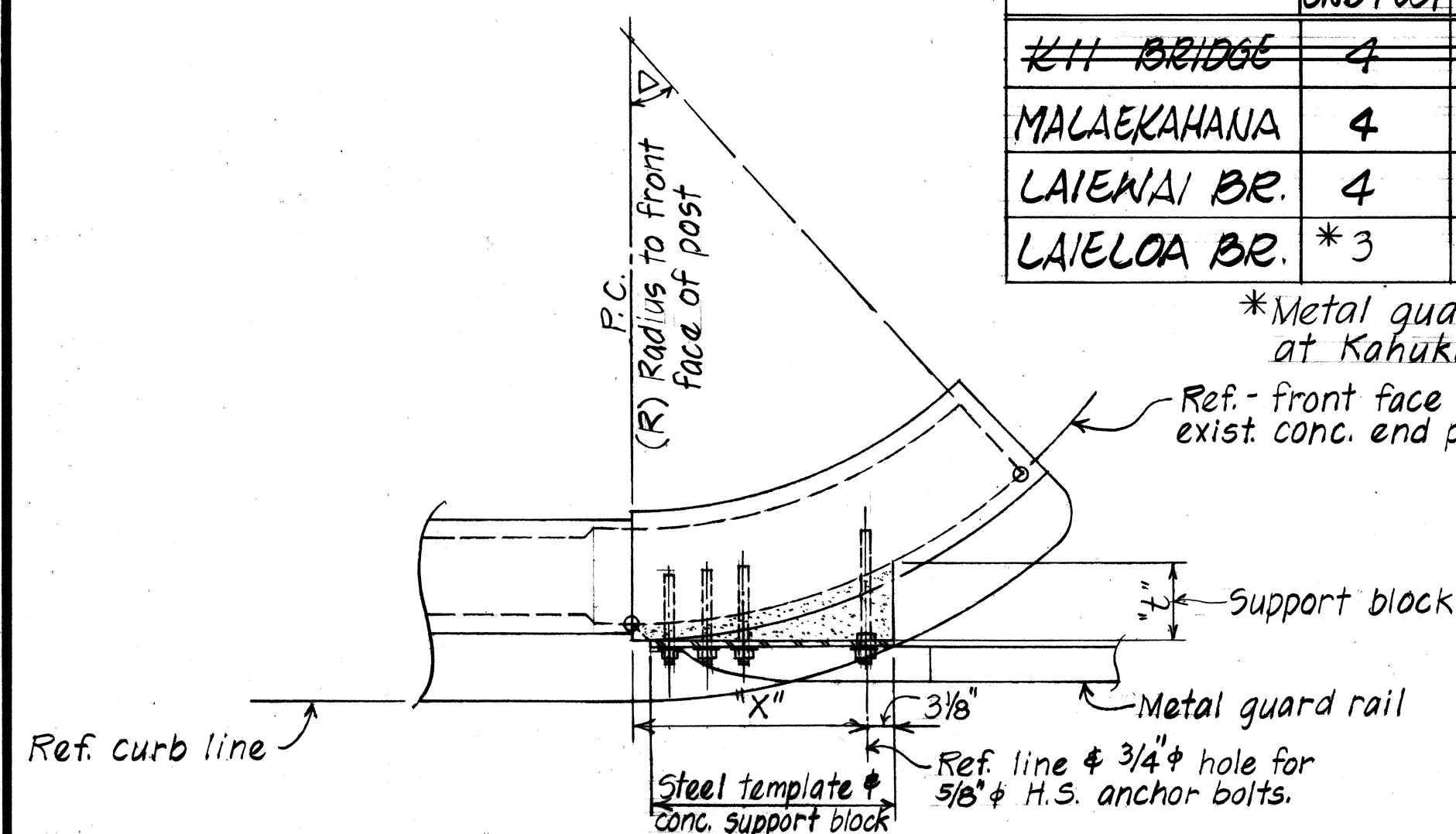


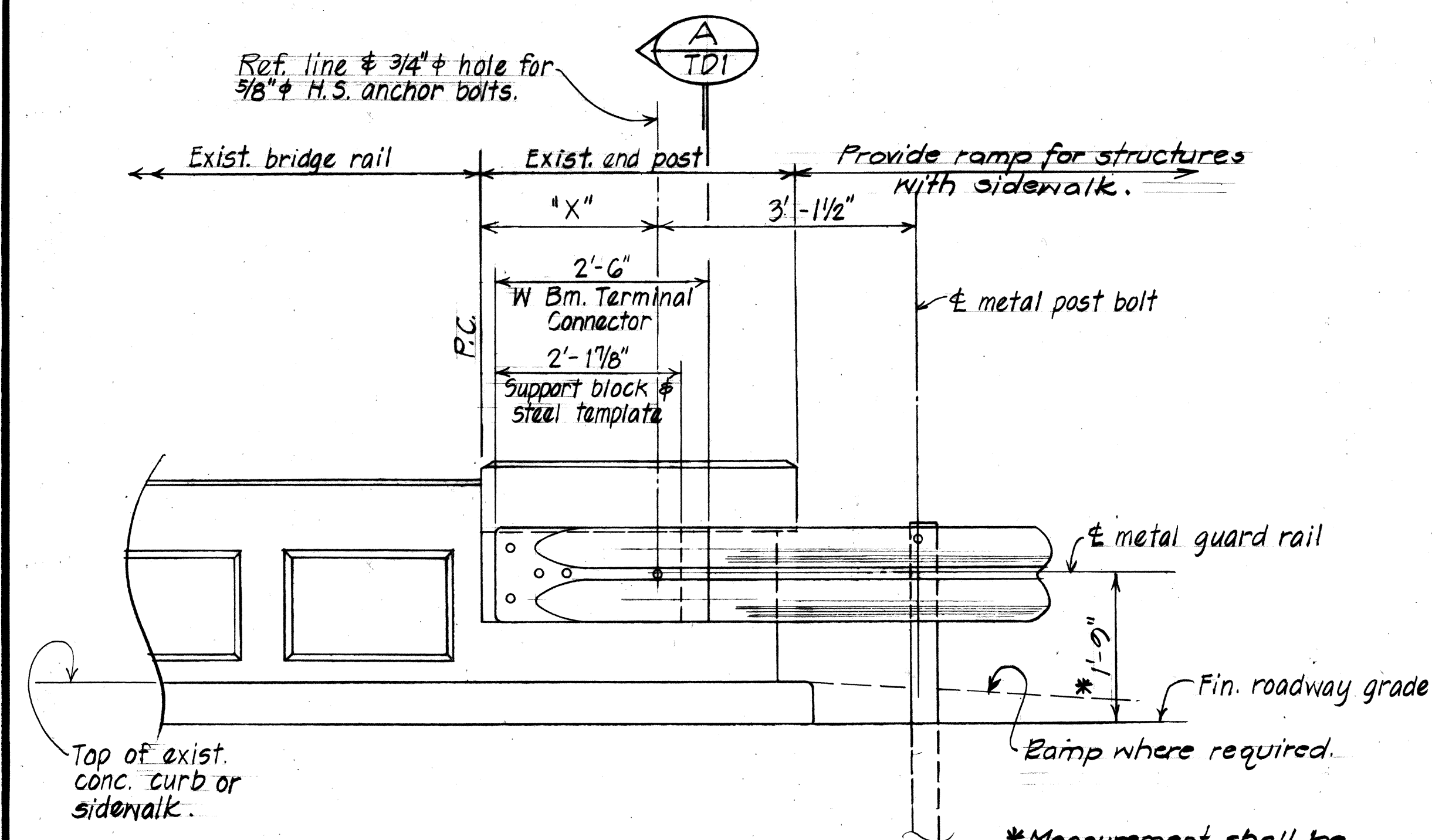
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83C-01-86M	1986	16	40

EXISTING END POST CURVE DATA				
LOCATION	No. OF END POST	Δ	R	L_c
KII BRIDGE	4	45°	7.5'	5.89'
MALAEKAHANA	4	43.39°	4.33'	3.15'
LAIE/NAI BR.	4	38.14°	5.67'	3.77'
LAIELOA BR.	*3	43.39°	4.33'	3.15'

*Metal guard rail connection not required at Kahuku - Makai side of end post.

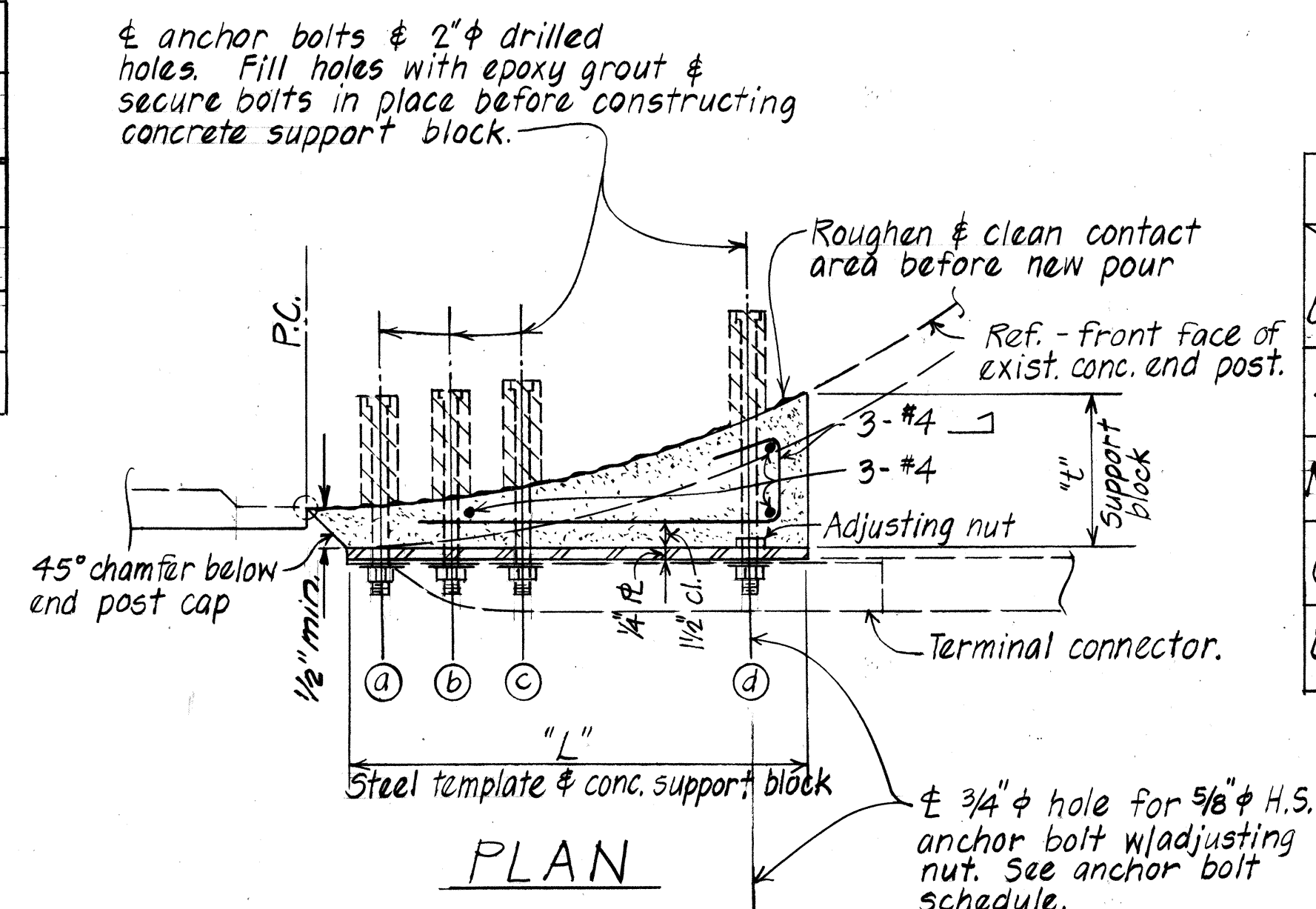


PLAN
Scale: 3/4" = 1'-0"



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

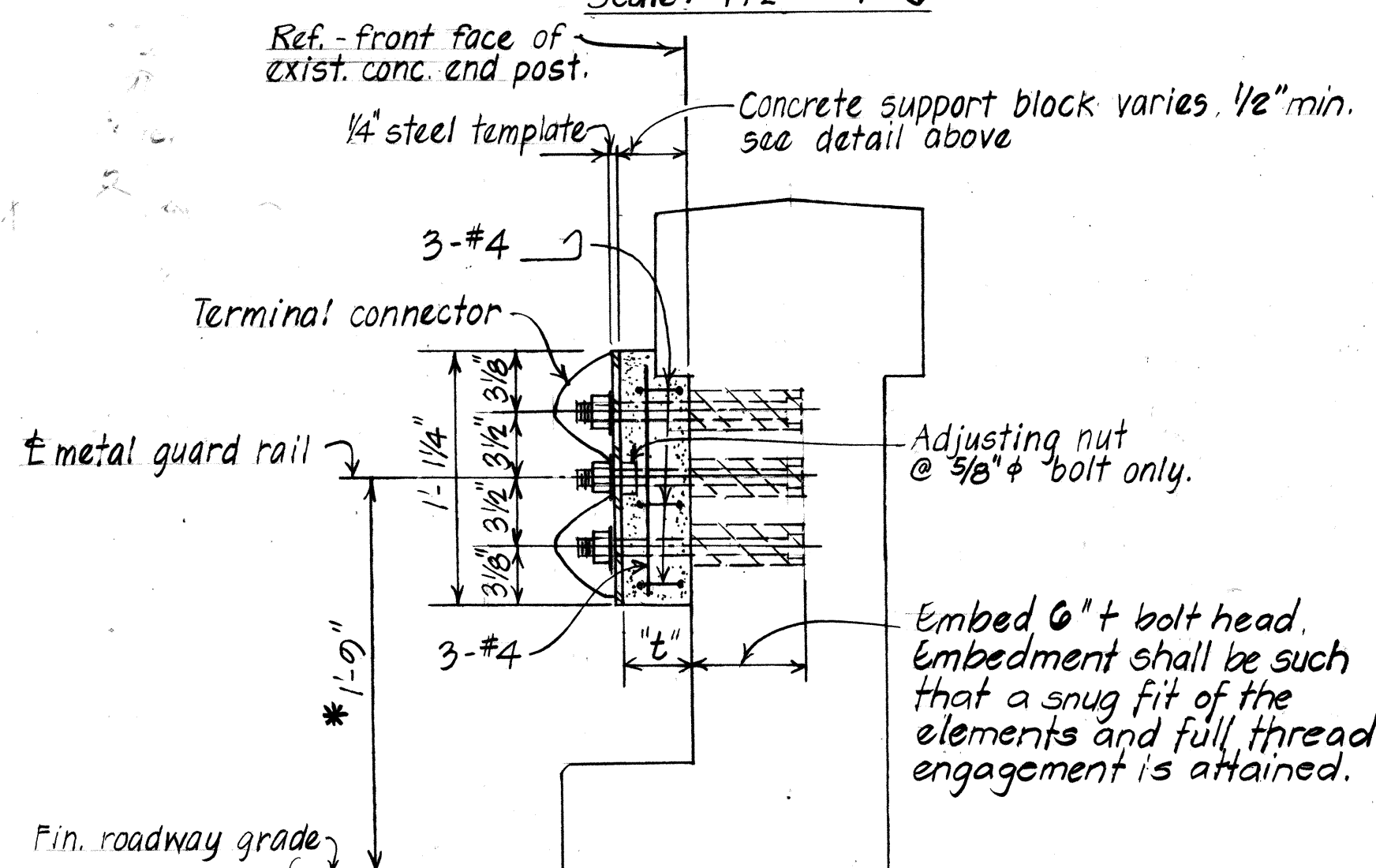
*Measurement shall be taken from top of existing sidewalk for structures requiring ramps.



4-1" holes for 7/8" H.S. anchor bolts.

