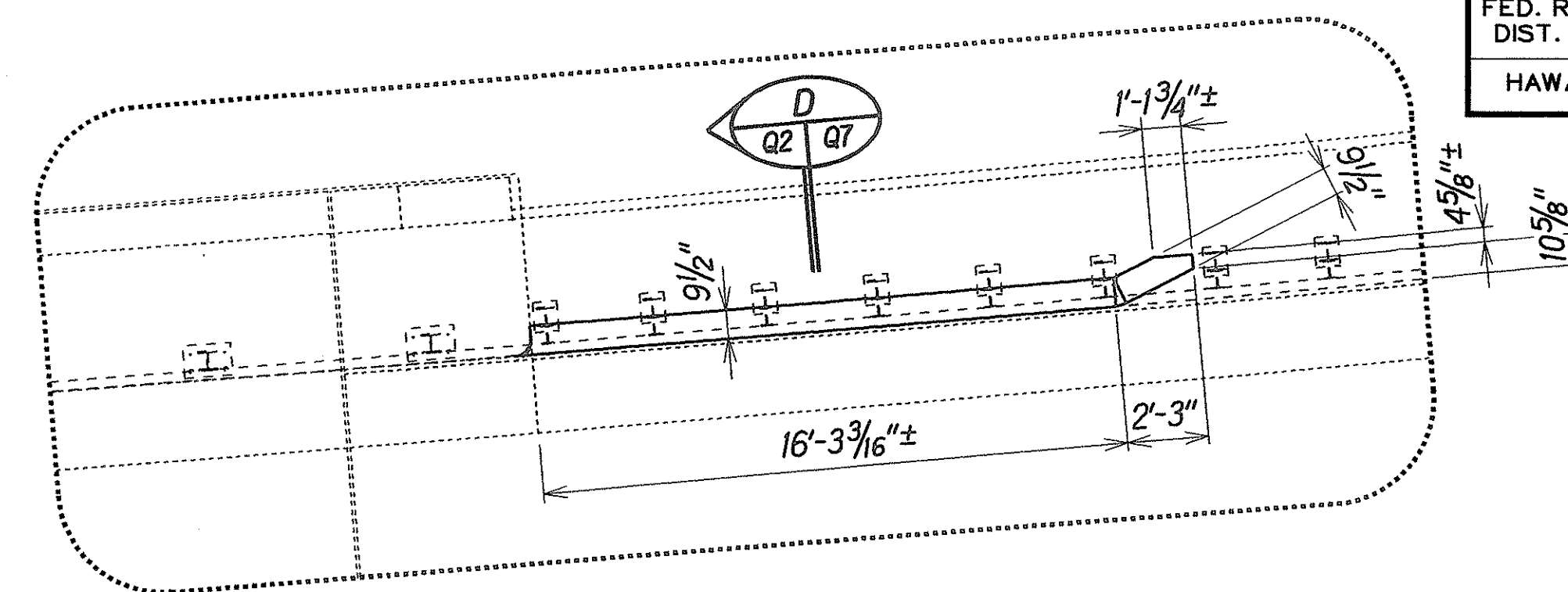
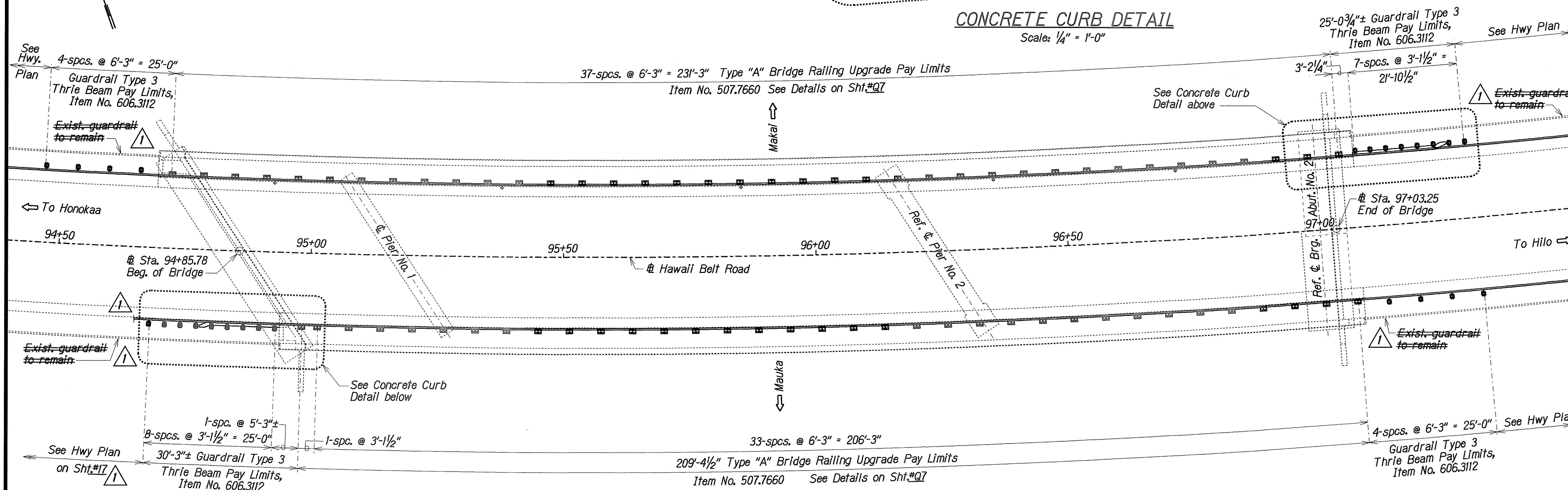


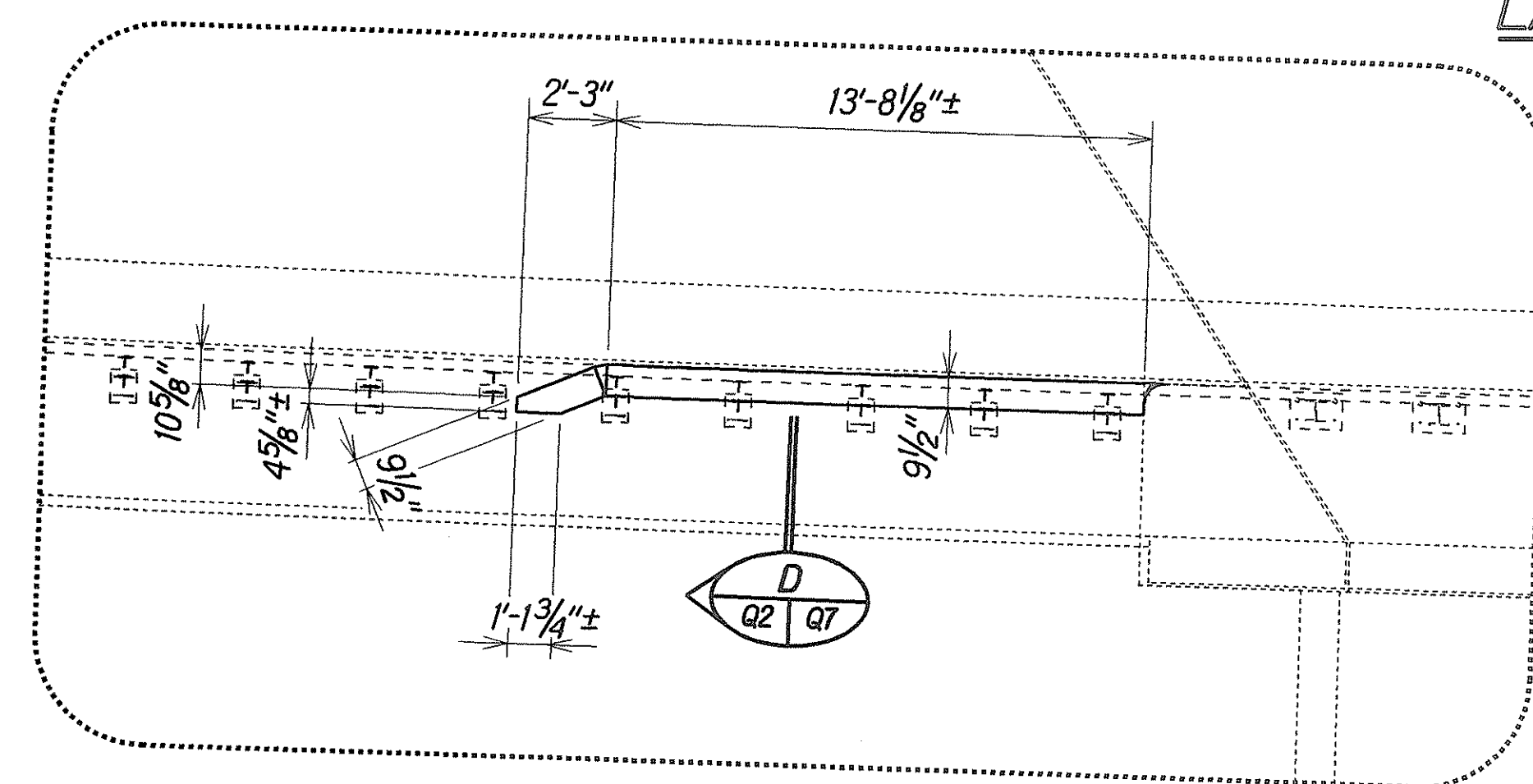
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(37)	2007	ADD.25	47



CONCRETE CURB DETAIL
Scale: 1/4" = 1'-0"



LAYOUT PLAN--TYPE "A" BRIDGE RAILING UPGRADE
KAHAWAILILII STREAM BRIDGE
Scale: 1" = 10'-0"



CONCRETE CURB DETAIL
Scale: 1/4" = 1'-0"

ORIGINAL PLAN	DATE	07/2006
DRAWN BY	ASG	07/2006
DESIGNED BY	IFU	07/2006
CHECKED BY	IFU	07/2006
NOTED BY	IFU	07/2006

4-26-07 Delete Note "Existing guardrail to remain". Add reference to "Sht.#17". Add break symbol to new metal guardrail.

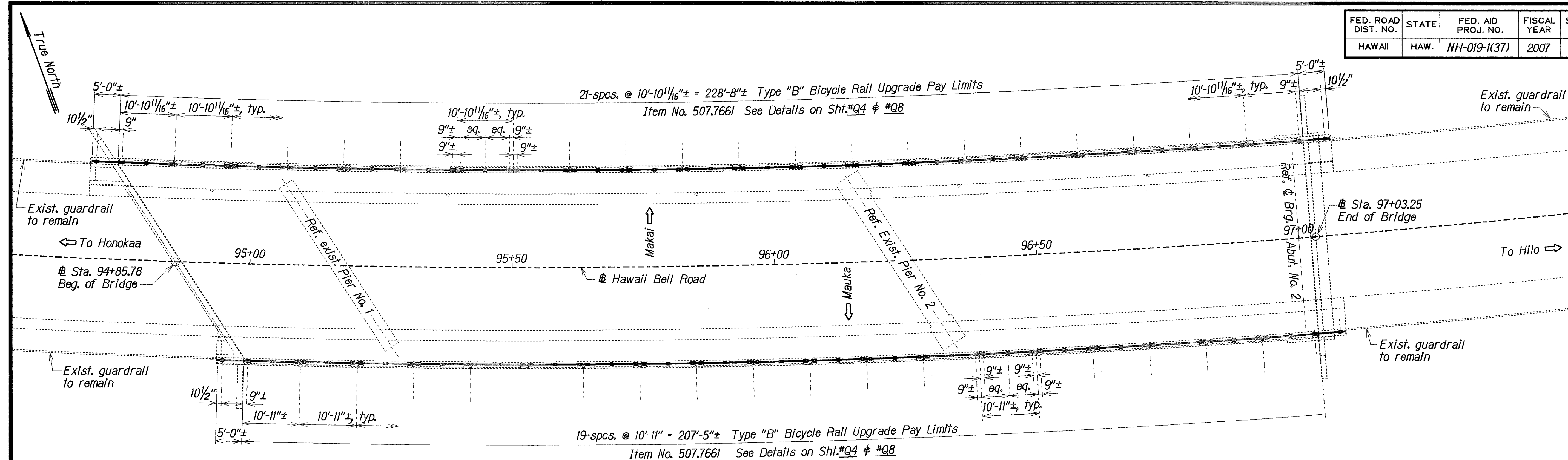
DATE REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
LAYOUT PLAN--TYPE "A" BRIDGE
RAILING UPGRADE
KAHAWAILILII STREAM BRIDGE
HAWAII BELT ROAD GUARDRAIL & SHOULDER IMPROVEMENTS
Paauhau Road to Papalele Road and Various Locations
Fed. Aid Project No. NH-019-1(37)
Scale: As Noted Date: Oct. 2006

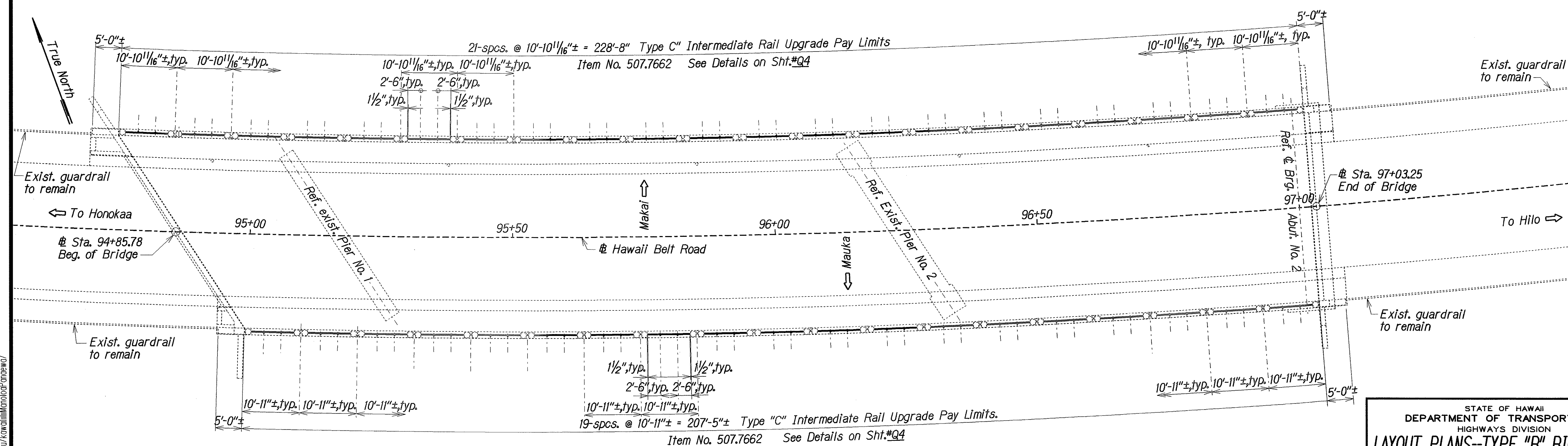
SHEET No. Q2 OF 13 SHEETS

ADD.25

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(37)	2007	26	47



LAYOUT PLAN--TYPE "B" BICYCLE RAIL UPGRADE



LAYOUT PLAN--TYPE "C" INTERMEDIATE RAIL UPGRADE

KAHAWAILILII STREAM BRIDGE

Scale: 1" = 10'-0"

