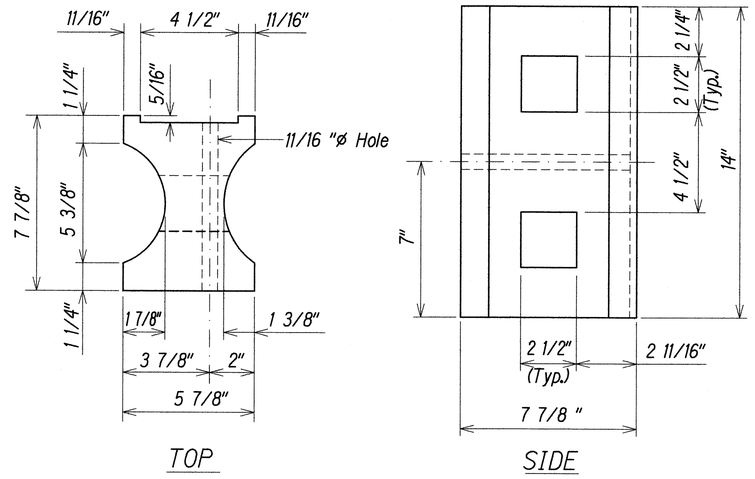
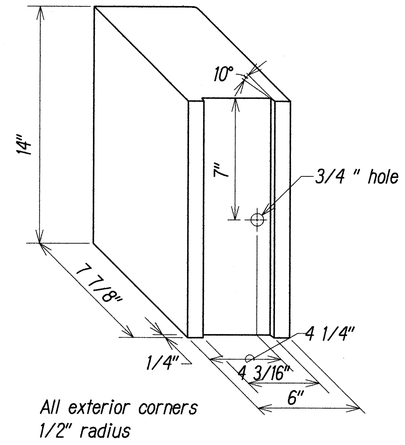
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	550AB-01-06	2009	8	34



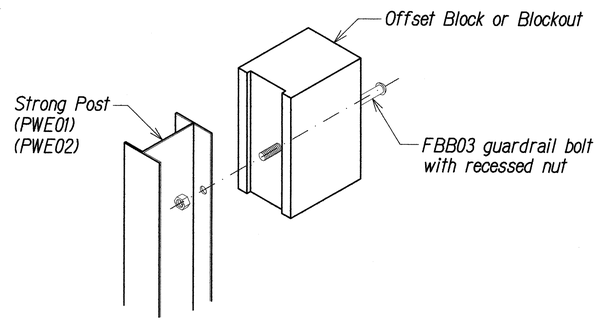
TOP SIDE

RECYCLED PLASTIC BLOCKOUT (TYPE I)



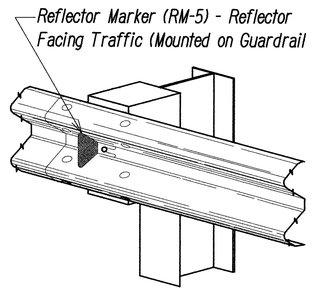
All exterior corners 1/2" radius

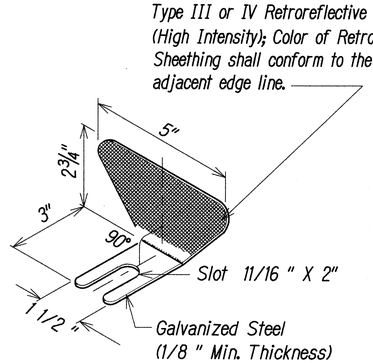
RECYCLED POLYETHYLENE OFFSET BLOCK (TYPE II)



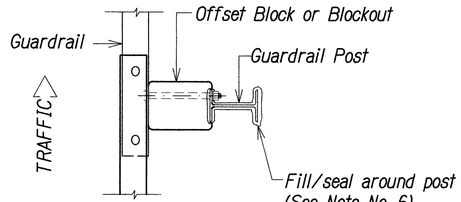
EXPLODED VIEW
(Rail and washer not shown)

STEEL POST AND BLOCK DETAIL

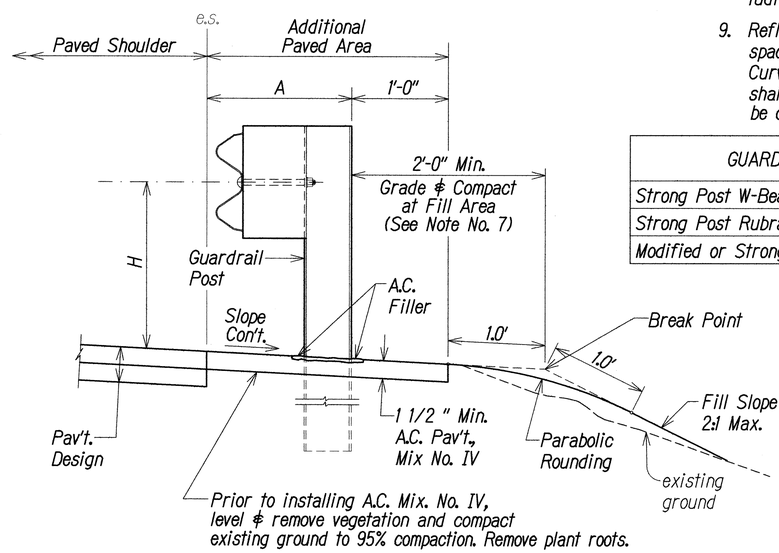




REFLECTOR MARKER (RM-5) DETAIL AND TYPICAL INSTALLATION



PLAN



ELEVATION

TYPICAL GUARDRAIL INSTALLATION

GENERAL NOTES

1. All hardware, posts and fasteners shall be hot-dip zinc coated galvanized after fabrication. No punching, drilling or cutting will be permitted after galvanizing.
2. Where conditions require, special post lengths in increments of 6 inches may be specified.
3. All fasteners, posts, and rail elements (i.e. FBB03, PWE01, RWM02b, etc.) 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, Subcommittee On New Highway Materials, Task Force 13 Report. Dimensions of fasteners, posts and rail elements have been converted from metric units into their present form.
4. The Recycled Plastic Block or Offset Block shall be accepted by the State.
5. All new guardrail systems (system consists of total length of guardrail including both end treatments) shall include the Additional Paved Area.
6. After the guardrail posts are installed in the paved area, the Contractor shall fill/seal around each guardrail post and all cracks in the paved area caused during the guardrail post installation. If required by the inspector/engineer, the Contractor shall tamper the paved area around the guardrail post prior to filling/sealing. All costs associated with this work shall not be paid for separately, but shall be considered incidental to the various guardrail items.
7. When standards for the fill slope area cannot be met, a site specific, engineer approved design may be used.
8. New A.C. pavement at guardrails shall extend 6 feet longitudinally beyond terminal ends.
9. Reflector Markers (RM-5) mounted on guardrails shall be spaced every 25 feet. Spacing of RM-5's on Horizontal Curves shall comply with Table III-1 of the MUTCD. RM-5's shall not be installed on Terminal Sections. RM-5's shall be considered incidental to the adjacent guardrail system.

GUARDRAIL TYPE	DIMENSION	
	H	A
Strong Post W-Beam	1'-9 5/8 "	1'-6"
Strong Post Rubrail (W-Beam)	2'-0"	1'-6"
Modified or Strong Post Thrie Beam	2'-0"	2'-0"

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APRIL 30, 2010
WILSON OKAMOTO CORPORATION LIC. EXP. DATE

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL DETAILS & NOTES

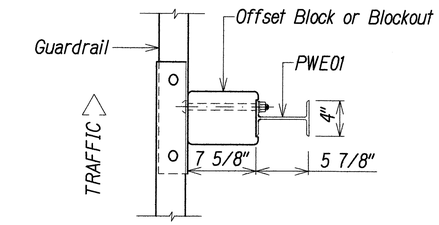
WAIMEA CANYON DRIVE/KOKEE ROAD
IMPROVEMENTS PHASE 1
MILE POST 0.80 TO MILE POST 4.60
Proj. No. 550AB-01-06

Scale: Not to Scale Date: October 2008

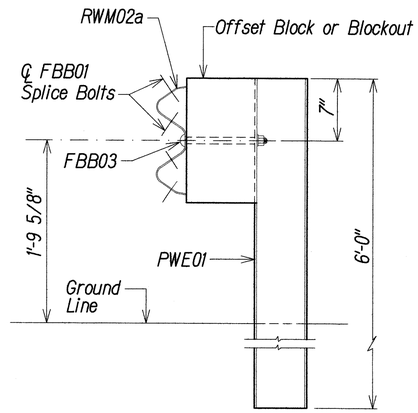
SHEET No. 1 OF 14 SHEETS

ORIGINAL PLAN	DRAWN BY	TRACED BY	DESIGNED BY	QUANTITIES BY	CHECKED BY	DATE
NOTE BOOK						

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	550AB-01-06	2009	9	34



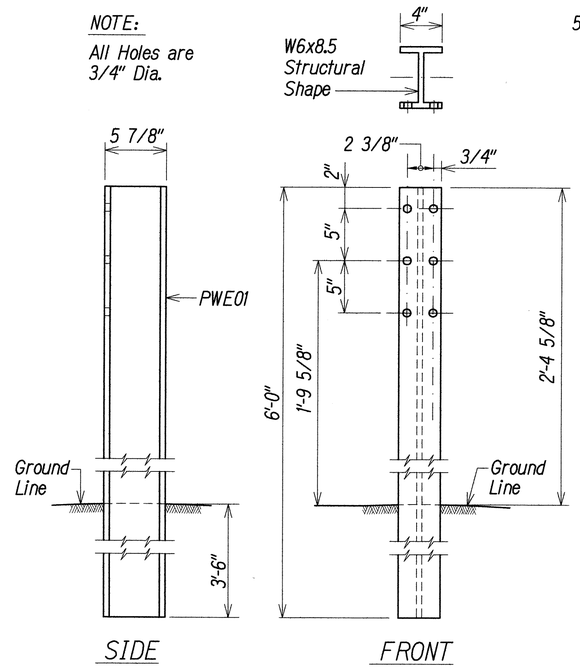
PLAN



ELEVATION

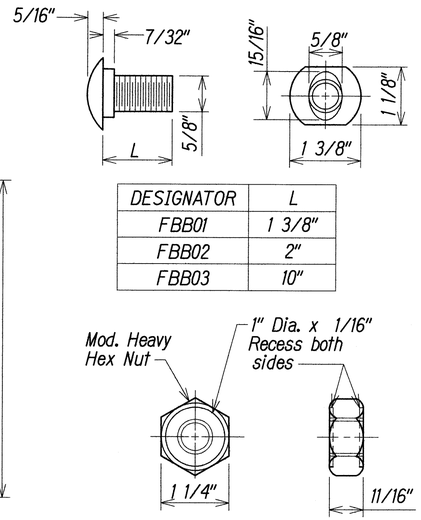
STRONG POST W-BEAM GUARDRAIL (SGR04a)

NOTE:
All Holes are 3/4" Dia.



