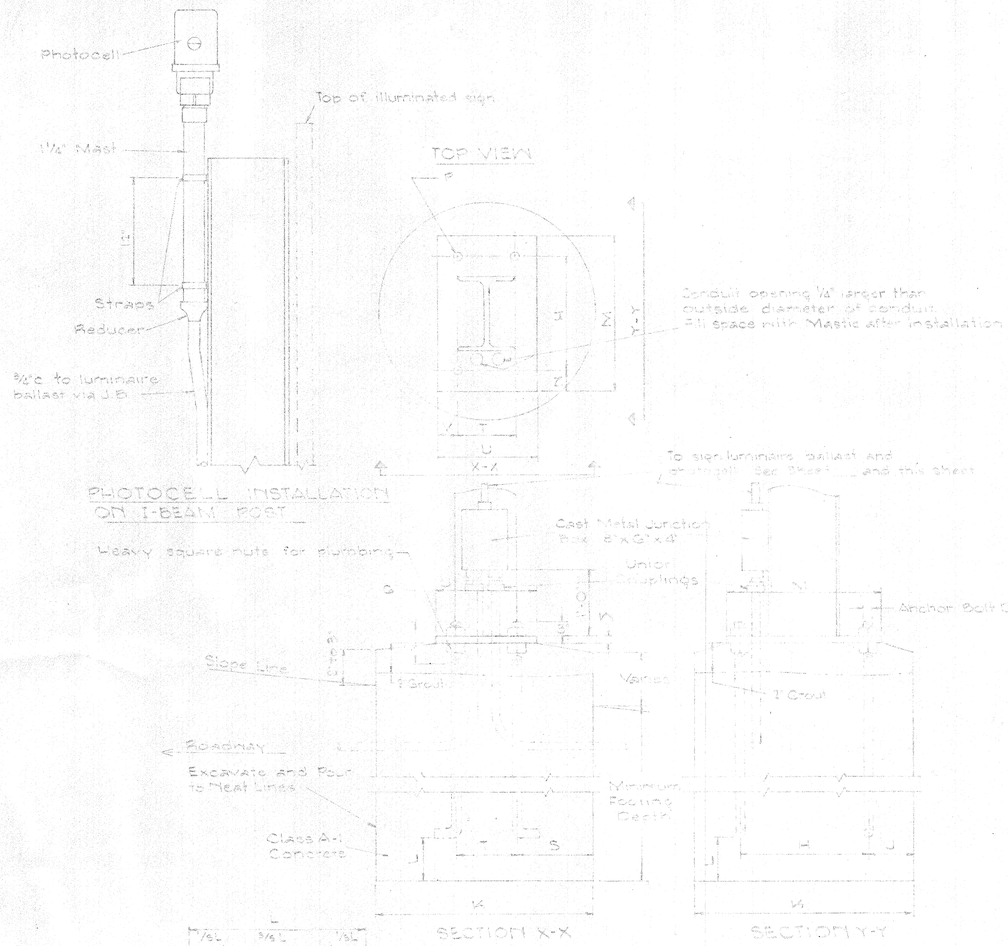
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1 (47):5	1968	200	227

NOTE:

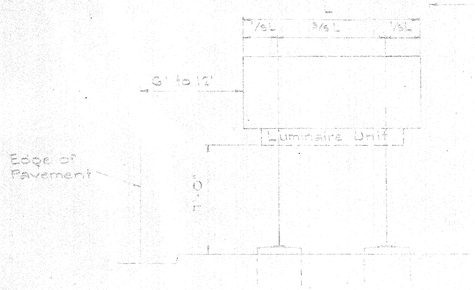
For signs with panel areas of less than 30 sq. ft. but greater than 16 sq. ft. use 3" I 5.7# steel I beam
* For moment calculations only. Post to be from top of foundation to top of sign
** For fills with side slopes flatter than 4:1, 4½ feet

SUPPORT STRUCTURE DATA FOR GROUND MOUNTED SIGNS

POST SIZE	MAXIMUM SIGN AREA	POST HGT. TOP OF FOUND. TO CENTER OF SIGN *	DIMENSIONS SEC. Y-Y H	J	K	L	M	N	O	DIMENSIONS SEC. X-X K	P	S	T	U	V	W	ANCHOR BOLT DIA.	MIN. FOOTING DEPTH (FEET) CUT	FILL **	TYPE OF WELD TO BASE PLATE
6 J 10	50 sq. ft.	14'	14"	3"	24"	3"	17¼"	1⅝"	¼"	24"	1½"	9"	6"	10"	2"	1"	1⅛"ø	4½'	4½'	⅜
8 WF 24	90 sq. ft.	21'	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	5'	
8 WF 35	100 sq. ft.	15'	16½"	6¾"	50"	6"	20"	1¾"	¾"	30"	1⅜"	11¾"	6¼"	10"	1¾"	1"	1½"ø	6'	7'	
10 WF 45	100 sq. ft.	25'																↓		
10 WF 45	200 sq. ft.	25'																		
12 WF 50	230 sq. ft.	25'																7'		
12 WF 50	250 sq. ft.	25'	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓

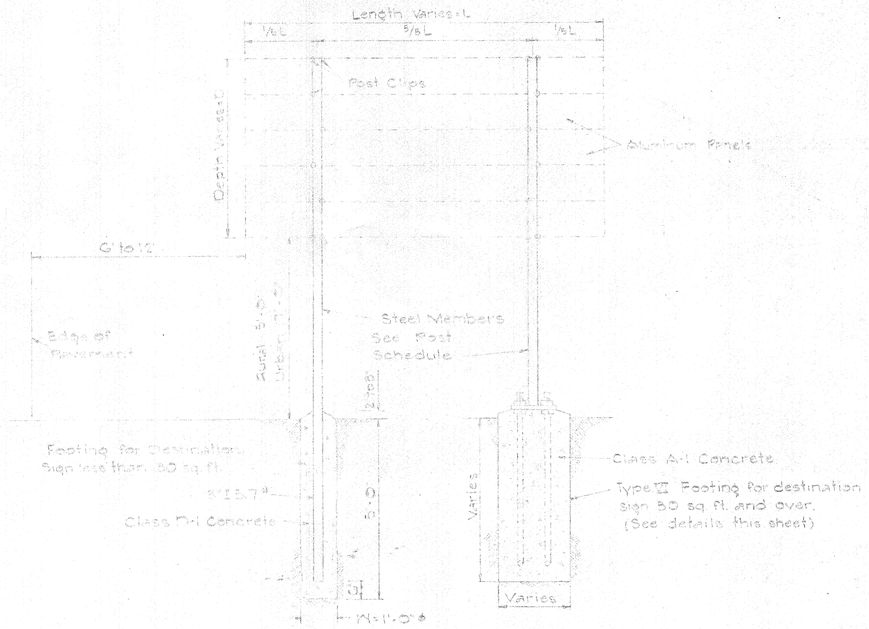


FOUNDATION DETAILS FOR GROUND MOUNTED EXPRESSWAY SIGN
TYPE VI FOOTING



TYPICAL GROUND MOUNTED EXPRESSWAY SIGN TYPE A

NOTE:
Conduit and ballast details are shown only for ground mounted illuminated Expressway signs.



TYPICAL DESTINATION SIGN PANEL & POST

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DESTINATION & EXPRESSWAY SIGNS

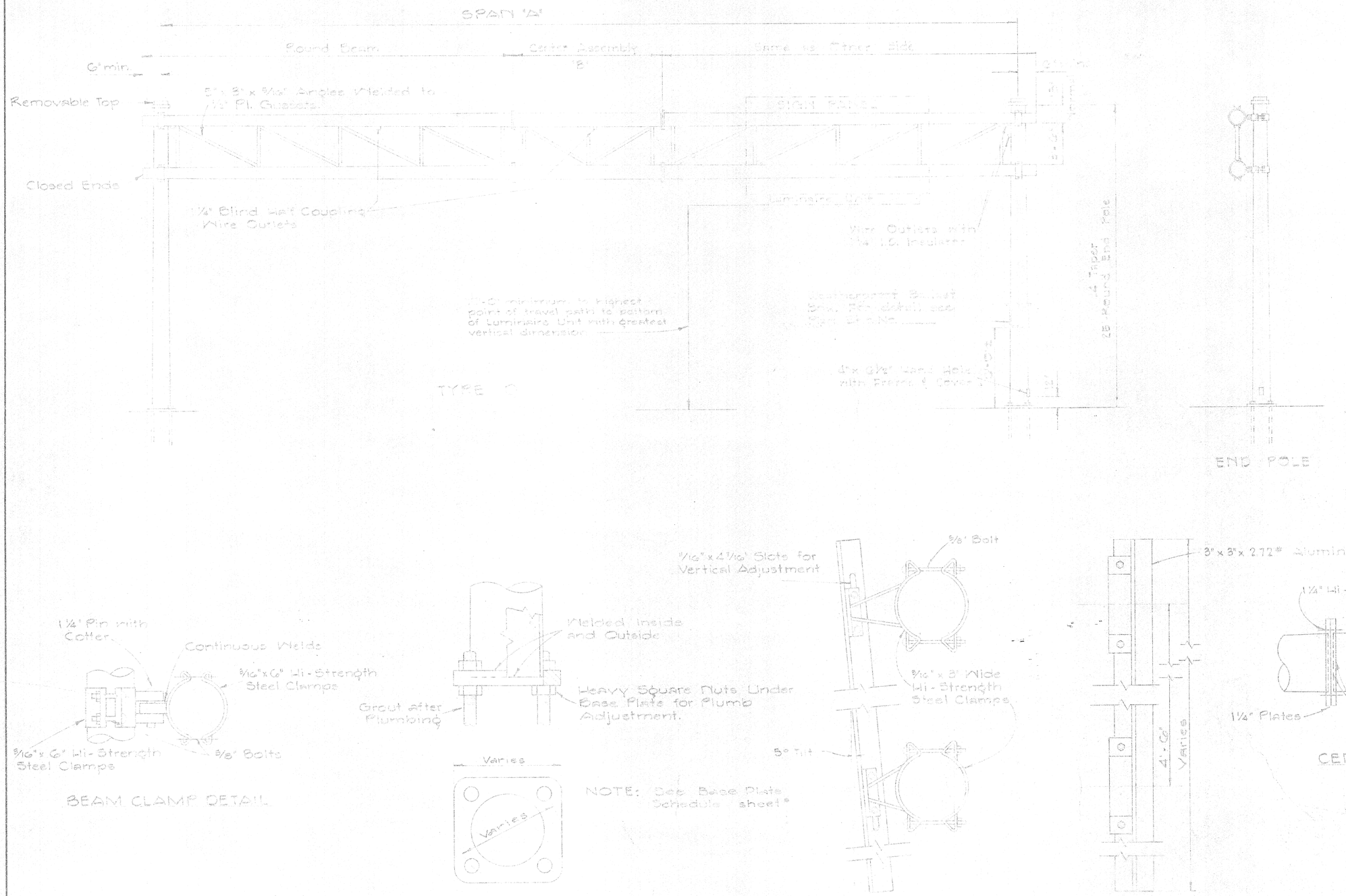
DETAILS & SCHEDULES
TYPE A SIGN SUPPORT
TYPE VI FOOTING

SHEET No. 1 OF 28 SHEETS

200

PRINTED ON CLEARPRINT 1000-H

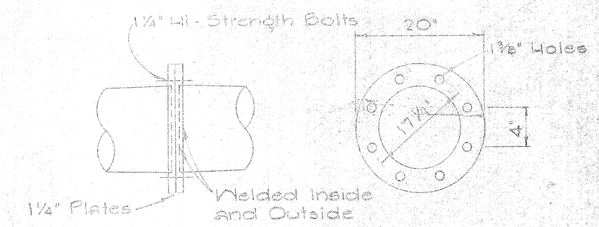
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEARS	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-[illegible] (41) S	1968	201	~~237~~ 238



BEAM CLAMP DETAIL

POLE BASE DETAIL

SIGN BRACKET ASSEMBLY



CENTER JOINT DETAIL

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPE "D"
OVERHEAD SIGN SUPPORT
TWO-TUBE TRUSS TYPE
STEEL

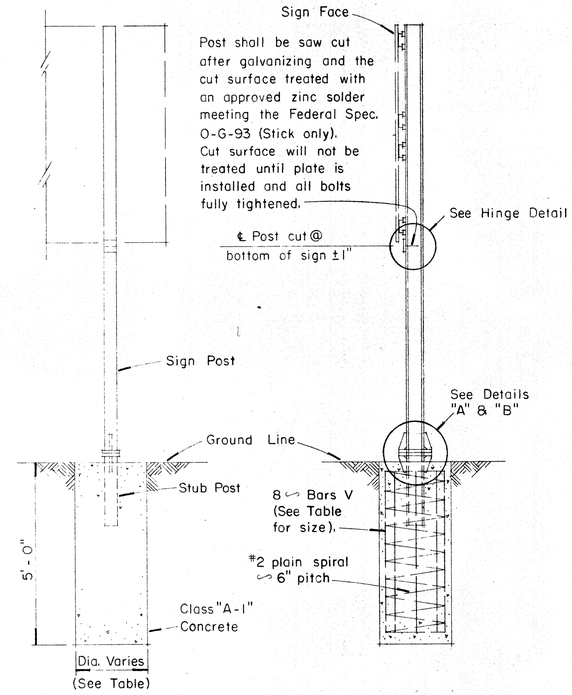
SHEET No. 2 OF 28 SHEETS

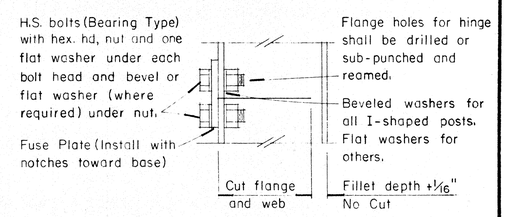
201

PRINTED ON CLEARPRINT 1000-H

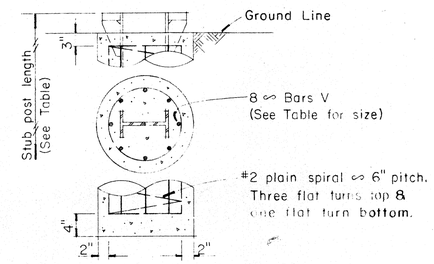
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1 (47):9	1968	202	238 ~~227~~

	BASE CONNECTION DATA TABLE										FUSE PLATE DATA TABLE											FOUNDATION DATA			
Post Size	Bolt Size & Torque	A	B	C	D	E	t1	t2	W	R	F	G	H	J	K	L	N	d1	t3	Bolt Dia.	Wt. of each Fuse ℞	Stub Length	Stub Projection	Footing Diameter	Bars V Size
6 B 8.5	5/8"ø x 2 3/4" Torque = 450"#	5"	2"	1 1/4"	2 3/4"	1 1/8"	3/4"	1/2"	1/4"	11/32"	3 5/8"	2"	1 1/8"	4"	2 1/4"	7/8"	1/2"	9/16"	1/4"	1/2"ø	1.09#	2'-0"	3"	2'-0"	#5
6 B 12											3 3/4"	2"	1 1/8"	4"	2 1/4"	7/8"	5/8"	11/16"	3/8"	5/8"ø	1.60#	2'-0"	3"	2'-0"	#5
6 B 15.5											4 1/2"	2 1/2"	1 1/4"	6"	3 1/2"	1 1/4"	3/4"	13/16"	1/2"	3/4"ø	3.75#	2'-6"	3"	2'-0"	#6
8 WF 17											4 1/2"	2 1/2"	1 1/4"	5 1/4"	2 3/4"	1 1/4"	3/4"	13/16"	1/2"	3/4"ø	3.27#	2'-6"	3"	2'-0"	#7
8 WF 20	3/4"ø x 3 1/2" Torque = 750"#	6"	2 1/4"	1 3/8"	3 1/2"	1 1/4"	1"	3/4"	5/16"	13/32"	4 7/8"	2 1/2"	1 1/2"	5 1/4"	2 3/4"	1 1/4"	7/8"	15/16"	9/16"	7/8"ø	3.93#	3'-0"	2 1/2"	2'-0"	#8
10 WF 21											5 3/8"	3"	1 1/2"	5 3/4"	2 3/4"	1 1/2"	7/8"	15/16"	9/16"	7/8"ø	4.75#	3'-0"	2 1/2"	2'-0"	#9
10 WF 25											5 3/8"	3"	1 1/2"	5 3/4"	2 3/4"	1 1/2"	7/8"	15/16"	9/16"	7/8"ø	4.79#	3'-0"	2 1/2"	2'-0"	#10
12 WF 27											5 3/8"	3"	1 1/2"	6 1/2"	3 1/2"	1 1/2"	7/8"	15/16"	9/16"	7/8"ø	5.42#	3'-0"	2 1/2"	2'-0"	#11
3 I 5.7	1/2"ø x 2 1/2" Torque = 200"#	SEE DETAIL "A"									3 1/8"	1 1/2"	1 1/8"	2 5/8"	1 1/2"	9/16"	1/2"	9/16"	1/4"	1/2"ø	0.64#	1'-6"	3 1/2"	1'-6"	#5
4 I 7.7											3 1/8"	1 1/2"	1 1/8"	2 5/8"	1 1/2"	9/16"	1/2"	9/16"	1/4"	1/2"ø	0.64#	1'-6"	3 1/2"	1'-6"	#5

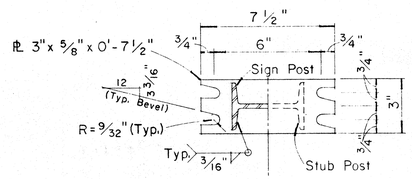




HINGE DETAIL

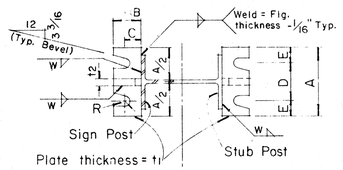


FOUNDATION DETAIL

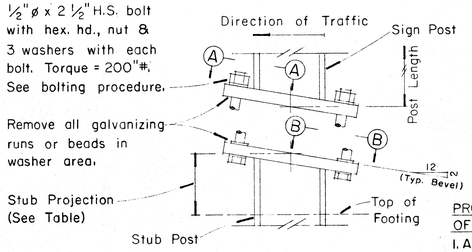


SECTION "A-A" SECTION "B-B"

NOTE:
Sections shown are for installations on right shoulder and in gore. Reverse plate slot bevels for installations on left shoulder.



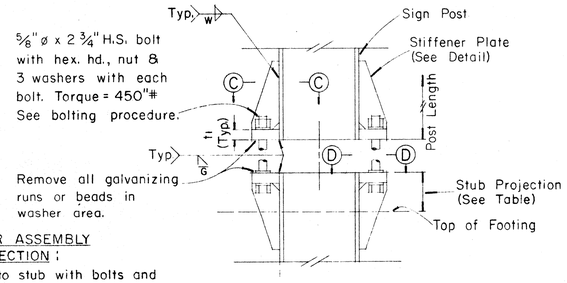
SECTION "C-C" SECTION "D-D"



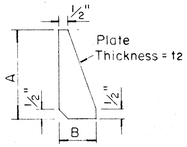
DETAIL "A"
SIGN POST & STUB POST
(For 4 I 7.7 and 3 I 5.7 Shapes)

PROCEDURE FOR ASSEMBLY OF BASE CONNECTION:

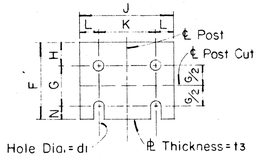
1. Assemble post to stub with bolts and with one flat washer on each bolt between plates.
2. Shim as required to plumb post.
3. Tighten all bolts the max. possible with 12" to 15" wrench to bed washers & shims and to clean bolt threads then loosen each bolt in turn & retighten bolts in systematic order to prescribed torque. (See Table)
4. Burr threads at junction with nut using a center punch to prevent nut loosening.



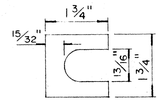
DETAIL "B"
SIGN POST & STUB POST
(For WF and B Shapes)



STIFFENER PLATE DETAIL



FUSE PLATE DETAIL



SHIM DETAIL

Furnish 2 ∽ .012" ± thick and 2 ∽ .032" ± thick shims per post. Shims shall be fabricated from brass shim stock or strip conforming to A.S.T.M.-B 36.

GENERAL NOTES

1. Design conforms with AASHO Specifications for the design and Construction of Structural Supports for Highway Signs.
2. Materials and Fabrication shall conform to the requirements of the Standard Specifications and Special Provisions.
3. All holes shall be drilled. All plate cuts shall preferably be saw cuts, however; flame cutting will be permitted provided all edges are ground. Metal projecting beyond the plane of the plate face will not be tolerated.
4. Tighten the high strength bolts in the base connection only to the torque shown, do not overtighten. All bolts other than high strength bolts shall conform to ASTM-A307, Class A.
5. All structural steel, bolts, nuts and washers shall be galvanized as per the Standard Specifications and Special Provisions. Structural steel to be galvanized after fabrication except as noted.
6. Structural steel shall conform with with the requirements of ASTM Specification A441.
7. Galvanizing of all posts shall be projection above concrete plus 6" minimum.
8. All friction fuse bolts shall be tightened in the shop following a method approved by the Engineer. Tightening shall be to such a degree as to obtain the following minimum residual tension in each bolt:

Bolt Size	Min. Tension	Bolt Size	Min. Tension
1/2"ø	12050 Lbs.	3/4"ø	28400 Lbs.
5/8"ø	19200 Lbs.	7/8"ø	36050 Lbs.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
BREAK-AWAY SIGN SUPPORTS FOR GROUND MOUNTED GUIDE SIGNS

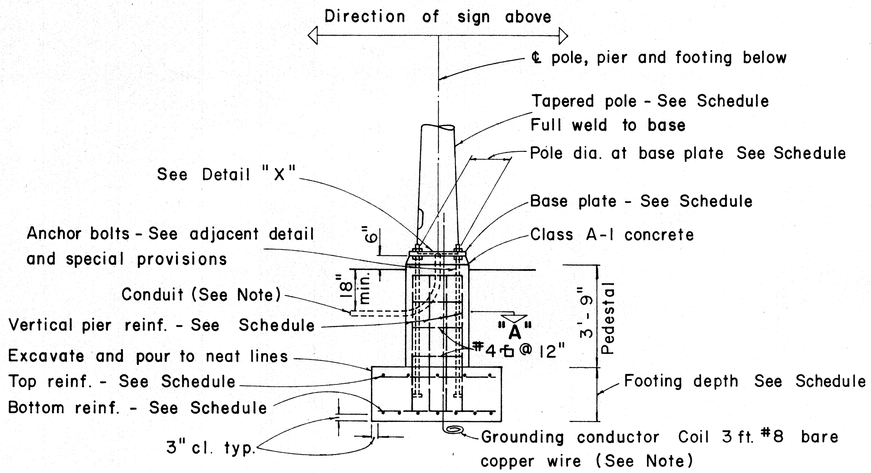
Not to Scale

SHEET No. 3 OF 28 SHEETS

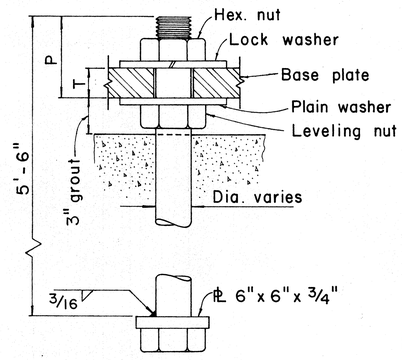
202

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

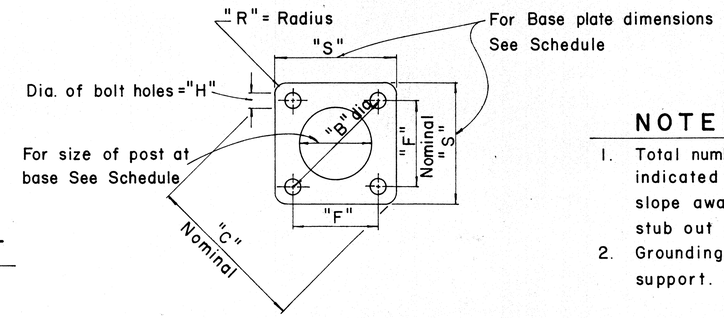
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(47)9	1968	203	~~227~~ 238



TYPICAL POLE FOUNDATION DETAIL



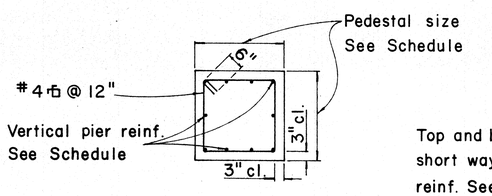
TYPICAL ANCHOR BOLT
4 REQ'D



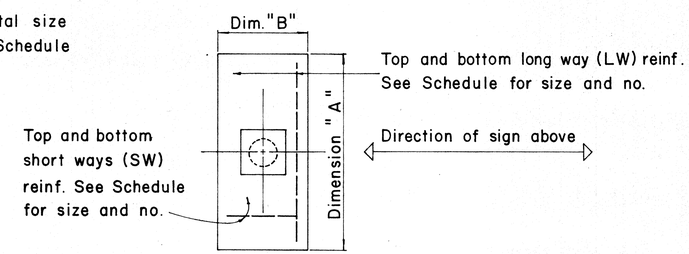
TYPICAL BASE PLATE

NOTE:

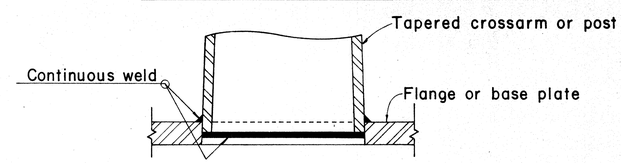
1. Total number of conduits into pole foundation as indicated on Lighting plans. Conduits shall slope away from pole foundation. Conduit shall stub out 5'-0" min. for direct burial entry.
2. Grounding conductor shall be bonded to sign support.



SECTION "A"



TYPICAL FOOTING DETAIL



DETAIL "X"

FOUNDATION SCHEDULE

Type	Dimension		Depth	Bot Reinf.		Top Reinf.		Pedestal	
	A	B		L.W.	S.W.	L.W.	S.W.	Size	Vert. Reinf.
I	7'-0"	3'-0"	2'-0"	3-#4	8-#4	#4 @ 12 each way		1'-11"	10-#5
II	9'-0"	4'-6"	2'-0"	6-#6	10-#4	Do.		2'-6"	10-#7
III	10'-0"	5'-0"	2'-0"	5-#8	11-#4	Do.		2'-6"	10-#8
IV	12'-0"	6'-0"	2'-0"	7-#9	13-#4	Do.		2'-9"	10-#10
V	14'-0"	7'-0"	2'-0"	8-#11	19-#4	Do.		2'-9"	10-#11

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

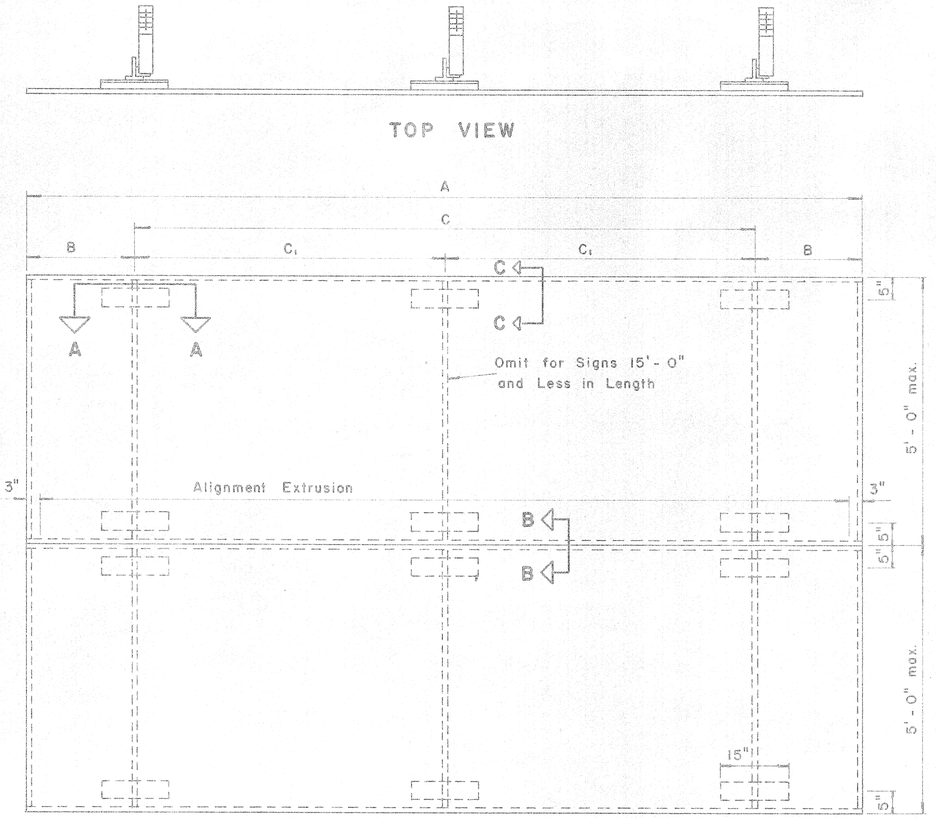
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

FOUNDATION DETAILS
FOR
EXPRESSWAY SIGN SUPPORTS

SHEET No. 4 OF 28 SHEETS

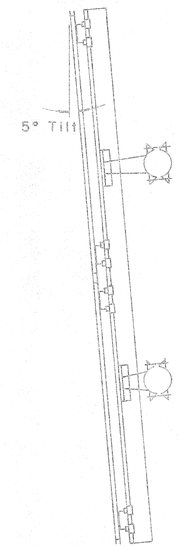
203

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-(27)-5	1968	204	~~227~~ 238

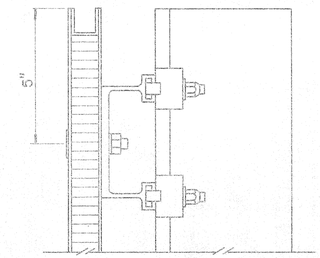


TYPICAL SIGN ASSEMBLY

Scale: $\frac{3}{4}$" = 1'-0"

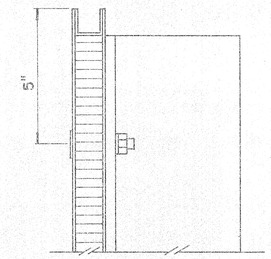


SIDE VIEW



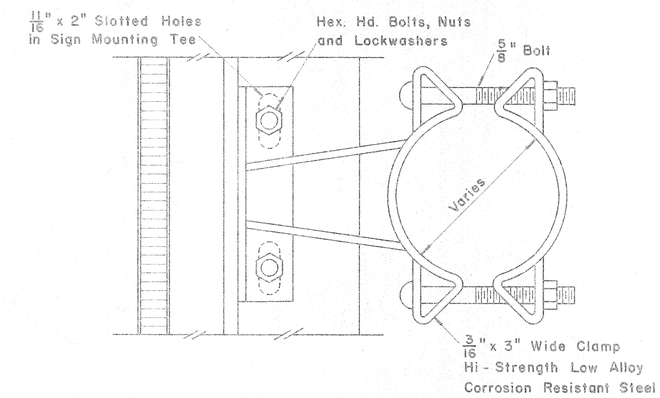
SECTION "C-C"

Scale: $\frac{3}{8}$" = 1"



SECTION "C-C"
(Alternate)

Scale: $\frac{3}{8}$" = 1"



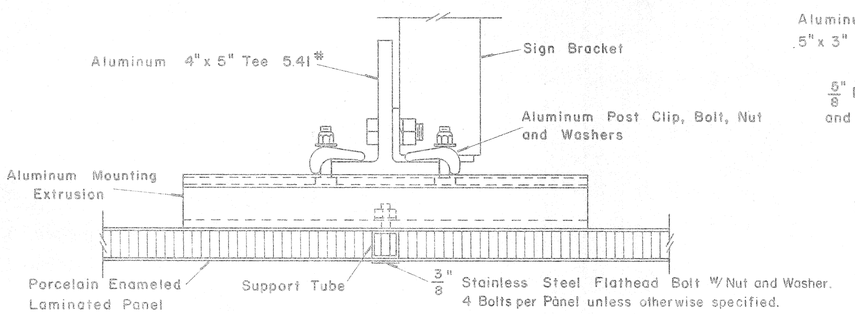
SIGN BRACKET ASSEMBLY

Scale: $\frac{3}{8}$" = 1"

(OVERHEAD SIGNS)