ORIGINAL PLAN	DATE
DESIGNED BY	DATE
CHECKED BY	DATE
NOTED BY	DATE
APPROVED BY	DATE

0147 d1/10/07/ksq/jtu/kawaililii010701new01

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**LAYOUT PLANS--TYPE "B" BICYCLE and
TYPE "C" INTERMEDIATE RAIL UPGRADE**

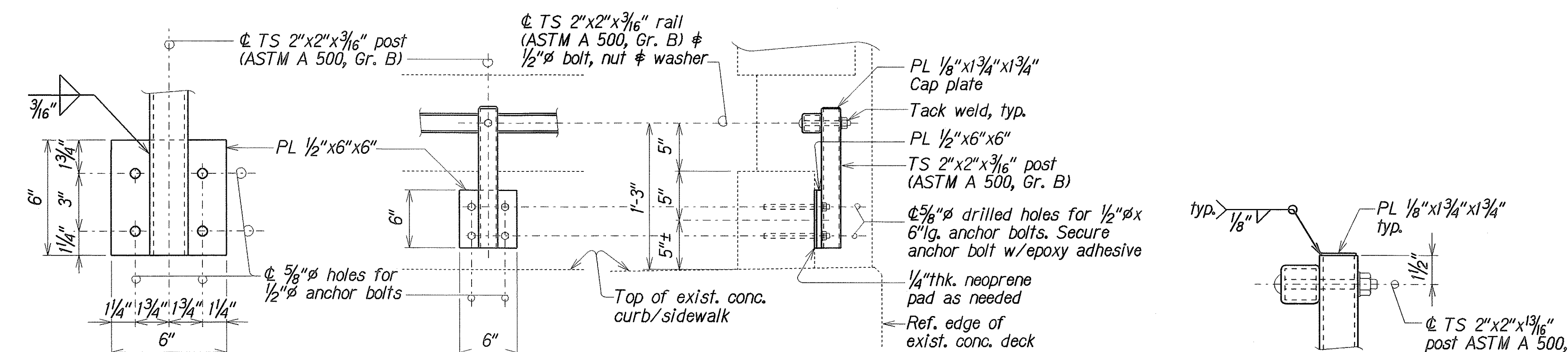
KAHAWAILILII STREAM BRIDGE
HAWAII BELT ROAD GUARDRAIL & SHOULDER IMPROVEMENTS
Paauhau Road to Papalele Road and Various Locations
Fed. Aid Project No. NH-019-1(37)

Scale: As Noted Date: Oct. 2006

SHEET No. Q3 OF 13 SHEETS

[illegible][illegible]

TYPE "B" BICYCLE and TYPE "C" INTERMEDIATE RAIL UPGRADE--KAHAWAILIILII STREAM BRIDGE



SECTION

A	
Q4	Q4

CAP PLATE DETAIL
Scale: 3" = 1'-0"

TYPICAL TYPE "C" INTERMEDIATE RAIL UPGRADE DETAILS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPE "B" BICYCLE & TYPE "C" INTER. RAIL
PLAN and ELEV.-KAHAWAILILII STR. BRIDGE
and TYP. TYPE "C" INTER. RAIL UPGR. DETAILS
HAWAII BELT ROAD GUARDRAIL & SHOULDER IMPROVEMENTS
Paahau Road to Papalele Road and Various Locations
Fed Aid Project No. HI-019-I(37)

Scale: As Noted Date: Oct. 2006

[illegible][illegible]

ELEVATION--TYPE "A" BRIDGE RAIL UPGRADE
Scale: 1" = 5'-0"

MANOLOA STREAM BRIDGE

SHEET No. 05 OF 13 SHEETS

[illegible][illegible]

Exist. conc. and post

ELEVATION--TYPE "B" BICYCLE and TYPE "C" INTERMEDIATE RAIL UPGRADE

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

MANOLOA STEAM BRIDGE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PLAN and ELEVATION--TYPE "B" BICYCLE and
TYPE "C" INTERMEDIATE RAIL UPGRADE

MANOLOA STEAM BRIDGE

HAWAII BELT ROAD GUARDRAIL & SHOULDER IMPROVEMENTS
Paahau Road to Papalele Road and Various Locations
Fed. Aid Project No. NH-019-11(37)

Scale: As Noted Date: Oct, 2006

SHEET No. 06 OF 13 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PLAN and ELEVATION-TYPE "B" BICYCLE and
TYPE "C" INTERMEDIATE RAIL UPGRADE

MANOLOA STREAM BRIDGE
HAWAII BELT ROAD GUARDRAIL & SHOULDER IMPROVEMENTS
Paahau Road to Papalele Road and Various Locations
Fed. Aid Project No. NH-019-1(37)

Scale: As Noted Date: Oct, 2006

SHEET No. 06 OF 13 SHEETS

SECTION thru EXISTING CONCRETE BRIDGE RAILING

Scale: 1" = 1'-0"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(37)	2007	30	47

SECTION thru EXISTING
CONCRETE DOWN RAMP
Scale: 1" = 1'-0"

SECTION thru EXISTING
CONCRETE SIDEWALK EXTENSION
Scale: 1" = 1'-0"

CONCRETE

$\frac{E}{Q7 \quad Q7}$
 ϕ W6x25 post $1\frac{3}{8}"$
 ϕ Thrie beam
 ϕ $\frac{3}{4}"$ bolt hole for $\frac{5}{8}"$ button head bolt
 $3\frac{3}{16}"$ $3\frac{3}{16}"$ $1\frac{5}{8}"$
 $\frac{1}{4}"$ $1\frac{3}{4}"$ Typ.
 Top of exist. conc. sidewalk
 Add washers to level plate
 $1" \times 1'-4" \times 11"$ base PL. See Detail at right
 ϕ 2- $1\frac{3}{8}"$ drilled holes for 2- $1\frac{1}{4}"$ ASTM A 449 threaded rods
 $8"$ $8"$ $1'-4"$
 $\frac{3}{4}"$ min. non-shrink epoxy grout to level PL
 1'-10"
 1'-0"
 3/4" typ.
 3/4"

ELEVATION SECTION
TYPE "A" THREE BEAM POST DETAILS
 Scale: $1\frac{1}{2}" = 1'-0"$

[illegible]

SECTION E
TLC Q7 Q7

TYPICAL SECTION

METAL GUARDRAIL ON METAL POST
WITH METAL SPACER BLOCK

Scale: 1" = 1'-0"

D

02 05 011 07

PLAN
BASE PLATE DETAIL
Scale: 3" = 1'-0"

