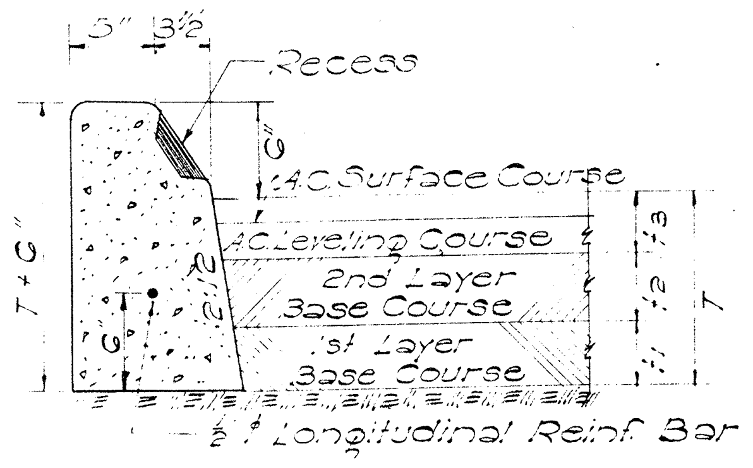
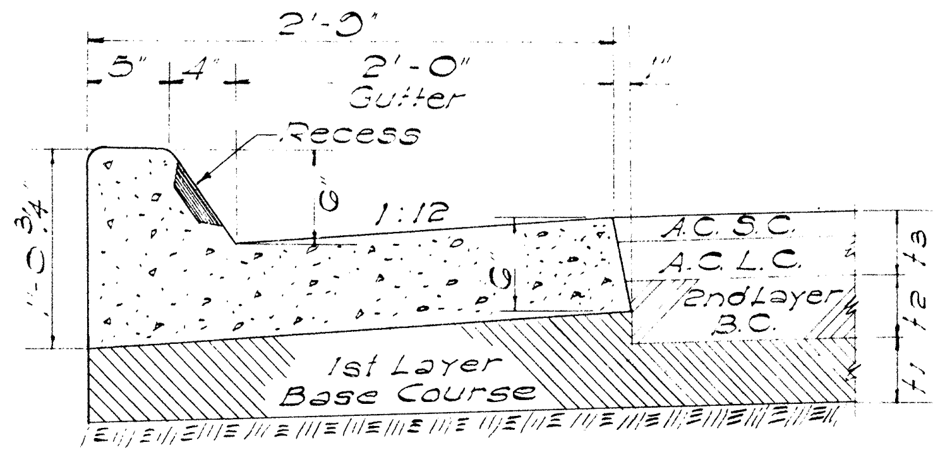
2/17/59
9/22/61

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	U-072-1(3)	1963	46	246
		U-098-1(4)	1963	16	88
		F-090-1(2)	1963	12	93

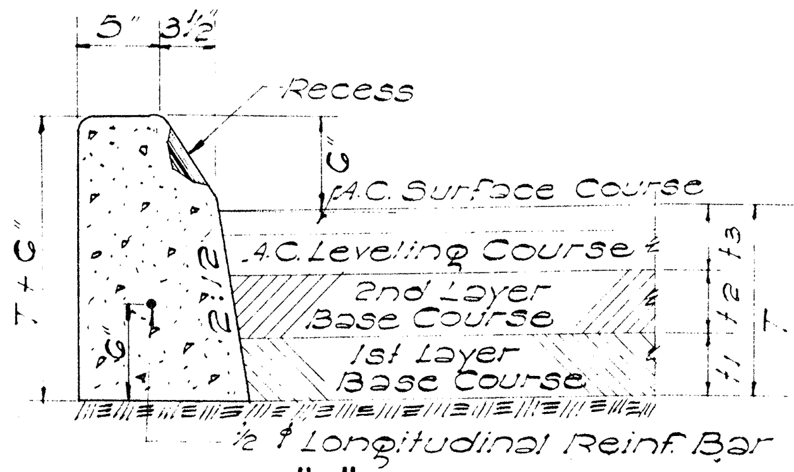
AUG. 1957



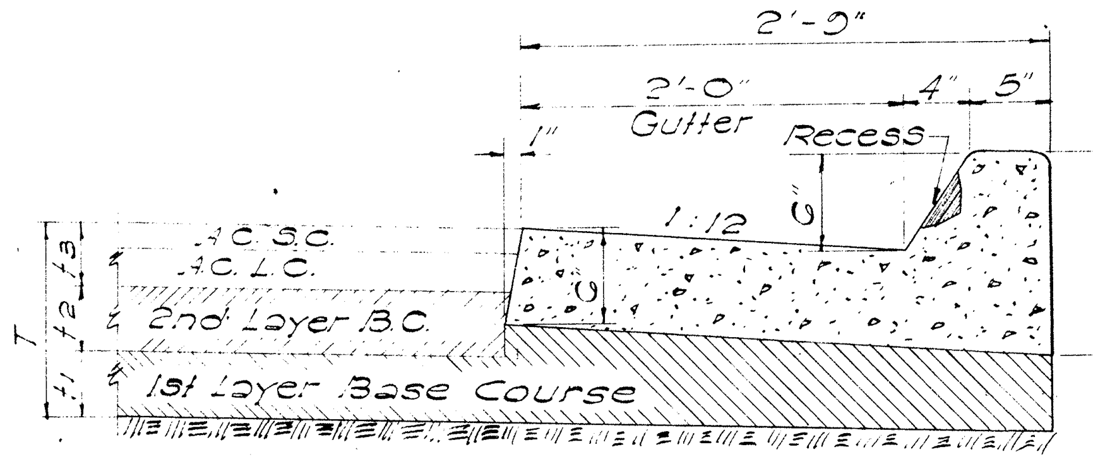
TYPE "A" & "B" CURB
SCALE: 1" = 1'-0"



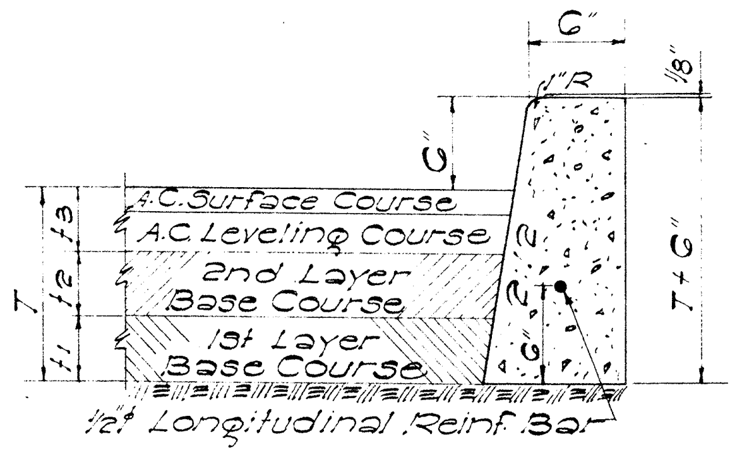
TYPE "AG" & "BG" CURB & GUTTER
SCALE: 1" = 1'-0"



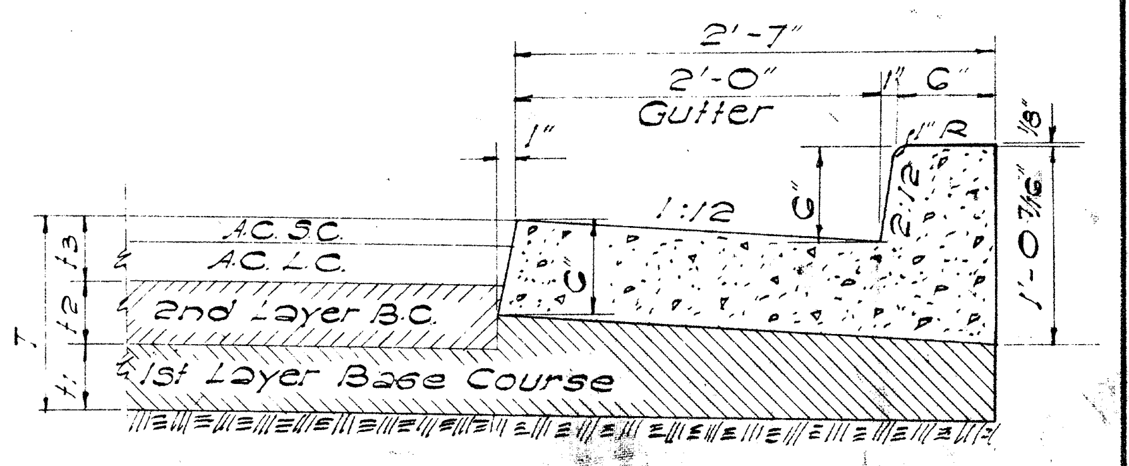
TYPE "C" CURB
SCALE: 1" = 1'-0"



TYPE "CG" CURB & GUTTER
SCALE: 1" = 1'-0"

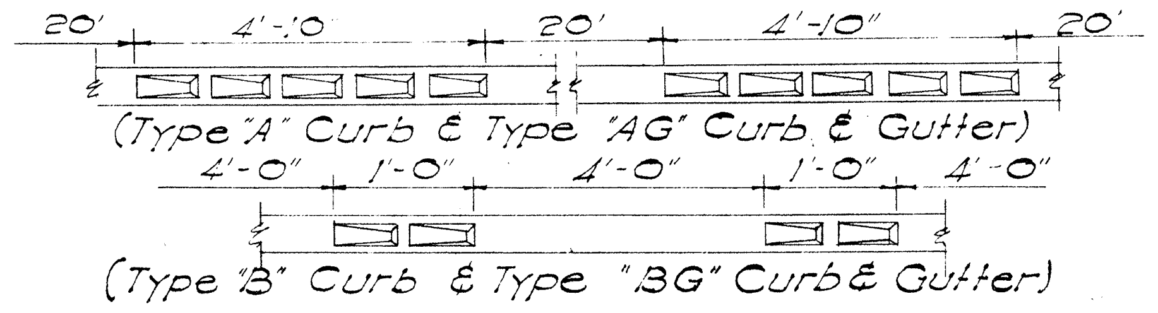


TYPE "D" CURB
SCALE: 1" = 1'-0"



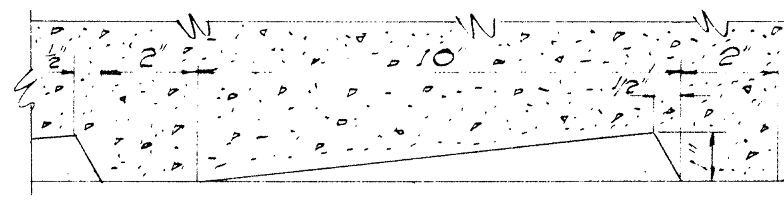
TYPE "DG" CURB & GUTTER
SCALE: 1"-1'-0"

General Note Covering All Types of Curbs:
Occasionally curb rests on first layer of base course. See typical sections.

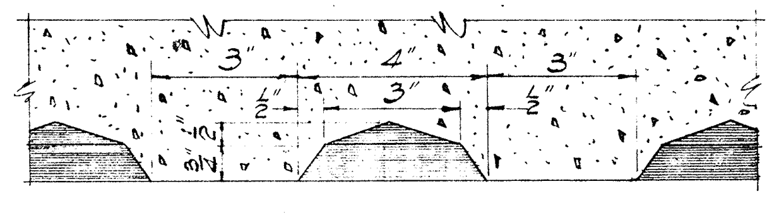


TYPE AND SPACING OF RECESSES

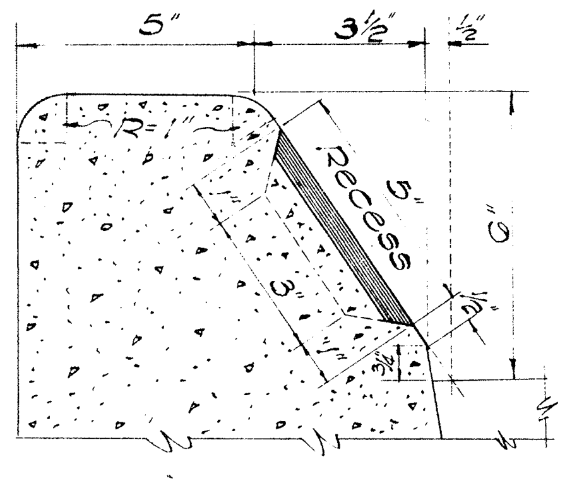
NOTES:
1.) Types "AG", "BG", "CG", "DG" and "EG" Concrete Curbs and Gutters are to be poured monolithically.
2.) Types "A", "B", and "C" Curbs and Types "AG", "BG" and "CG" Curbs and Gutters occur at Median Strips and Traffic Islands.
3.) Shaded area in Curbs are to be painted with an approved white lacquer. (One Coat)
4.) All Conc. Curbs and Gutters shown herein are to be of Class "A-1" Conc. and Cast-in-Place.



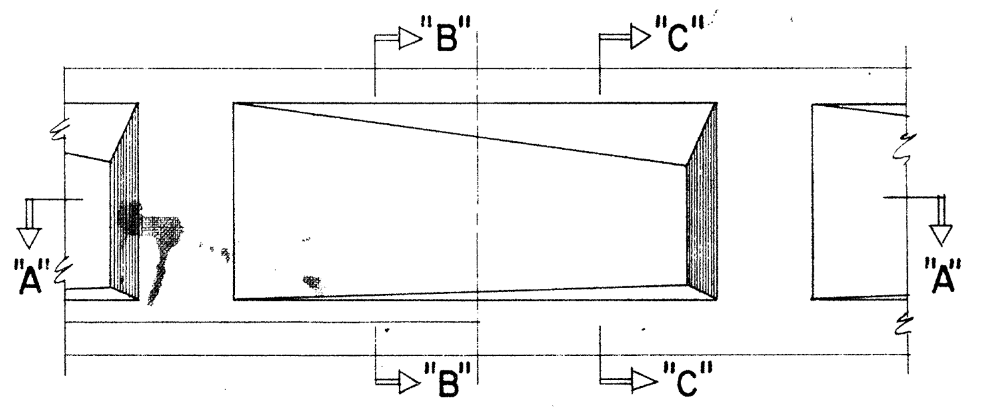
SECTION "A-A"



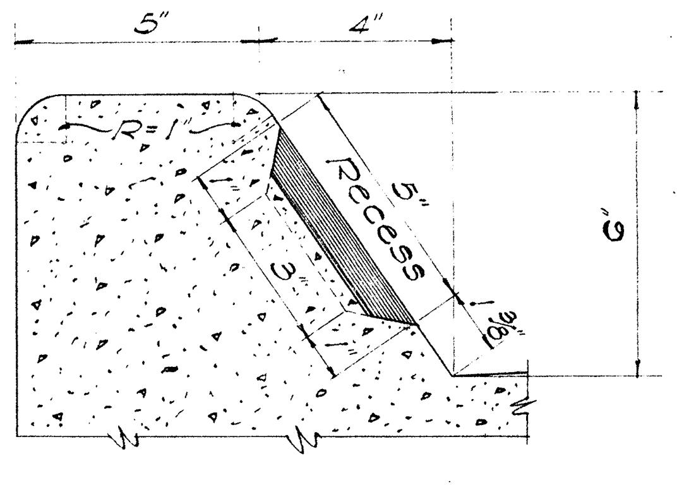
SECTION "X-X"



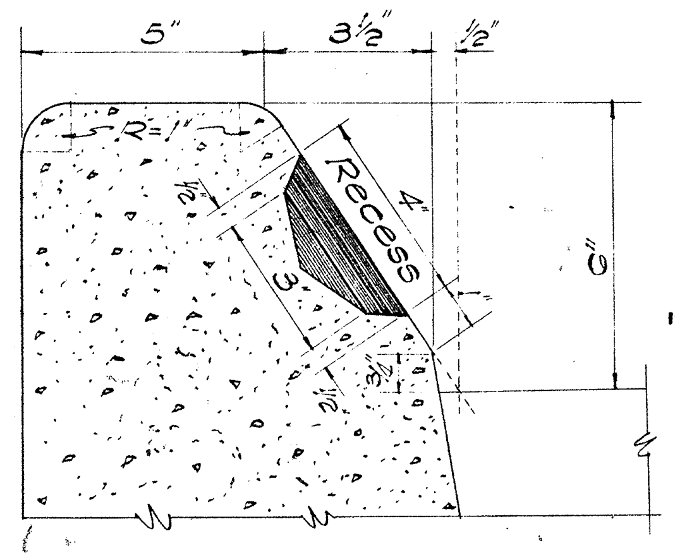
SECTION "B-B"
TYPE "A" & "B" CURB



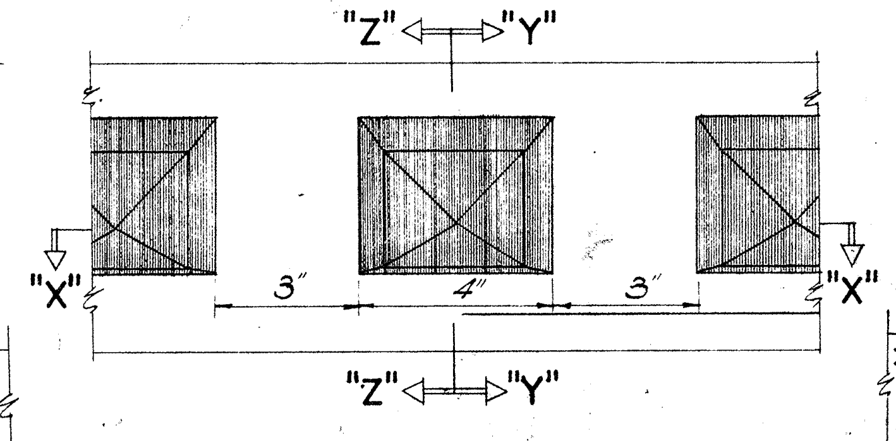
ELEVATION
SCALE: 3" = 1'-0"



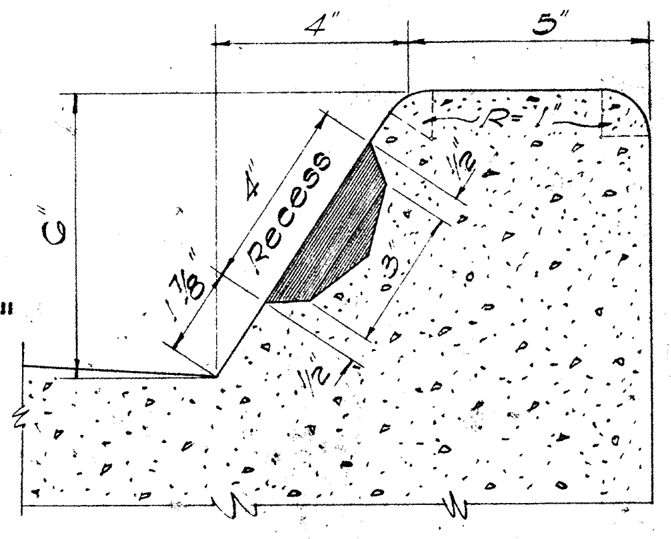
SECTION "C-C"
TYPE "AG" & "BG" CURB



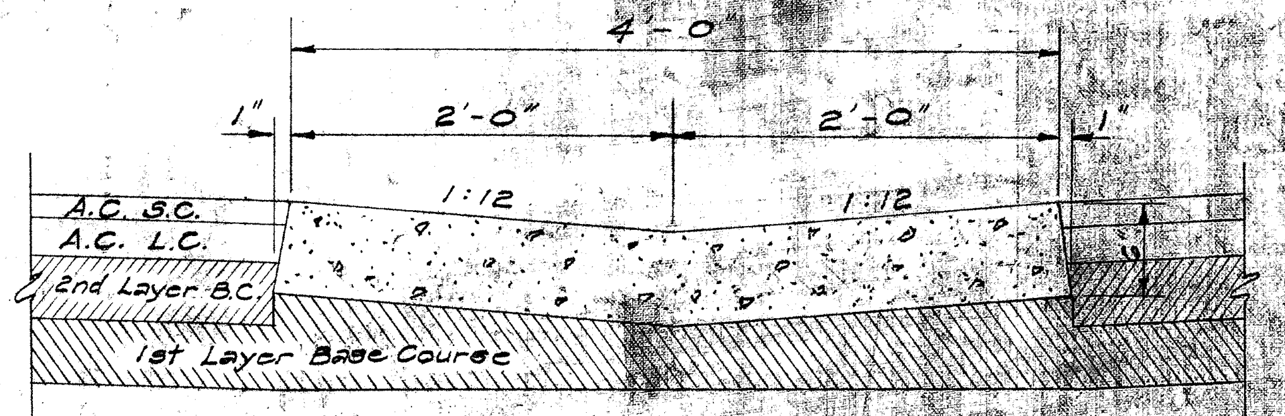
SECTION "Y-Y"
TYPE "C" CURB



ELEVATION
SCALE: 3" = 1'-0"

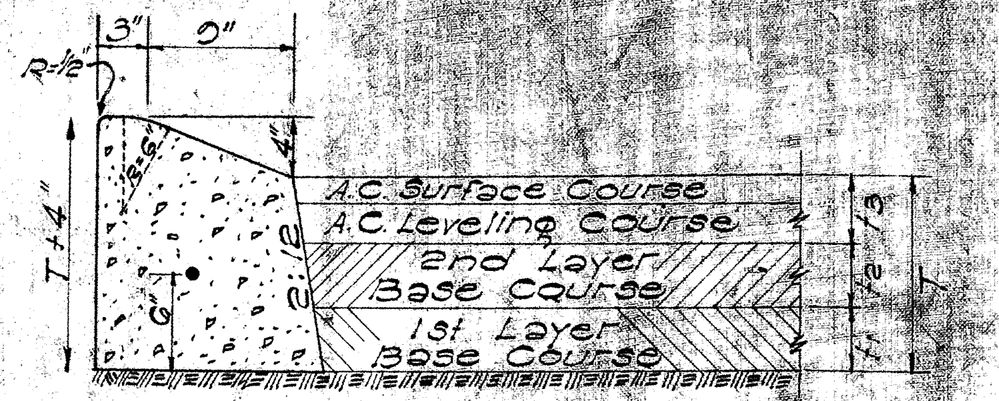


SECTION "Z-Z"
TYPE "CG" CURB

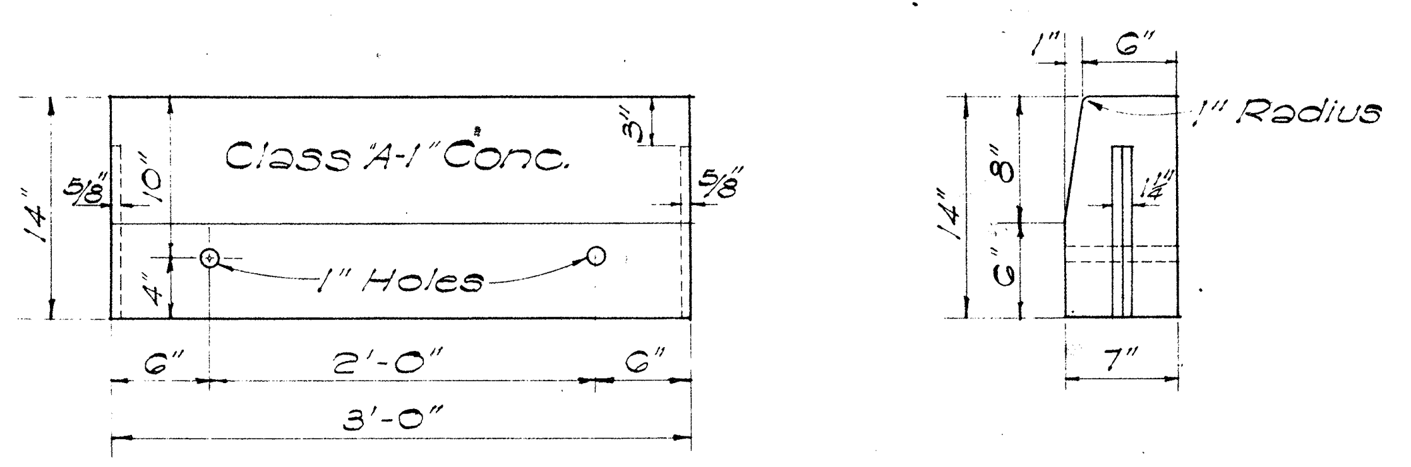


TYPE "G" GUTTER
SCALE: 1" = 1'-0"

DETAILS OF CAST-IN-PLACE CONC. CURBS AND GUTTERS

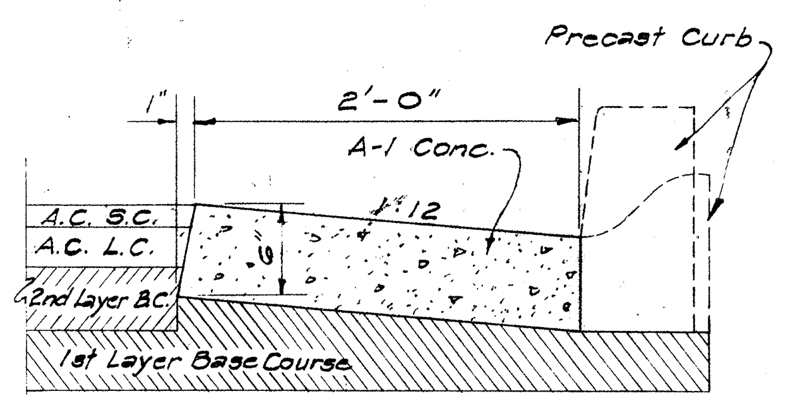


TYPE "E" CAST-IN-PLACE CONCRETE CURB
SCALE: 1" = 1'-0"

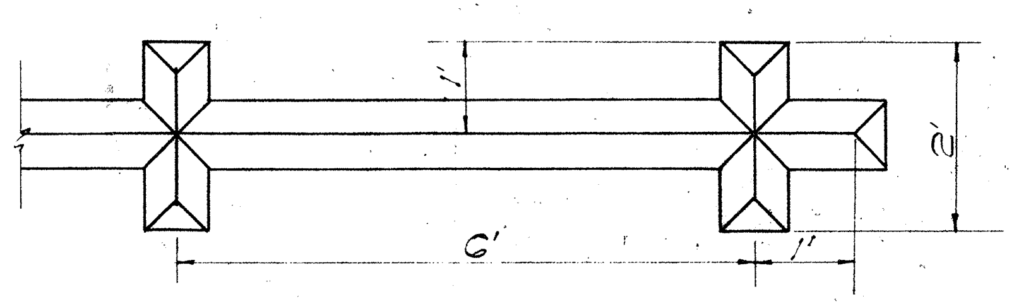


FRONT ELEV.
END ELEV.

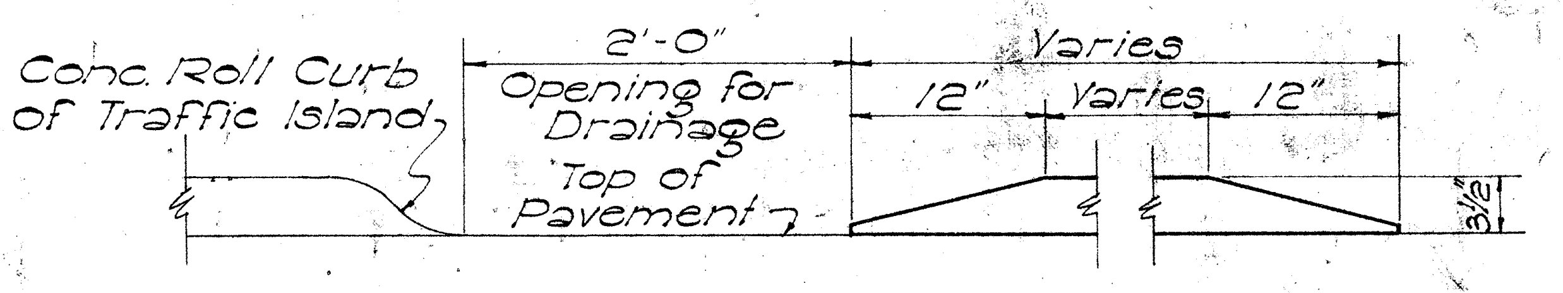
PRECAST CONC. CURB
SCALE: 1" = 1'-0"



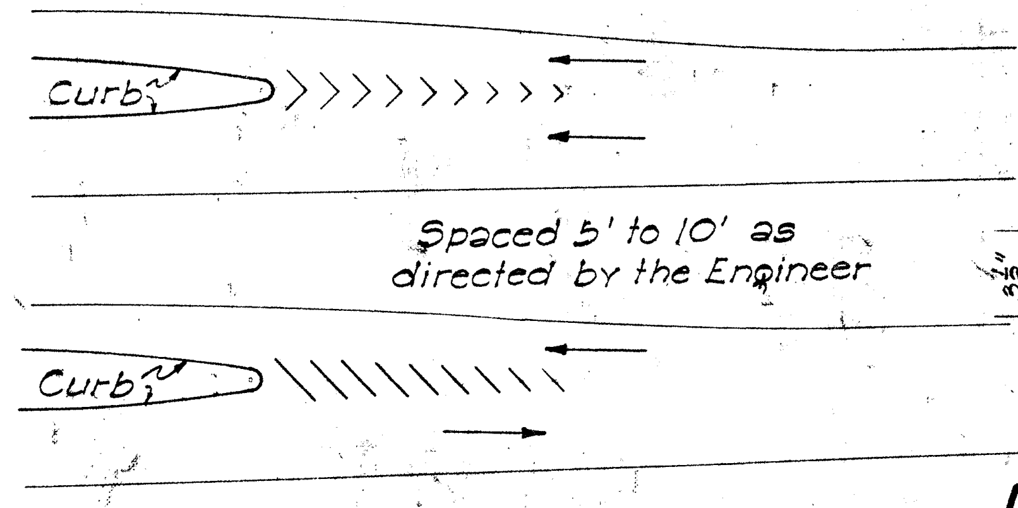
TYPE "F" GUTTER FOR PRECAST CURB



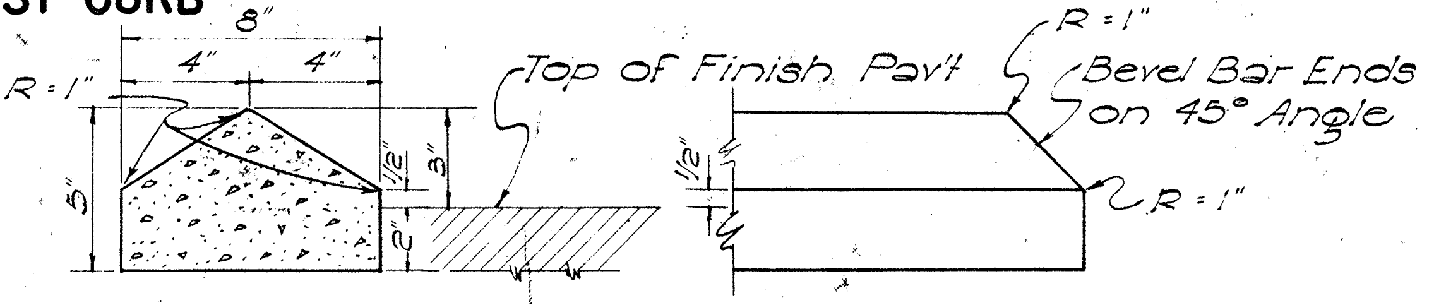
PLAN
SCALE: 1/2" = 1'-0"



ELEVATION

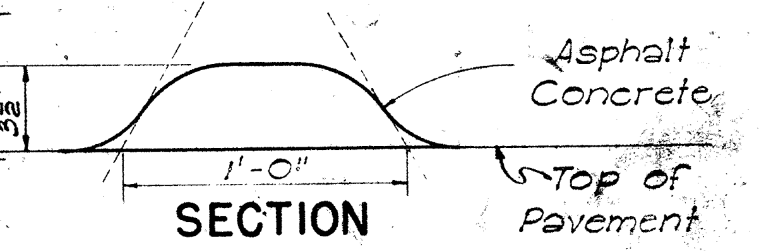


AT CURBED ISLAND



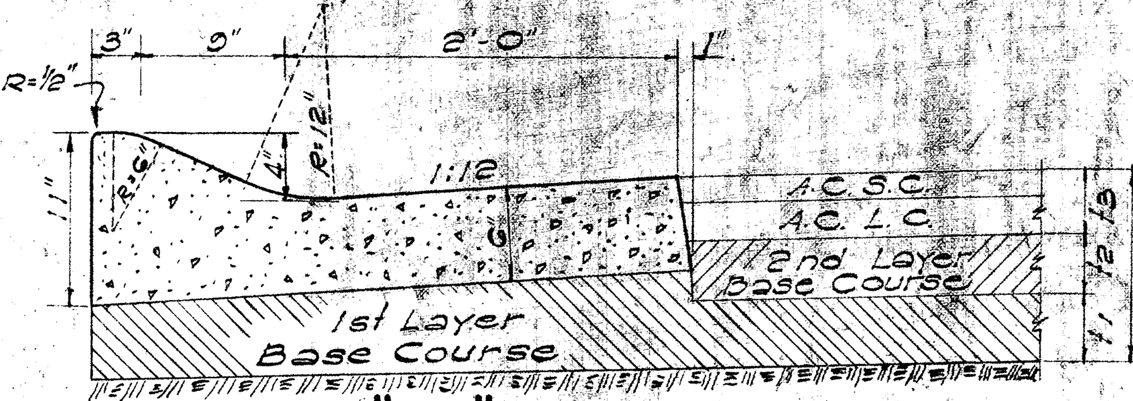
SECTION
ELEVATION

RAISED TRAFFIC BARS
SCALE: 2" = 1'-0"

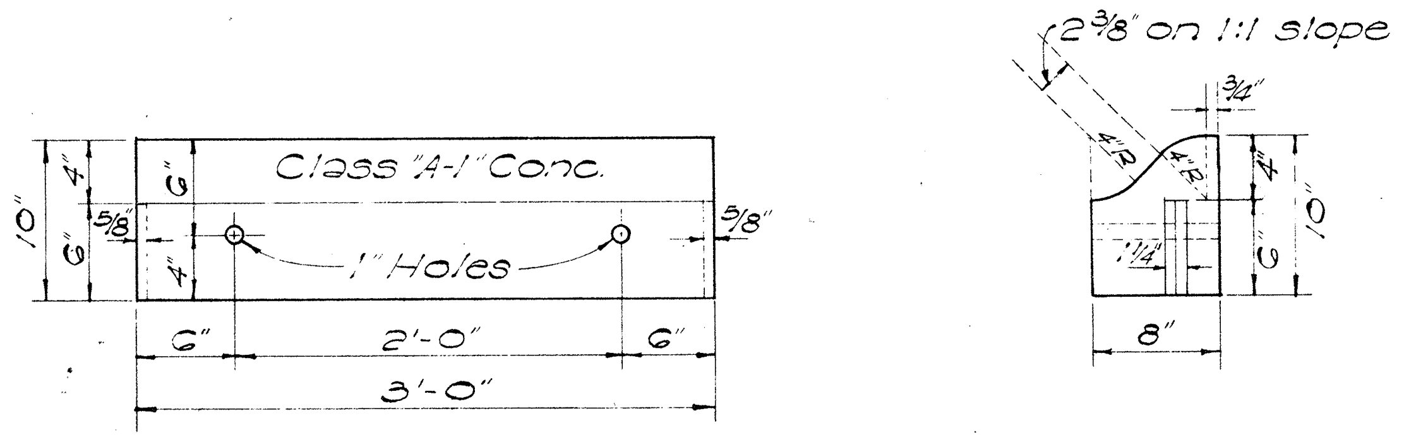


SECTION

A.C. TRAFFIC ROLL
NOT TO SCALE

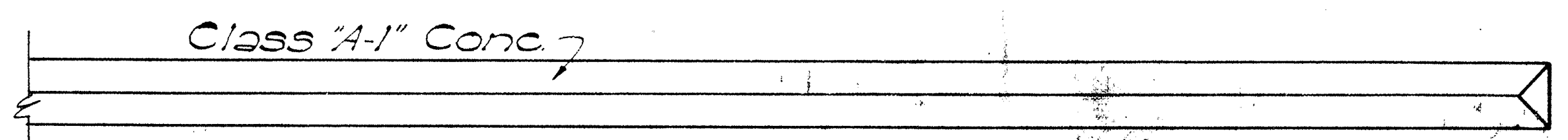


TYPE "EG" CAST-IN-PLACE CONC. CURB & GUTTER
SCALE: 1" = 1'-0"



FRONT ELEV.
END ELEV.

PRECAST CONC. ROLL CURB
SCALE: 1" = 1'-0"

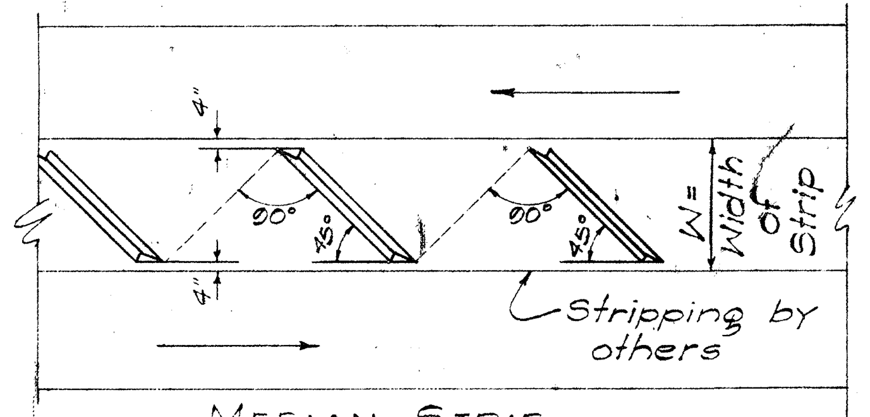


PLAN

NOTE:
Section and Elevation for Jiggle Bars are same as the Traffic Bars.

