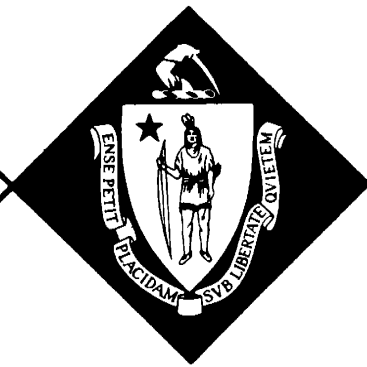


COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF PUBLIC WORKS

CONSTRUCTION MANUAL

PART 3



CONSTRUCTION STANDARDS

MAY 1966

DANIEL S. HORGAN
Chief Engineer

1st Printing

FRANCIS W. SARGENT
Commissioner

FOREWORD

This initial printing of the 1966 Edition of "Construction Standards" or more precisely, Department Standards, as defined under Plans in Article One of the Standard Specifications For Highways and Bridges is published in a stapled binding and will be referred to where applicable, thereby eliminating the necessity for having numerous standards detailed on the construction plans. These standards are an integral part of the Project Plans.

All previous issues of Department Standards are superseded by the 1966 Edition but previous issues of Standards which are a part of work currently under contract must be adhered to until said contracts are completed.

Each drawing in these "Construction Standards" is identified with a title, date of approval by the Massachusetts Department of Public Works, and a drawing number, e. g., 101.1.0, 101.2.0, 101.2.1, 205.1.0, etc. The numbering scheme is illustrated and interpreted on the following page.

The Standards have been submitted to the Bureau of Public Roads for review and approval. The approval date, together with the B.P.R. identification will be added to each standard upon receipt of official notification of such approval. A final edition will then be published in looseleaf form to be incorporated, as Part III, in the Construction Manual.

KEY TO NUMBERING SYSTEM

(EXAMPLE) 2 0 1 . 1 . 0

SECTION NUMBER (1,2,3,4 OR 5) _____
(100, 200, 300, 400 OR 500 SERIES)

SECTION 1 -- HIGHWAY DESIGN AND PAVEMENT DETAILS
(100 SERIES)

SECTION 2 -- DRAINAGE - - - - -
(200 SERIES)

SECTION 3 -- CEMENT CONCRETE; MASONRY STANDARDS
(300 SERIES)

SECTION 4 -- HIGHWAY GUARD AND FENCES
(400 SERIES)

SECTION 5 -- MISCELLANEOUS
(500 SERIES)

CATEGORY IN SERIES: 01 FOR MANHOLES _____
02 FOR CATCH BASINS]
04 FOR DROP INLETS, ETC.]

PLATE NUMBER IN EACH CATEGORY _____

AUXILIARY PLATE NUMBER: A NUMBER OTHER THAN ZERO
WILL APPEAR IN THIS POSITION WHEN IT IS SUBSEQUENT-
LY NECESSARY TO INSERT ONE OR MORE ADDITIONAL DRAW-
INGS BETWEEN TWO EXISTING PLATE NUMBERS IN THE SAME
CATEGORY.

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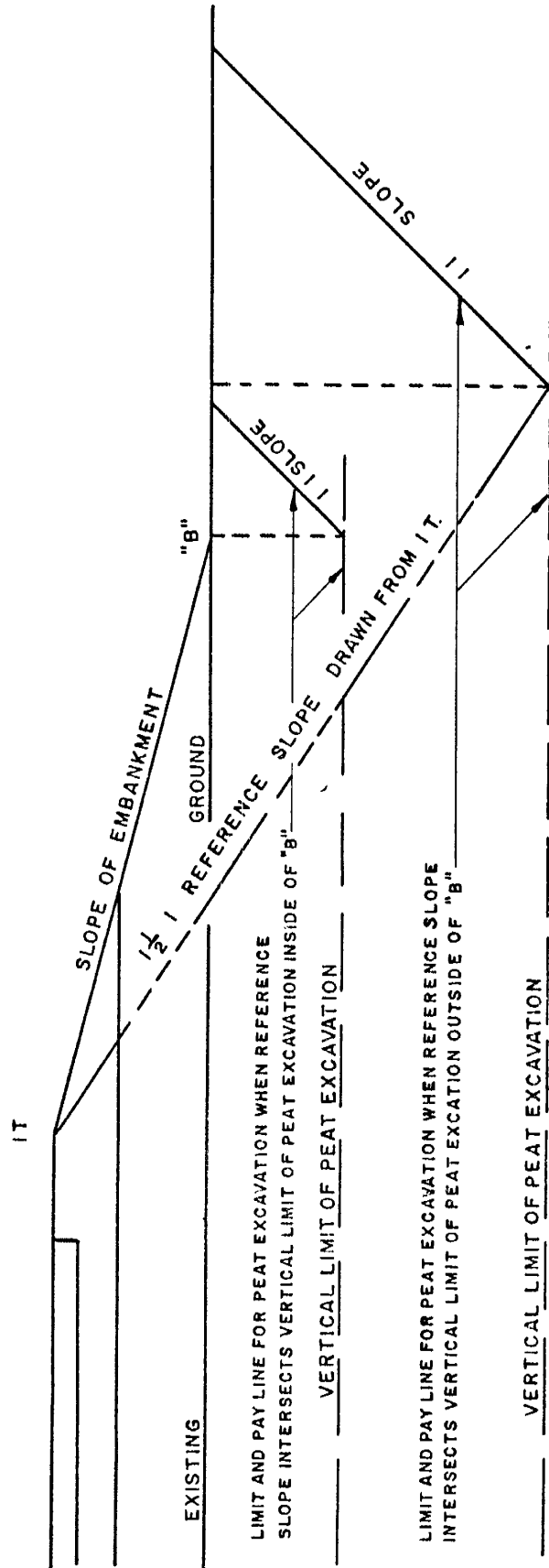
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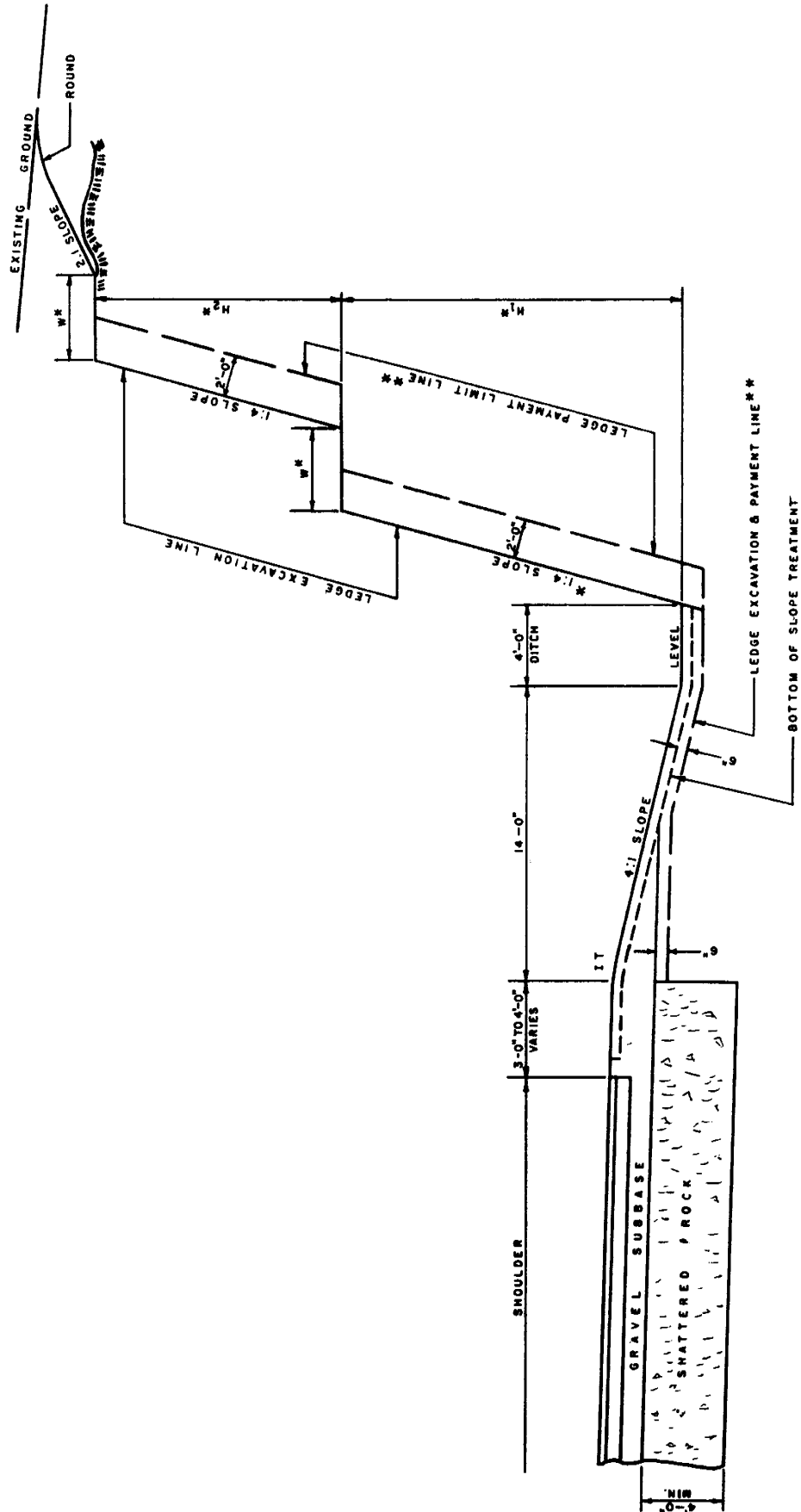
LIMIT OF PEAT EXCAVATION



NOTES

- 1 "B" — INTERSECTION OF EXISTING GROUND AND SLOPE OF EMBANKMENT
- 2 THE ABOVE METHOD MAY ALSO BE USED TO DETERMINE THE LIMIT FOR EXCAVATION OF OTHER UNSUITABLE MATERIALS

LEDGE EXCAVATION



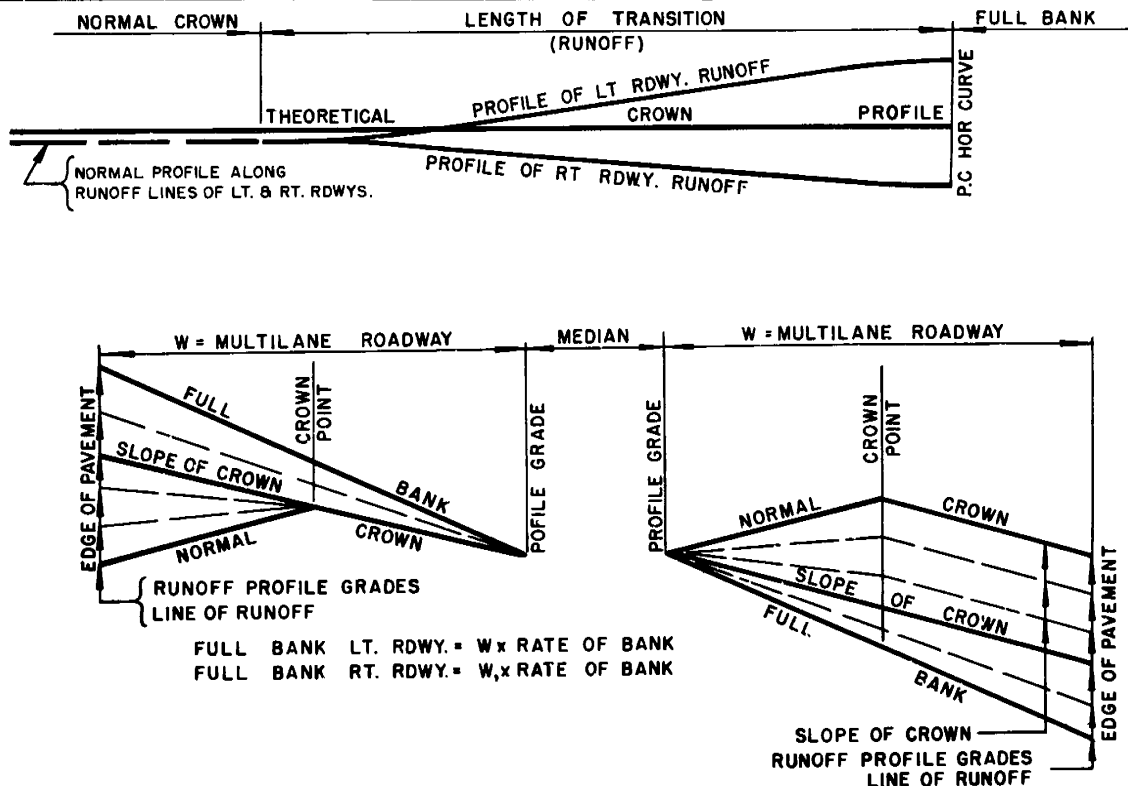
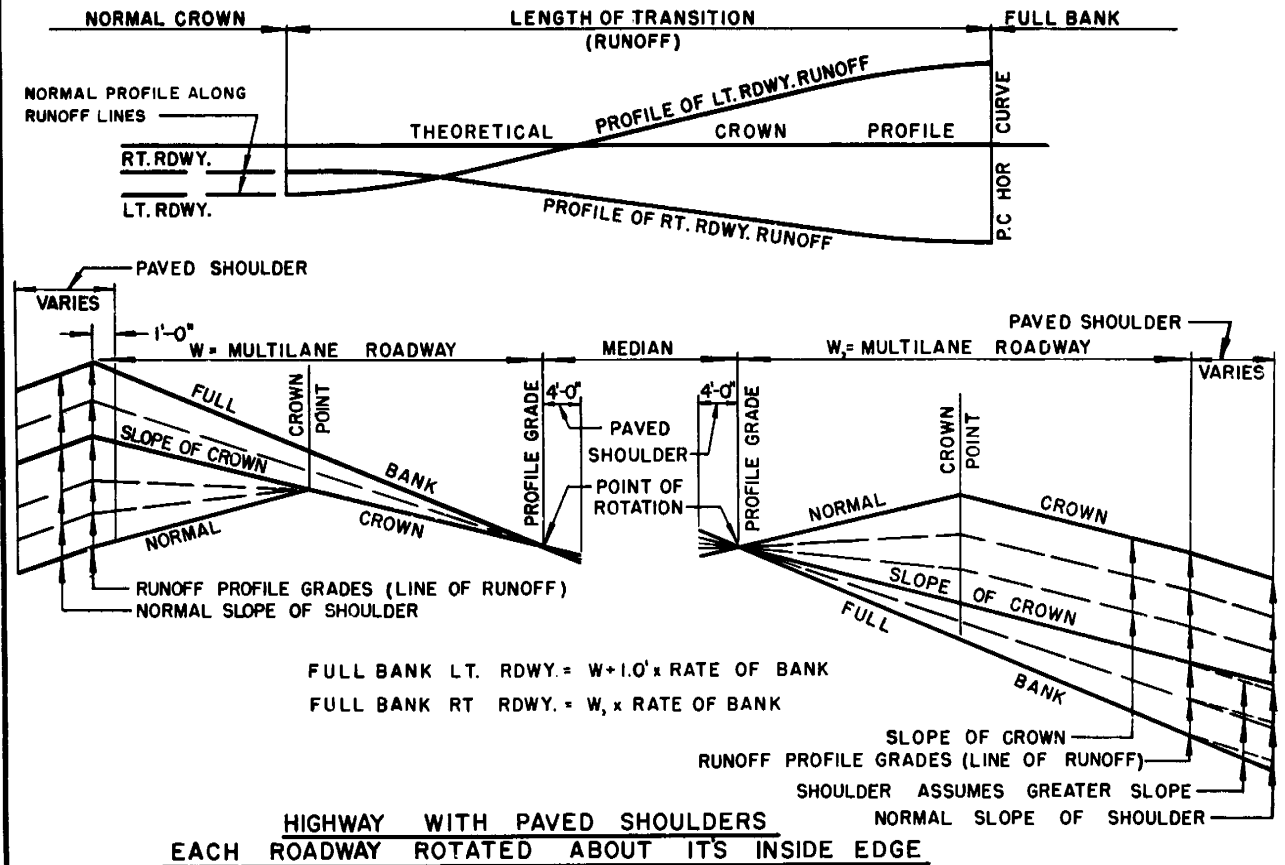
* THESE DIMENSIONS AND SLOPES ARE SUBJECT TO VERIFICATION AND/OR CHANGE BY THE RESEARCH AND MATERIALS SECTION OF THE DEPARTMENT

** ONLY LEDGE ACTUALLY REMOVED IS PAYABLE NO PAYMENT WILL BE MADE BEYOND THE LEDGE PAYMENT LINE

NOTES
THE TRANSVERSE LIMITS OF THE SHATTERED ROCK AREAS ARE TO BE AT THE IT POINTS
FOR EXCEPTIONS SEE 106 4 0 & 108 2 0

METHODS OF BANKING

DIVIDED HIGHWAY



RATE OF SUPERELEVATION (e) FOR ALL TYPES OF HIGHWAYS
AND
MINIMUM LENGTH OF RUNOFF (L) FOR UNDIVIDED HIGHWAYS
e max = 0.06

D	R	V = 30				V = 40				V = 50				V = 60				V = 70			
		"e" ft/ft	L (feet)		"e" ft/ft	L (feet)		"e" ft/ft	L (feet)		"e" ft/ft	L (feet)		"e" ft/ft	L (feet)		"e" ft/ft	L (feet)			
			2-Lane	4-Lane		2-Lane	4-Lane		2-Lane	4-Lane		2-Lane	4-Lane		2-Lane	4-Lane		2-Lane	4-Lane	2-Lane	4-Lane
0° 15'	22918'	NC	0	0	NC	NC	0	0	NC	NC	0	0	NC	NC	0	0	NC	NC	0	0	
0° 30'	11459'	NC	0	0	NC	NC	0	0	NC	NC	0	0	NC	NC	0	0	NC	NC	0	0	
0° 45'	7639'	NC	0	0	NC	NC	0	0	NC	NC	0	0	NC	NC	0	0	NC	NC	0	0	
1° 00'	5730'	NC	0	0	NC	NC	0	0	NC	NC	0	0	NC	NC	0	0	NC	NC	0	0	
1° 30'	3820'	NC	0	0	NC	NC	0	0	NC	NC	0	0	NC	NC	0	0	NC	NC	0	0	
2° 00'	2865'	NC	0	0	NC	NC	0	0	NC	NC	0	0	NC	NC	0	0	NC	NC	0	0	
2° 30'	2292'	NC	0	0	NC	NC	0	0	NC	NC	0	0	NC	NC	0	0	NC	NC	0	0	
3° 00'	1910'	0.22	100	100	0.32	0.32	125	125	0.42	0.42	150	150	0.53	0.53	175	175	0.60	0.60	200	200	
3° 30'	1637'	0.25	100	100	0.36	0.36	125	125	0.46	0.46	150	150	0.56	0.56	175	175	0.60	0.60	200	200	
4° 00'	1432'	0.27	100	100	0.39	0.39	125	125	0.50	0.50	150	150	0.59	0.59	175	175	0.60	0.60	200	200	
5° 00'	1146'	0.32	100	100	0.45	0.45	125	125	0.56	0.56	150	150	0.60	0.60	175	175	0.60	0.60	200	200	
6° 00'	955'	0.36	100	100	0.49	0.49	125	125	0.59	0.59	150	150	0.60	0.60	175	175	0.60	0.60	200	200	
7° 00'	819'	0.40	100	110	0.53	0.53	125	170	0.60	0.60	150	220	D max. = 4.6°		D max. = 3.3°						
8° 00'	716'	0.43	100	120	0.56	0.56	125	180													
9° 00'	637'	0.45	100	120	0.58	0.58	125	180													
10° 00'	573'	0.48	100	130	0.59	0.59	125	190													
11° 00'	521'	0.50	100	130	0.60	0.60	130	190													
12° 00'	477'	0.52	100	140	0.60	0.60	130	190													
13° 00'	441'	0.53	100	140	0.60	0.60	130	190													

D = Degree of Curve
R = Radius of Curve
NC = Normal Crown Section

D = Degree of Curve
R = Radius of Curve
NC = Normal Crown Section

LENGTH OF RUNOFF FOR DIVIDED HIGHWAYS

$$L = \frac{We}{P}$$

L = Length of Runoff (in feet), Minimum L = 200'

W = Width of Banked Section

e = Rate of Superelevation (from table above)

P = Slope Ratio of Runoff Profile Relative to the Normal Profile

V = Design Speed (mph)

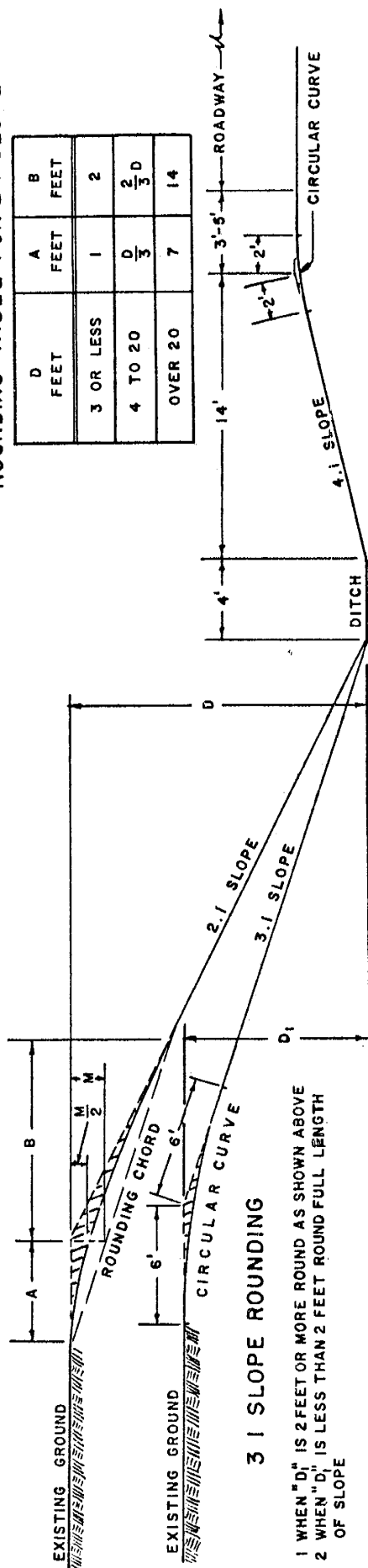
"P" VALUES TO BE USED IN THE FORMULA

Design Speed M.P.H.	30	40	50	60	70
P	1 150	1 175	1 200	1 225	1 250

METHOD OF ROUNDING CUT SLOPES

ROUNDING TABLE FOR 2:1 SLOPE

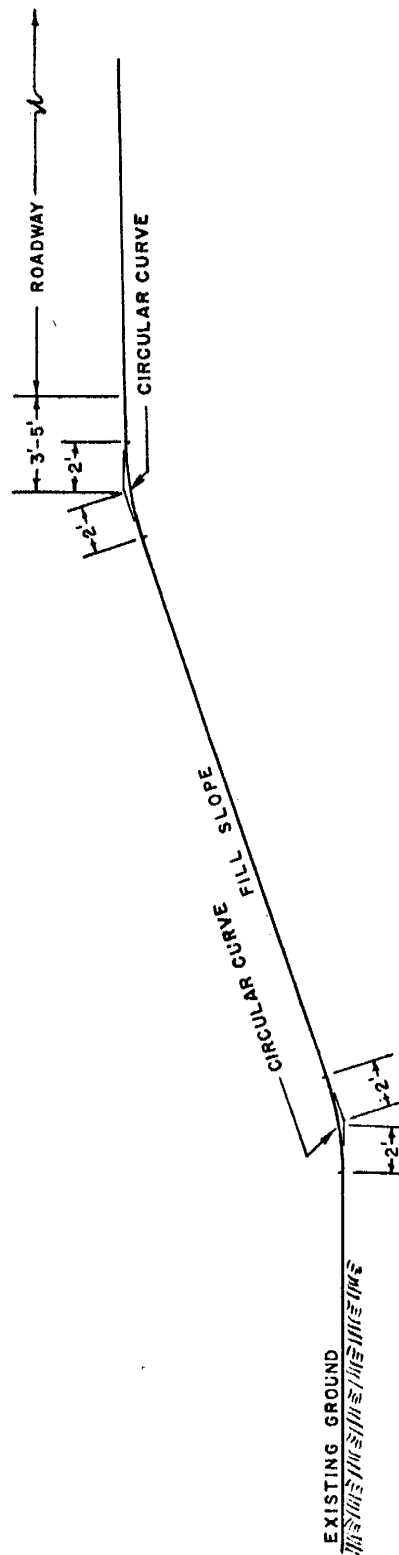
D FEET	A FEET	B FEET
3 OR LESS	1	2
4 TO 20	$\frac{D}{3}$	$\frac{2}{3}D$
OVER 20	7	14



3:1 SLOPE ROUNDING

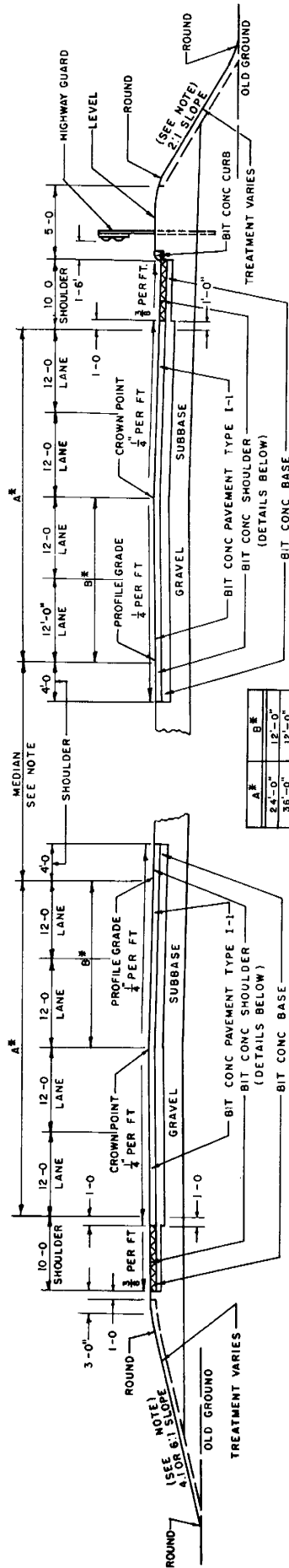
- 1 WHEN "D1" IS 2 FEET OR MORE ROUND AS SHOWN ABOVE
- 2 WHEN "D1" IS LESS THAN 2 FEET ROUND FULL LENGTH OF SLOPE

METHOD OF ROUNDING FILL SLOPES



NOTE THE DIMENSIONS SHOWN FOR ROUNDING CUT AND FILL SLOPES ARE APPROXIMATE; THEY ARE TO BE USED AS GUIDES

NORMAL TYPICAL SECTIONS FOR DIVIDED HIGHWAY FLEXIBLE PAVEMENT

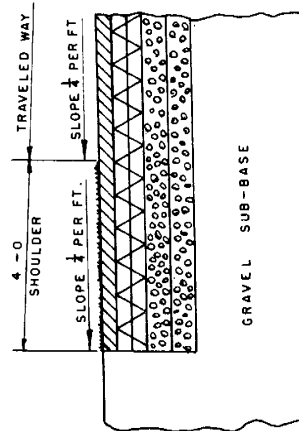


A	B
24'-0"	12'-0"
36'-0"	12'-0"
48'-0"	24'-0"

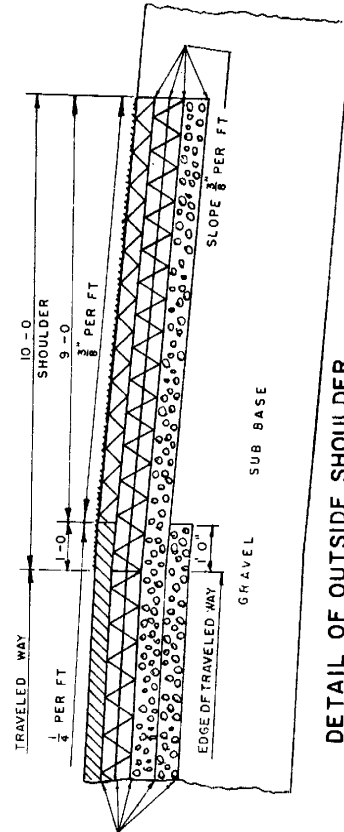
A - WIDTH OF TRAVELED WAY
B - DISTANCE OF CROWN POINT FROM INSIDE
EDGE OF TRAVELED WAY

LEGEND

- BITUMINOUS CONCRETE TOP COURSE MATERIAL
- BITUMINOUS CONCRETE TOP COURSE MATERIAL WITH PEASTONE COVER
- BITUMINOUS CONCRETE BINDER COURSE MATERIAL WITH PEASTONE COVER
- BITUMINOUS CONCRETE BINDER COURSE MATERIAL
- BITUMINOUS CONCRETE BASE COURSE MATERIAL (BLACK BASE)



DETAIL OF INSIDE SHOULDER



DETAIL OF OUTSIDE SHOULDER

- NOTES
- 1 THE THICKNESS OF EACH PAVEMENT ELEMENT (SURFACE BASE SUB-BASE) AND THE NUMBER OF LAYERS ARE TO BE DETERMINED FOR EACH PROJECT
 - 2 WHEN THE DEPTH OF FILL IS 5 FEET OR LESS A 6:1 EMBANKMENT SLOPE IS TO BE USED WHEN THE DEPTH OF FILL IS MORE THAN 5 FEET AND NOT MORE THAN 15 FEET
 - 3 A 4:1 EMBANKMENT SLOPE IS TO BE USED WHEN THE DEPTH OF FILL IS MORE THAN 15 FEET A 2:1 EMBANKMENT SLOPE IS TO BE USED THE EMBANKMENT SLOPES NOTED ABOVE ARE NORMALLY USED, THIS CRITERIA IS SUBJECT TO CHANGE IN ORDER TO SATISFY CERTAIN SAFETY CONDITIONS SOILS CONDITIONS ETC
 - 3 A 3:1 BACKSLOPE IN A CUT SECTION IS TO BE CONSIDERED ON THE CUT SECTIONS OF A BORROW PROJECT IF THE EXCAVATED MATERIAL IS SUITABLE FOR EMBANKMENT
 - 4 SLOPE ROUNDING DETAILS ARE SHOWN ON 104 10
 - 5 VARIOUS MEDIAN WIDTHS ARE SHOWN ON 106 10 106 20 106 30
 - 6 THE METHOD OF SETTING CURB IS SHOWN ON 112 10

The diagram illustrates a cross-section of an earth cut. Key features include:

- EDGE OF TRAVELED WAY**: The left boundary of the road.
- SHOULDER**: A section 10'-0" wide, composed of:
 - GRAVEL**: 1'-0" wide, with a 1/4" PER FT. slope.
 - SUBBASE**: 1'-0" wide, with a 3/8" PER FT. slope.
 - BIT. CONC. SHOULDER**: 3'-0" wide.
- BIT. CONC. BASE**: 14'-0" wide.
- BIT. CONC. PAVEMENT**: The top layer of the road.
- DITCH**: 4'-0" wide, located to the right of the road.
- SLOPES**: The cut slopes are 4:1 and * 2:1.
- ROUND**: Two circular features are indicated on the slopes.
- LEVEL**: A horizontal line indicating the ground level.
- TREATMENT VARIES**: A label pointing to the slopes.
- OLD GROUND**: The original ground surface.

(FOR DETAILS SEE 105.1.0)

EDGE OF TRAVELED WAY

12'-0"

ACCEL. OR DECEL. LANE

4'-0"

14'-0"

4'-0"

DITCH

1/4" PER FT.

1/4" PER FT.

LEVEL

ROUND

4:1 SLOPE

OLD GROUND

#2:1 SLOPE

ROUND

GRAVEL

SUBBASE

LEVEL

TREATMENT VARIES

FOR SETTING DETAILS SEE 112.3.0

BIT. CONC. PAVEMENT

BIT. CONC. BASE

EDGE OF TRAVELED WAY

12'-0"

ACCEL. OR DECEL. LANE 1'-6"

5'-0"

HIGHWAY GUARD

LEVEL

⊗ ROUND

⊗ ROUND

#2:1 SLOPE

OLD GROUND

TREATMENT VARIES

FOR SETTING DETAIL SEE 112.3.0

GRAVEL

SUBBASE

BIT. CONC. PAVEMENT

BIT. CONC. BASE

1/4" PER FT.

1/4" PER FT.

Diagram illustrating the cross-section of a road shoulder and subbase. The diagram shows the transition from the traveled way to the shoulder, including the gravel, bit. conc. pavement, bit. conc. base, and subbase layers. The shoulder is sloped at a 4:1 or 6:1 ratio. The diagram also shows the old ground level and the treatment varies.

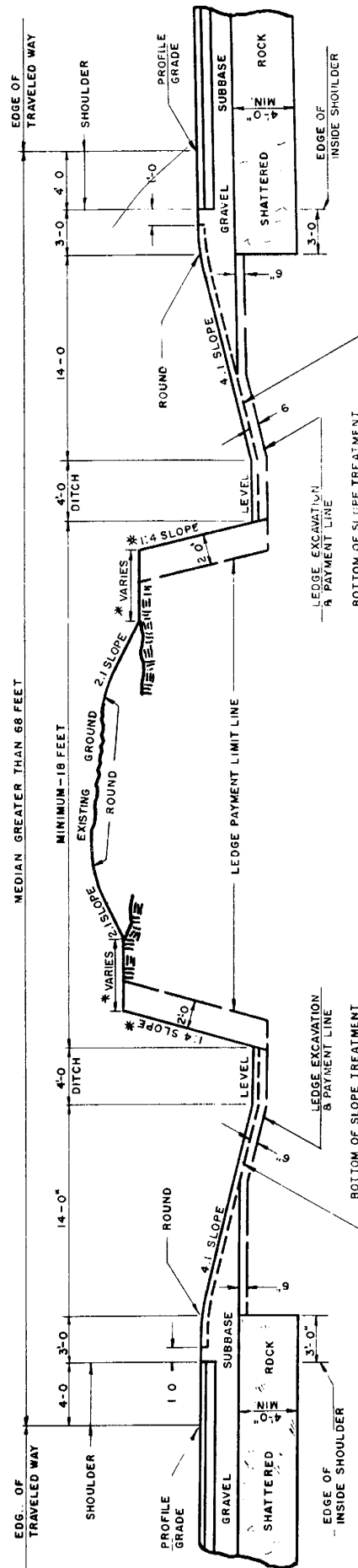
Labels and dimensions in the diagram include:

- EDGE OF TRAVELED WAY
- 12'-0"
- ACCEL. OR DECEL. LANE
- 4'-0"
- FOR SETTING DETAIL SEE 112.3.0
- LEVEL
- ROUND
- 4:1 OR 6:1 SLOPE
- ROUND
- OLD GROUND
- TREATMENT VARIES
- GRAVEL
- SUBBASE
- 1/4" PER FT.
- BIT. CONC. PAVEMENT
- BIT. CONC. BASE

⑦ SLOPE ROUNDING DETAILS ARE SHOWN ON 104.1.0
* SEE NOTES ON 105.1.0

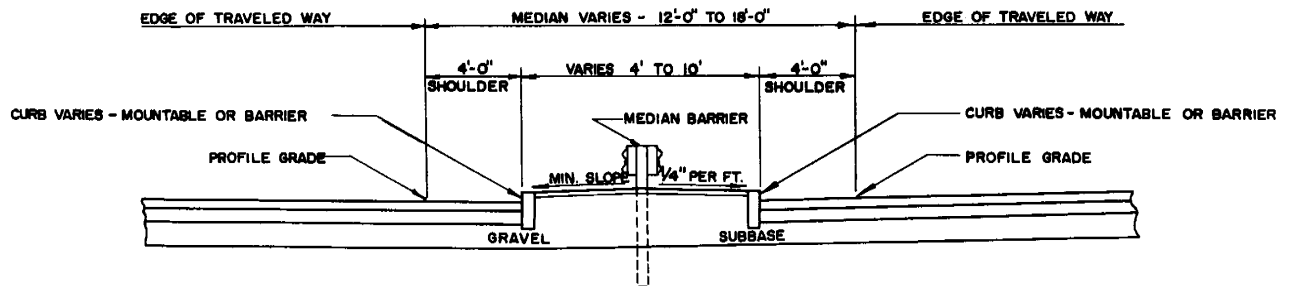
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CUT SECTION AT INTERCHANGE

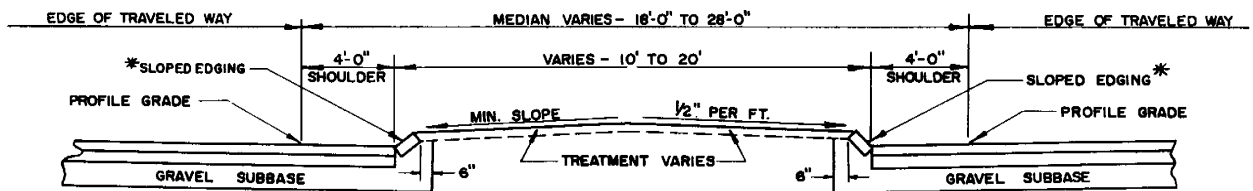


* REFER TO 10210 FOR METHOD OF DETERMINING HEIGHT OF SLOPE WIDTH OF SHELVES NUMBER OF SHELVES AND SLOPES

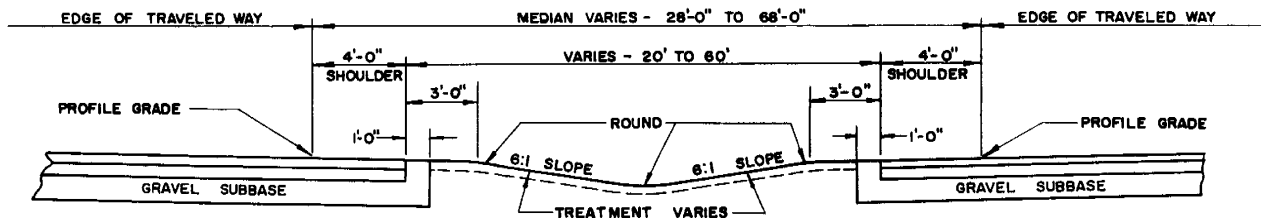
NORMAL TYPICAL SECTIONS OF MEDIANS



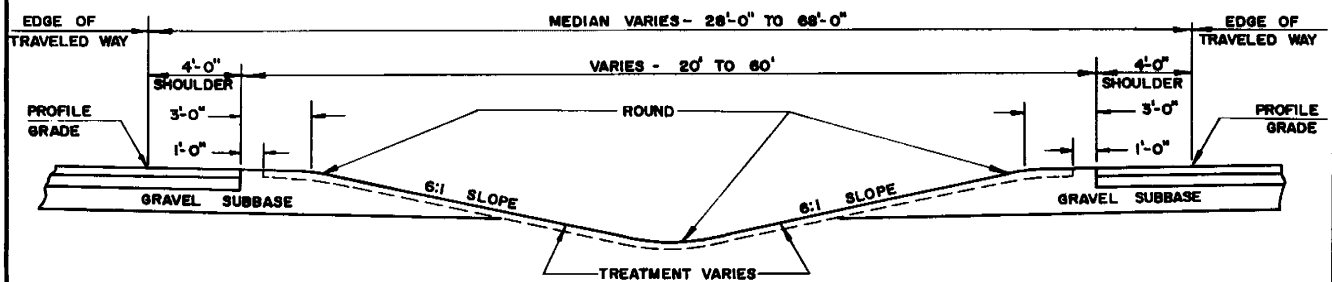
RAISED PAVED MEDIANS



RAISED TURF MEDIANS



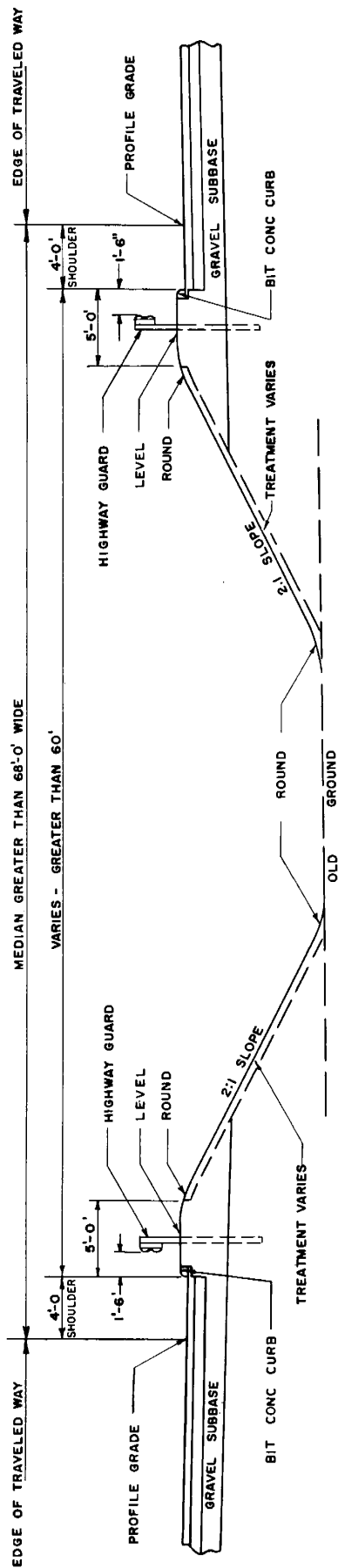
**CUT OR FILL
BOTTOM OF SUBBASE DOES NOT INTERSECT SLOPES**



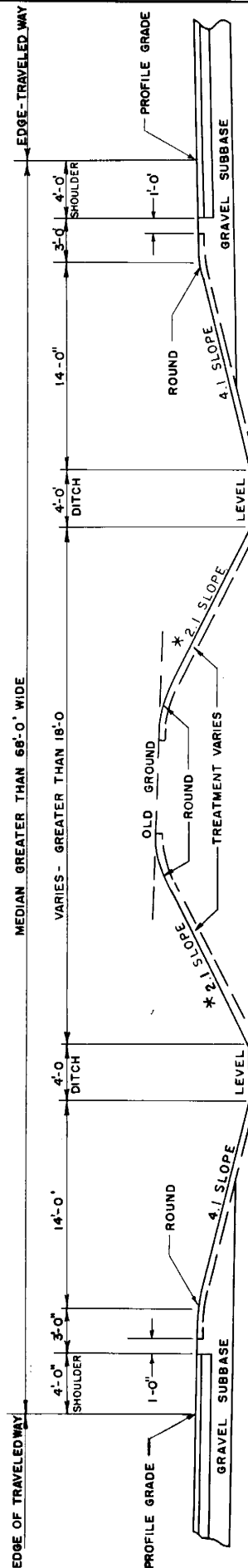
**CUT OR FILL
BOTTOM OF SUBBASE INTERSECTS SLOPES**

* SEE 102.3.0 FOR METHOD OF SETTING
SEE 104.1.0 FOR METHOD OF ROUNDING SLOPES

NORMAL TYPICAL SECTIONS OF MEDIANS



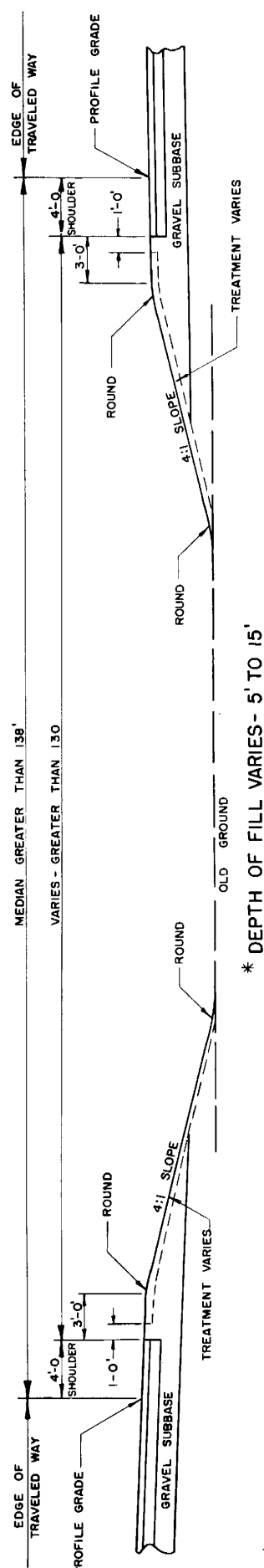
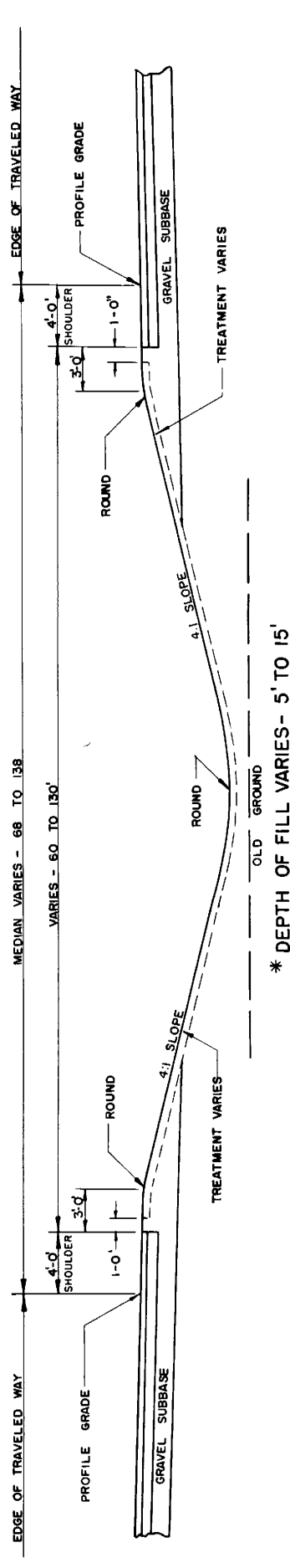
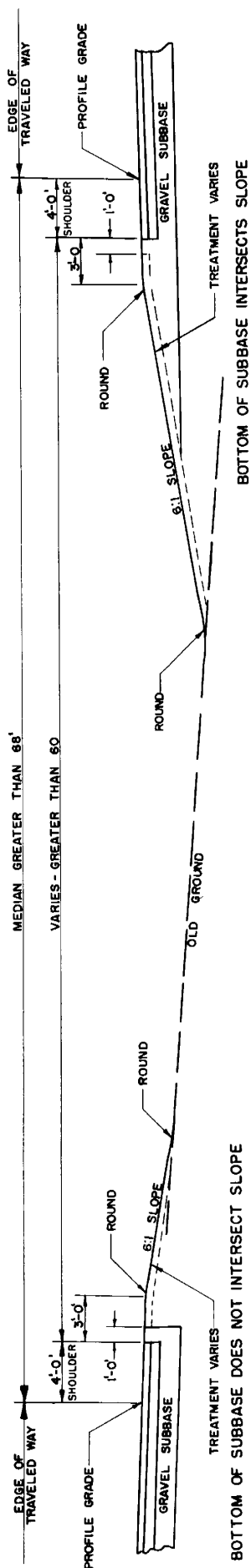
DEPTH OF FILL IS GREATER THAN 15 FEET



CUT SECTION - MEDIAN GREATER THAN 68'-0" WIDE

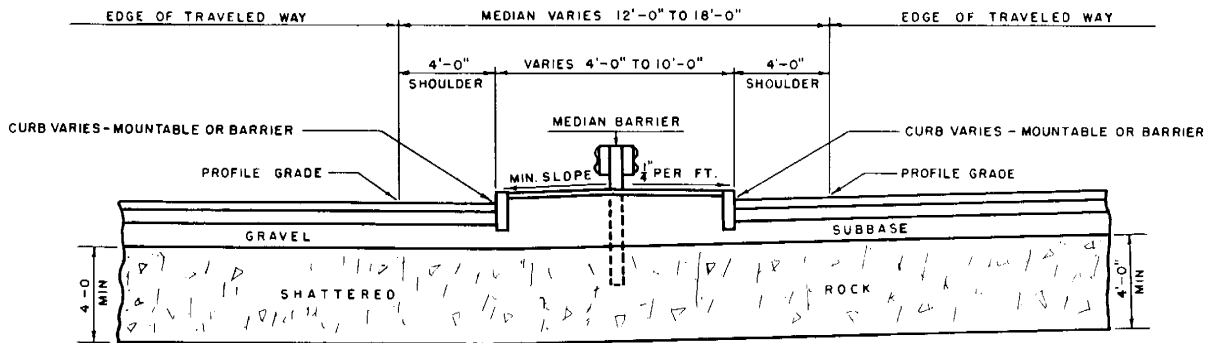
* SEE NOTES ON 105.10
SLOPE ROUNDING DETAILS ARE SHOWN ON 104.10

NORMAL TYPICAL SECTIONS OF MEDIANS

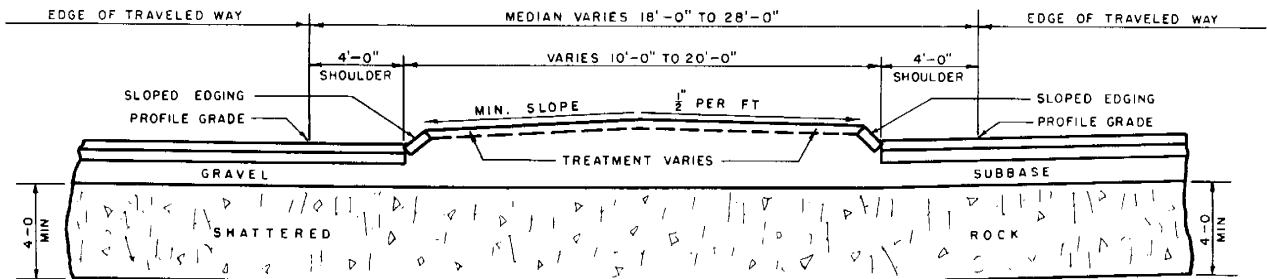


* SEE 106.2.0 WHEN DEPTH OF FILL IS GREATER THAN 15 FEET
METHOD OF ROUNDING SLOPES IS SHOWN ON 104.1.0

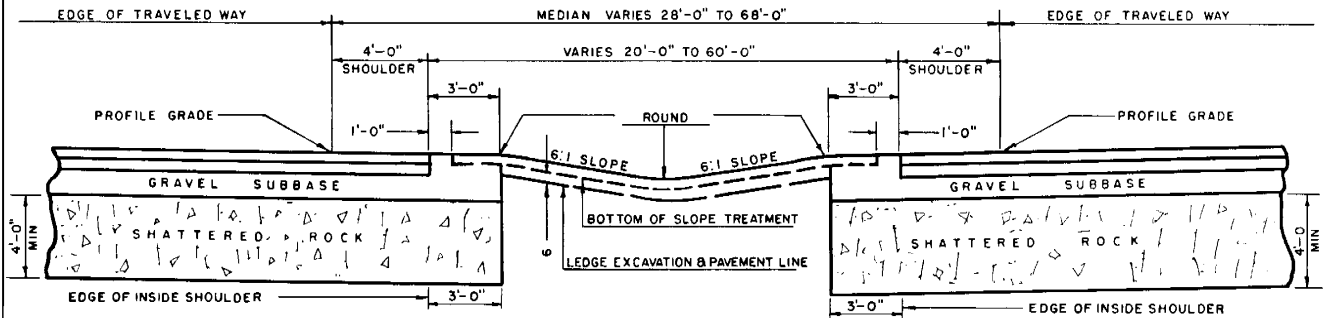
TYPICAL SECTIONS OF MEDIANS IN LEDGE CUT AREAS



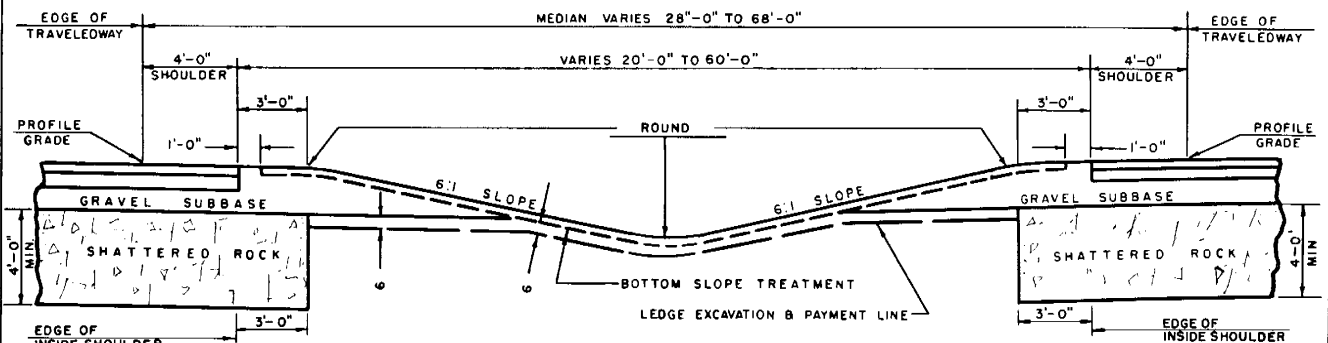
RAISED PAVED MEDIAN



RAISED TURF MEDIAN



BOTTOM OF SUBBASE DOES NOT INTERSECT SLOPE

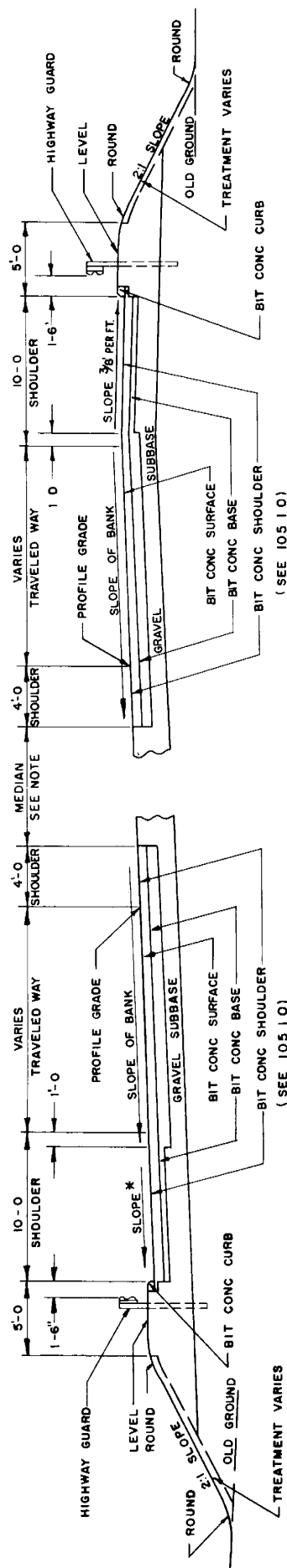


BOTTOM OF SUBBASE INTERSECTS SLOPE

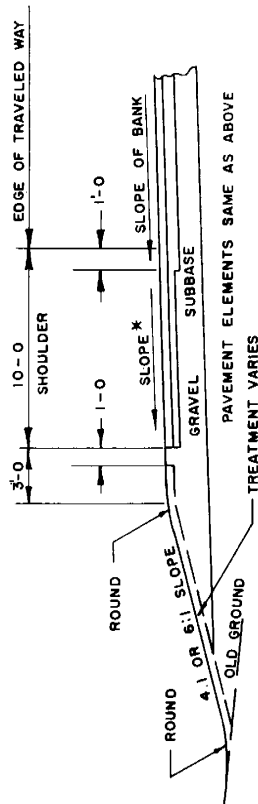
NOTES:

THE TYPICAL SECTION OF MEDIANS IN LEDGE CUT GREATER THAN 68' WIDE IS SHOWN ON 105.3.0
FOR METHODS OF CONSTRUCTION AND BASIS OF PAYMENT REFER TO STANDARD SPECIFICATIONS.