db4/d:/usr2/ksa/ifu/Kahawajili/MandaoPangewa/

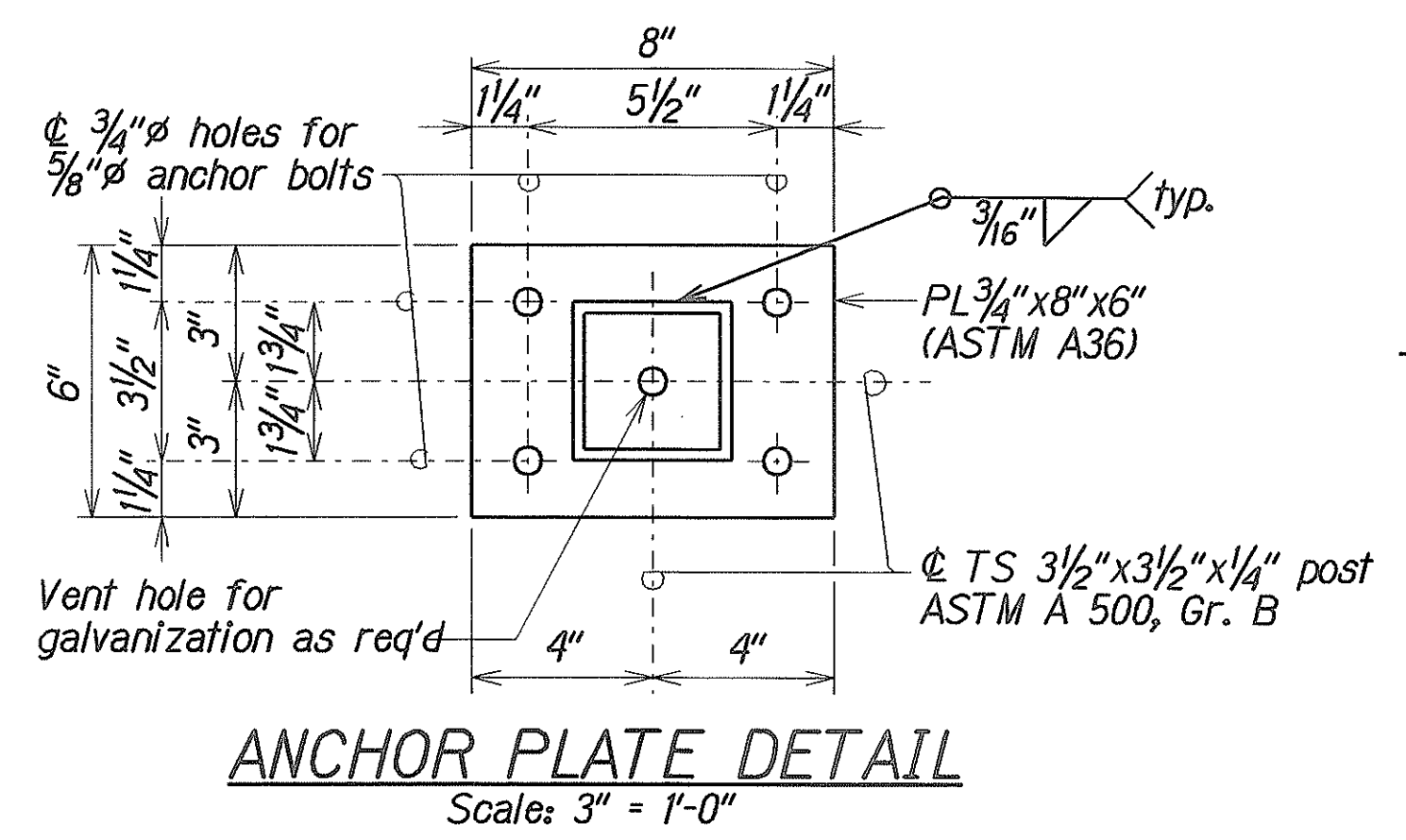
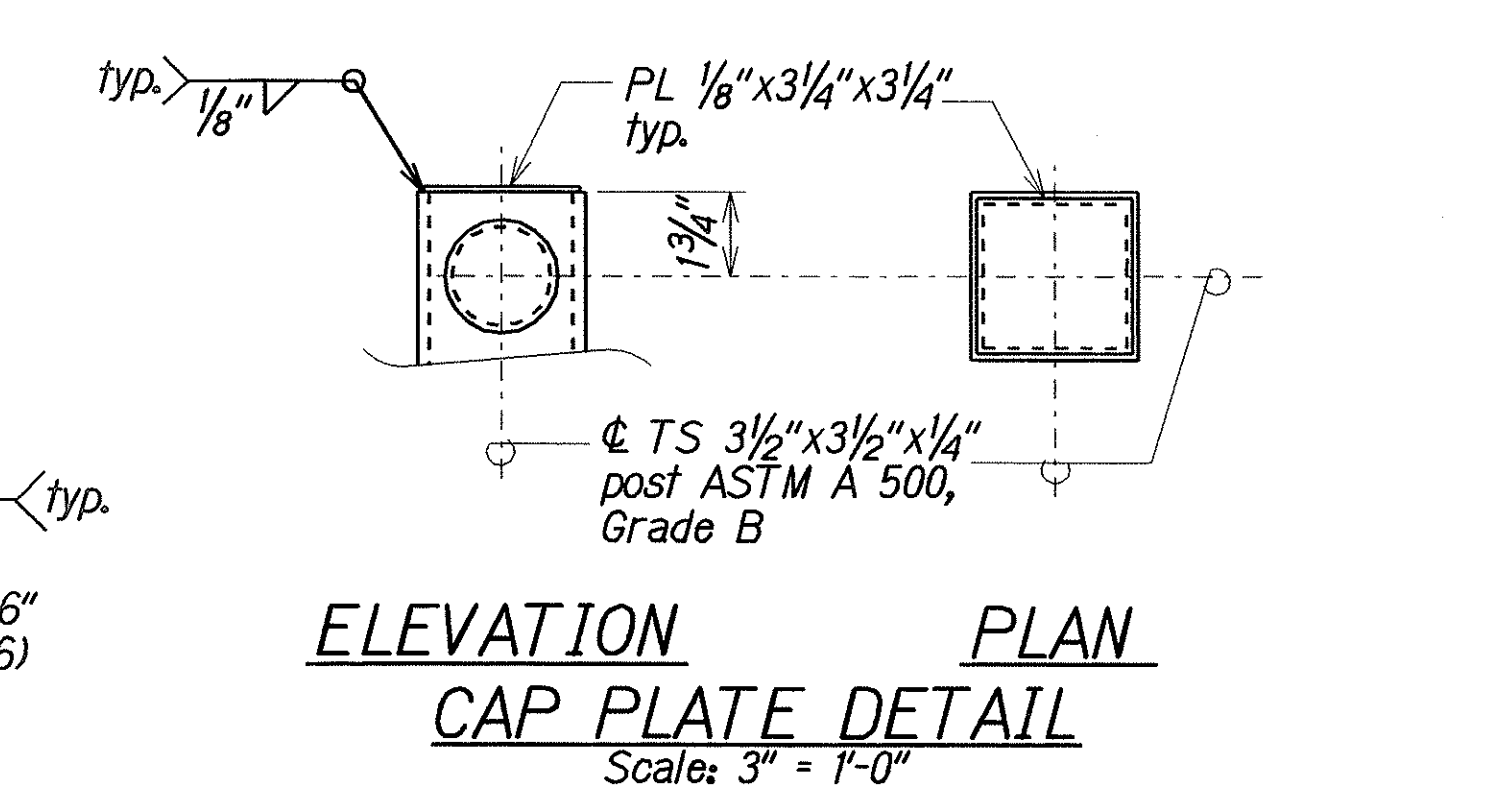
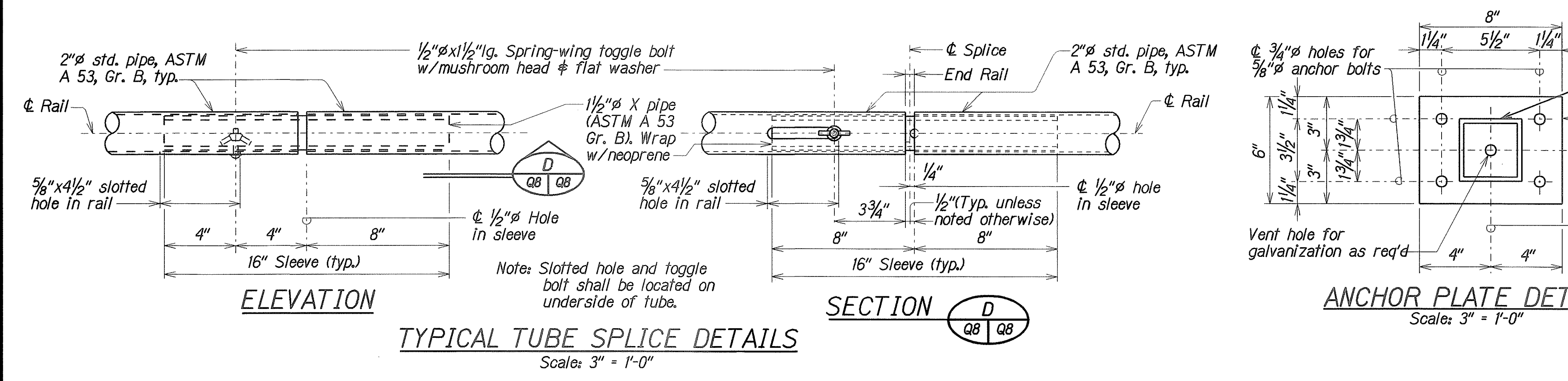
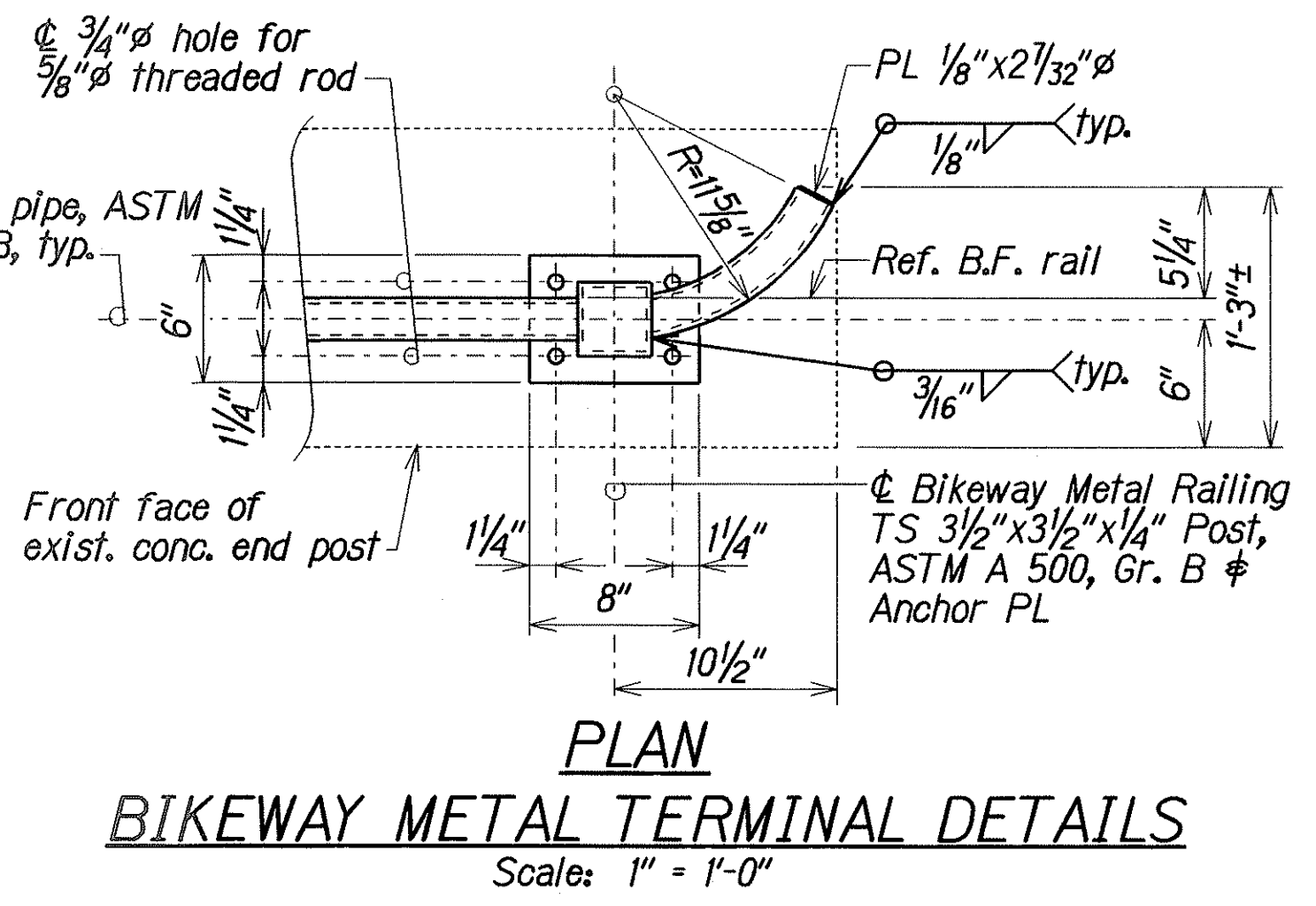
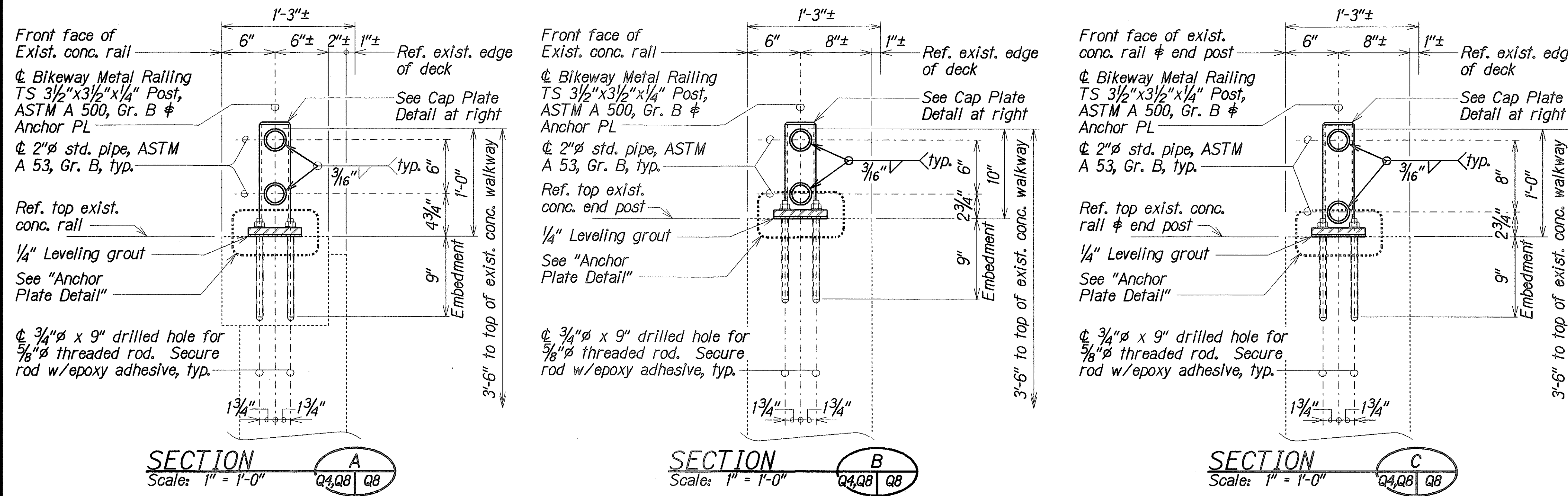
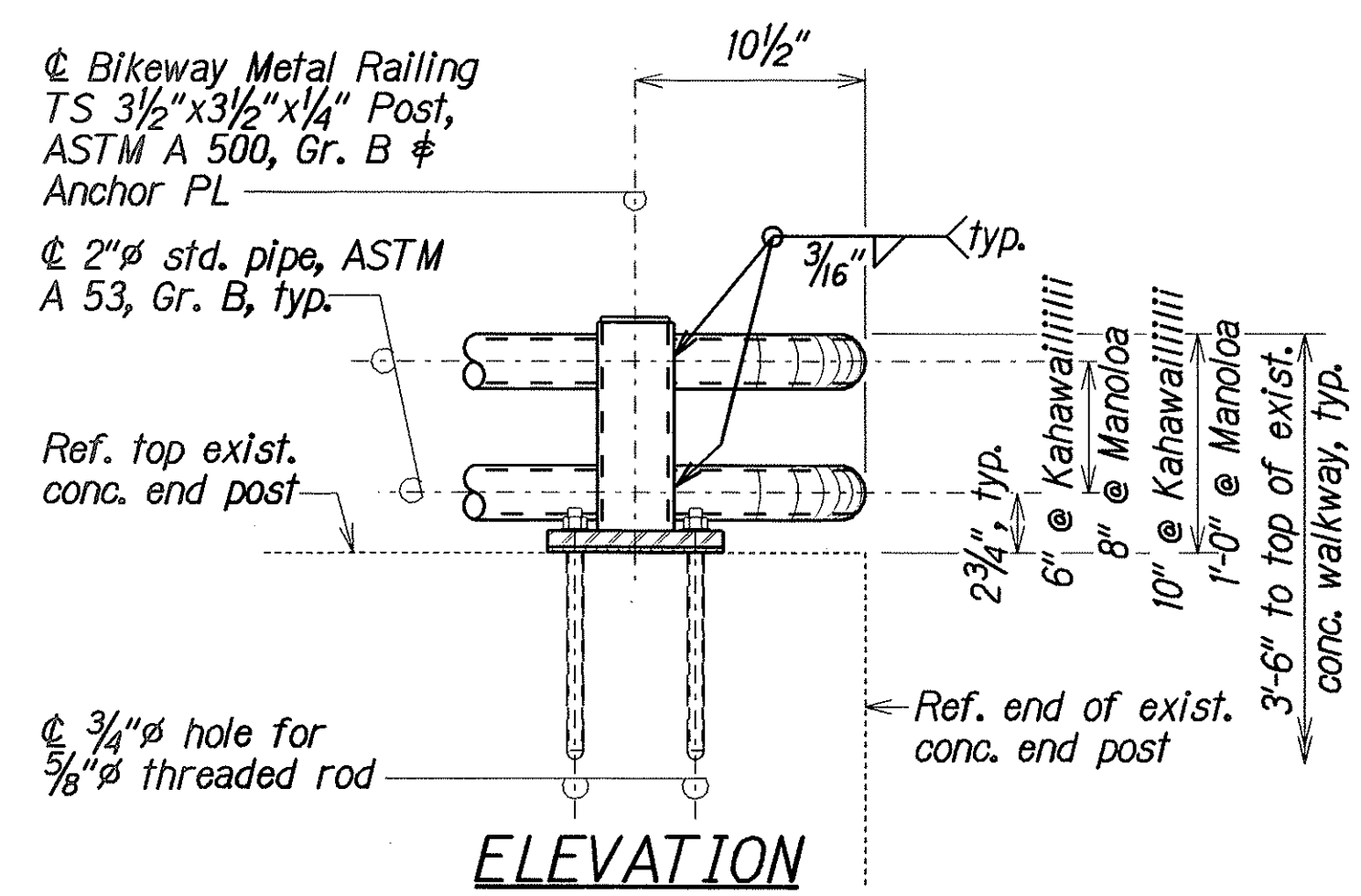
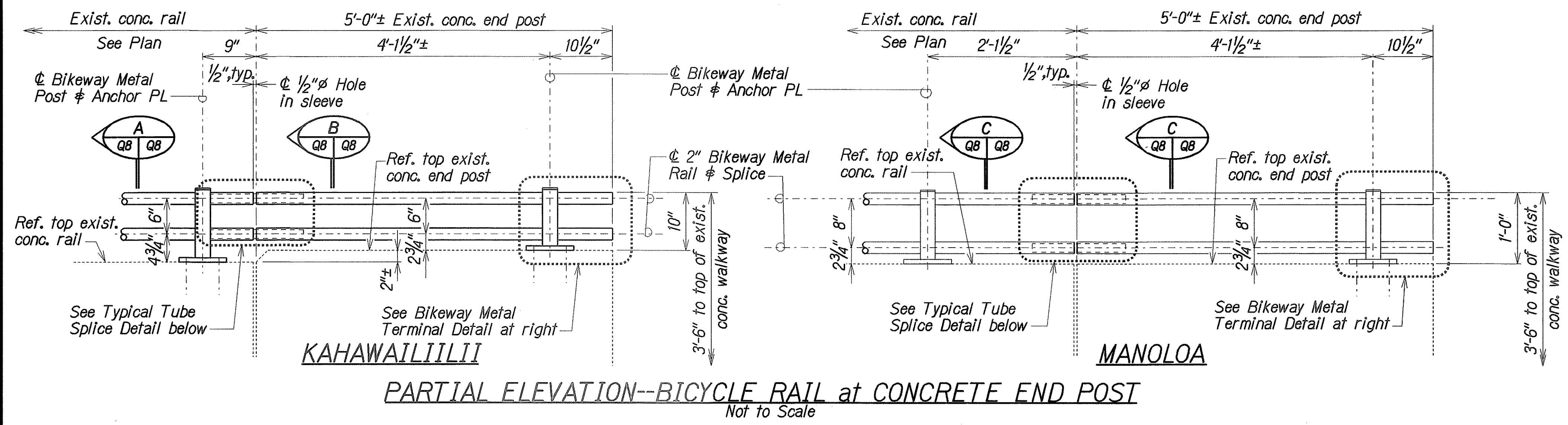
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SECTIONS and DETAILS
TYPE "A" BRIDGE RAIL UPGRADE
KAHAWAILILI and MANOLOA STREAM BRIDGES
HAWAII BELT ROAD GUARDRAIL & SHOULDER IMPROVEMENTS
Paahau Road to Papalele Road and Various Locations
Fed. Aid Project No. NH-019-(137)

Scale: As Noted Date: Oct, 2006

SHEET No. 97 OF 13 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(37)	2007	31	47



TYPE "B" BIKEWAY RAIL UPGRADE DETAILS **KAHAWAILIILII and MANOLOA STREAM BRIDGES**

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BIKEWAY RAIL UPGRADE DETAILS
KAHAWAILIILII and MANOLOA STREAM BRIDGES
HAWAII BELT ROAD GUARDRAIL & SHOULDER IMPROVEMENTS
Paauhau Road to Papalele Road and Various Locations
Fed. Aid Project No. NH-019-1(37)

