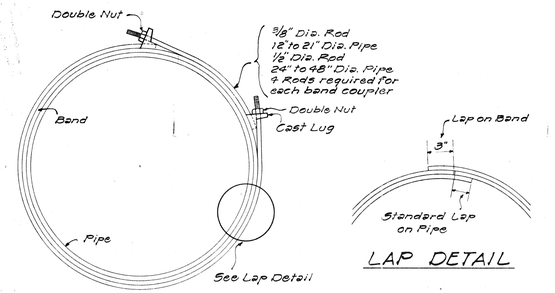
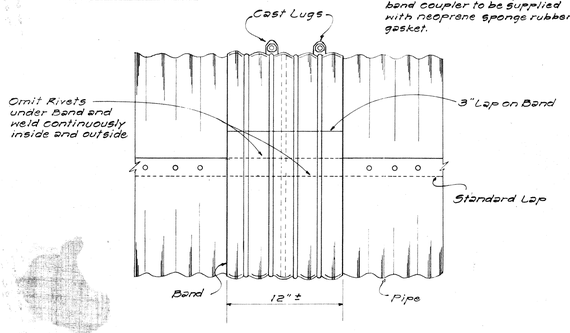
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	G-0570(1)	1964	23	47



END VIEW

LAP DETAIL

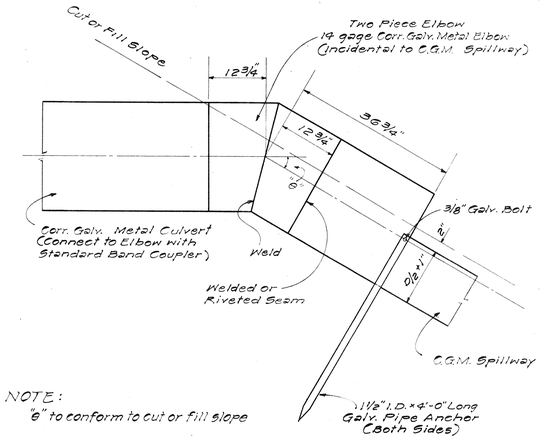
NOTE:
Each watertight band coupler to be supplied with neoprene sponge rubber gasket.



SIDE VIEW

DETAIL OF WATERTIGHT BAND COUPLER

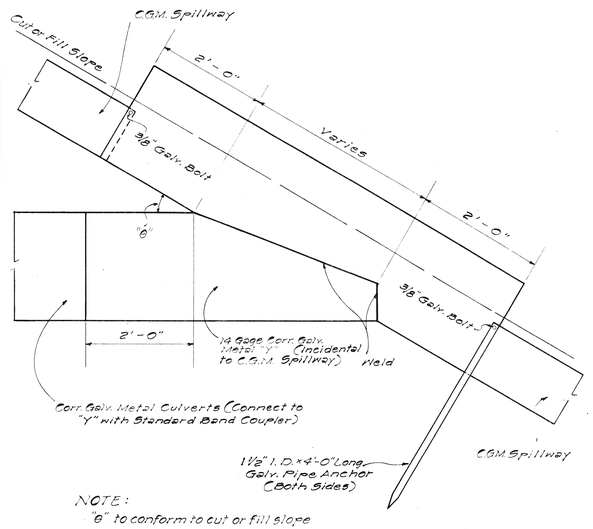
NOT TO SCALE



NOTE:
"6" to conform to cut or fill slope

DETAIL OF CULVERT TO SPILLWAY CONNECTION

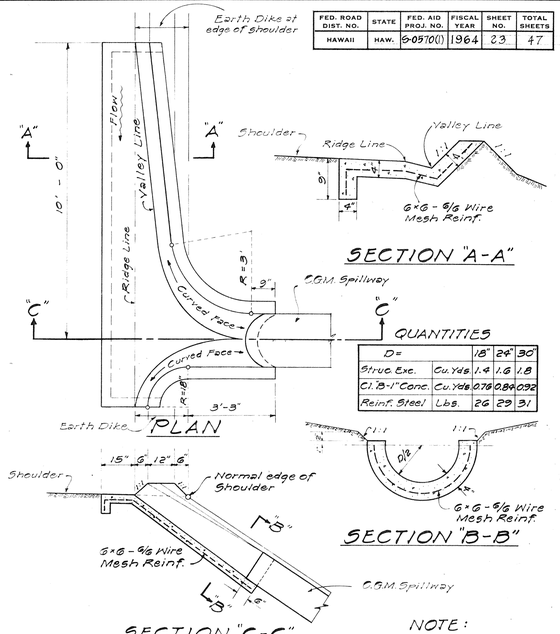
NOT TO SCALE



NOTE:
"6" to conform to cut or fill slope

DETAIL OF CULVERT TO SPILLWAY "Y" CONNECTION

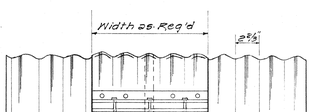
NOT TO SCALE



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

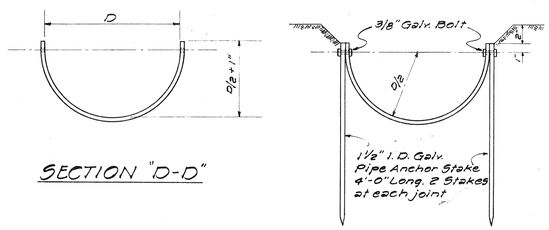


BAND DETAIL

SIDE VIEW

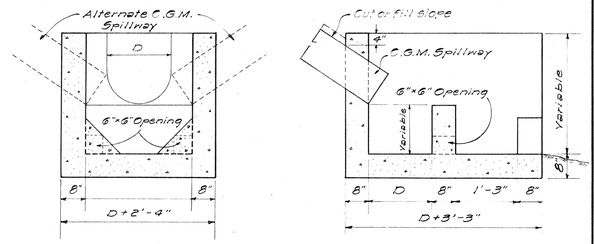
DETAIL OF STANDARD BAND COUPLER

NOT TO SCALE



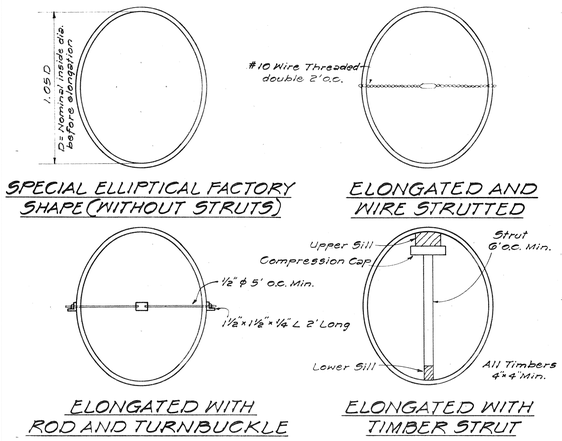
C.G.M. SPILLWAY

NOT TO SCALE



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

NOT TO SCALE



METHOD OF ELONGATING AND STRUTTING CORRUGATED PIPE

NOT TO SCALE

APPROVED: DATE 8-14-64
DIRECTOR OF TRANSPORTATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

CORRUGATED GALVANIZED METAL CULVERTS, SPILLWAYS, AND SPECIAL DETAILS

SCALES AS NOTED

SHEET No. 23 OF SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	R.Y.	DATE 5-22-64
	DRAWN BY		
	TRACED BY		
NOTE BOOK	DESIGNED BY	O.M.	5-26-64
No.	QUANTITIES BY		
	CHECKED BY		

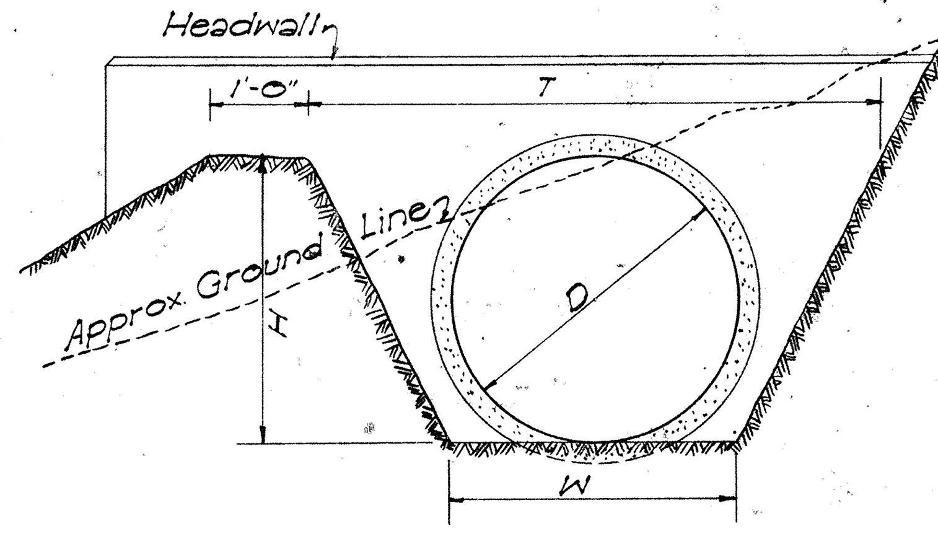
LIETZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

