

- ① For  $h = 4'$  to  $7'$   
1.58:1 or less sloping surcharge unlimited.  
1.5:1 sloping surcharge limited to  $\frac{E}{H} = 2.3$
- ② For  $h$  of 8 and 9  
1.62:1 or less sloping surcharge unlimited.  
1.5:1 sloping surcharge limited to  $\frac{E}{H} = 1.8$
- ③ For  $h$  of 10 and 11  
1.9:1 or less sloping surcharge unlimited.  
1.5:1 sloping surcharge limited to  $\frac{E}{H} = 1.4$
- ④ For  $h = 13, 14'$  and  $15'$   
2.2:1 or less sloping surcharge unlimited.  
1.5:1 sloping surcharge limited to  $\frac{E}{H} = 1.2$
- ⑤ For  $h = 18$  to  $21'$   
2.7:1 or less sloping surcharge unlimited.
- ⑥ For  $h = 22'$  to  $24'$   
3:1 sloping surcharge unlimited

\* Special cases are not applicable if traffic can come within a distance from the top of the stem equal to one-half its height.

\* \* When footing is on rock, L shall be reduced to  $L_p + 0.4(h + t + 2')$  to increase footing pressure.  $L_p$  shall be measured from the toe. Adjust footing design accordingly.



(Spacing of Joints)  
 Contraction Joint - 30'-0" Max.  
 Expansion Joint - 90'-0" Max.

### GENERAL NOTE

Except where detailed otherwise in the plans,  
all details on this sheet govern.

\* F.S. Against Sliding based on friction factor of 0.40

APPROVED:  DATE Aug. 26, 1953

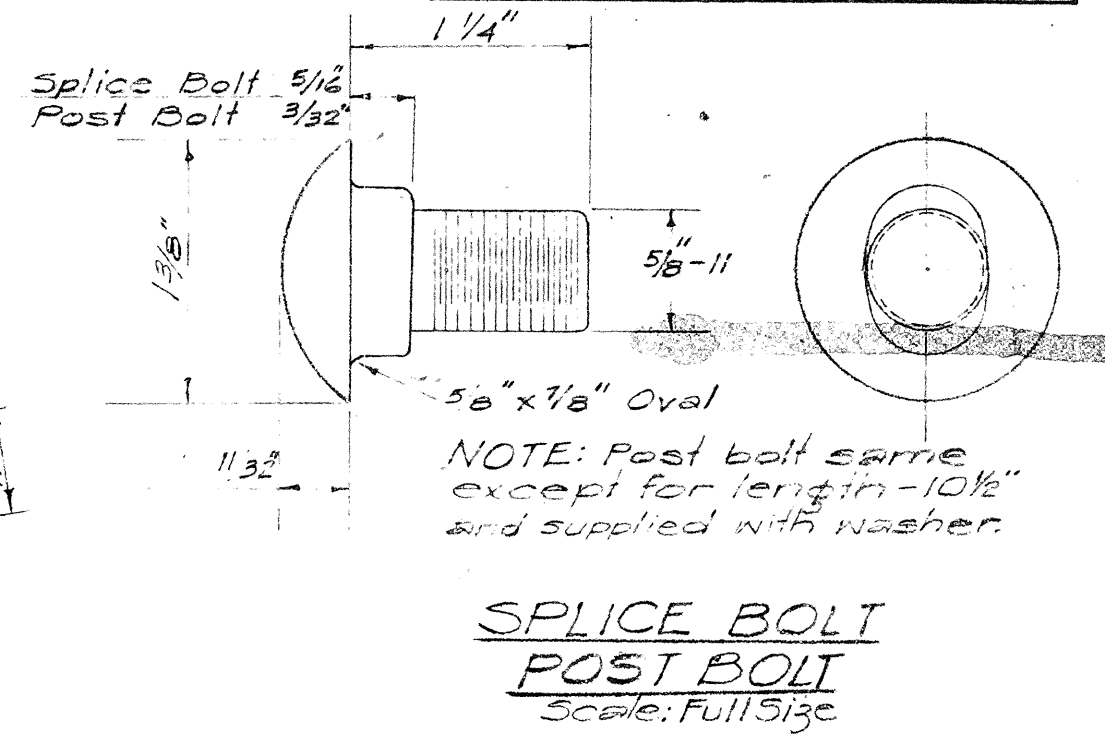
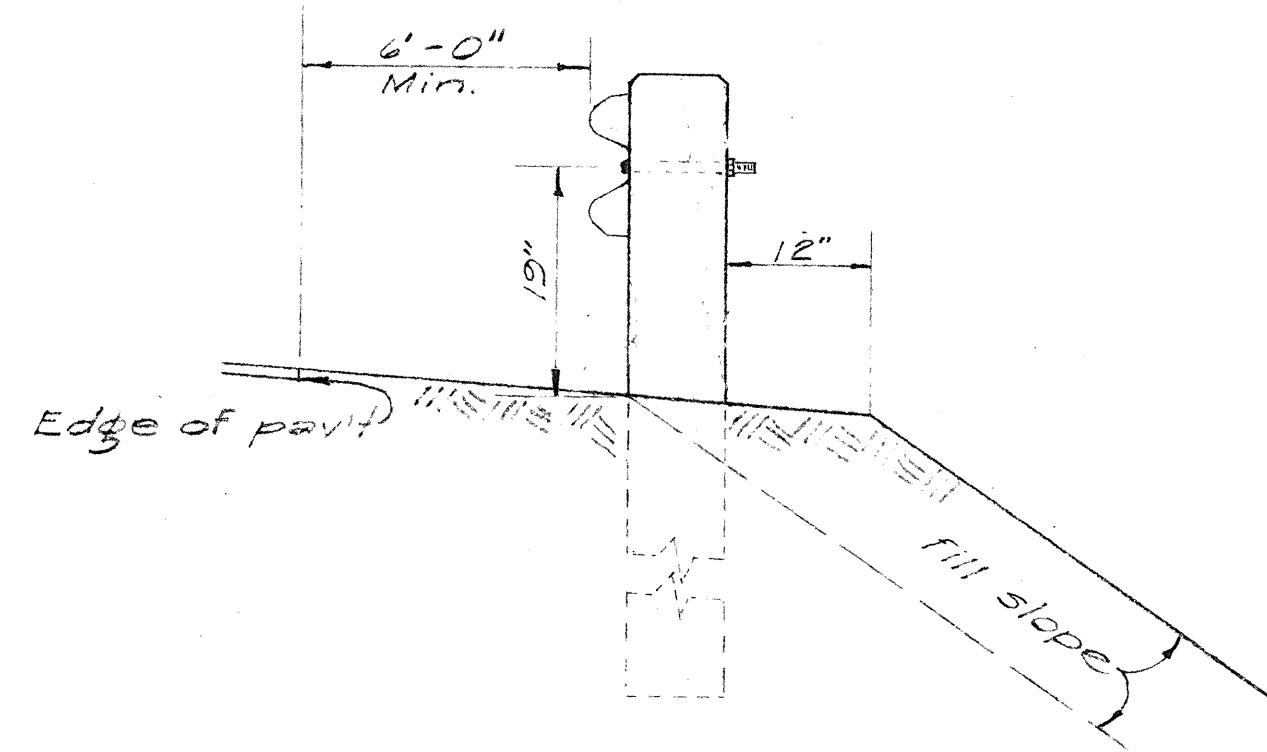
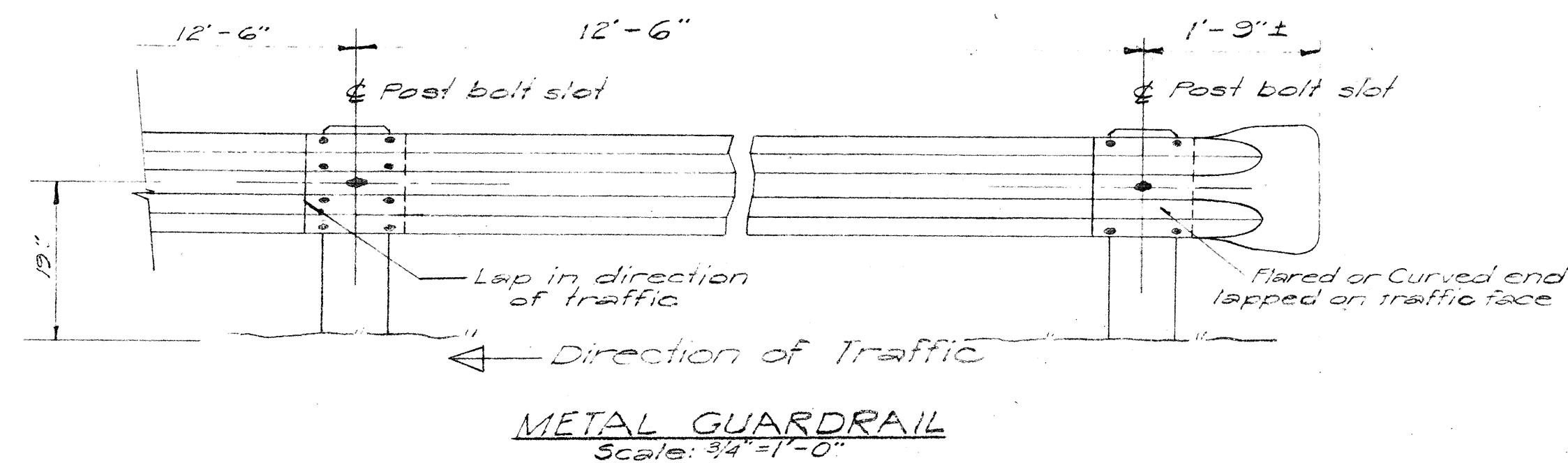
STATE HIGHWAY ENGINEER

DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
STATE OF HAWAII

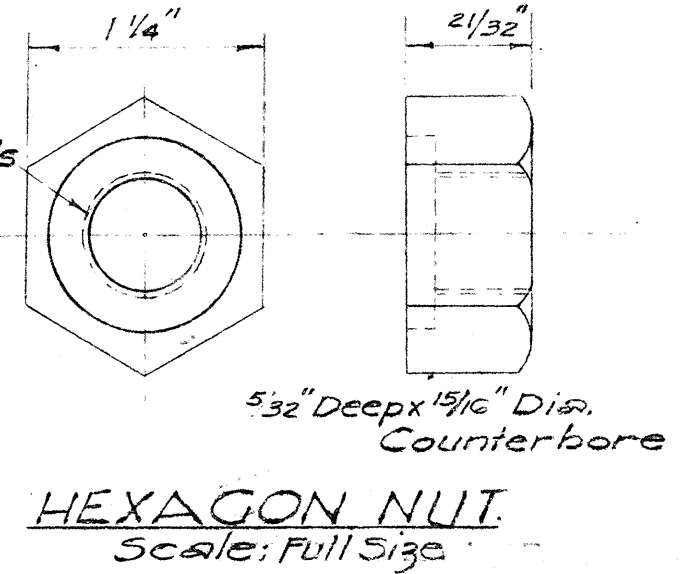
# RETAINING WALL STANDARDS

SCALES AS NOTED MAY 1956

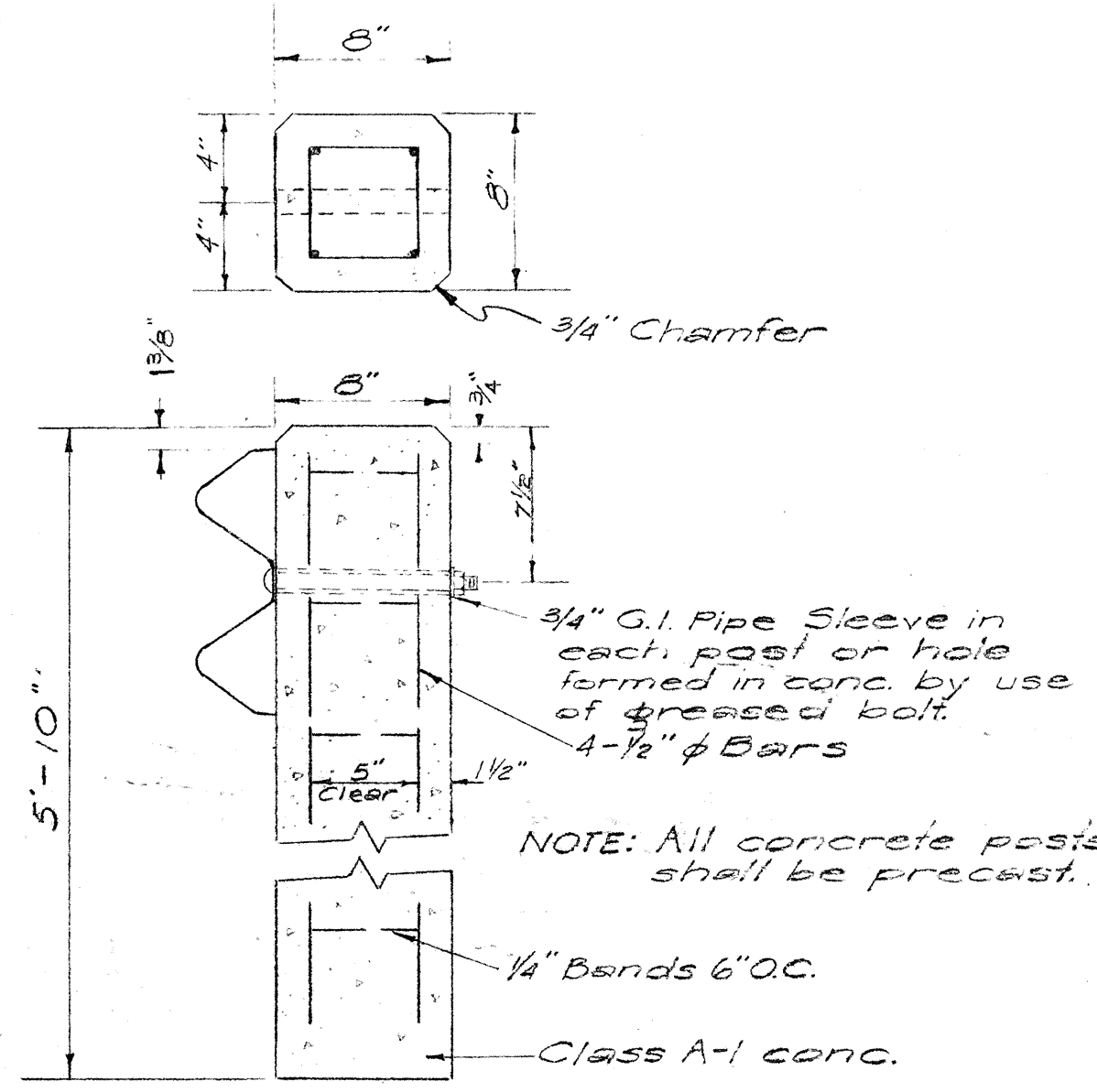
SHEET No. 6 OF 8 SHEETS



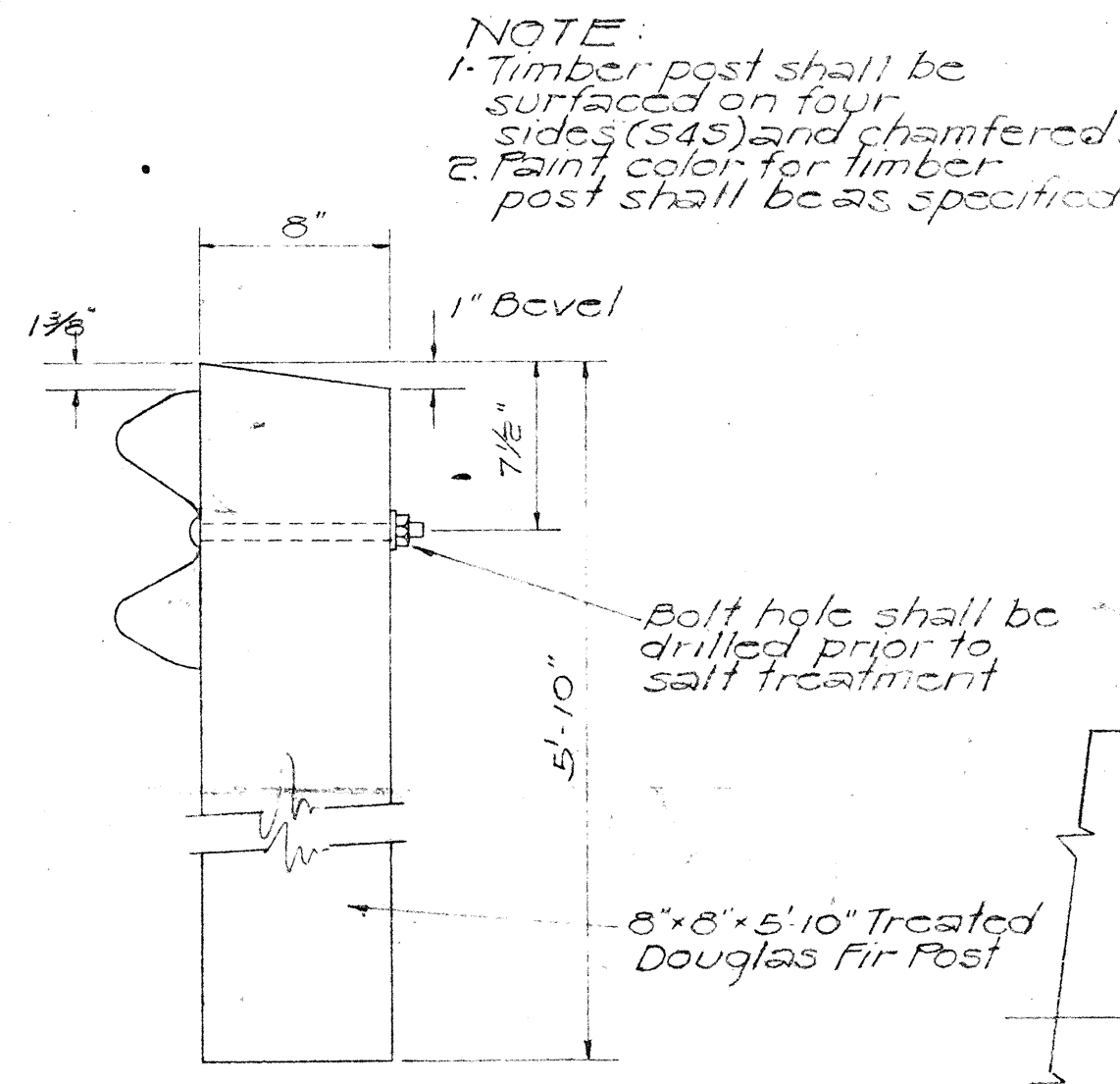
**SPICE BOLT POST BOLT**  
Scale: Full Size