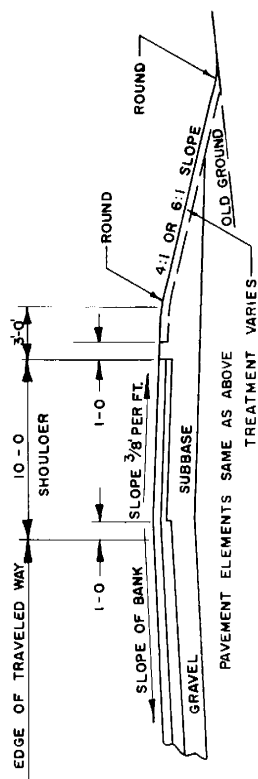
TYPICAL SECTIONS FOR DIVIDED HIGHWAY AT BANKED CURVE FLEXIBLE PAVEMENT



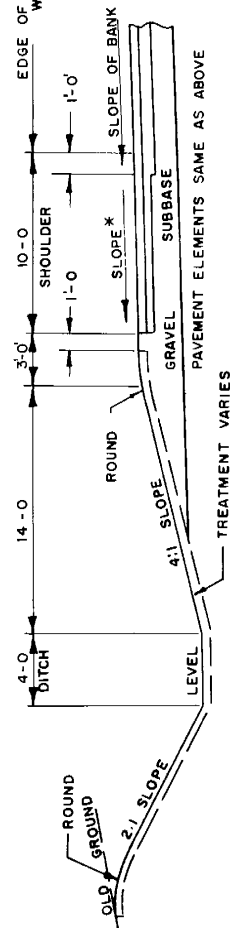
FULL BANK IN FILL SECTION WITH 2:1 SLOPE



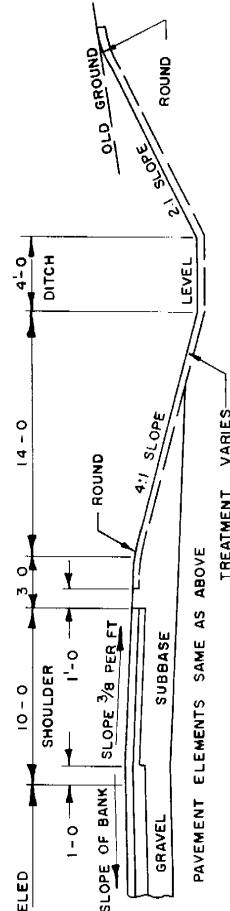
LOW SIDE OF BANKED SECTION IN 4:1 OR 6:1 FILL



HIGH SIDE OF BANKED SECTION IN 4:1 OR 6:1 FILL



LOW SIDE OF BANKED SECTION IN CUT

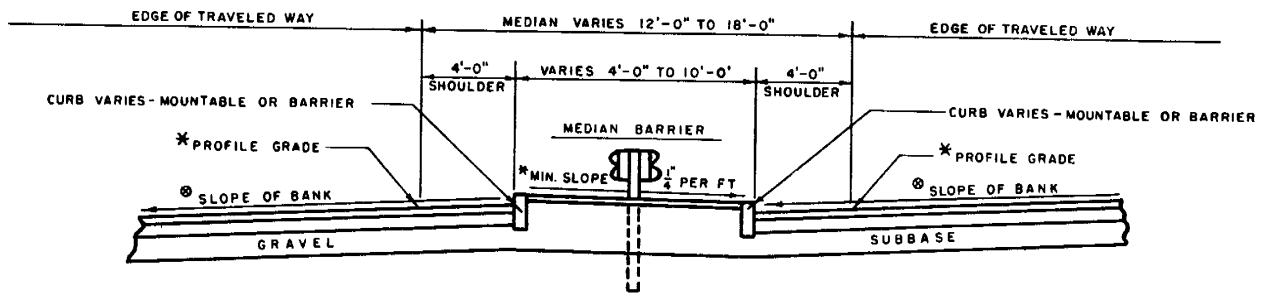


HIGH SIDE OF BANKED SECTION IN CUT

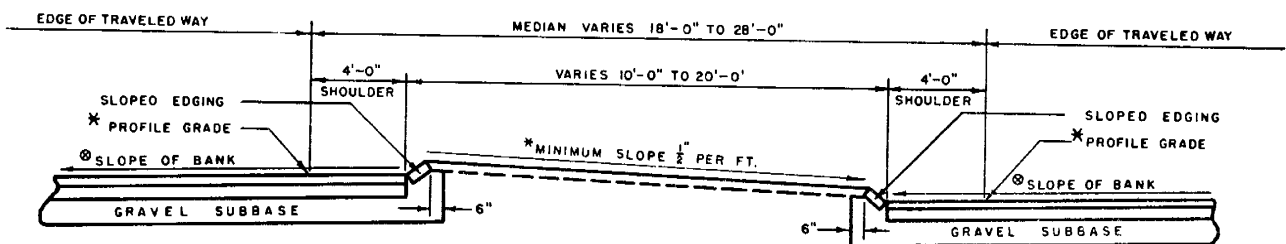
NOTES

- * THE SLOPE OF THE BANK IS EXTENDED ALONG THE SHOULDER IF GREATER THAN THE NORMAL SHOULDER SLOPE. OTHERWISE RETAIN NORMAL SHOULDER SLOPE.
- SEE 105.10 FOR SIDE SLOPE CRITERIA.
- VARIOUS MEDIAN WIDTHS ARE SHOWN ON 108.10, 108.20, 108.30.

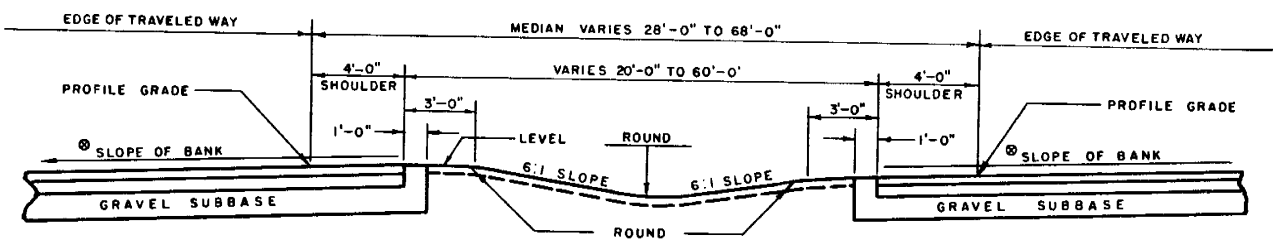
TYPICAL SECTIONS OF MEDIANS AT BANKED CURVES



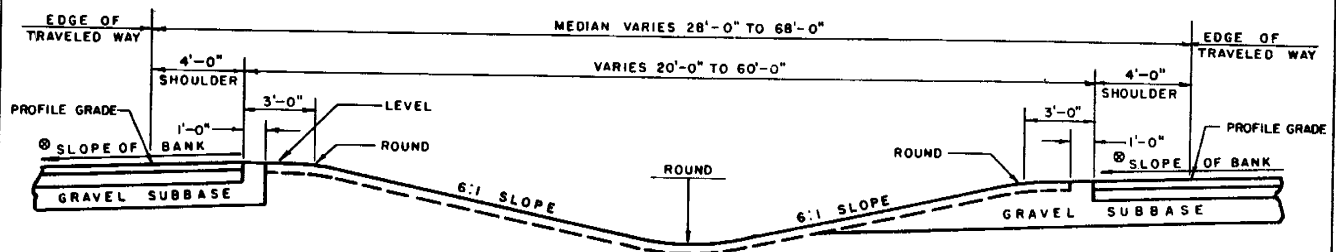
RAISED PAVED MEDIAN



RAISED TURF MEDIAN



BOTTOM OF SUBBASE DOES NOT INTERSECT SLOPE-CUT OR FILL



BOTTOM OF SUBBASE INTERSECTS SLOPE-CUT OR FILL

- * THE PROFILE SHALL BE DESIGNED SO THAT THE DIRECTION OF THE MEDIAN CROSS SLOPE PITCH WILL BE OPPOSITE TO THAT OF THE SUPERELEVATION (BANK)
- ⊗ THE CROSS SLOPE OF THE SHOULDER IS TO BE THE SAME AS THAT OF THE TRAVELED WAY

The diagram illustrates a highway cross-section with the following components and dimensions:

- EDGE OF TRAVELED WAY**: The left boundary of the road.
- SHOULDER**: A 4'-0" wide area adjacent to the traveled way.
- HIGHWAY GUARD LEVEL**: A 5'-0" high barrier.
- ROUND**: The top surface of the guardrail.
- PROFILE GRADE**: The existing ground surface.
- GRAVEL SUBBASE**: The proposed base layer for the shoulder.
- SLOPE OF BANK**: The existing slope of the embankment.
- TREATMENT VARIES**: Indicated for the shoulder and embankment areas.
- 2:1 SLOPE**: The proposed slope for the embankment.
- 3:1 SLOPE**: The proposed slope for the ditch.
- BIT CONC CURB**: A curb at the edge of the traveled way.
- ROUND**: The top surface of the curb.
- OLD GROUND**: The existing ground surface on the right side of the road.

Median Dimensions:

- MEDIAN GREATER THAN 66'-0" WIDE**: The overall width of the median.
- VARIES - GREATER THAN 60**: The width of the gravel subbase area.

EDGE OF TRAVELED WAY

4'-0" SHOULDER

3'-0" DITCH

14'-0" ROUND

4'-0" DITCH

MEDIAN GREATER THAN 66'-0" WIDE

VARIES - GREATER THAN 18"

OLD GROUND

TREATMENT VARIES

* 2:1 SLOPE

* 4:1 SLOPE

LEVEL

4'-0" SHOULDER

3'-0" DITCH

14'-0" ROUND

4'-0" DITCH

EDGE OF TRAVELED WAY

PROFILE GRADE

SLOPE OF GRADE

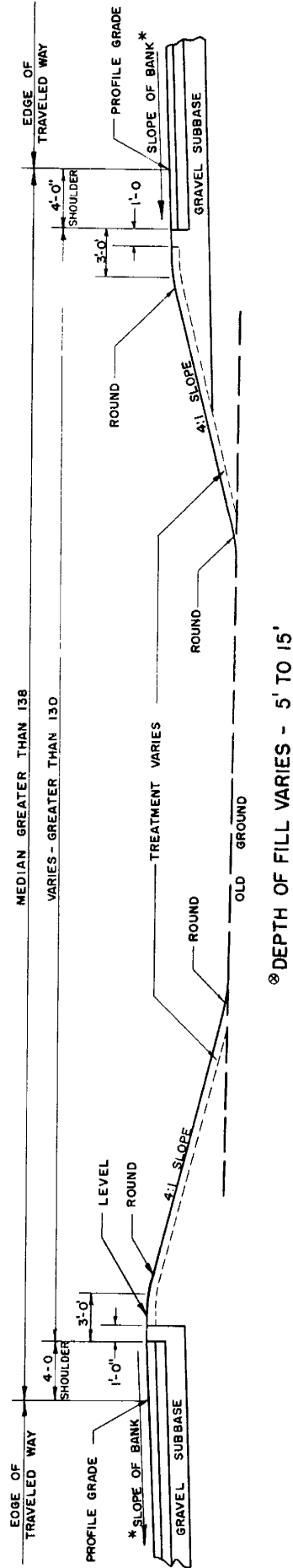
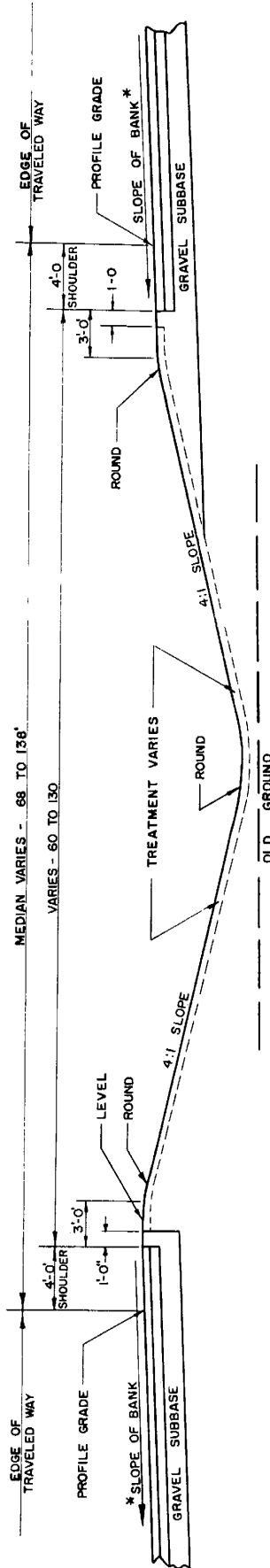
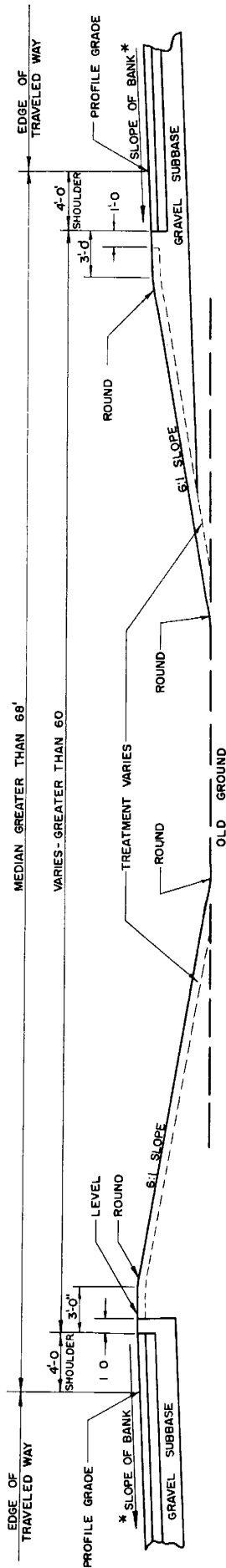
SLOPE OF BANK

GRAVEL SUBBASE

LEVEL

- * SEE NOTE ON 105.10
- THE CROSS SLOPE OF THE SHOULDER IS TO BE THE SAME AS THAT OF THE TRAVELED WAY
- ⊗ CURB IS NOT REQUIRED ON A 2:1 EMBANKMENT SLOPE WHEN THE HIGH SIDE OF A BANKED CURVE IS ON THE MEDIAN SIDE OF THE TRAVELED WAY

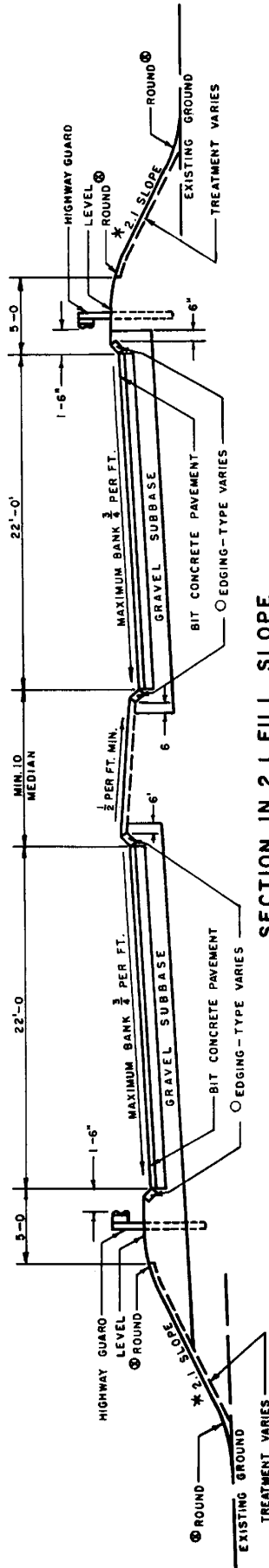
TYPICAL SECTIONS OF MEDIANS AT BANKED CURVES



⊗ SEE 108.2.0 WHEN DEPTH OF FILL IS GREATER THAN 15 FEET

* THE CROSS SLOPE OF THE SHOULDER IS TO BE THE SAME AS THAT OF THE TRAVELED WAY

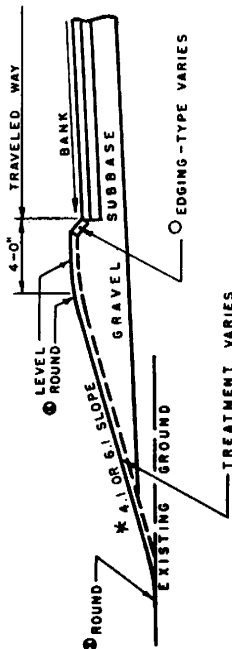
TYPICAL SECTIONS FOR RAMPS



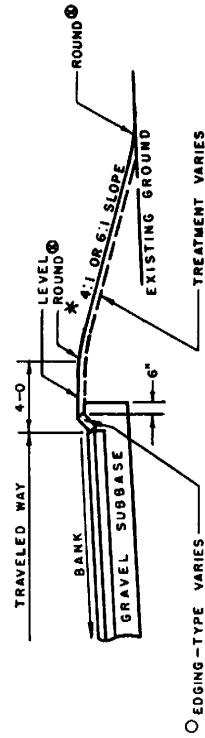
SECTION IN 2:1 FILL SLOPE

NOTES

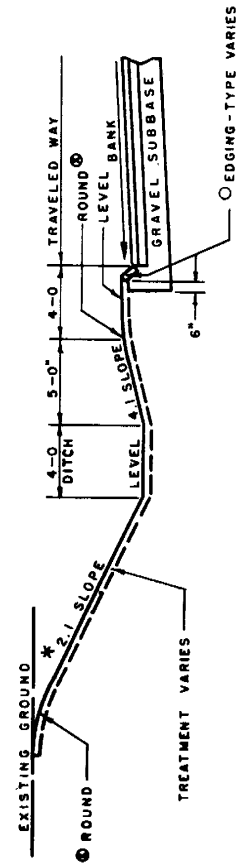
- 1 THE RAMP PAVEMENT STRUCTURES ARE TO BE SIMILAR TO THE MAIN LINE DESIGN UNLESS OTHERWISE NOTED
- 2 PROFILE SHALL BE DESIGNED SO THAT THE DIRECTION OF THE MEDIAN CROSS SLOPE PITCH WILL BE OPPOSITE TO THAT OF THE SUPERELEVATION (BANK)



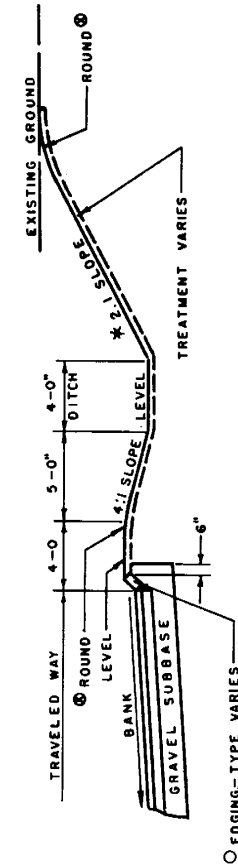
SECTION OF LOW SIDE IN 4:1 OR 6:1 FILL SLOPE



SECTION OF HIGH SIDE IN 4:1 OR 6:1 FILL SLOPE



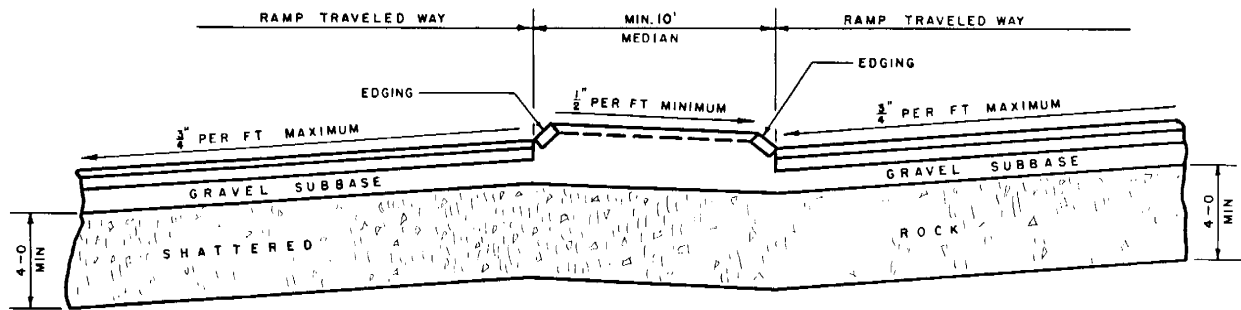
SECTION OF LOW SIDE IN CUT



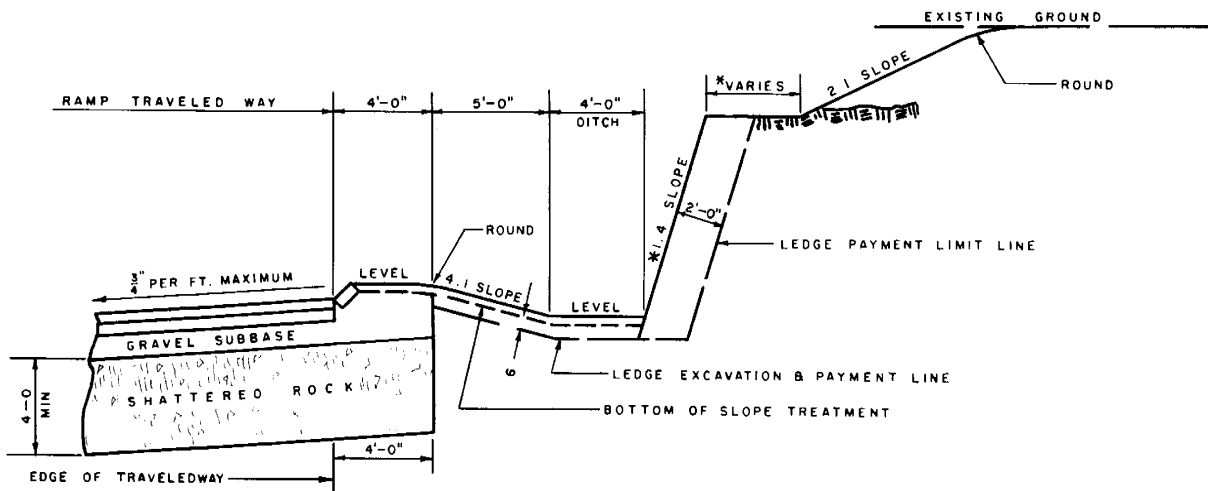
SECTION OF HIGH SIDE IN CUT

- * SEE NOTES ON 105.10 FOR DETAILS
- SEE 112.30 FOR METHODS OF SETTING
- SEE 104.10 FOR METHOD OF ROUNDING

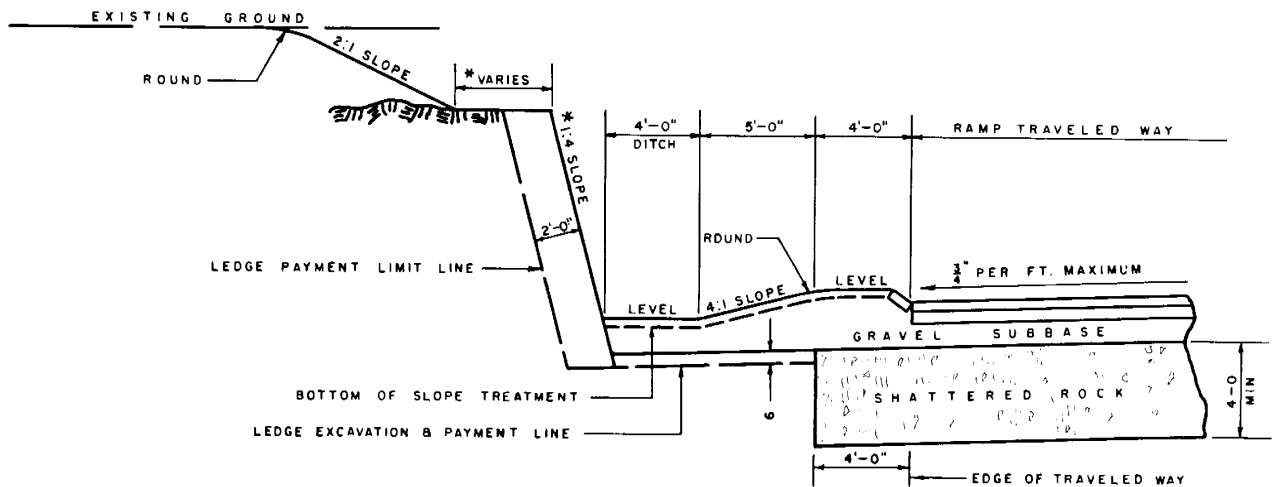
TYPICAL SECTIONS FOR RAMPS IN LEDGE CUT AREAS



RAISED MEDIAN



SECTION OF HIGH SIDE IN CUT

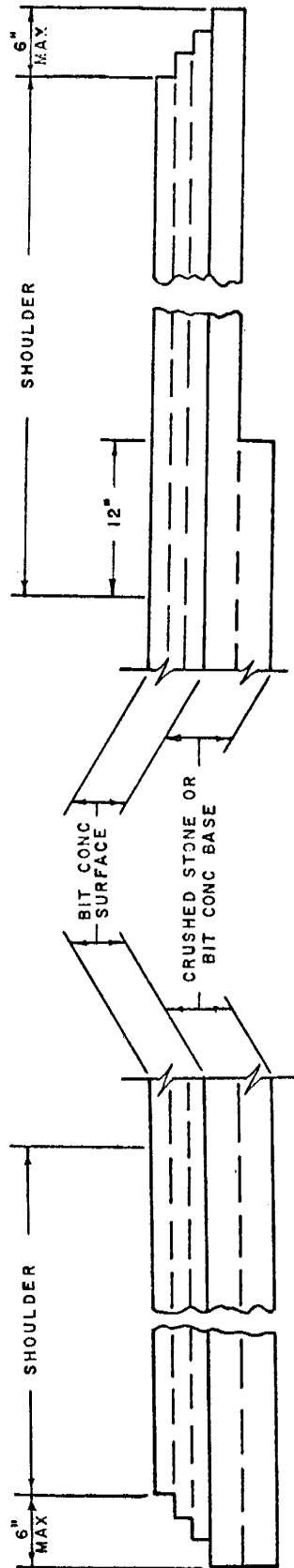


SECTION OF LOW SIDE IN CUT

*REFER TO 102.1.0 FOR METHOD OF DETERMINING HEIGHT OF SLOPE, WIDTH OF SHELVES, NUMBER OF SHELVES AND SLOPES

METHOD OF STEPPING SURFACE LAYERS AND BASE COURSE LAYERS

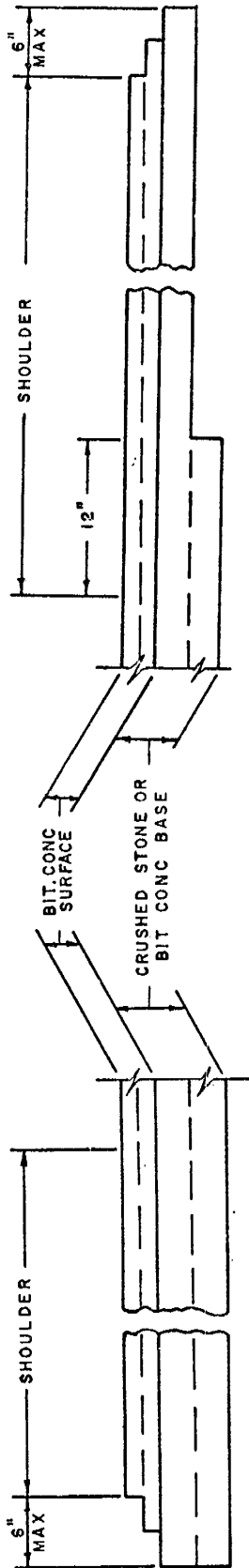
3-LAYERED SURFACE AND 2-LAYERED BASE COURSE



TYPICAL FOR SHOULDER WIDTHS LESS THAN 8 FEET

TYPICAL FOR SHOULDER WIDTHS 8 FEET OR MORE

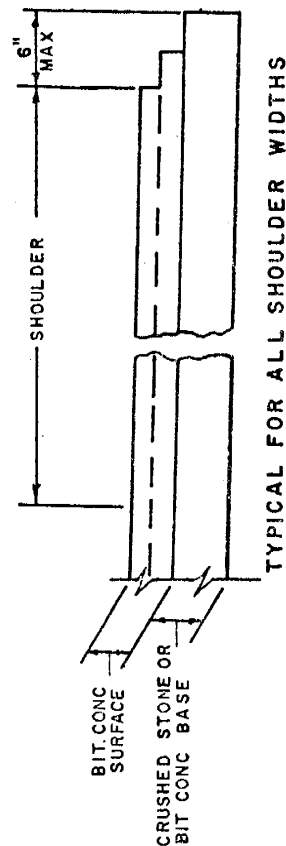
2-LAYERED SURFACE AND 2-LAYERED BASE COURSE



TYPICAL FOR SHOULDER WIDTHS LESS THAN 8 FEET

TYPICAL FOR SHOULDER WIDTHS 8 FEET OR MORE

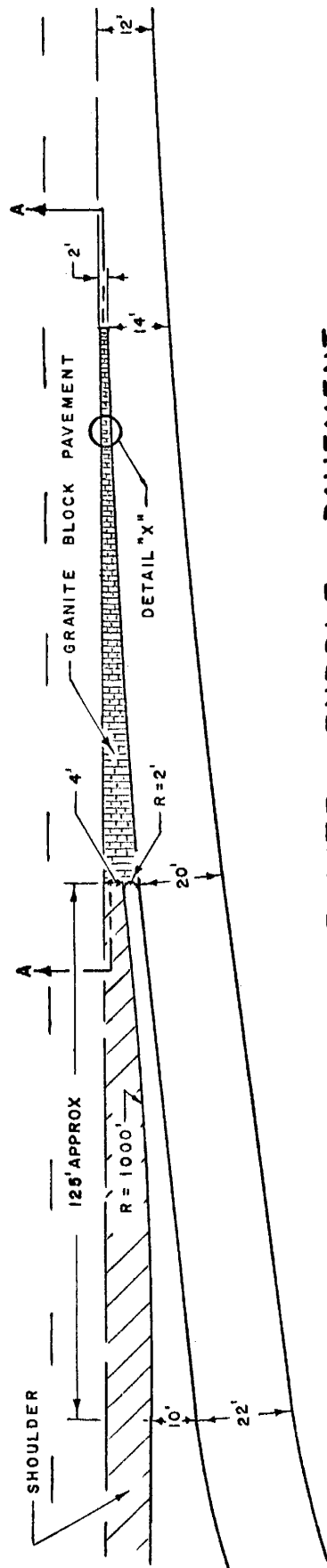
2-LAYERED SURFACE AND 1-LAYER BASE COURSE



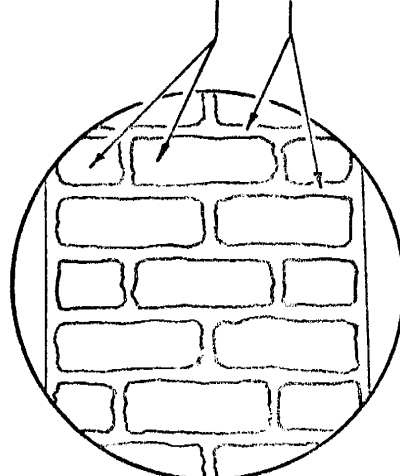
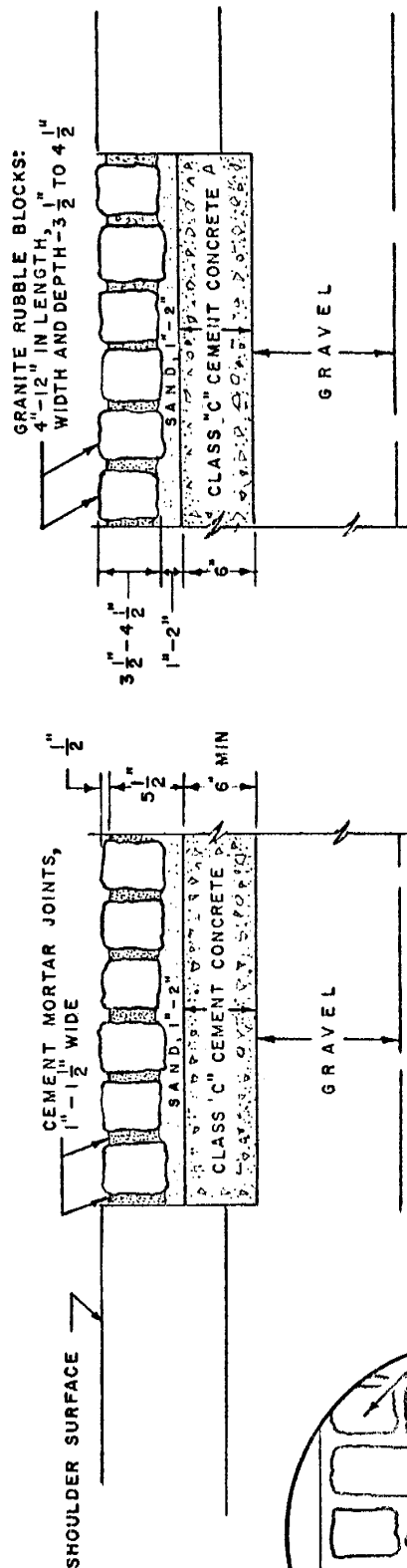
NOTES

- 1 ONLY APPLICABLE STEPPING METHODS OF THIS DRAWING ARE TO BE SHOWN IN THE TYPICAL SECTION OF THE CONSTRUCTION PLANS THIS SHALL BE SHOWN AS A SEPARATE DETAIL AND NOT INCLUDED ON EACH SECTION
- 2 STEPPING SHALL NOT BE SHOWN ON THE CROSS SECTION TEMPLATES
- 3 ADDITIONAL MATERIAL REQUIRED FOR STEPPING SHALL BE INCLUDED IN ESTIMATED QUANTITIES

GRANITE RUBBLE BLOCK PAVEMENT AT RAMPS



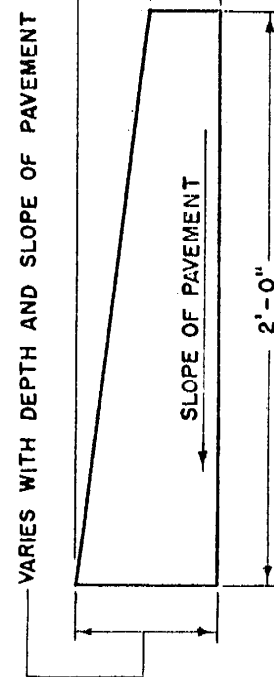
DETAIL OF GRANITE RUBBLE PAVEMENT



- NOTES
- 1 FOR DESCRIPTION, MATERIALS AND CONSTRUCTION METHOD, SEE SPECIFICATIONS
 - 2 LAY BLOCKS TRANSVERSE TO DIRECTION OF TRAVEL

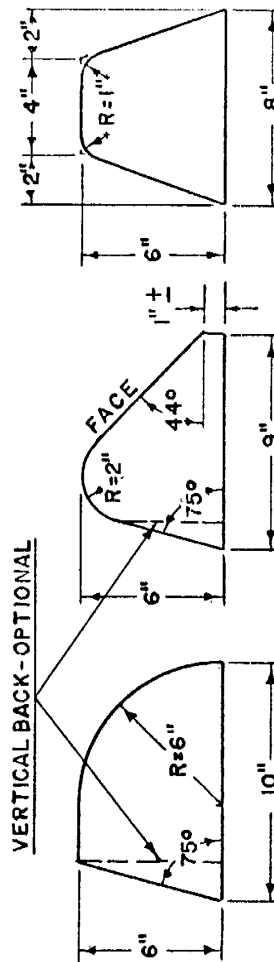
BITUMINOUS CONCRETE BERM, CURBS AND METHODS FOR SETTING

BITUMINOUS CONCRETE BERM



TYPE - A

BITUMINOUS CONCRETE CURBS

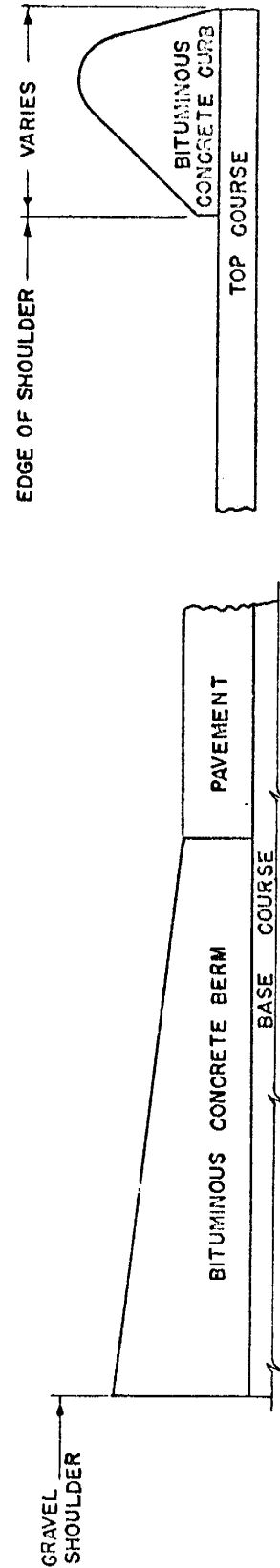


TYPE - 3

TYPE - 2

TYPE - 1

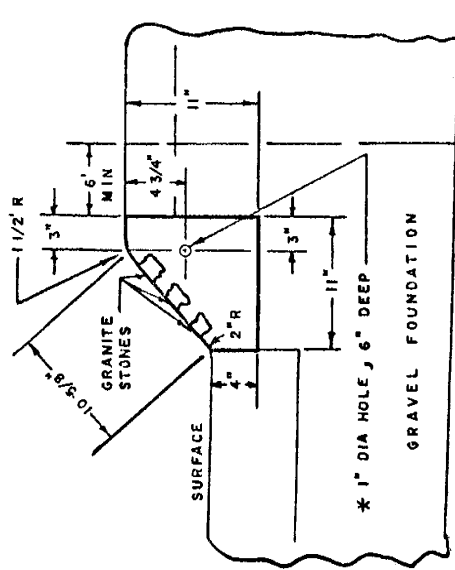
METHODS FOR SETTING BITUMINOUS CONCRETE BERM AND CURBS



TYPICAL FOR TYPE -A BERM

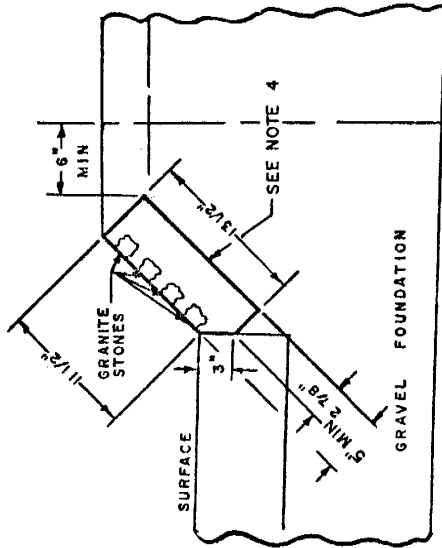
TYPICAL FOR TYPE-1, TYPE -2 & TYPE-3 CURBS

GRANITE FACED PRECAST CONCRETE EDGING

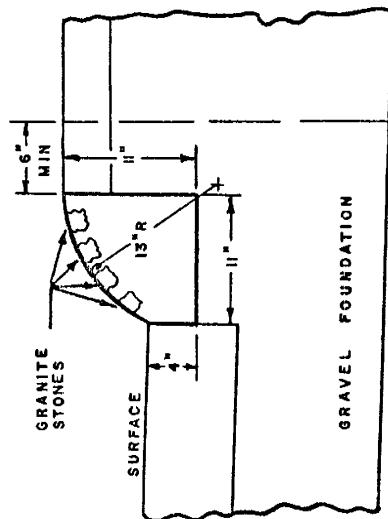


TYPE C

* FOR STEEL DOWELS
3/4" DIA X 11" LONG



TYPE B

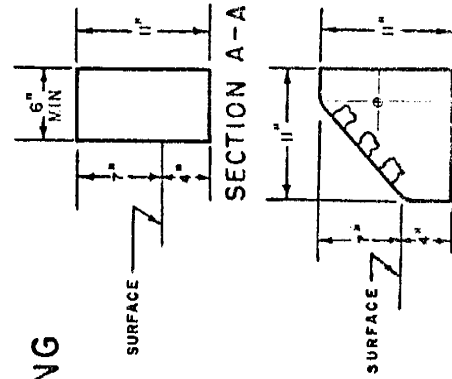


TYPE A

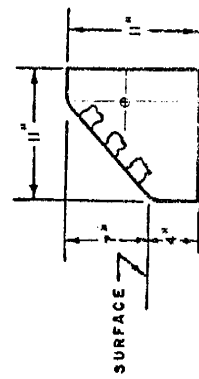
NOTE

- 1 STANDARD SECTION LENGTH, EXCEPT FOR CLOSURES AND CURVES, TO BE 3'
- 2 EDGING TO BE SET AS SHOWN
- 3 FOR DESCRIPTION, MATERIALS AND CONSTRUCTION METHODS, SEE SPECIFICATIONS
- 4 FOR DETAILS OF SETTING, SEE 112 3 0

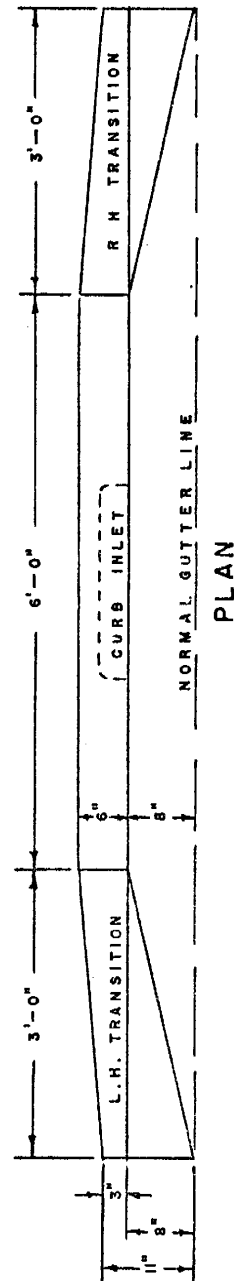
TRANSITION AT CURB INLET FOR TYPE-C EDGING



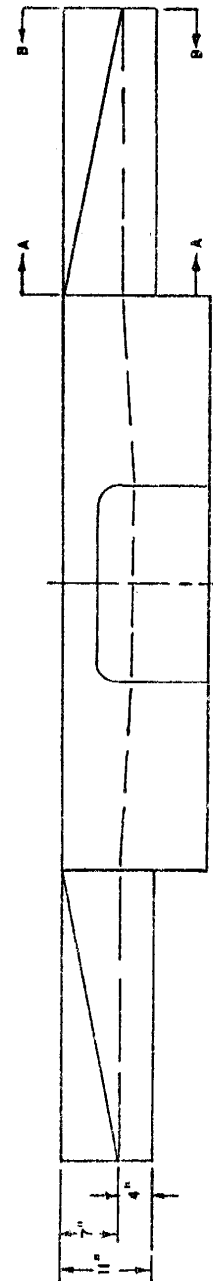
SECTION A-A



SECTION B-B
SEE TYPE C EDGING
FOR DETAILS



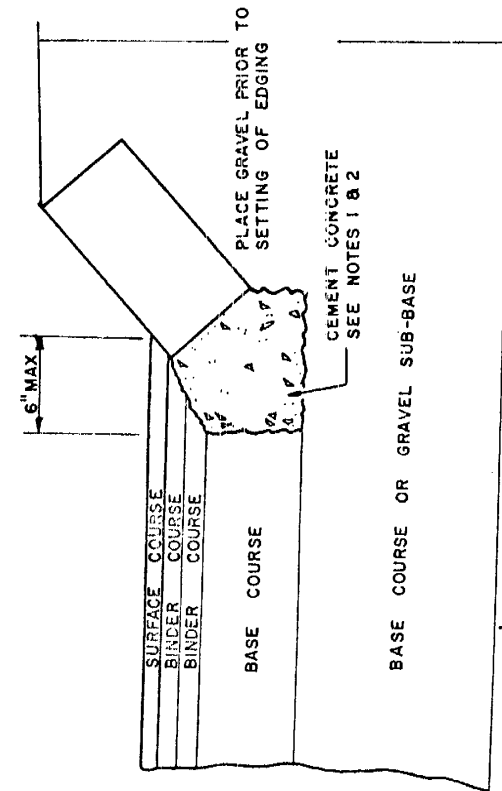
PLAN



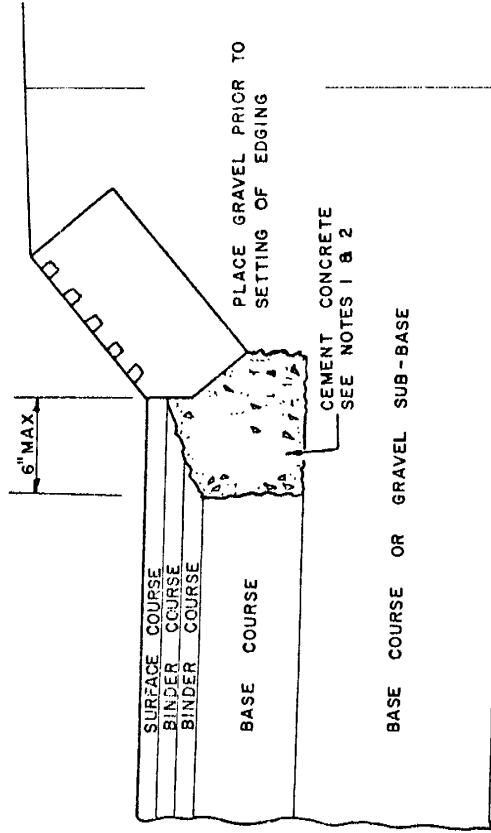
FRONT ELEVATION

ACCEPTABLE METHOD OF SETTING

PRE-CAST CONCRETE EDGING AND GRANITE EDGING



SLOPED GRANITE EDGING



PRE-CAST EDGING

NOTES

- 1 ANY CLASS CEMENT CONCRETE THAT IS ACCEPTABLE TO THE DEPARTMENT UNDER SECTION C-1 OF THE 1965 STANDARD SPECIFICATIONS; ALL TEST REQUIREMENTS ARE WAIVED BITUMINOUS CONCRETE IS NOT TO BE USED AS A SUBSTITUTE
- 2 PAYMENT FOR CEMENT CONCRETE WILL BE INCLUDED IN THE PRICE PER LINEAL FOOT OF PRE-CAST OR GRANITE EDGING
- 3 FOR DETAILS OF PRE-CAST EDGING, SEE 112 2 0

BRICK MANHOLE
FOR PIPES UP TO 30" DIA.

NOTE -

STANDARD M.H. DEPTH 6'-6"

ALL CAST IRON FRAMES & COVERS
SHALL BE MACHINED WHERE TRUE
BEARING SURFACES ARE REQUIRED.

CAST IRON FRAME
AND COVER SEE
STANDARDS.

MIN. WT. OF FRAME	265 LBS.
MIN. WT. OF COVER	200 LBS.

SET FRAME
CASTING IN FULL
MORTAR BED.

WALLS 8" THICK.
EVERY FIFTH
COURSE TO BE
HEADERS.

WHERE DEPTH
OF MANHOLE
IS OVER 9'-0"
THE WALLS
BELOW THAT
DEPTH TO BE
12" THICK.

WROUGHT IRON
OR STEEL
STEPS
STAGGERED.

ARCH OVER INLET
AND OUTLET PIPES
WITH BRICK LAID
AS HEADERS AND
ON EDGE.

OUTSIDE OF
MANHOLE TO BE
PLASTERED WITH $\frac{1}{2}$ "
CEMENT MORTAR.

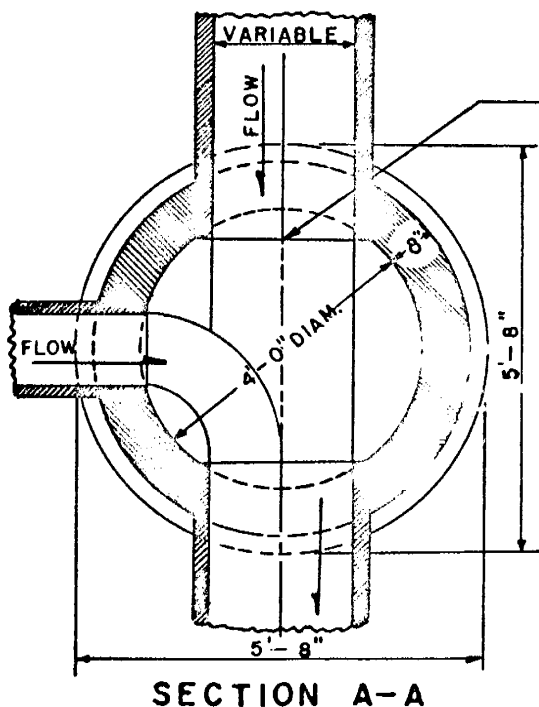
VARIABLE DEPTH

-FLOOR OF INVERT
TO BE HEADERS
LAID FLAT

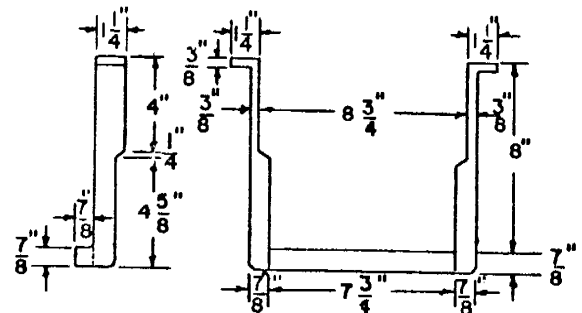
VARIABLE
UP TO 30"
DIA. PIPE

BRICK CHIPS & MORTAR OR GLASS
2" "D" CONCRETE (IF HAND
MIXED SEE SUBSECTION
E 6.25 OF STANDARD SPECIFI-
CATIONS.)

INVERT TO BE INVERTED
ARCH WITH BRICKS LAID
AS STRETCHERS AND ON
EDGE.



FACE OF PIPE FLUSH OR NOT TO PROJECT
MORE THAN 4" FROM FACE OF WALL ALONG
CENTERLINE OF PIPE.



WROUGHT IRON OR STEEL STEPS

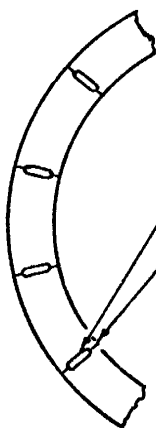
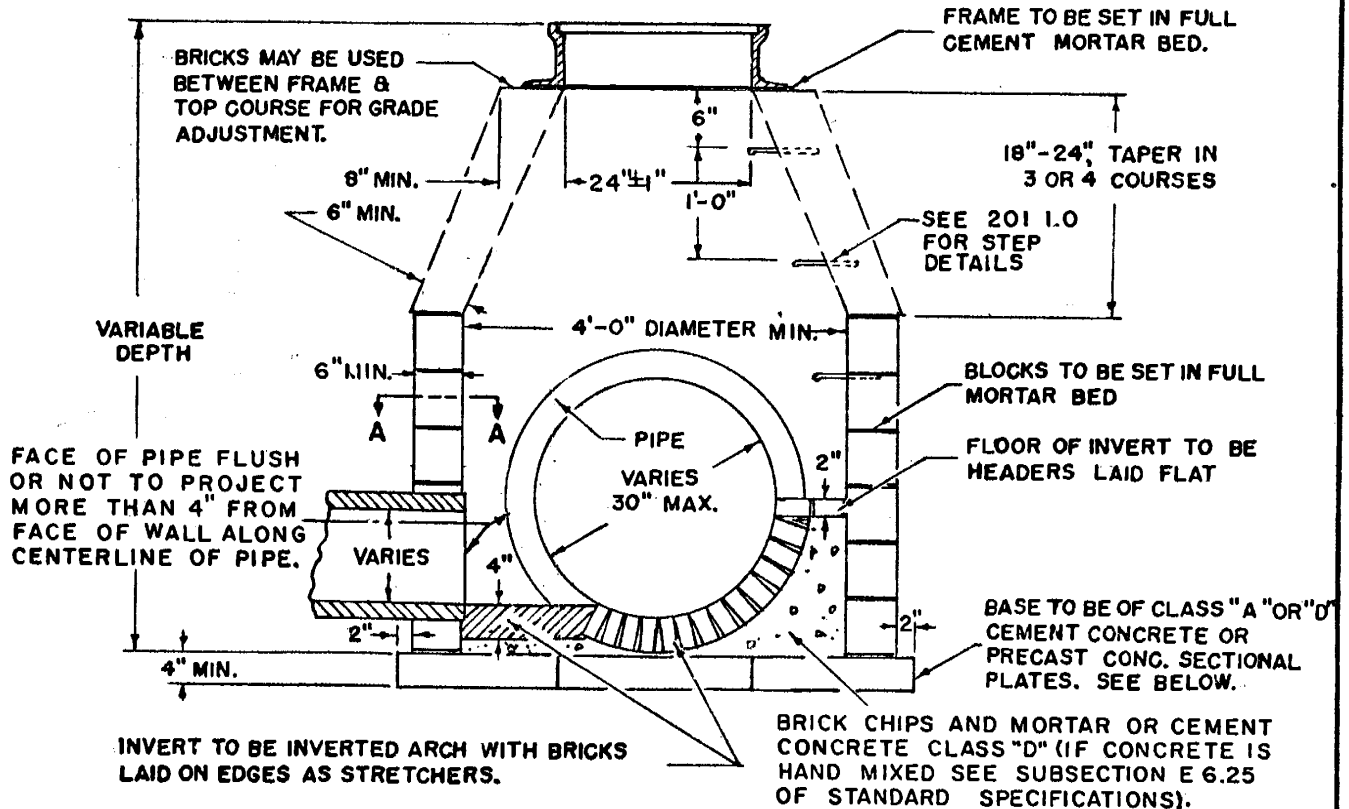
[illegible]

CONCRETE BLOCK MANHOLES

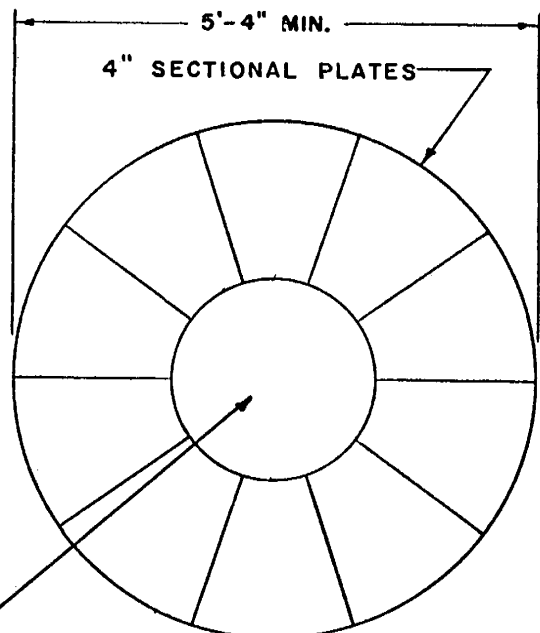
MANHOLES 9 FT. OR LESS IN DEPTH

NOTE:

1. DESIGN SHOWN IS FOR MANHOLE DEPTHS OF 9 FT. OR LESS AND PIPE DIAMETERS OF 30 INCHES OR LESS.
2. STANDARD MANHOLE DEPTH TO BE 6 FEET 6 INCHES.