2/17/59

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	S-0570(1)	1964	24	47

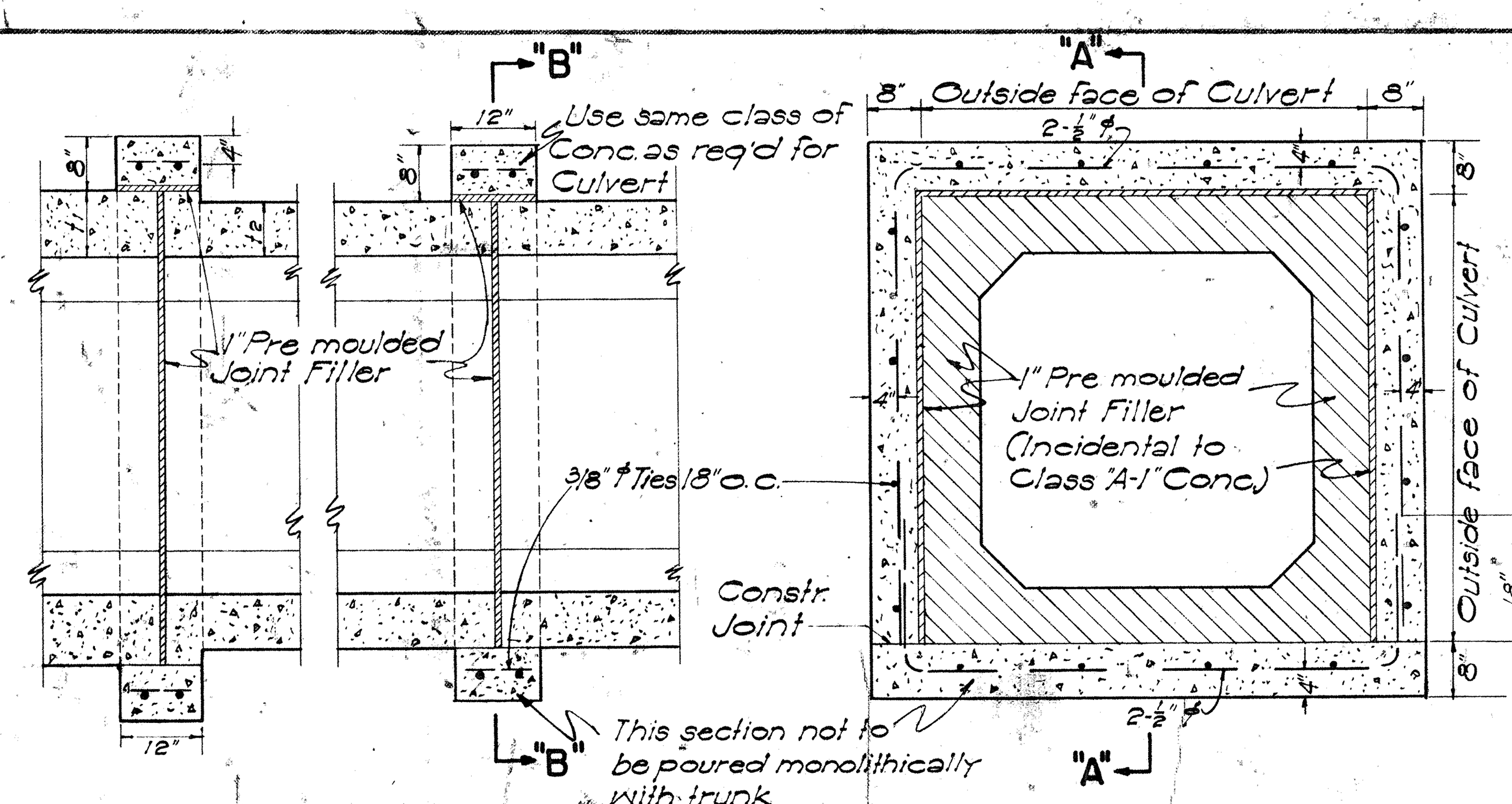
AUG. 1957

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"



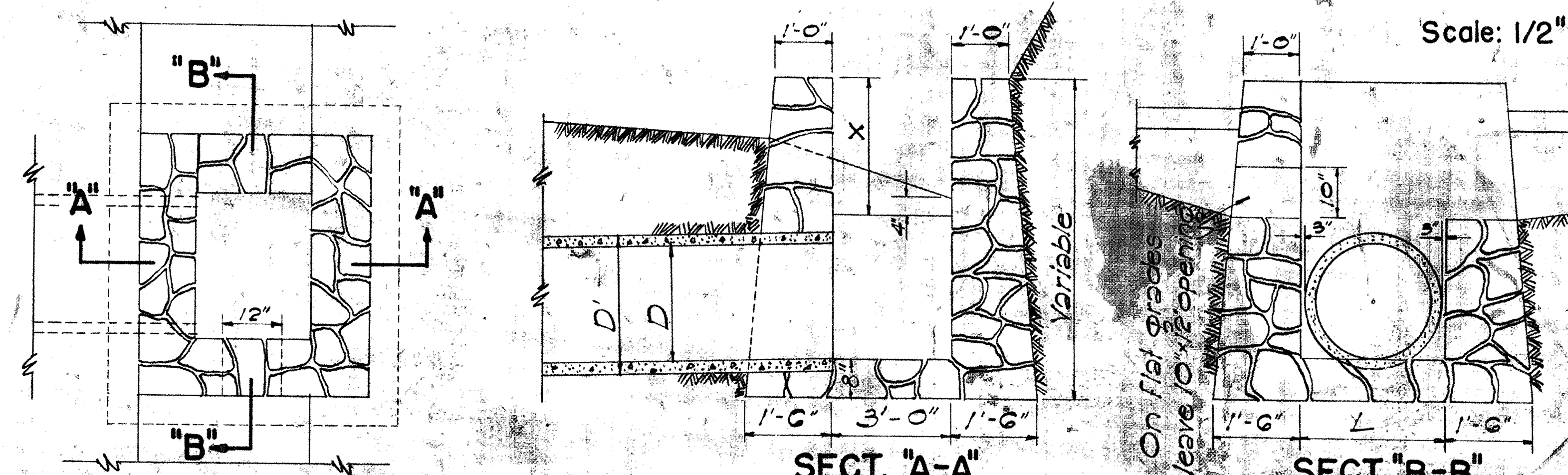
SECTION "A-A" SECTION "B-B"

CONC. COLLAR FOR CONC. BOX CULVERT

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

DATA FOR MASONRY DROP INTAKE				Where Variable Equals
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.



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.