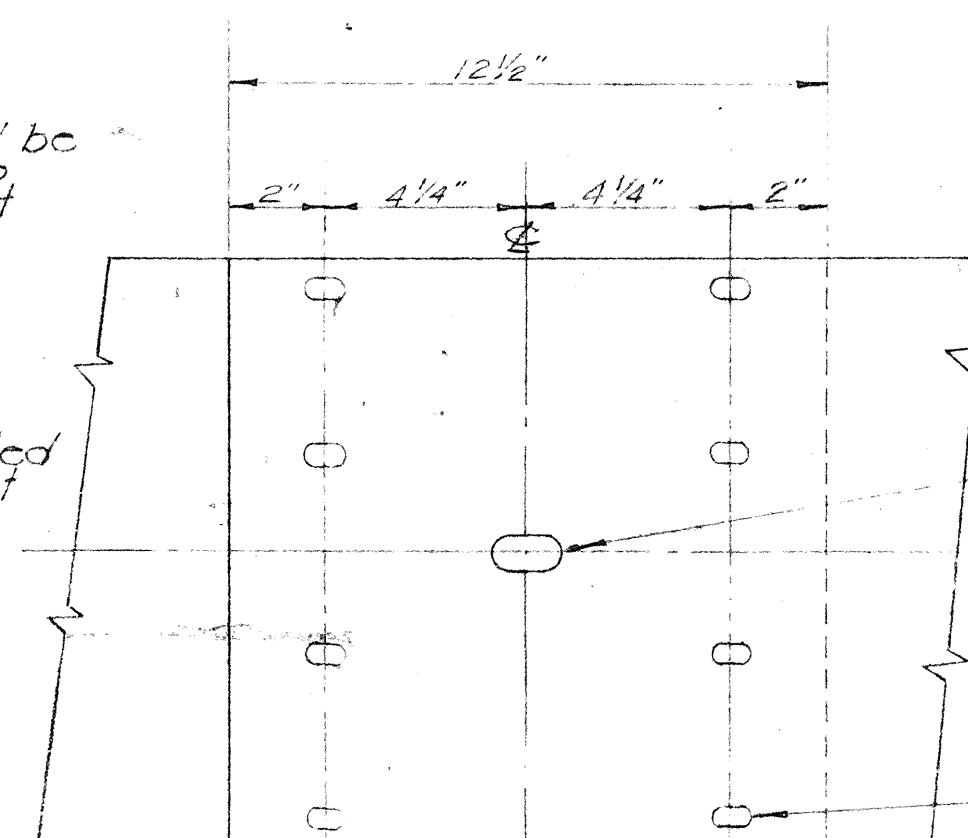
**HEXAGON NUT**  
Scale: Full Size



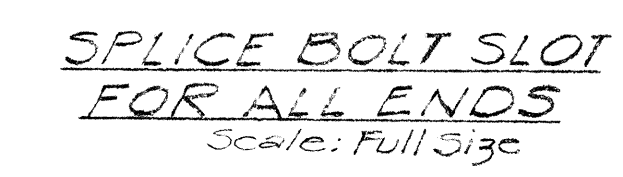
**DETAIL OF CONC. POST**  
Scale: 1 1/2"=1'-0"



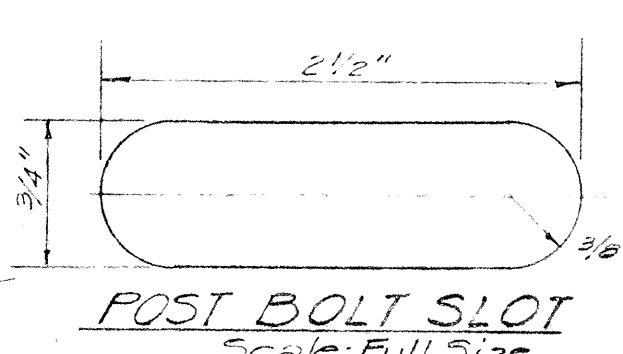
**DETAIL OF TIMBER POST**  
Scale: 1 1/2"=1'-0"



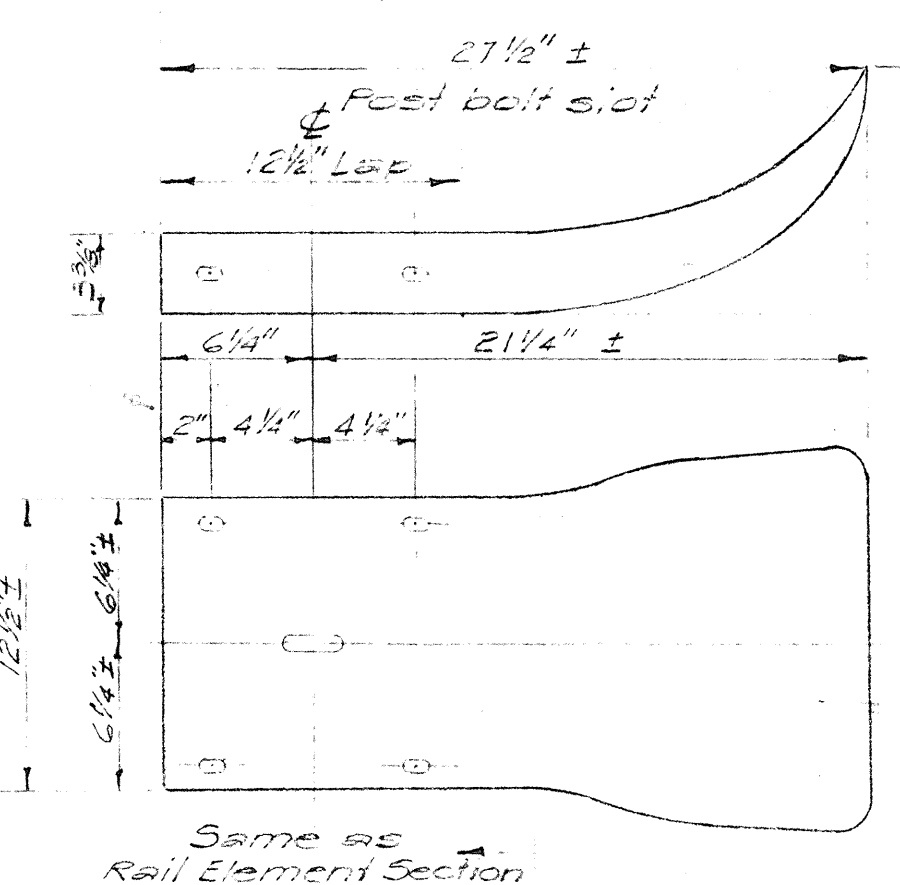
**RAIL SPLICE**  
Scale: 3"=1'-0"



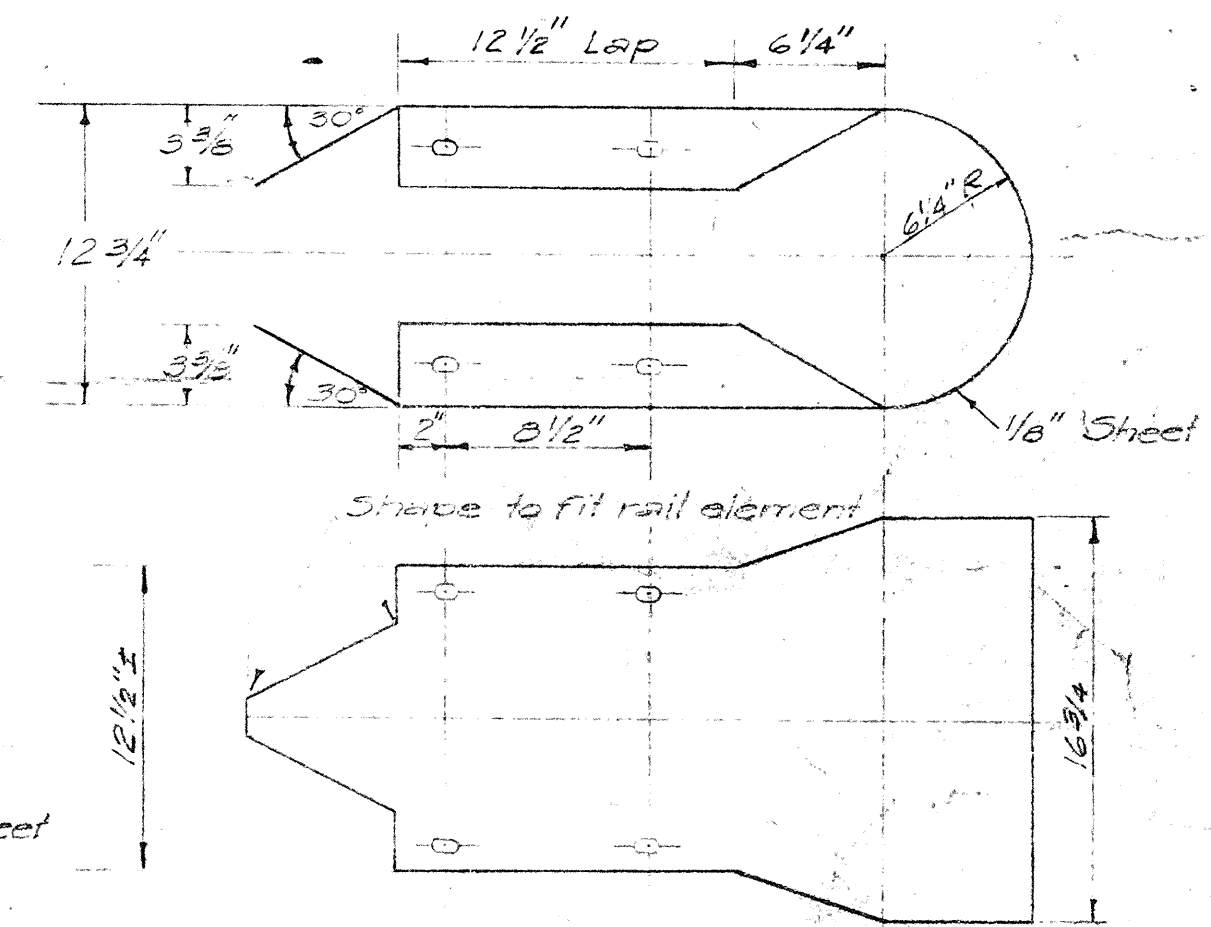
**SPICE BOLT SLOT FOR ALL ENDS**  
Scale: Full Size