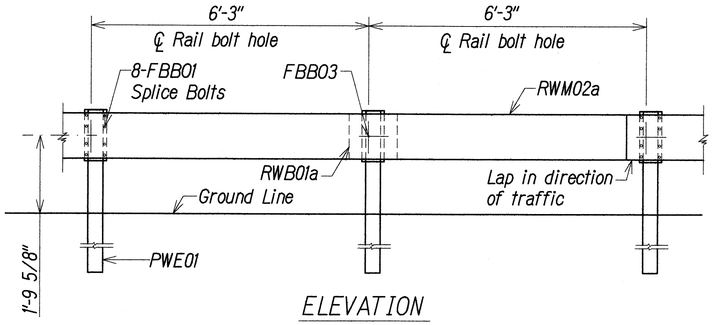
SIDE FRONT

W-BEAM STRONG POST (PWE01)



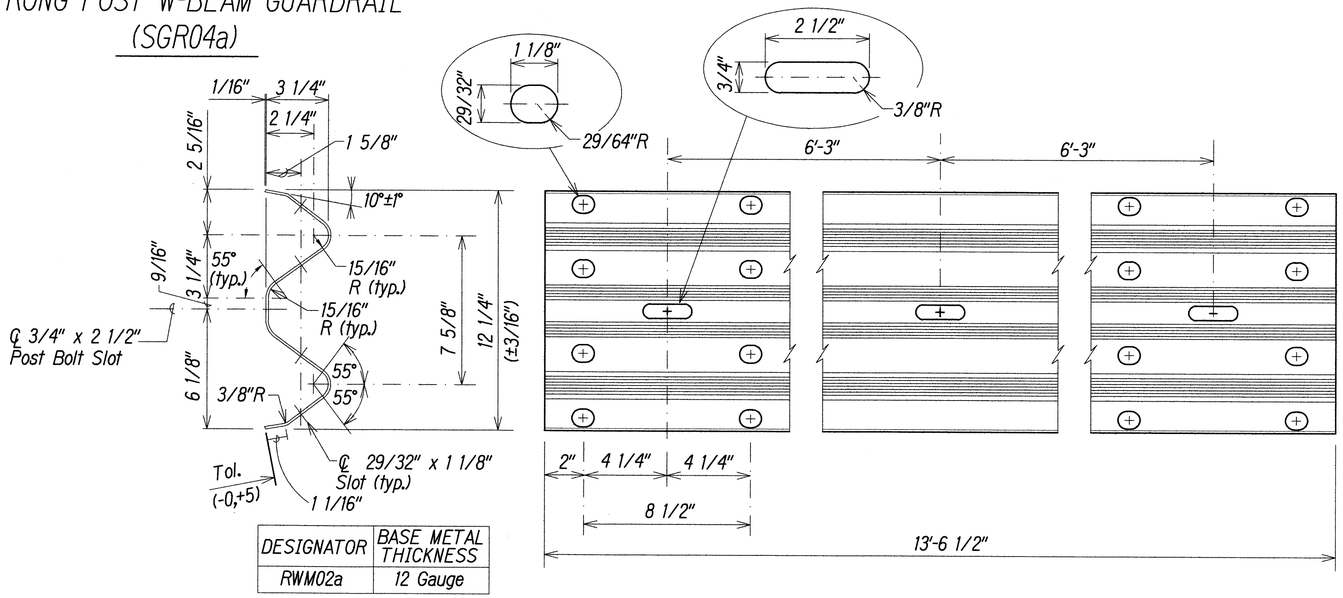
DESIGNATOR	L
FBB01	1 3/8"
FBB02	2"
FBB03	10"

GUARDRAIL BOLTS AND RECESSED NUT



ELEVATION

RECYCLED OFFSET BLOCK OR PLASTIC BLOCKOUT



DESIGNATOR	BASE METAL THICKNESS
RWM02a	12 Gauge

2 SPACE W-BEAM GUARDRAIL (RWM02a)

ORIGINAL PLAN
DATE
PRINT PLOTTED BY
REARR BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
NOTE BOOK
No. SHEETS

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STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRONG POST
W-BEAM GUARDRAIL

WAIMEA CANYON DRIVE/KOKEE ROAD
IMPROVEMENTS PHASE 1
MILE POST 0.80 TO MILE POST 4.60
Proj. No. 550AB-01-06

Scale: Not to Scale Date: October 2008

SHEET No. 2 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	550AB-01-06	2009	10	34

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STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

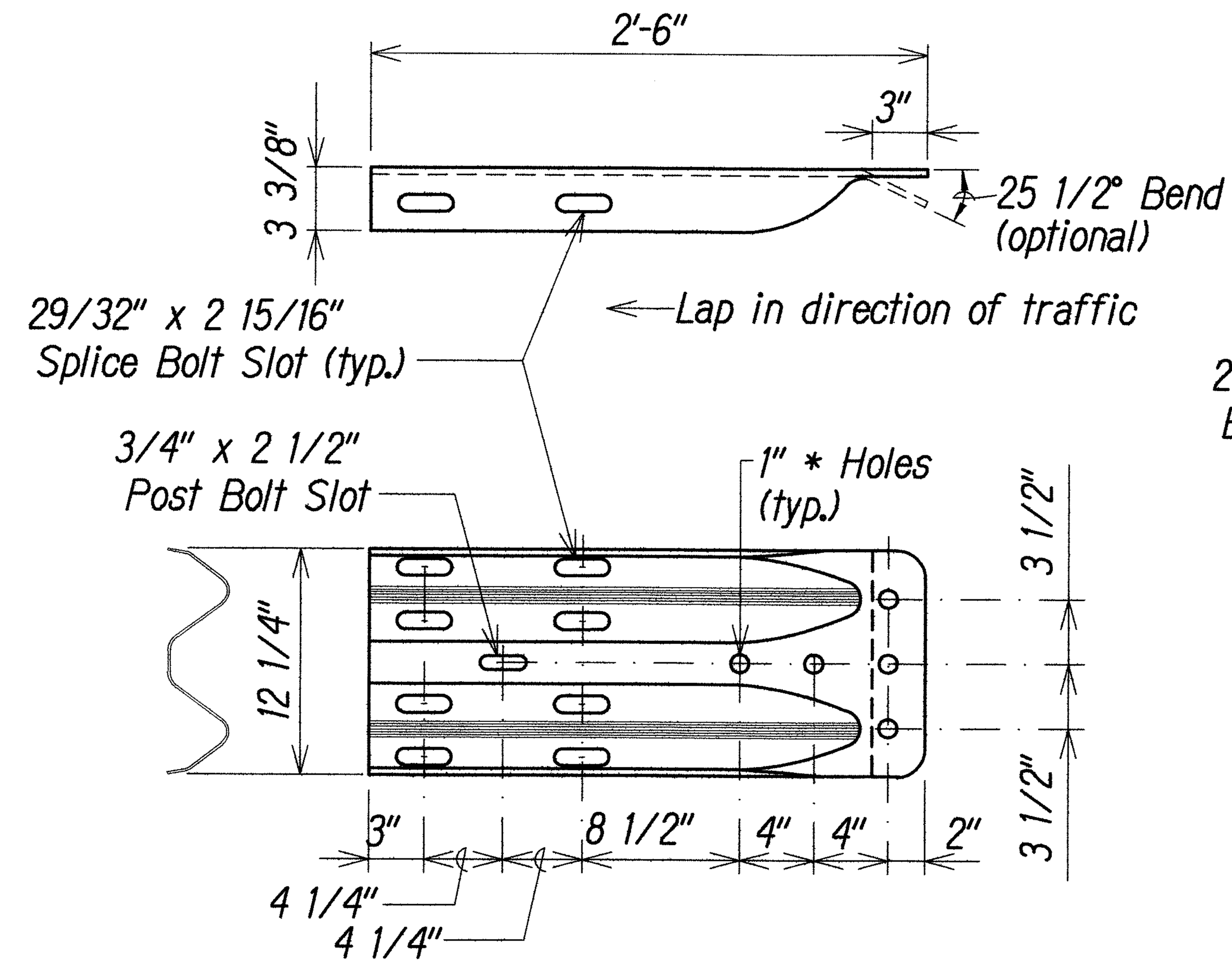
PORTABLE CONCRETE BARRIER

WAIMEA CANYON DRIVE/KOKEE ROAD
IMPROVEMENTS PHASE I
MILE POST 0.80 TO MILE POST 4.60
Proj. No. 550AB-01-06

Scale: Not to Scale   Date: October 2008

SHEET No. 3 OF 14 SHEETS

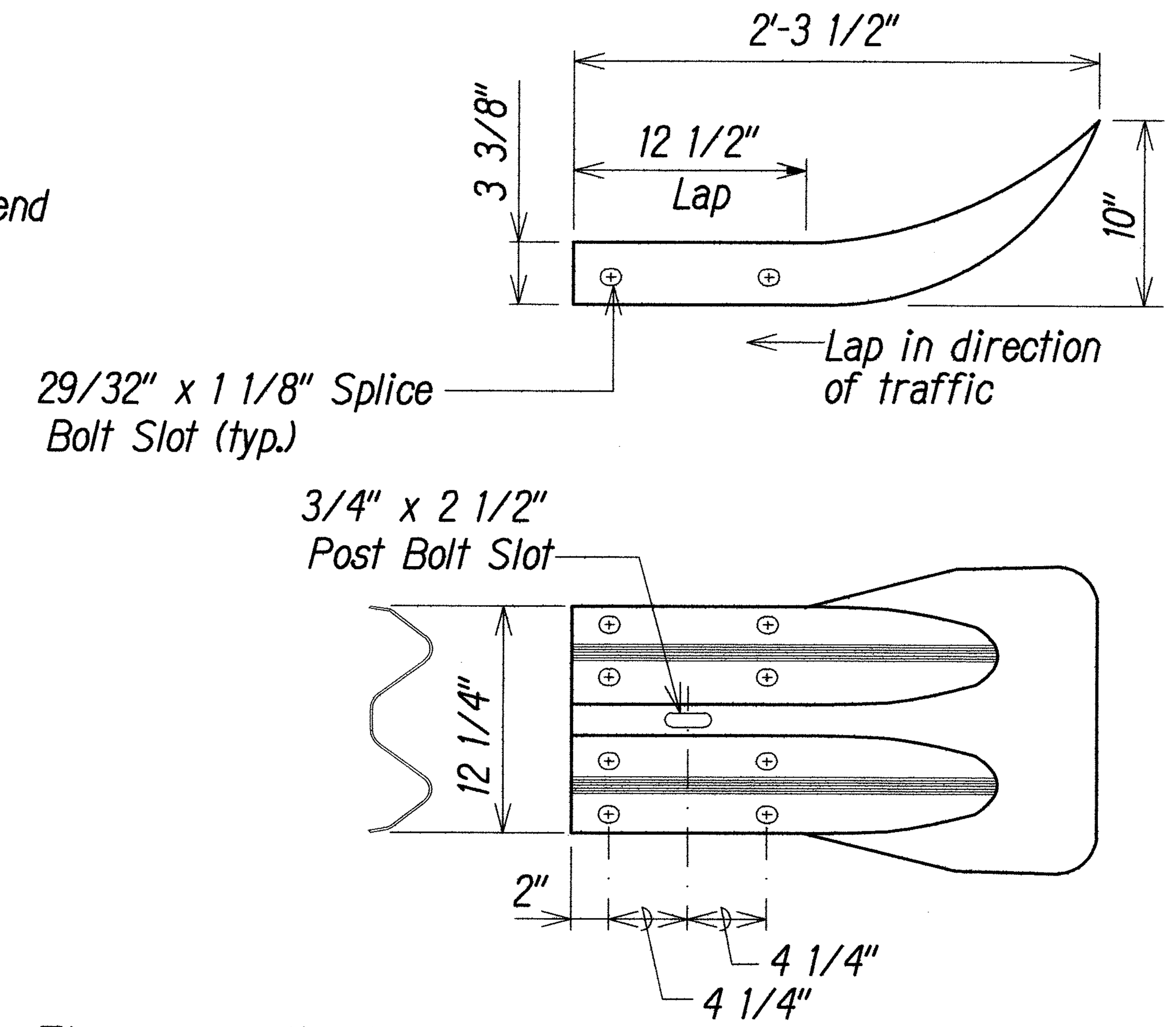
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	550AB-01-06	2009	11	34



The cross-sectional dimensions for this part are to fit over part RWM02a on the approach end and under part RWM02a on the trailing end.