RAISED JIGGLE BARS
SCALE: 1/2" = 1'-0"

NOTE:
Paint all exposed surfaces of bars with beaded white traffic lacquer.



MEDIAN STRIP

LAYOUT OF JIGGLE BARS
NOT TO SCALE

APPROVED: DATE Aug. 26, 1959
STATE HIGHWAY ENGINEER

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII

STANDARD DETAILS
CONCRETE CURBS,
CONCRETE CURBS & GUTTERS
SCALES AS NOTED

SHEET № 1 OF 8 SHEETS

"E" and "EG" Curbs have been revised 7-26-57
"G" and "F" Gutters have been added 9-22-61

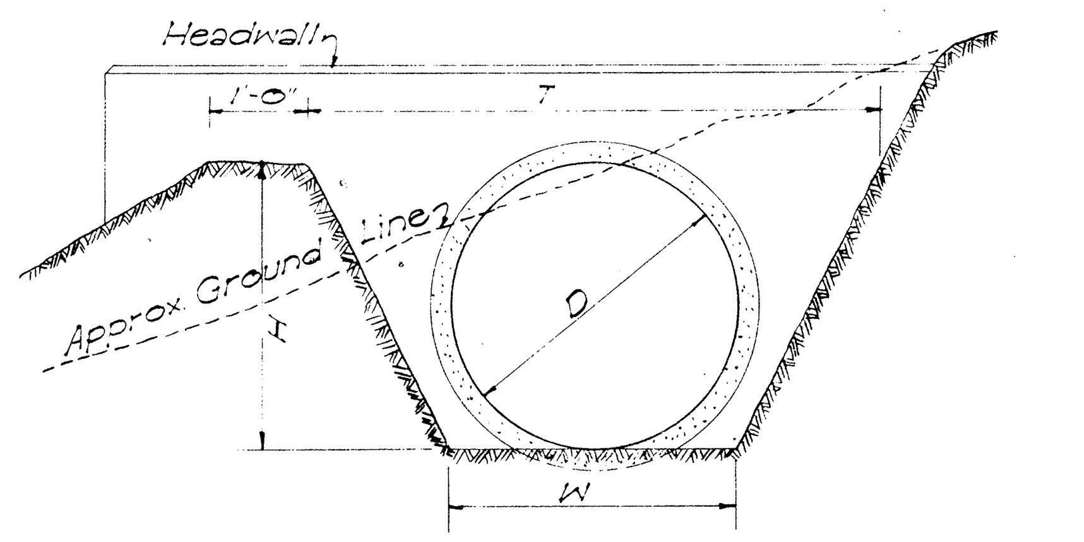
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DESIGNED BY	"
	DRAWN BY	"
NOTE BOOK No.	TRACED BY L. Callistro	"
	QUANTITIES BY	"
	QUANTITIES CHECKED BY	"
	CHECKED BY	"

2/17/59

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW.	U-072-1(3)	1963	47	246
		U-098-1(4)	1963	17	88
		F-090-1(2)	1963	13	93

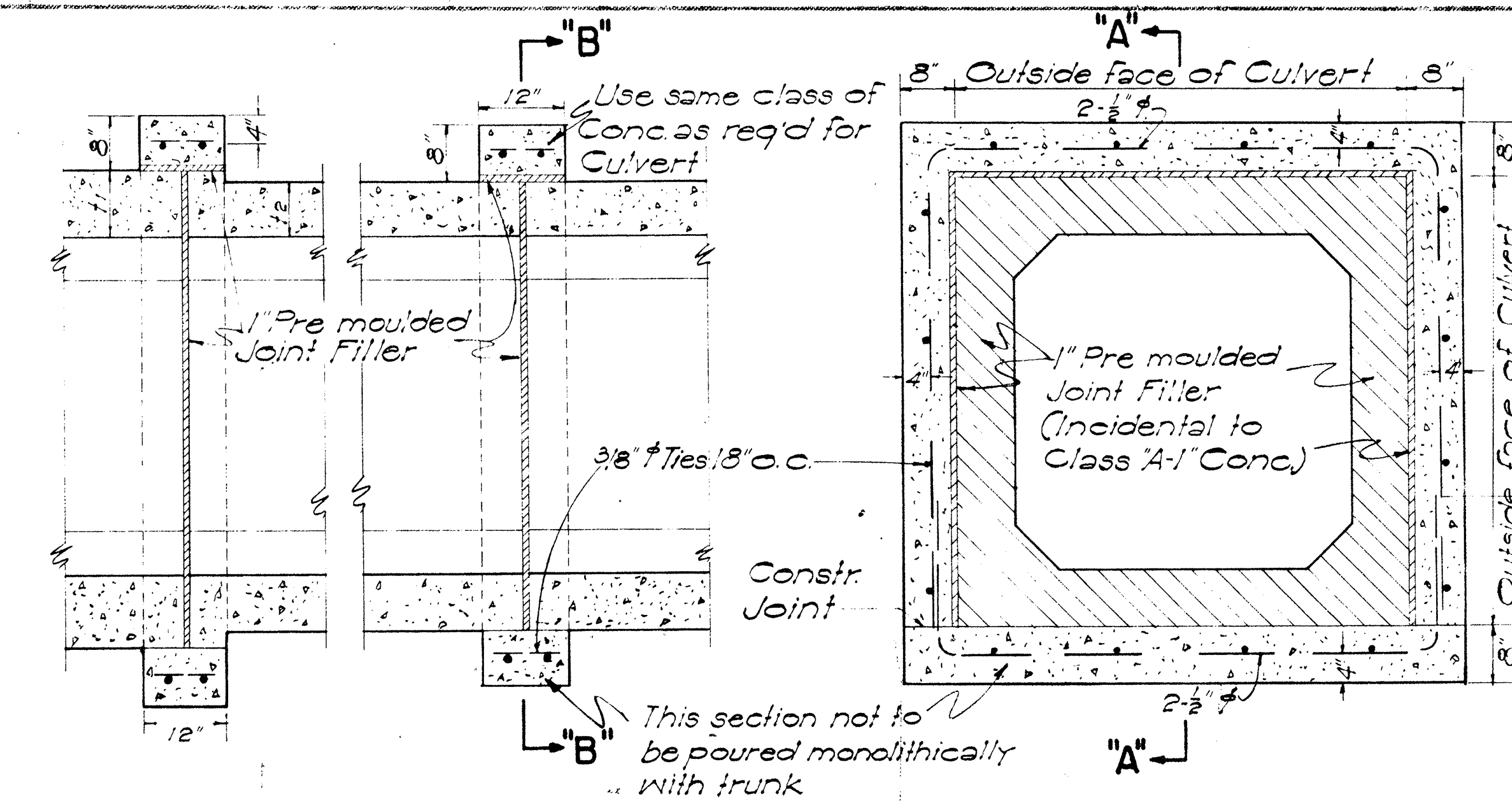
AUG. 1957

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"

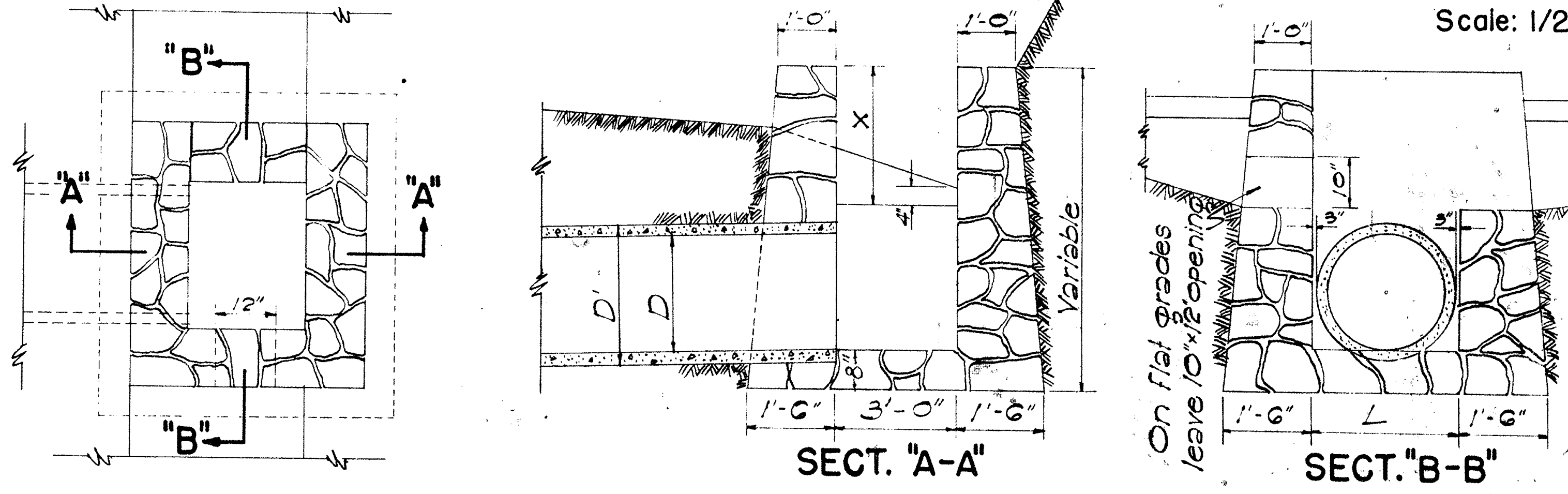
CONC. COLLAR FOR CONC. BOX CULVERT

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

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"

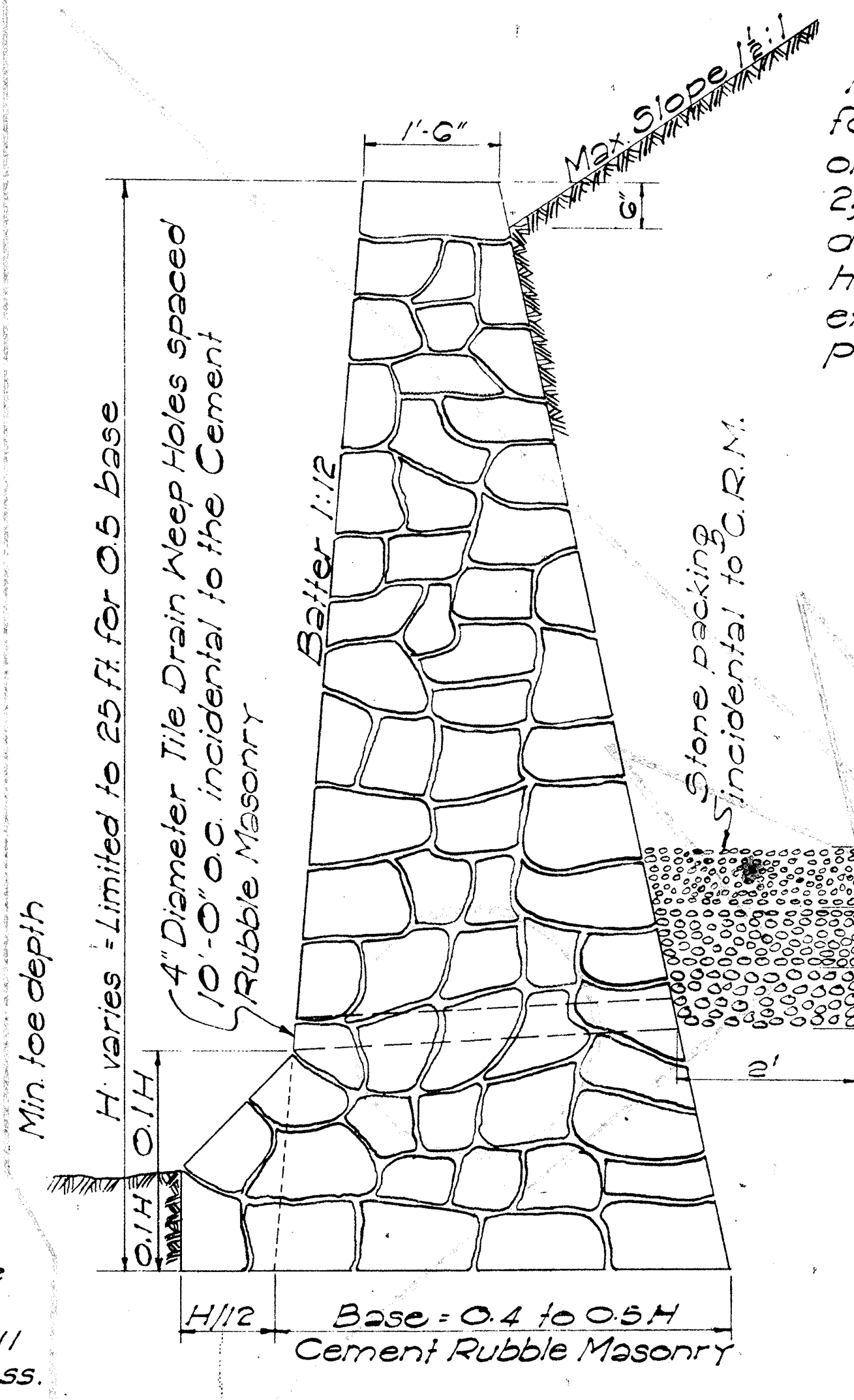
SECT. "B-B"

DETAIL OF MASONRY DROP INTAKE

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

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.

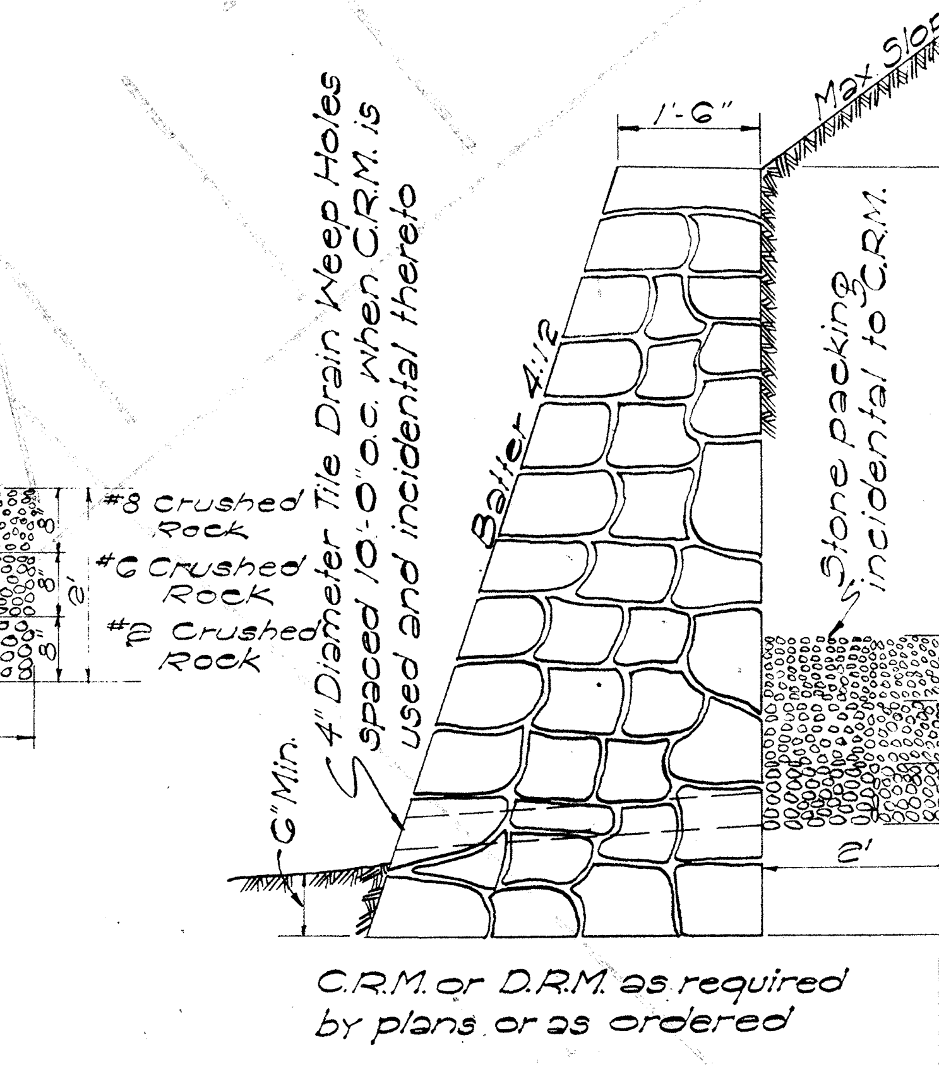


SECTION OF HIGH CEMENT RUBBLE MASONRY RETAINING WALL OR SEAWALL

Note: To Resident Engineer

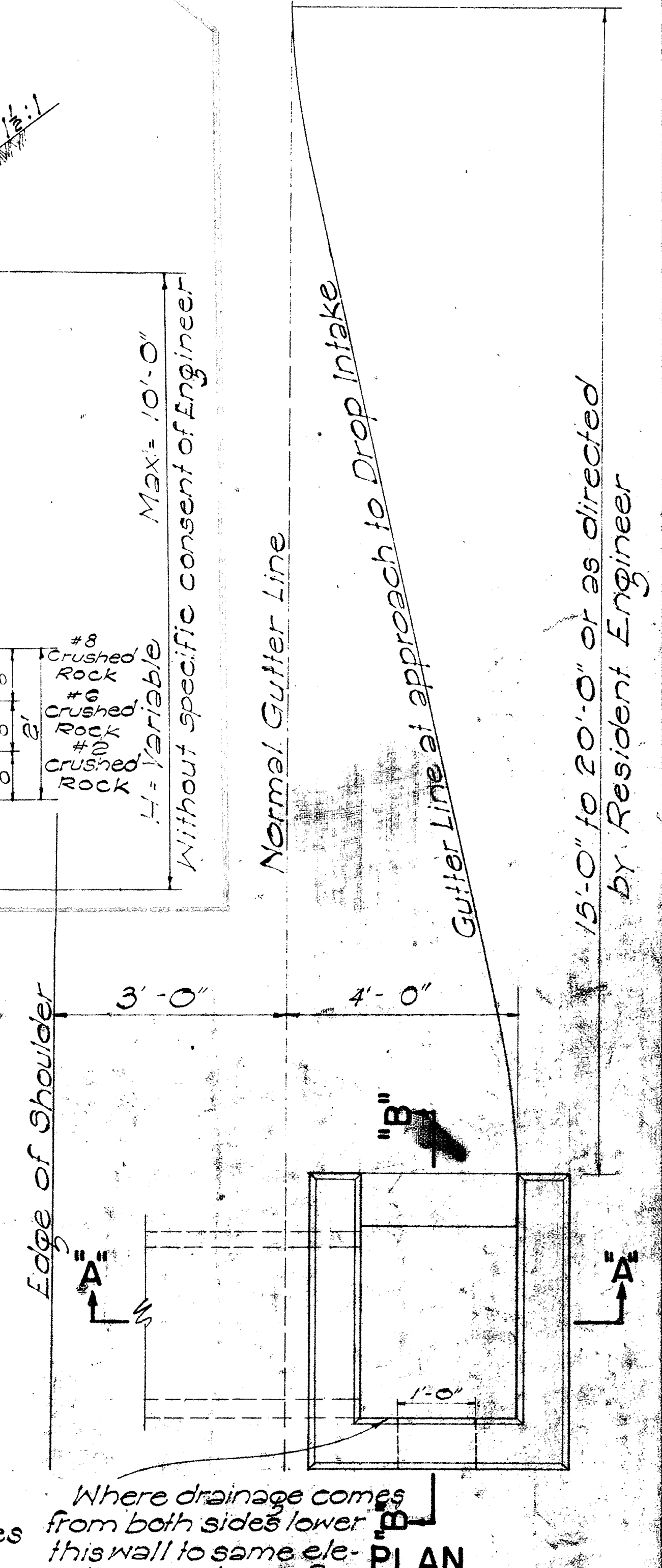
1.) Consider economy of reinf. conc. for high retaining walls which did not originate on plan layout.

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.



C.R.M. or D.R.M. as required by plans or as ordered

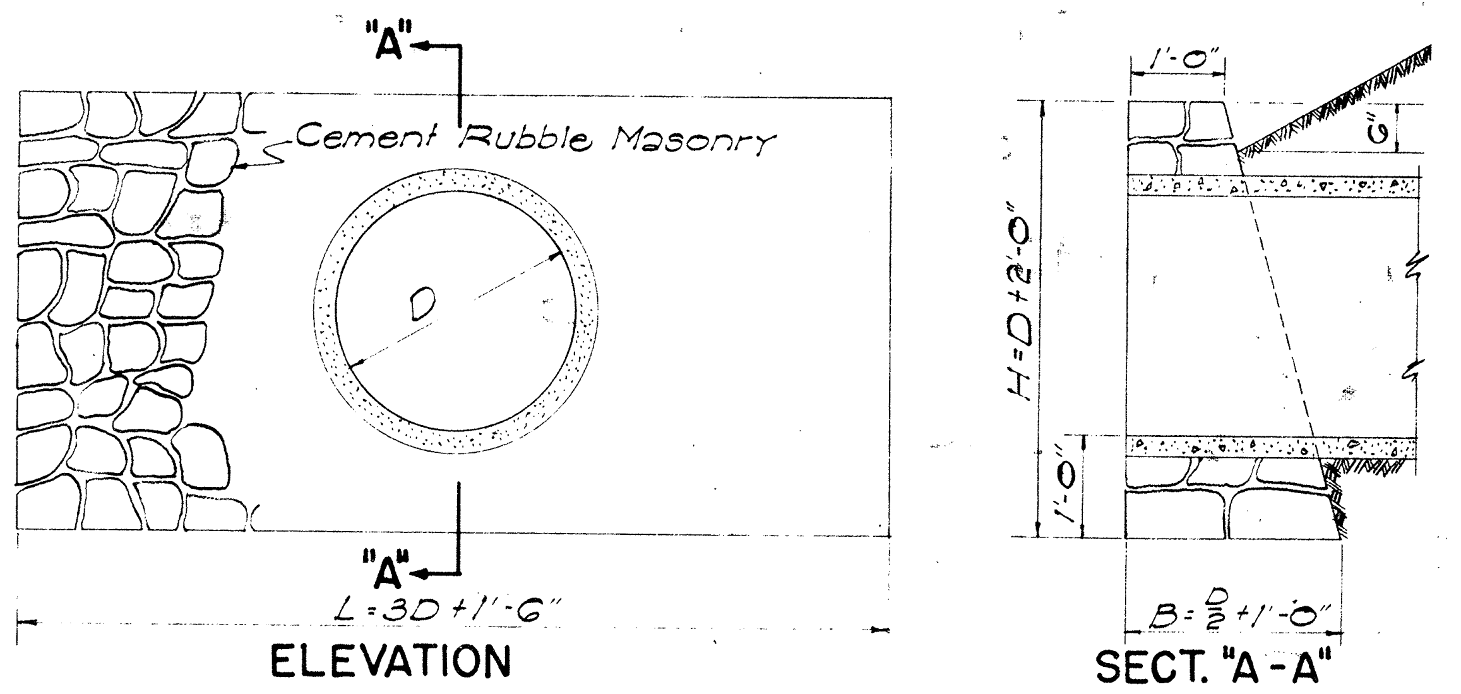
SECTION OF LOW MASONRY RETAINING WALL OR SEAWALL



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

PLAN

DATA-MASONRY HEADWALL				Cast-in-Place Conc. Culv't	Conc. Pipe Culvert	Corrugated Pipe Culv't
D	H	B	L	Cu. Yds.	Cu. Yds.	Cu. Yds.
18"	3'-6"	1'-9"	6'-0"	0.85	0.95	0.93
24"	4'-0"	2'-0"	7'-6"	1.28	1.45	1.41
30"	4'-6"	2'-3"	9'-0"	1.83	2.06	2.00
36"	5'-0"	2'-6"	10'-6"	2.49	2.84	2.72

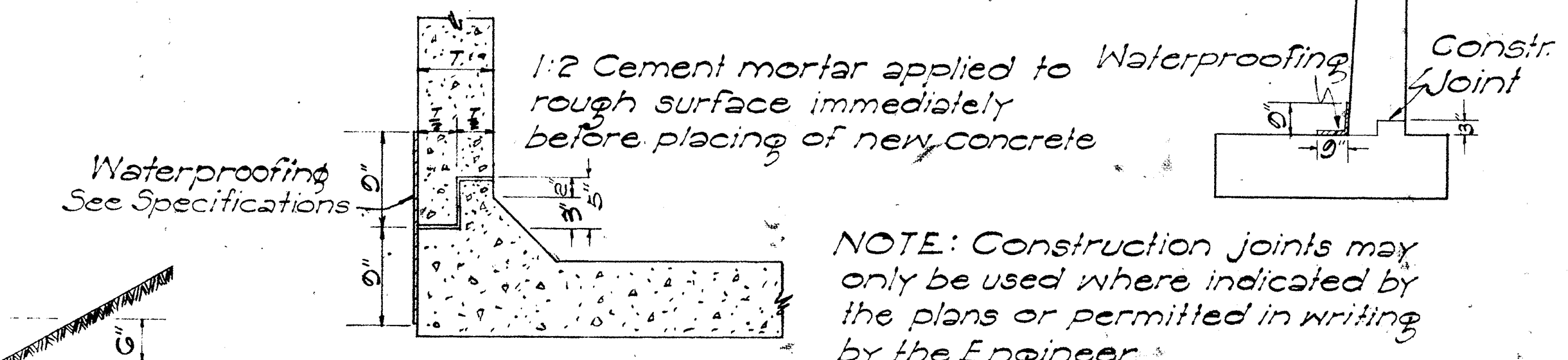


ELEVATION

SECT. "A-A"

DETAIL OF MASONRY HEADWALL

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



1:2 Cement mortar applied to rough surface immediately before placing of new concrete

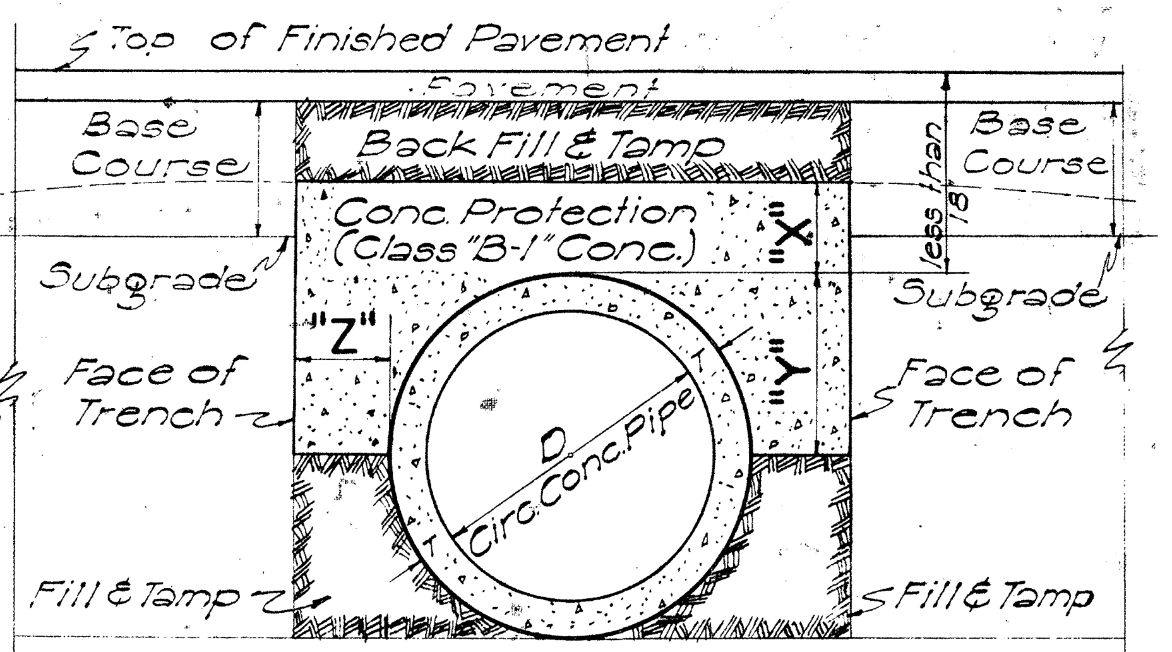
Waterproofing See Specifications

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

CONSTR. JOINT DETAILS

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"

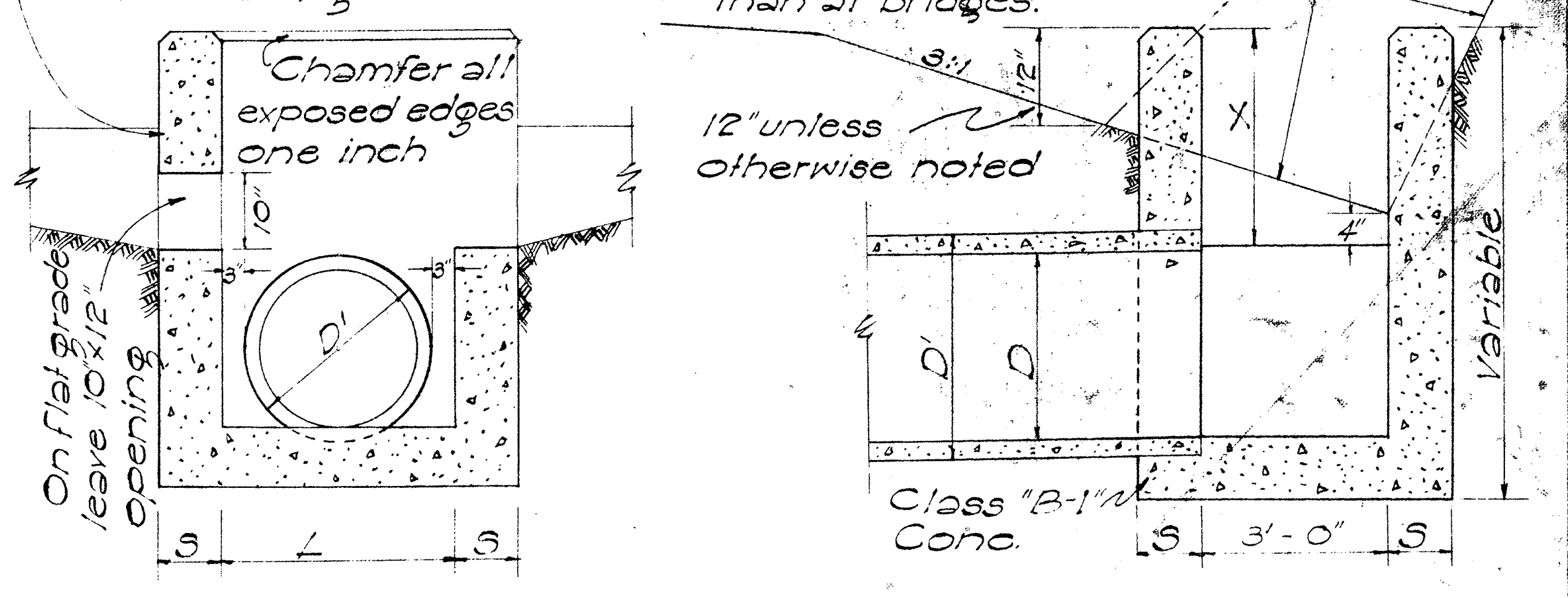
DATA-CONC. DROP INTAKE					Where Variable Equals
D'	D	L=D'+6"	S	Cu. Yds.	
23"	18"	2'-5"	8"	1.41	4'-6"
30"	24"	3'-0"	8"	1.72	5'-0"
37"	30"	3'-7"	9"	2.32	5'-6"
44"	36"	4'-2"	9"	2.73	6'-0"
51"	42"	4'-9"	10"	3.54	6'-6"
58"	48"	5'-4"	10"	4.01	7'-0"

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.

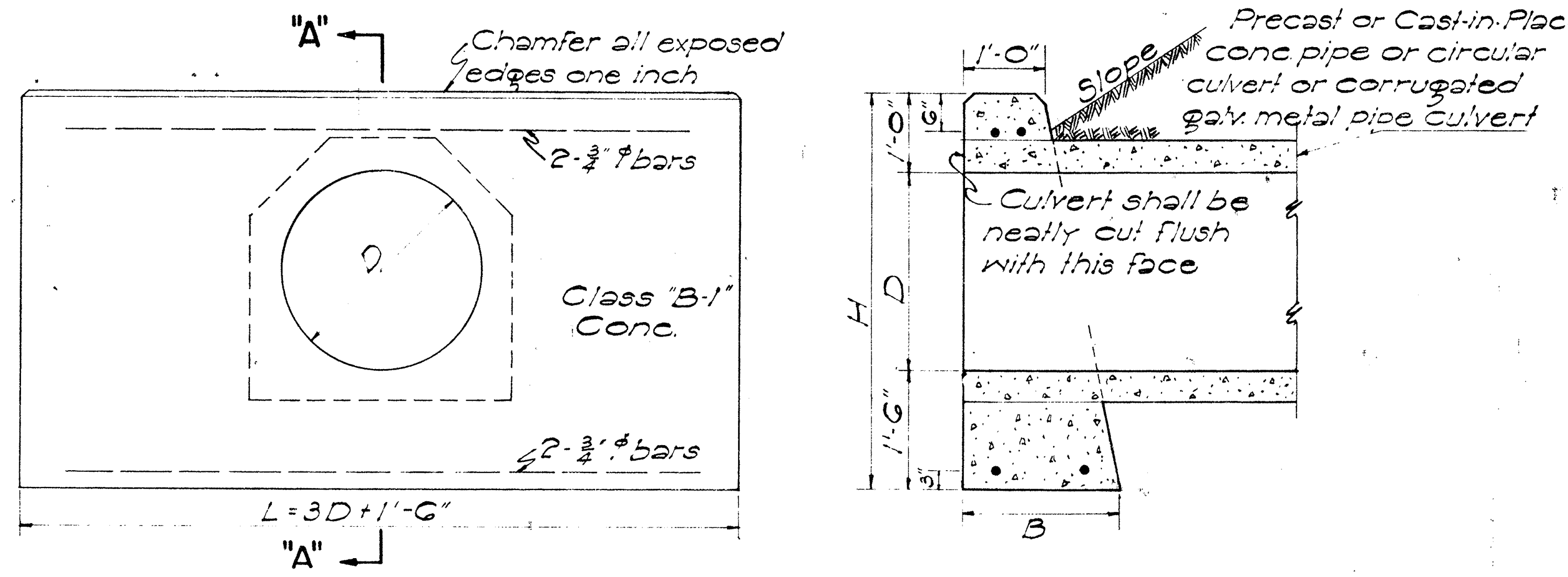


SECTION "B-B"

SECTION "A-A"

DETAIL OF CONCRETE DROP INTAKE

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



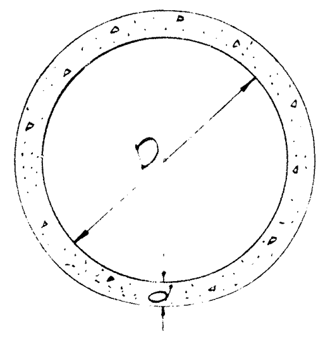
ELEVATION

SECTION "A-A"

DATA FOR CONC. HEADWALL				Cast-in-Place Conc. Culvert	Conc. Pipe Culvert	Steel For One Headwall			
D	B	L	H	Cu. Yd.	Cu. Yd.	No. of Bars	Size	Length	Lbs.
18"	1'-6"	6'-0"	4'-0"	0.92	1.00	4	¾" ϕ	5'-6"	33
24"	1'-6"	7'-6"	4'-6"	1.25	1.38	4	¾" ϕ	7'-0"	42
30"	2'-0"	9'-0"	5'-0"	1.95	2.17	4	¾" ϕ	8'-6"	51
36"	2'-0"	10'-6"	5'-6"	2.45	2.74	4	¾" ϕ	10'-0"	60
42"	2'-6"	12'-0"	6'-0		3.87	4	¾" ϕ	11'-6"	69
48"	2'-6"	13'-6"	6'-6"		4.66	4	¾" ϕ	13'-0"	78

DETAIL OF CONCRETE HEADWALL

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

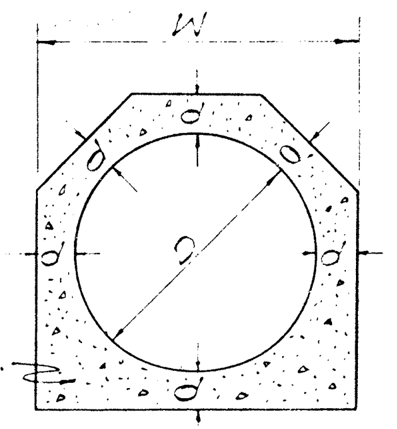


SECTION

CONC. PIPE CULVERT

NOTE:

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



Class "A-1" Conc.