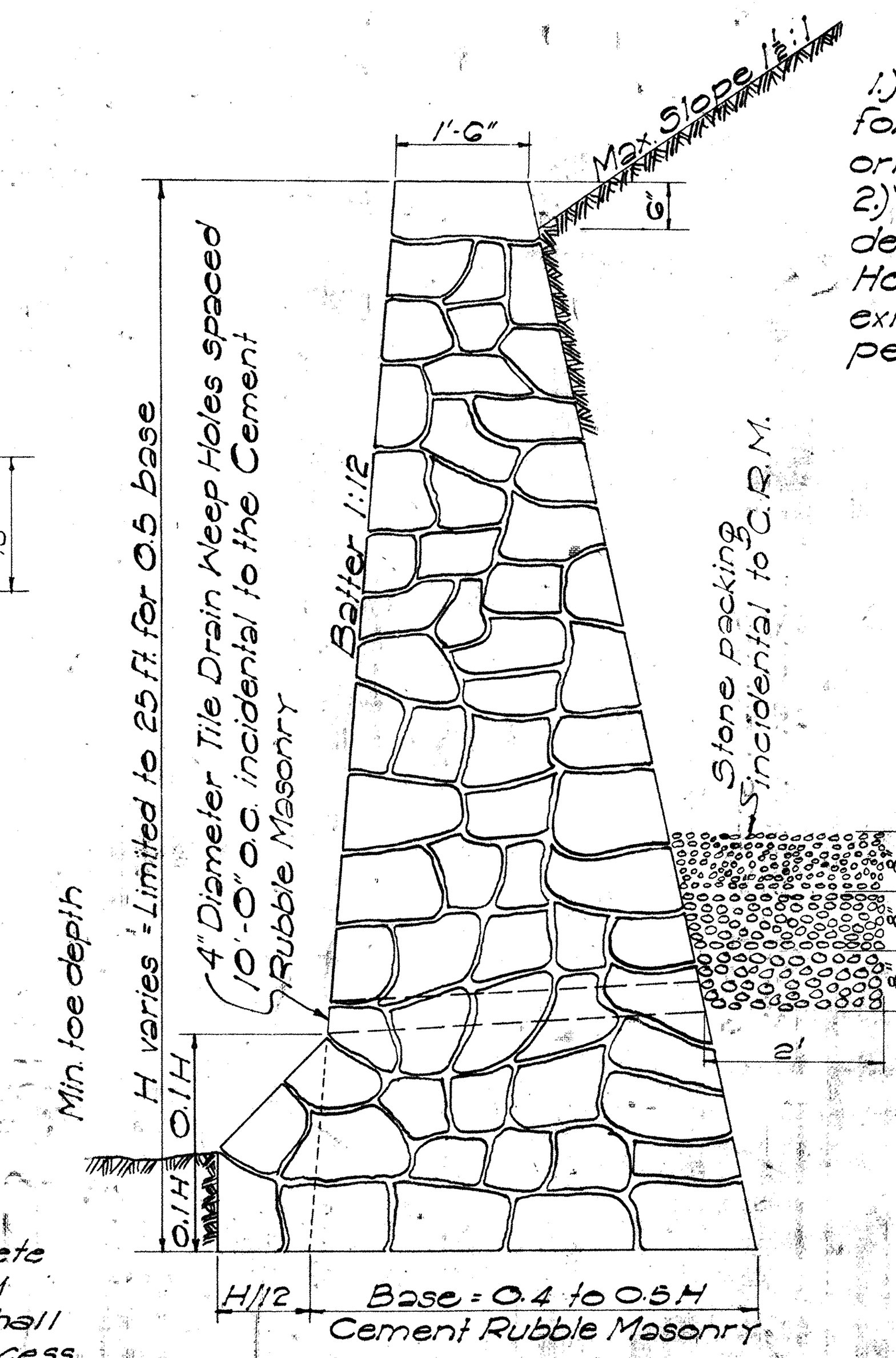
DETAIL OF MASONRY DROP INTAKE

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

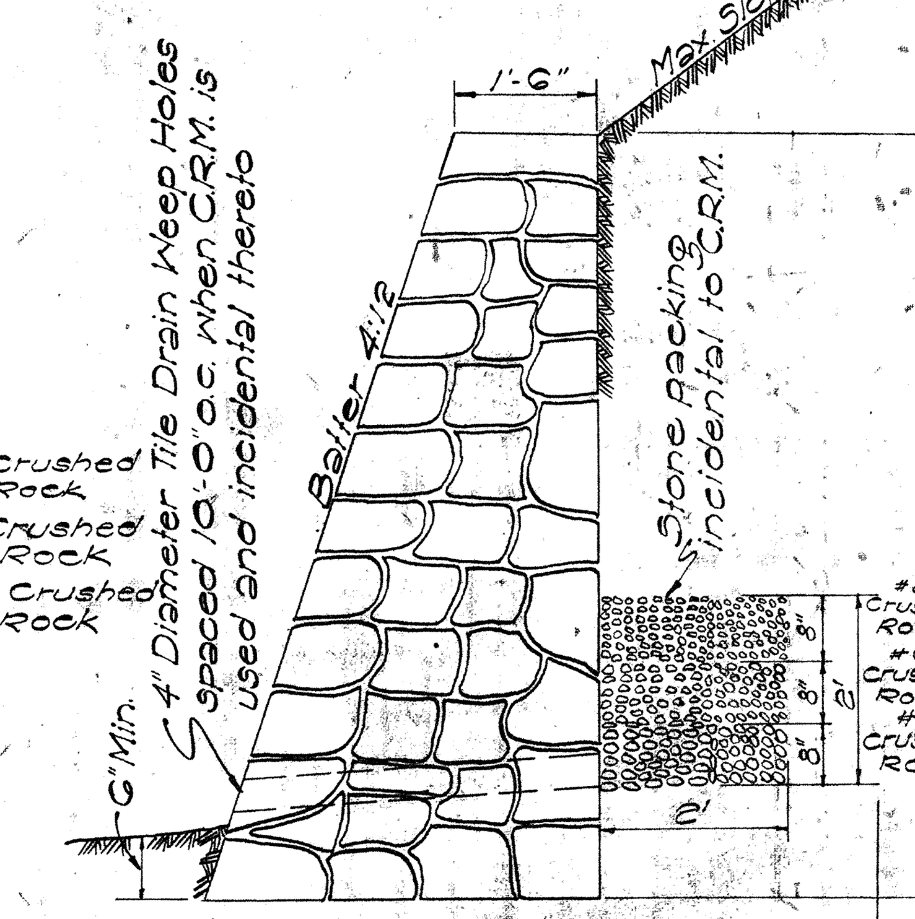
Note: To Resident Engineer

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.