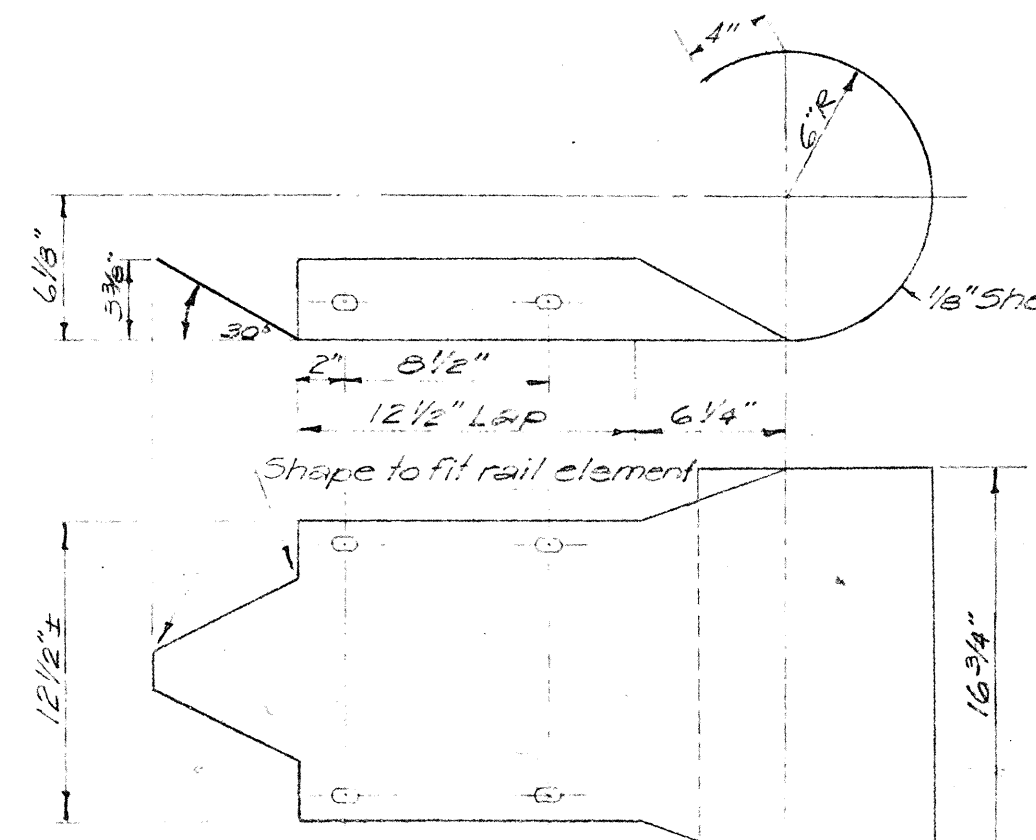
**POST BOLT SLOT**  
Scale: Full Size



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



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

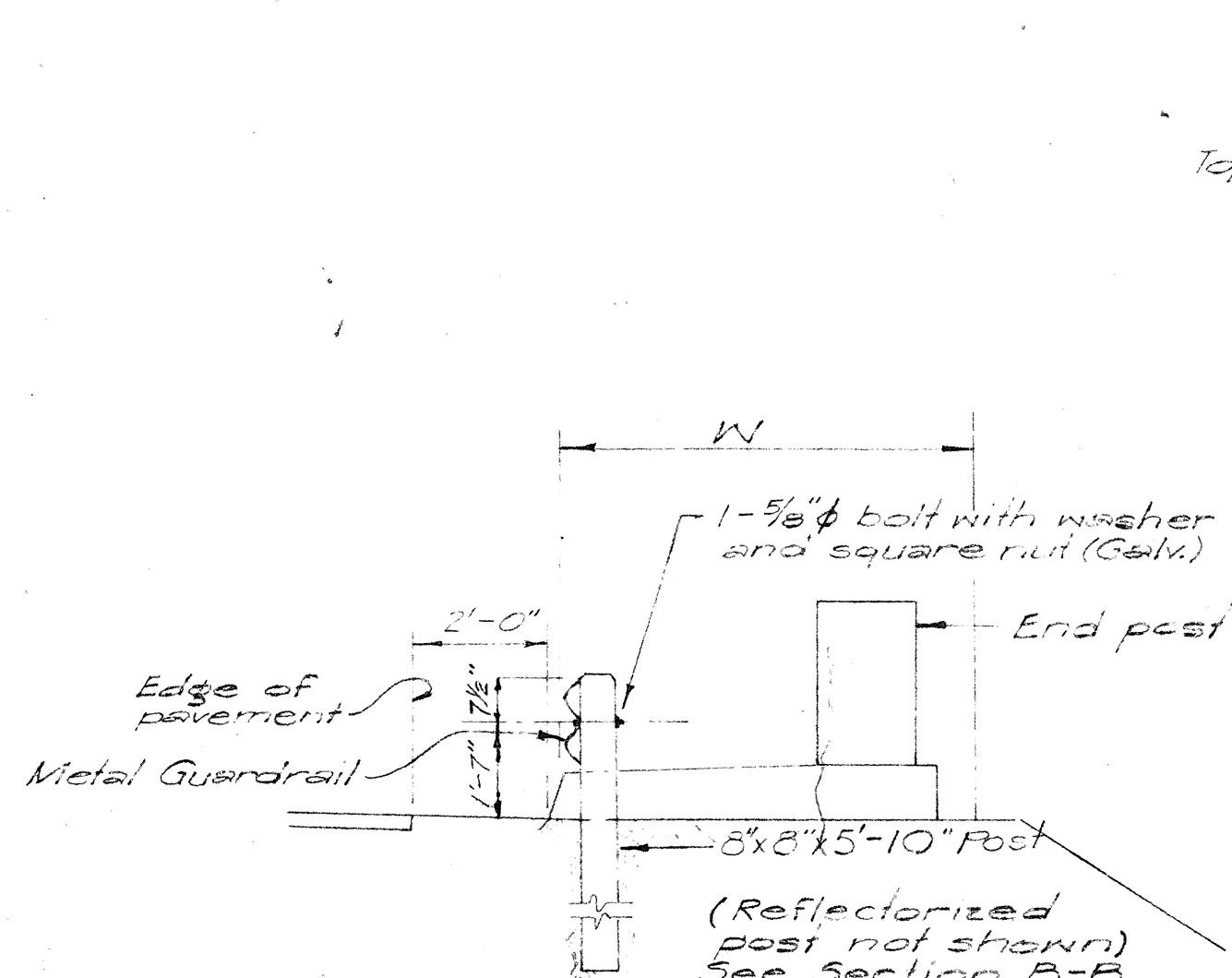


**CURVED END**  
Scale: 1 1/2"=1'-0"

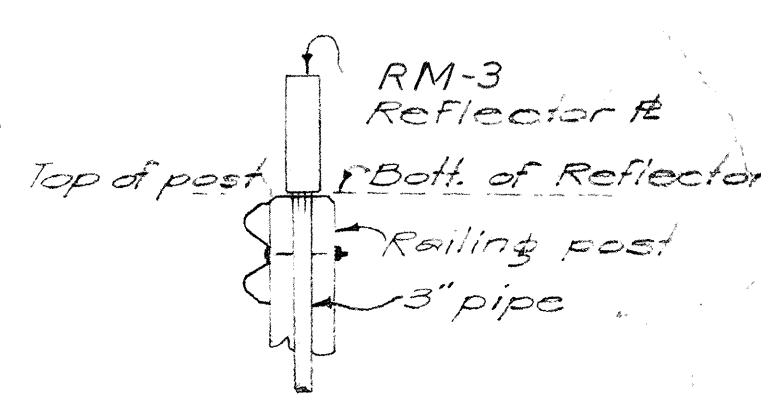
**GUARDRAIL OFFSET**

| X     | N=3' | N=4' | N=5' | N=6' | N=7' | N=8' |
|-------|------|------|------|------|------|------|
| 12.5  | 0.19 | 0.16 | 0.14 | 0.12 | 0.09 | 0.08 |
| 25.0  | 0.75 | 0.64 | 0.55 | 0.49 | 0.35 | 0.32 |
| 37.5  | 1.69 | 1.44 | 1.25 | 1.10 | 0.78 | 0.72 |
| 50.0  | 3.00 | 2.56 | 2.22 | 1.96 | 1.38 | 1.28 |
| 62.5  |      | 4.00 | 3.47 | 3.06 | 2.16 | 2.00 |
| 75.0  |      |      | 5.00 | 4.41 | 3.11 | 2.88 |
| 87.5  |      |      |      | 6.00 | 4.23 | 3.92 |
| 100.0 |      |      |      |      | 5.55 | 5.12 |
| 112.5 |      |      |      |      | 7.00 | 6.48 |
| 125.0 |      |      |      |      |      | 8.00 |

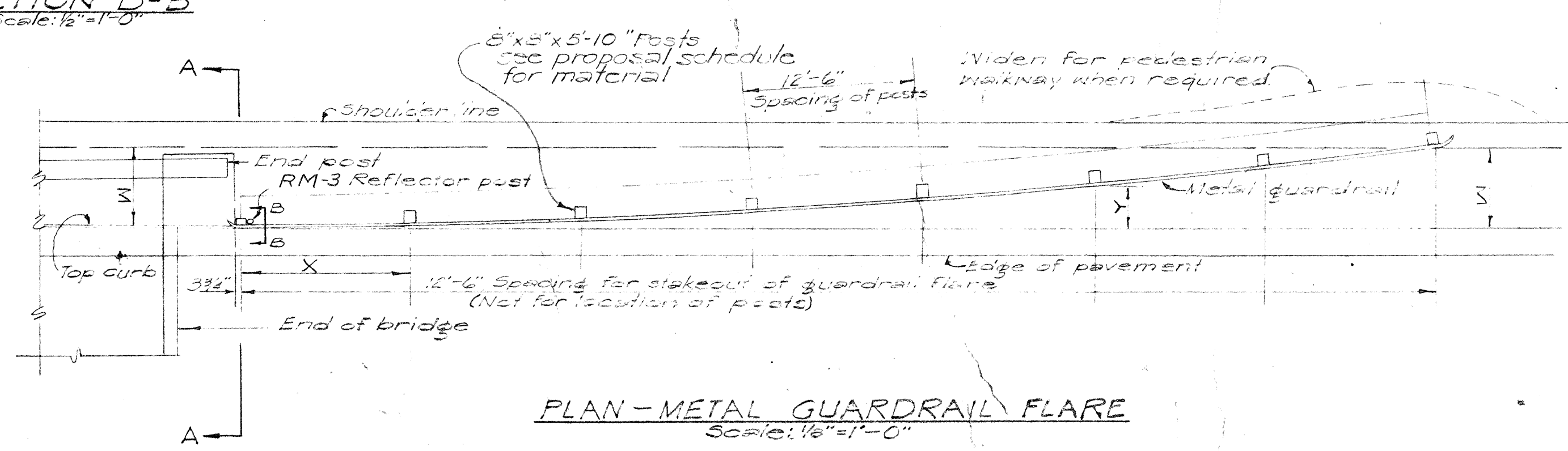
W = Guardrail flare.  
X = Distance from post at bridge to offset point.  
Y = Guardrail flare offset.