SECTION

DATA-CAST-IN-PLACE CONC. CULV'T			
D	d	W	Cu. Yd. per ft.
18"	4"	2'-2"	0.11
24"	4½"	2'-9"	0.14
30"	5"	3'-4"	0.19
36"	5½"	3'-11"	0.26

CAST-IN-PLACE CONC. CULVERT

APPROVED: DATE Aug. 26, 1959

STATE HIGHWAY ENGINEER

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII

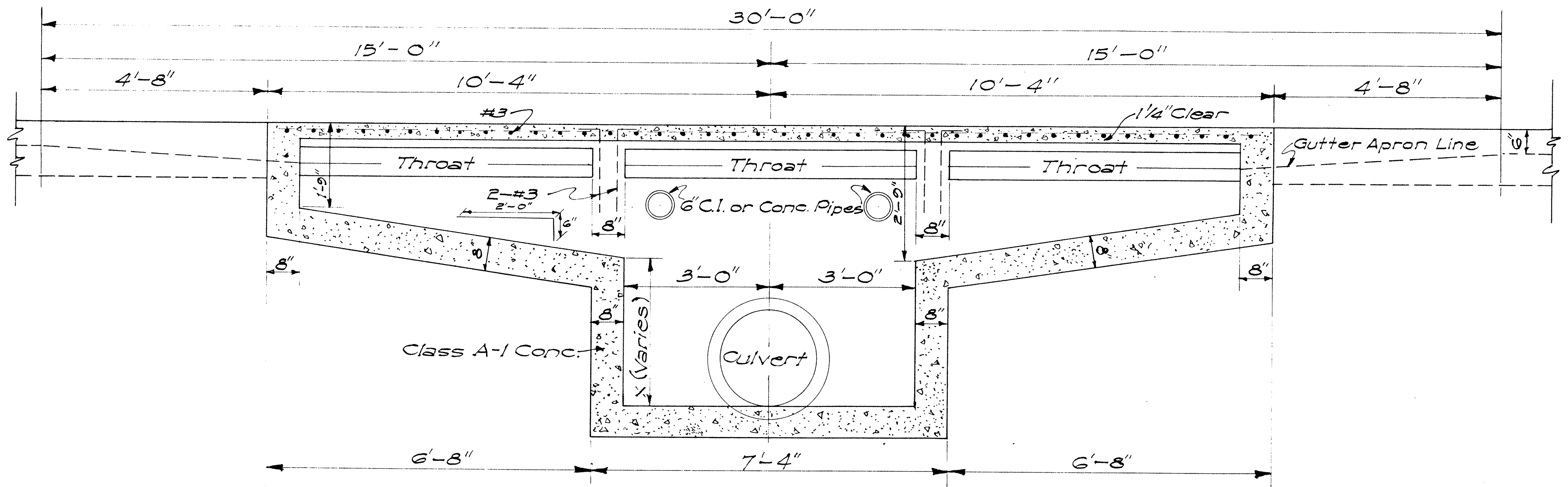
STANDARD DETAILS

DROP INTAKES, RETAINING WALLS, HEADWALLS, CONSTRUCTION JOINTS

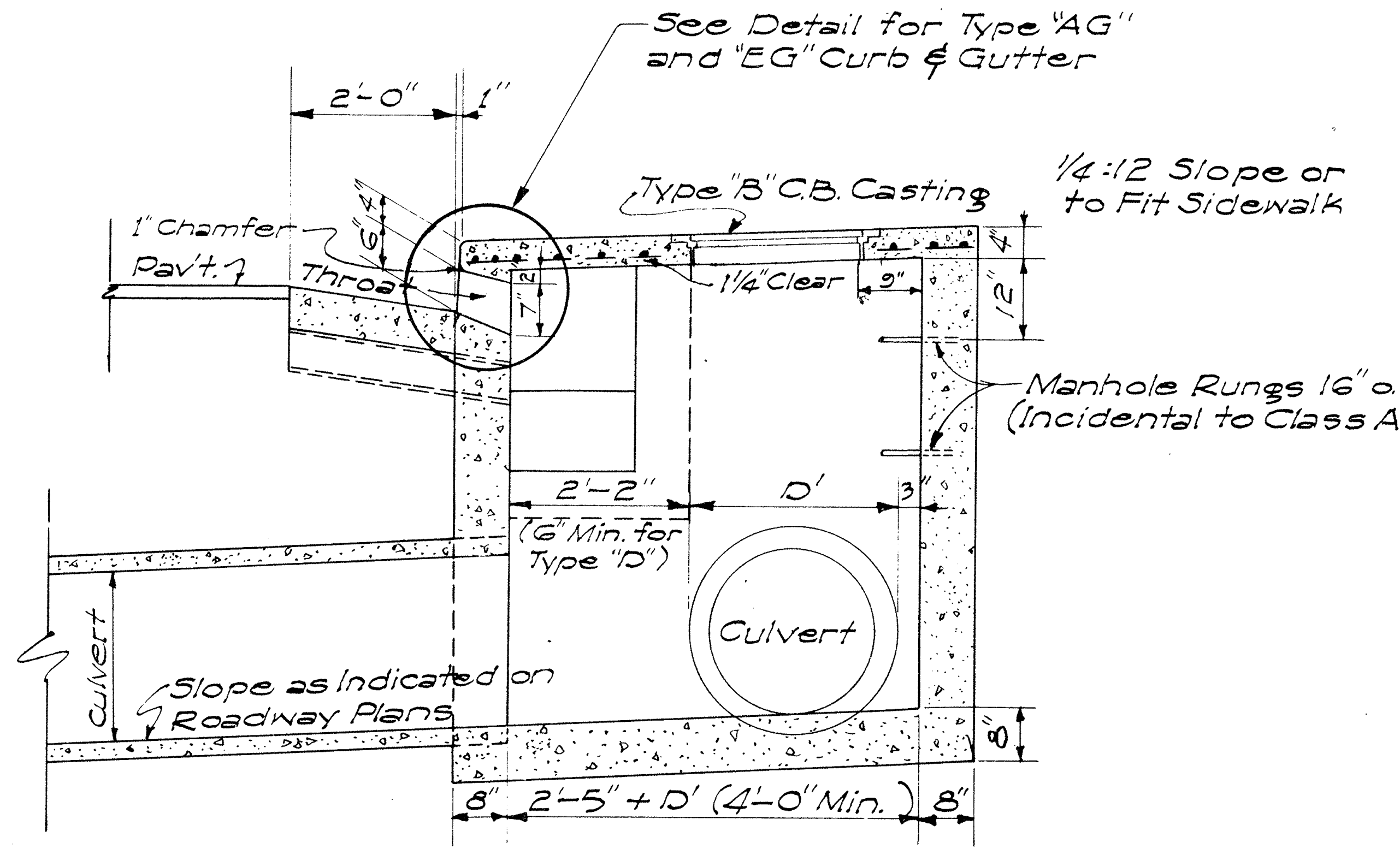
SCALES AS NOTED

2/17/59

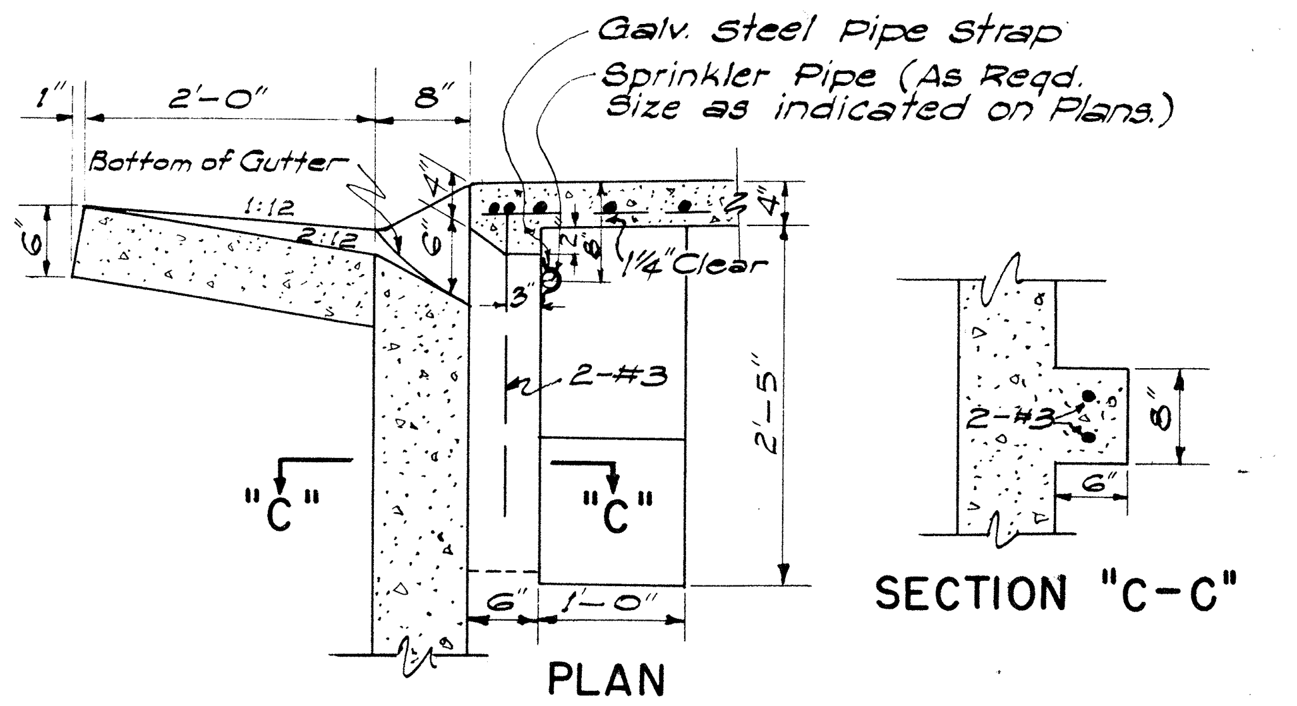
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	U-072-1(3)	1963	48	246
		U-098-1(4)	1963	18	88
		F-090-1(2)	1963	14	93



SECTION "A-A"



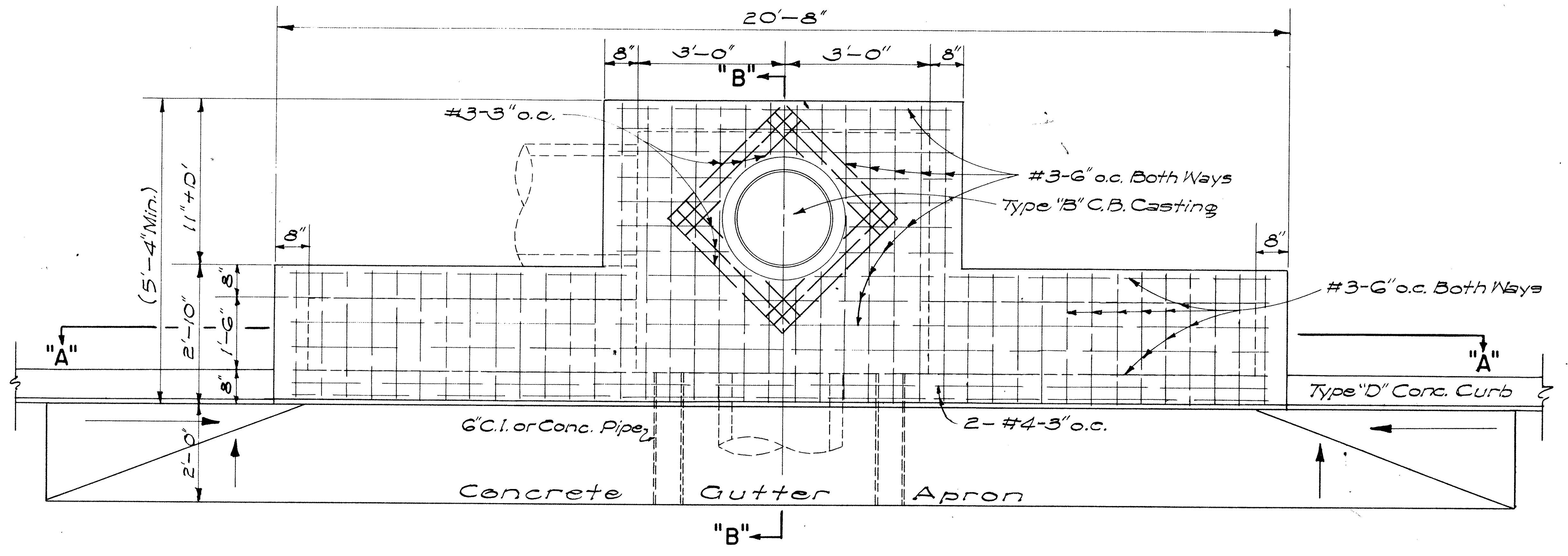
SECTION "B-B"



PLAN

THROAT DETAIL FOR TYPE "EG" CURB & GUTTER

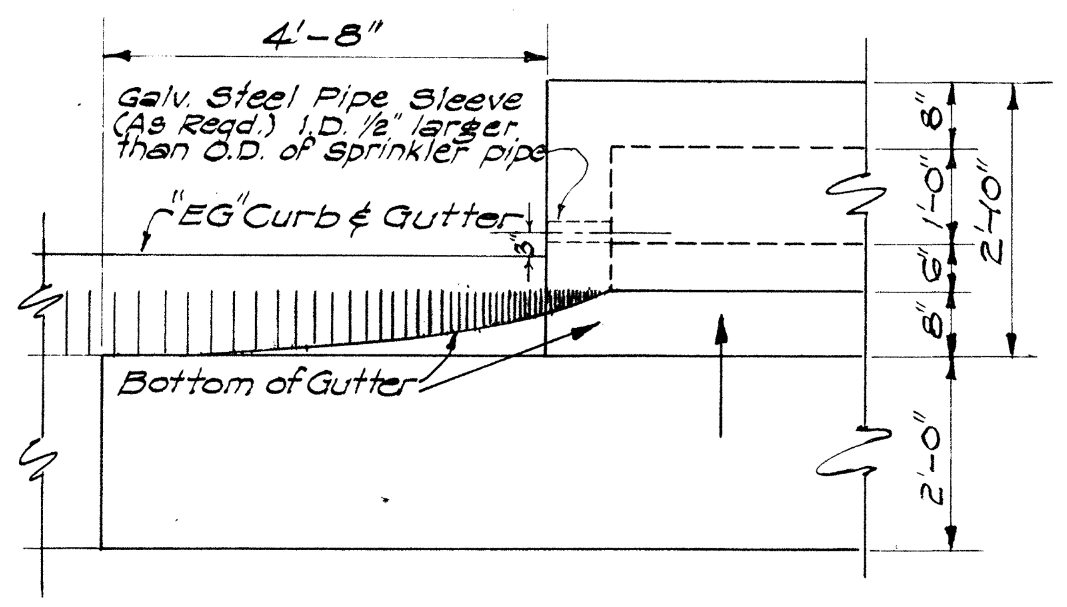
SCALE: 3/4" = 1'-0"



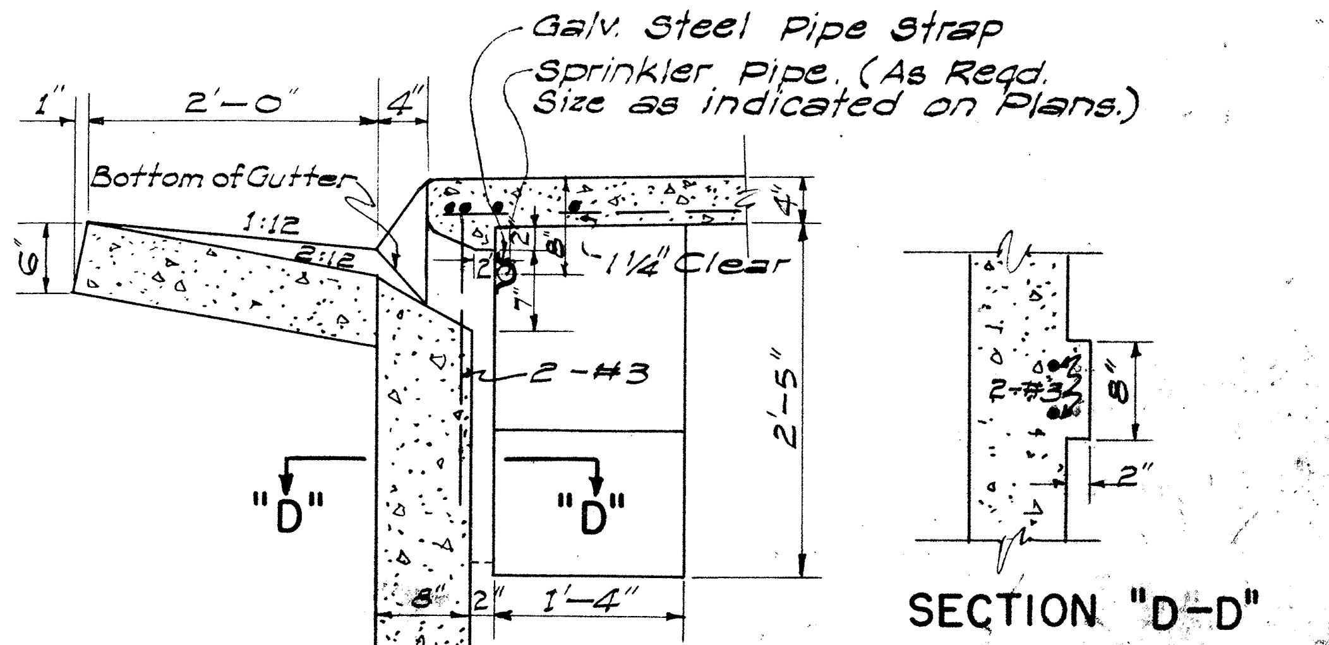
PLAN

DETAIL OF TYPE "A" CATCH BASIN

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



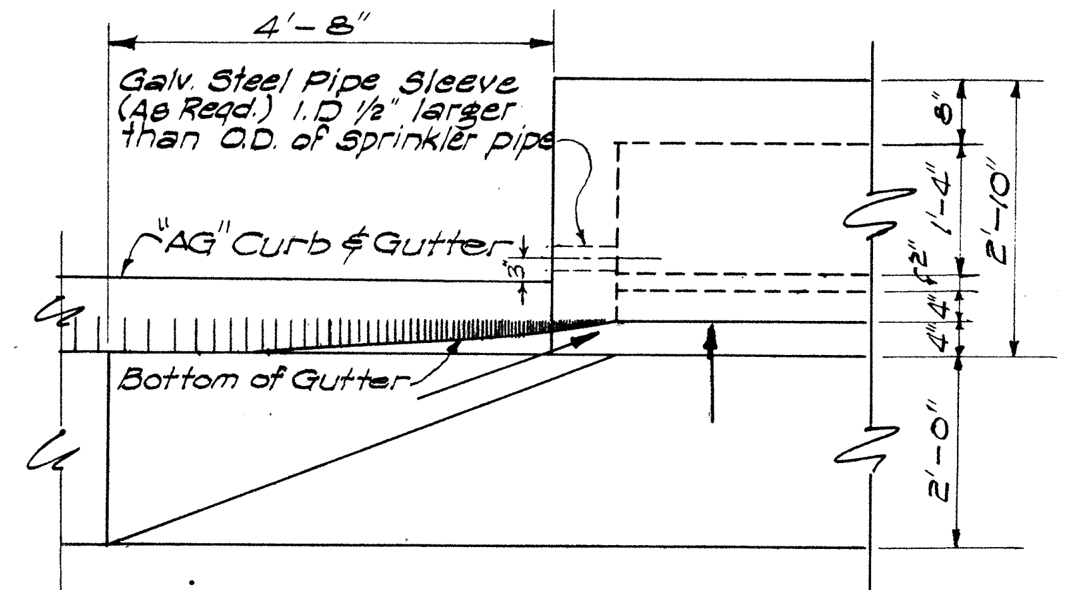
DETAIL OF CATCH BASIN WITH TYPE "EG" CURB & GUTTER



PLAN

THROAT DETAIL FOR TYPE "AG" CURB & GUTTER

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



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

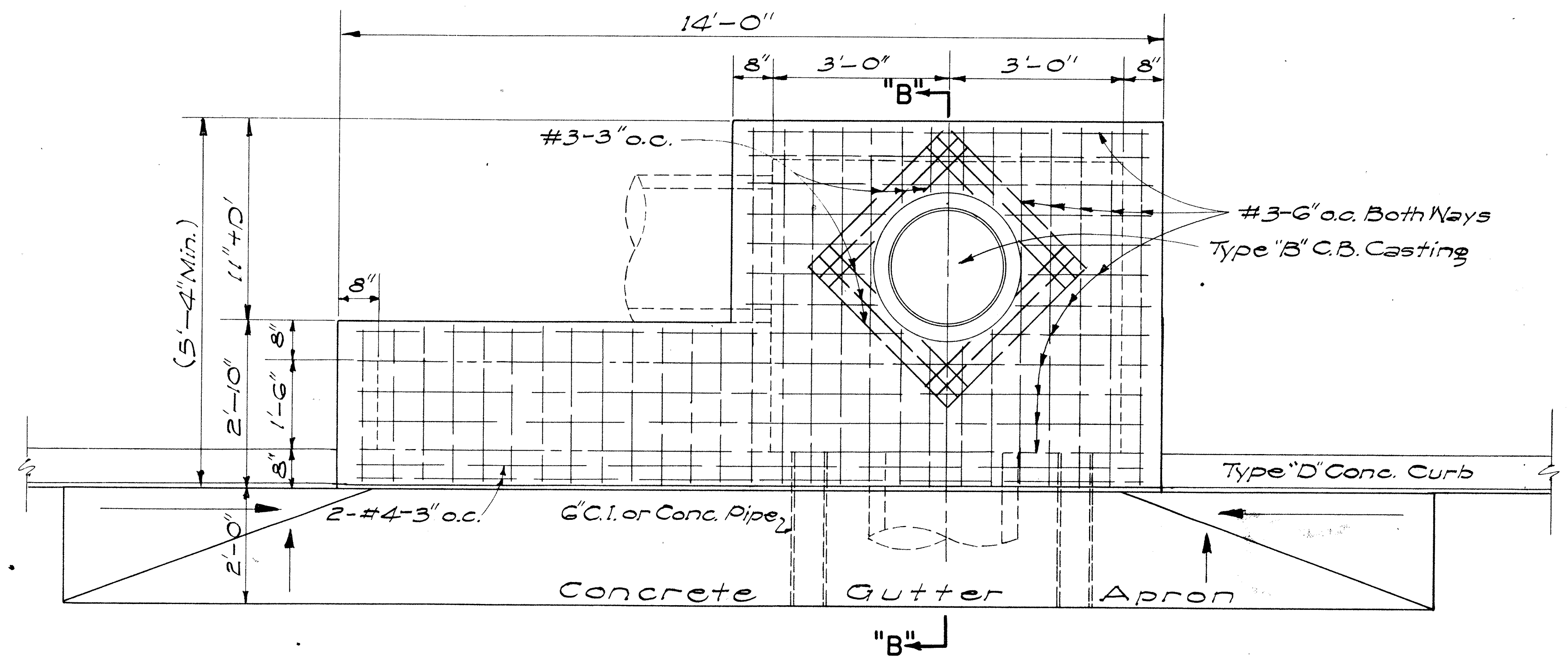
SCALE: 1/2" = 1'-0"

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:

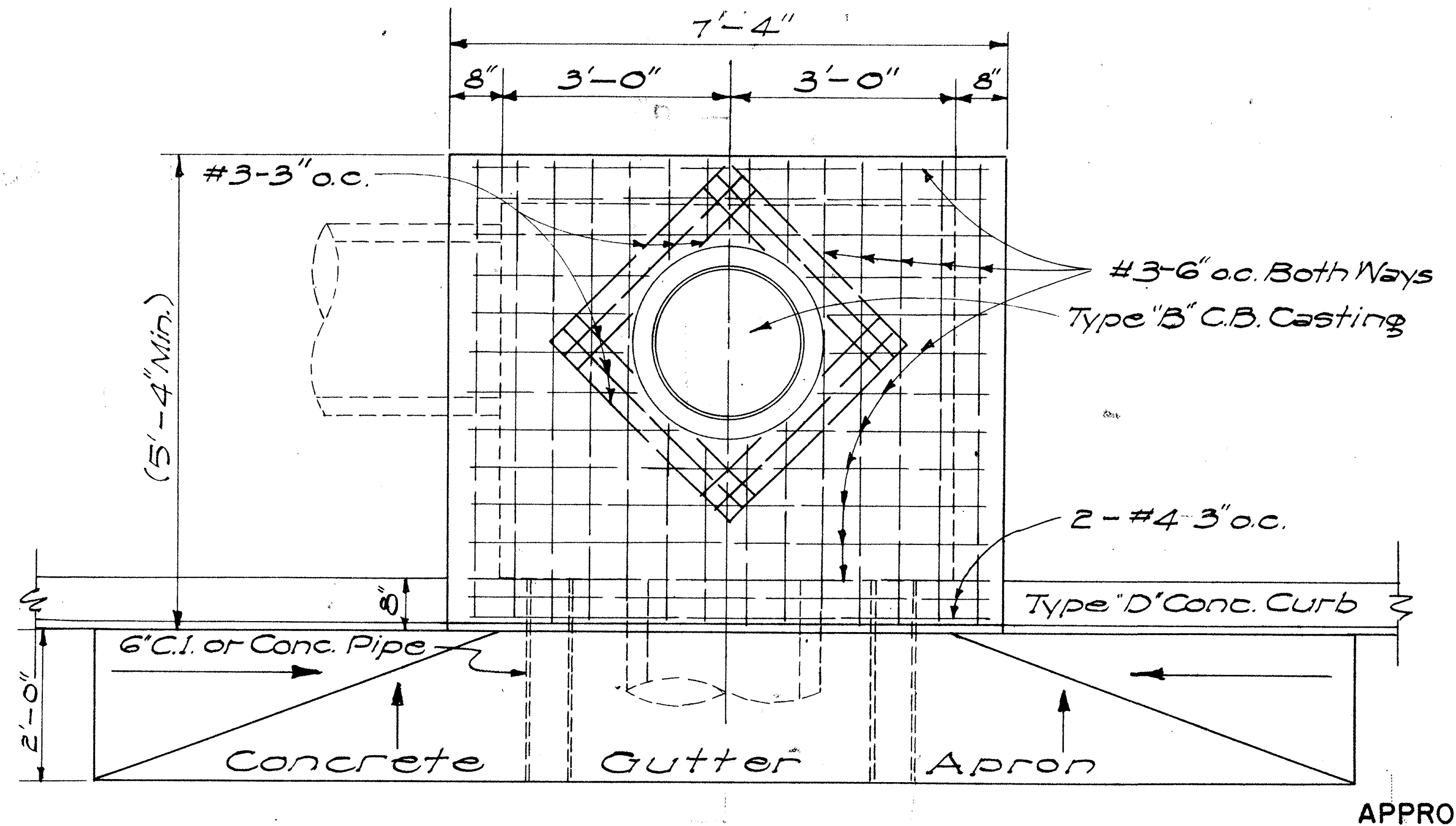
1. Quantities based on X = 3'-0" and D' = 30"
2. Quantities do not include concrete for Gutter Apron.
3. The Contractor shall install 2-6" Cast Iron or Concrete Pipes as incidental to Class A-1 Concrete for Construction Drainage.
4. Culvert shall leave C.B from any position and any direction indicated 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.



DETAIL OF TYPE "B" CATCH BASIN

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

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



DETAIL OF TYPE "D" CATCH BASIN

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

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

APPROVED: DATE Aug. 26, 1959

STATE HIGHWAY ENGINEER

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII
STANDARD DETAILS
CONCRETE CATCH BASINS

SCALES AS NOTED

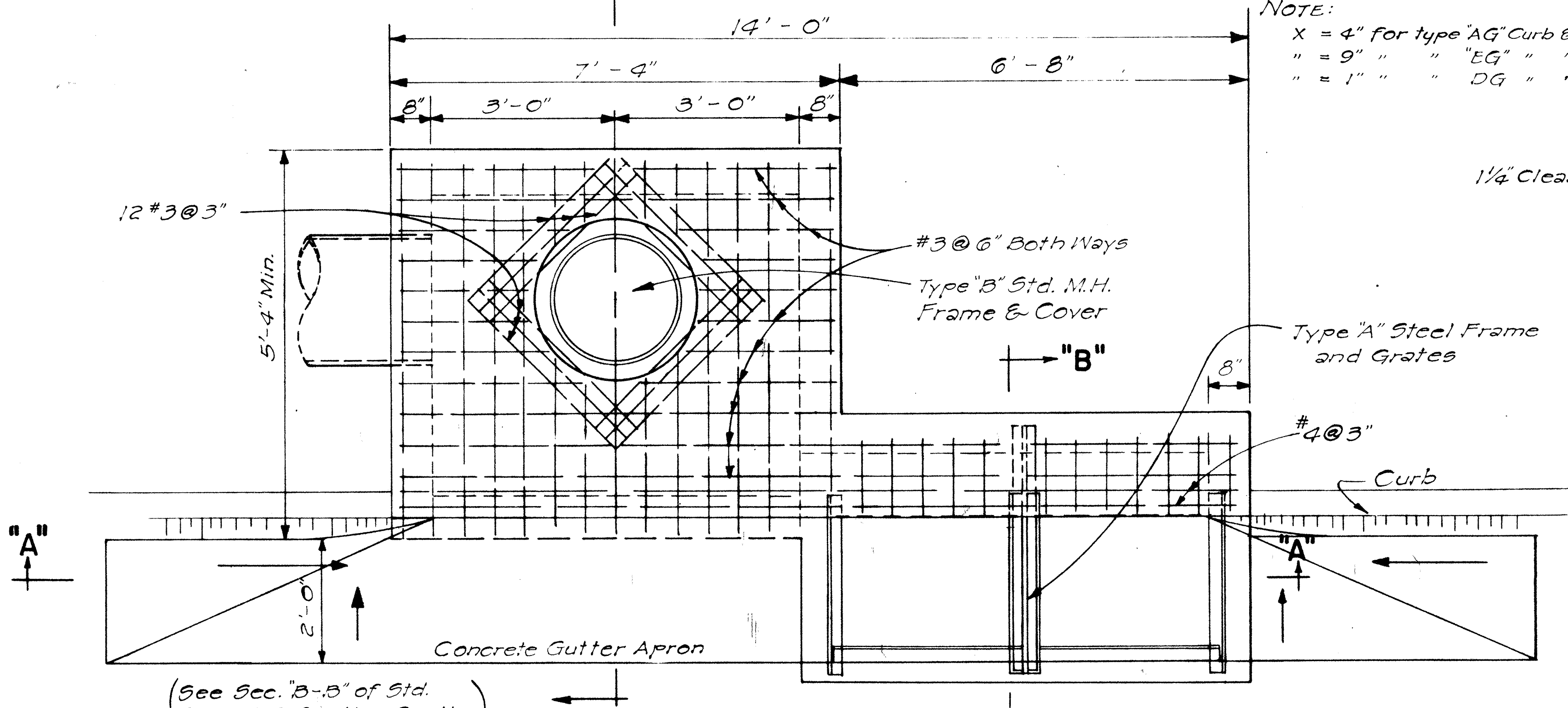
SHEET No 3 OF 8 SHEETS

F09010200.14 U09S10400.1S U07210300.4S

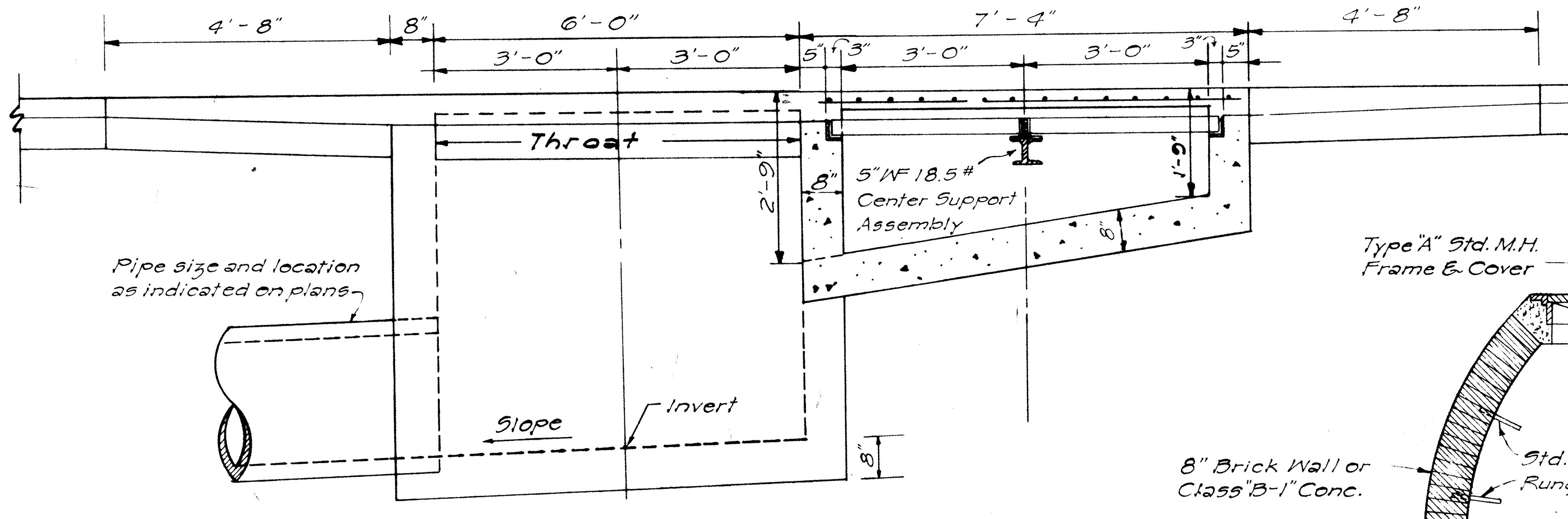
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	U-072-1(3)	1963	49	246
		U-098-1(4)	1963	19	88
		F-090-1(2)	1963	15	93

REVISED: SEPT. 1, 1961

NOTE:
X = 4" for type "AG" Curb & Gutter
" = 9" " " "EG" " "
" = 1" " " "DG" " "



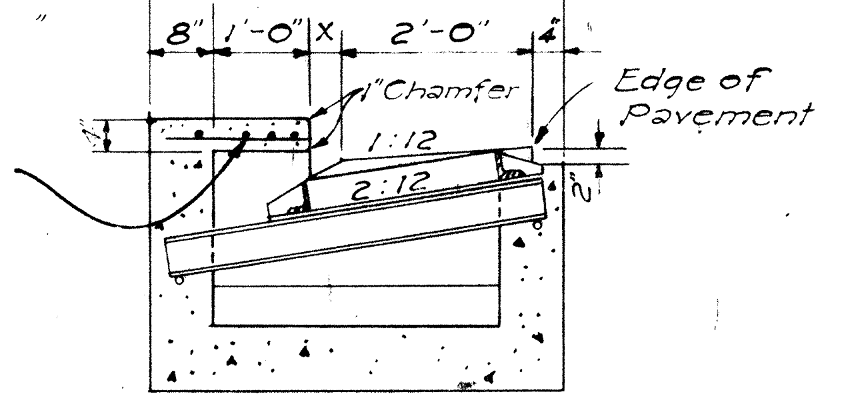
PLAN



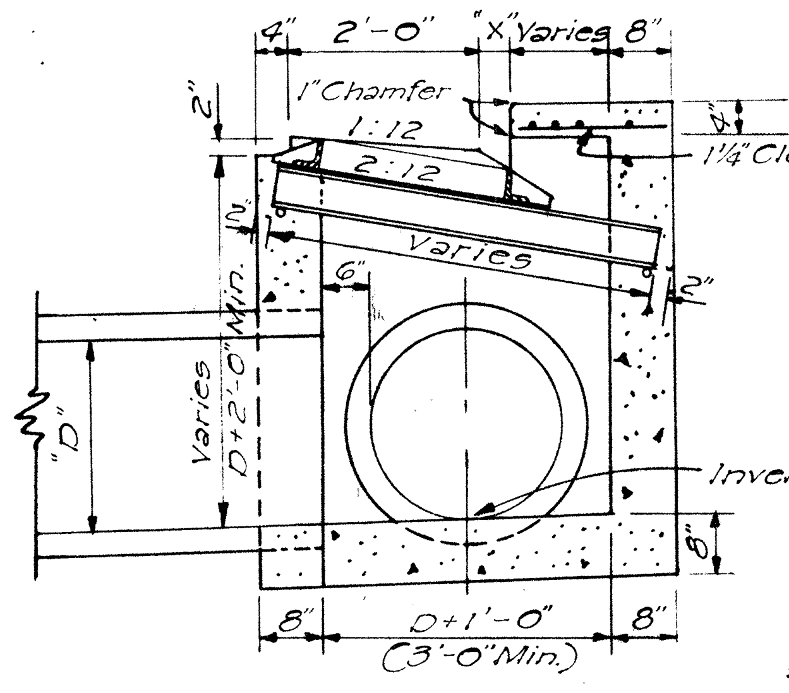
SECTION "A-A"

DETAIL OF TYPE "CG" CATCH BASIN

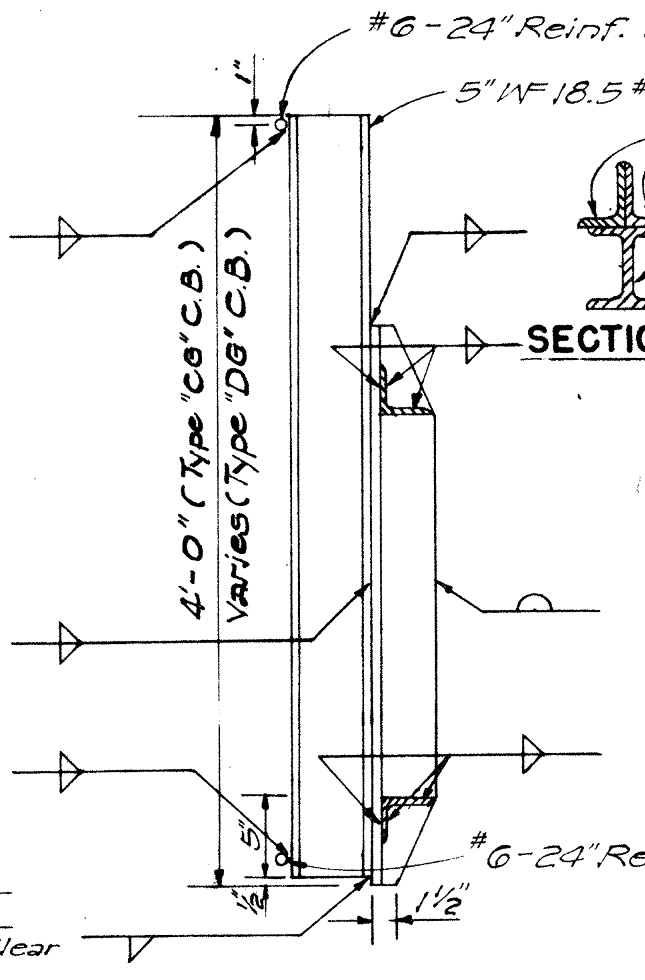
SCALE: 1/2" = 1'-0"