DESIGNATOR	BASE METAL THICKNESS
RWE02b	10 Gauge

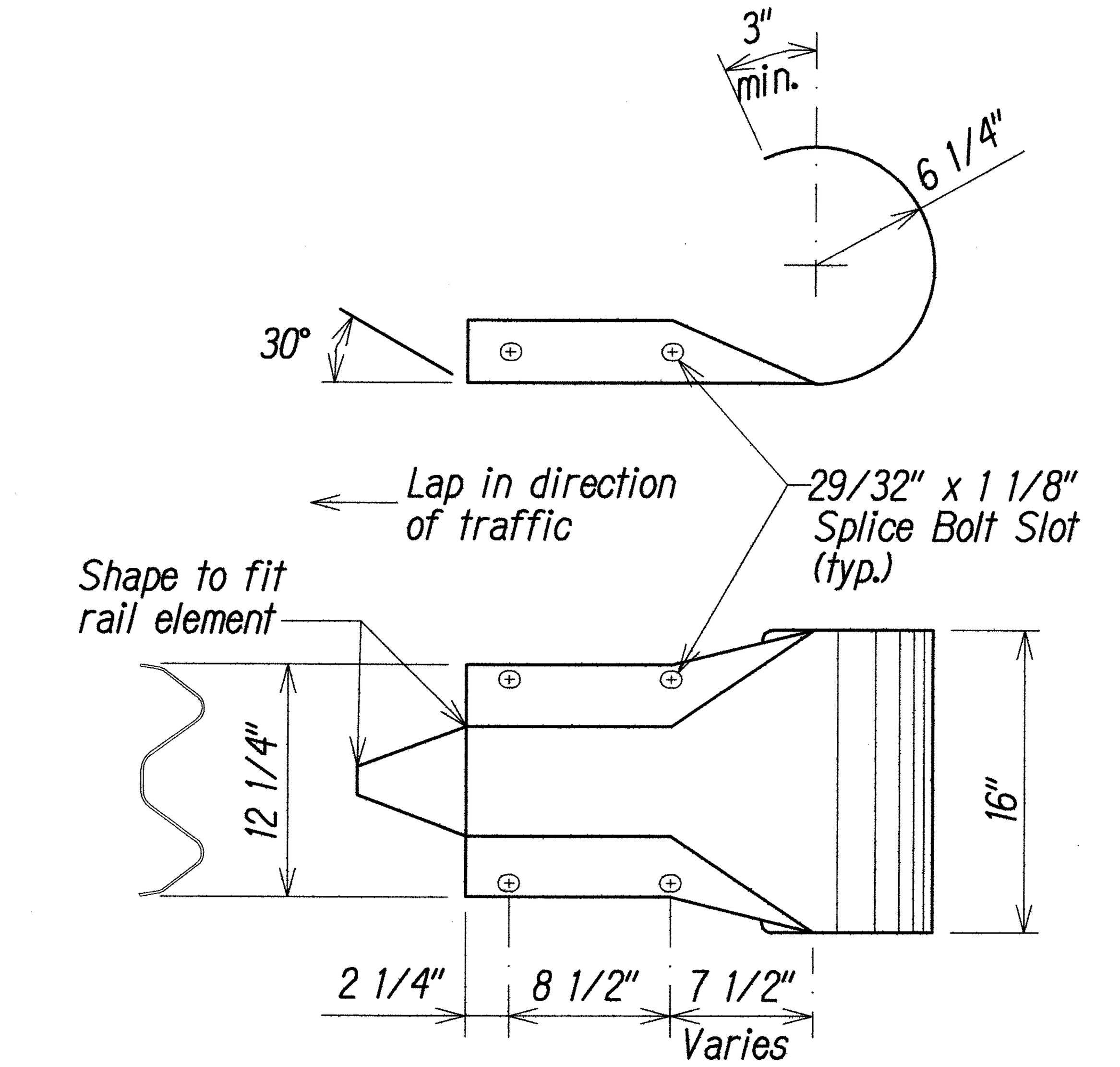
W-BEAM TERMINAL CONNECTOR (RWE02b)



The cross-sectional dimensions for this part are to fit over part RWM02a on the approach end and under part RWM02a on the trailing end.

DESIGNATOR	BASE METAL THICKNESS
RWE01a	12 Gauge

W-BEAM END SECTION (FLARED RWE01a)



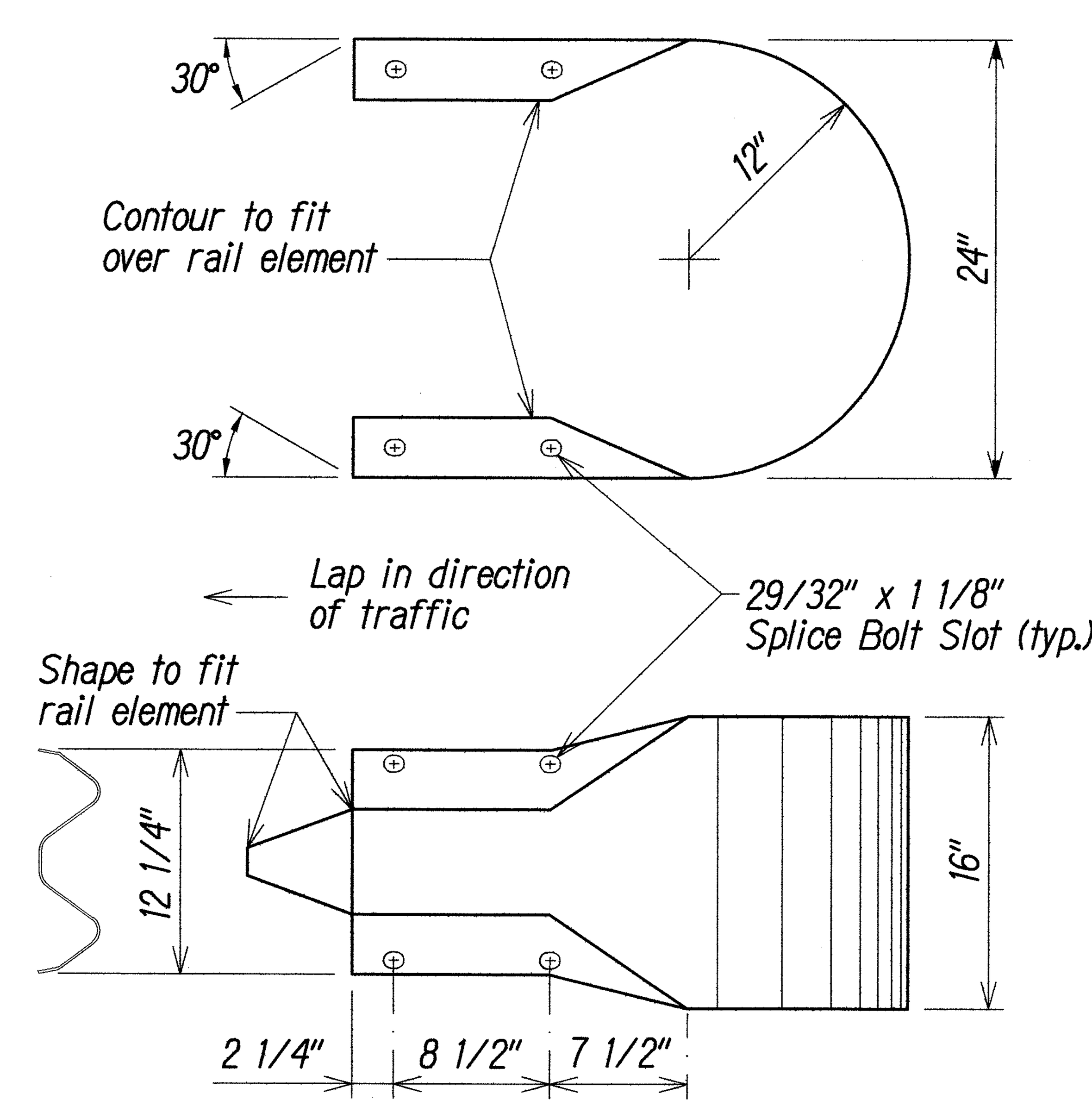
The cross-sectional dimensions for this part are to fit over part RWM02a

DESIGNATOR	BASE METAL THICKNESS
RWE03a	12 Gauge

W-BEAM END SECTION (ROUNDED RWE03a)

METAL REINFORCEMENT TABLE

MARK	LOCATION	BAR SIZE	(NO. BARS)	SKETCH
H-1	Horizontal in Barrier Tied Inside V-1 Bars	#5	(6)	19'-3"
H-2	Centered Above Scuppers Long. & Transversely	#5	(6)	6'-6"
H-3	Tied Above H-1 Bars to Support H-2, Tied to V-1	#4	(2)	1'-6"
S-1	Horizontal in Top of Wing Wall & in Floor Back Wall	#4	(2)	2'-5" Lifting Hole 90° R=3⅜"
S-2	Horizontal Around Slots Between V-1's @ Scuppers	#4	(2)	R=1½" Slots 7" 1" Min. Clear to Bar 1'-6" 5'-1" Bar w/(4) 1½"R Bends & Min. 1'-0" Overlap
V-1	Vertical in Barrier (3) Each End & (2) at Each Scupper	#5	(16)	Total Length 4'-9" R=2 3/16" 12° 9½" 4⅜" 2'-1⅜"



The cross-sectional dimensions for this part are to fit over part RWM02a

DESIGNATOR	BASE METAL THICKNESS
RWE06a	12 Gauge

W-BEAM END SECTION (BUFFER RWE06a)

NOTES:

1. For end treatment, layout, crash cushions and where needed see Project Plans or Special Provisions.
2. Barriers must be pinned together and cannot exceed the Table of Maximum Tapers.
3. The concrete barrier "Standard Installation" design allows for 3'-3" of outward lateral movement if the barrier is struck. Barrier installations that require less than the 3'-3" of outward lateral movement should have stabilization pins.
4. ASTM A-36 steel shall be used for the connection pin, connection loops and stabilization pins. A one piece pin with a 3" rounded top may be used in place of the detailed connection pin if the one piece pin meets ASTM A-36 requirements.
5. A 4" white PVC sleeve may be used to form the lifting hole and if used the sleeve is to be left in place.
6. Concrete shall be Class A and reinforcing shall be Grade 60.
7. Identification and date of design will be as follows:
   PROPERTY
   OF HDOT
   OCT 2001
   Text letters and numbers shall be shown as on Standard Plan Sht. No. B-01. "PROPERTY OF HDOT" may be changed depending upon ownership. All Portable Concrete Barriers made for HDOT will be subject to rejection, if "PROPERTY OF HDOT" is not imprinted. The Contractor shall bear the cost of the rejected Portable Concrete Barriers.
8. Minimum tangent length for portable Concrete Barrier System shall be 100' (5 units). This minimum does not include the required system length of the Inertial Barrier System.
9. Install steady burn amber lamps on portable concrete barriers @ 20.0' o.c. Installing, maintaining and removing each steady burn amber lamp including changing of batteries and bulbs shall be considered incidental to applicable portable concrete barrier items.

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WILSON OKAMOTO CORPORATION LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL TERMINAL CONNECTORS AND END SECTIONS

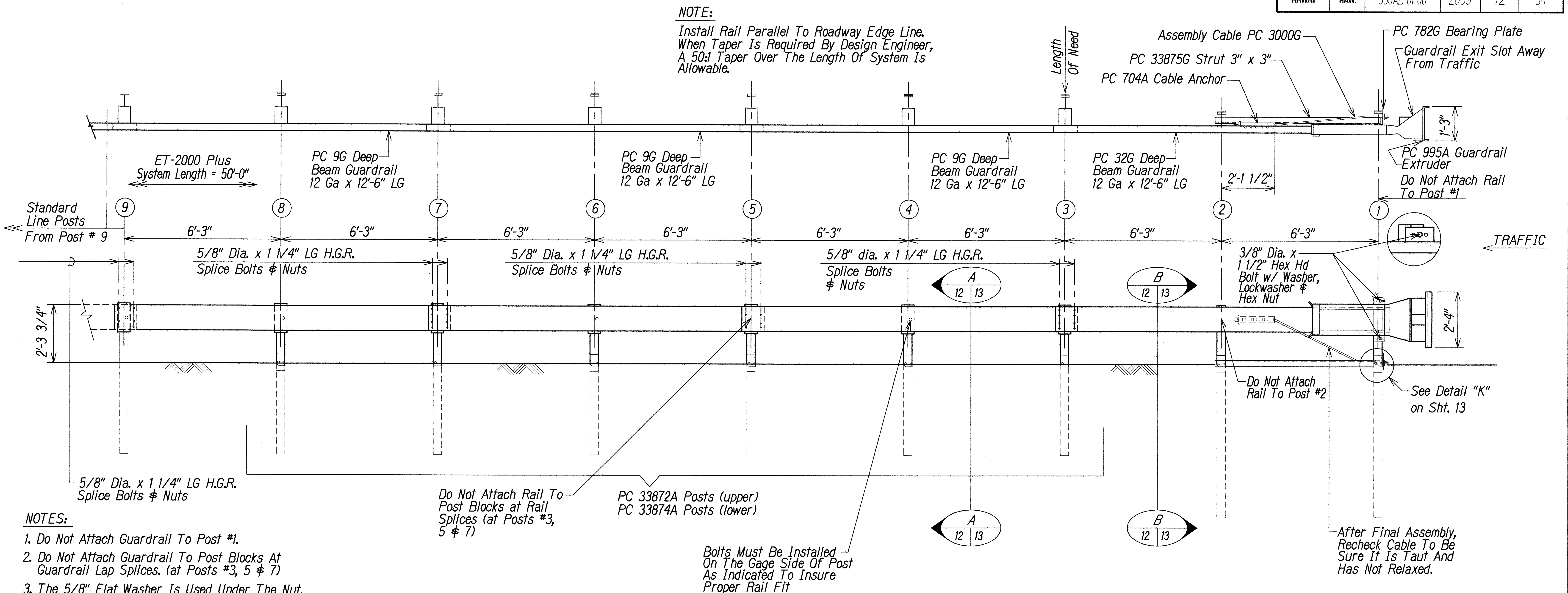
WAIMEA CANYON DRIVE/KOKEE ROAD
IMPROVEMENTS PHASE I
MILE POST 0.80 TO MILE POST 4.60
Proj. No. 550AB-01-06

