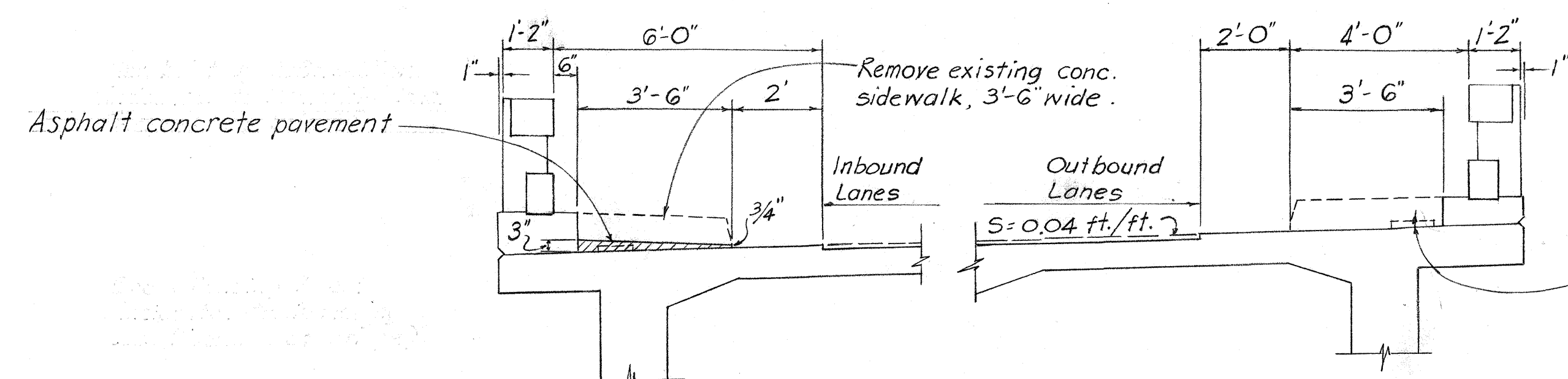
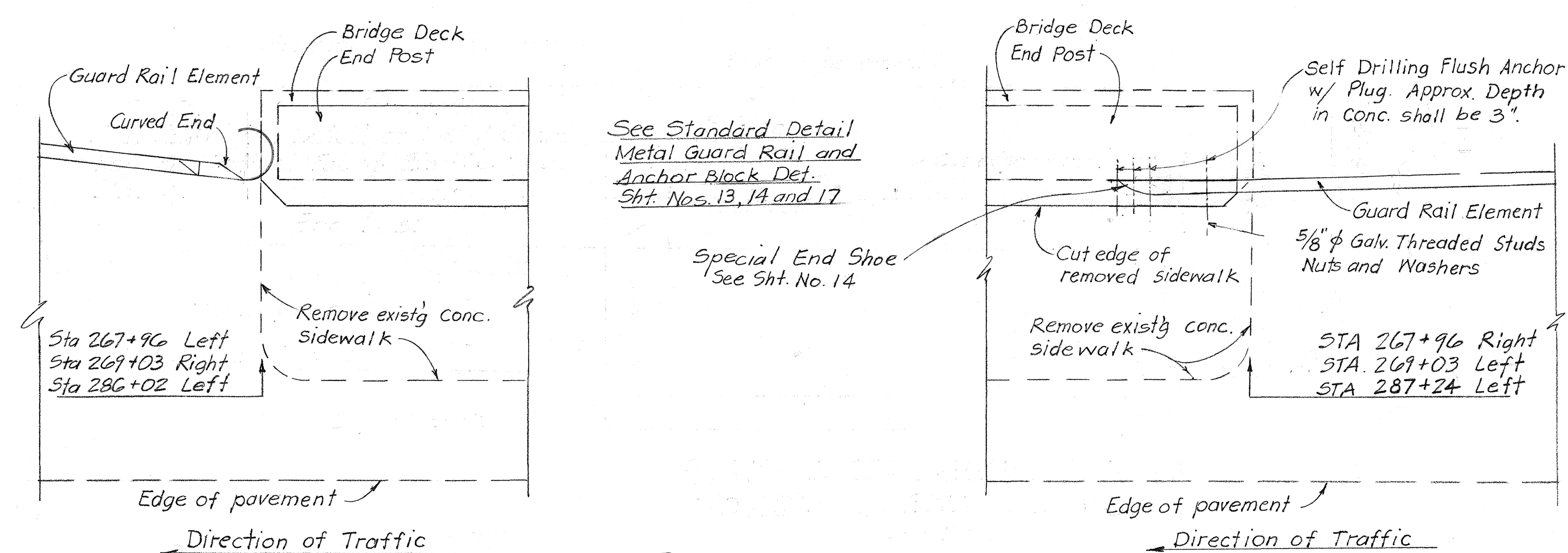


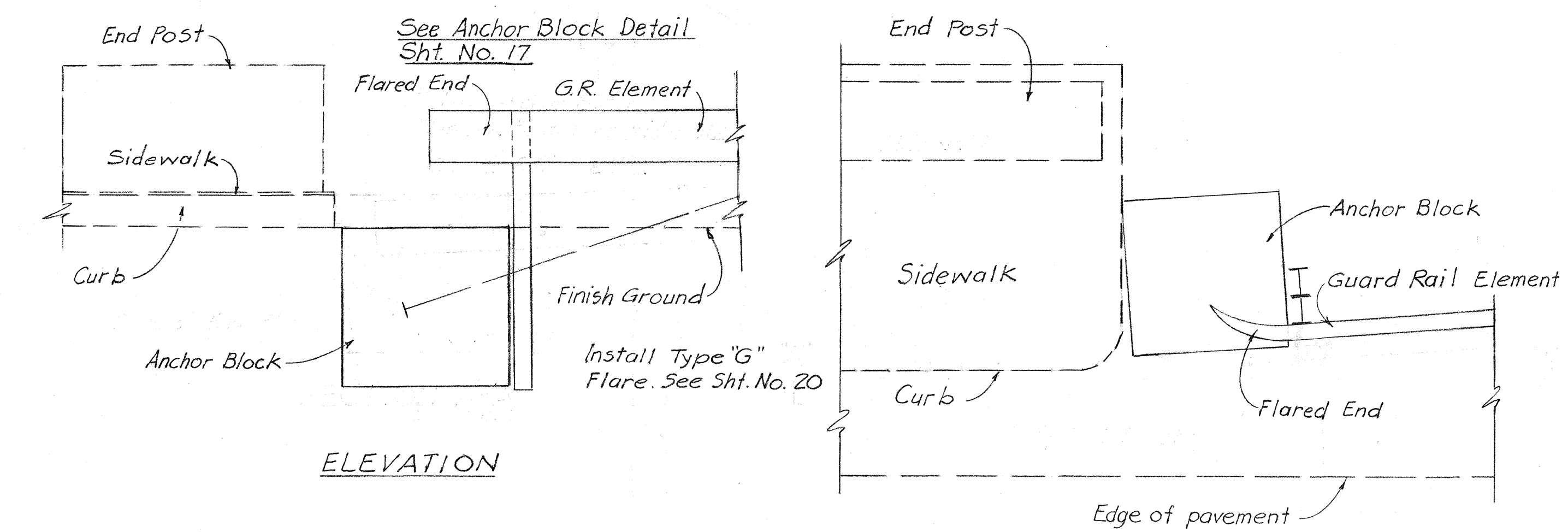
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-061-1 (15)	1969	12	37



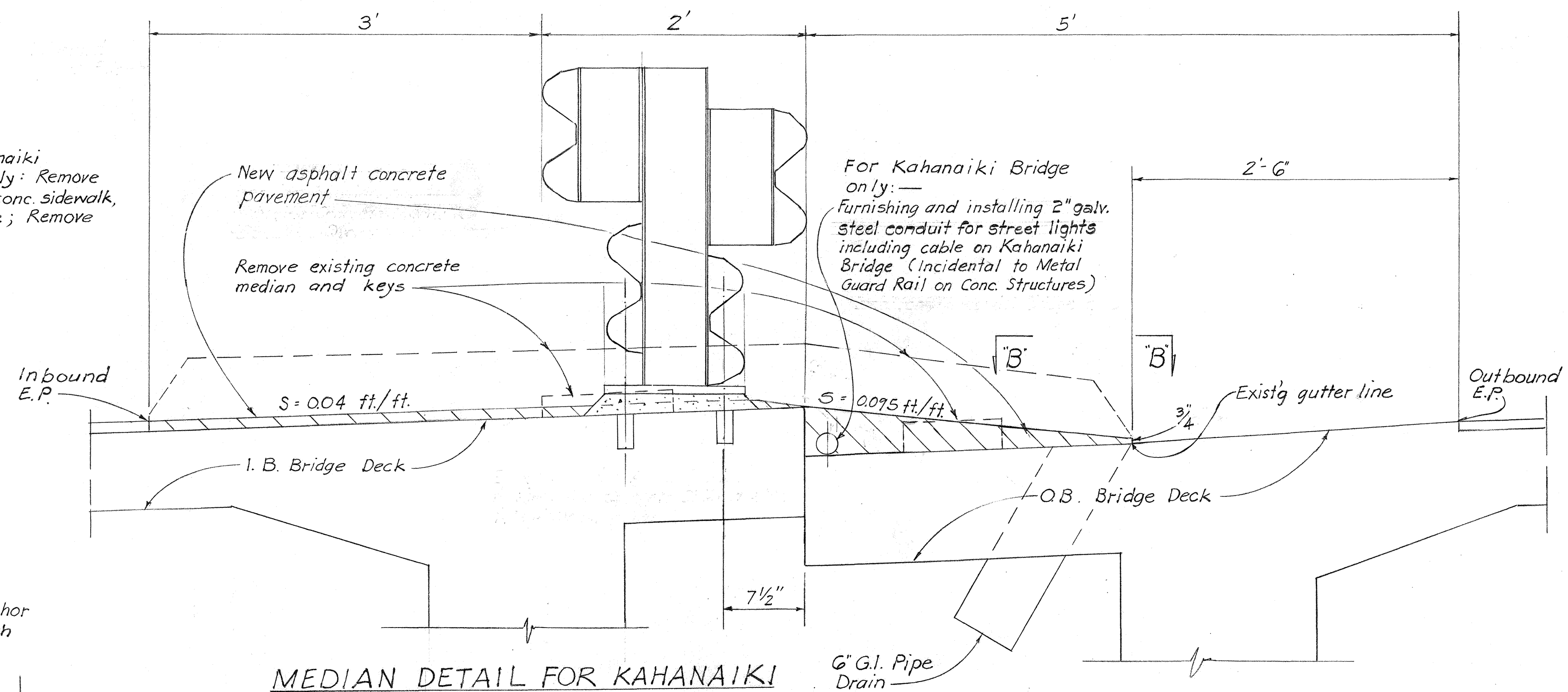
**SIDEWALK DETAIL
KAHANAIKI BRIDGE OR MAUNAWILI BRIDGE**
Scale: $\frac{3}{8}'' = 1'-0''$



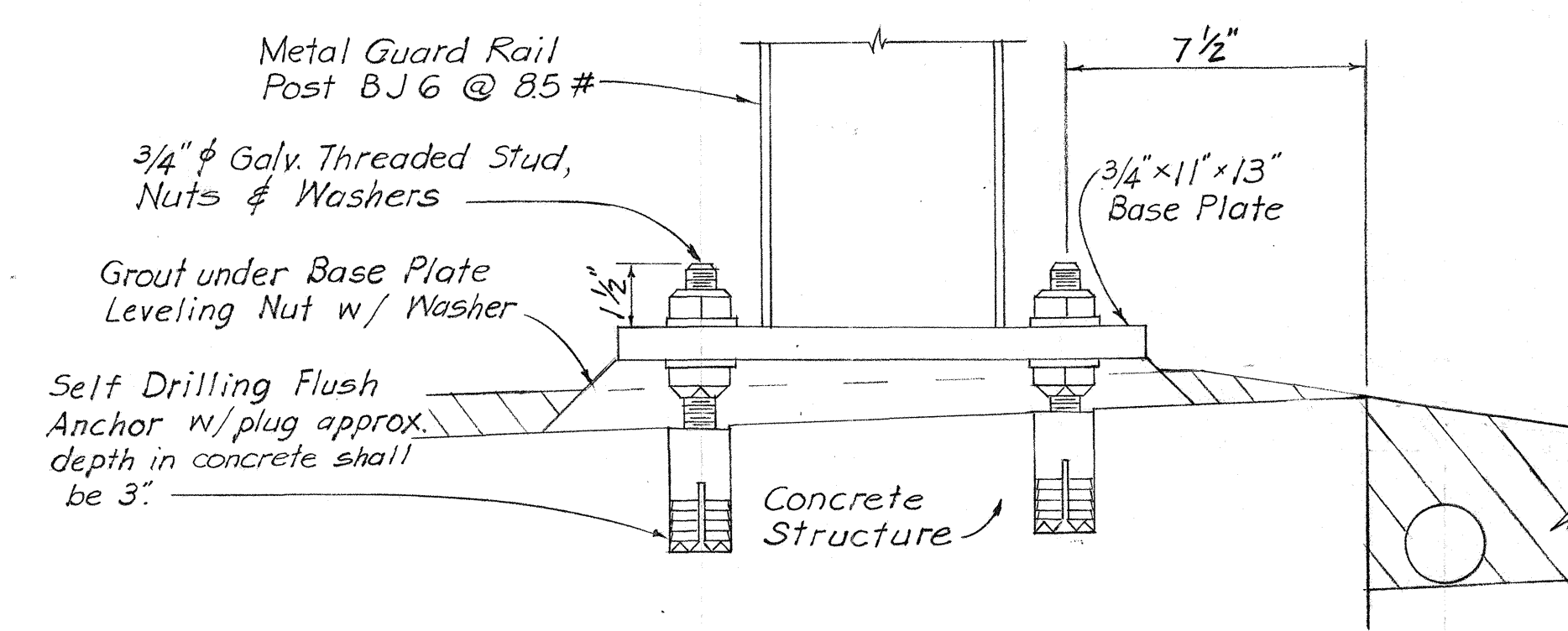
**PLAN
METAL GUARD RAIL END AT STRUCTURE IN SHOULDER**
Scale: $\frac{1}{2}'' = 1'-0''$



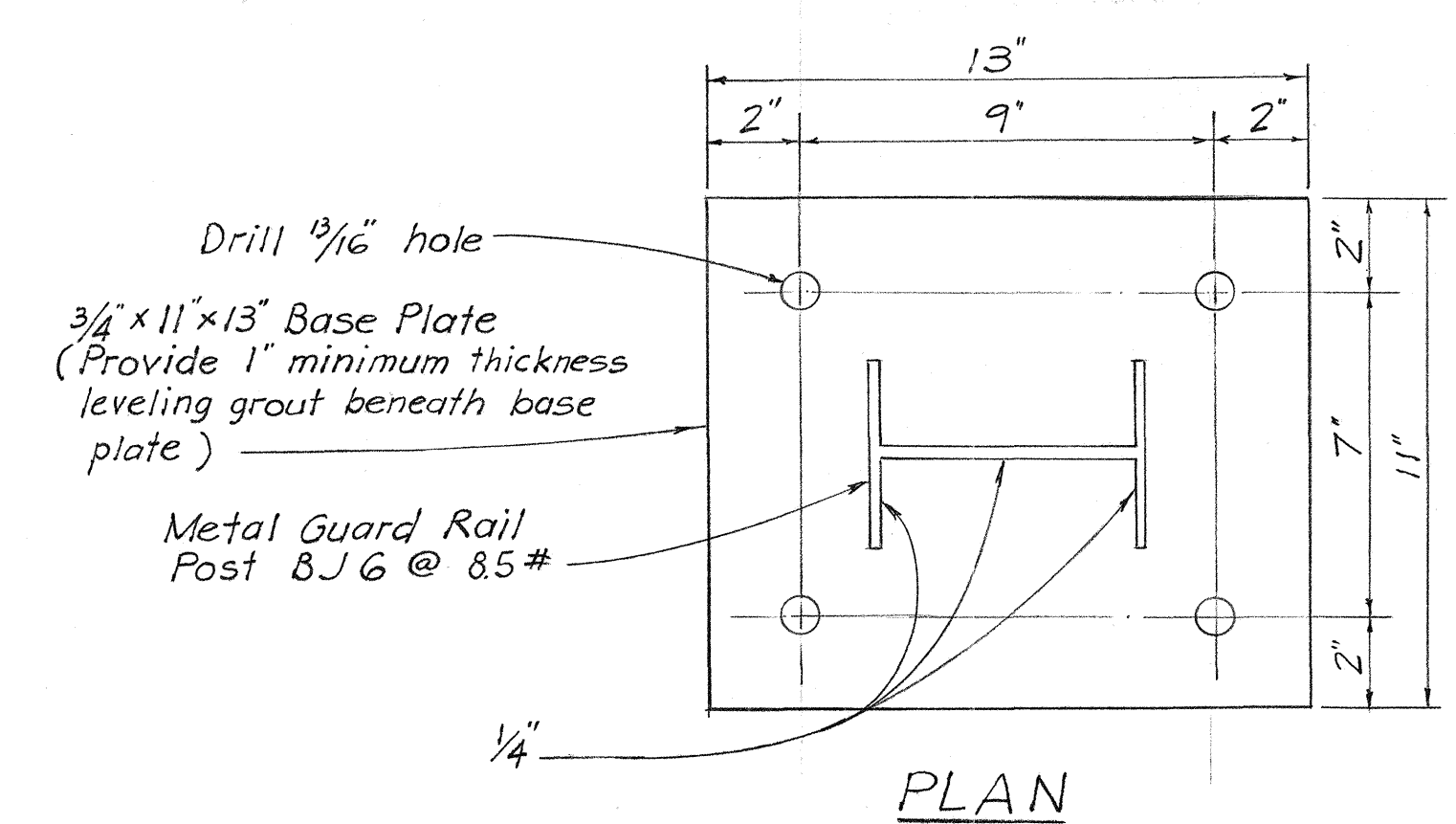
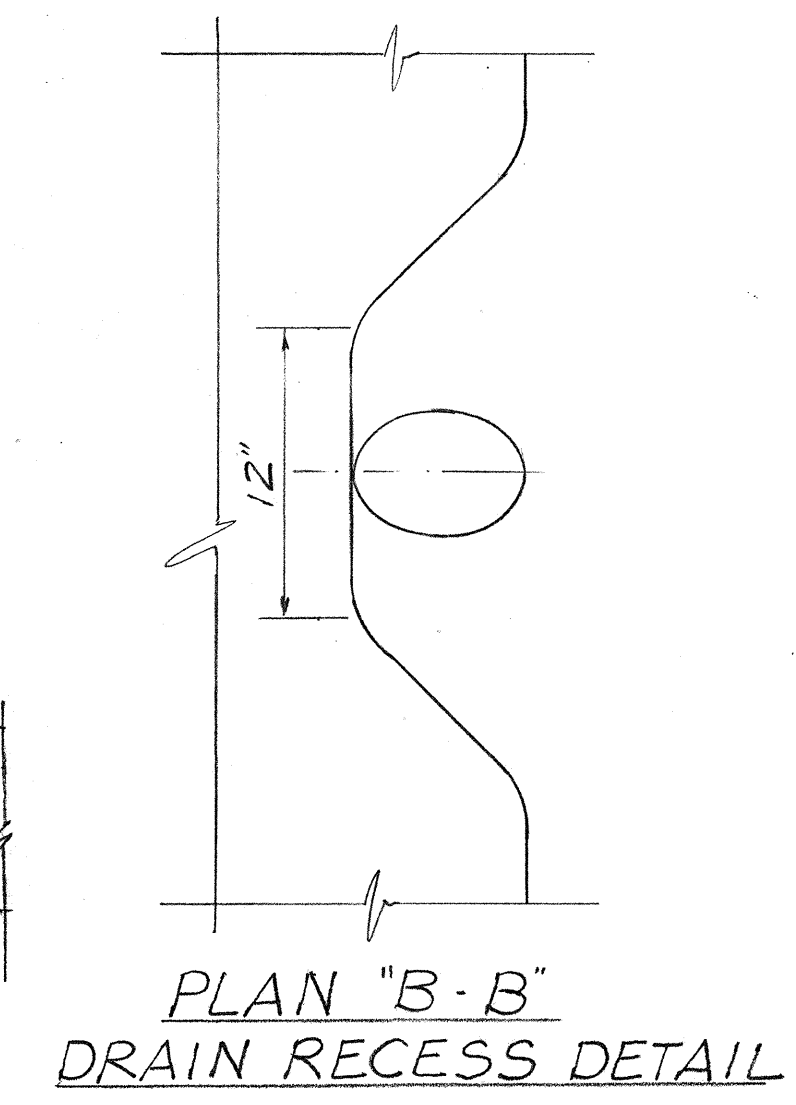
**PLAN
METAL GUARD RAIL END
AT STA. 286+00 Rt.**
Scale: $\frac{1}{2}'' = 1'-0''$



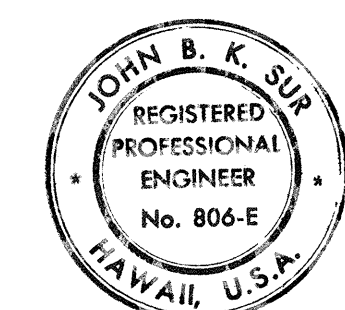
**MEDIAN DETAIL FOR KAHANAIKI
BRIDGE AND MAUNAWILI BRIDGE**
Scale: $\frac{1}{2}'' = 1'-0''$



**METAL GUARD RAIL ON
CONCRETE STRUCTURES**
Scale: $\frac{3}{4}'' = 1'-0''$



PLAN

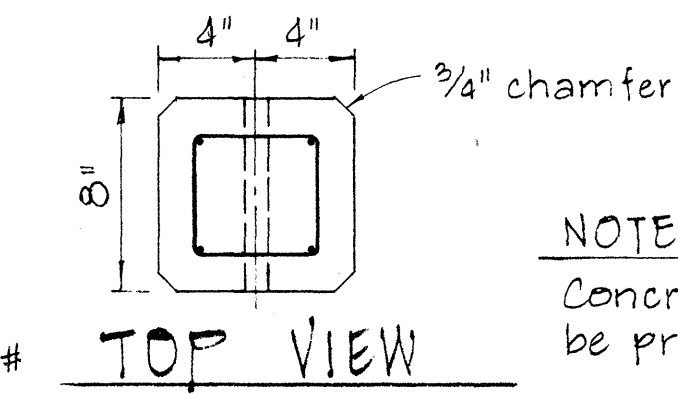
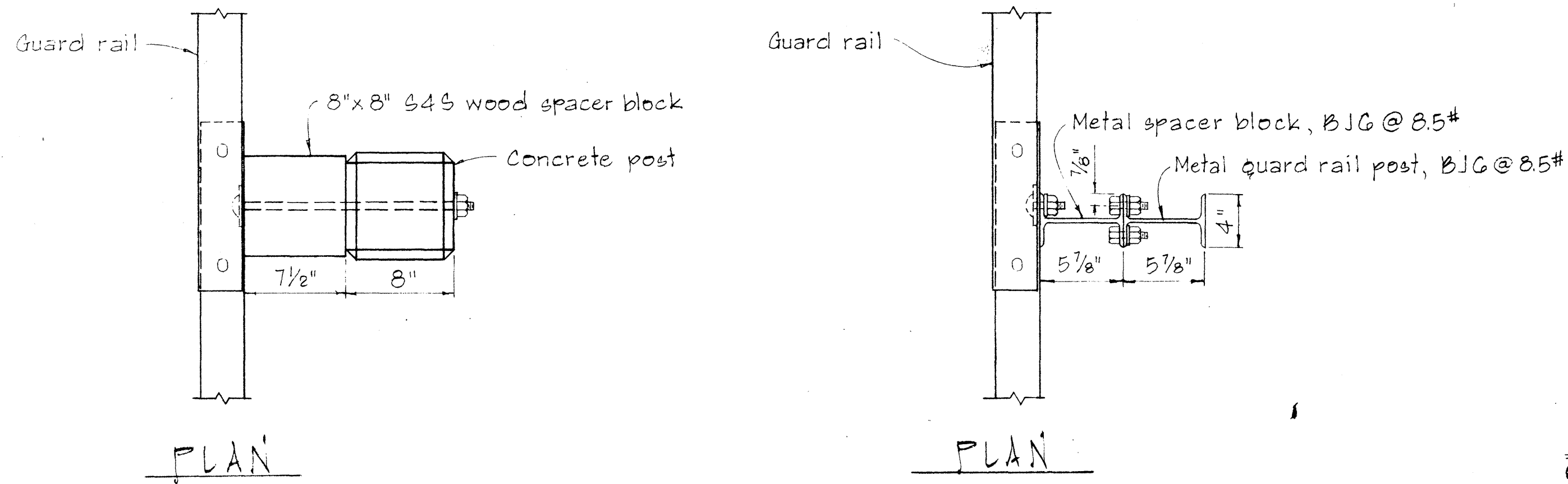


THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION.
John B. K. Sur

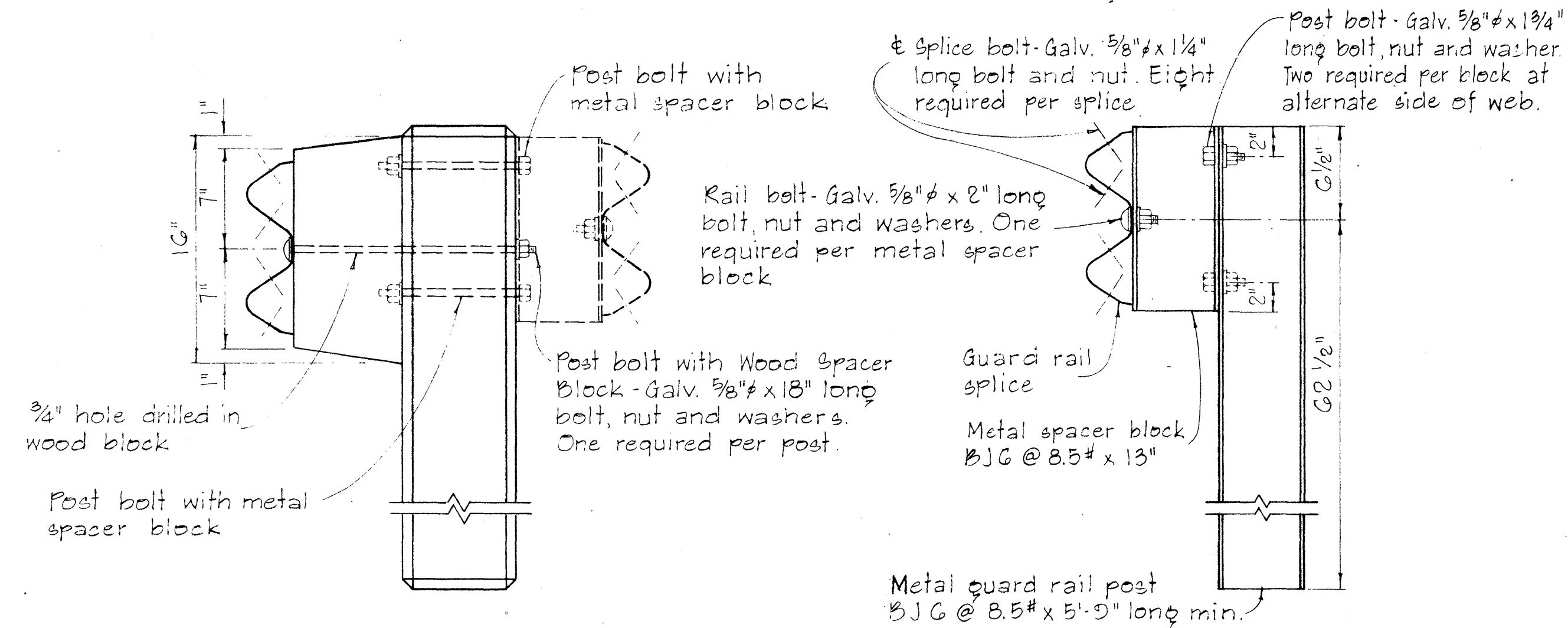
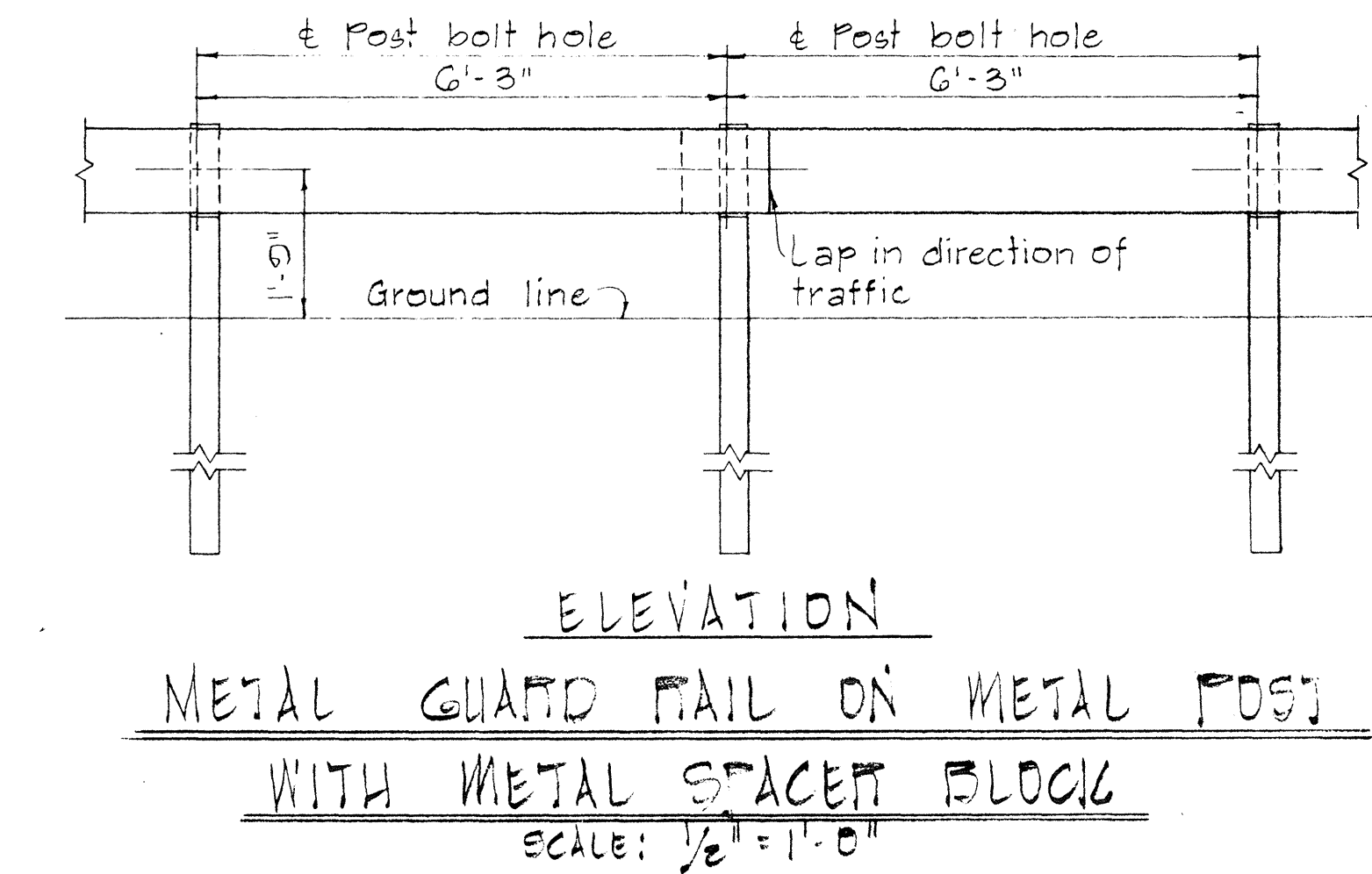
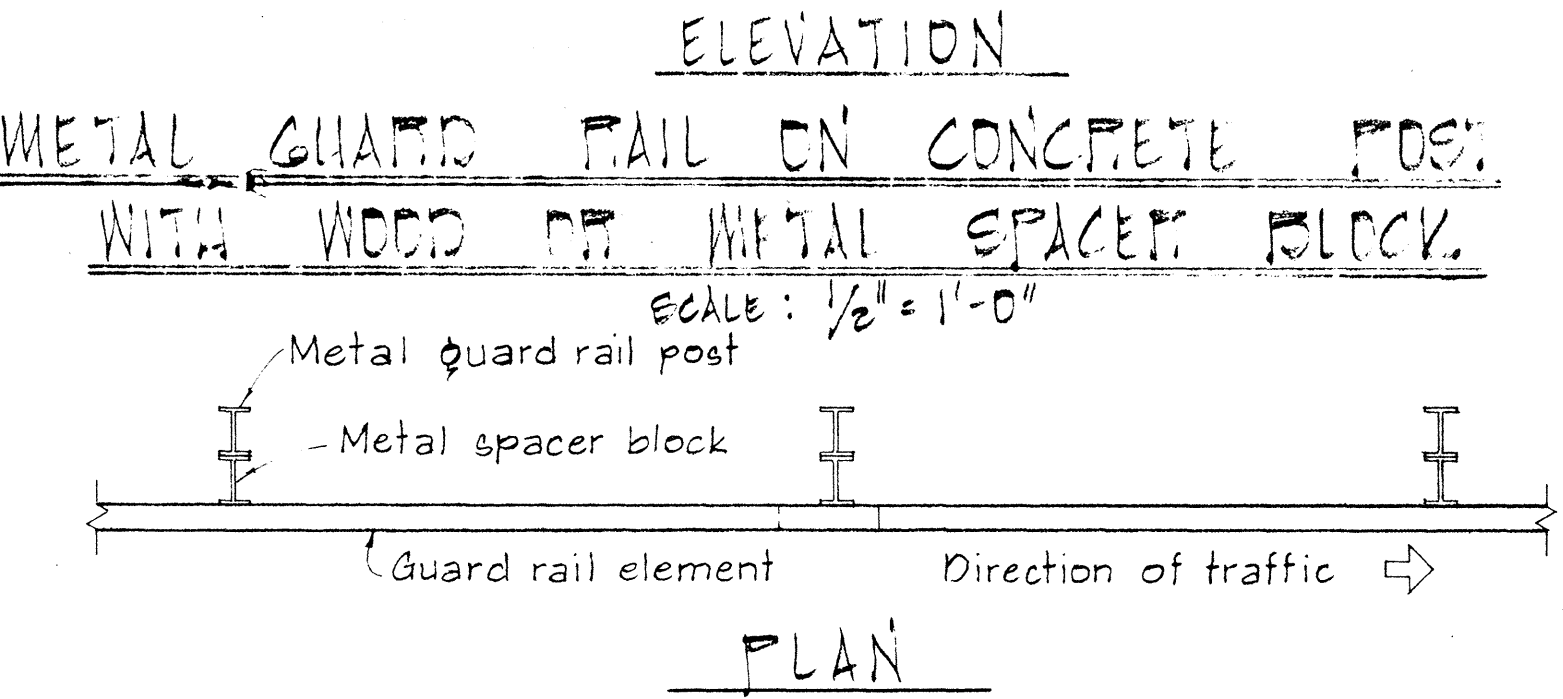
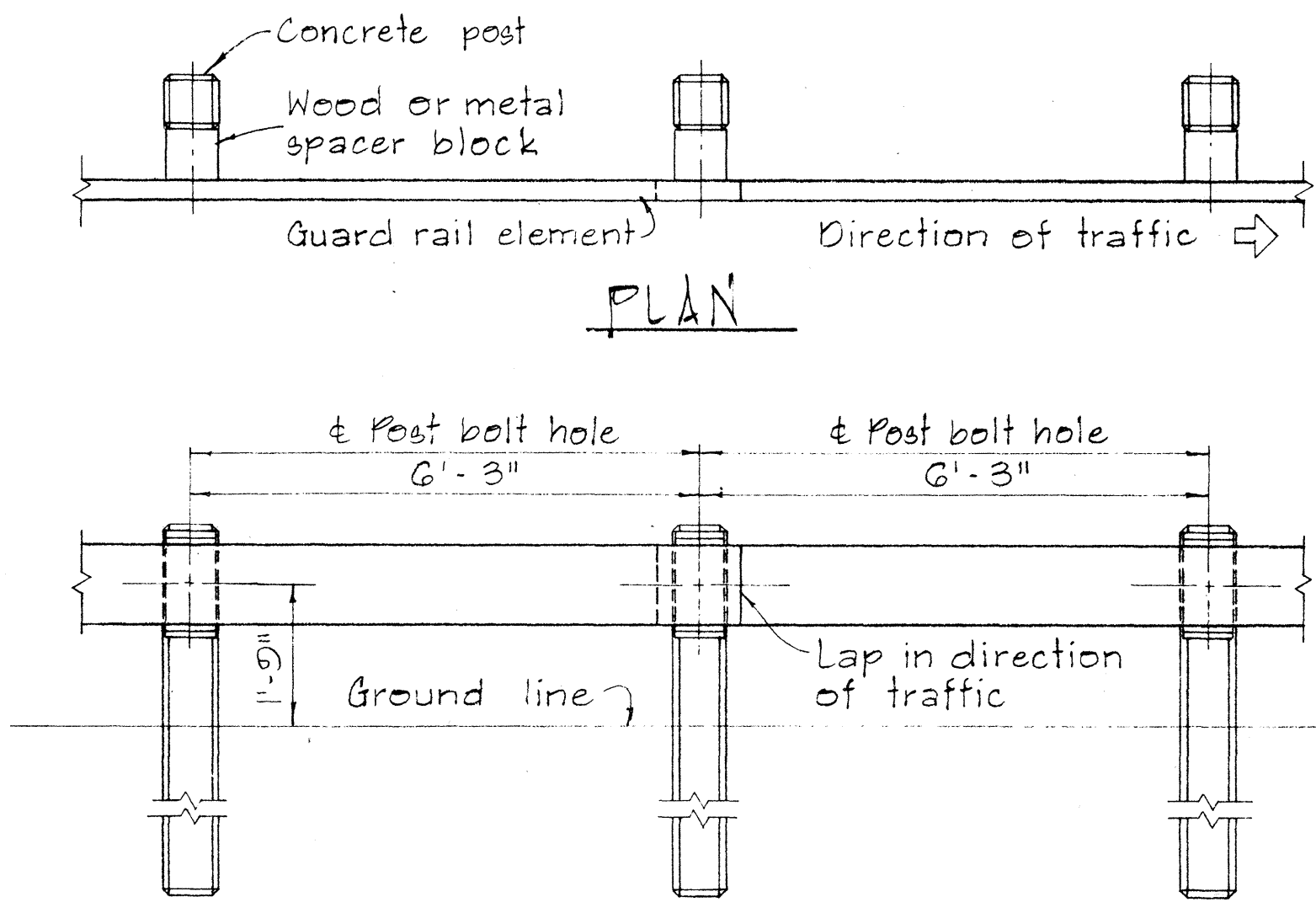
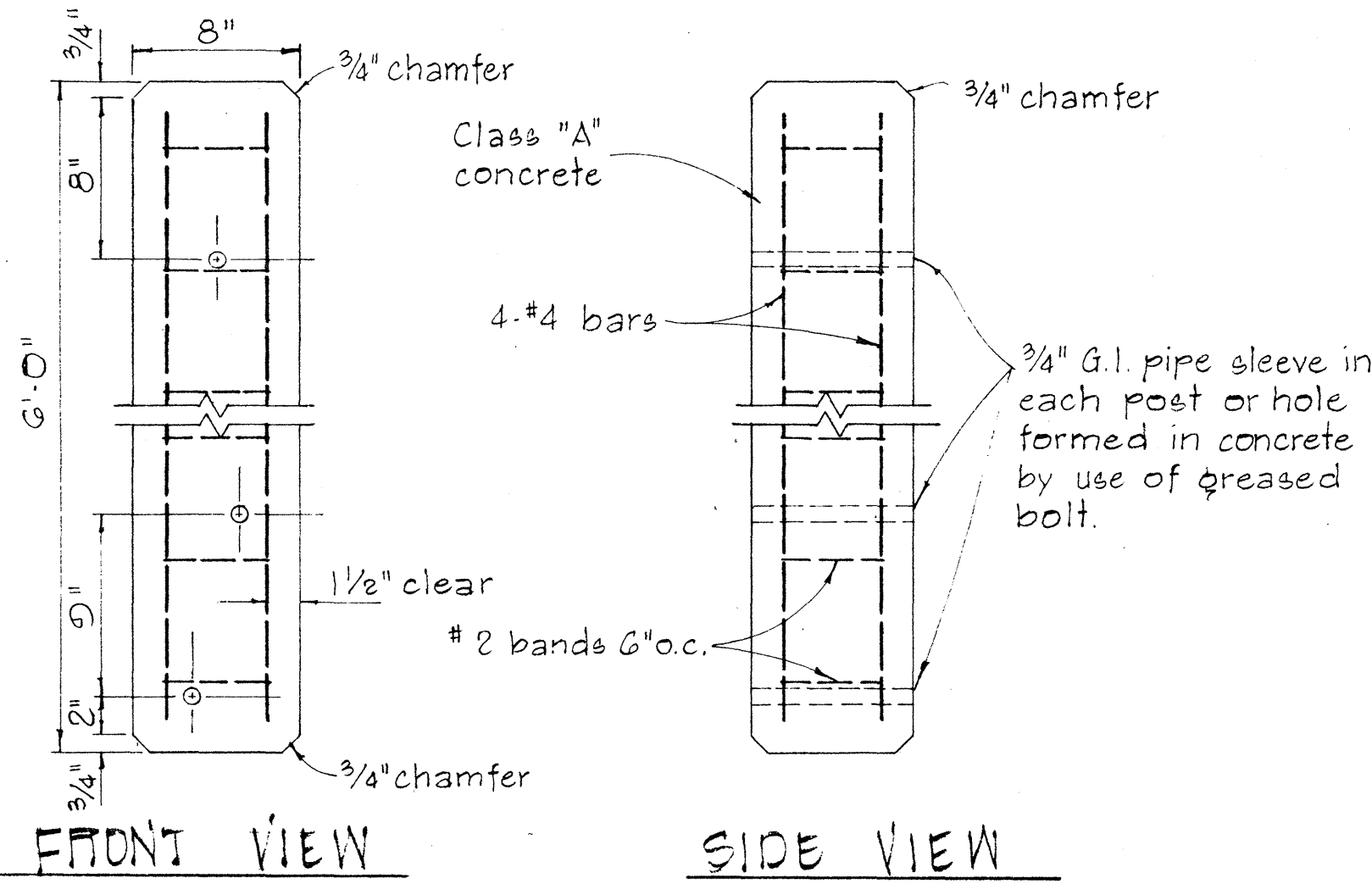
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**DETAILS OF REMOVAL OF
CONCRETE SIDEWALK OF BRIDGES**
INTERSECTION IMPROVEMENTS
ON KALANIANA'OLE HIGHWAY
AT MAUNAWILI ROAD
FEDERAL AID PROJ. NO. F-061-1(15)
KAILUA, KOOLAUPOKO, OAHU, HAWAII
Scale as shown May 1969
SHEET No. 1 OF 10 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FOG-1(15)	1969	13	37

REVISED: 12-11-68
REVISED: 2-26-69

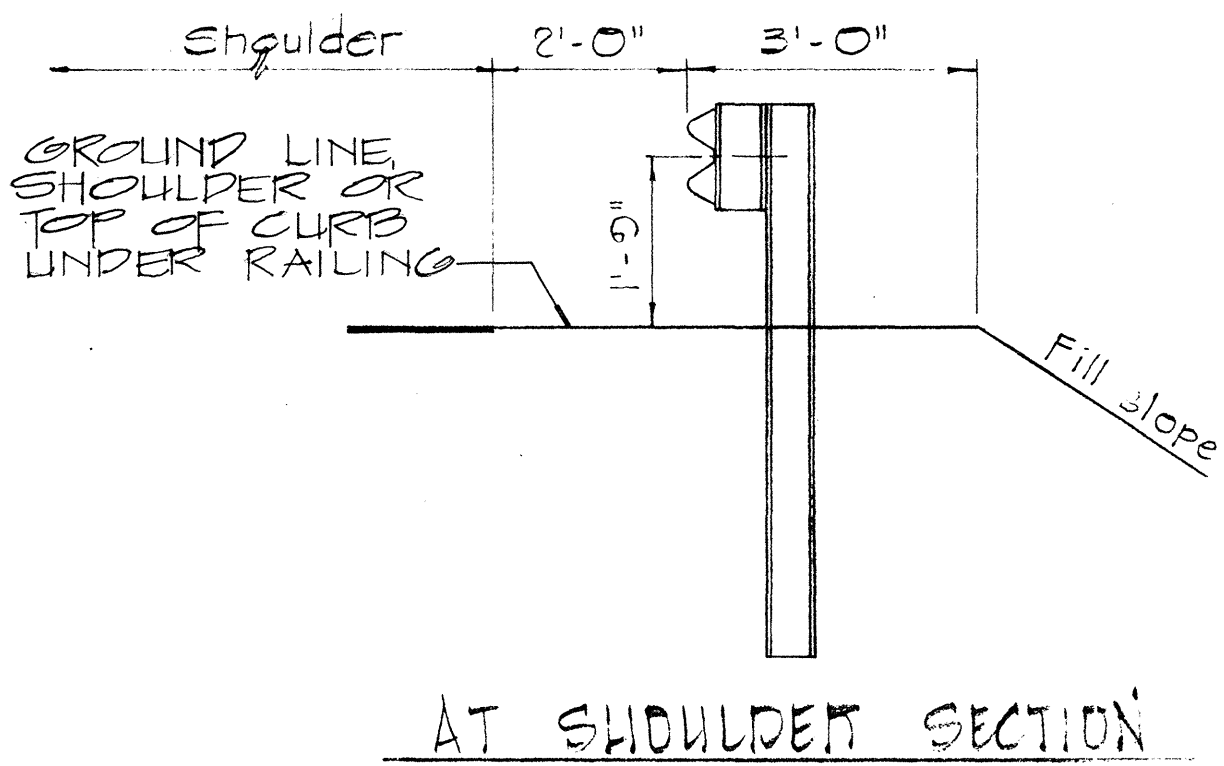
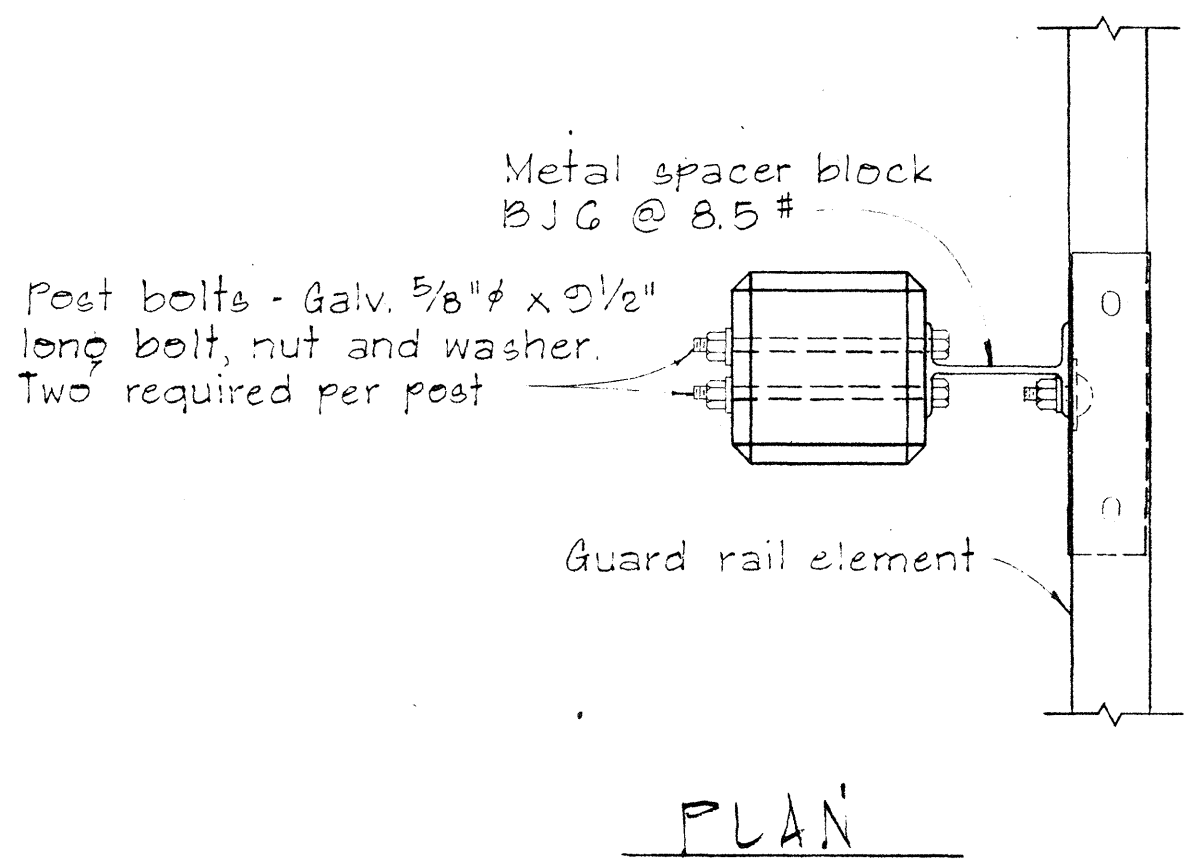


NOTE:
Concrete post shall be precast



SINGLE METAL GUARD RAIL ON METAL POST
WITH METAL SPACER BLOCK
SCALE: 1 1/2" = 1'-0"

DETAIL OF CONCRETE POST
SCALE: 1 1/2" = 1'-0"



SINGLE METAL GUARD RAIL ON PRECAST
CONCRETE POST WITH WOOD OR METAL SPACER BLOCK
SCALE: 1 1/2" = 1'-0"

TYPICAL METAL GUARD RAIL DETAIL
SCALE: 1/2" = 1'-0"

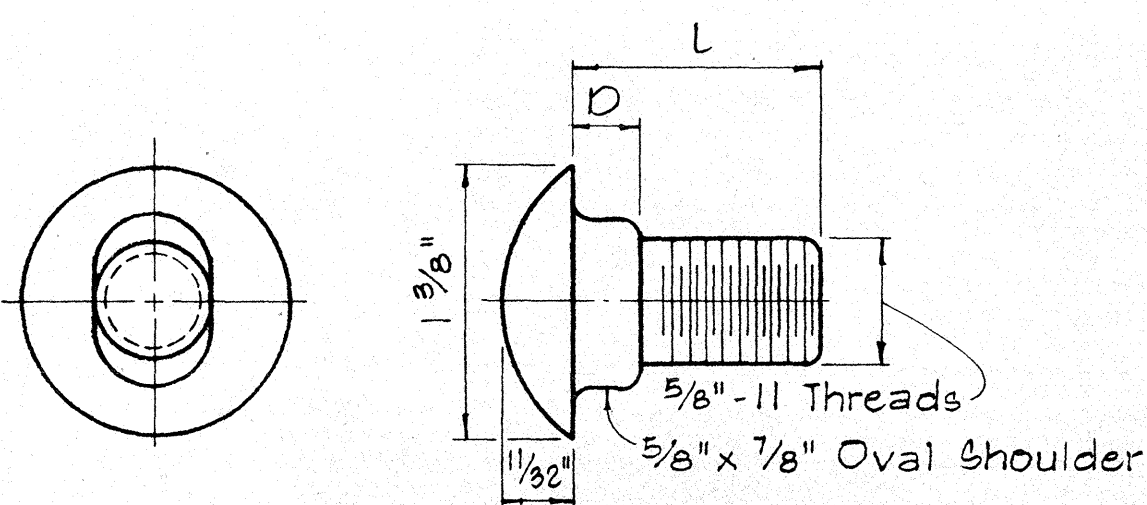
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
METAL GUARD RAIL