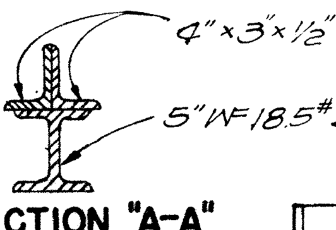
SECTION "B-B"
SCALE: 1/2" = 1'-0"



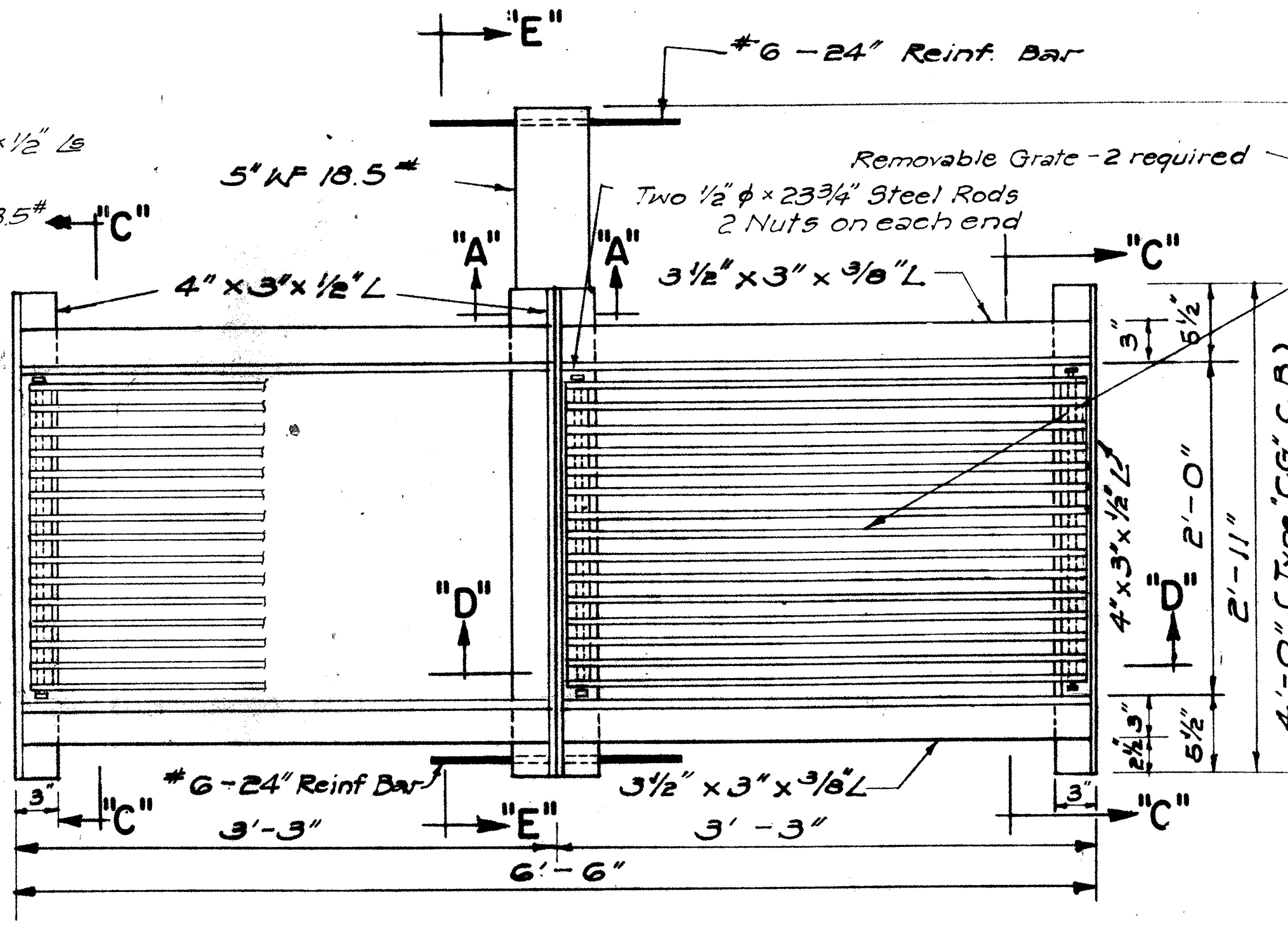
SECTION "G-G"
SCALE: 1/2" = 1'-0"



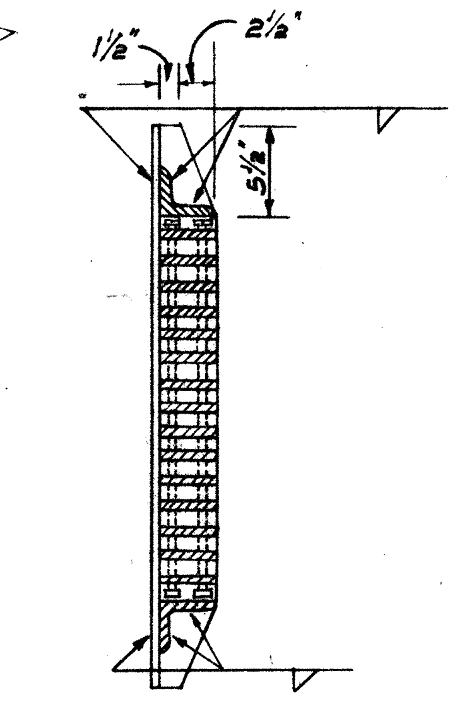
SECTION "E-E"
SCALE: 1" = 1'-0"



SECTION "A-A"

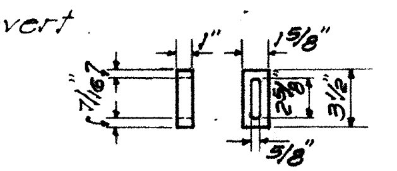


PLAN
SCALE: 1" = 1'-0"

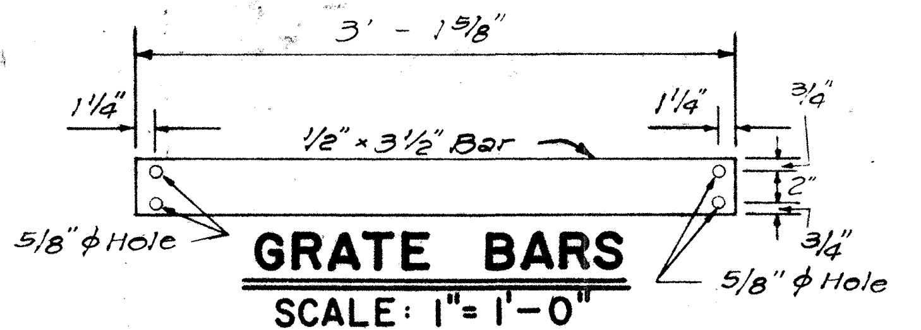


SECTION "C-C"
SCALE: 1' = 1'-0"

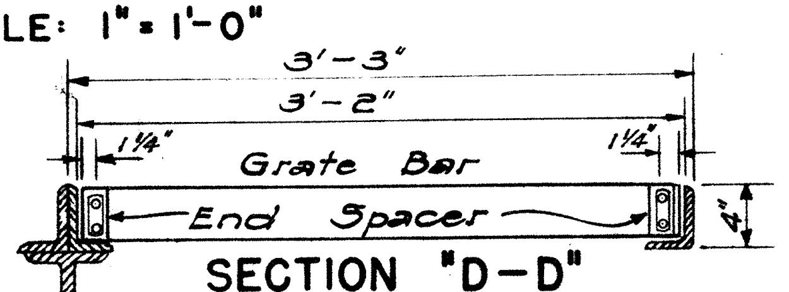
NOTE:
1. All welds 3/16" unless otherwise noted.
2. All steel shall be structural grade.
3. Grates and frame shall be hot dip galvanized after fabrication in accordance with Section 44(H) of the Standard Specifications.



END SPACER
SCALE: 1" = 1'-0"

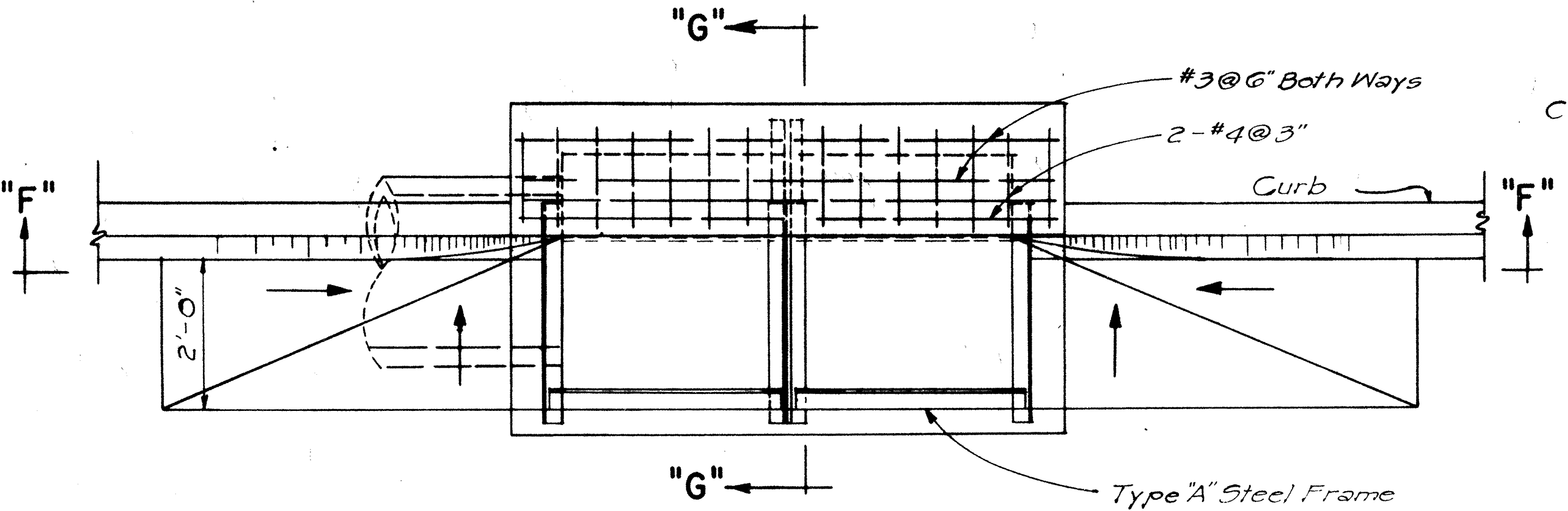


GRATE BARS
SCALE: 1" = 1'-0"

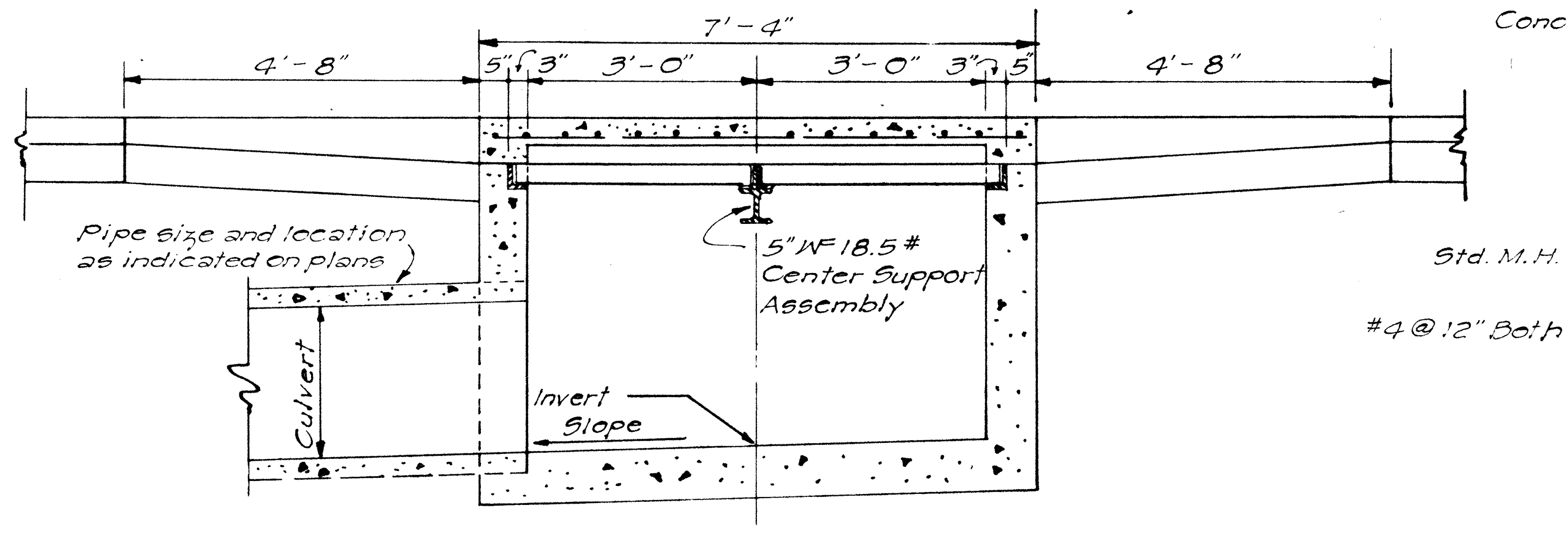


SECTION "D-D"
SCALE: 1" = 1'-0"

DETAIL OF TYPE "A" STEEL FRAME AND GRATES



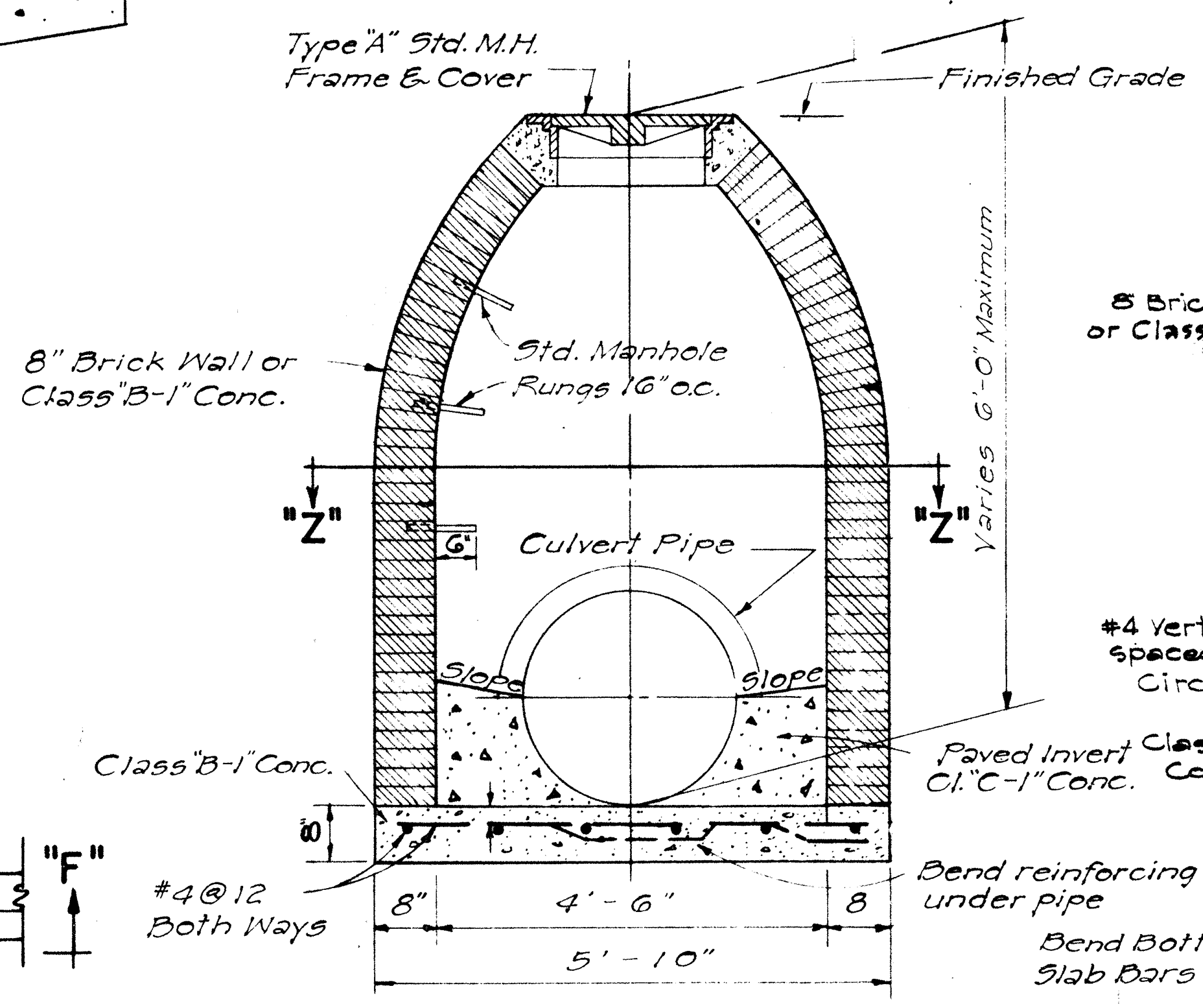
PLAN



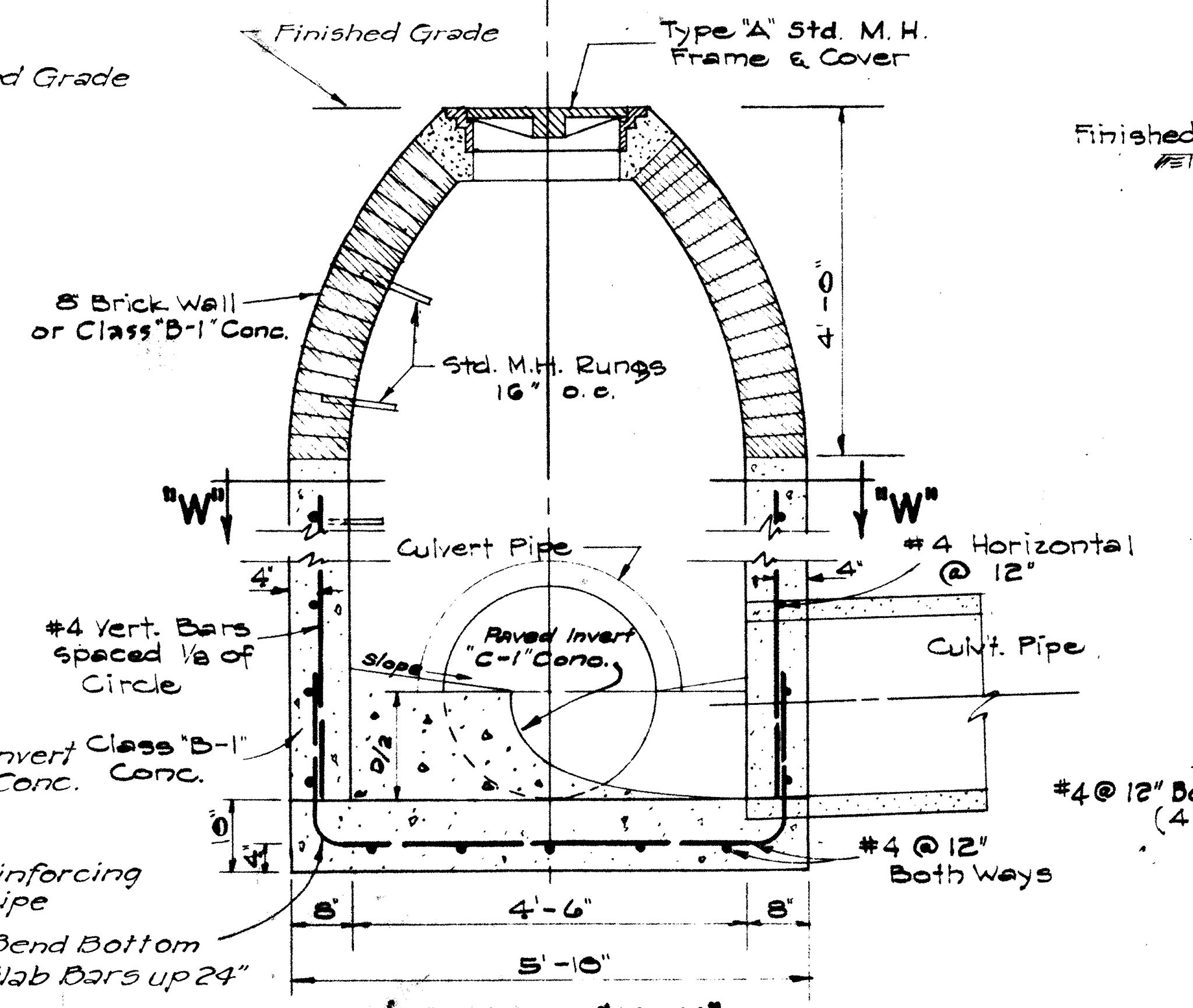
SECTION "F-F"

DETAIL OF TYPE "DG" CATCH BASIN

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

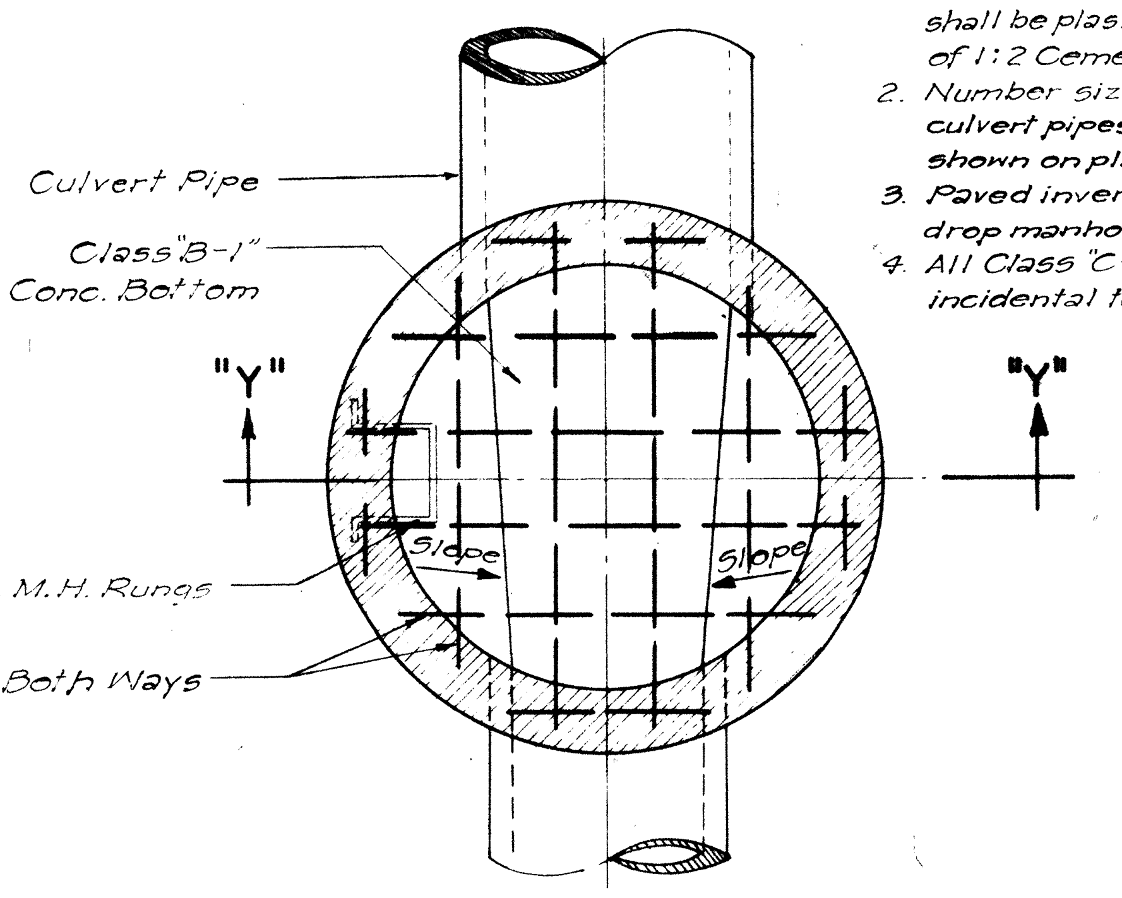


SECTION "Y-Y"



SECTION "X-X"

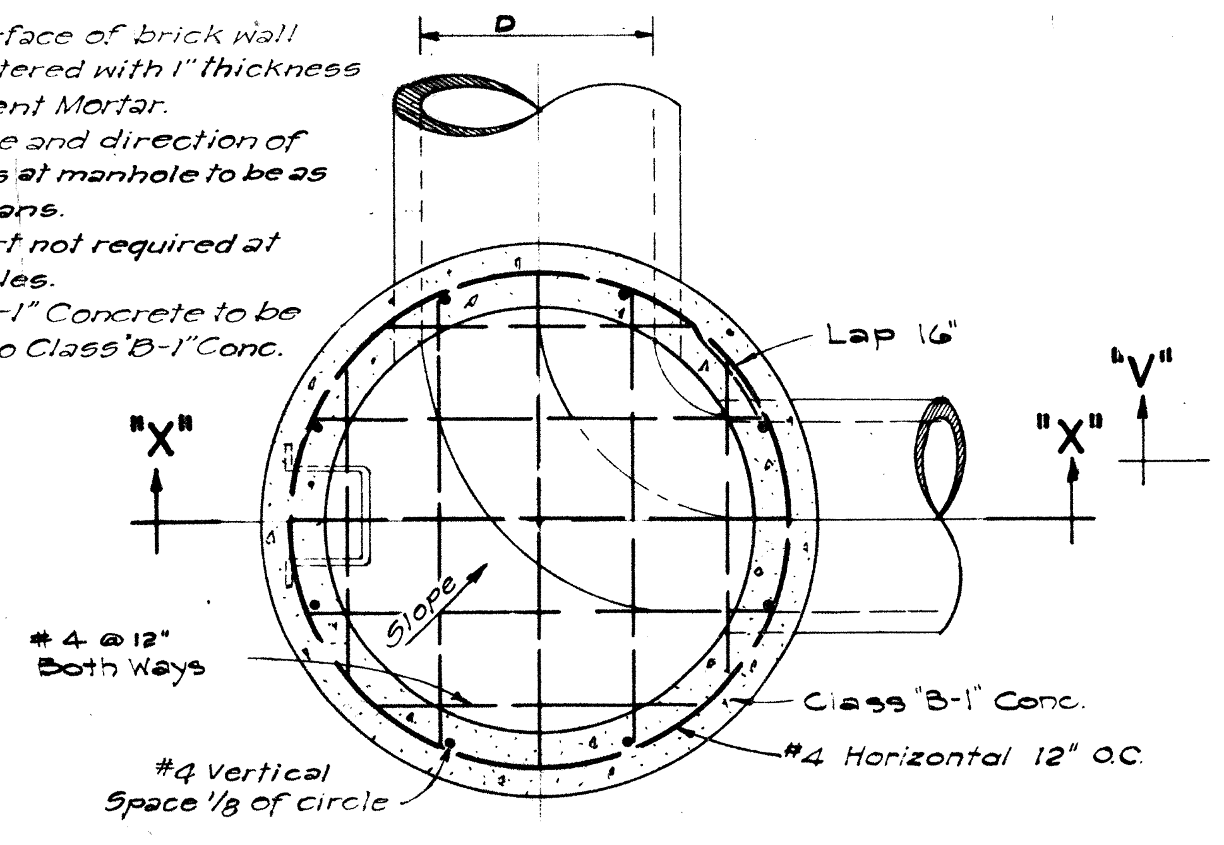
NOTE:
1. Exterior surface of brick wall shall be plastered with 1" thickness of 1:2 Cement Mortar.
2. Number, size and direction of culvert pipes at manhole to be as shown on plans.
3. Paved invert not required at drop manholes.
4. All Class "C-1" Concrete to be incidental to Class "B-1" Conc.



SECTION "Z-Z"

TYPE "D" STORM DRAIN MANHOLE

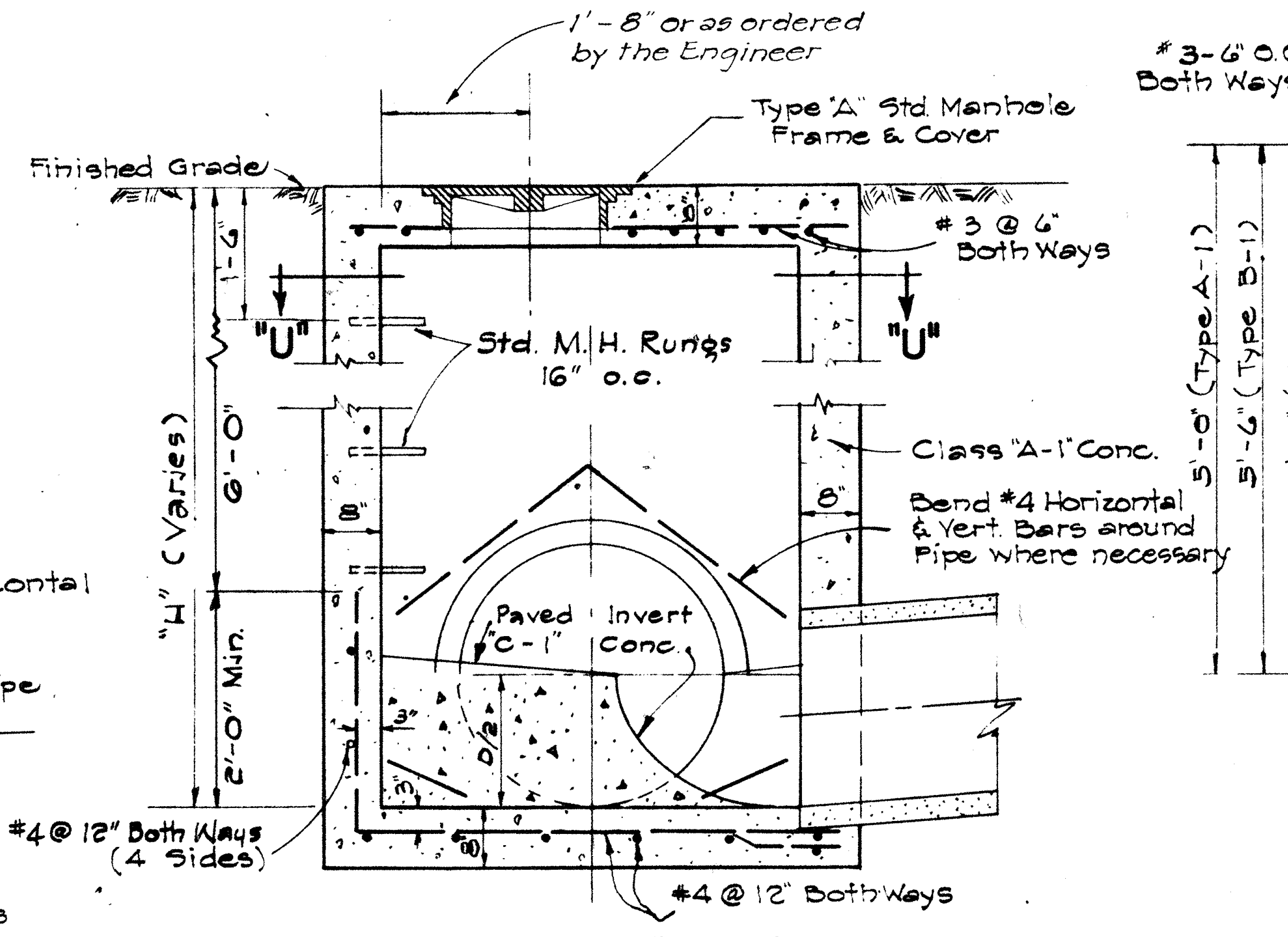
SCALE: 1/2" = 1'-0"



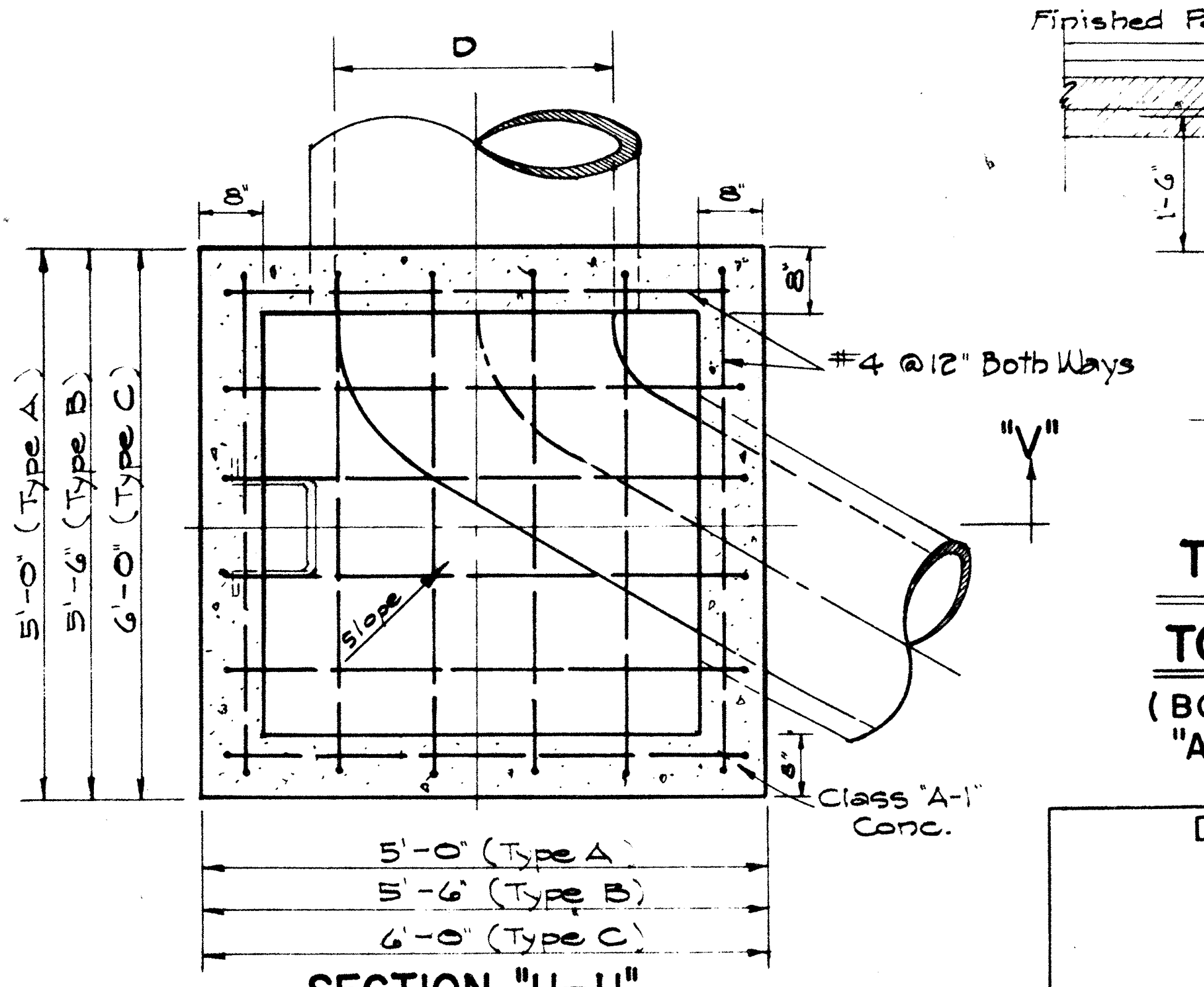
SECTION "W-W"

TYPE "E" STORM DRAIN MANHOLE

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



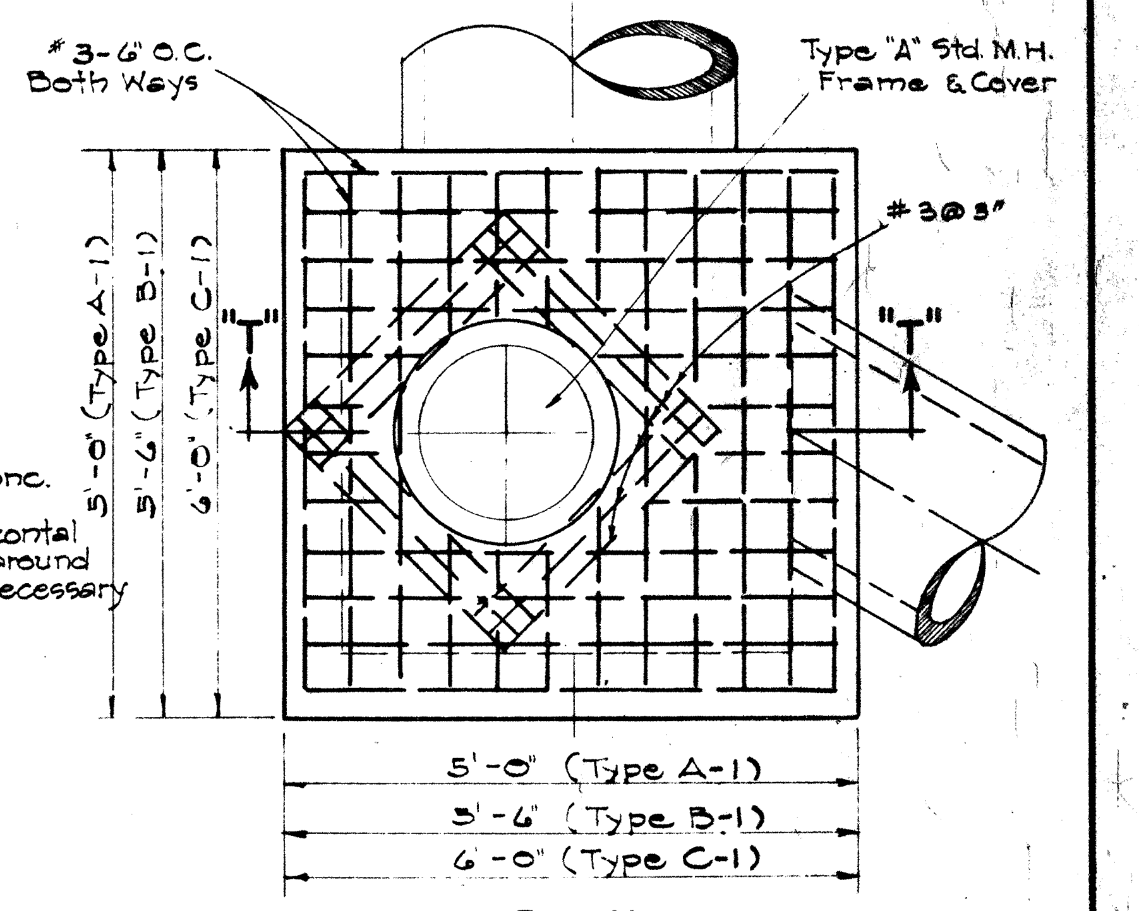
SECTION "V-V"



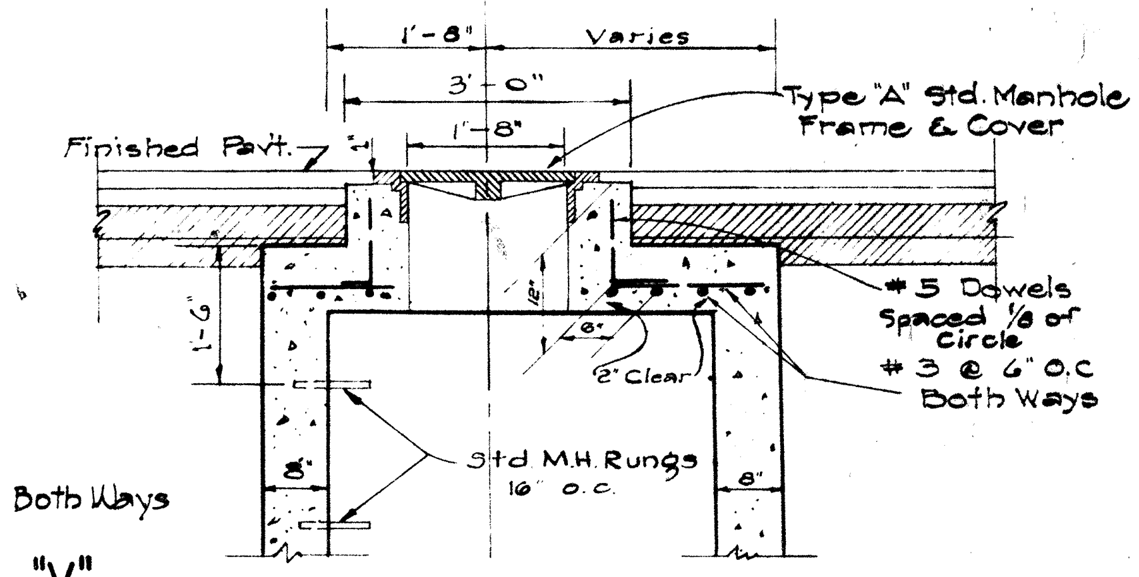
SECTION "U-U"

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

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



PLAN



SECTION "T-T"

TYPE "A-1", "B-1", & "C-1" S.D.M.H.