Scale: Not to Scale   Date: October 2008

SHEET No. 4 OF 14 SHEETS

ORIGINAL PLAN
NOTE BOOK
No. SWC05004.dgn
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	550AB-01-06	2009	12	34



NOTES:

1. Do Not Attach Guardrail To Post #1.
2. Do Not Attach Guardrail To Post Blocks At Guardrail Lap Splices. (at Posts #3, 5 & 7)
3. The 5/8" Flat Washer Is Used Under The Nut, Behind The Post Only. No Washer Is Used At The Rail.
4. Manufacturer Suggests Customer To Provide Reflectorization Of Terminal.

BILL OF MATERIAL

PC	QTY	DESCRIPTION	PC	QTY	DESCRIPTION
9G	3	12 GA./12'6"/6'3"/S (GUARDRAIL)	3910G	2	1" HEX NUT
32G	1	12 GA./12'6"/6'3"/S ANC (GUARDRAIL)	5326B	6	RECYCLED PLASTIC BLOCKOUT OR OFFSET BLOCK
704A	1	CABLE ANCHOR BRACKET			
782G	1	5/8" x 8" x 8" BEARING PLATE	4254G	18	3/8" WASHER
995A	1	ET-2000 PLUS EXTRUDER	4255G	2	3/8" FENDER WASHERS
3000G	1	CABLE 3/4" x 6'6"	4258G	16	3/8" LOCKWASHER
3300G	6	5/8" WASHER	4261G	2	3/8" Dia. x 1 1/2" HEX HD BOLT
3340G	38	5/8" HEX NUT	4699G	16	3/4" LOCKWASHER
3360G	32	5/8" dia. x 1 1/4" SPLICE BOLT	6321G	16	3/8" Dia. x 2" HEX HD BOLT
3500G	6	5/8" dia. x 10" POST BOLT	6405G	18	3/8" HEX NUT
3701G	19	3/4" WASHER	33871A	1	ET2000 HBA POST #1 TOP
3704G	16	3/4" HEX NUT	33872A	7	ET2000 HBA POST #2-#8 TOP
3717G	15	3/4" Dia. x 2 1/2" HEX HD BOLT	33873A	2	ET2000 HBA POST #1-#2 BOTTOM
3718G	1	3/4" Dia. x 3" HEX HD BOLT	33874A	6	ET2000 HBA POST #3-#8 BOTTOM
3900G	2	1" WASHER	33875G	1	6'-6" ANGLE STRUT ET HBA

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APRIL 30, 2010
LIC. EXP. DATE

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK	TRACED BY	
	DESIGNED BY	
No. SWCDK005.dgn	QUANTITIES BY	
	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

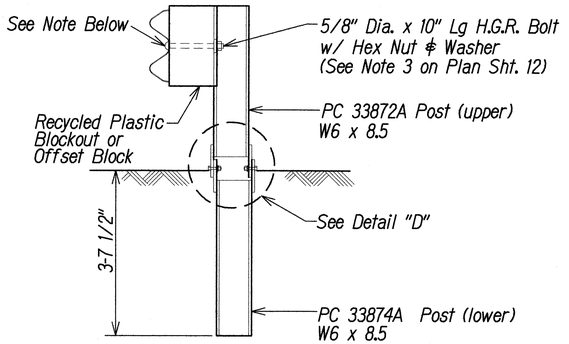
ET-2000 PLUS

WAIMEA CANYON DRIVE/KOKEE ROAD IMPROVEMENTS PHASE I
MILE POST 0.80 TO MILE POST 4.60
Proj. No. 550AB-01-06

Scale: Not to Scale
Date: October 2008

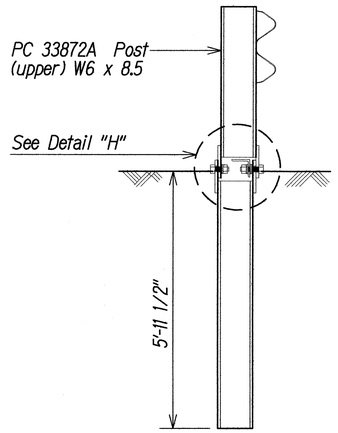
SHEET No. 5 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	550AB-01-06	2009	13	34

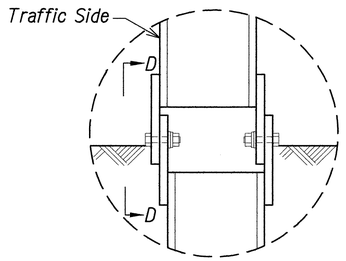


Note:
Section "A-A" Is Similar at Post #3, 5 & 7.
Except Rail Is Not Attached.

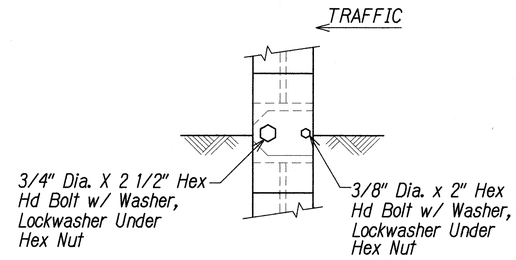
SECTION A (Typ. at Posts #4, 6 & 8)



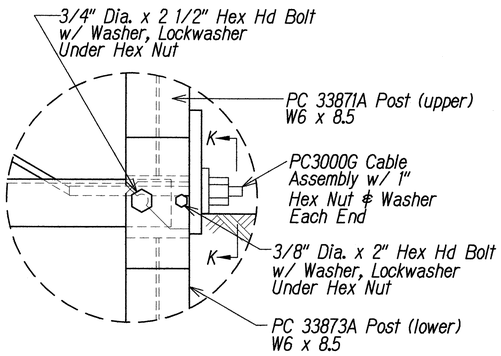
SECTION B (Post #2)



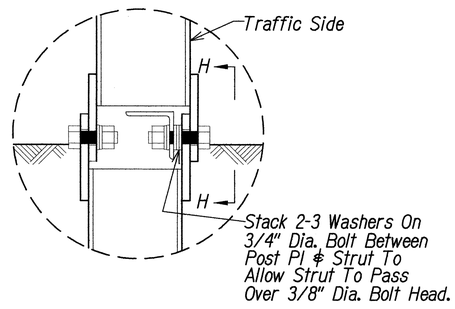
DETAIL "D"



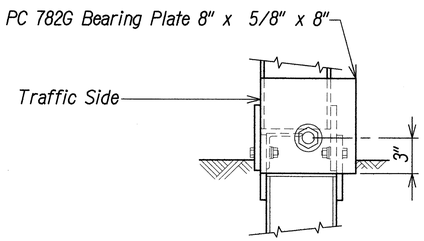
VIEW "D-D"



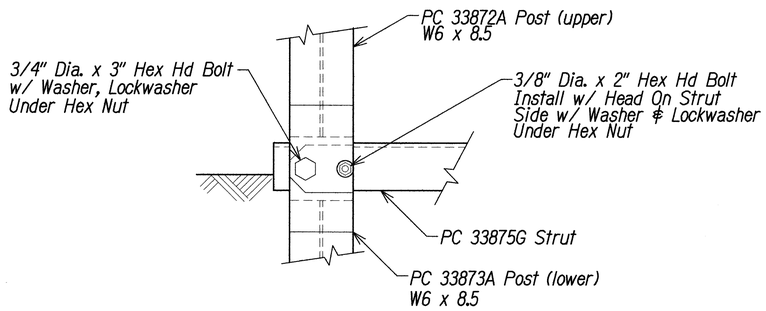
DETAIL "K"
(post #1)



DETAIL "H"
(Post #2)



VIEW "K-K"



VIEW "H-H"

ORIGINAL PLAN
NOTE BOOK
ENTRY PLOTTED BY
DRAWN BY
TRACED BY
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CHECKED BY
DATE

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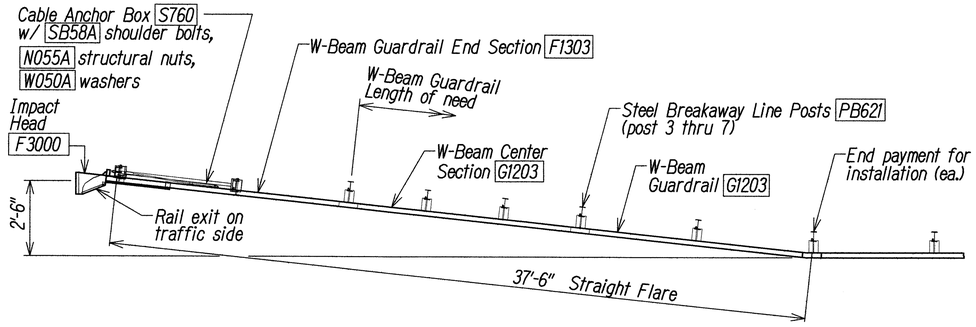
STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