SCALE: AS SHOWN NOV. 1968
SHEET No. 2 OF 10 SHEETS DT 500

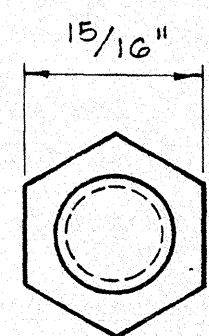
DATE
SURVEY PLOTTED BY
PLAN
DESIGNED BY
NOTE BOOK
QUANTITIES BY
CHECKED BY

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

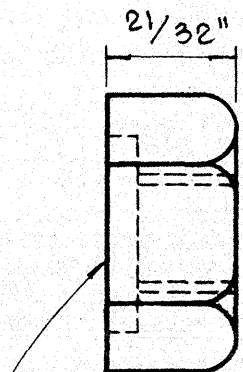
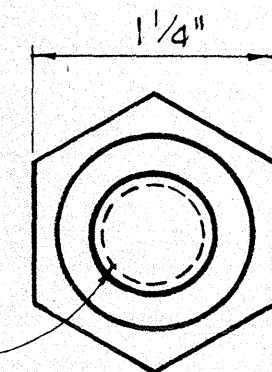
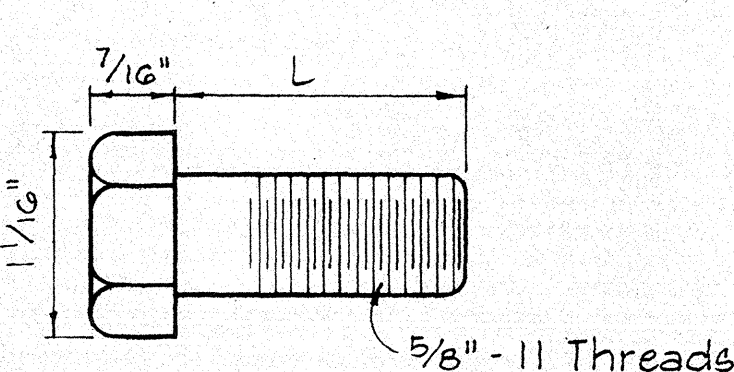
BOLT DIMENSIONS	
TYPE B BOLT	
	L
Post Bolt for Conc. Post w/ Metal Blocks	5 1/2"
Post Bolt for Metal Post w/ Metal Block	1 3/4"



TYPE A BOLT



TYPE B BOLT



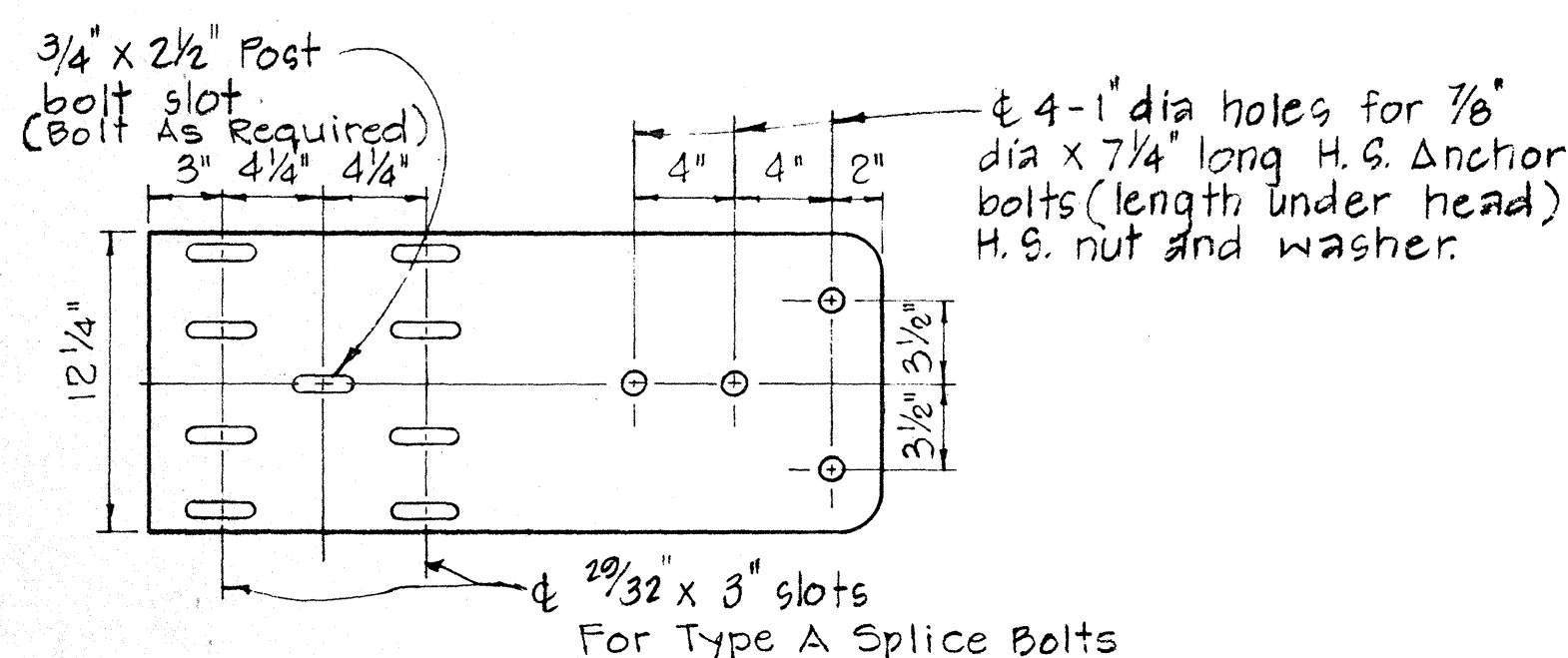
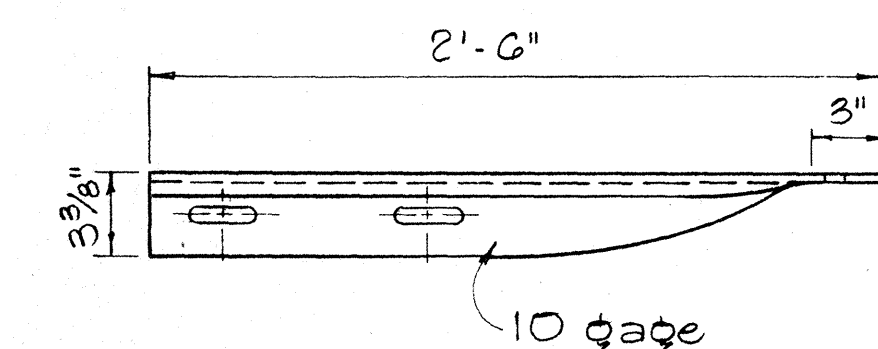
5/32" Deep x 15/16" Dia. C' Bore for Type A Bolt only.
Plain nut for Type B Bolt.

SPICE RAIL AND POST BOLTS

Scale: Full Size

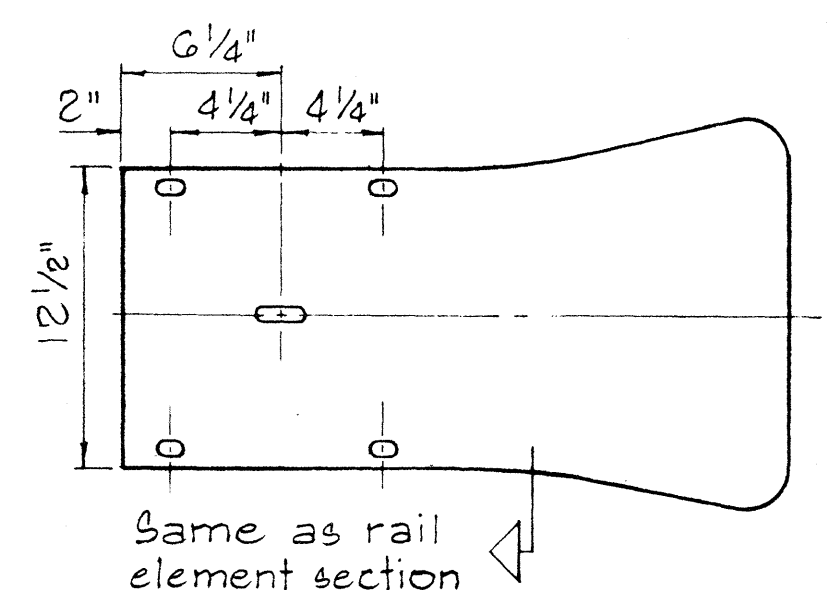
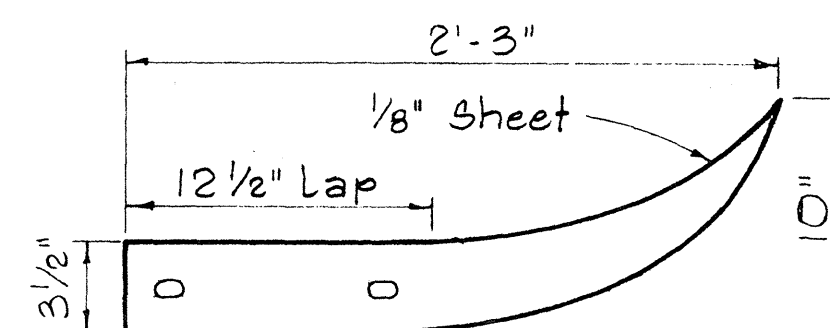
HEXAGON NUT

Scale: Full Size



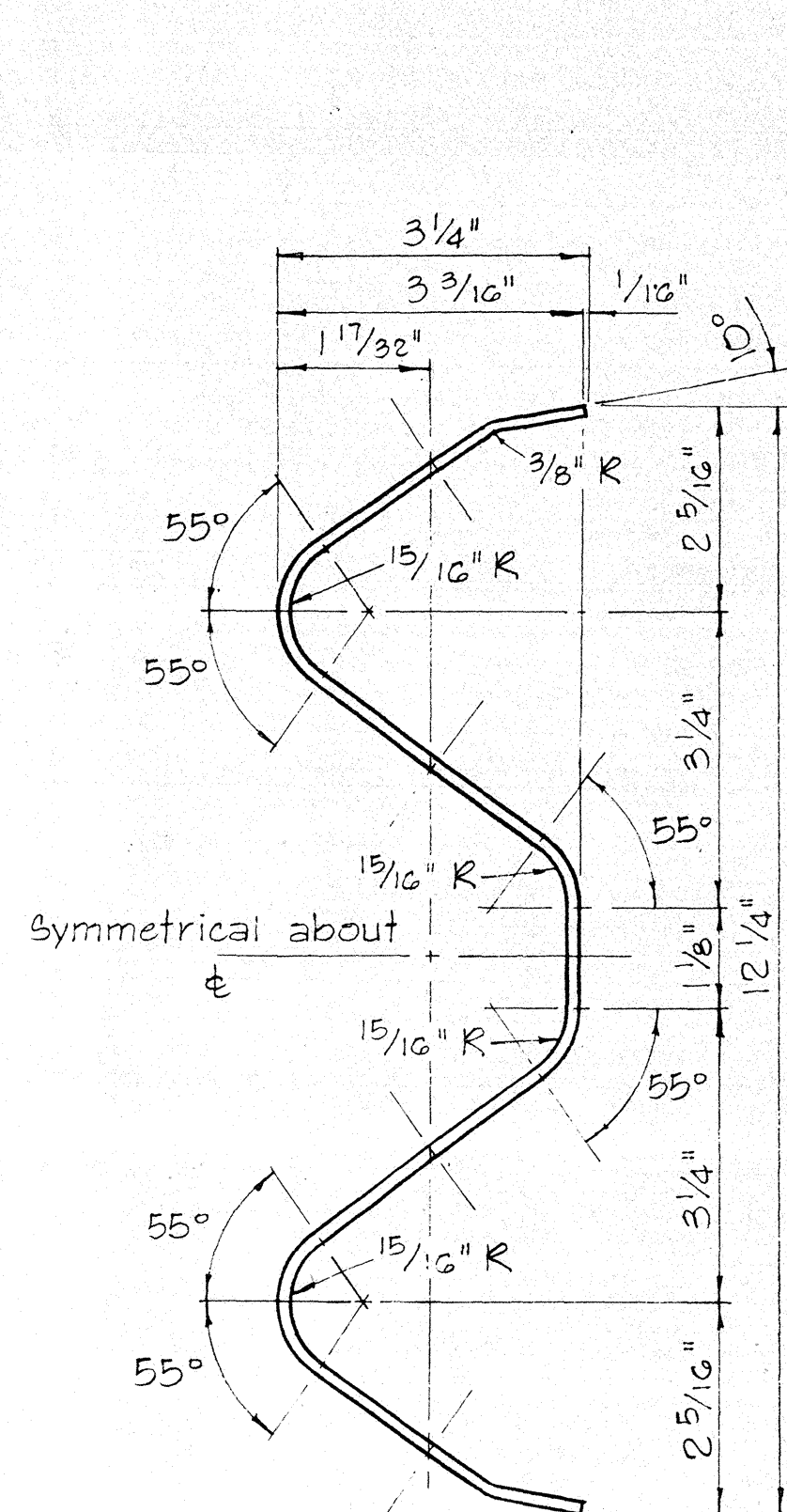
SPECIAL END SHOE

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



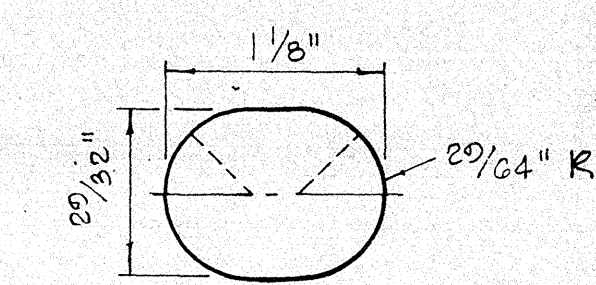
FLARED END

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



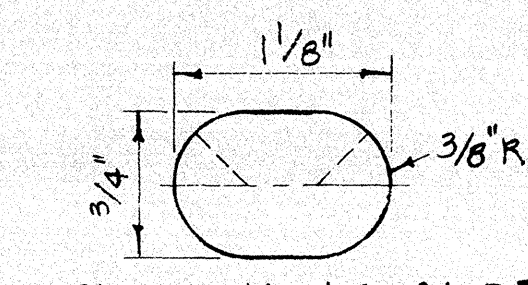
RAIL ELEMENT SECTION

Scale: 6" = 1'-0"

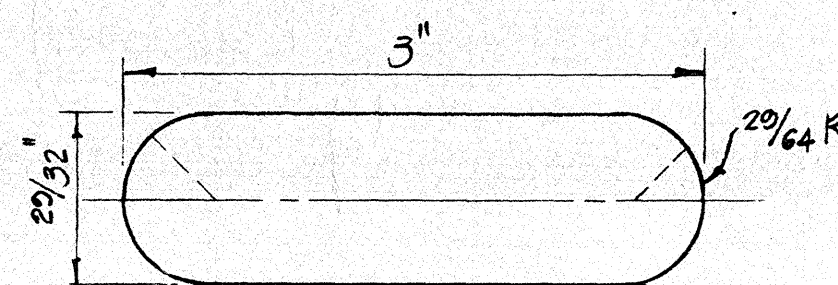


SPICE BOLT SLOT

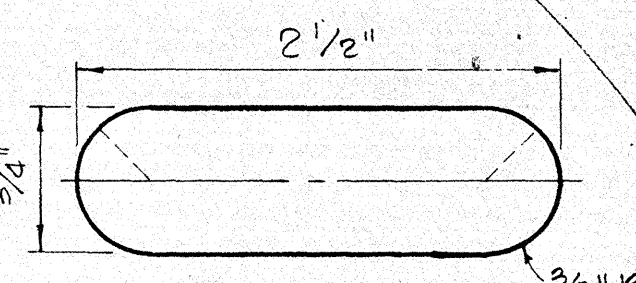
Scale: Full Size



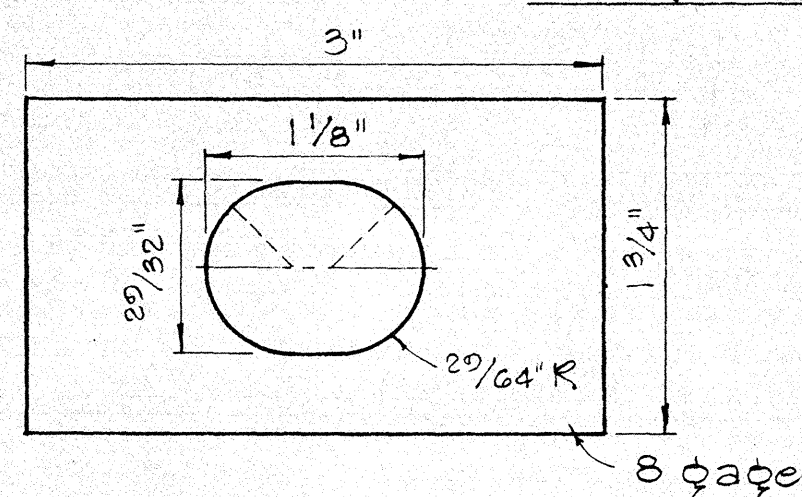
SPICE BOLT SLOT FOR ALL ENDS



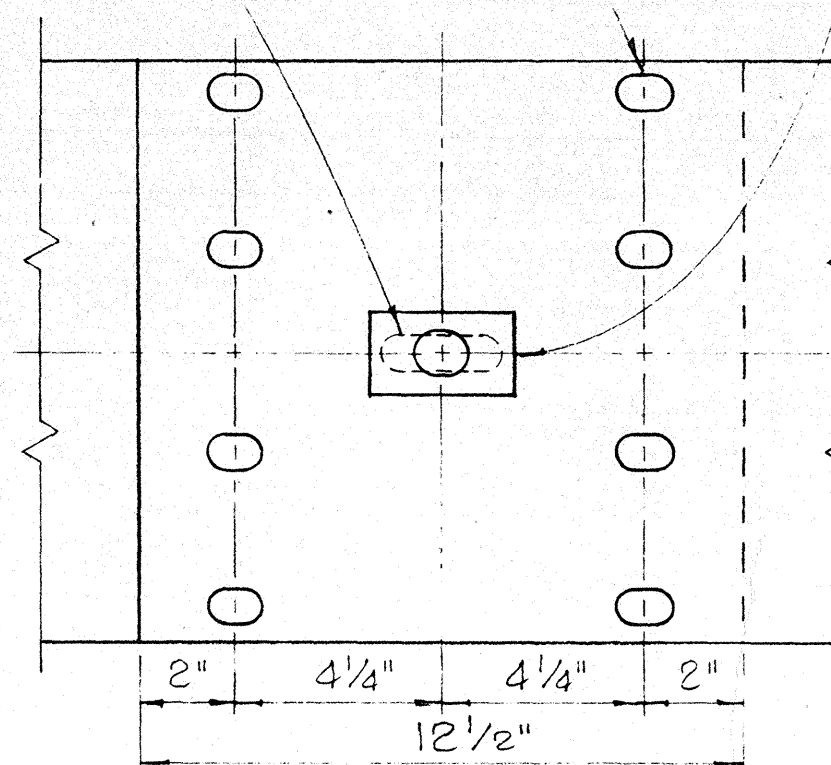
SPICE BOLT SLOT FOR SPECIAL END SHOE



POST BOLT SLOT



RAIL WASHER

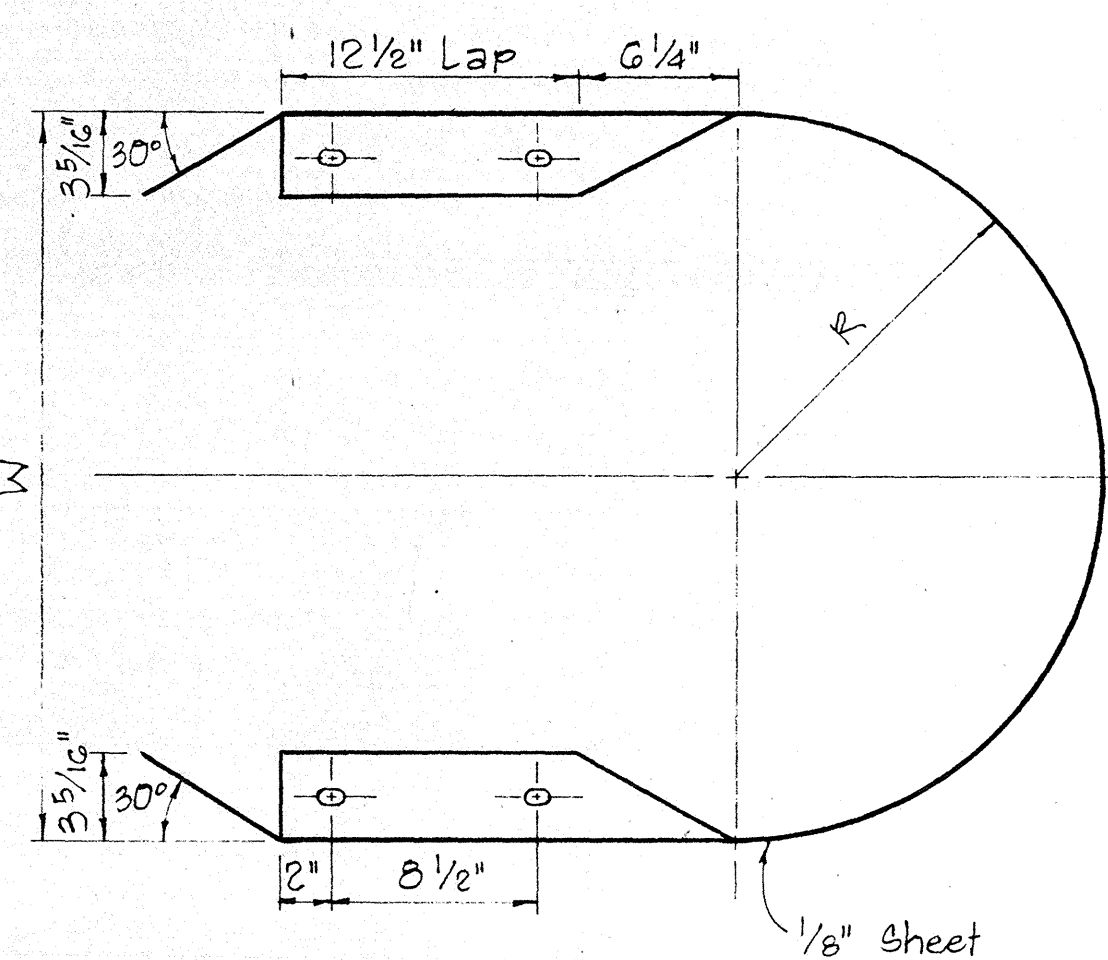


RAIL SPICE

Scale: 3" = 1'-0"

NOTES:

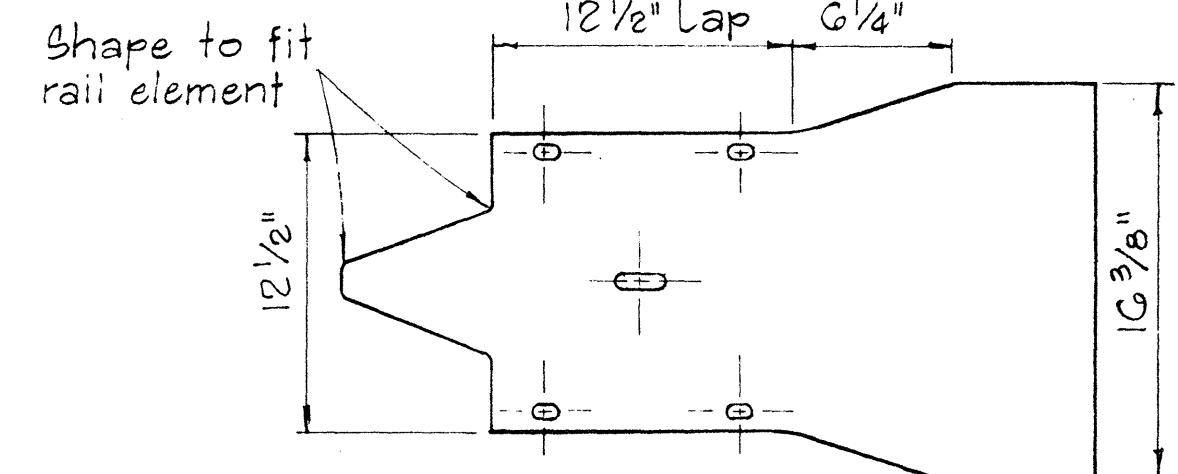
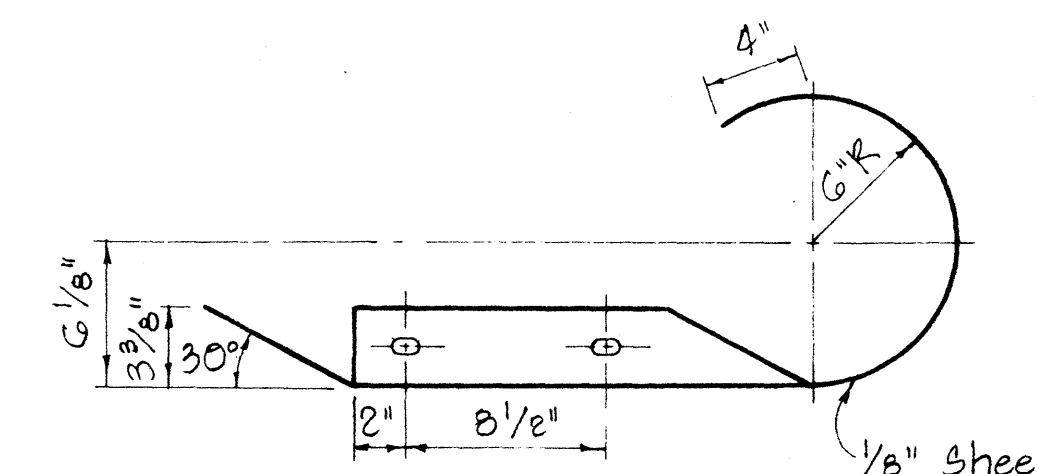
1. H.S. Bolts shall conform to the requirements of ASTM A-325.
2. Special End Shoe shall be fabricated from 10 Gage steel conforming to the requirements of AASHO 180.