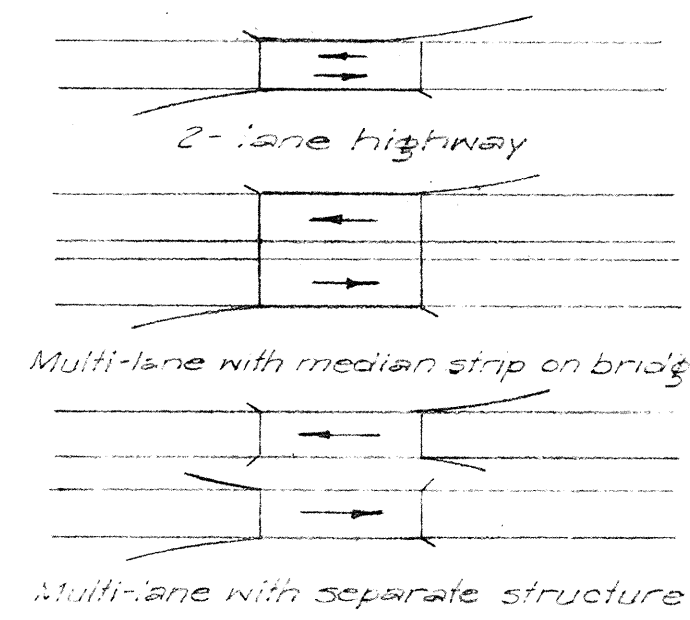
**SECTION A-A**  
Scale: 3/8"=1'-0"



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



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



DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
STATE OF HAWAII

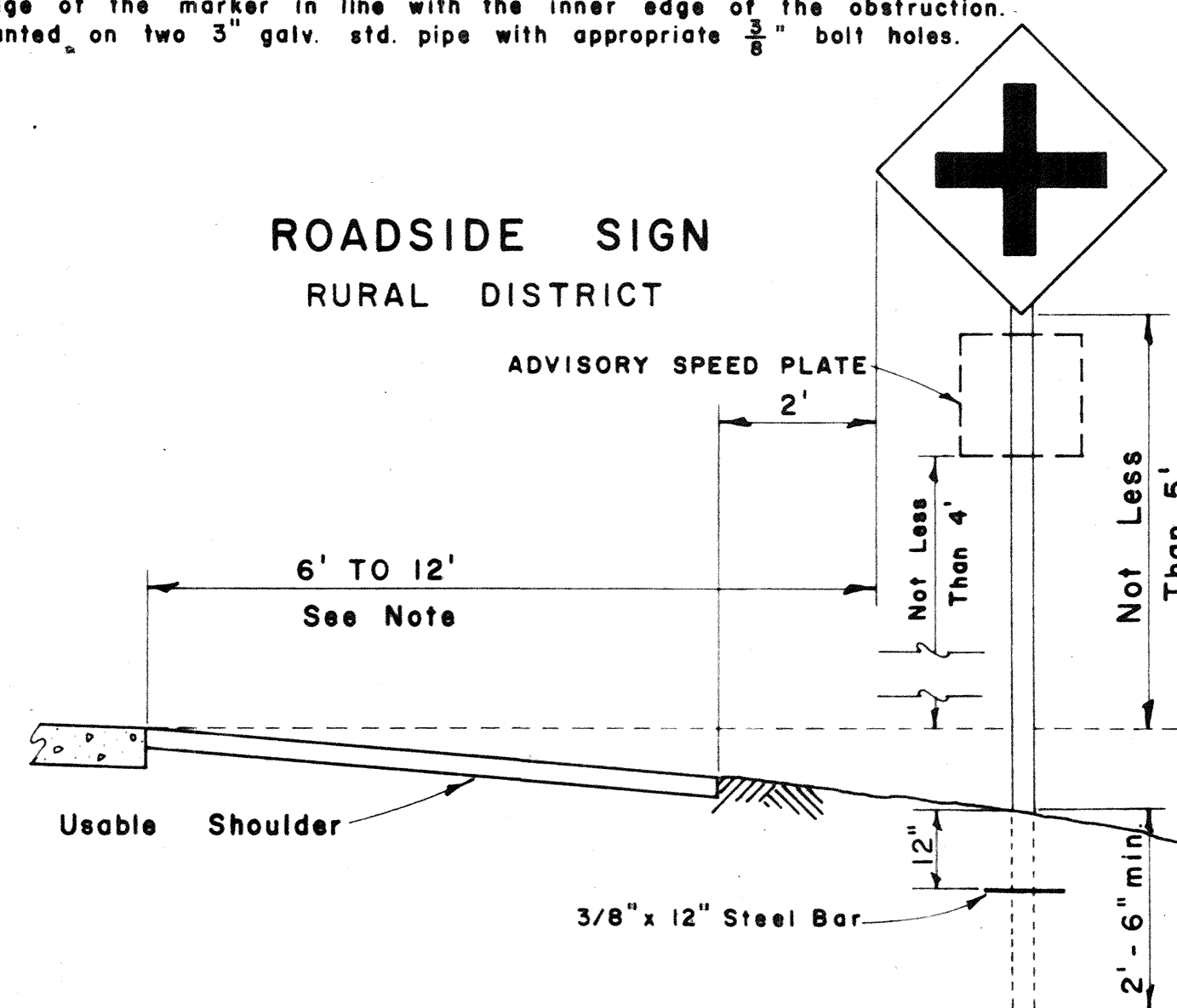
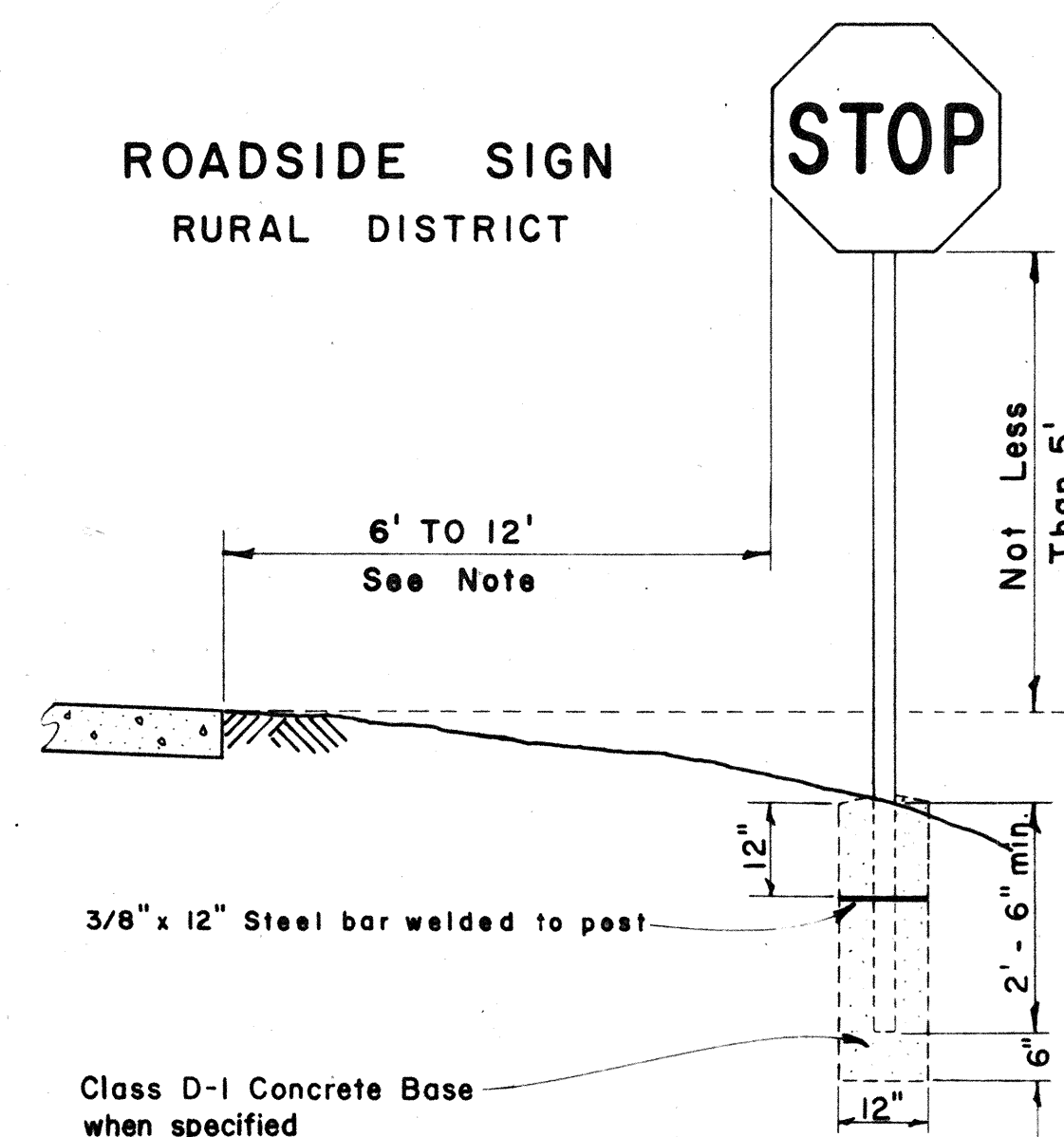
**DETAIL METAL GUARDRAIL**