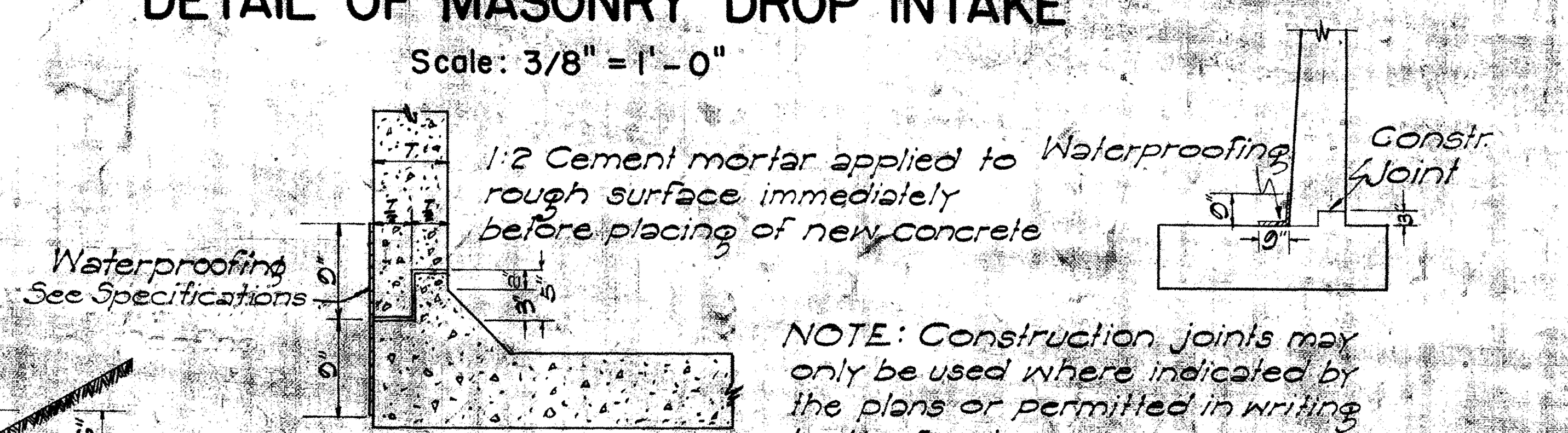


SECTION OF HIGH CEMENT RUBBLE MASONRY RETAINING WALL OR SEAWALL



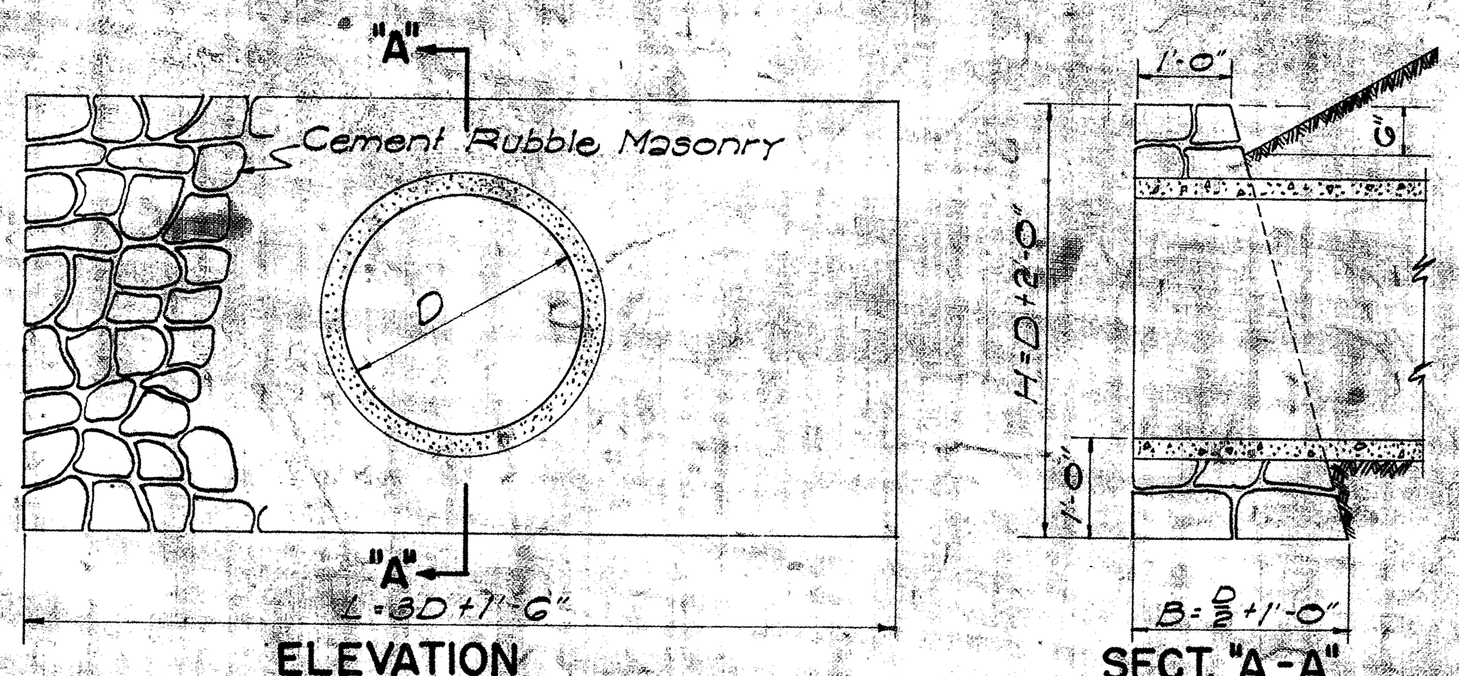
SECTION OF LOW MASONRY RETAINING WALL OR SEAWALL

DATA-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



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

CONSTR. JOINT DETAILS

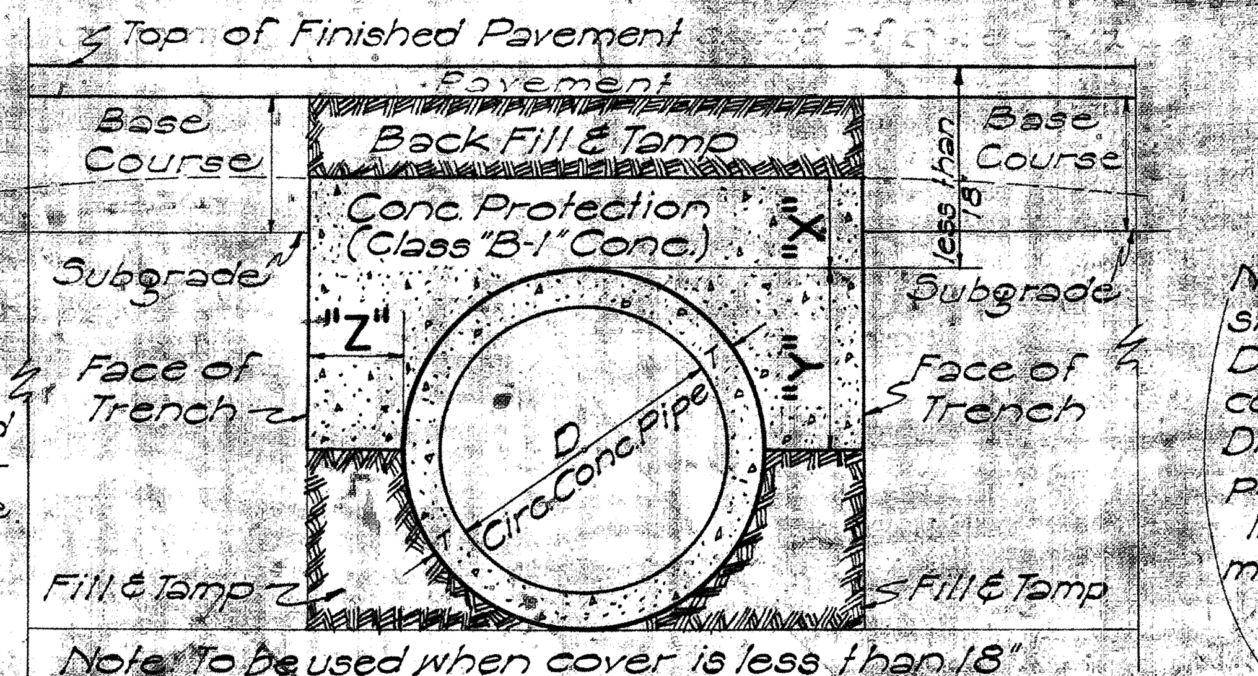


ELEVATION SECT. "A-A"

DETAIL OF MASONRY HEADWALL

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

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
7" " 24" D		Minimum = X
8" " 30" D		Maximum pay quantity will be Z = 12"
9" " 36" D		
10" " 42" D		
11" " 48" D		
12" " 54" D		