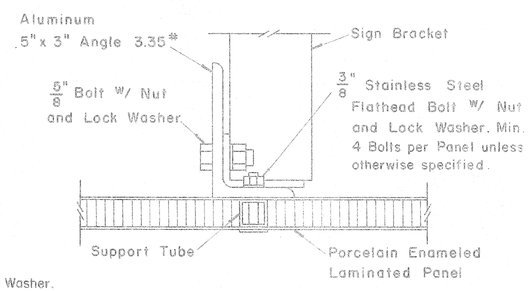
SUPPORT SPACING TABLE

PANEL THICK.	LENGTH OF SIGN A	NO. OF SUPPORTS	OVERHANG B	SUPPORT SPACING C or C₁
1"	6'-0"	2	12"	48"
1"	6-6"	2	15"	48"
1"	7'-0"	2	15"	54"
1"	7'-6"	2	18"	54"
1"	8'-0"	2	18"	60"
1"	8'-6"	2	20"	62"
1"	9'-0"	2	22"	64"
1"	9'-6"	2	23"	68"
1"	10'-0"	2	24"	72"
1"	10'-6"	2	24"	78"
1"	11'-0"	2	24"	84"
1"	11'-6"	2	27"	84"
1"	12'-0"	2	30"	84"
1"	12'-6"	2	30"	90"
1"	13'-0"	2	30"	96"
1"	13'-6"	2	30"	102"
1"	14'-0"	2	30"	108"
1"	14'-6"	2	36"	102"
1"	15'-0"	2	36"	108"
1"	15'-6"	3	24"	69"
1"	16'-0"	3	24"	72"
1"	16'-6"	3	24"	75"
1"	17'-0"	3	24"	78"
1"	17'-6"	3	24"	81"
1"	18'-0"	3	24"	84"
1"	18'-6"	3	27"	84"
1"	19'-0"	3	27"	87"
1"	19'-6"	3	27"	90"
1"	20'-0"	3	30"	90"
1"	20'-6"	3	30"	93"
1"	21'-0"	3	30"	96"
1"	21'-6"	3	33"	96"
1"	22'-0"	3	36"	96"
1"	22'-6"	3	36"	99"
1"	23'-0"	3	36"	102"
1"	23'-6"	3	36"	105"
1"	24'-0"	3	36"	108"



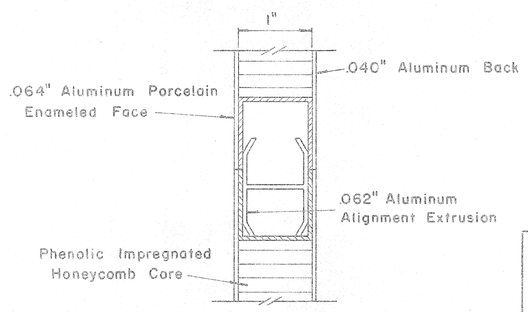
SECTION "A-A"

Scale: $\frac{3}{8}$" = 1"



SECTION "A-A"
(Alternate)

Scale: $\frac{3}{8}$" = 1"



CLOSURE DETAIL
SECTION "B-B"

FULL SCALE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
LAMINATED ALUMINUM
SIGN PANELS
(OVERHEAD)

Scale: As Shown

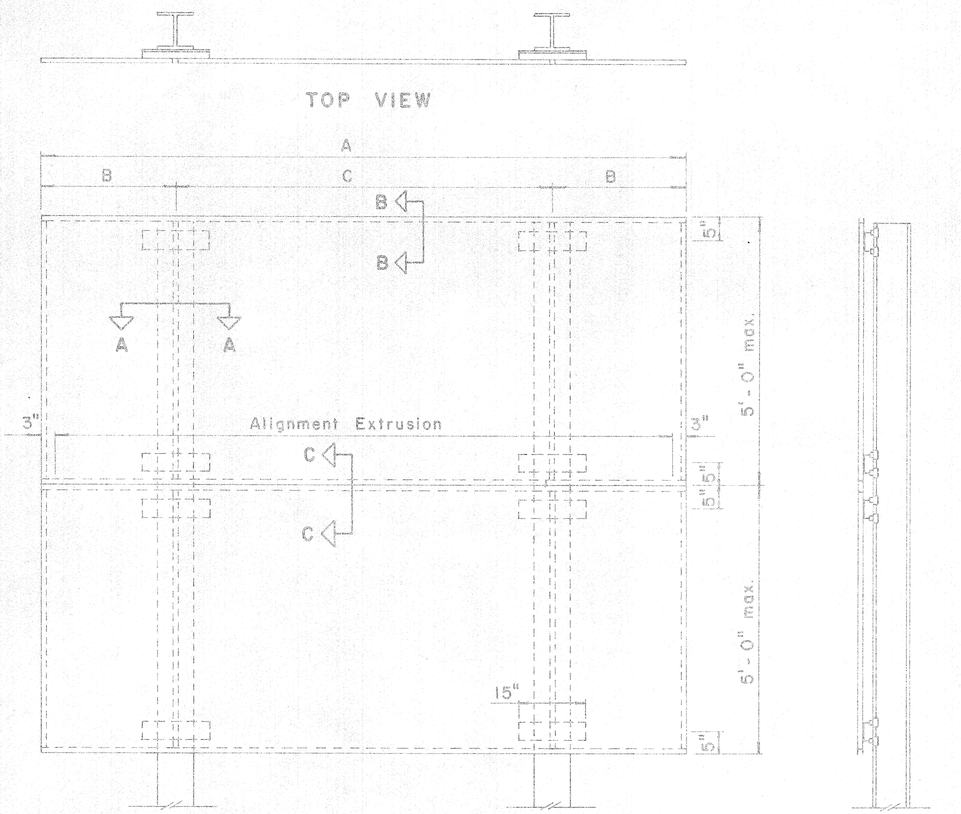
SHEET No. 5 OF 28 SHEETS

204

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

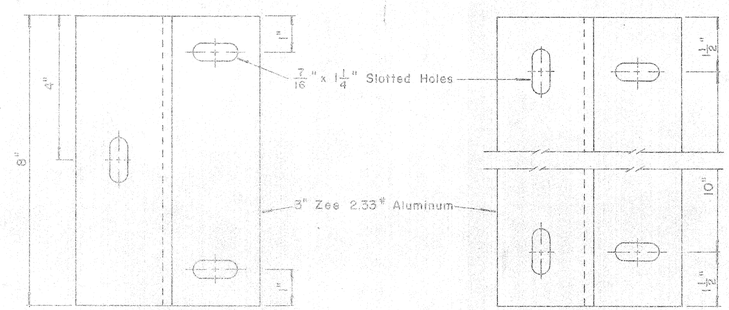
PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-R-F-(47)-8	1968	205	~~227~~ 238



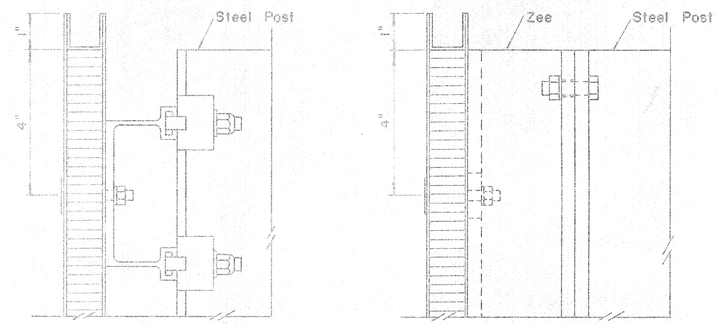
TYPICAL SIGN ASSEMBLY

Scale: $\frac{3}{4}$" = 1'-0"



ZEE MOUNTING DETAILS

Scale: $\frac{1}{2}$" = 1"



SECTION "B-B"

Scale: $\frac{1}{2}$" = 1"

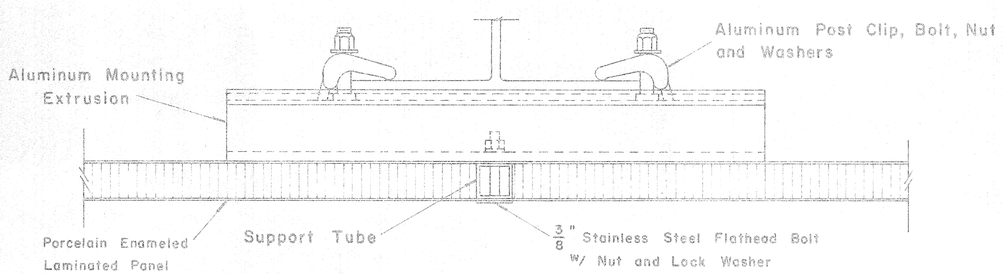
SECTION "B-B" (Alternate)

Scale: $\frac{1}{2}$" = 1"

(GROUND MOUNTED SIGNS)

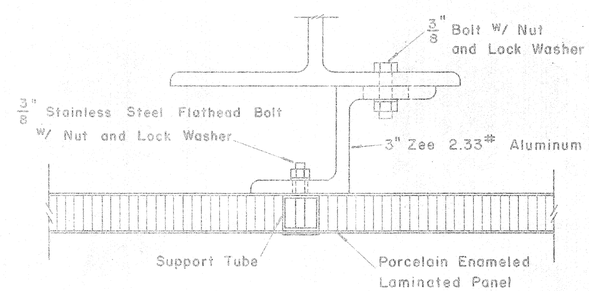
SUPPORT SPACING TABLE

PANEL THICK.	LENGTH OF SIGN A	NO. OF SUPPORTS	OVERHANG B	SUPPORT SPACING C
1"	6'-0"	2	12"	48"
1"	6'-6"	2	15"	48"
1"	7'-0"	2	15"	54"
1"	7'-6"	2	18"	54"
1"	8'-0"	2	18"	60"
1"	8'-6"	2	20"	62"
1"	9'-0"	2	22"	64"
1"	9'-6"	2	23"	68"
1"	10'-0"	2	24"	72"
1"	10'-6"	2	24"	78"
1"	11'-0"	2	24"	84"
1"	11'-6"	2	27"	84"
1"	12'-0"	2	30"	84"
1"	12'-6"	2	30"	90"
1"	13'-0"	2	30"	96"
1"	13'-6"	2	30"	102"
1"	14'-0"	2	30"	108"
1"	14'-6"	2	36"	102
1"	15'-0"	2	36"	108"
2.5"	15'-6"	2	36"	114"
2.5"	16'-0"	2	39"	114"
2.5"	16'-6"	2	39"	120"
2.5"	17'-0"	2	39"	126"
2.5"	17'-6"	2	42"	126"
2.5"	18'-0"	2	42"	132"
2.5"	18'-6"	2	45"	132"
2.5"	19'-0"	2	45"	138"
2.5"	19'-6"	2	45"	144"
2.5"	20'-0"	2	48"	144"
2.5"	20'-6"	2	48"	150"
2.5"	21'-0"	2	51"	150"
2.5"	21'-6"	2	51"	156"
2.5"	22'-0"	2	51"	162"
2.5"	22'-6"	2	54"	162"
2.5"	23'-0"	2	54"	168"
2.5"	23'-6"	2	54"	174"
2.5"	24'-0"	2	57"	174"



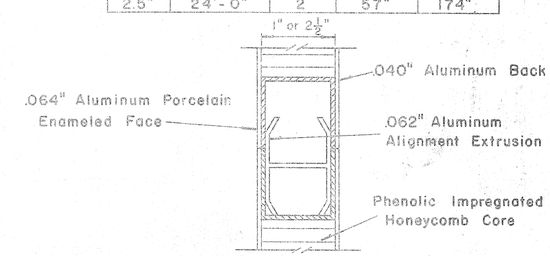
SECTION "A-A"

Scale: $\frac{1}{2}$" = 1"



SECTION "A-A" (Alternate)

Scale: $\frac{1}{2}$" = 1"



CLOSURE DETAIL

SECTION "C-C"

FULL SCALE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
LAMINATED ALUMINUM
SIGN PANELS
(GROUND MOUNTED)

Scale: As Shown

SHEET No. 6 OF 28 SHEETS

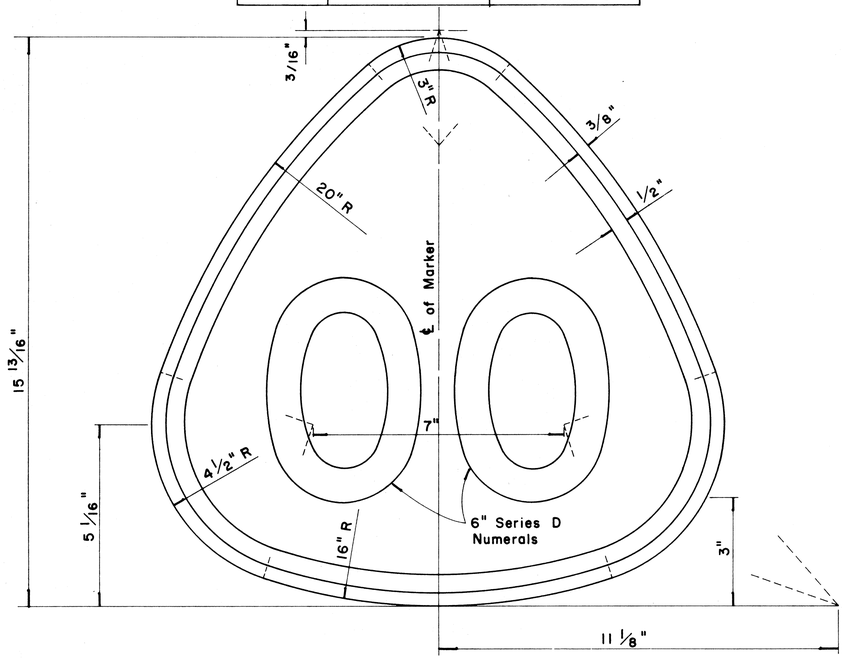
ORIGINAL PLAN	SURVEY PLOTTED BY / DRAWN BY / TRACED BY	DATE
NOTE BOOK No.	DESIGNED BY / QUANTITIES BY / CHECKED BY	

PRINTED ON NO. 1000H CLEARPRINT

205

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-HPP-1 (4)73	1968	206	~~229~~ 228

Shield Size	Multiply Dimensions by	Numeral Size
16"	1	6" Series D
21"	1.3	8" Series D
32"	2.0	12" Series D
42"	2.63	15" Series D
48"	3	18" Series D



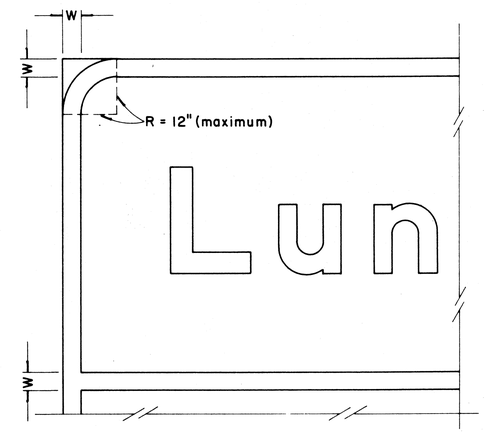
STATE ROUTE MARKER
FOR
DESTINATION & EXPRESSWAY SIGNS

Scale: Half Size

NOTE:

1. State Route Markers on Destination and Expressway signs shall have black numerals and borders on a white reflectorized background mounted on a flat aluminum cut-out.
2. All numerals shall be Series "D" from the "Standard Alphabets for Highway Signs," Bureau of Public Roads, 1957.
3. All Cut-outs shall be fastened on sign panel with Aluminum blind rivets. See Special Provisions.

RADII FOR SIGNS		
Least Dimension of Sign	W	R
2'-0" to 4'-6"	2"	3"
4'-9" to 5'-6"	2"	6"
5'-9" to 7'-6"	2"	9"
7'-9" and greater	2"	12"



BORDER DETAIL
FOR
DESTINATION & EXPRESSWAY SIGNS

No Scale

NOTE:

1. Area outside corner radius need not be trimmed.
2. All borders shall be embossed cut-outs, white and reflectorized.
3. All signs shall have borders.

REVISED: Nov. 29, 1967

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DESTINATION & EXPRESSWAY SIGNS

STATE ROUTE MARKER
AND
BORDER DETAIL

Scale: As Shown

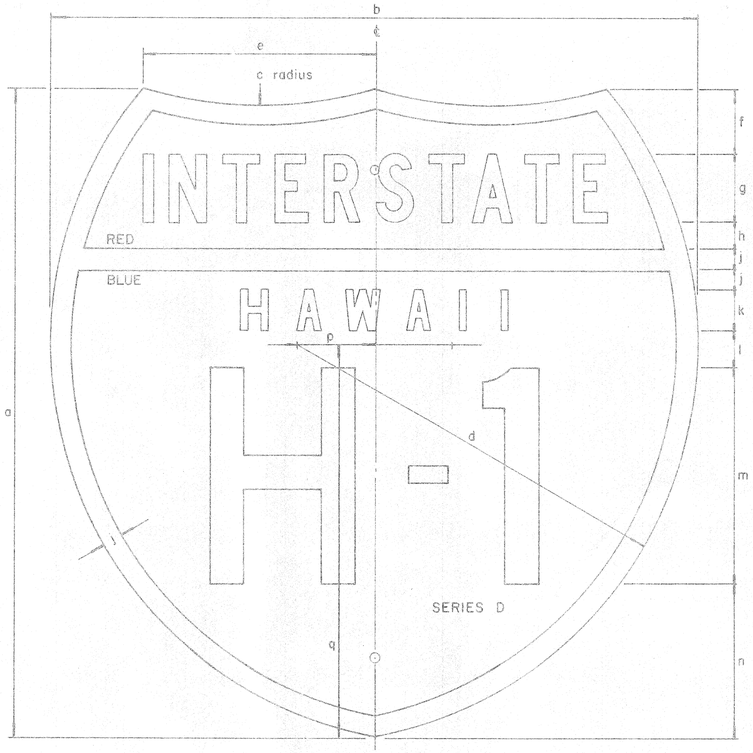
SHEET No. 7 OF 28 SHEETS

206

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

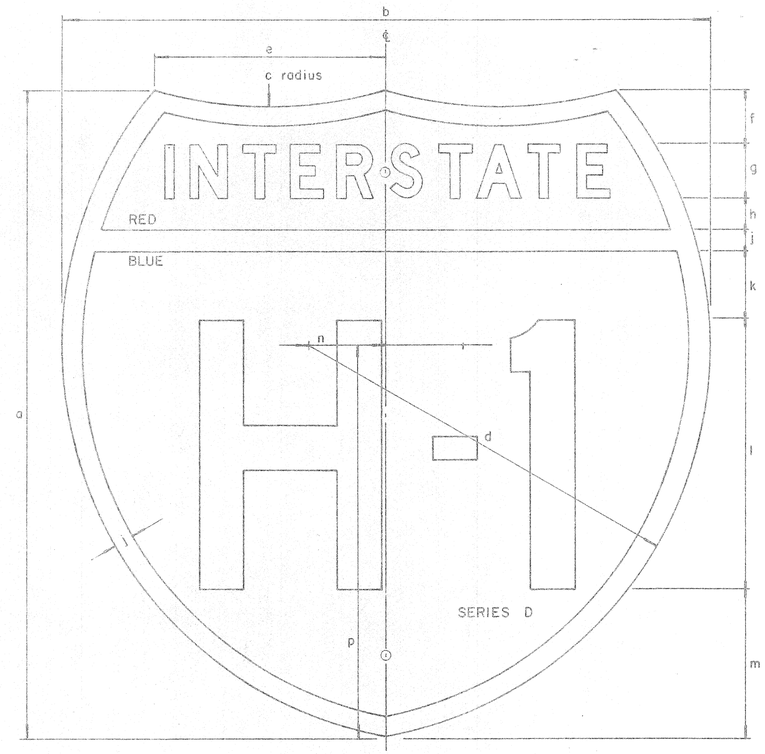
PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H-1-1 (47) 5	1968	207	~~227~~ 238



INTERSTATE ROUTE MARKER

IM-1( )



INTERSTATE ROUTE MARKER

IM-2( )

INTERSTATE SHIELDS - INDEPENDENT USE

( )	a	b	c	d	e	f	g	h	j	k	l	m	n	p	q
1	18	21	13 1/8	12 9/16	9 3/16	1 25/32	1 7/8 C	3/4	9/16	1 1/8 D	1 1/32	6	4 5/16	2 1/16	12 7/16
2	24	24	15	14 7/8	8 5/8	2 3/8	2 1/2 C	1	3/4	1 1/2 D	1 3/8	8	5 3/4	2 7/8	14 5/8
3	36	36	22 1/2	22 5/16	12 15/16	3 9/16	3 3/4 C	1 1/2	1 1/8	2 1/4 D	2 1/16	12	8 5/8	4 5/16	21 15/16

INTERSTATE SHIELDS ON GUIDE SIGNS

( )	a	b	c	d	e	f	g	h	j	k	l	m	n	p
2	24	24	15	14 7/8	8 5/8	2	2 D	1 3/16	3/4	2 9/16	10	5 1/2	2 7/8	14 5/8
3	36	36	22 1/2	22 5/16	12 15/16	3 7/16	3 C	1 5/16	1 1/8	3 1/8	15	9	4 5/16	21 15/16
4	48	48	30	29 3/4	17 1/4	4 3/4	5 C	2	1 1/2	4	18	12 3/4	5 3/4	29 1/4

GENERAL NOTES

1. The shape, dimensions, symbols, wording, lettering, color 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 3/8" bolt holes drilled at appropriate locations unless otherwise specified.
5. The Interstate Route Marker shall be a cut-out shield, in a red, white and blue design as shown on the plans

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

INTERSTATE ROUTE MARKERS

SHEET No. 8 OF 28 SHEETS

207

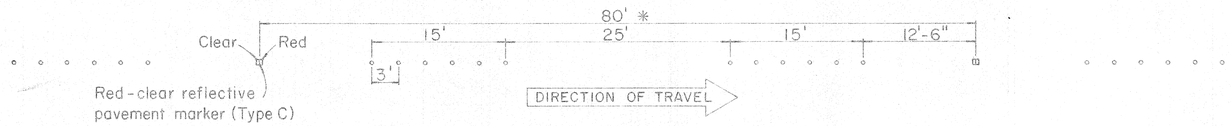
ORIGINAL PLAN
SURVEY PLOTTED BY ____ DATE
DRAWN BY "
TRACED BY "
DESIGNED BY "
QUANTITIES BY "
CHECKED BY "
NOTE BOOK No.

PRINTED ON NO. 1500H CLEARPRINT

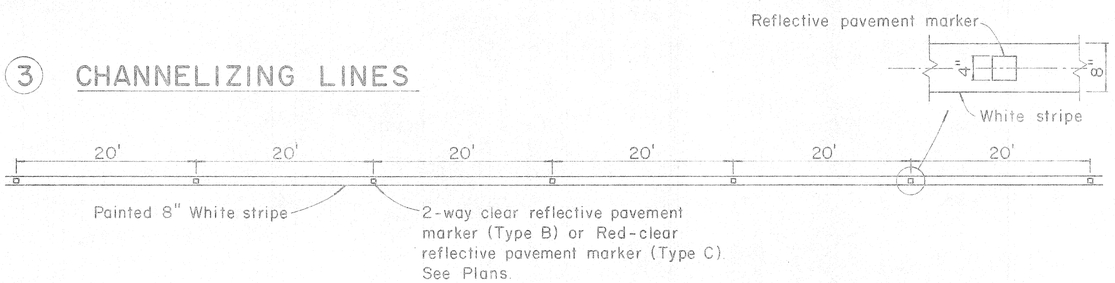
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1 (47): 9	1968	208	~~227~~ 228

1 CENTER LINES ON TWO - LANE RURAL ROADS AND CITY STREETS

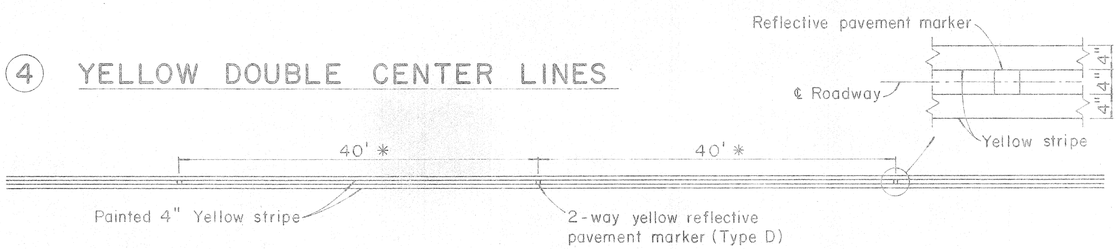
2 LANE LINES



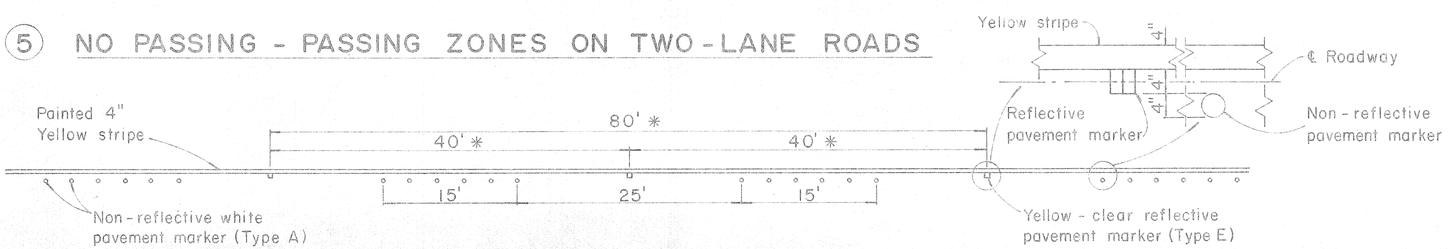
3 CHANNELIZING LINES



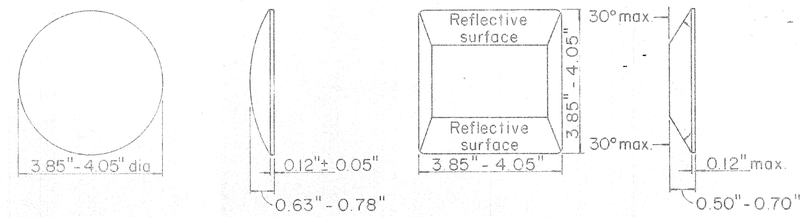
4 YELLOW DOUBLE CENTER LINES



5 NO PASSING - PASSING ZONES ON TWO-LANE ROADS



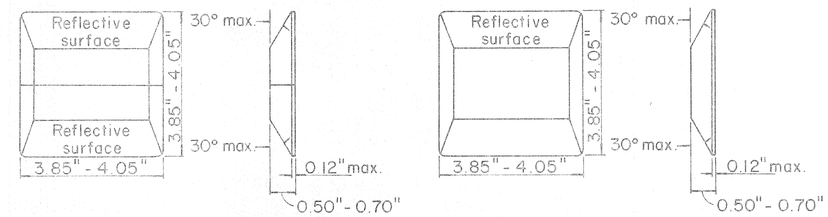
* For curves less than 1000' radius use one-half spacing



TYPE A
Non-reflective white marker

TYPE B
2-way clear reflective surface

TYPE D
2-way yellow reflective surface



TYPE C
Red-clear reflective surface

TYPE H
One-way yellow reflective surface

TYPE E
Yellow-clear reflective surface

TYPE G
One-way clear reflective surface

NOTE:

Painted stripes to be done by State forces

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

RAISED PAVEMENT MARKERS

Not to Scale

SHEET No. 9 OF 28 SHEETS

208

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

PRINTED ON NO. 1000R CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1 (47): 9	1968	209	~~227~~ 236

R1-1 30"x 30"

R1-2 36"x36"x36"
R1-2-E 48"x48"x48"
R1-2-I 60"x60"x60"

R2-1(50) 24"x30"
R2-1(50)-E 36"x48"
R2-1(50)-I 48"x60"

R2-2(40) 24"x24"
R2-2(40)-E 36"x36"
R2-2(40)-I 48"x48"

R2-4(40) 24"x30"
R2-4(40)-E 36"x48"
R2-4(40)-I 48"x60"

R2-5 24"x30"
R2-5-E 36"x48"
R2-5-I 48"x60"

R2-6(25) 24"x30"
R2-6(25)-E 36"x48"
R2-6(25)-I 48"x60"

R2-7 24"x30"
R2-7-E 36"x48"
R2-7-I 48"x60"

R3-1 24"x30"
R3-1-E 36"x48"

R3-2 24"x30"
R3-2-E 36"x48"

R3-3 24"x24"

R3-4 24"x30"
R3-4-E 36"x48"
R3-4-I 48"x60"

R3-5(L) 30"x 36"

R3-6(L) 30"x 36"

R3-7(R) 30"x 30"

R3-8(L) 30"x 30"

R4-1 24"x 30"

R4-2 24"x 30"

R4-3 24"x 30"
R4-3-E 36"x 48"
R4-3-I 48"x 60"

R4-4 24"x 30"
R4-4-E 36"x 48"
R4-4-I 48"x 60"

R4-5 24"x 30"
R4-5-E 36"x 48"

R4-6 24"x 30"
R4-6-E 36"x 48"

R4-7(R) 24"x 30"
R4-7(R)-E 36"x 48"

R5-1 24"x 24"

R6-1(R) 36"x 12"

R6-2(R) 18"x 24"

R6-3 24"x 30"

R6-4 24"x 30"

R6-5 24"x 30"

R7-1 12"x 18"

R7-4 12"x 18"
R7-4-E 24"x 30"

R7-107(R) 12"x 18"

R7-201 12"x 6"

R8-1 24"x 30"
R8-1-E 36"x 48"
R8-1-I 48"x 60"

R8-2 24"x30"
R8-2-E 36"x 48"

R8-3 24"x 30"
R8-3-E 36"x 48"

R8-4 24"x30"
R8-4-E 36"x 48"
R8-4-I 48"x 36"

R9-1 18"x24"

R9-2 12"x 18"

R9-3 12"x 18"

R9-4 12"x18"

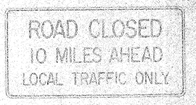
R9-5 12"x18"

R9-6 9"x 12"

R9-7 9"x12"

R10-1 24"x30"
R10-1-E 36"x48"
R10-1-I 48"x60"

R10-2 48"x30"



R10-3(10) 60"x 30"

R10-4(10) 18"x24"

R3-7(L) 30"x 30"

R3-17 30"x 30"

NOTE:

1. The shape, color, dimensions, symbols, wording, lettering and reflectorization 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 regulatory signs shall be reflectorized unless otherwise specified.
3. All regulatory signs shall have 3/8" bolt holes drilled at appropriate locations unless otherwise noted.
4. The suffix "E" denotes Expressway signs and "I" denotes Interstate signs.
5. For R2 signs, number in ( ) indicates speed and shall be as shown on the plans.
6. (R) or (L) indicates right or left and shall be as shown on the plans.
7. For R10-4 sign, number in ( ) indicates weight and shall be as shown on the plan.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

REGULATORY SIGNS

NOT TO SCALE

SHEET No 10 OF 28 SHEETS

209

PRINTED ON CLEARPRINT 1000-H

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1 (47) 0	1968	210	238 ~~227~~

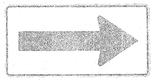

W1-1(R) 30" x 30"

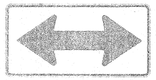

W1-2(R) 30" x 30"


W1-3(R) 30" x 30"


W1-4(R) 30" x 30"


W1-5(R) 30" x 30"


W1-6 48" x 24"


W1-7 48" x 24"


W2-1 30" x 30"


W2-2 30" x 30"


W2-3(R) 30" x 30"


W2-4 30" x 30"

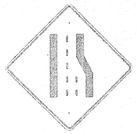

W2-5 30" x 30"

W3-1 30" x 30"

W3-2 30" x 30"

W3-3 36" x 36"

W4-1 30" x 30"
W4-1-E 36" x 36"
W4-1-I 48" x 48"


W4-2 30" x 30"
W4-2-E 36" x 36"

W5-1 30" x 30"
W5-1-E 36" x 36"

W5-2 30" x 30"

W5-3 30" x 30"

W6-1 36" x 36"

W6-2 36" x 36"

W7-1 30" x 30"

W8-1 30" x 30"

W8-2 30" x 30"

W8-3 30" x 30"

W8-4 30" x 30"

W8-5 30" x 30"

W9-1 30" x 30"

W9-2 30" x 30"

W10-1 36" DIAMETER

W11-1 30" x 30"

W11-5 30" x 30"

W12-2 36" x 36"

W13-1(35) 18" x 18"
W13-1(35)-E 24" x 24"

W13-2(25) 12" x 18"

W13-3(25) 48" x 60"

NOTE:
1. The shape, color, dimensions, symbols, wording, lettering and reflectorization 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 warning signs shall be reflectorized unless otherwise specified.
3. All warning signs shall have 5/8" bolt holes drilled at appropriate locations unless otherwise noted.
4. (R) or (L) indicates right or left and shall be as shown on the plan.
5. The suffix "E" denotes Expressway signs and "I" denotes Interstate signs.
6. For W13 sign, number in ( ) indicates speed and shall be as shown on the plans.