Scale: As Noted Date: Oct. 2006

SHEET No. 08 OF 13 SHEETS

DESIGNED BY	DATE
DRAWN BY	08/20/06
CHECKED BY	08/20/06
IN CHARGE	08/20/06
APPROVED	08/20/06

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(37)	2007	32	47

True North

106'-3"± Type "D" Bridge Rail Upgrade
Replace exist. metal rail (shown hatched)
53'-1 1/2"±

Partial removal of exist. conc. end post & foot'g (shown hatched)

Ref. ϕ pier Sta. 1278+27.00

Ref. ϕ pier Sta. 1278+27.00

OUTBOUND $\leftarrow$ To Volcano

Ref. begin bridge Sta. 1277+72.75

INBOUND $\rightarrow$ To Hilo

Ref. end bridge Sta. 1278+81.25

Partial removal of exist. conc. end post & foot'g (shown hatched)

106'-3"± Type "D" Bridge Rail Upgrade
Replace exist. metal rail (shown hatched)

Partial removal of exist. conc. end post & foot'g (shown hatched)

LAYOUT PLAN SHOWING LIMITS of REMOVAL
Not to Scale

TYPICAL SECTION A
Scale: 3/4" = 1'-0"

TYPICAL SECTION B
Scale: 3/4" = 1'-0"

TYPICAL SECTION C
Scale: 3/4" = 1'-0"

PLAN -- EXISTING METAL RAIL and CONCRETE END POST
Not to Scale

ELEVATION -- EXISTING METAL RAIL and CONCRETE END POST
Not to Scale

PANAWEA STREAM BRIDGE

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

**LAYOUT PLAN SHOWING LIMITS of REMOVAL
TYPICAL EXISTING SECTIONS and ELEVATION
PANAWEA STREAM BRIDGE**

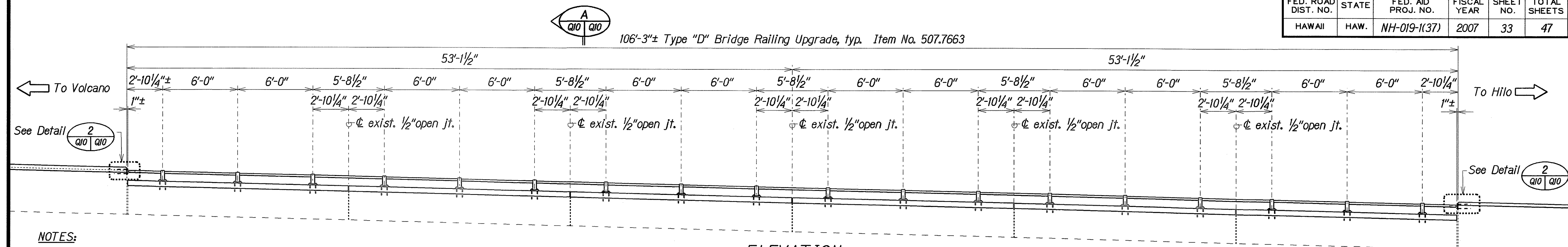
HAWAII BELT ROAD GUARDRAIL & SHOULDER IMPROVEMENTS
Paauhau Road to Papalele Road and Various Locations
Fed. Aid Project No. NH-019-1(37)

Scale: As Noted Date: Oct. 2006

SHEET No. Q9 OF 13 SHEETS

32

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(37)	2007	33	47



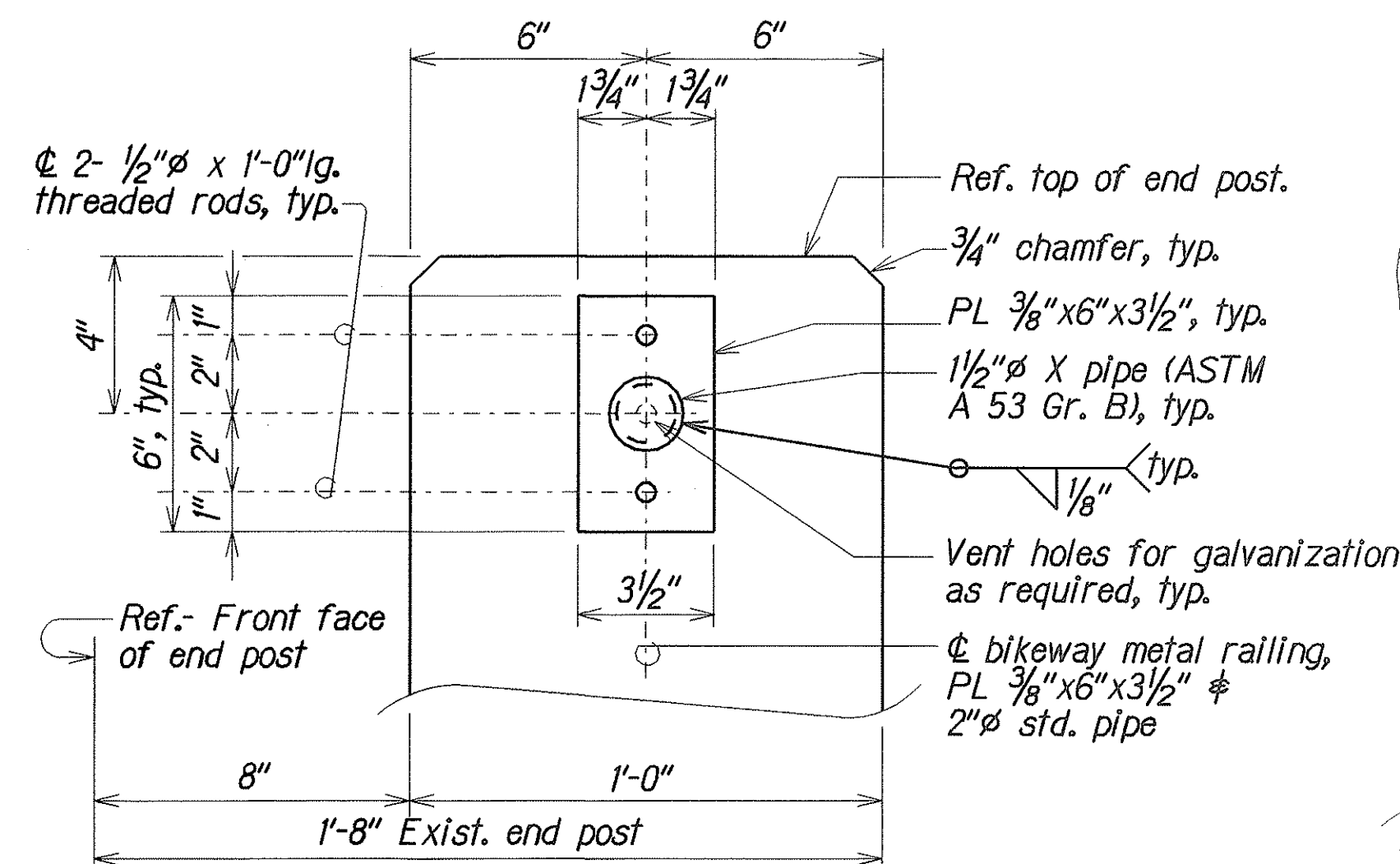
NOTES:

1. Tube splices over open joint in rail and at end of bridge, at bridge joint, between bridge rail and end post joint should be placed as close as possible to post.
2. Epoxy for new #5 rebar and anchor bolts and shall meet ASTM C881 Type IV Grade 3 Class C.
3. #6 Bars in new 5"-ht. built-up sections shall not cross existing joints in bridge. Construct new joints to match existing.

ELEVATION

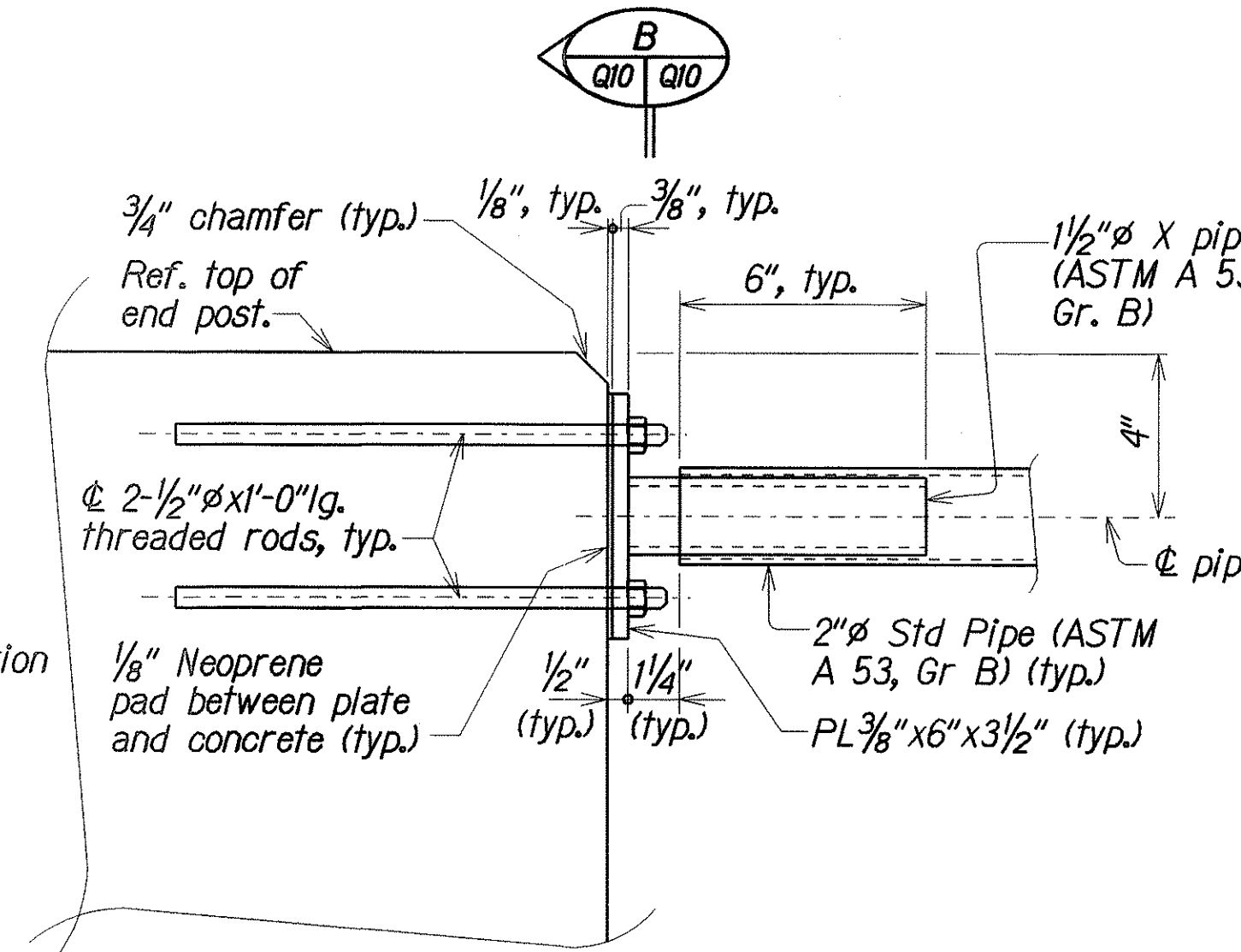
Scale: 1/4" = 1'-0"