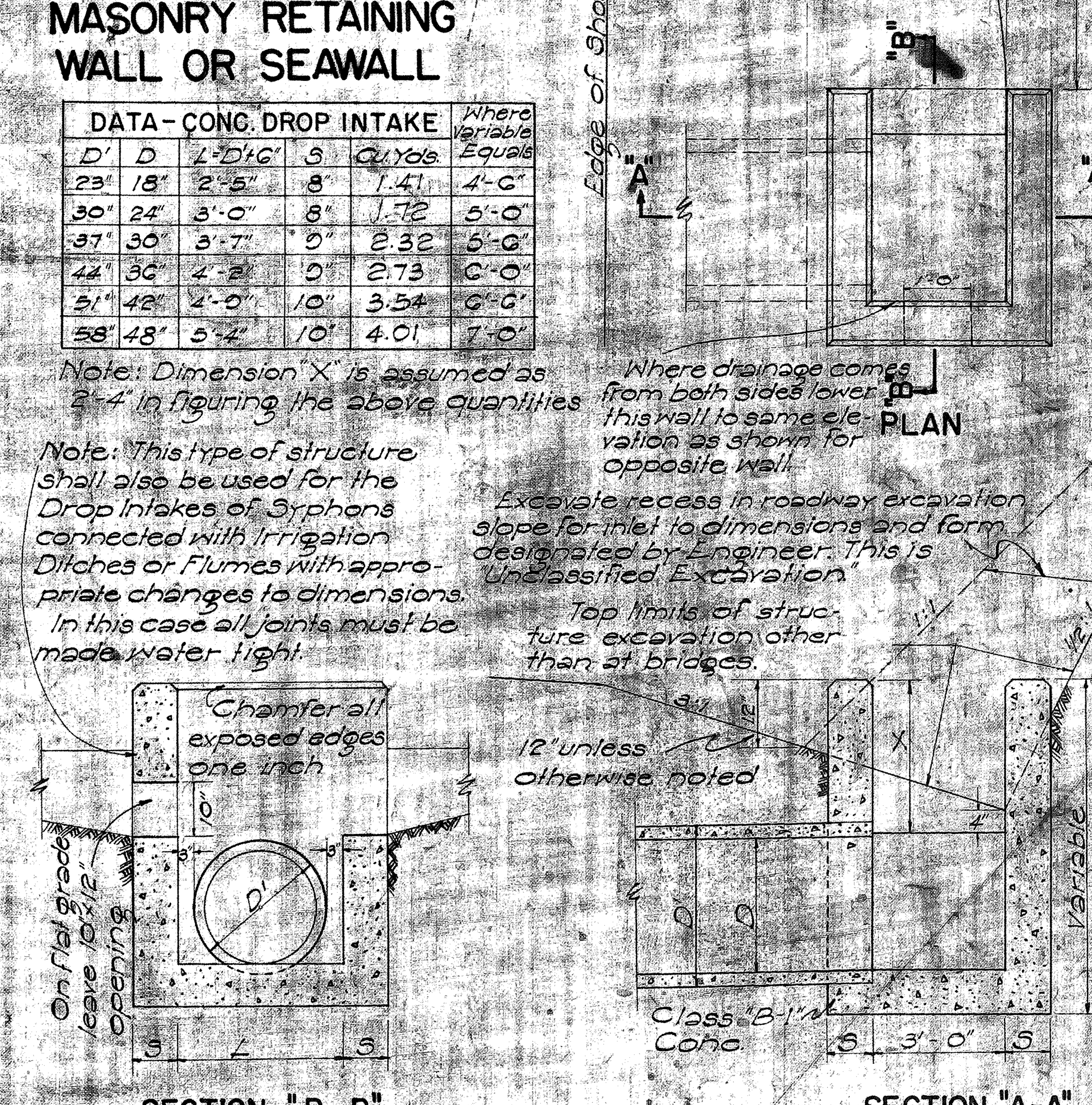
SECT. OF CULVERT WITH CONC. PROTECTION

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.

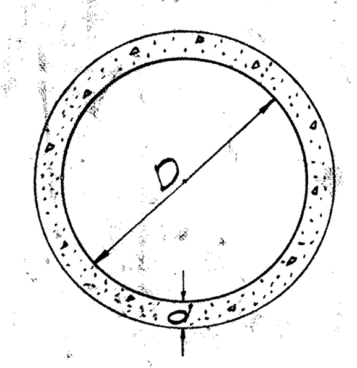
Note: This type of structure shall also be used for the Drop Intakes of Syphons connected with Irrigation Ditches or Flumes with appropriate changes to dimensions. In this case all joints must be made water tight.



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

DETAIL OF CONCRETE DROP INTAKE

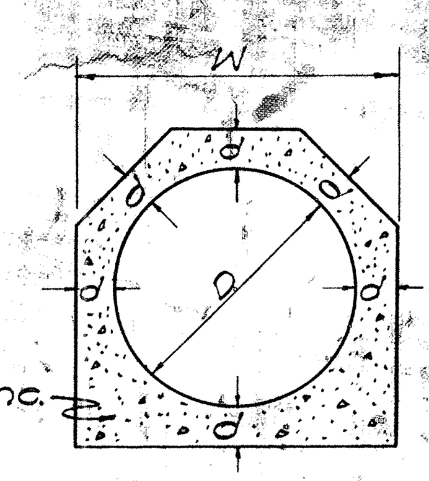
Scale: 1/2" = 1'-0"



SECTION

CONC. PIPE CULVERT

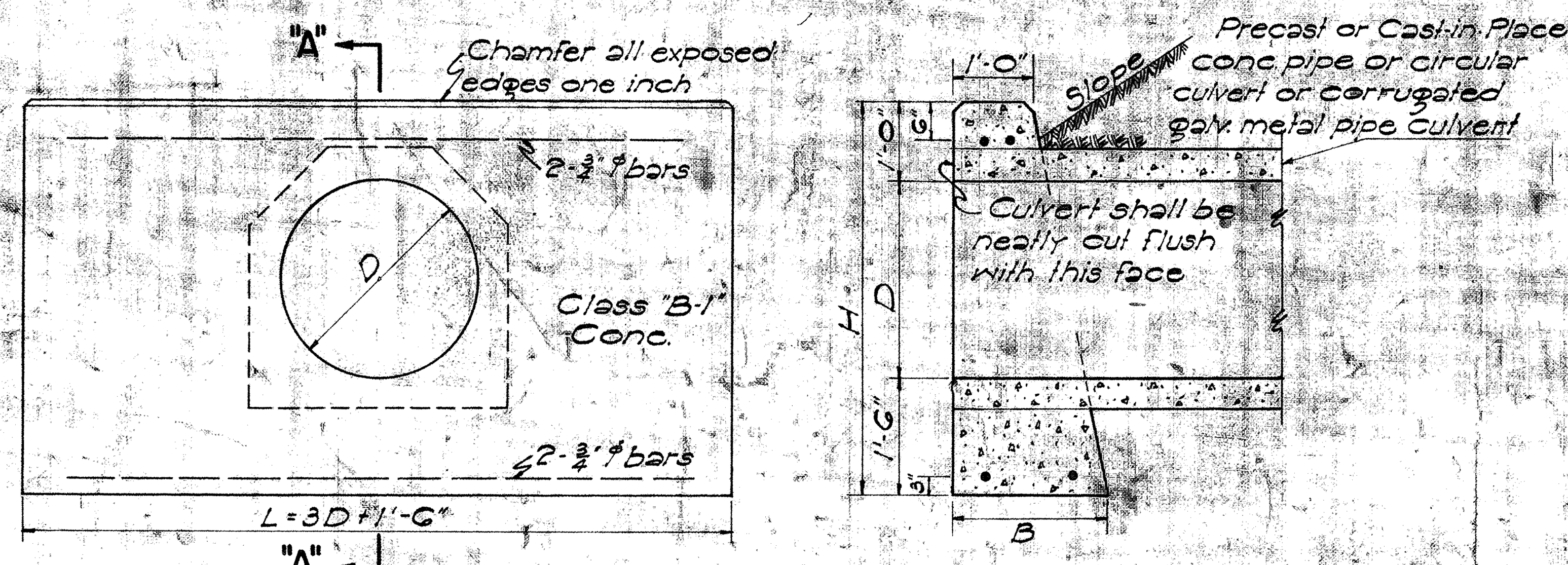
NOTE: Thickness 'd', reinforcing, and Concrete used, are to conform with the approved design as provided by the Specifications.



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



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	3/4" Ø	5'-6"	33
24"	1'-6"	7'-6"	4'-6"	1.25	1.38	4	3/4" Ø	7'-0"	42
30"	2'-0"	9'-0"	5'-0"	1.95	2.17	4	3/4" Ø	8'-6"	51
36"	2'-0"	10'-6"	5'-6"	2.45	2.74	4	3/4" Ø	10'-0"	60
42"	2'-6"	12'-0"	6'-0		3.87	4	3/4" Ø	11'-6"	69
48"	2'-6"	13'-6"	6'-6"		4.66	4	3/4" Ø	13'-0"	78