MEDIAN END

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

MEDIAN END DIMENSIONS		
TYPE OF POST AND BLOCK	W	R
Double Metal Guard Rail on Concrete Post with Wood Blocks	25 3/4"	14 1/8"
Double Metal Guard Rail on Concrete Post with Metal Blocks (BJG)	26 1/6"	13 1/4"
Double Metal Guard Rail on Metal Post with Metal Blocks (BJG)	24 3/8"	12 3/16"



CURVED END

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

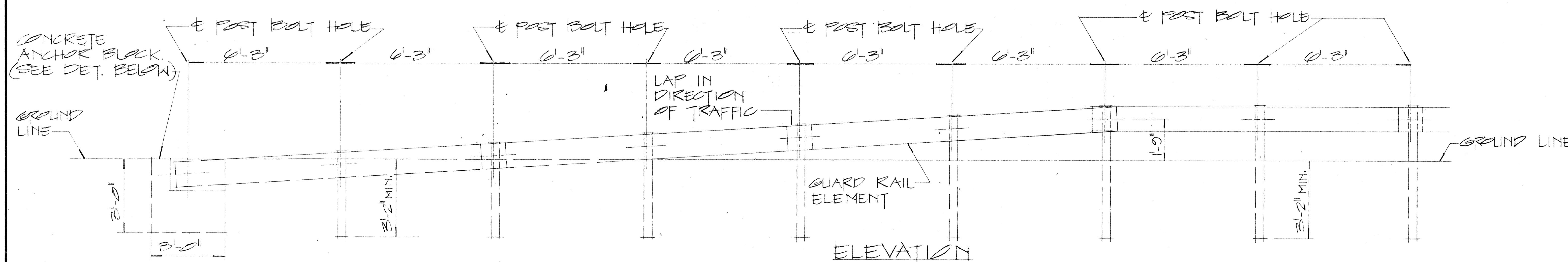
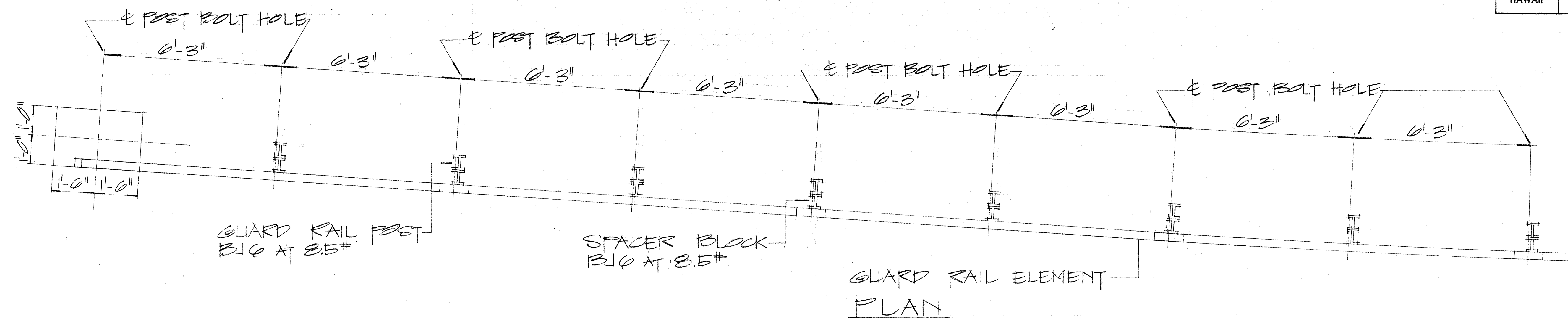
STANDARD DETAILS METAL GUARD RAIL

Scale: As Noted

August, 1968

SHEET No. 3 OF 10 SHEETS DT 501

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-061-1(15)	1969	15	37

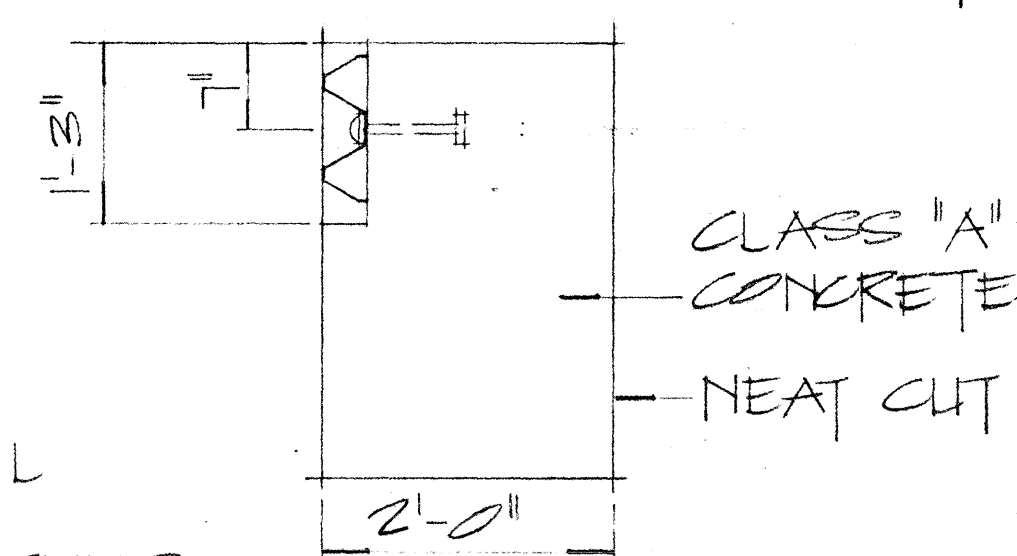
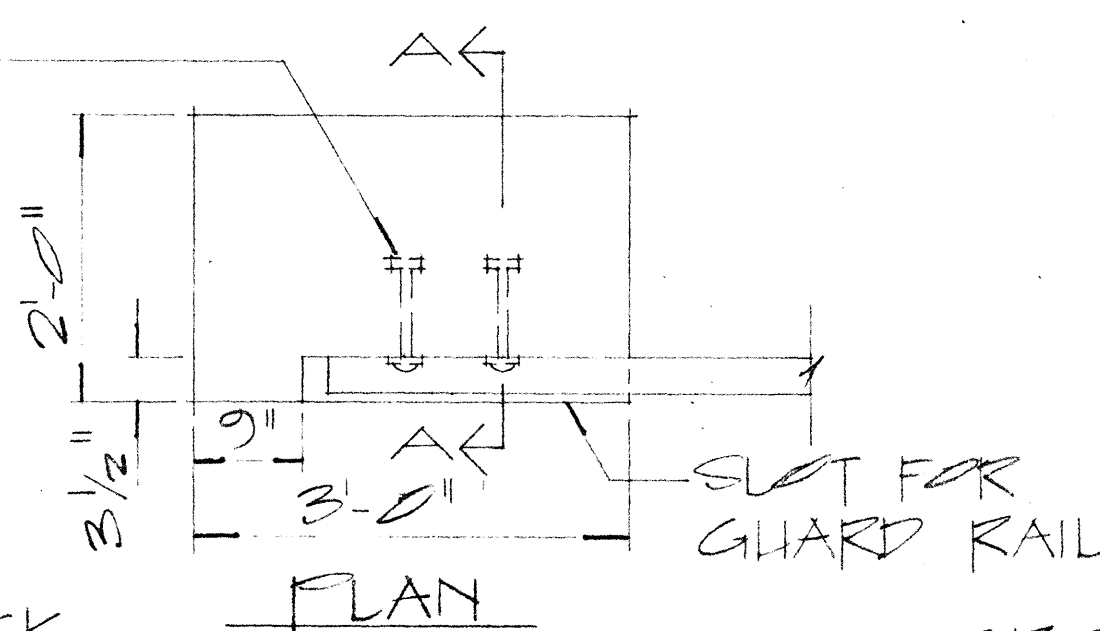


RAMP END ANCHORAGE

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

2-5/8" x 7/4" LONG BOLTS, w/ NUTS & WASHERS INCIDENTAL TO METAL GUARD RAIL. ALL METAL PIECES SHALL BE GALVANIZED.

TOP OF ANCHOR BLOCK TO BE FLUSH w/ GROUND.



PLAN

SECTION 'A-A'

ELEVATION

CONCRETE ANCHOR BLOCK

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

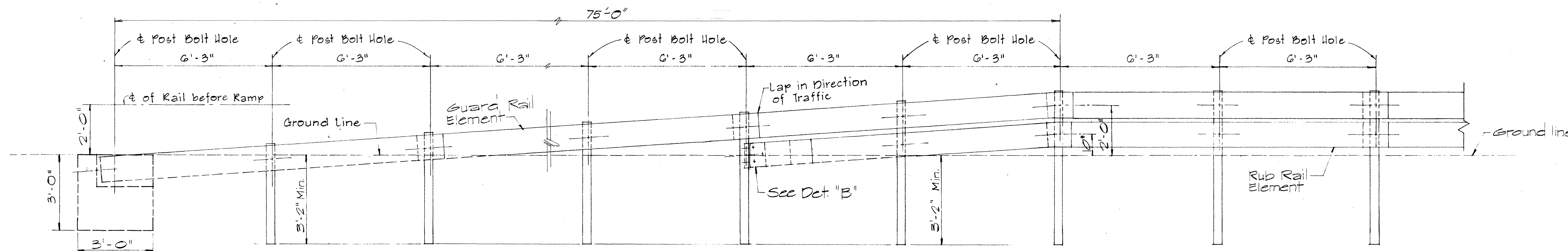
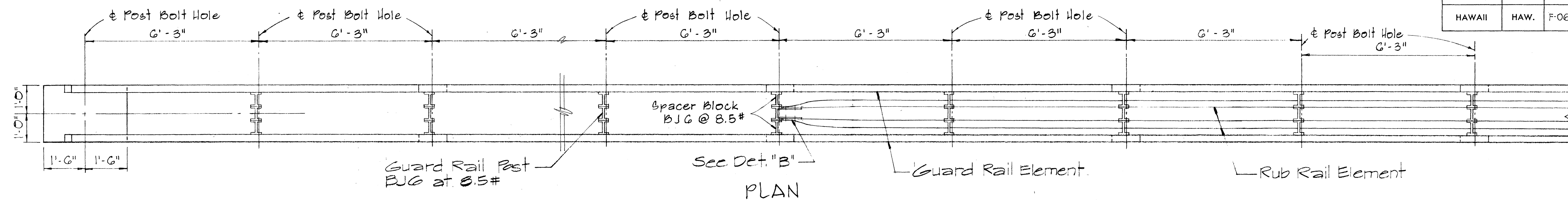
NOTE: CONCRETE, EXCAVATION AND MISCELLANEOUS APPURTENANCES NECESSARY TO ANCHOR THE GUARD RAIL ENDS, SHALL BE INCIDENTAL TO THE METAL GUARD RAIL.

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
STANDARD DETAILS
GUARD RAIL, TYPE 3 RAMP END ANCHORAGE
SCALE: AS SHOWN

SHEET No. 4 OF 10 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-061-1(5)	1969	16	37

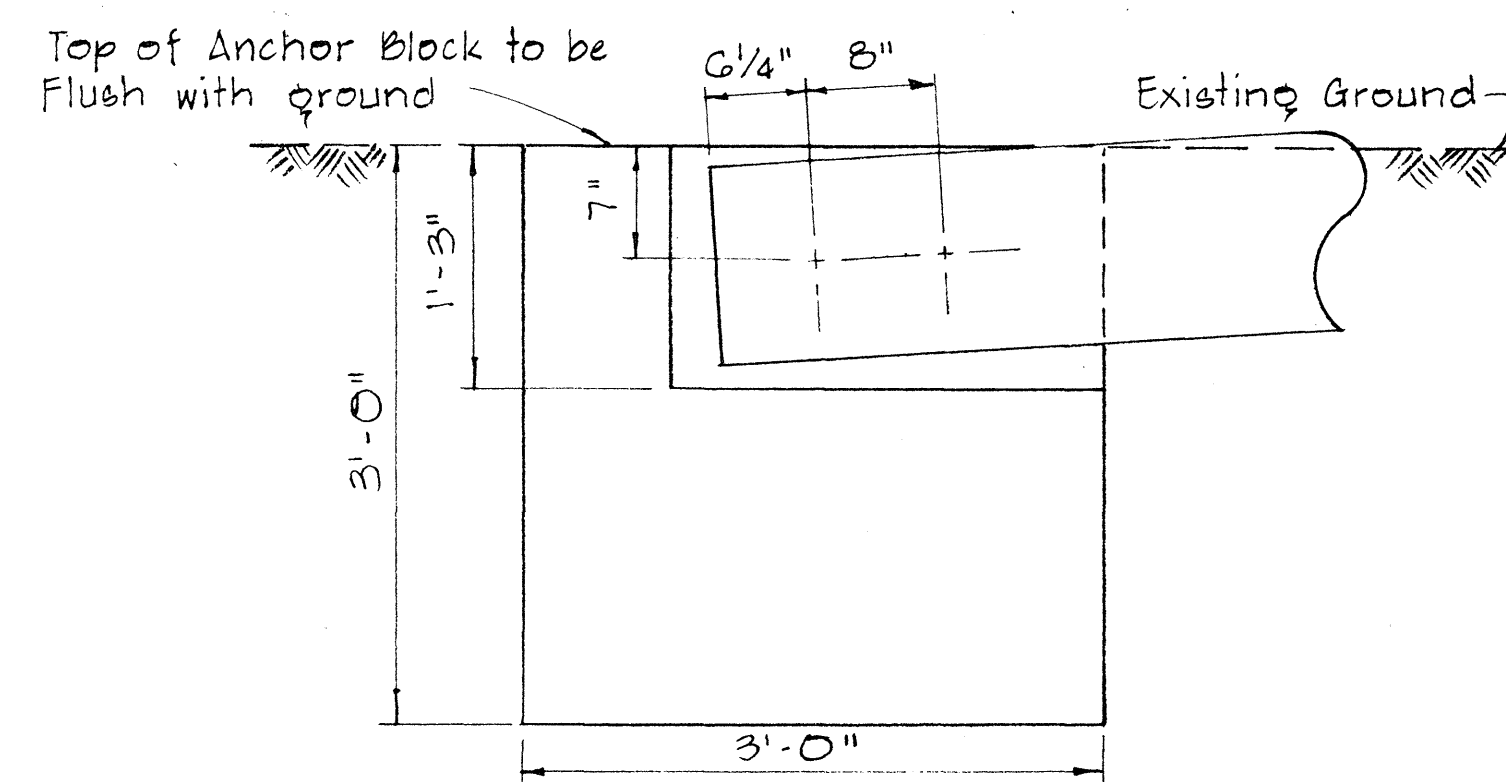
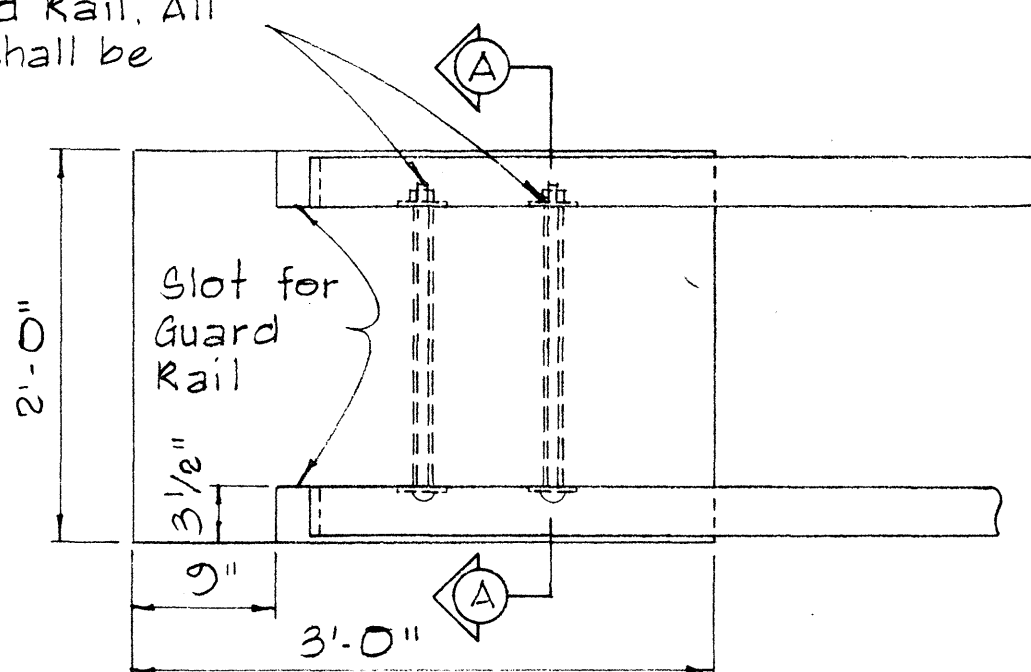
REVISED: 12-11-68
REVISED: 2-24-69



STRAIGHT APPROACH - RAMP END ANCHORAGE (MEDIAN)

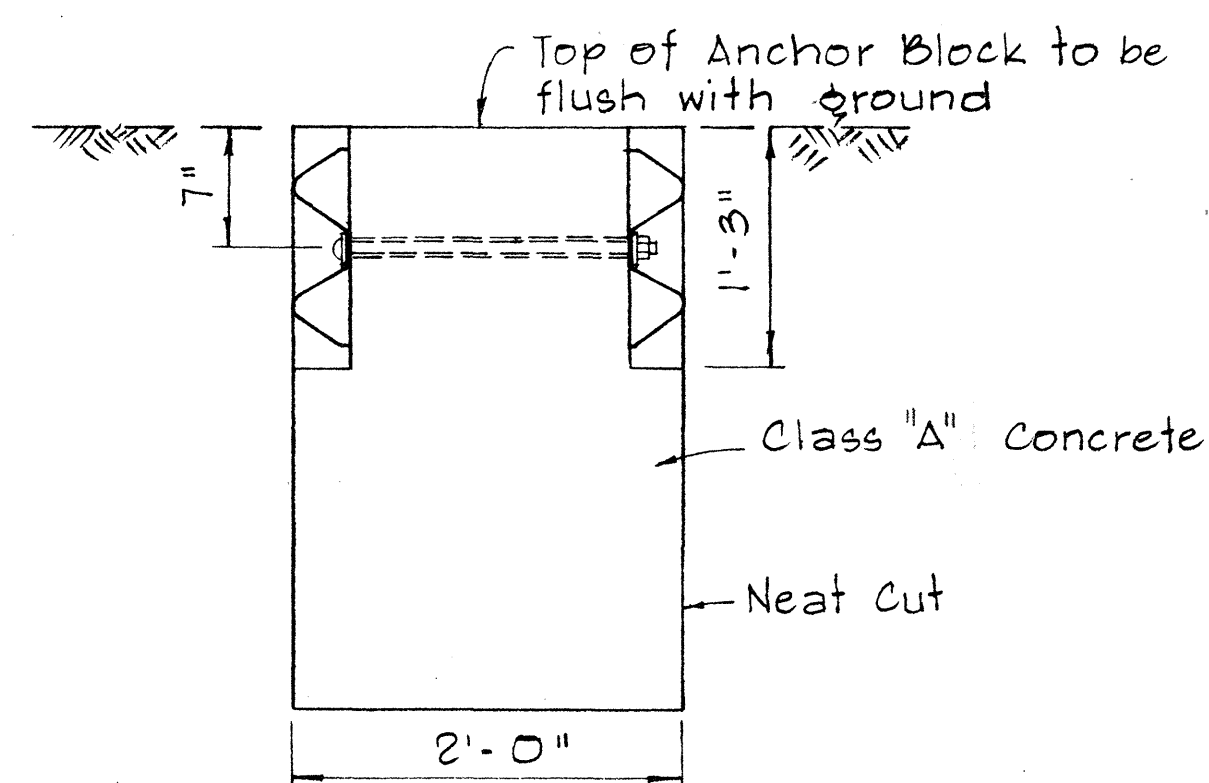
Scale: 1/2" = 1'-0"

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

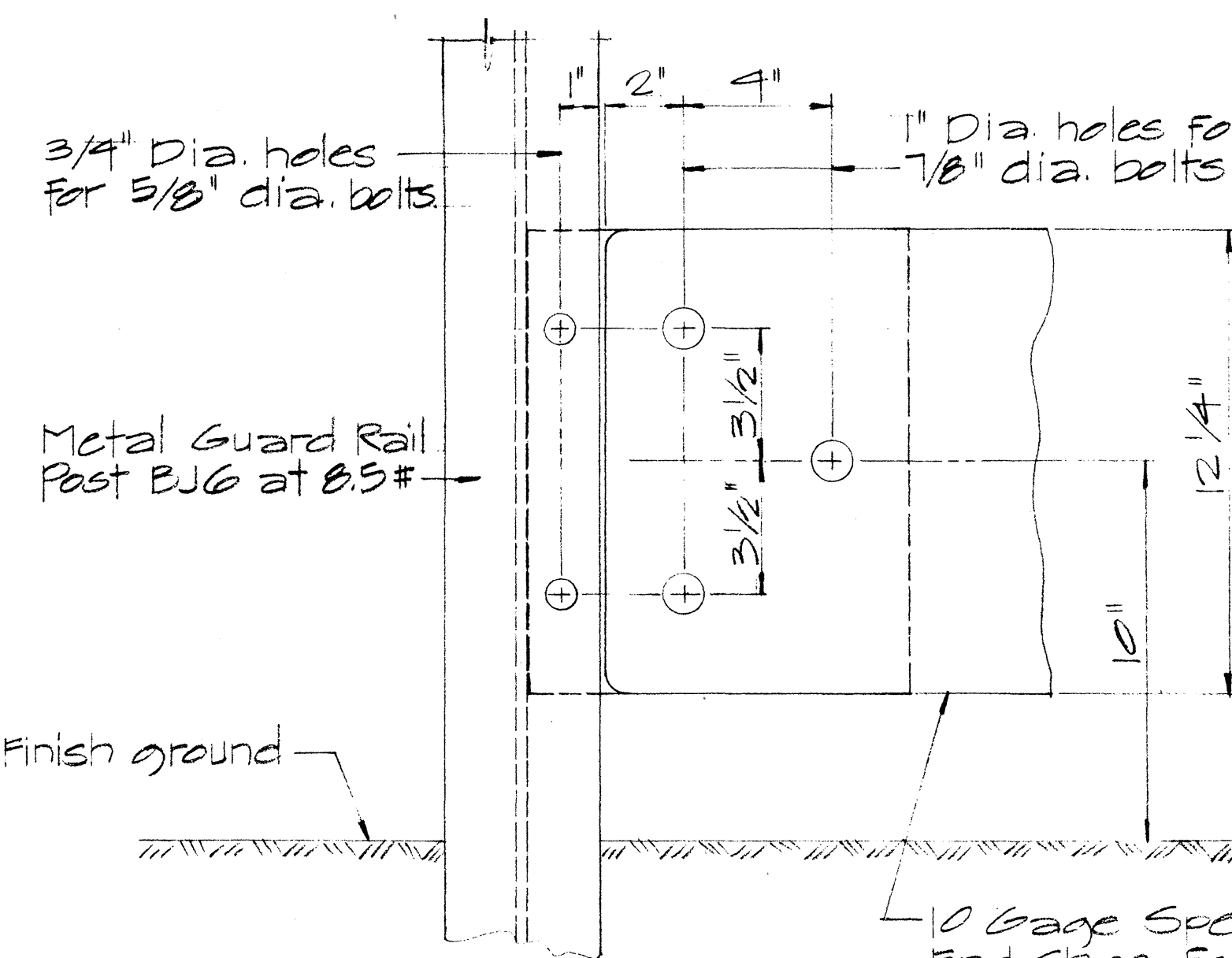


CONCRETE ANCHOR BLOCK FOR RAMP END

Scale: 1" = 1'-0"



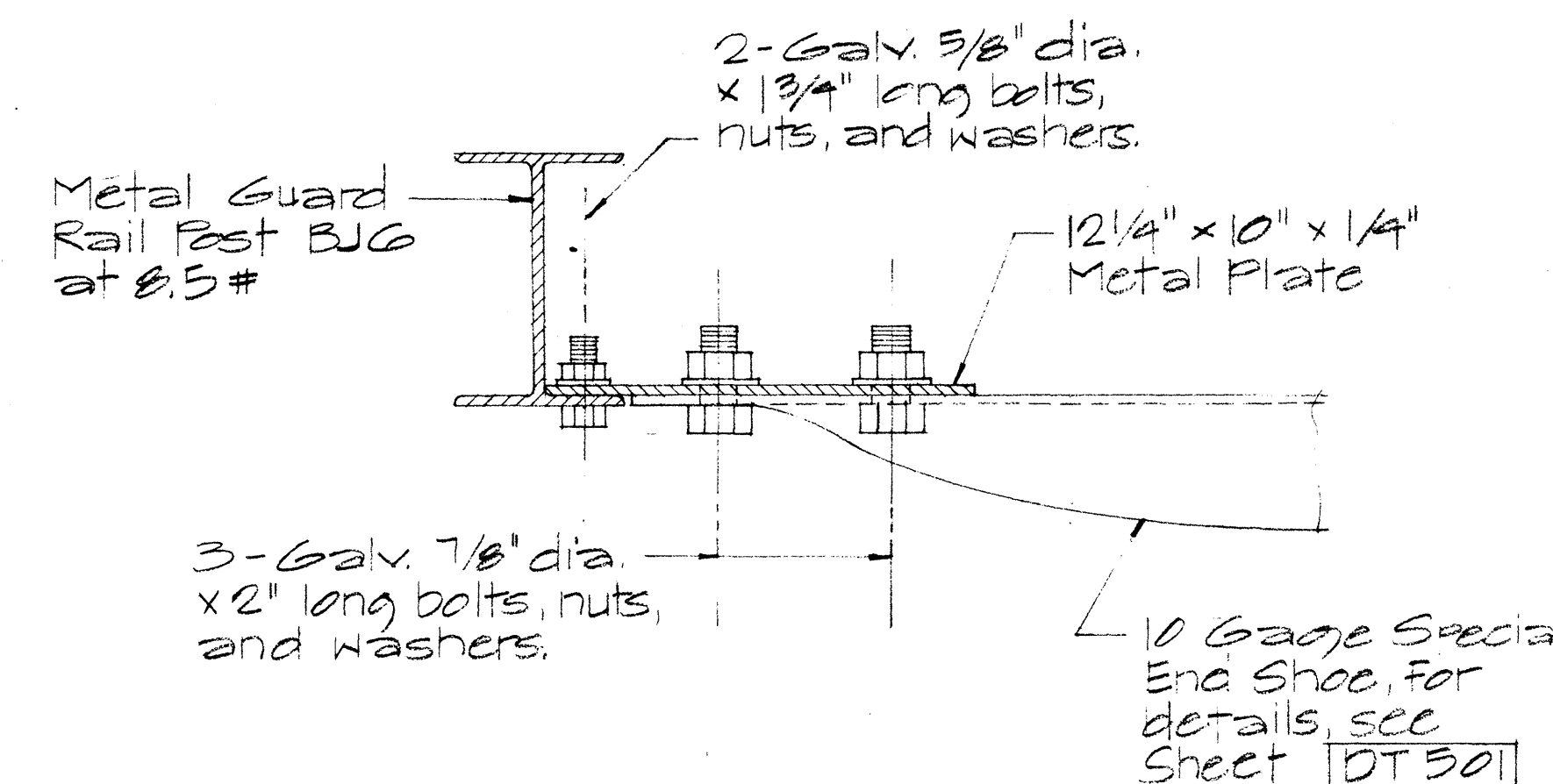
NOTE: Concrete, Excavation, and Miscellaneous Appurtenances necessary to anchor the Guard Rail Ends, shall be incidental to the Metal Guard Rail.