Ref. to template & guard rail. (Terminal connector & metal guard rail not shown)

STEEL TEMPLATE AND CONCRETE SUPPORT BLOCK DETAILS
Scale: 1 1/2" = 1'-0"



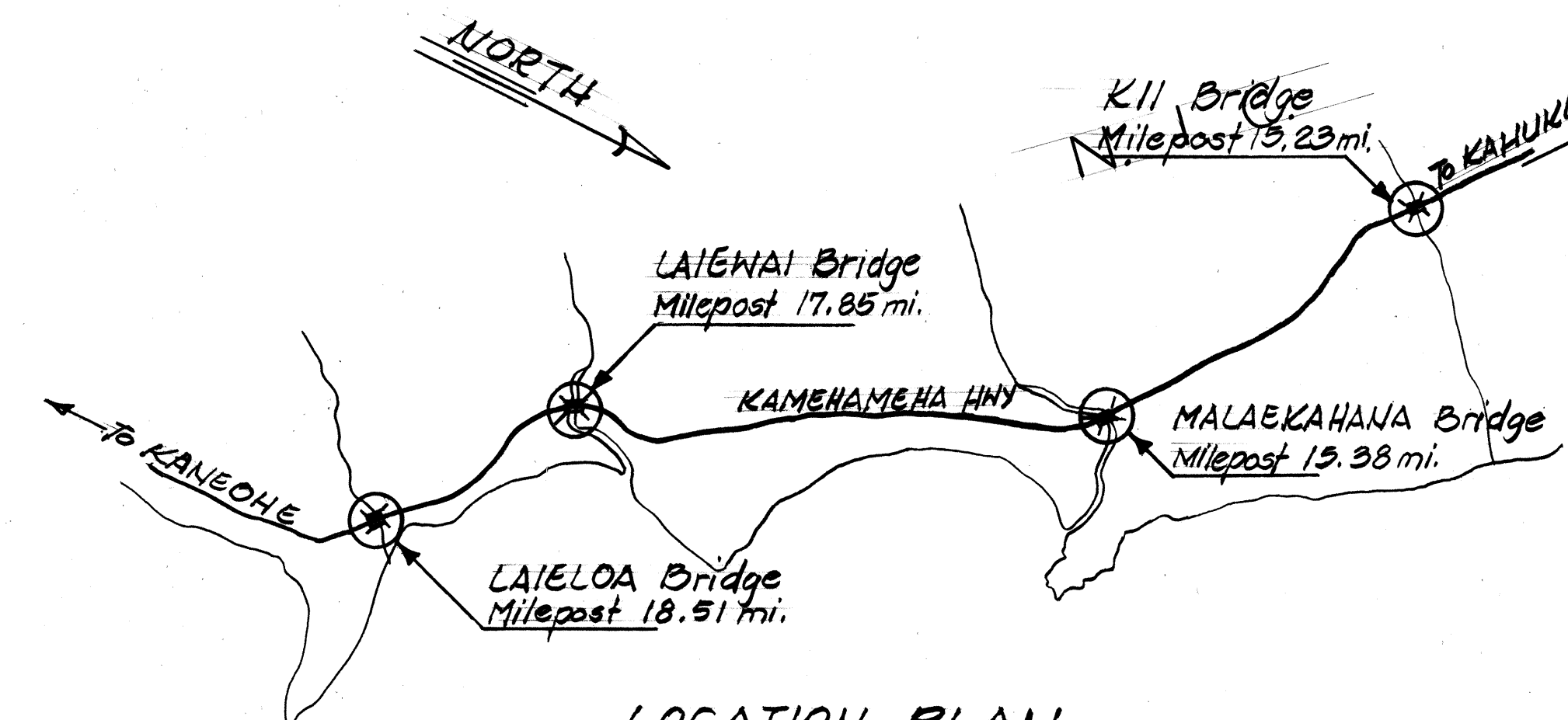
SECTION
Scale: 1 1/2" = 1'-0"

CONCRETE SUPPORT BLOCK & ANCHOR BOLT SCHEDULE

LOCATION	CONC. SUPPORT BLOCK			ANCHOR BOLT * (Length under head)			
	"X"	"L"	"t"	(a)	(b)	(c)	(d)
KII	4'-0 3/4"	2'-1 7/8"	1'-2 3/8"	2'-7/8" x 8 1/2"	1'-7/8" x 10 3/4"	1'-7/8" x 12 1/4"	1'-5/8" x 10 1/2"
MALAEKAHANA	2'-2 3/4"	2'-1 7/8"	0 3/4"	2'-7/8" x 8 1/2"	1'-7/8" x 10"	1'-7/8" x 10"	1'-5/8" x 15 1/4"
LAIE/NAI	2'-0 3/4"	2'-1 7/8"	0 1/2"	2'-7/8" x 8 1/2"	1'-3/8" x 8 3/4"	1'-7/8" x 9 1/4"	1'-5/8" x 12 3/4"
LAIELOA	2'-2 3/4"	2'-1 7/8"	0 3/4"	2'-7/8" x 8 1/2"	1'-7/8" x 10"	1'-7/8" x 10"	1'-5/8" x 15 1/4"

NOTES

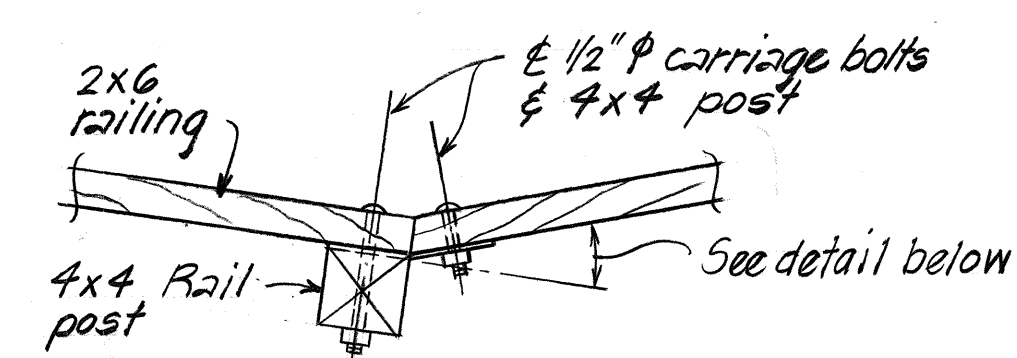
- See Standard Specifications for Road & Bridge Construction, (Hawaii 1985) & Special Provisions.
- See Standard Detail Sht. #DT 501 for terminal connector details and information. "Terminal Connector" shall be incidental to Guard Rail.
- All anchor bolts shall be high strength bolts conforming to the requirements of ASTM A325.
- "Terminal Connector" shall be fabricated from 10 gauge steel conforming to the requirements of AASHTO 180.
- All "Terminal Connector", anchor bolts, nuts, and washers shall be galvanized.
- First 25'-0" of guard rail adjoining "Terminal Connector" shall be of galvanized steel and supports spaced at 3'-1 1/2" o.c.
- Large impacting or vibratory type of equipment will not be permitted for drilling.
- Any damage to the existing structures due to the Contractor's operation shall be repaired at his expense, to the satisfaction of the Engineer.
- The work necessary to connect guard rail to concrete end post shall include all labor, materials, tools, equipment and incidentals necessary to complete the work. This work will be measured and paid for in units of one.
- The Contractor shall verify all dimensions in field before commencing with work.
- The Contractor shall verify the location of all existing utility lines near structures and notify their respective owners before commencing with work.



LOCATION PLAN
Not to Scale

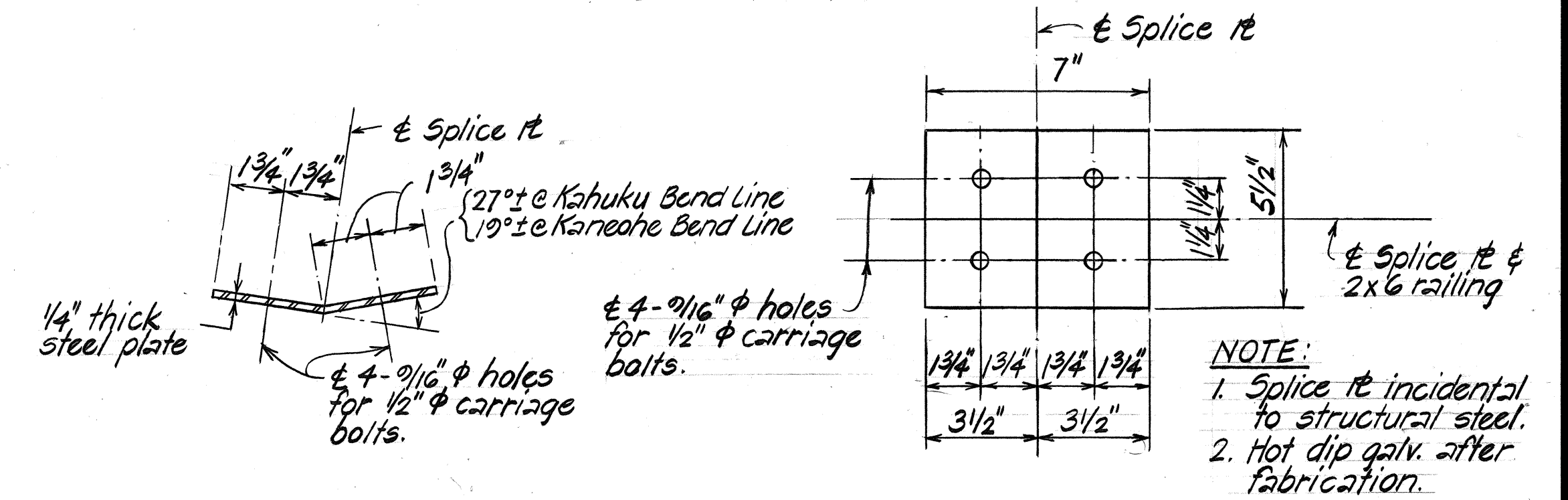
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
LAND TRANSPORTATION FACILITIES DIVISION
METAL GUARDRAIL CONNECTIONS
AT EXIST. CONC. END POST AT
KII, MALAEKAHANA, LAIE/NAI & LAIELOA BRGS.
KAMEHAMEHA HIGHWAY RESURFACING
Laie/Naioa Bridge to Puuhana Street
Proj. No. 83C-01-86M
Scale: As Note Date: Sept. 1985
SHEET NO. 1 OF 1 SHEETS

NOTE:
Provide 1/4" deep slot in rail post to accommodate splice plate at ea. 2x8 railing connection.



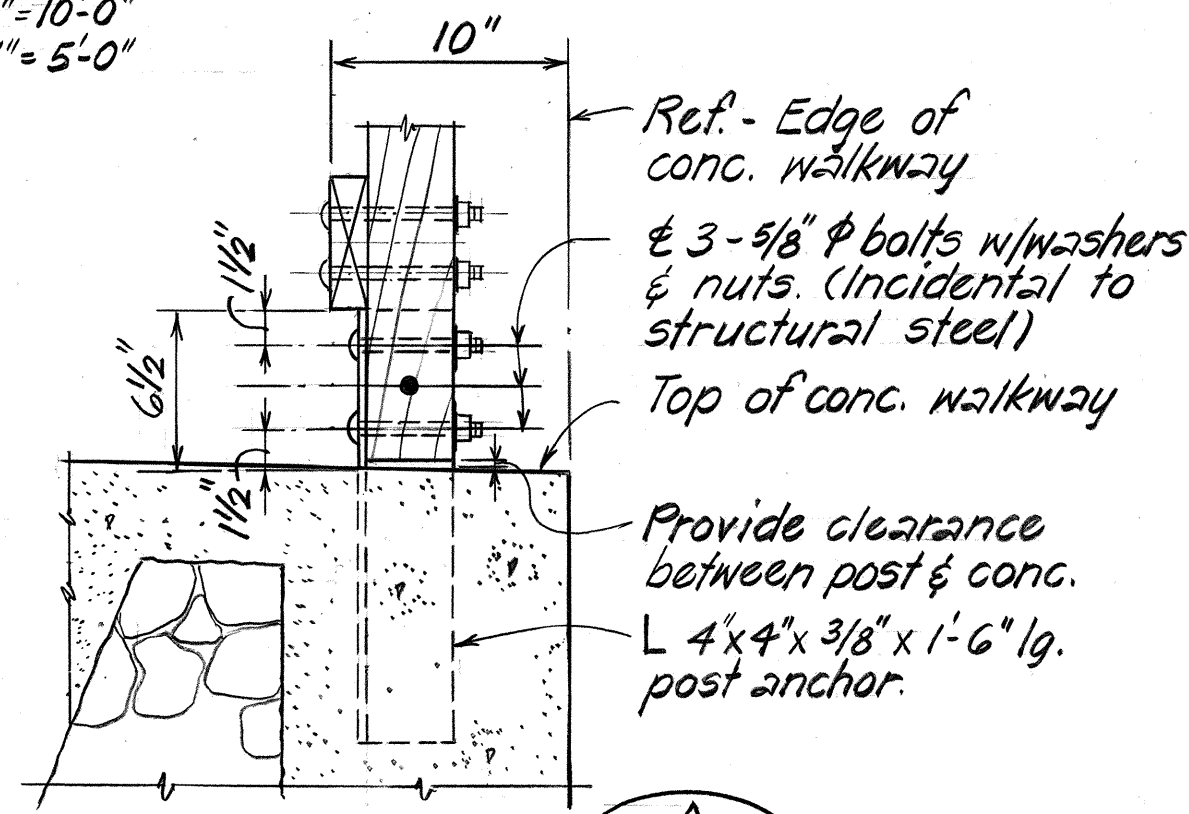
NORMAL

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

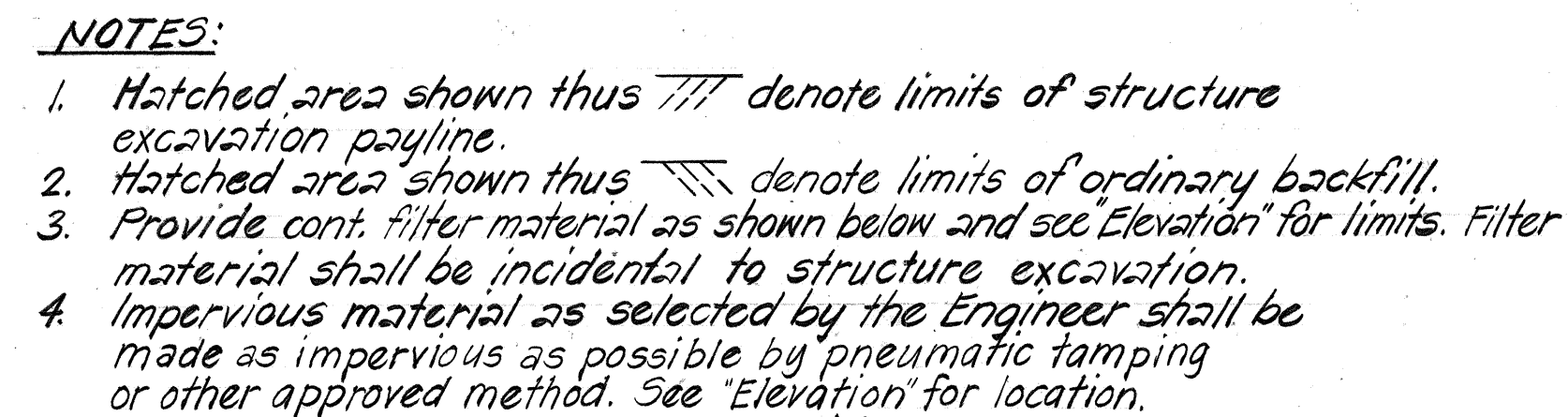


FRONT VIEW

Scale: 3" = 1'-0"



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



TYPICAL C.R.M. WALL & RAILING ELEVATION

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



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

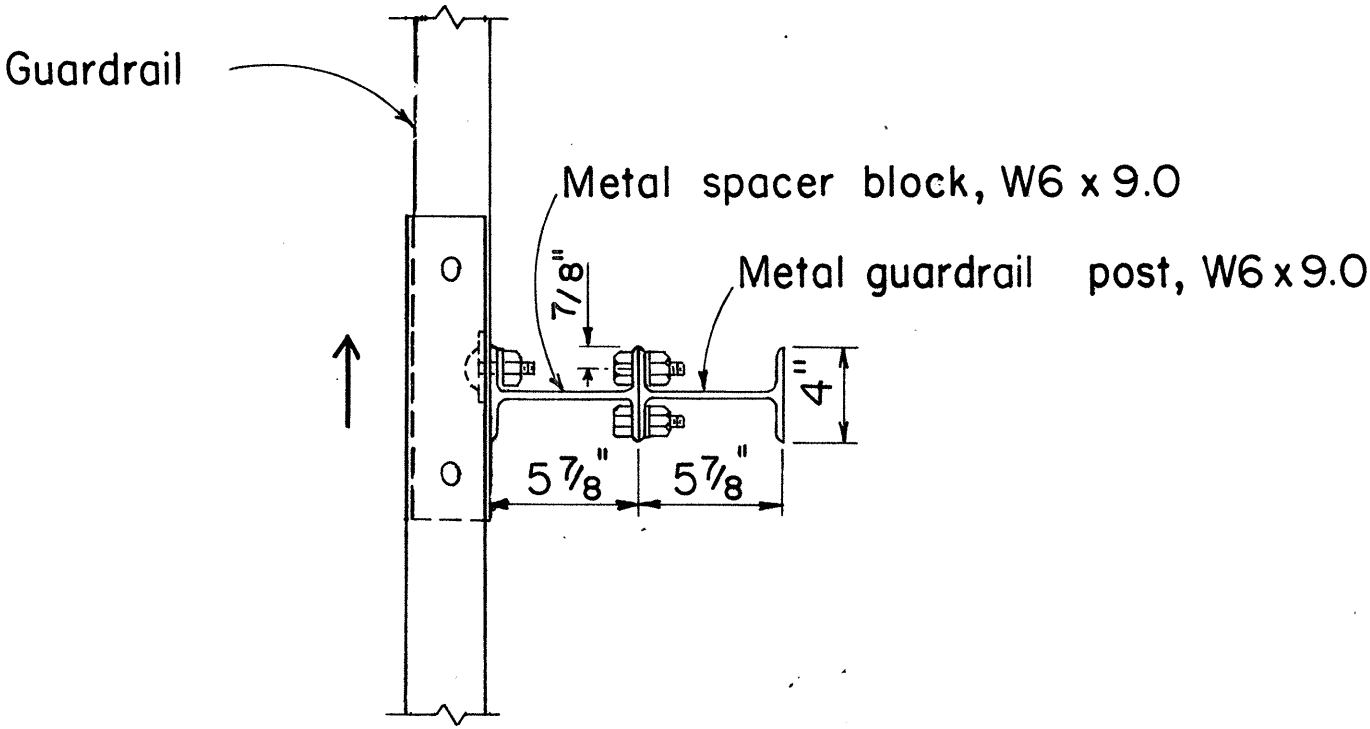
9/9/86 Improvements to the approaches of the Lavelon Bridge footwalk to accommodate the installation of BCTs.