DETAIL OF CONCRETE HEADWALL

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

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

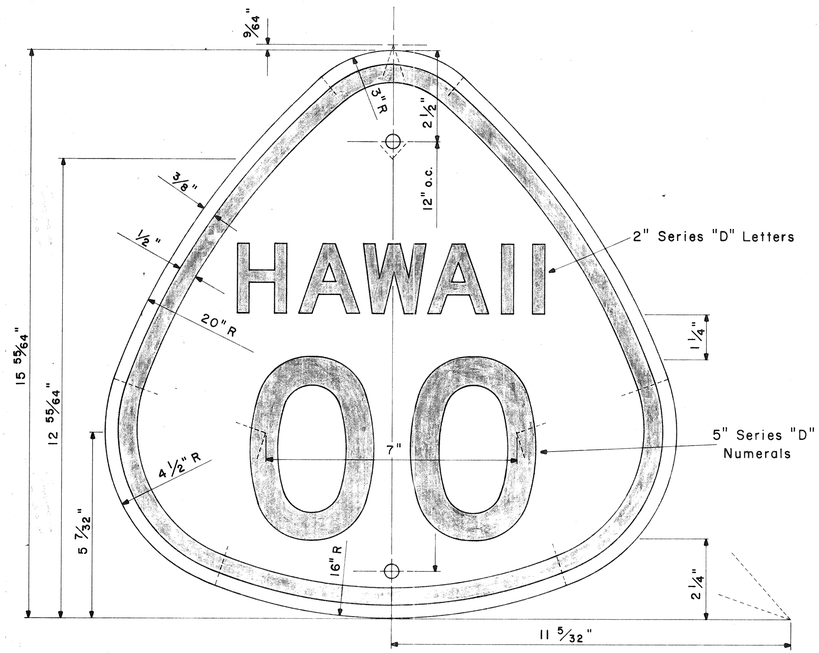
SHEET No. OF SHEETS

24

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

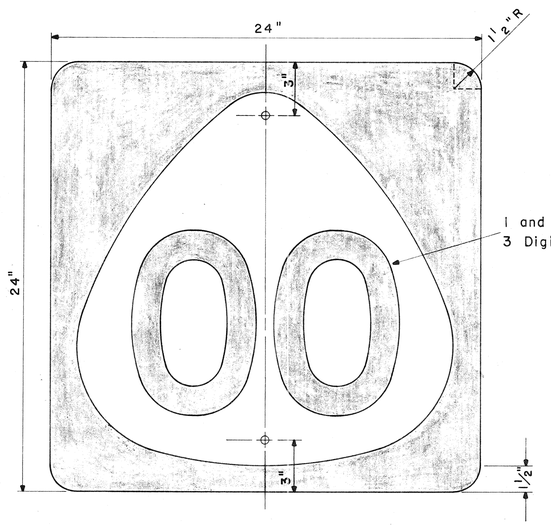
2/17/59
3/22/61
FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS
HAWAII | HAW. | S-0570(1) | 1964 | 25 | 47
AUG. 1957
Recess
A.C. Surface Course
A.C. Leveling Course
2nd Layer Base Course
1st Layer Base Course
Longitudinal Reinf. Bar
TYPE "A" & "B" CURB
SCALE: 1" = 1'-0"
Gutter
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 'A' Curb & Type 'AG' Curb & Gutter)
(Type 'B' Curb & Type 'BG' Curb & Gutter)
TYPE AND SPACING OF RECESSES
SECTION "A-A"
SECTION "X-X"
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 "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
1st Layer Base Course
TYPE "G" GUTTER
SCALE: 1" = 1'-0"
"E" and "EG" Curbs have been revised 7-26-57
"G" and "F" Gutters have been added 3-22-61
DETAILS OF CAST-IN-PLACE CONC. CURBS AND GUTTERS
TYPE "E" CAST-IN-PLACE CONCRETE CURB
SCALE: 1" = 1'-0"
Class 'A-1' Conc.
1" Holes
1" Radius
FRONT ELEV.
END ELEV.
PRECAST CONC. CURB
SCALE: 1" = 1'-0"
Precast Curb
A-1 Conc.
TYPE "F" GUTTER FOR PRECAST CURB
PLAN
SCALE: 1/2" = 1'-0"
Conc. Roll Curb of Traffic Island
Opening for Drainage
Top of Pavement
Varies
ELEVATION
Curb
Spaced 5' to 10' as directed by the Engineer
AT CURBED ISLAND
Top of Finish Pavt.
Bevel Bar Ends on 45° Angle
SECTION
ELEVATION
RAISED TRAFFIC BARS
SCALE: 2" = 1'-0"
Asphalt Concrete
Top of Pavement
SECTION
A.C. TRAFFIC ROLL
NOT TO SCALE
TYPE "EG" CAST-IN-PLACE CONC. CURB & GUTTER
SCALE: 1" = 1'-0"
2 3/8" on 1:1 slope
FRONT ELEV.
END ELEV.
PRECAST CONC. ROLL CURB
SCALE: 1" = 1'-0"
Class 'A-1' Conc.
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.
Width of Strip
Stripping by others
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 No. OF SHEETS
25
ORIGINAL PLAN
NOTE BOOK No.
SURVEY PLOTTED BY
DESIGNED BY
DRAWN BY
TRACED BY
QUANTITIES BY
QUANTITIES CHECKED BY
CHECKED BY
DATE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	S-0570(1)	1964	26	47



STATE ROUTE MARKER
M1-3(00)

Scale: ½" = 1"

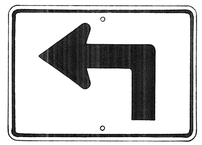


STATE ROUTE MARKER
M1-4(00)

Scale: ¼" = 1"

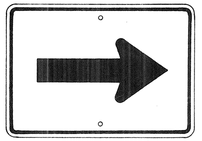
NOTE:
Multiply all dimensions of State Route Marker M1-3 by 1.3 for the dimensions of the shield for M1-4.

M2-1
21" x 15"

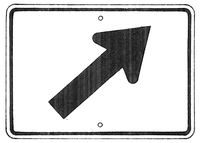


M3-1-L
* M3-1-R
21" x 15"

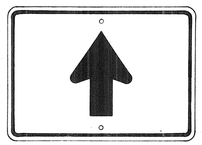
M3-2-L
* M3-2-R
21" x 15"



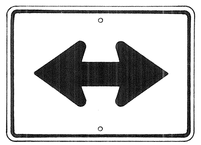
M4-1
21" x 15"



M4-2-R
* M4-2-L
21" x 15"



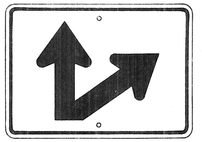
M4-3
21" x 15"



M4-4
21" x 15"

M4-5-R
* M4-5-L
21" x 15"

M4-6-R
* M4-6-L
21" x 15"



M4-7-R
* M4-7-L
21" x 15"

AUXILIARY MARKERS

Scale: ⅛" = 1"

* NOTE:
Signs shall be similar but opposite in direction.

M5-1
21" x 9"

M5-2
21" x 9"

M5-3
21" x 9"

M5-4
21" x 9"

M5-5
21" x 9"

M5-6
21" x 9"

M6-1-N
21" x 9"
(See Note 6)

M7-1
18" x 12"

GENERAL NOTES

1. The shape, color, dimensions, symbols, wording, lettering and reflectorizing of all signs shall be in accordance with the "Manual on Uniform Traffic Control Devices for Streets and Highways," dated June 1961 and the BPR manual "Standard Highway Signs," dated September 1961, unless otherwise specified.
2. All letters and figures shall conform to the manual "Standard Alphabets for Highway Signs," Dept. of Commerce, Bureau of Public Roads, 1952.
3. All markers shall be reflectorized unless otherwise specified.
4. All markers shall have ⅜" bolt holes drilled at appropriate locations unless otherwise specified.
5. All markers shall have a black legend on a white background unless otherwise specified.
6. Sign message of Cardinal Direction Marker (M6-1) shall be denoted by the following suffixes:
   - M6-1-N : NORTH
   - M6-1-E : EAST
   - M6-1-S : SOUTH
   - M6-1-W : WEST
7. Auxiliary markers denoted with the suffix "I": (M4-1-I) shall have a white legend on a blue background.
8. Cardinal Direction Marker (M6-1) with suffix I(3) shall have a white legend on a blue background and shall be 30" x 15" in size.
9. For M1-3, and M1-4 signs, number in ( ) indicates route number and shall be as shown on the plan.
10. All regulatory signs shall be reflectorized unless otherwise specified
11. All regulatory signs shall have 3/8" bolt holes drilled at appropriate locations unless otherwise noted.
12. For R2 signs, number in ( ) indicates speed and shall be as shown on the plans.

R1-1 30"x30"

R2-1( ) 24"x30"

R2-5 24"x30"

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

APPROVED: DATE: .....

..... DIRECTOR OF TRANSPORTATION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
MARKERS AND SIGNS

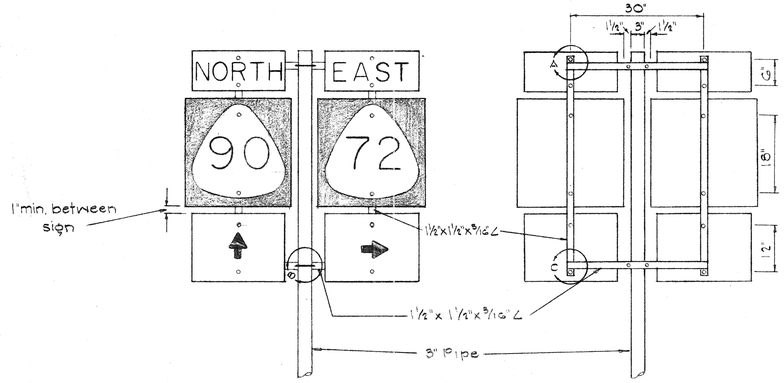
Scale: As Noted

SHEET Nº OF SHEETS

26

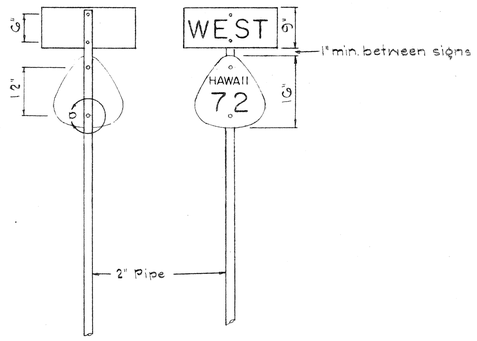
TZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	S-05700	1964	27	47