SECTION A-A



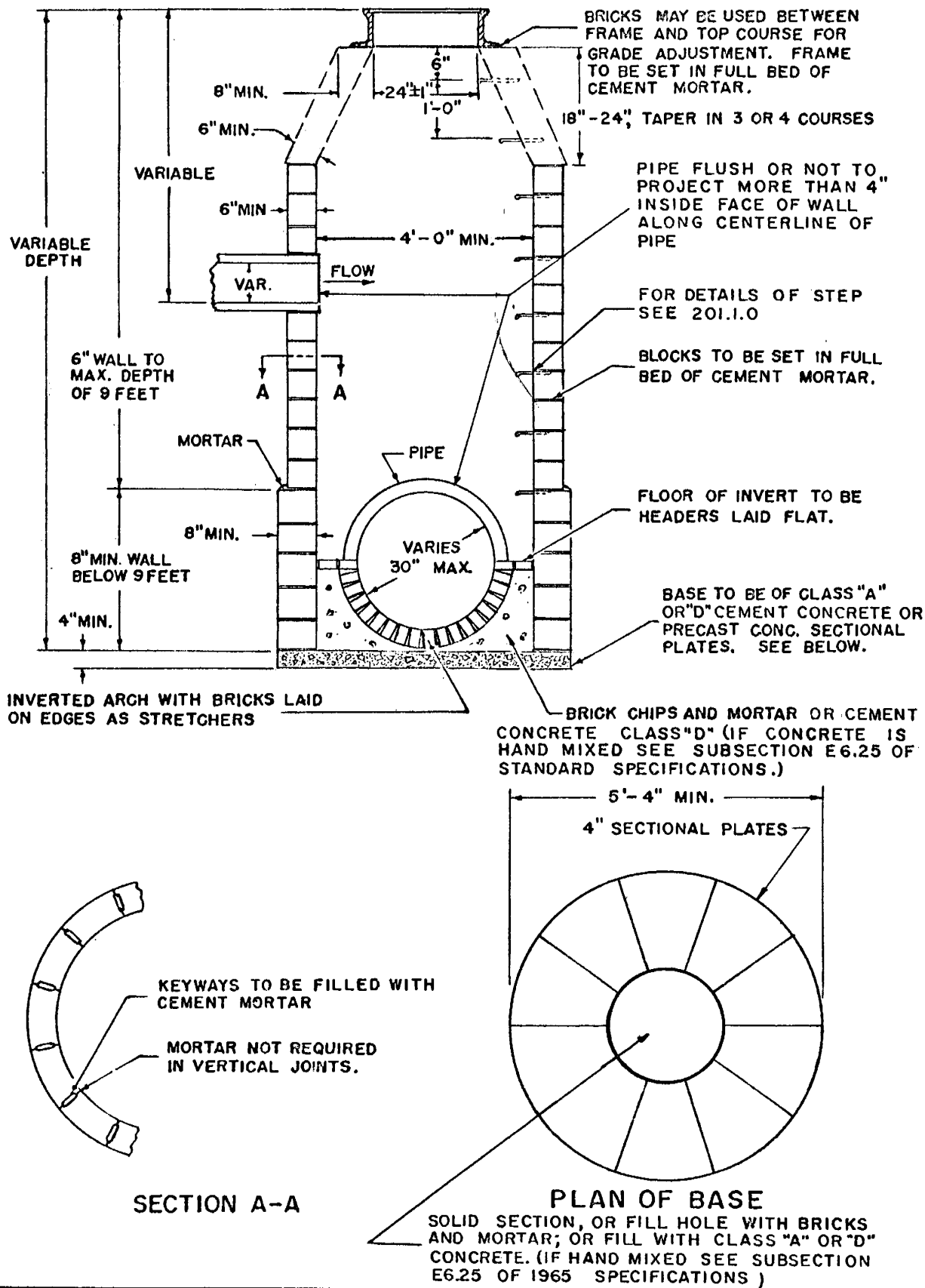
PLAN OF BASE

SOLID SECTION; OR FILL HOLE WITH BRICKS AND MORTAR; OR FILL WITH CLASS "A" OR "D" CONCRETE. (IF CONCRETE IS HAND MIXED SEE SUBSECTION E 6.25 OF 1965 SPECIFICATIONS.)

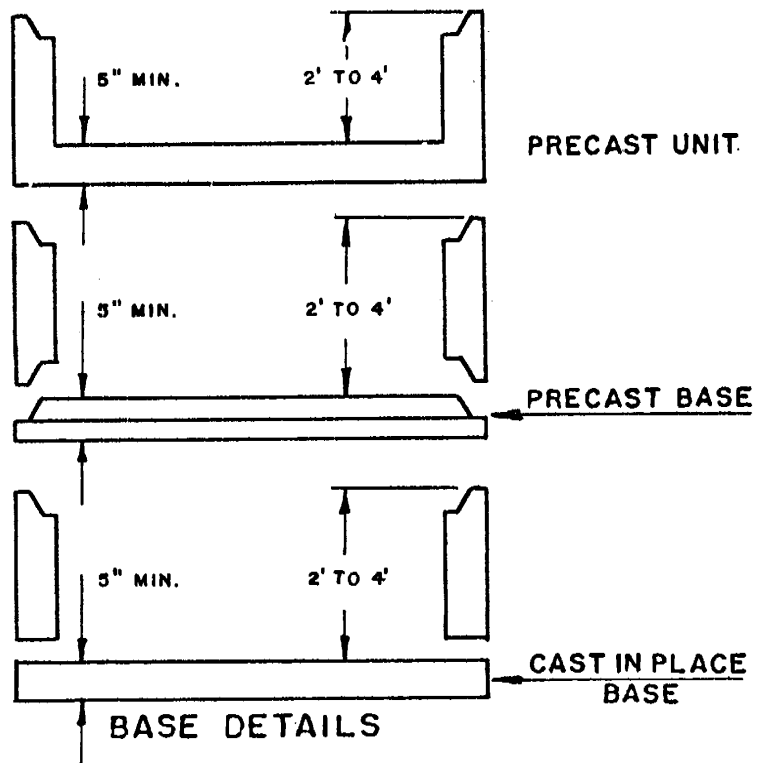
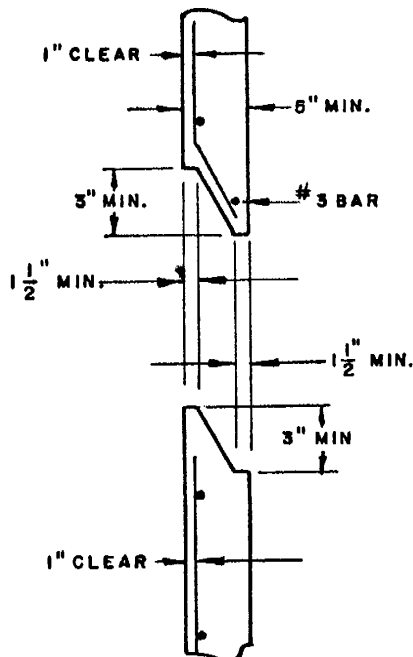
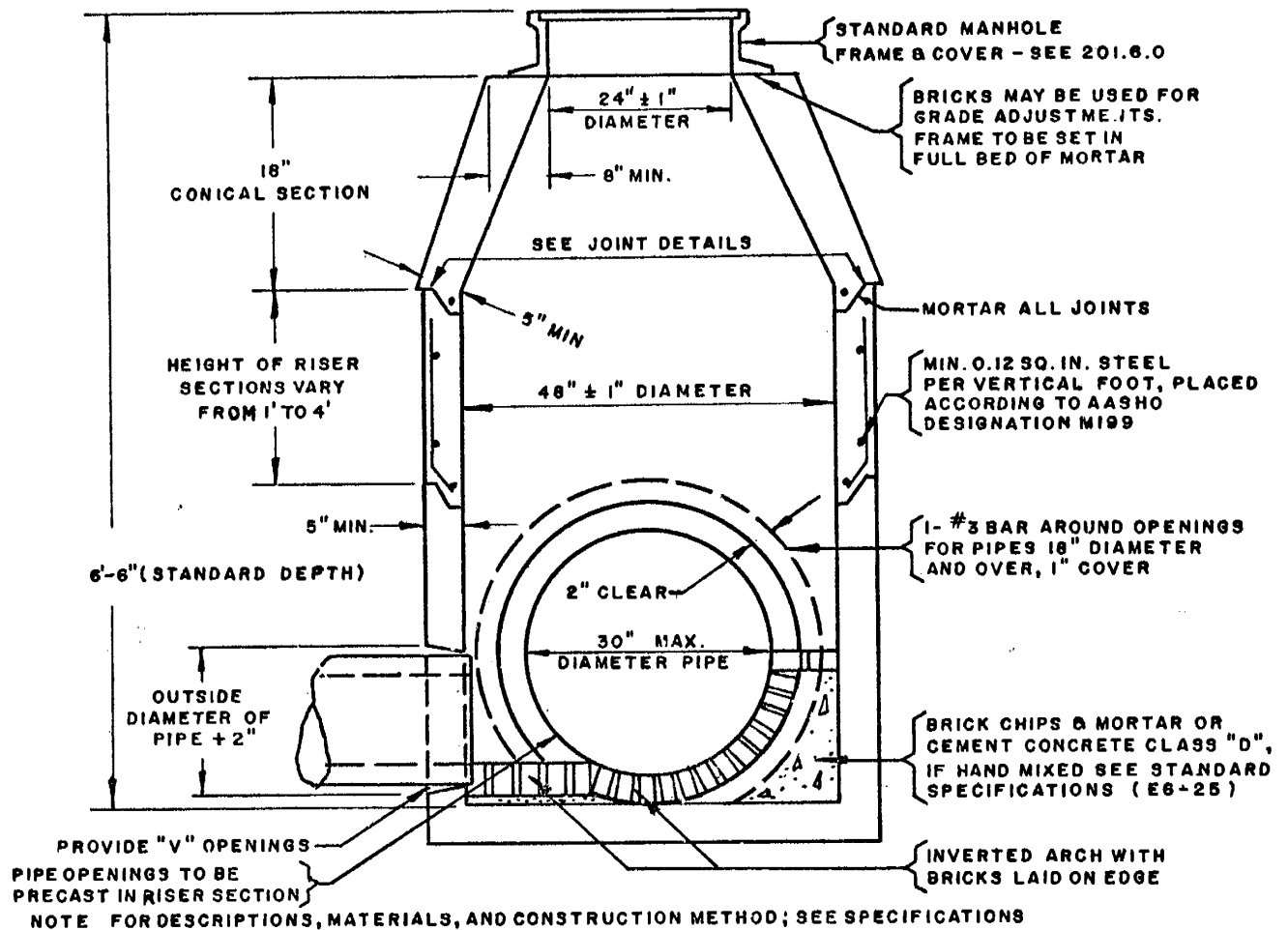
CONCRETE BLOCK MANHOLES
MANHOLES OVER 9 FT IN DEPTH

NOTE:

MANHOLE DESIGN SHOWN IS FOR PIPE DIAMETER OF 30 INCHES OR LESS.

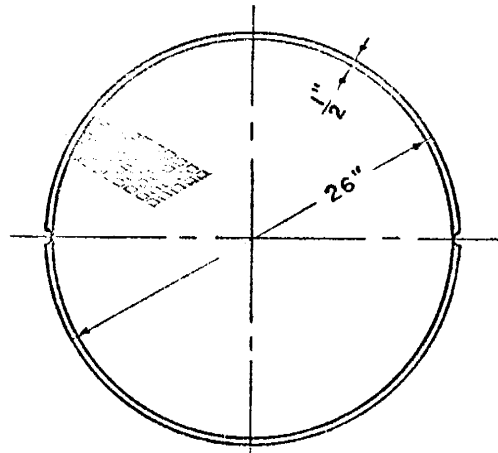


PRECAST CONCRETE MANHOLE 9 FEET OR LESS IN DEPTH

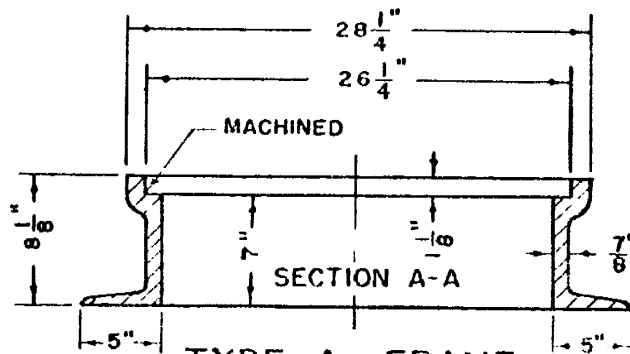
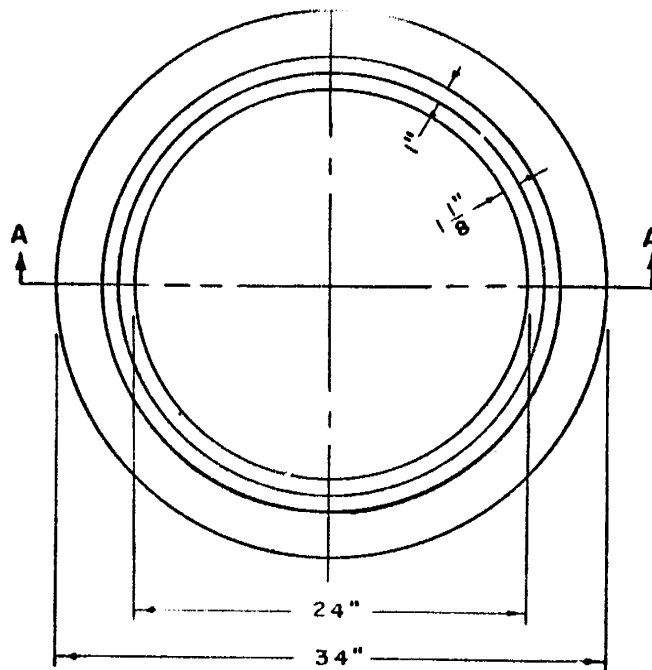


MANHOLE FRAME AND COVER

STANDARD COVER



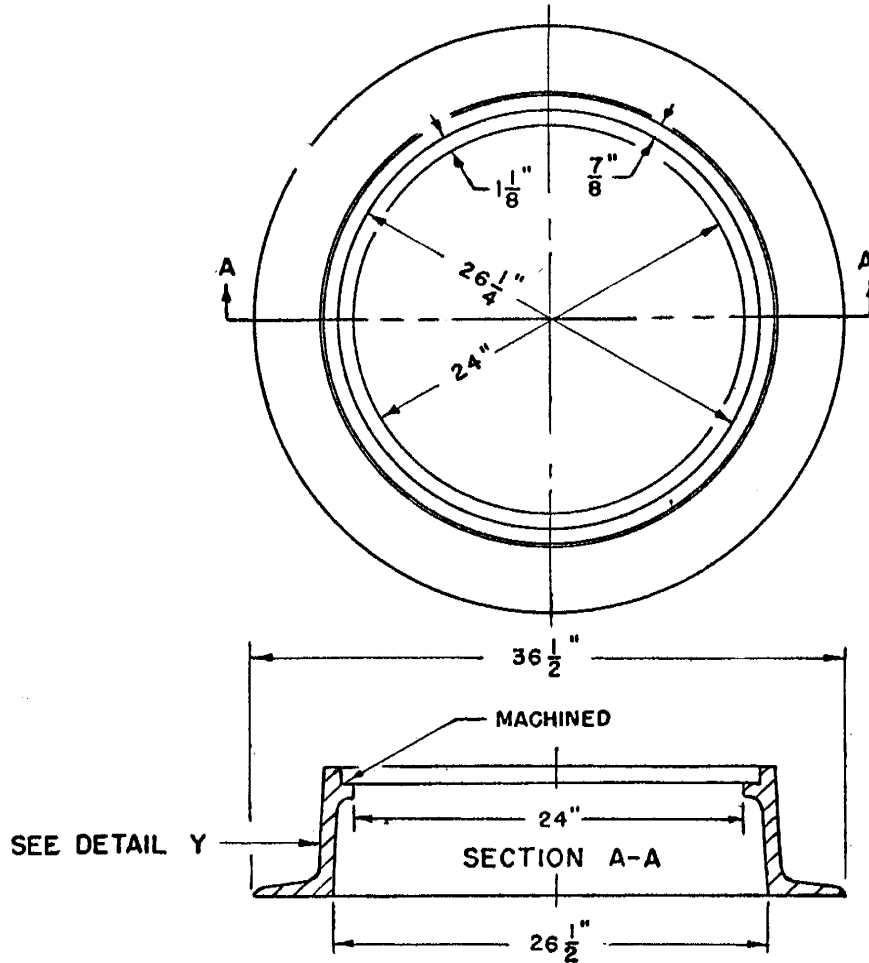
FOR COVER DETAILS SEE 201.8 0



TYPE-A FRAME

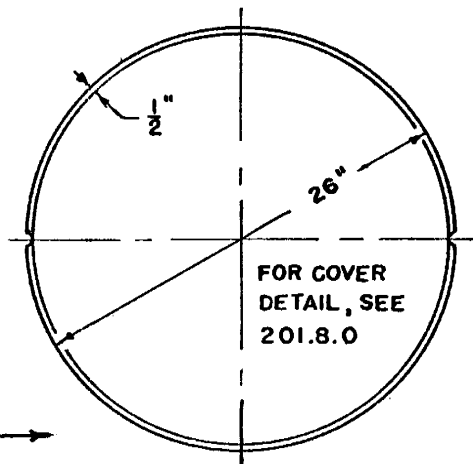
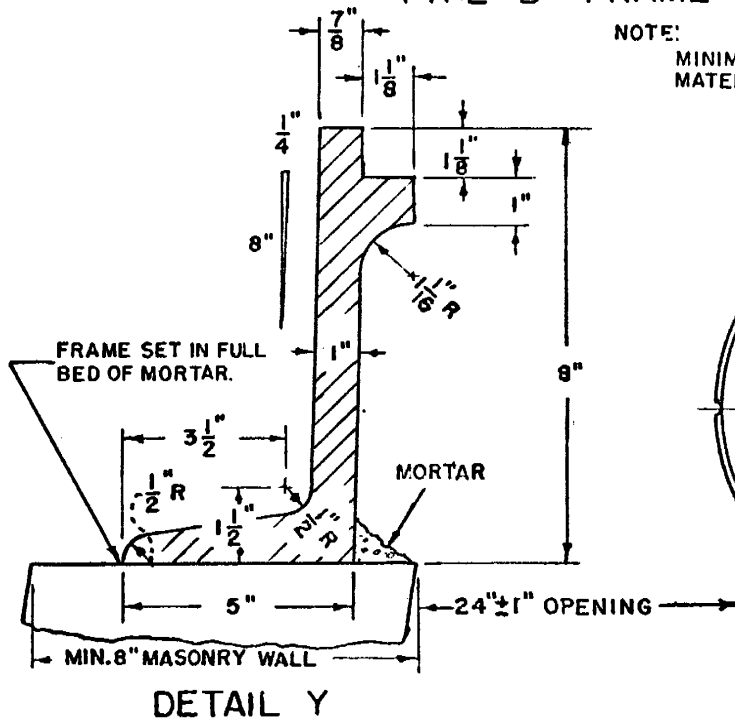
MINIMUM WEIGHT - 205 LBS.
MATERIAL - CAST IRON

MANHOLE FRAME AND COVER



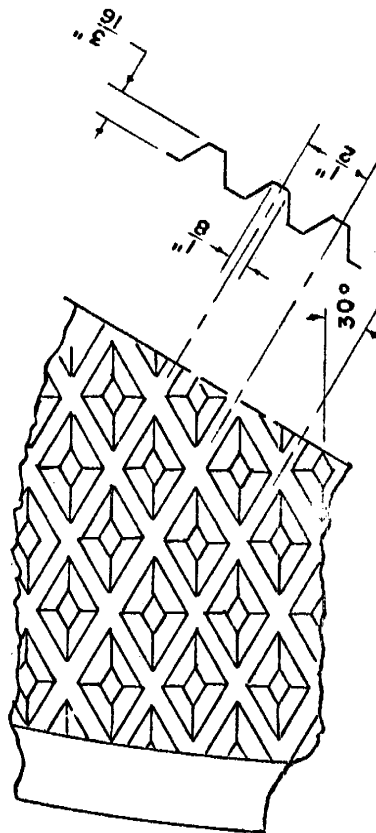
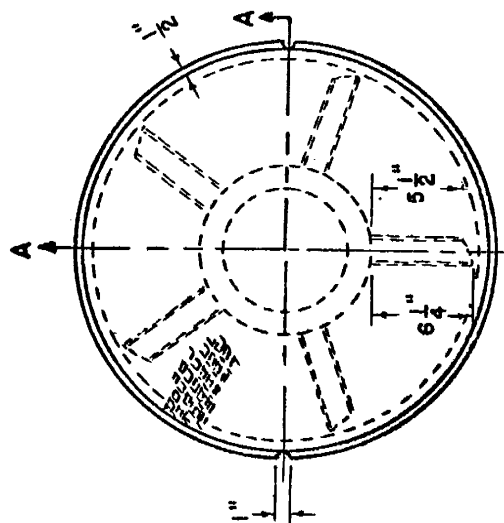
TYPE-B FRAME

NOTE:
MINIMUM FRAME WEIGHT 265 LBS.
MATERIAL—CAST IRON



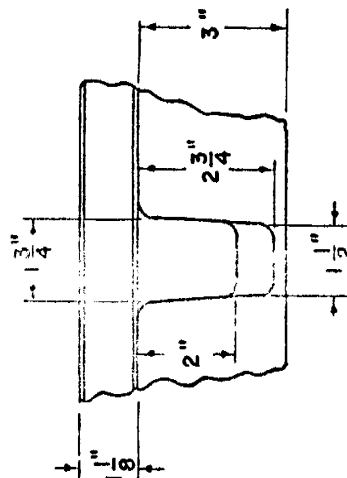
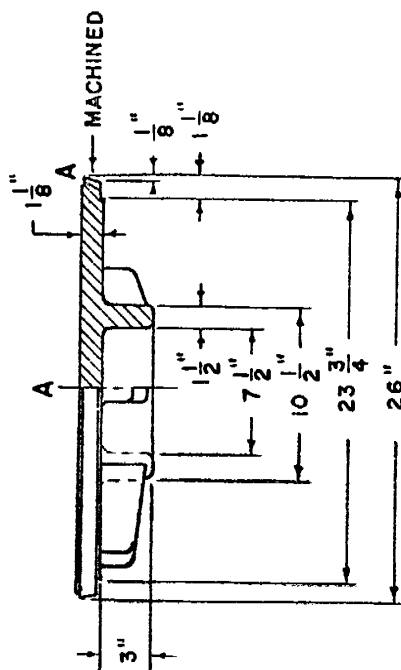
STANDARD COVER

MANHOLE COVER



MATERIAL - CAST IRON; SEE SPECIFICATIONS
MINIMUM COVER WEIGHT - 200 LBS.

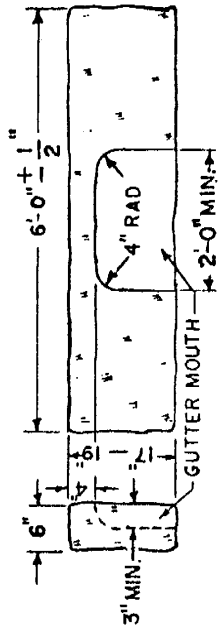
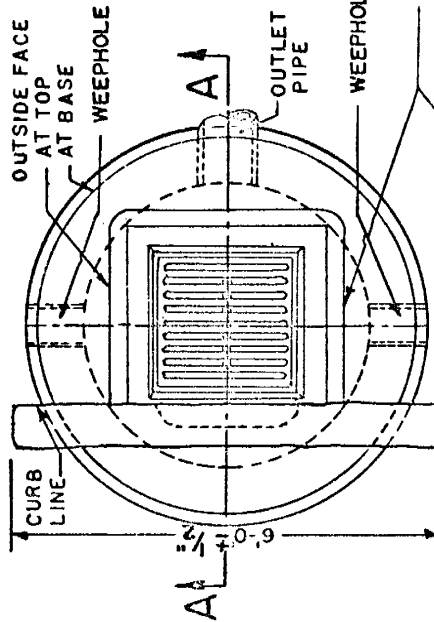
DETAIL OF TREAD



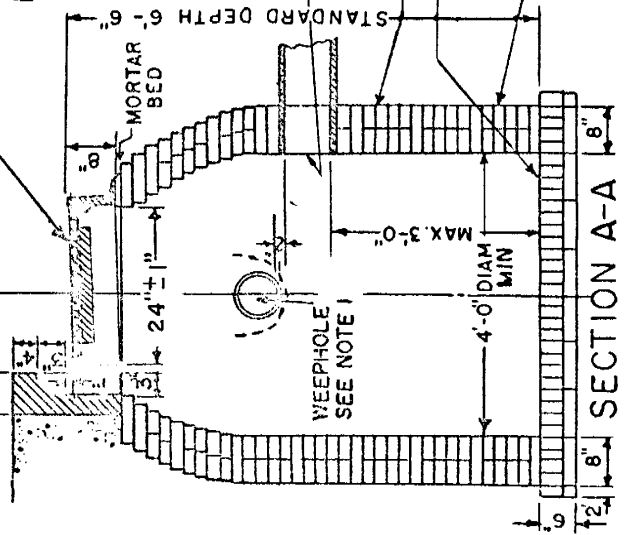
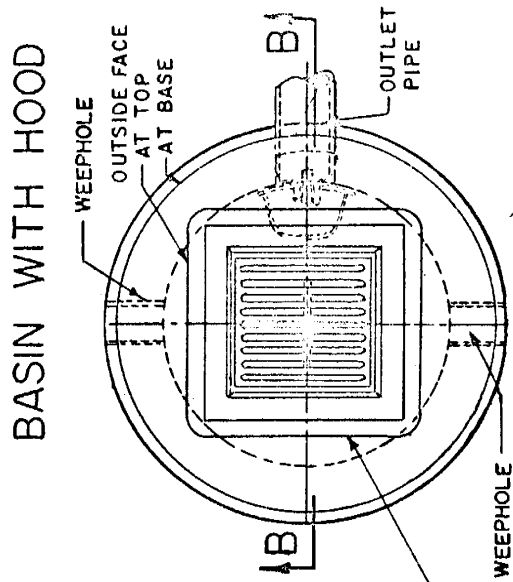
MANHOLE COVER FOR TYPE A & B FRAMES

DETAIL OF FIN

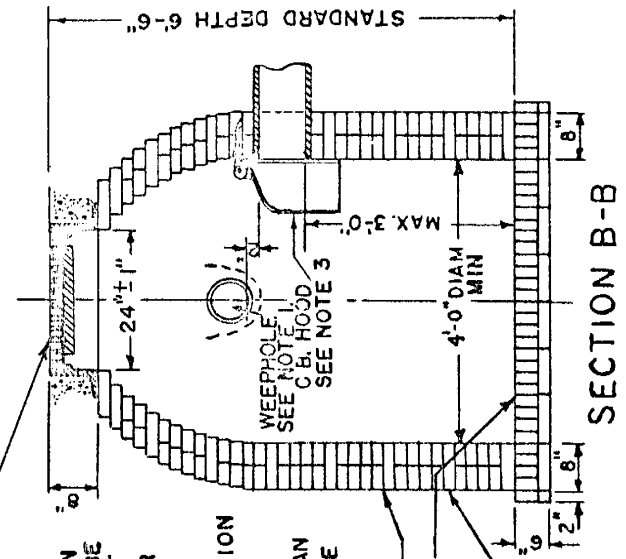
BRICK CATCH BASIN



GRANITE CURB INLET



SECTION A-A



SECTION B-B

- NOTES**
- 1. WEEPHOLES SHALL BE 4" PIPE OPENING OR EQUIVALENT WITH 1/4 IN. MESH, 23 GAGE, GALVANIZED WIRE SCREEN COVERING; 2 CUBIC FEET OF CRUSHED STONE SHALL BE PLACED AROUND EACH WEEPHOLE.**
 - 2. FRAME SHALL BE SET IN A FULL BED OF MORTAR**
 - 3. MASS STANDARD CATCH BASIN HOOD SHALL BE INSTALLED ON OUTLET PIPE (SEE 20270)**
 - 4. FOR DESCRIPTION, MATERIALS, AND CONSTRUCTION METHODS, SEE SPECIFICATIONS**

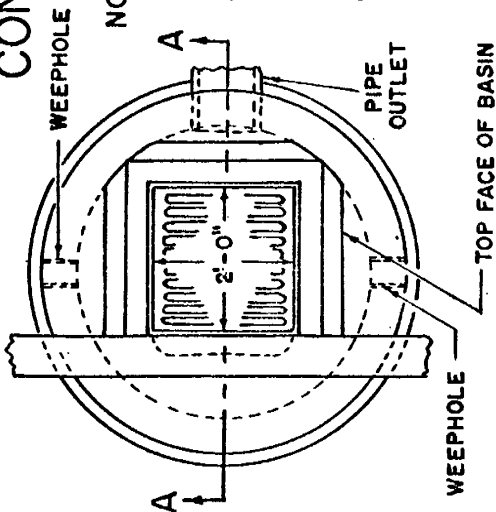
FACE OF PIPE FLUSH OR NOT TO PROJECT MORE THAN 4" FROM FACE OF WALL ALONG CENTERLINE OF PIPE

WALLS - 8" THICK - EVERY FIFTH COURSE TO BE HEADERS

BOTTOM-6"THICK-IN TWO COURSES EXTENDING 2" BEYOND
OUTSIDE FACE OF WALL - UPPER COURSE ON EDGE, LOWER
LAID FLAT.

OUTSIDE OF STRUCTURE TO BE PLASTERED WITH $\frac{1}{2}$ " CEMENT MORTAR

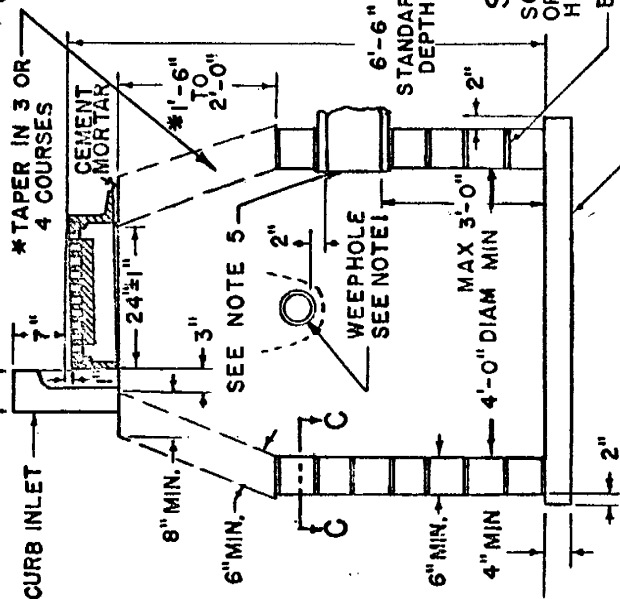
CONCRETE BLOCK CATCH BASIN



NOTES

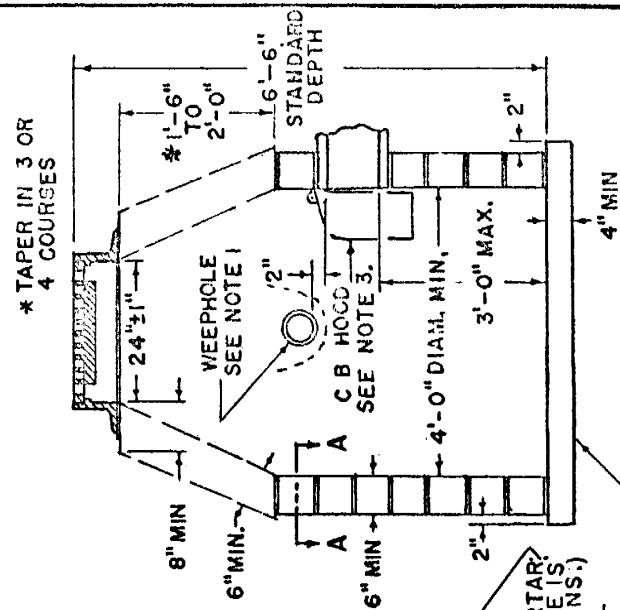
1. WEEPHOLES SHALL BE 4" PIPE OPENING OR EQUIVALENT WITH 1/4 IN MESH, 23 GAGE, GALVANIZED WIRE SCREEN COVERING; 2 CUBIC FEET OF CRUSHED STONE SHALL BE PLACED AROUND EACH WEEPHOLE
2. BRICKS MAY BE USED BETWEEN TOP COURSE AND C.B. FRAME FOR GRADE ADJUSTMENT. FRAME SHALL BE SET IN FULL BED OF MORTAR.
3. MASS. STANDARD CATCH BASIN HOOD SHALL BE INSTALLED ON OUTLET PIPE (SEE 202 7.0)
4. FOR DESCRIPTION, MATERIALS AND CONSTRUCTION METHODS, SEE SPECIFICATIONS
5. FACE OF PIPE SET FLUSH OR NOT TO PROJECT MORE THAN 4" FROM FACE OF WALL ALONG CENTERLINE OF PIPE.

BASIN WITH CURB INLET



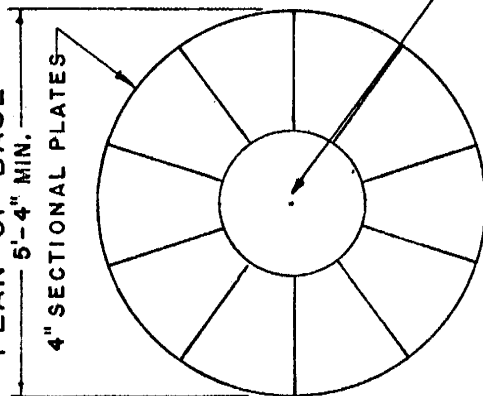
SECTION A-A

BASIN WITH HOOD



SECTION B-B

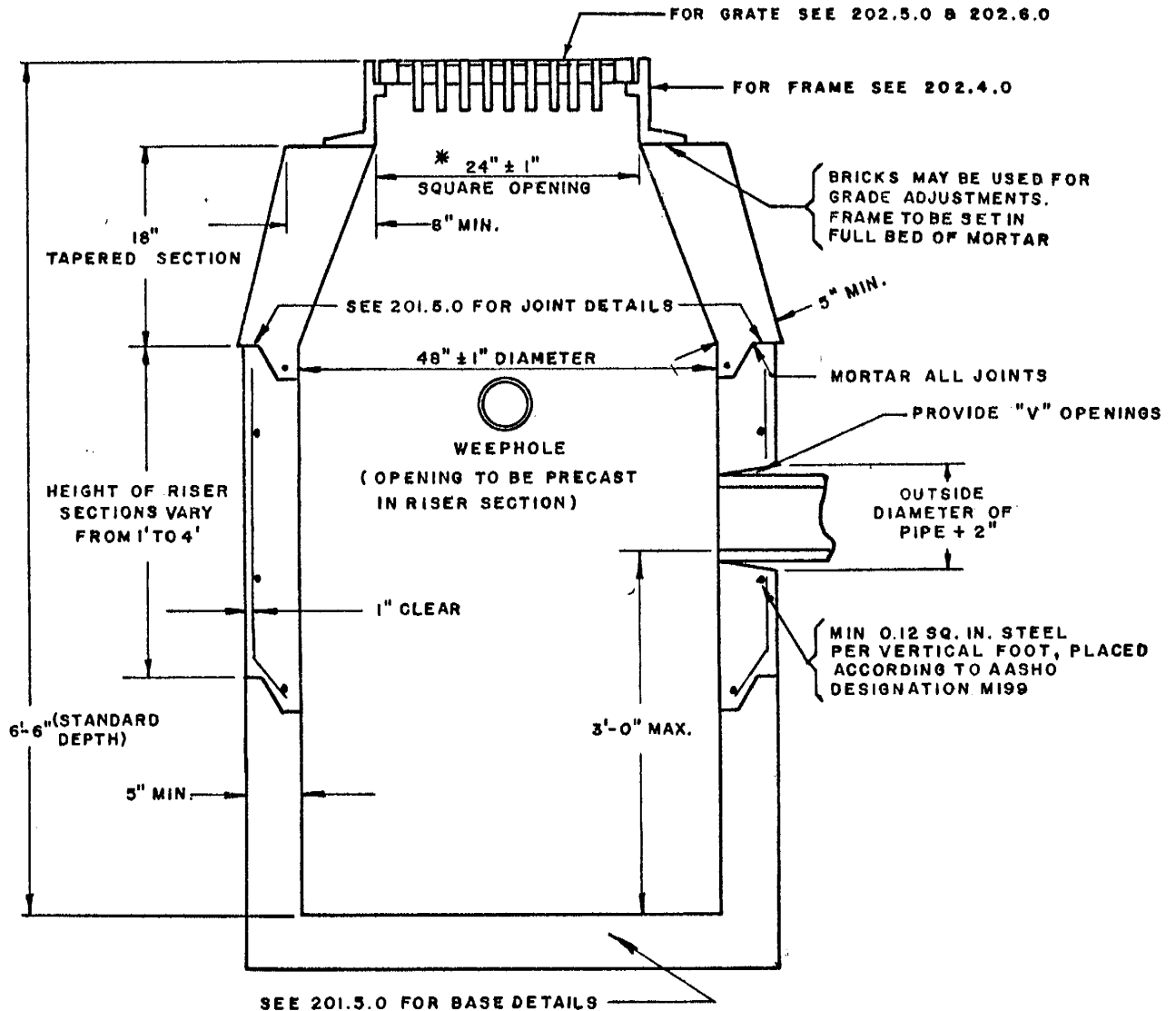
PLAN OF BASE



SECTION C-C

SOLID SECTION, OR FILL HOLE WITH BRICKS AND MORTAR, OR FILL WITH CLASS "A" OR "D" CONCRETE (IF CONCRETE IS HAND MIXED SEE SECTION E625 OF 1965 SPECIFICATIONS.)

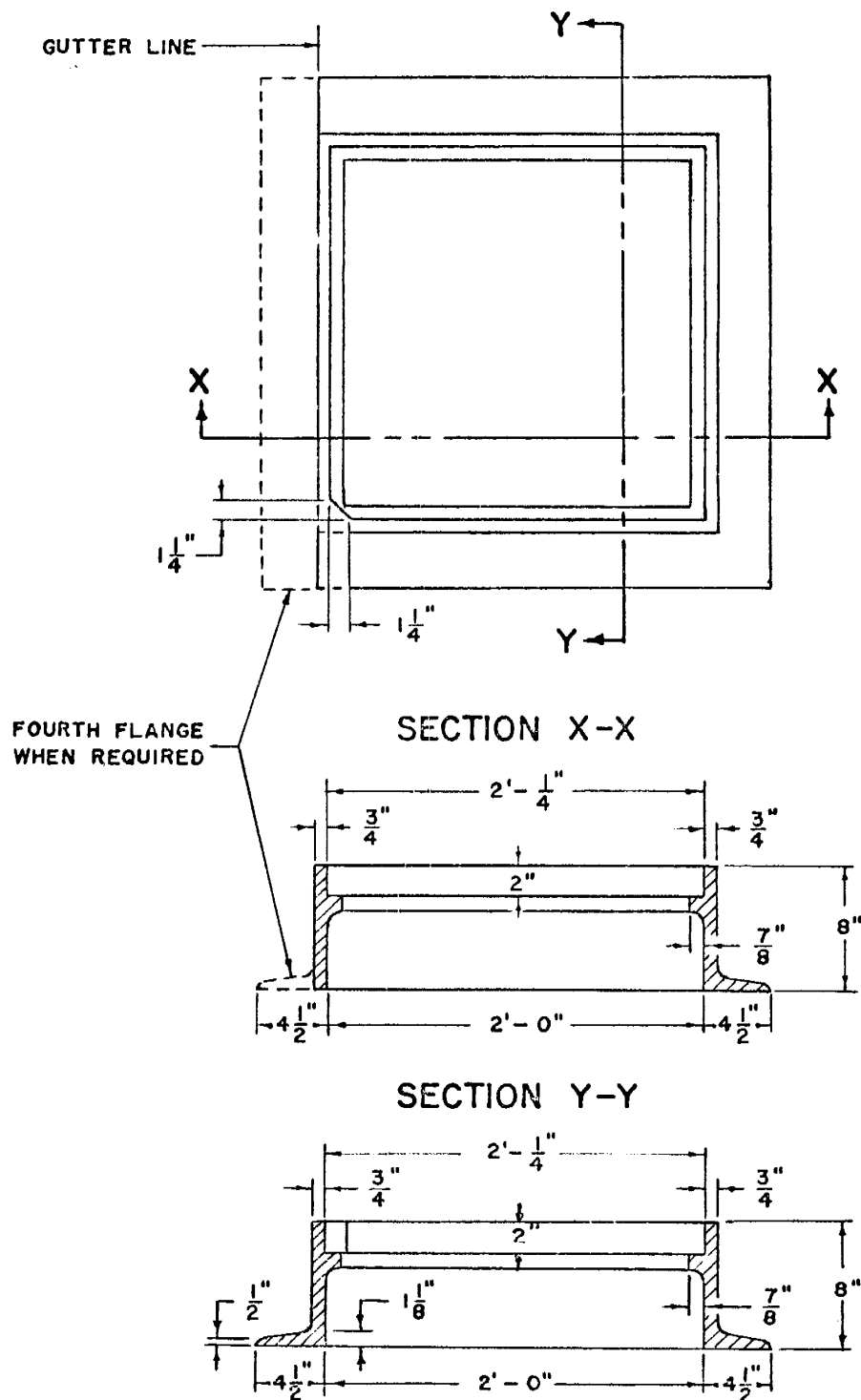
BLOCKS TO BE SET IN FULL BED OF CEMENT MORTAR



* WHEN A CURB INLET IS INSTALLED, THE OPENING IS TO BE $24" \pm 1" \times 27" \pm 1"$

1. DETAILS NOT INDICATED ABOVE ARE TO BE SIMILAR TO THOSE SHOWN ON 202.1.0
2. FOR DESCRIPTIONS, MATERIALS AND CONSTRUCTION METHOD, SEE SPECIFICATIONS

CATCH BASIN FRAME



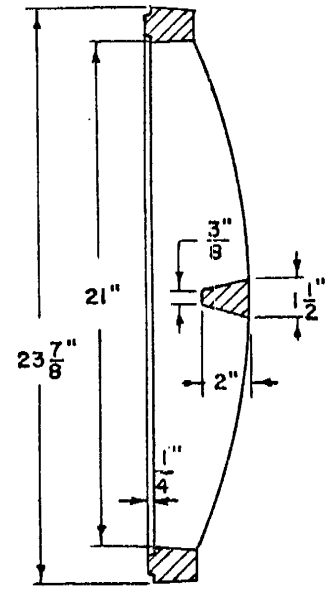
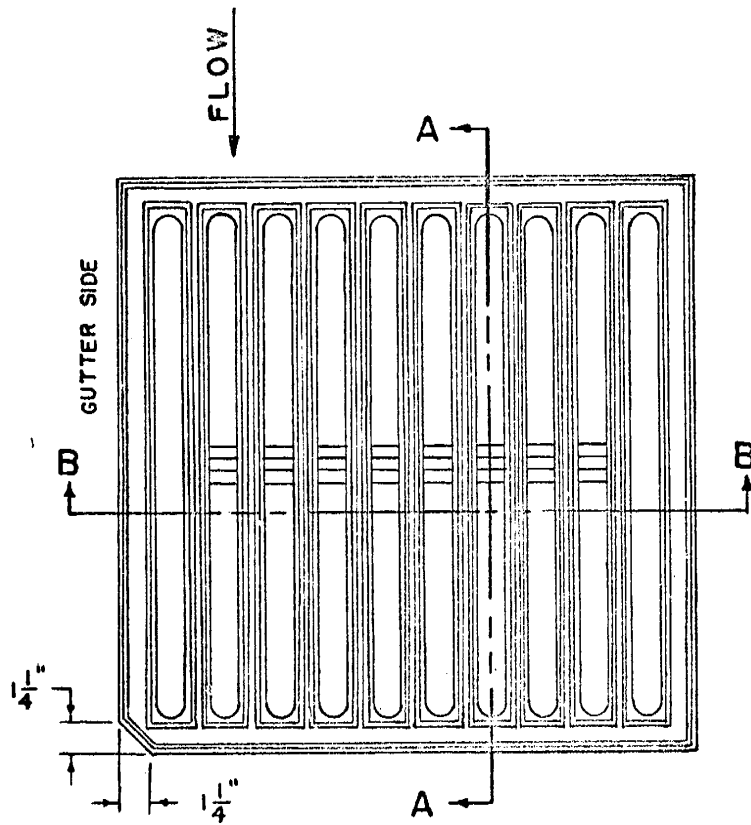
NOTE

1. MINIMUM FRAME WEIGHT.

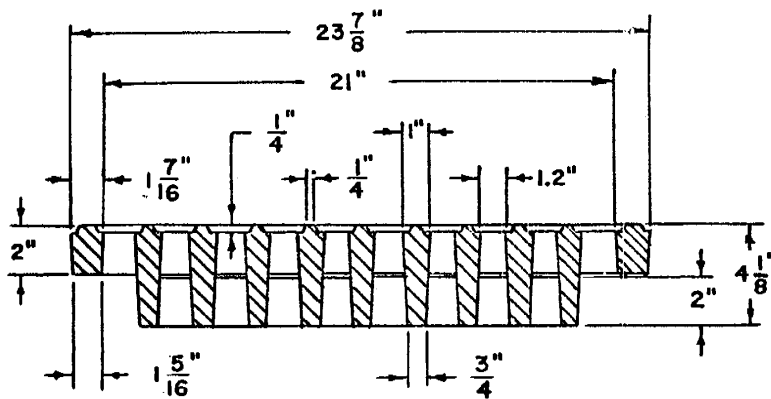
4 FLANGE - 295 LBS.
3 FLANGE - 265 LBS.

2. MATERIAL - CAST IRON; SEE SPECIFICATIONS

CATCH BASIN GRATE TYPE A-1



SECTION A-A



SECTION B-B

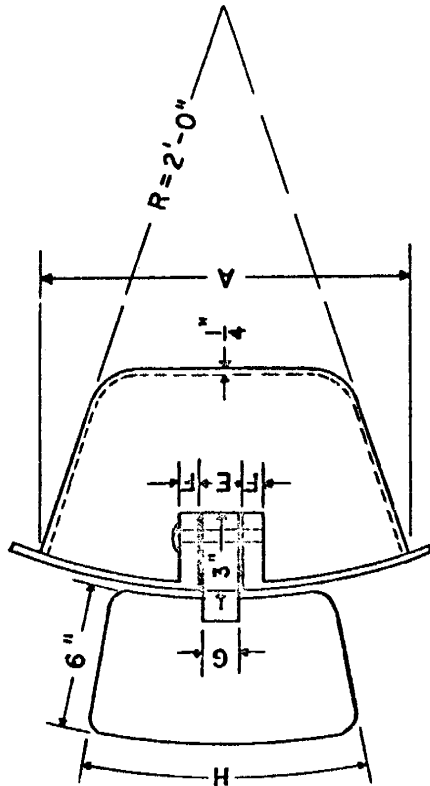
MATERIAL — CAST IRON; SEE SPECIFICATIONS.
MINIMUM WEIGHT — 210 LBS.

The technical drawing illustrates the design of a heat exchanger with the following details:

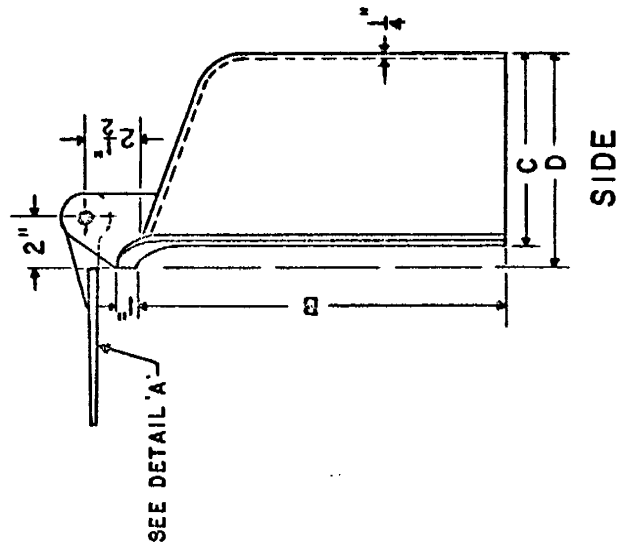
- Plan View (Top):** Shows a rectangular shell with 11 vertical tubes. The overall width is $23\frac{7}{8}$ " and the height is $23\frac{7}{8}$ ". A flow arrow labeled "FLOW" points downwards. Section lines A-A and B-B are indicated.
- Section B-B (Right):** A longitudinal section showing the internal structure of the tubes. The total length is $23\frac{7}{8}$ ". The tube diameter is $2\frac{1}{4}$ ". The spacing between tubes is $3\frac{1}{4}$ ".
- Detail View (Bottom):** A cross-section of the tube bundle showing the tube pitch and dimensions. The tube diameter is $2\frac{1}{4}$ ". The pitch (center-to-center distance) is $3\frac{1}{4}$ ". The shell thickness is $1\frac{1}{2}$ ". The tube wall thickness is $\frac{5}{16}$ ". The shell inner diameter is $23\frac{7}{8}$ ".