Note: West rail shown.
East rail similar

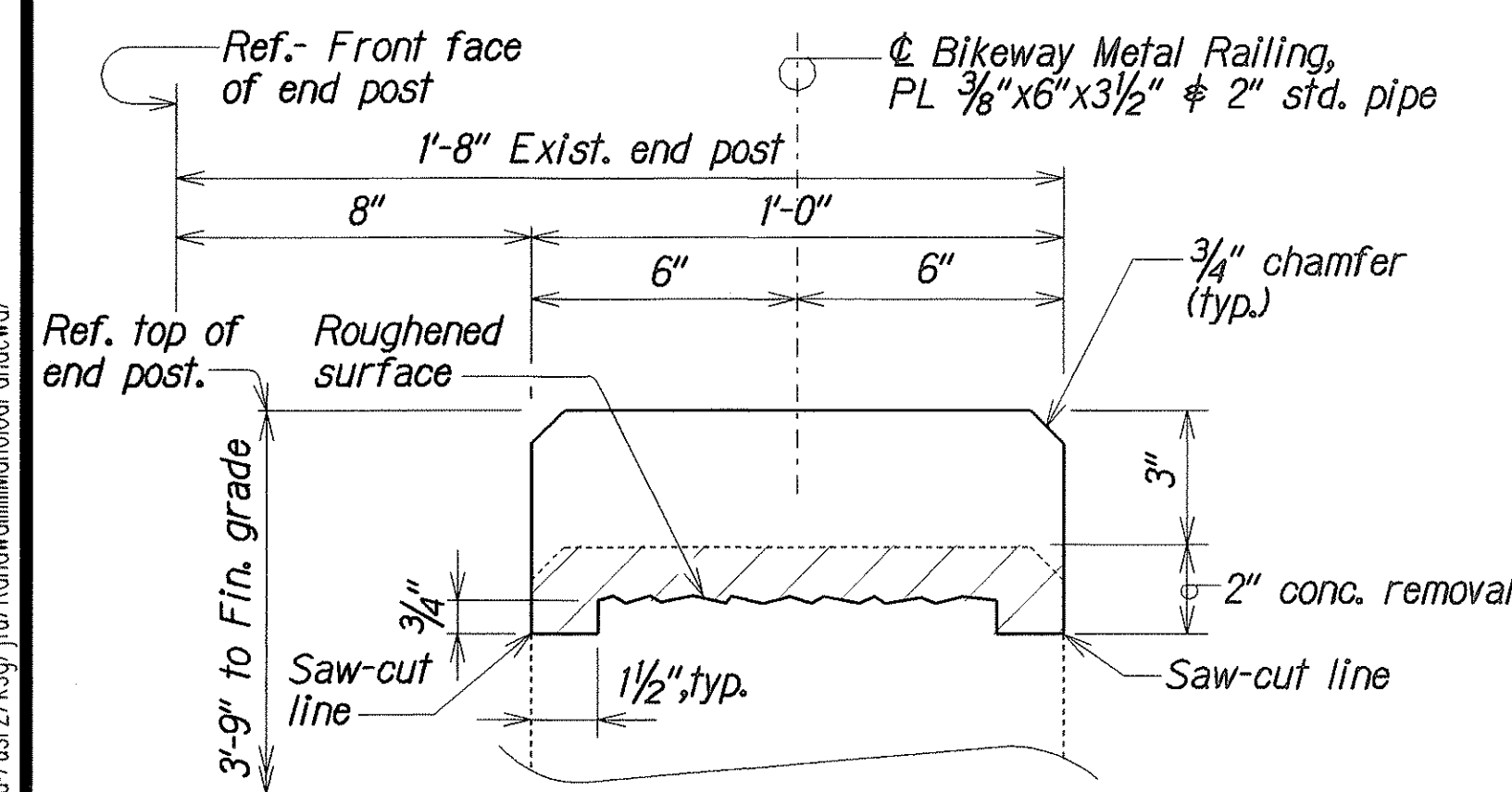


SECTION
Scale: 3" = 1'-0"
Q10 Q10

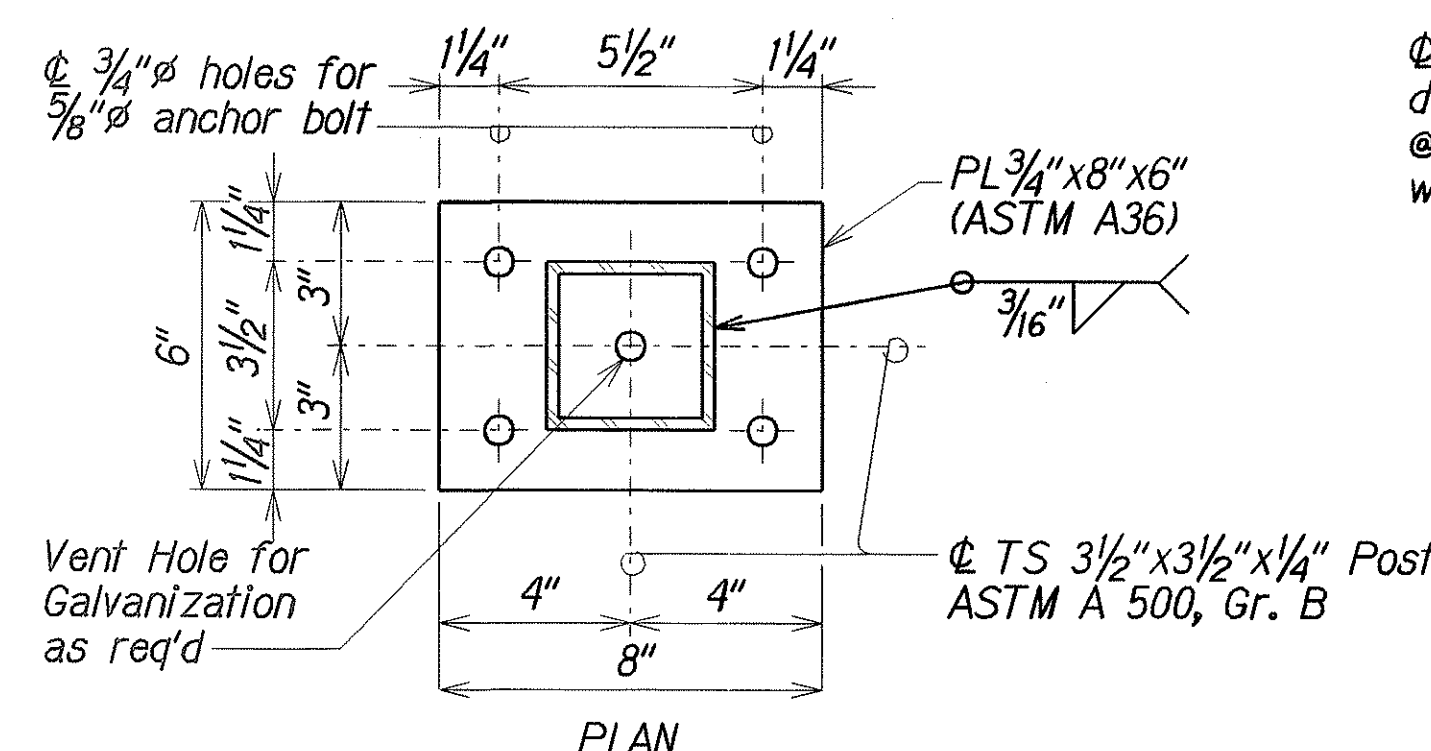
TYPICAL RAIL SLEEVE ANCHOR AT END POST CONNECTION DETAILS



DETAIL
Scale: 3" = 1'-0"
Q10 Q10

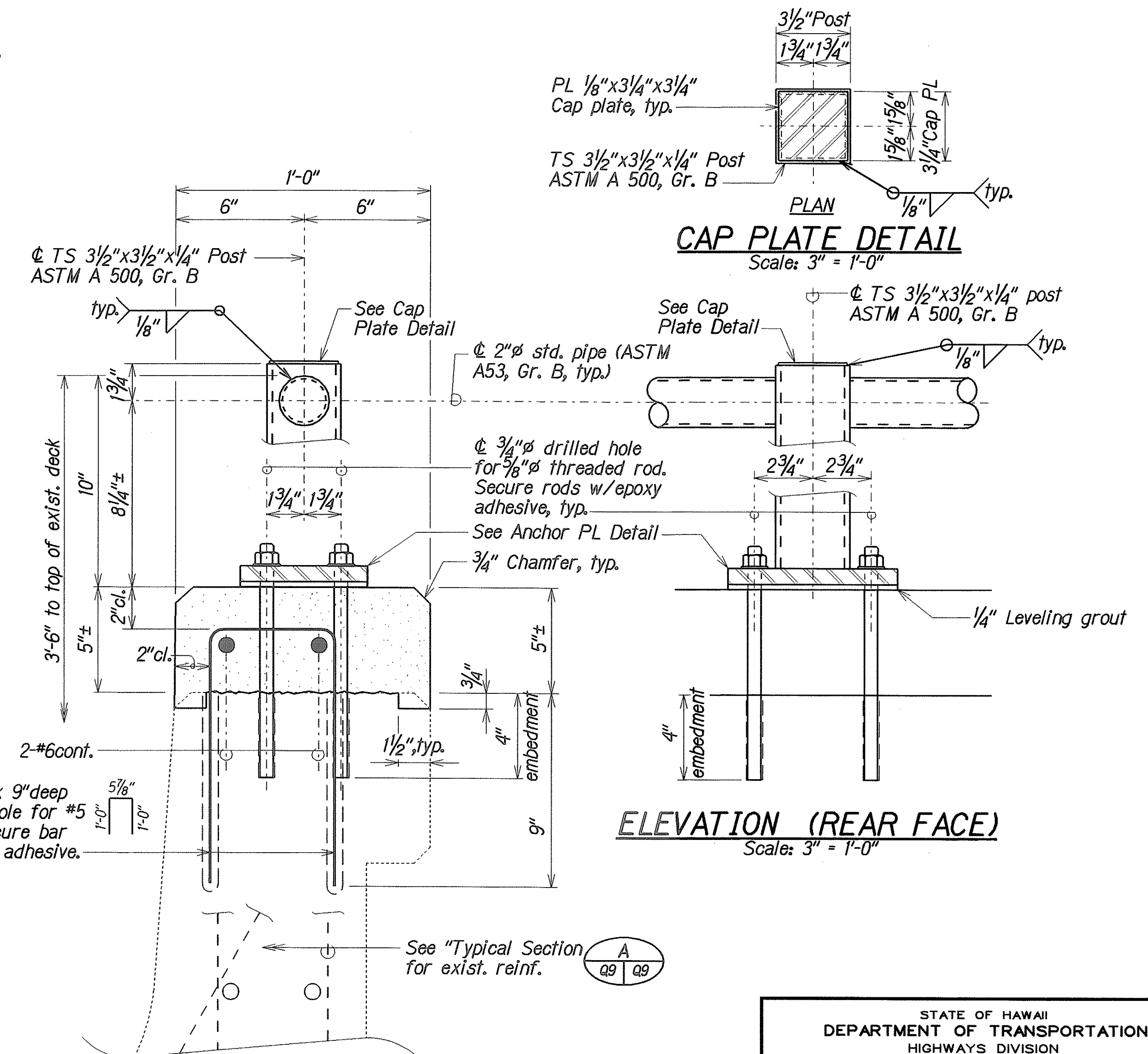


DETAIL
Scale: 3" = 1'-0"
Q9 Q11 Q10



ANCHOR PLATE DETAIL
Scale: 3" = 1'-0"

**TYPE "D" BRIDGE RAIL UPGRADE DETAILS
PANAWEA STREAM BRIDGE**



CAP PLATE DETAIL
Scale: 3" = 1'-0"

ELEVATION (REAR FACE)
Scale: 3" = 1'-0"

SECTION
Scale: 3" = 1'-0"
Q10 Q10

ORIGINAL PLAN	DATE	DESIGNED BY	CHECKED BY
	07/2006	KSJ	KSJ
	08/2006	KSJ	KSJ
	09/2006	KSJ	KSJ
	10/2006	KSJ	KSJ

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

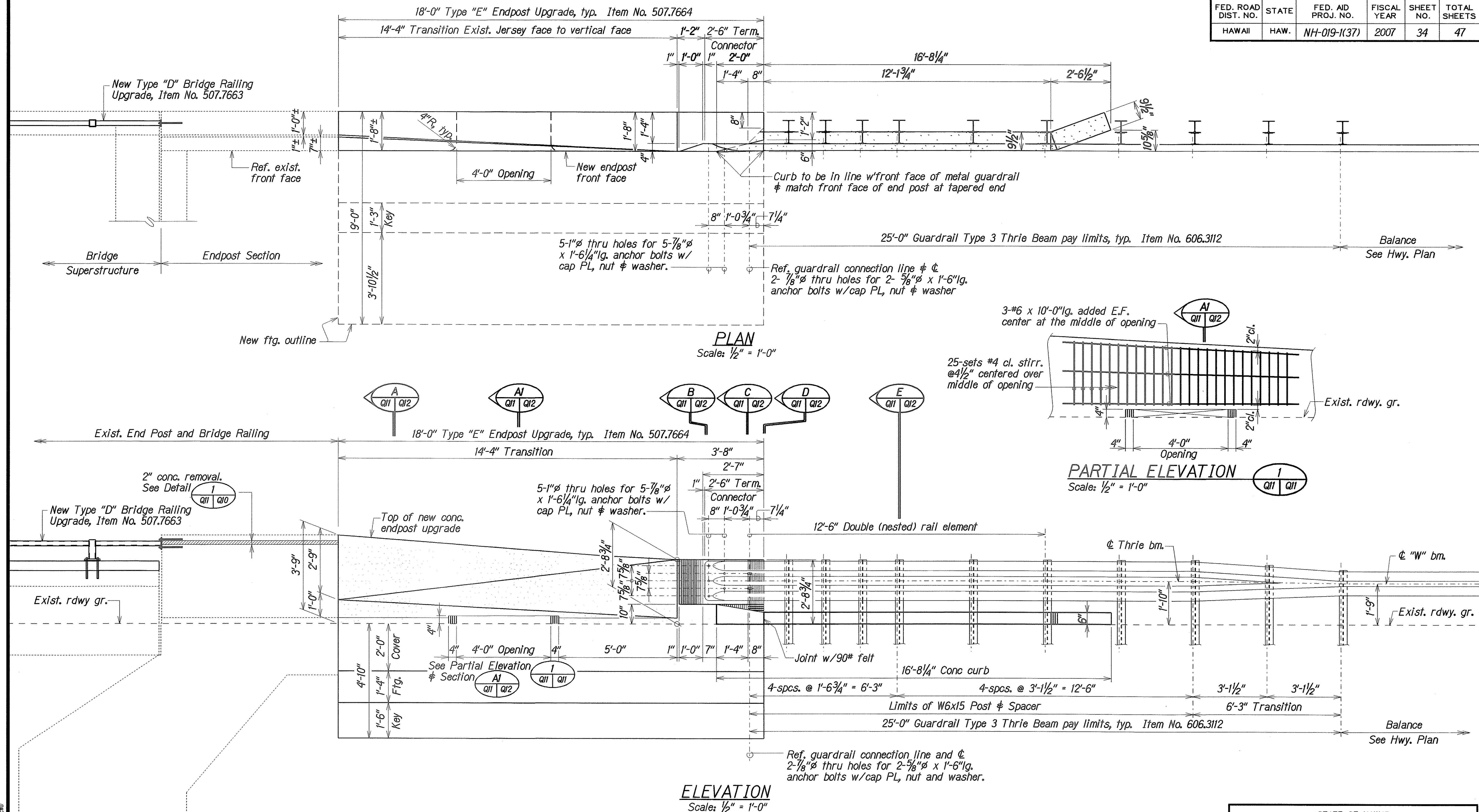
TYPE "D" BRIDGE RAIL UPGRADE DETAILS
PANAWEA STREAM BRIDGE

HAWAII BELT ROAD GUARDRAIL & SHOULDER IMPROVEMENTS
Paauhau Road to Papalele Road
Fed. Aid Proj. No. NH-011-2(33)

Scale: As Noted Date: Oct, 2006

SHEET No. Q10 OF 13 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(37)	2007	34	47