C.O. ADD. 16S-1

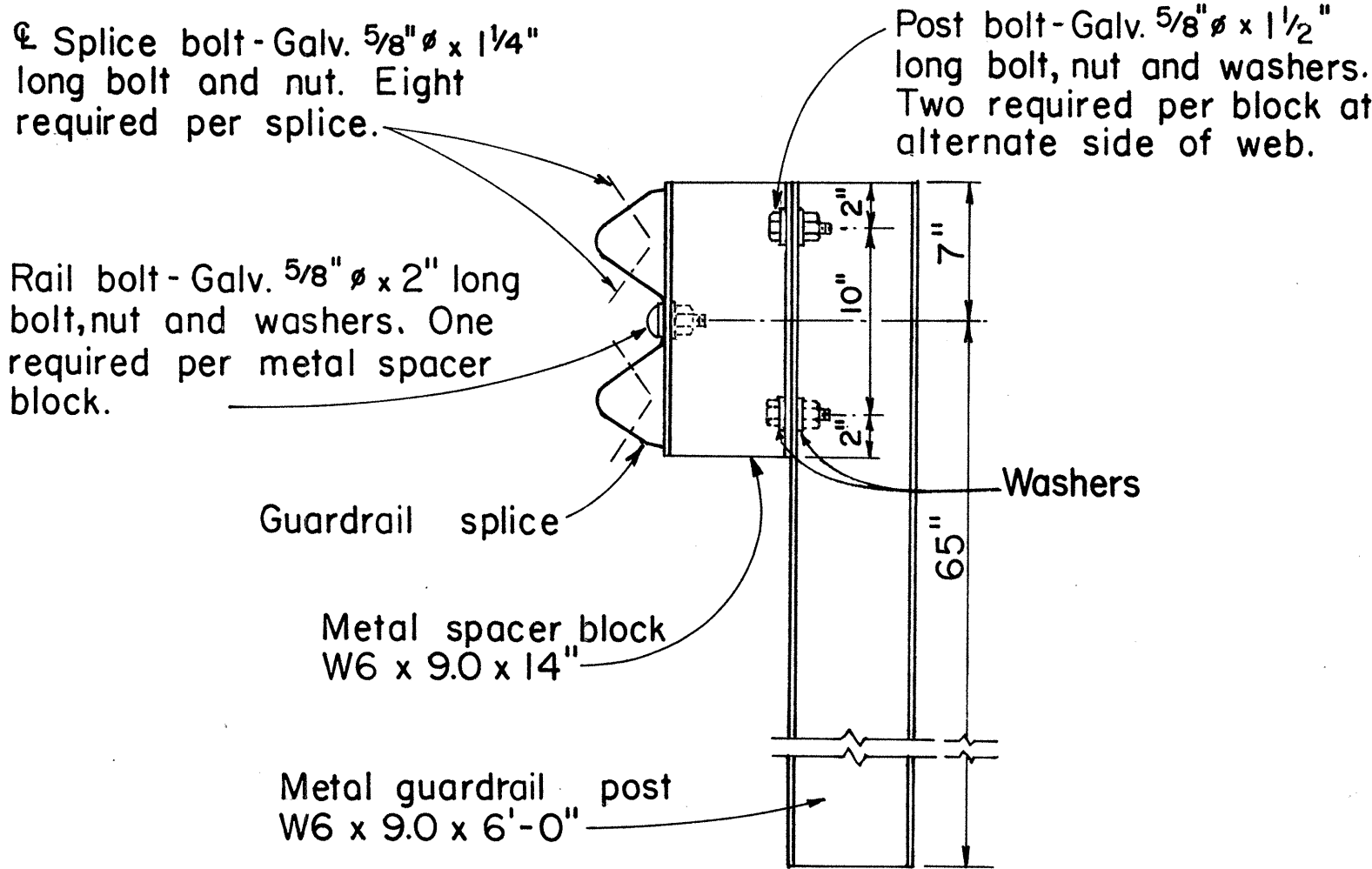
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83C-01-86M	1986	17	40

GENERAL NOTES

- Both of the alternate type posts may be used on any one project however, only one type of post shall be used in any single run of guardrail.
- All hardware, posts and blocks shall be galvanized. No punching, drilling or cutting will be permitted after galvanizing.
- Connection details for bent plate post and block shall be similar to the details shown for structural shape post, and block.
- Where conditions require, special post lengths in increments of 6 inches may be specified.
- For details of rail elements, bolts and nuts, see sheet DT 501.
- All fasteners, posts, blocks and rail elements shall conform to the latest edition and amendments of "A Guide to Standardized Highway Barrier Rail Hardware", a report prepared and approved by the AASHTO-AGC-ARTBA Joint Cooperative Committee.



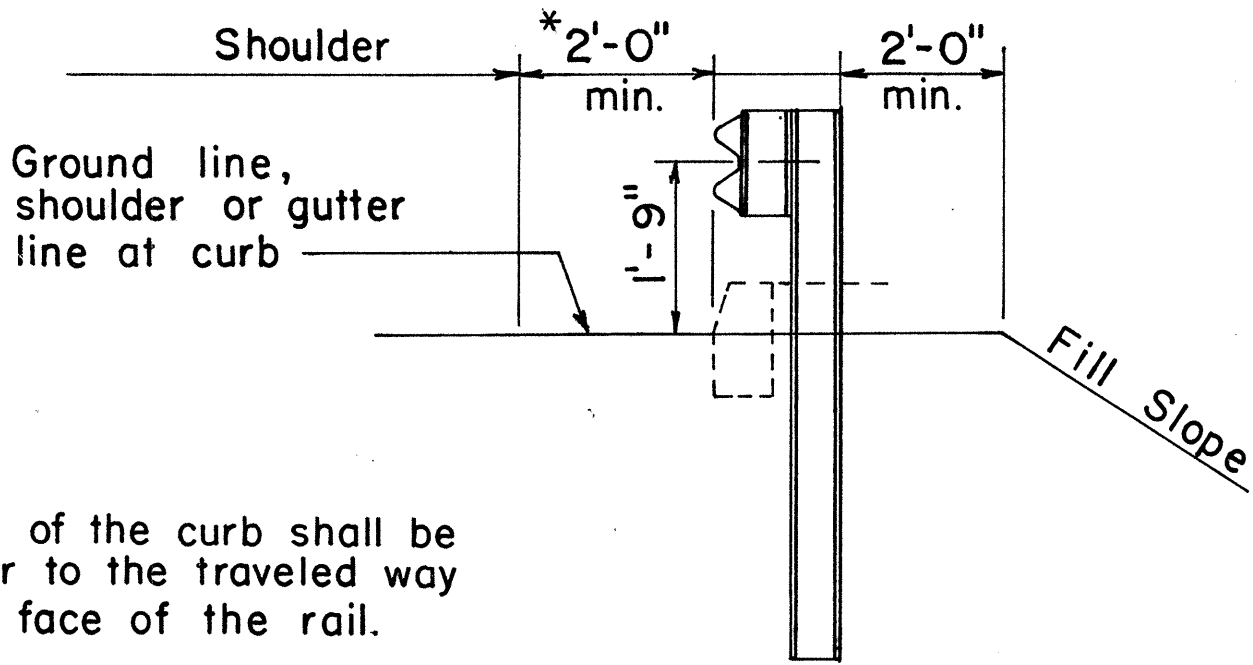
PLAN



ELEVATION

SINGLE METAL GUARDRAIL ON METAL POST WITH METAL SPACER BLOCK

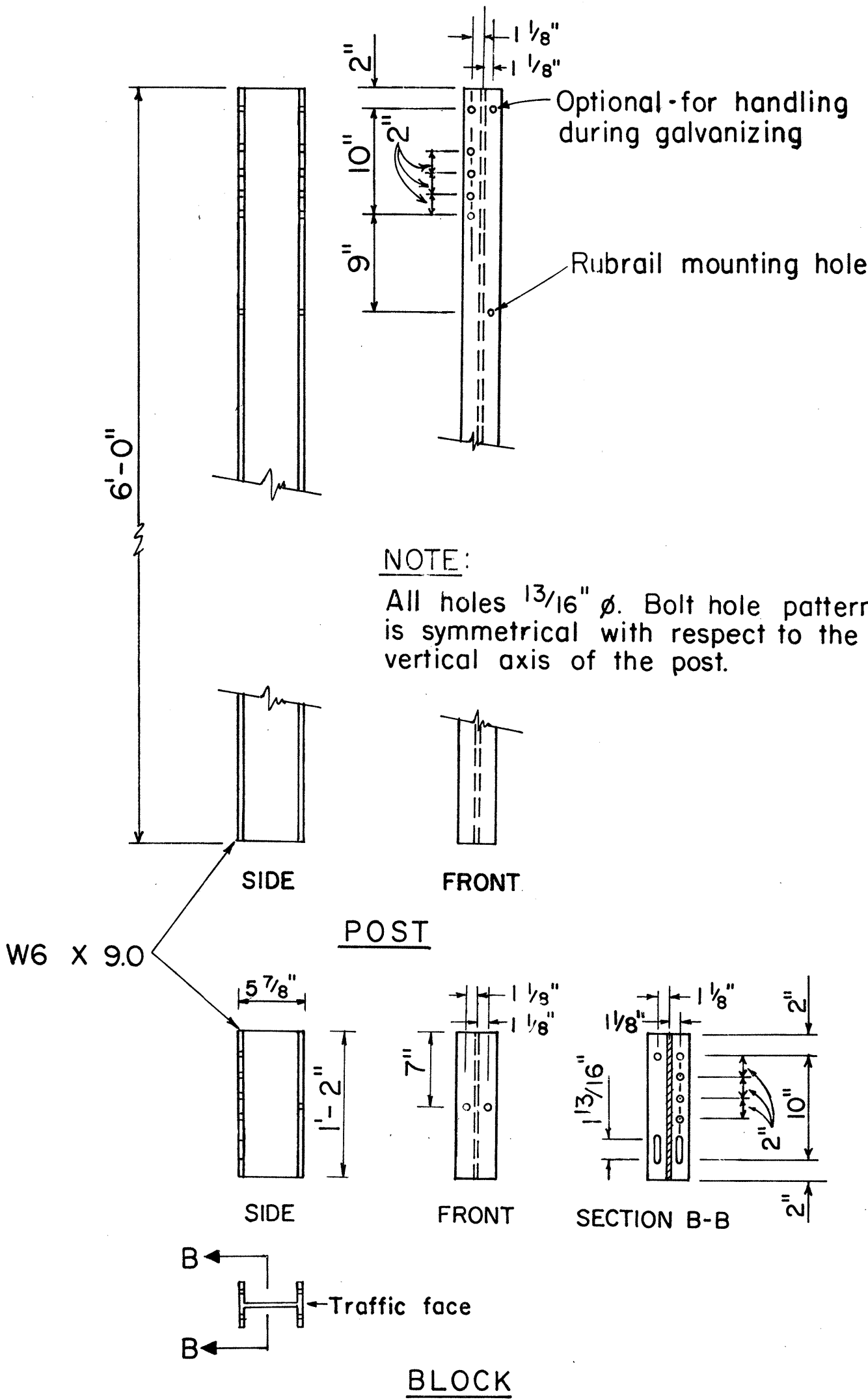
SCALE: 1 1/2" = 1'-0"



AT SHOULDER SECTION

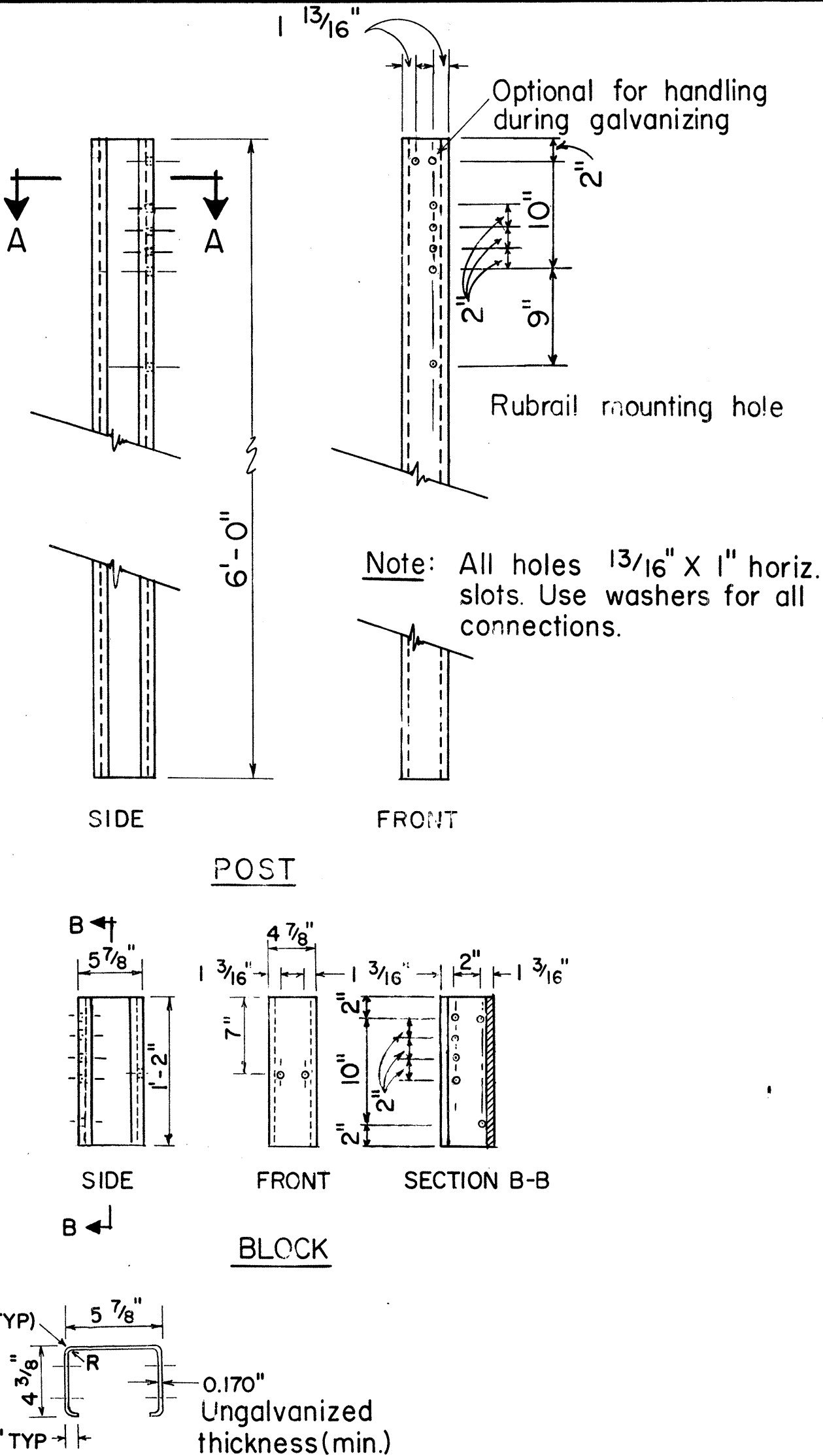
TYPICAL METAL GUARDRAIL DETAIL

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



STRUCTURAL SHAPE POST AND BLOCK

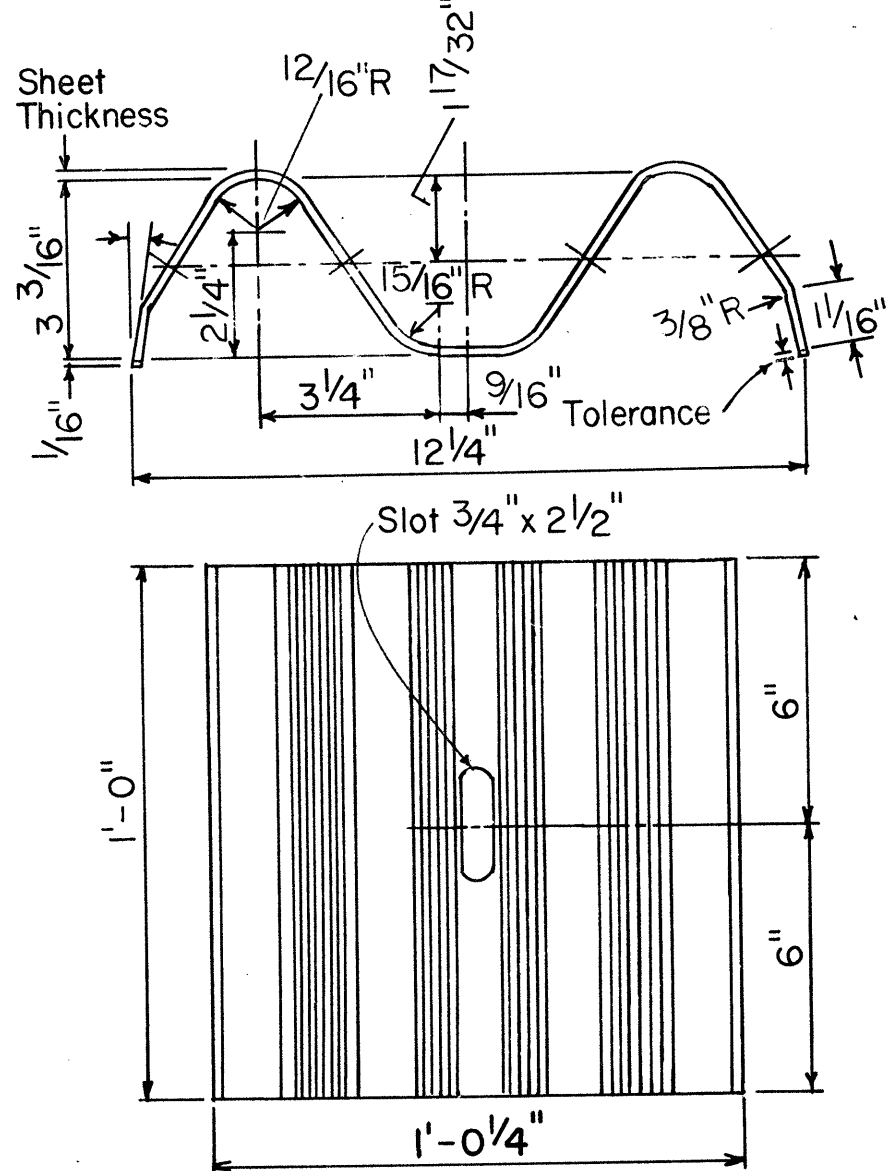
SCALE: 1" = 1'-0"



SECTION A-A N.T.S.