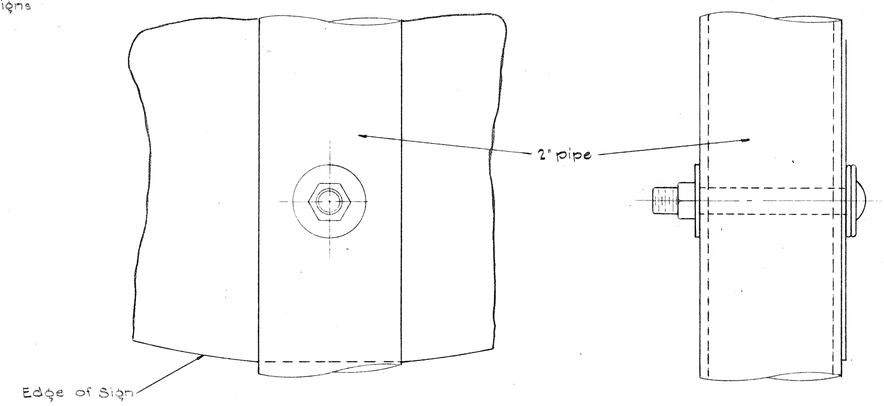
TYPE "B" ASSEMBLY
NOT TO SCALE

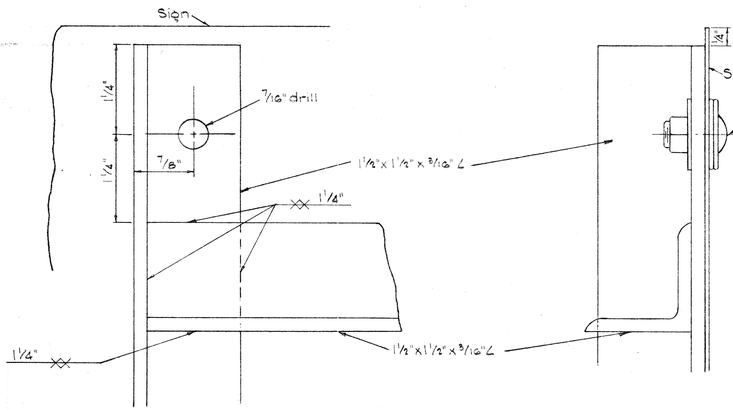
NOTE:
Minimum clearance between signs shall be 1 inch. (Larger clearances shall be in multiples of 1 inch.)



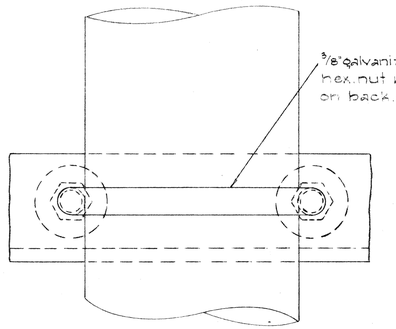
TYPE "A" ASSEMBLY
NOT TO SCALE

NOTE:
Use 2" pipe for Type "A" Assembly
Use 3" pipe for Type "B" Assembly.

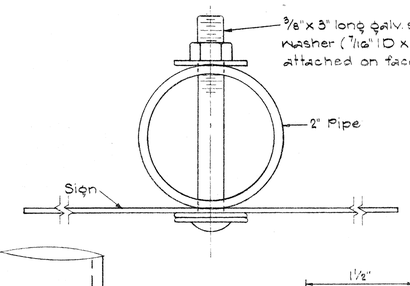




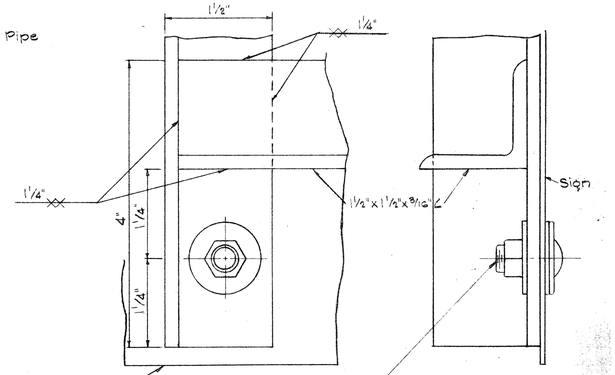
DETAIL "A"
FULL SCALE



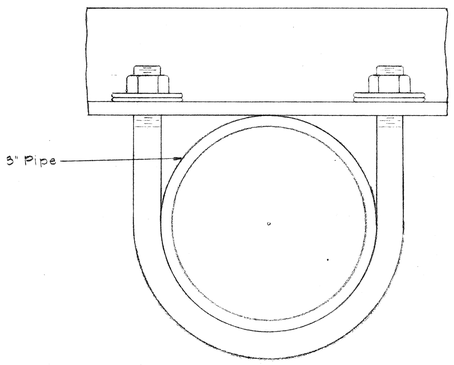
DETAIL "B"
FULL SCALE



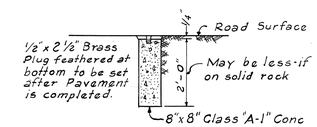
DETAIL "D"
FULL SCALE



DETAIL "C"
FULL SCALE



NOTE:
For height and lateral location of State Route Markers, See Sheet 19



CENTER LINE MONUMENT
Scale: 1/2"=1'-0"

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

DETAILS OF STATE ROUTE MARKER AND CENTER LINE MONUMENT

Scale: As Noted

SHEET No. OF SHEETS

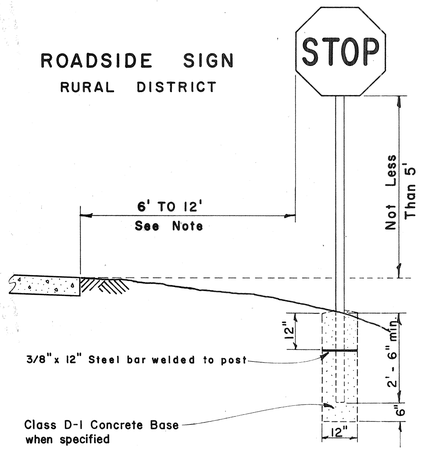
27

PRINTED ON CLEARPRINT 1000-H

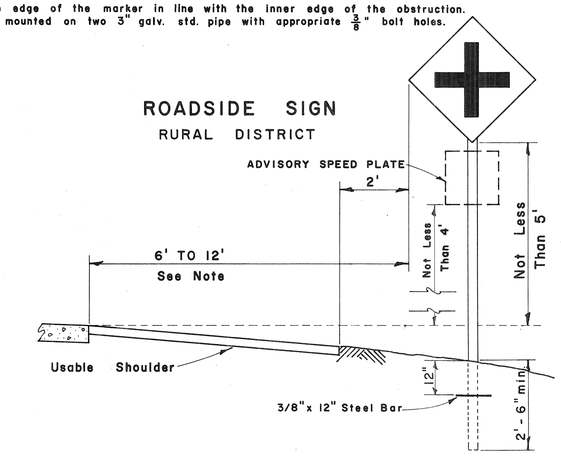
NOTE:
1. All signs and road delineators shall be placed 2' outside the usable roadway shoulder or 1' outside unmountable curbing present and within the limits shown below.
2. Except as noted below, sign posts shall be 3" galv. std. pipe for signs larger than 24" in any dimension and 2" galv. std. pipe for signs not over 24" in any dimension, with two $\frac{9}{16}$" ϕ bolt holes or adjustable band brackets.
3. Sign shall be attached to post with $\frac{5}{16}$" galvanized carriage bolts with nuts and $\frac{7}{8}$" x $\frac{7}{16}$" x .120 stainless - steel washers with neoprene rubber gasket.
4. Clearance Markers (RM-4, RM-3) shall be installed with the inside edge of the marker in line with the inner edge of the obstruction.
5. Signs 48" and wider or larger than 10 sq. ft. in area shall be mounted on two 3" galv. std. pipe with appropriate $\frac{3}{8}$" bolt holes.