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

REVISED: September 26, 1967

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

WARNING SIGNS

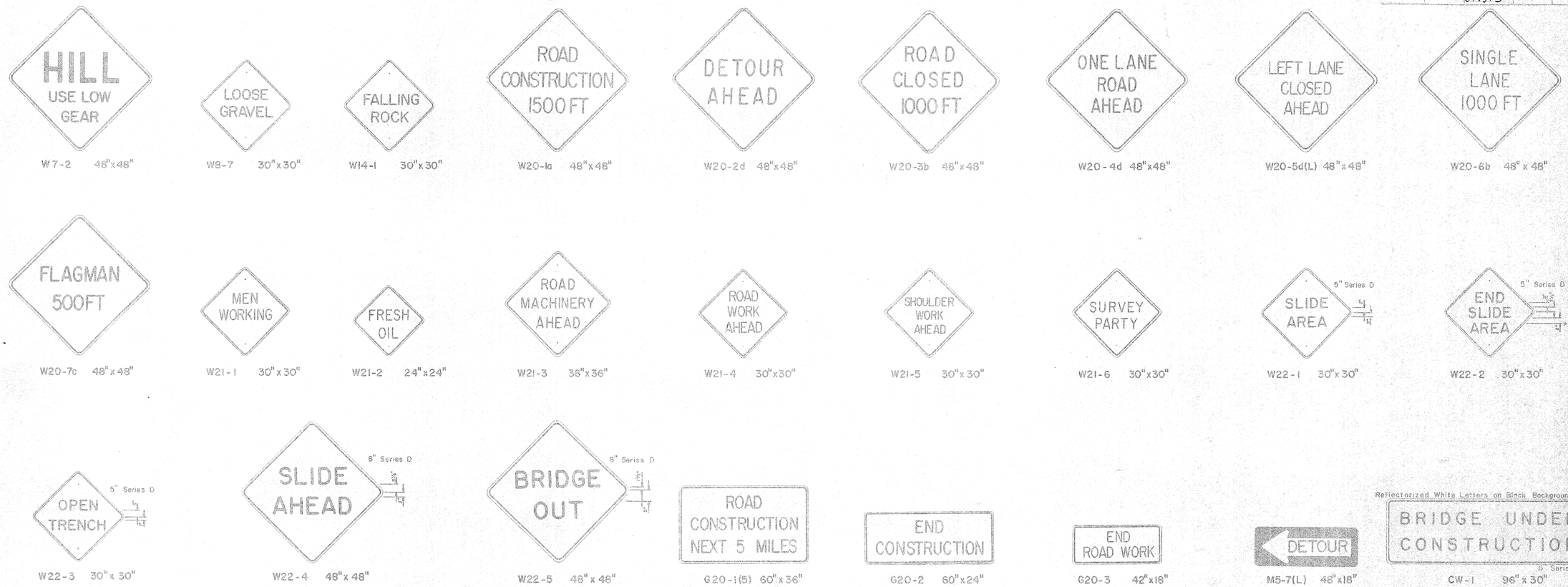
NOT TO SCALE

SHEET No. 11 OF 28 SHEETS

210

PRINTED ON CLEARPRINT 1000-H

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1 (AT):0	1968	211	238 ~~227~~



NOTE:

1. The shape, color, dimensions, symbols, wording, lettering and reflectorization 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 signs shall be reflectorized unless otherwise specified.
3. All signs shall have 3/8" bolt holes drilled at appropriate locations unless otherwise noted.
4. For W20 series signs, suffixes a,b,c and d are as follows a 1500 FT, b 1000 FT, c 500 FT and d AHEAD
5. (R) or (L) indicates right or left and shall be as shown on the plans.
6. Number in ( ) indicates miles and shall be as shown on the plans.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

CONSTRUCTION SIGNS

NOT TO SCALE

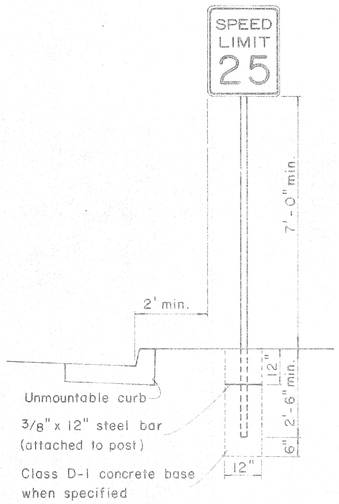
ORIGINAL PLAN		
	SURVEY PLOTTED BY	DATE
	DRAWN BY	"
	TRACED BY	"
NOTE BOOK	DESIGNED BY	"
	QUANTITIES BY	"
No.	CHECKED BY	"

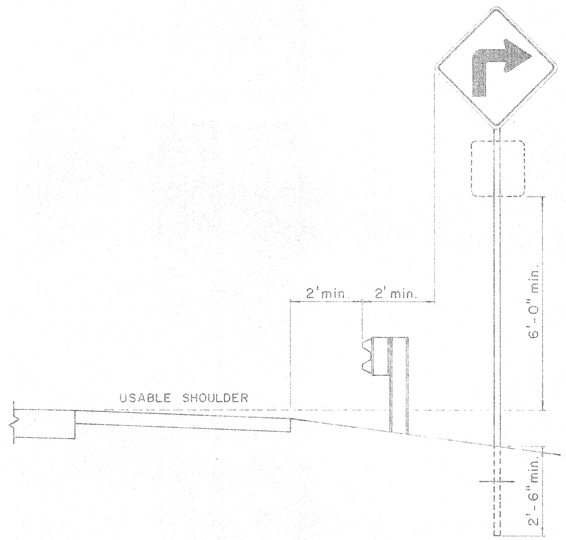
SHEET No. 12 OF 28 SHEETS

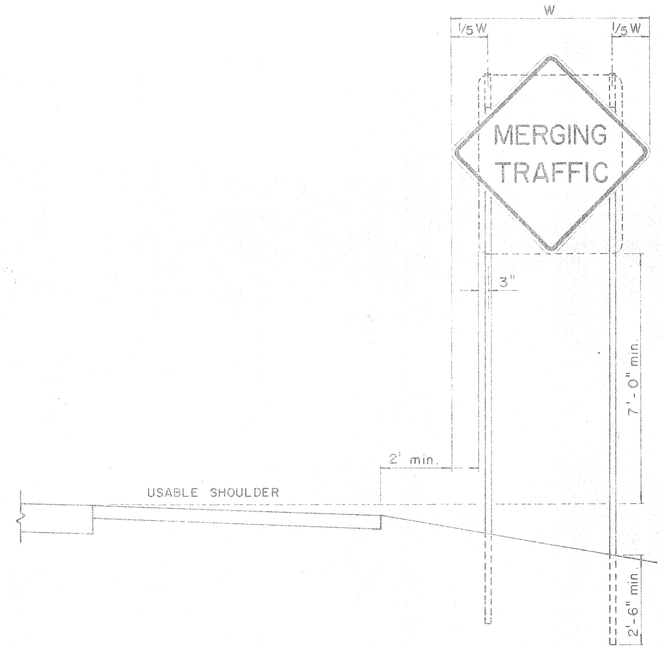
211

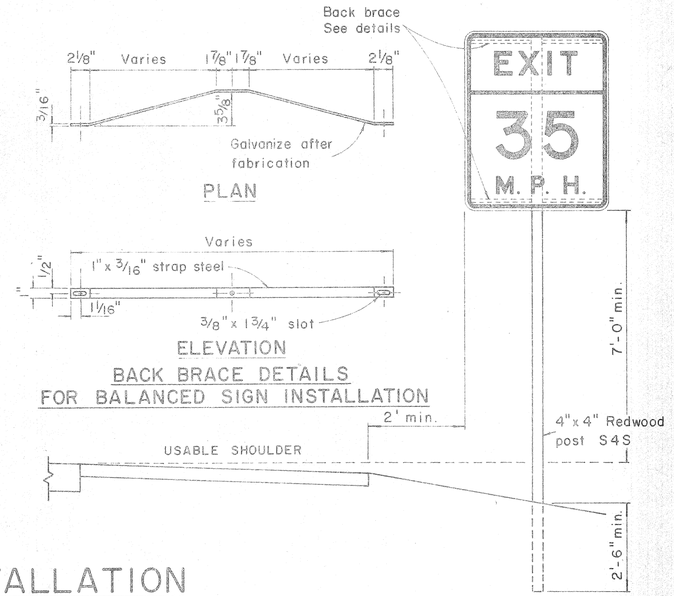
PRINTED ON CLEARPRINT 1000-H

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1 (47):9	1968	212	~~227~~ 238

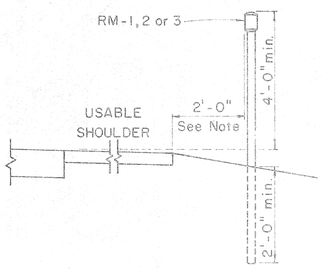




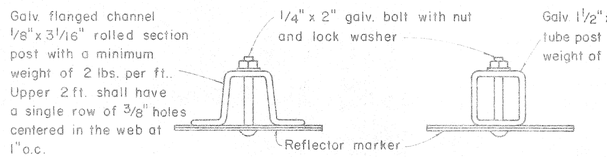




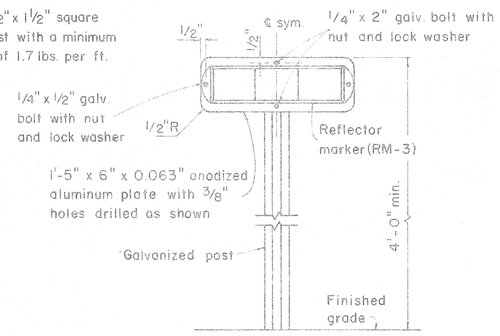
HEIGHT AND LATERAL LOCATION OF SIGNS - TYPICAL INSTALLATION



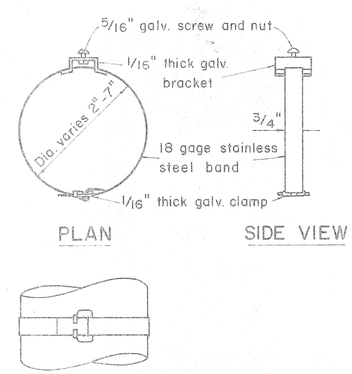
ROAD DELINEATOR



TYPICAL SECTION OF ROAD DELINEATOR



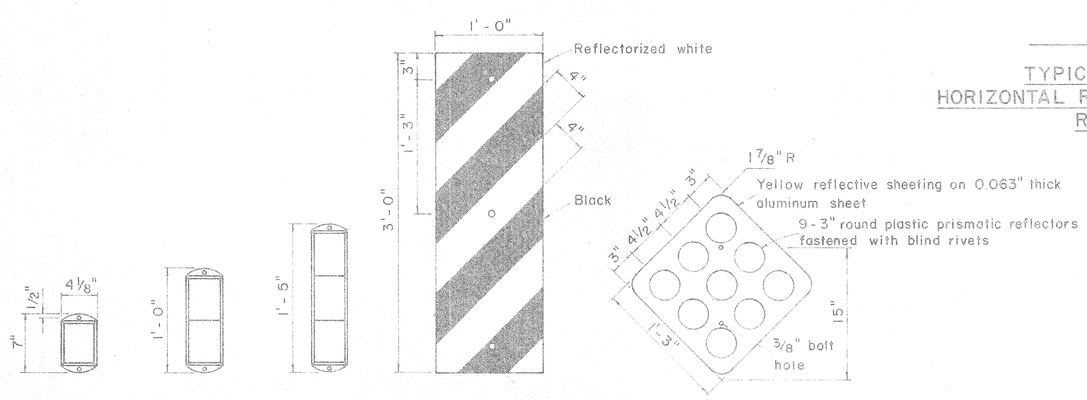
TYPICAL DETAIL
HORIZONTAL REFLECTOR MARKER
RM-3H



TYPICAL BAND BRACKET FOR
MOUNTING TRAFFIC SIGNS

GENERAL NOTES:

1. Sign posts shall be 2" galv. standard pipe, or 2" x 2" galv. sq. tube post.
2. Signs 48" and wider or larger than 10 sq. ft. in area shall be mounted on two 2" galv. standard pipe or two 2" x 2" galv. sq. tube post or 4" x 4" redwood post S4S.
3. Signs shall be attached to post with 5/16" galv. bolts with nuts and 7/8" x 0.06 stainless steel washers with neoprene rubber gasket.
4. Sign posts shall extend 3 1/2" above sign where required for City and County street name signs.
5. Reflector markers RM-1, 2, 3 shall be glass sphere reflector markers with 4" x 5" reflector units (as shown) or plastic prismatic reflector markers with 3" diameter reflector units.
6. Clearance markers (RM-3, RM-4) shall be installed with the edge of the marker in line with the inner edge of the obstruction.
7. (R) or (L) indicates right or left and shall be as shown on the plans.



REFLECTOR MARKERS

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

MISCELLANEOUS SIGN DETAILS

Not to scale — Aug., 1968

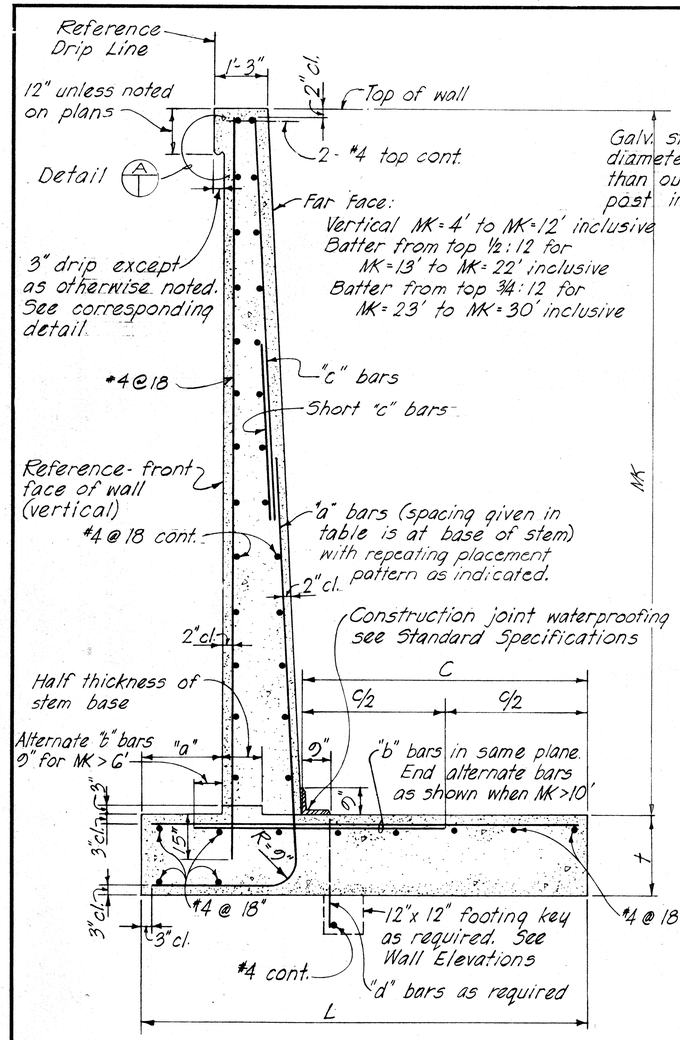
SHEET No. 13 OF 28 SHEETS

212

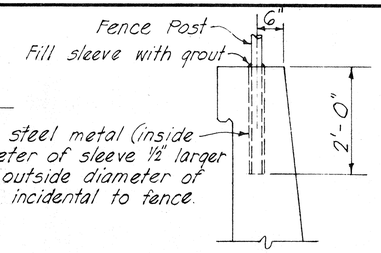
PRINTED ON NO. 1000N CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	T-HI-2 (47) 9	1968	213	~~227~~ 238

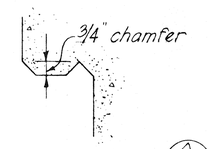
Revision - Dec. 1966
" Jan. 1967
" July 1968



WALL SECTION



CHAIN LINK FENCE POST DETAIL

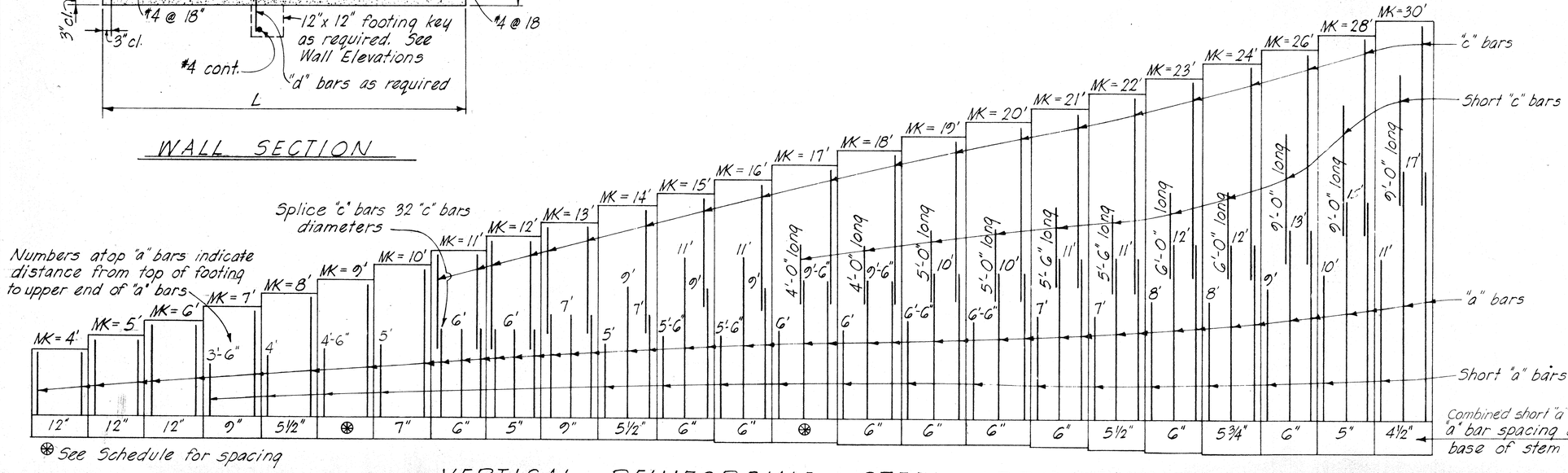


DETAIL A

SCHEDULE OF DIMENSIONS AND REINFORCING STEEL

Maximum "MK"	4E	5E	6E	7E	8E	9E	10E	11E	12E	13E	14E	15E	16E	17E	18E	19E	20E	21E	22E	23E	24E	26E	28E	30E
a	6"	6"	6"	12"	12"	12"	12"	12"	12"	12"	15"	18"	21"	24"	24"	24"	27"	30"	33"	36"	39"	54"	60"	72"
t	14"	14"	14"	14"	14"	14"	14"	18"	18"	18"	18"	18"	21"	21"	24"	24"	24"	27"	30"	31"	33"	36"	39"	42"
L	2.5'	3.0'	3.5'	4.0'	4.5'	5.0'	5.5'	6.0'	6.5'	7.0'	7.75'	8.25'	9.0'	9.75'	10.5'	11.5'	12.5'	13.5'	14.5'	15.25'	16.0'	18.0'	20.0'	21.0'
"a" bars	#3@12"	#3@12"	#4@12"	#4@9"	#4@5½"	#5@7"	#6@7"	#6@6"	#6@5"	#7@9"	#6@5½"	#7@6"	#8@6"	#8@5¾"	#9@6"	#9@6"	#10@6"	#10@6"	#10@5½"	#10@6"	#10@5¾"	#11@6"	#11@5"	#11@4½"
"b" bars	#3@12"	#3@12"	#3@12"	#3@9"	#4@11"	#4@7"	#5@7"	#5@6"	#5@5"	#7@9"	#6@5½"	#7@6"	#8@6"	#7@5¾"	#8@6"	#9@6"	#10@6"	#10@6"	#10@5½"	#10@6"	#10@5¾"	#11@6"	#11@5"	#11@4½"
"c" bars								#4	#4	#4	#4	#4	#5	#5	#5	#6	#6	#6	#7	#7	#7	#7	#7	#7
"d" bars	#3@12"	#3@12"	#3@12"	#3@12"	#4@18"	#4@15"	#4@15"	#4@12"	#4@11"	#4@9"	#5@12"	#5@12"	#5@10"	#5@9"	#5@9"	#5@8"	#6@10"	#6@9"	#7@12"	#7@11"	#7@10"	#7@	#7@	#7@6"

Maximum "MK"	4R	5R	6R	7R	8R	9R	10R	11R	12R	13R	14R	15R	16R	17R	18R	19R	20R	21R	22R	23R	24R	26R	28R	30R
a	6"	6"	6"	12"	12"	12"	12"	12"	12"	12"	15"	18"	21"	21"	21"	21"	24"	24"	27"	30"	33"	39"	39"	51"
t	14"	14"	14"	14"	14"	14"	14"	18"	18"	18"	18"	18"	18"	18"	18"	21"	21"	21"	21"	24"	24"	27"	30"	36"
L	2.5'	3.0'	3.5'	4.0	4.5'	5.0'	5.5'	6.0'	6.5'	6.75	7.25'	7.75	8.25'	8.75'	9.25'	9.75'	10.25'	10.5'	11.0'	11.5'	12.0'	13.0'	14.0'	15.0'
"a" bars	#3@12"	#3@12"	#4@12"	#4@9"	#4@5½"	#5@6"	#6@7"	#6@6"	#6@5"	#7@9"	#6@5½"	#7@6"	#8@6"	#8@6"	#9@6"	#9@6"	#10@6"	#10@6"	#10@5½"	#10@6"	#10@5¾"	#11@6"	#11@5"	#11@4½"
"b" bars	#3@12"	#3@12"	#3@12"	#3@9"	#4@11"	#4@6"	#5@7"	#5@6"	#5@5"	#7@9"	#6@5½"	#7@6"	#7@6"	#8@6"	#9@6"	#9@6"	#10@6"	#10@6"	#10@5½"	#10@6"	#10@5¾"	#10@6"	#10@5"	#9@4½"
"c" bars								#4	#4	#4	#4	#4	#5	#5	#5	#6	#6	#6	#7	#7	#7	#7	#7	#7
"d" bars	#3@12"	#3@12"	#3@12"	#3@12"	#4@18"	#4@15"	#4@15"	#4@12"	#4@11"	#4@9"	#5@12"	#5@12"	#5@10"	#5@9"	#5@9"	#5@8"	#6@10"	#6@9"	#7@12"	#7@11"	#7@10"	#7@	#7@	#7@6"



VERTICAL REINFORCING STEEL ARRANGEMENT

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

RETAINING WALL TYPE T-1

SCALE AS NOTED DATE: AUG., 1968

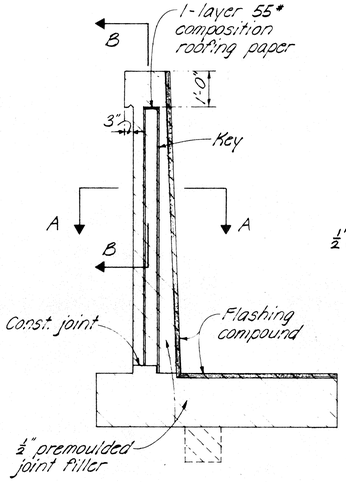
SHEET No. 14 OF 28 SHEETS

213

PRINTED ON NO. 1000H CLEARPRINT

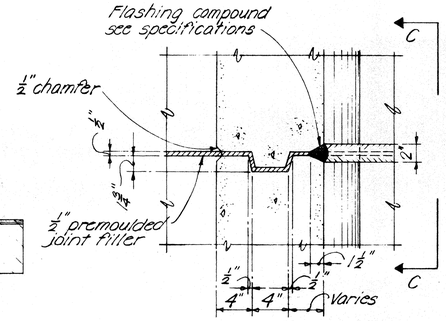
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-(4)1-6 (47)1-6	1968	214	~~227~~ 238

June, 1968

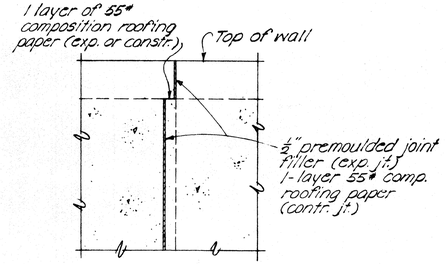


JOINT ELEVATION

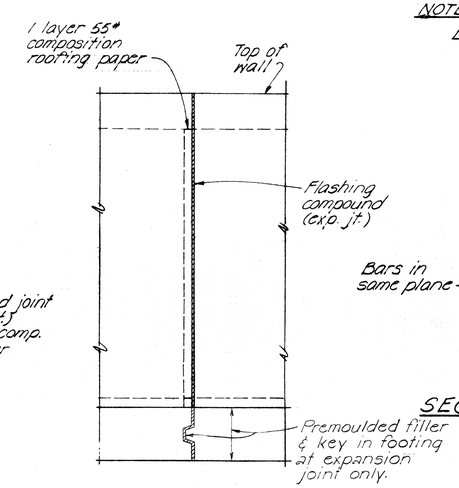
NOTE
Spacing of joints
Expansion = 90'-0" max.
Contraction = 30'-0" max. except where conc. railing or curb occurs 26'-8" max. (match with railing joint above.)
For alternate contraction joint and control joint details - See Standard Bridge Details.



SECTION A-A



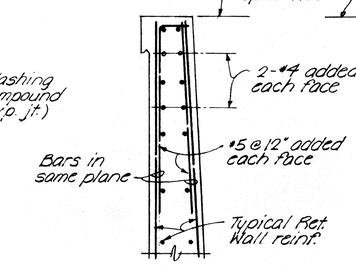
SECTION B-B



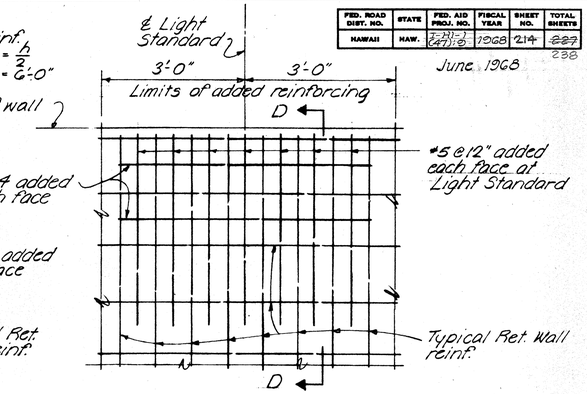
SECTION C-C

TYPICAL EXPANSION JOINT DETAILS No Scale

NOTE:
Limits of added reinf.
Height 0'-18' L = h/2
Height 19'-30' L = 6'-0"

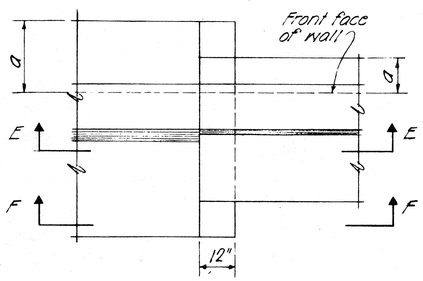


SECTION D-D

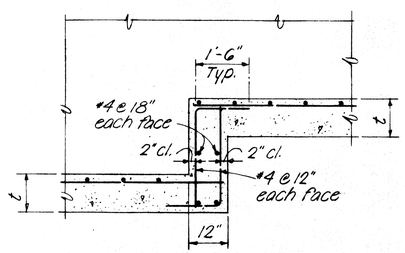


ELEVATION

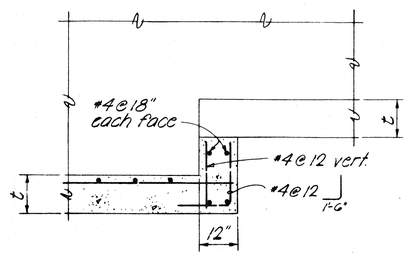
TYPICAL ADDED REINFORCEMENT AT LIGHT STANDARD BASE No Scale



PLAN



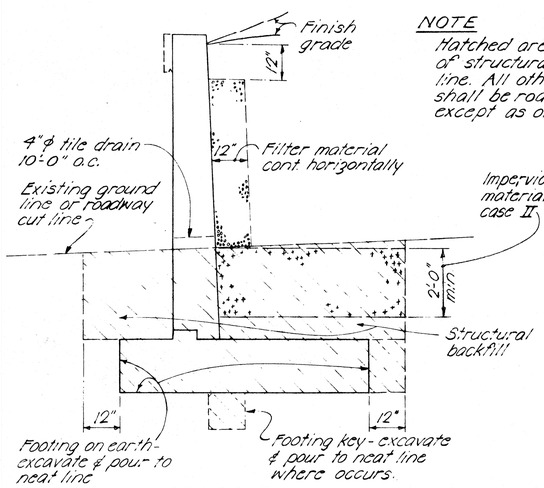
SECTION E-E



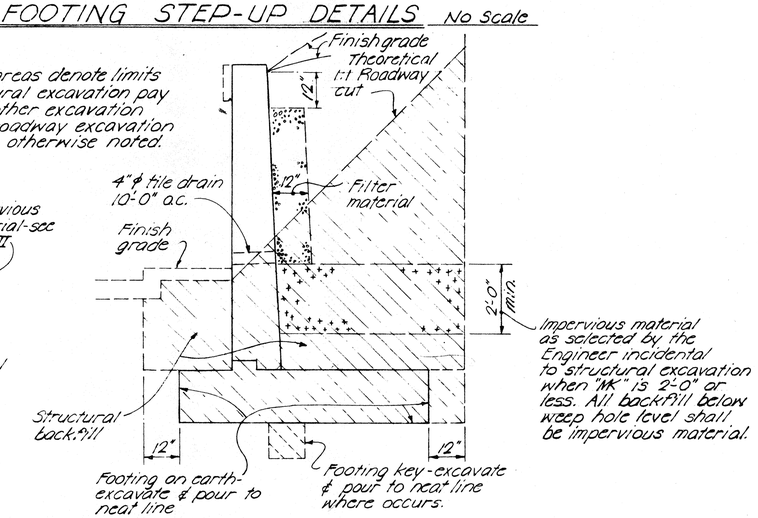
SECTION F-F

FOOTING STEP-UP DETAILS No Scale

NOTE
Hatched areas denote limits of structural excavation pay line. All other excavation shall be roadway excavation except as otherwise noted.