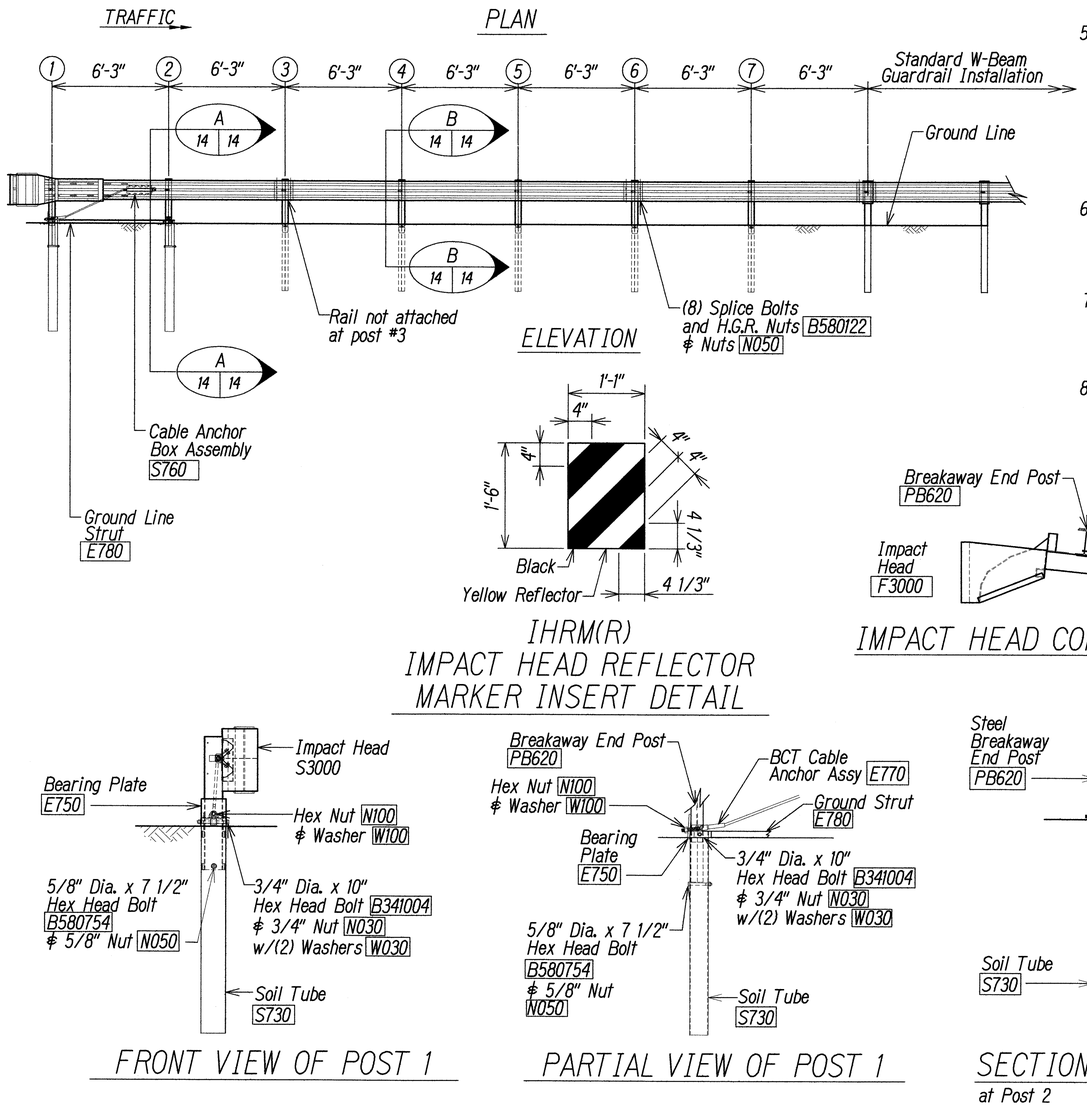
ET-2000 PLUS

WAIMEA CANYON DRIVE/KOKEE ROAD
IMPROVEMENTS PHASE 1
MILE POST 0.80 TO MILE POST 4.60
Proj. No. 550AB-01-06

Scale: Not to Scale Date: October 2008

SHEET No. 6 OF 14 SHEETS



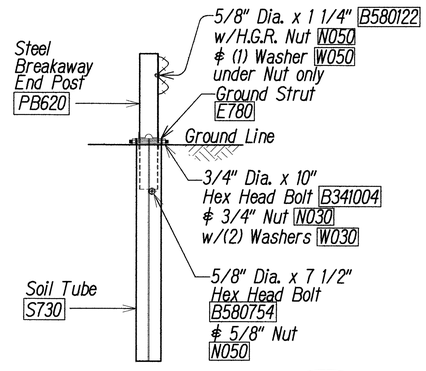


IHRM(R) IMPACT HEAD REFLECTOR MARKER INSERT DETAIL

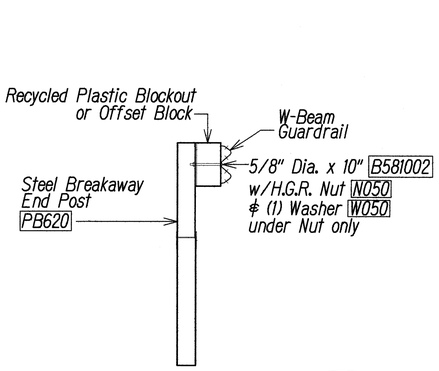
FRONT VIEW OF POST 1

PARTIAL VIEW OF POST 1

IMPACT HEAD CONNECTING DETAIL



SECTION A
at Post 2



SECTION B
Typical at Post 3 thru 8

GENERAL NOTES

1. Breakaway steel posts are required with the FLEAT Terminal.
2. All bolts, nuts, cable assemblies, cable anchors and bearing plates shall be galvanized.
3. The soil tubes shall not protrude more than 4" above ground (measured along a 5' cord). Site grading maybe necessary to meet this requirement.
4. The soil tubes may be driven with an approved driving head. Soil tubes shall not be driven with the post in the tube. If the tubes are placed in drilled holes, the backfill material must be satisfactorily compacted to prevent settlement.
5. When rock is encountered during excavation, a 12" dia. post hole, 20" deep may be used if approved by the engineer. Granular material will be placed in the bottom of the hole approx. 2 1/2" deep to provide drainage. The soil tubes will be field cut to length, placed in the hole and backfilled with adequately compacted material excavated from the hole.
6. The breakaway cable assembly must be taut. A locking device (vice grips or channel lock pliers), should be used to prevent the cable from twisting when tightening nuts.
7. (R) or (L) indicates right or left Impact Head Reflector Marker (IHRM). Providing and installing of IHRM shall be considered incidental to end treatment.
8. The stripes for IHRM shall slope downward at an angle of 45° towards the side of the end treatment that traffic is to pass.

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	550AB-01-06	2009	14	34

ITEM NO.	QTY.	BILL OF MATERIALS
F3000	1	IMPACT HEAD
F1303	1	W-BEAM GUARDRAIL END SECTION, 12 GA.
G1203	2	W-BEAM GUARDRAIL, 12 GA.
S730	2	*FOUNDATION SOIL TUBE, 6" x 8" x 72"
E750	1	BEARING PLATE
S760	1	CABLE ANCHOR BOX
E770	1	BCT CABLE ANCHOR ASSEMBLY
E780	1	GROUND STRUT
PB620	2	STEEL BREAKAWAY END POST
PB621	5	STEEL BREAKAWAY LINE POST
	5	RECYCLED PLASTIC BLOCKOUT OR OFFSET BLOCK
	1	IMPACT HEAD REFLECTOR MARKER - IHRM(R) OR (L)
		HARDWARE
B580122	25	5/8 " Dia. x 1 1/4 " SPLICE BOLT, POST #2
B580754	2	5/8 " Dia. x 7 1/2 " HEX BOLT
B341004	2	3/4 " Dia. x 10" HEX BOLT
B581002	5	5/8 " Dia. x 10" H.G.R. BOLT (POST 3 THRU 7)
N050	32	5/8 " Dia. H.G.R. NUT
		(SPLICE 24, SOIL TUBES 2, POST 2 THRU 7, 6)
N030	2	3/4 " Dia. HEX NUT
W050	6	H.G.R. WASHER
W030	4	3/4 " ID WASHER
N100	2	1" ANCHOR CABLE HEX NUT
W100	2	1" ANCHOR CABLE WASHER
B140404	2	1/4 " x 4" HEX BOLT
N014	2	1/4 " HEX NUT
W014	4	1/4 " WASHER
SB58A	8	CABLE ANCHOR BOX SHOULDER BOLT
N055A	8	1/2 " A325 STRUCTURAL NUT
W050A	16	1 1/16 " OD x 9/16 " ID A325 STR. WASHER

Foundation Tube Options For Posts 1 & 2
*6'-0" Split Foundation Tubes S730
*6'-0" Solid Foundation Tubes E731
*5'-0" Foundation Tubes S735 W/Soil Plates SP600
*4'-6" Foundation Tubes E735 W/Soil Plates SP600

ORIGINAL PLAN
NOTE BOOK
SHEET PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

BRIAN A. LOCK
LICENSED PROFESSIONAL ENGINEER
No. 9867-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
APRIL 30, 2010
WILSON OKAMOTO CORPORATION LIC. EXP. DATE

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

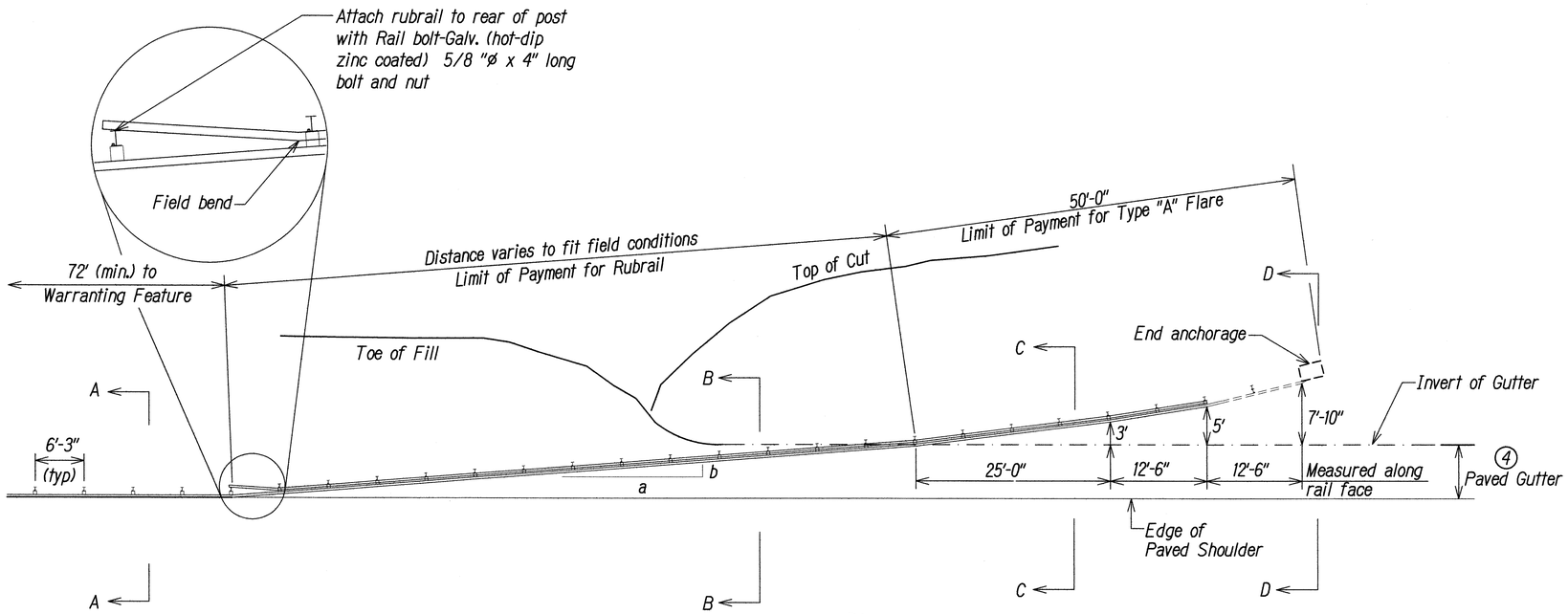
FLEAT-350
FLARED ENERGY ABSORBING TERMINAL

WAIMEA CANYON DRIVE/KOKEE ROAD
IMPROVEMENTS PHASE 1
MILE POST 0.80 TO MILE POST 4.60
Proj. No. 550AB-01-06

Scale: Not to Scale Date: October 2008

SHEET No. 7 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	550AB-01-06	2009	15	34