ORIGINAL PLAN	DATE
DESIGNED BY	DATE
CHECKED BY	DATE
NOTED BY	DATE
DATE	DATE

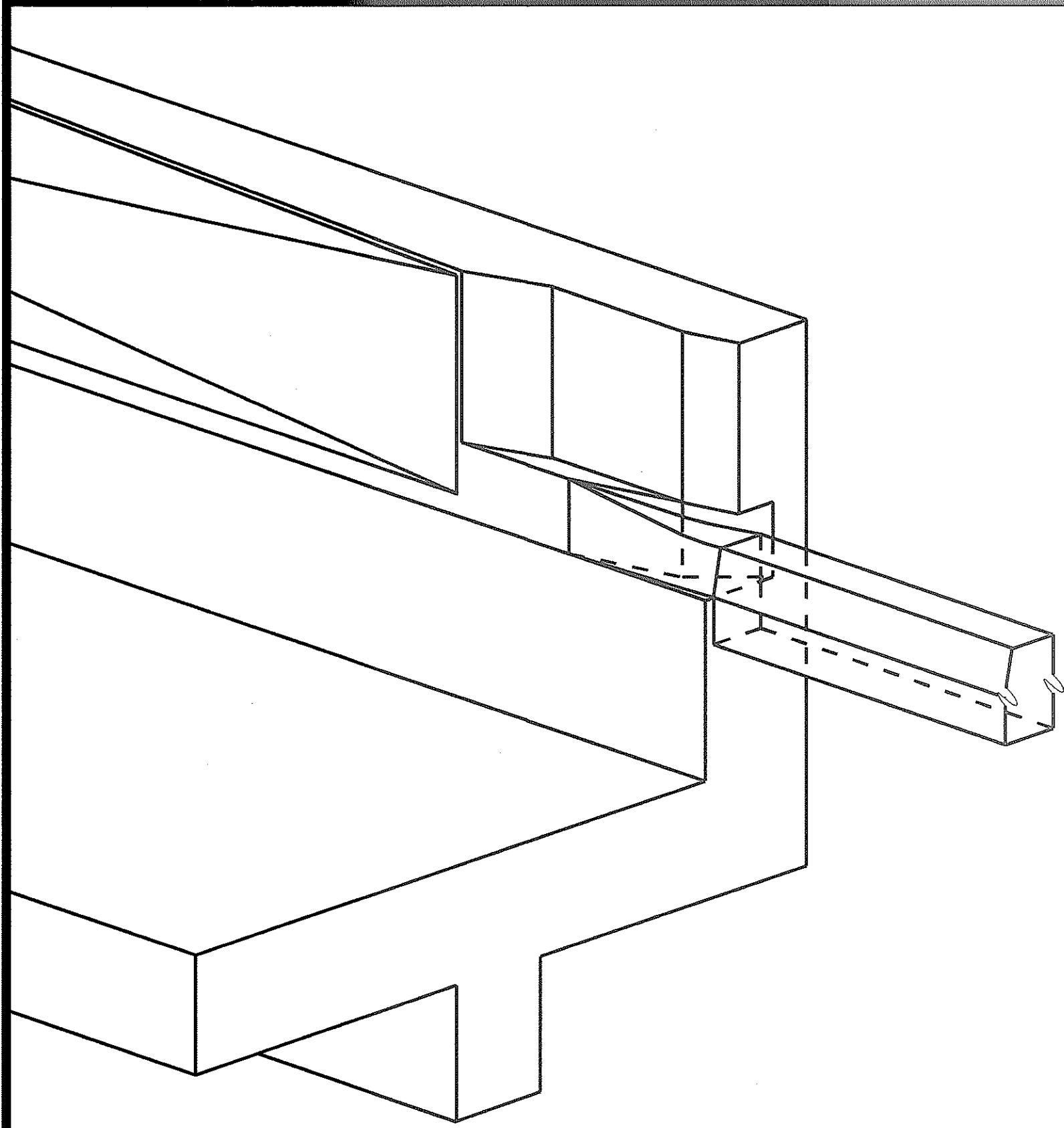
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPE "E" ENDPOST UPGRADE DETAILS
PLAN and ELEVATION
PANAWEA STREAM BRIDGE
HAWAII BELT ROAD GUARDRAIL & SHOULDER IMPROVEMENTS
Paauhau Road to Papalele Road
Fed. Aid Proj. No. NH-019-1(37)

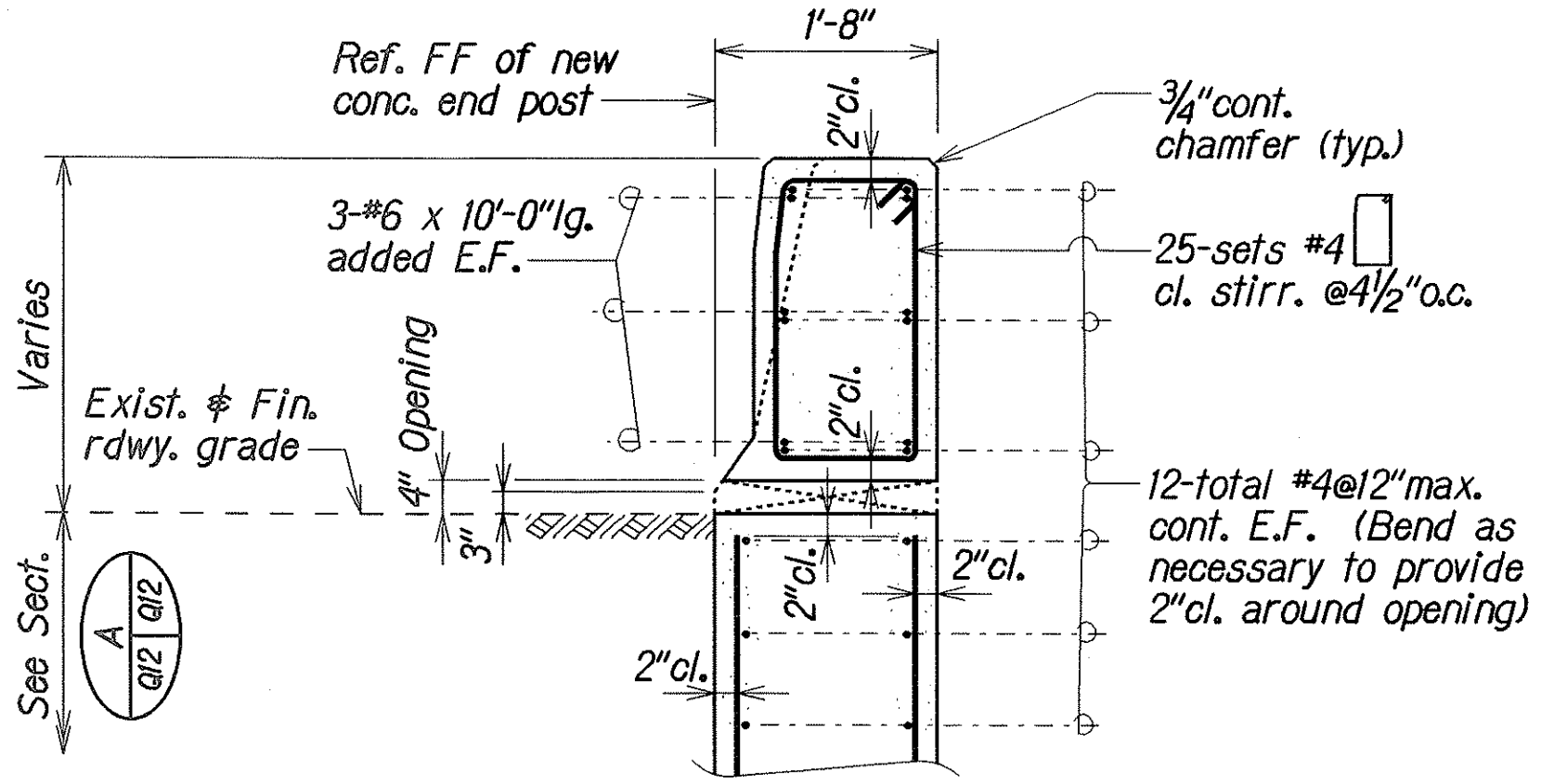
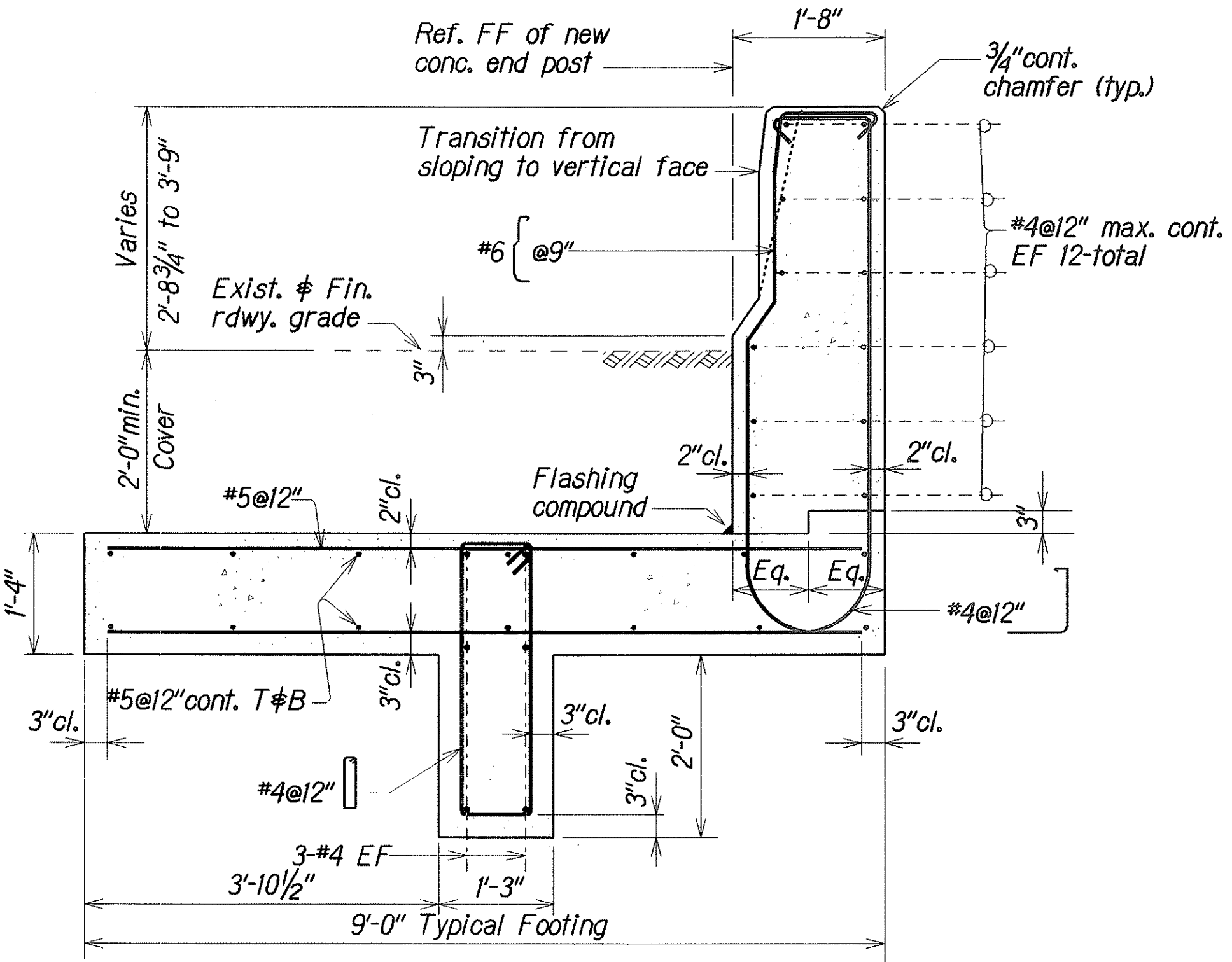
Scale: As Noted Date: Oct. 2006

SHEET No. Q11 OF 13 SHEETS

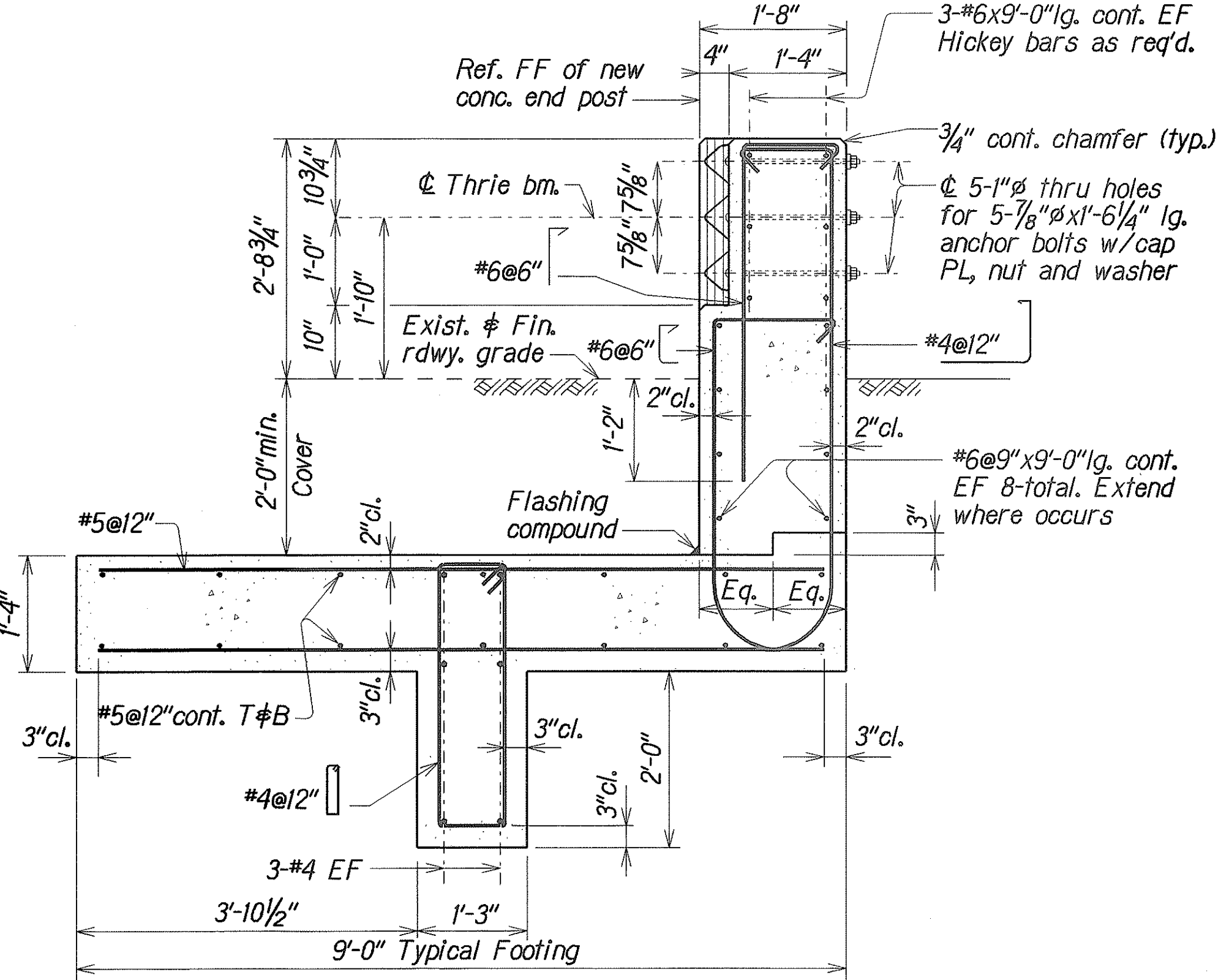
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(37)	2007	35	47