BENT PLATE POST AND BLOCK

SCALE: 1" = 1'-0"



BACK-UP-PLATE

N.T.S.

METAL GUARDRAIL ON METAL POST WITH METAL SPACER BLOCK

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

APPROVAL RECOMMENDED:		9/1/82
TRAFFIC ENGINEER		DATE
APPROVED:		9/22/82
ASSISTANT CHIEF, ENGINEERING		DATE

NO.	REVISION	APPROVED BY	DATE
1	Supersedes sht. DT 500 approved 12/30/69.	H.P.	9/22/82
2	Added General Notes No. 6	J.D.	9-28-83
3	Added details for adjusting guardrail height and added Back-up Plate and washer	E.T.	9/18/85

STATE OF HAWAII
HIGHWAYS DIVISION

STANDARD DETAILS
METAL GUARDRAIL

Scale: As Shown

July, 1982

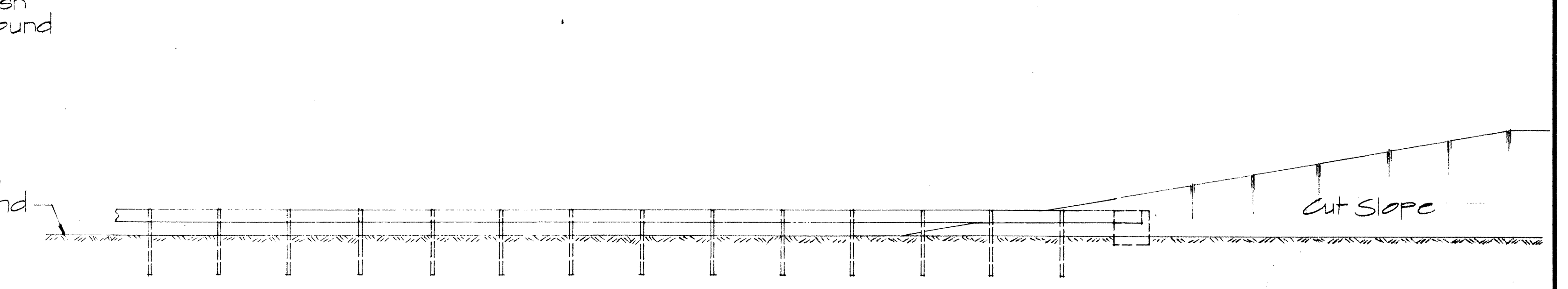
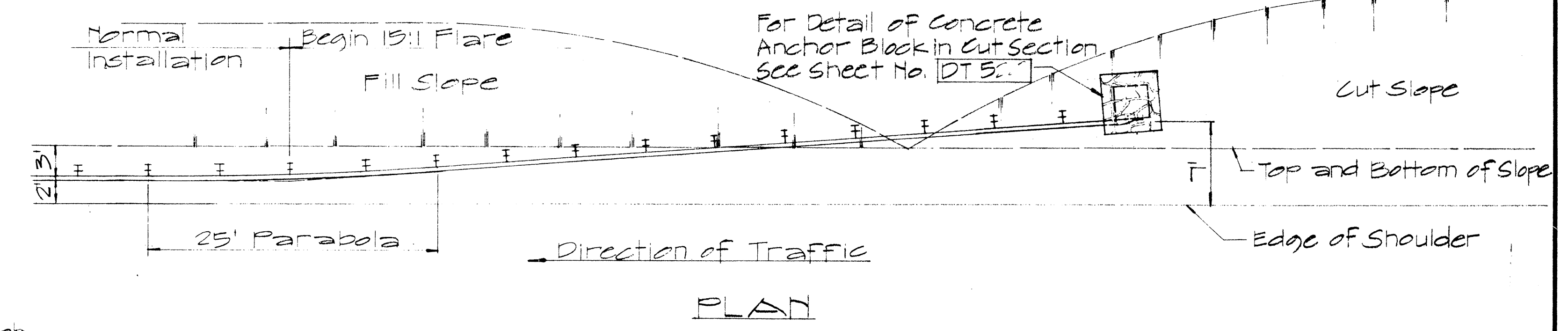
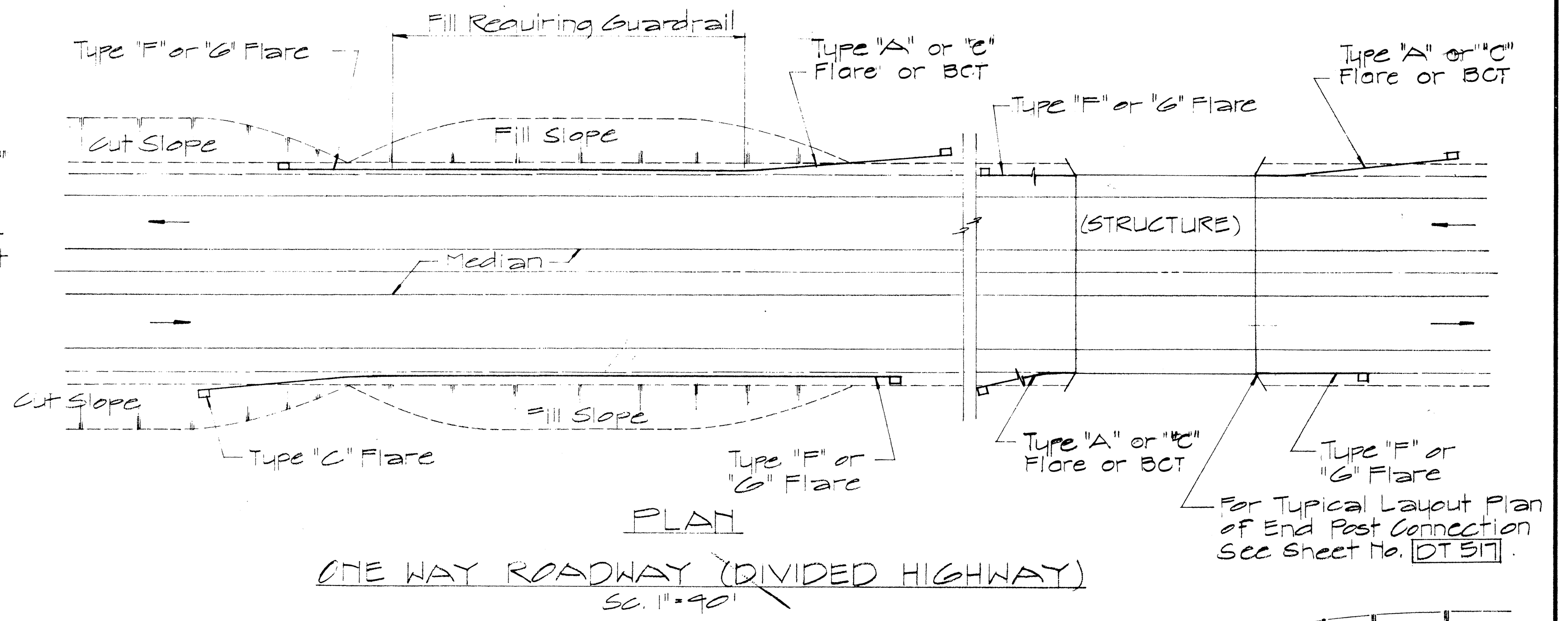
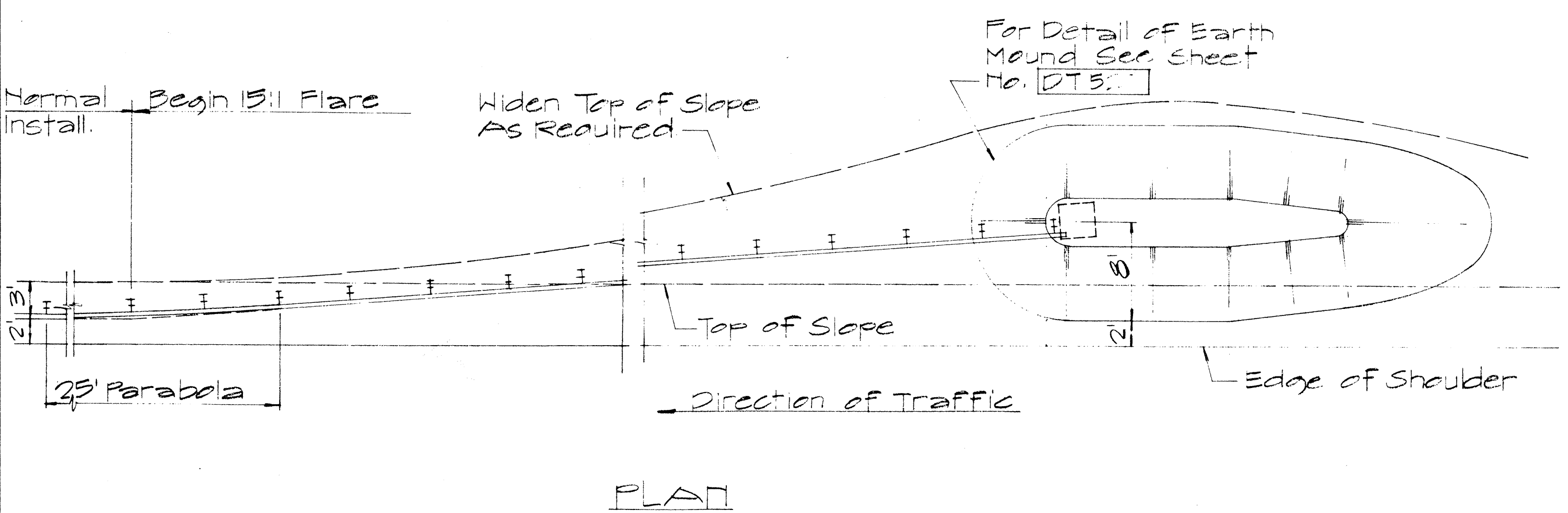
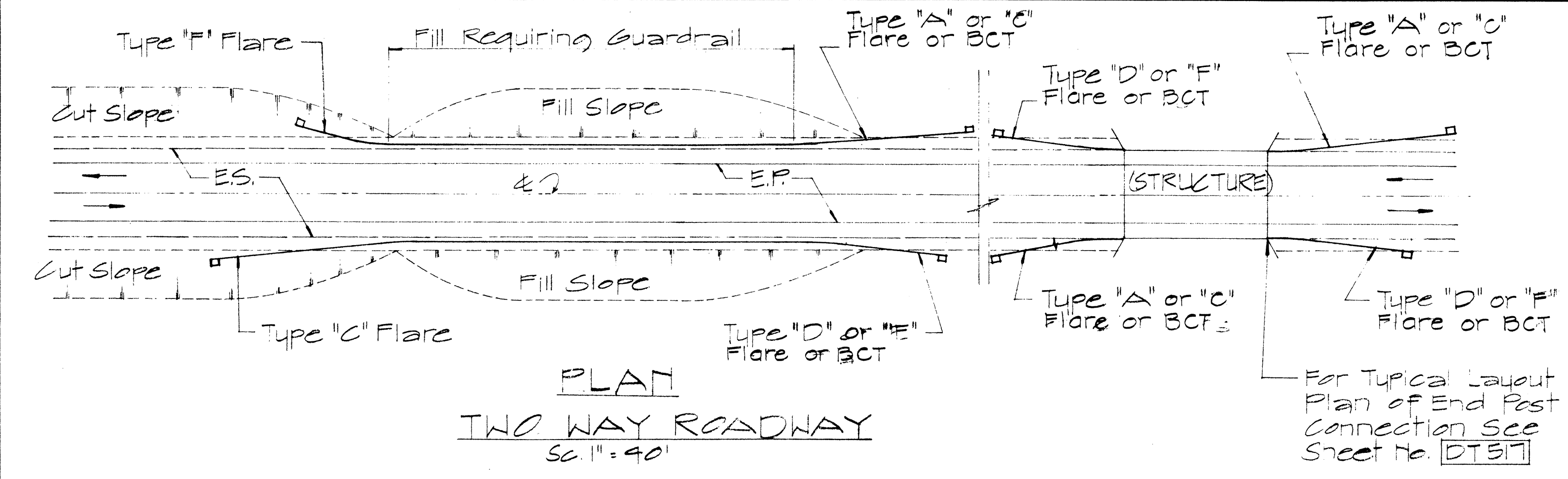
SHEET NO. OF SHEETS

SDT 500

DATE	
SURVEY PLOTTED BY	
DRAWN BY	
TRACED 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.	33C-01-86M	1986	19	40

NOTE:
 1. Metal guard rail connection to structures requires End Post Connection. See structure plans.
 2. For detail of Breakaway Cable Terminal (BCT) See Sheet No. DT 519



APPROVAL RECOMMENDED:
Eugene Tanaka 12/29/63
 TRAFFIC ENGINEER DATE

APPROVED:
John J. J. J. 12-30-63
 ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE
1	Delete Type "B" Flare and Type "E" Flare	H.T.	6/15/78