Plan

Design speed mph	a:b
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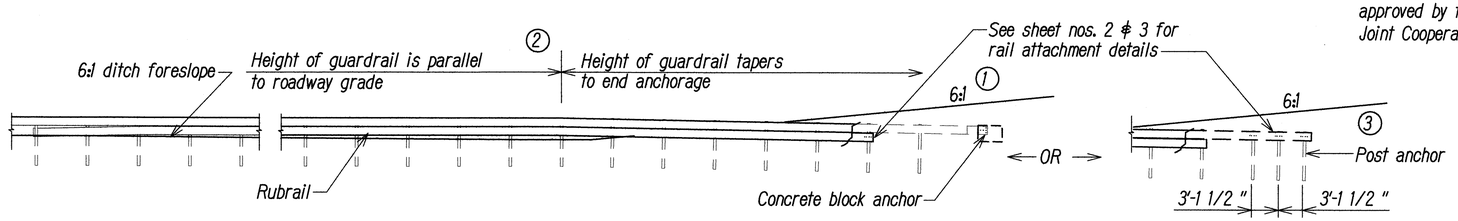
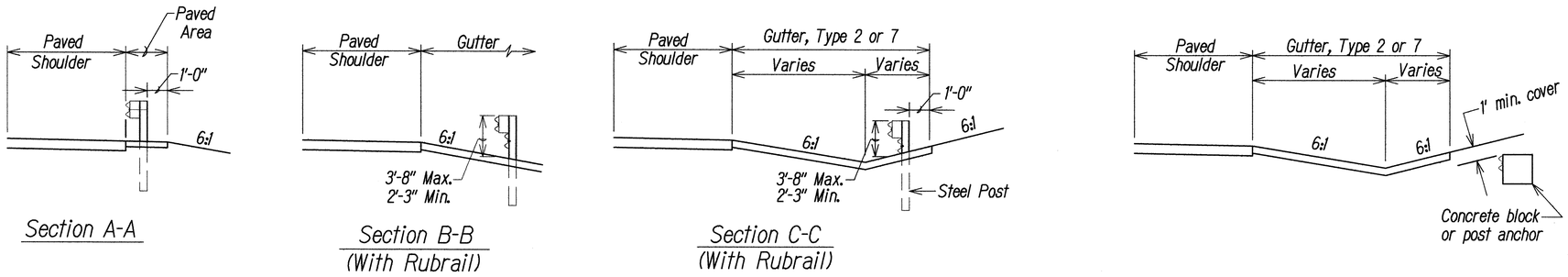
62	13:1
56	12:1
50	11:1
43	10:1
37	9:1
31	7:1



Elevation (Profile Along Rail)



General Notes

1. A 6:1 or flatter slope is desireable. However, a steeper or flatter existing slope may be used.
2. Height of guardrail may be tapered down in elevation to maintain 3'-8" maximum height.
3. All posts are 8'-0" in length from where the guardrail flares away from the shoulder back to the post anchor. Posts for the post anchor are 6'-0" long.
4. Variable Paved Gutter offsets may be used to fit field conditions.
5. The Guardrail Posts shall be located away from the gutter/swale invert.
6. 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-AGCARTBA Joint Cooperative Committee.

ORIGINAL PLAN — NOTE BOOK — SURVEY PLOTTED BY — DRAWN BY — TRACED BY — DESIGNED BY — QUANTITIES BY — CHECKED BY — DATE

BRIAN A. LOCK LICENSED PROFESSIONAL ENGINEER No. 9867-C HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

APRIL 30, 2010
WILSON OKAMOTO CORPORATION LIC. EXP. DATE

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPE "A" FLARE

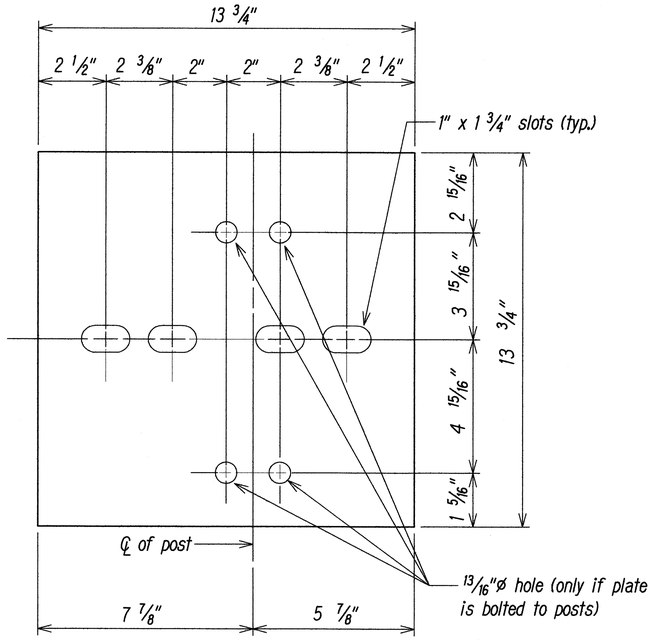
WAIMEA CANYON DRIVE/KOKEE ROAD
IMPROVEMENTS PHASE 1
MILE POST 0.80 TO MILE POST 4.60
Proj. No. 550AB-01-06

Scale: Not to Scale Date: October 2008

SHEET No. 8 OF 14 SHEETS

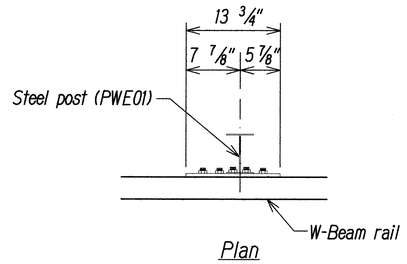
BACKSLOPE ANCHOR TERMINAL (WITH 6:1 PAVED GUTTER AND TYPE "A" FLARE)

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	550AB-01-06	2009	17	34

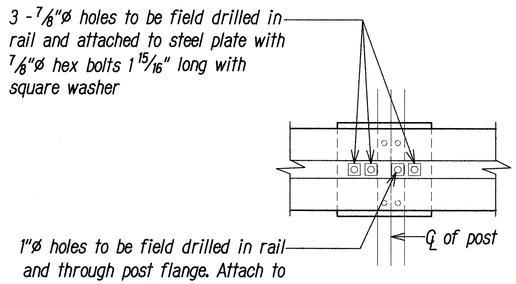


Steel Plate - ½"

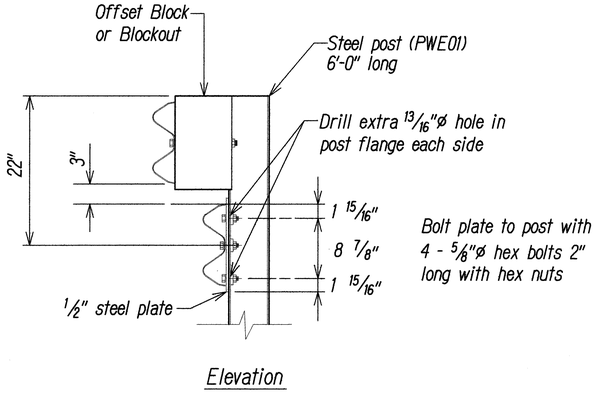
(Hot-dip Zinc Coated Galvanized Welded or Bolted to Post)



Plan

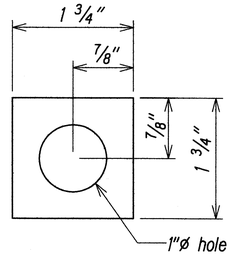


Front View



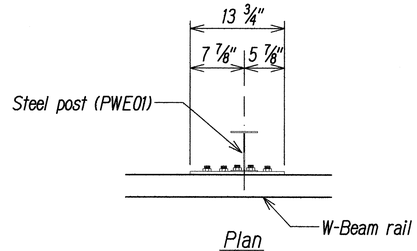
Elevation

RUBRAIL ANCHOR DETAILS

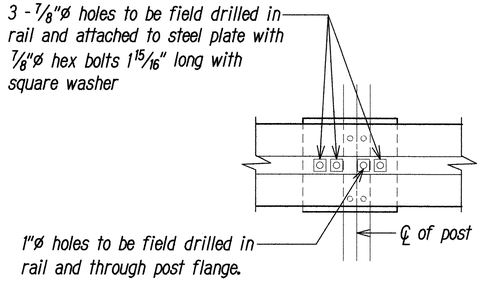


Square Washer

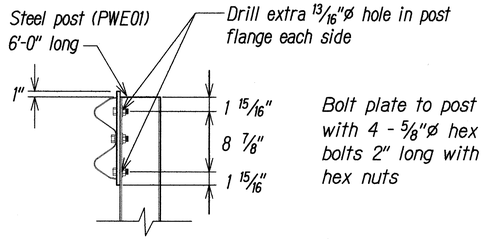
(3/16" Thick - Hot-dip Zinc Coated Galvanized)



Plan



Front View



Elevation

POST ANCHOR DETAILS

BACKSLOPE ANCHOR TERMINAL END ANCHORAGE DETAILS TYPE "A" FLARE

Note:

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-AGCARTBA Joint Cooperative Committee. Repair galv. coating damaged by drilling.

ORIGINAL PLAN | REVISED PLAN | NOTE BOOK | NO. | DATE
ORIGINAL PLOTTED BY
REVISED BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY

BRIAN A. LOCK
LICENSED PROFESSIONAL ENGINEER
No. 9867-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
APRIL 30, 2010
WILSON OKAMOTO CORPORATION LIC. EXP. DATE

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

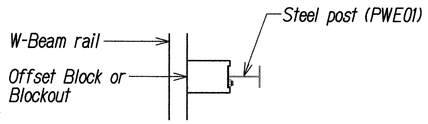
TYPE "A" FLARE

WAIMEA CANYON DRIVE/KOKEE ROAD
IMPROVEMENTS PHASE 1
MILE POST 0.80 TO MILE POST 4.60
Proj. No. 550AB-01-06

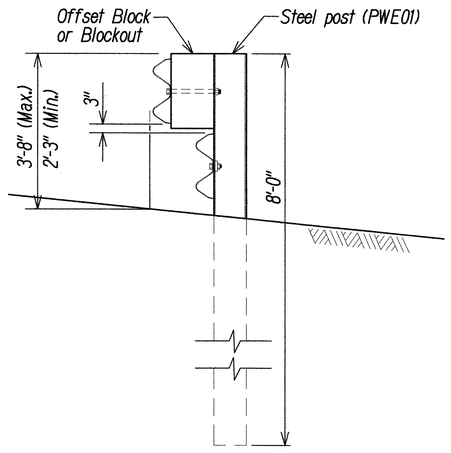
Scale: Not to Scale Date: October 2008

SHEET No. 9 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	550AB-01-06	2009	17	34

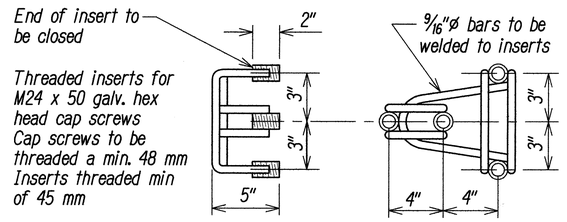


Plan

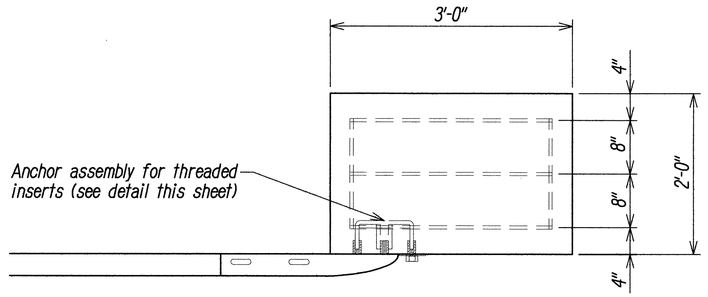


Elevation

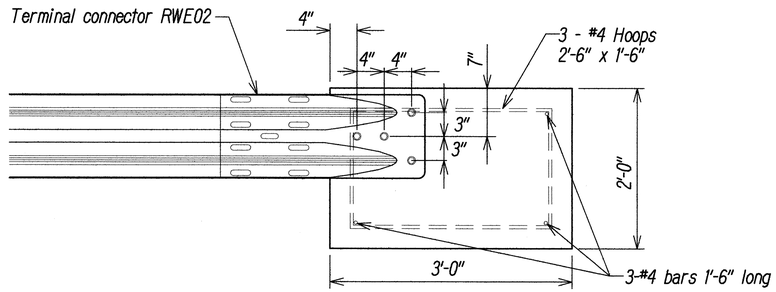
STEEL POST GUARDRAIL WITH RUBRAIL



ANCHOR ASSEMBLY CONCRETE BLOCK ANCHOR



Plan



Elevation

CONCRETE BLOCK ANCHOR (2' X 2' X 3')

BACKSLOPE ANCHOR TERMINAL END ANCHORAGE DETAILS TYPE "A" FLARE

Note:

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-AGCARTBA Joint Cooperative Committee.