TOP DETAIL UNDER PAVEMENT

(BOTTOM DETAIL SIMILAR TO TYPE "A", "B", & "C")

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

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII

STANDARD DETAILS

GRATED CATCH BASINS & STORM DRAIN MANHOLES

SCALES AS NOTED

SHEET Nº 4 OF 8 SHEETS

APPROVED:
DATE: Aug. 26, 1959
STATE HIGHWAY ENGINEER

ORIGINAL PLAN	SURVEY PLOTTED BY		DATE
	DESIGNED BY	O.M.	May '57
NOTE BOOK	DRAWN BY		
	TRACED BY	L.M.	May '57
No.	QUANTITIES BY		
	CHECKED BY	O.M.	June '57

④

F09010200.15 U09S10400.19 U07210300.49

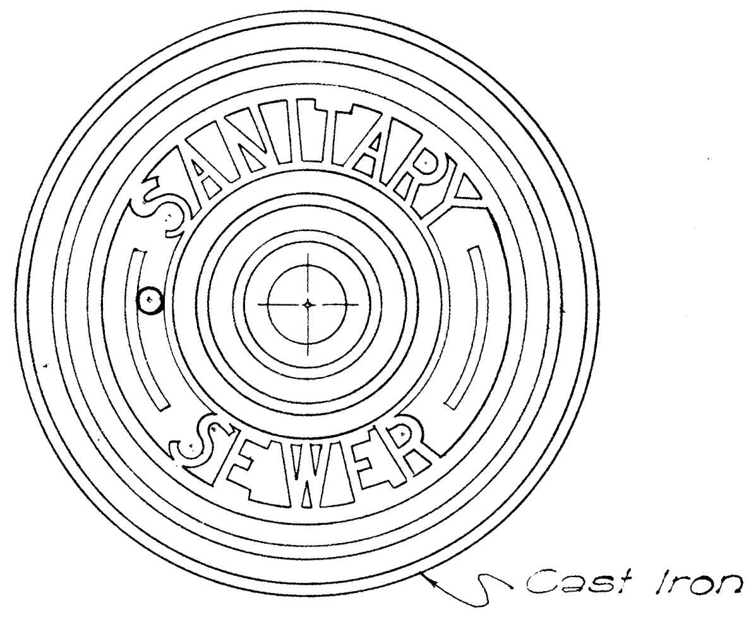
aabcde efghi abcefg aaabcde eee

2/17/59
8/14/59

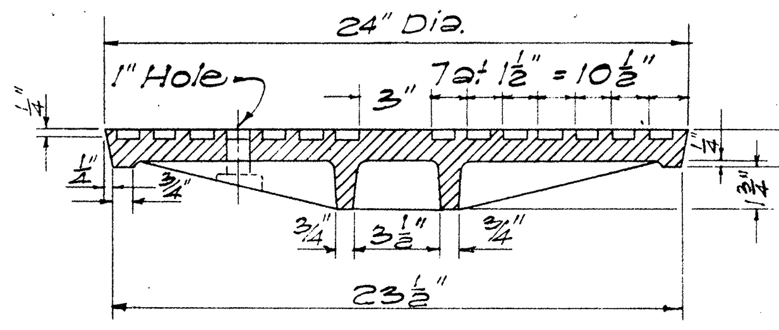
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	U-072-1(3)	1963	50	246
		U-098-1(4)	1963	20	88
		F-090-1(2)	1963	16	93

August 1957

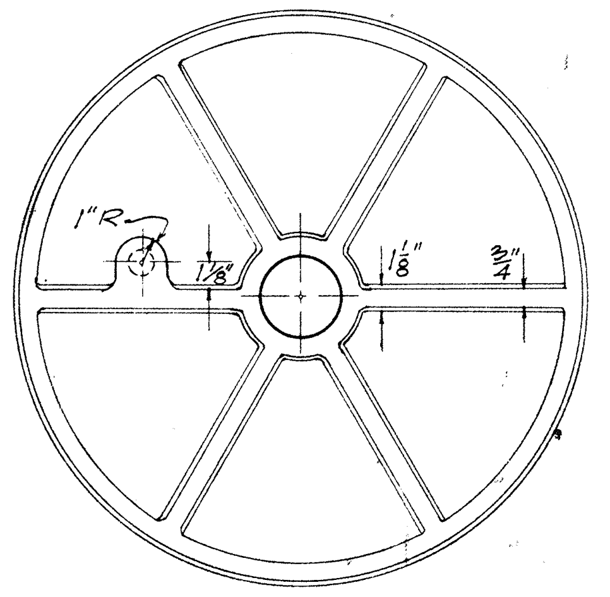
NOTE: Stock Pattern From Novelty Foundry ~ Honolulu



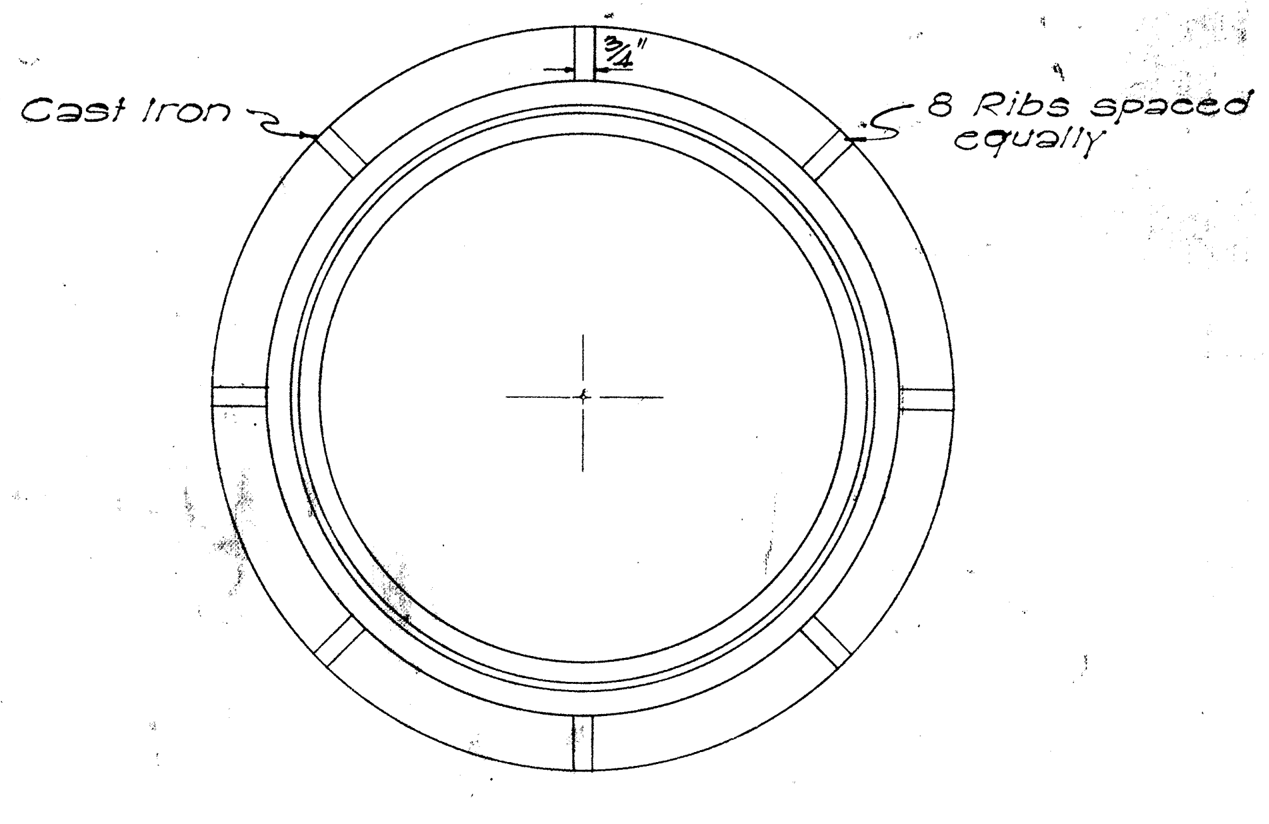
TOP VIEW OF COVER



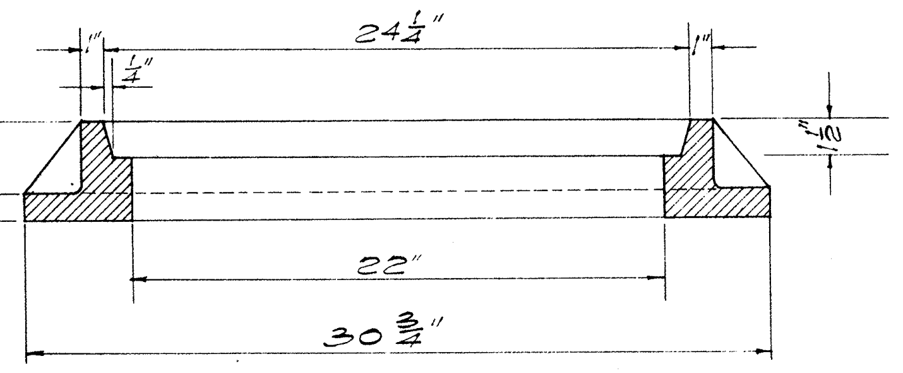
SECTION



BOTTOM VIEW OF COVER



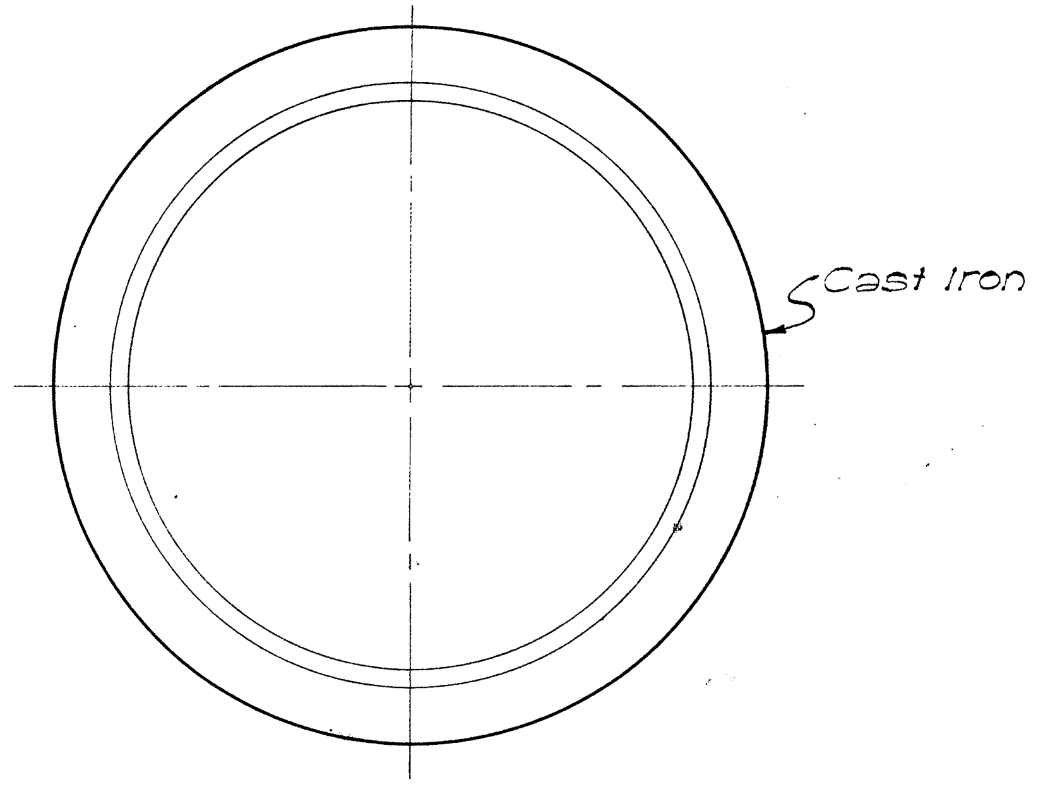
PLAN OF RIM



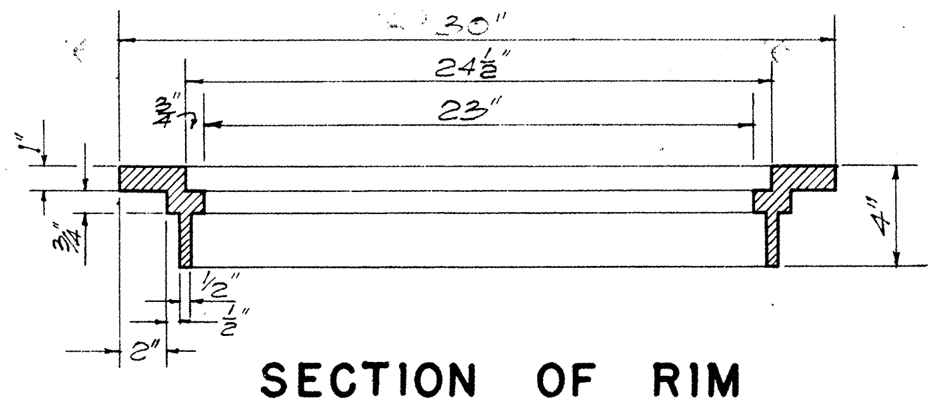
SECTION OF RIM

DETAILS OF STANDARD MANHOLE CASTINGS (SEWER)

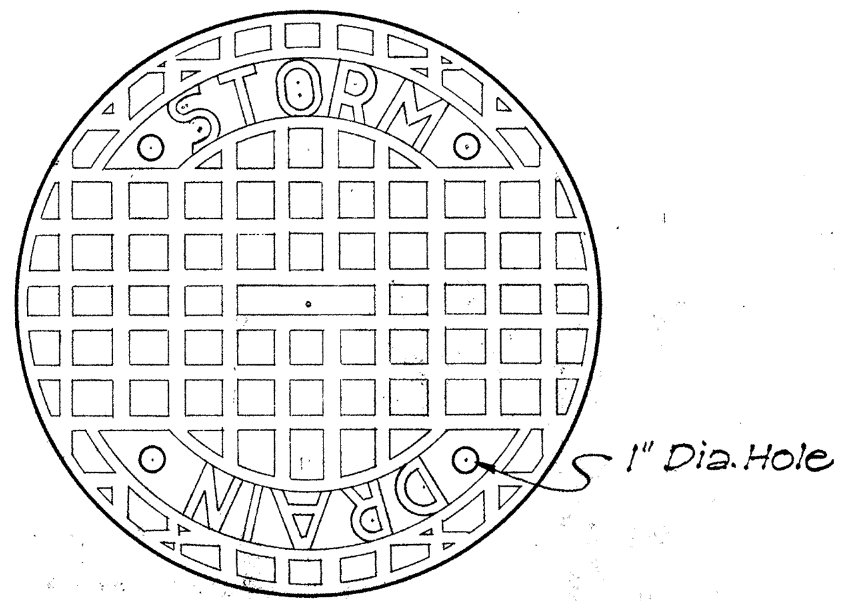
SCALE: 1-1/2" = 1'-0"



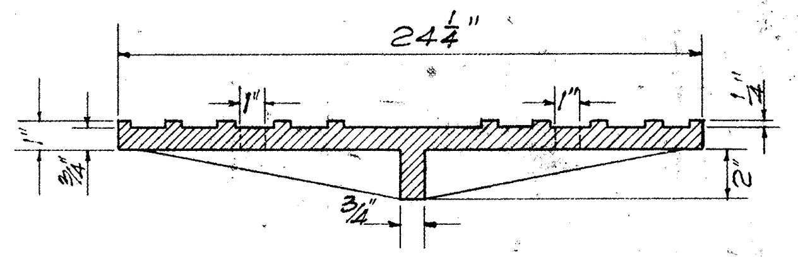
PLAN OF RIM



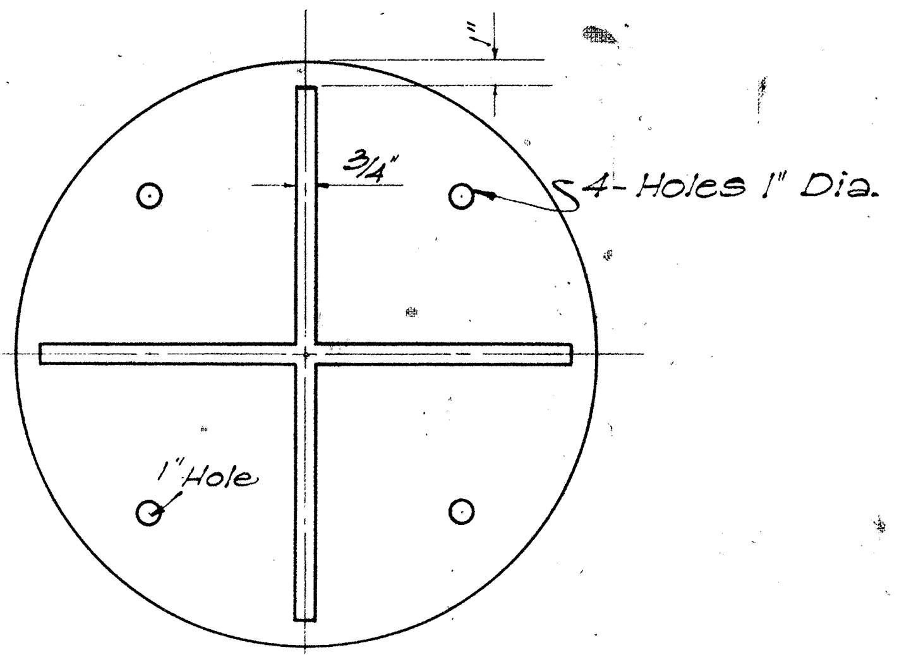
SECTION OF RIM



TOP VIEW OF COVER



SECTION

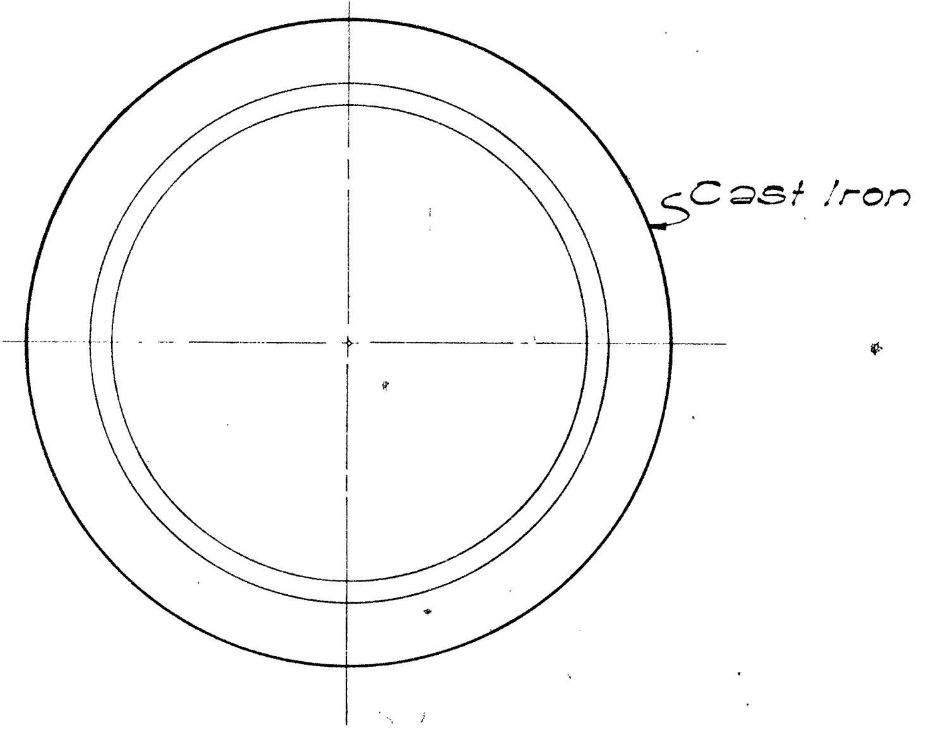


BOTTOM VIEW OF COVER

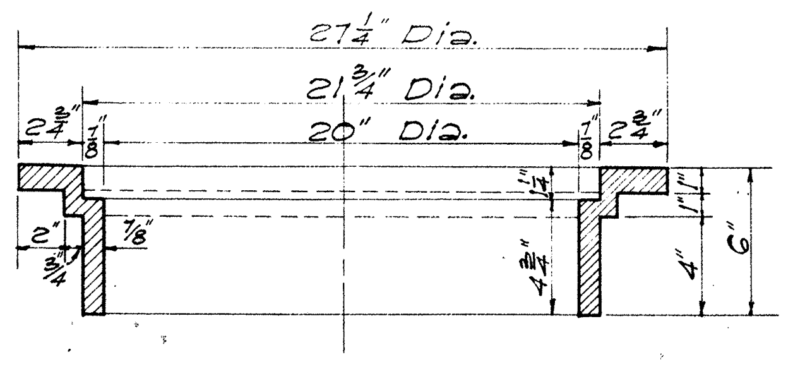
DETAILS OF TYPE "B" CATCH BASIN CASTINGS

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

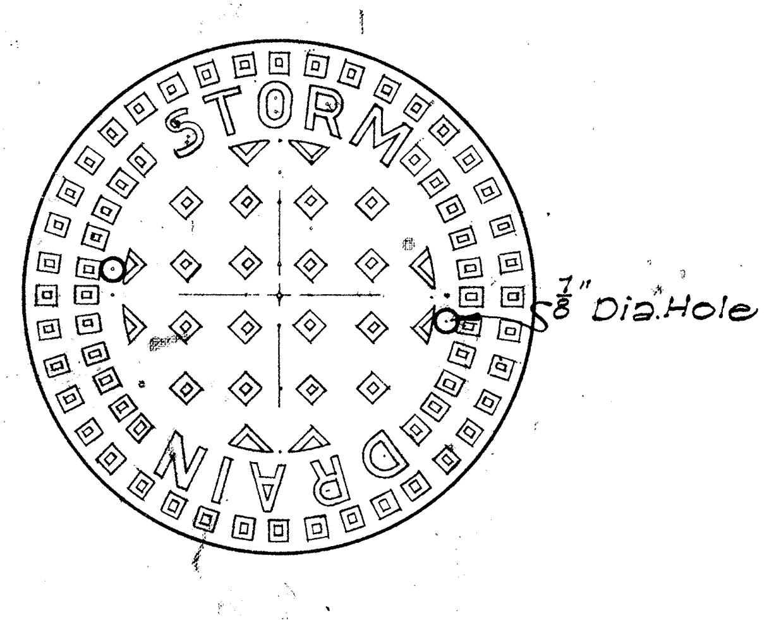
(STORM DRAIN)



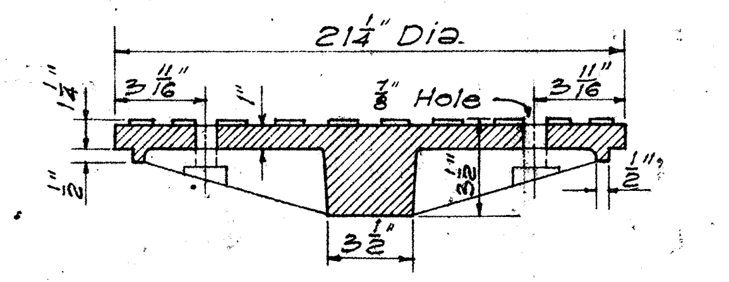
PLAN OF RIM



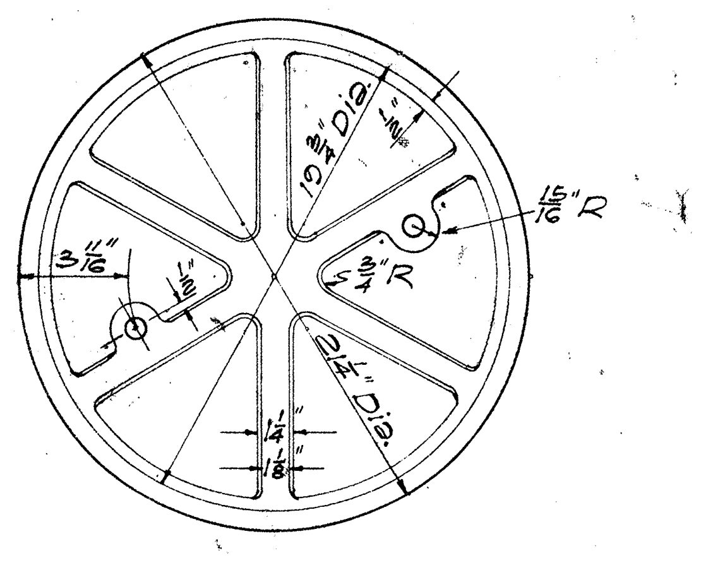
SECTION OF RIM



TOP VIEW OF COVER



SECTION

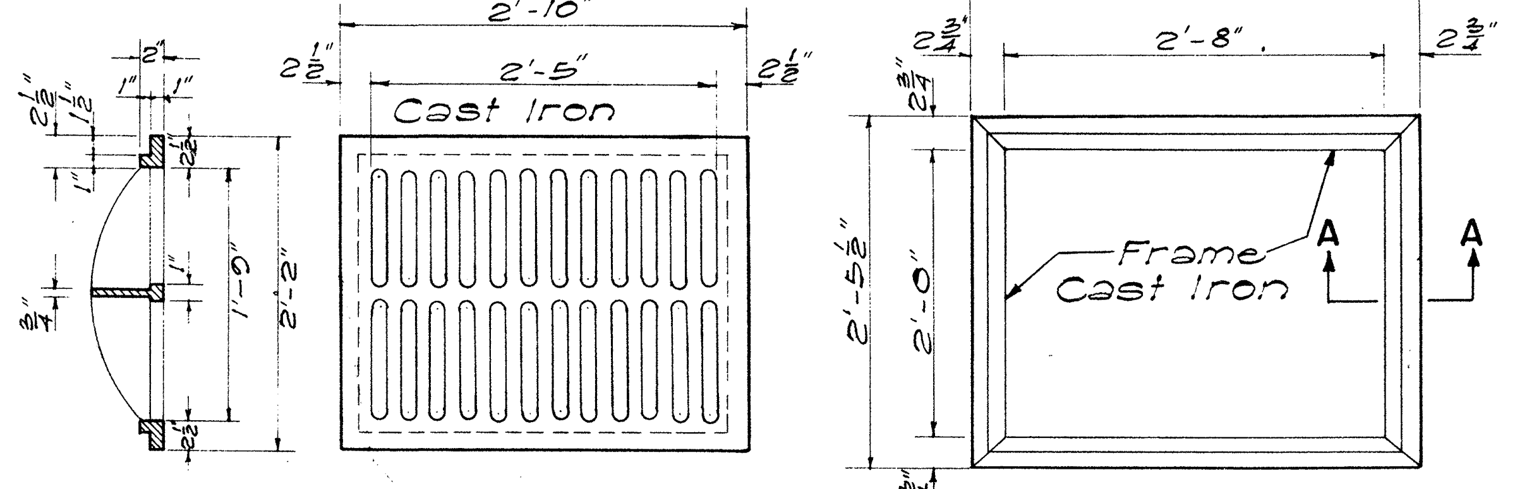


BOTTOM VIEW OF COVER

DETAILS OF TYPE "A" MANHOLE CASTINGS

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

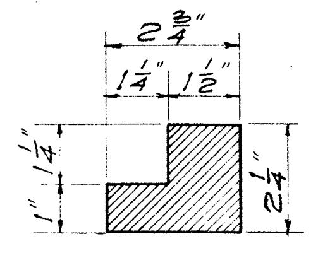
(STORM DRAIN)



SECTION TOP VIEW TOP VIEW.