CASE I



CASE II

STRUCTURAL EXCAVATION & DRAINAGE DETAILS No Scale

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

RETAINING WALL TYPE T-1

SCALE AS NOTED DATE: AUG., 1968

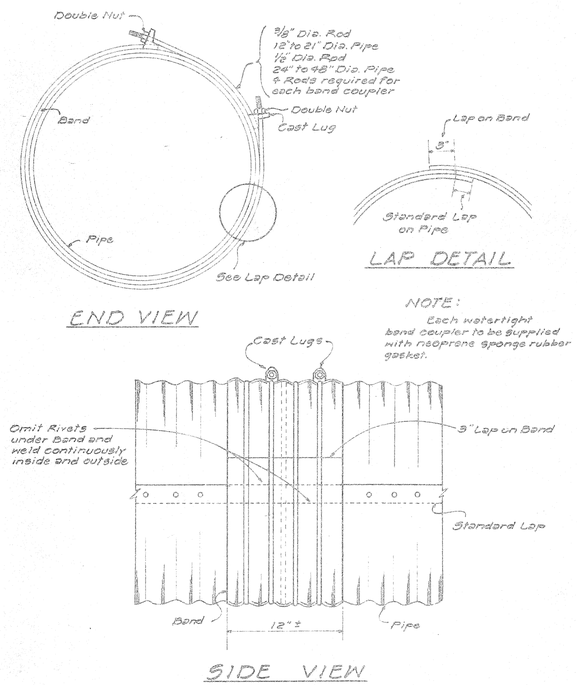
SHEET No. 15 OF 28 SHEETS

2214

PRINTED ON NO. 1000H CLEARPRINT

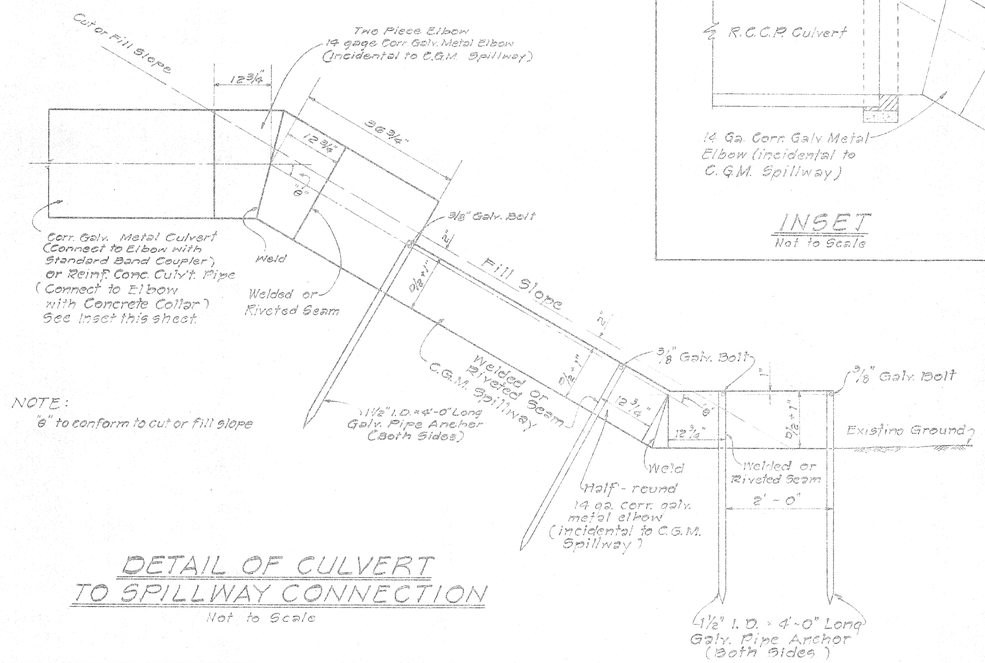
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-H1-1 (47):5	1968	215	~~227~~ 238

Revised : Oct. 1966



DETAIL OF WATERTIGHT BAND COUPLER

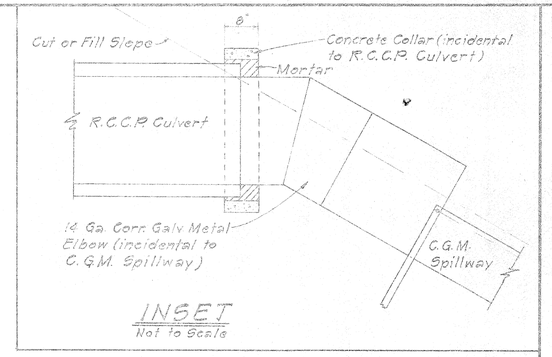
NOT TO SCALE



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

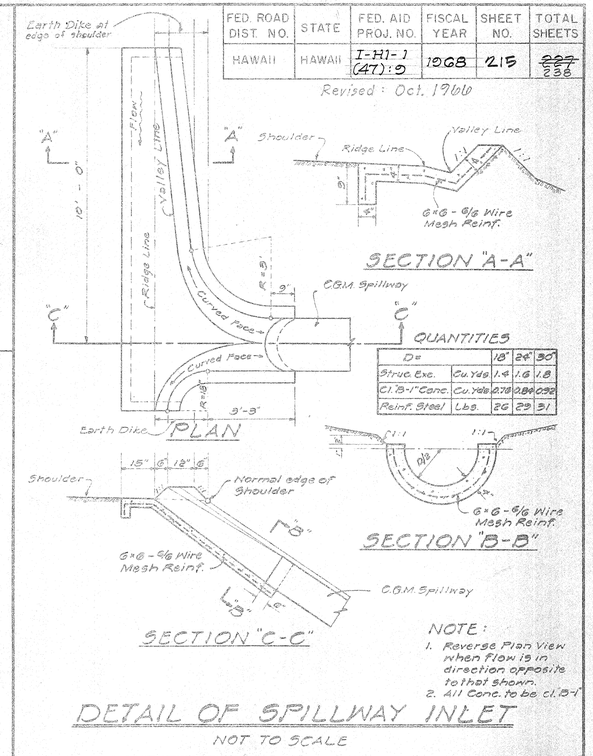
DETAIL OF CULVERT TO SPILLWAY CONNECTION

Not to Scale



INSET

Not to Scale

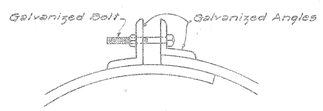


D=		18"	24"	30"
Struc. Exc.	Cu. Yds.	1.4	1.6	1.8
Cl. B-1" Conc.	Cu. Yds.	0.70	0.84	0.98
Reinf. Steel	Lbs.	26	29	31

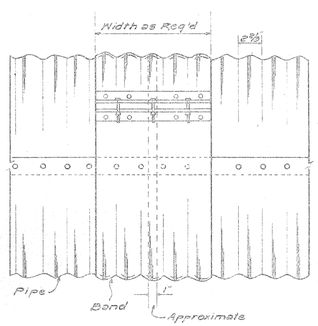
NOTE:
1. Reverse Plan View when flow is in direction opposite to that shown.
2. All Conc. to be cl. B-1

DETAIL OF SPILLWAY INLET

NOT TO SCALE



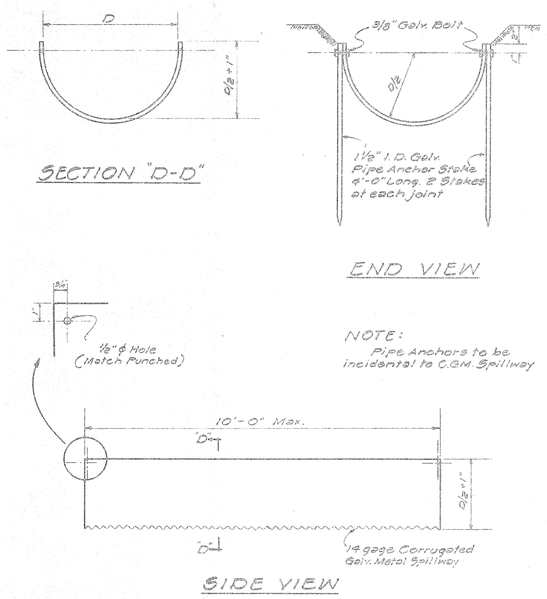
BAND DETAIL



SIDE VIEW

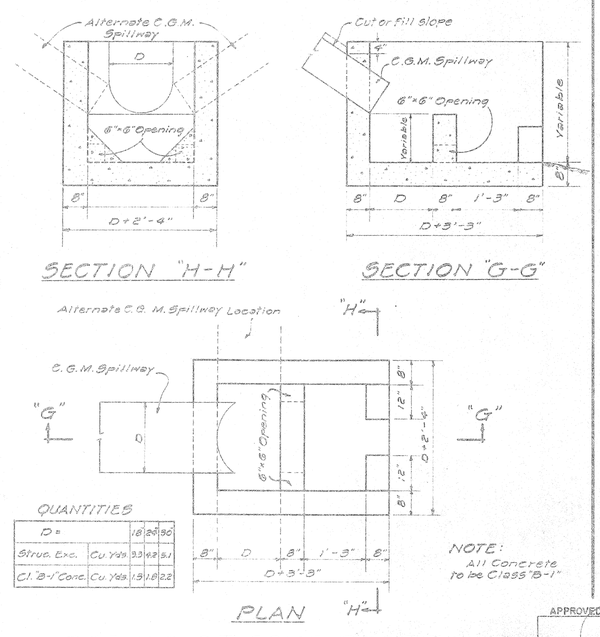
DETAIL OF STANDARD BAND COUPLER

NOT TO SCALE



C.G.M. SPILLWAY

NOT TO SCALE



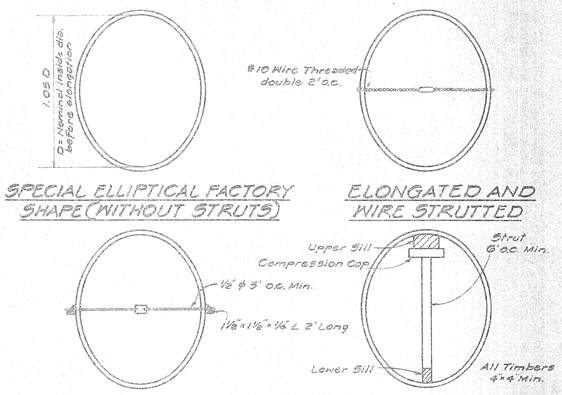
QUANTITIES

D=		18"	24"	30"
Struc. Exc.	Cu. Yds.	3.3	4.2	5.1
Cl. B-1" Conc.	Cu. Yds.	1.9	1.8	2.2

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

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

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 5-24-66
	DRAWN BY R. Y.	
	TRACED BY	
NOTE BOOK	DESIGNED BY O.M.	5-26-61
	QUANTITIES BY	
No.	CHECKED BY	

APPROVED DATE 8-14-61

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. 16 OF 28 SHEETS

215

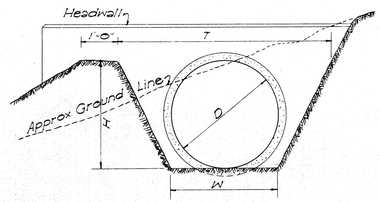
6

LIETZ 1103 ARKWRIGHT TRACING CLOTH 15-60 200P

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO	TOTAL SHEETS
HAWAII	HAW.	I-H1-1 (47) : 0	1968	216	~~227~~ 238

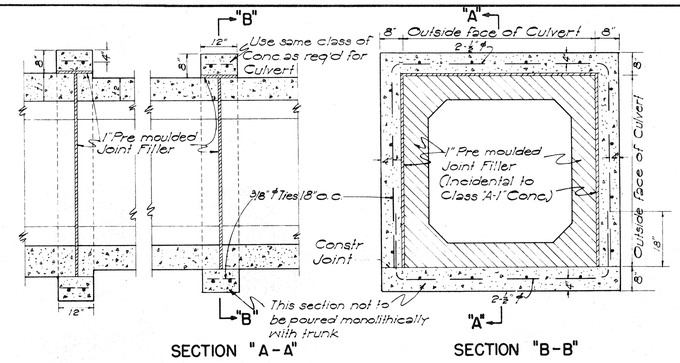
Revised: June 1965
Revised: August 1967

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"



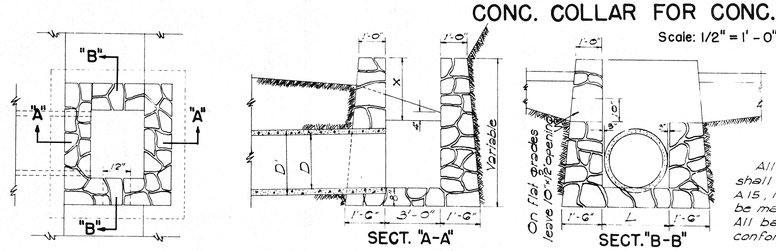
SECTION "A-A" SECTION "B-B"

CONC. COLLAR FOR CONC. BOX CULVERT

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

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.

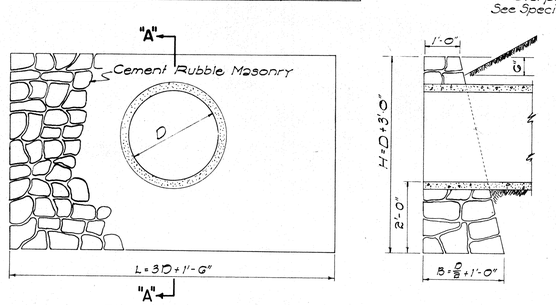


REINFORCING BARS
All reinforcing bars for concrete shall be Billet Steel bars, ASTM A15, intermediate grade. Steel shall be made by the open-hearth process. All bars shall be deformed type conforming to ASTM A-305.

DETAIL OF MASONRY DROP INTAKE

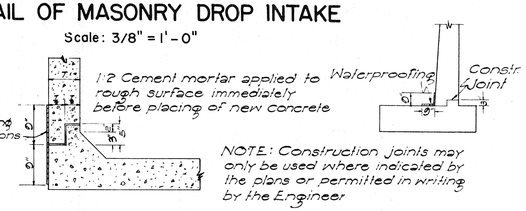
Scale: 3/8" = 1'-0"

DATA - MASONRY HEADWALL				C.R.M. For RCCP	C.R.M. For CGMP
D	H	B	L	Cu. Yds.	Cu. Yds.
18"	4'-6"	1'-8"	6'-0"	1.24	1.20
24"	5'-0"	2'-0"	7'-6"	1.83	1.98
30"	5'-6"	2'-3"	9'-0"	2.56	2.70
36"	6'-0"	2'-6"	10'-6"	3.43	3.66



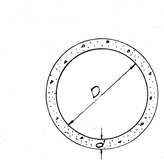
DETAIL OF MASONRY HEADWALL

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



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

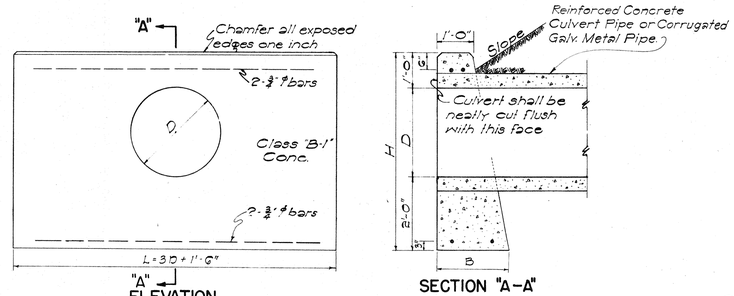
CONSTR. JOINT DETAILS



SECTION

CONC. PIPE CULVERT

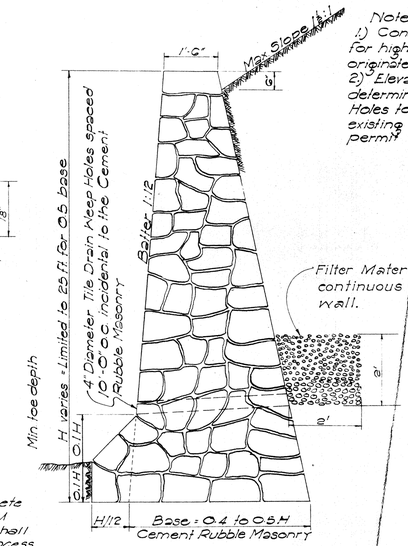
NOTE:
Thickness 'd', reinforcing, and Concrete used, are to conform with the approved design as provided by the Specifications.



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"	38
24"	1'-6"	7'-6"	5'-0"	1.52	1.60	4	3/4" ϕ	7'-0"	48
30"	2'-0"	9'-0"	5'-6"	2.36	2.49	4	3/4" ϕ	8'-6"	59
36"	2'-0"	10'-6"	6'-0"	2.94	3.13	4	3/4" ϕ	10'-0"	69
42"	2'-6"	12'-0"	6'-6"	4.15	4.47	4	3/4" ϕ	11'-6"	80
48"	2'-6"	13'-6"	7'-0"	5.01	5.36	4	3/4" ϕ	13'-0"	78

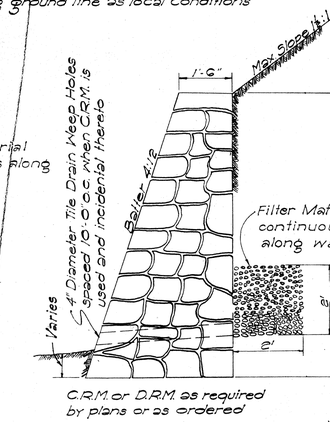
DETAIL OF CONCRETE HEADWALL

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

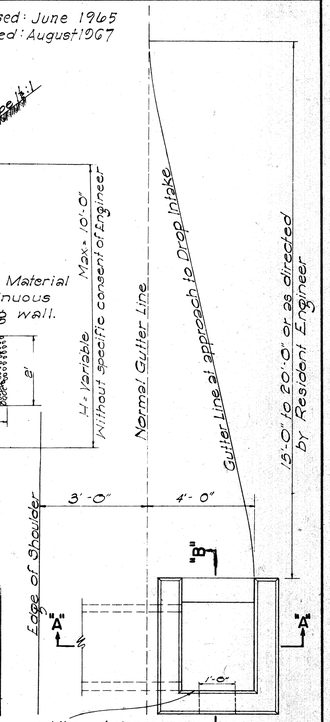


SECTION OF HIGH CEMENT RUBBLE MASONRY RETAINING WALL OR SEAWALL

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.



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

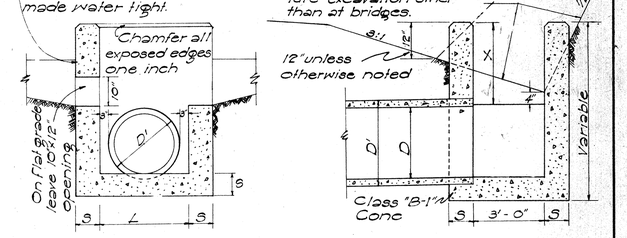
DATA - CONC. DROP INTAKE					Where Variable Equals
D'	D	L=D'+6"	S	Cu. Yds.	
23"	18"	2'-5"	8"	1.41	4'-6"
30"	24"	3'-0"	8"	1.72	5'-0"
37"	30"	3'-7"	9"	2.32	5'-6"
44"	36"	4'-2"	9"	2.73	6'-0"
51"	42"	4'-9"	10"	3.54	6'-6"
58"	48"	5'-4"	10"	4.01	7'-0"

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"

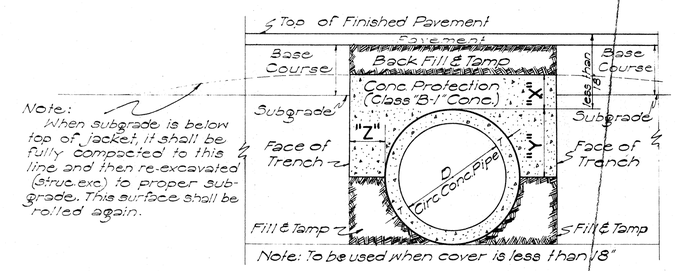
Top limits of structure excavation other than at bridges.



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

DETAIL OF CONCRETE DROP INTAKE

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



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
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"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

DROP INTAKES, RETAINING WALLS, HEADWALLS, CONSTRUCTION JOINTS

SCALES AS NOTED

SHEET № 17 OF 28 SHEETS

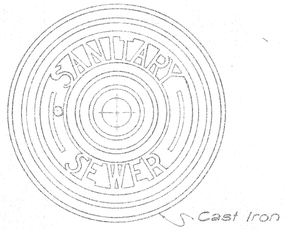
216

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

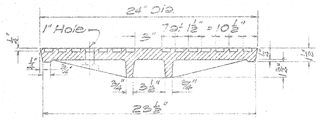
2/17/59
8/2/50

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1 (47) 9	1968	217	~~227~~ 228

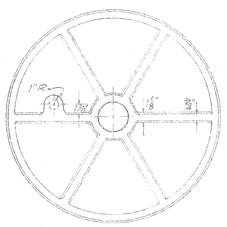
NOTE: Stock Pattern From Novelty Foundry ~ Honolulu



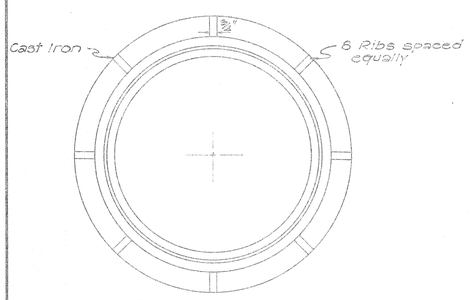
TOP VIEW OF COVER



SECTION



BOTTOM VIEW OF COVER

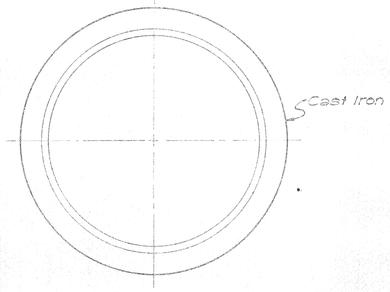


PLAN OF RIM

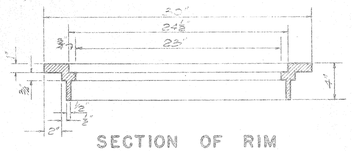
SECTION OF RIM

DETAILS OF TYPE "S" CAST IRON FRAME AND COVER

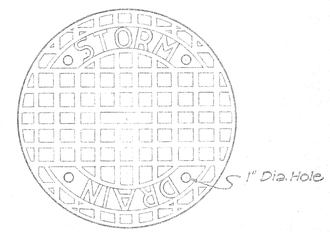
SCALE: 1-1/2" = 1'-0"



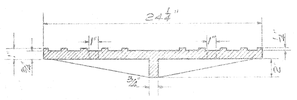
PLAN OF RIM



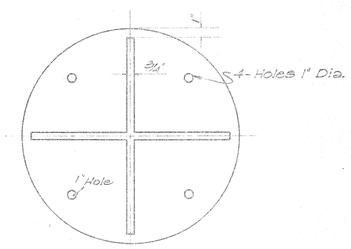
SECTION OF RIM



TOP VIEW OF COVER



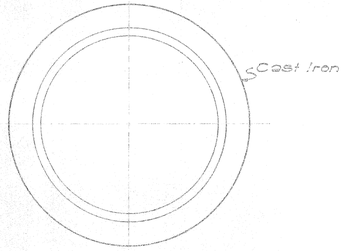
SECTION



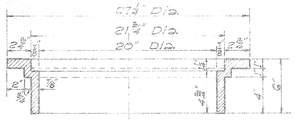
BOTTOM VIEW OF COVER

DETAILS OF TYPE "B" CAST IRON FRAME AND COVER

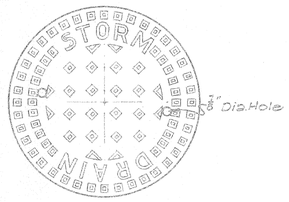
SCALE: 1-1/2" = 1'-0"



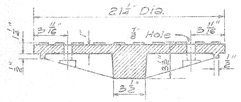
PLAN OF RIM



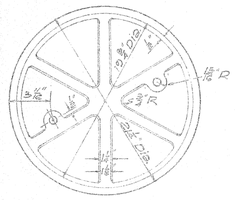
SECTION OF RIM



TOP VIEW OF COVER



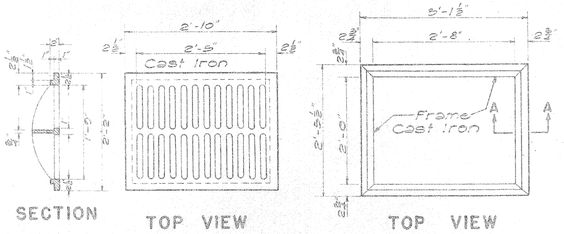
SECTION



BOTTOM VIEW OF COVER

DETAILS OF TYPE "A" CAST IRON FRAME AND COVER

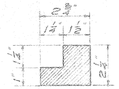
SCALE: 1-1/2" = 1'-0"



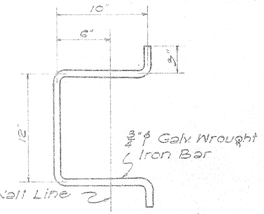
SECTION TOP VIEW TOP VIEW

TYPE C C.I. FRAME AND GRATING

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

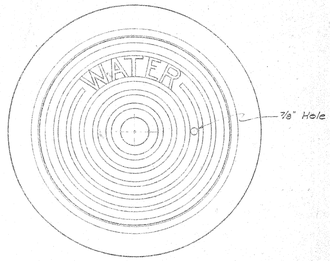


SECTION "A-A"
SCALE 3" = 1'-0"

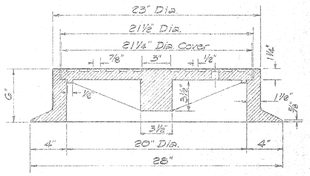


MANHOLE RUNG

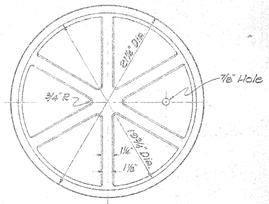
SCALE: 1-1/2" = 1'-0"



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.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
CATCH BASIN AND
MANHOLE CASTINGS

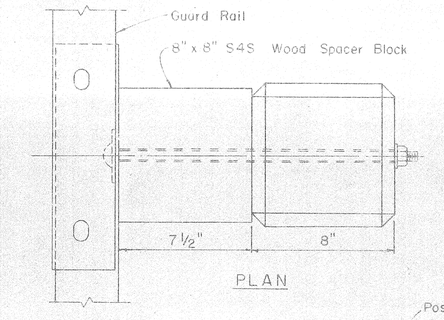
SCALES AS NOTED

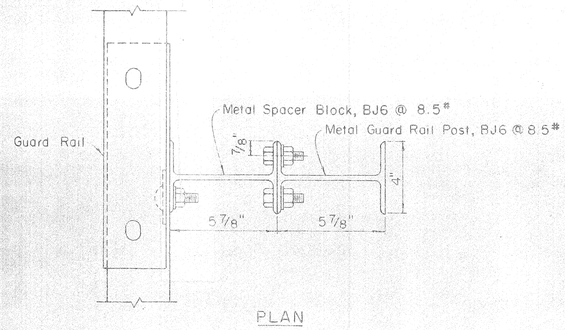
SHEET No 18 OF 28 SHEETS

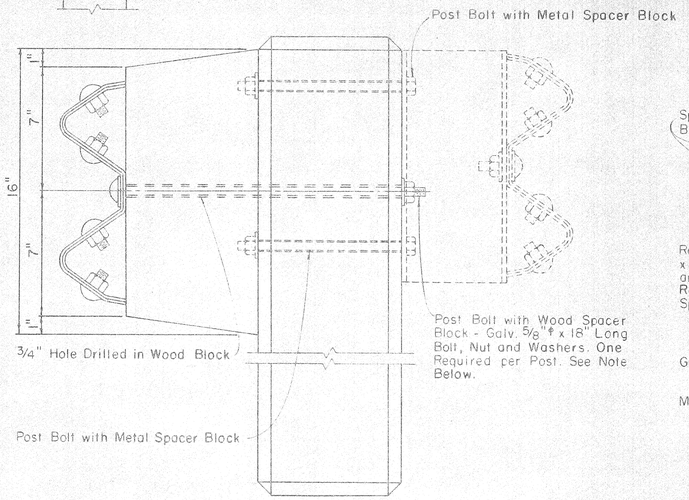
217

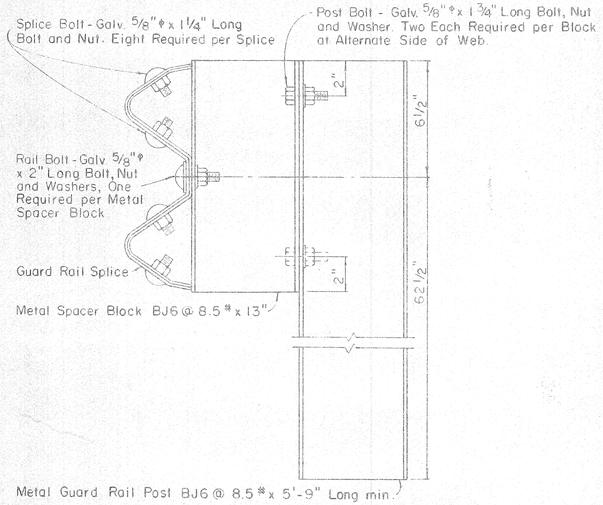
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DESIGNED BY	" "
	DRAWN BY	" "
	TRACED BY J. Calistro	" "
NOTE BOOK	CALCULATED BY	" "
No.	CHECKED BY	" "

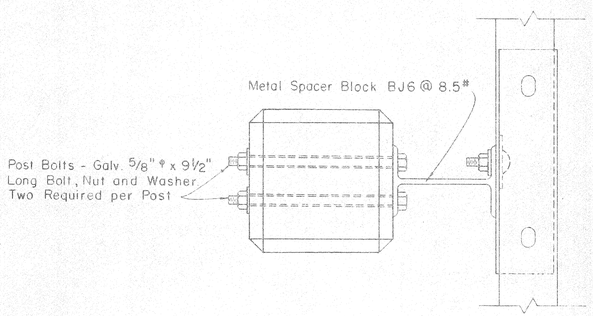
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1 (47):9	1968	218	~~227~~ 238











SINGLE METAL GUARD RAIL ON PRECAST CONCRETE POST WITH WOOD OR METAL SPACER BLOCK

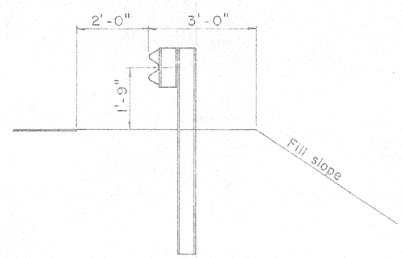
Scale: 3" = 1' - 0"

NOTE:

Single Guard Rails Shown. For Double Guard Rails Additional Spacer Blocks and Rail Elements Required on Opposite Side of Posts. See Bolt Schedule for Required Bolt Lengths.

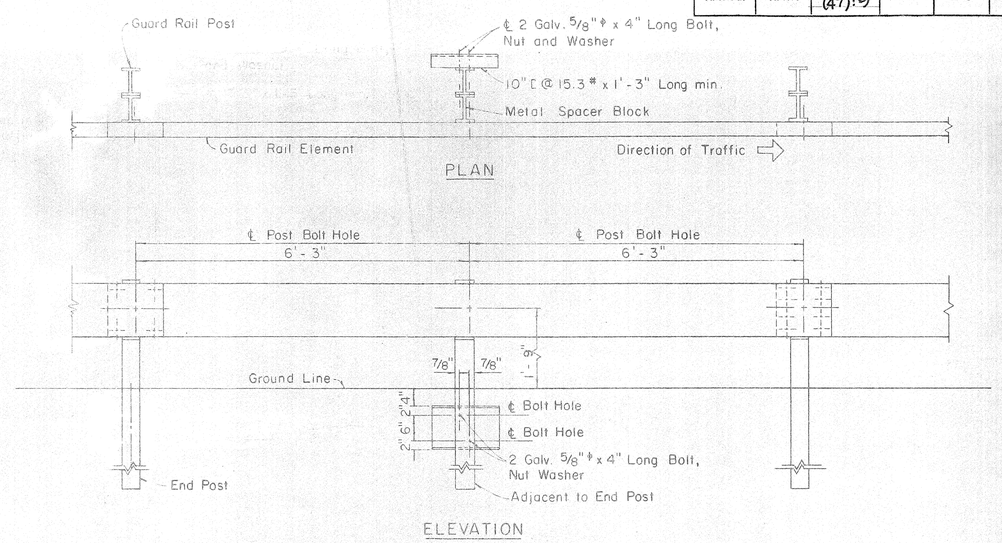
SINGLE METAL GUARD RAIL ON METAL POST WITH METAL SPACER BLOCK

Scale: 3" = 1' - 0"



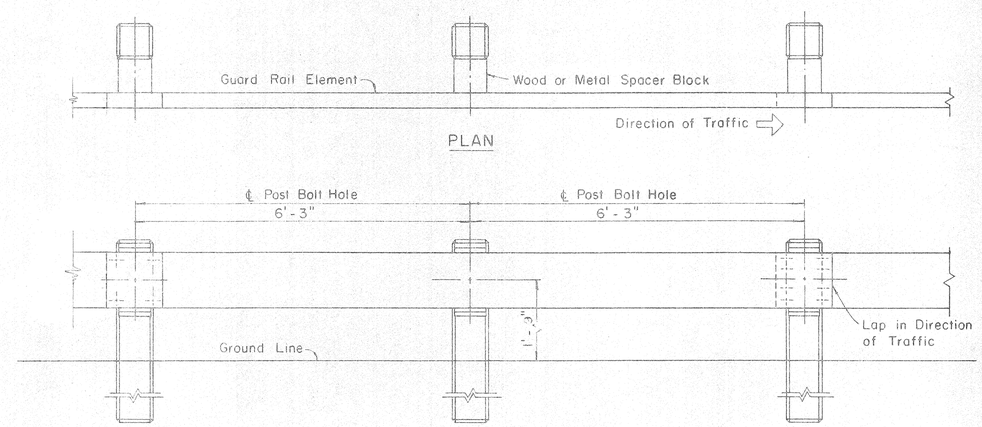
TYPICAL GUARD RAIL DETAIL

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



METAL GUARD RAIL ON METAL POST WITH METAL SPACER BLOCK

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



METAL GUARD RAIL ON CONCRETE POST WITH WOOD OR METAL SPACER BLOCK

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

REVISED: October 27, 1967
REVISED: August 10, 1967

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

METAL GUARD RAIL

Scale: as noted

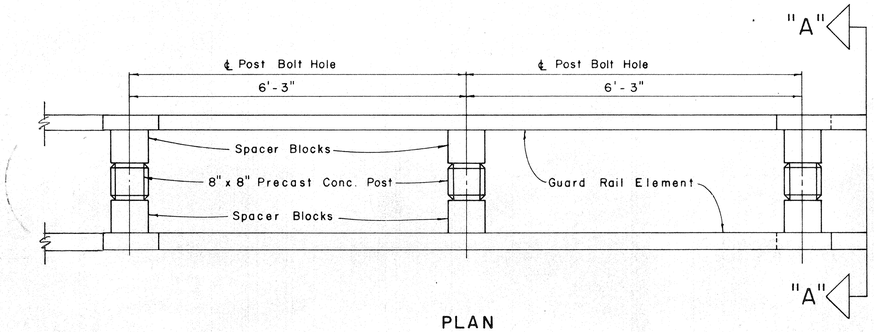
SHEET No. 19 OF 28 SHEETS

218

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

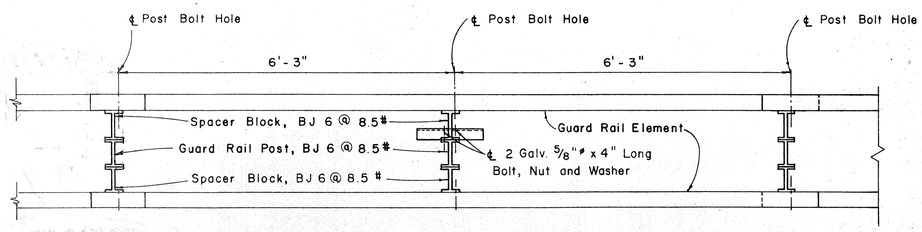
PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	[illegible]	1968	219	~~227~~ 238