FED. ROAD DIST. No.	STATE	FED. AID PROJ. No.	FISCAL YEAR	SHEET No.	TOTAL SHEETS
HAWAII	HAW	S-0570(1)	1964	28	47

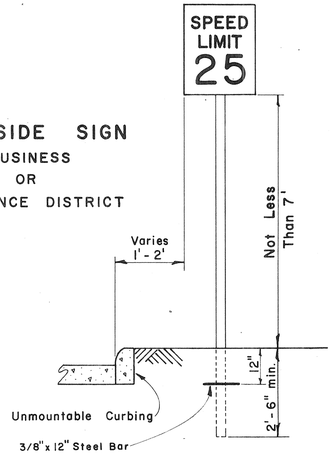
ROADSIDE SIGN
RURAL DISTRICT



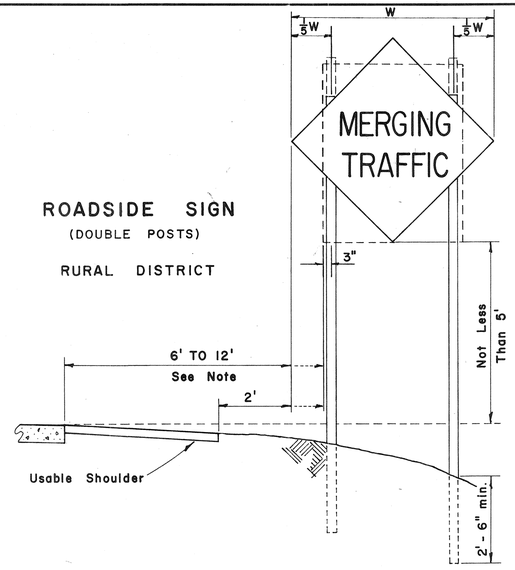
ROADSIDE SIGN
RURAL DISTRICT



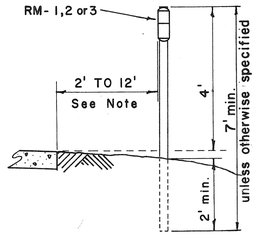
ROADSIDE SIGN
BUSINESS OR RESIDENCE DISTRICT



ROADSIDE SIGN
(DOUBLE POSTS)
RURAL DISTRICT

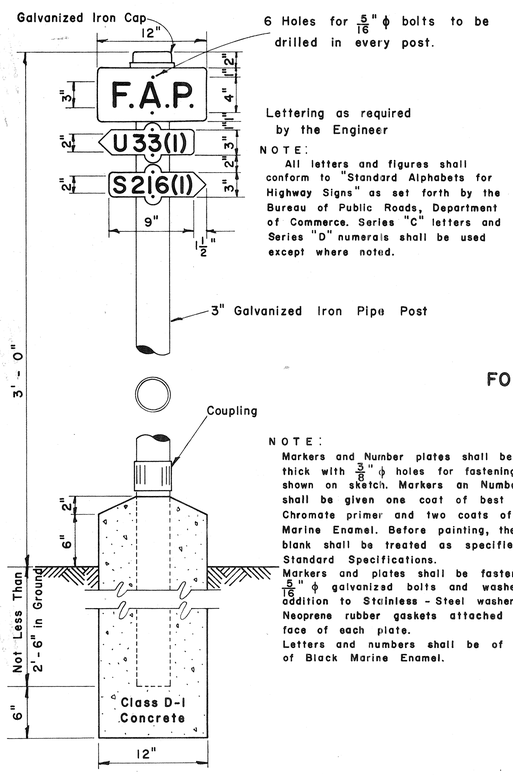


ROAD DELINEATOR



HEIGHT AND LATERAL LOCATION OF SIGNS - TYPICAL INSTALLATIONS

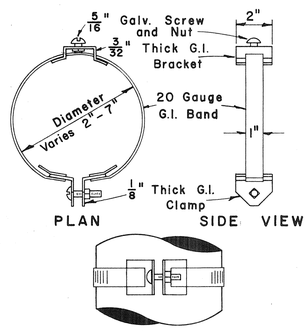
Scale: $\frac{1}{2}$" = 1'-0"



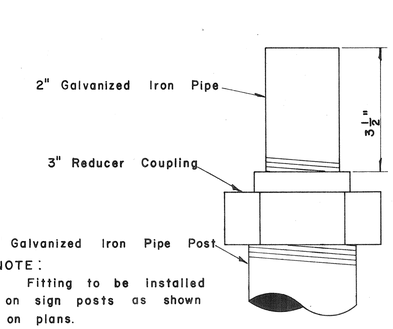
NOTE:
All letters and figures shall conform to "Standard Alphabets for Highway Signs" as set forth by the Bureau of Public Roads, Department of Commerce. Series "C" letters and Series "D" numerals shall be used except where noted.

NOTE:
Markers and Number plates shall be 0.081" thick with $\frac{3}{8}$" ϕ holes for fastening as shown on sketch. Markers an Number plates shall be given one coat of best Zinc Chromate primer and two coats of White Marine Enamel. Before painting, the Aluminum blank shall be treated as specified in the Standard Specifications.
Markers and plates shall be fastened with $\frac{5}{16}$" ϕ galvanized bolts and washers in addition to Stainless - Steel washers with Neoprene rubber gaskets attached on front face of each plate.
Letters and numbers shall be of two coats of Black Marine Enamel.

FEDERAL AID MARKER
Scale: $\frac{1}{2}$" = 1'-0"

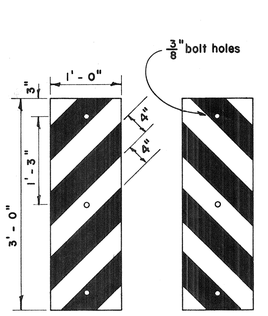


ADJUSTABLE BAND BRACKET FOR MOUNTING TRAFFIC SIGNS
Scale: 3" = 1'-0"

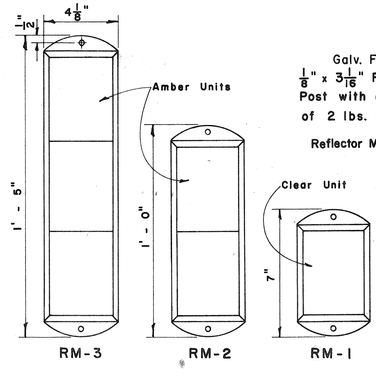


NOTE:
Fitting to be installed on sign posts as shown on plans.

DETAIL OF SIGN POST FITTING FOR CITY & COUNTY STREET NAME SIGNS
Scale: $\frac{1}{2}$" = 1"

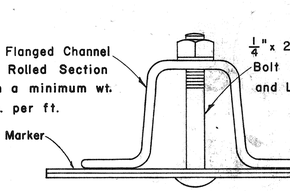


Scale: 1" = 1'-0"



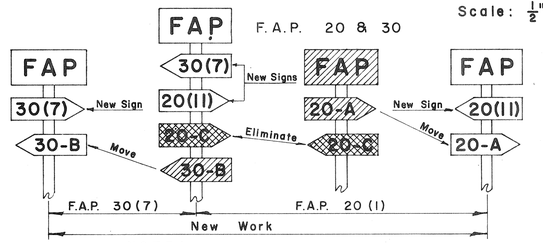
Scale: 3" = 1'-0"

REFLECTOR MARKERS
Scale: As Shown



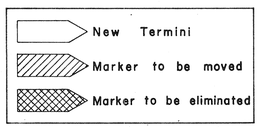
TYPICAL SECTION OF ROAD DELINEATOR
Full Size

NOTE:
1. Reflector Units for RM-1,2,3 shall be 4" x 5" in size and shall consist of reflective sheeting encapsulated in acrylic plastic.
2. The upper 2 feet of the Galvanized Flanged Channel shall have a single row of 3/8" holes centered in the web and spaced 1 inch on centers.



NOTE:
Federal Aid Markers should be placed at the termini of suffix designated sections. Intermediate letter designated markers of adjacent sections located within the limits of new improvements should be moved to the termini of the new work. The same procedure should be followed on each successive improvement until all markers for letter designated sections are eventually eliminated.

METHOD OF MARKING F.A. PROJECTS AT OVERLAPS
(USING NUMBER SUFFIX ON NEW WORK)



REVISED: JULY 3, 1963

APPROVED:
DIRECTOR OF TRANSPORTATION
DATE: 7/22/63

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
F. A. MARKER AND MISCELLANEOUS SIGN DETAILS

Scale: As Shown

SHEET No. 28 OF SHEETS