DETAIL "B"

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

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



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

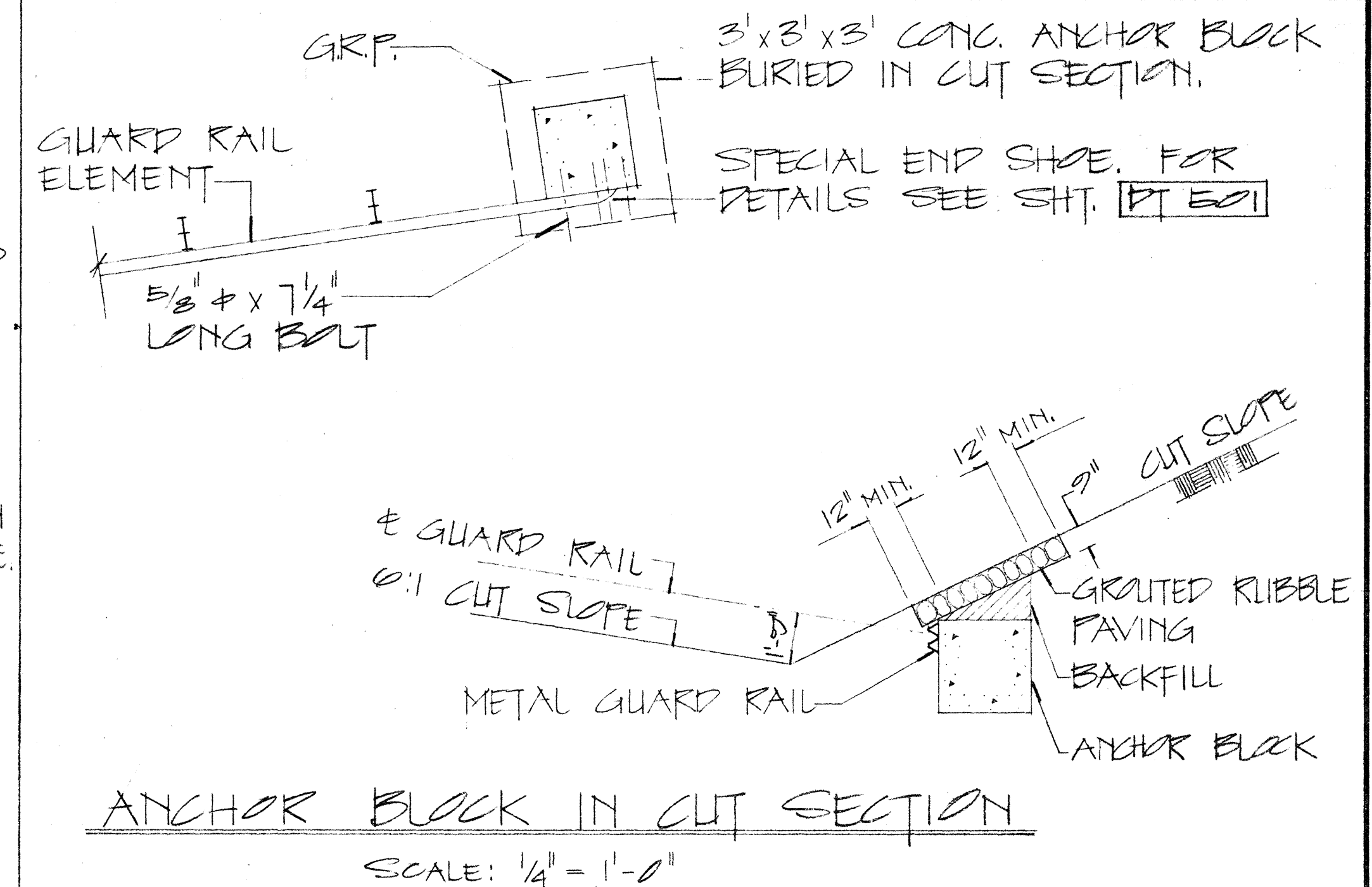
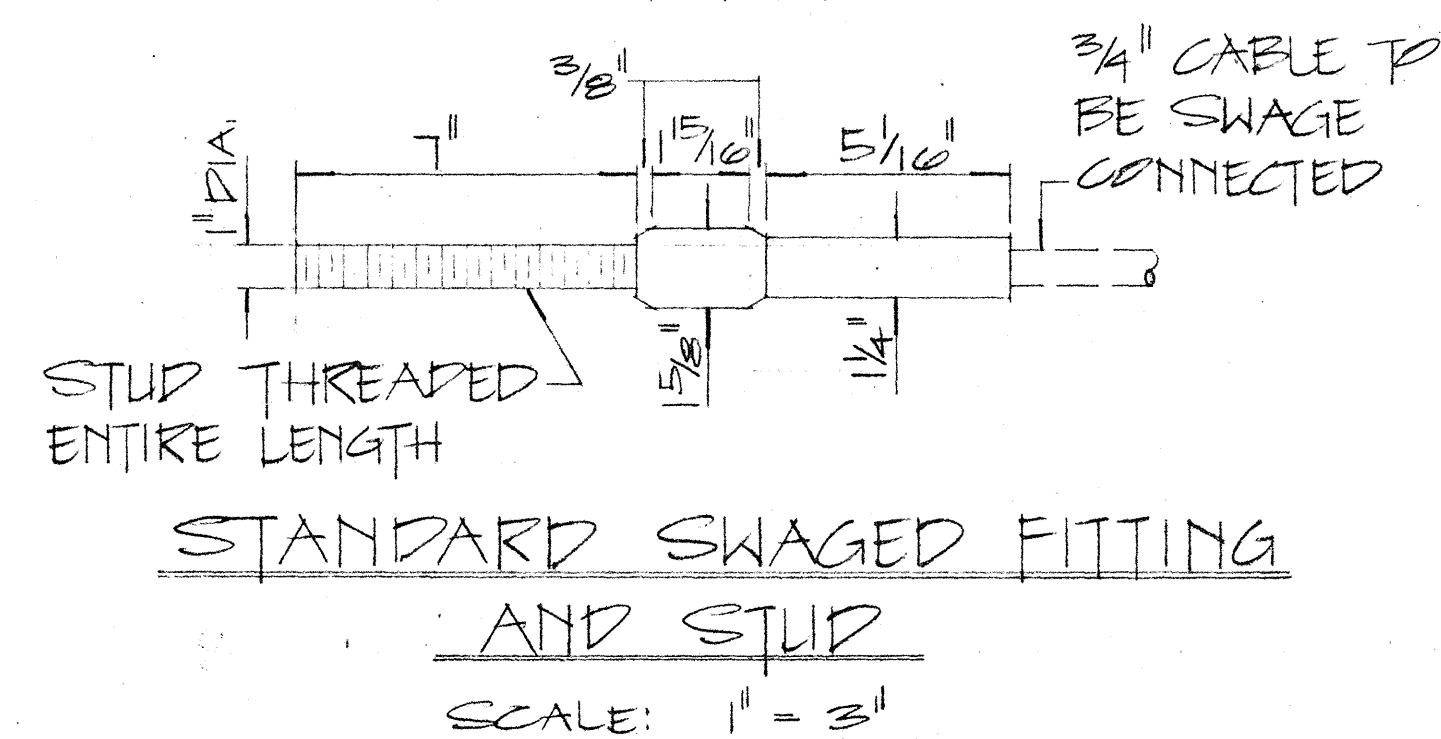
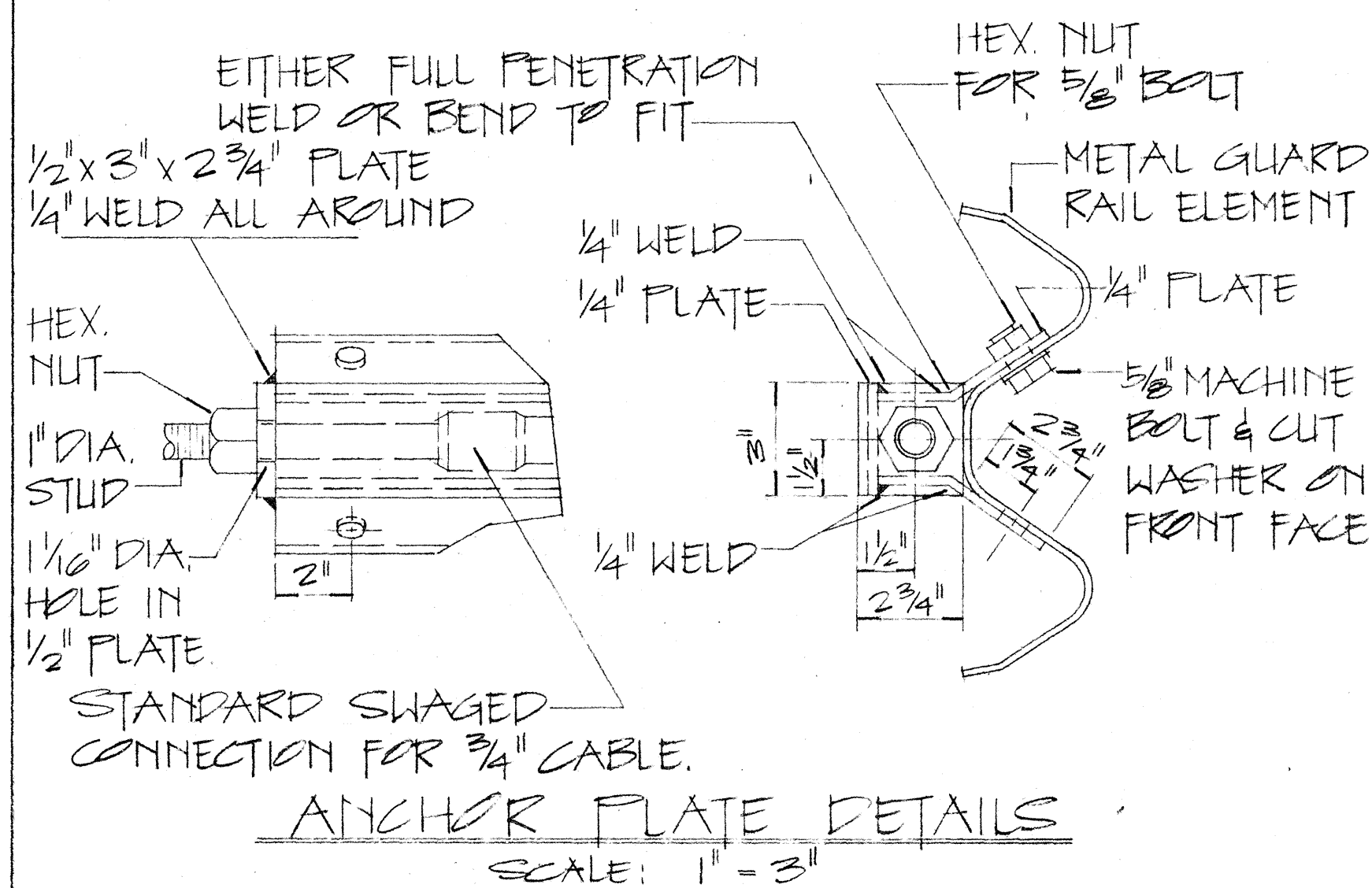
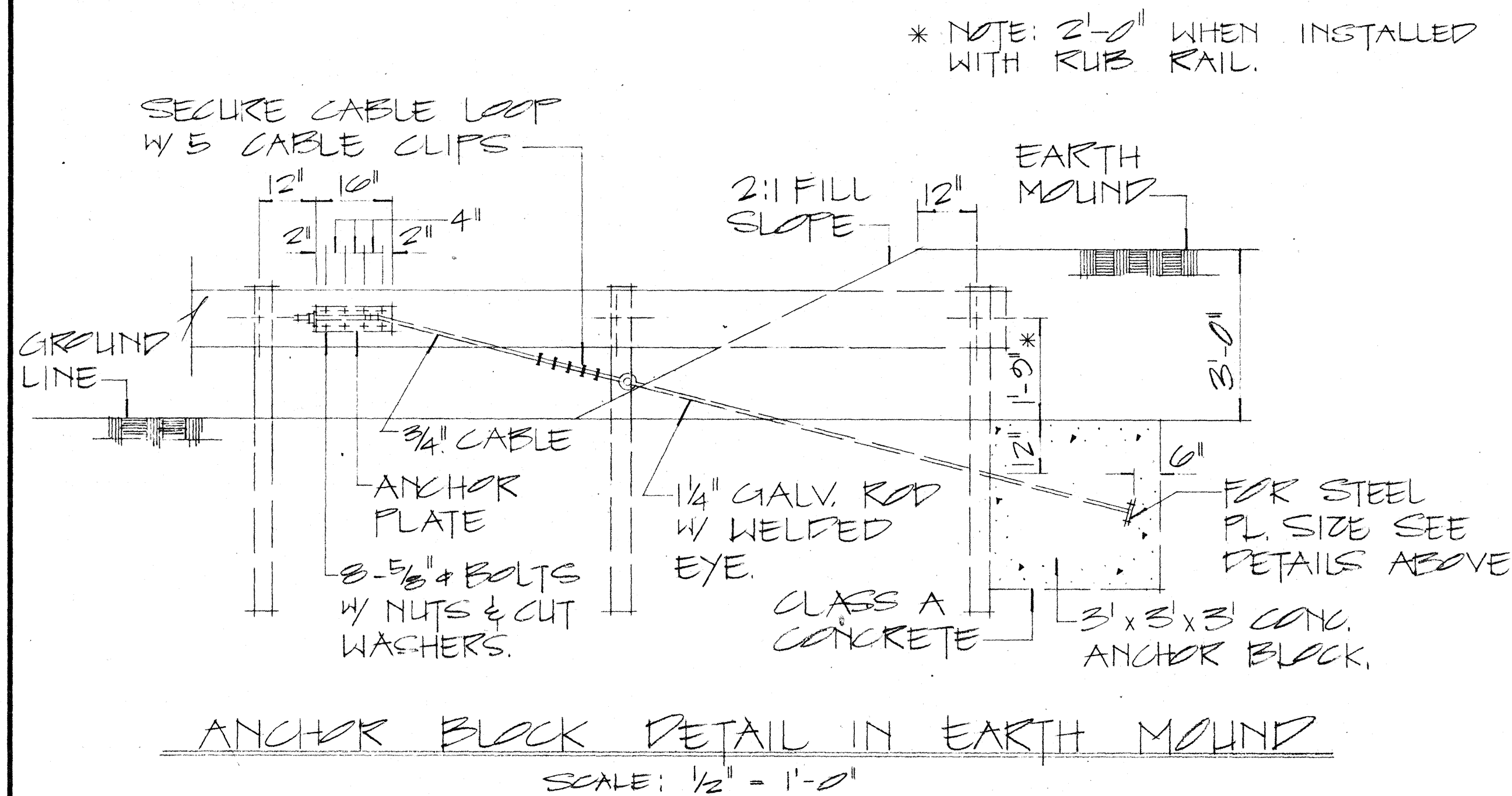
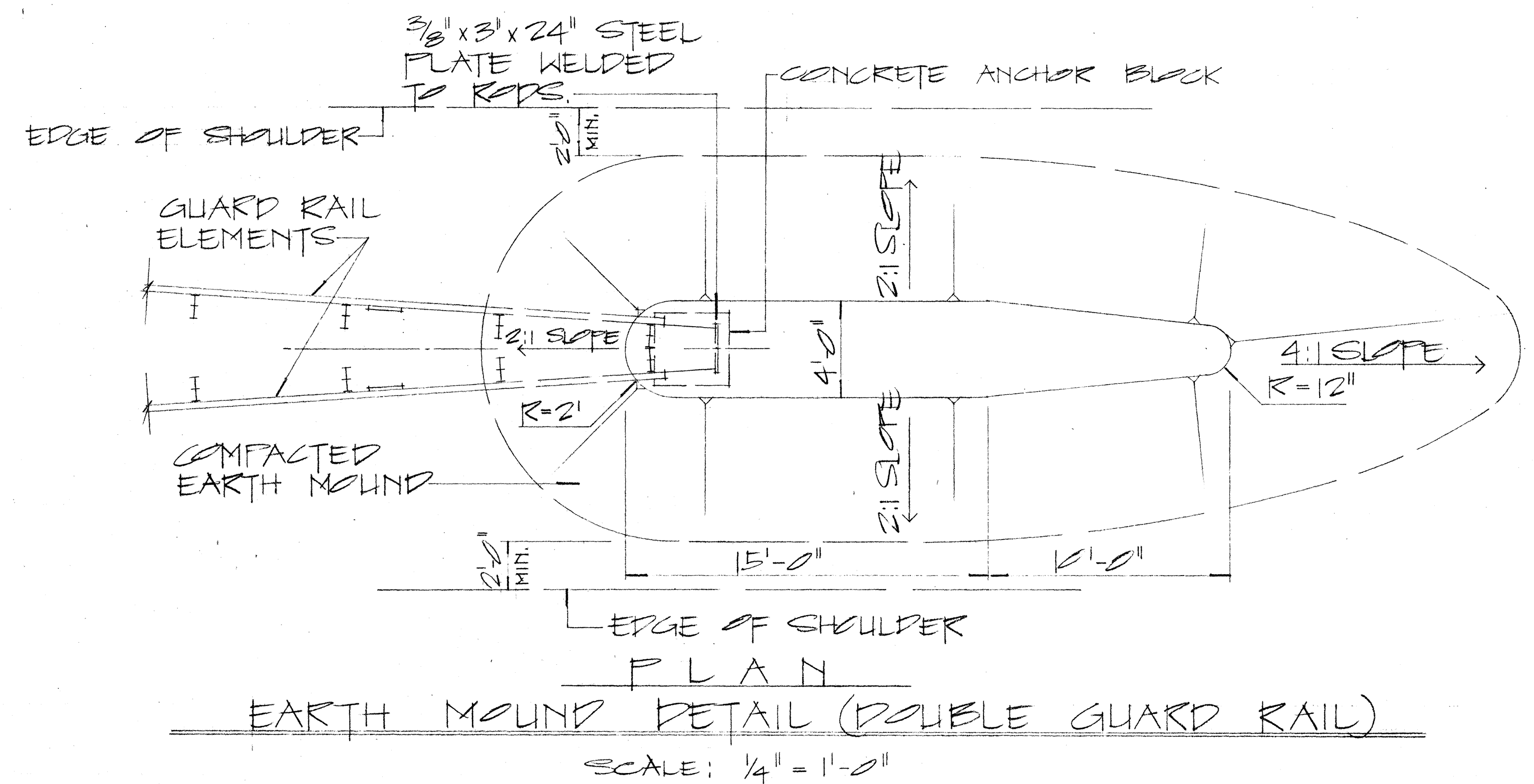
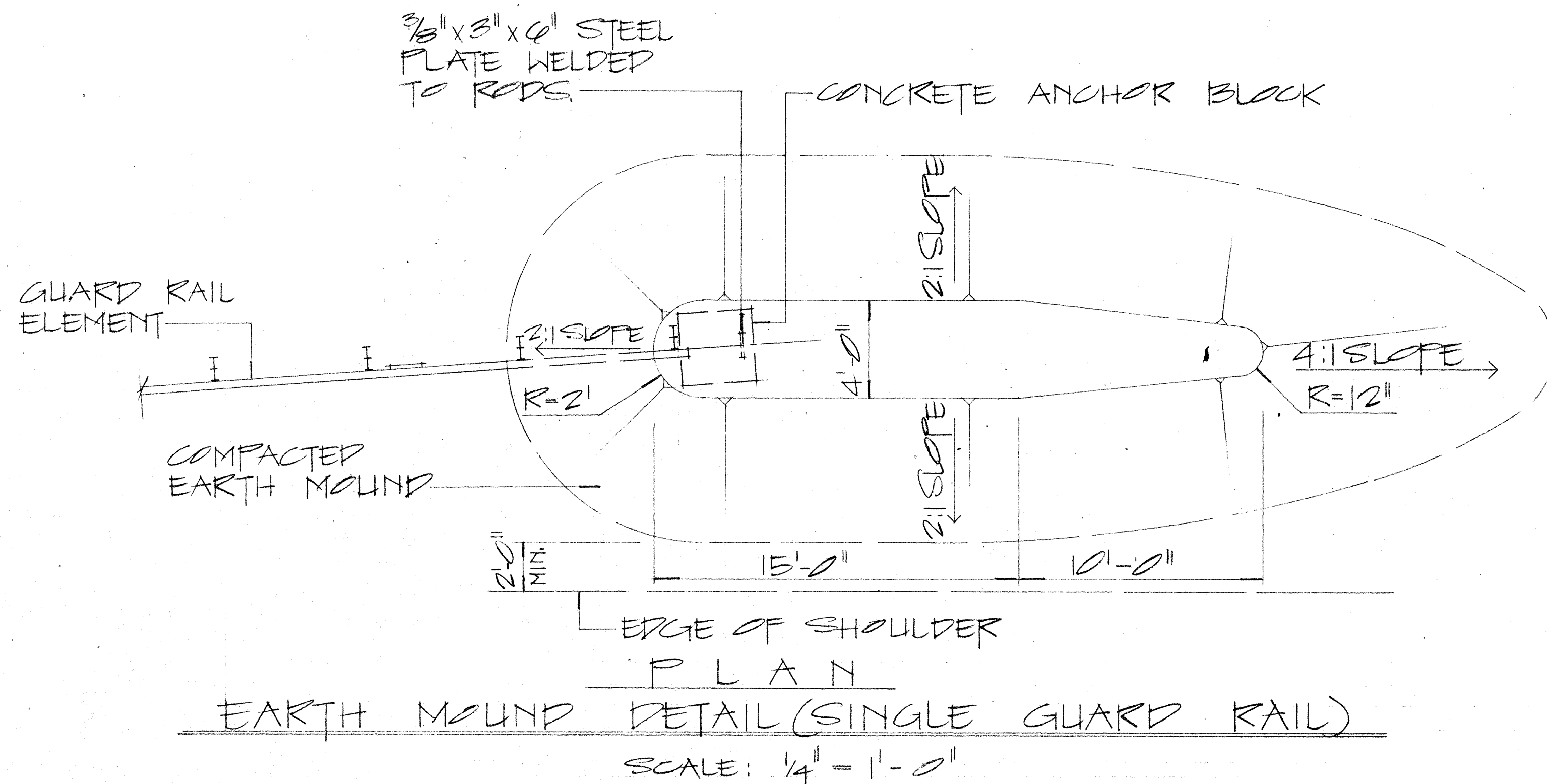
STANDARD DETAIL GUARD RAIL RAMP END ANCHORAGE

Scale: as Noted

August, 1968

SHEET No. 5 OF 10 SHEETS DT 502

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-061-1(15)	1969	17	37



- NOTE:
1. GALVANIZED ANCHOR ROD, METAL GUARD RAIL AND POST BURIED IN GROUND SHALL BE COVERED WITH COAT OF COAL TAR ENAMEL.
 2. CONCRETE, GRP, EXCAVATION, EARTH MOUND, ANCHOR RODS AND MISCELLANEOUS APPURTENANCES NECESSARY TO ANCHOR THE GUARD RAIL ENDS SHALL BE INCIDENTAL TO THE METAL GUARD RAIL.