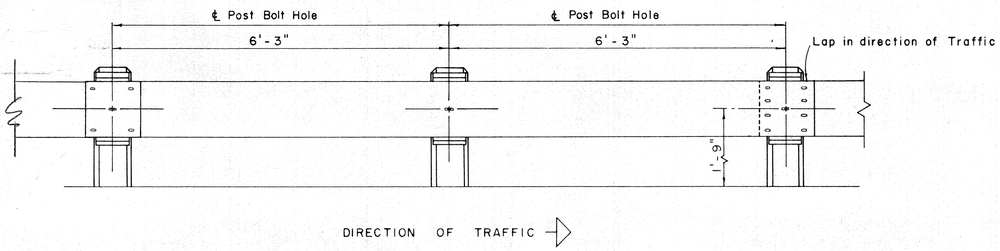
PLAN

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



PLAN

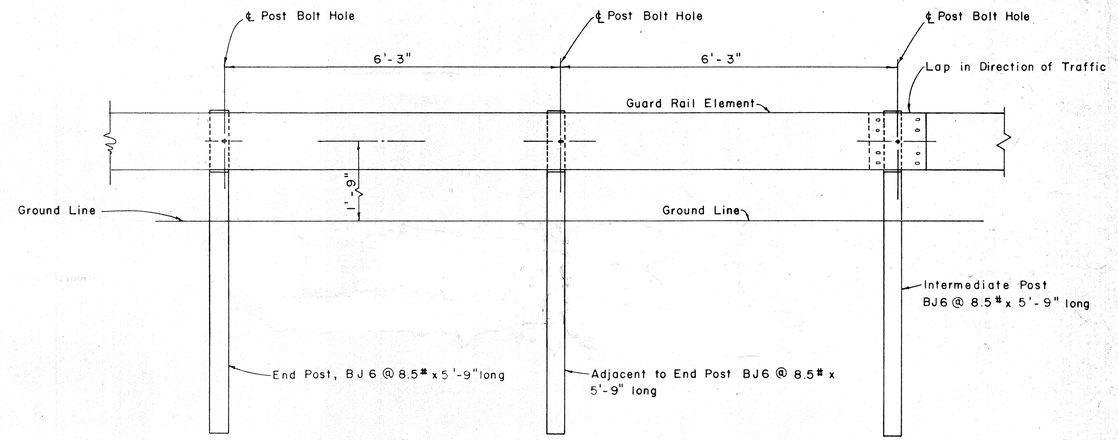
Scale: 3/4" = 1'-0"



ELEVATION

METAL GUARD RAIL ON CONCRETE POSTS AND WOOD SPACER BLOCKS

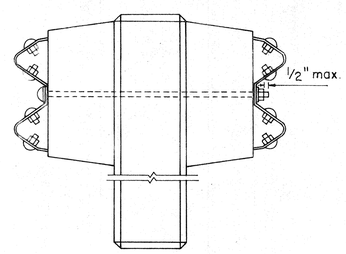
Scale: 3/4" = 1'-0"



ELEVATION

METAL GUARD RAIL ON METAL POSTS AND METAL SPACER BLOCKS

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



SECTION "A-A"

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

REVISED: October 25, 1967
REVISED: August 10, 1967

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

METAL GUARD RAIL

SHEET No. 20 OF 28 SHEETS

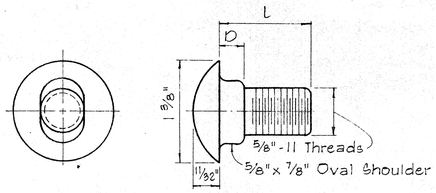
ORIGINAL PLAN		DATE
	SURVEY PLOTTED BY	
	DRAWN BY	
	TRACED BY	
	DESIGNED BY	
NOTE BOOK	QUANTITIES BY	
No.	CHECKED BY	

219

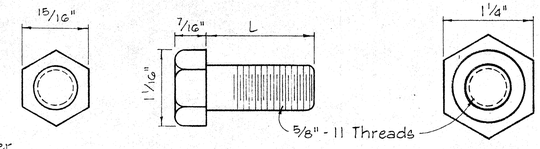
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1 (47)9	1968	220	~~227~~ 228

BOLT DIMENSIONS		
TYPE A BOLT	D	L
Splice Bolt	5/16"	1 1/4"
Post Bolt for Conc. Post w/ Double Wood Blocks	3/32"	24"
Post Bolt for Conc. Post w/ Single Wood Block	3/32"	18"
Rail Bolt for Metal Block	3/32"	2"

BOLT DIMENSIONS	
TYPE B BOLT	L
Post Bolt for Conc. Post w/ Metal Blocks	9 1/2"
Post Bolt for Metal Post w/ Metal Block	1 3/4"



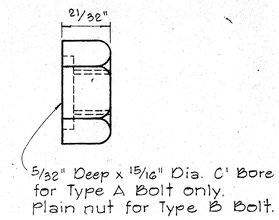
TYPE A BOLT



TYPE B BOLT

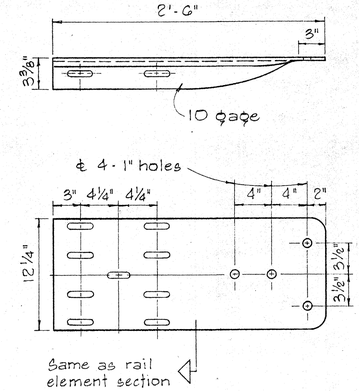
SPLICE RAIL AND POST BOLTS

Scale: Full Size



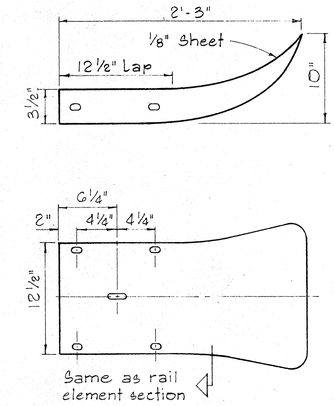
HEXAGON NUT

Scale: Full Size



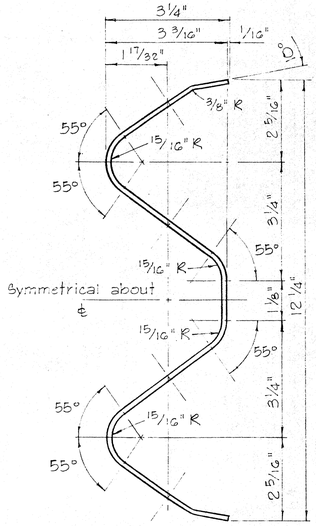
SPECIAL END SHOE

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



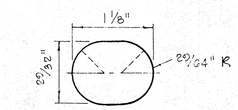
FLARED END

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

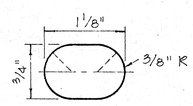


RAIL ELEMENT SECTION

Scale: 6" = 1'-0"

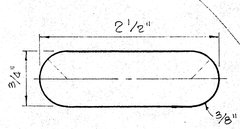


SPLICE BOLT SLOT

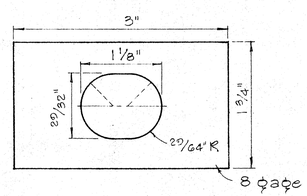


SPLICE BOLT SLOT FOR ALL ENDS

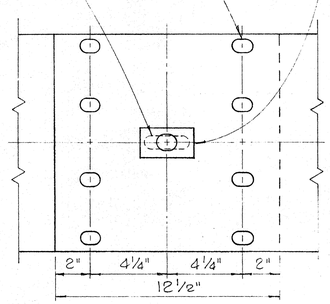
Scale: Full Size



POST BOLT SLOT

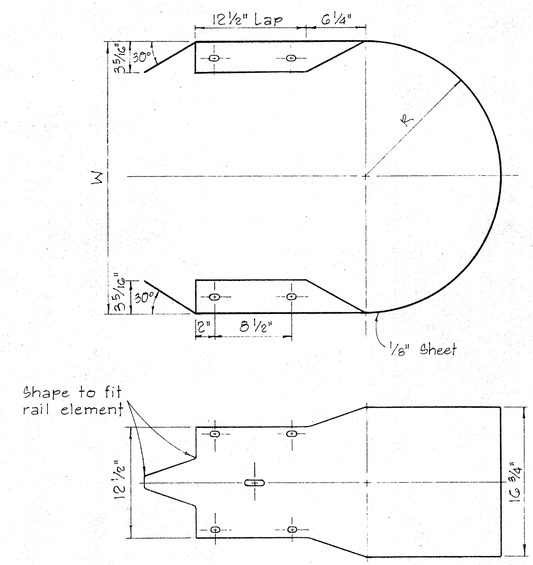


RAIL WASHER



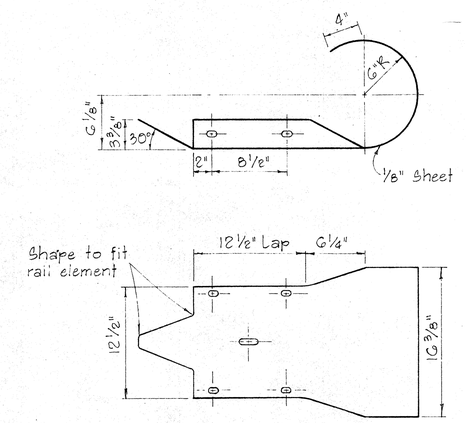
RAIL SPLICE

Scale: 3" = 1'-0"



MEDIAN END

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



CURVED END

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

MEDIAN END DIMENSIONS		
TYPE OF POST AND BLOCK	W	R
Double Metal Guard Rail on Concrete Post with Wood Blocks	29 3/4"	14 7/8"
Double Metal Guard Rail on Concrete Post with Metal Blocks (BJG)	26 1/2"	13 1/4"
Double Metal Guard Rail on Metal Post with Metal Blocks (BJG)	24 3/8"	12 3/16"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

METAL GUARD RAIL

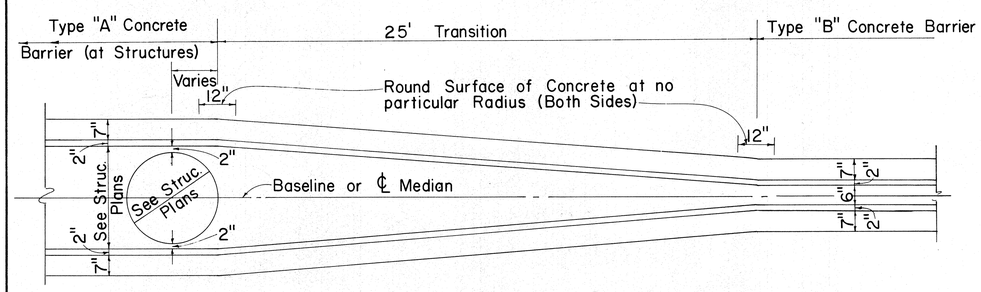
Scale: As Noted — August, 1968

SHEET No. 21 OF 28 SHEETS

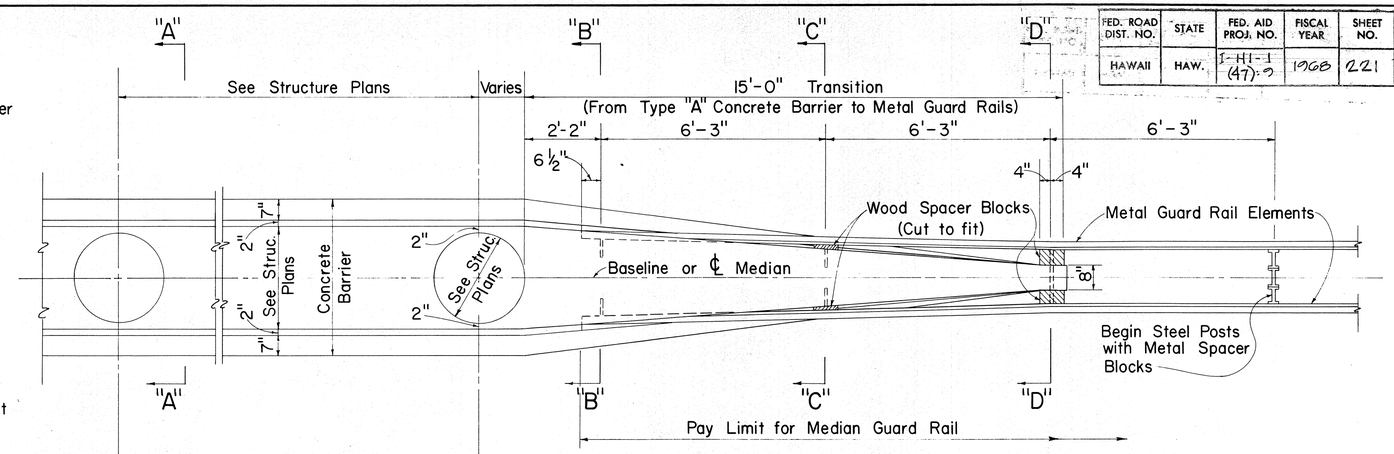
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

PRINTED ON NO. 1000H CLEARPRINT

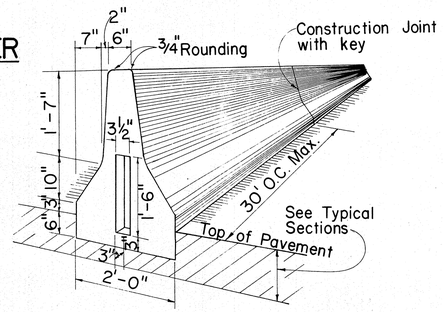
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1 (47)-2	1968	221	228



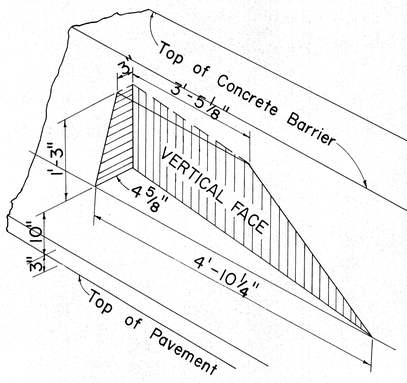
TYPICAL TRANSITION PLAN FROM TYPE "A" TO TYPE "B" CONC. BARRIER



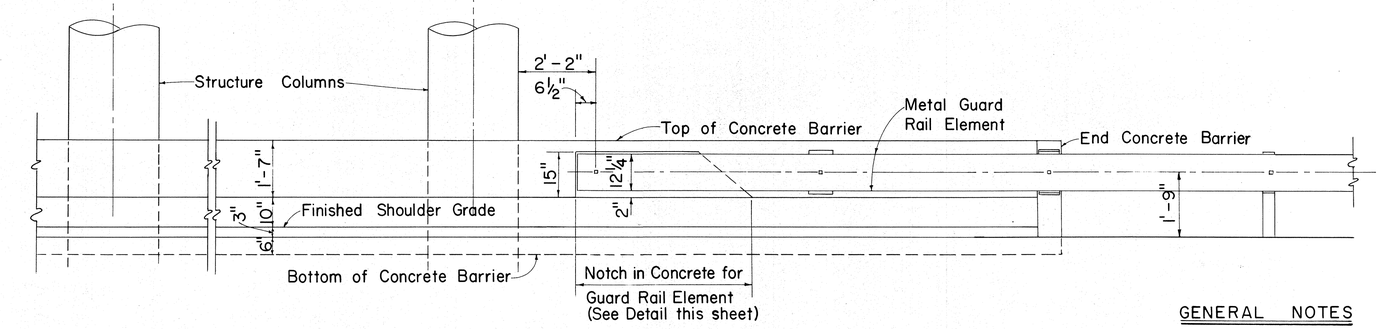
PLAN



TYPE "B" CONC. BARRIER (AT TANGENT SECTIONS)

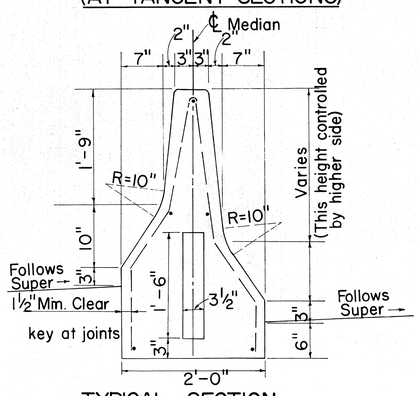


DETAIL OF NOTCH IN CONCRETE BARRIER

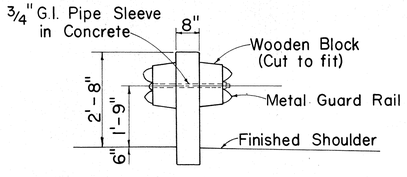


ELEVATION

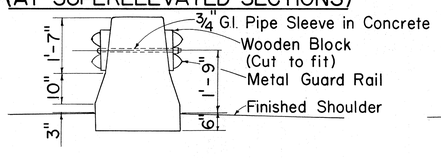
TYPE "A" CONCRETE BARRIER FOR MEDIANS



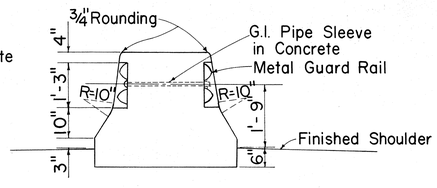
TYPICAL SECTION TYPE "B" CONC. BARRIER (AT SUPERELEVATED SECTIONS)



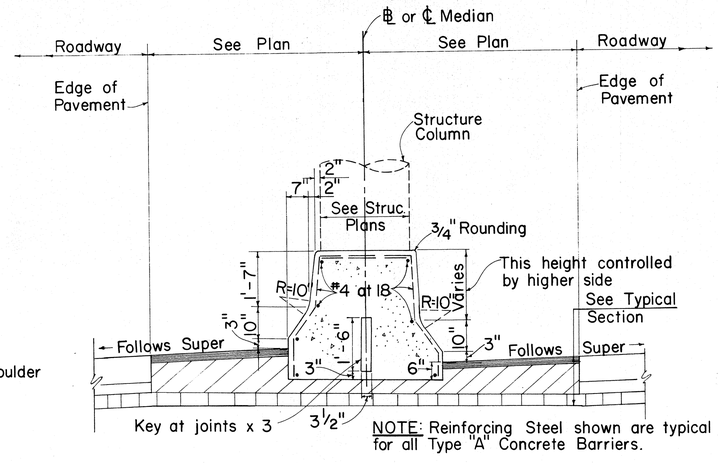
SECTION "D-D"



SECTION "C-C"



SECTION "B-B"



TYPE "A" CONCRETE BARRIER SECTION "A-A"

GENERAL NOTES

1. Concrete for Concrete Barriers shall be Class "A-1".
2. The Contractor shall furnish and install ⅝" ø bolts of appropriate lengths, and appurtenant washers, nuts and wooden blocks for anchoring metal guard rail elements to Concrete Barrier. (Incidental to Metal Guard Rail.)

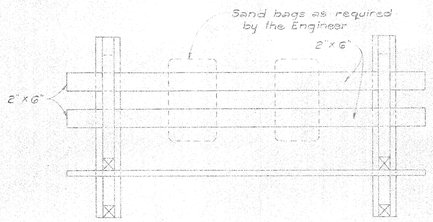
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CONCRETE BARRIER

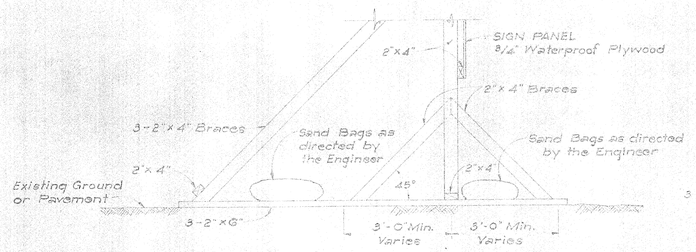
SHEET No. 22 OF 28 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	~~T-H-1 (47)-6~~	1968	222	~~227~~ 238

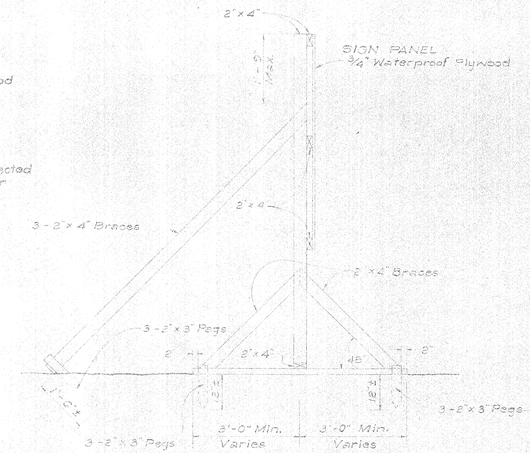


PLAN VIEW



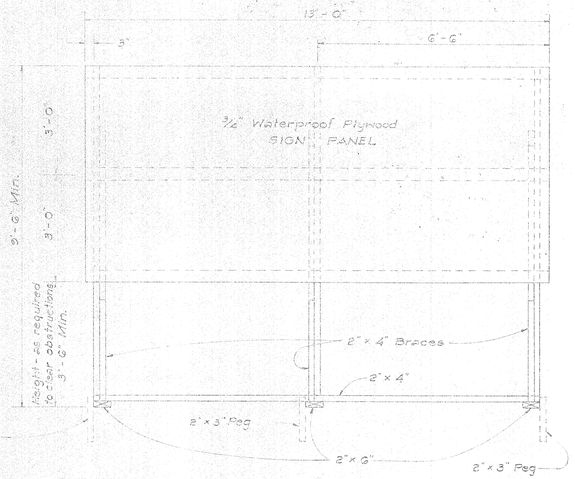
SIDE VIEW

(SIGN FRAME WEIGHTED DOWN)



SIDE VIEW

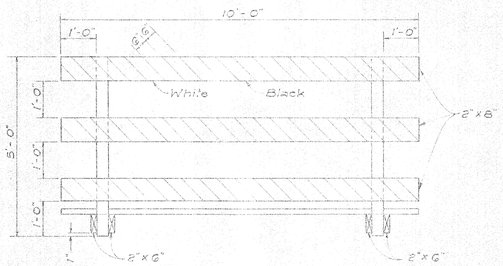
(SIGN FRAME ANCHORED IN GROUND)



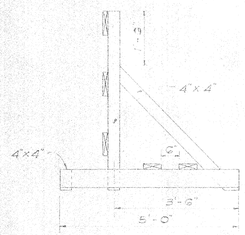
FRONT VIEW

ELEVATIONS

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

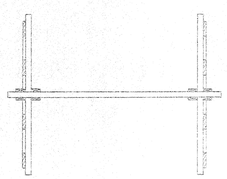


FRONT VIEW

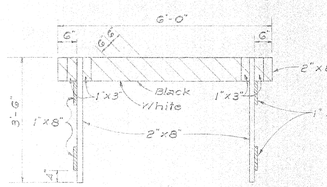


END VIEW

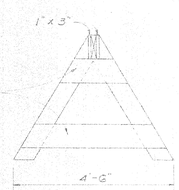
CLASS I BARRICADE



PLAN VIEW



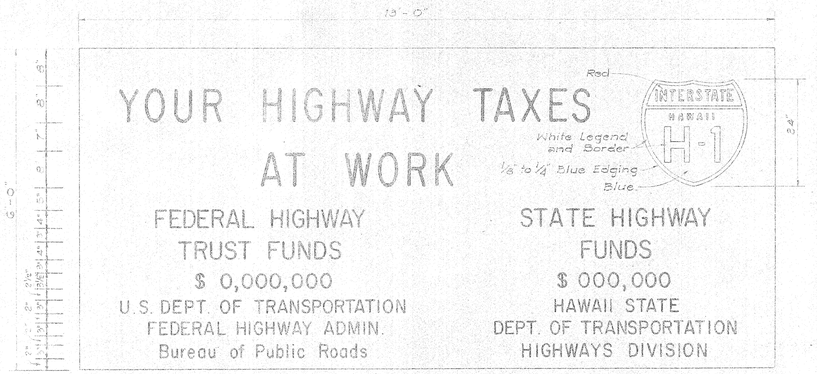
FRONT VIEW



END VIEW

CLASS II BARRICADE

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



SIGN PANEL

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

INTERSTATE SYSTEM CONSTRUCTION IDENTIFICATION SIGN

Scale: As Shown

NOTES:

A. CONSTRUCTION IDENTIFICATION SIGNS

1. The sign legend shall be black on white background except for the Interstate Route marker which shall be as shown on the plan.
2. The Contractor shall construct, install and maintain the project signs at the locations shown on the Plans and as ordered by the Engineer.
3. The signs shall be removed and stockpiled upon completion of the project as ordered by the Engineer and are to become State property.
4. Letters shall be Series "C" of the sizes shown on the Plan and shall conform with the "Standard Alphabet for Highway Signs", Bureau of Public Roads, 1952.
5. The Contractor shall fill in the proper numerals in place of ciphers as ordered by the Engineer.

B. WOOD BARRICADES

1. The Contractor shall construct, install and maintain the wood barricades at the locations shown on the Plans and as ordered by the Engineer.
2. The permanent wood barricades shall be left in place or relocated upon completion of the project as ordered by the Engineer and are to become State property.

REVISED: October 2, 1967

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL DETAILS
CONSTRUCTION IDENTIFICATION SIGN
AND
WOOD BARRICADES

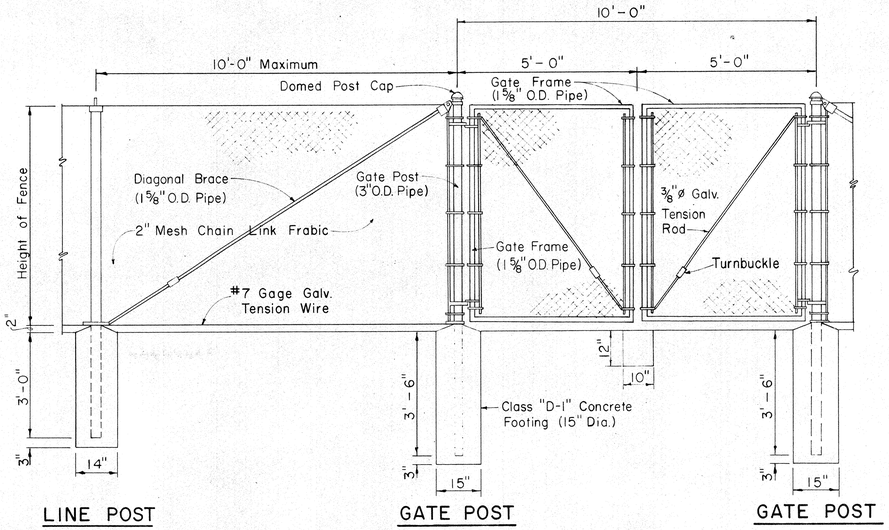
SCALE: As Shown DATE: Aug., 1968

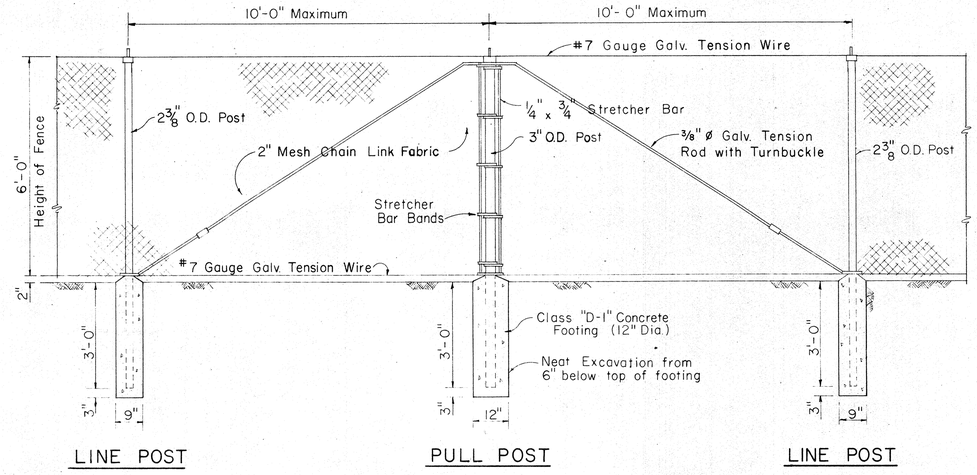
SHEET No. 23 OF 28 SHEETS

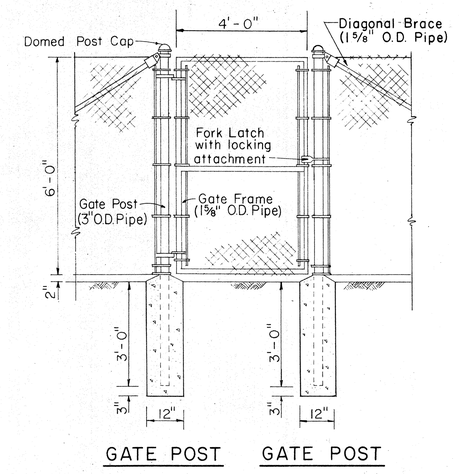
222

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

FED. ROAD DIST. NO	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1 (47) 5	1968	223	~~227~~ 228







DETAIL OF 4 FT. CH. LK. GATE

NOTE: 1. Gate fork latch and lock, flush plate and anchor, and plunger shall be installed with Gates, and shall be considered as incidental to 10 feet Chain Link Fence.

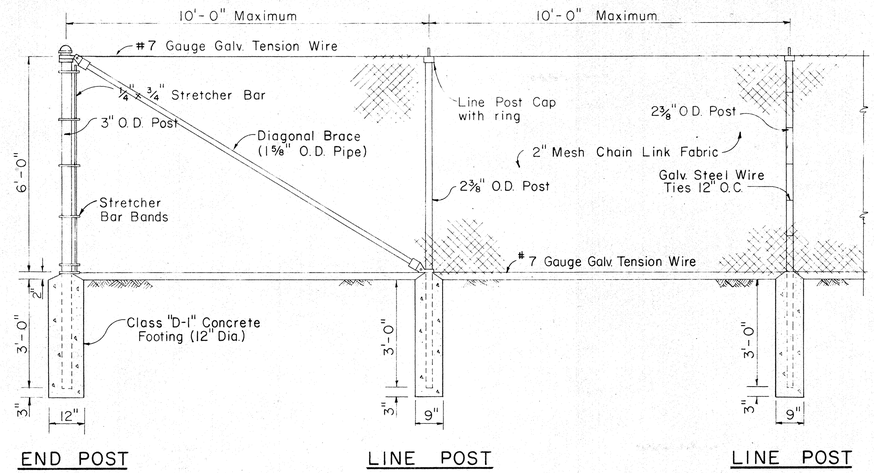
2. Gate frames shall be mitered and welded at corners.

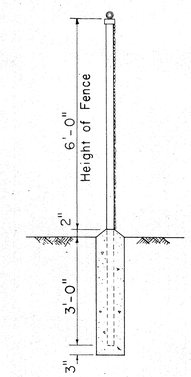
3. Fence detail not shown shall be in accordance with the Standard Specifications.

DETAIL OF 10 FT. CHAIN LINK GATE

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

NOTE: DETAILS FOR 16-FT. CHAIN LINK FENCE SIMILAR TO ABOVE.





END POST

TYPICAL SECTION

NOTE: O.D. refers to outside diameter.

CHAIN LINK FENCE DETAILS

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

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

Scales: As Noted Date: Aug., 1968

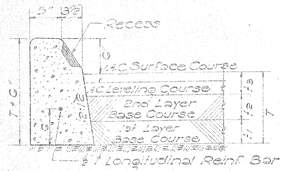
SHEET No. 24 OF 28 SHEETS

~~223~~

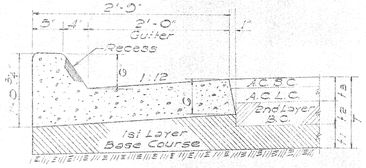
2/17/59
9/22/61

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1 (47):9	1968	224	~~227~~ 238

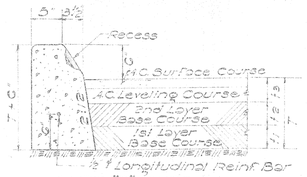
Aug. 1957



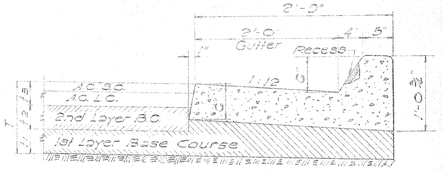
TYPE "A" & "B" CURB
SCALE: 1" = 1'-0"



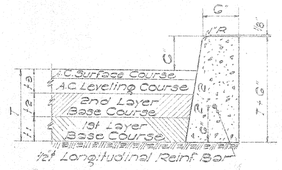
TYPE "AG" & "BG" CURB & GUTTER
SCALE: 1" = 1'-0"



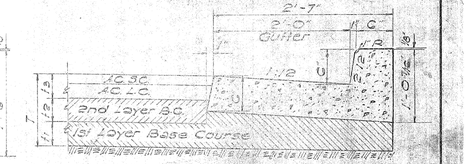
TYPE "C" CURB
SCALE: 1" = 1'-0"



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

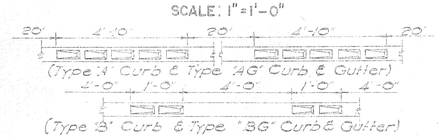


TYPE "D" CURB
SCALE: 1" = 1'-0"

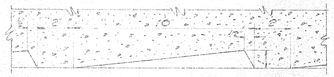


TYPE "DG" CURB & GUTTER
SCALE: 1" = 1'-0"

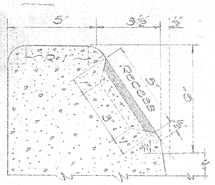
General Note Covering All Types of Curbs:
Occasionally curb rests on first layer of base course. See typical sections.