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

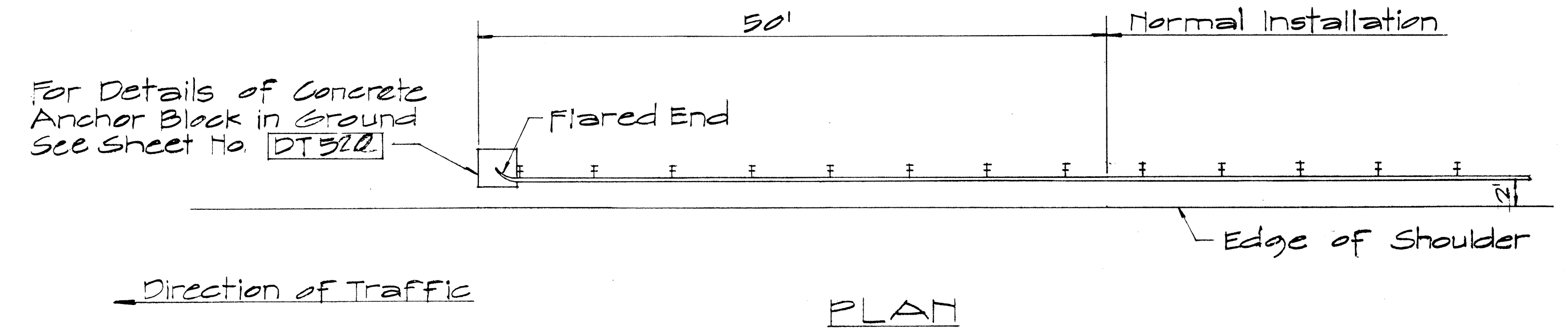
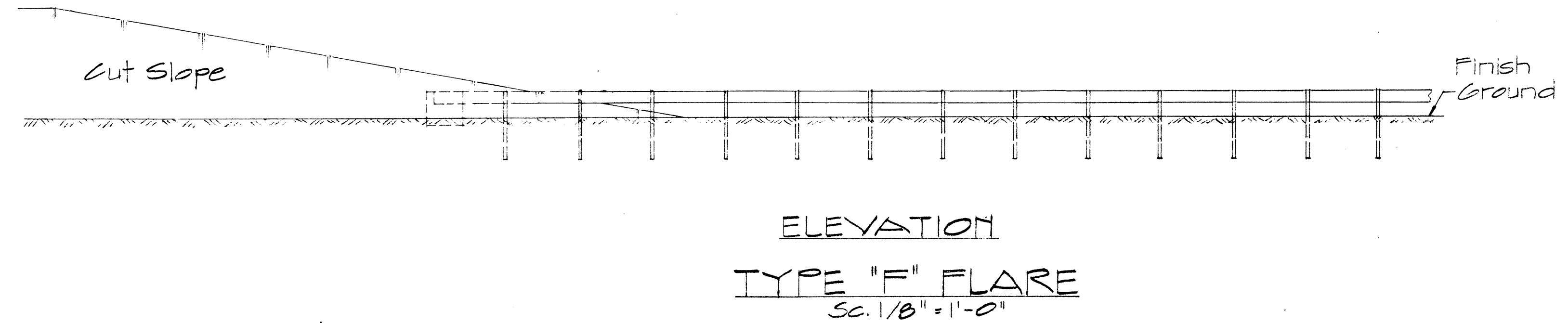
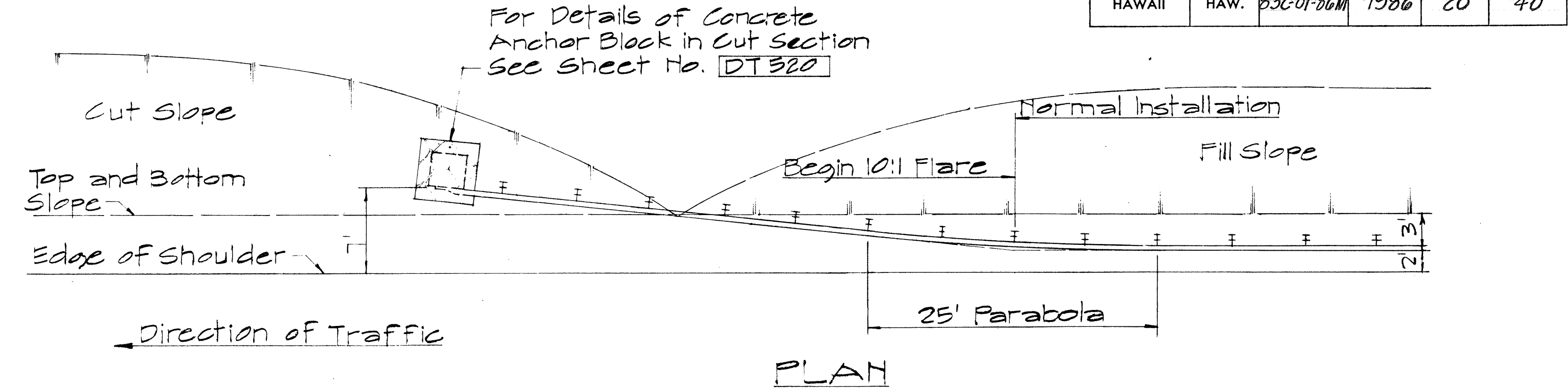
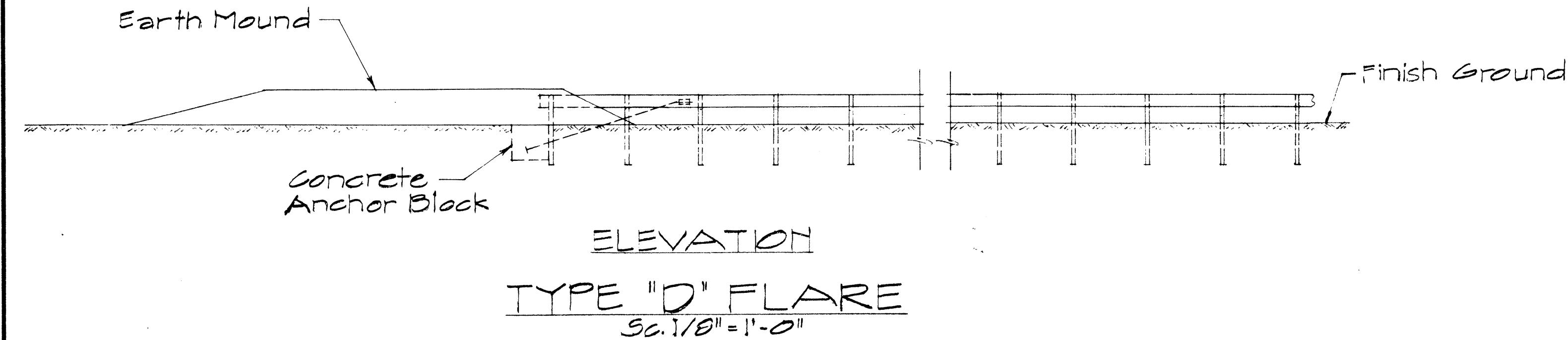
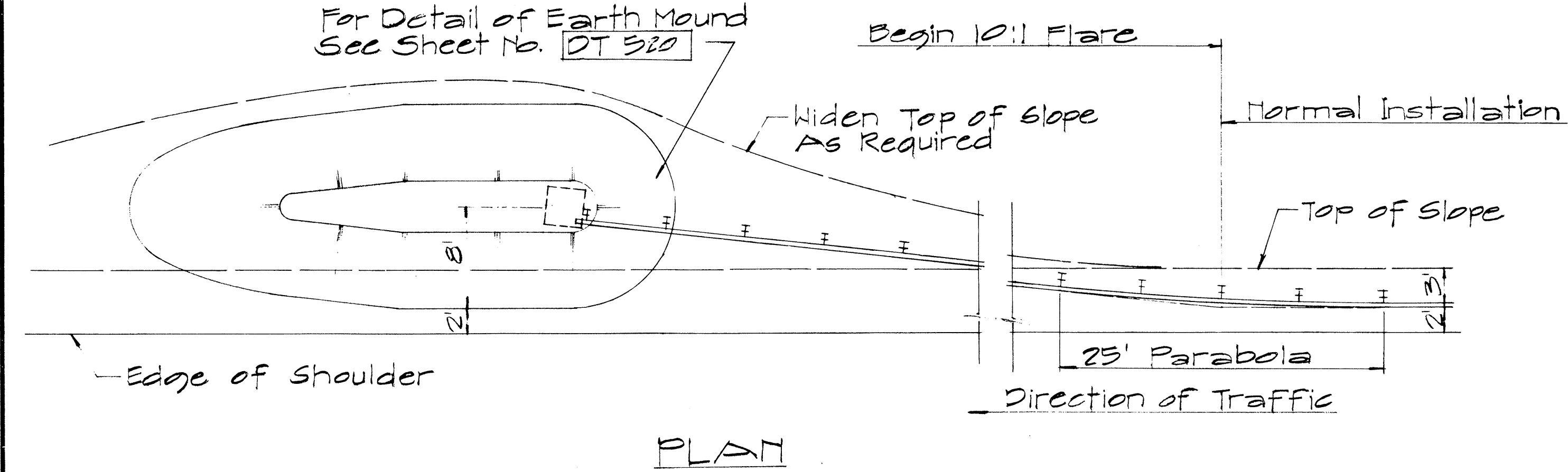
**STANDARD DETAILS
 OF APPROACH END
 FLARE - ONE & TWO
 WAY ROADWAY**

Sc. As Noted April 1967

SHEET No. 19 OF SHEETS DT 516

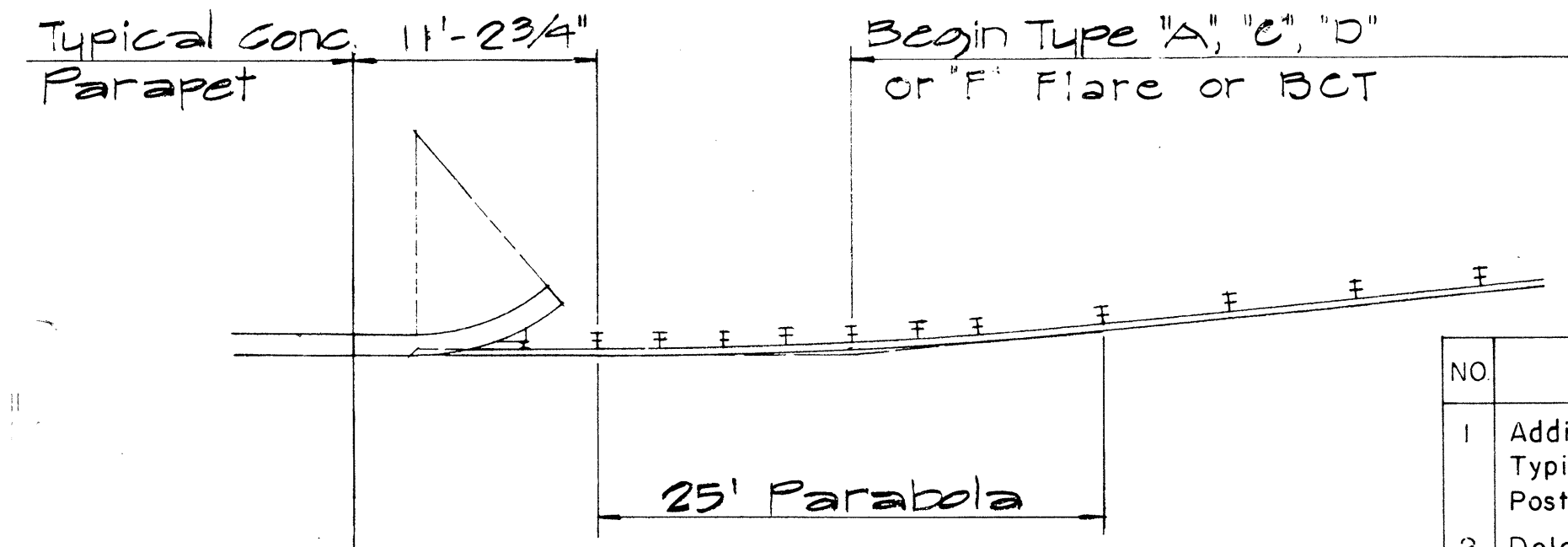
DATE	_____
SURVEY PLOTTED BY	_____
DRAWN BY	_____
DESIGNED BY	_____
QUANTITIES BY	_____
CHECKED BY	_____
ORIGINAL PLAN	_____
NOTE BOOK	_____
No.	_____

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83C-01-86M	1986	20	40



NOTE:

For detail of Breakaway Cable Terminal (BCT) See Sheet No. DT 519



TYPICAL LAYOUT PLAN OF END POST CONNECTION

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

ELEVATION

TYPE "G" FLARE

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

APPROVAL RECOMMENDED:

Eishi Tanaka 12/29/69
TRAFFIC ENGINEER DATE

APPROVED:

W. S. Kal 12-30-69
ASSISTANT CHIEF, ENGINEERING DATE

NO	REVISION	APPROVED BY	DATE
1	Additional Posts Added to Typical Layout Plan Of End Post Connection	H.C.	4-12-72
2	Delete Type "B" Flare and Type "E" Flare	H.C.	6-15-78

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
TRAILING END
FLARE - ONE & TWO
WAY ROADWAY

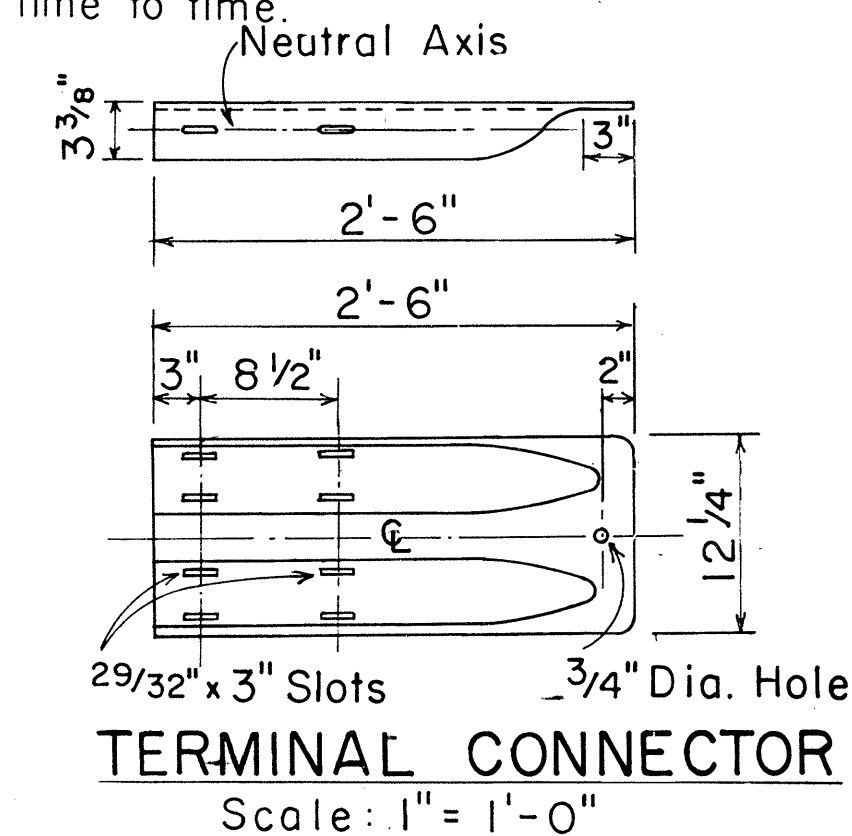
Scale: As Noted
April 1969

SHEET No. 20 OF 40 SHEETS DT 517

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	33C-01-86M	1986	21	40

NOTES:

- Anchor Plate and Anchor Cable Assembly (Standard Swaged Fitting and Stud). See Standard Detail Sheet No. DT 520.
- Other Anchor Cable Assemblies may be used. Minimum breaking strength of assembly should be 40,000 lbs.
- Second Terminal Post does not require holes to accomodate Anchor Cable.
- Slip Base Load shall be controlled with a Calibrated Torque Wrench - Torque 155 - 170 ft. lbs.
- Concrete shall be Class A.
- B.C.T. Hardware has been supersceded by "A Guide Standardized Highway Barrier Rail Hardware," A report prepared and approved by the AASHTO-AGC-ARTBA joint cooperation committee. All hardware shall conform to above mentioned publication and as revised from time to time.