MASS. D.P.W. - MAY 1966

CATCH BASIN HOOD

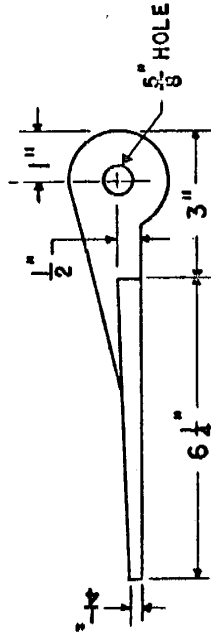


TOP

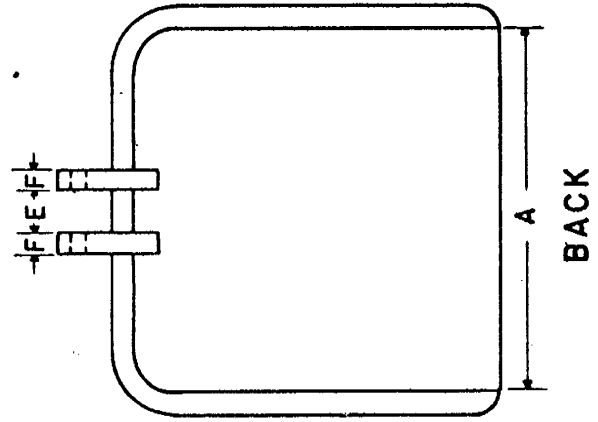
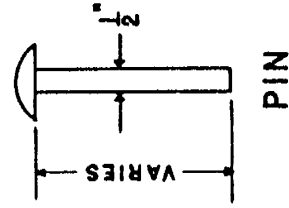


SIDE

DIMENSIONS	A	B	C	D	E	F	G	H
8" AND 10" PIPE	15"	15"	8"	9"	13 $\frac{3}{4}"$	7 $\frac{7}{8}"$	15 $\frac{1}{2}"$	11"
12" AND 15" PIPE	18"	18"	10"	11 $\frac{1}{4}"$	2"	1"	17 $\frac{1}{2}"$	14 $\frac{1}{2}"$



DETAIL "A" HINGE

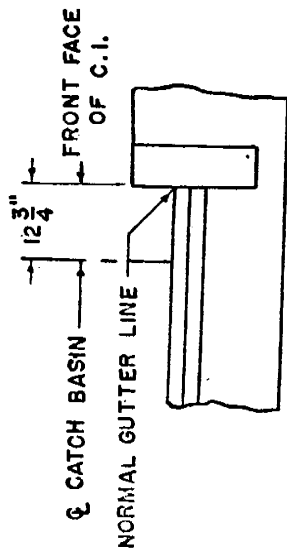


BACK

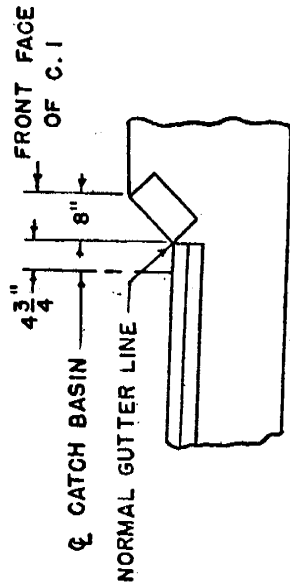
HOODS TO BE GRAY CAST IRON A S H O CLASS #30

LOCATION OF CATCH BASINS

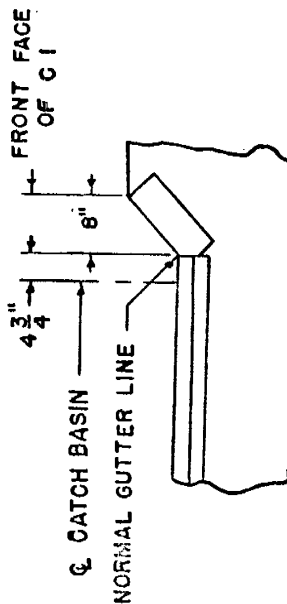
NOTE: "C.I." REFERS TO CURB INLET



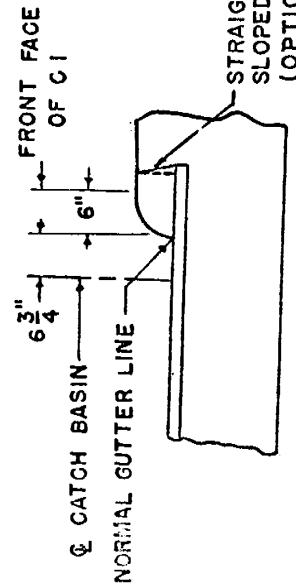
VERTICAL CURB



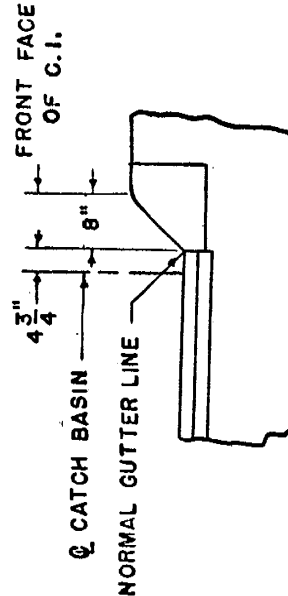
GRAN. SLOPED EDGING



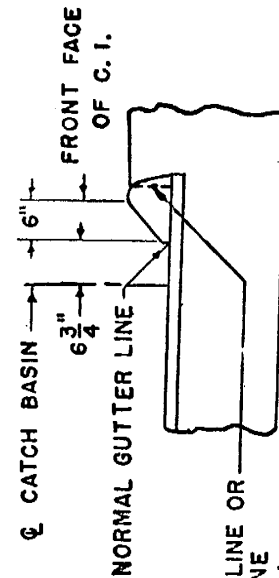
GRAN FACED PRECAST CONC. EDGING TYPE-B



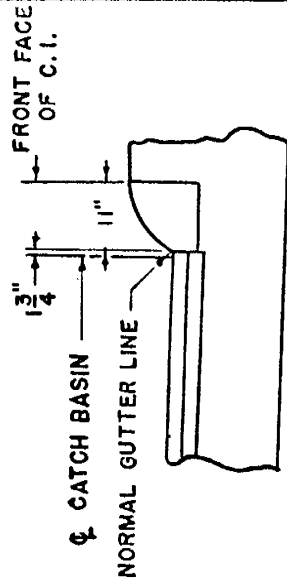
BIT. CONC CURB TYPE-1



GRAN. FACED PRECAST CONC EDGING TYPE-C

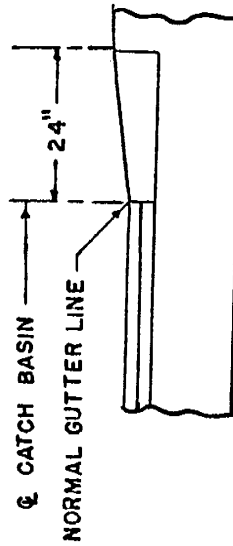


BIT CONC. CURB TYPE-2

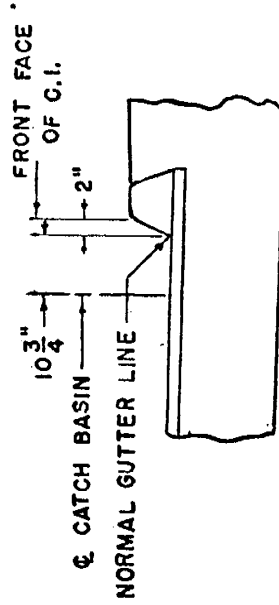


GRAN FACED PRECAST CONC EDGING TYPE-A

A C I IS NOT USED WITH THIS TYPE BERM

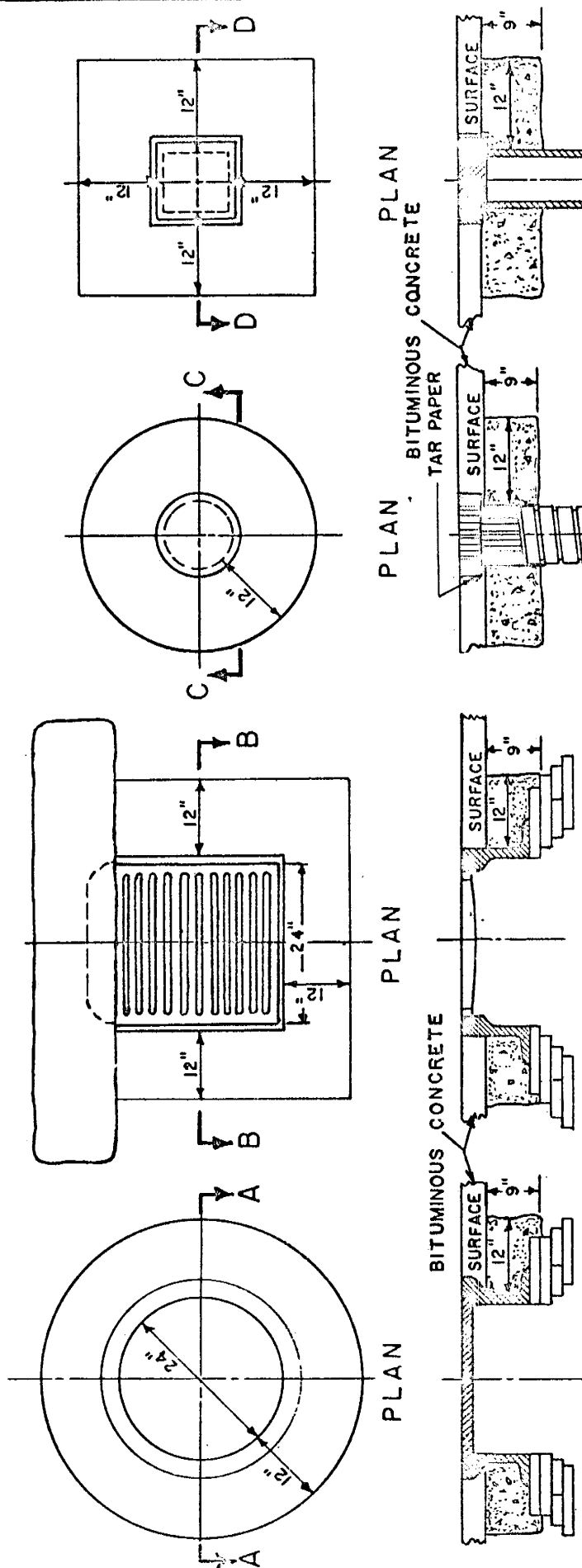


BIT. CONC. BERM TYPE-A



BIT. CONC CURB TYPE-3

CONCRETE COLLARS



SECTION A-A

SECTION B-B

MANHOLES

CATCH BASINS

SECTION C-C
ROUND

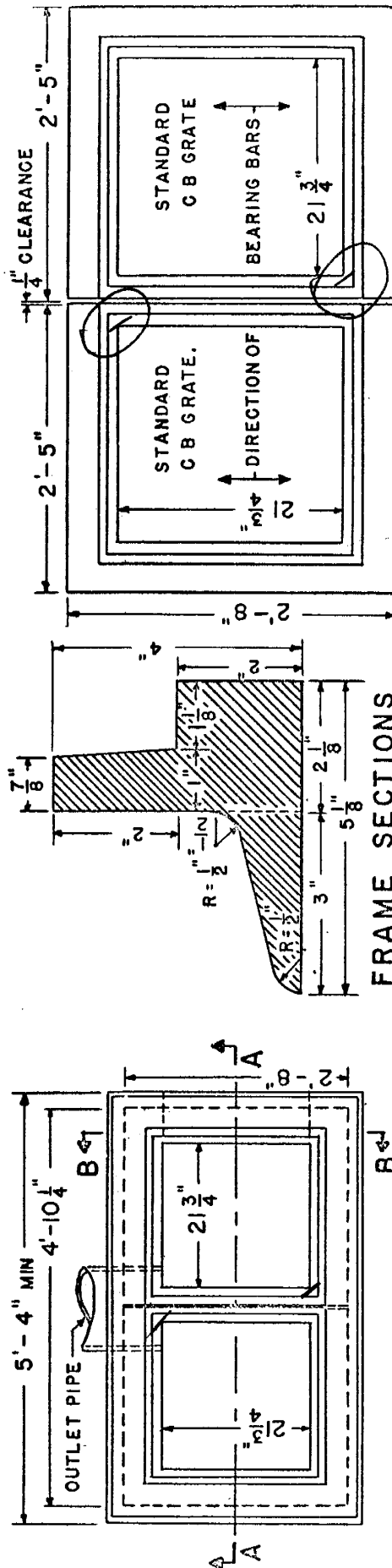
SECTION D-D
SQUARE

WATER SERVICE BOXES

NOTES
1 COLLARS TO BE CLASS "D" CEMENT CONCRETE MASONRY REGULAR OR H.E.S. AS DIRECTED
(IF HANDMIXED SEE SECTION E6.25 OF 1965 SPECIFICATIONS)

2 NO CONCRETE COLLAR REQUIRED IN CONCRETE PAVEMENT.

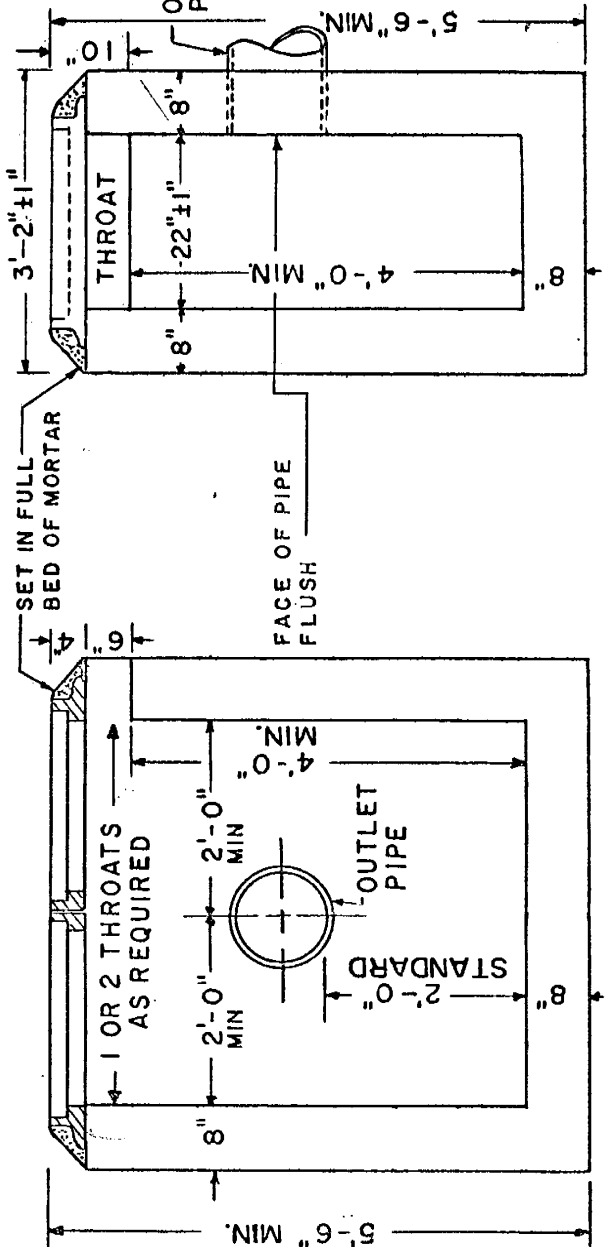
DROP INLETS TYPE A - CLASS "A" CONCRETE TYPE B - CONCRETE BLOCK



PLAN

FRAME SECTIONS

2-3 FLANGE 4" C I FRAMES



SECTION A-A

SECTION B-B

OUTLET NOTES:

- 1 STANDARD GRATES TO BE USED
SEE DETAILS ON 202 5 0 AND 202 6 0
- 2 MINIMUM C I FRAME WEIGHT - 205 LBS EACH
- 3 FOR DESCRIPTIONS, MATERIALS AND
CONSTRUCTION METHODS SEE
STANDARD SPECIFICATIONS

TYPE "A"

4 CLASS "A" CEMENT CONCRETE

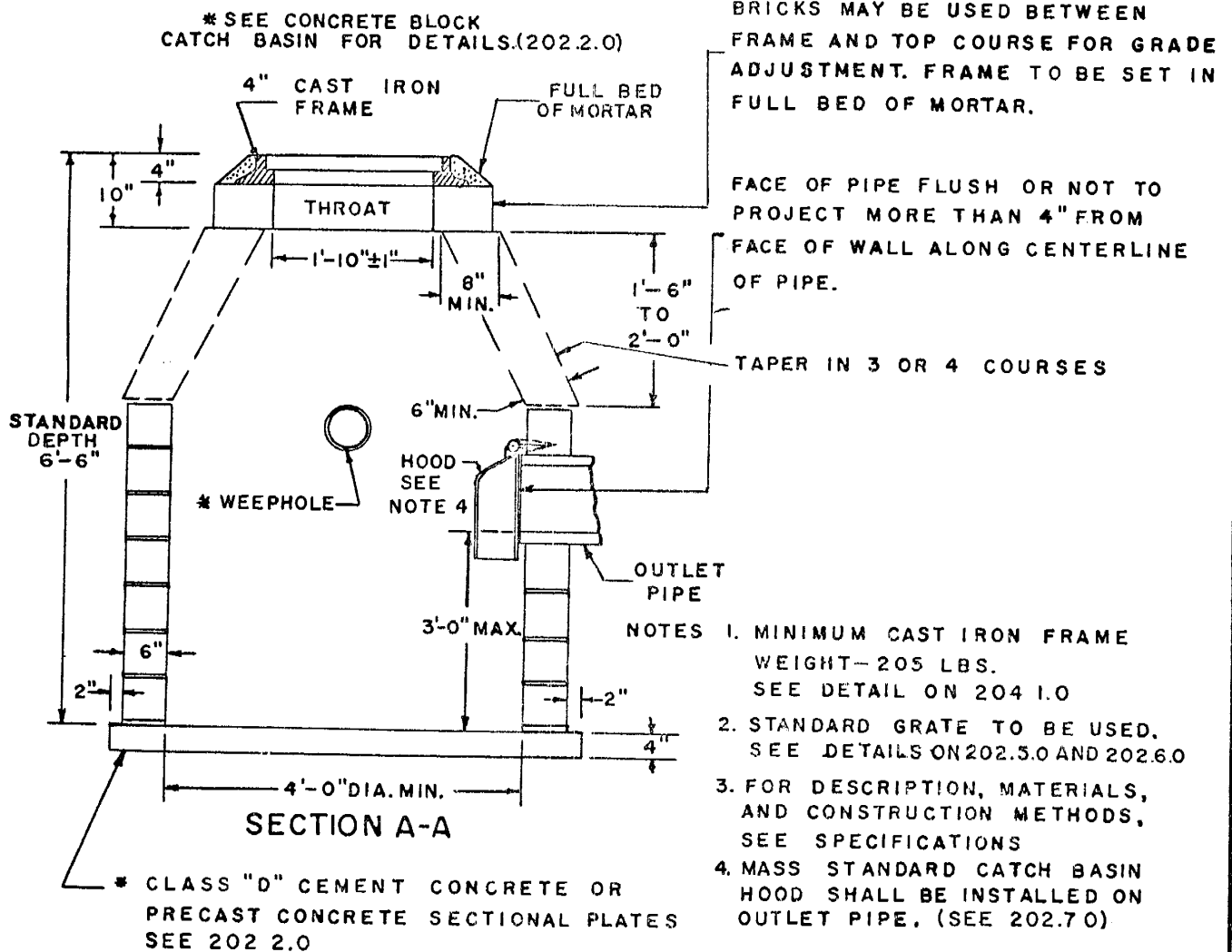
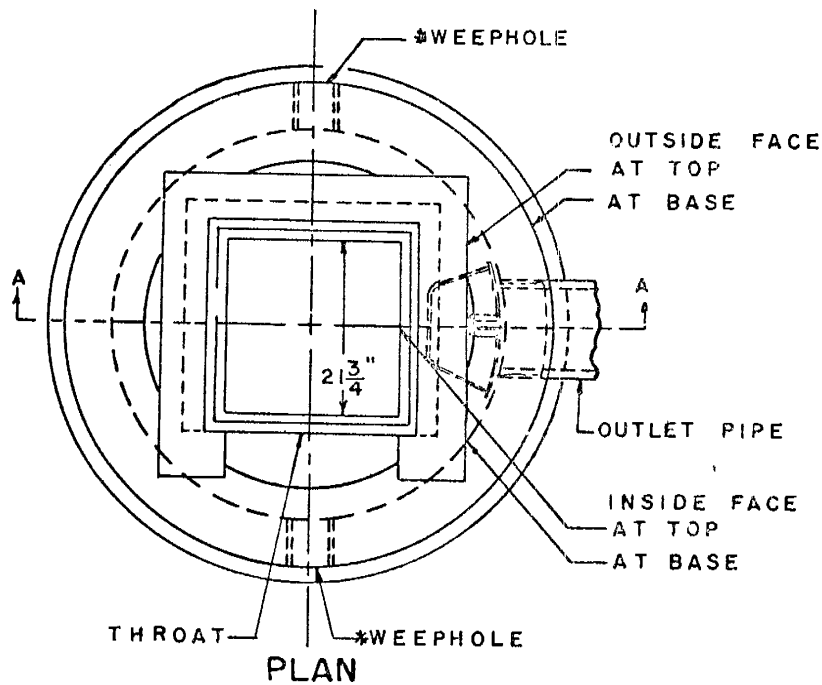
TYPE "B"

5 NOMINAL CONCRETE BLOCK DIMENSIONS
HEIGHT, 4" TO 8"
WIDTH, 8"

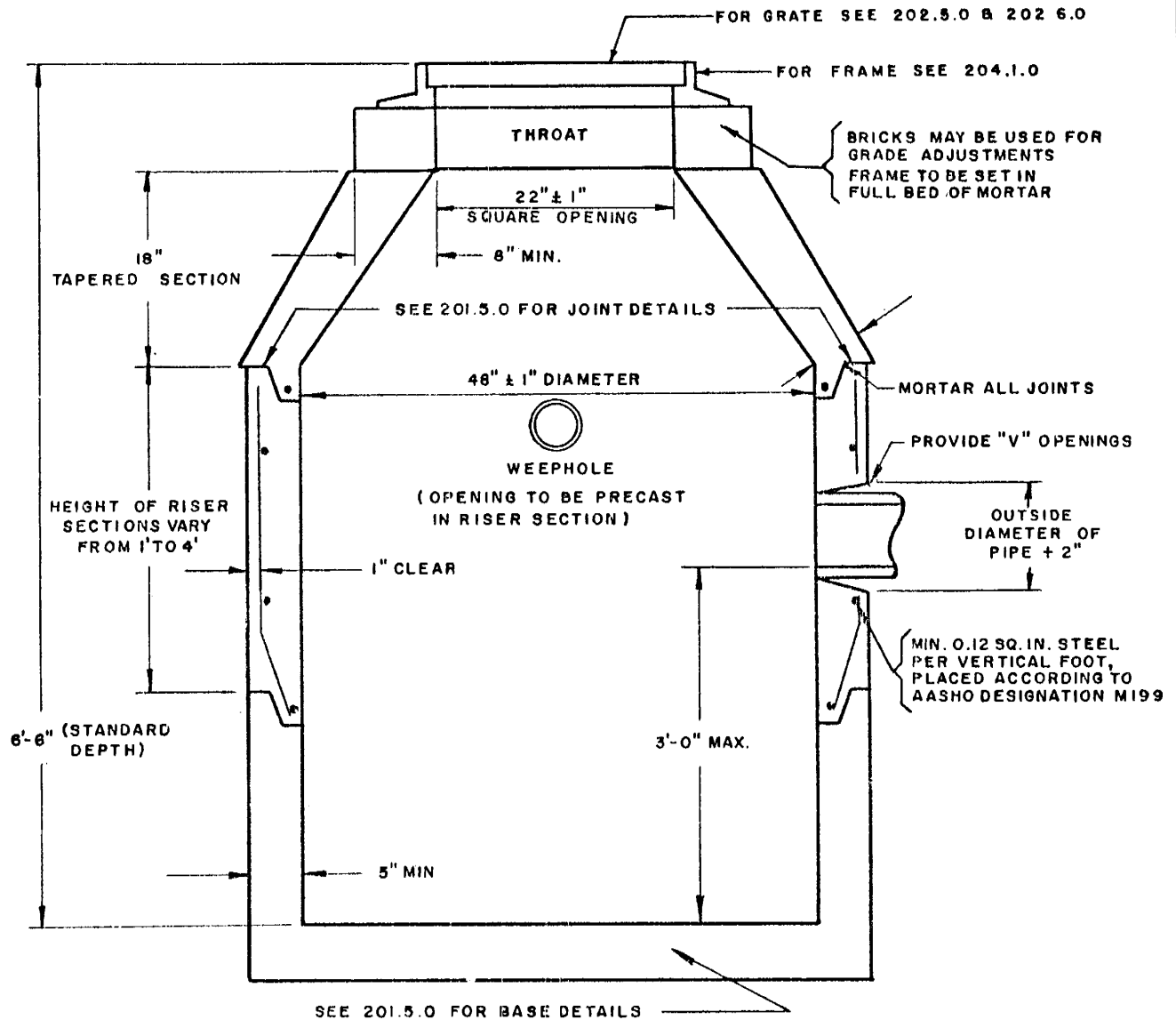
LENGTH, 8" TO 16"

6 BLOCKS TO BE SET IN FULL MORTAR BED

DROP INLET TYPE-C



PRECAST CONCRETE DROP INLET TYPE-D



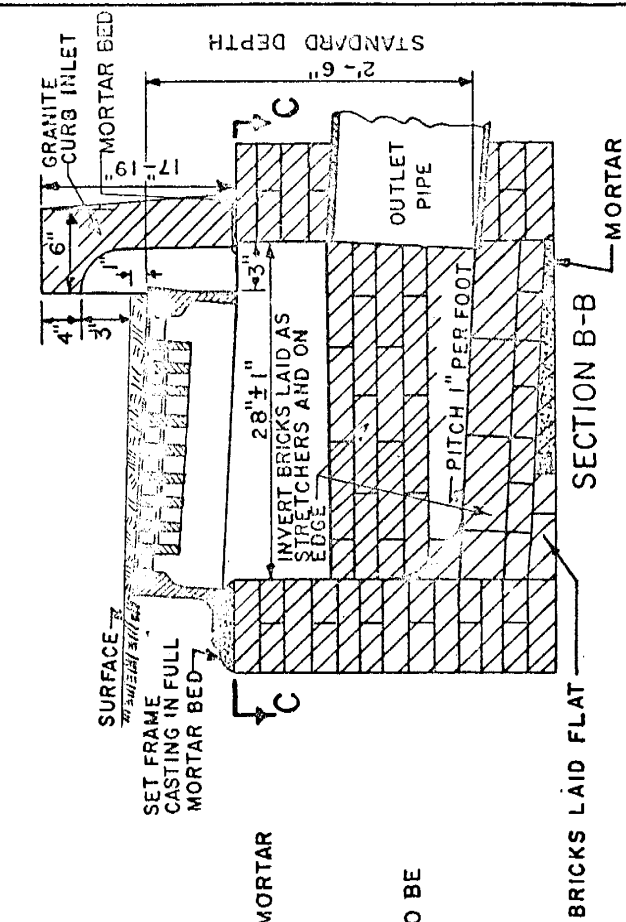
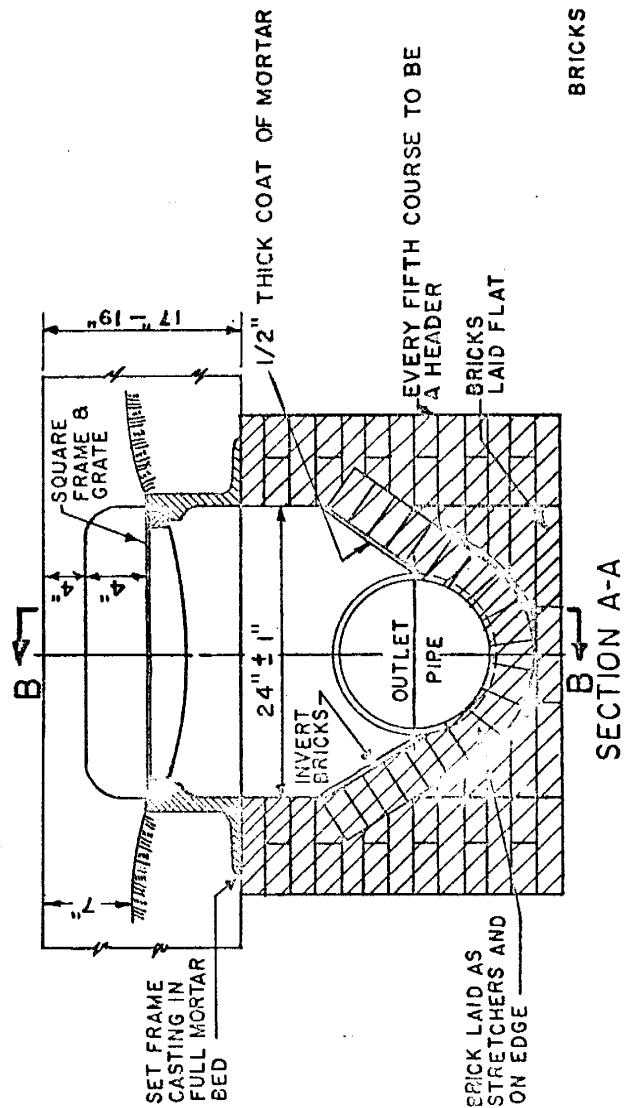
NOTES

- 1 DETAILS NOT INDICATED ABOVE ARE TO BE SIMILAR TO THOSE SHOWN ON 204.2.0
- 2 FOR DESCRIPTIONS, MATERIALS AND CONSTRUCTION METHOD, SEE SPECIFICATIONS

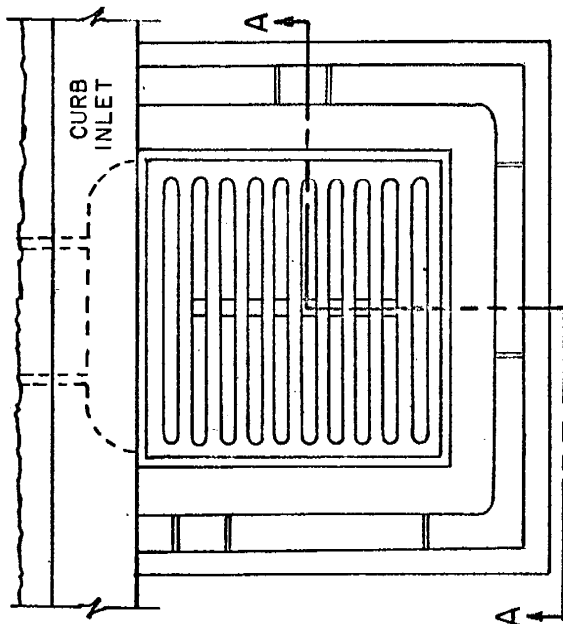
Diagram illustrating the plan view of the device. The device is rectangular, with a central area containing a grid of horizontal lines, likely representing the heating elements. The device is mounted on a base, with a 6" dimension indicated for the width of the base. The outlet pipe is shown extending from the bottom of the device, with a 3" dimension indicated for the distance from the base to the pipe. The inlet is labeled "GRANITE CURB INLET". The plan view is labeled "A-A PLAN".

1 WHERE CURB INLET IS NOT USED THE INSIDE HORIZONTAL DIMENSIONS OF GUTTER INLET TO BE $24 \pm 1"$ X $24 \pm 1"$ IN WHICH CASE AND UNLESS OTHERWISE DIRECTED, A STANDARD 4-FLANGE FRAME IS TO BE USED

2 FOR DESCRIPTION, MATERIALS AND CONSTRUCTION METHODS SEE SPECIFICATIONS



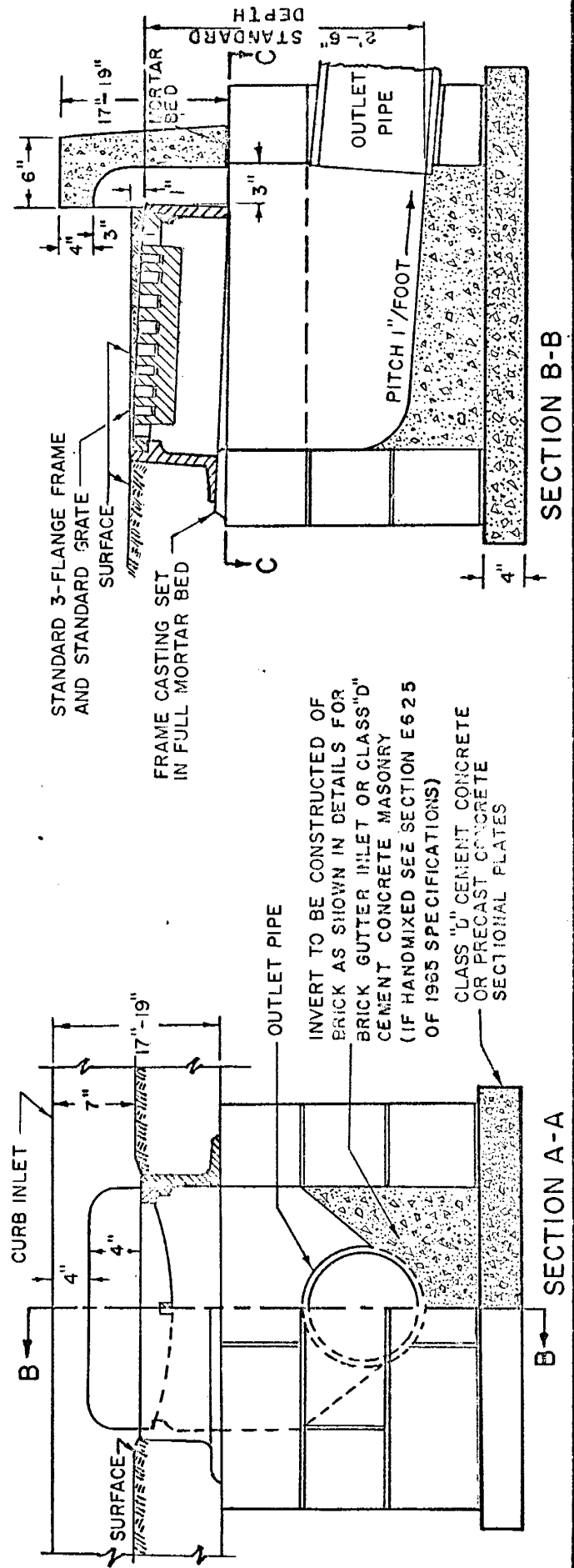
CONCRETE BLOCK GUTTER INLET



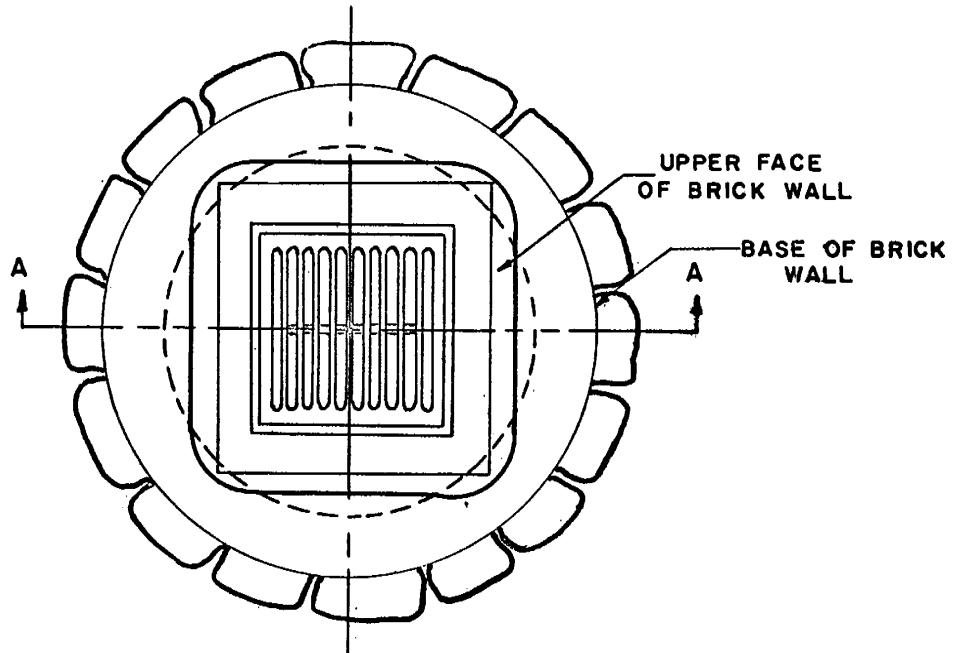
NOTES:

1. WHERE CURB INLET IS NOT USED THE INSIDE HORIZONTAL DIMENSIONS OF GUTTER INLET TO BE 24" ± 1" x 24" ± 1" WHICH CASE AND UNLESS OTHERWISE DIRECTED, A STANDARD 4-FLANGE FRAME IS TO BE USED
2. BRICKS MAY BE USED BETWEEN TOP COURSE AND FRAME FOR GRADE ADJUSTMENT
3. FOR DESCRIPTION, MATERIALS AND CONSTRUCTION METHODS, SEE SPECIFICATIONS.

SECTION C-C

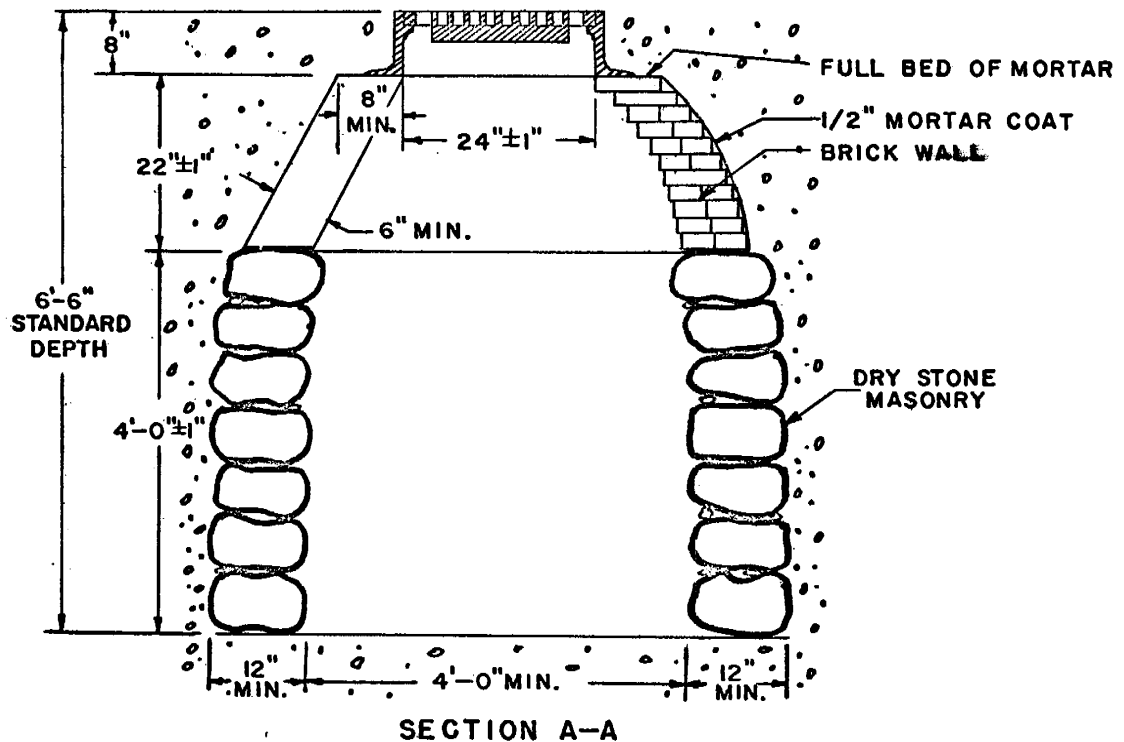


LEACHING BASIN

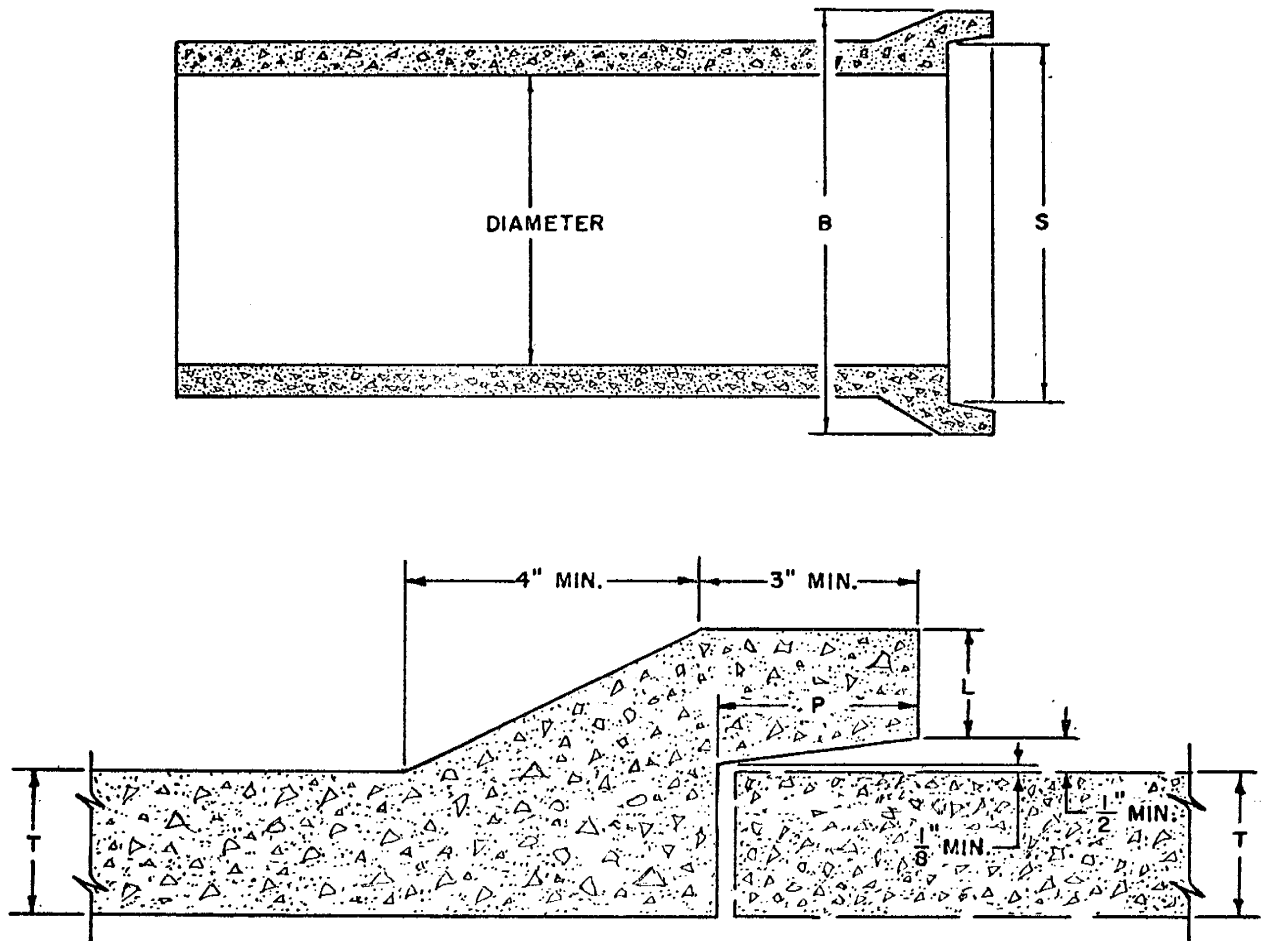


NOTES:

1. ONE STANDARD FRAME AND GRATE REQUIRED.
2. BRICK WALL TO BE 8" THICK; EVERY FIFTH COURSE TO BE HEADERS, OUTSIDE TO BE FINISHED WITH CEMENT MORTAR COATING.
3. WHEN USING CONCRETE BLOCKS, BLOCKS TO BE SET IN FULL BED OF MORTAR AND TAPERED IN 3. OR 4 COURSES.
4. BACKFILL FOR FULL DEPTH OF BASIN EXCAVATION TO BE GRAVEL.
5. FOR DESCRIPTION, MATERIALS, AND METHOD OF CONSTRUCTION, SEE SPECIFICATIONS.

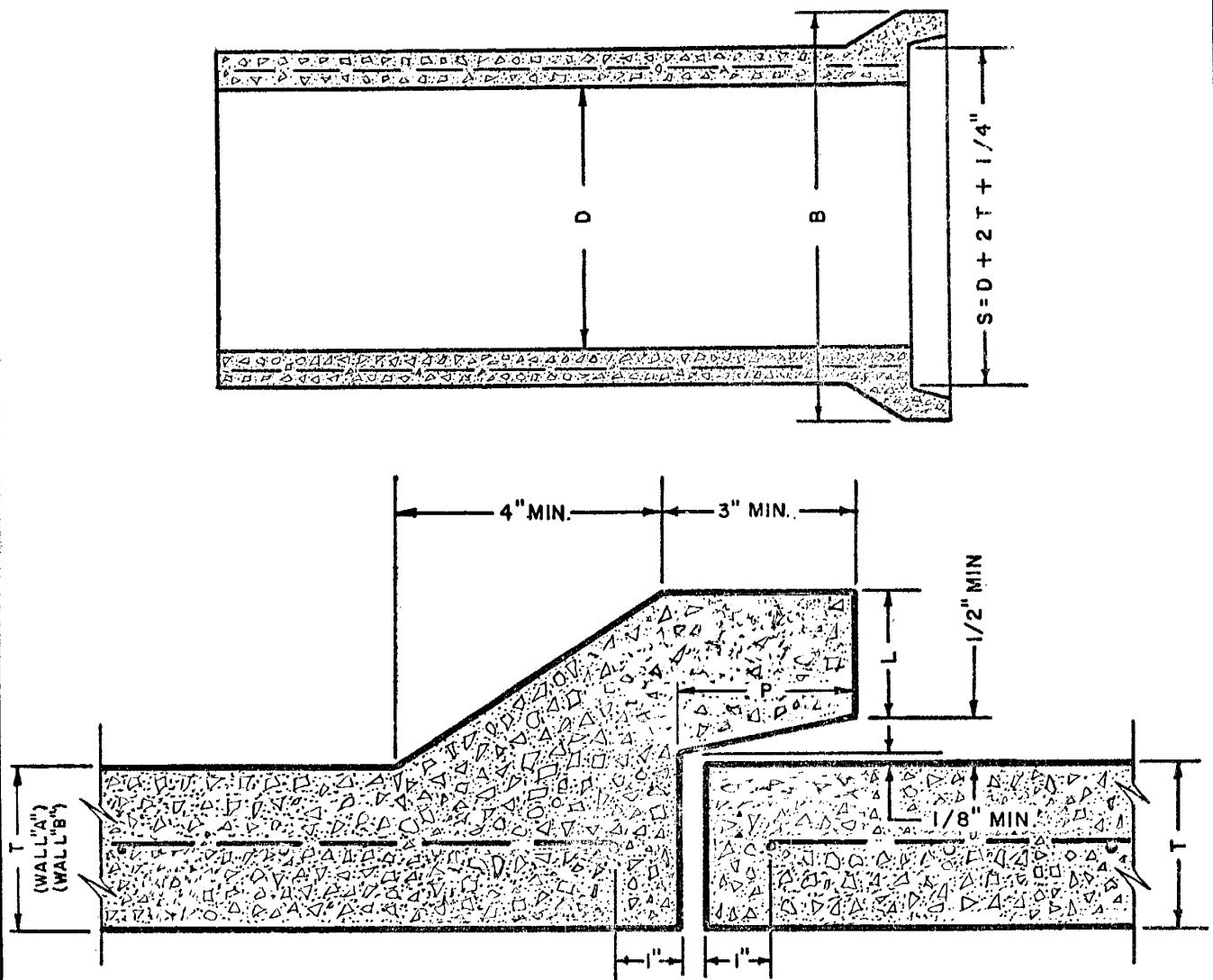


STANDARD JOINT FOR PLAIN CONCRETE PIPE SIZES 12" THROUGH 24"



NOM. DIAM. INCHES	T	B	S	P	L
	MINIMUM DIMENSIONS, INCHES				
12	$1\frac{3}{8}$	$17\frac{13}{16}$	15	$2\frac{1}{2}$	$1\frac{1}{32}$
15	$1\frac{5}{8}$	$21\frac{11}{16}$	$18\frac{1}{2}$	$2\frac{1}{2}$	$1\frac{7}{32}$
18	2	26	$22\frac{1}{4}$	$2\frac{3}{4}$	$1\frac{1}{2}$
21	$2\frac{1}{2}$	$30\frac{3}{4}$	$26\frac{1}{4}$	$2\frac{3}{4}$	$1\frac{7}{8}$
24	3	$35\frac{1}{2}$	$30\frac{1}{4}$	3	$2\frac{1}{4}$

STANDARD JOINT FOR REINFORCED CONCRETE PIPE SIZES 12" THROUGH 24"



WALL A

D	T	B	S	P	L
NOM. DIA.	MINIMUM DIMENSIONS, INCHES				
12	1 3/4	19 1/8	15 3/4	2 1/2	1 5/16
15	1 7/8	22 9/16	19	2 1/2	1 3/32
18	2	26	22 1/4	2 3/4	1 1/2
21	2 1/4	29 7/8	25 3/4	2 3/4	1 11/16
24	2 1/2	33 3/4	29 1/4	3	1 7/8

WALL B

D	T	B	S	P	L
NOM. DIA.	MINIMUM DIMENSIONS, INCHES				
12	2	20	16 1/4	2 1/2	1 1/2
15	2 1/4	23 7/8	19 3/4	2 1/2	1 11/16
18	2 1/2	27 3/4	23 1/4	2 3/4	1 7/8
21	2 3/4	31 5/8	26 3/4	2 3/4	2 1/16
24	3	35 1/2	30 1/4	3	2 1/4

NOTE

PIPE SHALL CONFORM TO THE REQUIREMENTS OF AASHTO DESIGNATION M170

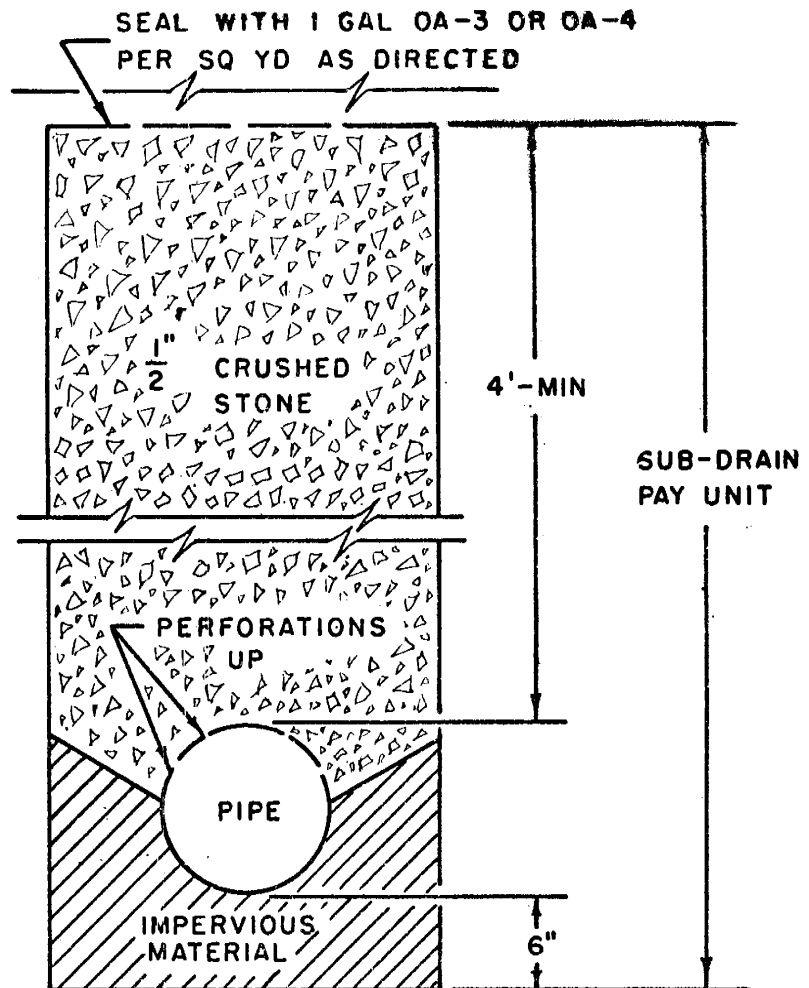
SUB-DRAINS

SUPERSEDED - - - A REVISED

STANDARD FOR SUB-DRAINS WILL BE

ISSUED AT A LATER DATE.

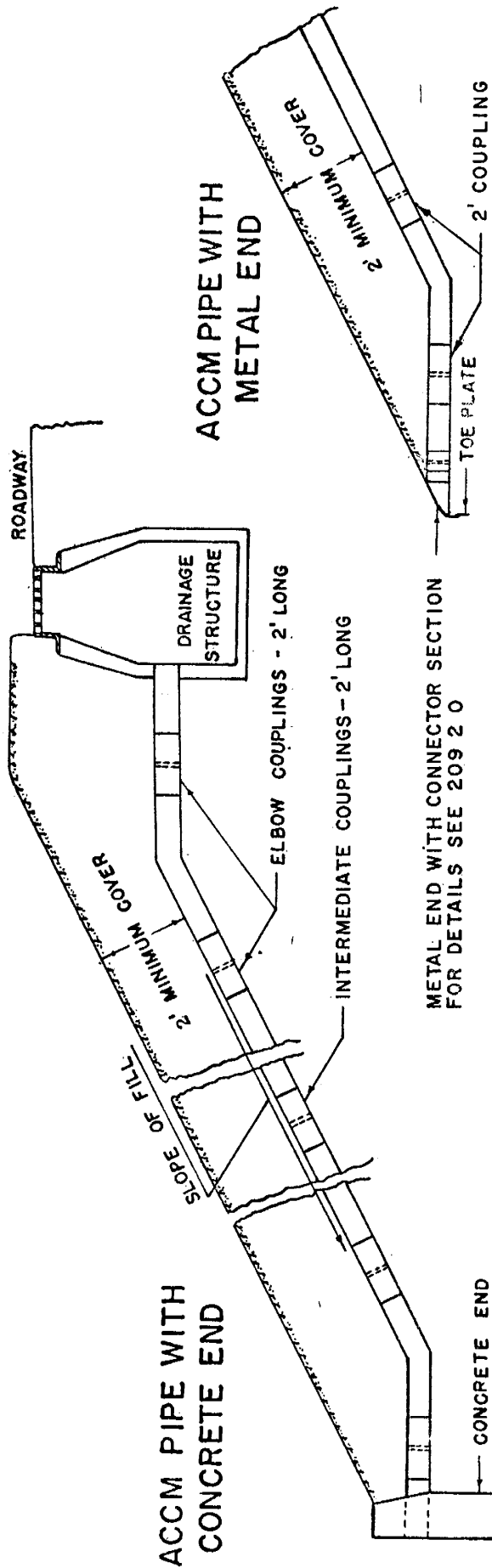
(Mass. D. P. W. - July 1966)



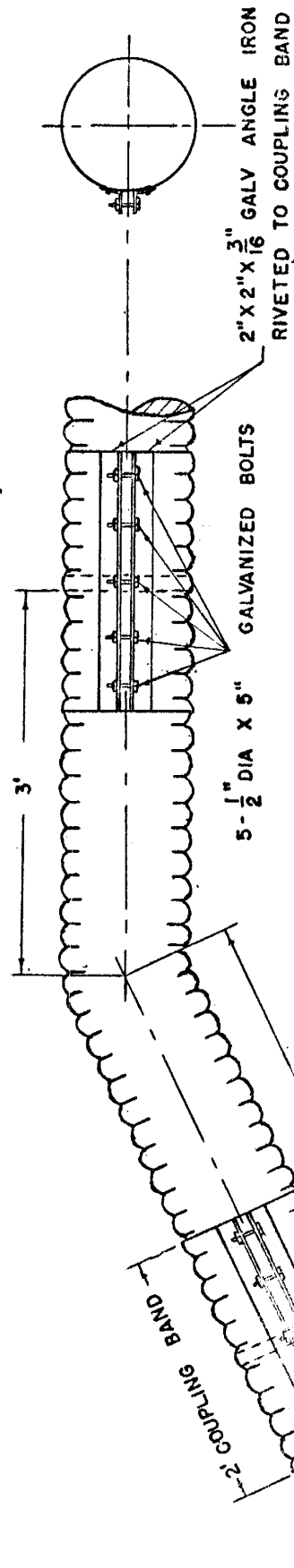
NOTES:

1. PIPE TO BE LAID WITH PERFORATIONS UP
2. FOR MATERIALS, DESCRIPTION, AND METHODS OF CONSTRUCTION, SEE SPECIFICATIONS.

ACCM PIPE UNDER FILL SLOPES



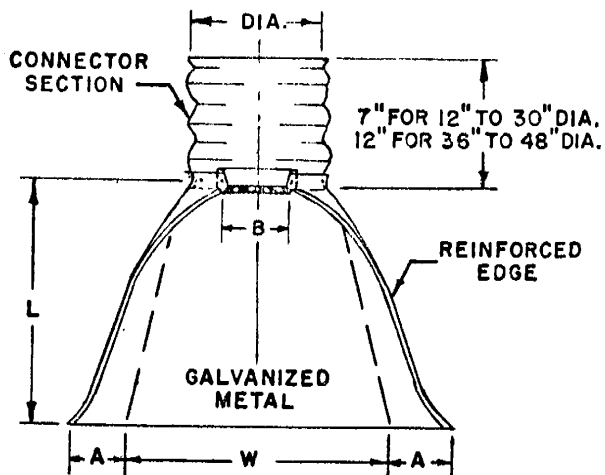
ELBOW AND COUPLING DETAILS



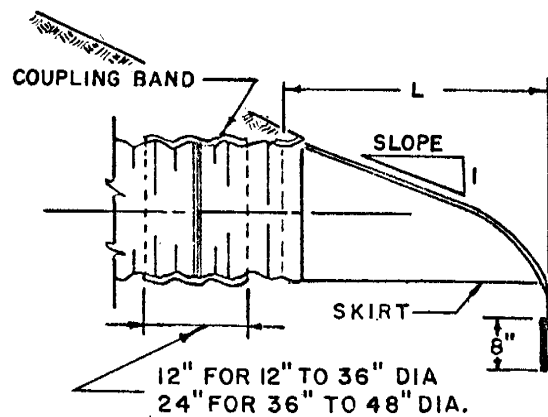
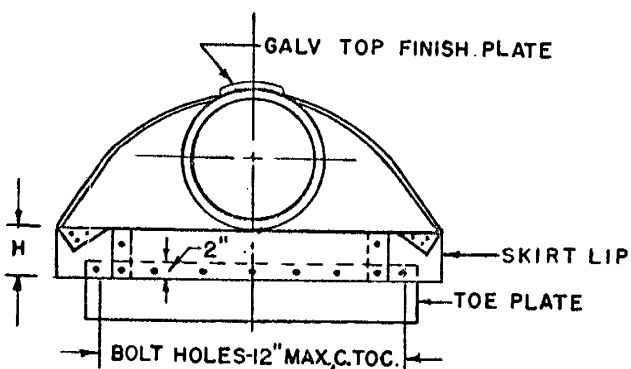
NOTE :

- 1 A TOE PLATE IS REQUIRED FOR ALL METAL ENDS
- 2 ALL METAL END UNITS AND ELBOWS TO BE SHOP FABRICATED

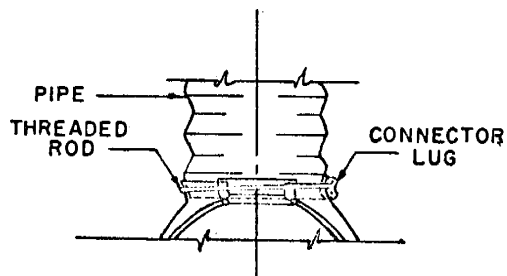
STANDARD METAL END



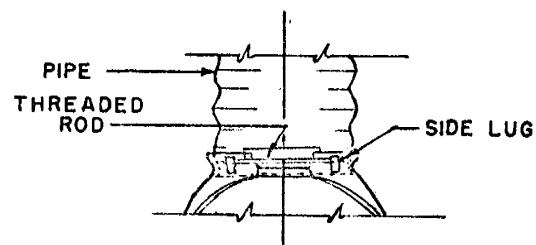
PIPE DIA. (IN.)	GA.	DIMENSIONS (IN.)					APPROX. SLOPE
		A ($\pm 1"$)	B (MAX)	H ($\pm 1"$)	L ($\pm 1\frac{1}{2}"$)	W ($\pm 2"$)	
12	16	6	6	6	21	24	2-1/2
15	16	7	8	6	26	30	2-1/2
18	16	8	10	6	31	36	2-1/2
21	16	9	12	6	36	42	2-1/2
24	16	10	13	6	41	48	2-1/2
30	14	12	16	8	51	60	2-1/2
36	14	14	19	9	60	72	2-1/2
42	12	16	22	11	69	84	2-1/2
48	12	18	27	12	78	90	2-1/4



ALTERNATE CONNECTIONS



FOR 12" TO 24" ONLY



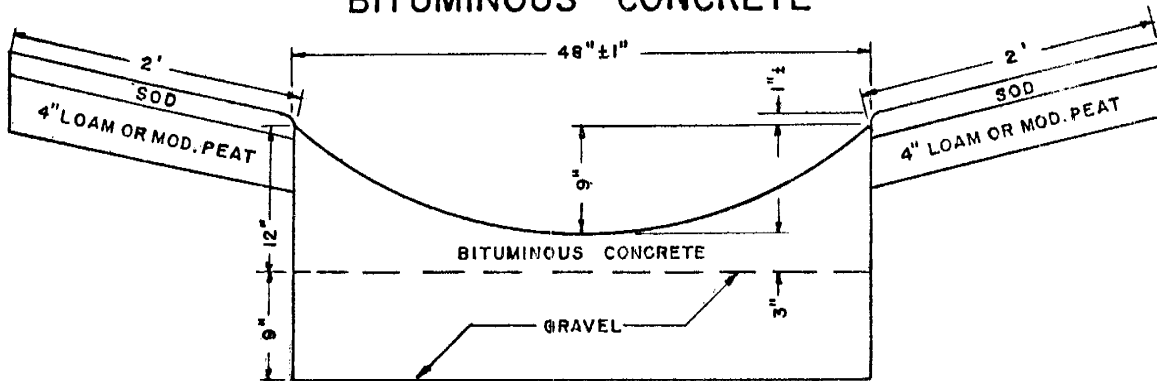
FOR 30" AND 36" ONLY

NOTE:

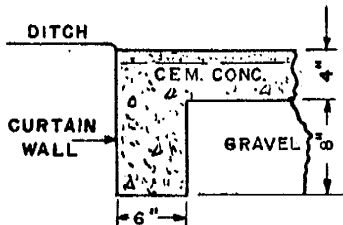
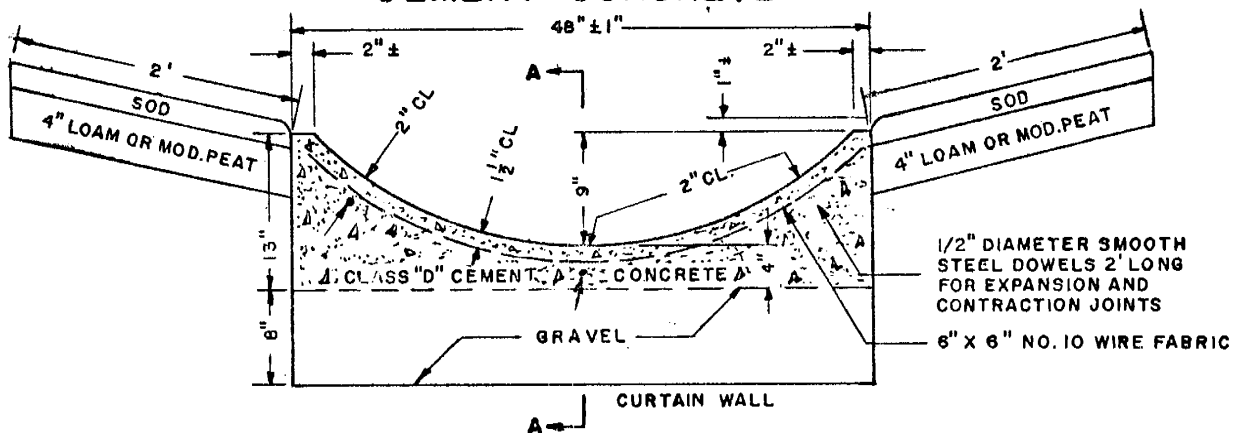
1. TOE PLATE TO BE PUNCHED TO MATCH HOLES IN SKIRT LIP 3/8" GALVANIZED BOLTS TO BE FURNISHED LENGTH OF TOE. PLATE TO BE W+10" FOR 12" TO 30" DIA. PIPE AND W+22" FOR 36" TO 48" DIA. PIPE
2. SKIRT SECTION FOR 12" TO 24" DIA. PIPE TO BE MADE IN ONE PIECE; SKIRT SECTION FOR 30" TO 48" DIA. PIPE MAY BE MADE FROM TWO SHEETS JOINED BY RIVETING OR BOLTING ON CENTER LINE WITH 3/8" DIA. FASTENERS.
3. CONNECTOR SECTION, TOE PLATE AND SKIRT TO BE OF SAME GAGE METAL, EACH TO BE GALV. AND COATED WITH A TAR BASE PAINT
4. FOR DESCRIPTION, MATERIALS AND CONSTRUCTION METHODS, SEE SPECIFICATIONS.