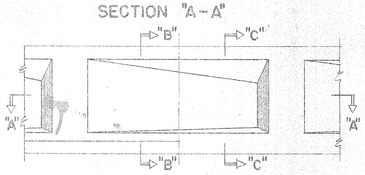
TYPE AND SPACING OF RECESSES



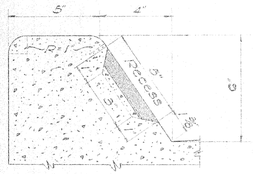
SECTION "A-A"



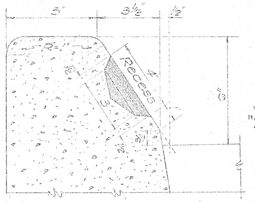
SECTION "B-B"
TYPE "A" & "B" CURB



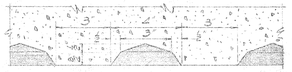
ELEVATION
SCALE: 3" = 1'-0"



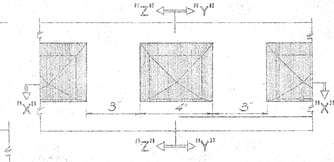
SECTION "C-C"
TYPE "AG" & "BG" CURB



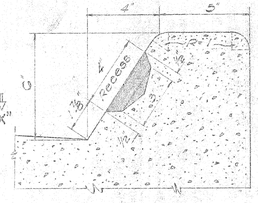
SECTION "Y-Y"
TYPE "C" CURB



SECTION "X-X"

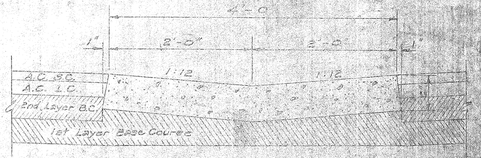


ELEVATION
SCALE: 3" = 1'-0"



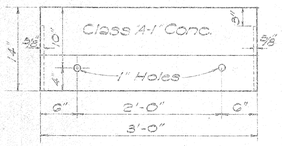
SECTION "Z-Z"
TYPE "CG" CURB

NOTES:
1.) Types 'AG', 'BG', 'CG', 'DG' and 'G' 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 Coat Finish.

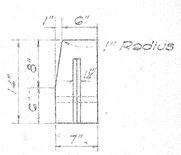


TYPE "G" GUTTER
SCALE: 1" = 1'-0"

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

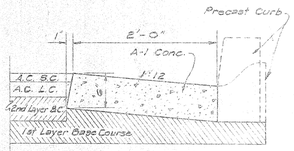


FRONT ELEV.

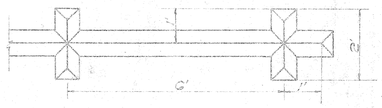


END ELEV.

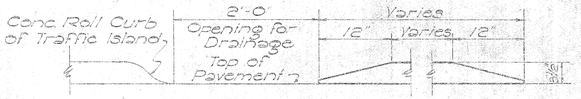
PRECAST CONC. CURB
SCALE: 1" = 1'-0"



TYPE "F" GUTTER
FOR PRECAST CURB

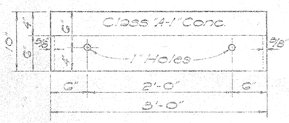


PLAN
SCALE: 1/2" = 1'-0"

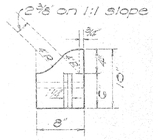


ELEVATION

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

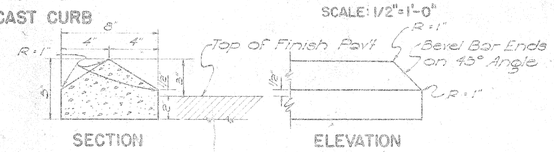


FRONT ELEV.



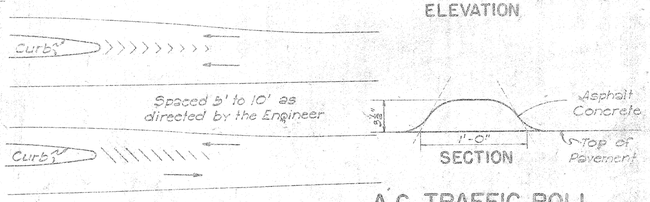
END ELEV.

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



SECTION ELEVATION

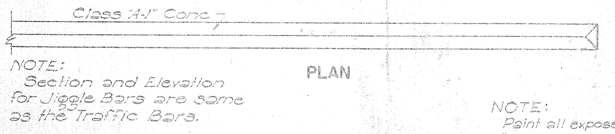
RAISED TRAFFIC BARS
SCALE: 2" = 1'-0"



SECTION

A.C. TRAFFIC ROLL
NOT TO SCALE

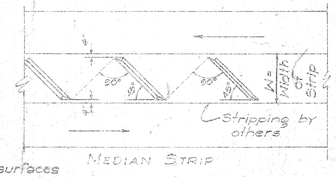
TYPE "EG" CAST-IN-PLACE
CONC. CURB & GUTTER
SCALE: 1" = 1'-0"



PLAN

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

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



MEDIAN STRIP

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

LAYOUT OF JIGGLE BARS
NOT TO SCALE

APPROVED: DATE Aug. 24, 1959
STATE HIGHWAY ENGINEER

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
CONCRETE CURBS, CONCRETE CURBS & GUTTERS
SCALES AS NOTED

SHEET No. 25 OF 28 SHEETS

224

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

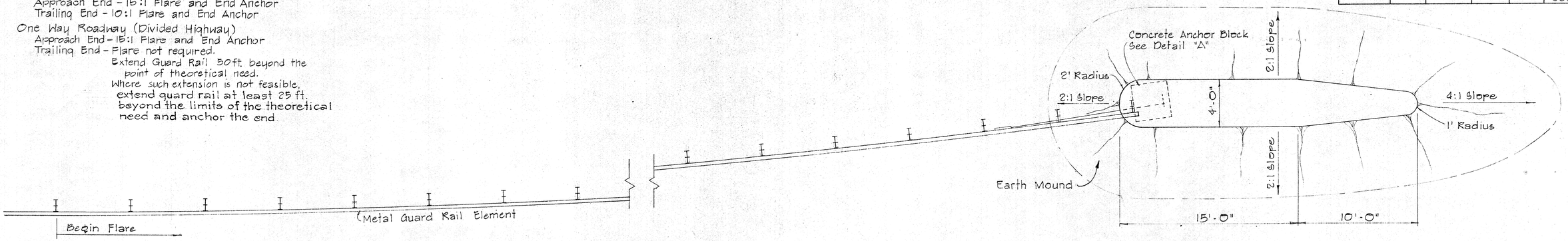
ORIGINAL PLAN		
	SURVEY PLOTTED BY	DATE
	DESIGNED BY	" "
	DRAWN BY L. Galisito	" "
	TRACED BY	" "
	QUANTITIES BY	" "
	QUANTITIES CHECKED BY	" "
	CHECKED BY	" "
NOTE BOOK No.		

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1 (47):0	1968	225	~~227~~ 238

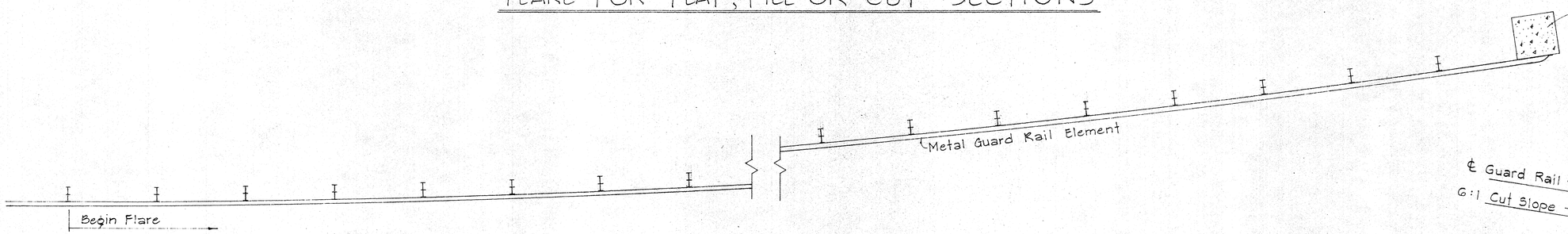
NOTE:

Two Way Roadway:
Approach End - 15:1 Flare and End Anchor
Trailing End - 10:1 Flare and End Anchor

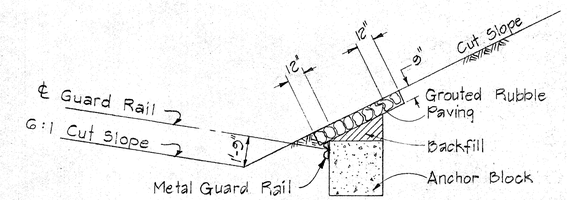
One Way Roadway (Divided Highway)
Approach End - 15:1 Flare and End Anchor
Trailing End - Flare not required.
Extend Guard Rail 50 ft. beyond the point of theoretical need.
Where such extension is not feasible, extend guard rail at least 25 ft. beyond the limits of the theoretical need and anchor the end.



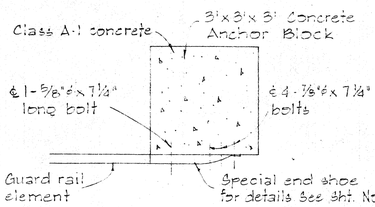
FLARE FOR FLAT, FILL OR CUT SECTIONS



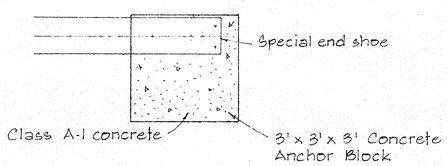
FLARE FOR CUT SECTION



DETAIL "B"
Not to Scale

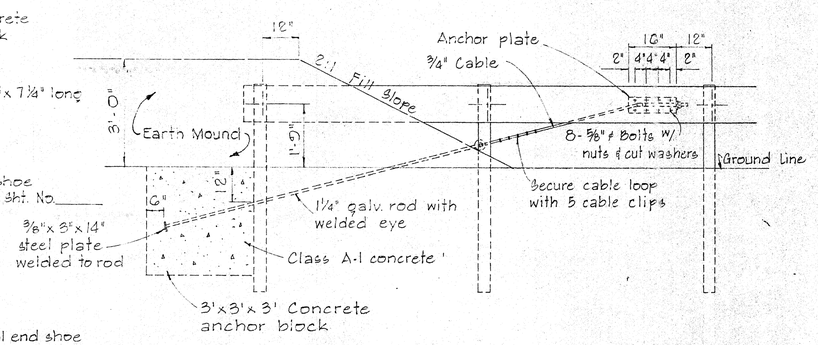


PLAN

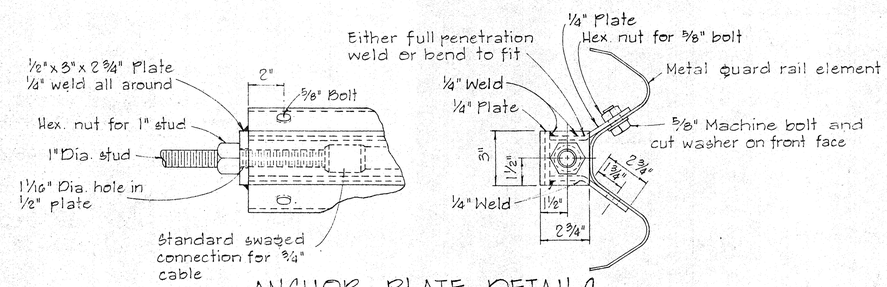


ELEVATION

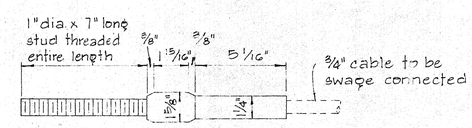
ANCHOR BLOCK DETAIL
Scale: 1/2"=1'-0"



DETAIL "A"



ANCHOR PLATE DETAILS



STANDARD SWAGED FITTING AND STUD

NOTE:

1. Galvanized Anchor Rod, Metal Guard Rail and Post buried in ground shall be covered with coat of coal tar enamel
2. Concrete, GRP, Excavation, Earth Mound, Anchor Rods, and Miscellaneouse Appurtenances necessary to anchor the Guard Rail Ends, shall be incidental to the Metal Guard Rail.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

METAL GUARD RAIL
FLARE DETAIL

SHEET No. 26 OF 28 SHEETS

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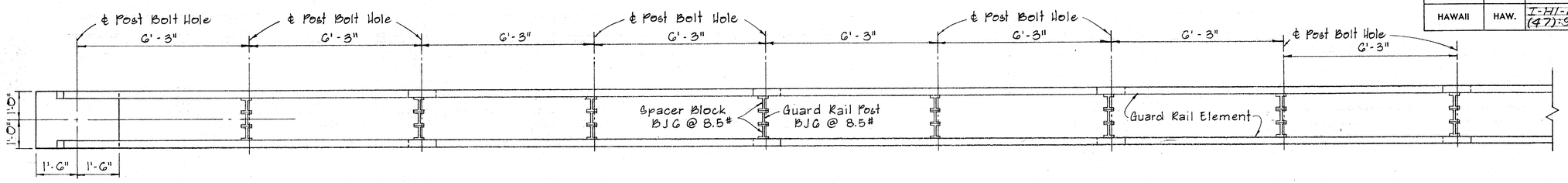
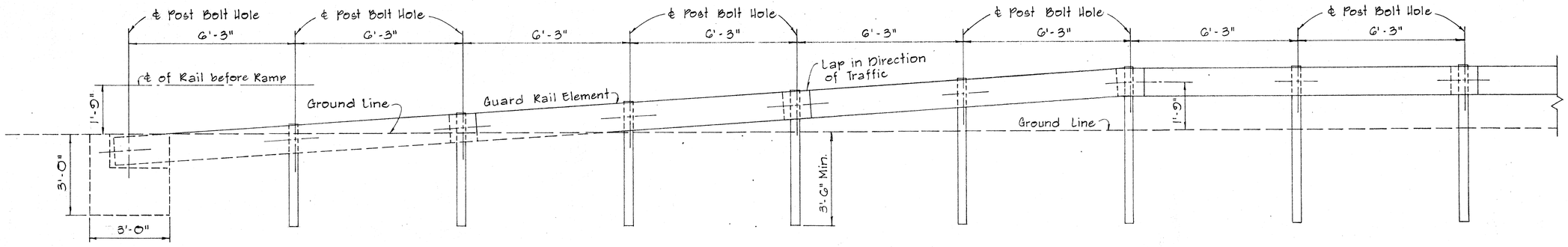
ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | NOTE BOOK | QUANTITIES BY | No. | CHECKED BY | DATE

PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1 (47):9	1968	226	~~227~~ 238



PLAN

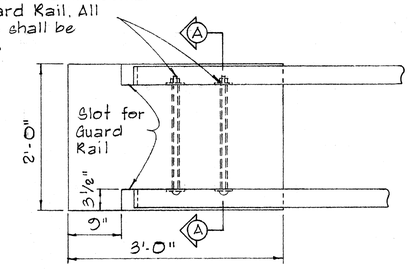


ELEVATION

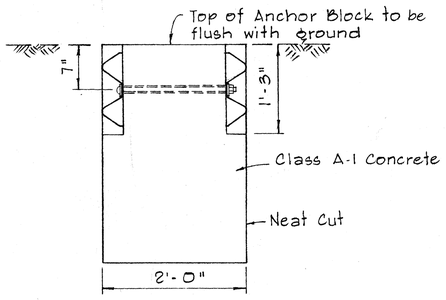
STRAIGHT APPROACH - RAMP END ANCHORAGE (MEDIAN)

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

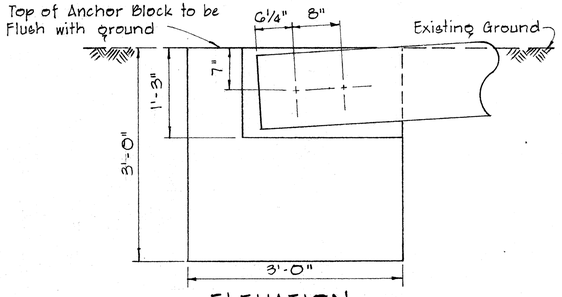
5/8"ø Bolts with 3/4" G.I. Pipe Sleeve in each hole. Incidental to Metal Guard Rail. All Metal Pieces shall be Galvanized.



PLAN



SECTION A-A



ELEVATION

CONCRETE ANCHOR BLOCK FOR RAMP END

Scale: 1" = 1'-0"

NOTE:

Concrete, G.R.P., Excavation, Earth Mound, Anchor Rods, and Miscellaneous Appurtenances necessary to anchor the Guard Rail Ends, shall be incidental to the Metal Guard Rail.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

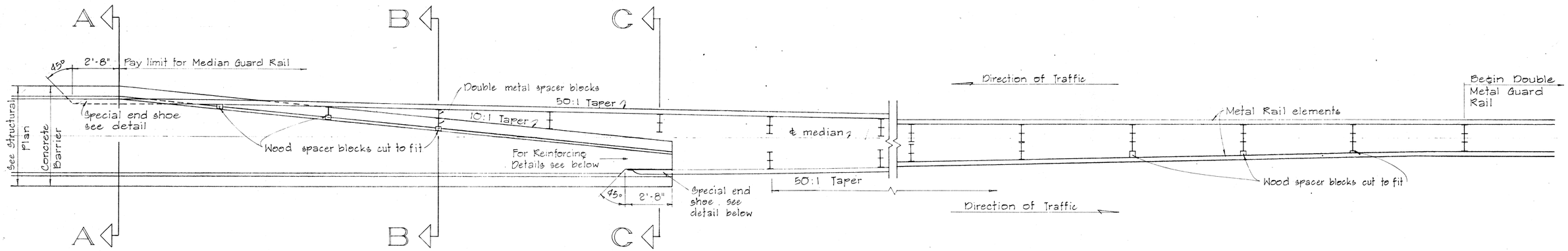
STANDARD DETAIL
GUARD RAIL
RAMP END ANCHORAGE

Scale: as Noted — August, 1968

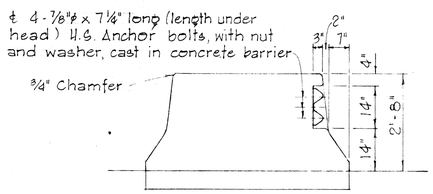
SHEET No. 27 OF 28 SHEETS

226

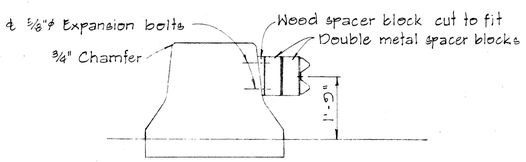
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1 (47):9	1968	227	~~227~~ 238



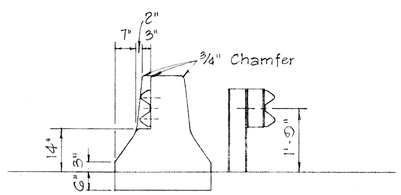
TYPICAL TRANSITION PLAN FROM CONCRETE BARRIER TO METAL GUARD RAILS



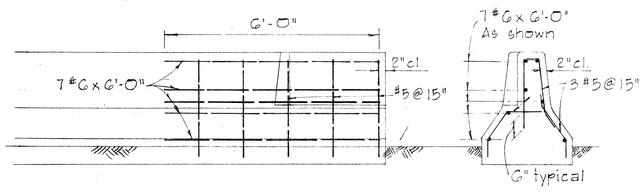
SECTION "A-A"



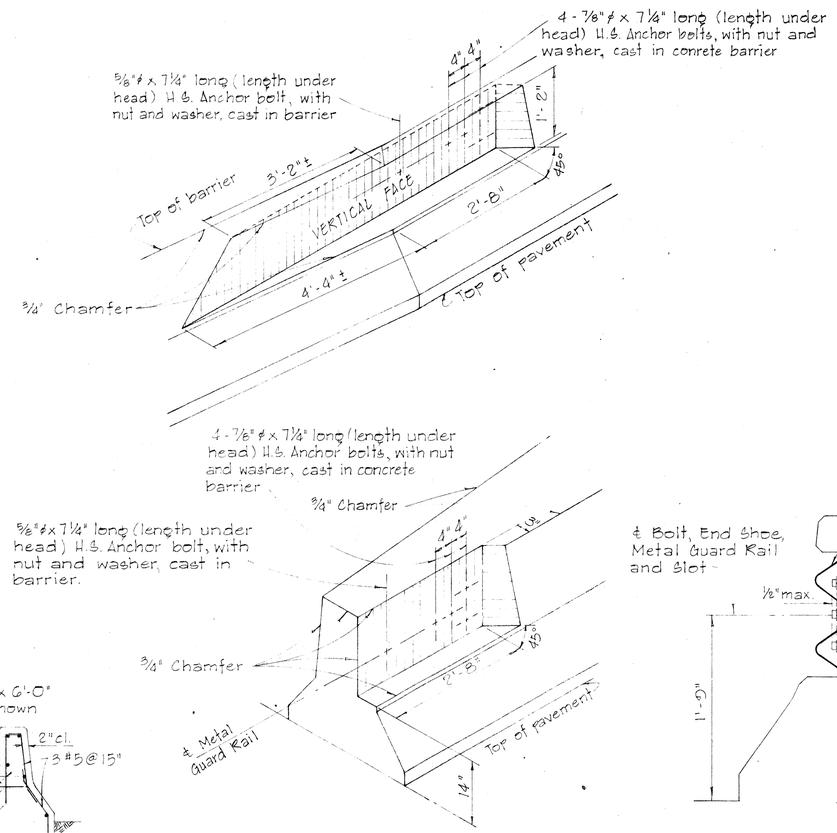
SECTION "B-B"



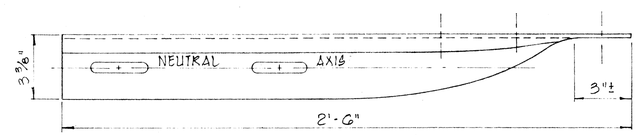
SECTION "C-C"



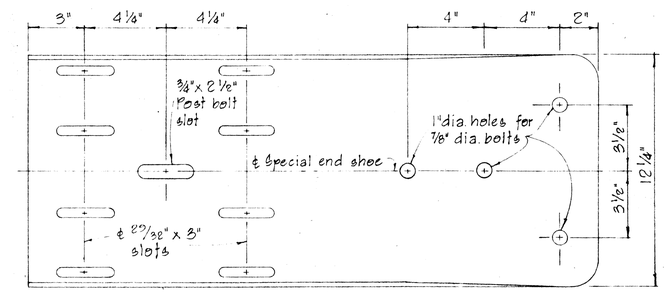
REINFORCING DETAILS



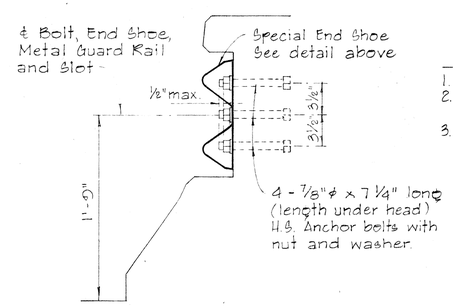
DETAILS OF NOTCH IN CONCRETE BARRIER



END VIEW



SPECIAL END SHOE



TYPICAL END SHOE CONNECTION

NOTES:

1. H.S. Bolts shall conform to the requirements of ASTM A-325.
2. All shoe assembly, including anchor bolts, nuts and washers, shall be galvanized.
3. Special End Shoe shall be fabricated from 10 gage steel conforming to the requirements of AASHO 180.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

METAL GUARD RAIL CONNECTION DETAILS AT CONCRETE BARRIER

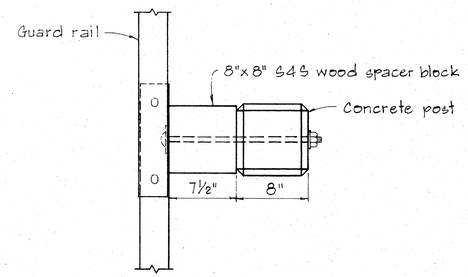
Not to Scale — Aug. 1968

SHEET No. 28 OF 28 SHEETS

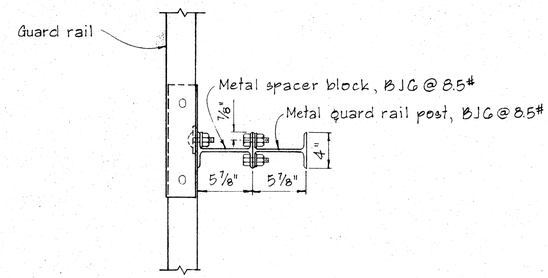
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
No.	QUANTITIES BY	
	CHECKED BY	

PRINTED ON NO. 1000H CLEARPRINT

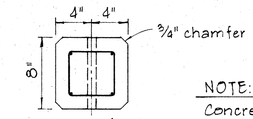
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(47):9	1968	228	238



PLAN

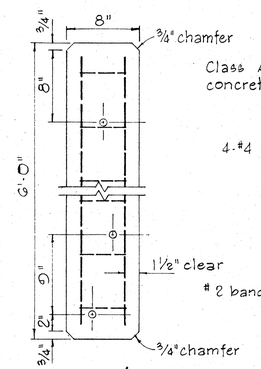


PLAN

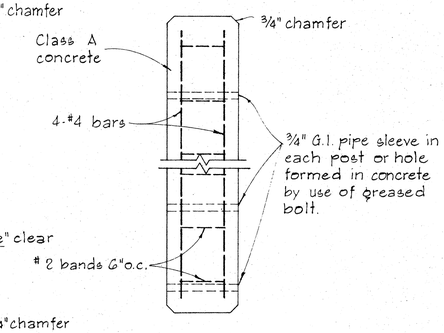


TOP VIEW

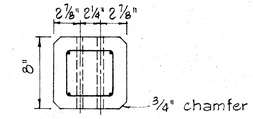
NOTE:
Concrete post shall be precast



FRONT VIEW



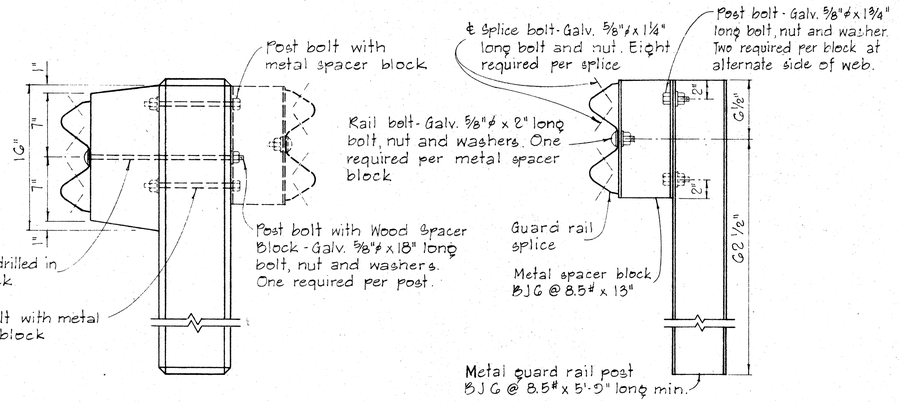
SIDE VIEW



BOTTOM VIEW

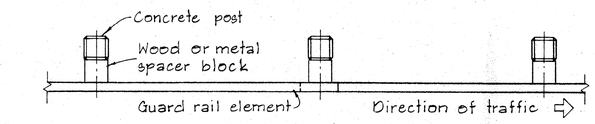
DETAIL OF CONCRETE POST

SCALE: 1½" = 1'-0"

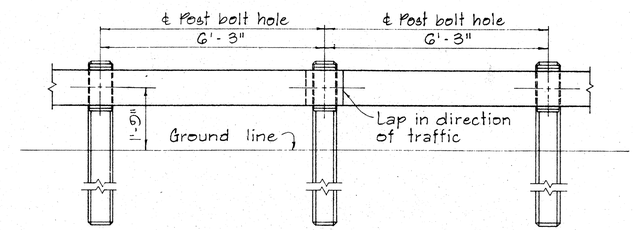


SINGLE METAL GUARD RAIL ON METAL POST WITH METAL SPACER BLOCK

SCALE: 1½" = 1'-0"



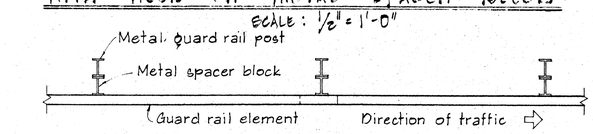
PLAN



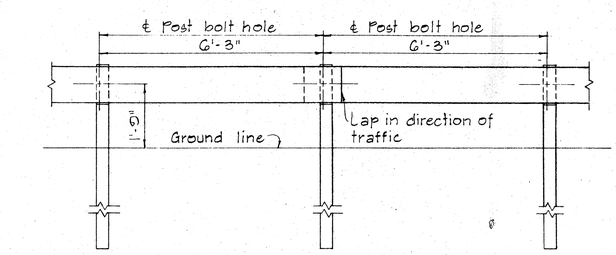
ELEVATION

METAL GUARD RAIL ON CONCRETE POST WITH WOOD OR METAL SPACER BLOCK

SCALE: ½" = 1'-0"



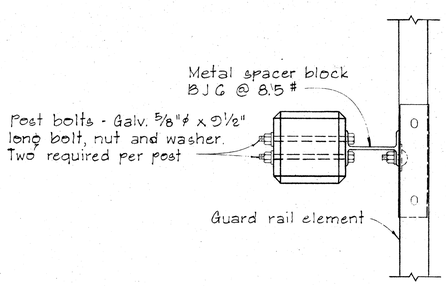
PLAN



ELEVATION

METAL GUARD RAIL ON METAL POST WITH METAL SPACER BLOCK

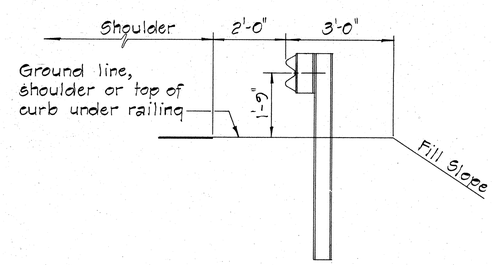
SCALE: ½" = 1'-0"



PLAN

SINGLE METAL GUARD RAIL ON PRECAST CONCRETE POST WITH WOOD OR METAL SPACER BLOCK

SCALE: 1½" = 1'-0"



AT SHOULDER SECTION

TYPICAL METAL GUARD RAIL DETAIL

SCALE: ½" = 1'-0"

APPROVAL RECOMMENDED:
Eichi Tanaka — TRAFFIC ENGINEER — 12/23/69 DATE

APPROVED:
Herbert G. Gehrs — ASSISTANT CHIEF, ENGINEERING — 12-30-69 DATE

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

METAL GUARD RAIL

SCALE: AS SHOWN — NOV. 1968

SHEET No. OF SHEETS DT 500

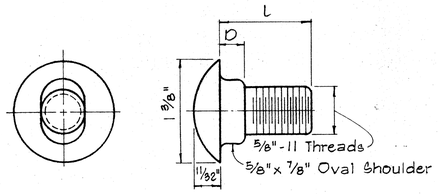
ORIGINAL PLAN — SURVEY PLOTTED BY — DRAWN BY — TRACED BY — DESIGNED BY — QUANTITIES BY — CHECKED BY — DATE — NOTE BOOK No.