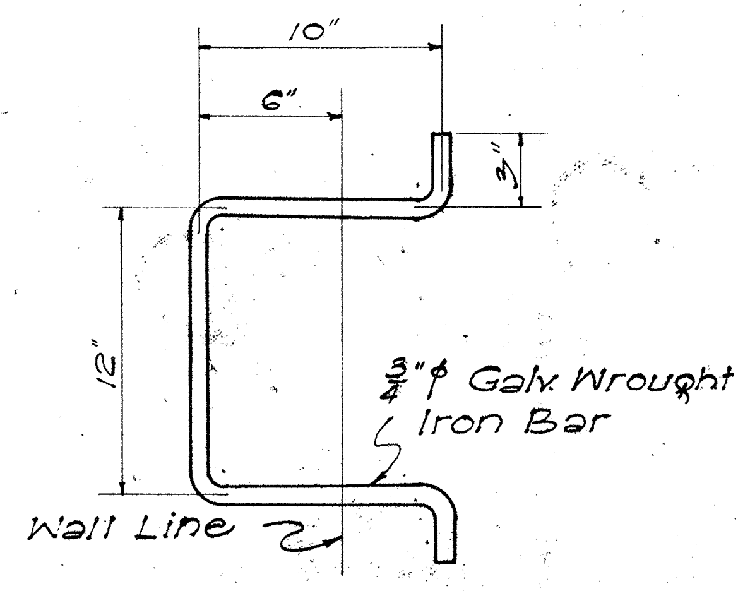
TYPE C C.I. FRAME AND GRATING

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



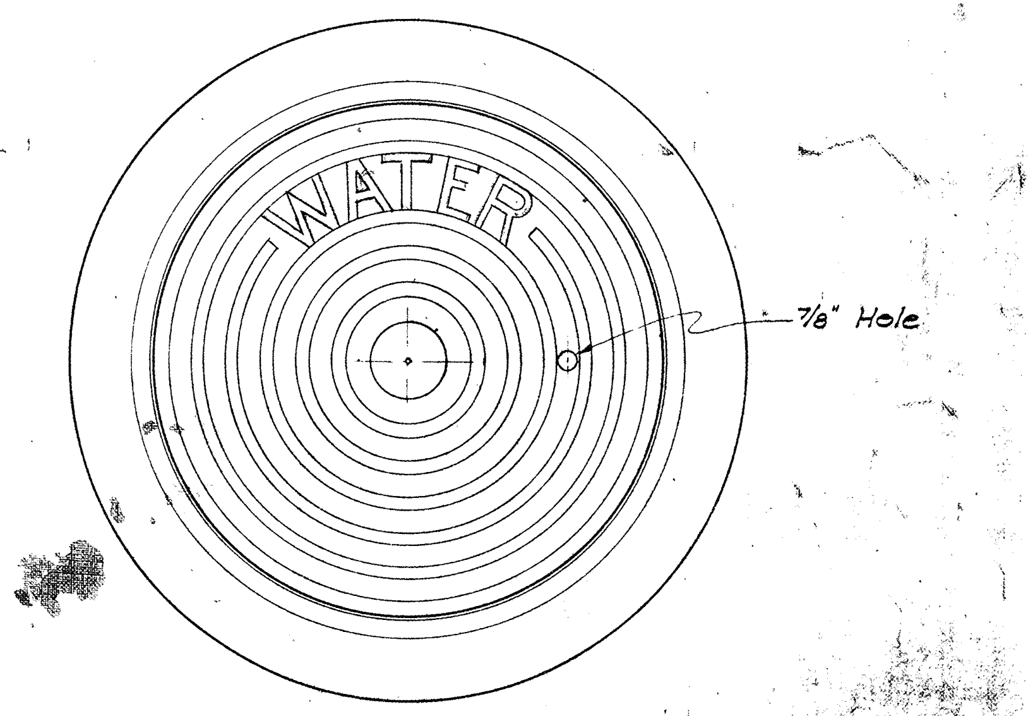
SECTION "A-A"

SCALE 3" = 1'-0"

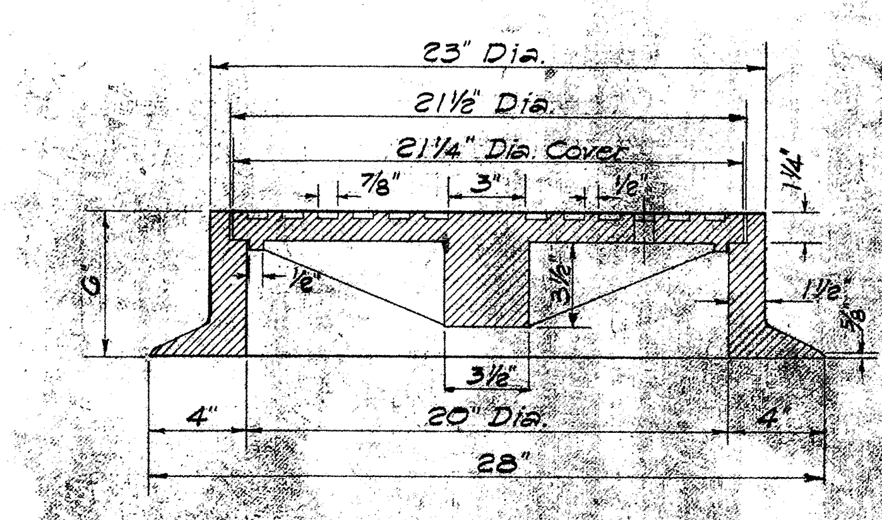


MANHOLE RUNG

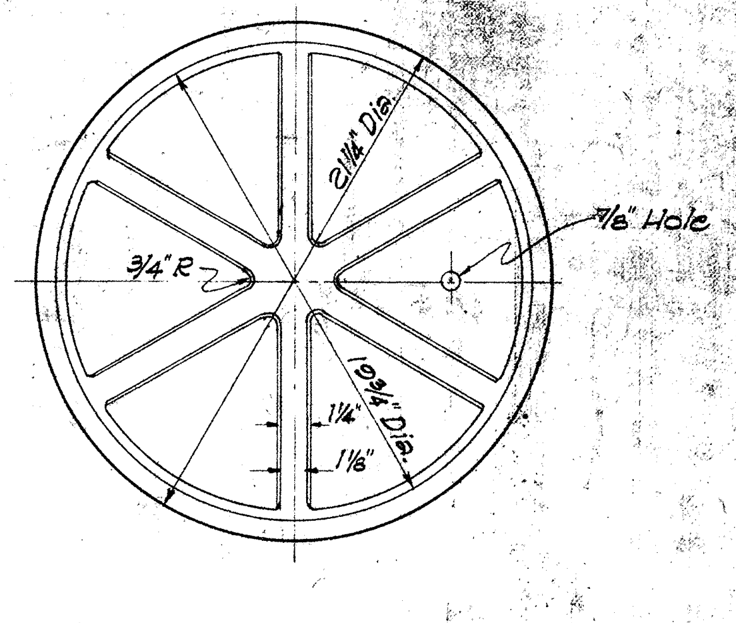
SCALE: 1-1/2" = 1'-0"



PLAN OF FRAME AND COVER



SECTION OF FRAME AND COVER



BOTTOM VIEW OF COVER

DETAILS OF 20" CAST IRON FRAME AND COVER FOR WATER MANHOLE

SCALE: 1½" = 1'-0"

APPROVED: DATE Aug. 26, 1959

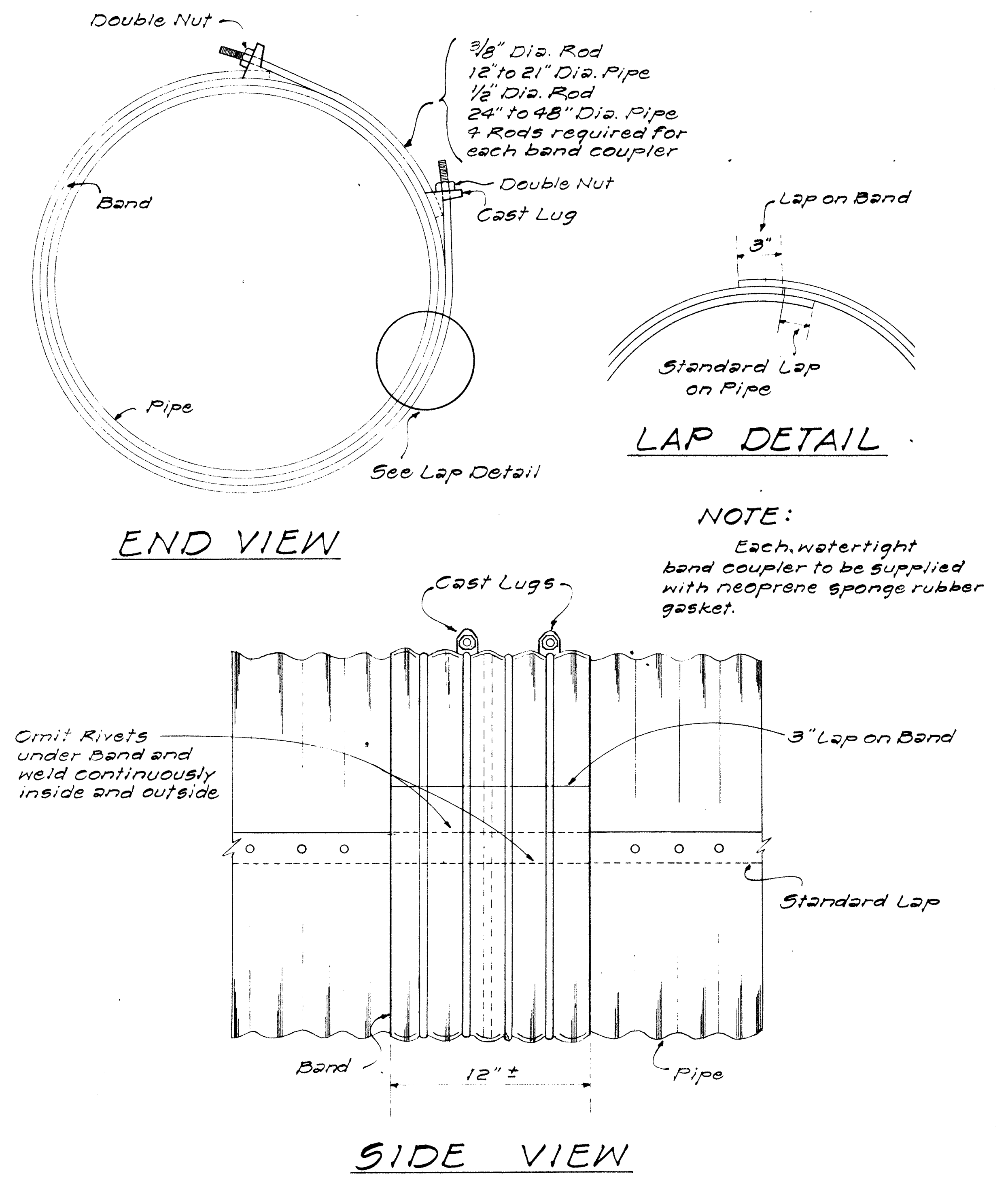
STATE HIGHWAY ENGINEER

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII
STANDARD DETAILS
CATCH BASIN AND
MANHOLE CASTINGS
SCALES AS NOTED

SHEET № 5 OF 8 SHEETS

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

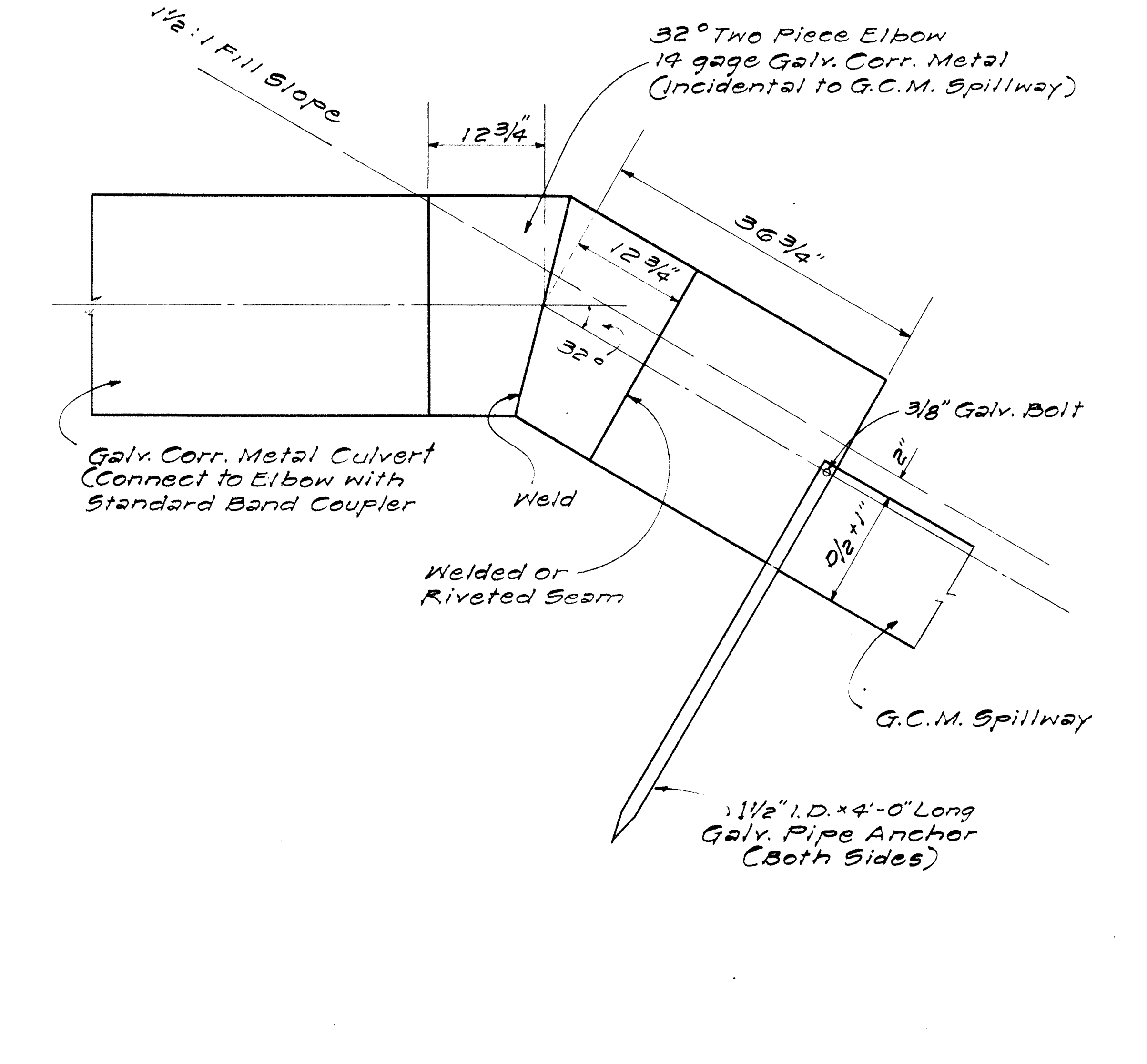
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	U-072-1(3)	1963	51	246
		U-098-1(4)	1963	21	88
		F-090-1(2)	1963	17	93



NOTE:
Each watertight band coupler to be supplied with neoprene sponge rubber gasket.

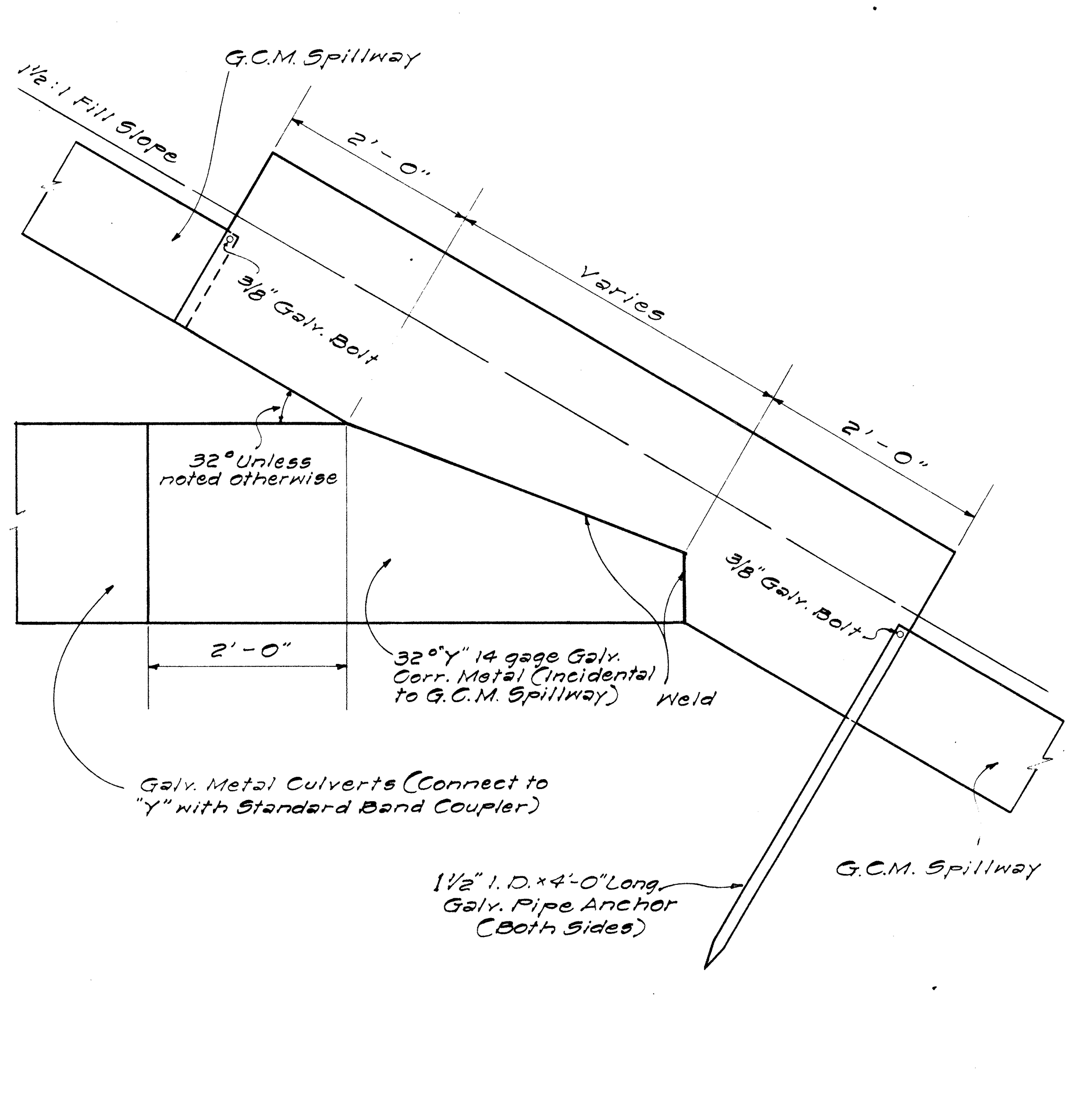
DETAIL OF WATERTIGHT BAND COUPLER

NOT TO SCALE



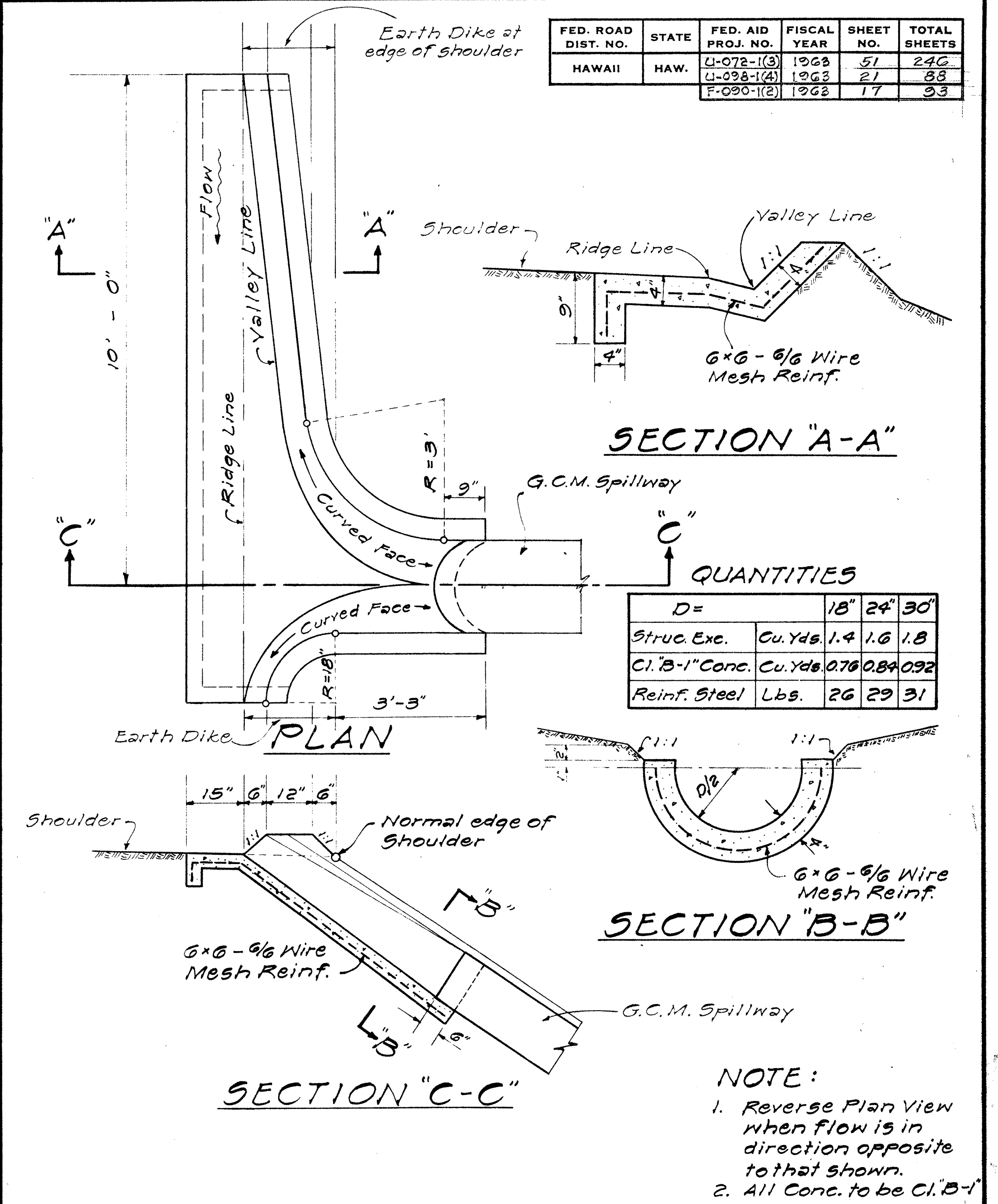
DETAIL OF CULVERT TO SPILLWAY CONNECTION

NOT TO SCALE



DETAIL OF CULVERT TO SPILLWAY "Y" CONNECTION

NOT TO SCALE



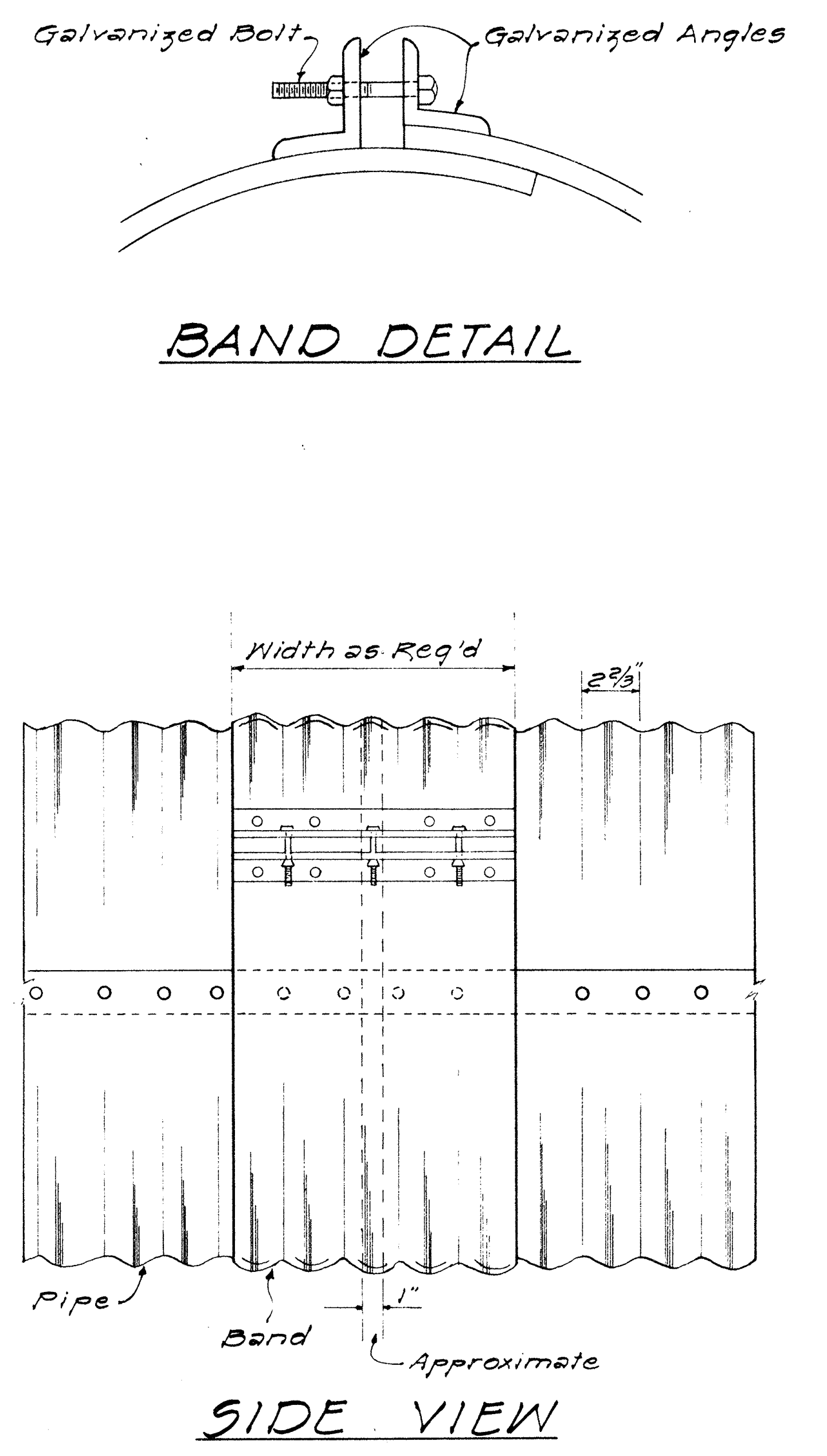
QUANTITIES

D =		18"	24"	30"
Struc. Exc.	Cu. Yds.	1.4	1.6	1.8
Cl. "B-1" Conc.	Cu. Yds.	0.76	0.84	0.92
Reinf. Steel	Lbs.	26	29	31

NOTE:
1. Reverse Plan View when flow is in direction opposite to that shown.
2. All Conc. to be Cl. "B-1"

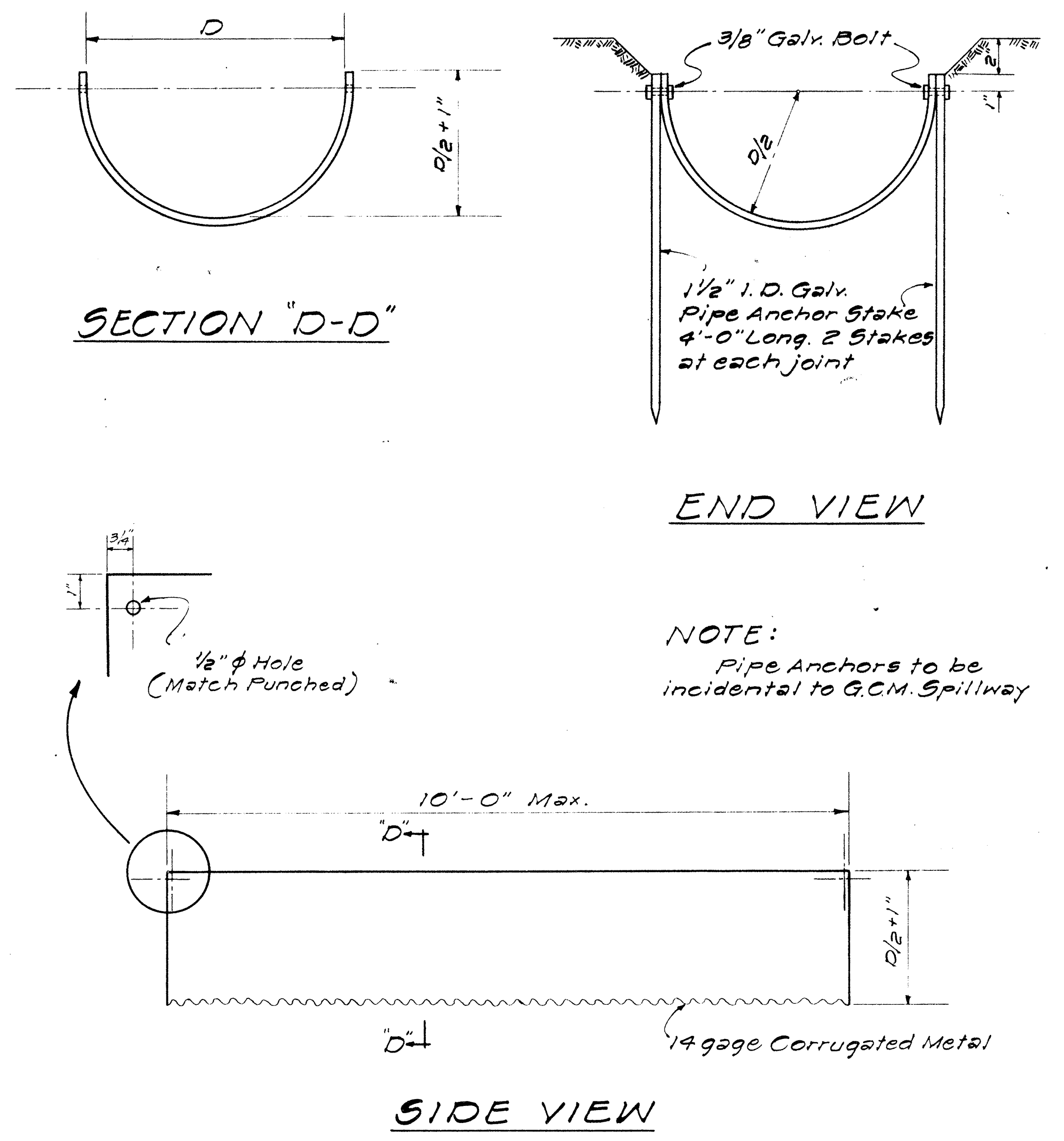
DETAIL OF SPILLWAY INLET

NOT TO SCALE



DETAIL OF STANDARD BAND COUPLER

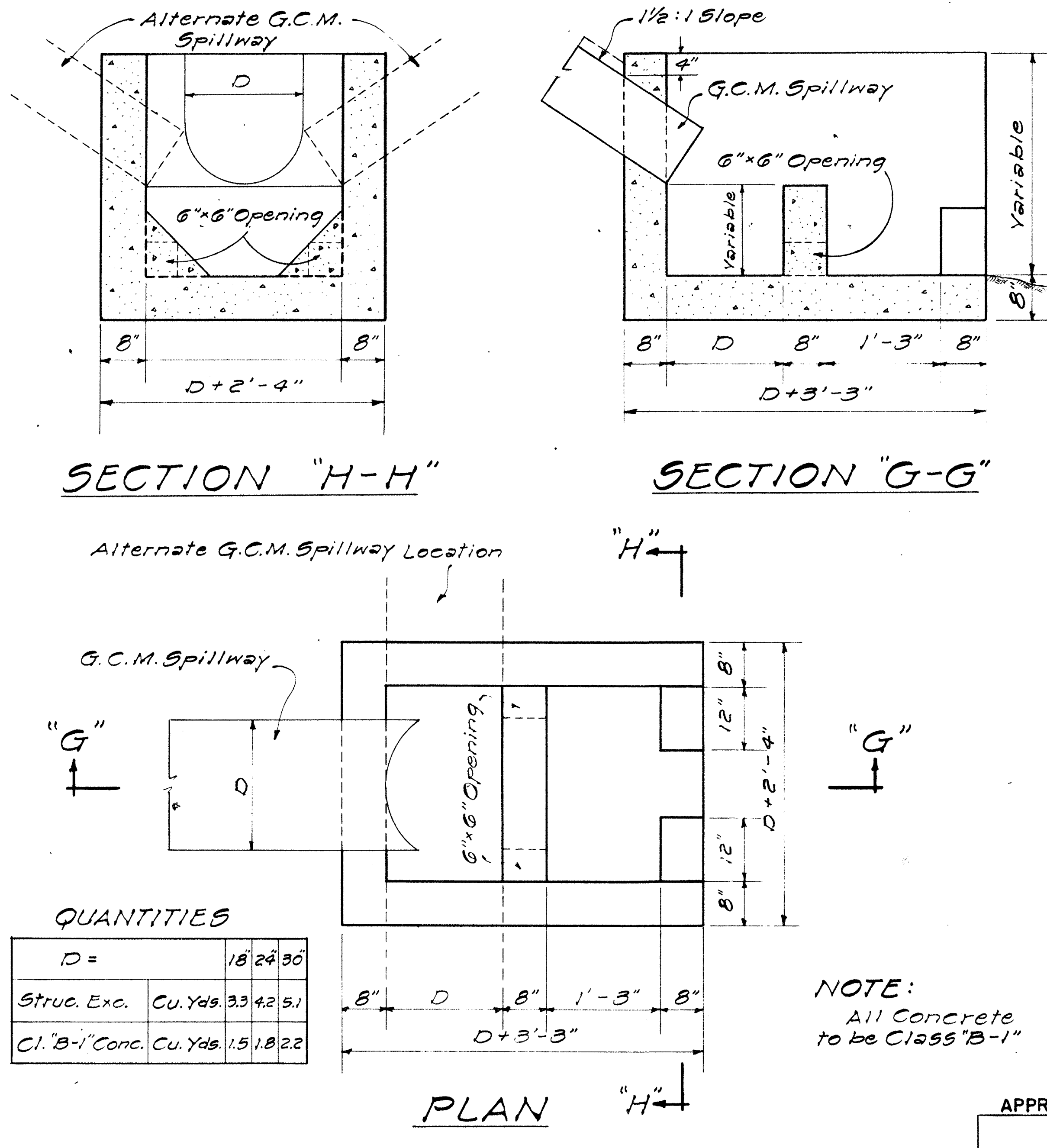
NOT TO SCALE



NOTE:
Pipe Anchors to be incidental to G.C.M. Spillway

G. C. M. SPILLWAY

NOT TO SCALE



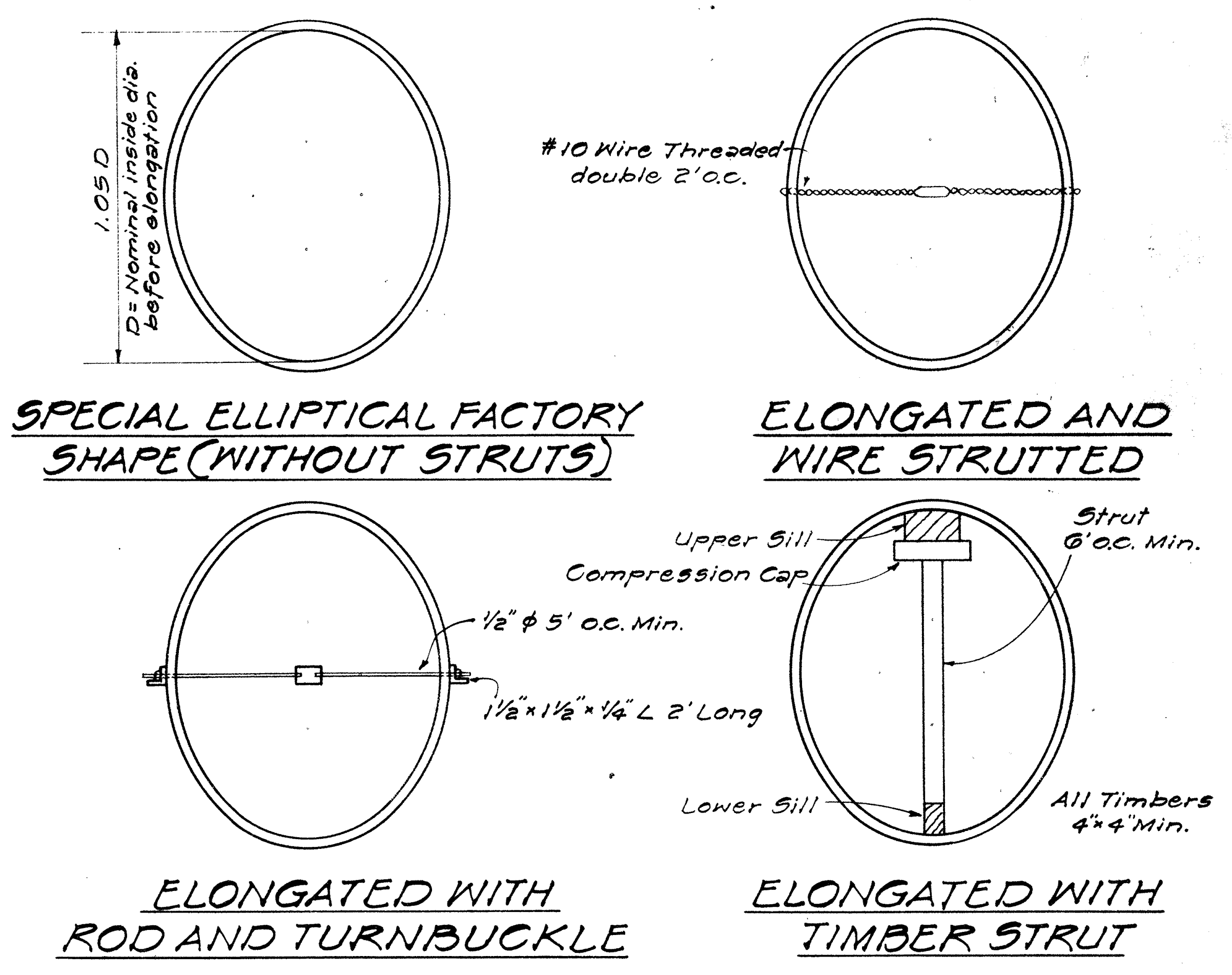
QUANTITIES

D =		18"	24"	30"
Struc. Exc.	Cu. Yds.	3.3	4.2	5.1
Cl. "B-1" Conc.	Cu. Yds.	1.5	1.8	2.2

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

DETAILS OF CONC DROP BOX AT OUTLET OF G.C.M. SPILLWAY

NOT TO SCALE



METHOD OF ELONGATING AND STRUTTING CORRUGATED PIPE

NOT TO SCALE

APPROVED: Alexander[?] DATE 8-14-61
DIRECTOR OF TRANSPORTATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
GALVANIZED CORRUGATED METAL CULVERTS, SPILLWAYS, AND SPECIAL DETAILS
SCALES AS NOTED
SHEET No 6 OF 8 SHEETS

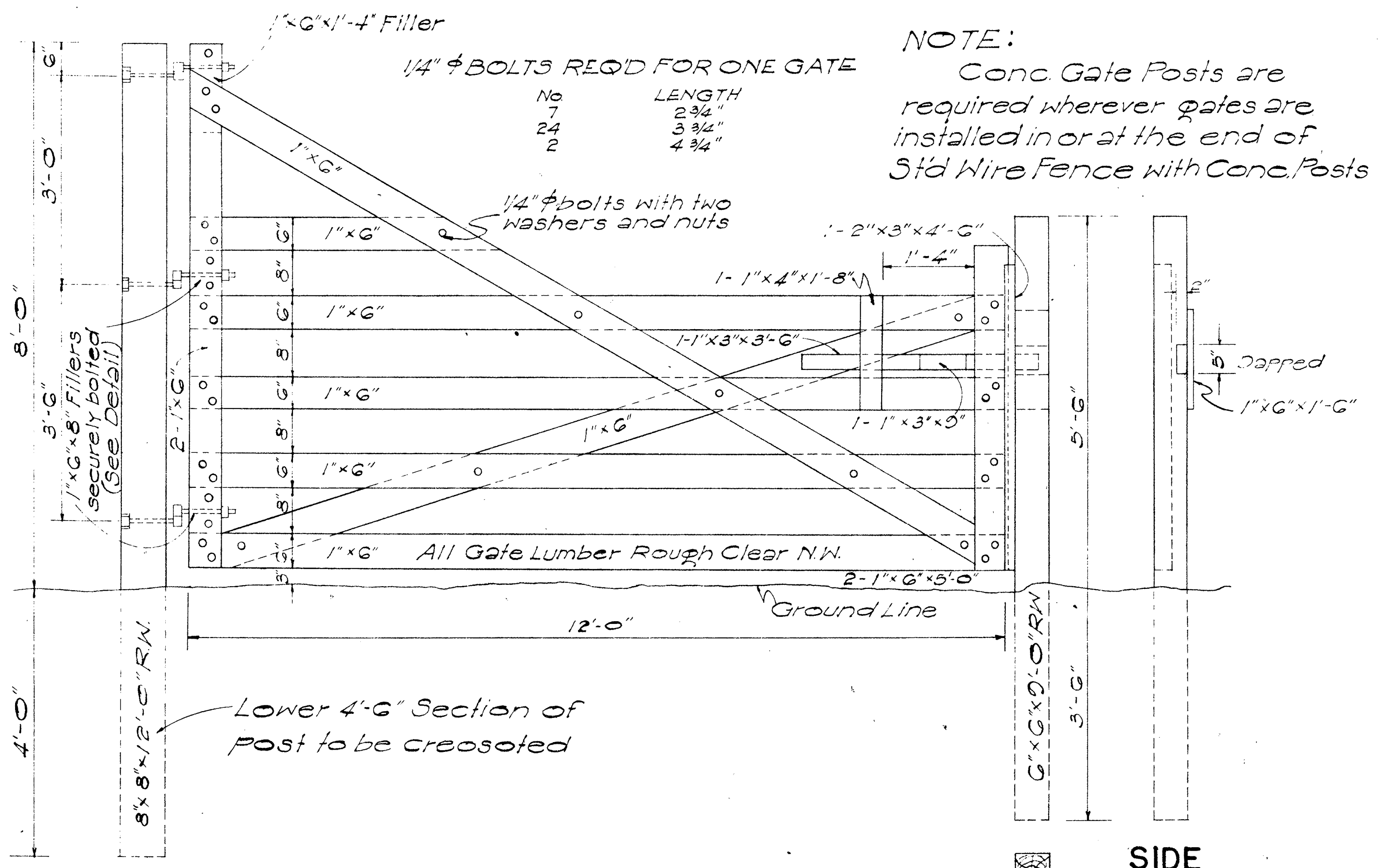
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY R. Y.	" 5-24-61
NOTE BOOK	TRACED BY	"
	DESIGNED BY O. M.	" 5-24-61
No.	QUANTITIES BY	"
	CHECKED BY	"

LIETZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

2/17/59

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	U-072-1(3)	1963	52	246
		U-098-1(4)	1963	22	88
		F-090-1(2)	1963	18	83

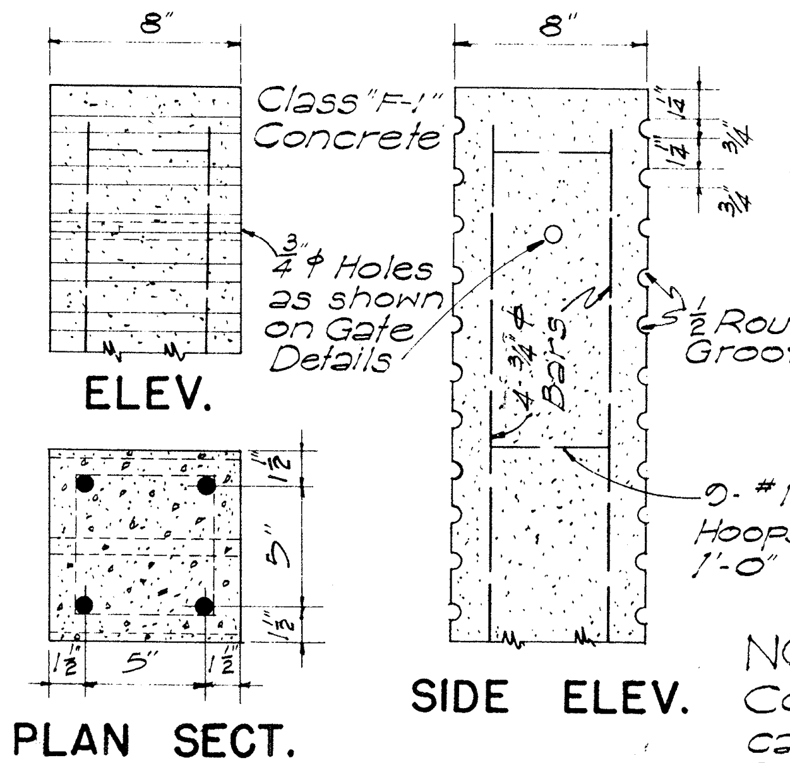
AUG. 1957



NOTE:
Conc. Gate Posts are required wherever gates are installed in or at the end of Std Wire Fence with Conc. Posts

DETAIL OF CATTLE GATE

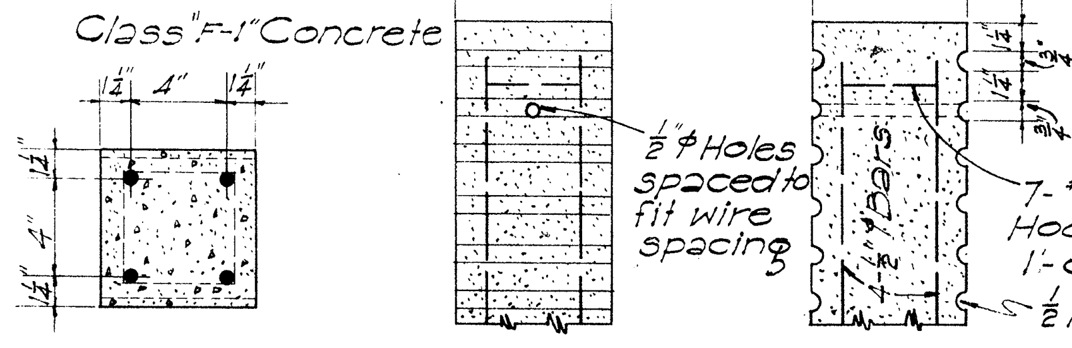
Scale: 1/2" = 1' - 0"



CONC. GATE POST

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

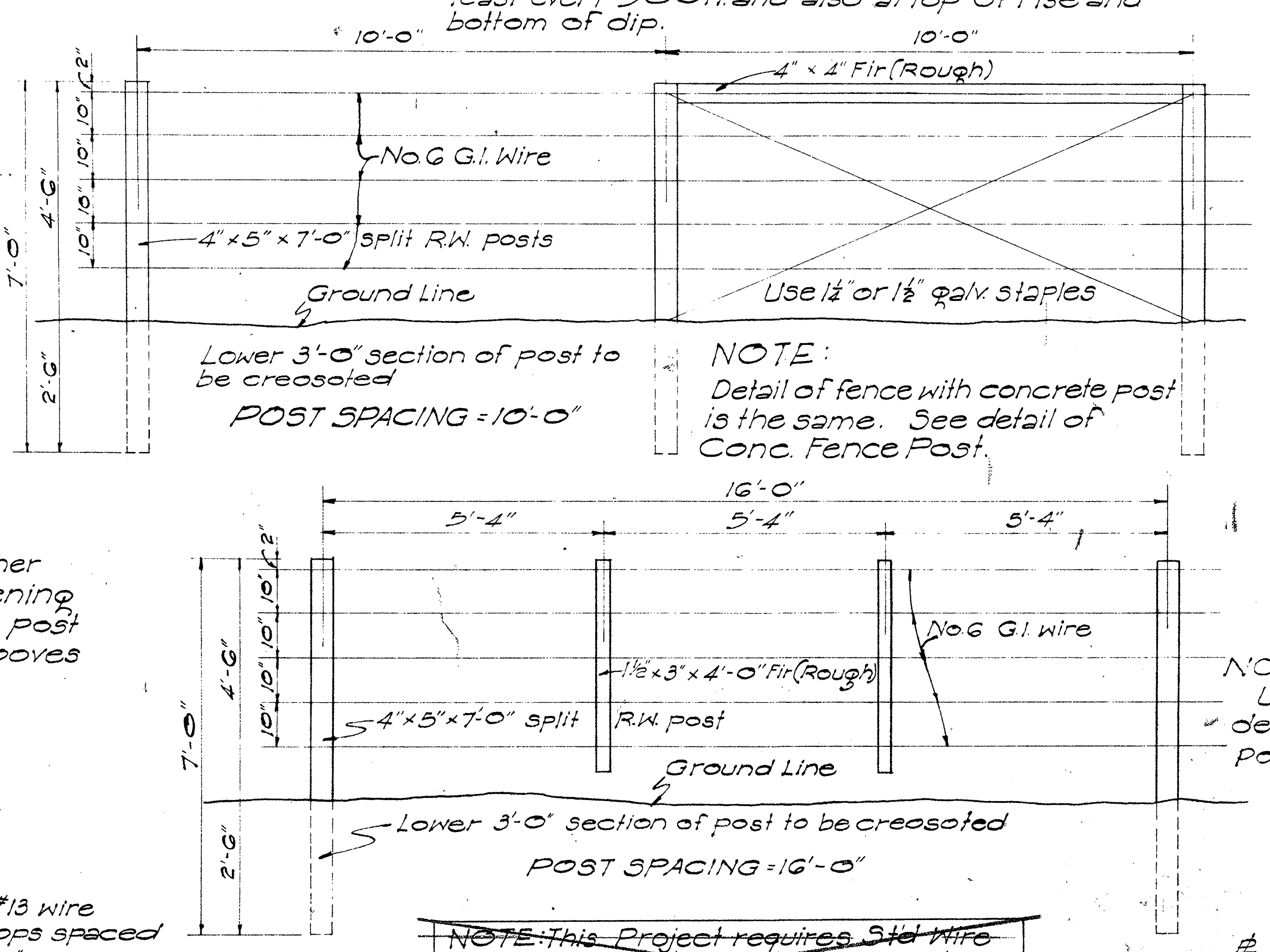
NOTE:
Contractor may either cast holes for fastening fence wire or cast post with 3/4" - 1/2 round grooves on 2 sides.



CONC. FENCE POST

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

Note: Fence must be anchored against pull at least every 500 ft. and also at top of rise and bottom of dip.



NOTE:
Detail of fence with concrete post is the same. See detail of Conc. Fence Post.

NOTE:
Use above detail for end post.

~~NOTE: This Project requires Std Wire Fence with ft. post spacing (If spacing is not indicated above use 16 ft)~~

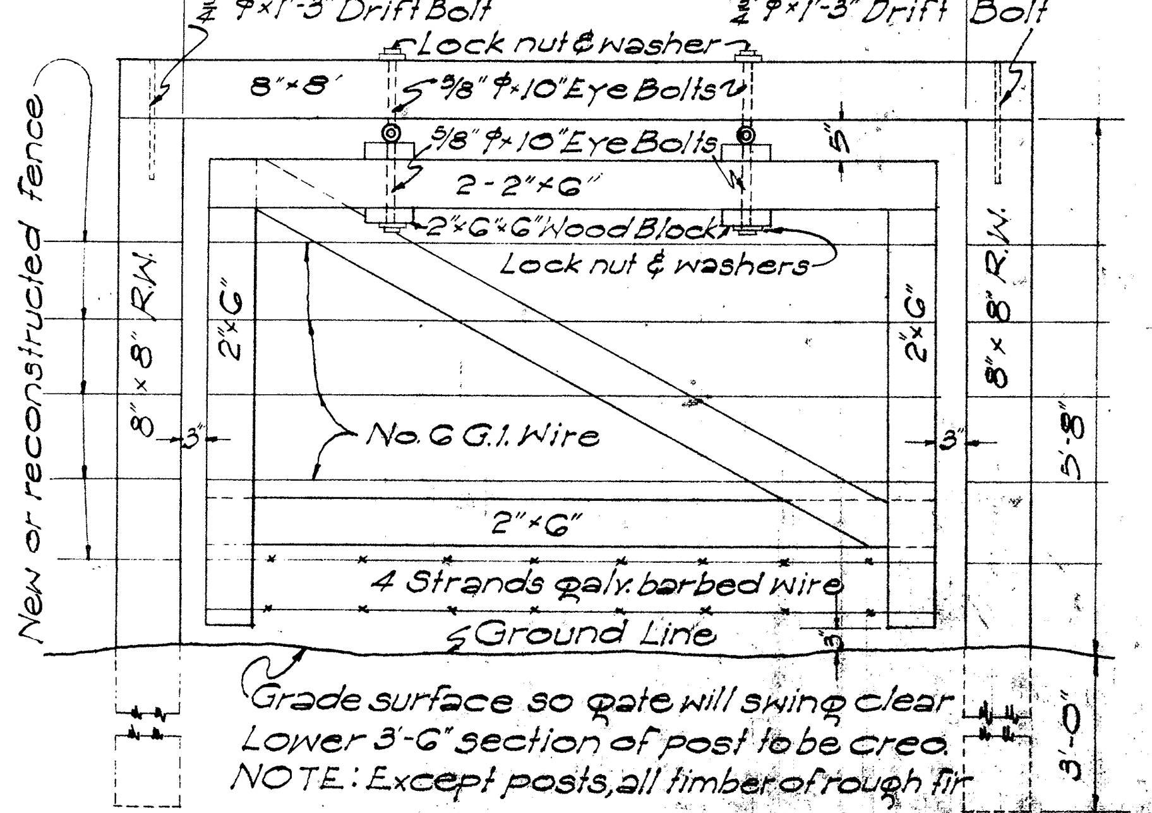
DETAILS OF STANDARD WIRE FENCE WITH WOOD POSTS

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

℄
Position in relation to ℄ in front of each separate property must be secured from the Engineer.

Note to Engineer: Fence must be on Road R/W to participate in Federal Aid. Consult office if uncertain what to do.

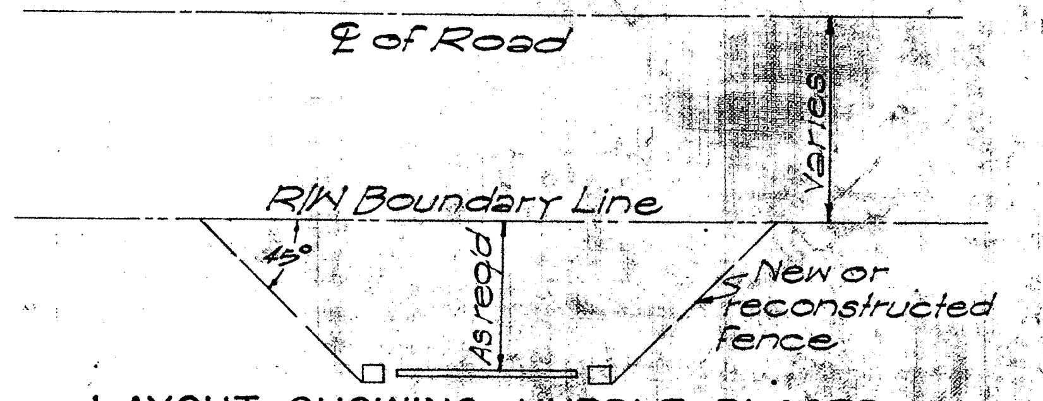
8'-0" opposite Box Culverts 6'-0" wide
10'-0" " " " 8'-0" "



Grade surface so gate will swing clear
Lower 3'-6" section of post to be creo.
NOTE: Except posts, all timber of rough fir

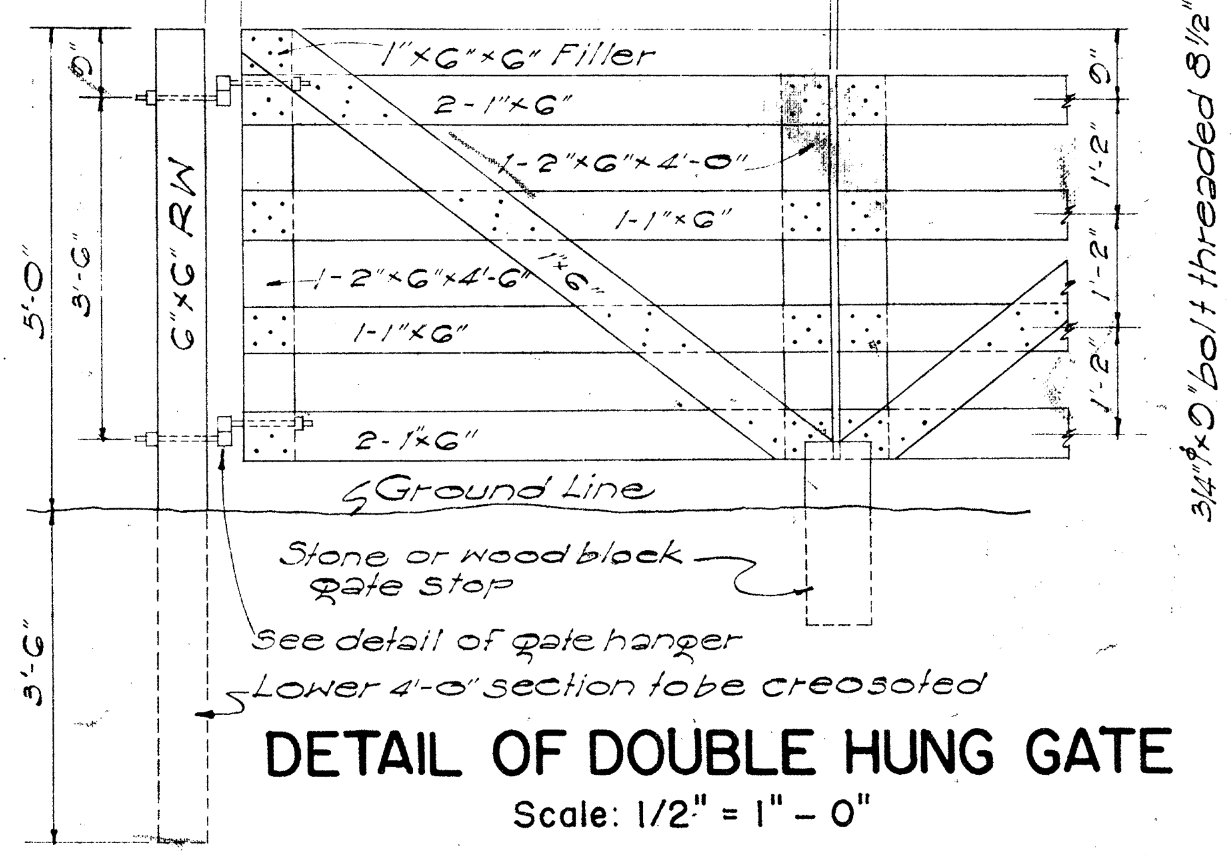
ELEVATION

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



LAYOUT SHOWING HURDLE PLACED BELOW CULVERT IN A POSITION WHICH WILL BE CATTLE TIGHT

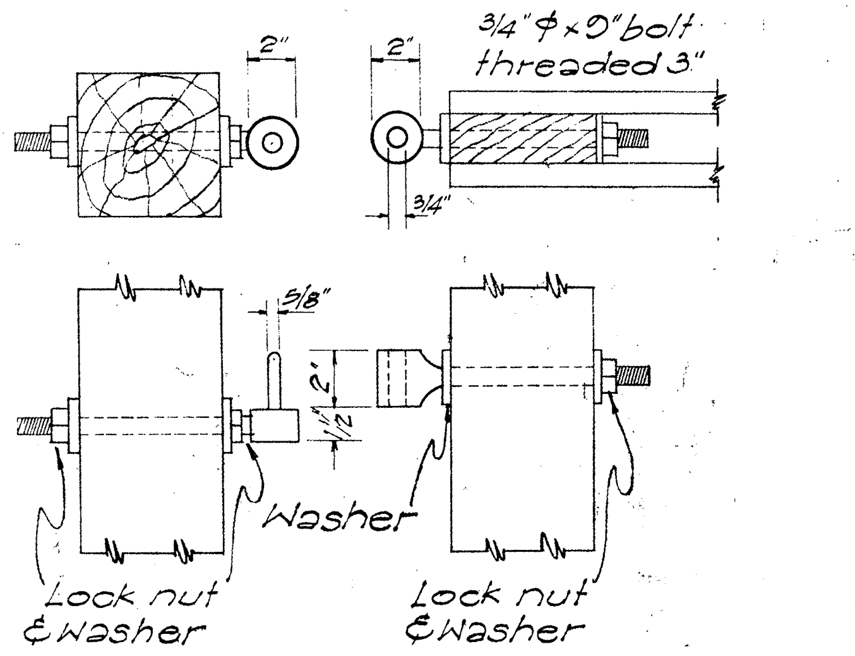
DETAILS OF HURDLE



DETAIL OF DOUBLE HUNG GATE

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

See note regarding use of Conc. Posts

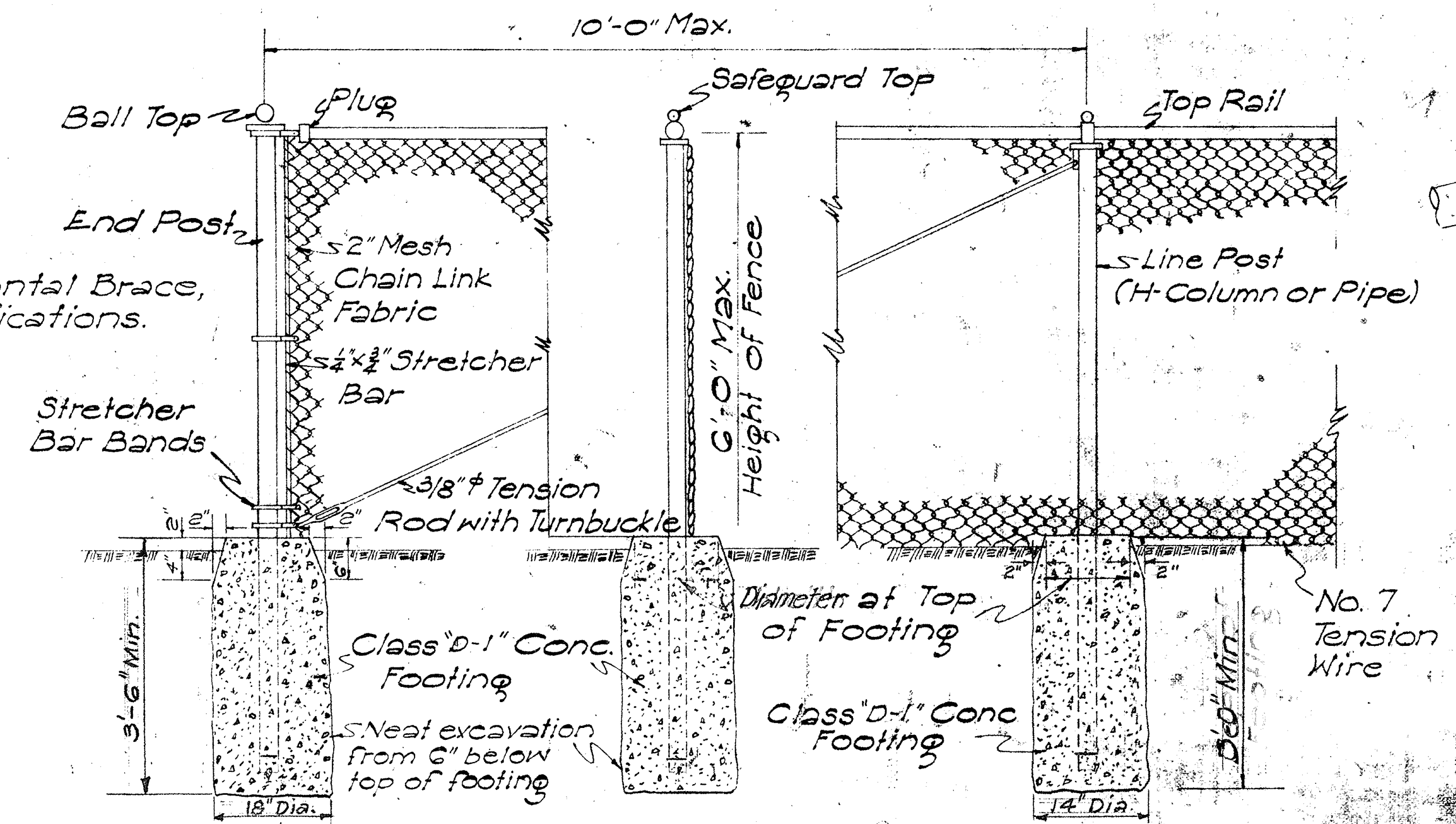


DETAIL OF GATE HANGER

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

Note: Use 3/4"⌀×11" bolts for Cattle Gate

For Horizontal Brace, see Specifications.



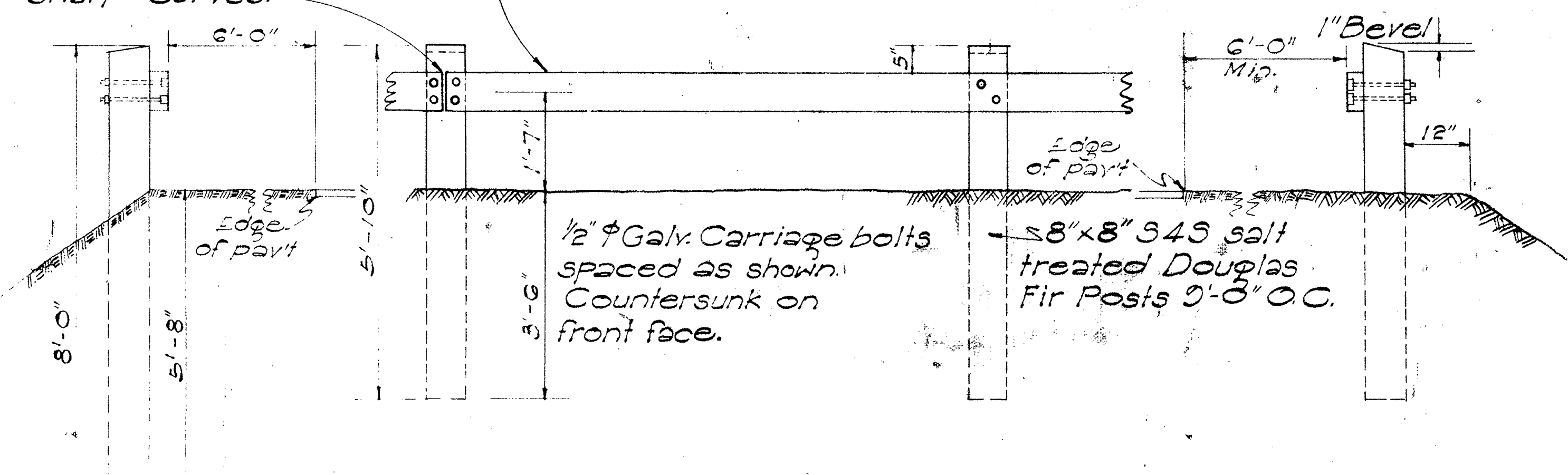
DETAIL OF CHAIN LINK FENCE

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

Butt Joints to be left open approx. 1/2" spaced every other post except on sharp curves.

4"×8"×18'-0" S4S railing painted 3 coats of white paint. Contact surfaces between posts and rails and all butt joints shall be Painted 3 coats before assembly

NOTES:
All bolt holes in posts shall be drilled before being salt treated.
Posts shall be painted the same as called for in the railing.



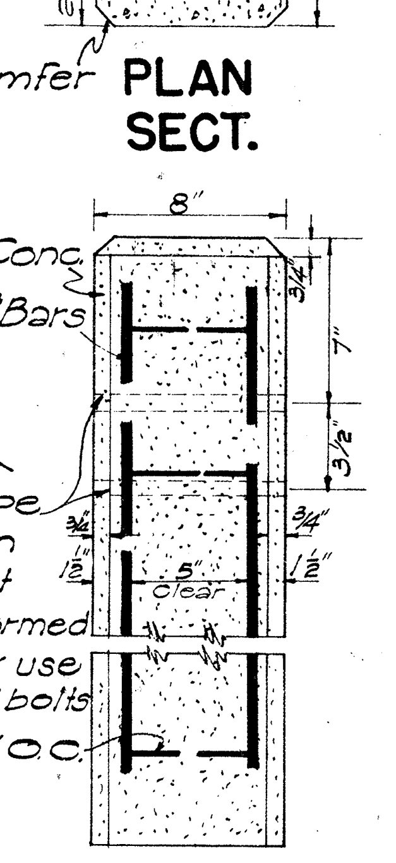
8"×8"×8'-0" S4S salt treated Douglas Fir or 8"×8"×8'-0" precast Concrete Posts shall be used where shoulders are less than 8'-0" wide.

WOOD GUARD RAIL WITH WOOD POSTS

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

NOTE: For Conc. Post see detail at right

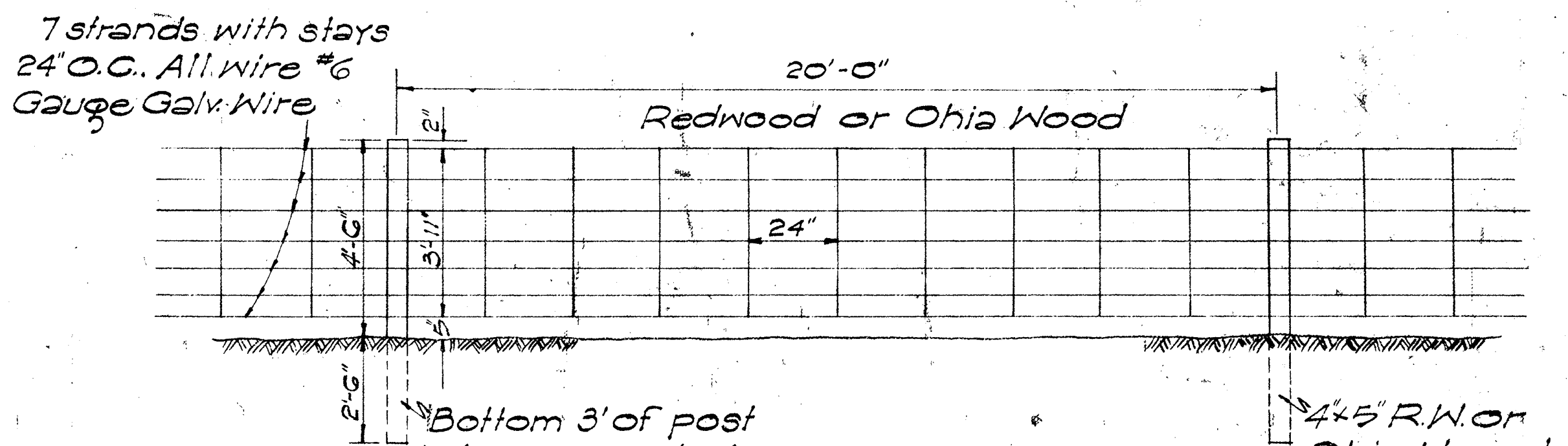
GUIDE POSTS: Wood or Conc. Guide Posts are the same as those used for Wood Guard Rail spaced as shown on plans.



NOTE:
All concrete posts shall be precast

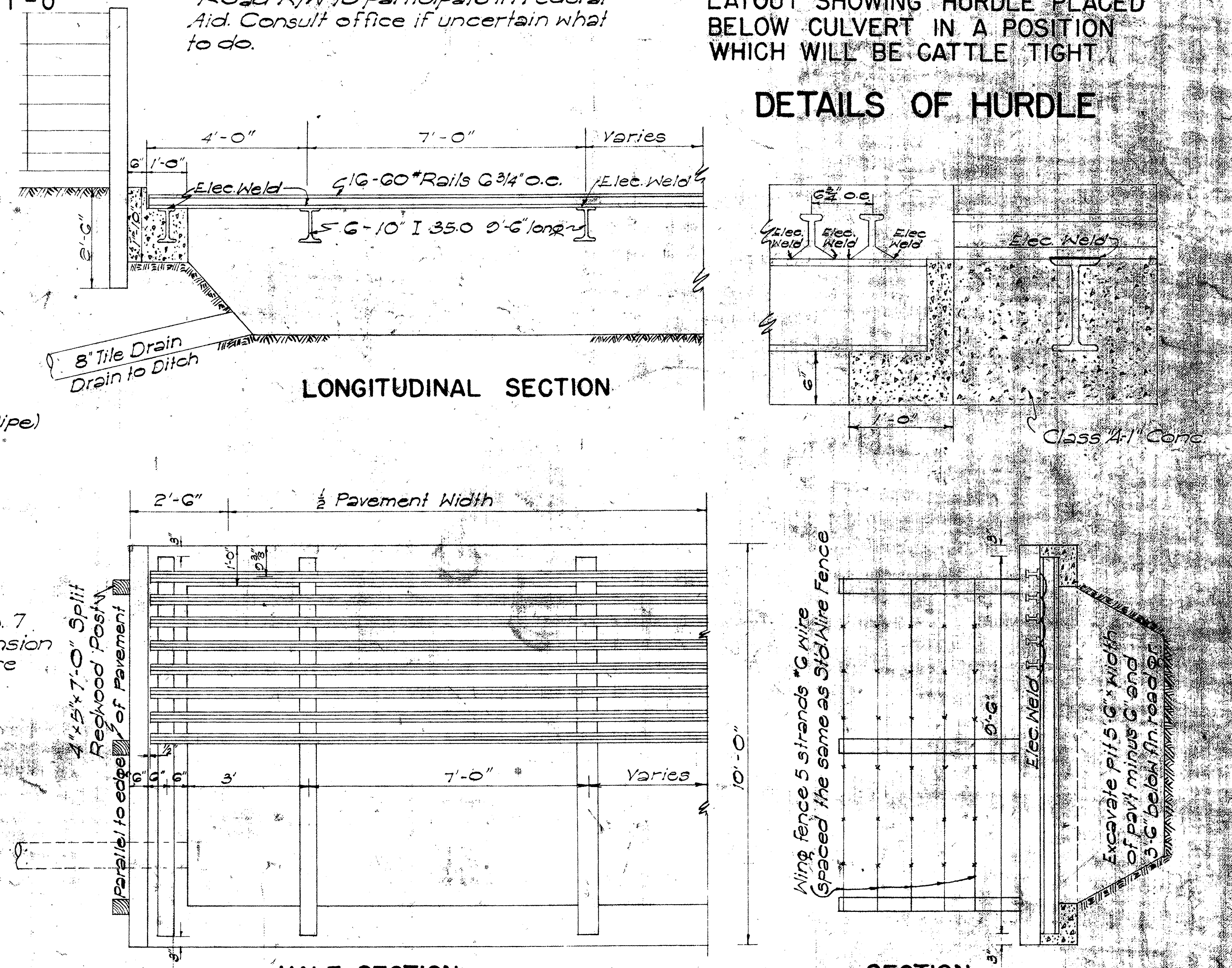
DETAIL OF CONC. POST

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



DETAIL OF WOVEN WIRE FENCE

Scale: 1/4" = 1' - 0"



DETAIL OF CATTLE GUARD

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

APPROVED: DATE: Aug. 26, 1959
STATE HIGHWAY ENGINEER

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII

STANDARD DETAILS

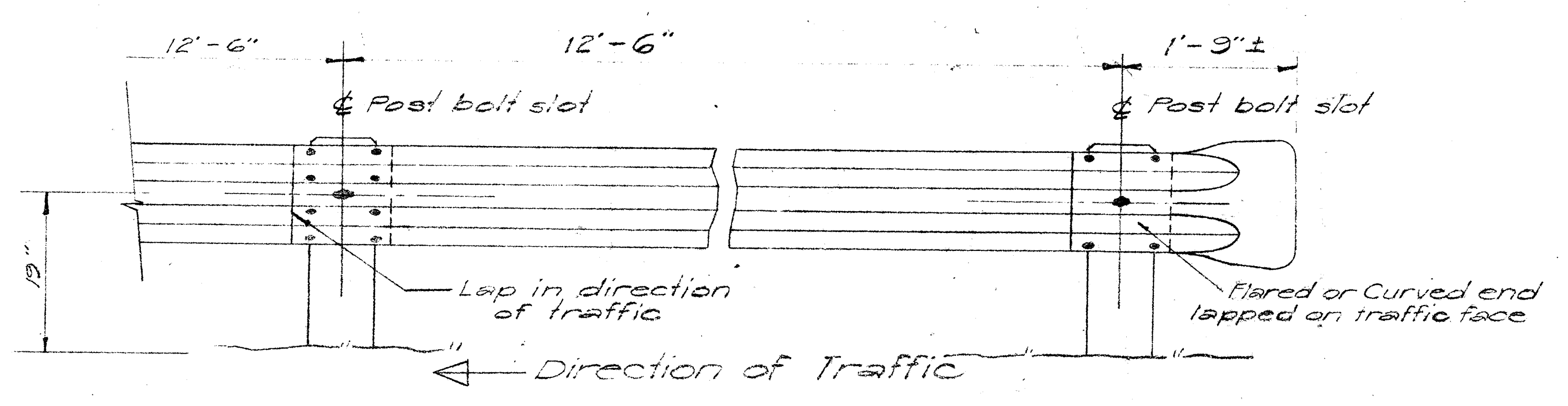
FENCES, GATES, GUARD RAILS, GUIDE POSTS, CATTLE GUARD