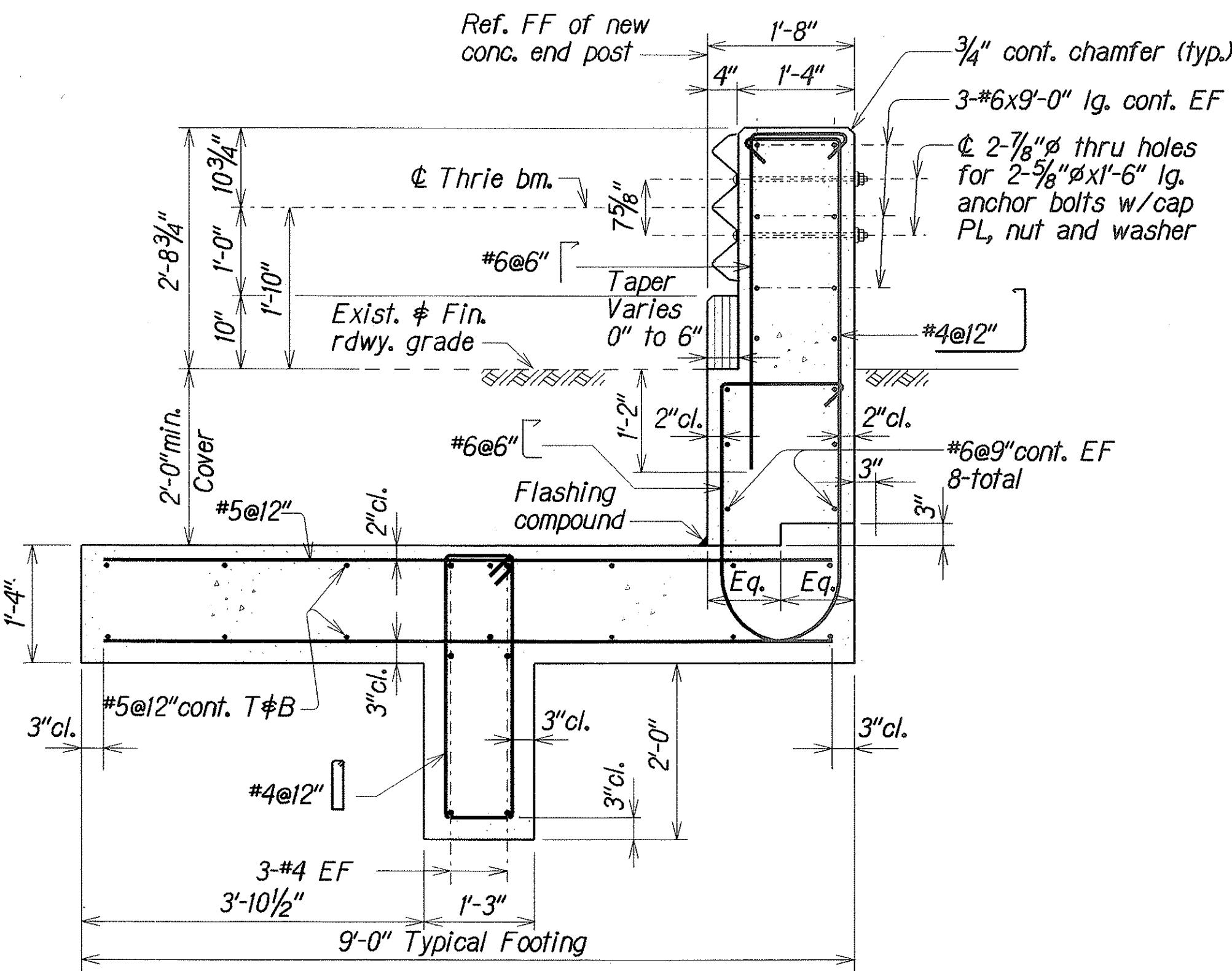
**PARTIAL ISOMETRIC VIEW
TYPE "E" ENDPST UPGRADE**
Not to Scale



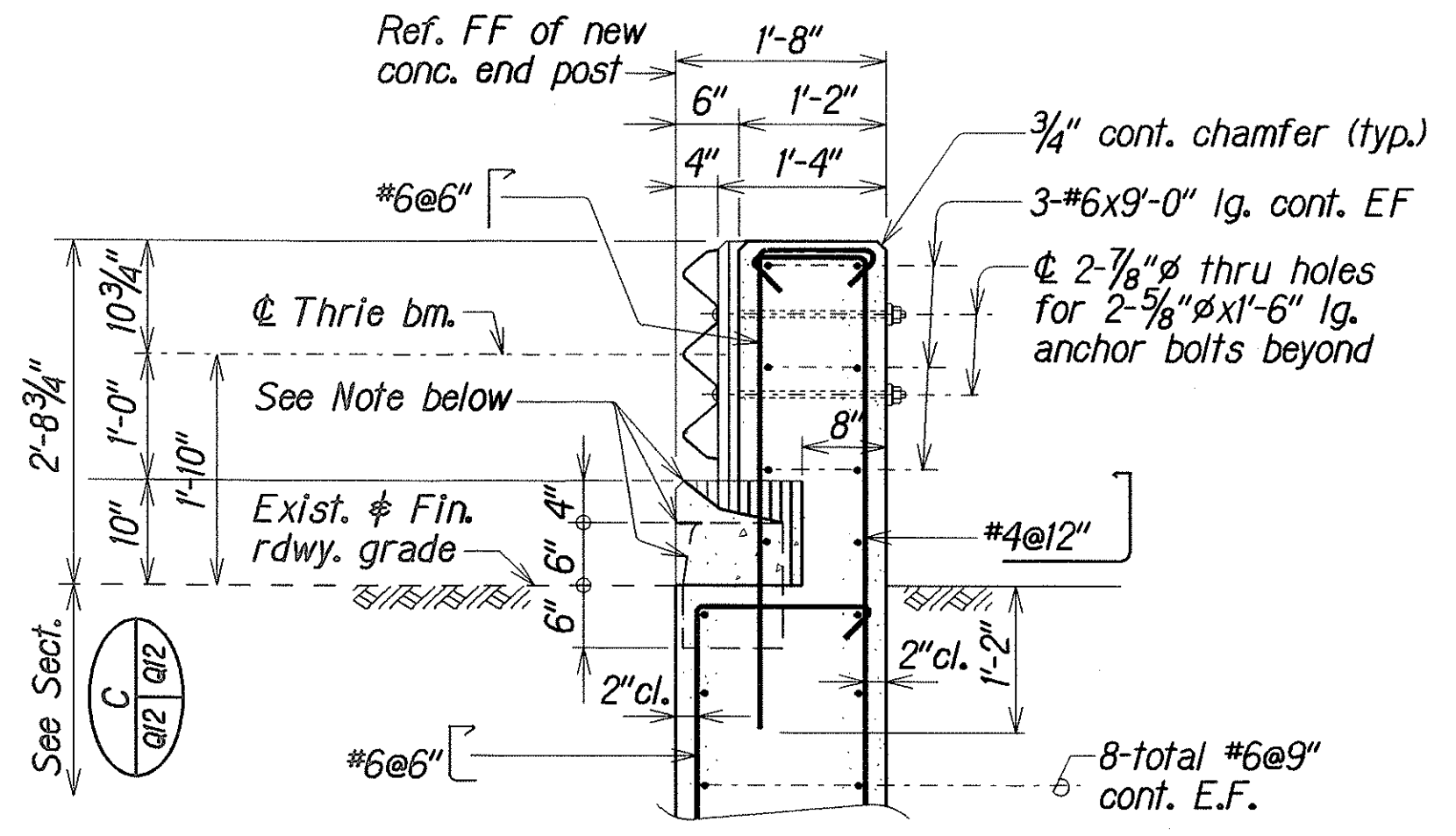
SECTION A1
Scale: 3/4" = 1'-0"



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



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



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

Note: Curb to be in line with front face of metal guardrail and match front face of concrete endpost at tapered end

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**TYPE "E" ENDPST UPGRADE
ISOMETRIC VIEW and DETAILS**

PANAWEA STREAM BRIDGE
HAWAII BELT ROAD GUARDRAIL & SHOULDER IMPROVEMENTS
Paauhau Road to Papalele Road
Fed. Aid Proj. No. NH-019-1(37)