PRINTED ON NO. 1000H CLEARPRINT

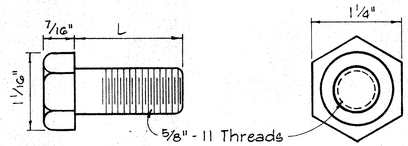
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(47):9	1968	220	238

BOLT DIMENSIONS		
TYPE A BOLT	D	L
Splice Bolt	5/16"	1 1/4"
Post Bolt for Conc. Post w/ Double Wood Blocks	3/32"	24"
Post Bolt for Conc. Post w/ Single Wood Block	3/32"	18"
Rail Bolt for Metal Block	3/32"	2"

BOLT DIMENSIONS	
TYPE B BOLT	L
Post Bolt for Conc. Post w/ Metal Blocks	9 1/2"
Post Bolt for Metal Post w/ Metal Block	1 3/8"



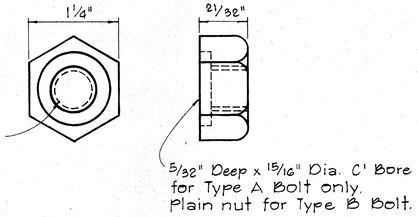
TYPE A BOLT



TYPE B BOLT

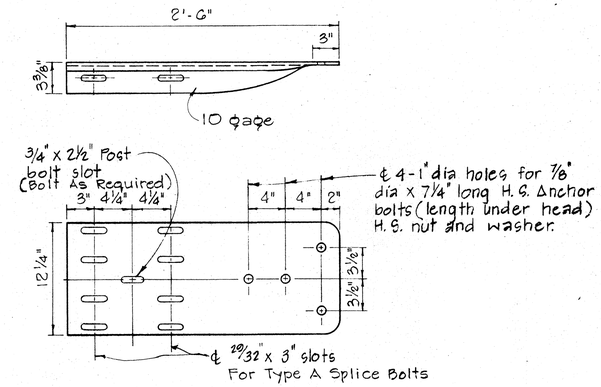
SPLICE RAIL AND POST BOLTS

Scale: Full Size



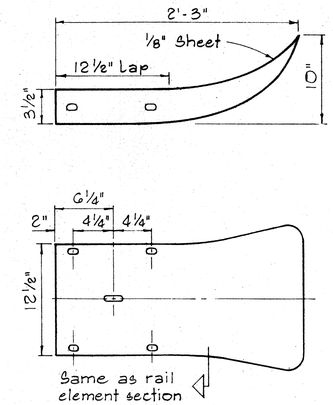
HEXAGON NUT

Scale: Full Size



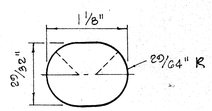
SPECIAL END SHOE

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

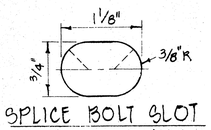


FLARED END

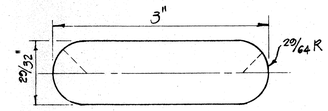
Scale: 1 1/2" = 1'-0"



SPLICE BOLT SLOT

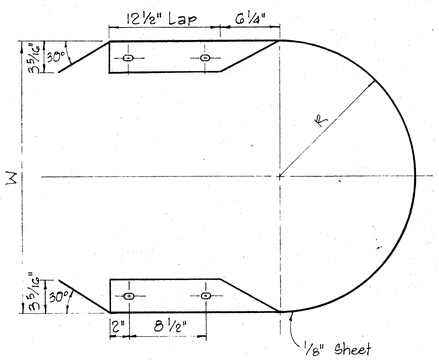


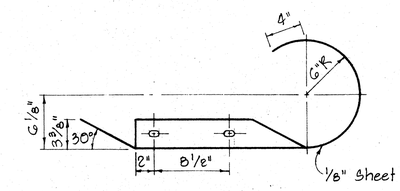
SPLICE BOLT SLOT FOR ALL ENDS

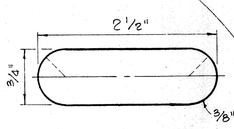


SPLICE BOLT SLOT FOR SPECIAL END SHOE

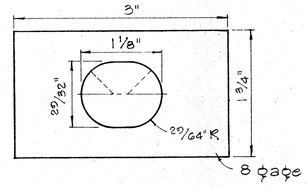
Scale: Full Size



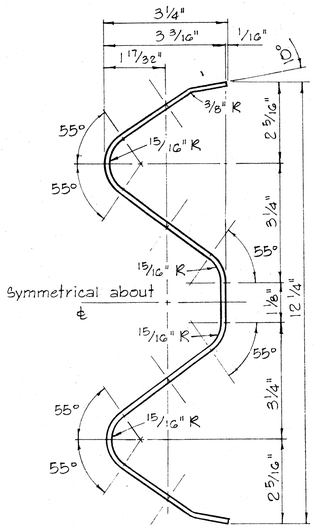




POST BOLT SLOT

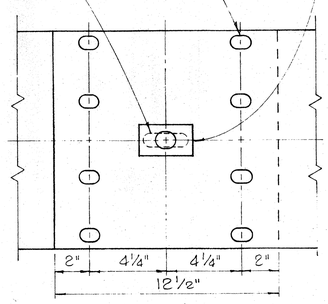


RAIL WASHER



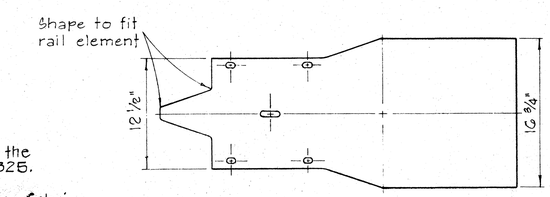
RAIL ELEMENT SECTION

Scale: 6" = 1'-0"



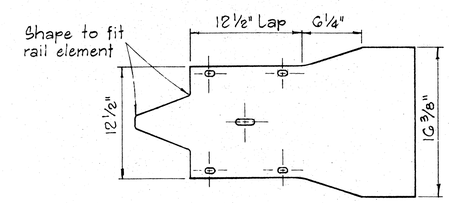
RAIL SPLICE

Scale: 3" = 1'-0"



MEDIAN END

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



CURVED END

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

NOTES:

1. H.S. Bolts shall conform to the requirements of ASTM A 325.
2. Special End Shoe shall be fabricated from 10 Gage steel conforming to the requirements of AASHO 180.

MEDIAN END DIMENSIONS		
TYPE OF POST AND BLOCK	W	R
Double Metal Guard Rail on Concrete Post with Wood Blocks	29 3/4"	14 7/8"
Double Metal Guard Rail on Concrete Post with Metal Blocks (BJG)	26 1/2"	13 1/4"
Double Metal Guard Rail on Metal Post with Metal Blocks (BJG)	24 3/8"	12 3/16"

NO.	REVISION	APPROVED BY	DATE

APPROVAL RECOMMENDED:
Eiichi Tanaka — 12/20/69
TRAFFIC ENGINEER — DATE

APPROVED:
[signature] — 12-30-69
ASSISTANT CHIEF, ENGINEERING — DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
METAL GUARD RAIL

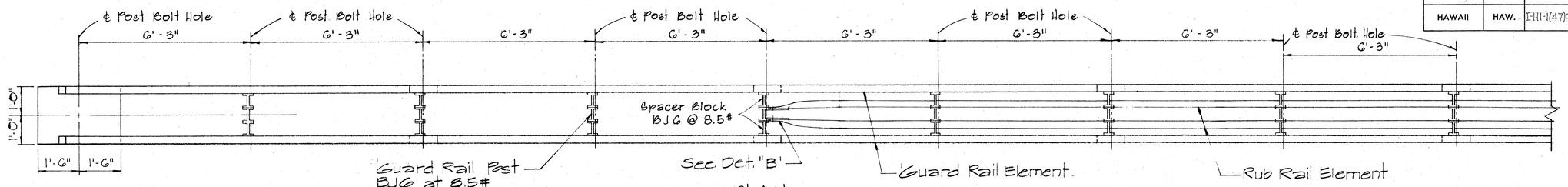
Scale: As Noted — August, 1968

SHEET No. OF SHEETS — DT 501

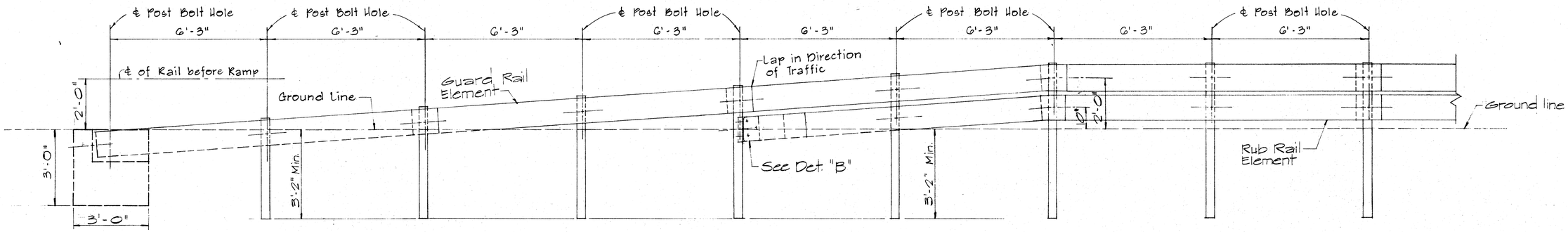
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(47):9	1968	230	238



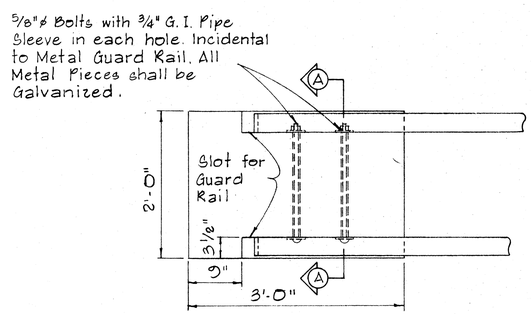
PLAN



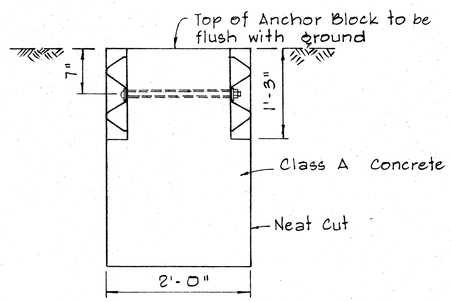
ELEVATION

STRAIGHT APPROACH - RAMP END ANCHORAGE (MEDIAN)

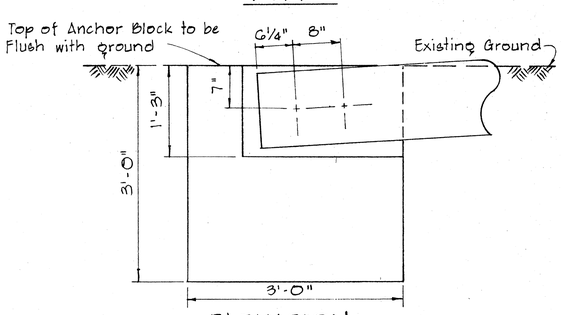
Scale: ½"=1'-0"



PLAN



SECTION A-A

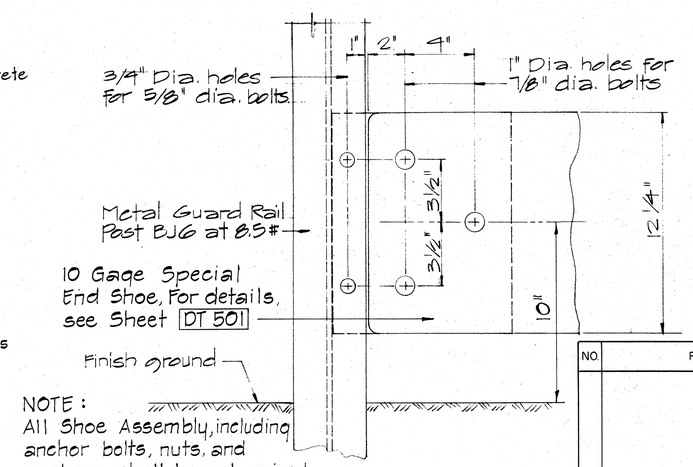


ELEVATION

CONCRETE ANCHOR BLOCK FOR RAMP END

Scale: 1"=1'-0"

NOTE:
Concrete, Excavation, and Miscellaneous Appurtenances necessary to anchor the Guard Rail Ends, shall be incidental to the Metal Guard Rail.

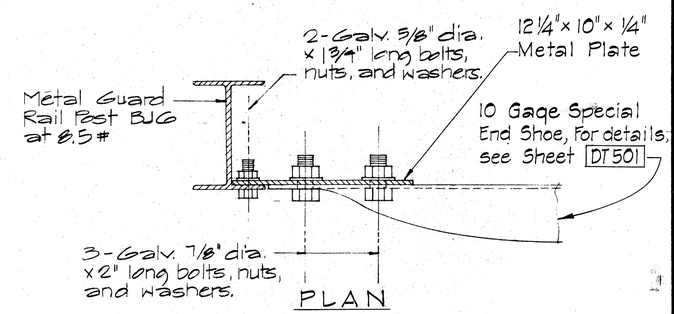


NOTE:
All Shoe Assembly, including anchor bolts, nuts, and washers, shall be galvanized.

ELEVATION

DETAIL "B"

Sc. 3"=1'-0"



PLAN

APPROVAL RECOMMENDED:
Eiichi Tanaka — 12/20/69
TRAFFIC ENGINEER — DATE

APPROVED:
[illegible] — 12-20-69
ASSISTANT CHIEF, ENGINEERING — DATE

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAIL
GUARD RAIL
RAMP END ANCHORAGE

Scale: as Noted — August, 1968

SHEET No. OF SHEETS DT 502

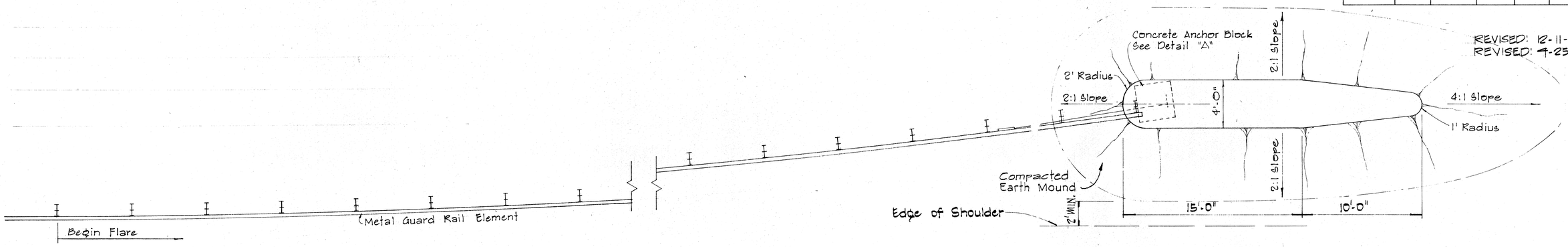
ORIGINAL PLAN — SURVEY PLOTTED BY / DRAWN BY / TRACED BY / DESIGNED BY / QUANTITIES BY / CHECKED BY — DATE — NOTE BOOK No.

PRINTED ON NO. 1000H CLEARPRINT

230

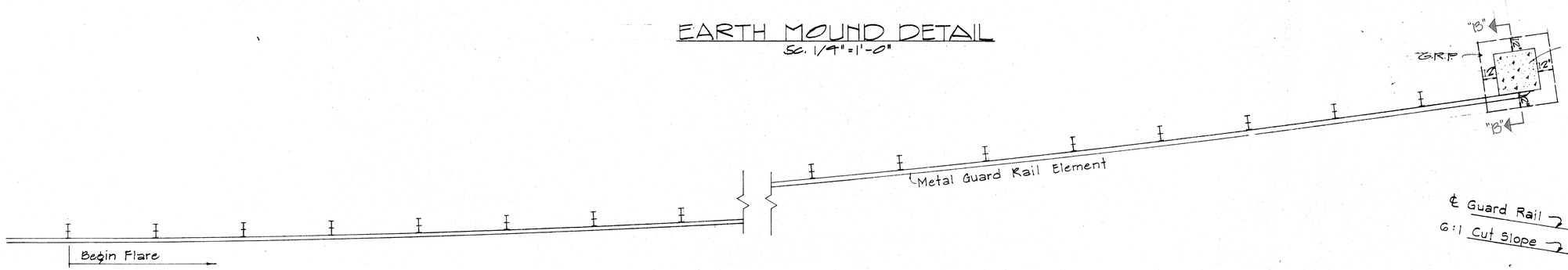
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(47):9	1968	231	238

REVISED: 12-11-68
REVISED: 4-25-67



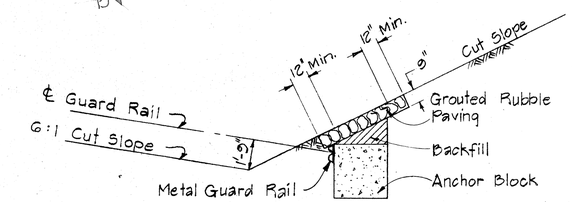
EARTH MOUND DETAIL

Sc. 1/4" = 1'-0"



ANCHOR BLOCK IN CUT SECTION

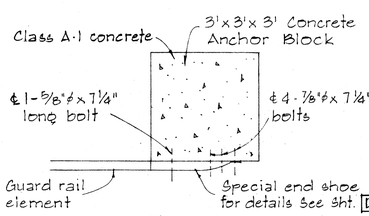
Sc. 1/4" = 1'-0"



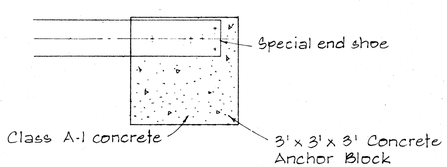
TYPE "C" & "F" ANCHOR BLOCK

DETAIL "B"

Not to Scale



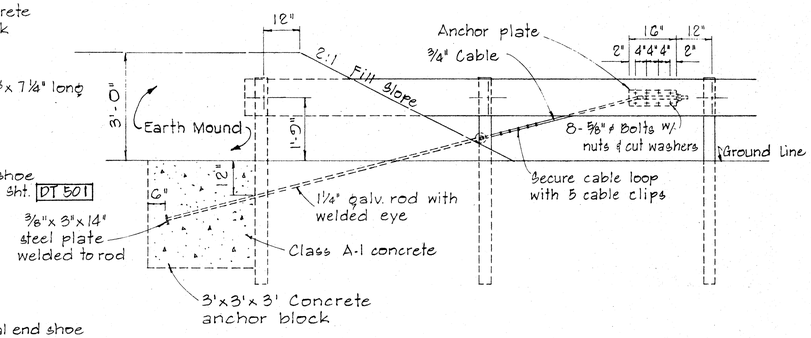
PLAN



ELEVATION

TYPE "B" & "E" ANCHOR BLOCK DETAIL

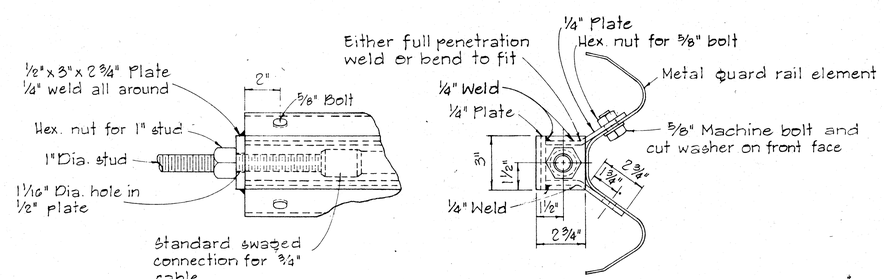
Scale: 1/2" = 1'-0"



TYPE "G" ANCHOR BLOCK

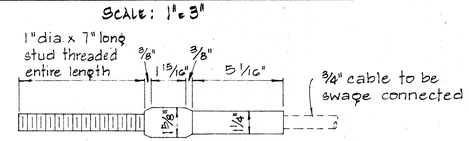
DETAIL "A"

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



ANCHOR PLATE DETAILS

Scale: 1" = 3"



STANDARD SWAGED FITTING AND STUD

Scale: 1" = 3"

NOTE:

1. Galvanized Anchor Rod, Metal Guard Rail and Post buried in ground shall be covered with coat of coal tar enamel
2. Concrete, GRP, Excavation, Earth Mound, Anchor Rods, and Miscellaneouse Appurtenances necessary to anchor the Guard Rail Ends, shall be incidental to the ~~Metal Guard Rail.~~ Concrete Anchor Block.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS EARTH MOUND AND ANCHOR BLOCK DET.

Scale: As Shown — Nov. 1968

SHEET No. OF SHEETS | DT 503

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

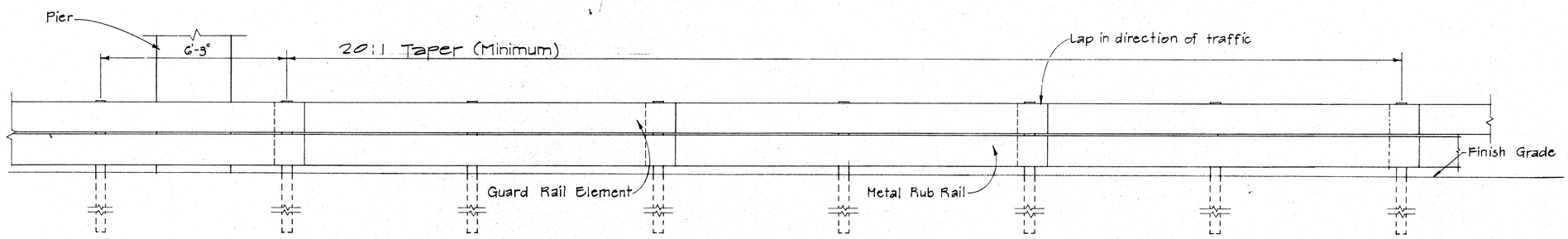
PRINTED ON NO. 1000H CLEARPRINT

Erick Tanaka Erick Tanaka

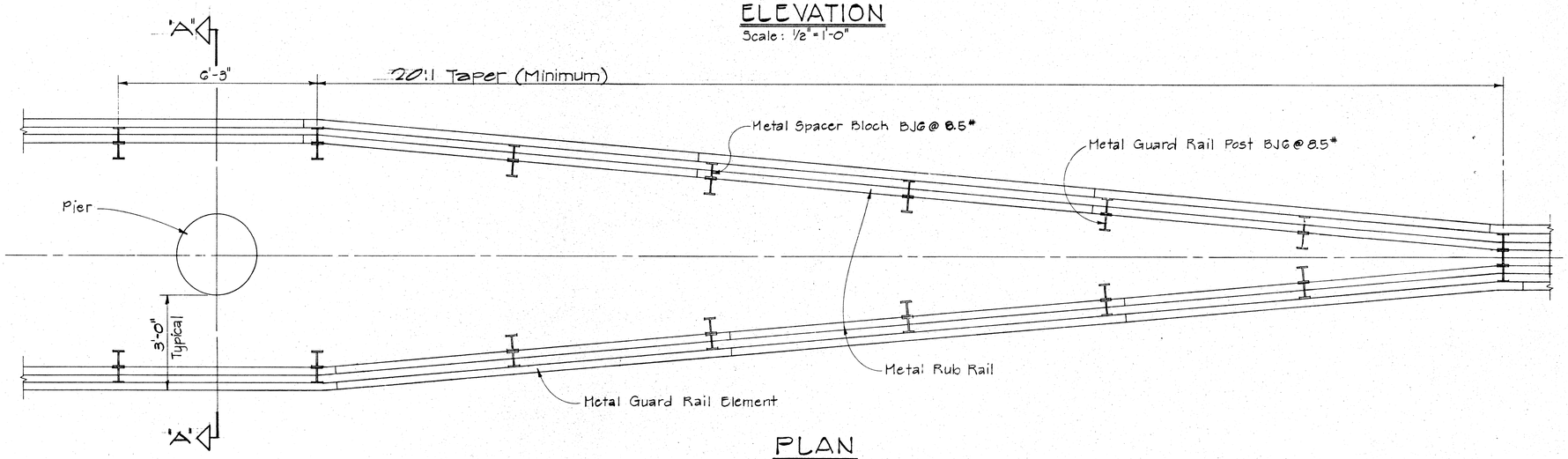
Dick S. Miyagawa

2331 VOID

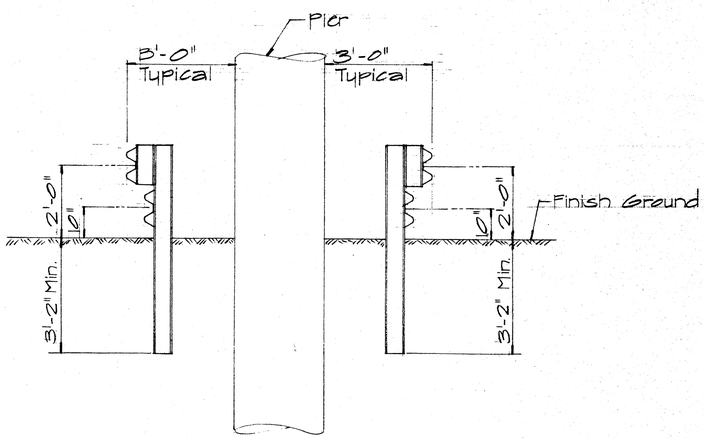
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(47)9	1968	232	238



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



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



SECTION "A"-"A"
Sc. 1/2" = 1'-0"

APPROVAL RECOMMENDED:
Eiichi Tanaka
TRAFFIC ENGINEER — DATE 12/29/69

APPROVED:
Walter E. Zadai
ASSISTANT CHIEF, ENGINEERING — DATE 12/30/69

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRANSITION DETAIL OF METAL GUARD RAIL WITH RUB RAIL AT OBSTRUCTION

Scale: As Shown — Nov. 1968

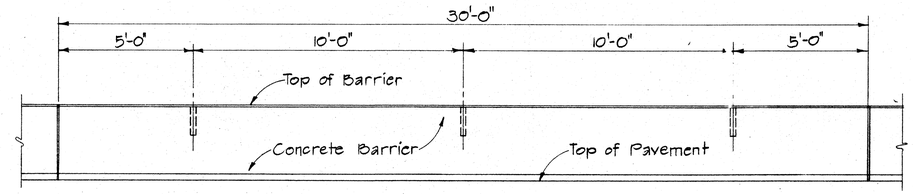
SHEET No. OF SHEETS DT 505

232

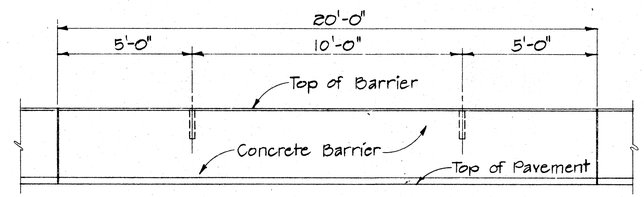
ORIGINAL PLAN — SURVEY PLOTTED BY — DRAWN BY — TRACED BY — DESIGNED BY — QUANTITIES BY — CHECKED BY — DATE — NOTE BOOK — No.

PRINTED ON NO. 1000H CLEARPRINT

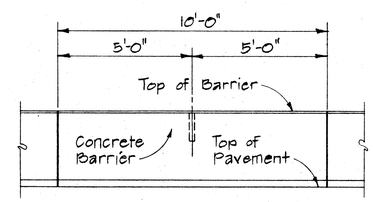
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(47):9	1968	233	238



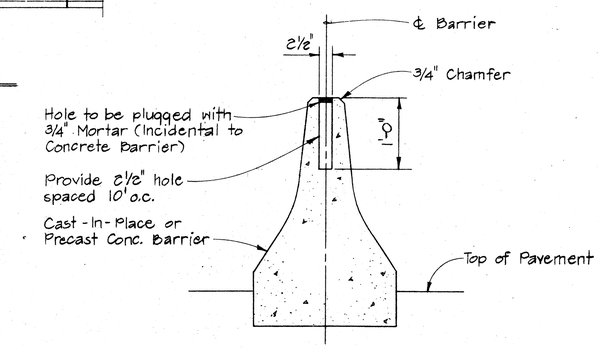
ELEVATION
30' LENGTH CONCRETE BARRIER
Scale: 3/8"=1'-0"



ELEVATION
20' LENGTH CONCRETE BARRIER
Scale: 3/8"=1'-0"



ELEVATION
10' LENGTH CONC. BARRIER
Scale: 3/8"=1'-0"



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

HOLE SPACING DETAIL FOR CONCRETE BARRIER

APPROVAL RECOMMENDED:
Eiichi Tanaka — 12/23/69
TRAFFIC ENGINEER — DATE

APPROVED:
[signature] — 12-30-69
ASSISTANT CHIEF, ENGINEERING — DATE

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HOLE SPACING DETAILS FOR CONC. BARRIER

Scale: As Shown — Nov. 1968

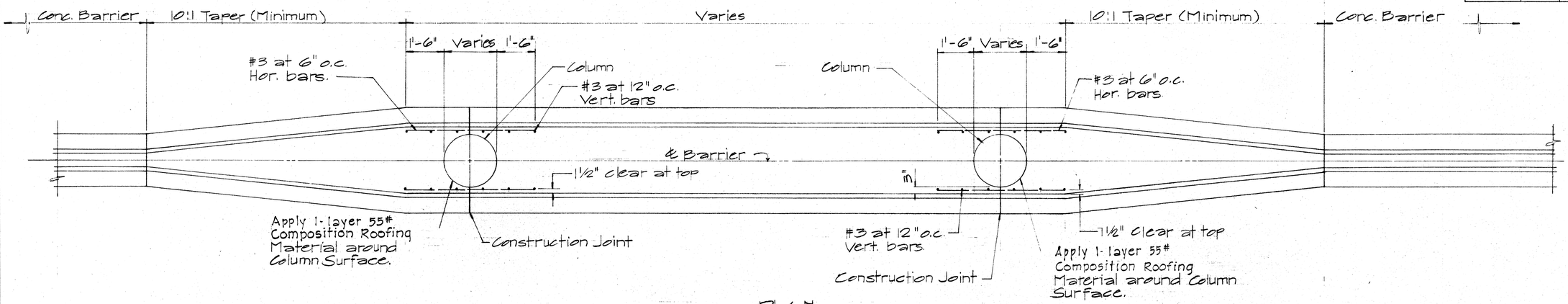
SHEET No. 233 OF 238 SHEETS | DT 507

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

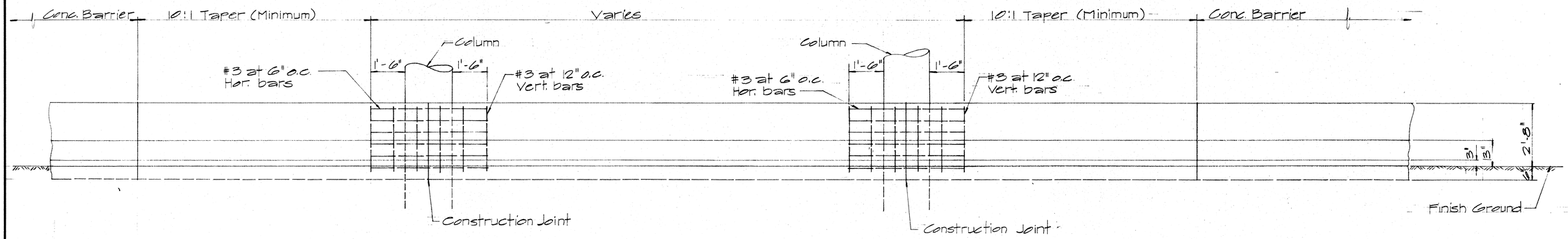
PRINTED ON NO. 1000H CLEARPRINT

VOID

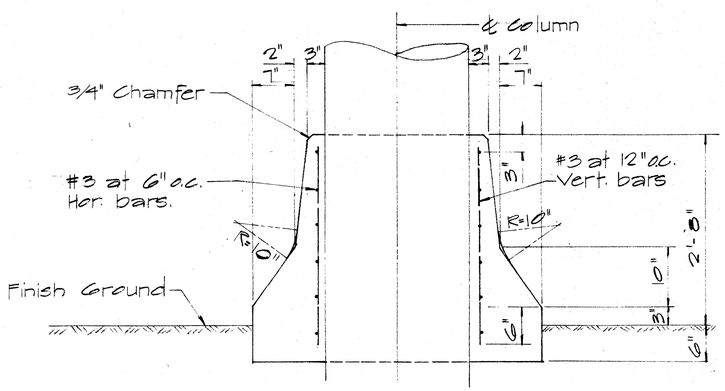
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(47):9	1968	234	238



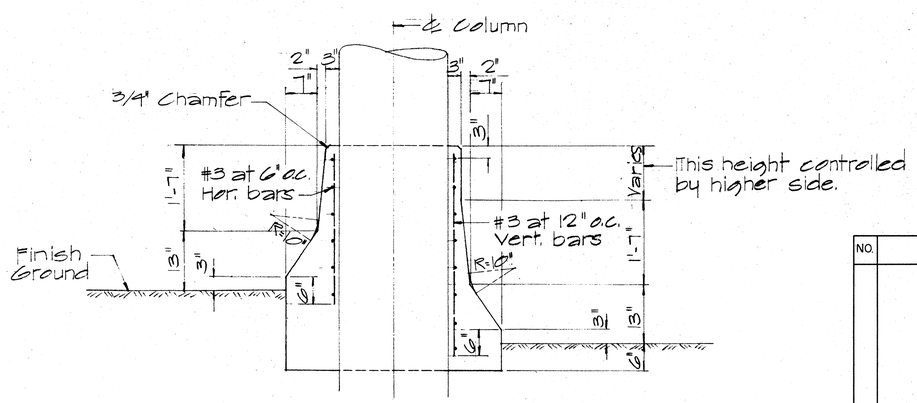
PLAN
Sc. 1/2" = 1'-0"