BRIAN A. LOCK
LICENSED PROFESSIONAL ENGINEER
No. 9867-C
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THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

WILSON OKAMOTO CORPORATION — APRIL 30, 2010 LIC. EXP. DATE

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPE "A" FLARE

WAIMEA CANYON DRIVE/KOKEE ROAD
IMPROVEMENTS PHASE 1
MILE POST 0.80 TO MILE POST 4.60
Proj. No. 550AB-01-06

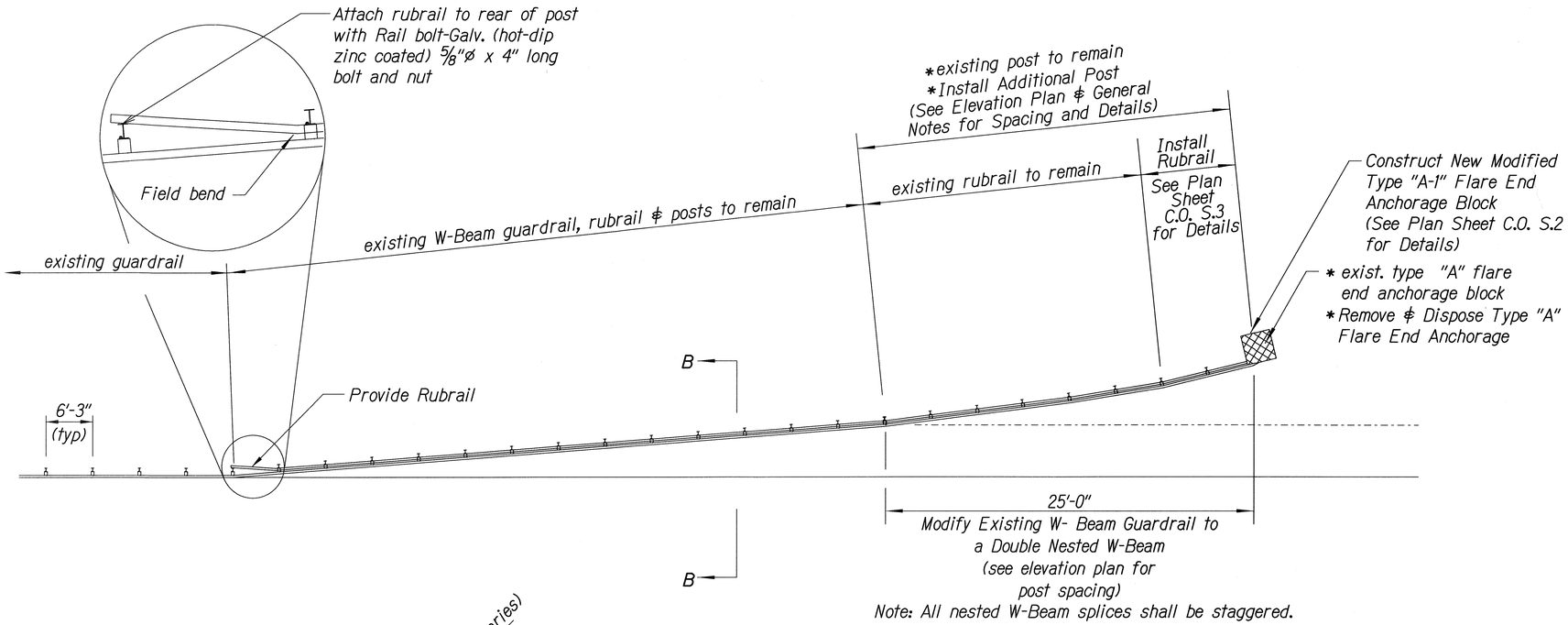
Scale: Not to Scale — Date: October 2008

SHEET No. 10 OF 14 SHEETS

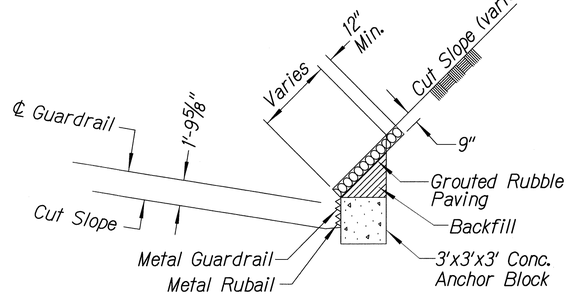
17

ORIGINAL PLAN
NOTE BOOK
SHEETS PLOTTED BY — DATE
SHEETS PREPARED BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
No. SUBMITTED/APPROVED

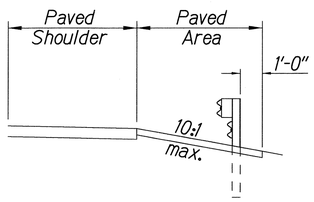
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	550AB-01-06	2011	C.O. 17 S-1	34



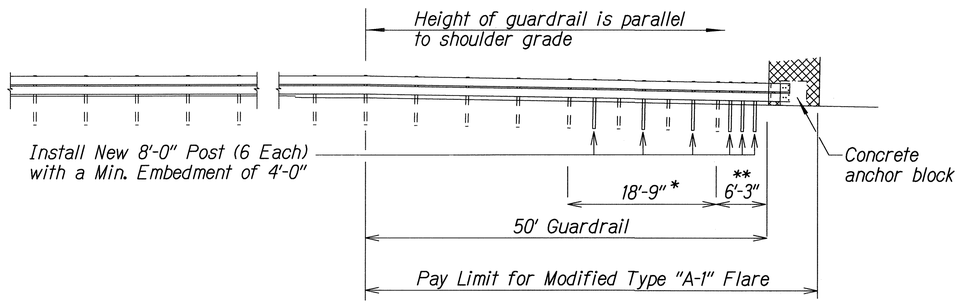
PLAN



ANCHOR BLOCK IN CUT SECTION

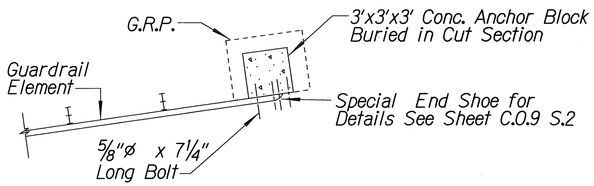


Section B-B



ELEVATION (Profile Along Rail)

* Posts at 3'-1½" o.c.
** Posts at 1'-6¾" o.c.



PLAN - ANCHOR BLOCK IN CUT SECTION

General Notes

1. 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-AGCARTBA Joint Cooperative Committee and HDOT's Statewide Guideline for Permanent Highway Safety Hardware.
2. Excavation, Anchor Block, Backfill and GRP work shall be considered incidental to the Modified Type "A-1" Flare End Terminal.
3. Re-use undamaged guardrail components and hardware. Remove and dispose all materials that do not conform to the Modified Type "A-1 Flare, this work shall be considered incidental to Modified Type "A-1 Flare End Terminal.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY JT	
NOTE BOOK N/A	TRACED BY JT	
	DESIGNED BY JT	
	QUANTITIES BY	
No. C.O.9 S.1.dgn	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MODIFIED TYPE "A-1" FLARE

WAIMEA CANYON DRIVE/KOKEE ROAD
IMPROVEMENTS, PHASE 1
Mile Post 0.80 to Mile Post 4.60
Project No. 550AB-01-06

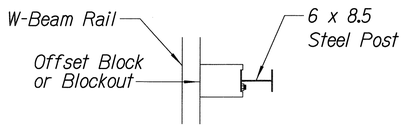
Scale: As Noted Date: Nov. 2010

SHEET No. 1 OF 3 SHEETS

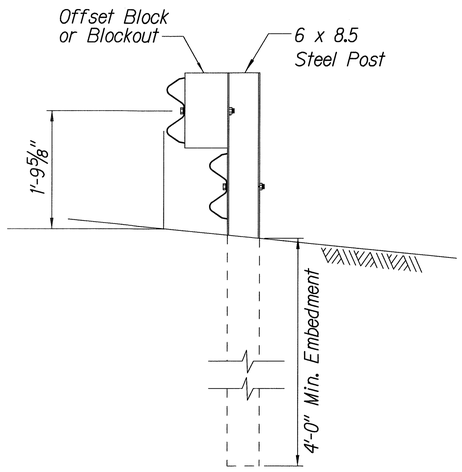
"AS-BUILT"

C.O. 17 S-1

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	550AB-01-06	2011	C.O. 17 S-2	34

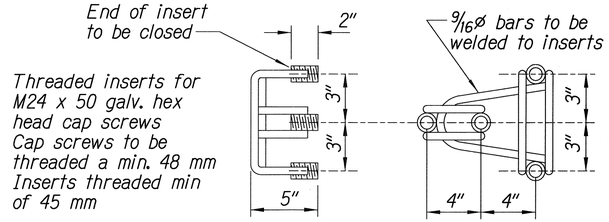


Plan

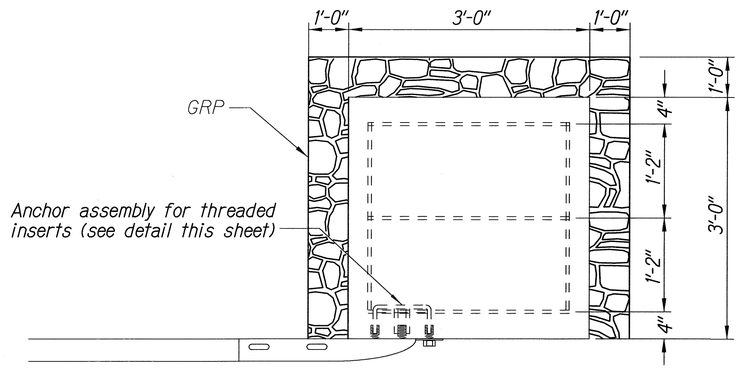


Elevation

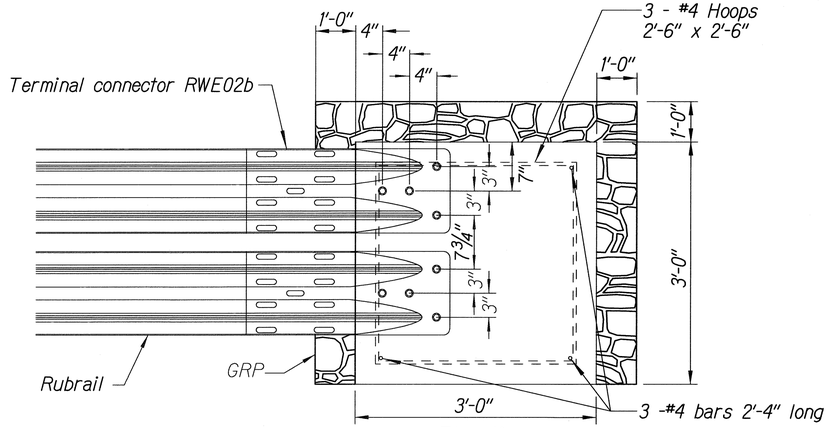
STRONG POST W-BEAM GUARDRAIL



ANCHOR ASSEMBLY
CONCRETE BLOCK ANCHOR



Plan



Elevation

CONCRETE BLOCK ANCHOR
(3' X 3' X 3')

BACKSLOPE ANCHOR TERMINAL END ANCHORAGE DETAILS
MODIFIED TYPE "A-1" FLARE

Note:

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-AGCARTBA Joint Cooperative Committee and HDOT's Statewide Guideline for Permanent Highway Safety Hardware.