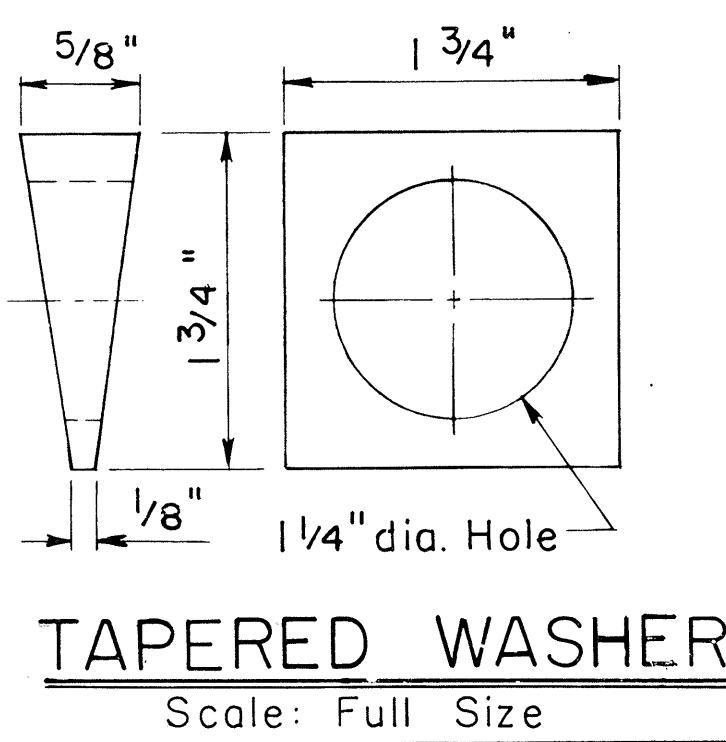
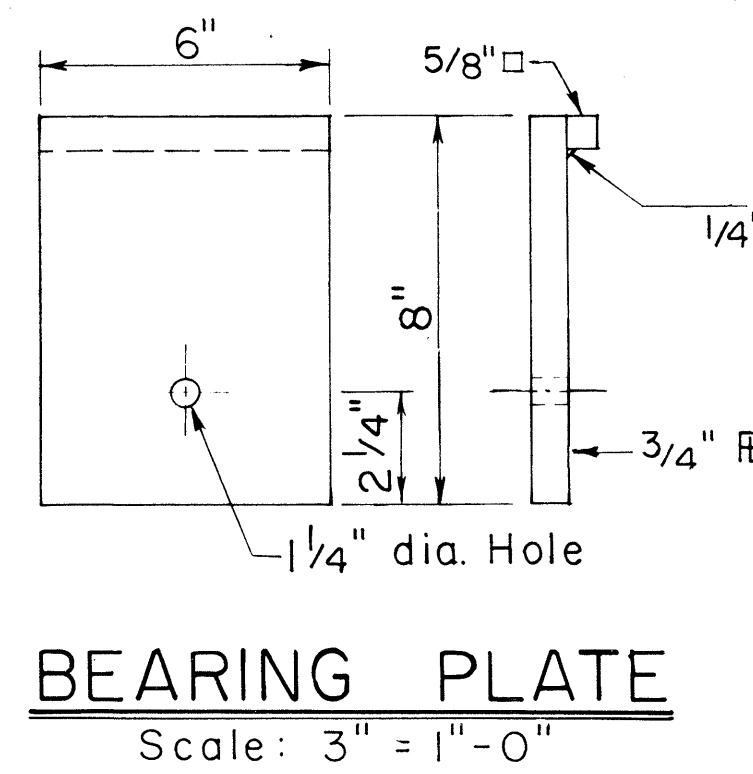
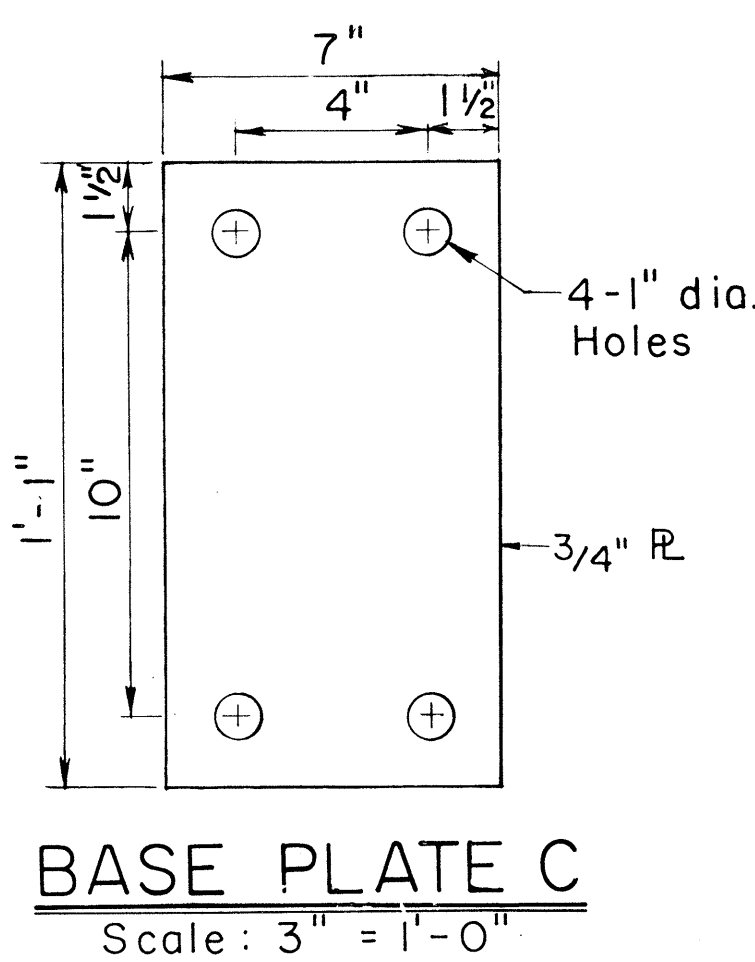
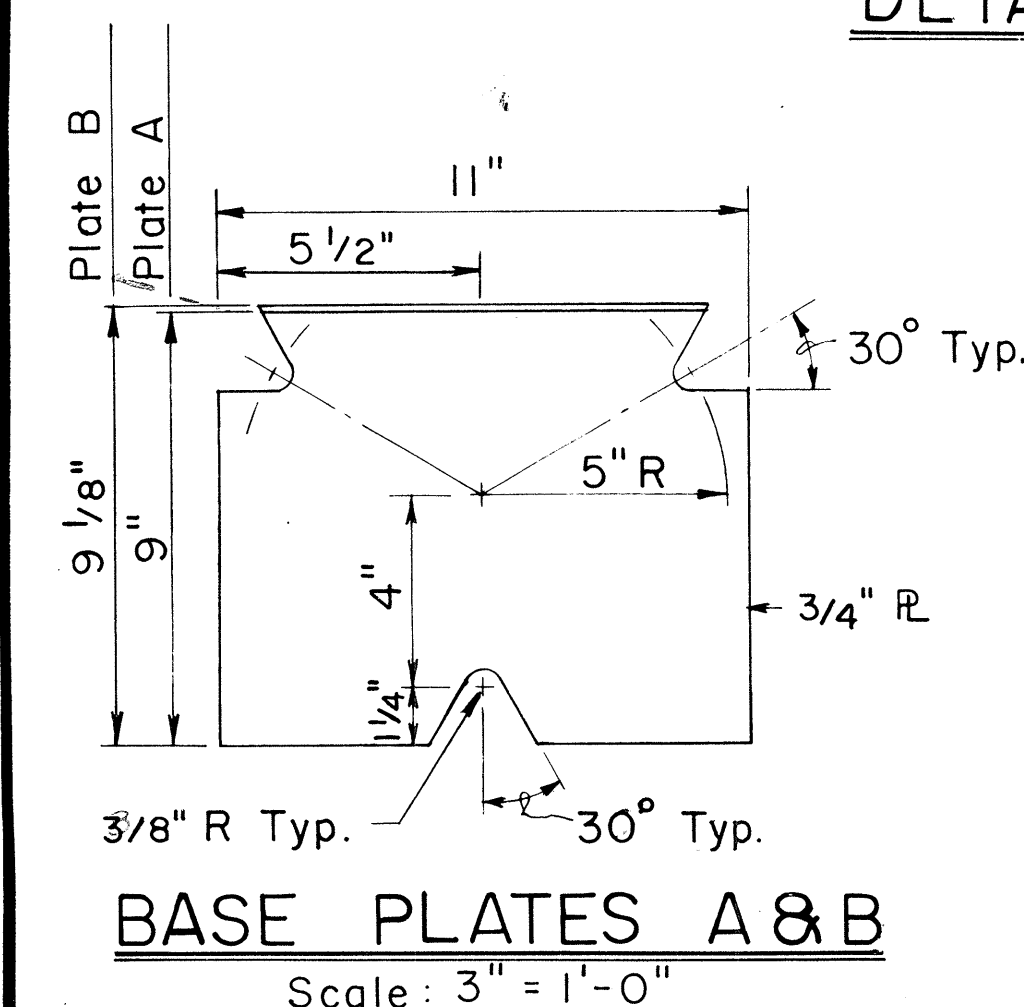
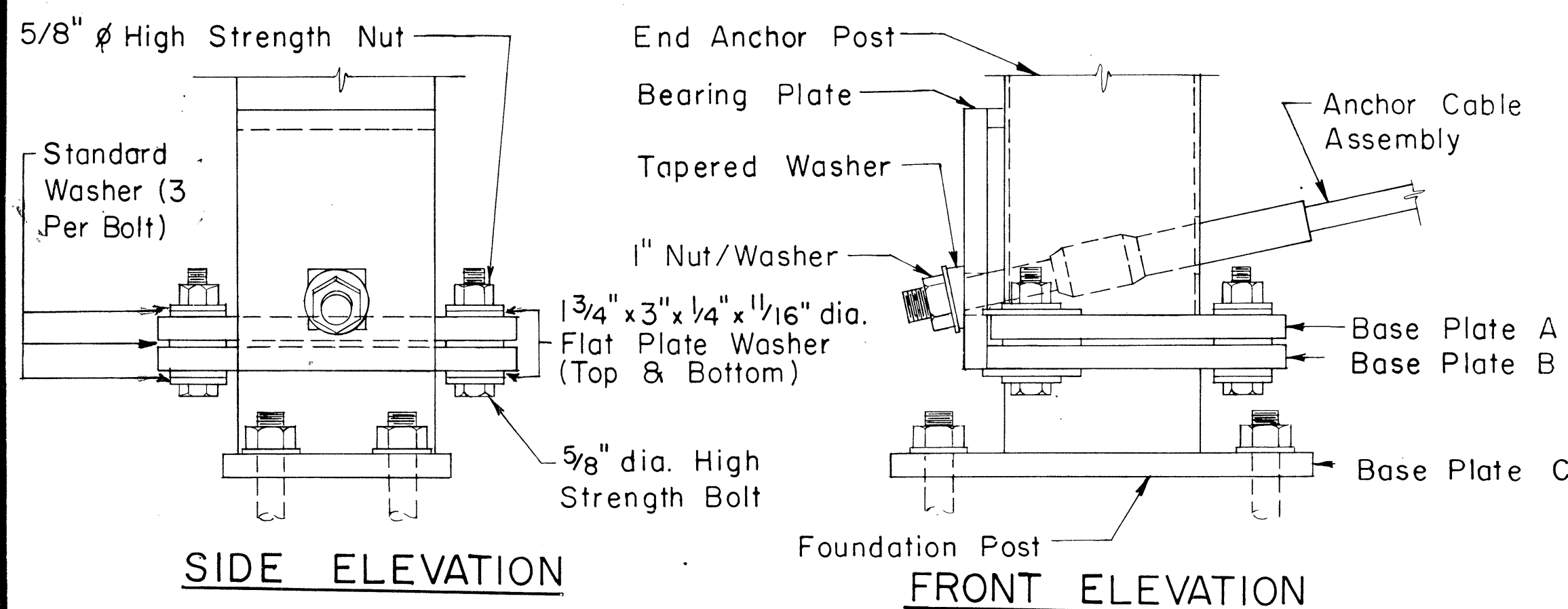
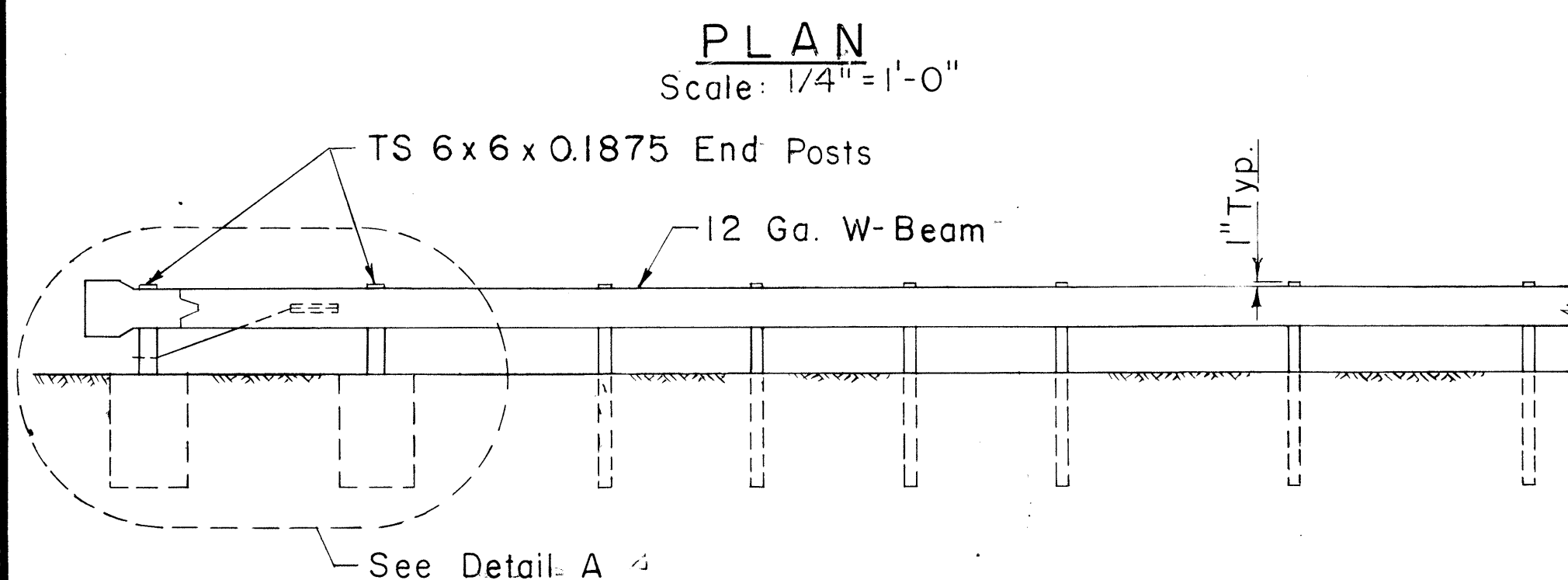
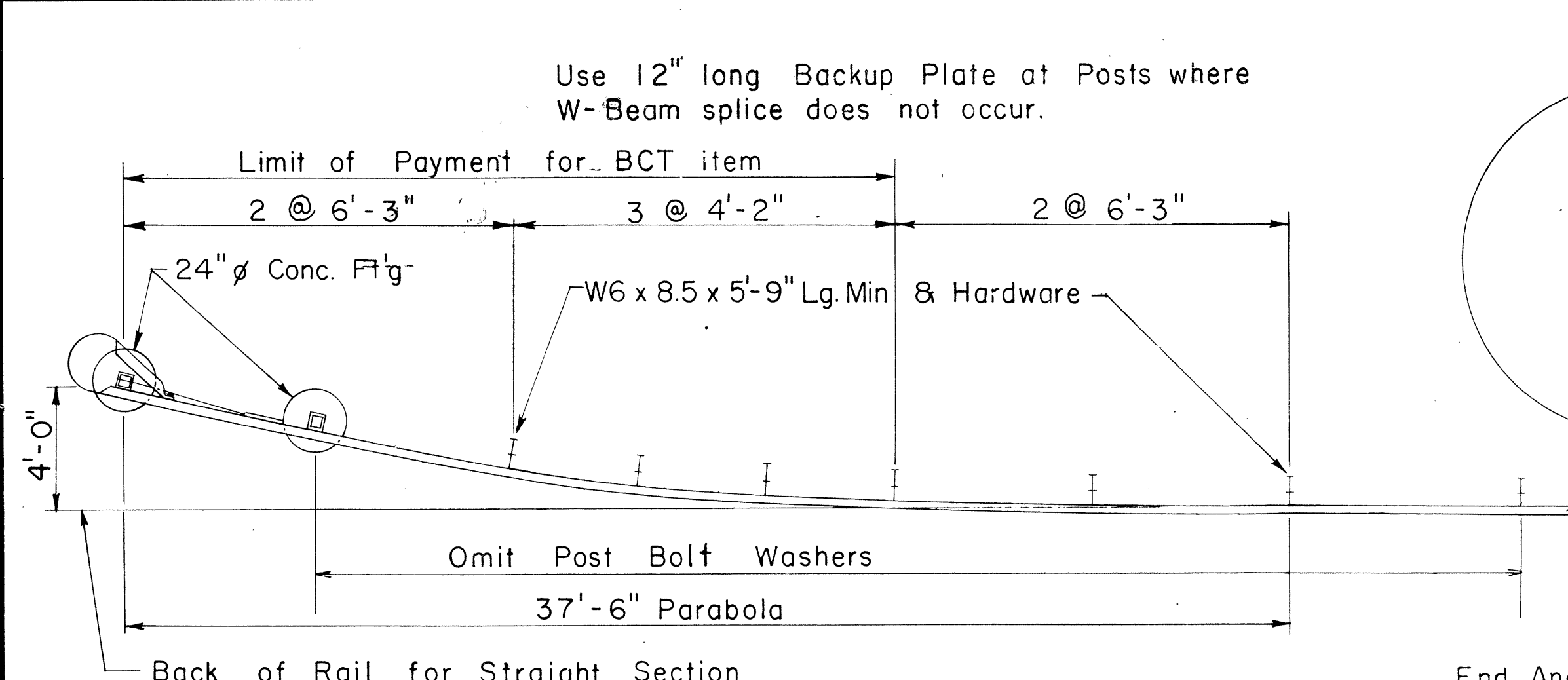
APPROVAL RECOMMENDED:

Eiichi Tanaka
TRAFFIC ENGINEER 6/14/78
DATE

APPROVED:

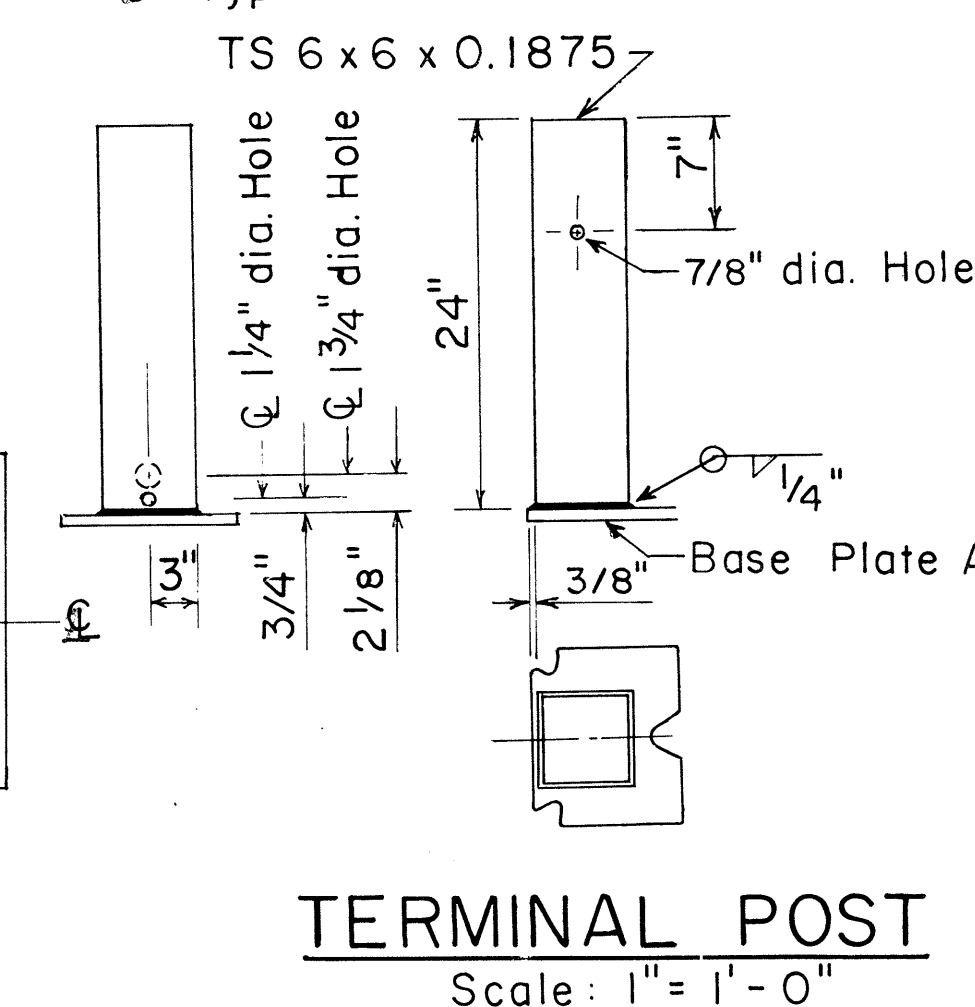
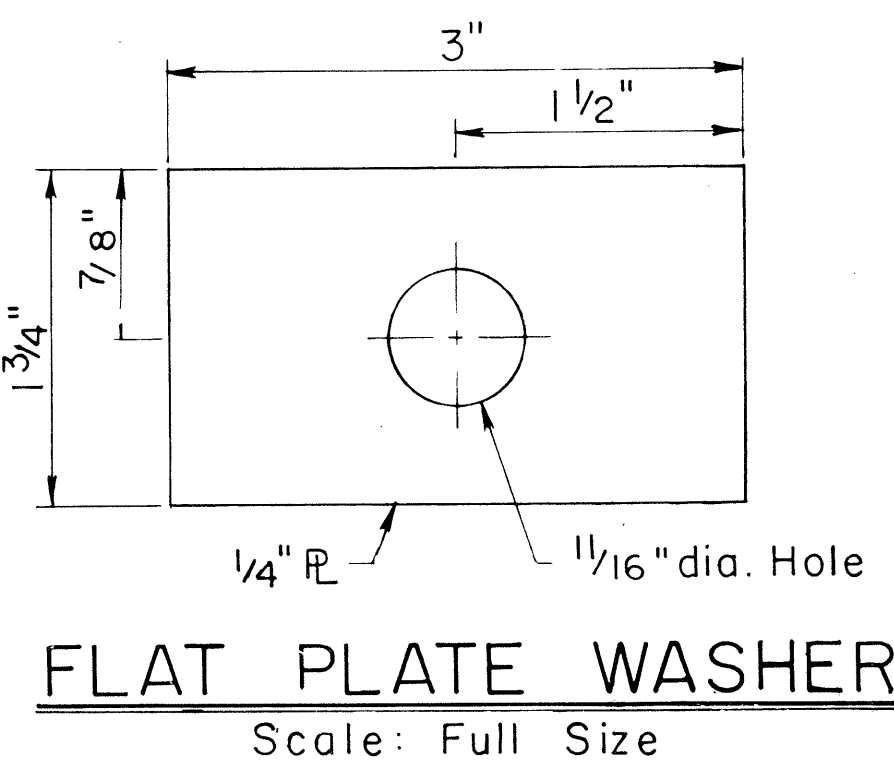
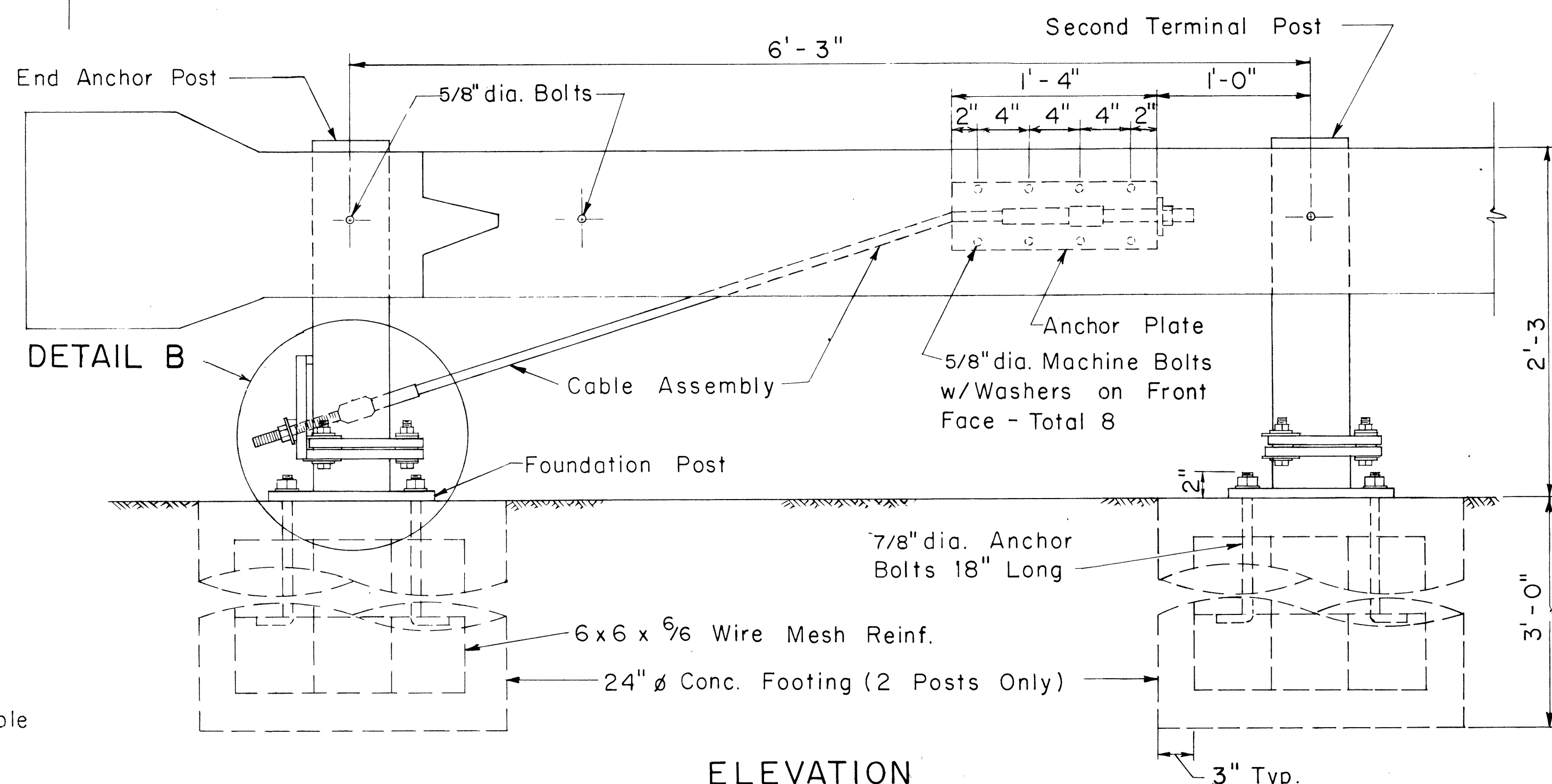
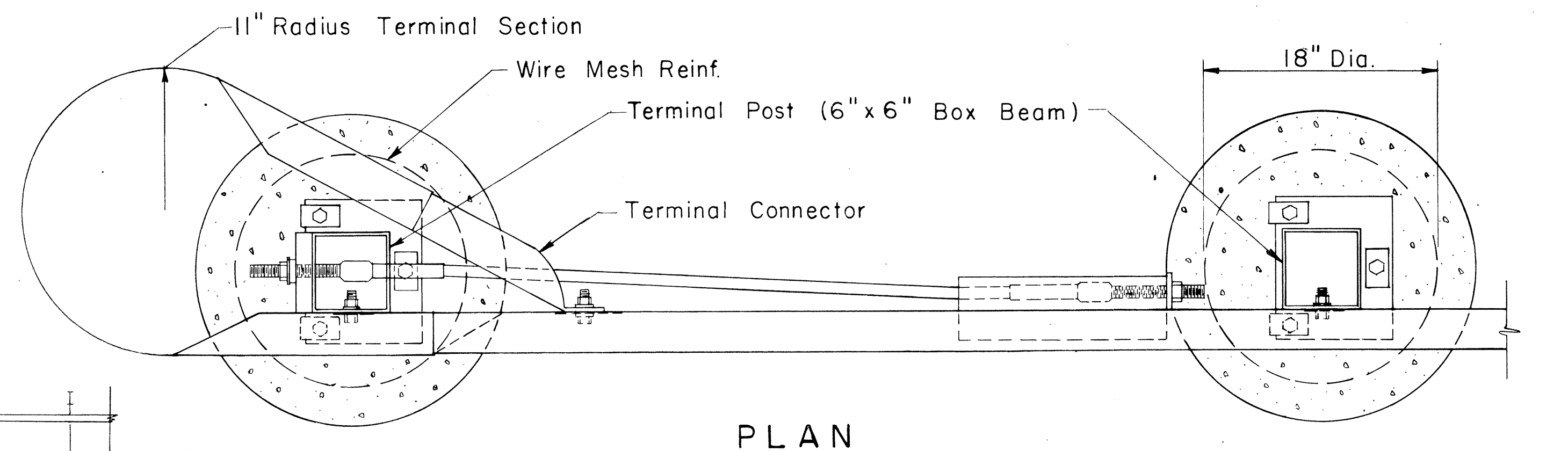
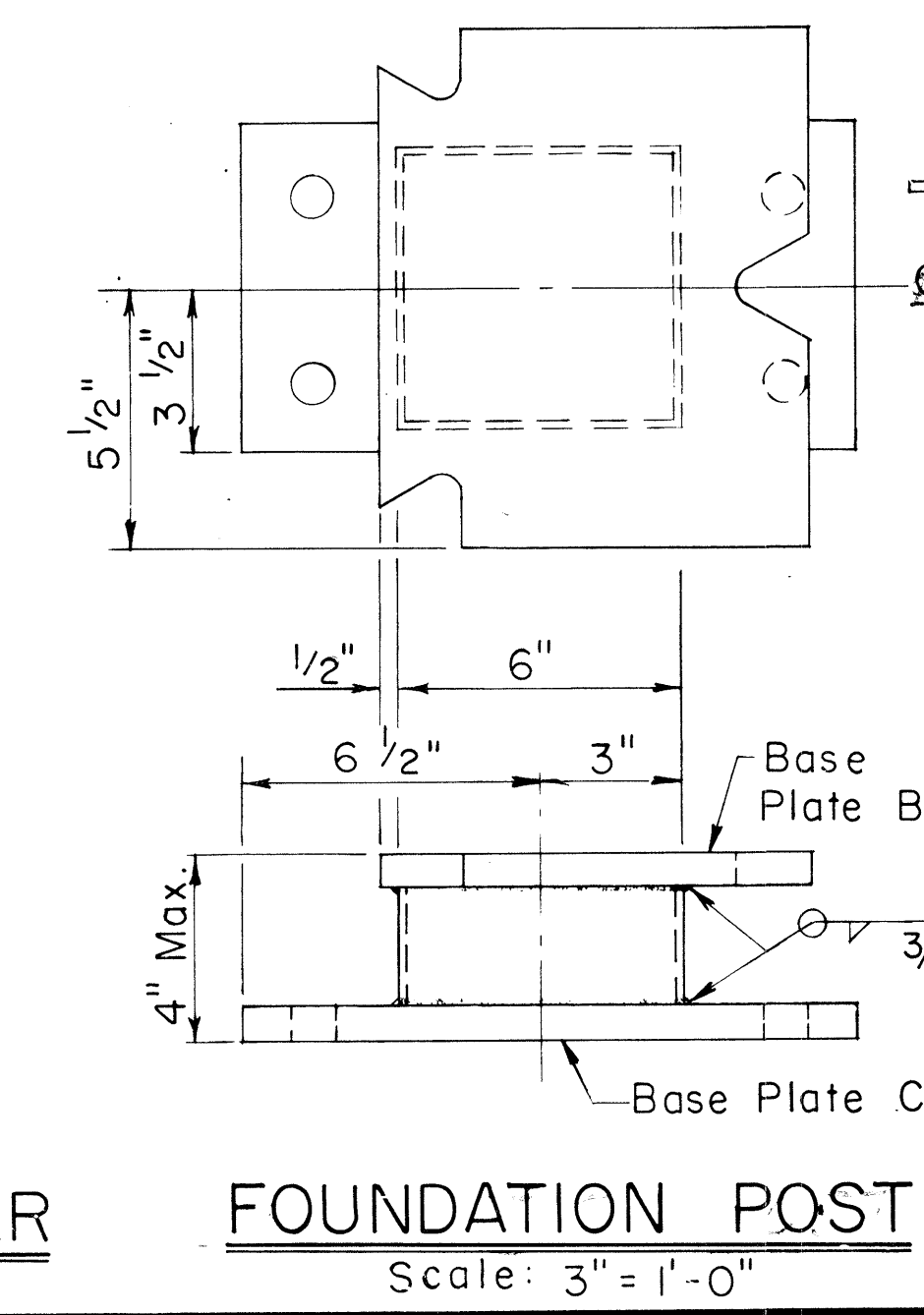
Shoibear Zakeishi
ASSISTANT CHIEF, ENGINEERING 6/15/78
DATE

STATE OF HAWAII	
DEPARTMENT OF TRANSPORTATION	
HIGHWAYS DIVISION	
STANDARD DETAIL	
BREAKAWAY CABLE TERMINAL (BCT)	
Scale: As Shown	Date: June 1978
SHEET No. 21	OF SHEETS DT 519