ELEVATION
Sc. 1/2" = 1'-0"



TYP. SEC. AT TANGENT
Sc. 1" = 1'-0"



TYP. SEC. AT SUPER
Sc. 3/4" = 1'-0"

APPROVAL RECOMMENDED:
Eiichi Tanaka — TRAFFIC ENGINEER — 12/29/69 DATE

APPROVED:
[illegible] — ASSISTANT CHIEF, ENGINEERING — 12-30-69 DATE

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAIL
CONCRETE BARRIER
TRANSITION

Scale As Noted — Feb. 1969

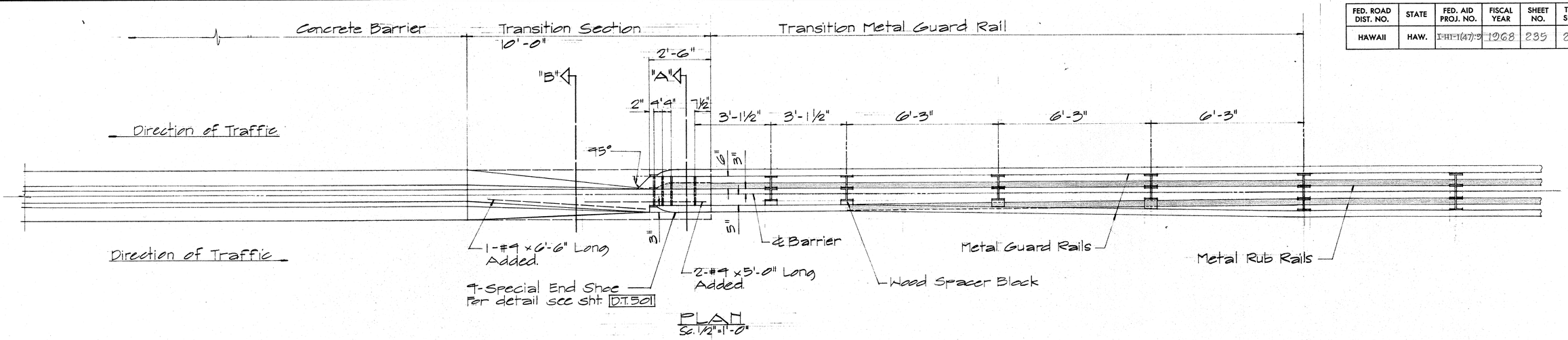
SHEET No. OF SHEETS DT 512

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

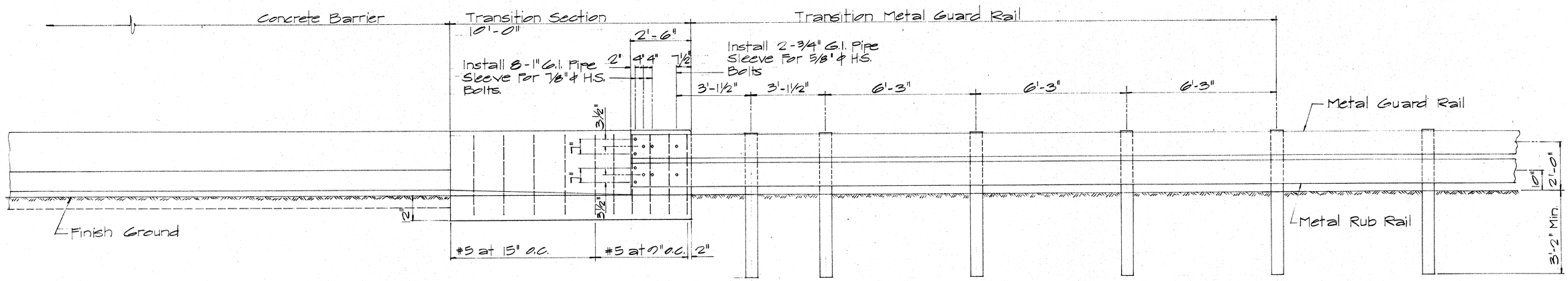
PRINTED ON NO. 1000H CLEARPRINT

234

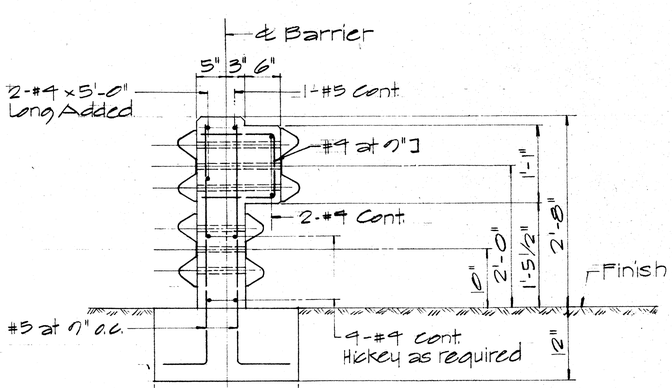
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(47)	1968	235	238



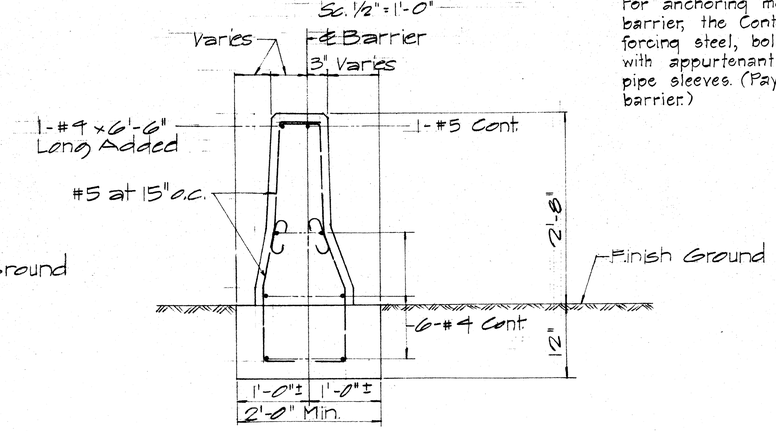
PLAN
Sc. ½" = 1'-0"



ELEVATION
Sc. ½" = 1'-0"



SECTION "A"
Sc. 1" = 1'-0"



SECTION "B"
Sc. 1" = 1'-0"

NOTE:
For anchoring metal guard rail elements to concrete barrier, the Contractor shall furnish and install reinforcing steel, bolts of appropriate lengths and size with appurtenant washers, nuts, wooden blocks and pipe sleeves. (Payments shall be incidental to concrete barrier.)

APPROVAL RECOMMENDED:
Euichi Tanaka — TRAFFIC ENGINEER — DATE 12/20/69

APPROVED:
Shinkichi Ichiki — ASSISTANT CHIEF ENGINEERING — DATE 12-30-69

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAIL
METAL GUARD RAIL
CONNECTION TO CONC. BARRIER

Scale As Noted — Feb. 1967

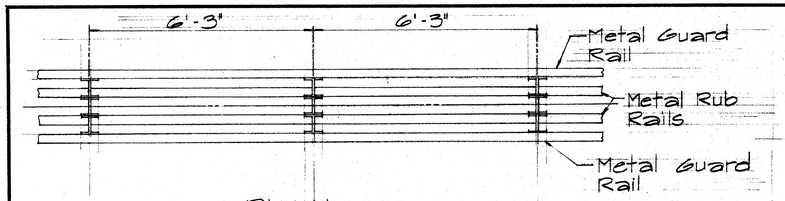
SHEET No. OF SHEETS DT 513

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

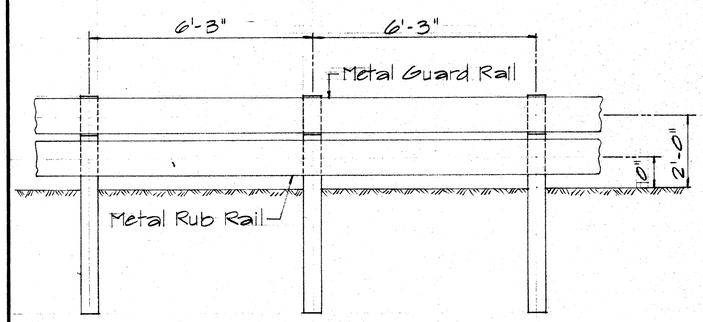
PRINTED ON NO. 1000H CLEARPRINT

235

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(47)9	1968	236	238

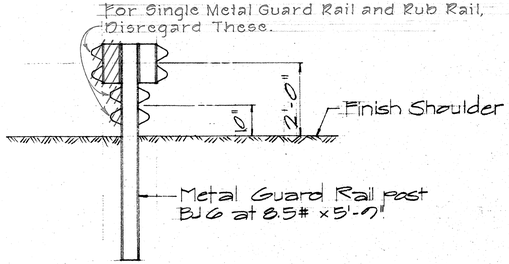


PLAN

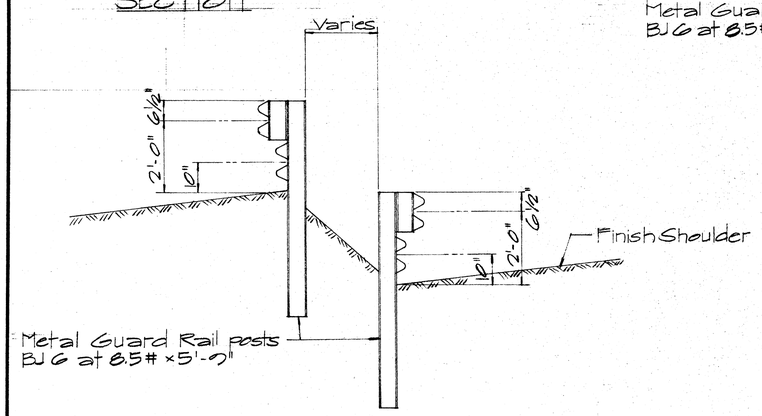


ELEVATION

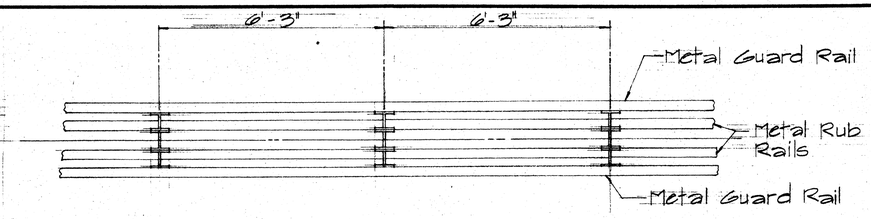
For Single Metal Guard Rail and Rub Rail, Disregard These.



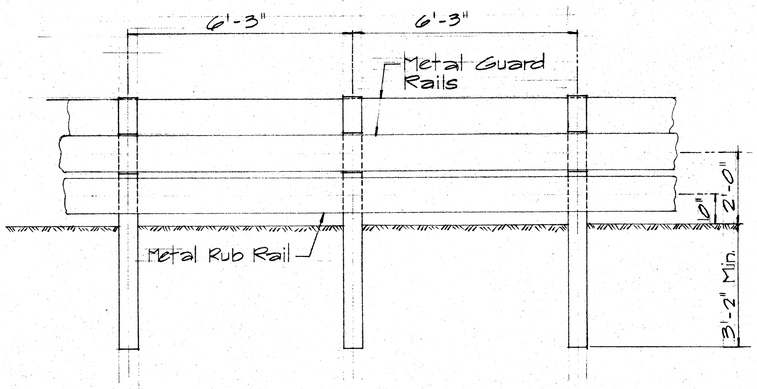
SECTION



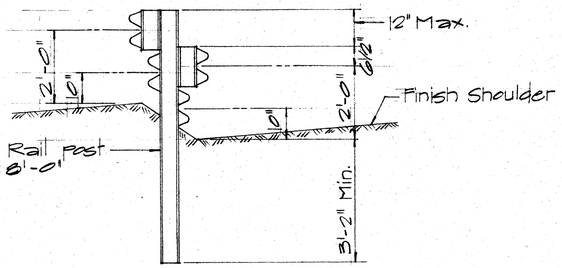
TYP. DOUBLE POST SEC.



PLAN



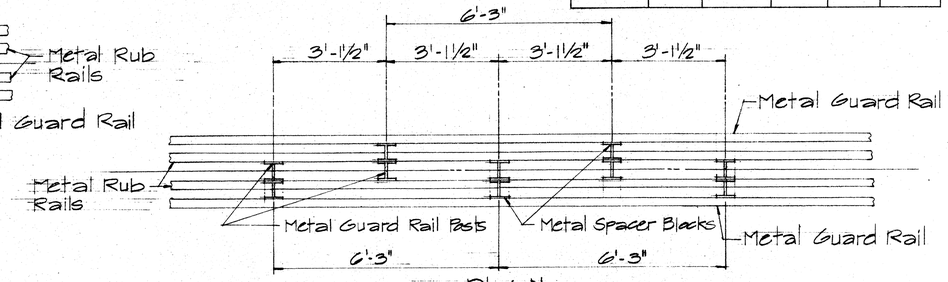
ELEVATION



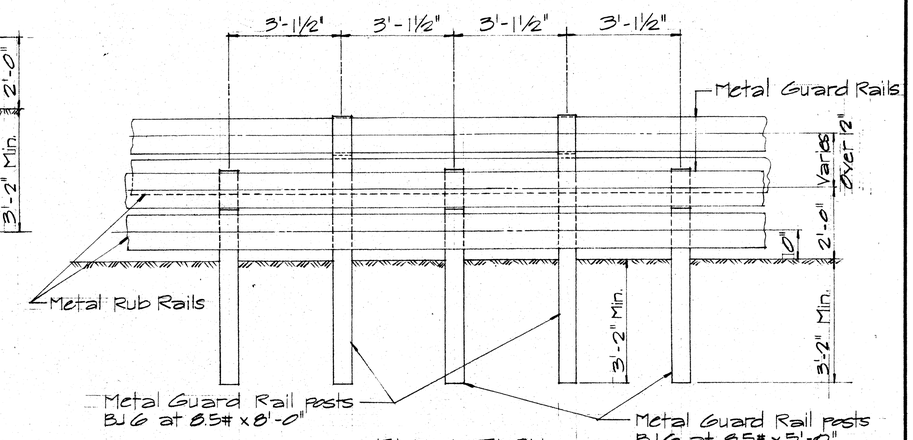
SECTION

TYPICAL SAW TOOTH INSTALLATION

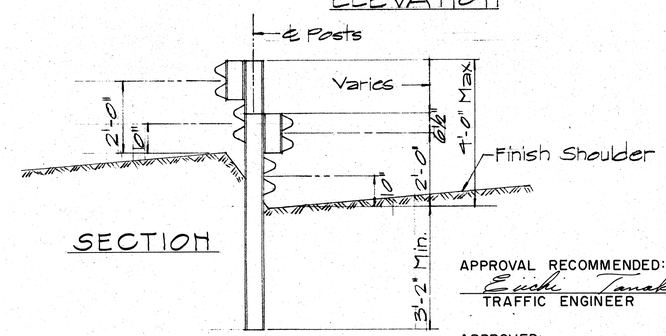
Sc. 1/2" = 1'-0"



PLAN



ELEVATION



SECTION

TYPICAL STAGGERED INSTALLATION

Sc. 1/2" = 1'-0"

APPROVAL RECOMMENDED:

Eiichi Tanaka — TRAFFIC ENGINEER — 12/23/69 DATE

APPROVED:

[illegible] — ASSISTANT CHIEF, ENGINEERING — 12-30-69 DATE

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAIL
METAL GUARD RAIL
WITH RUB RAIL

Scale: 1/2" = 1'-0" Feb. 1969

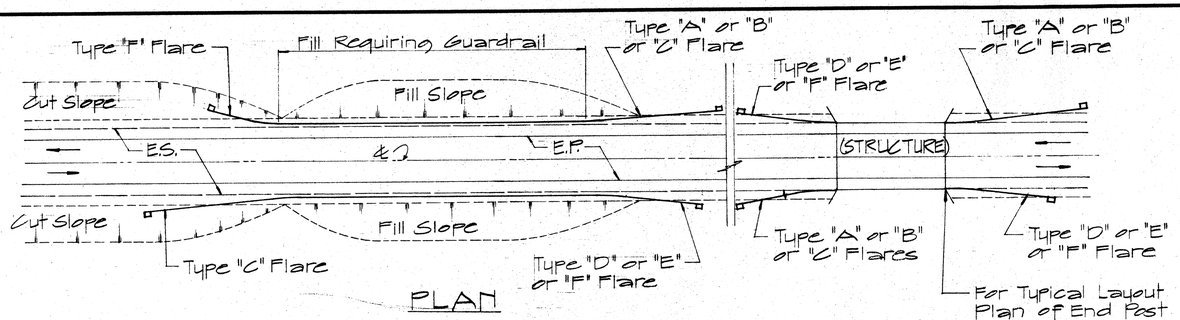
SHEET No. 236 OF SHEETS DT 514

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

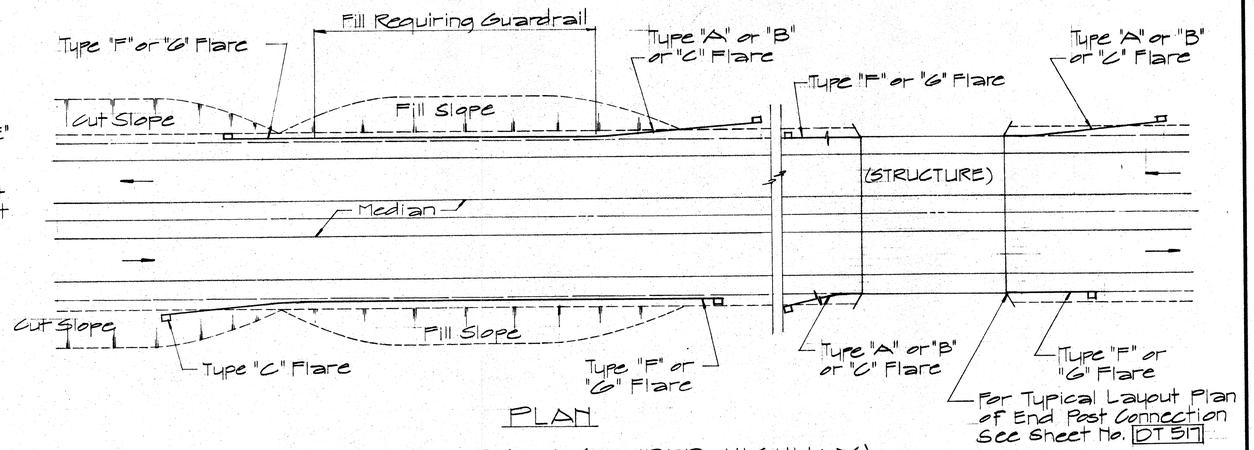
PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(47)-9	1968	237	238

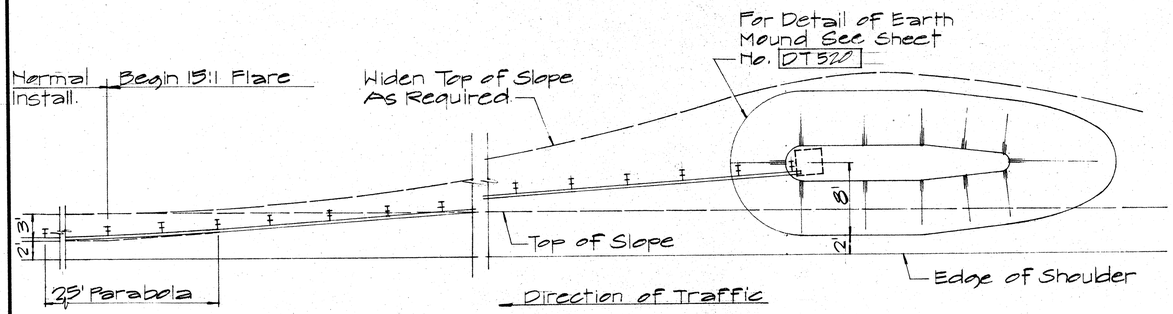
NOTE:
Metal guard rail connection to structures requires End Post Connection. See structure plans.



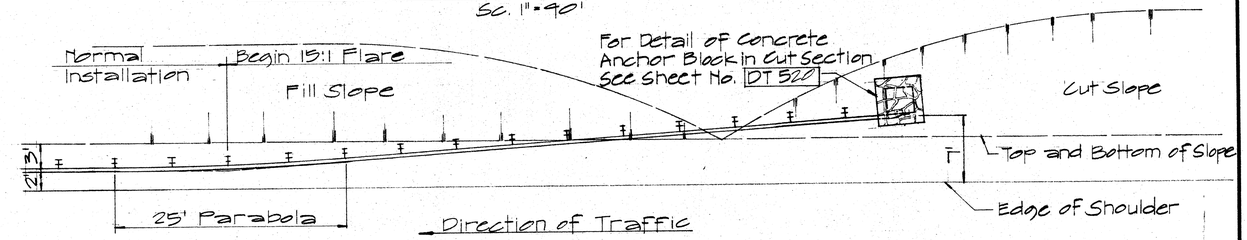
PLAN
TWO WAY ROADWAY
Sc. 1" = 40'



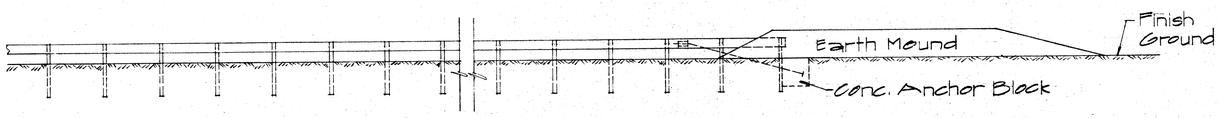
PLAN
ONE WAY ROADWAY (DIVIDED HIGHWAY)
Sc. 1" = 40'



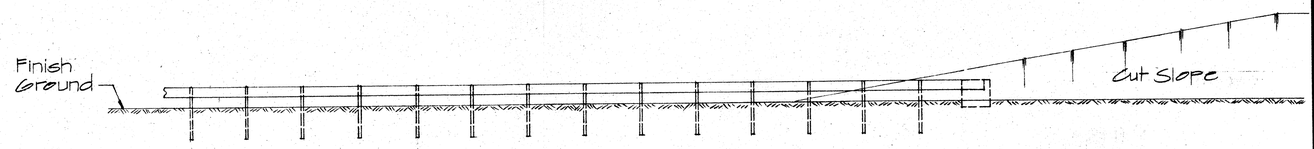
PLAN



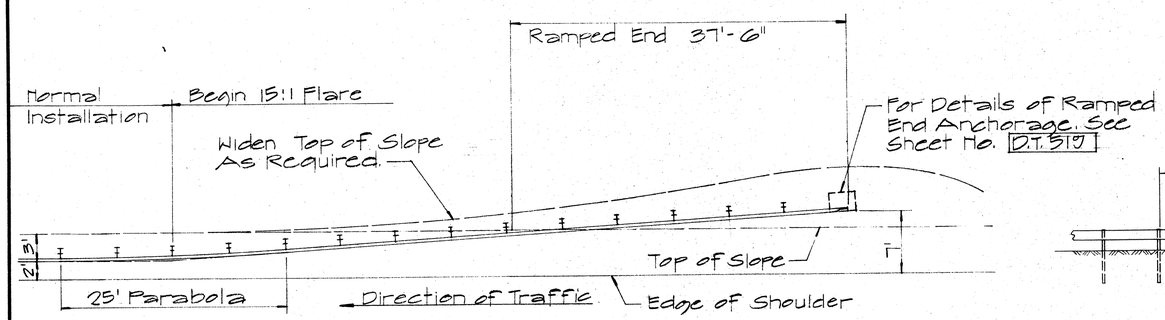
PLAN



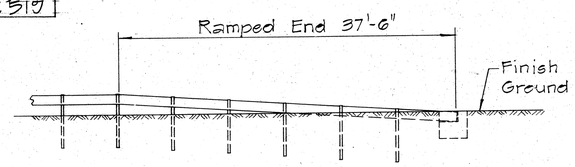
ELEVATION
TYPE "A" FLARE
Sc. 1/8" = 1'-0"



ELEVATION
TYPE "C" FLARE
Sc. 1/8" = 1'-0"



PLAN



ELEVATION

TYPE "B" FLARE
Sc. 1/8" = 1'-0"

APPROVAL RECOMMENDED:
Euichi Tanaka
TRAFFIC ENGINEER — DATE 12/29/69

APPROVED:
ASSISTANT CHIEF, ENGINEERING — DATE 12-30-69

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS OF APPROACH END FLARE - ONE & TWO WAY ROADWAY

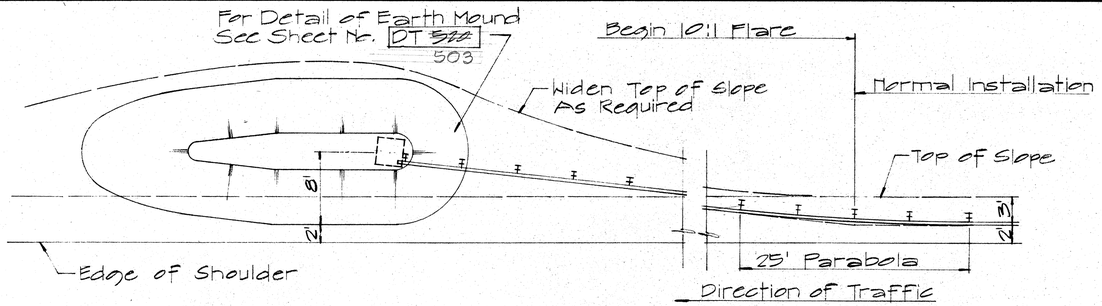
Sc. As Noted — April 1969

SHEET No. 237 OF SHEETS 238 — DT 516

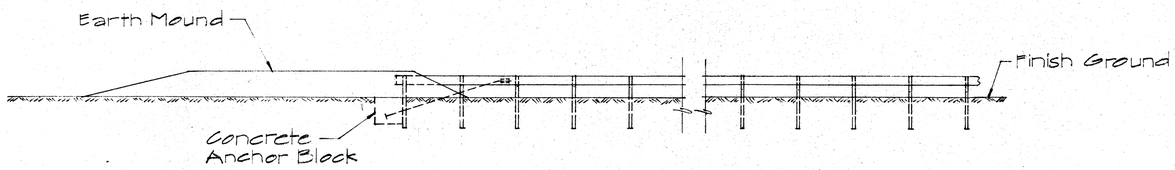
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	"
	TRACED BY	"
NOTE BOOK	DESIGNED BY	"
No.	QUANTITIES BY	"
	CHECKED BY	"

PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(47):9	1968	238	238



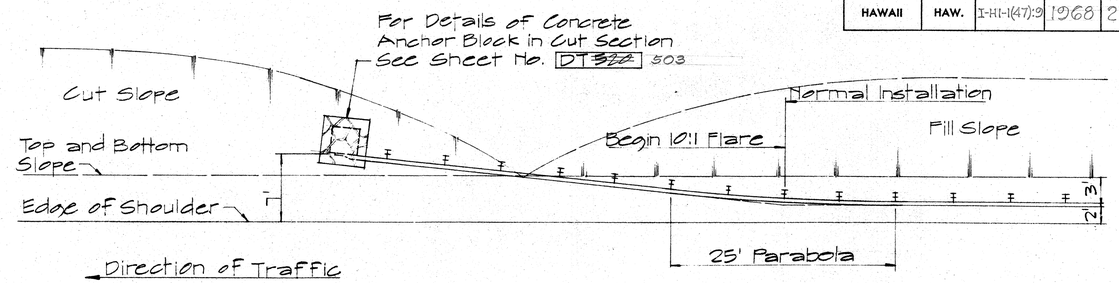
PLAN



ELEVATION

TYPE "D" FLARE

Sc. 1/8" = 1'-0"



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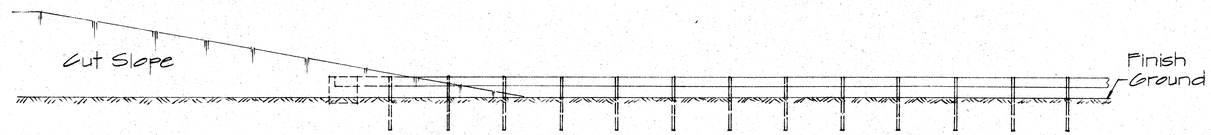

ELEVATION

TYPE "F" FLARE

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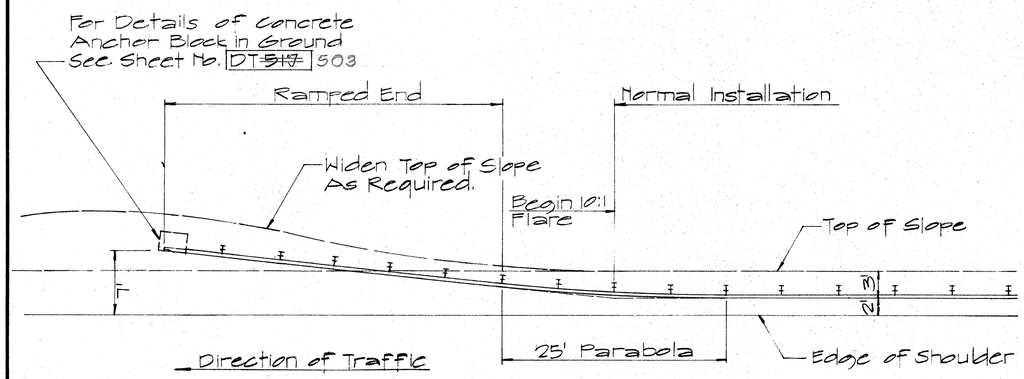

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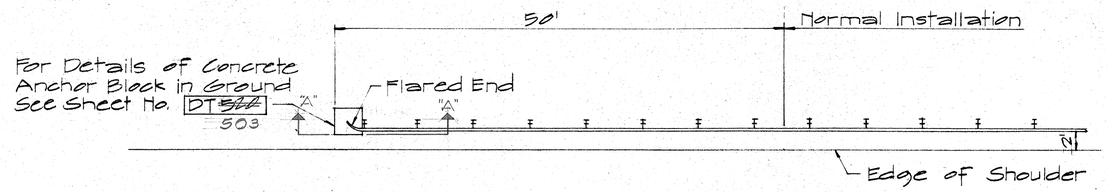

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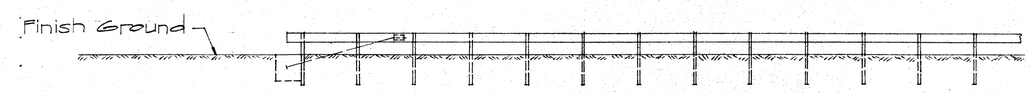
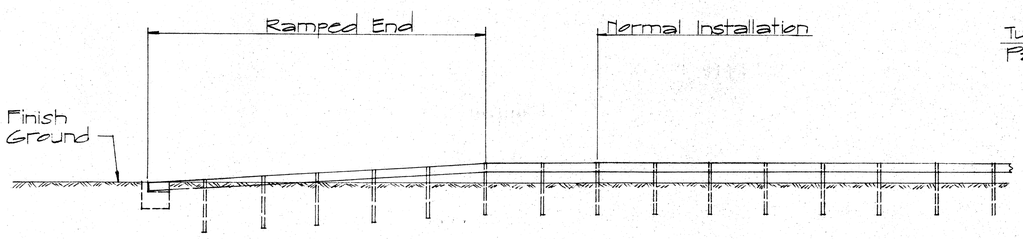


ELEVATION

TYPE "G" FLARE

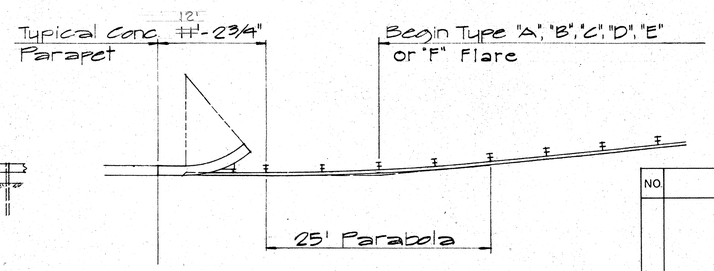
Sc. 1/8" = 1'-0"



ELEVATION

TYPE "E" FLARE

Sc. 1/8" = 1'-0"



TYPICAL LAYOUT PLAN OF
END POST CONNECTION

Sc. 1/8" = 1'-0"

APPROVAL RECOMMENDED:

Euichi Tanaka — 12/29/69
TRAFFIC ENGINEER — DATE

APPROVED:

[signature] — 12-30-69
ASSISTANT CHIEF, ENGINEERING — DATE

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
OF TRAILING END
FLARE - ONE & TWO
WAY ROADWAY

Sc. As Noted — April 1969

SHEET No. OF SHEETS DT517

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

PRINTED ON NO. 1000H CLEARPRINT

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