PROJECT NO. RA20 (1)

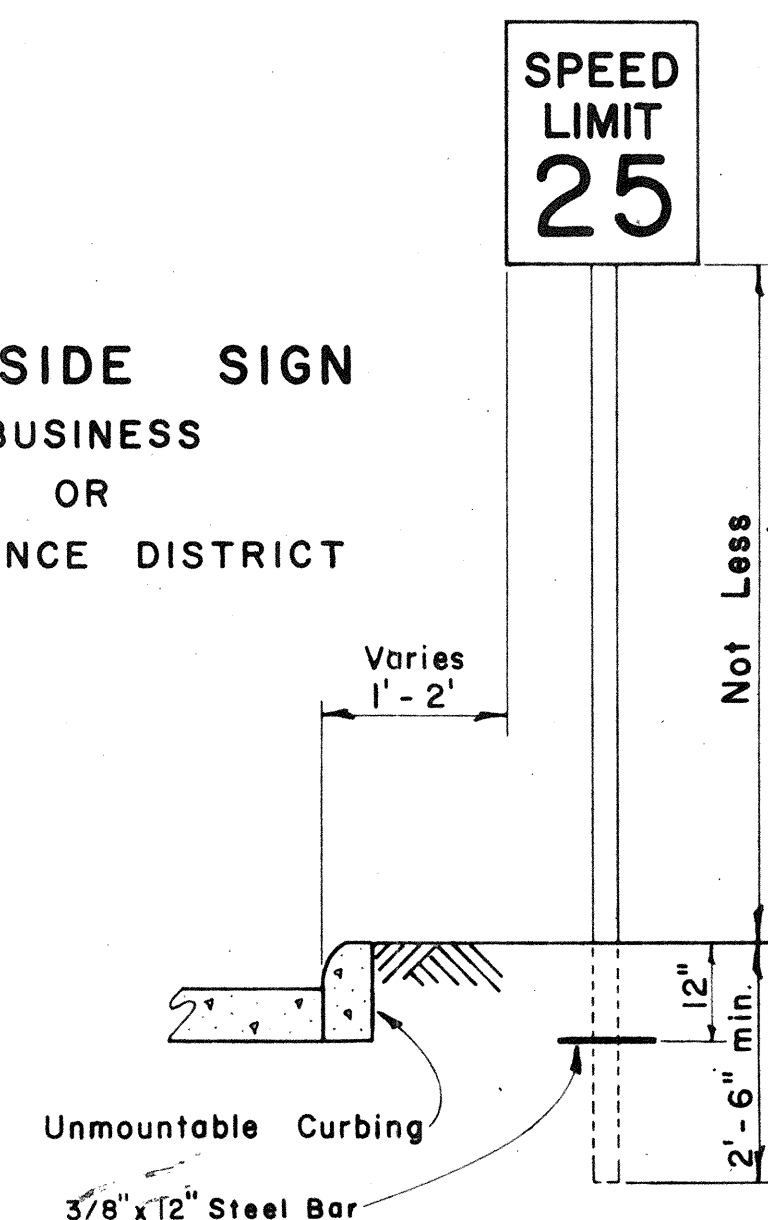
SCALE: AS NOTED MAY 1963

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

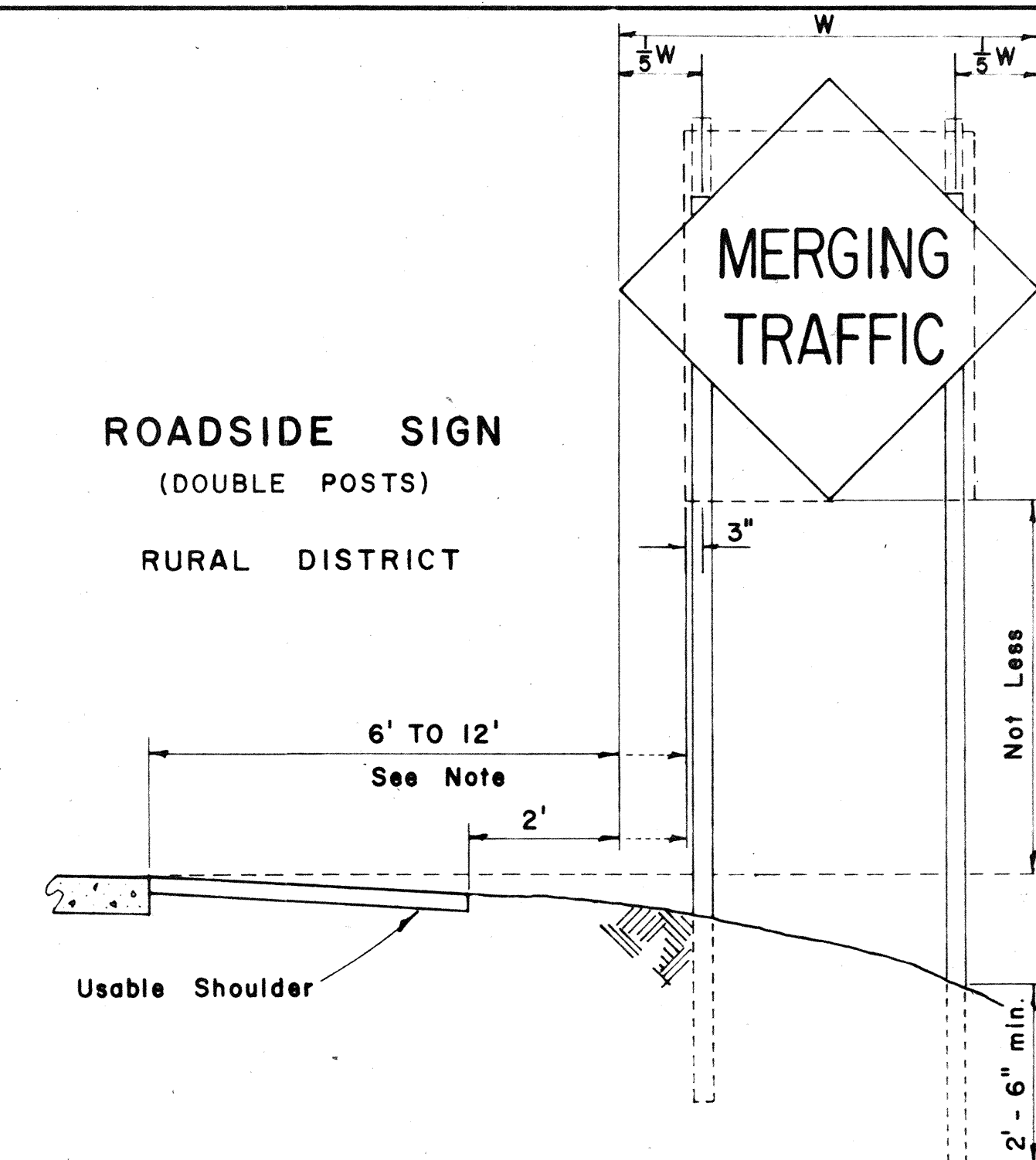
| FED. ROAD DIST. NO. | STATE | FEDERAL PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|-------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | R-AD20            | 1963        | 15        | 15           |



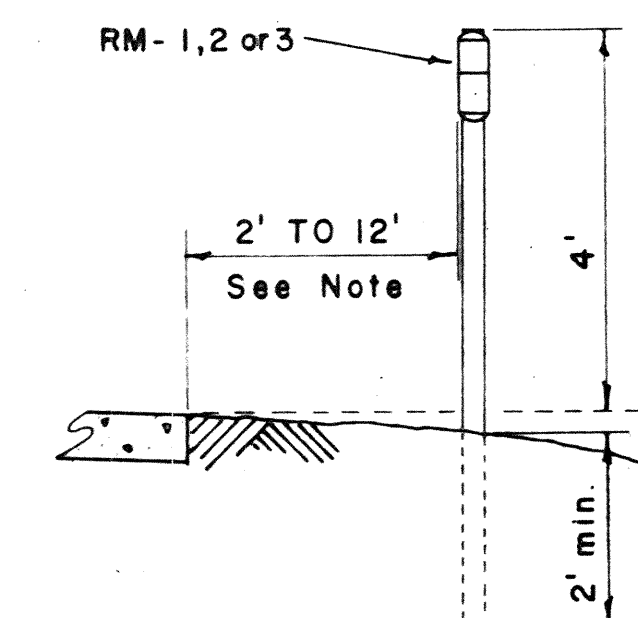
ROADSIDE SIGN  
BUSINESS  
OR  
RESIDENCE DISTRICT