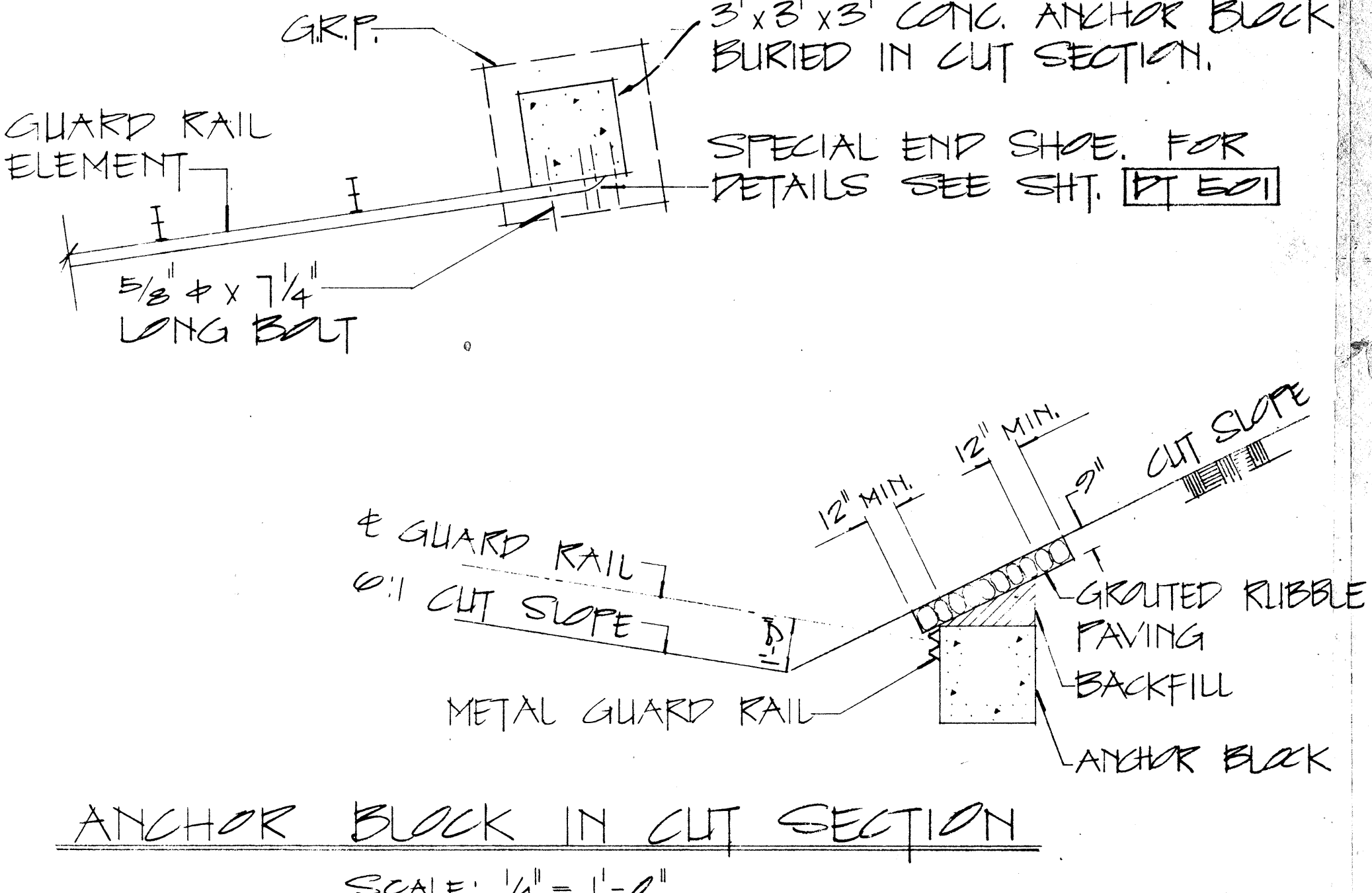
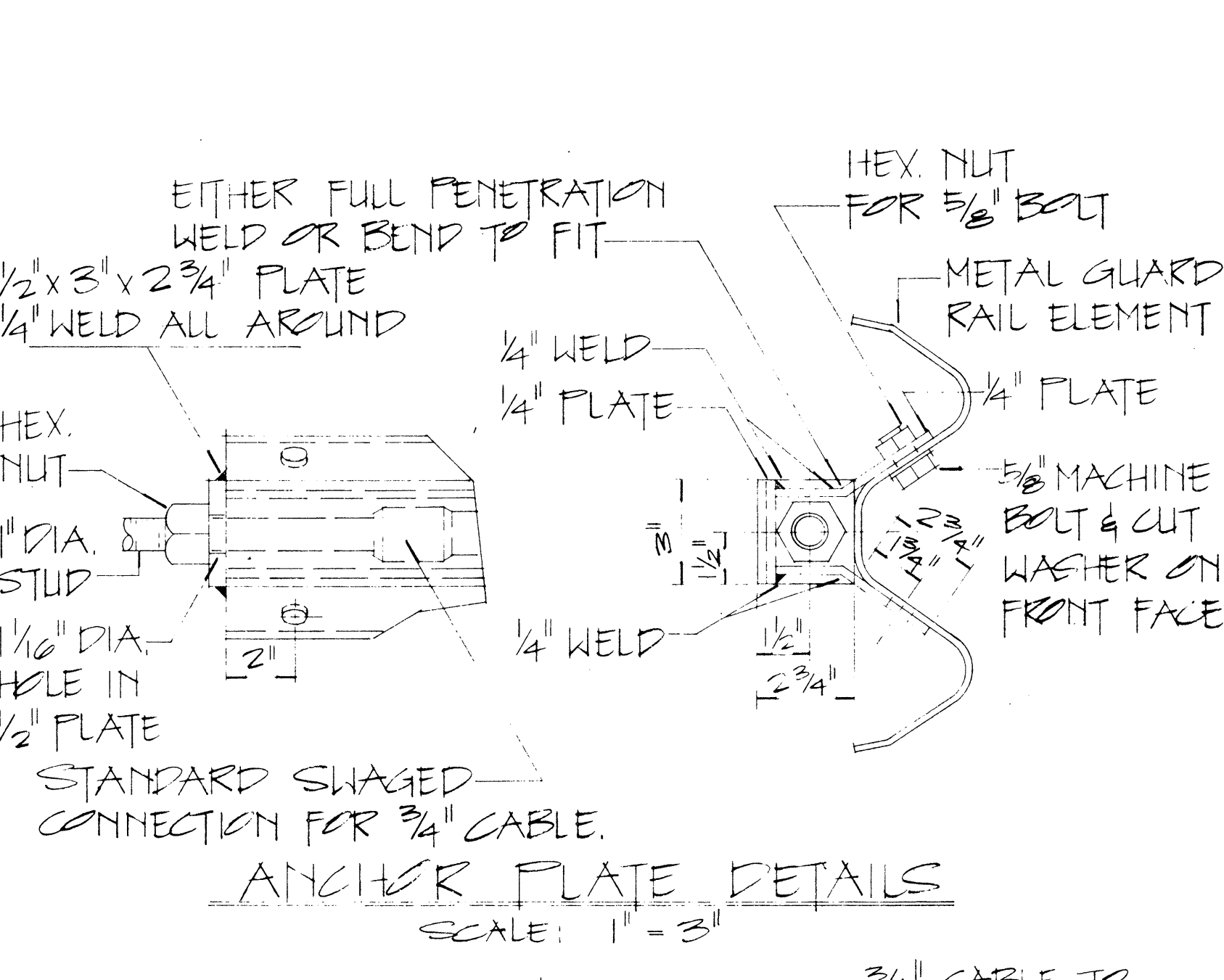
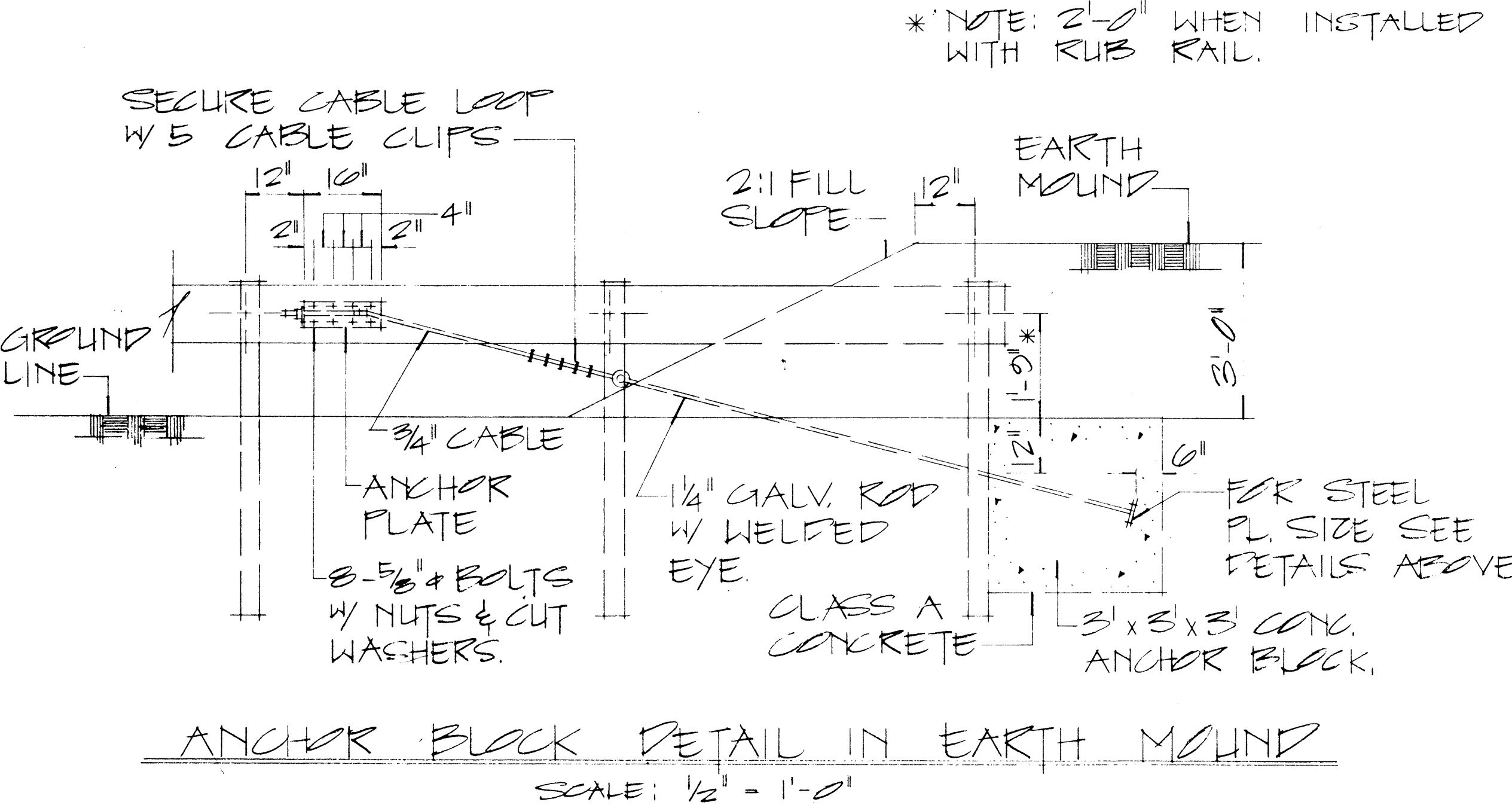
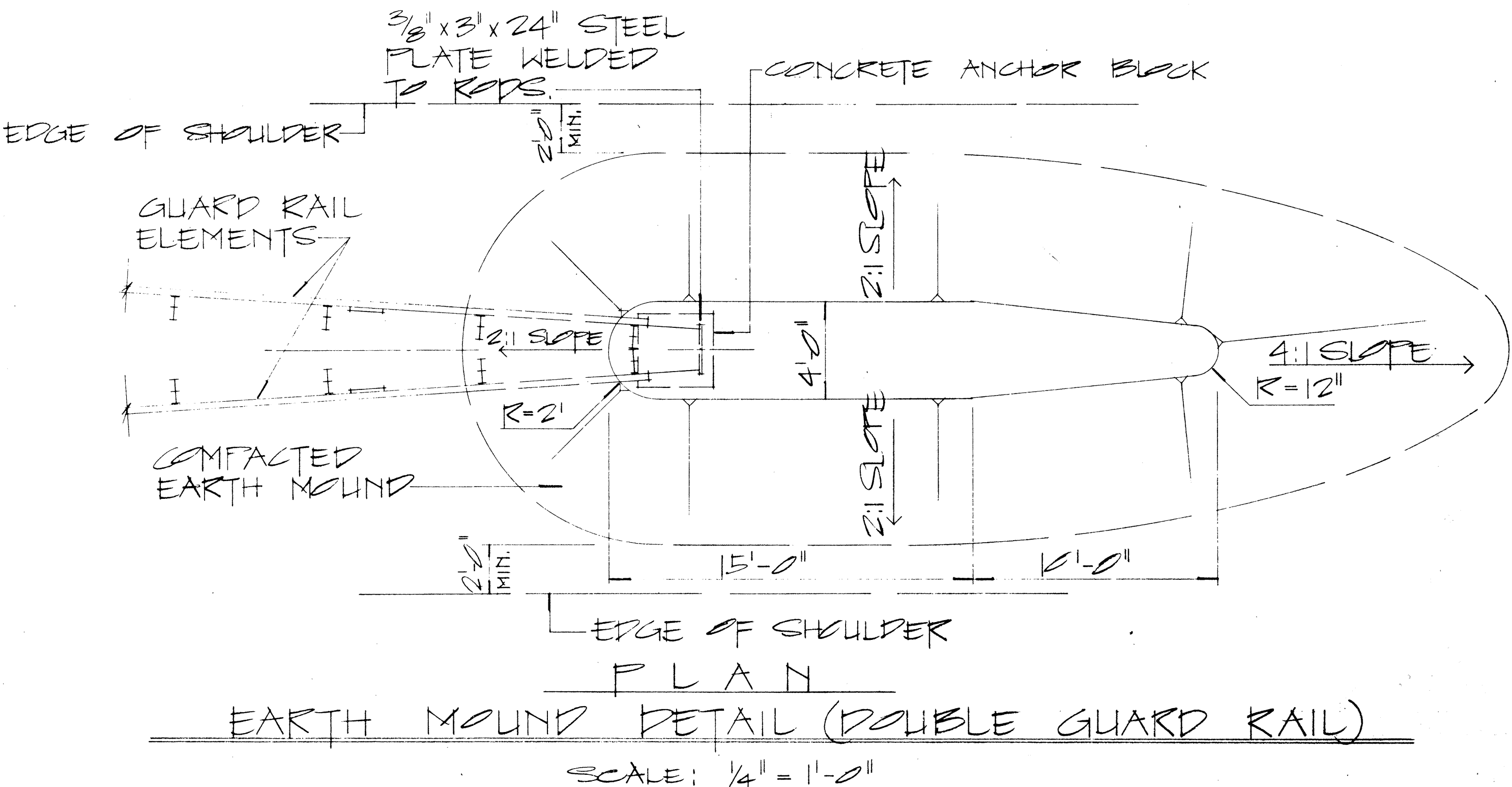
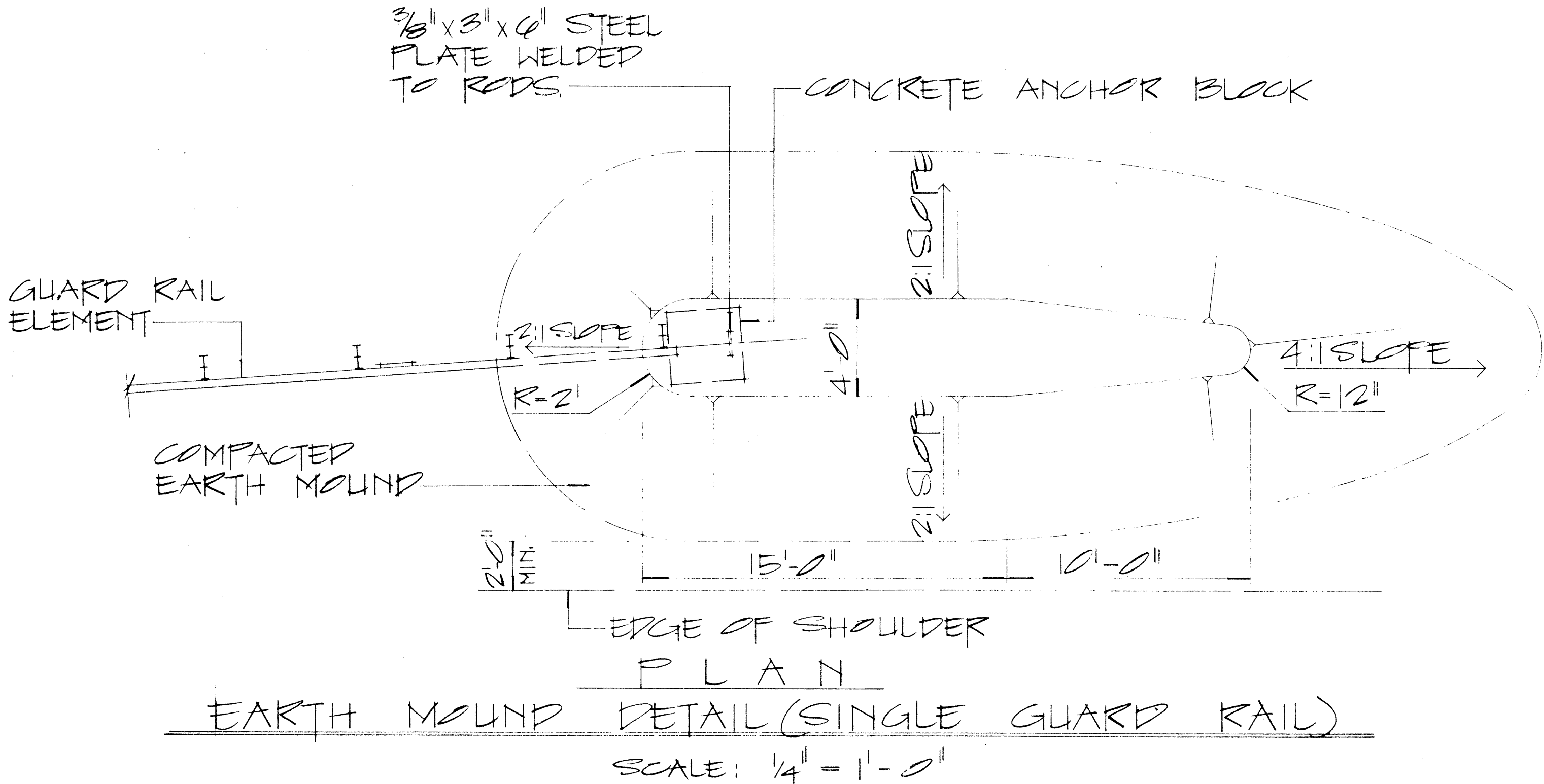
ELEVATION DETAIL A

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



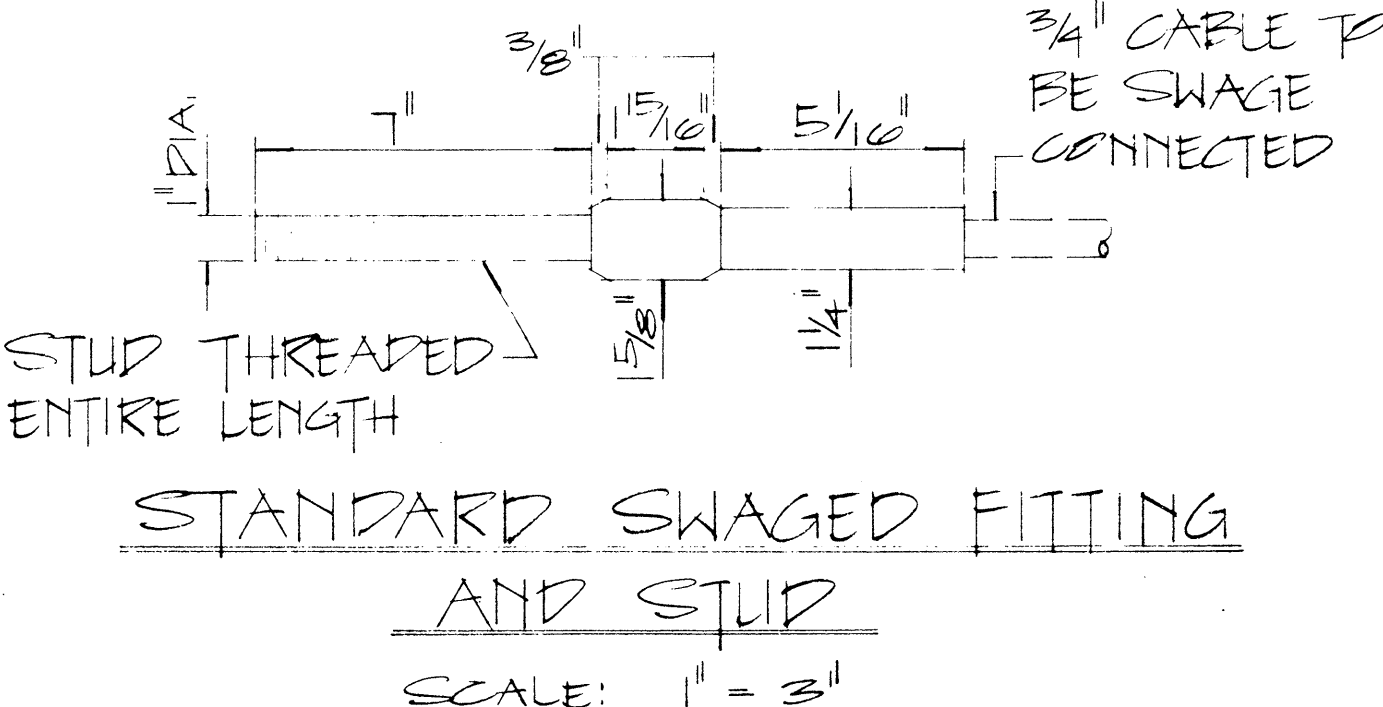
NO.	REVISION	APPROVED BY	DATE
1	Supersedes Sht. DT 519 Approved 12/30/69	H.I.	6/15/78
2	Added Note 6	H.I.	12/17/80
3	Eliminated requirement of 25' rail.	NO	1-31-85

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	83C-01-86M	1986	22	40



NOTE:

1. GALVANIZED ANCHOR ROD, METAL GUARD RAIL AND FAST BURIED IN GROUND SHALL BE COVERED WITH A MIN. 20-MIL THICKNESS OF COAL TAR ENAMEL, CONFORMING TO AWWA STANDARD: C 203
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.



APPROVAL RECOMMENDED: *Erich Tanaka* 12/29/69
TRAFFIC ENGINEER DATE

APPROVED: *Amos O. O. O.* 12-30-69
ASSISTANT CHIEF, ENGINEERING DATE

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
EARTH MOUND AND
ANCHOR BLOCK DETAILS

SCALE: AS SHOWN 12/10/69
SHEET No. OF SHEETS 22 22

DATE: _____

ORIGINAL PLAN: _____

TRACED BY: _____

QUANTITIES BY: _____

CHECKED BY: _____

NO. _____