PAVED WATERWAYS

BITUMINOUS CONCRETE

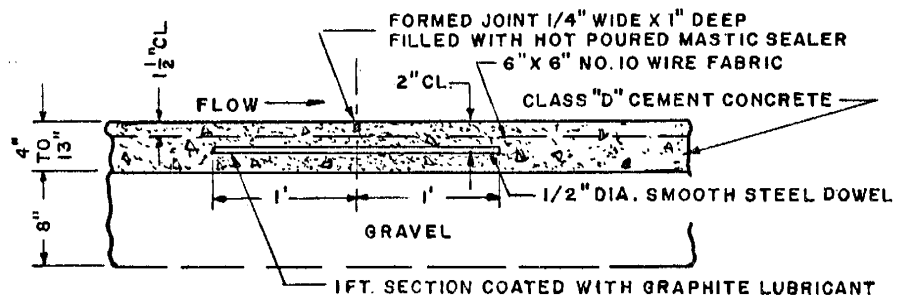


CEMENT CONCRETE



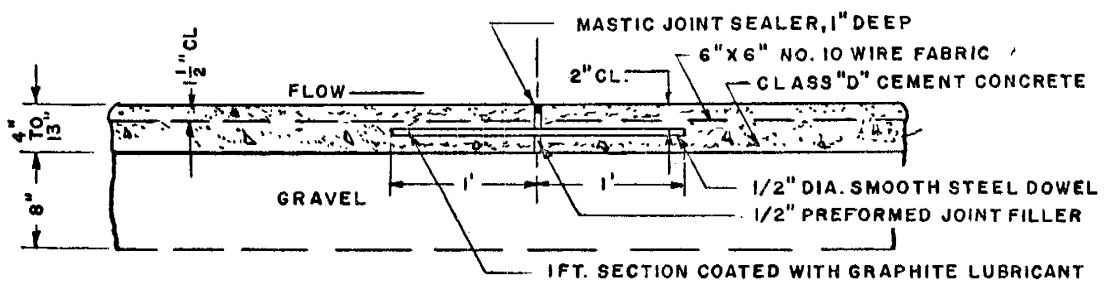
CURTAIN WALL TO BE INSTALLED
AT TERMINI OF PAVING

SECTION A-A



CONTRACTION JOINTS TO BE PLACED 30' MAXIMUM CENTER TO CENTER

DETAILS OF CONTRACTION JOINTS



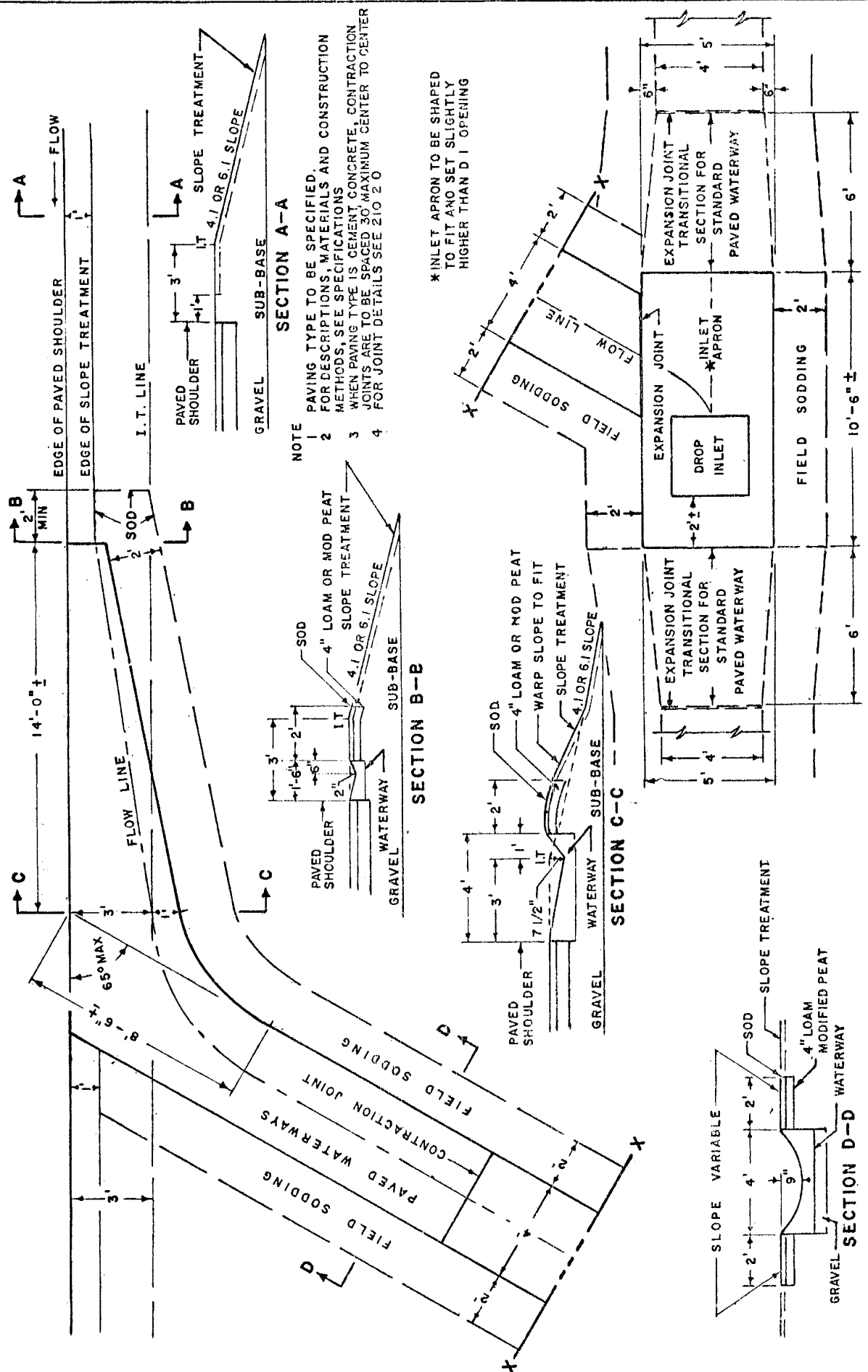
EXPANSION JOINTS TO BE INSTALLED AT APPROACHES TO STRUCTURES

DETAILS OF EXPANSION JOINTS

NOTES:

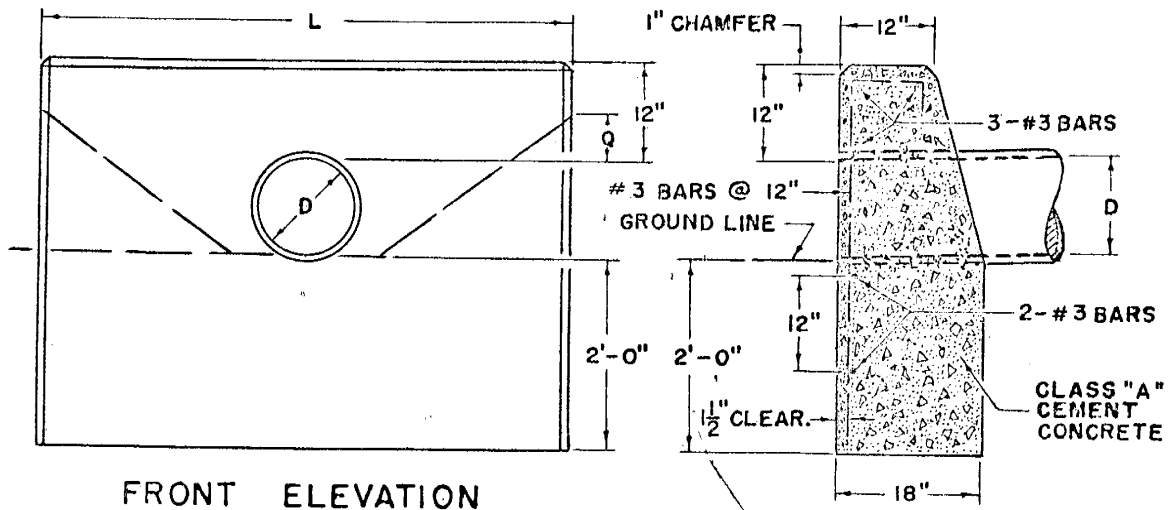
1. ON CURVED ALIGNMENT, WATERWAYS SHALL BE BANKED AS DIRECTED
2. FOR DESCRIPTIONS, MATERIALS AND CONSTRUCTION METHODS, SEE SPECIFICATIONS

PAVED WATERWAY APRONS



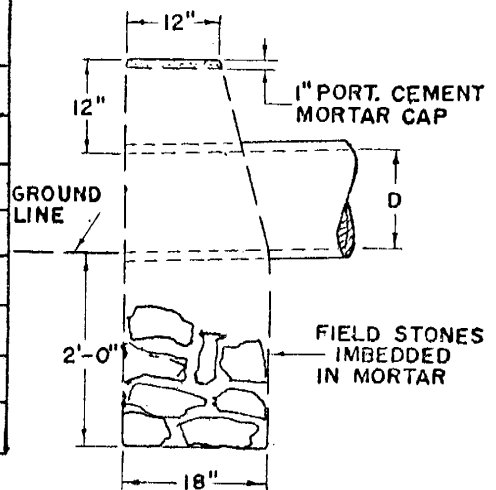
CONCRETE AND FIELD STONE MASONRY ENDS FOR 8" TO 30" PIPE CULVERTS

CONCRETE ENDS



END ELEVATION

TRENCH EXCAV. I.O. DEPTH	PIPE DIAM.	$1\frac{1}{2}$: 1 SLOPE			2 : 1 SLOPE			TRENCH EXCAV. I.O. DEPTH
CU. FT.	D	L	CONC. OR F.S.M. CU. YDS.	STEEL LBS.	L	CONC. OR F.S.M. CU. YDS.	STEEL LBS.	CU. FT.
21.60	8"	4'-2"	0.77	15	5'-10"	1.08	21	27.40
23.91	10"	4'-10"	0.92	20	6'-8"	1.28	23	30.35
26.25	12"	5'-6"	1.08	21	7'-6"	1.49	29	33.25
29.75	15"	6'-6"	1.34	24	8'-9"	1.82	32	37.63
33.25	18"	7'-6"	1.61	30	10'-0"	2.18	39	42.00
37.35	21"	8'-8"	1.95	34	11'-6"	2.62	43	47.25
39.38	24"	9'-3"	2.16	35	12'-6"	2.97	50	50.75
43.75	30"	10'-6"	2.63	44	15'-0"	3.86	62	59.50
		Q						
		4" FOR $1\frac{1}{2}$: 1 SLOPE						
		6" FOR 2 : 1 SLOPE						

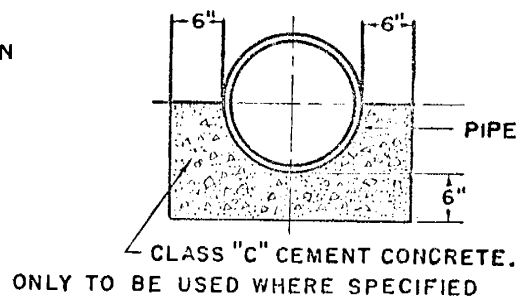


END ELEVATION

CONCRETE CRADLE FOR PIPE CULVERTS

NOTE:

1. FOR DESCRIPTIONS, MATERIALS AND CONSTRUCTION METHODS, SEE SPECIFICATIONS.
2. ALL CONCRETE DIMENSIONS SHOWN ARE MINIMUM.
3. PAYMENTS WILL BE BASED ON THE ACCOMPANYING TABLE.



NOTE

- 2 ALL CONCRETE DIMENSIONS SHOWN ARE MINIMUM

3 PAYMENTS WILL BE BASED ON THE QUANTITIES SHOWN
IN THE ACCOMPANYING TABLE



FIELD STONE MASONRY ENDS

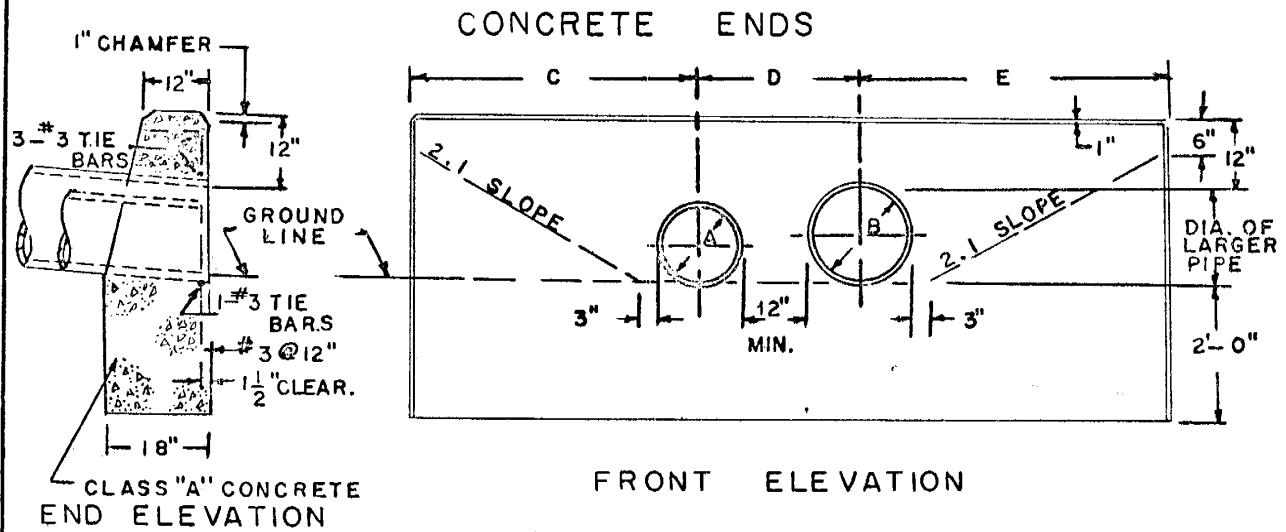
[illegible]

ELEV A-A SECTION B-B

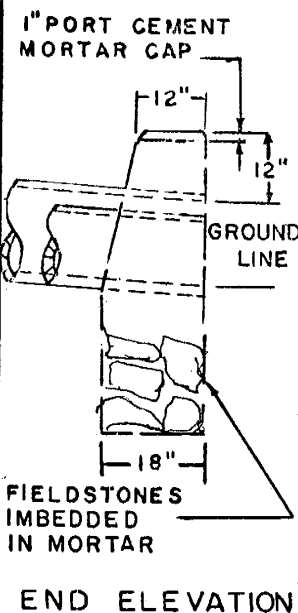
FRONT ELEVATION

SECTION C-C ELEV D-D

CONCRETE AND FIELDSTONE MASONRY COMBINATION ENDS FOR PIPES UP TO 30" DIAMETER



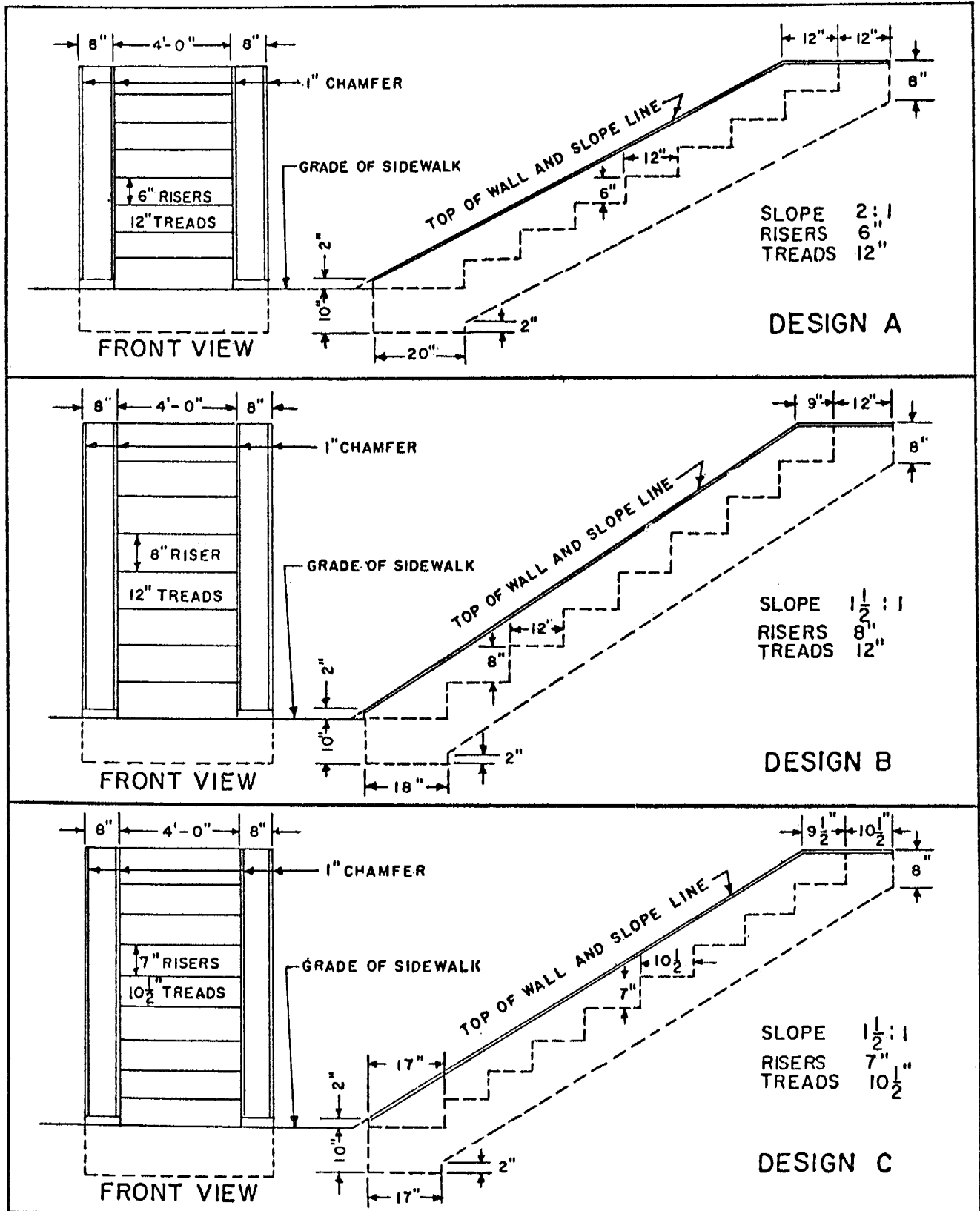
FIELD STONE MASONRY ENDS



DESIGN NO.	DIAMETER IN INCHES		LENGTHS			CUBIC YARDS OF MASONRY	POUNDS OF STEEL	CU. FT. TRENCH EX. 1.0' DEPTH
	A	B	C	D	E			
1	12"	12"	3'-9"	2'-2"	3'-9"	1.89	37	40.85
2	12"	15"	4'-3"	2'-4"	4'-5"	2.27	42	45.50
3	12"	18"	4'-9"	2'-6"	5'-0"	2.66	48	49.88
4	12"	21"	5'-4"	2'-8"	5'-8"	3.12	54	54.85
5	12"	24"	5'-9"	2'-10"	6'-3"	3.54	59	58.91
6	12"	30"	6'-9"	3'-0"	7'-6"	4.48	71	67.38
7	15"	15"	4'-5"	2'-6"	4'-5"	2.32	41	46.66
8	15"	18"	4'-11"	2'-8"	5'-0"	2.72	48	51.03
9	15"	21"	5'-5"	2'-10"	5'-8"	3.16	54	55.72
10	15"	24"	5'-11"	3'-0"	6'-3"	3.60	60	60.10
11	15"	30"	6'-11"	3'-2"	7'-6"	4.54	72	68.53
12	18"	18"	5'-0"	2'-8"	5'-0"	2.72	48	51.35
13	18"	21"	5'-7"	2'-10"	5'-8"	3.17	52	56.28
14	18"	24"	6'-0"	3'-0"	6'-3"	3.58	60	60.38
15	18"	30"	7'-0"	3'-2"	7'-6"	4.53	72	68.85
16	21"	21"	5'-8"	3'-0"	5'-8"	3.20	53	57.19
17	21"	24"	6'-2"	3'-4"	6'-3"	3.69	61	62.13
18	21"	30"	7'-2"	3'-6"	7'-6"	4.65	73	70.60
19	24"	24"	6'-3"	3'-4"	6'-3"	3.67	61	62.40
20	24"	30"	7'-3"	3'-8"	7'-6"	4.69	74	64.47
21	30"	30"	7'-6"	4'-0"	7'-6"	4.76	75	73.50

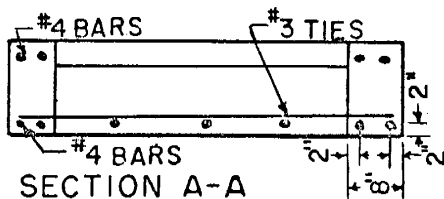
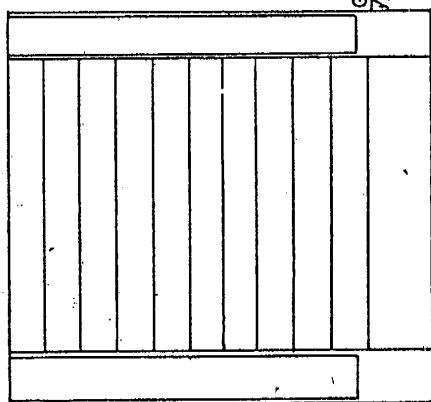
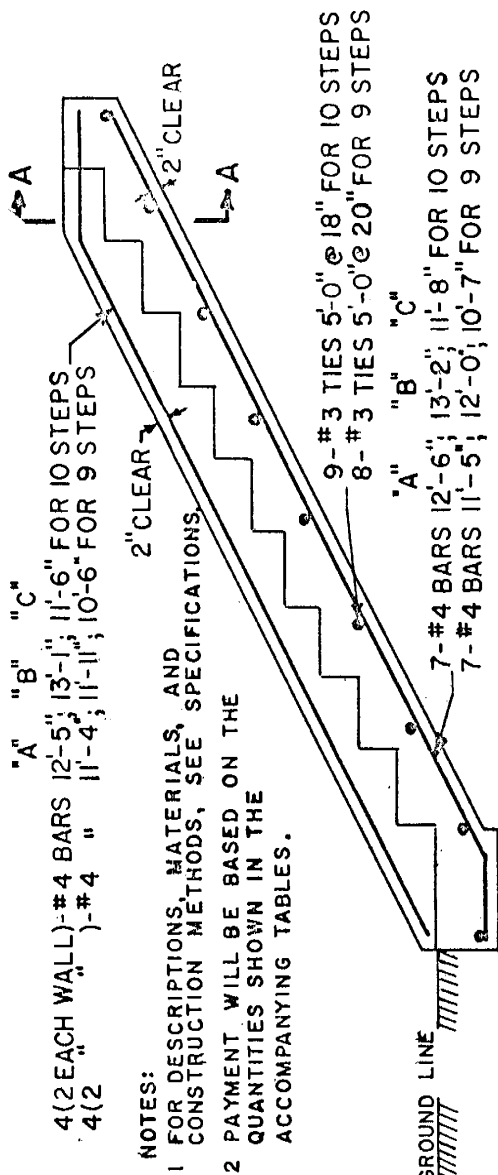
- NOTE: 1. FOR DESCRIPTIONS, MATERIALS, AND CONSTRUCTION METHODS, SEE SPECIFICATIONS.**
2. ALL CONCRETE DIMENSIONS SHOWN ARE MINIMUM
3. PAYMENTS WILL BE BASED ON THE QUANTITIES SHOWN IN THE ACCOMPANYING TABLE

CEMENT CONCRETE STEPS



- NOTES: 1. WHERE IRON PIPE HAND RAIL IS REQUIRED SEE 409.1.0 FOR DETAILS
 2. ALL CONCRETE DIMENSIONS SHOWN ARE MINIMUM EXCEPT RISERS AND TREADS WHICH HAVE $\pm \frac{1}{4}$ " TOLERANCE
 3. FOR REINFORCING STEEL AND CONCRETE QUANTITIES SEE 301.2.0.

CEMENT CONCRETE STEPS



SECTION A-A

FRONT VIEW

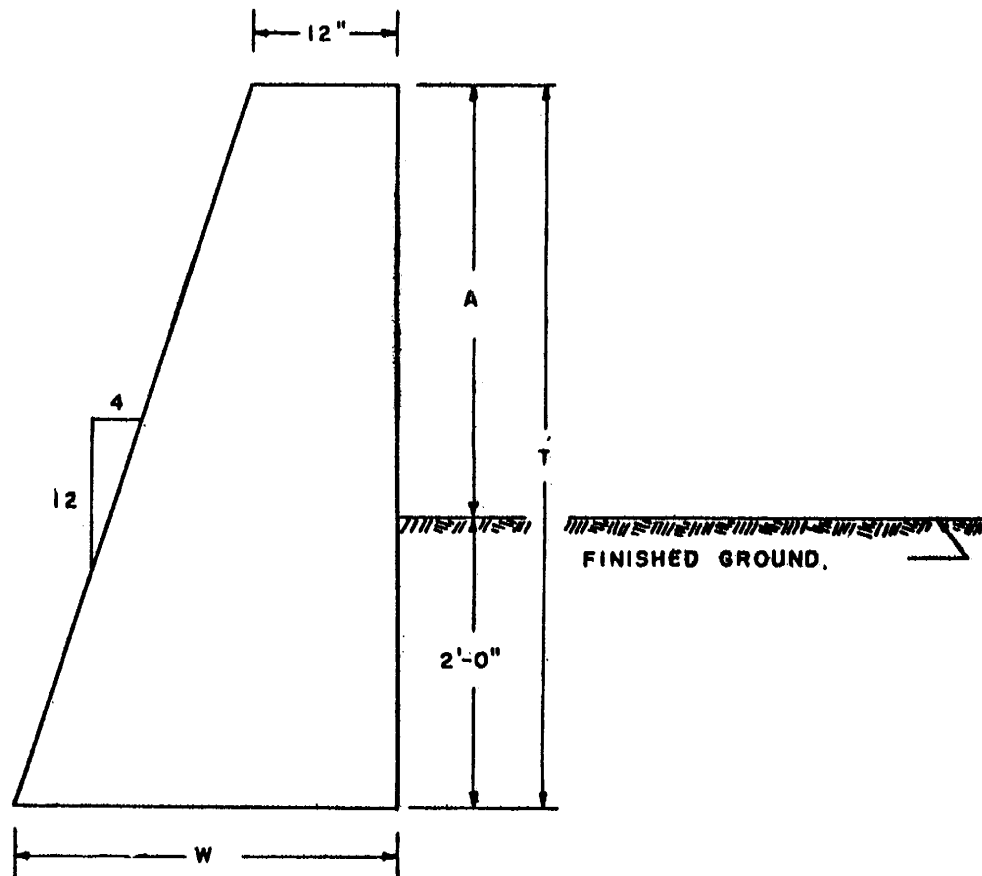
SIDE VIEW

FOR DESIGNS "A", "B", AND "C" SEE 301.1.0

FOR DESIGNS A, B, AND C SEE CONT'D

DESIGN A-CLASS "A" CONCRETE										DESIGN B-CLASS "A" CONCRETE										DESIGN C-CLASS "A" CONCRETE									
STEP NOS.	QUANTITIES - CU. FT.			TOTAL CY	REIN. STEEL LBS.	QUANTITIES - CU. FT.			TOTAL CY	REIN. STEEL LBS.	QUANTITIES - CU. FT.			TOTAL CY	REIN. STEEL LBS.	QUANTITIES - CU. FT.			TOTAL CY	REIN. STEEL LBS.									
	BASE	STEPS	2-WALLS			BASE	STEPS	2-WALLS			BASE	STEPS	2-WALLS			BASE	STEPS	2-WALLS											
2	5.55	7.33	6.26	19.15	0.71	—	5.00	8.00	6.53	19.53	0.72	—	4.72	6.71	5.65	17.08	0.63	—											
3	5.55	11.00	8.48	25.03	0.93	—	5.00	12.00	8.97	25.97	0.96	—	4.72	10.06	7.69	22.48	0.83	—											
4	5.55	14.66	10.70	30.92	1.15	—	5.00	16.00	11.42	32.42	1.20	—	4.72	13.42	9.73	27.87	1.03	—											
5	5.55	18.33	12.92	36.81	1.36	—	5.00	20.00	13.86	38.86	1.44	—	4.72	16.77	11.78	33.27	1.23	—											
6	5.55	22.00	15.15	42.70	1.58	—	5.00	24.00	16.30	45.30	1.68	—	4.72	20.12	13.82	38.66	1.43	—											
7	5.55	25.66	17.37	48.59	1.80	—	5.00	28.00	18.75	51.75	1.92	—	4.72	23.48	15.86	44.06	1.63	—											
8	5.55	29.33	19.59	54.47	2.02	—	5.00	32.00	21.19	58.19	2.16	—	4.72	26.83	17.90	49.46	1.83	—											
9	5.55	33.00	21.81	60.36	2.24	99	5.00	36.00	23.64	64.64	2.39	103	4.72	30.19	19.94	54.85	2.03	92											
10	5.55	36.66	24.03	66.25	2.45	109	5.00	40.00	26.08	71.08	2.63	113	4.72	33.54	22.00	60.25	2.23	102											

LOW RETAINING WALLS



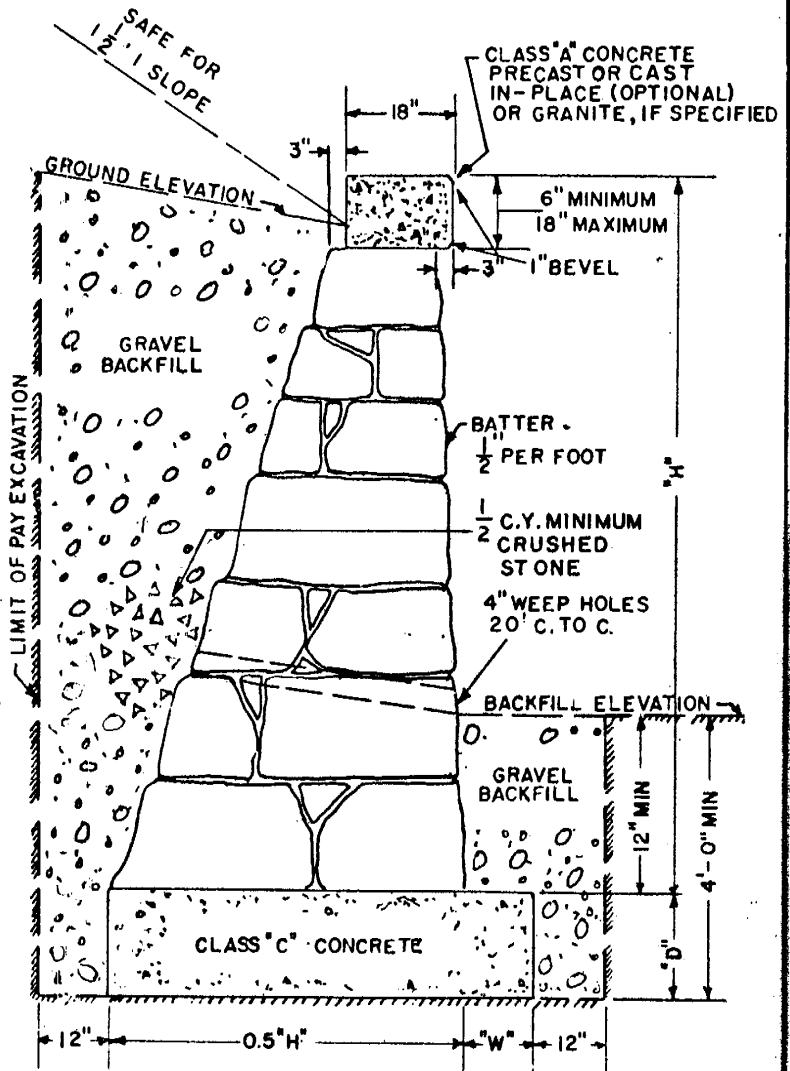
NOTES:

1. CLASS "A" CEMENT CONCRETE TO BE USED.
2. EXPANSION JOINTS TO BE PLACED 90' O.C. MAXIMUM WITH INTERMEDIATE CONSTRUCTION JOINTS PLACED AT 30' O.C. MAXIMUM.
3. ALL CONCRETE DIMENSIONS SHOWN ARE MINIMUM.
4. PAYMENTS WILL BE BASED ON TABLE BELOW.

HEIGHTS		WIDTH	AREA	CU. YDS.
A	T	W	SQ. FT.	PER LIN. FT.
2'-0"	4'-0"	2'-4"	6.667	0.247
2'-6"	4'-6"	2'-6"	7.875	0.292
3'-0"	5'-0"	2'-8"	9.165	0.339
3'-6"	5'-6"	2'-10"	10.541	0.390
4'-0"	6'-0"	3'-0"	12.000	0.444
4'-6"	6'-6"	3'-2"	13.541	0.502
5'-0"	7'-0"	3'-4"	15.162	0.562

CEMENTED STONE MASONRY WALL

H	W	D	CONC. MASONRY FOOTING		STONE MASONRY EXCLUDING COPING	
			SECTION AREA SQ. FT.	CU. YD. PER LIN. FT.	SECTION AREA SQ. FT.	CU. YD. PER LIN. FT.
5.0	0.75	1.25	4.06	0.150	9.00	0.333
5.5			4.38	0.162	10.63	0.394
6.0			4.69	0.174	12.38	0.458
6.5			5.00	0.185	14.16	0.524
7.0			5.31	0.197	16.05	0.594
7.5			5.63	0.208	18.06	0.669
8.0	1.0	1.5	7.50	0.278	20.16	0.747
8.5			7.88	0.292	22.40	0.829
9.0			8.25	0.306	24.75	0.917
9.5			8.63	0.319	27.22	1.008
10.0	1.2	2.0	12.40	0.459	29.80	1.104
10.5			12.90	0.478	32.50	1.204
11.0			13.40	0.496	35.28	1.307
11.5			13.90	0.515	38.21	1.415
12.0			14.40	0.533	41.25	1.528
12.5			14.90	0.552	44.41	1.645
13.0	1.5	2.5	20.00	0.741	47.68	1.766
13.5			20.63	0.764	51.07	1.891
14.0			21.25	0.787	54.53	2.020
14.5			21.88	0.810	58.14	2.153
15.0			22.50	0.833	61.88	2.292
15.5			23.13	0.856	65.72	2.434
16.0			23.75	0.880	69.68	2.581
16.5	1.8	3.0	30.15	1.117	73.76	2.732
17.0			30.90	1.144	77.90	2.885
17.5			31.65	1.172	82.21	3.045
18.0			32.40	1.200	86.63	3.208
18.5			33.15	1.228	91.38	3.384
19.0			33.90	1.256	96.25	3.565
19.5			34.65	1.283	101.25	3.750
20.0			35.40	1.311	106.38	3.940
20.5			36.15	1.339	111.63	4.134
21.0			36.90	1.367	117.00	4.333
21.5			37.65	1.394	122.50	4.537
22.0			38.40	1.422	128.13	4.745
22.5			39.15	1.450	133.88	4.958
23.0			39.90	1.478	139.75	5.176
23.5			40.65	1.506	145.75	5.398
24.0			41.40	1.533	151.88	5.625
24.5			42.15	1.561	158.13	5.856
25.0			42.90	1.589	164.50	6.093
25.5			43.65	1.617	171.00	6.333
26.0			44.40	1.644	177.63	6.579
26.5			45.15	1.672	184.38	6.829



NOTES:

1. COPING OVERHANG 3" FOR WALLS 10' AND OVER IN HEIGHT AND 2" FOR WALLS LESS THAN 10' EXCEPT IN A CONTINUOUS WALL OF VARYING HEIGHT WHEN THE OVERHANG WILL BE 2" OR 3" FOR ENTIRE LENGTH.
2. ALL DIMENSIONS SHOWN ARE MINIMUM
3. PAYMENT WILL BE BASED ON ACCOMPANYING TABLE.

COPING TO BE PRECAST CONCRETE OR GRANITE OF UNIFORM DEPTH FOR ENTIRE LENGTH DEPTH OF CONCRETE TO BE $\frac{1}{12}$ THE AVERAGE "H" WITHIN THE LIMITS SHOWN. DEPTH OF GRANITE TO BE AS SHOWN ON THE PLANS, 6" OR 9"

FOR CHAIN LINK FENCE ON TOP OF WALL, THE COPING SHALL BE CONCRETE CAST-IN-PLACE WITH A MINIMUM DEPTH OF 12 THE LENGTH OF GALVANIZED WROUGHT IRON PIPE SLEEVES FOR FENCE POSTS SHALL BE EQUAL TO DEPTH OF COPING.

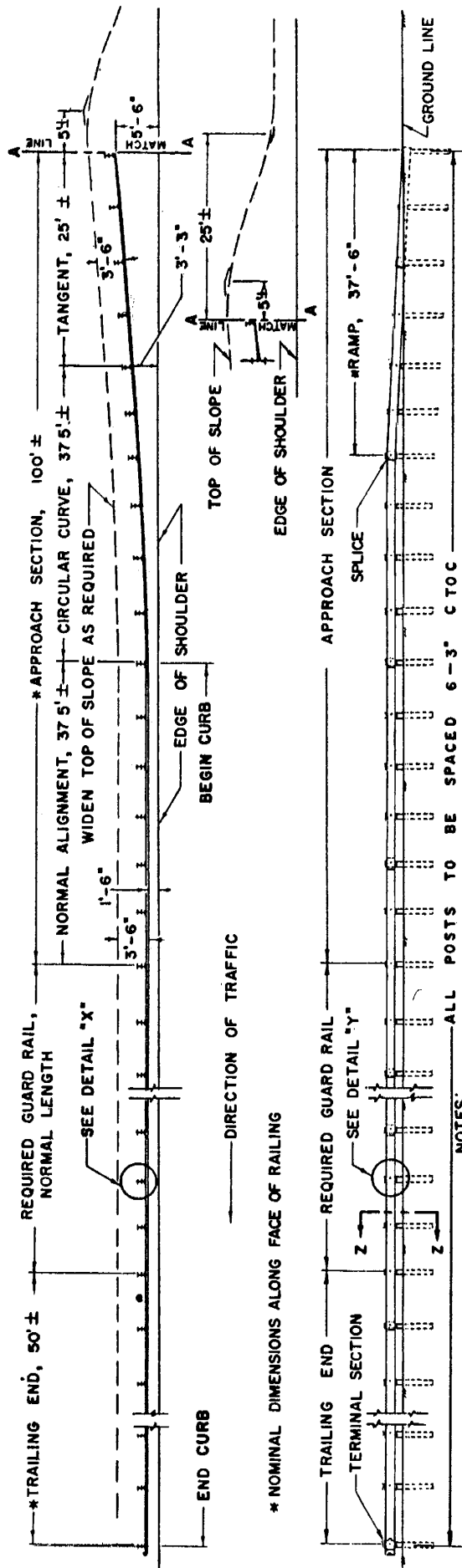
CONCRETE REINFORCING STEEL

STANDARD REINFORCING BARS

BAR SIZES		WEIGHT POUNDS PER FOOT	NOMINAL DIMENSION— ROUND SECTIONS		
OLD (INCHES)	NEW (NOS.)		DIAMETER INCHES	CROSS SECTIONAL AREA-SQ.INCHES	PERIMETER INCHES
($\frac{1}{4}$)	②	.167	.250	.05	.786
($\frac{3}{8}$)	③	.376	.375	.11	1.178
($\frac{1}{2}$)	④	.668	.500	.20	1.571
($\frac{5}{8}$)	⑤	1.043	.625	.31	1.963
($\frac{3}{4}$)	⑥	1.502	.750	.44	2.356
($\frac{7}{8}$)	⑦	2.044	.875	.60	2.749
(1)	⑧	2.670	1.000	.79	3.142
[1]	⑨	3.400	1.128	1.00	3.544
[$1\frac{1}{8}$]	⑩	4.303	1.270	1.27	3.990
[$1\frac{1}{4}$]	⑪	5.313	1.410	1.56	4.430

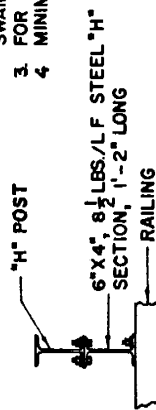
THE NEW BAR NUMBERS ARE BASED ON THE NUMBER OF $\frac{1}{8}$ INCHES INCLUDED IN THE NOMINAL DIAMETER OF THE BAR.
 BAR NUMBER 2 IN PLAIN ROUNDS ONLY. BARS NUMBERED 9, 10 AND 11 ARE ROUND BARS AND EQUIVALENT IN WEIGHT AND NOMINAL CROSS-SECTIONAL AREA TO OLD TYPE 1", $1\frac{1}{8}$ " AND $1\frac{1}{4}$ " SQUARE BARS.

STEEL BEAM HIGHWAY GUARD TYPE SS

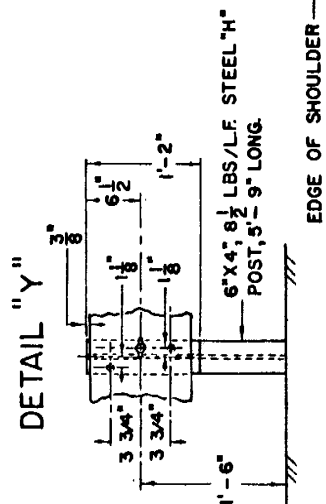


- NOTES:**
1. EMBANKMENTS OVER 15 FEET IN HEIGHT SHALL BE USED AS A GUIDE IN DETERMINING THE NEED FOR GUARD RAIL (GENERALLY, 2:1 EMBANKMENT SLOPES ARE USED WHERE HEIGHT OF FILL IS GREATER THAN 15 FEET)
 2. DESIGNERS TO DETERMINE NEED FOR GUARD RAIL ON FILLS LESS THAN 15 FEET IN CASES SUCH AS ACROSS SWAMPS, AT SHARP CURVATURES, AT HAZARDOUS LOCATIONS, ETC
 3. FOR DESCRIPTIONS, MATERIALS AND CONSTRUCTION METHODS, SEE SPECIFICATIONS
 4. MINIMUM LENGTH OF GUARD RAIL SECTION TO BE 200'

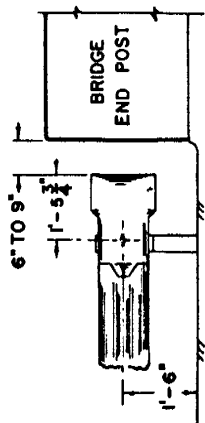
DETAIL "X"



SECTION Z-Z



GUARD RAIL ADJACENT TO BRIDGE

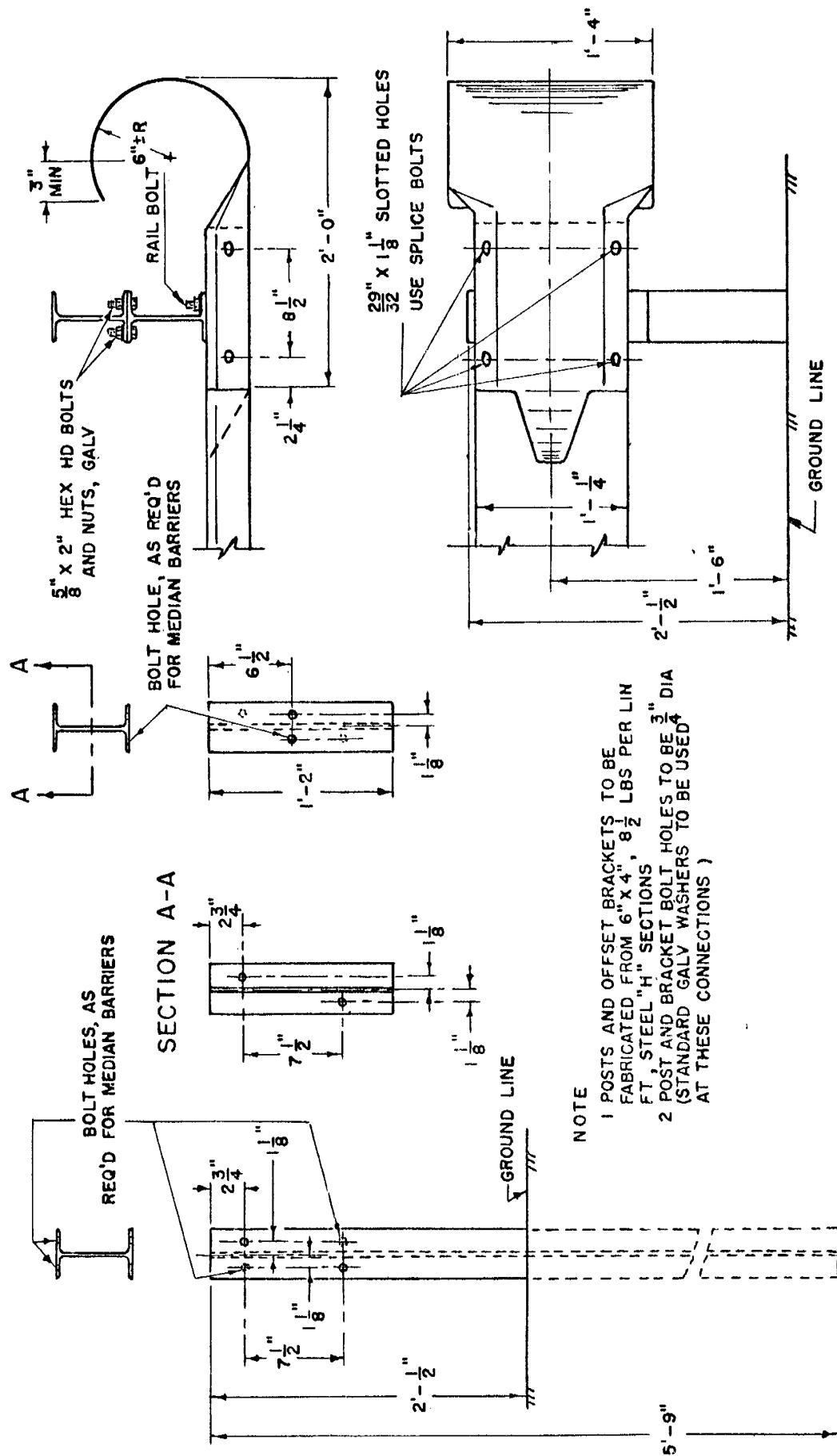


STEEL BEAM HIGHWAY GUARD TYPE SS

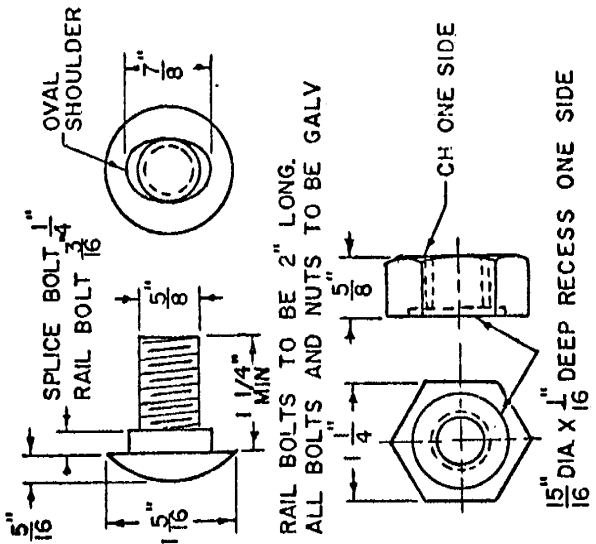
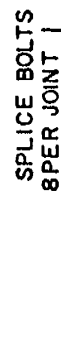
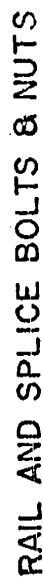
POST

OFFSET BRACKET

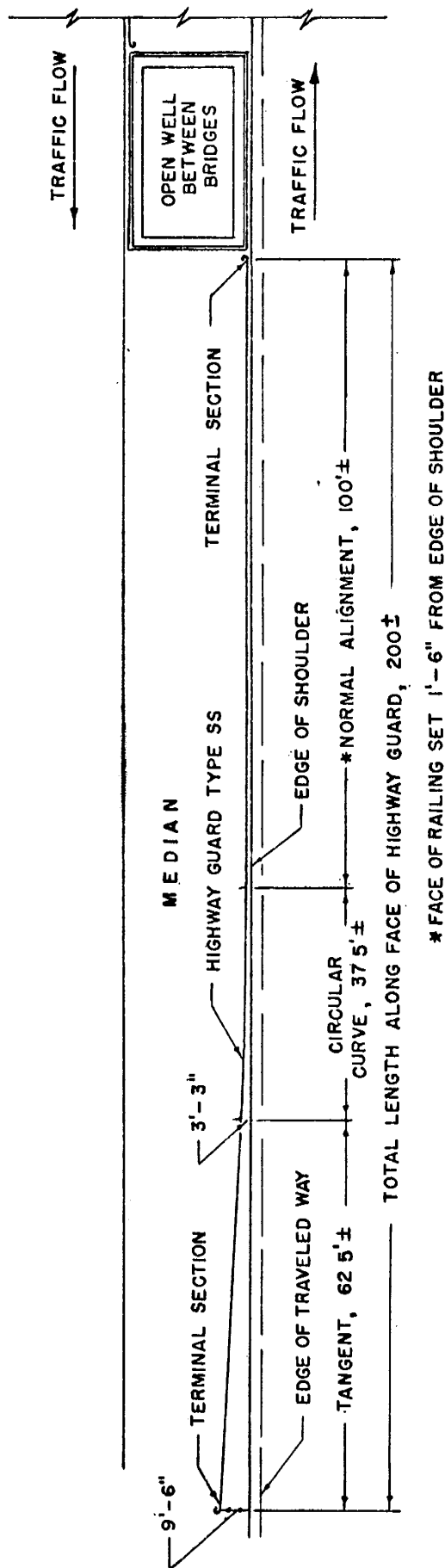
TERMINAL SECTION



SECTION THROUGH RAIL AT SPLICE



INSTALLATION OF HIGHWAY GUARD IN MEDIANS WITH OPEN WELL BETWEEN TWIN BRIDGES

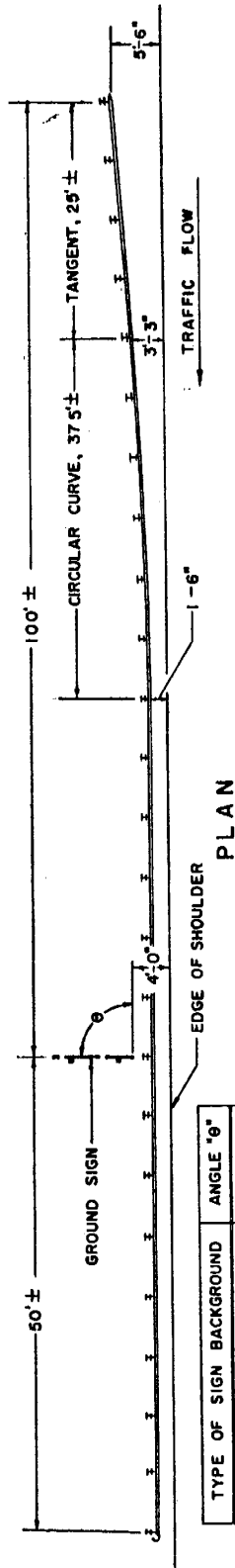


NOTES:

- 1 THIS TYPE OF INSTALLATION IS ONLY APPLICABLE WHERE HIGHWAY GUARD IS NOT NORMALLY REQUIRED
- 2 SEE 40110, 40120, & 40130 FOR DETAILS
3. FOR DESCRIPTIONS, MATERIALS AND CONSTRUCTION METHODS, SEE SPECIFICATIONS.
- 4 ALL POSTS TO BE SPACED 6'-3" CENTER TO CENTER

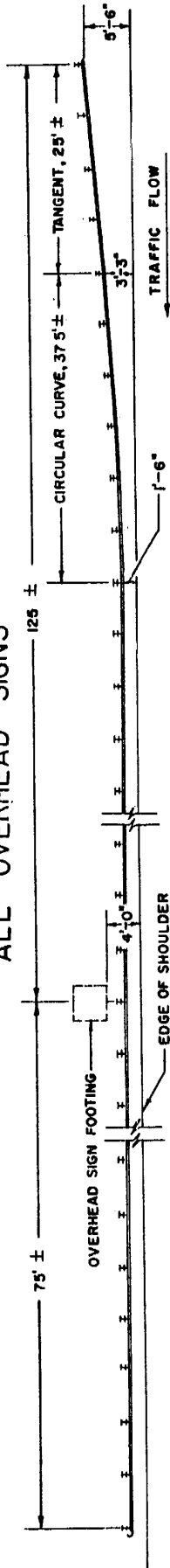
INSTALLATION OF TYPE SS HIGHWAY GUARD FOR SIGN PROTECTION

GROUND SIGNS 200 SQ. FT. AND OVER



TYPE OF SIGN BACKGROUND	ANGLE "θ"
REFLECTORIZED	93°
NON-REFLECTORIZED	89°

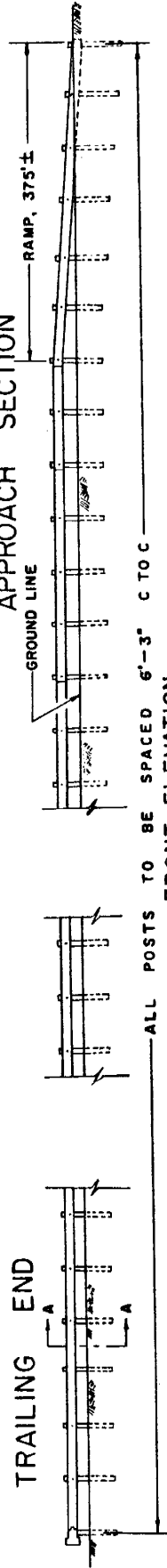
ALL OVERHEAD SIGNS



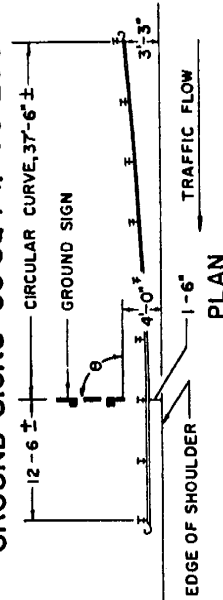
PLAN

TRAILING END

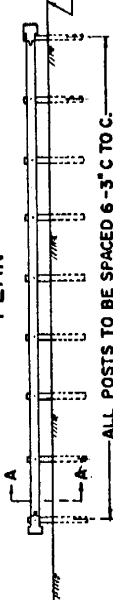
APPROACH SECTION



GROUND SIGNS 60 SQ. FT. TO 200 SQ. FT.