ROADSIDE SIGN  
(DOUBLE POSTS)  
RURAL DISTRICT

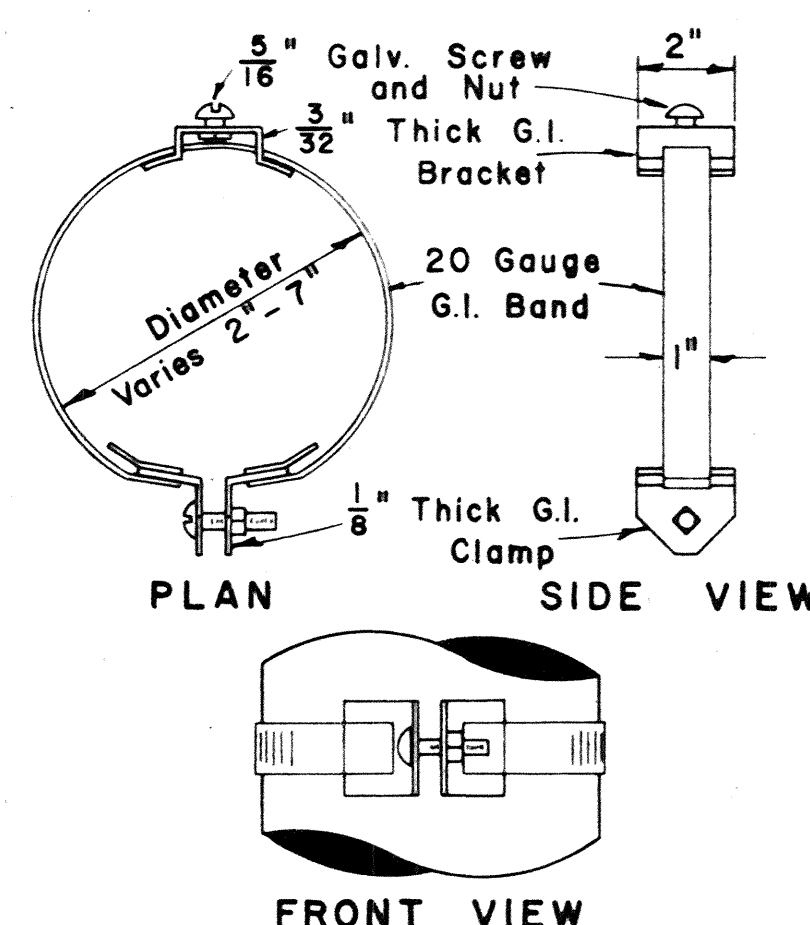
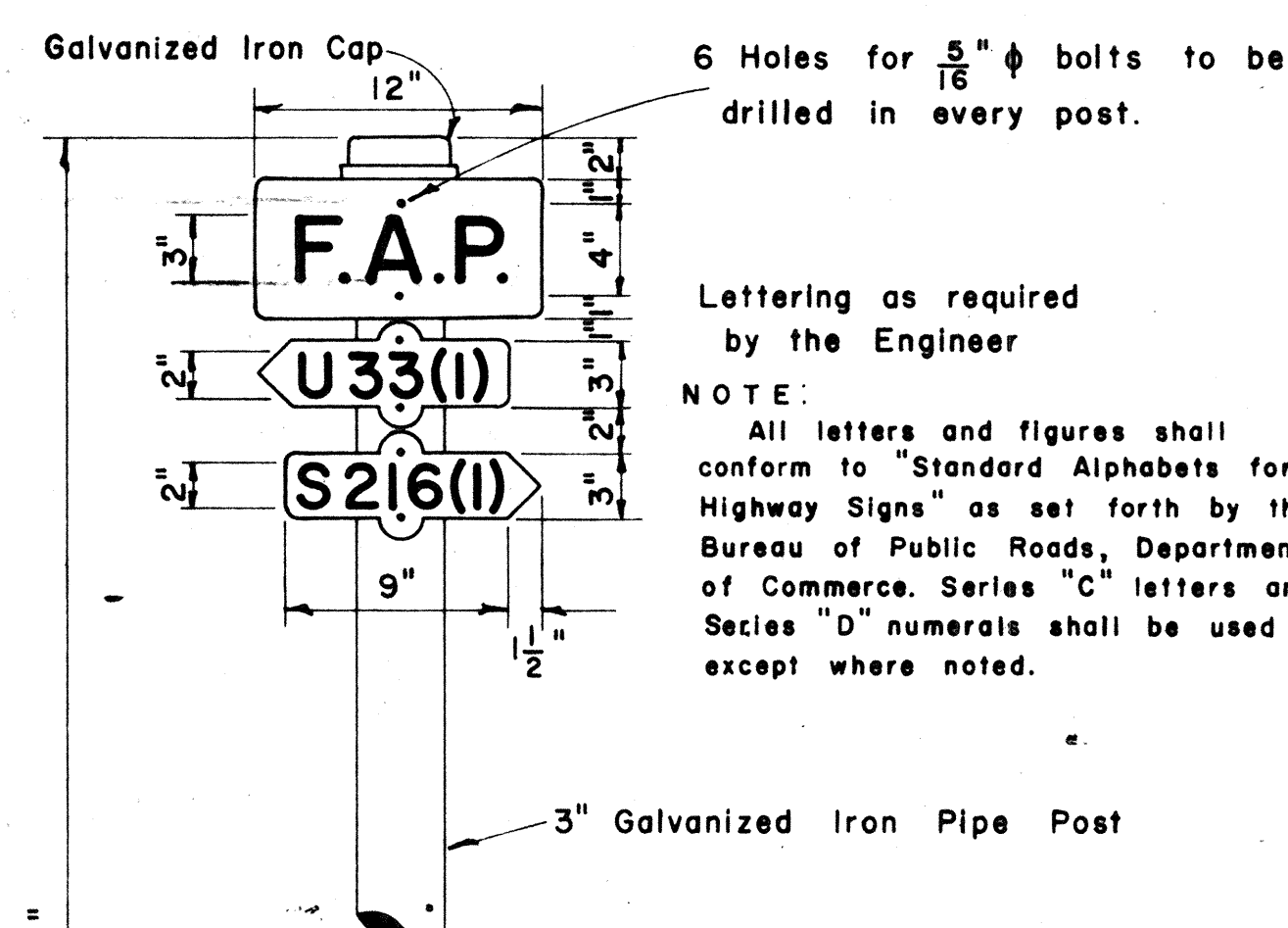