SCALES AS NOTED

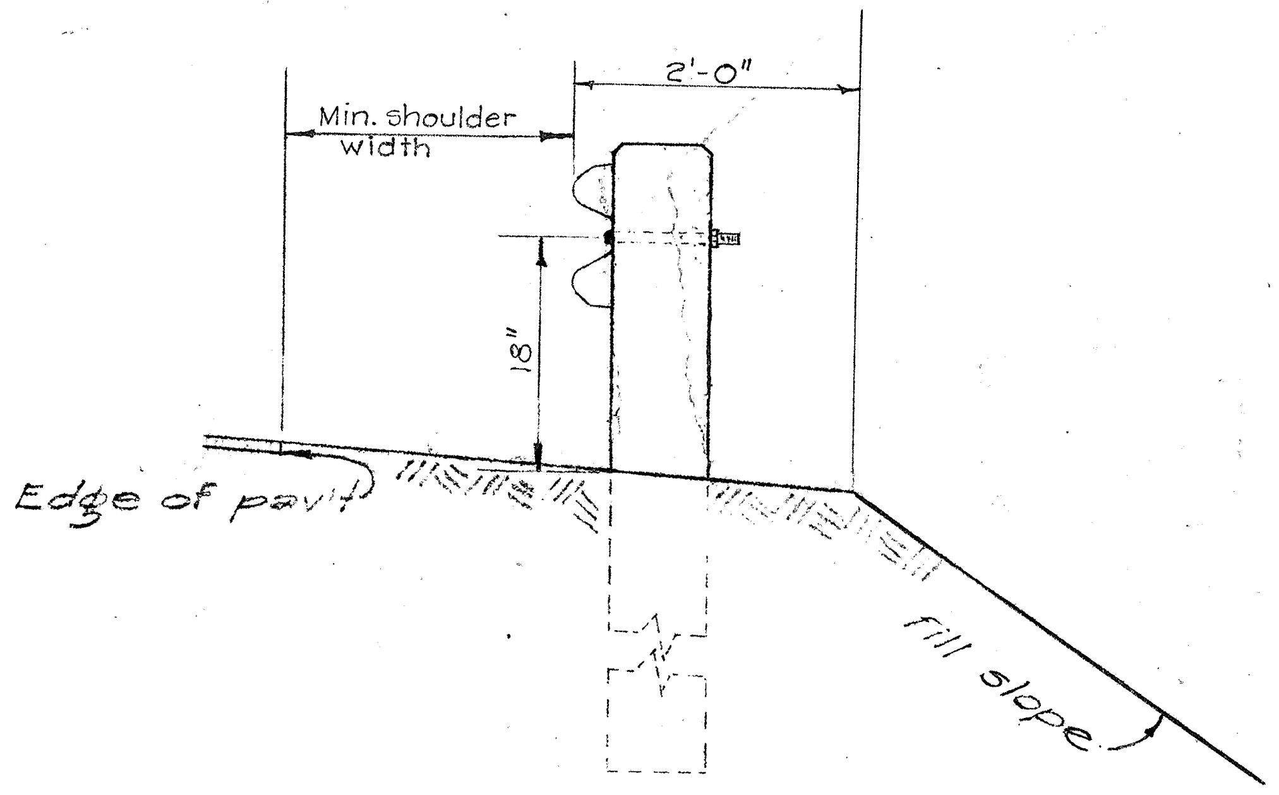
SHEET № 7 OF 8 SHEETS

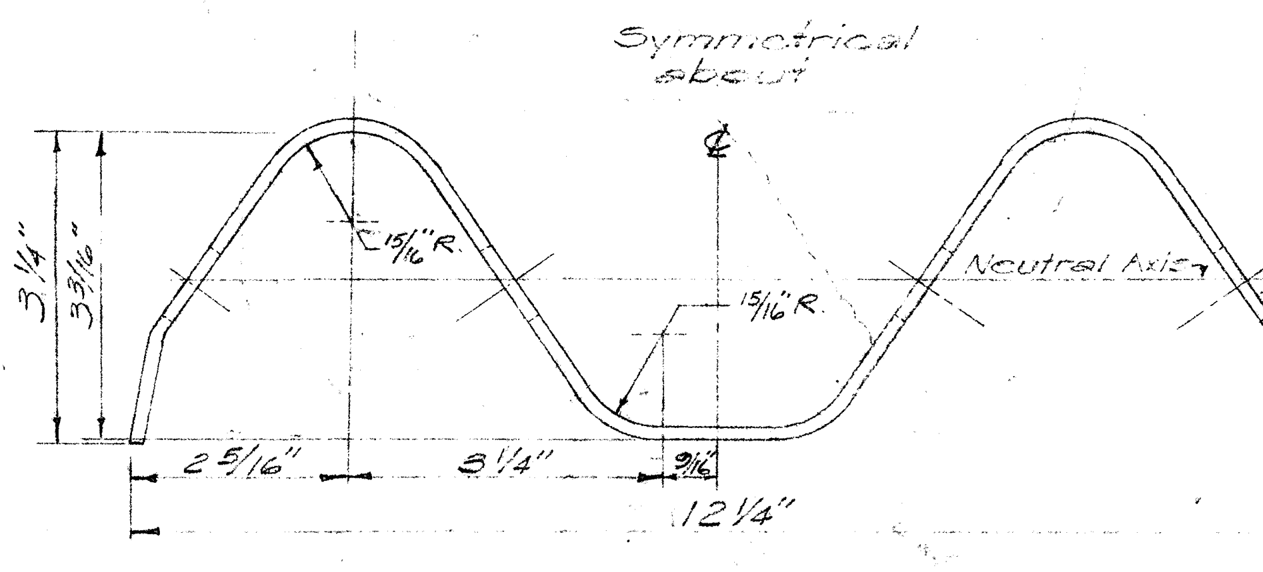
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DESIGNED BY	
	DRAWN BY	
NOTE BOOK	TRACED BY L. Calistro	
No.	QUANTITIES BY	
	QUANTITIES CHECKED BY	
	CHECKED BY	

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW.	U-072-1(3)	1963	53	246
		U-098-1(4)	1963	23	88
		F-090-1(2)	1963	19	93

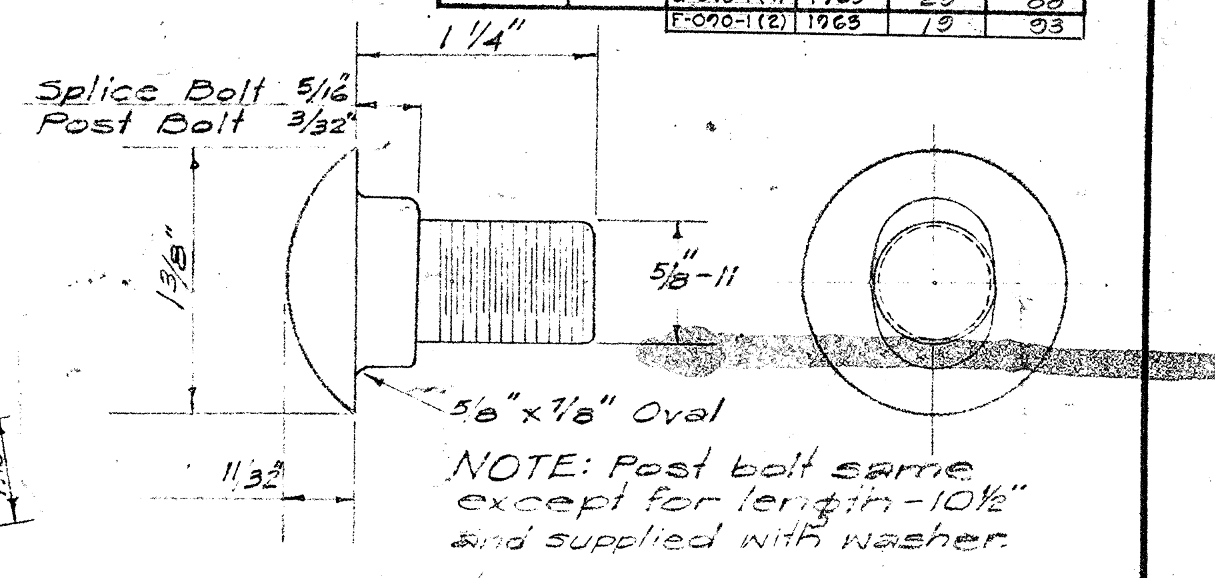


METAL GUARDRAIL
Scale: 3/4"=1'-0"



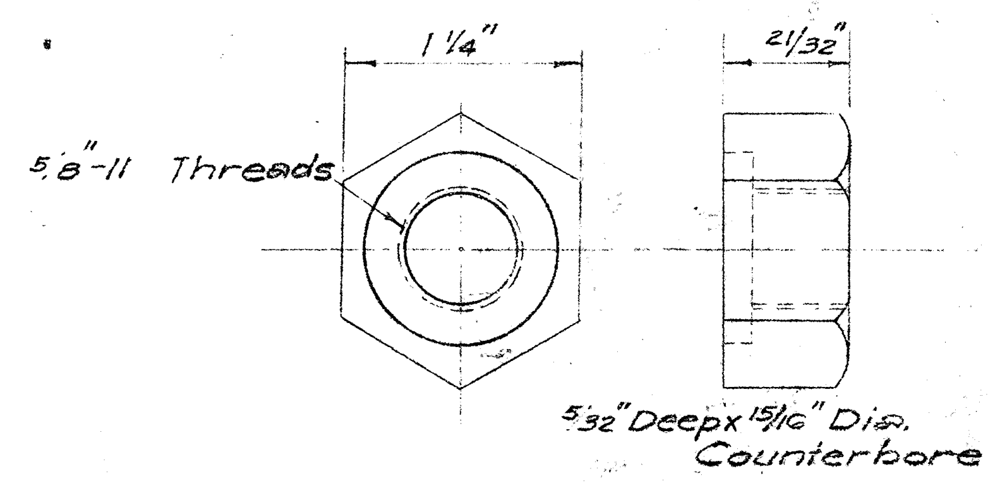


RAIL ELEMENT SECTION
Scale: Half Size

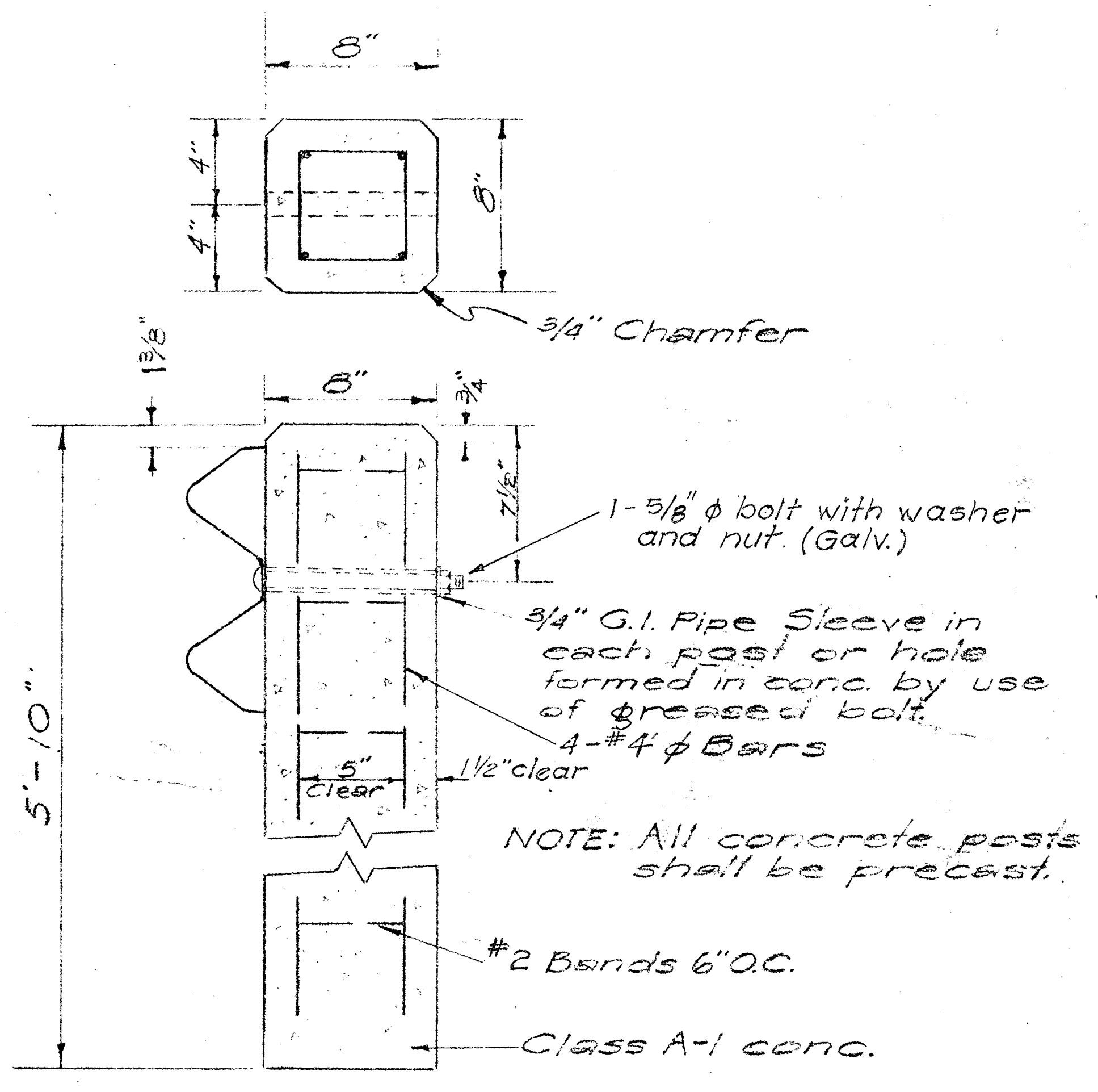


NOTE: Post bolt same except for length - 10 1/2" and supplied with washer.

SPLICE BOLT
POST BOLT
Scale: Full Size



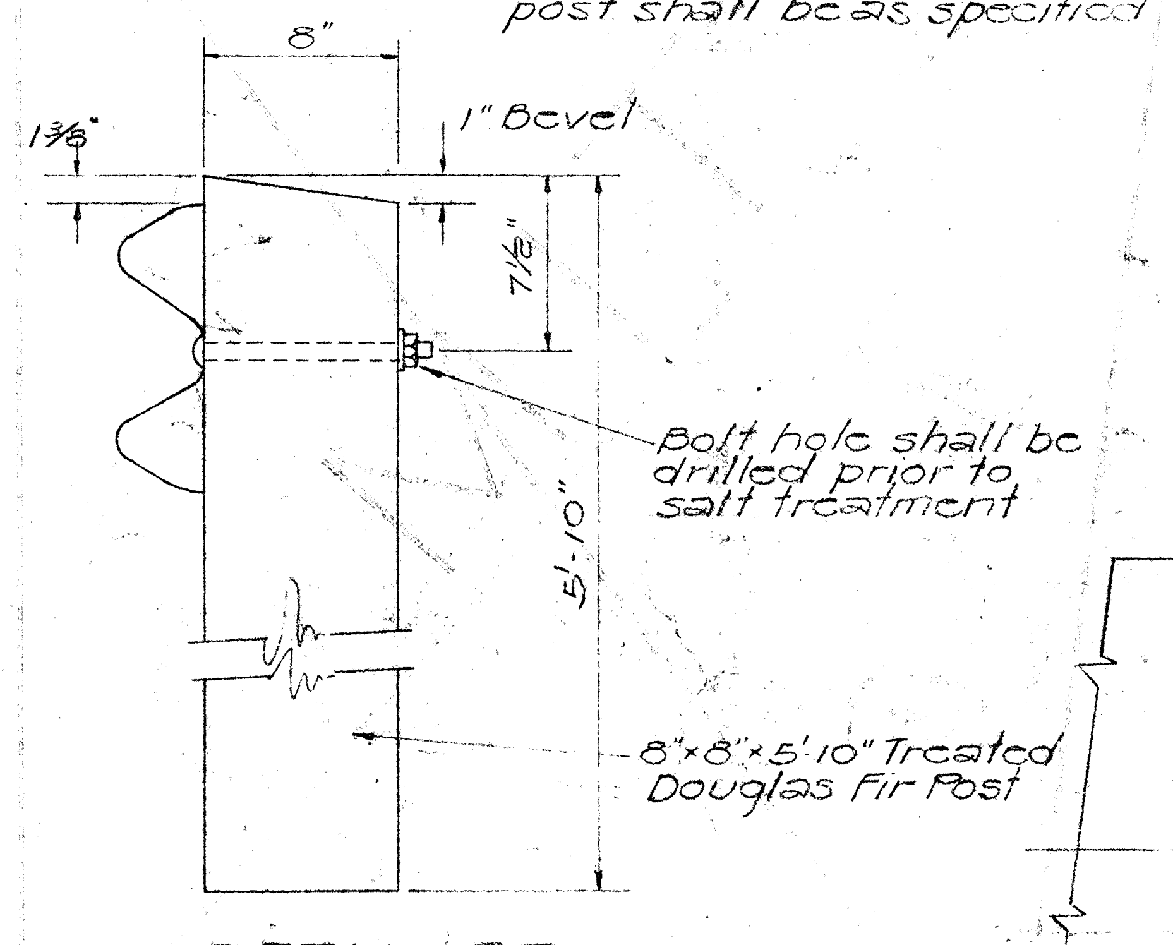
HEXAGON NUT
Scale: Full Size



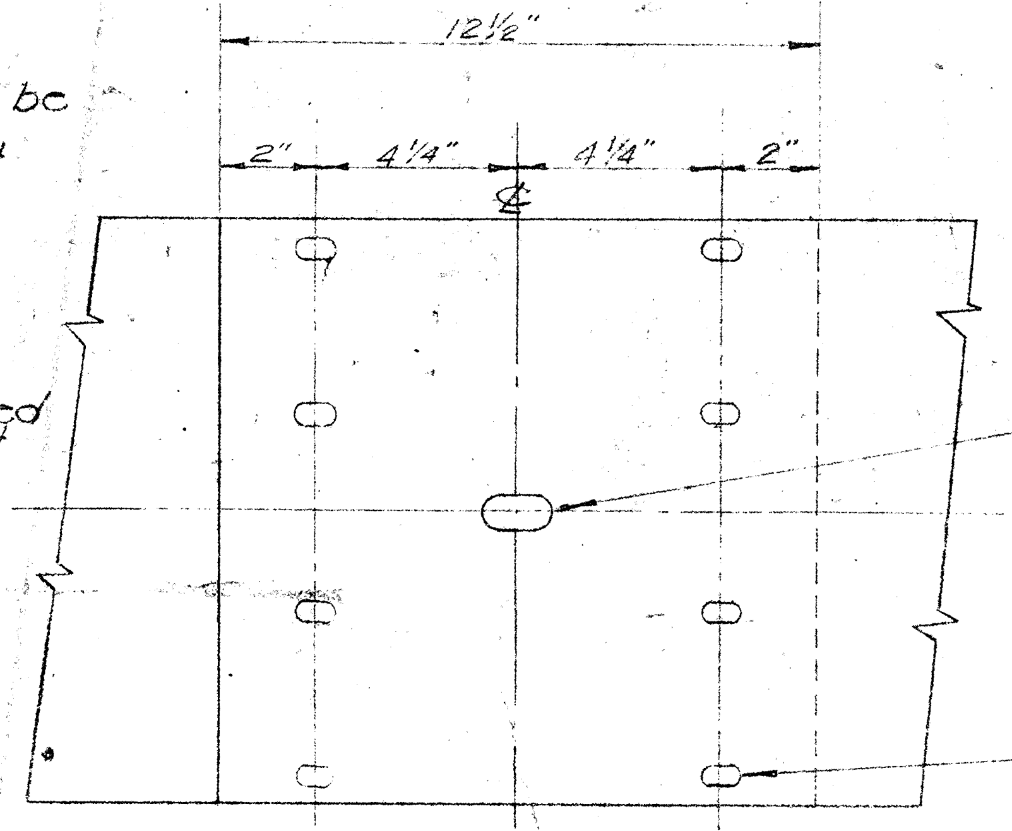
NOTE: All concrete posts shall be precast.

DETAIL OF
CONC. POST
Scale: 1 1/2"=1'-0"

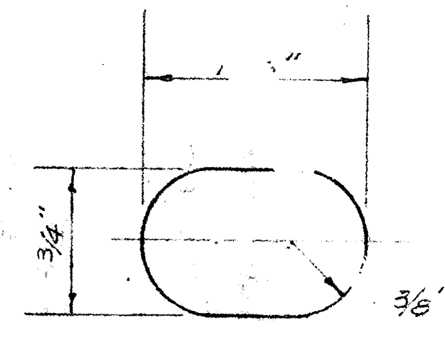
NOTE:
1- Timber post shall be surfaced on four sides (S4S) and chamfered.
2- Paint color for timber post shall be as specified.



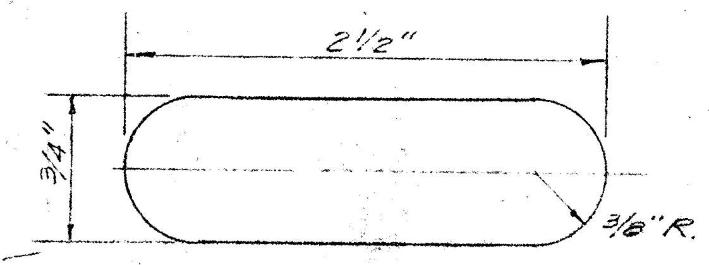
DETAIL OF
TIMBER POST
Scale: 1 1/2"=1'-0"



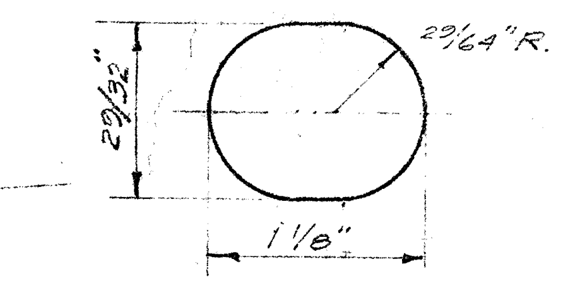
RAIL SPLICE
Scale: 3"=1'-0"



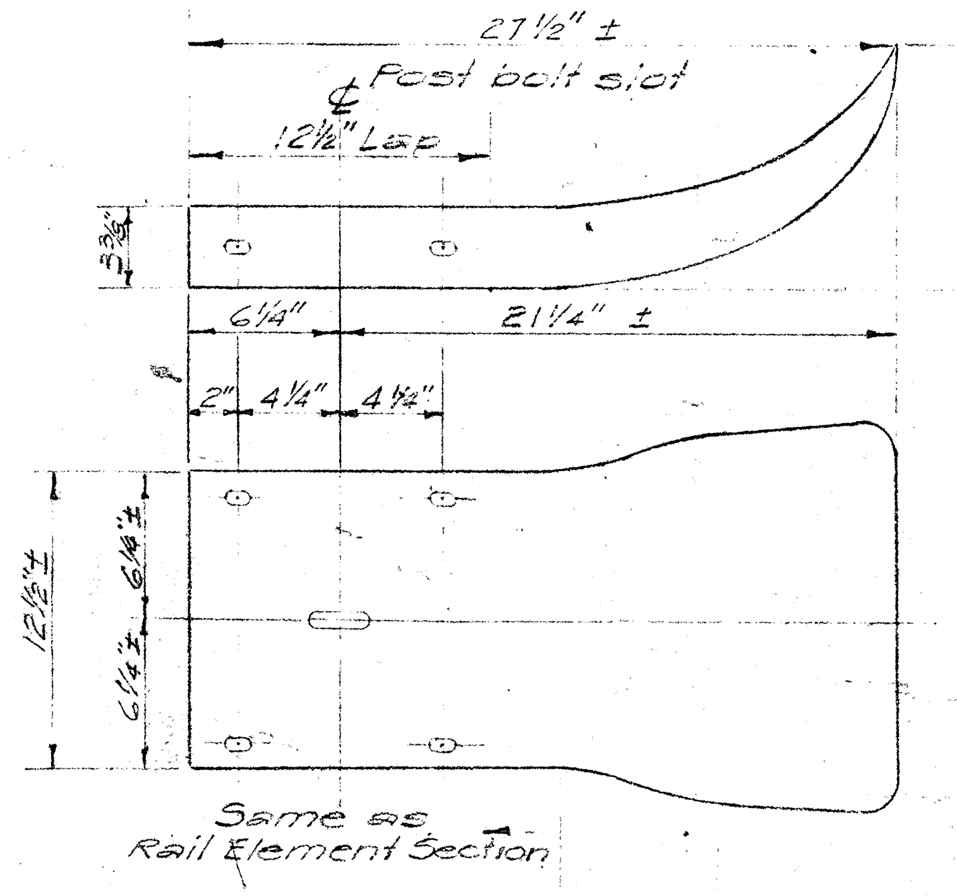
SPLICE BOLT SLOT
FOR ALL ENDS
Scale: Full Size



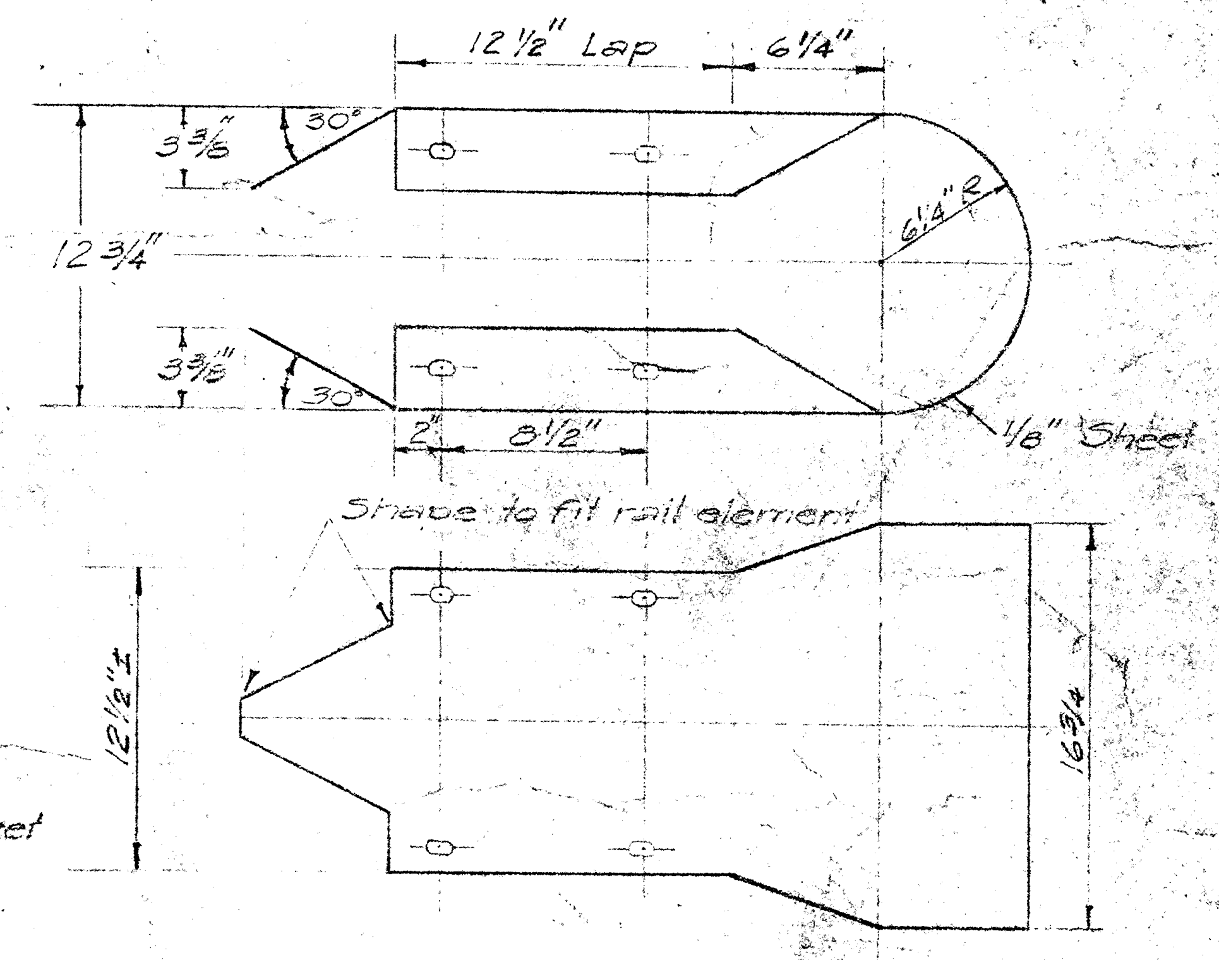
POST BOLT SLOT
Scale: Full Size



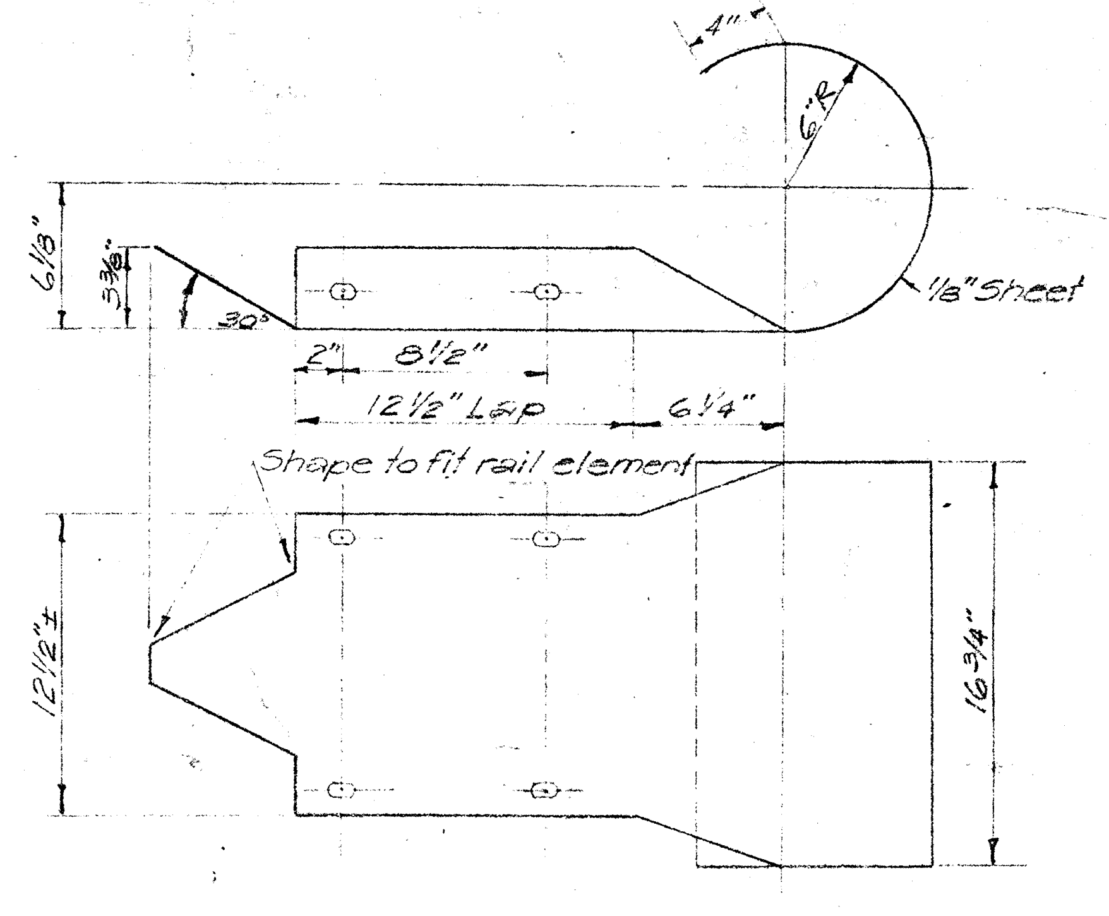
SPLICE BOLT SLOT
Scale: Full Size



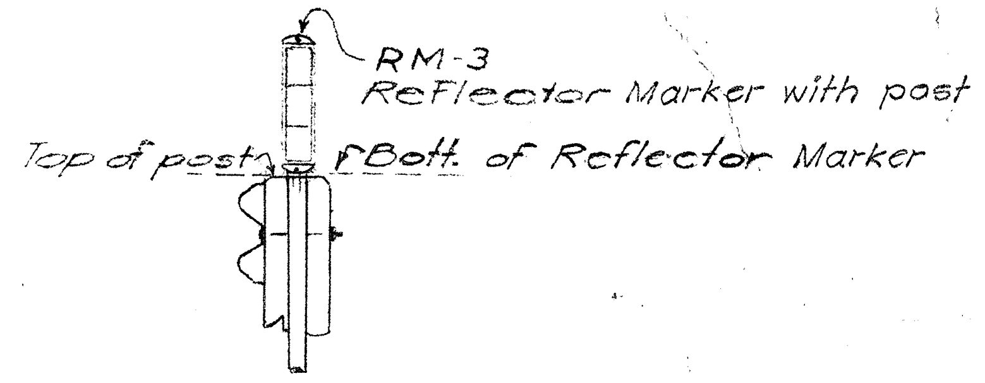
FLARED END
Scale: 1 1/2"=1'-0"



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

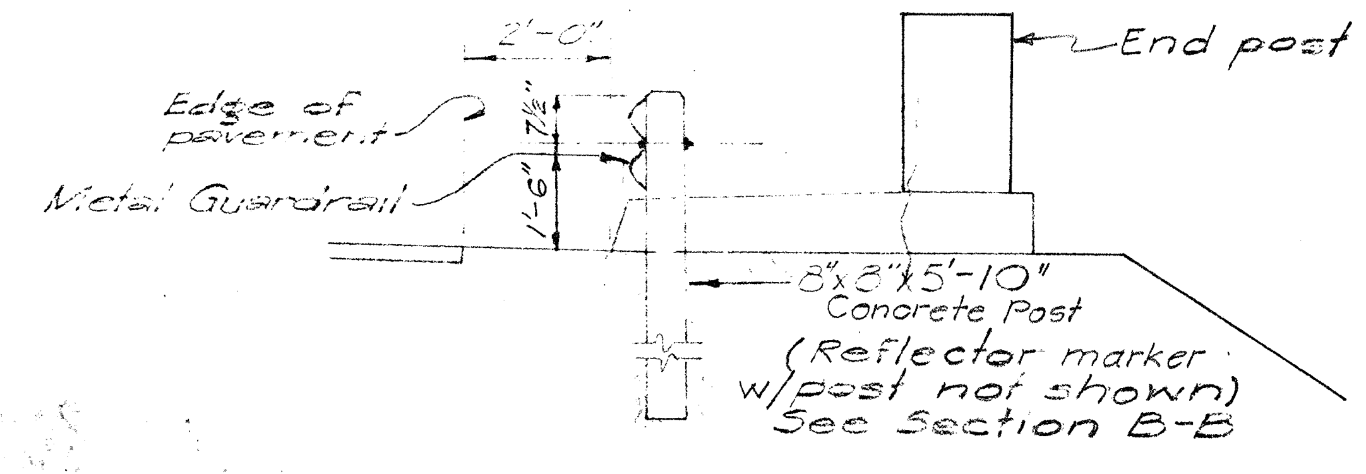


CURVED END
Scale: 1 1/2"=1'-0"

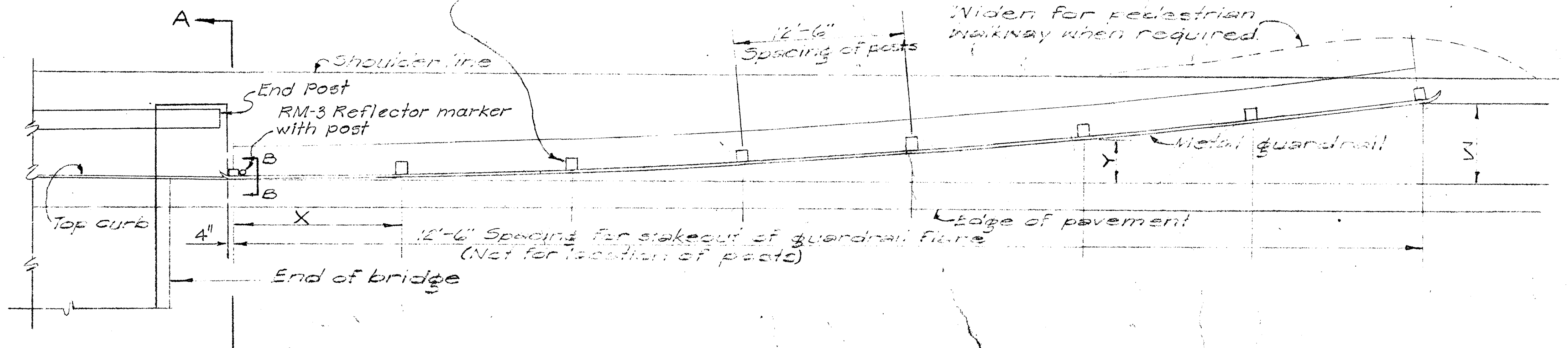


SECTION B-B
Scale: 1/2"=1'-0"

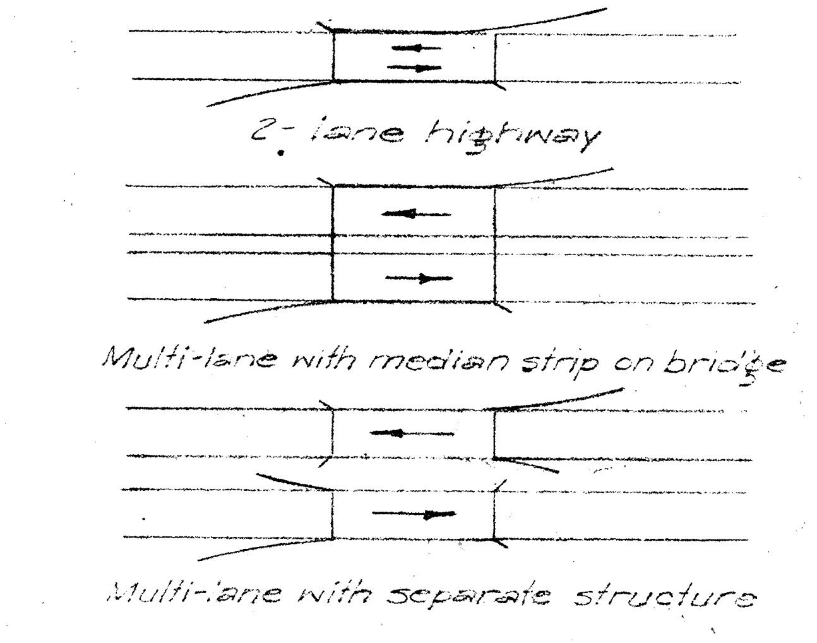
NOTE: See F.A. Marker and Misc. Sign Detail Sheet for details of RM-3 reflector marker with post.



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



PLAN - METAL GUARDRAIL FLARE
Scale: 1/8"=1'-0"



GUARDRAIL OFFSET

X	Y W=3'	W=4'	W=5'	W=6'	W=7'	W=8'
12.5	0.19	0.16	0.14	0.12	0.09	0.08
25.0	0.75	0.64	0.55	0.49	0.35	0.32
37.5	1.69	1.44	1.25	1.10	0.78	0.72
50.0	3.00	2.56	2.22	1.96	1.38	1.25
62.5		4.00	3.47	3.06	2.16	2.00
75.0			5.00	4.41	3.11	2.88
87.5				6.00	4.23	3.92
100.0					5.53	5.12
112.5					7.00	6.48
125.0						8.00

W = Guardrail flare.
X = Distance from post at bridge to offset points.
Y = Guardrail flare offset.

DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
STATE OF HAWAII

STANDARD DETAILS

METAL GUARD RAILS

LUNALILO FREEWAY U-072-1(3)
VINEYARD BOULEVARD U-098-1(4)
LILIHA STREET F-090-1(2)
SCALE: AS NOTED DATE: 1963

SHEET No. 8 OF 8 SHEETS

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