PLAN



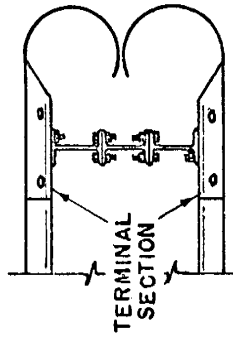
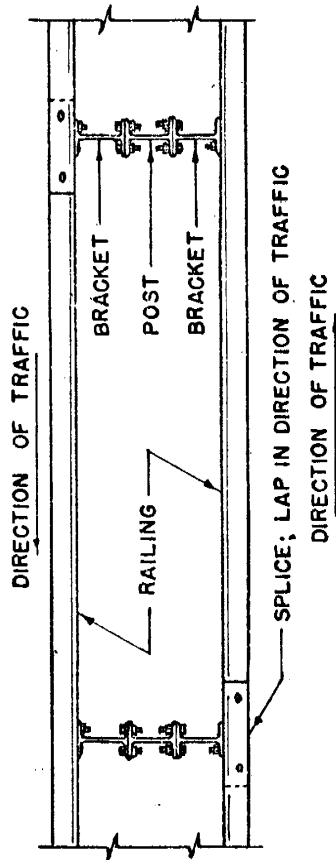
FRONT ELEVATION

SECTION A-A

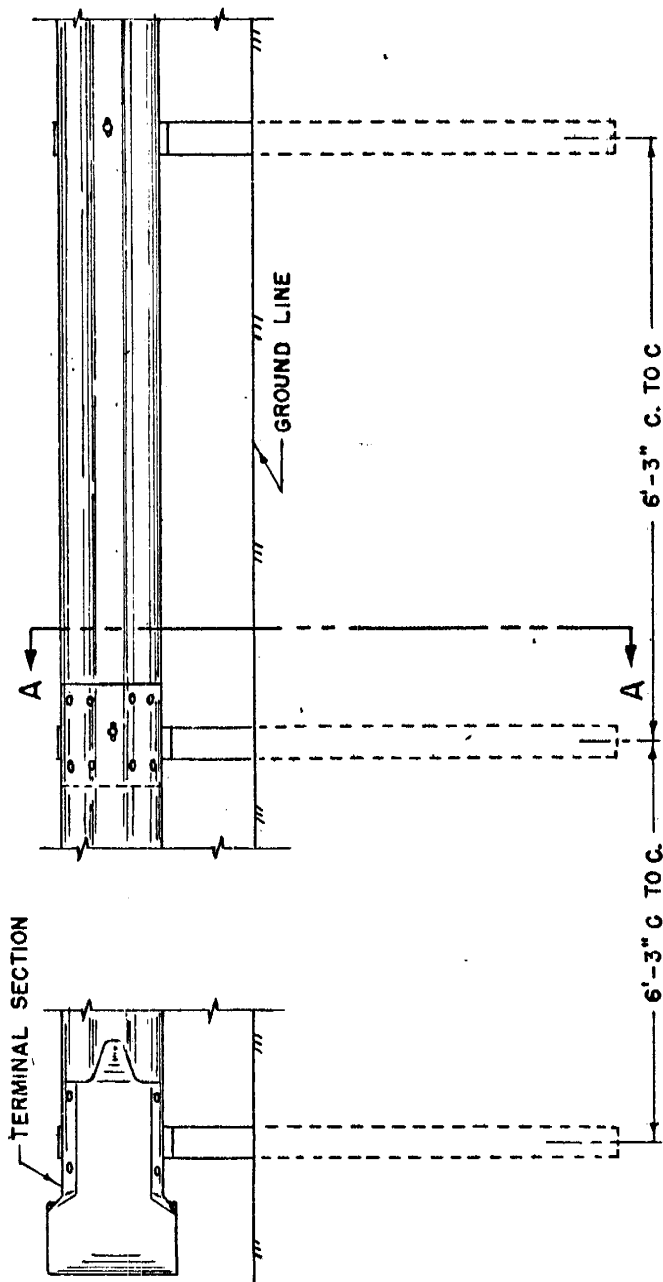
- NOTE:
- 1 LENGTHS OF HIGHWAY GUARD SHOWN ARE MEASUREMENTS ALONG FACE OF RAILING
 - 2 FOR DESCRIPTIONS, MATERIALS AND CONSTRUCTION METHODS, SEE SPECIFICATIONS AND 401J O, 401K O, 401L O FOR DETAILS.

NOTE: TO BE USED FOR LIGHT STANDARD PROTECTION WHERE DIRECTED

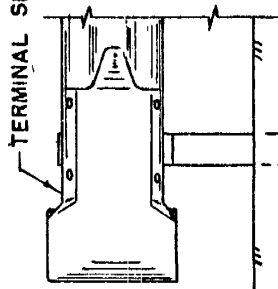
MEDIAN BARRIERS



SECTION A-A

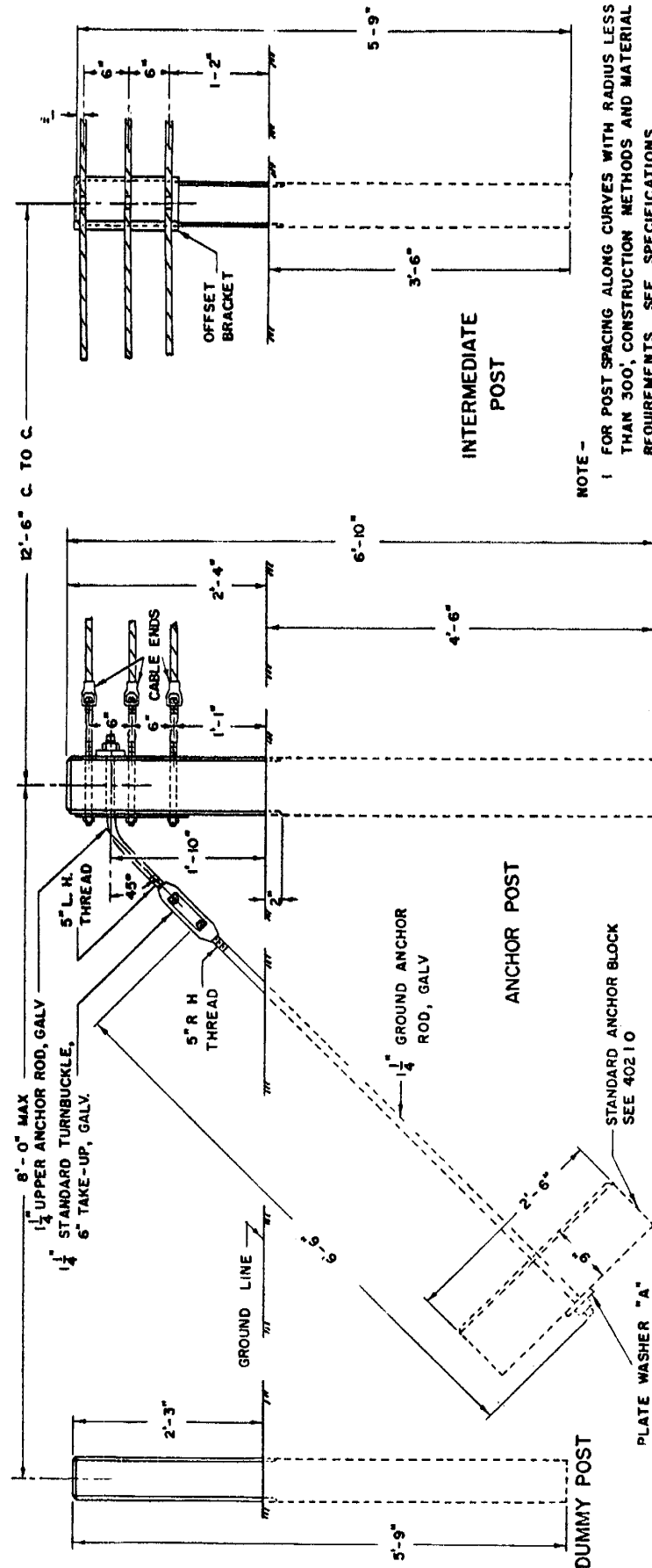
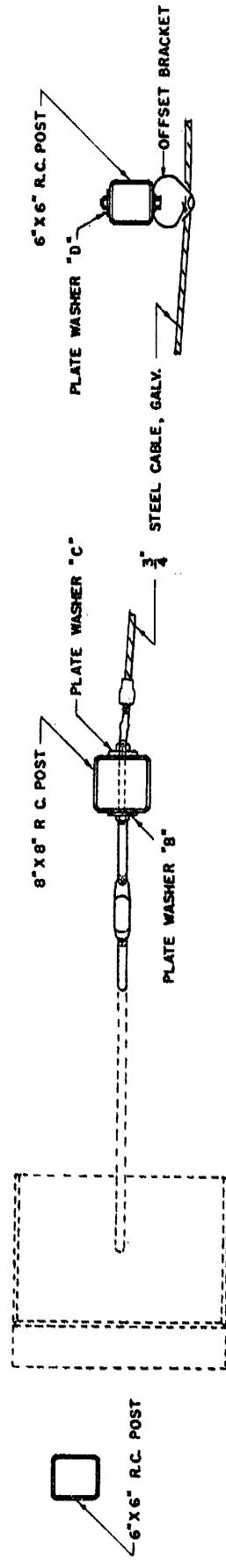


TERMINAL SECTION



- NOTE
1. ALL POSTS TO BE SPACED 6'-3" C. TO C.
 2. FOR DETAILS OF BARRIER COMPONENTS, SEE 40110, 40120, & 40130
 3. FOR DESCRIPTION, MATERIALS AND CONSTRUCTION METHOD, SEE SPECIFICATIONS

HIGHWAY GUARD TYPE C-3-C

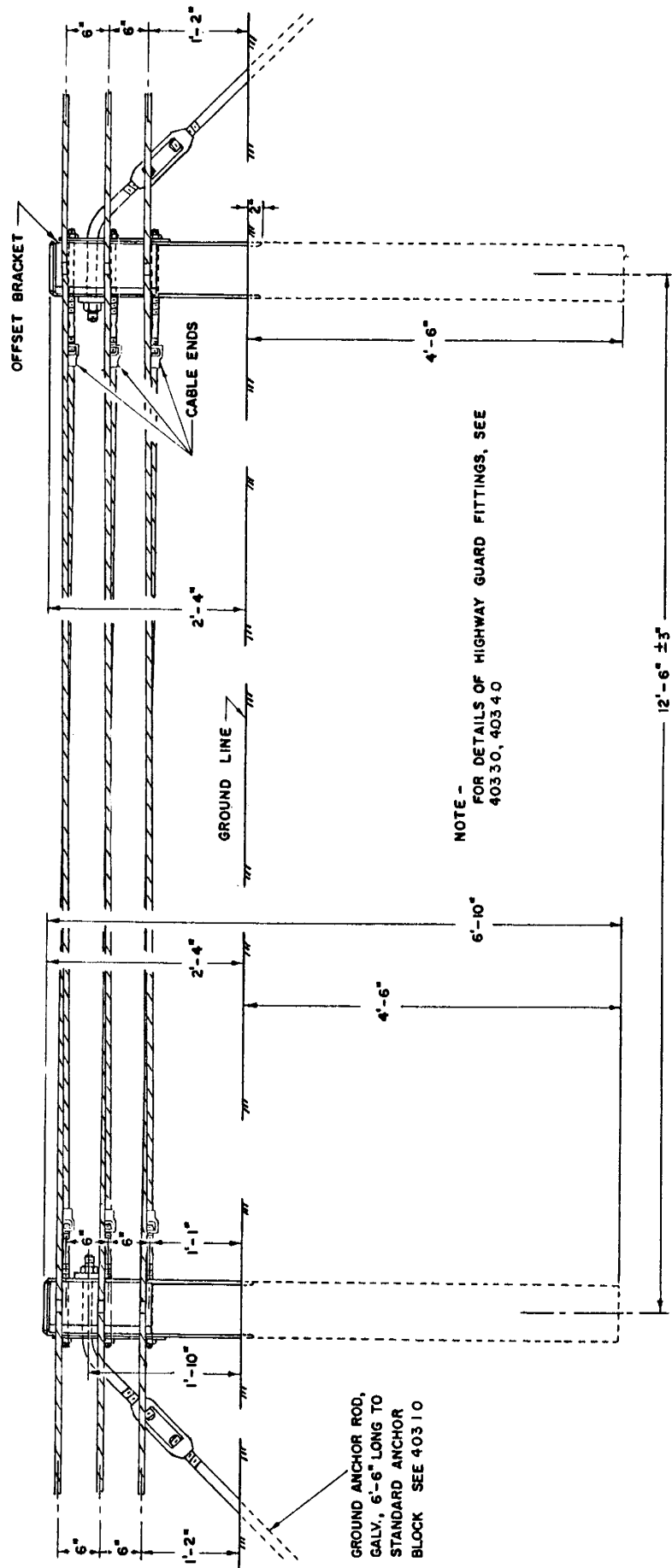
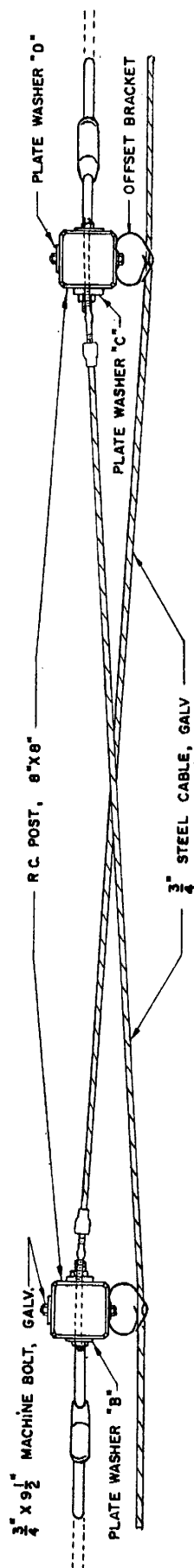


NOTE -

- 1 FOR POST SPACING ALONG CURVES WITH RADIUS LESS THAN 300', CONSTRUCTION METHODS AND MATERIAL REQUIREMENTS, SEE SPECIFICATIONS.
- 2 FOR DETAILS OF HIGHWAY GUARD FITTINGS SEE 403 3 0, 403 4 0

END ANCHOR ASSEMBLY

HIGHWAY GUARD TYPE C-3-C



INTERMEDIATE ANCHOR ASSEMBLY

NO 3 GAGE
WIRES, 6'-4" LONG

4-NO 5 DEFORMED BARS
6'-5" LONG

7 LOOPS, NO 8 GAGE WIRE, SPACED
4"-15"-28"-40"-52"-64"-76" FROM TOP

STEEL REINFORCING FOR 8" x 8" RC END ANCHOR POSTS

ALTERNATE

WASHER "D" 7

PLATE WASHER "D"

_TERNATE

AL

ANCHOR POSTS

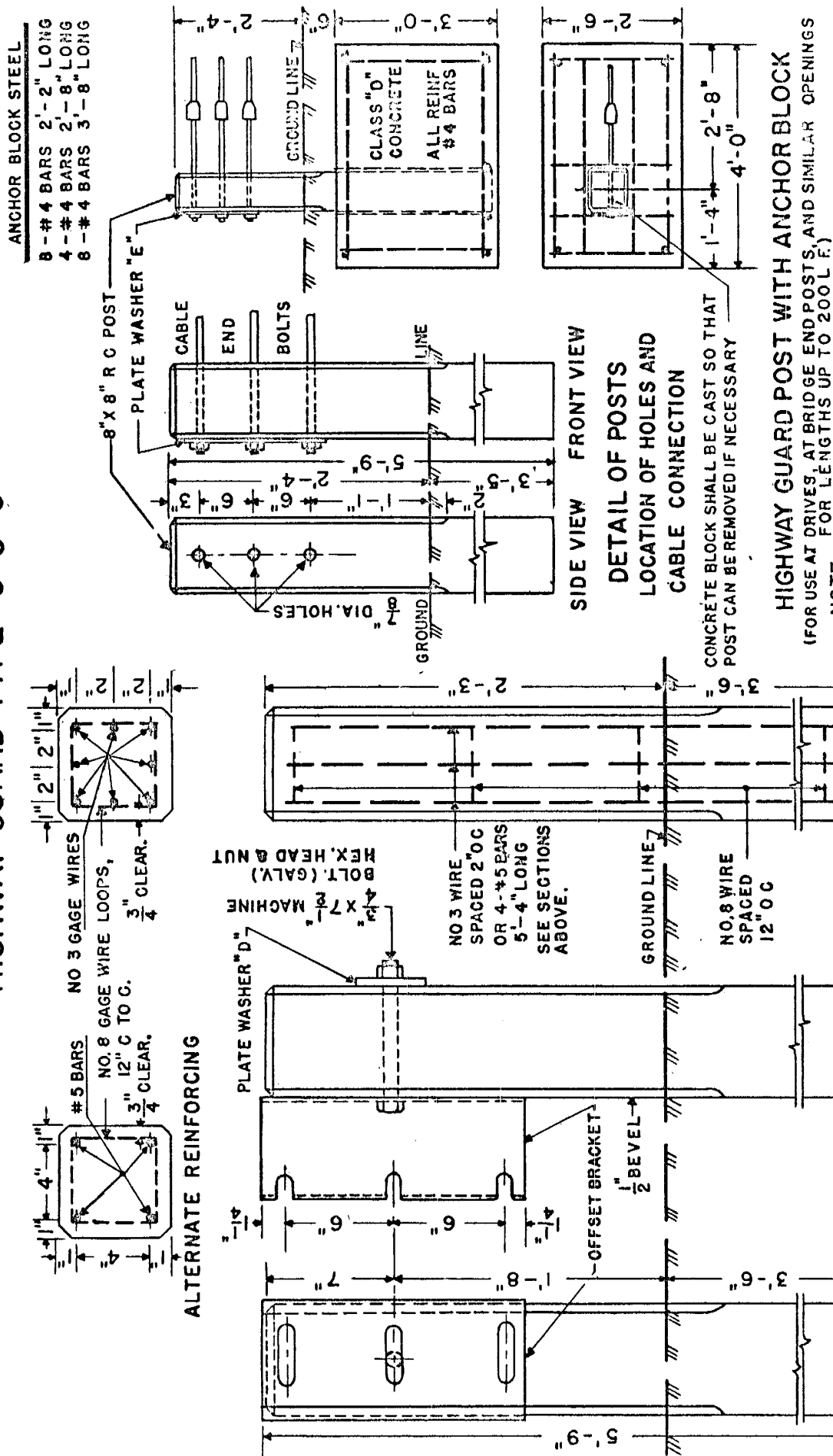
8" RC END AN

CING FOR 8"x

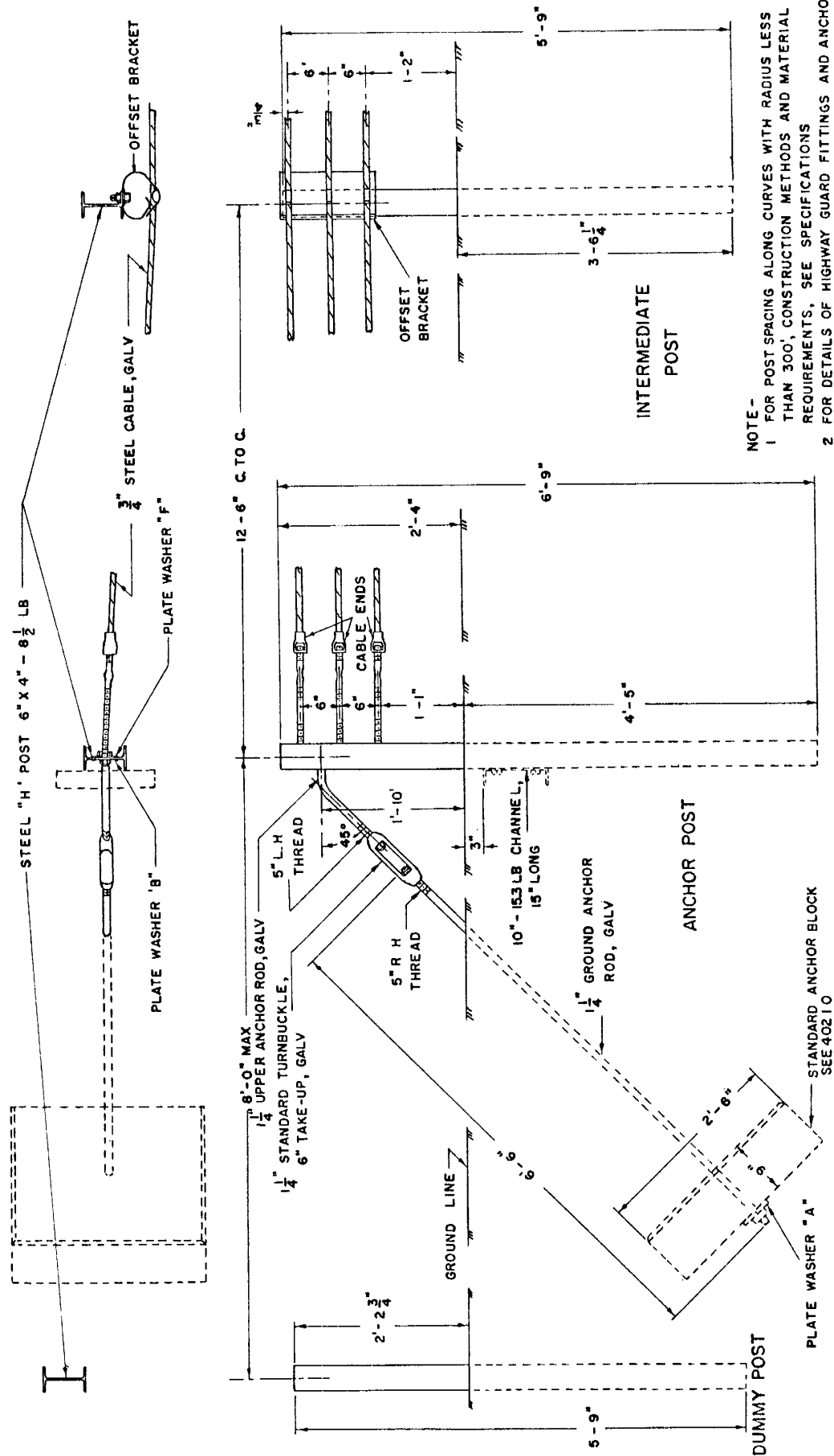
STEEL REINFORC

STEPS

HIGHWAY GUARD TYPE C-3-C



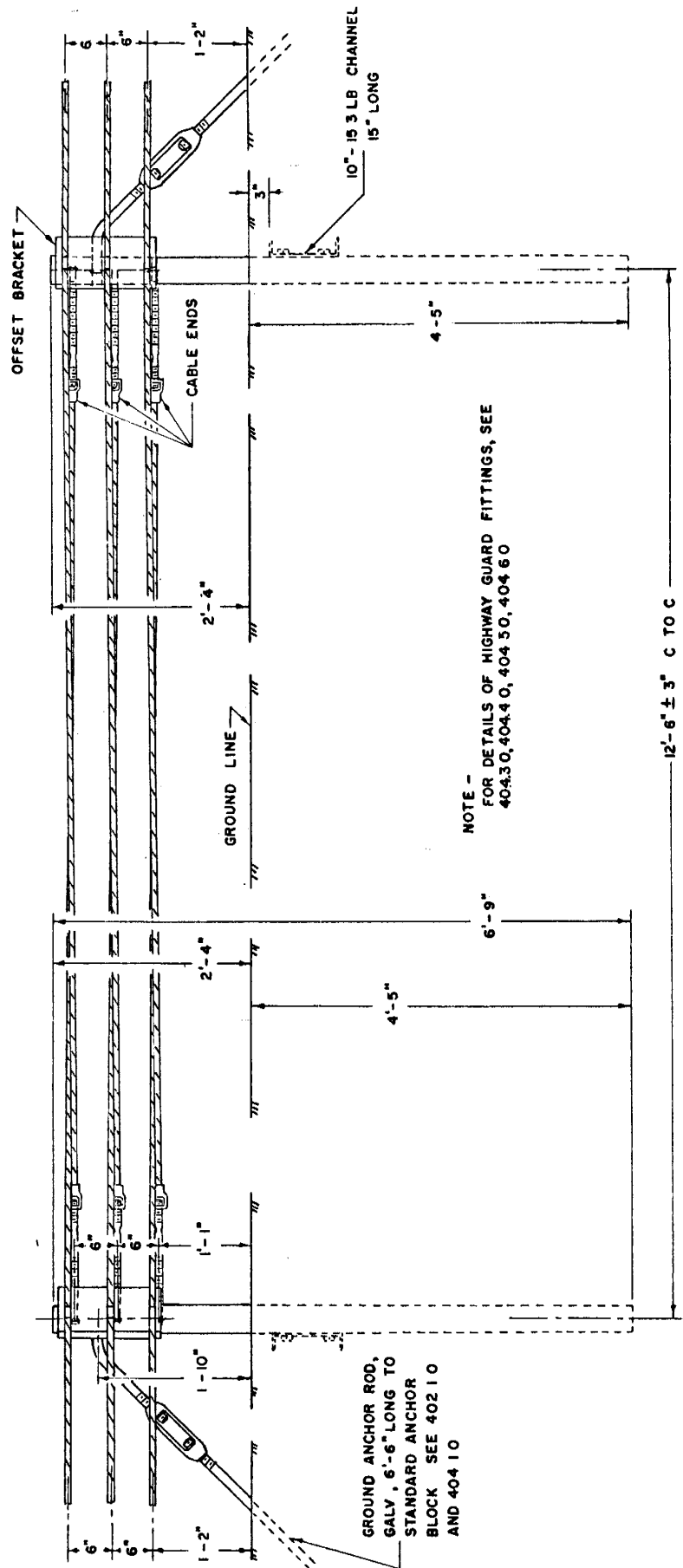
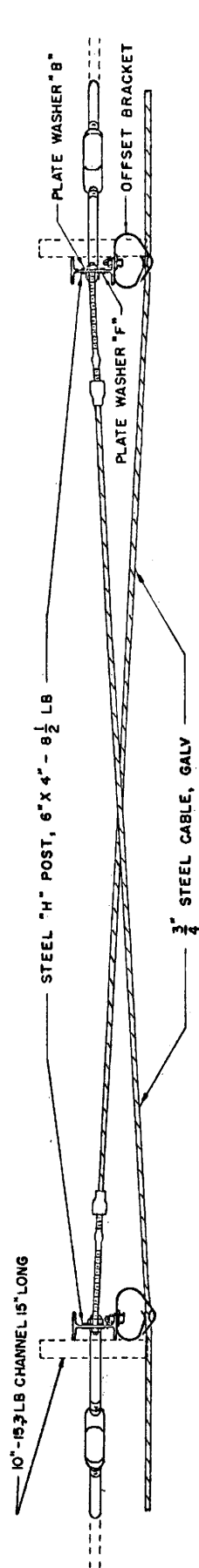
HIGHWAY GUARD TYPE C-3-S



NOTE -
 1 FOR POST SPACING ALONG CURVES WITH RADIUS LESS THAN 300', CONSTRUCTION METHODS AND MATERIAL REQUIREMENTS, SEE SPECIFICATIONS
 2 FOR DETAILS OF HIGHWAY GUARD FITTINGS AND ANCHOR BLOCK, SEE 40430, 40440, 40450, 40460

END ANCHOR ASSEMBLY

HIGHWAY GUARD TYPE C-3-S



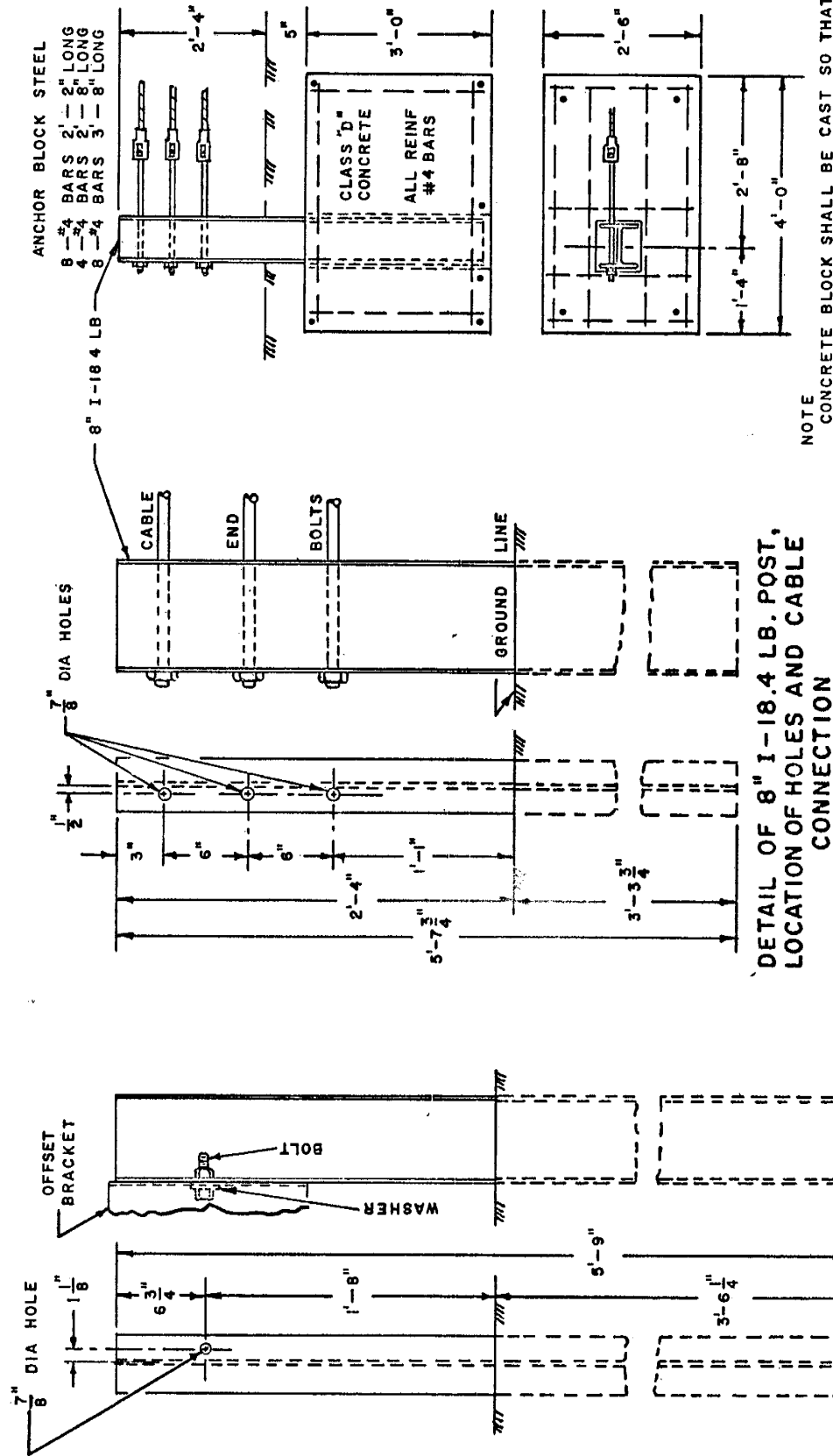
INTERMEDIATE ANCHOR ASSEMBLY

[illegible]

NOTE:

- NOTE:
- 1 ANCHOR POSTS TO BE FABRICATED TO THE DIMENSIONS INDICATED FROM 6" X 4", 8 1/2 LBS / LIN FT, 1/2" BEAM SECTIONS
 - 2 DRIVING CAPS SHALL BE USED TO PROTECT THE POSTS FROM BATTER WHEN POSTS ARE DRIVEN
 - 3 ALL BURRS AND RAGGED EDGES SHALL BE REMOVED FROM FITTINGS BEFORE GALVANIZING RODS, BOLTS AND NUTS TO HAVE CUT OR ROLLED THREADS - ALL TO BE GALVANIZED
 - 4 FOR DESCRIPTION, MATERIALS AND CONSTRUCTION METHODS, SEE SPECIFICATIONS

HIGHWAY GUARD TYPE C-3-S



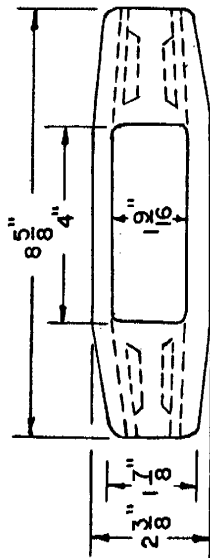
HIGHWAY GUARD POST WITH ANCHOR BLOCK

(FOR USE AT DRIVES, AT BRIDGE END POST, AND SIMILAR OPENING FOR LENGTHS UP TO 200 L F)

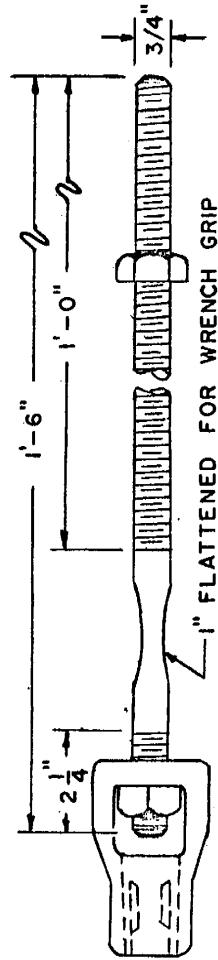
- NOTE
1. INTERMEDIATE POSTS TO BE "H" SECTION 6" X 4", 8 1/2 POUNDS PER LIN FT
 2. OFFSET BRACKET TO BE FASTENED TO POST WITH GALV STEEL BOLT, 3/4" X 2 1/2", HEX HD & NUT, WASHER TO BE GALV STEEL SEE 404 5.0 & 404 6 0.

INTERMEDIATE STEEL POST

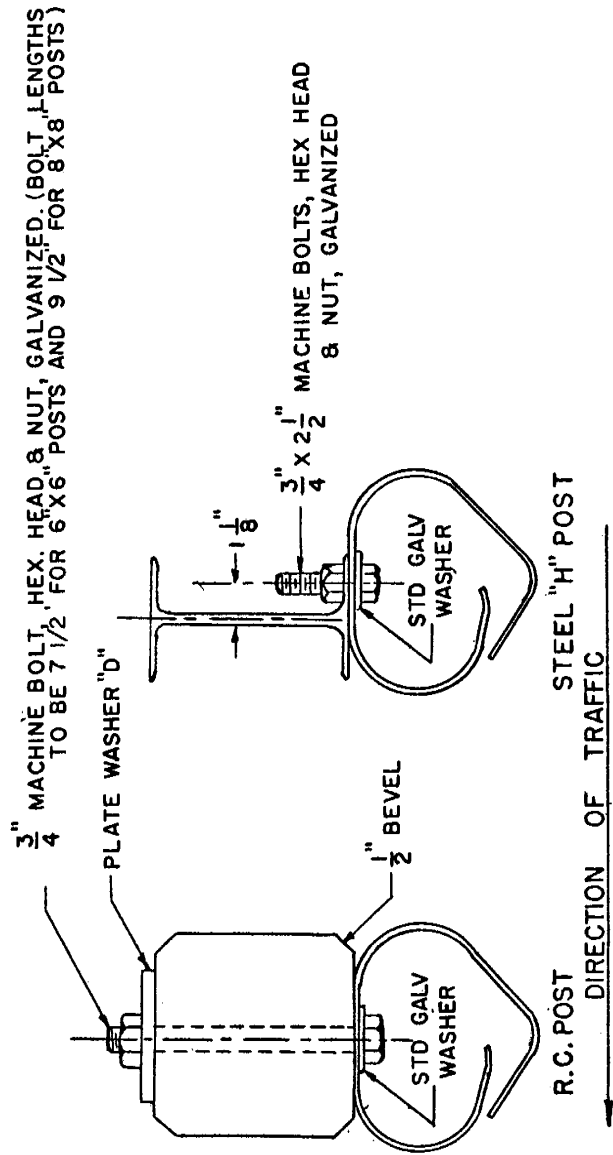
HIGHWAY GUARD TYPE C-3-S AND C-3-C



WEDGE TYPE CABLE SPLICE
(GALVANIZED)



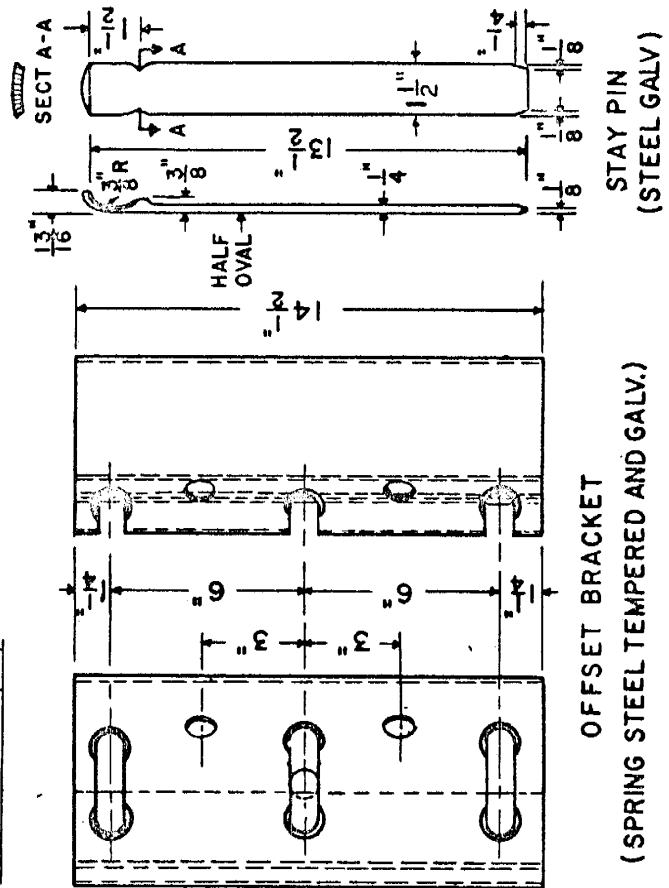
WEDGE TYPE CABLE END
(GALVANIZED)



OFFSET BRACKET AND POST ASSEMBLY

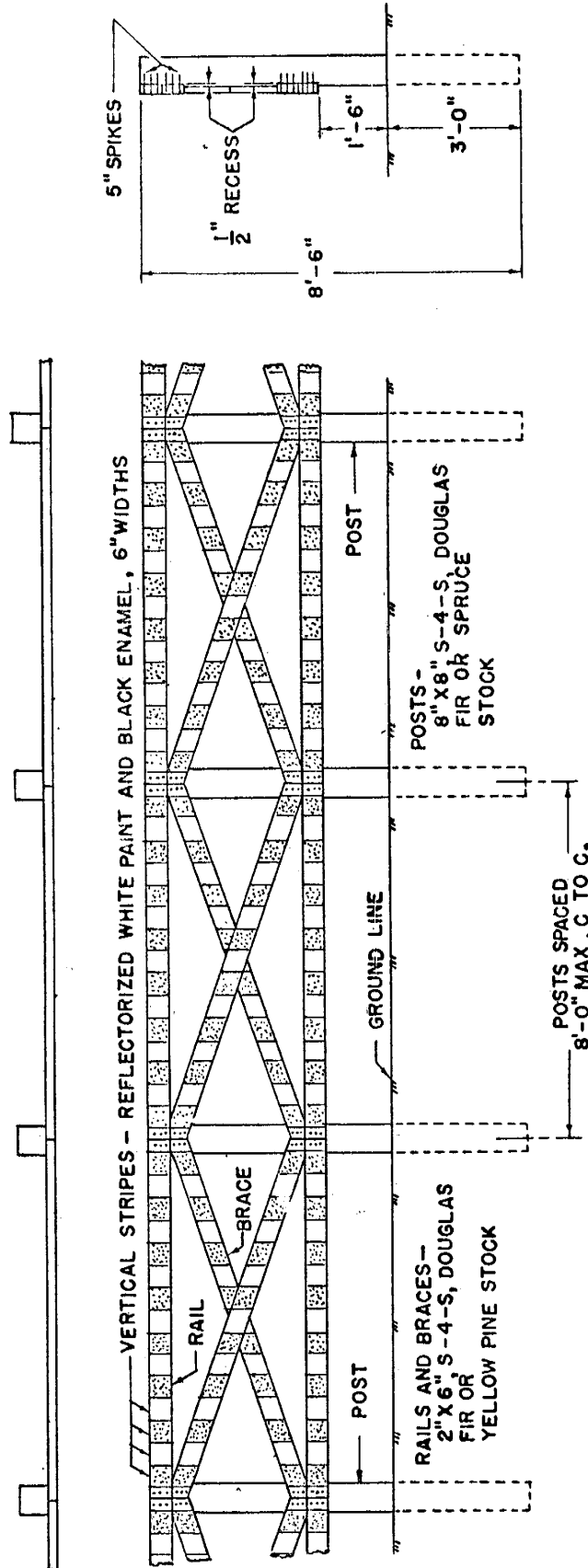
Technical drawing of a plate washer assembly, showing various views and dimensions:

- Top View (Left):** Dimensions include $3\frac{3}{4}$ " (width), 5 " (length), and 5 " (distance from edge to hole center). The hole is labeled $1\frac{3}{8}$ " DIA HOLE.
- Top View (Right):** Dimensions include $3\frac{3}{4}$ " (width), 4 " (length), and 4 " (distance from edge to hole center). The hole is labeled $1\frac{3}{8}$ " DIA HOLE.
- Side View (Left):** Dimensions include 4 " (width), $1\frac{1}{2}$ " (height), and $7\frac{7}{8}$ " DIA HOLES (three holes).
- Side View (Right):** Dimensions include 4 " (width), $1\frac{1}{2}$ " (height), and $7\frac{7}{8}$ " DIA HOLES (three holes).
- End View (Left):** Dimensions include $3\frac{3}{4}$ " (width), $1\frac{1}{2}$ " (height), and $7\frac{7}{8}$ " DIA HOLES (three holes).
- End View (Right):** Dimensions include $3\frac{3}{4}$ " (width), $1\frac{1}{2}$ " (height), and $7\frac{7}{8}$ " DIA HOLES (three holes).
- Section B-B:** A cross-section view showing the profile of the washer, with dimensions $3\frac{3}{4}$ " (width) and $1\frac{1}{2}$ " (height).
- Outside Face of Slot Before Bending:** A detailed view of the slot, showing dimensions for the slot width ($1\frac{1}{2}$ " and $1\frac{1}{8}$ " R), slot depth ($1\frac{1}{2}$ " and $1\frac{1}{8}$ " R), and slot length ($5\frac{1}{8}$ " and $5\frac{1}{8}$ " R).
- Plate Washer "A":** Dimensions include $3\frac{3}{4}$ " (width), 4 " (length), and 4 " (distance from edge to hole center). The hole is labeled $1\frac{3}{8}$ " DIA HOLE.
- Plate Washer "B":** Dimensions include $3\frac{3}{4}$ " (width), 5 " (length), and 5 " (distance from edge to hole center). The hole is labeled $1\frac{3}{8}$ " DIA HOLE.
- Plate Washer "C":** Dimensions include $3\frac{3}{4}$ " (width), 4 " (length), and 4 " (distance from edge to hole center). The hole is labeled $1\frac{3}{8}$ " DIA HOLE.
- Plate Washer "D":** Dimensions include $3\frac{3}{4}$ " (width), 4 " (length), and 4 " (distance from edge to hole center). The hole is labeled $1\frac{3}{8}$ " DIA HOLE.
- Plate Washer "E":** Dimensions include $3\frac{3}{4}$ " (width), 5 " (length), and 5 " (distance from edge to hole center). The hole is labeled $1\frac{3}{8}$ " DIA HOLE.
- Plate Washer "F":** Dimensions include $3\frac{3}{4}$ " (width), 4 " (length), and 4 " (distance from edge to hole center). The hole is labeled $1\frac{3}{8}$ " DIA HOLE.



OFFSET BRACKET DETAILS

PERMANENT BARRIER FENCE FOR DEAD END STREETS



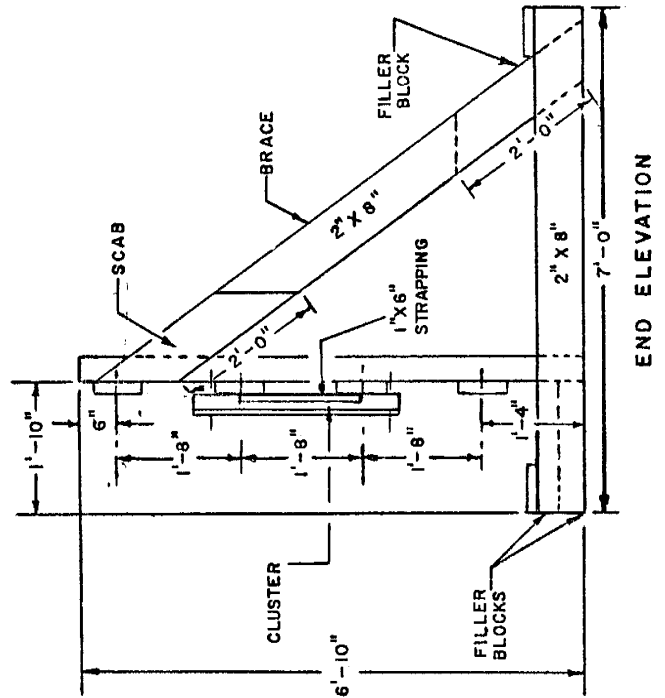
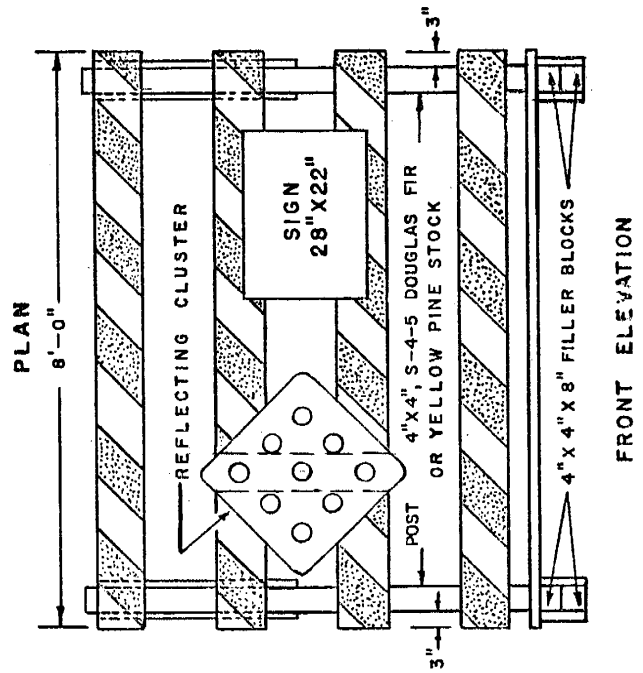
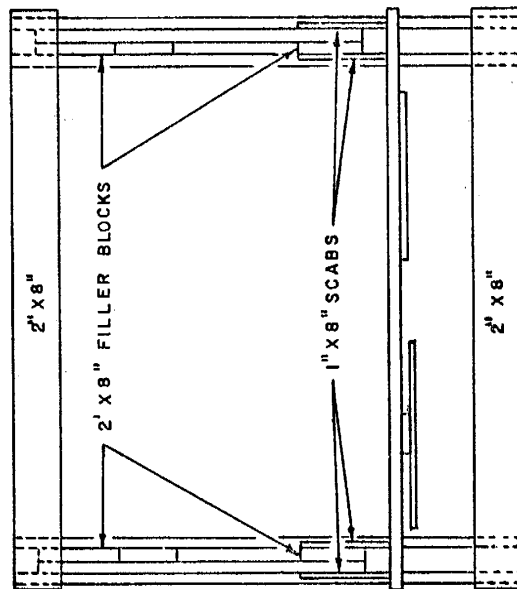
NOTES

- 1 THE BOTTOM SECTION OF POSTS, UP TO A HEIGHT 6" ABOVE THE GROUND LINE, TO BE COATED WITH TWO APPLICATIONS OF WOOD PRESERVATIVE.
- 2 RAILS AND BRACES TO BE FASTENED TO POSTS WITH 5" SPIKES AND/OR LAG SCREWS.
- 3 THE BARRIER SIDE FACING OBSTRUCTED ROADWAY TO BE COATED WITH REFLECTORIZED WHITE PAINT AND BLACK ENAMEL STRIPES IN THE PATTERN SHOWN. ALL OTHER SIDES TO BE PAINTED WITH TWO COATS OF STRUCTURAL CHROME OXIDE GREEN.
- 4 FOR DESCRIPTIONS, MATERIALS AND CONSTRUCTION METHODS, SEE SPECIFICATIONS.
- 5 ALL LUMBER DIMENSIONS ARE NOMINAL

PORTABLE BARRIER FENCE

NOTE:

- 1 BRACES AND RAILS TO BE CONSTRUCTED FROM 2" X 8", S-4-S SELECT DOUGLAS FIR OR YELLOW PINE STOCK; ALL LUMBER SIZES ARE NOMINAL
- 2 PORTABLE BARRIER TO BE PAINTED WITH ONE COAT OF WHITE PRIMER AND FINISHED WITH TWO COATS OF PAINT: THE FRONT FACE TO BE FINISHED IN THE PATTERN SHOWN ALTERNATING 6" WIDE STRIPES OF BLACK ENAMEL AND REFLECTORIZED WHITE PAINT; ALL OTHER SURFACES TO BE FINISHED WITH WHITE ENAMEL
- 3 FOR DESCRIPTION, MATERIALS AND CONSTRUCTION METHODS, SEE SPECIFICATIONS
- 4 SHAPE TOP & BOTTOM OF STRAPPING TO CONFORM TO SHAPE OF CLUSTER

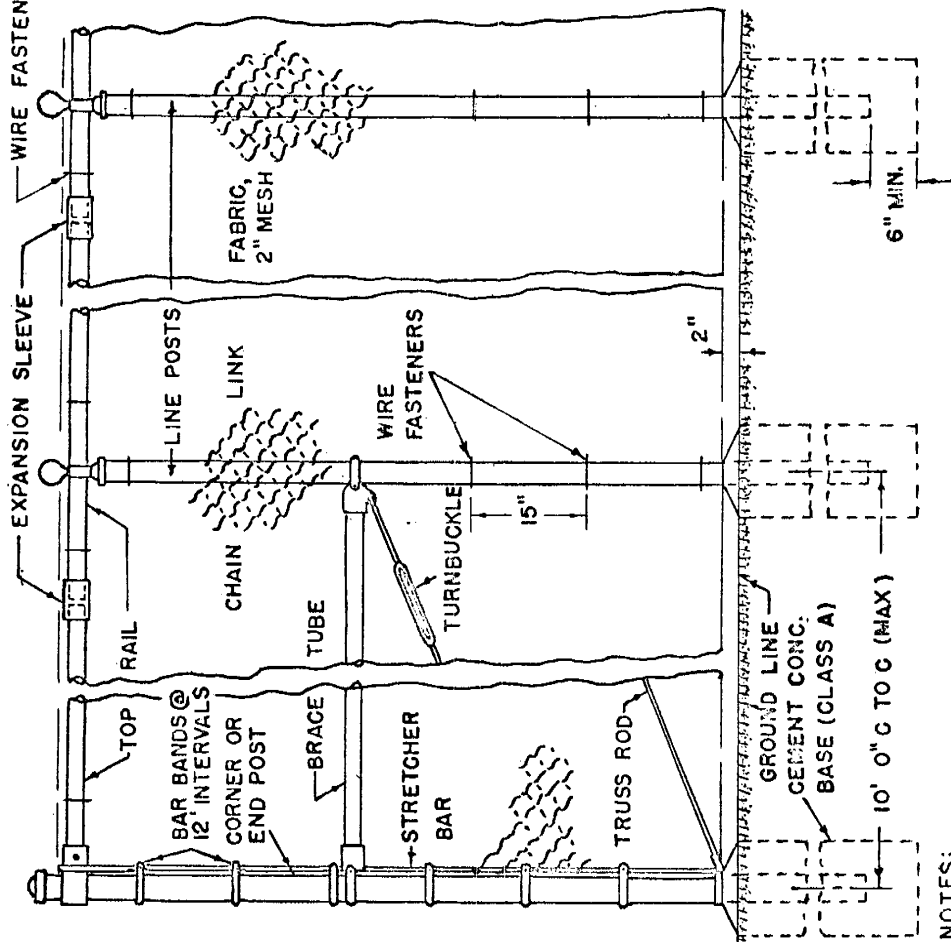


Technical drawings of a roof truss system. The top drawing is a side elevation showing a gabled roof with a 6'-10" base, a 7'-0" height, and a 2" x 8" x 3' SCAB. The bottom drawing is a plan view showing a 16'-0" wide roof with a 6'-0" base, a 7'-0" height, and a 2" x 8" x 3' SCAB. It includes detailed dimensions for the truss members, including 6'-0" and 1'-6" spans, and 7 1/2" and 1 1/2" widths.