ROAD DELINEATOR

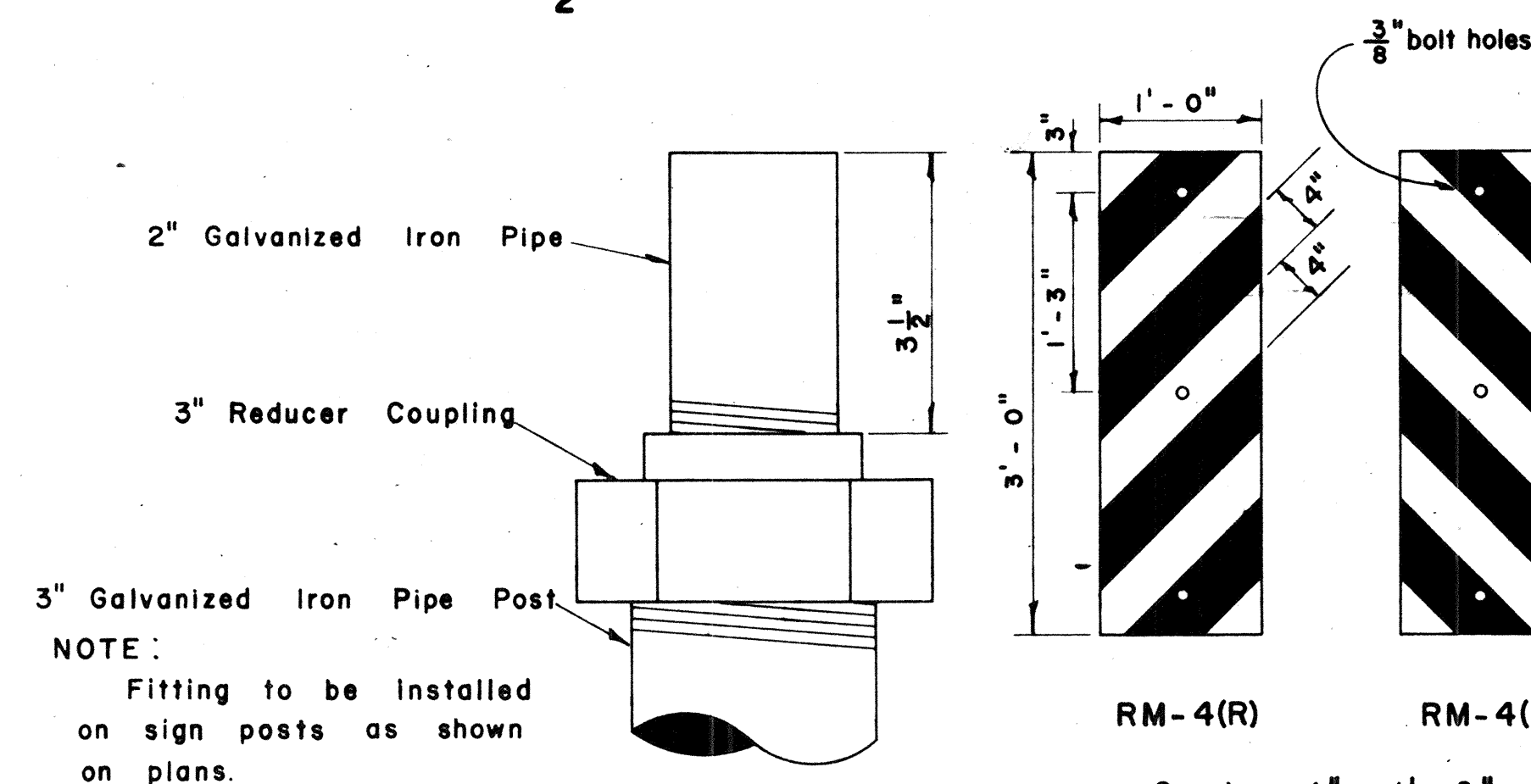


## HEIGHT AND LATERAL LOCATION OF SIGNS - TYPICAL INSTALLATIONS

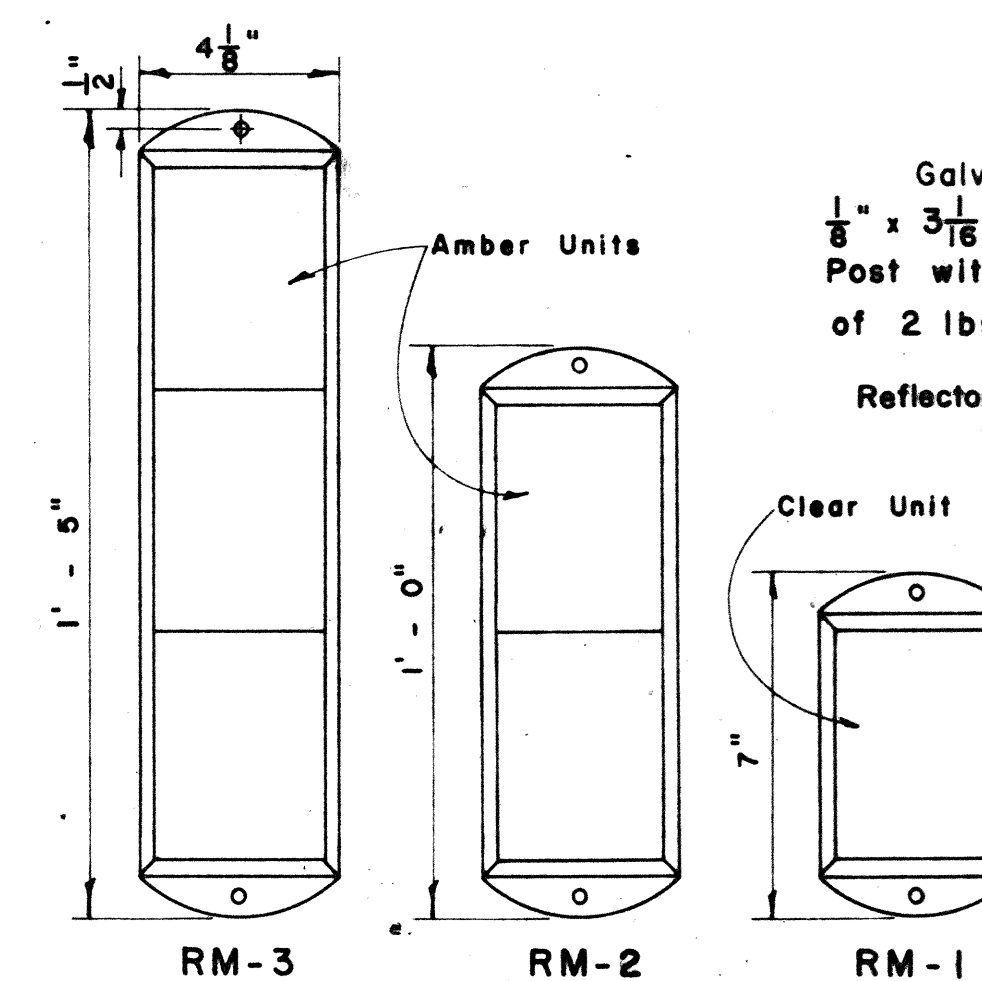
Scale:  $\frac{1}{2}$ " = 1' - 0"



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



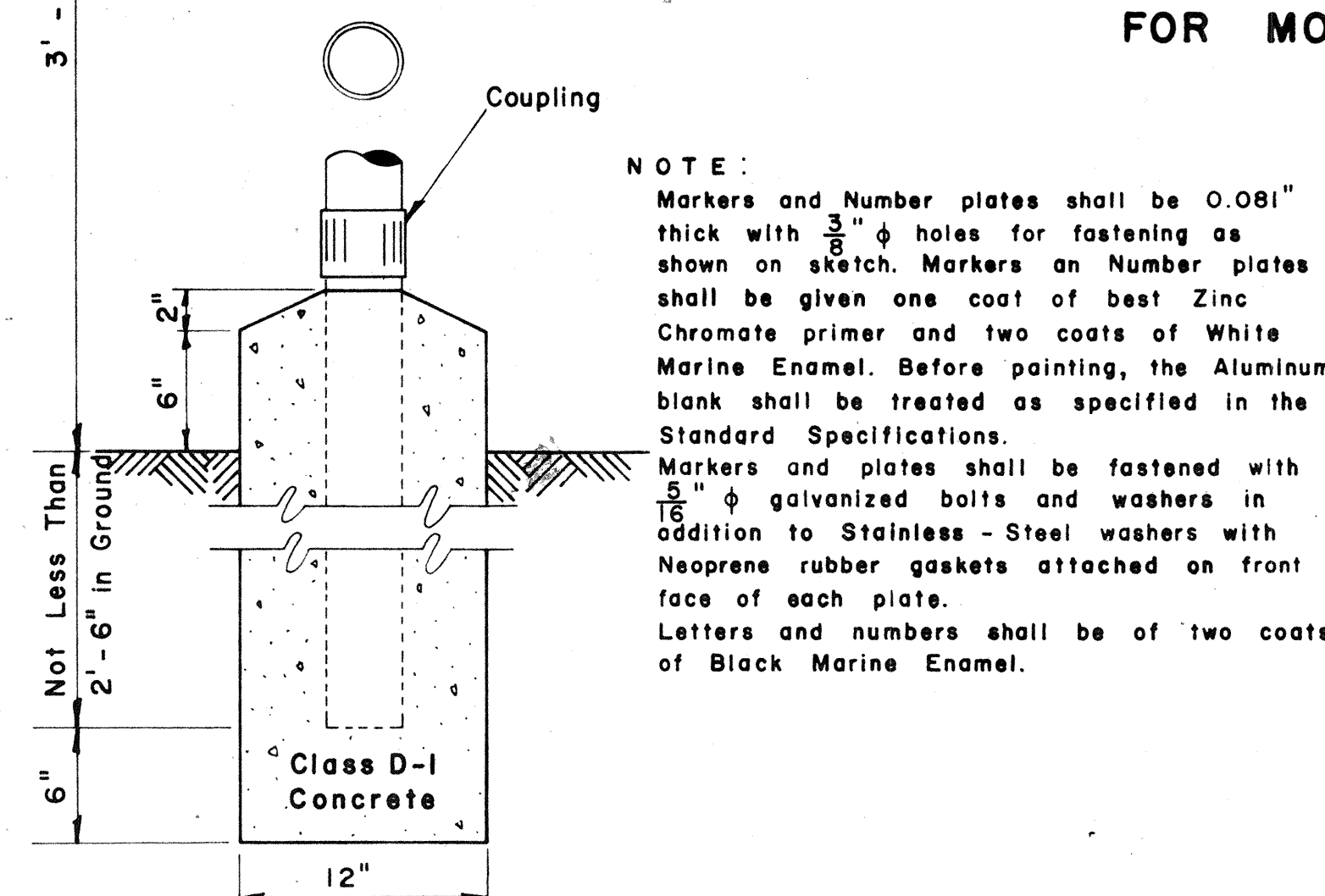
DETAIL OF SIGN POST FITTING  
FOR CITY & COUNTY  
STREET NAME SIGNS  
Scale:  $\frac{1}{2}$ " = 1"



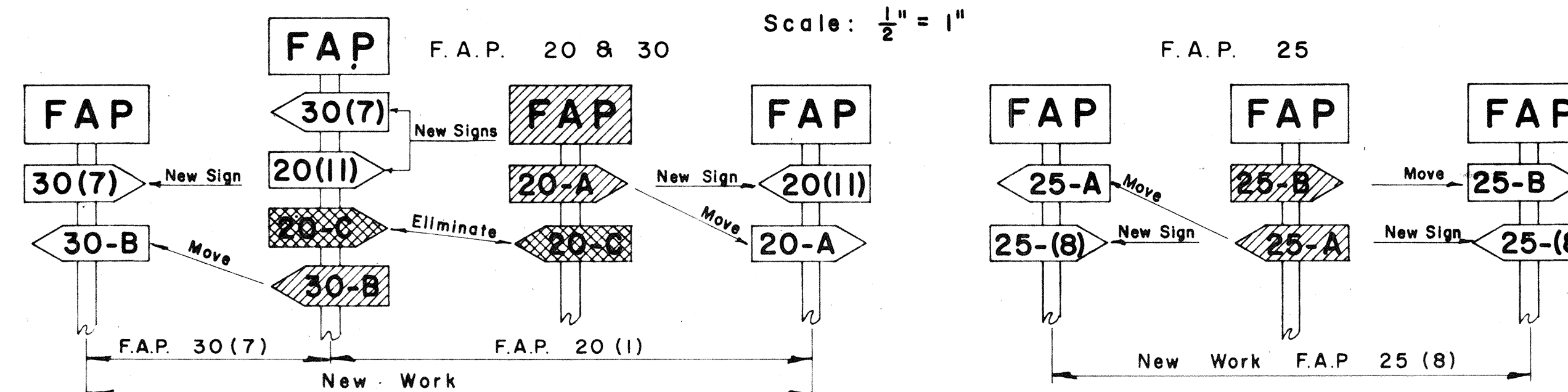
REFLECTOR MARKERS  
Scale: As Shown

## TYPICAL SECTION OF ROAD DELINEATOR Full Size

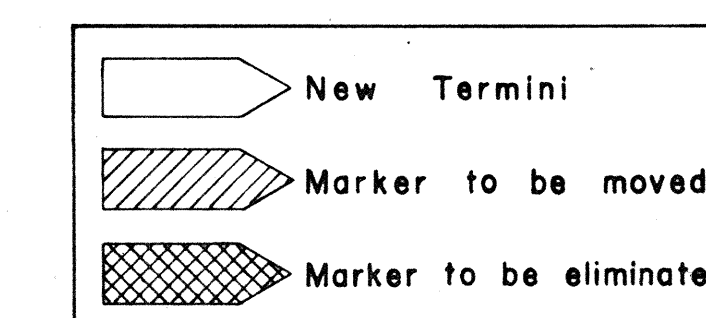
NOTE: Reflector Units for RM-1, 2, 3 shall be 4" x 5" in size and shall consist of reflective sheeting encapsulated in acrylic plastic.



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



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



APPROVED: \_\_\_\_\_ DATE: 1/22/64  
DIRECTOR OF TRANSPORTATION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
STANDARD DETAILS  
F.A. MARKER  
AND  
MISCELLANEOUS SIGN  
DETAILS  
Scale: As Shown

SHEET No. OF SHEETS