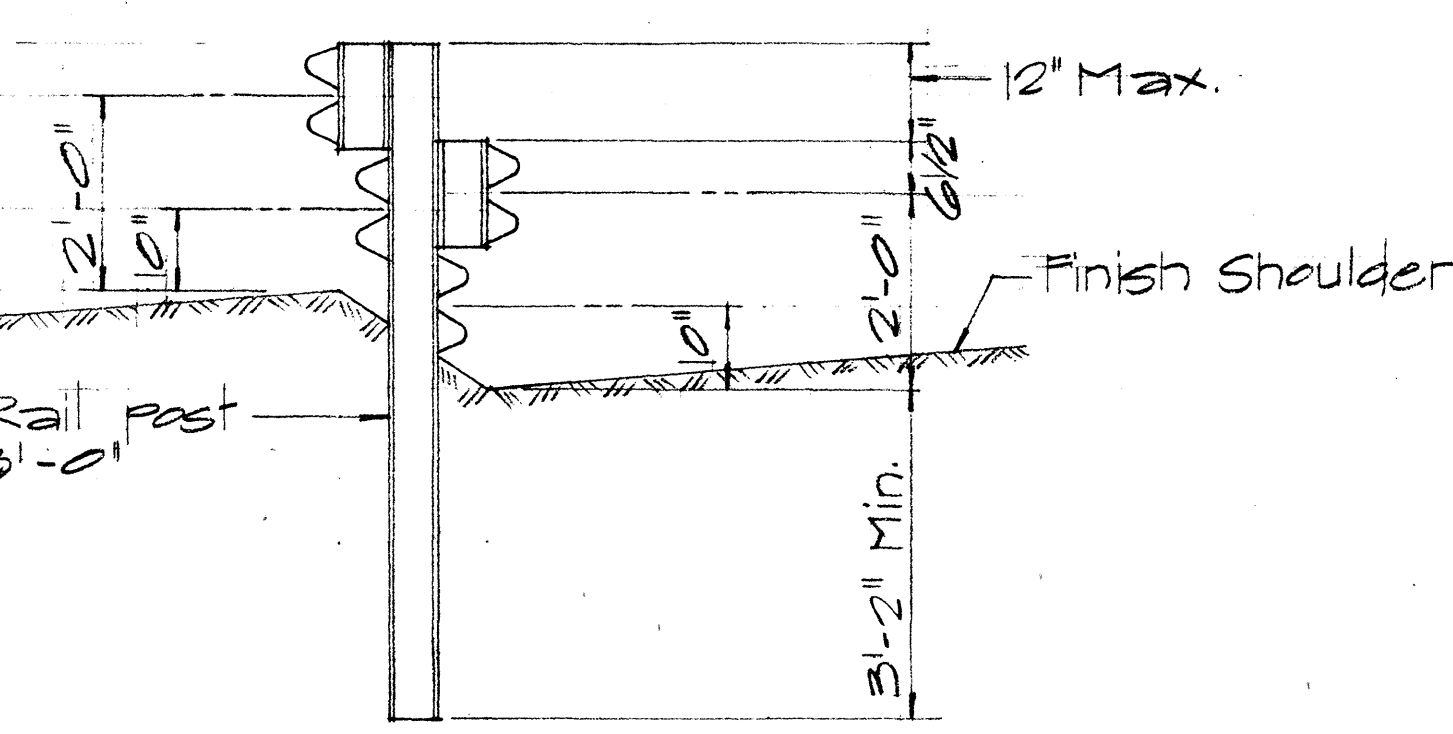
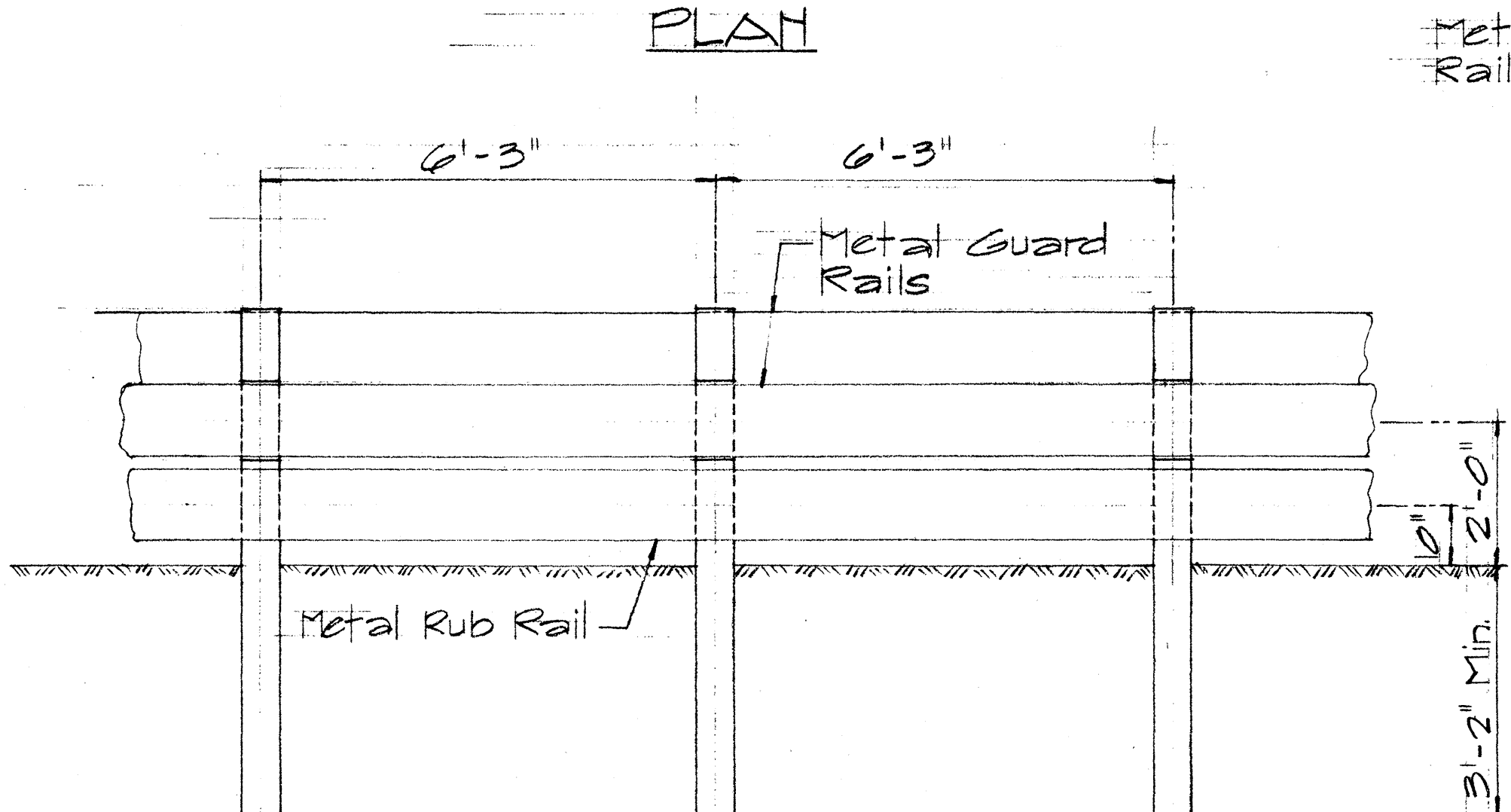
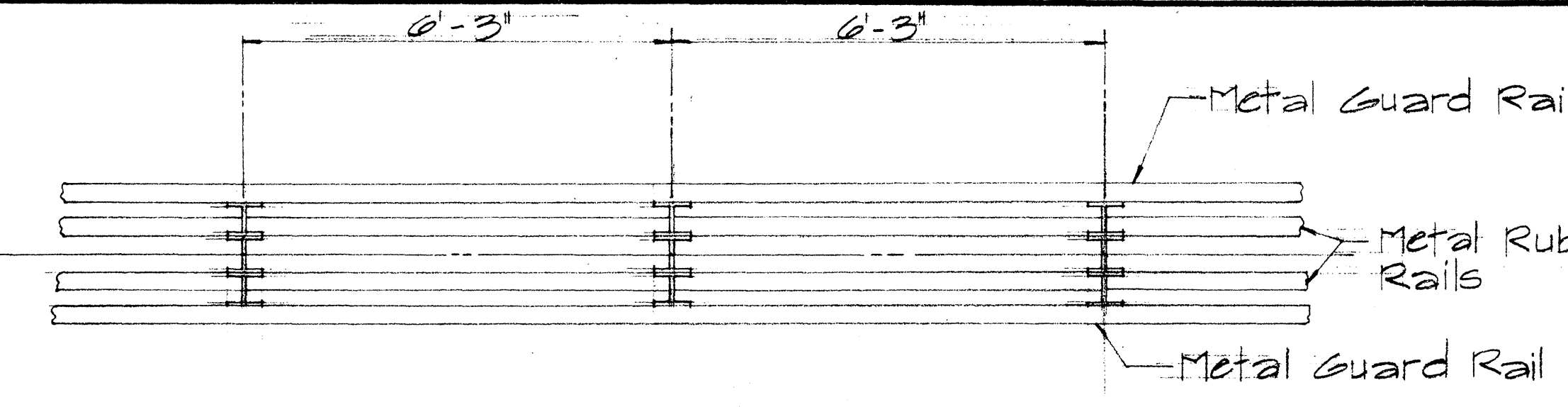
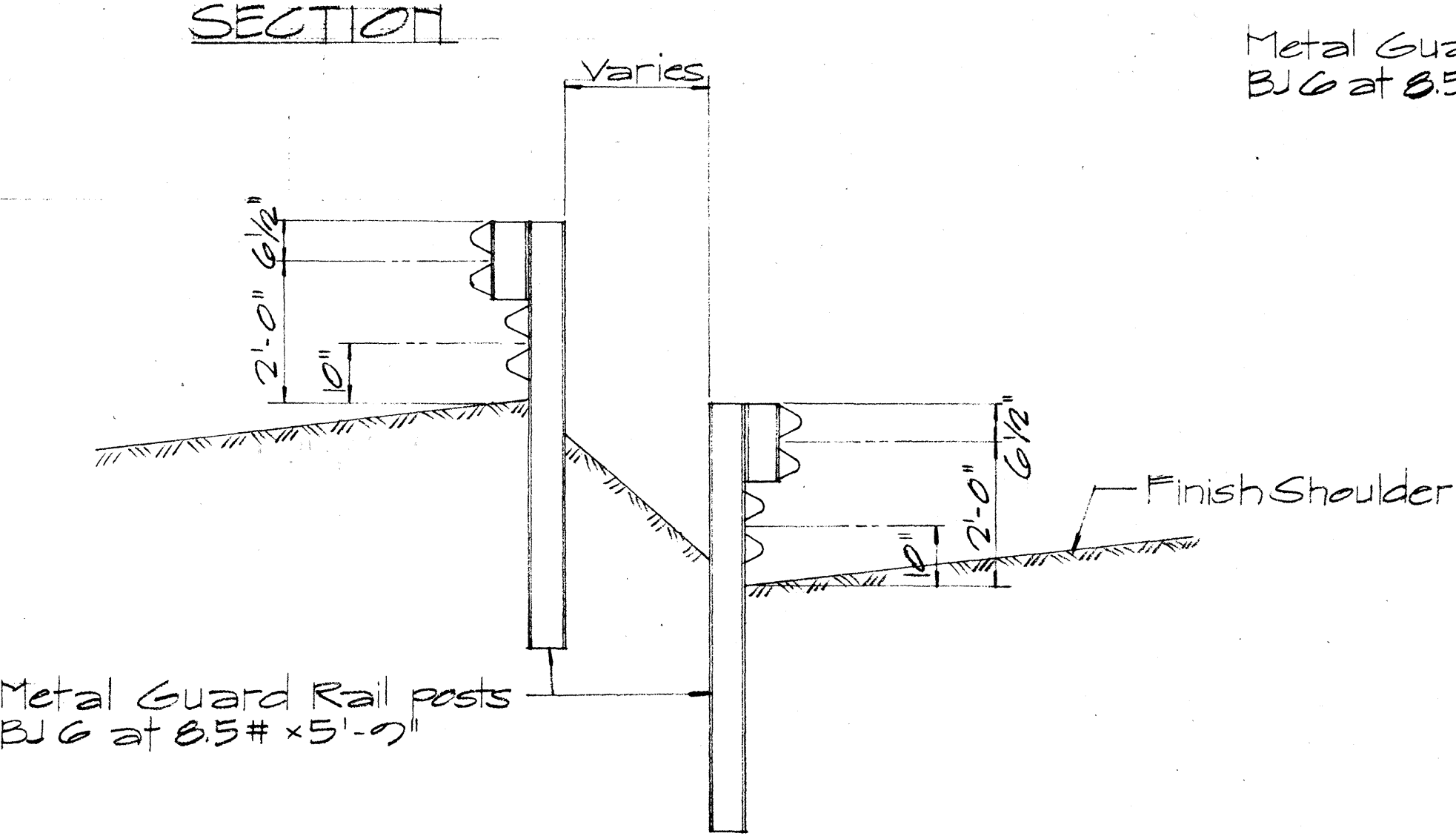
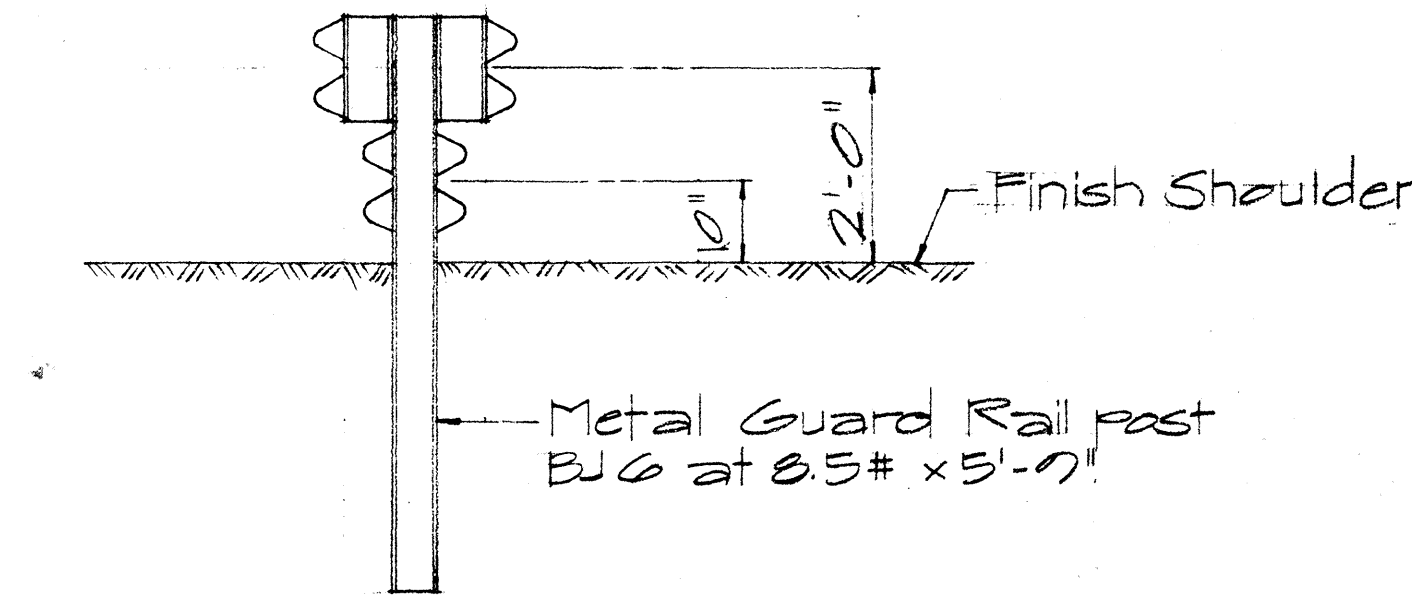
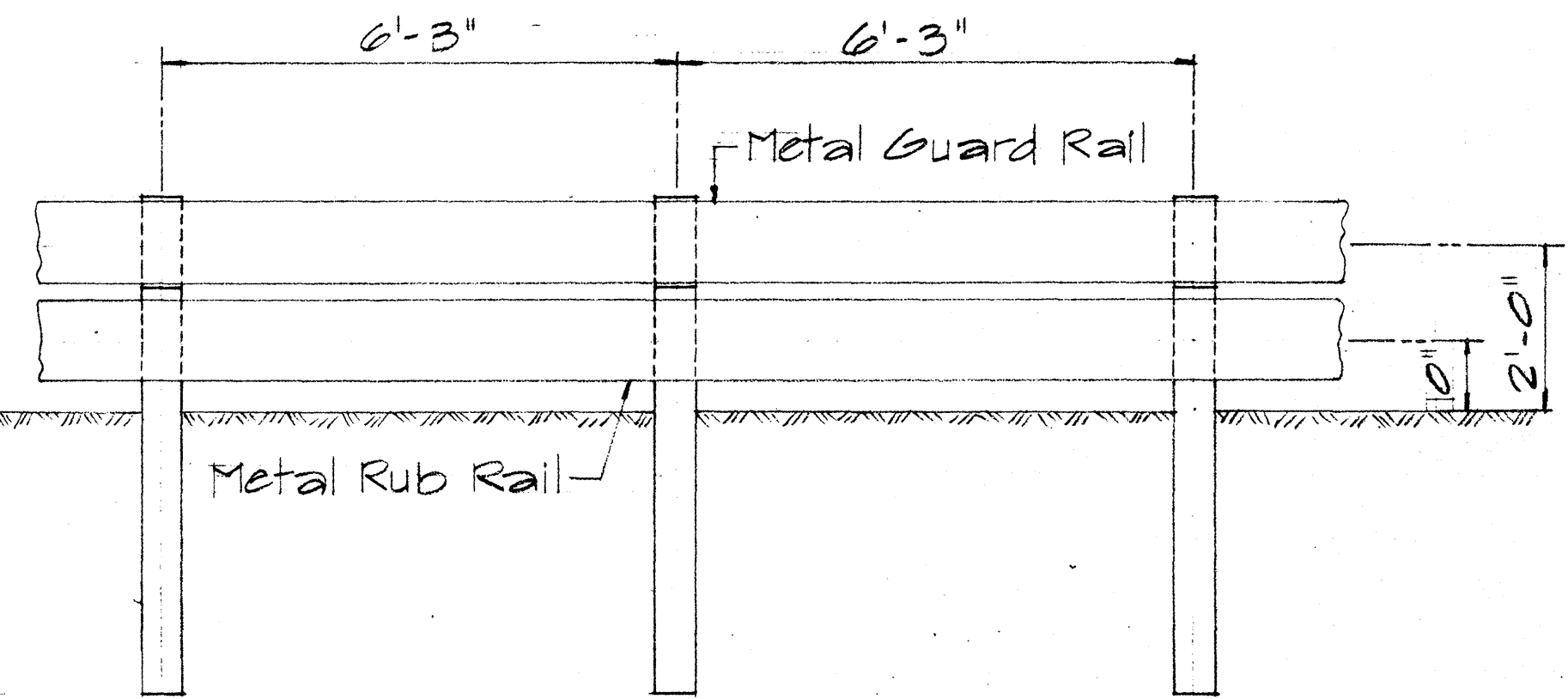
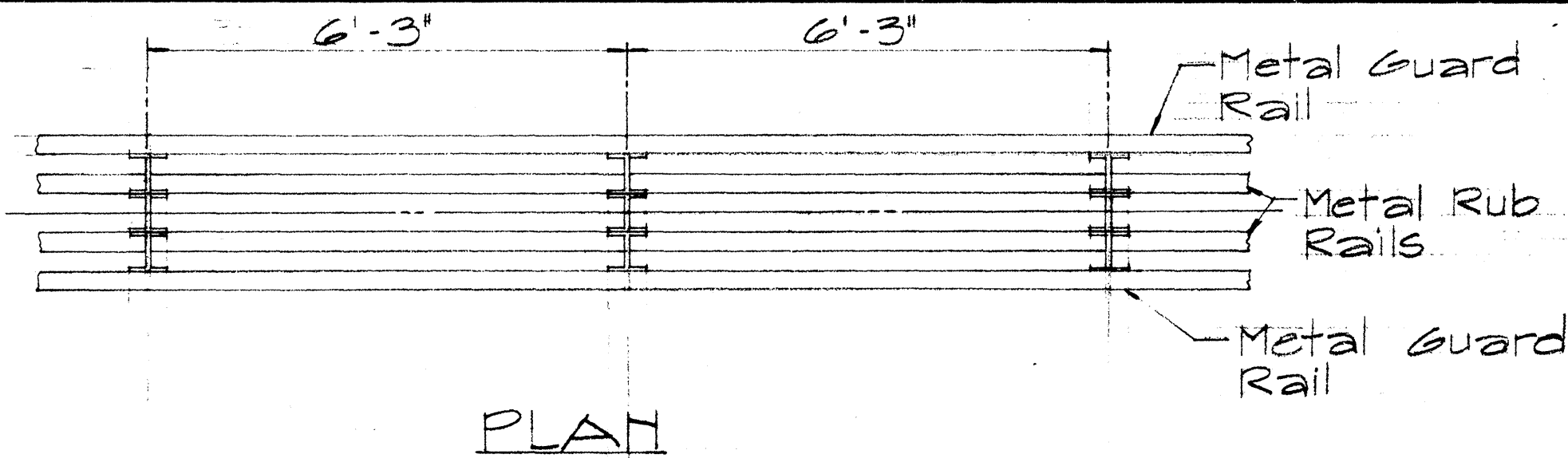
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
EARTH MOUND AND
ANCHOR BLOCK DETAILS

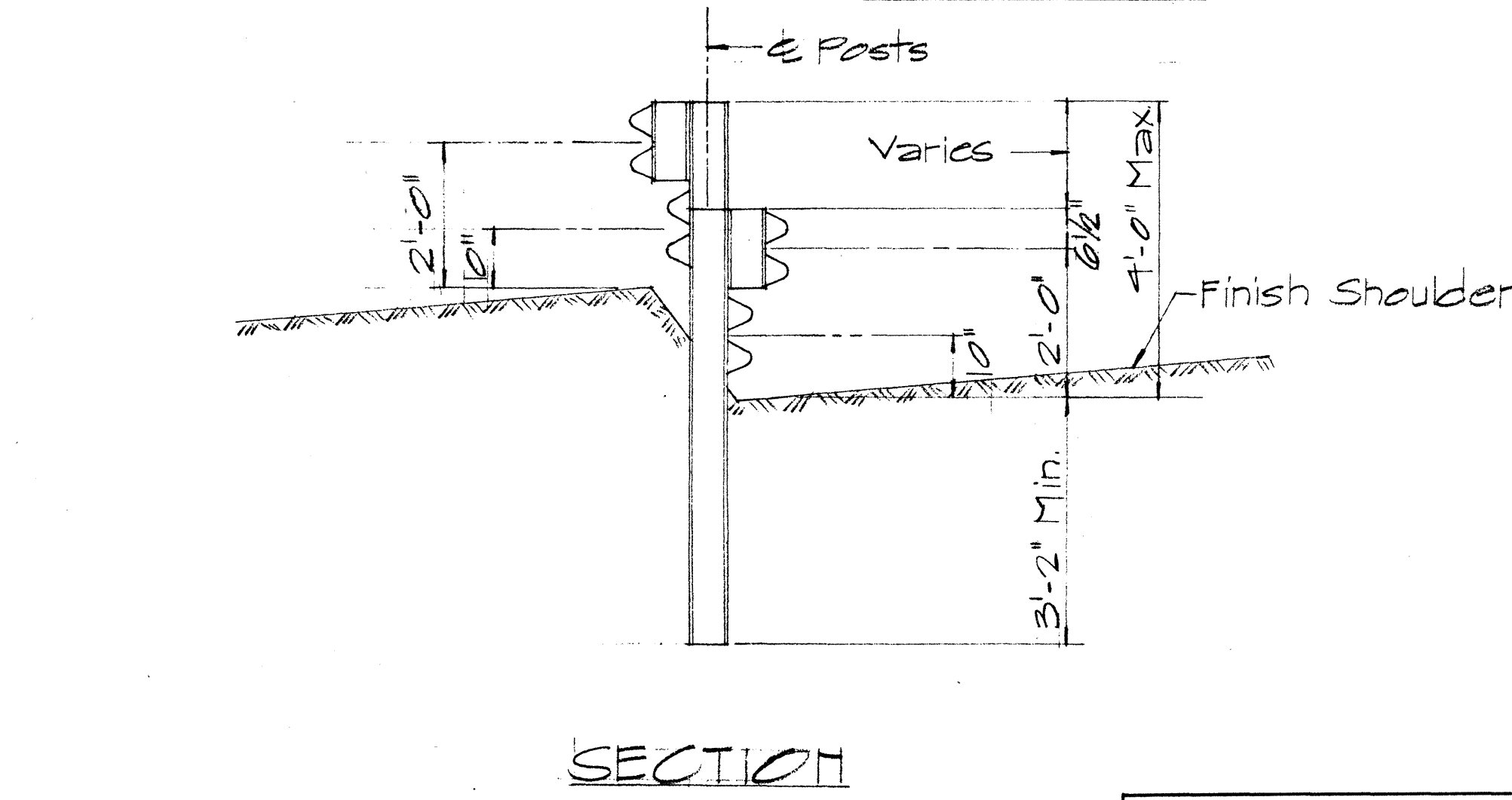
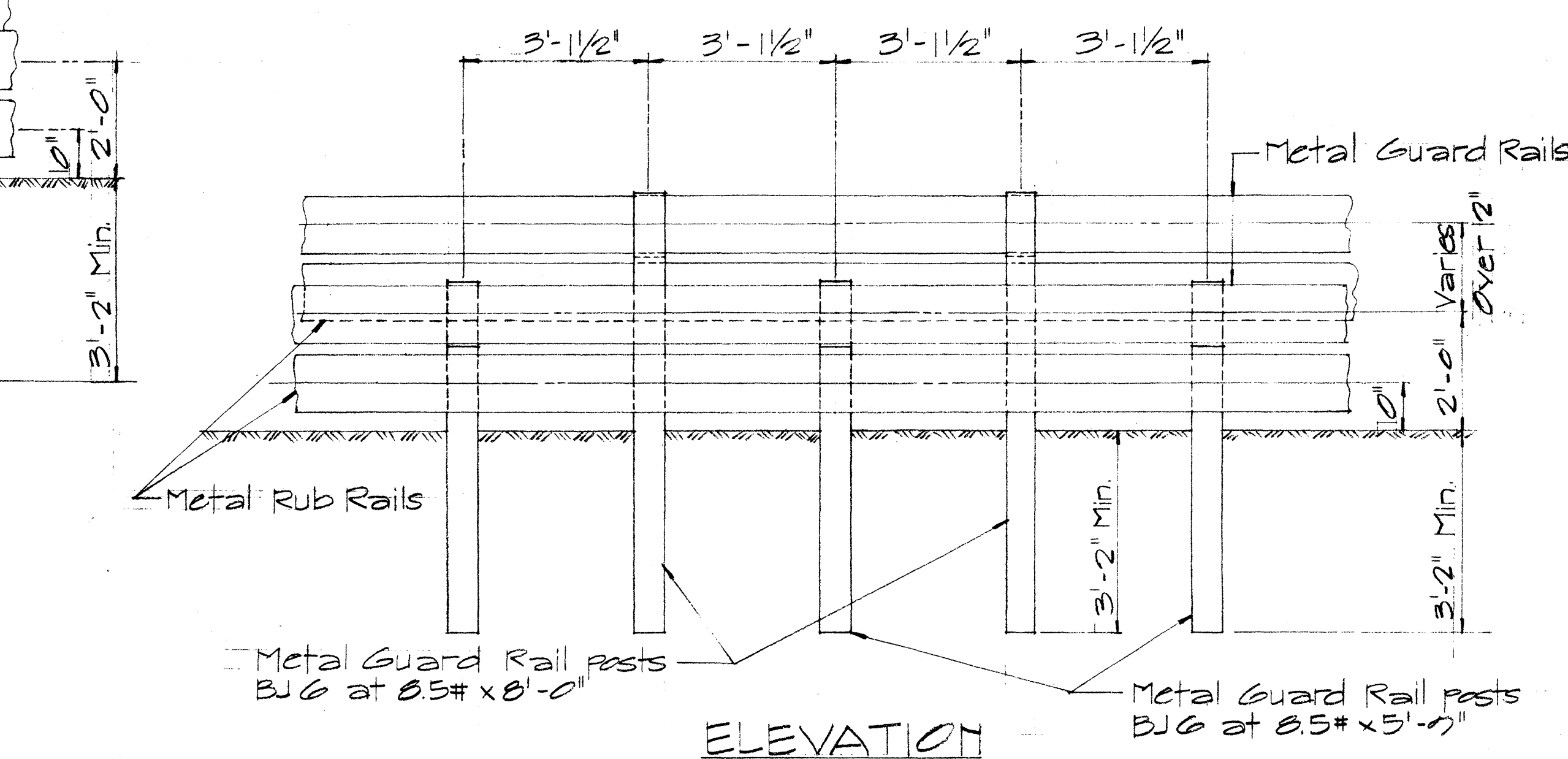
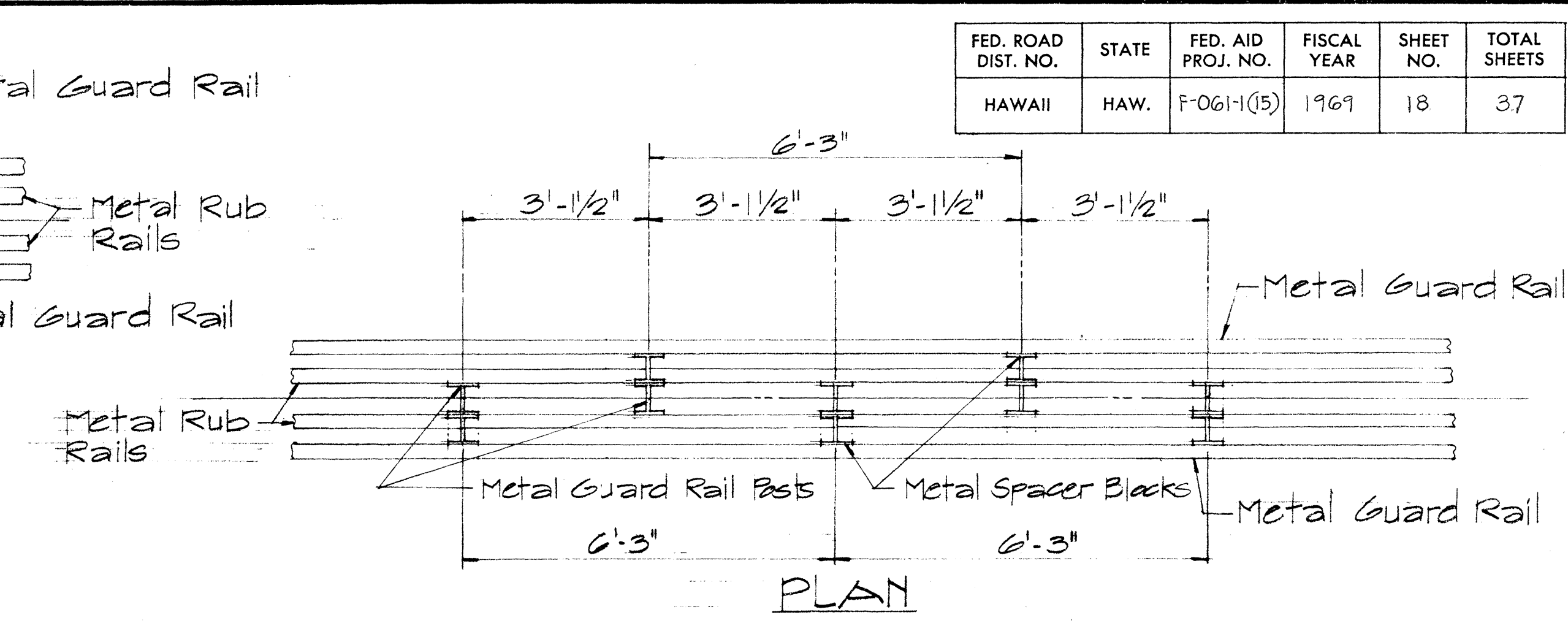
SCALE: AS SHOWN OCT 1969