NOTE
1 ILLUMINATED BARRIER TO BE MADE OF PORTABLE BARRIER UNITS FASTENED TOGETHER WITH 2" X 8" X 3' SCABS AS SHOWN SEE 40610 FOR CONSTRUCTION DETAILS

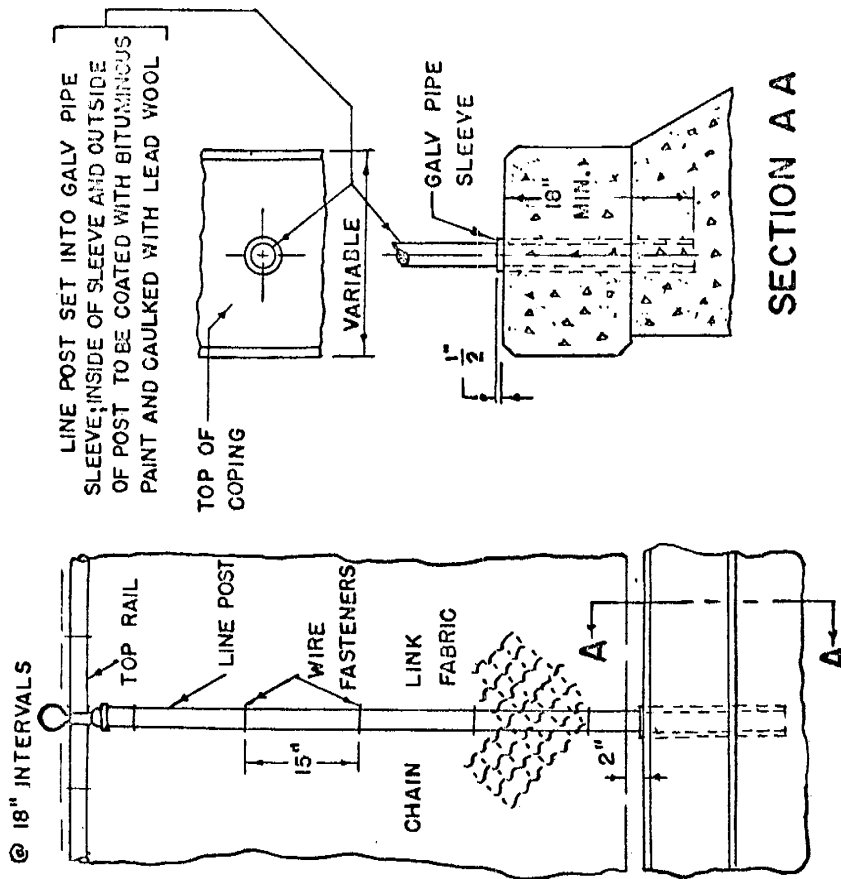
- SEE 40610 FOR CONSTRUCTION DETAILS
- TROUGHS FOR 6" DIAMETER LENSES AND FLASHING LIGHT COMPONENTS TO BE CONSTRUCTED TO THE DIMENSIONS SHOWN USING 1/2" MEDIUM DENSITY OVERLAY PLYWOOD FLAT TOP YELLOW WIDE ANGLE REFLECTIVE SHEETING TO BE BONDED TO FRONT FACE OF ARROW; ALL OTHER ARROW SURFACES TO BE PRIMED AND FINISHED WITH TWO COATS OF YELLOW ENAMEL, P-450-64.
- THE ARROW SEGMENTS ARE TO BE SECURELY FASTENED TO BARRIER WITH ANGLE IRONS AND/OR STEEL BRACKETS

CHAIN LINK FENCE WITH TOP RAIL FENCE ON GROUND



NOTES:

1. FABRIC FOR FENCES 4 FEET OR LESS IN HEIGHT TOP SELVAGE TO HAVE KNUCKLED FINISH. BOTTOM SELVAGE TO HAVE TWISTED AND BARBED FINISH UNLESS OTHERWISE NOTED.
2. FABRIC FOR FENCES 5 FEET OR OVER IN HEIGHT BOTH THE TOP AND BOTTOM SELVAGE TO HAVE TWISTED AND BARBED FINISH UNLESS OTHERWISE NOTED.
3. THE HEIGHT OF FENCE TO BE AS SPECIFIED.
4. GRADE OF FENCE TO BE PARALLEL WITH THE GRADE OF SIDEWALKS, CURBING, GROUND OR TOP OF WALL.

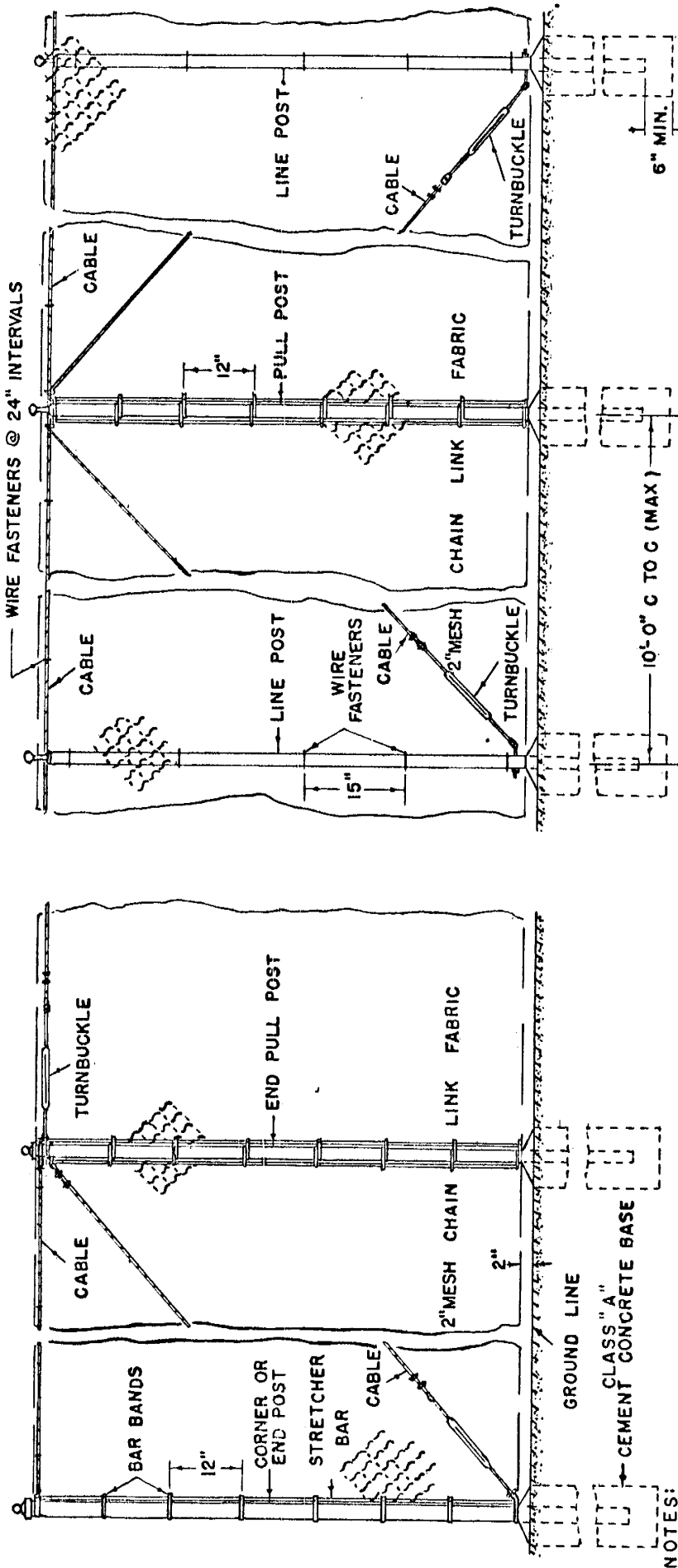


4. LINE POSTS TO BE SPACED 10'-0" C TO C. MAXIMUM EXCEPT ON CURVES WHERE THEY SHALL BE SPACED AS FOLLOWS-

CURVES 200' TO 500' RADIUS	8'-0" C TO C. MAXIMUM
" 100' " 200' "	6'-0" " "
" LESS THAN 100' "	5'-0" " "

5. FOR POST BASES AND CABLE ATTACHMENTS, SEE 407 40
6. FOR DESCRIPTION, MATERIALS AND CONSTRUCTION METHODS, SEE SPECIFICATIONS.

CHAIN LINK FENCE WITH TOP TENSION CABLE

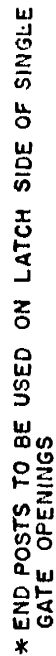


NOTES:

1. FABRIC FOR FENCES 4 FEET OR LESS IN HEIGHT; TOP SELVAGE TO HAVE KNUCKLED FINISH, BOTTOM SELVAGE TO HAVE TWISTED AND BARBED FINISH UNLESS OTHERWISE NOTED.
2. FABRIC FOR FENCES 5 FEET OR OVER IN HEIGHT; BOTH THE TOP AND BOTTOM SELVAGE TO HAVE TWISTED AND BARBED FINISH UNLESS OTHERWISE NOTED.
3. THE HEIGHT OF FENCE TO BE AS SPECIFIED.
4. GRADE OF FENCE TO BE PARALLEL WITH THE GRADE OF SIDEWALKS, CURBING, GROUND, OR TOP OF WALL.

4. FOR POST BASES AND CABLE ATTACHMENTS SEE 407 4 0
5. PULL POST INTERVALS NOT TO EXCEED 500 FT
6. SPACING OF LINE POSTS ON CURVES, SEE 407 1 0
7. FOR DESCRIPTION, MATERIALS AND CONSTRUCTION METHODS, SEE SPECIFICATIONS

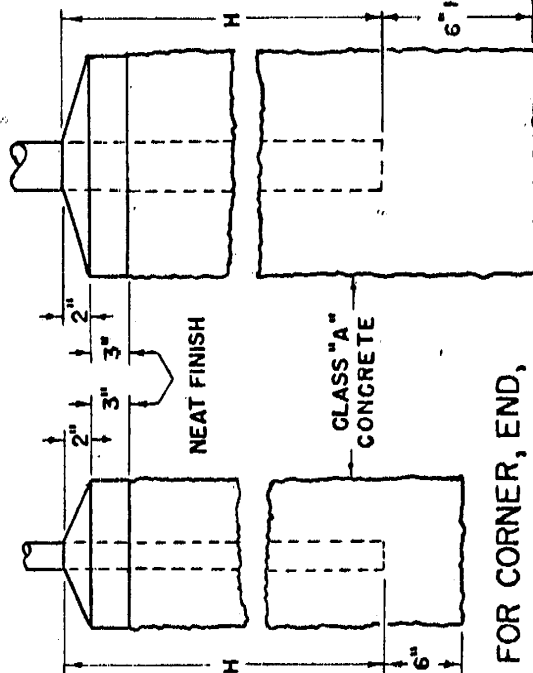
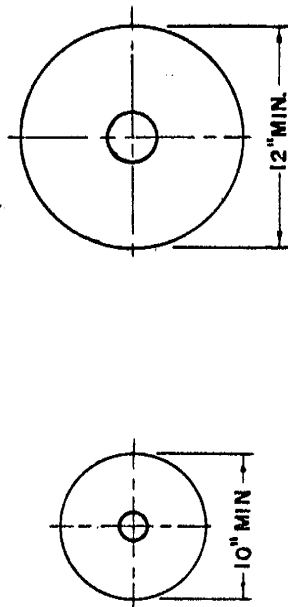
DOUBLE GATES



CHAIN LINK FENCES

DETAILS OF CABLE ATTACHMENTS

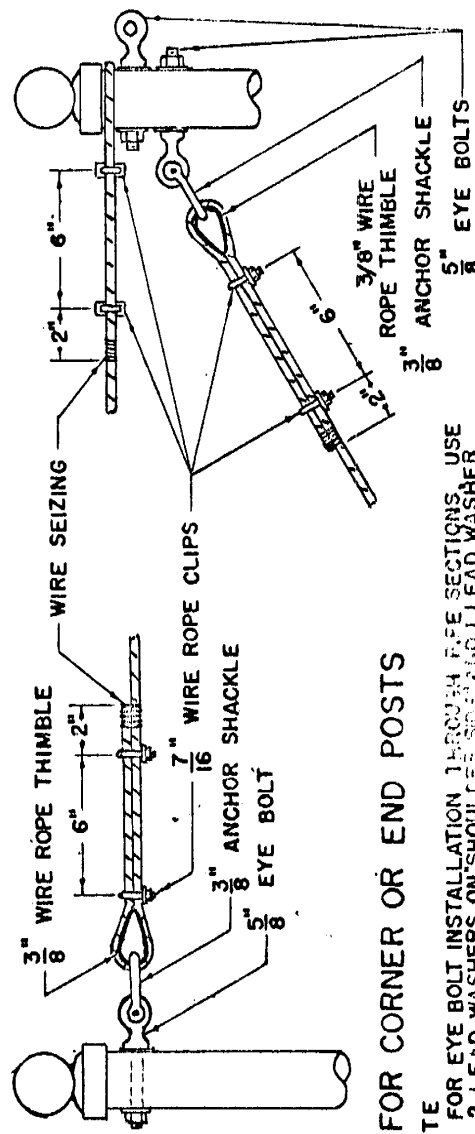
POST BASES



FOR CORNER, END,
LINE AND PULL
POSTS

FOR GATE POSTS

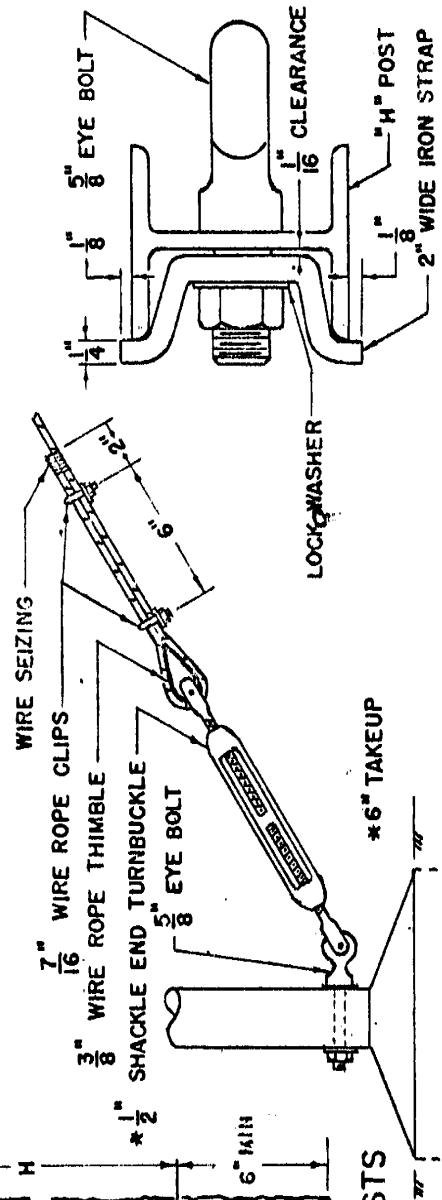
FENCE HEIGHT	MIN.	H
5' OR LESS	2'-6"	
OVER 5'	3'-0"	



FOR CORNER OR END POSTS

FOR END PULL POST

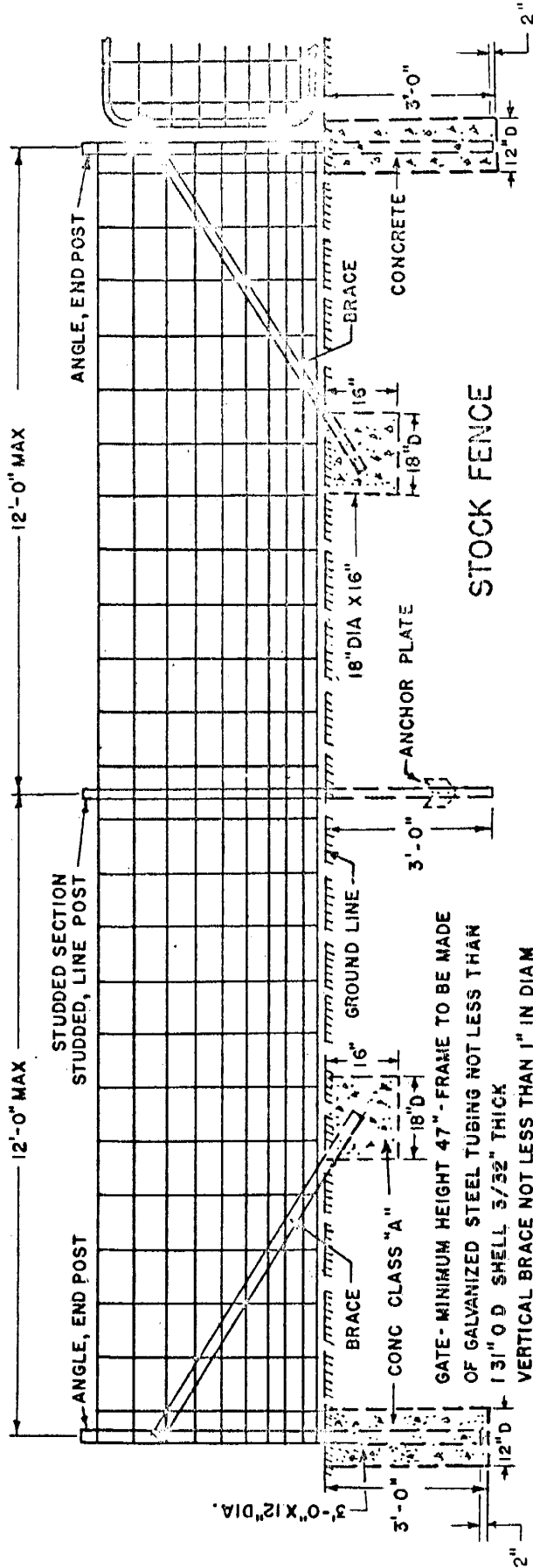
NOTE
FOR EYE BOLT INSTALLATION THROUGH PIPE SECTIONS, USE
2 LEAD WASHERS ON SHOULDER SIDE AND 1 LEAD WASHER
WITH LOCK WASHER ON "NUT SIDE" OF POSTS



FOR FASTENING TO BASE OF POST

EYE BOLT TO "H" COLUMN POST

STOCK FENCE

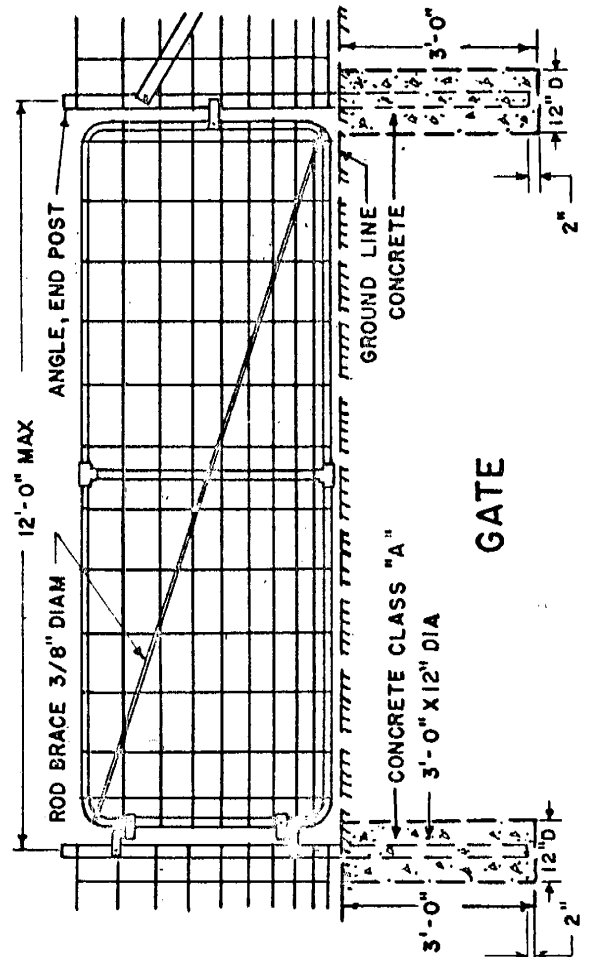


STOCK FENCE

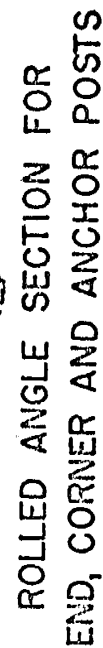
GATE - MINIMUM HEIGHT 47" - FRAME TO BE MADE OF GALVANIZED STEEL TUBING NOT LESS THAN 1 3/4" O D SHELL 3/32" THICK
VERTICAL BRACE NOT LESS THAN 1" IN DIAM

NOTE:

FOR MATERIALS AND CONSTRUCTION METHODS
SEE SPECIFICATIONS

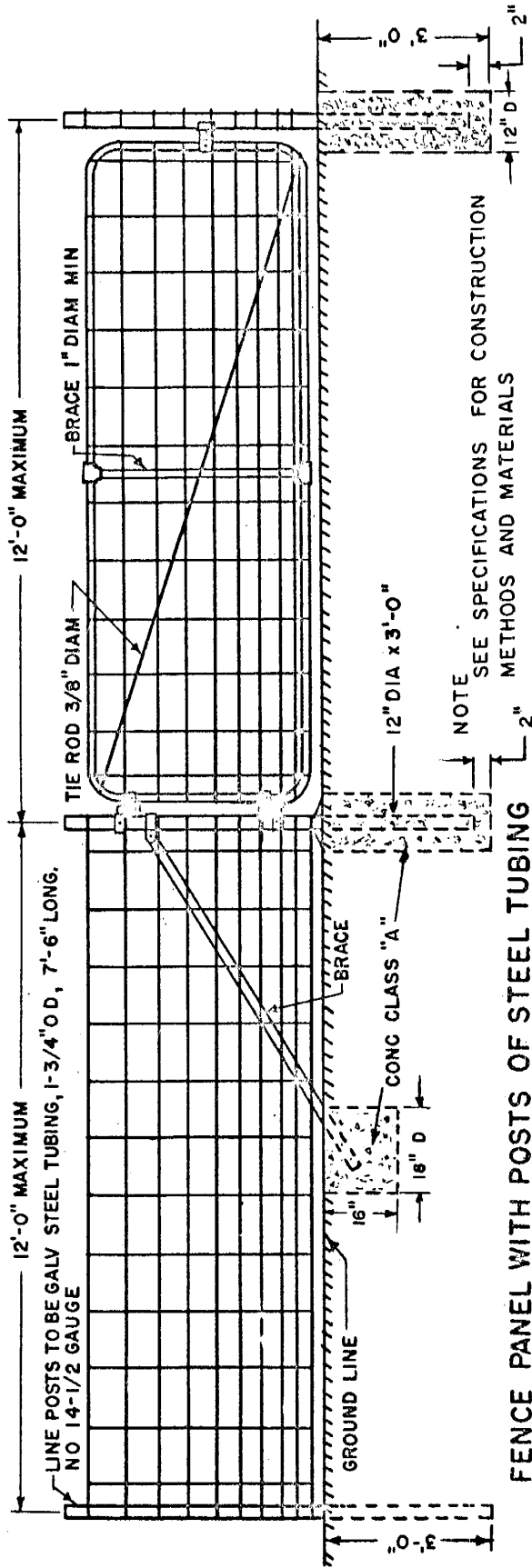


GATE

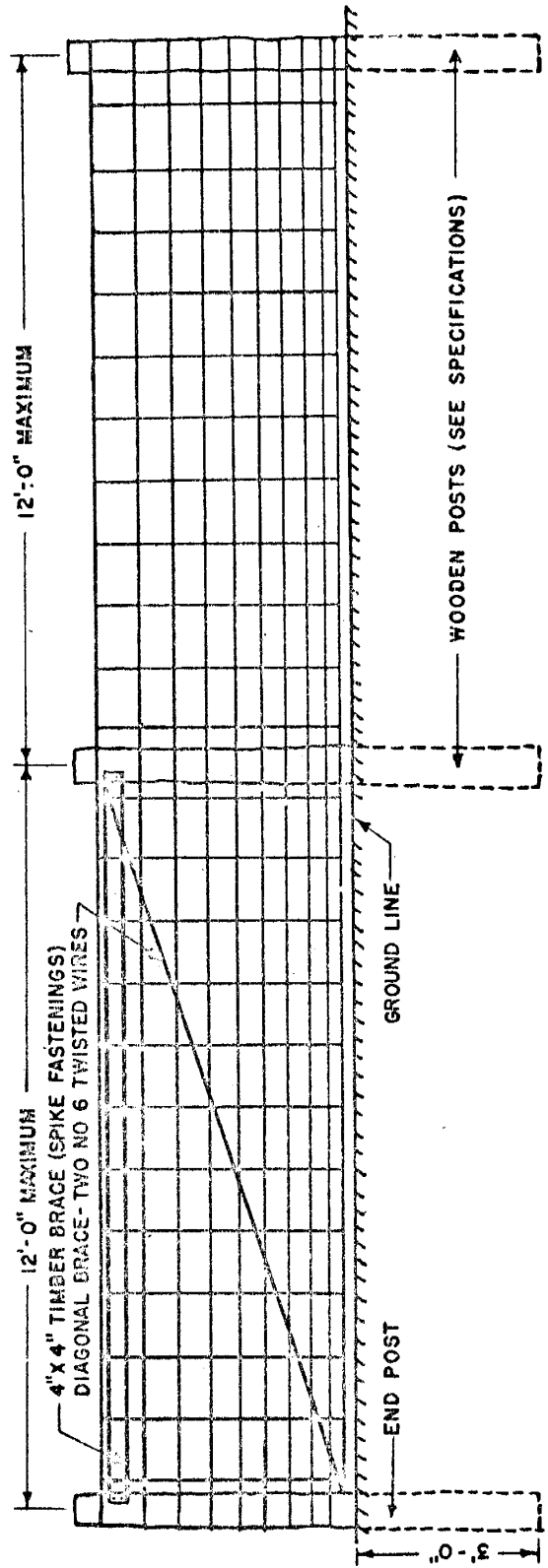


STUDED "T" SECTION LINE POST

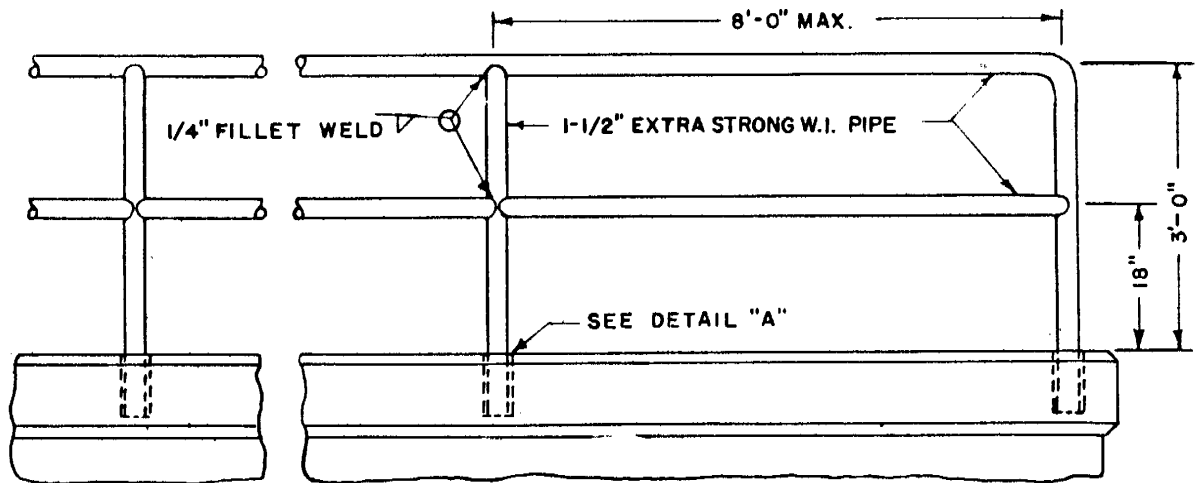
STOCK FENCE



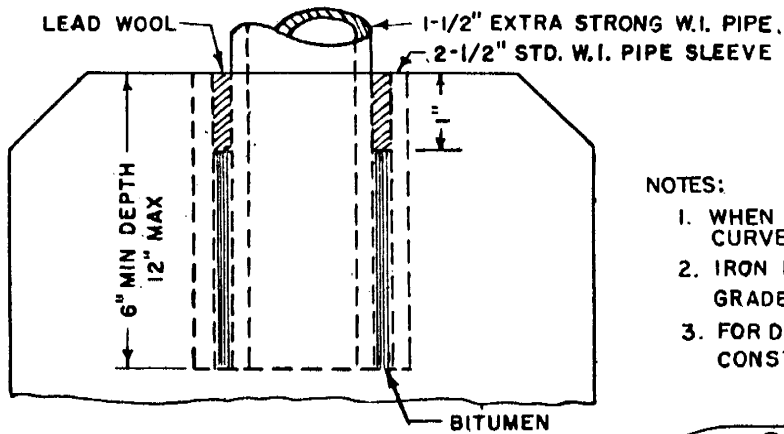
FENCE PANEL WITH POSTS OF STEEL TUBING



WROUGHT IRON PIPE FENCE



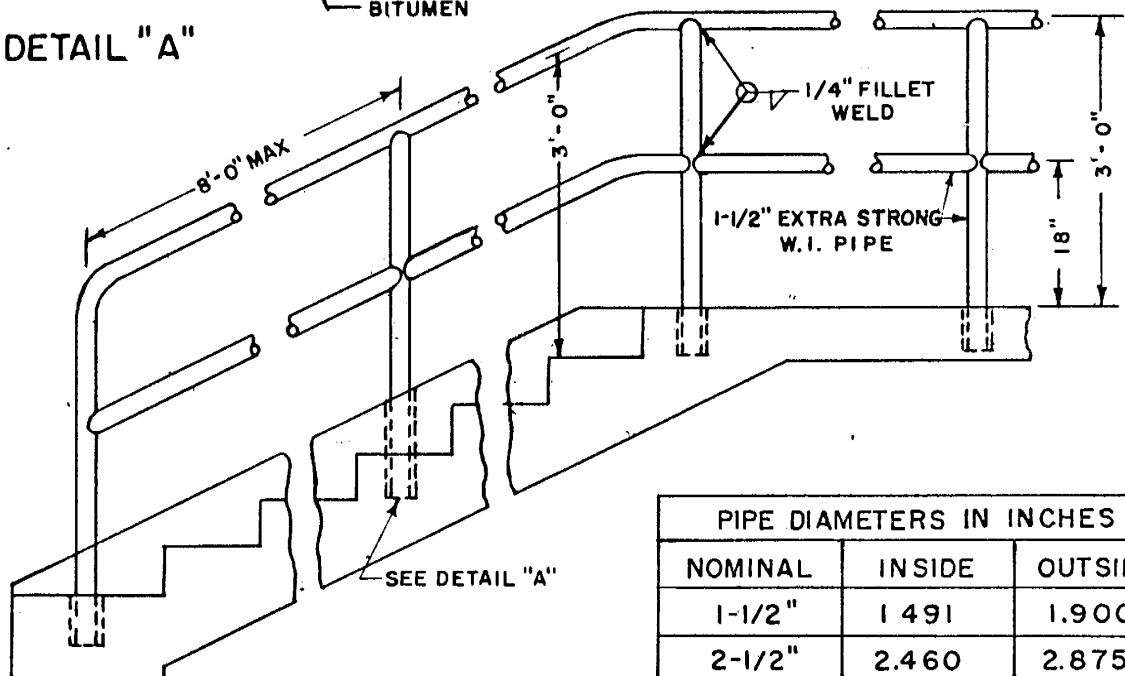
WROUGHT IRON PIPE HAND RAIL



NOTES:

1. WHEN USED ON A CURVE ALL RAILINGS TO BE CURVED TO LINE BEFORE ERECTION.
2. IRON PIPE FENCE AND HAND RAIL TO FOLLOW GRADE OF COPING OR STRUCTURE.
3. FOR DESCRIPTIONS, MATERIALS AND CONSTRUCTION METHODS, SEE SPECIFICATIONS.

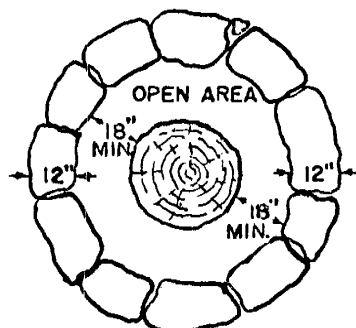
DETAIL "A"



PIPE DIAMETERS IN INCHES		
NOMINAL	INSIDE	OUTSIDE
1-1/2"	1.491	1.900
2-1/2"	2.460	2.875

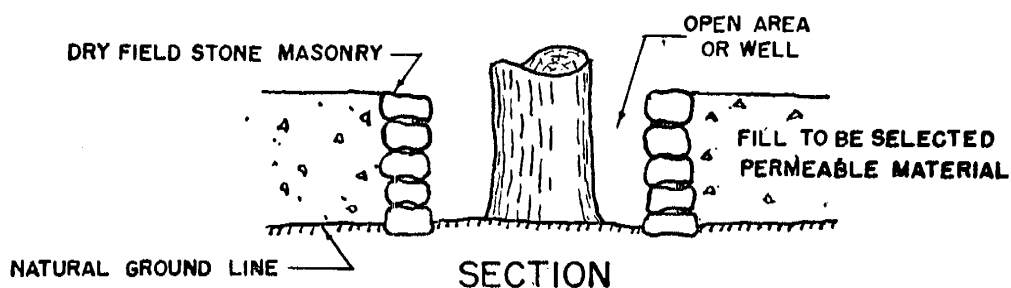
MASS. D.P.W.- MAY 1966

TREE WELLS



NOTE:
STONES SHALL BE NOT LESS
THAN 12" LONG

PLAN



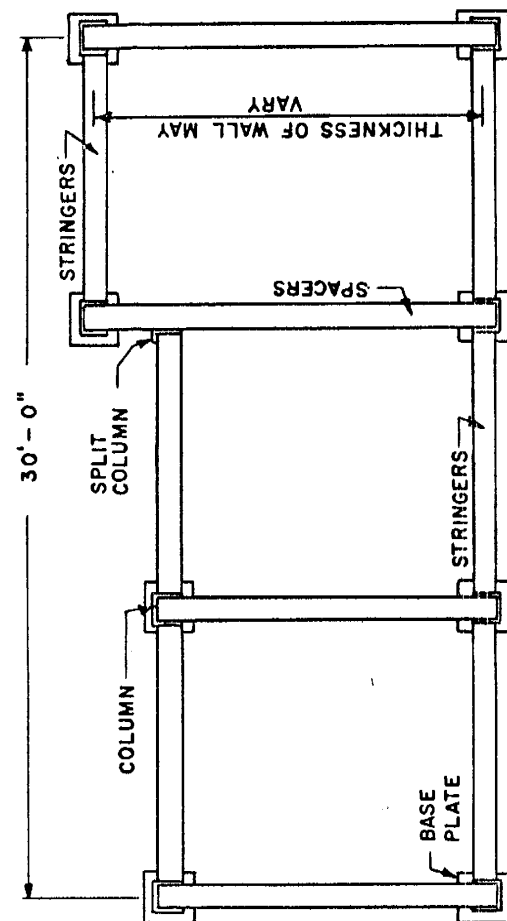
SECTION

TABLE SHOWING CUBIC YARDS OF DRY STONE MASONRY

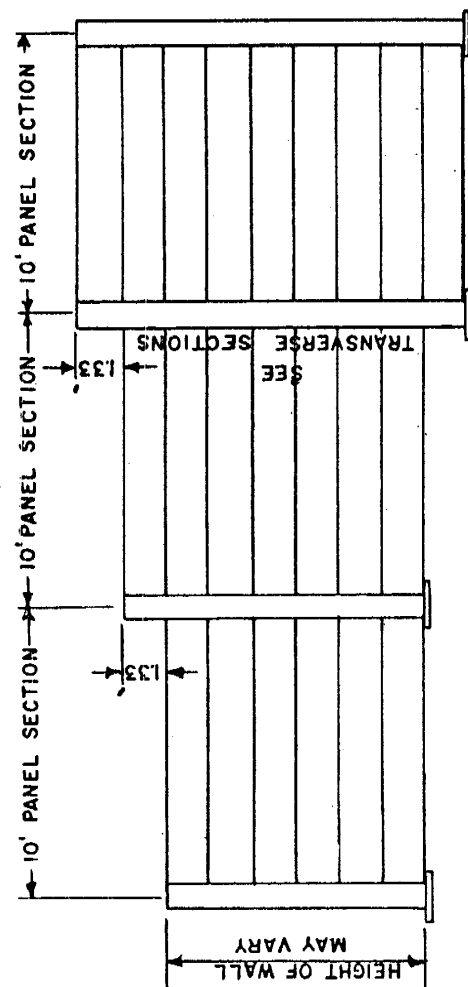
DIAM. OF TREE IN INCHES	DEPTH OF WELL IN FEET							
	1	1.5	2	2.5	3	3.5	4	5
4	0.51	0.76	1.01	1.26	1.51	1.76	2.02	2.52
6	0.53	0.79	1.05	1.31	1.57	1.83	2.10	2.62
8	0.54	0.82	1.09	1.36	1.63	1.90	2.17	2.72
10	0.56	0.84	1.12	1.41	1.69	1.97	2.25	2.81
12	0.58	0.87	1.16	1.46	1.75	2.04	2.33	2.91
14	0.60	0.90	1.20	1.50	1.80	2.10	2.40	3.00
16	0.62	0.93	1.24	1.55	1.86	2.17	2.48	3.10
18	0.64	0.96	1.28	1.60	1.92	2.24	2.56	3.20
20	0.66	0.99	1.32	1.65	1.98	2.31	2.64	3.30
22	0.68	1.02	1.36	1.70	2.04	2.38	2.72	3.39
24	0.70	1.05	1.40	1.75	2.09	2.44	2.79	3.49
30	0.76	1.13	1.51	1.89	2.27	2.65	3.02	3.78
36	0.82	1.22	1.63	2.04	2.44	2.85	3.26	4.07
42	0.87	1.31	1.75	2.18	2.62	3.06	3.49	4.36
48	0.93	1.40	1.86	2.33	2.79	3.26	3.72	4.65
54	0.99	1.48	1.98	2.47	2.97	3.46	3.96	4.95
60	1.05	1.57	2.09	2.62	3.14	3.67	4.19	5.24

BASED ON WALLS 12" THICK, INSIDE DIAM. 36" GREATER THAN DIAM. OF TREE.

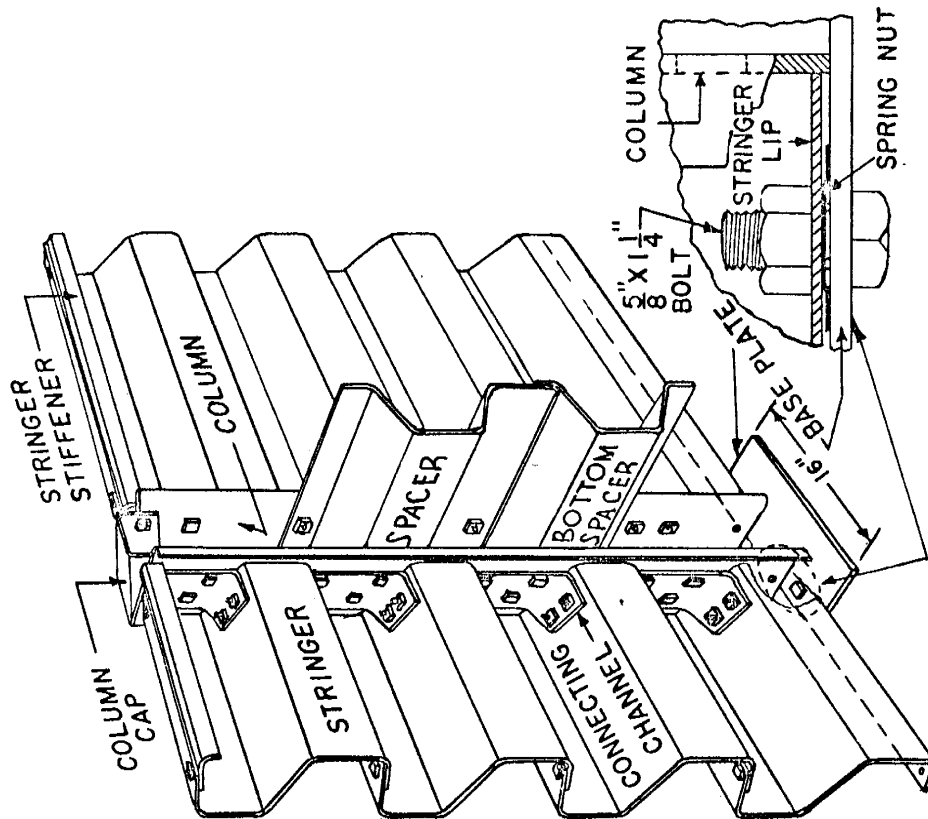
METAL BIN-TYPE RETAINING WALL



PLAN

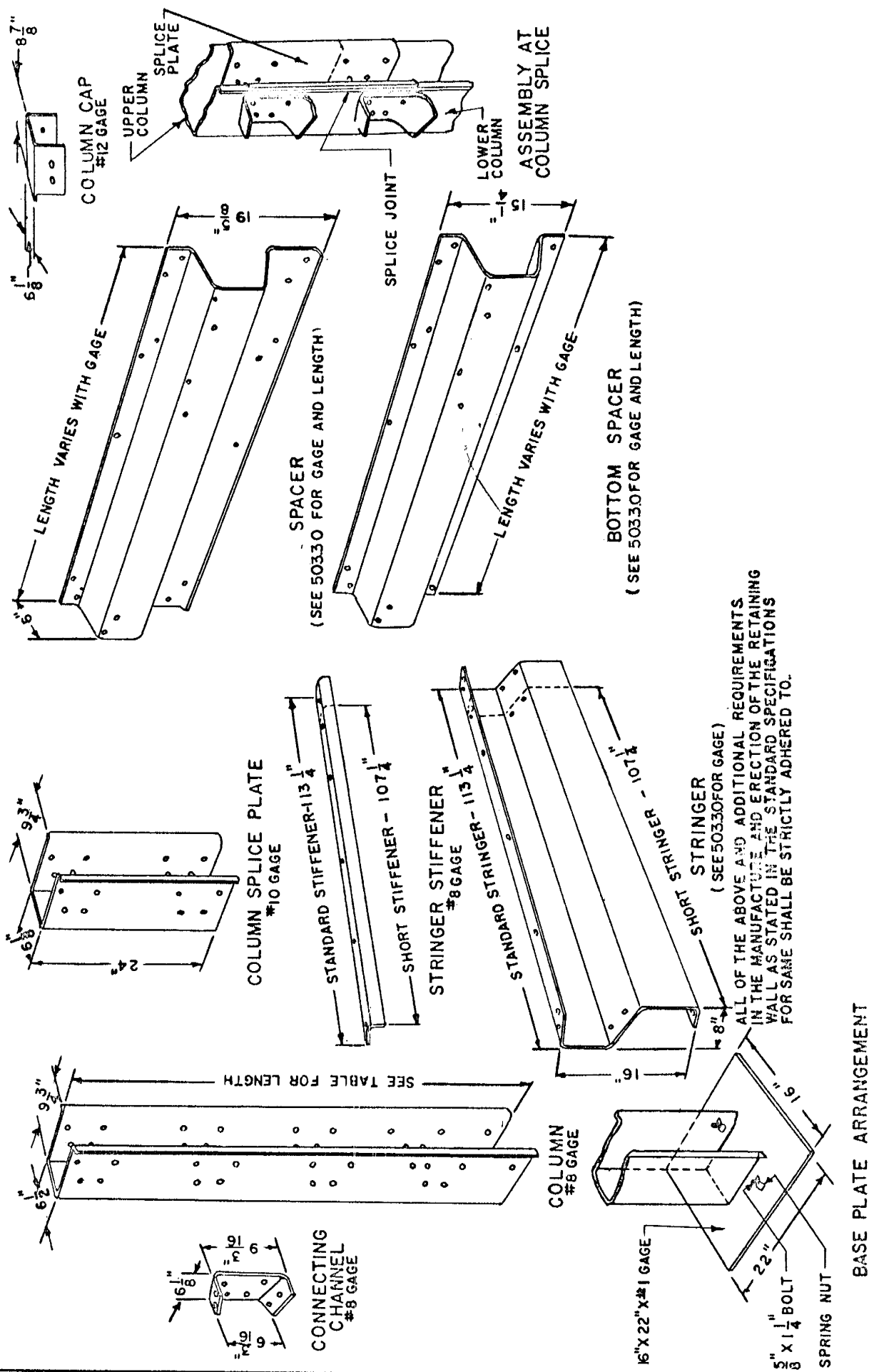


ELEVATION

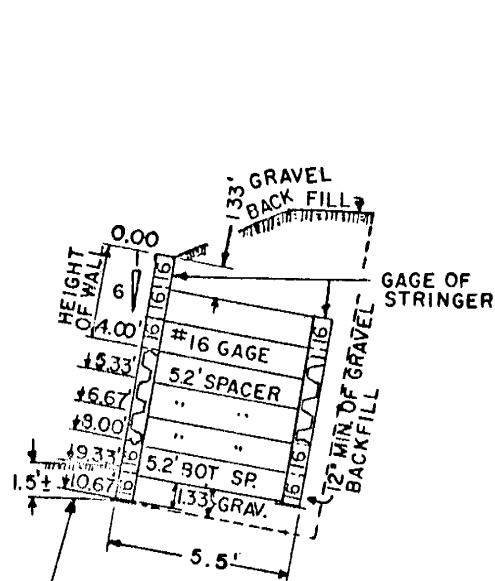


BIN ASSEMBLY
AT
FRONT COLUMN
(SIMILAR AT REAR COLUMN)

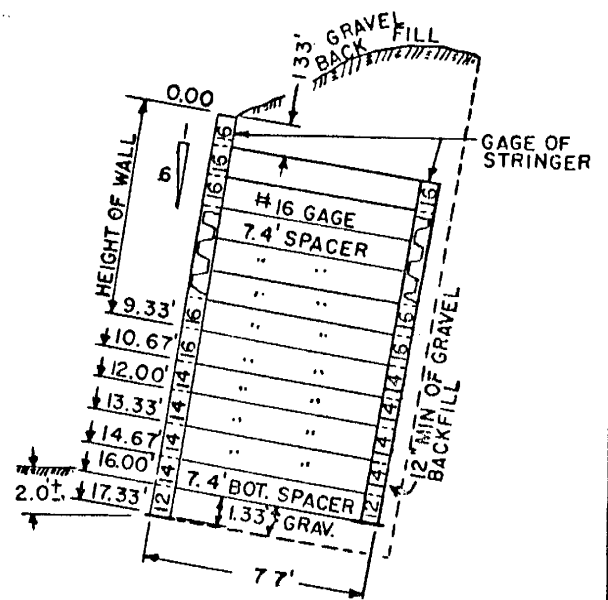
METAL BIN-TYPE RETAINING WALL



METAL BIN-TYPE RETAINING WALL

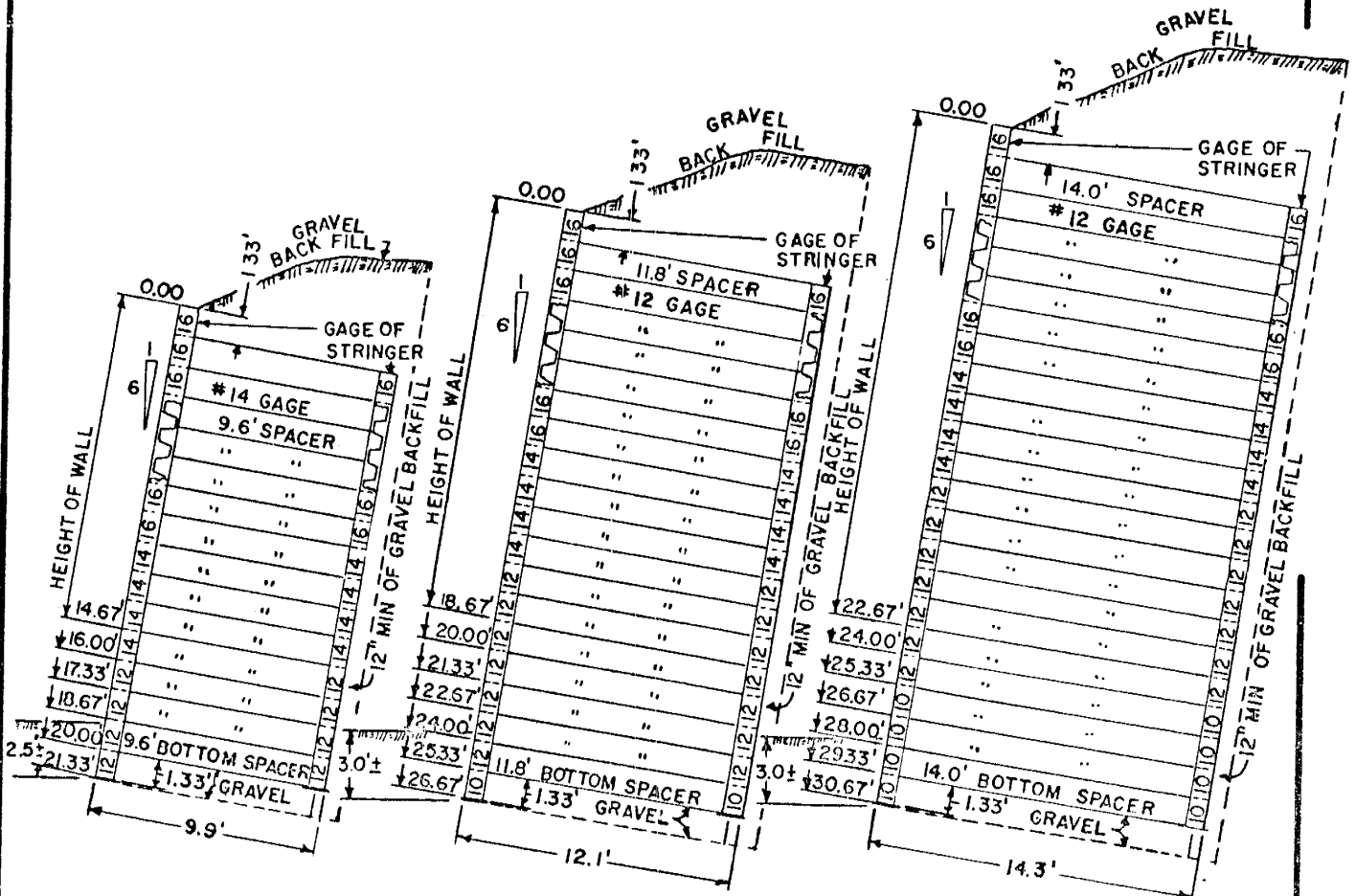


DESIGN "A"

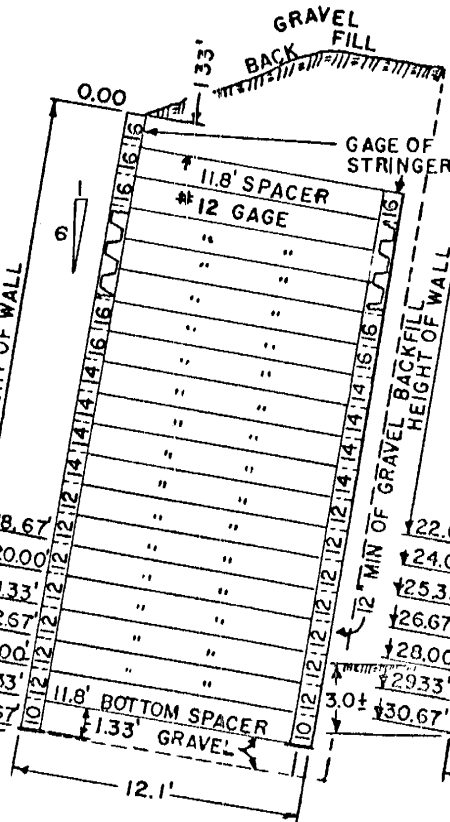


DESIGN "B"

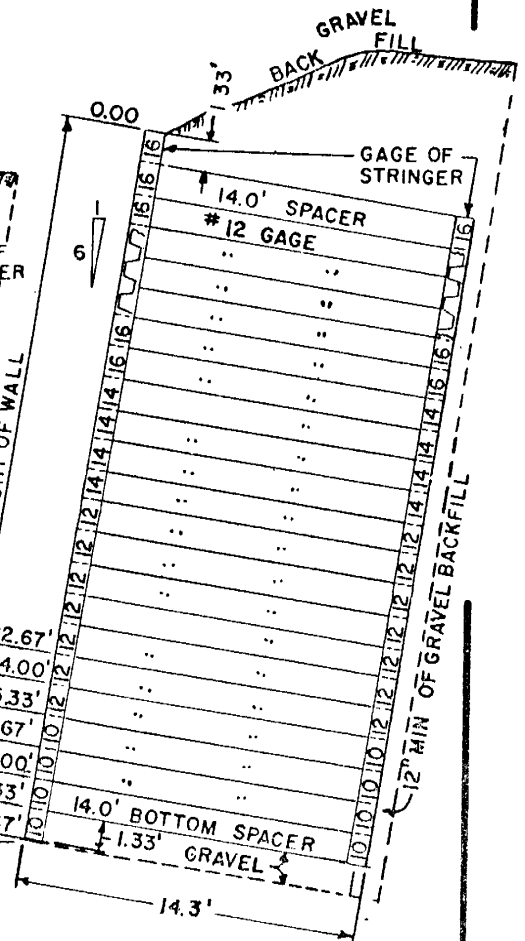
NOTE! THESE DEPTHS MAY VARY TO SUIT CONDITIONS



DESIGN "C"

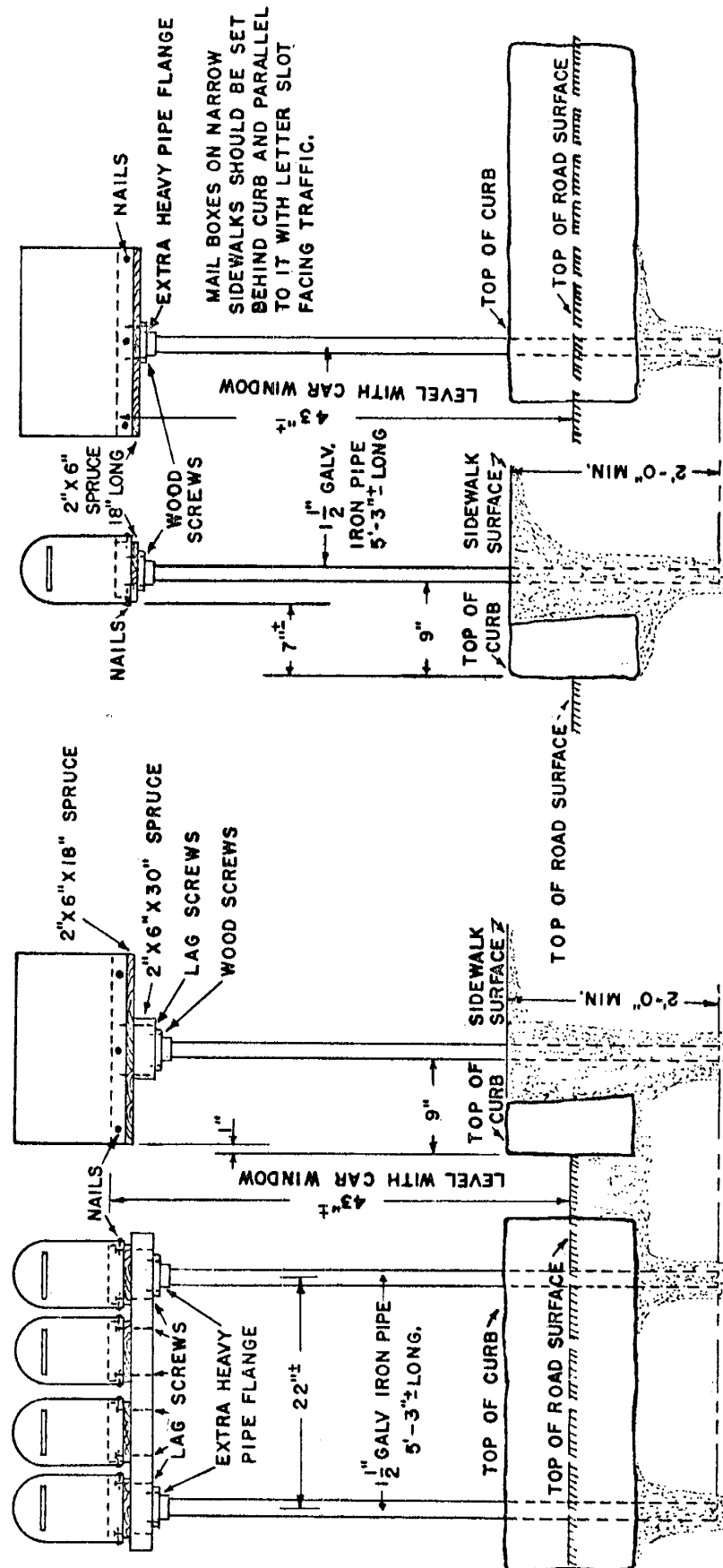


DESIGN "D"



DESIGN "E"

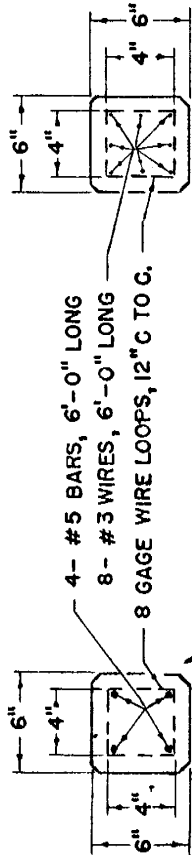
SETTING RURAL MAIL BOXES



NOTES.