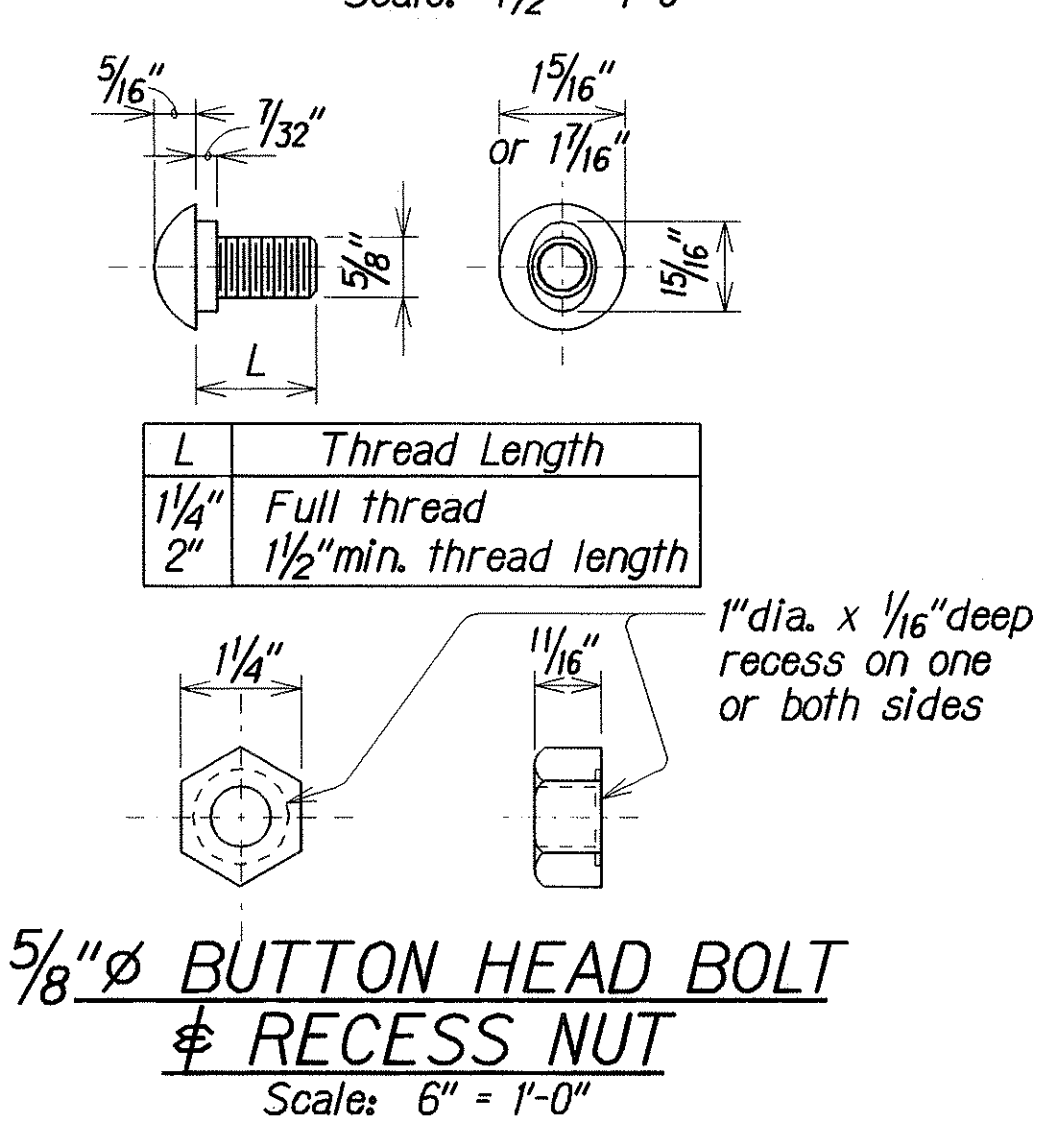
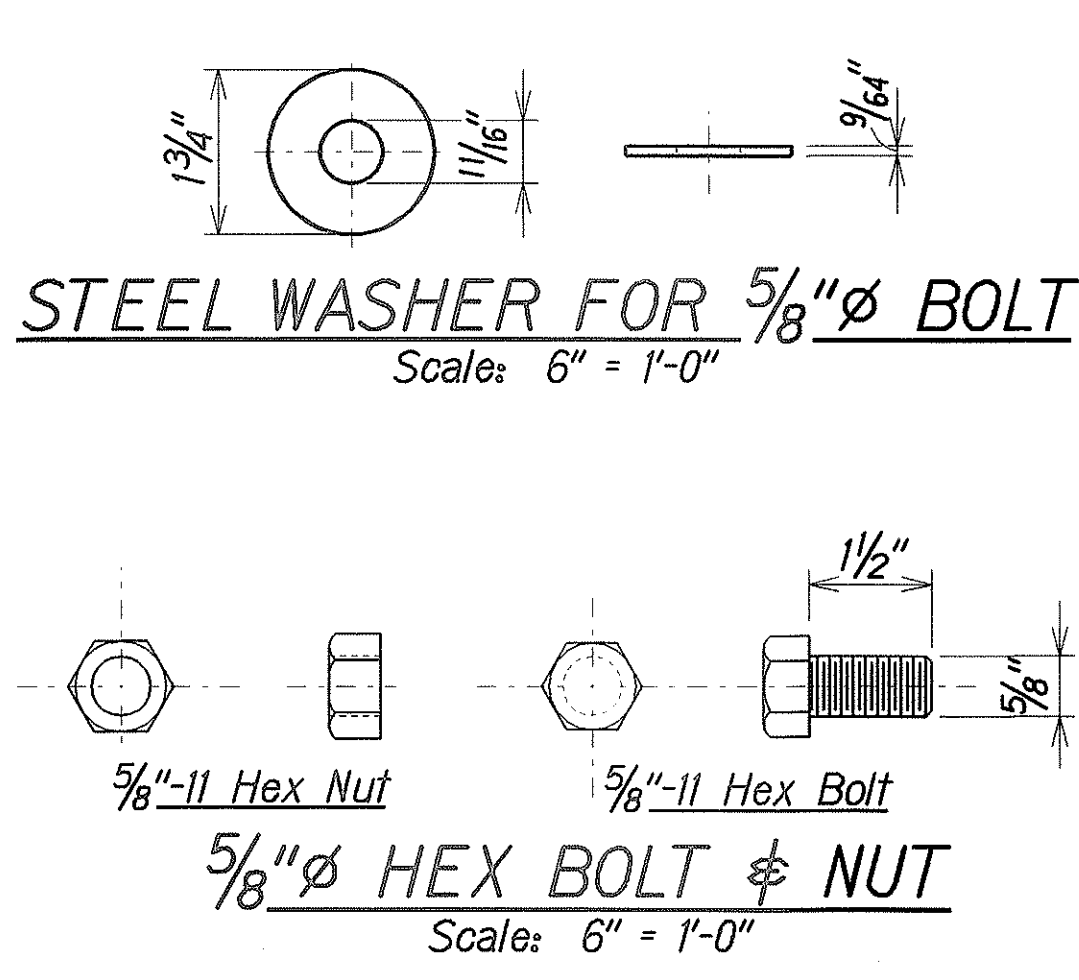
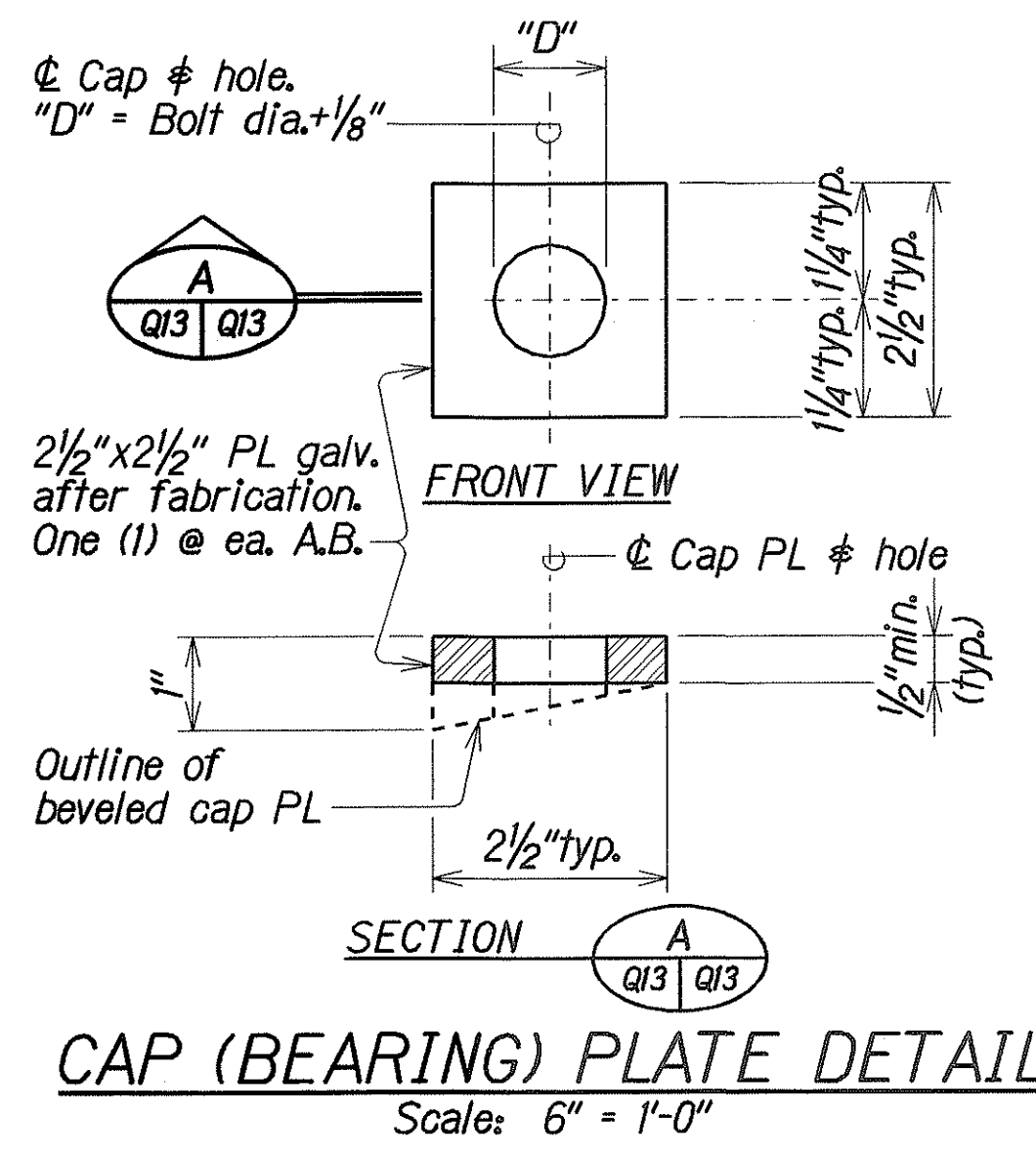
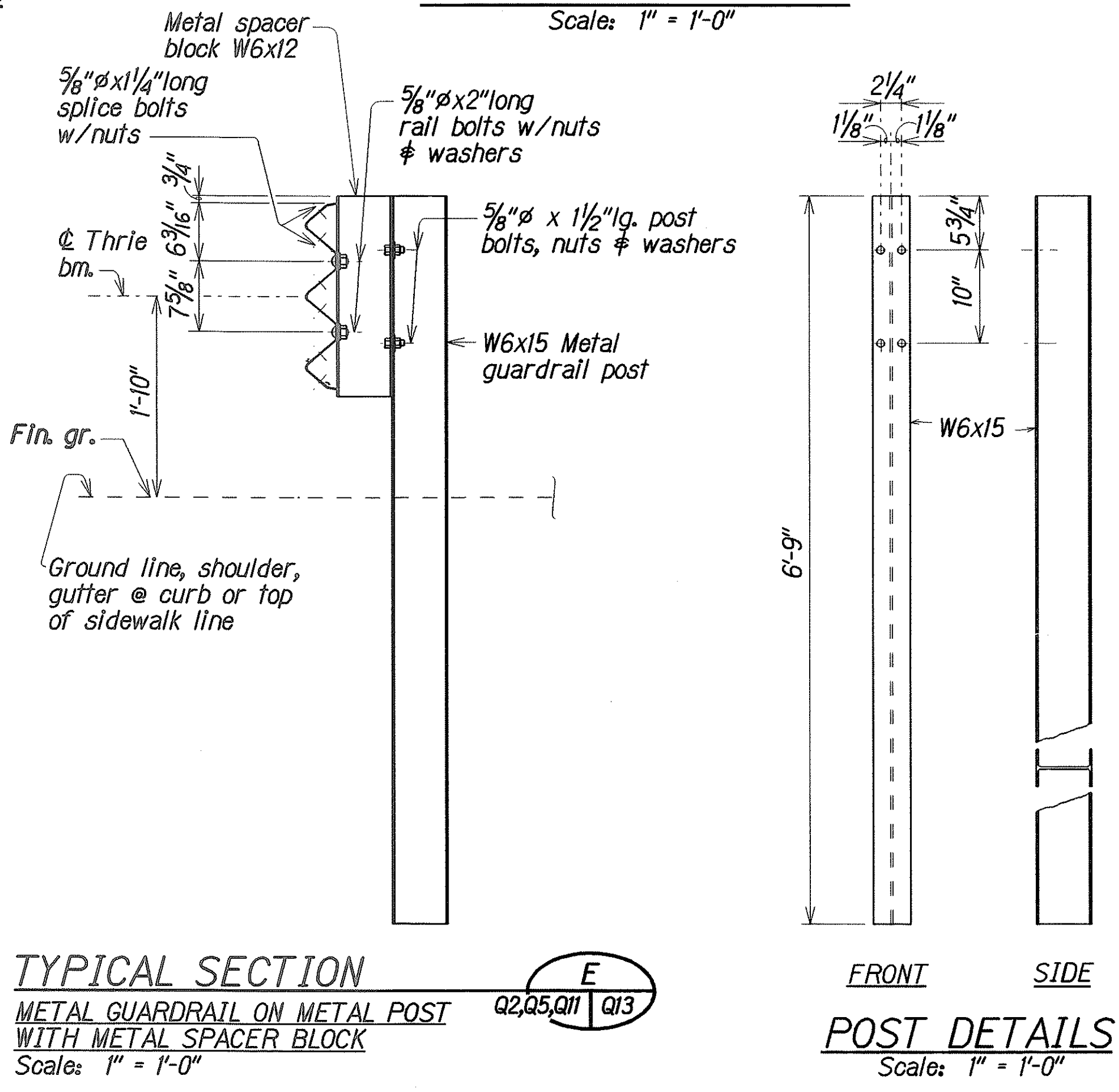
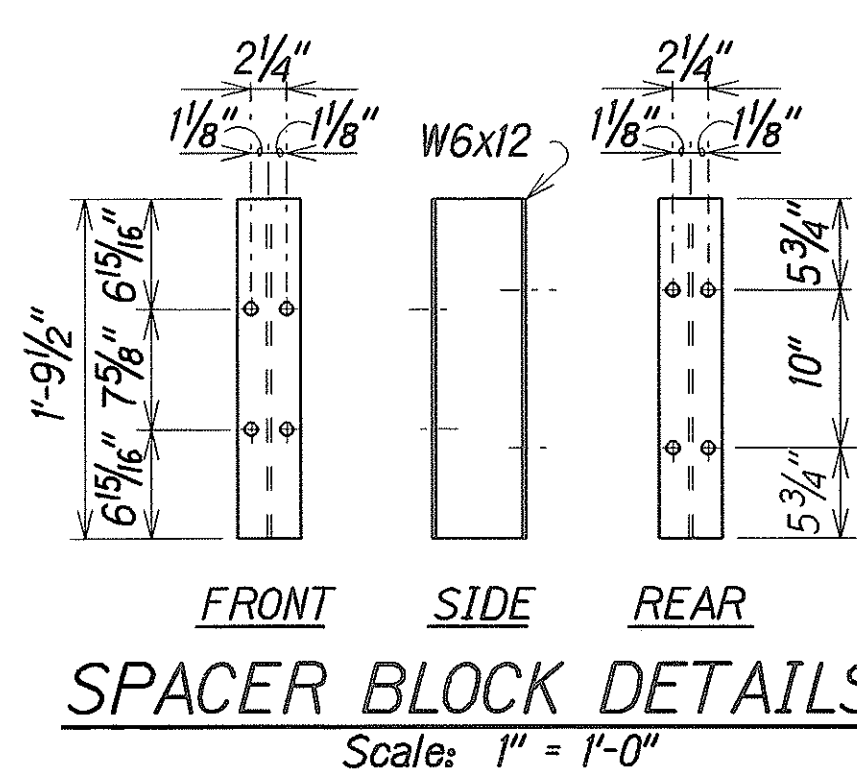
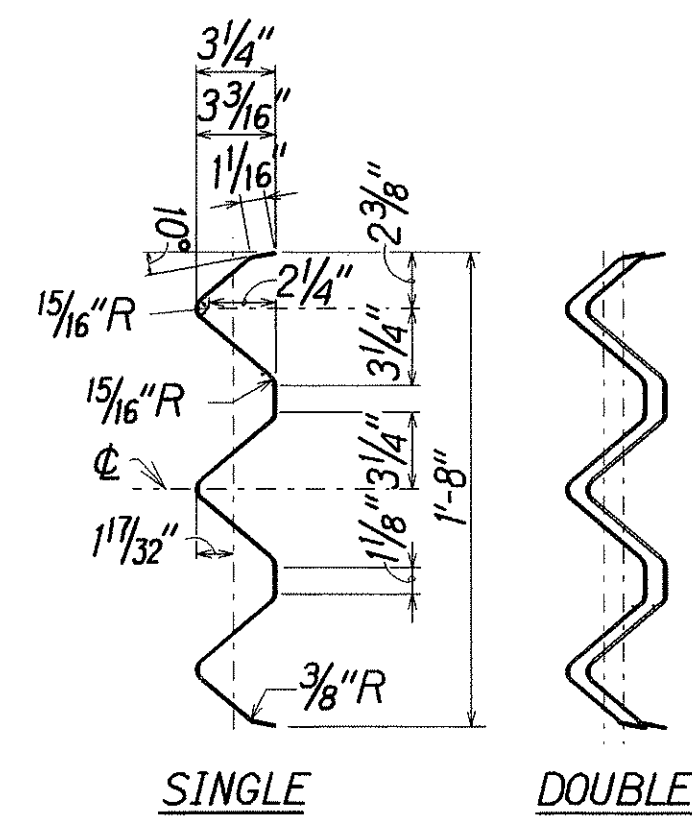
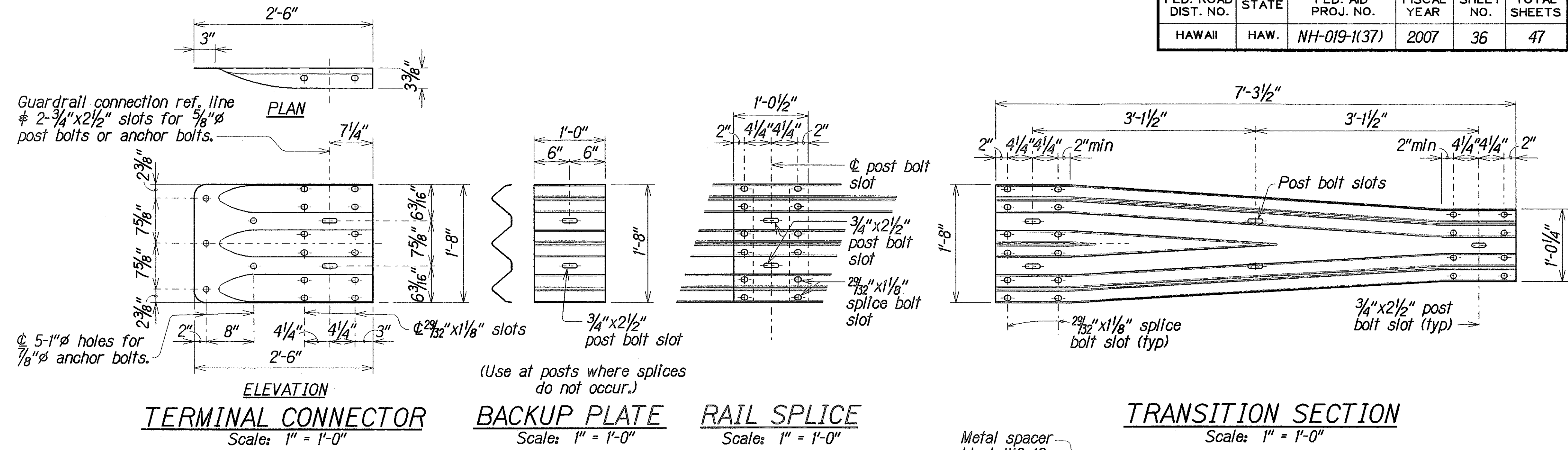
Scale: As Noted Date: Oct, 2006

SHEET No. Q12 OF 13 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRY, JFU	OCT 2006
QUANTITIES BY	DRY, JFU	OCT 2006
CHECKED BY	PTS	OCT 2006

0447/dt/ist/2/ksq/11u/KahawaiMikaeloPanaewa/

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-1(37)	2007	36	47



METAL GUARDRAIL TYPE 3 THRIE BEAM AND APPURTENANCES DETAILS **MANOLOA and PANAewa STREAM BRIDGES**

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

METAL GUARDRAIL TYPE 3 THRIE BEAM and APPURTENANCES DETAILS

KAHAWAILIILI, MANOLOA & PANAewa STR. BRIDGES
HAWAII BELT ROAD GUARDRAIL & SHOULDER IMPROVEMENTS
Paauhau Road to Papalele Road and Various Locations
Fed. Aid Proj. No. NH-019-1(37)

Scale: As Noted Date: Oct, 2006