SHEET No. 6 OF 10 SHEETS PT 520

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-061-1(15)	1969	18	37



TYPICAL SAW TOOTH INSTALLATION
Scale: 1/2" = 1'-0"



TYPICAL STAGGERED INSTALLATION
Scale: 1/2" = 1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAIL
METAL GUARD RAIL
WITH RUB RAIL

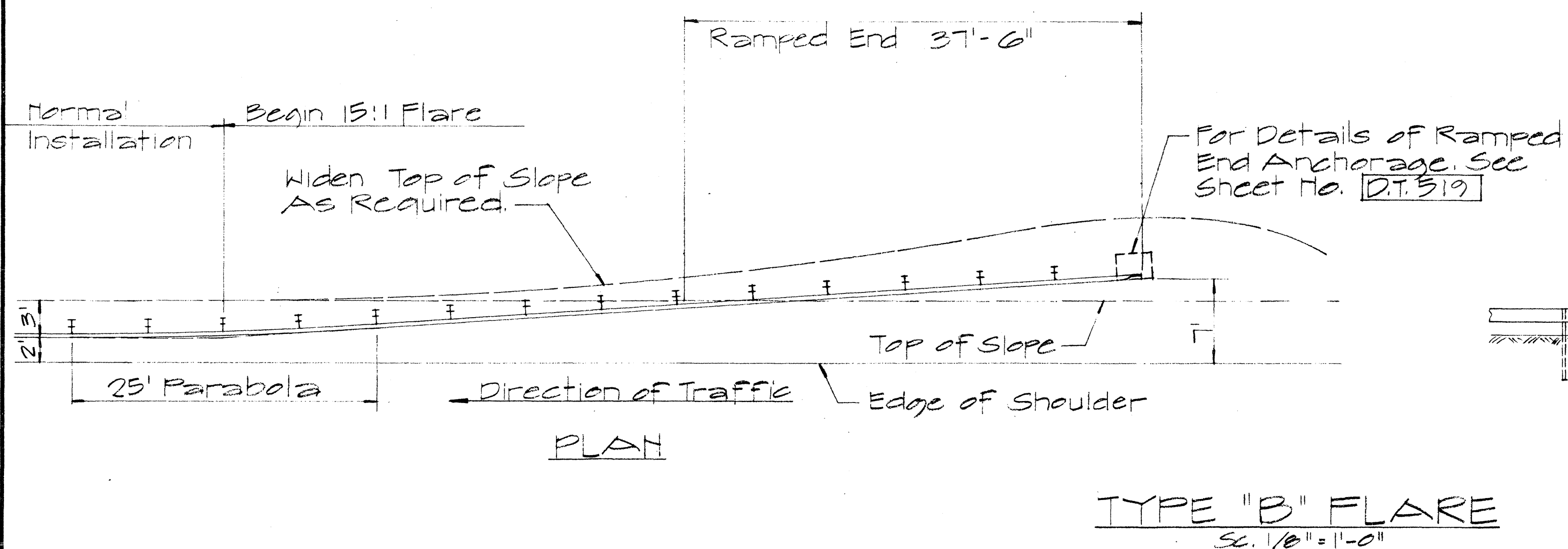
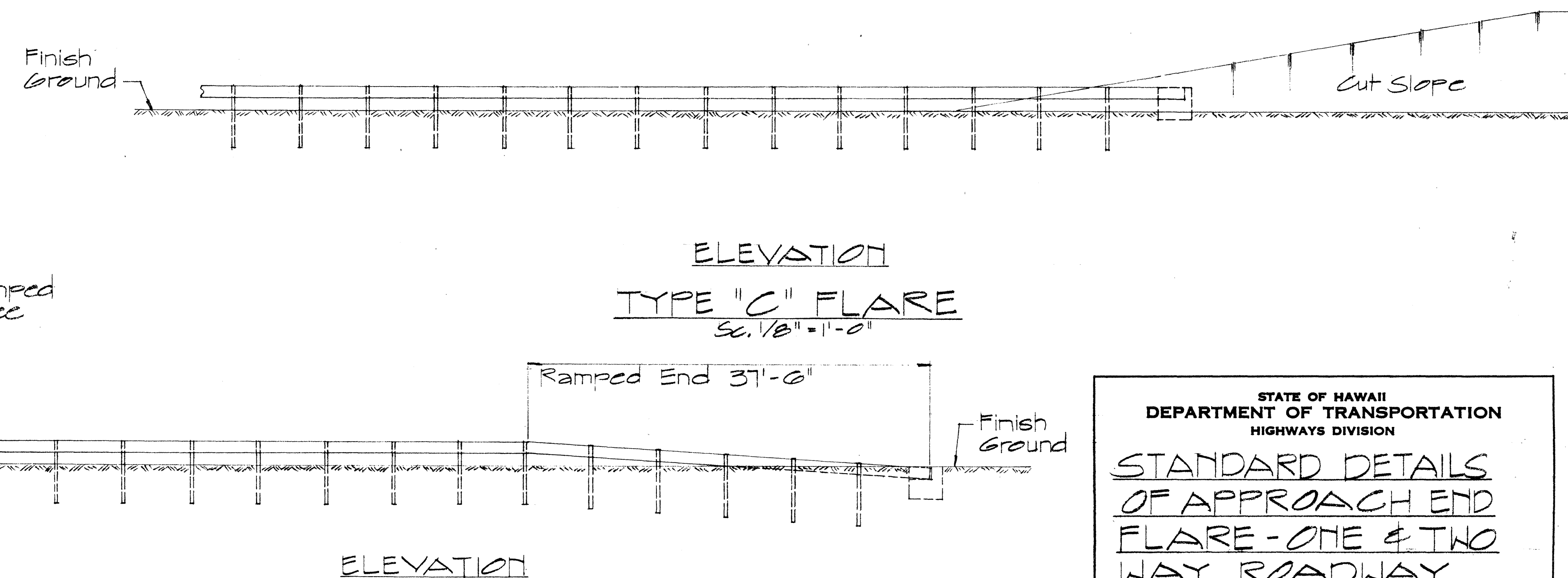
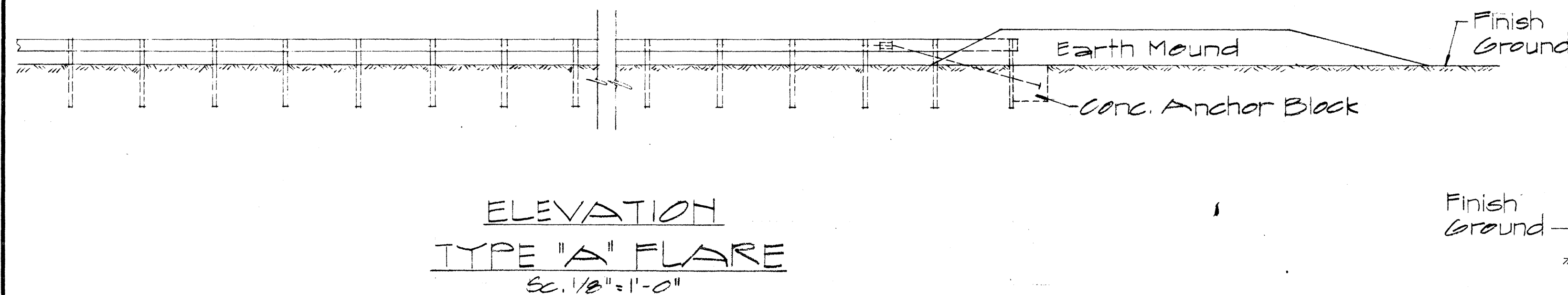
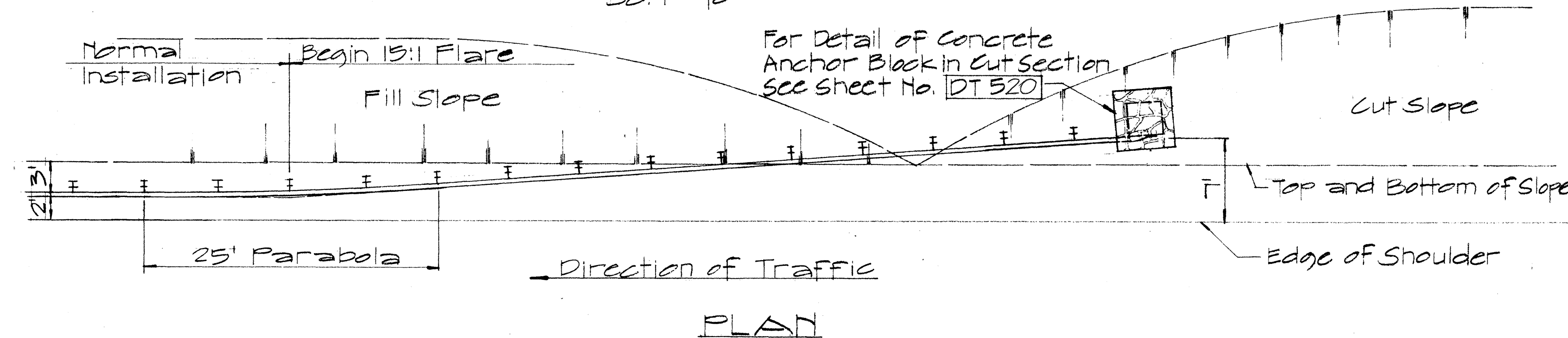
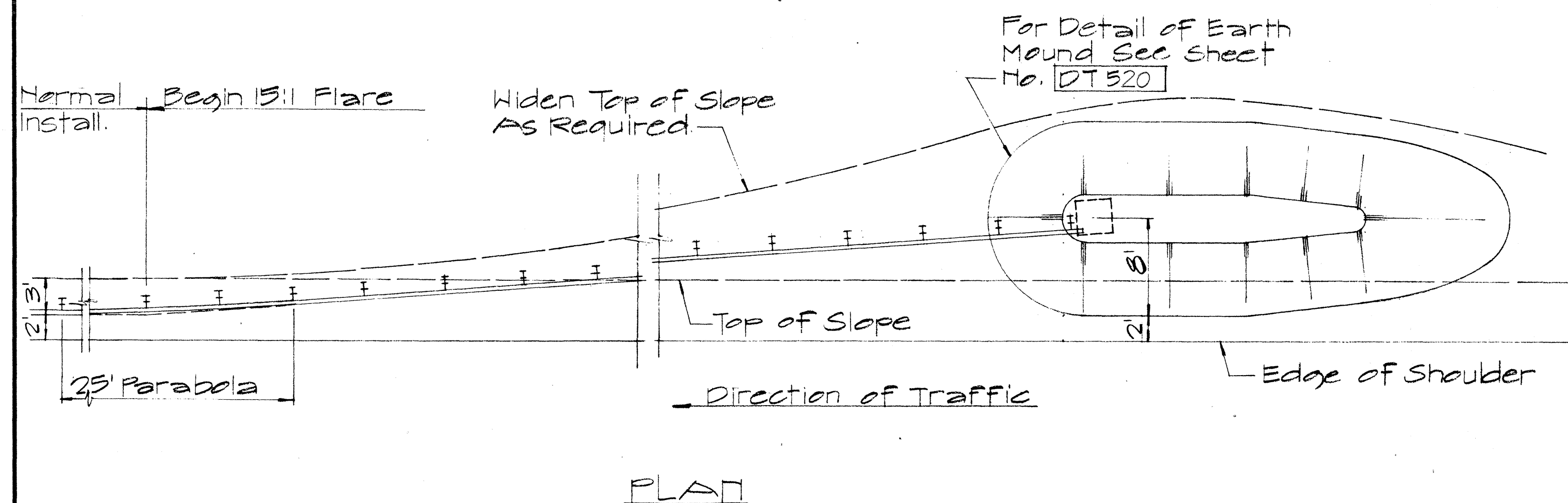
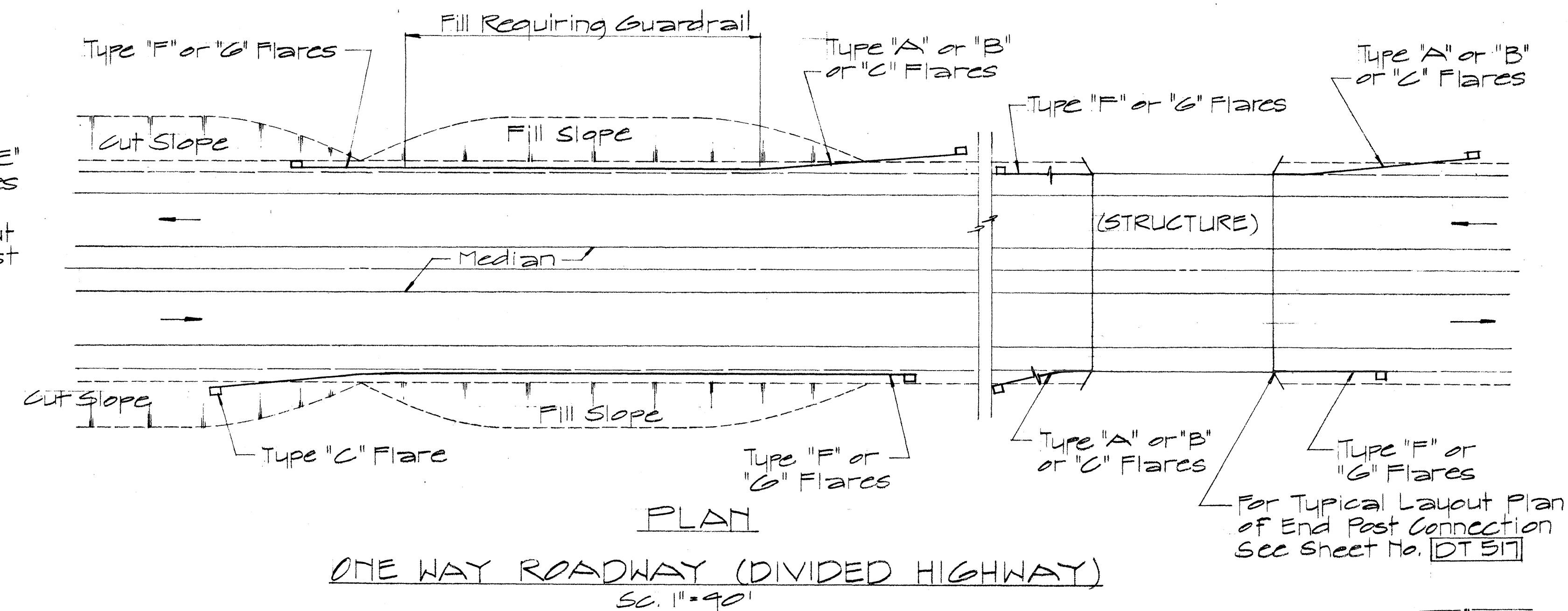
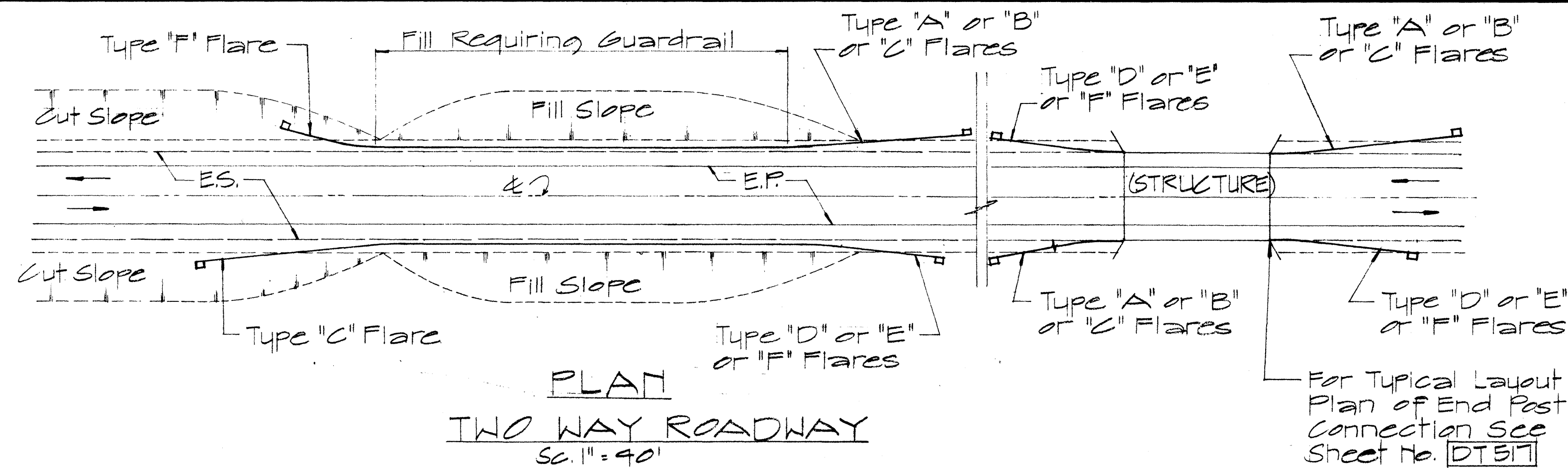
Scale: 1/2" = 1'-0" Feb. 1/1/69

SHEET No. 7 OF 10 SHEETS DT 514

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F-061-1(15)	1969	19	37

NOTE:

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



**STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION**

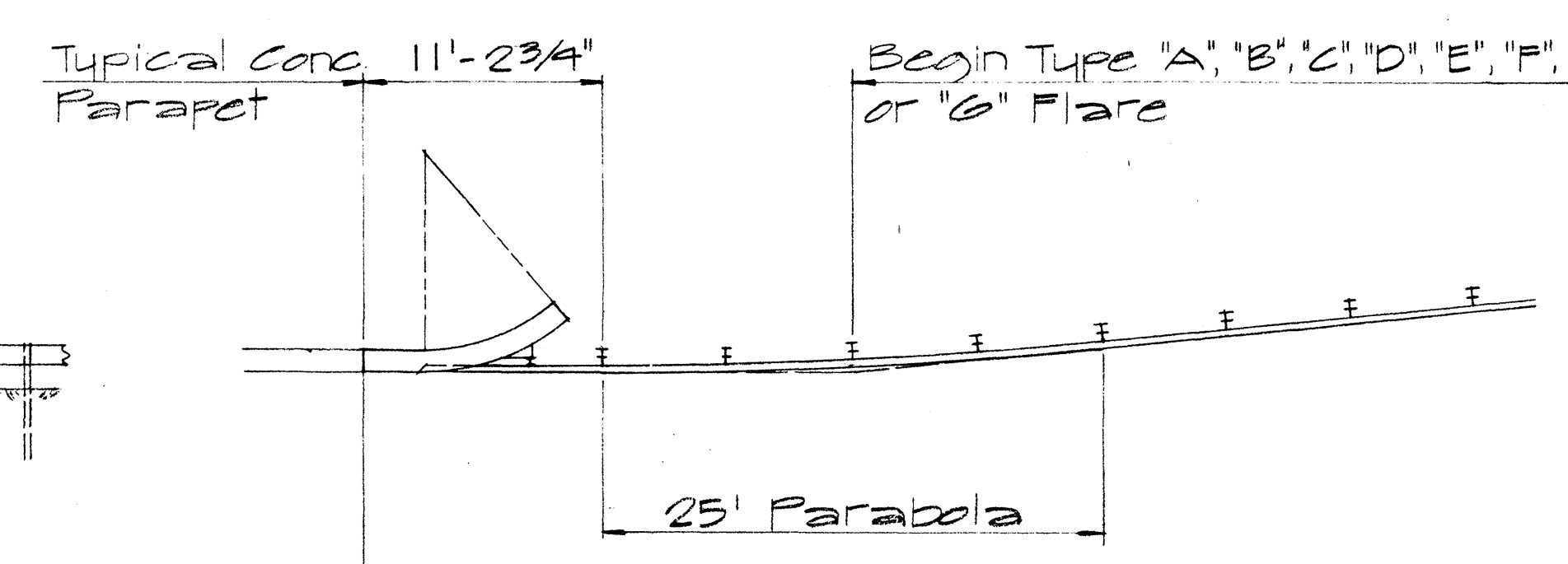
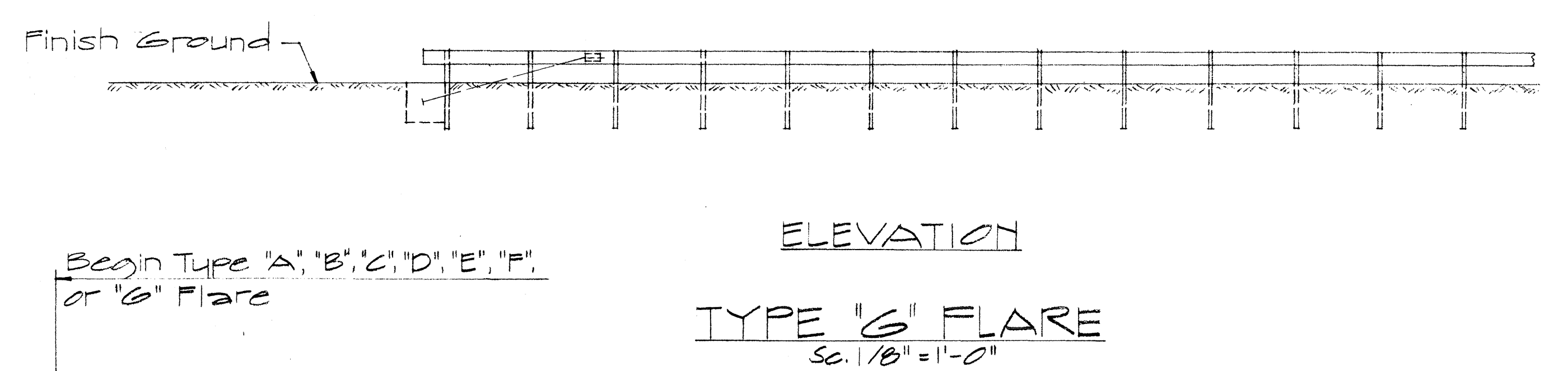
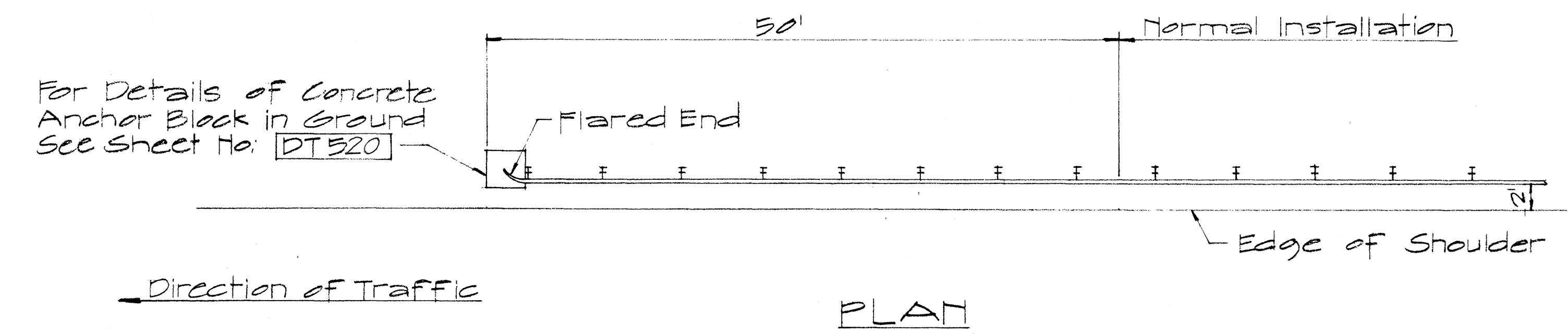
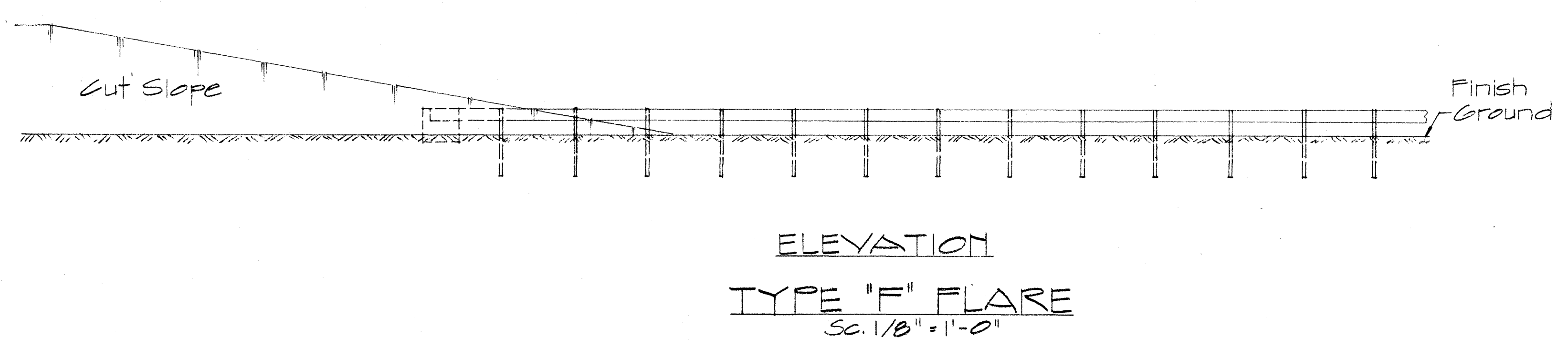
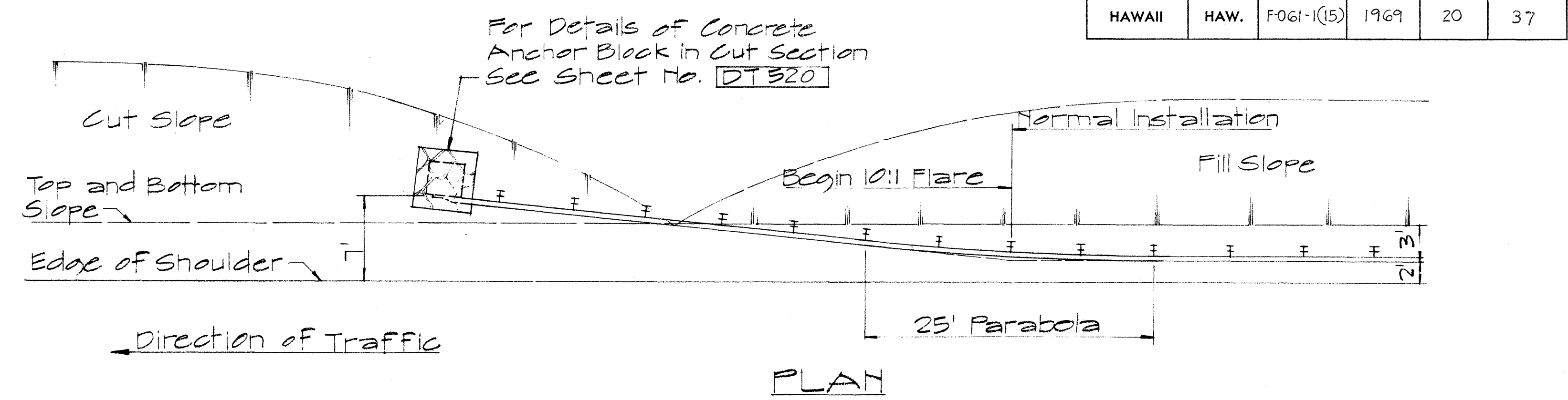
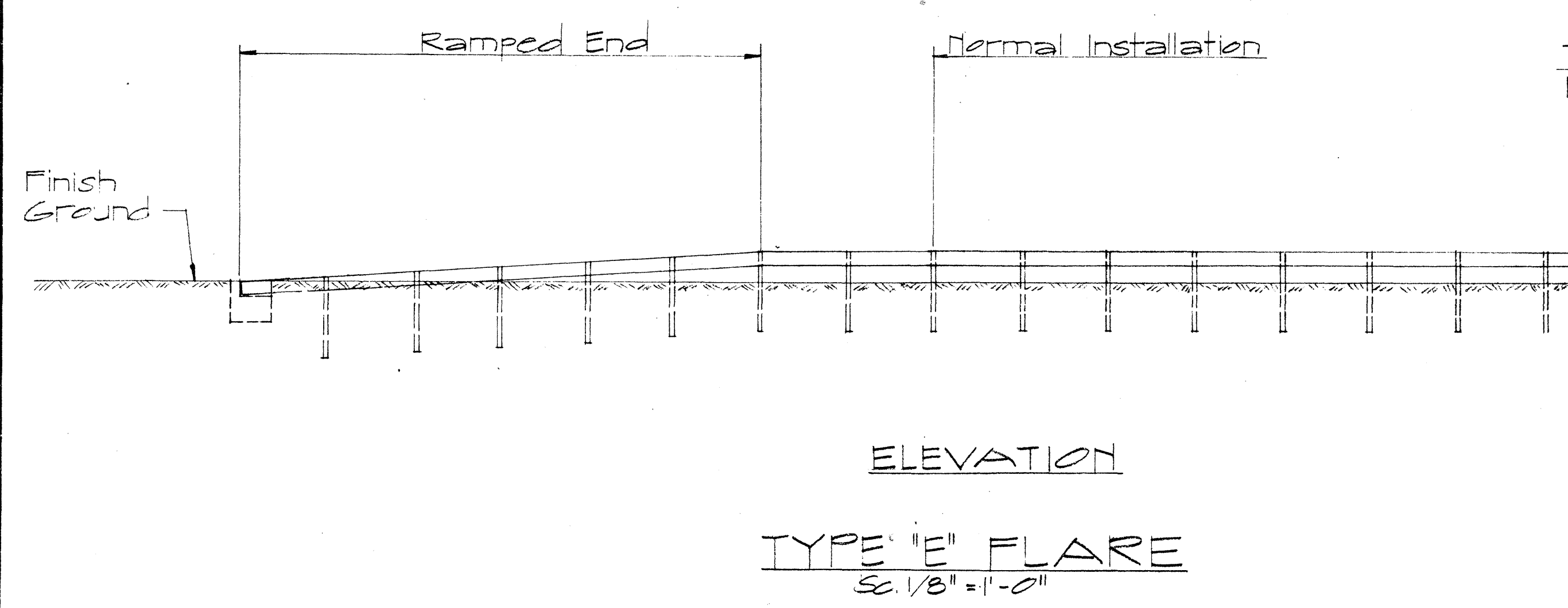
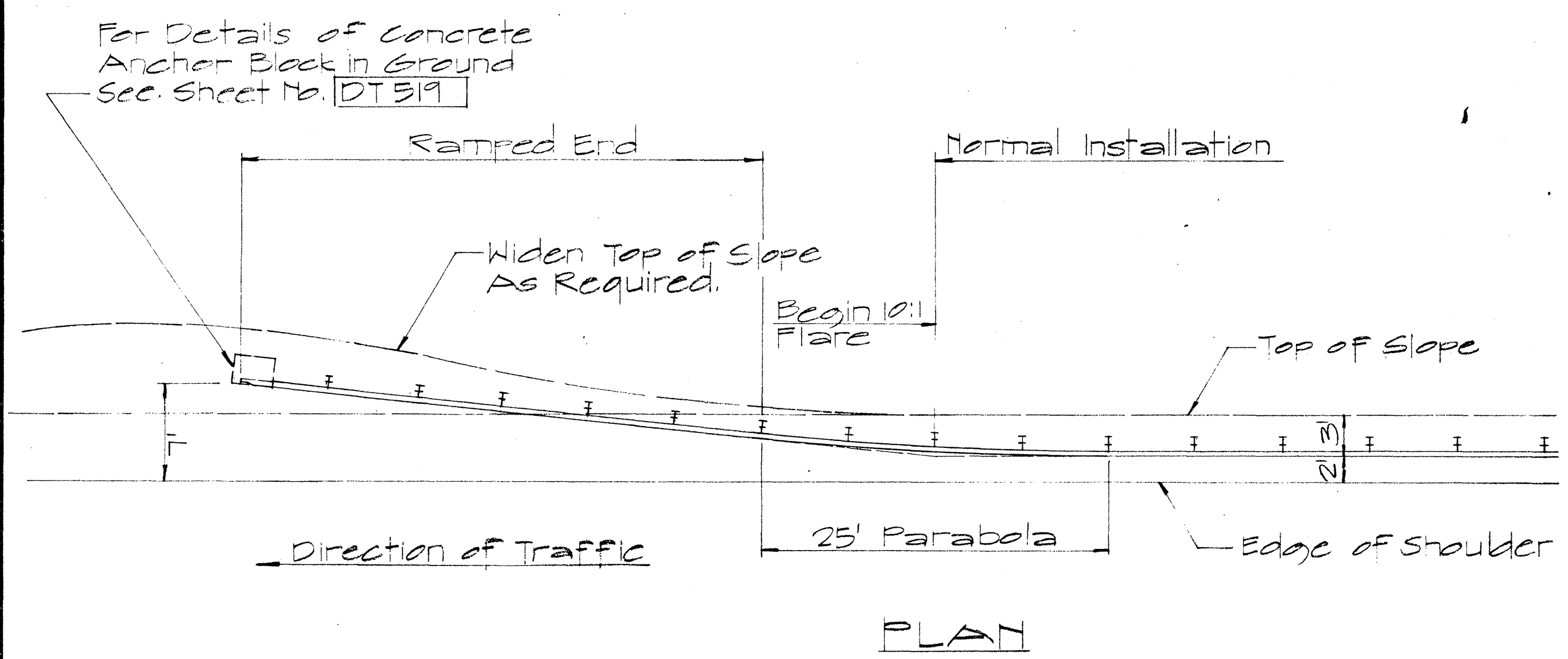
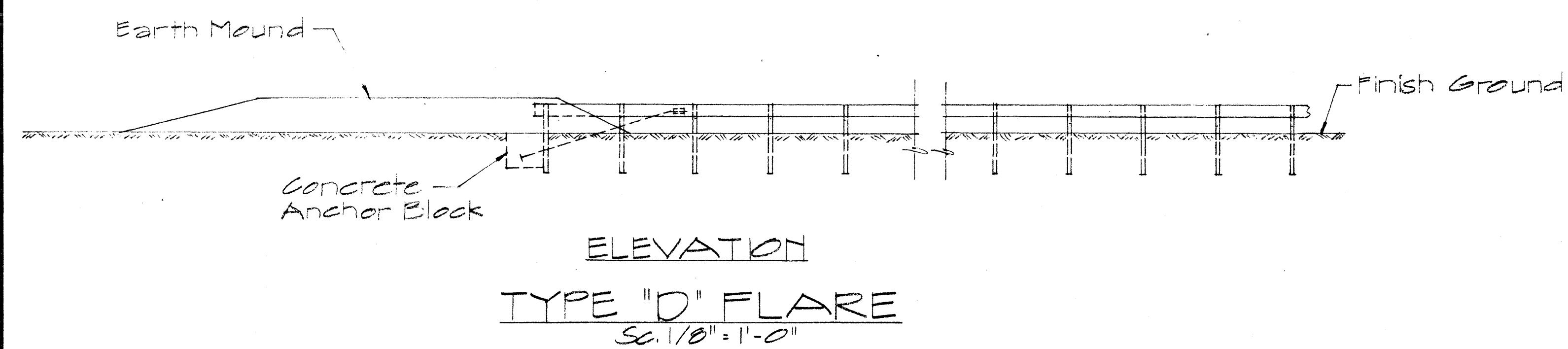
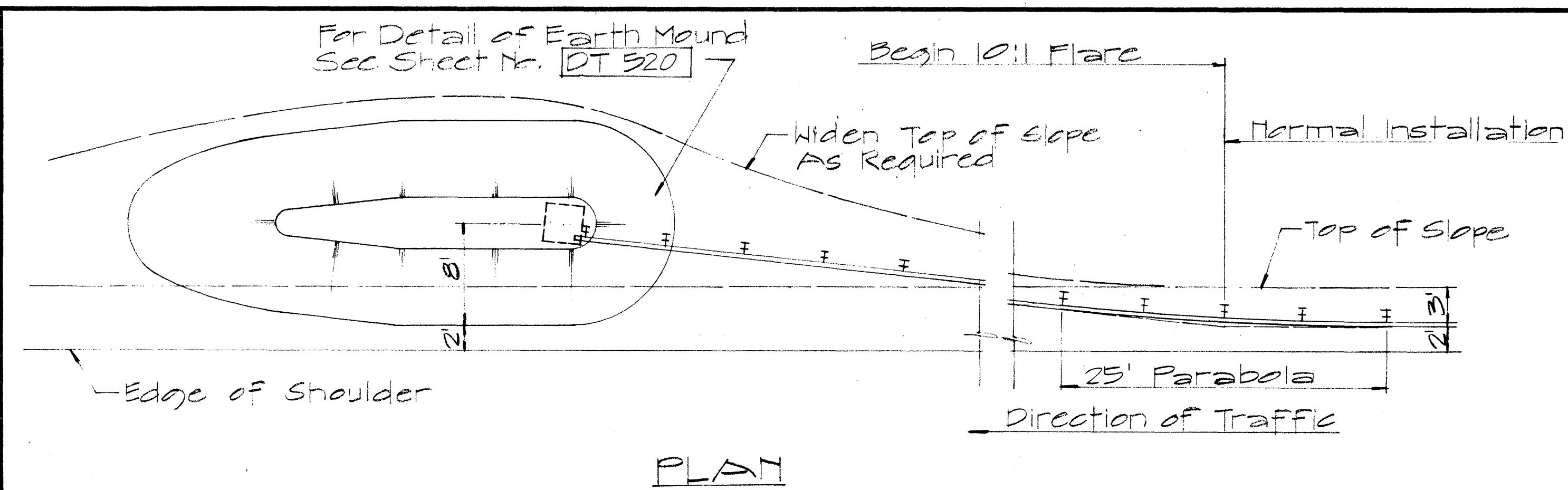
STANDARD DETAILS OF APPROACH END FLARE - ONE & TWO WAY ROADWAY

SC. As Noted April 1967

SHEET No. 8 OF 10 SHEETS DT 516

19

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	F061-1(15)	1969	20	37



TYPICAL LAYOUT PLAN OF END POST CONNECTION

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

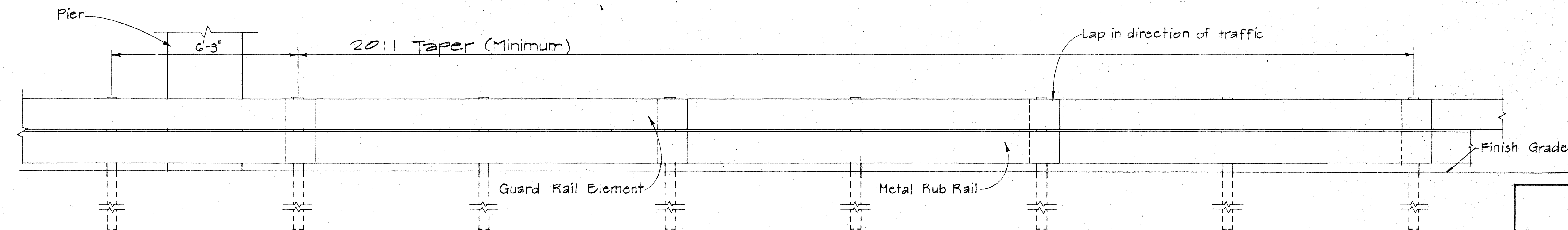
STANDARD DETAILS
OF TRAILING END
FLARE - ONE & TWO
WAY ROADWAY

Sc. As Noted April 1969

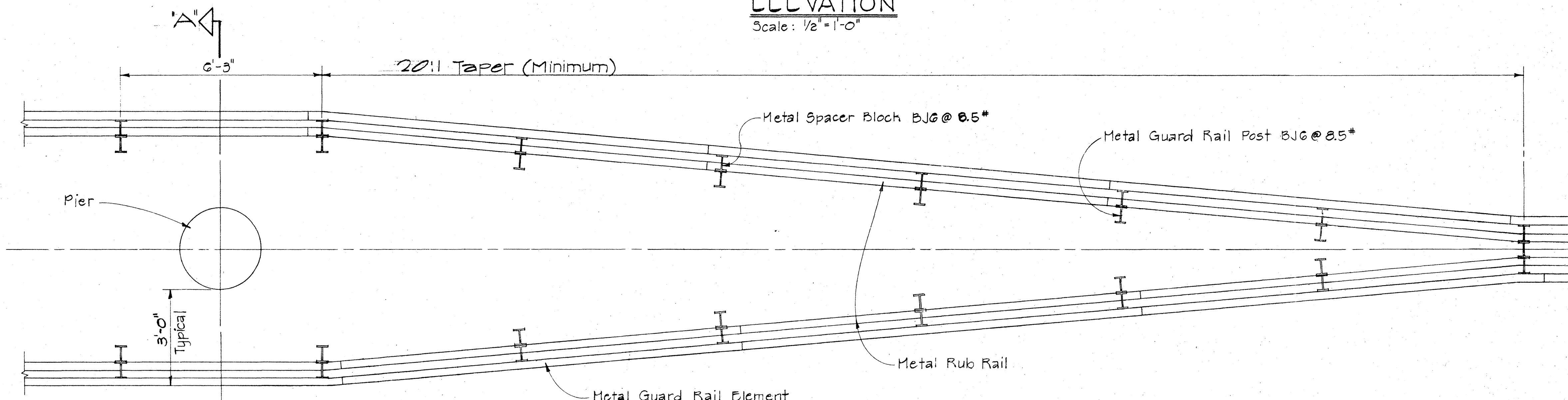
SHEET No. 9 OF 10 SHEETS DT 517

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

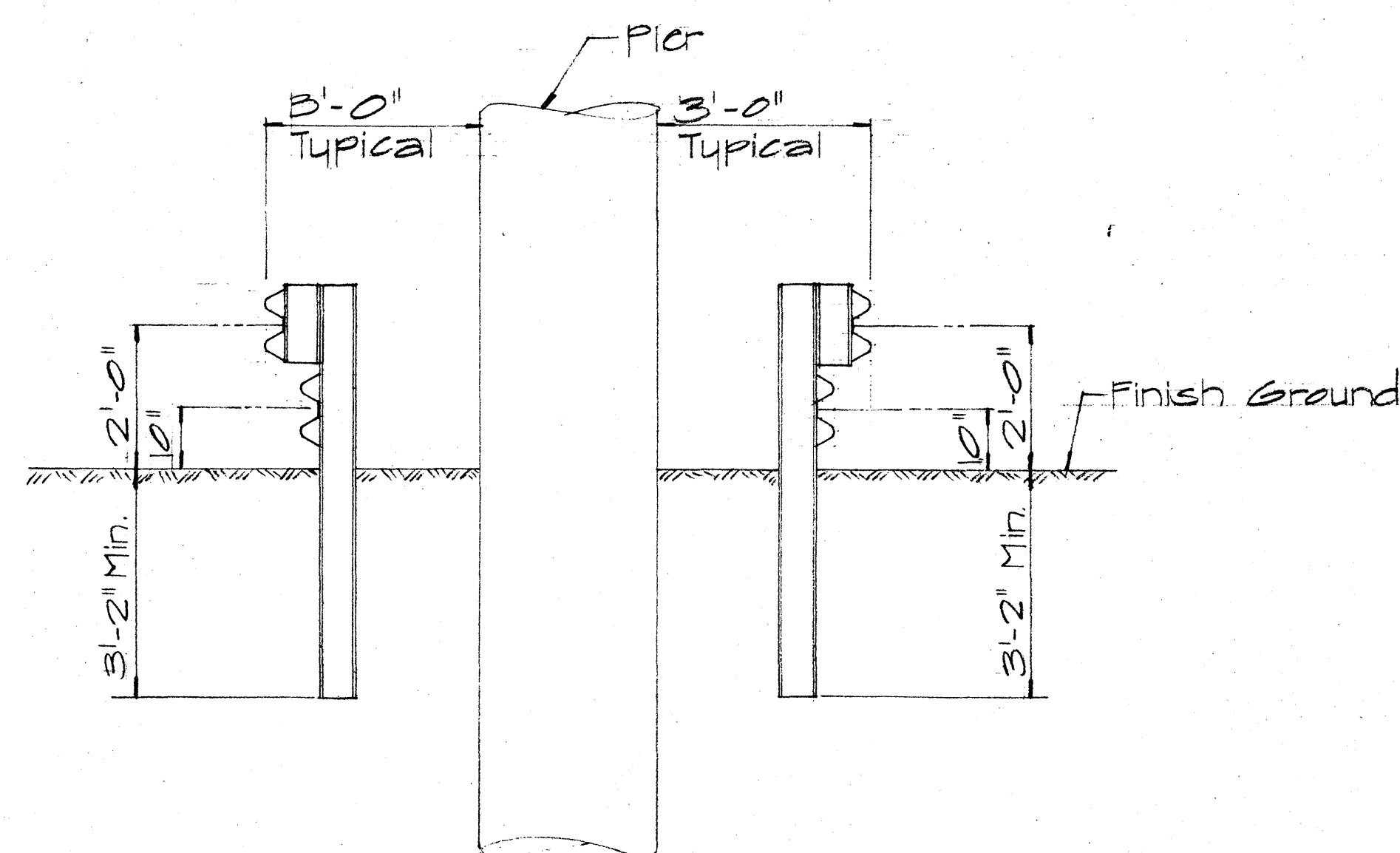
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	ED61-1(15)	1967	21	37



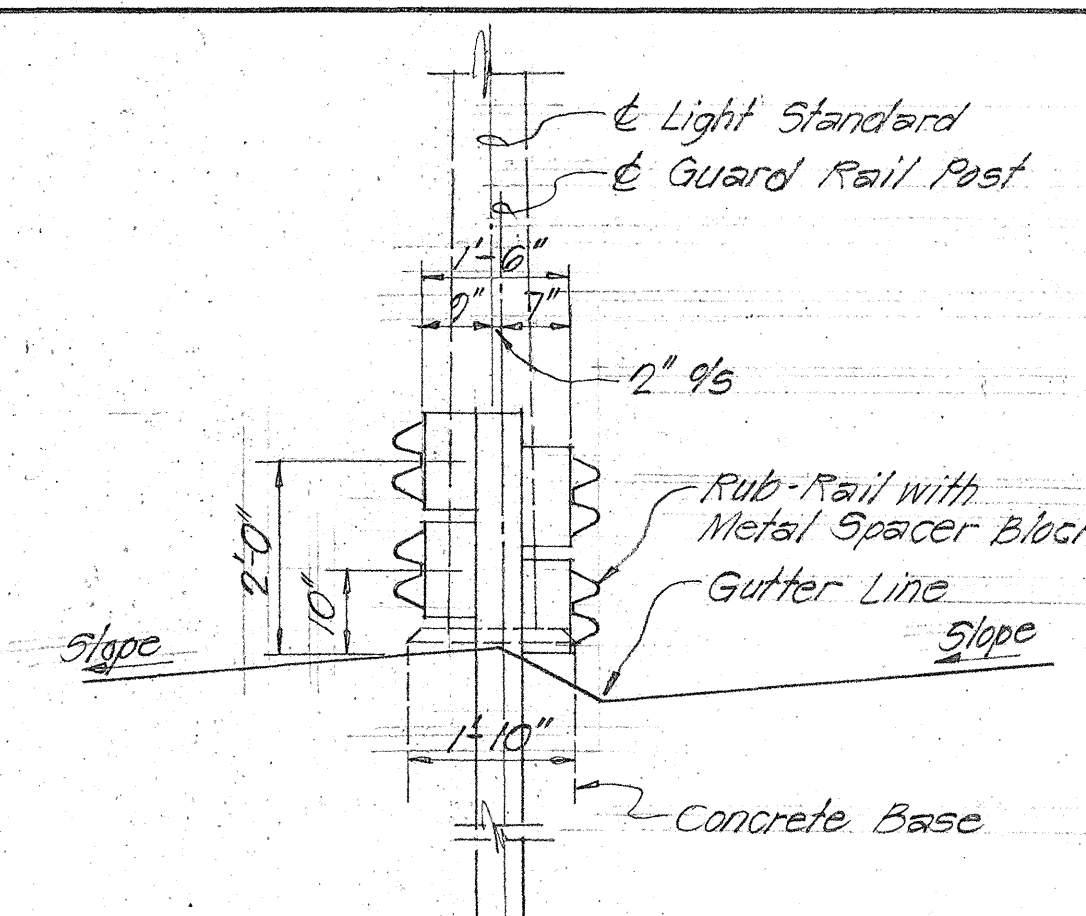
ELEVATION
Scale: 1/2" = 1'-0"



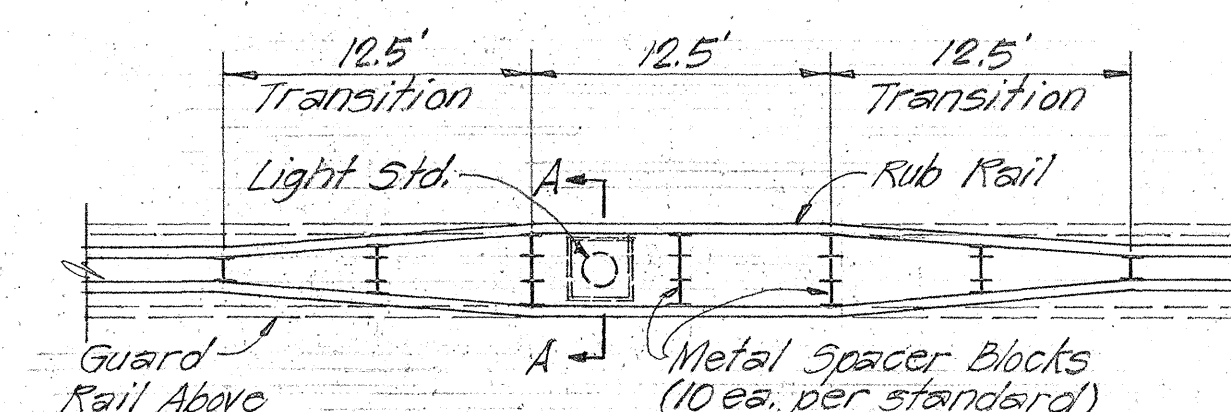
PLAN
Scale: 1/2" = 1'-0"



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



SECTION A-A



PLAN - RUB RAIL TRANS. AT LIGHT STD.

C.C.O. #6

"AS-BUILT" POSTING

APPROVAL RECOMMENDED:
Eisaku Tanaka 12/29/69
TRAFFIC ENGINEER DATE

APPROVED:
Shunji Saito 12/30/69
ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**TRANSITION DETAIL OF
METAL GUARD RAIL
WITH RUB RAIL AT
OBSTRUCTION**

Scale: As Shown Nov. 1968

SHEET No. 10 OF 10 SHEETS DT 505