ALL RURAL MAIL BOXES TO BE GALV METAL (APPROVED TYPES). LUMBER TO BE PLANED ALL FOUR SIDES TO FULL 2" X 6" SIZE TO FIT BOTTOM OF MAIL BOXES. TO SET 1-1/2" GALV PIPE POST, USE DRIVING POINT OF SAME SIZE, THEN TAMP POST INTO PLACE SO AS TO BE PLUMB BOTH WAYS.

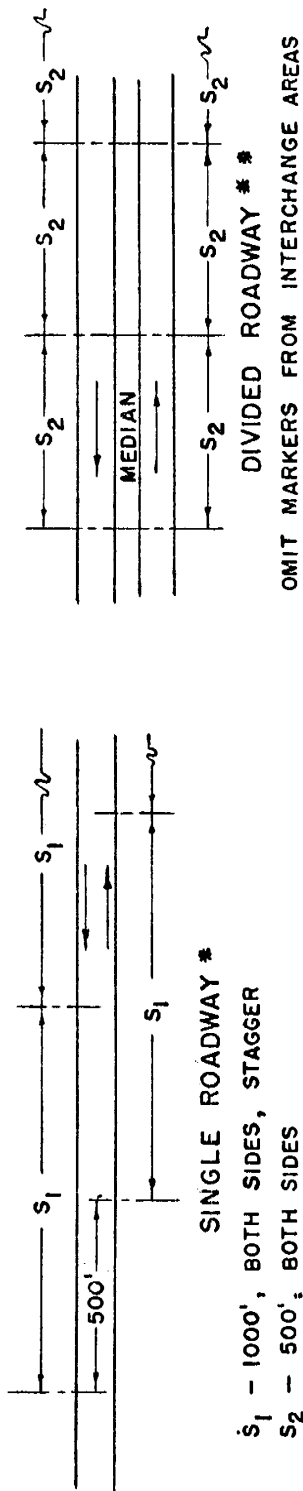
STATION, CULVERT, AND PROJECT MARKERS



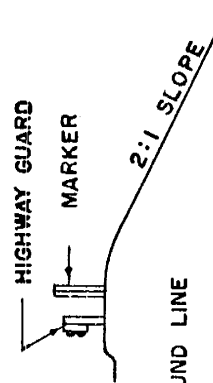
* EXAMPLE: AT STATIONS 0, 10, 20, ETC
ON ONE SIDE AND AT STATIONS 5,
15, 25, ETC ON THE OPPOSITE SIDE

** EXAMPLE: AT STATIONS 0, 5, 10, 15, ETC
ON BOTH SIDES OF HIGHWAY.

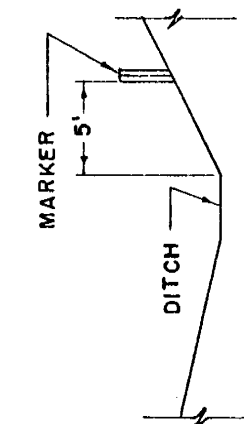
• SPACING OF STATION MARKERS



STATION MARKERS AT FILLS

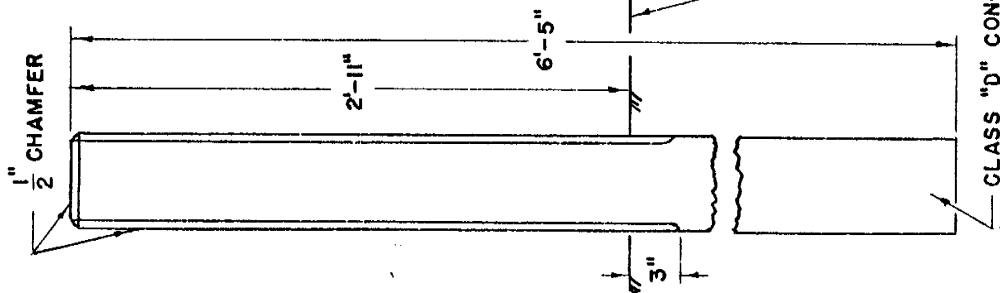


STATION MARKERS AT CUTS



NOTES

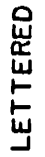
- 1 LOCATION OF PROJECT MARKERS TO BE AS DIRECTED BY ENGINEER.
- 2 PAINTING: EXPOSED PORTION OF STATION MARKERS TO BE PAINTED WHITE; EXPOSED PORTION OF PROJECT MARKERS TO BE PAINTED WITH 2 COATS OF ORANGE PROJECT NUMBERS AND STATIONS TO BE STENCILED IN BLACK.
- 3, FOR DESCRIPTIONS, MATERIALS, AND CONSTRUCTION METHODS, SEE SPECIFICATIONS
4. STATION AND PROJECT MARKERS SET WITH FACES AT 45° WITH ROADWAY
- 5 ONE MARKER WILL BE PROVIDED AT CULVERT ENDS WHERE NO GUARD RAIL IS INSTALLED, IT WILL BE LOCATED AT THE NEAR BACK CORNER OF THE END IN THE DIRECTION OF TRAFFIC.



GRANITE BOUNDS

TOP AND TOP 12 INCHES ON THREE
SIDES TO BE POINTED. TOP 12
INCHES ON FACE TO BE HAMMER
DRESSED

1/2" DIAM HOLE IN CENTER OF TOP, 1 1/2" DEEP; FLARED AT BOTTOM; RAMMED WITH LEAD ROPE.



*BOUNDS TO BE LOCATED IN
LAWNS, SIDEWALKS OR DRIVES
SHALL BE SET WITH TOP OF
BOUND 2" BELOW GROUND
LINE

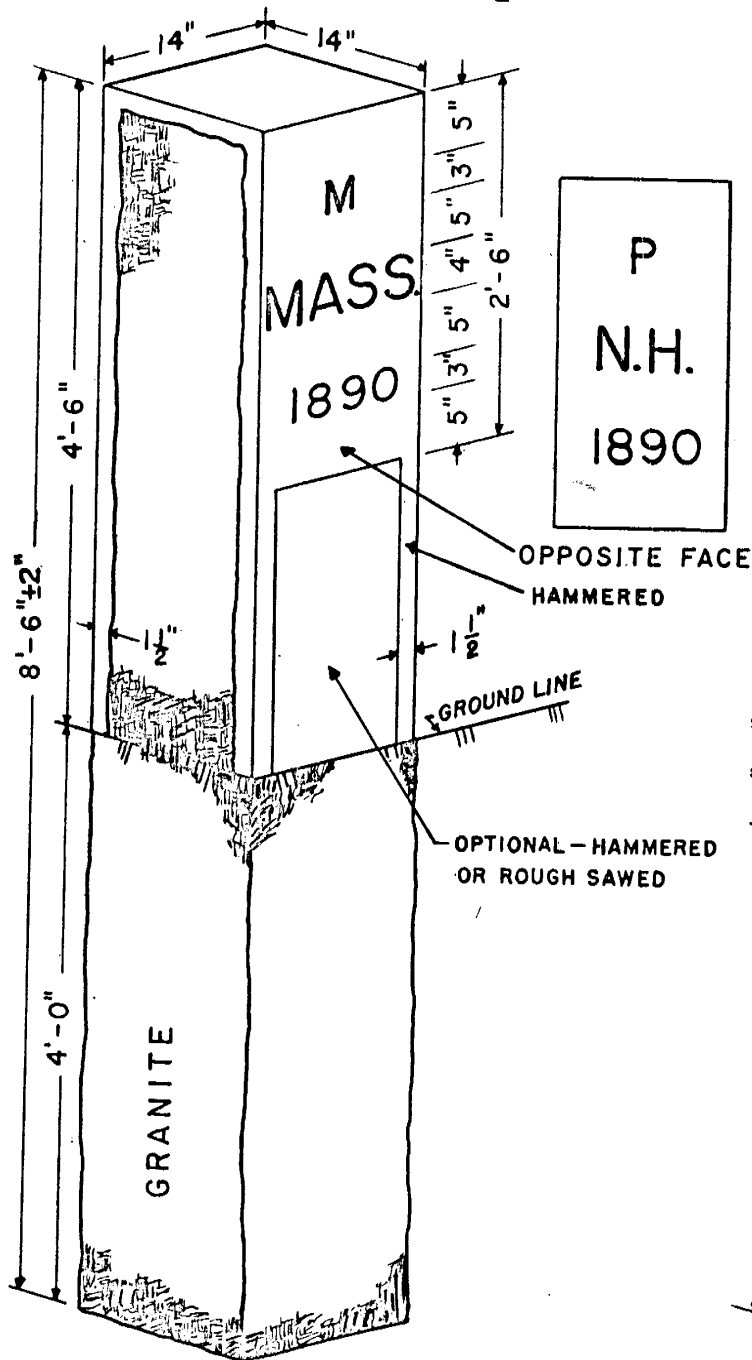
NOTE
FOR DESCRIPTIONS, MATERIALS
AND CONSTRUCTION METHODS,
SEE SPECIFICATIONS.

STONE MONUMENTS (BOUNDS)

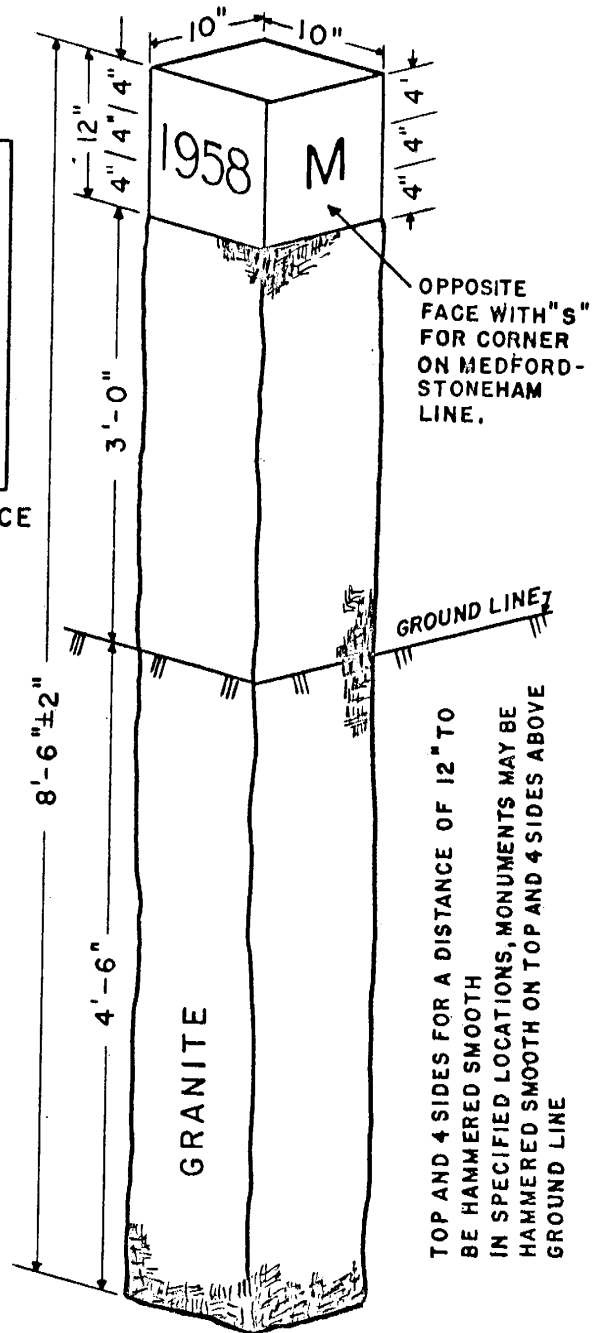
REPLACEMENT OF BOUND BROKEN OR LOST WILL BE INSCRIBED WITH THE YEAR BOUND POINT WAS ESTABLISHED.

BOUNDS LOCATING NEW CORNERS WILL BE INSCRIBED WITH THE YEAR NEW CORNER WAS ESTABLISHED.

ALL LETTERING TO BE
 $\frac{1}{2}$ " V SUNK LETTERS



STATE LINE

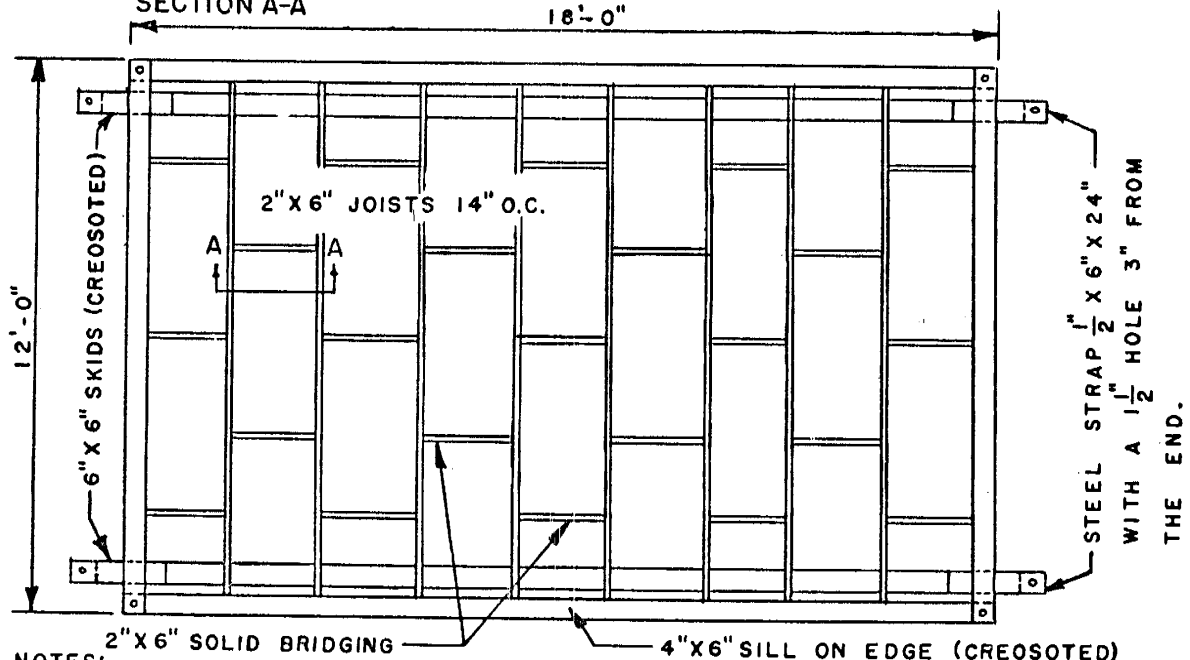
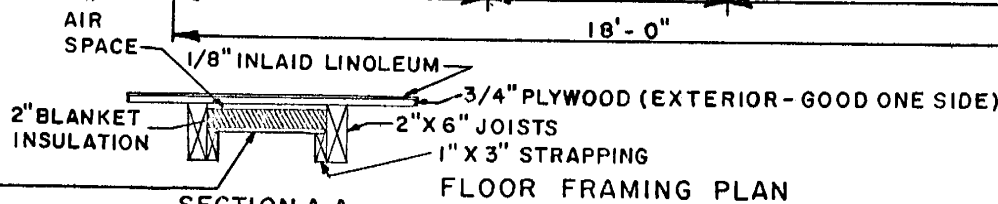
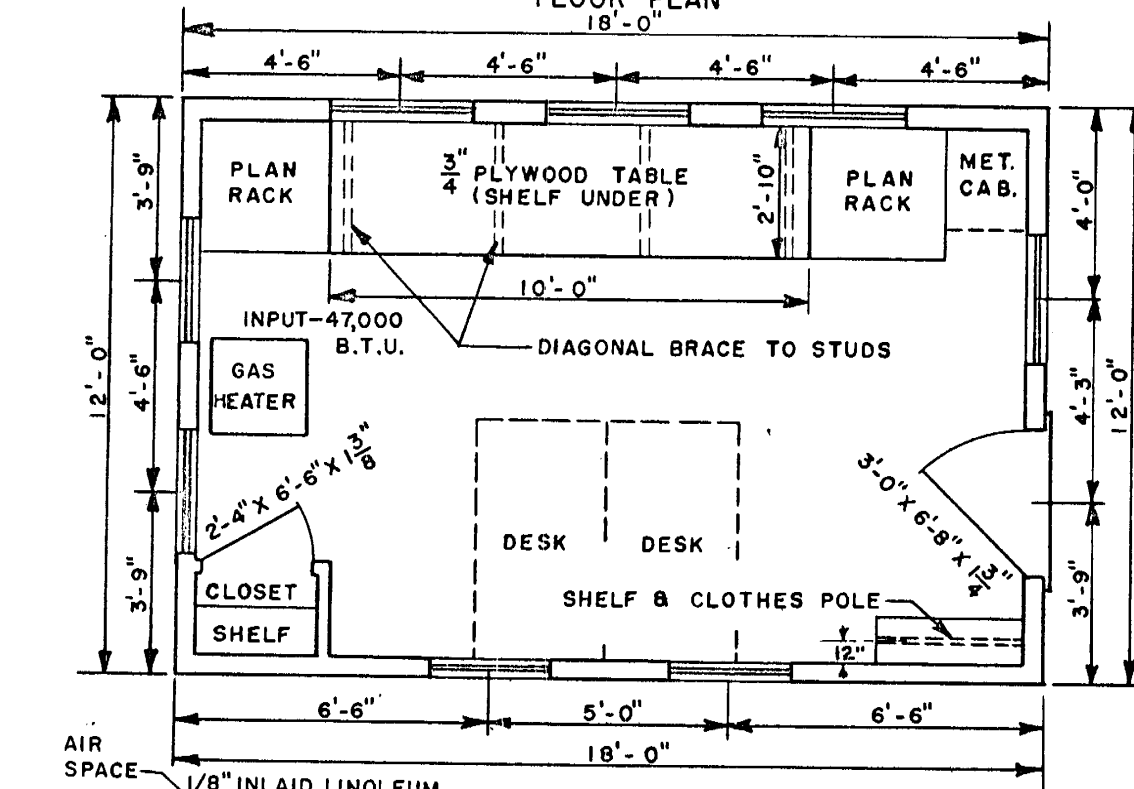


CITY OR TOWN CORNER

TOP AND 4 SIDES FOR A DISTANCE OF 12" TO BE HAMMERED SMOOTH IN SPECIFIED LOCATIONS, MONUMENTS MAY BE HAMMERED SMOOTH ON TOP AND 4 SIDES ABOVE GROUND LINE

PORTABLE OFFICE BUILDING

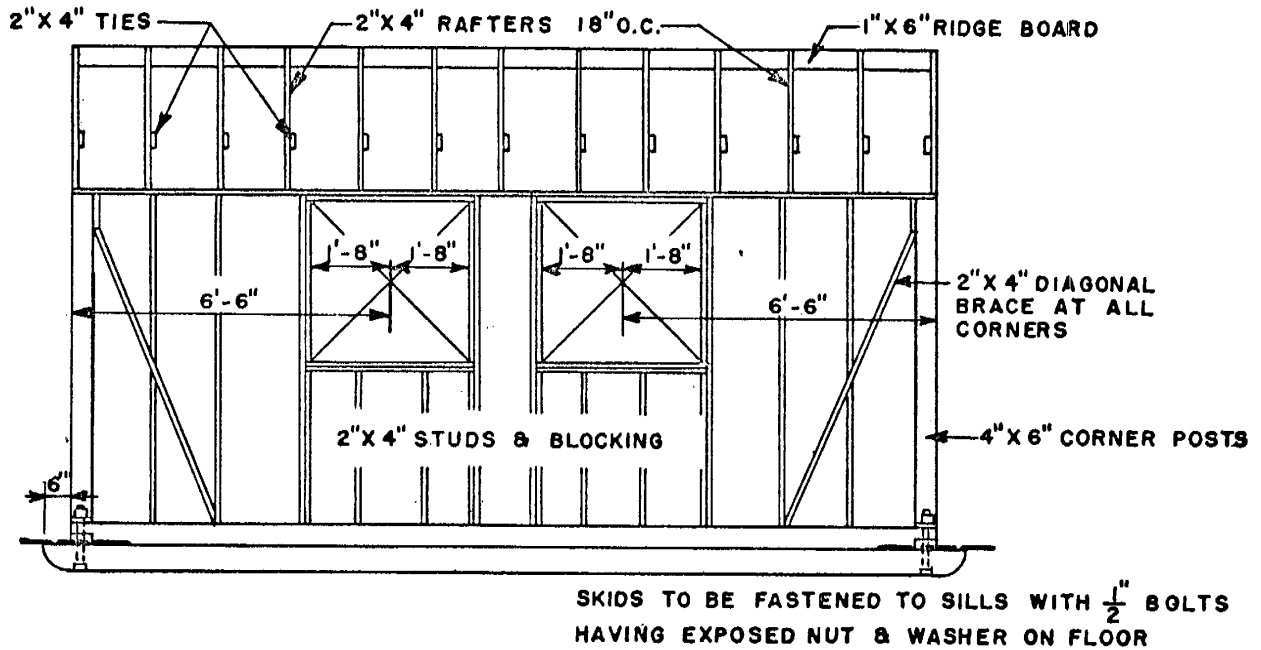
FLOOR PLAN
18'-0"



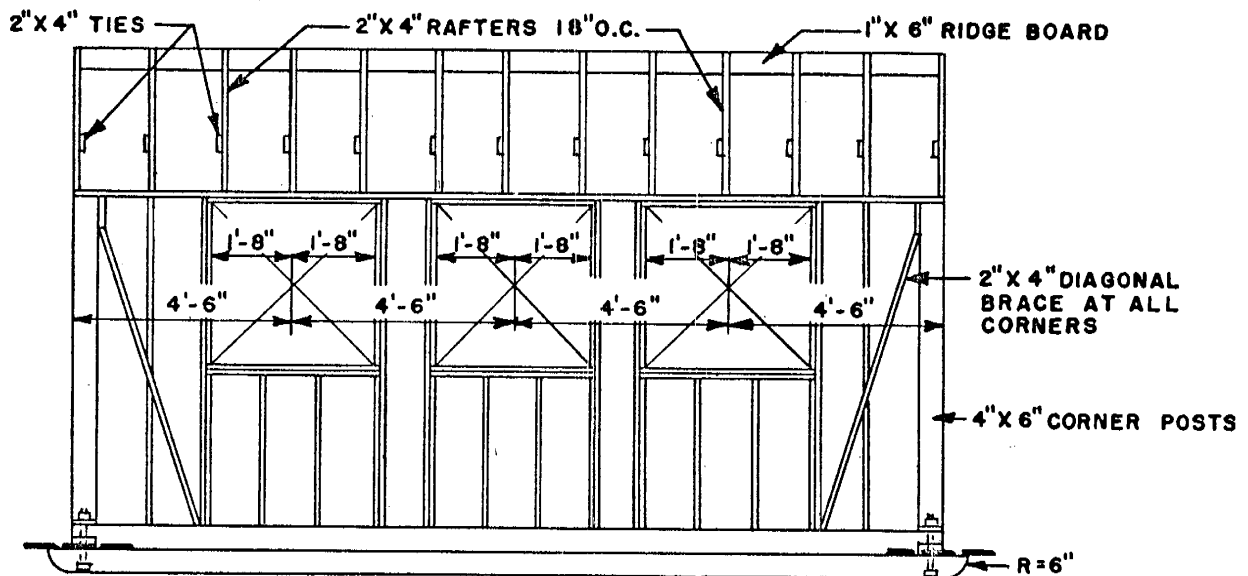
NOTES:

1. FOR DESCRIPTIONS, MATERIALS, AND CONSTRUCTION METHODS, SEE SPECIFICATIONS
2. LOCATION OF PLAN RACK, DRAFTING TABLE, DESKS, HEATER, ETC., IS TO BE DETERMINED IN THE FIELD. LOCATIONS SHOWN ABOVE ARE MERELY TYPICAL
3. FLOOR TO BE 1/8" INLAID LINOLEUM OVER 3/4" PLYWOOD
4. EXTERIOR WALLS AND ROOF TO BE 5/8" PLYWOOD (EXTERIOR-GOOD ONE SIDE)

PORTABLE OFFICE BUILDING

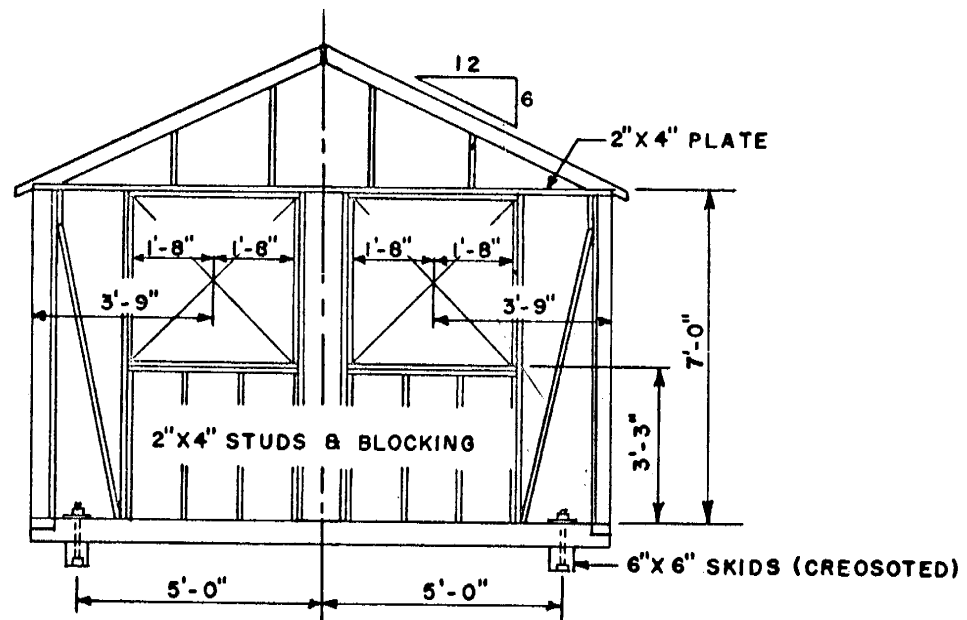


LEFT ELEVATION

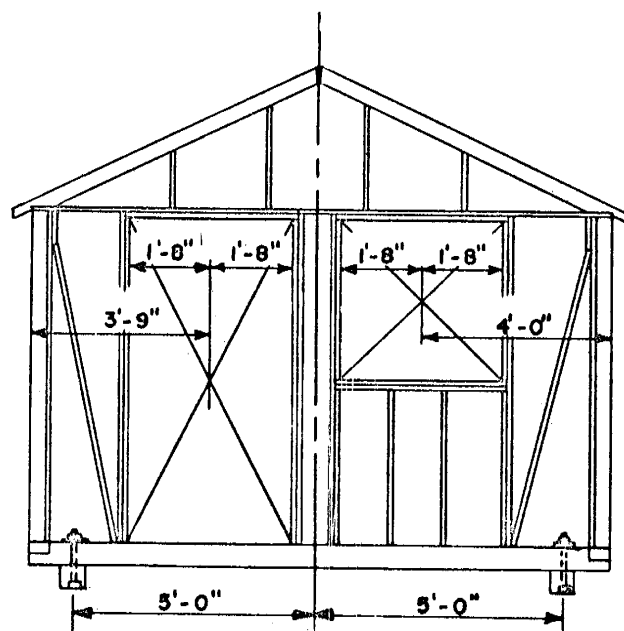


RIGHT ELEVATION

PORTABLE OFFICE BUILDING

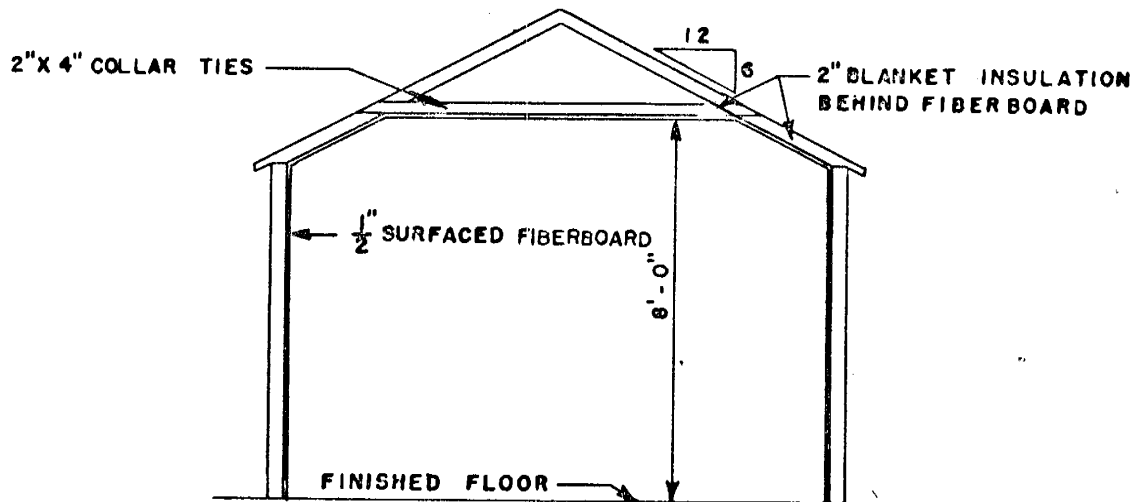


REAR ELEVATION

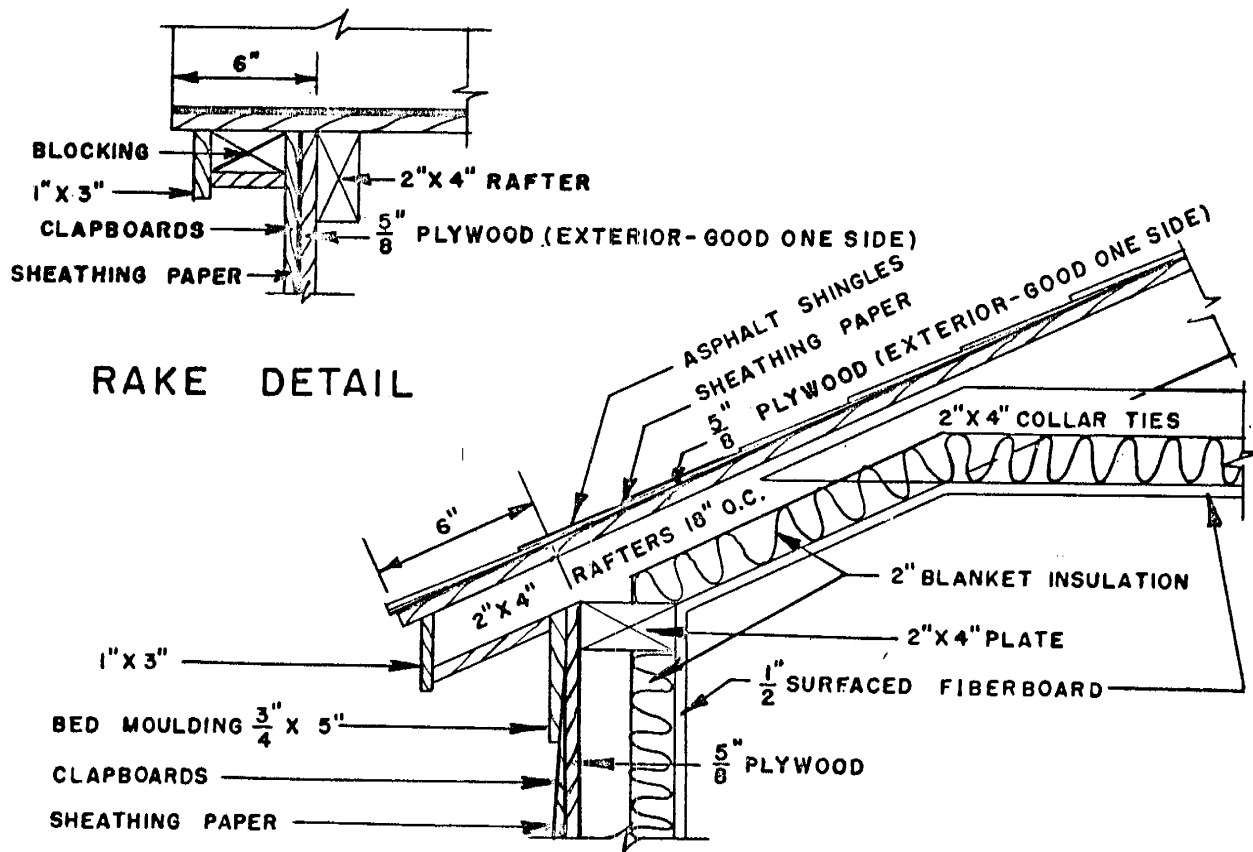


FRONT ELEVATION

PORTABLE OFFICE BUILDING

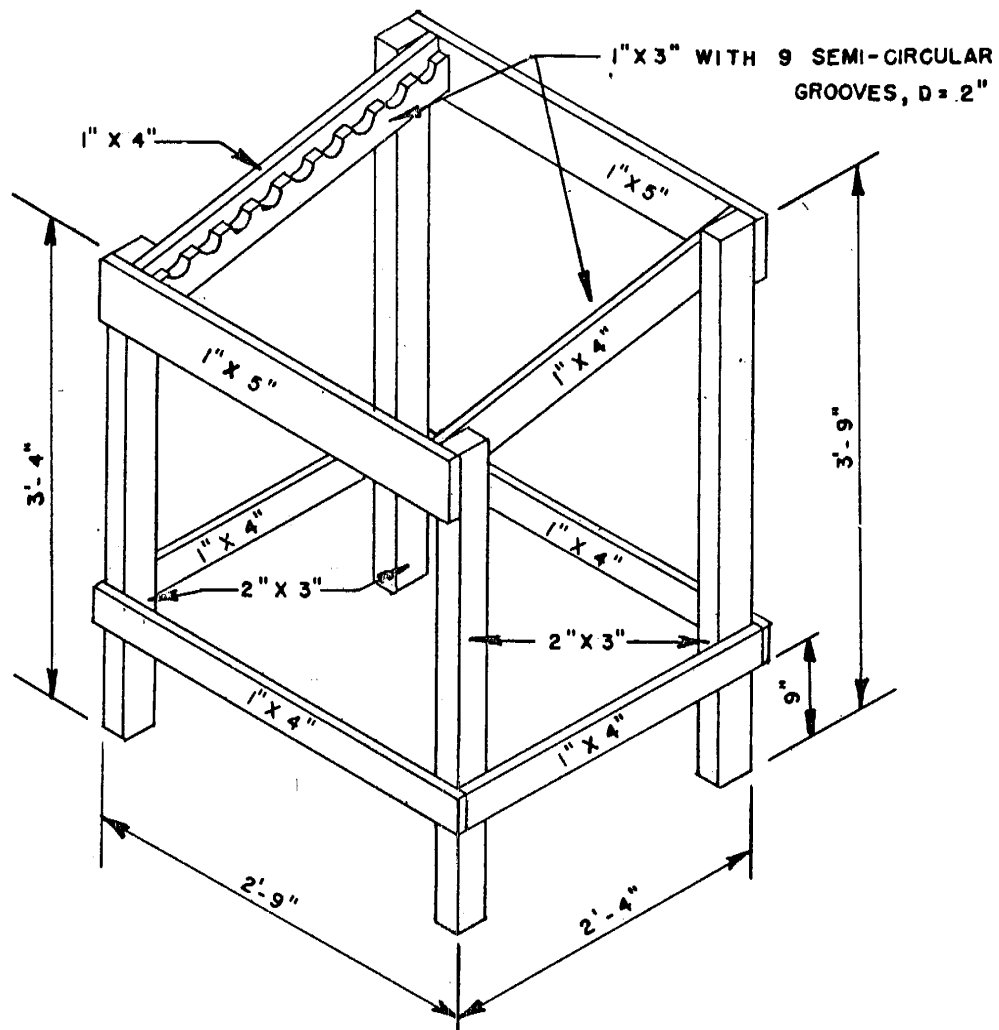


SECTION THROUGH BUILDING



TYPICAL CORNICE DETAIL

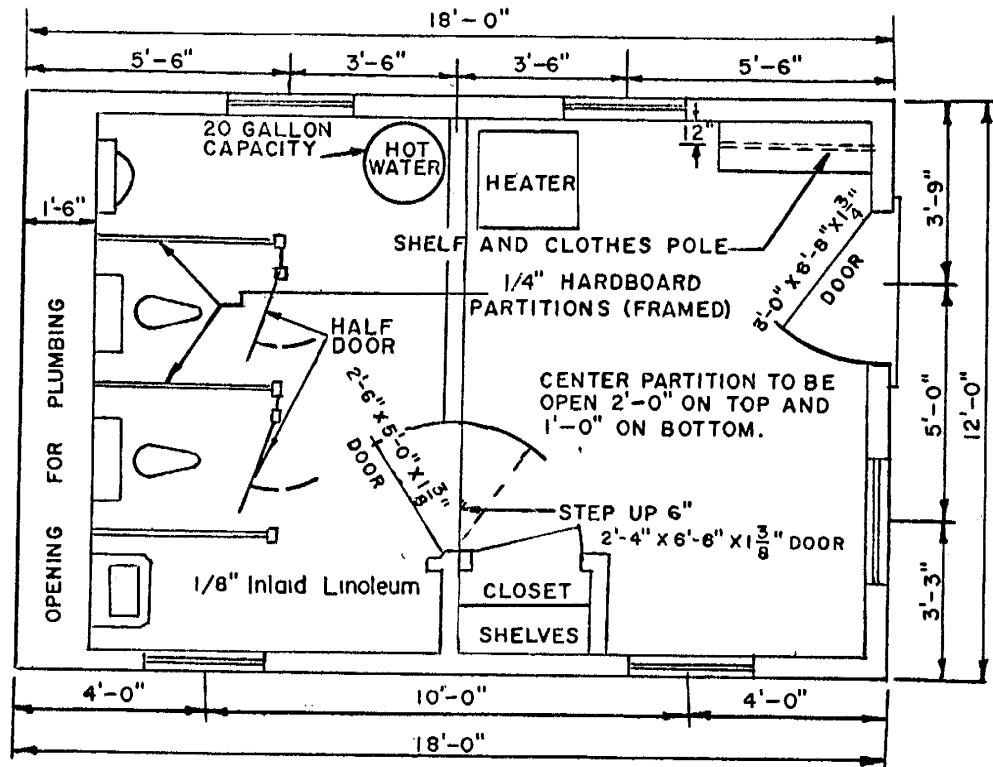
PORTABLE OFFICE BUILDING



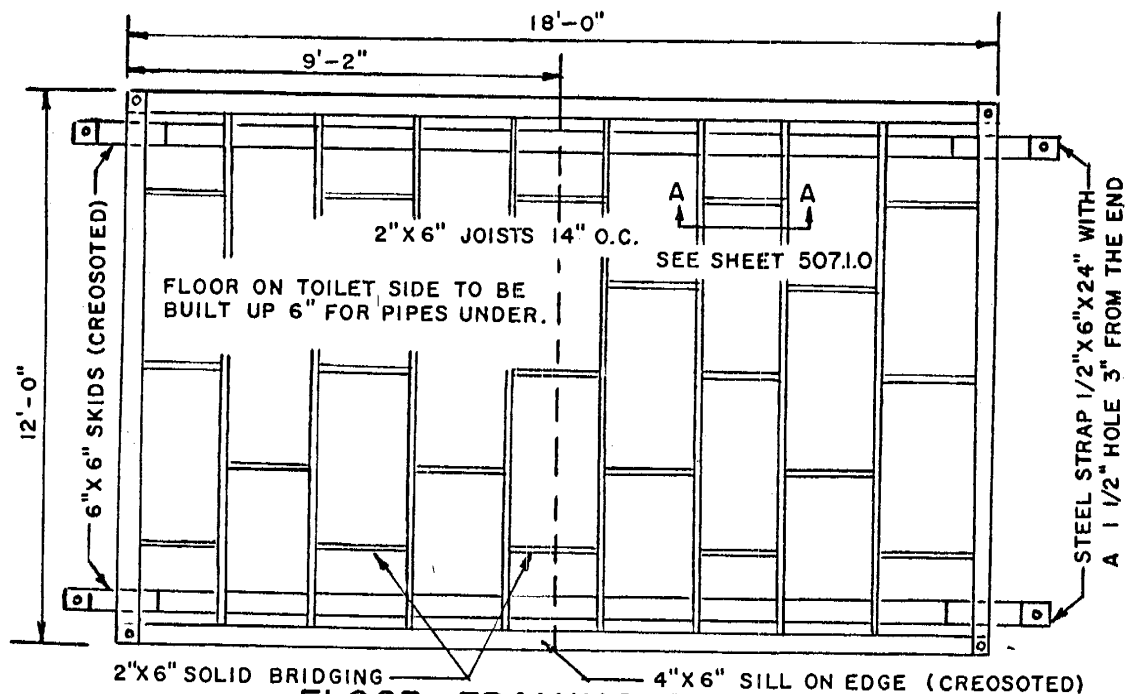
NOTE: ALL CONNECTIONS TO BE FASTENED WITH WOOD SCREWS

PLAN RACK

PORTABLE SANITARY BUILDING



FLOOR PLAN

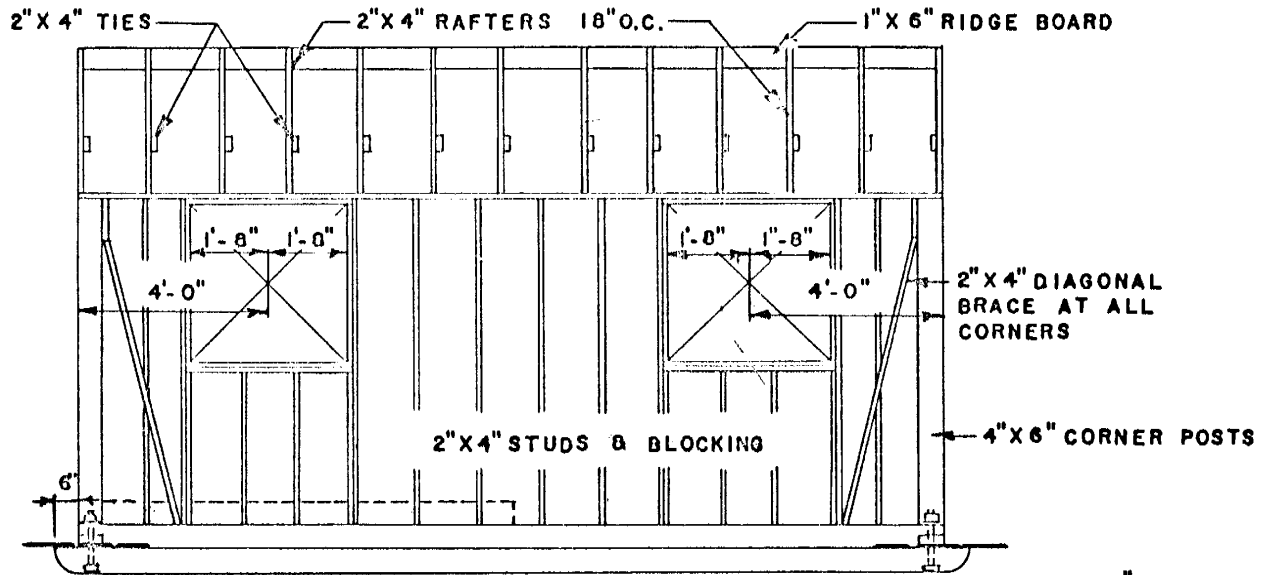


FLOOR FRAMING PLAN

NOTES

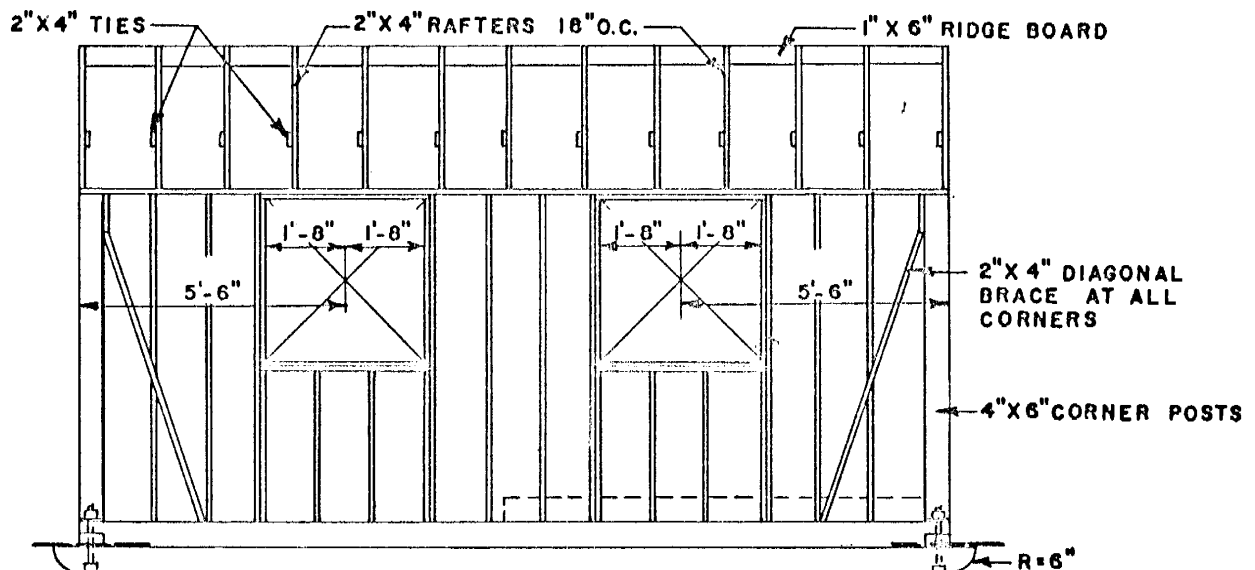
1. FOR DESCRIPTIONS, MATERIALS, AND CONSTRUCTION METHODS SEE SPECIFICATIONS.
2. FLOOR TO BE 1/8" INLAID LINOLEUM OVER 3/4" PLYWOOD.
3. EXTERIOR WALLS AND ROOF TO BE 5/8" PLYWOOD (EXTERIOR-GOOD ONE SIDE)

PORTABLE SANITARY BUILDING



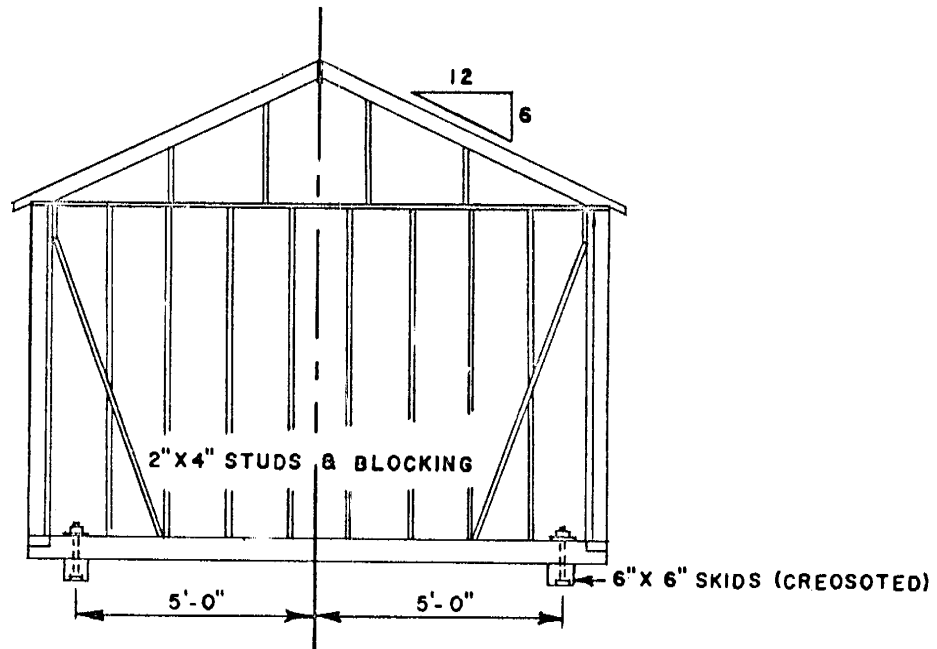
SKIDS TO BE FASTENED TO SILLS WITH $\frac{1}{2}$ " BOLTS
HAVING EXPOSED NUT & WASHER ON FLOOR

LEFT ELEVATION

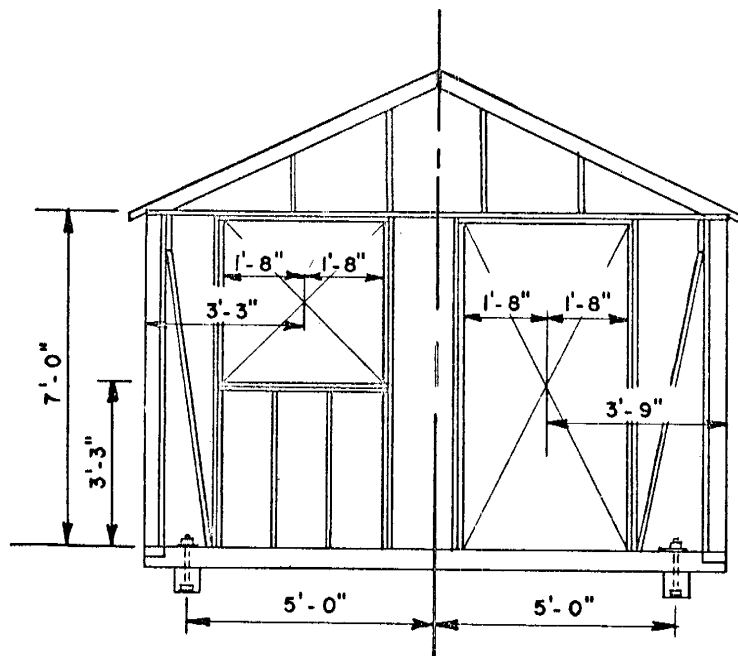


RIGHT ELEVATION

PORTABLE SANITARY BUILDING

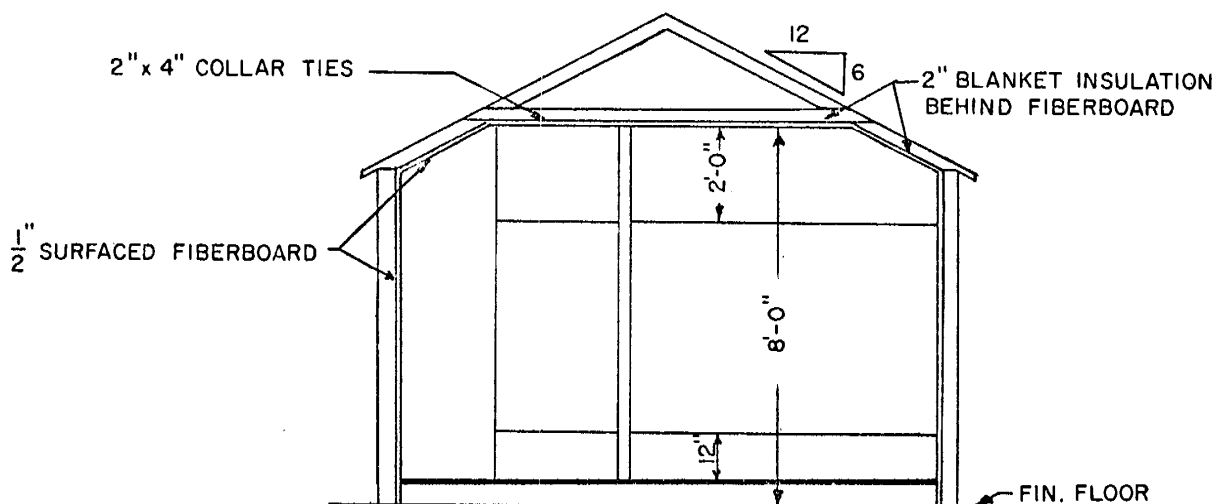


REAR ELEVATION

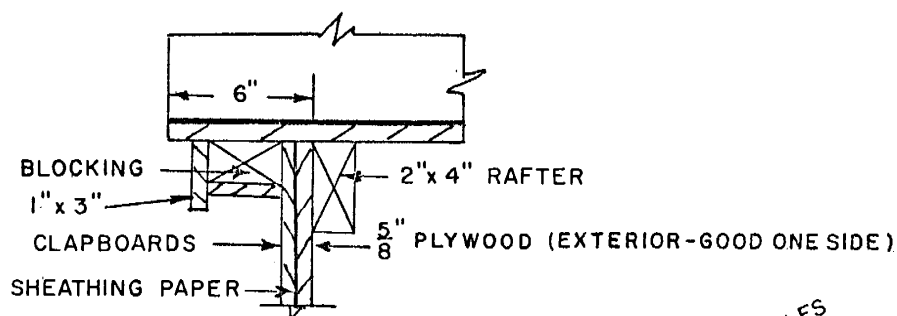


FRONT ELEVATION

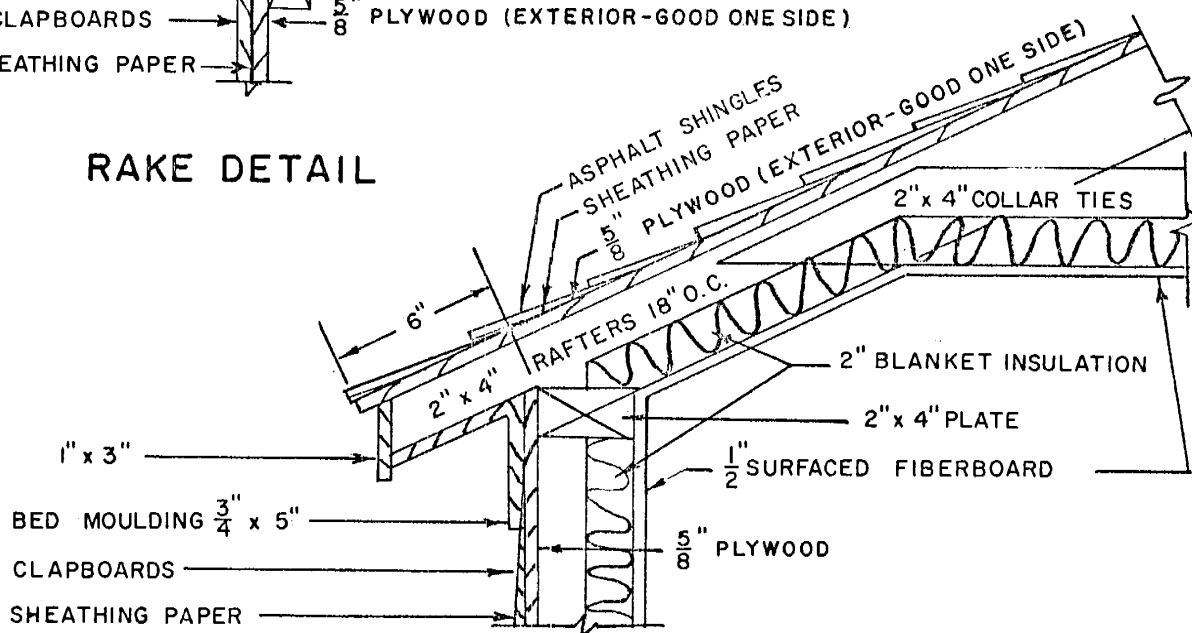
PORTABLE SANITARY BUILDING



SECTION THROUGH BUILDING



RAKE DETAIL



TYPICAL CORNICE DETAIL