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY J.	
NOTE BOOK	TRACED BY J.	
N.	DESIGNED BY J.	
	QUANTITIES BY	
	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MODIFIED TYPE "A-1" FLARE

WAIMEA CANYON DRIVE/KOKEE ROAD
IMPROVEMENTS, PHASE 1
Mile Post 0.80 to Mile Post 4.60
Project No. 550AB-01-06

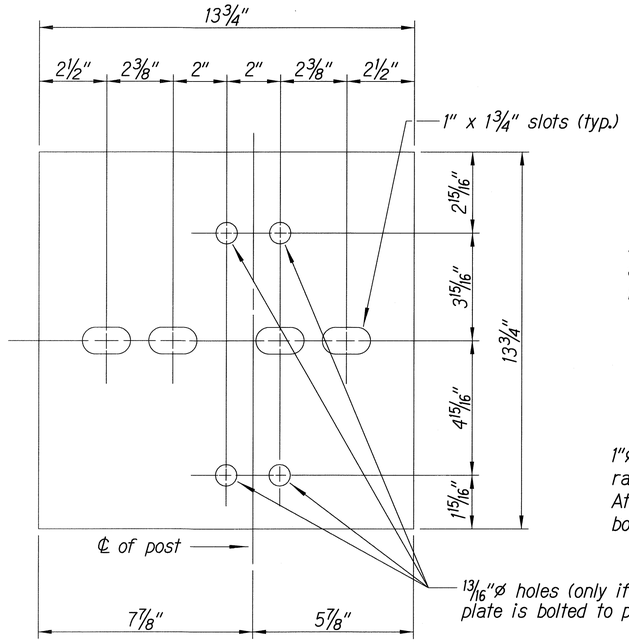
Scale: As Noted Date: Nov. 2010

SHEET No. 2 OF 3 SHEETS

"AS-BUILT"

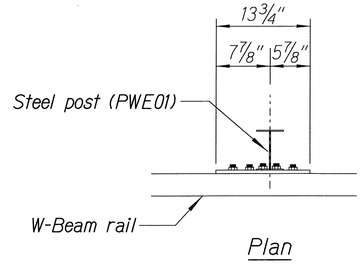
C.O. 17 S-2

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	550AB-01-06	2011	C.O. 17 S-3	34

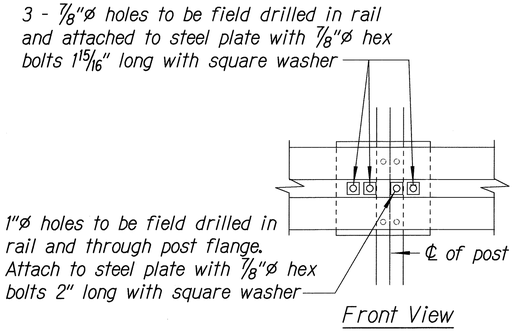


Steel Plate - ½"

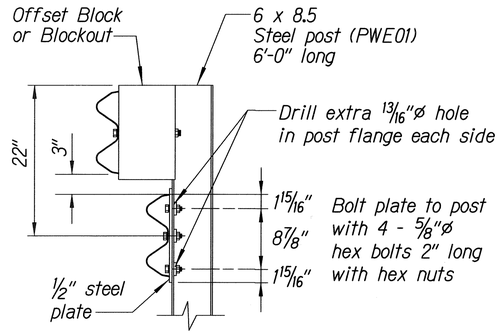
(Hot-dip Zinc Coated Galvanized- Welded or Bolted to Post)



Plan

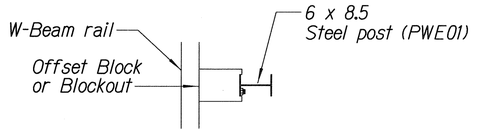


Front View

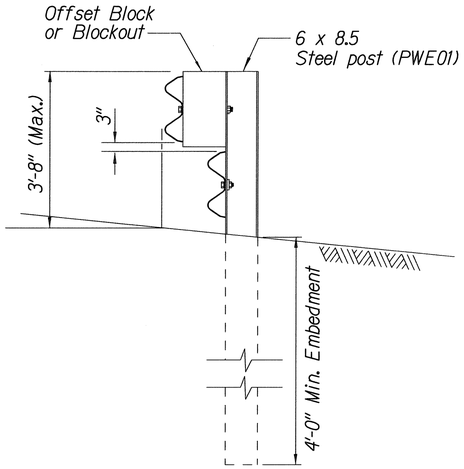


Elevation

RUBRAIL ANCHOR DETAILS

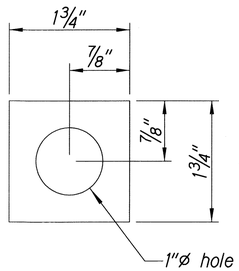


Plan



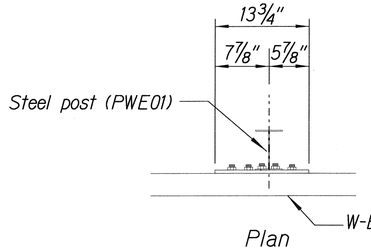
Elevation

STEEL POST GUARDRAIL WITH RUBRAIL

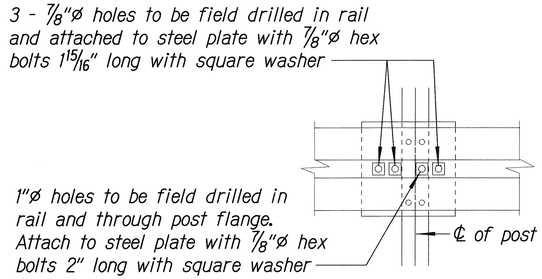


Square Washer

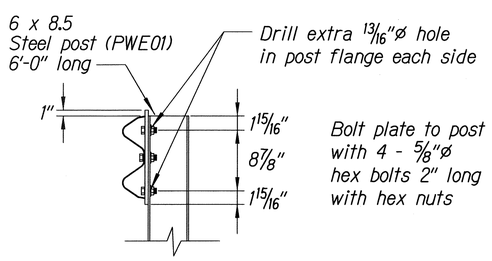
(3⁄16" Thick - Hot-dip Zinc Coated Galvanized)



Plan



Front View



Elevation

POST ANCHOR DETAILS

Note:

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-AGCARTBA Joint Cooperative Committee.

RUBRAIL DETAIL FOR MODIFIED TYPE "A-1" FLARE (WHEN CALLED FOR IN PLANS)

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY J	
NOTE BOOK DATED	TRACED BY J	
	DESIGNED BY J	
	QUANTITIES BY	
NO.	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MODIFIED TYPE "A-1" FLARE RUBRAIL DETAILS

WAIMEA CANYON DRIVE/KOKEE ROAD IMPROVEMENTS, PHASE 1
Mile Post 0.80 to Mile Post 4.60
Project No. 550AB-01-06

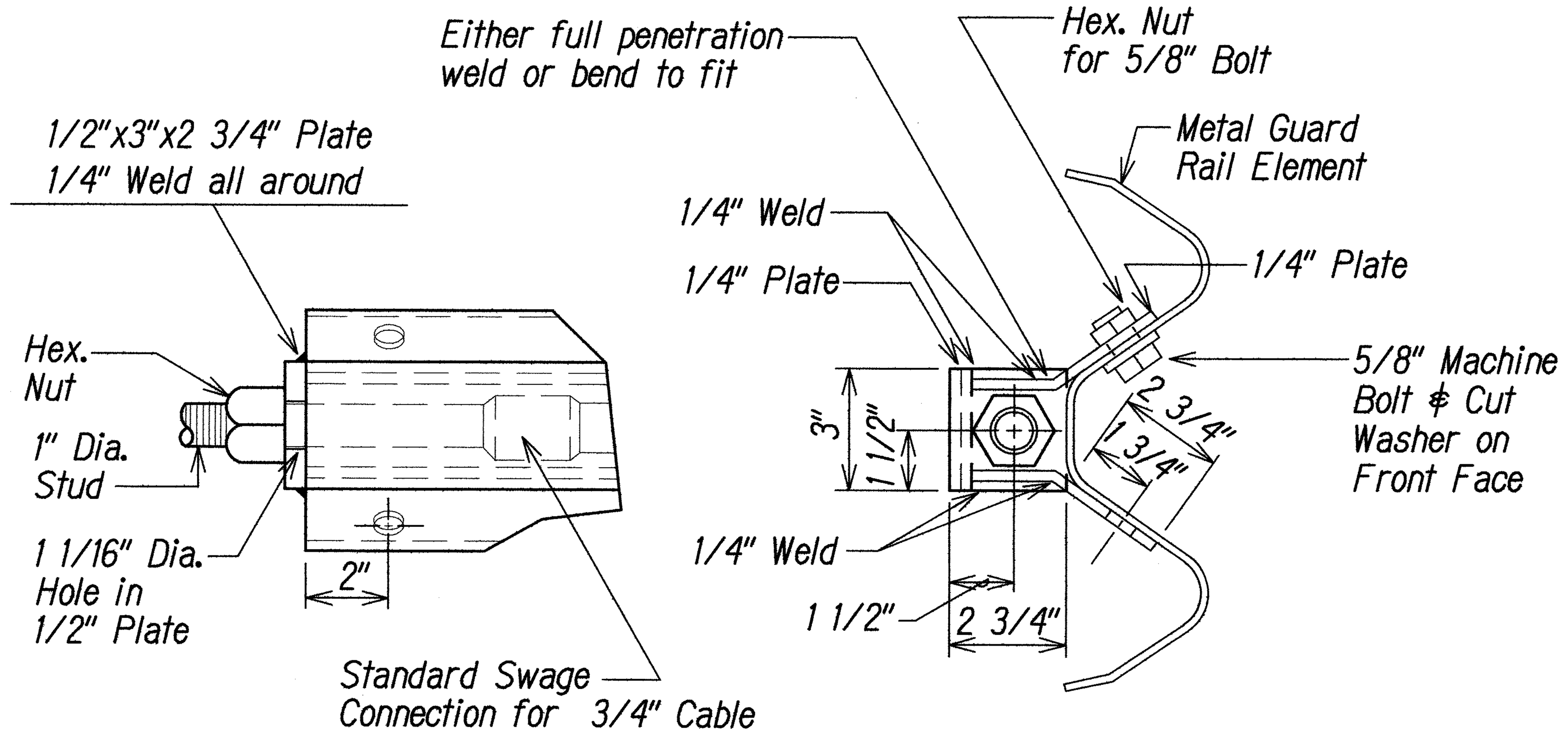
Scale: As Noted Date: Nov. 2010

SHEET No. 3 OF 3 SHEETS

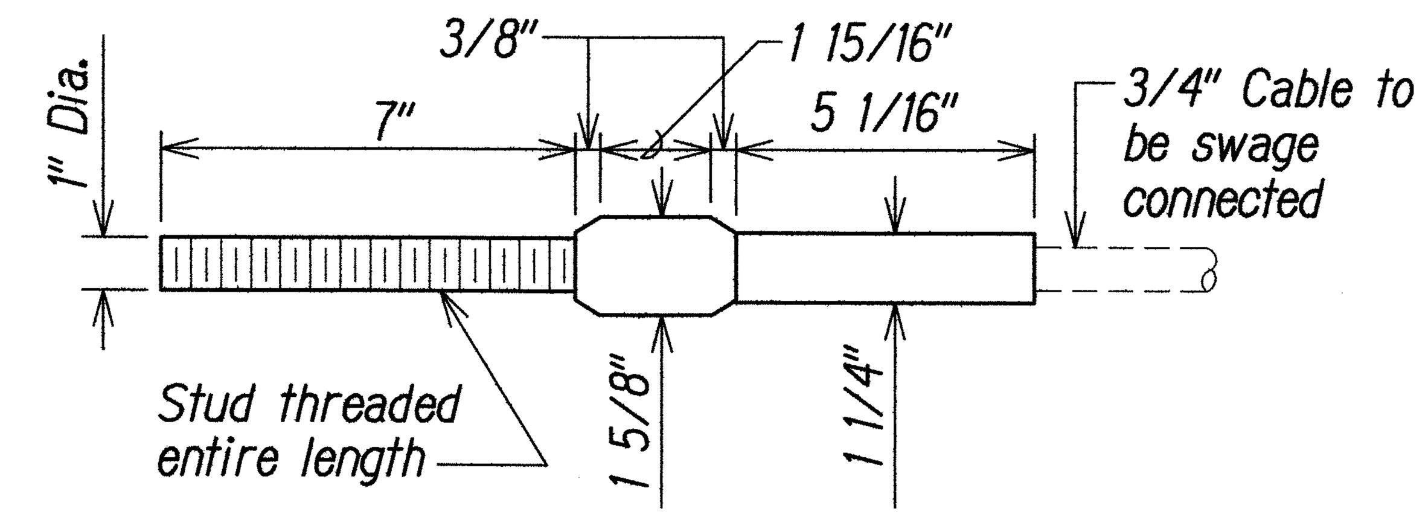
"AS-BUILT"

C.O. 17 S-3

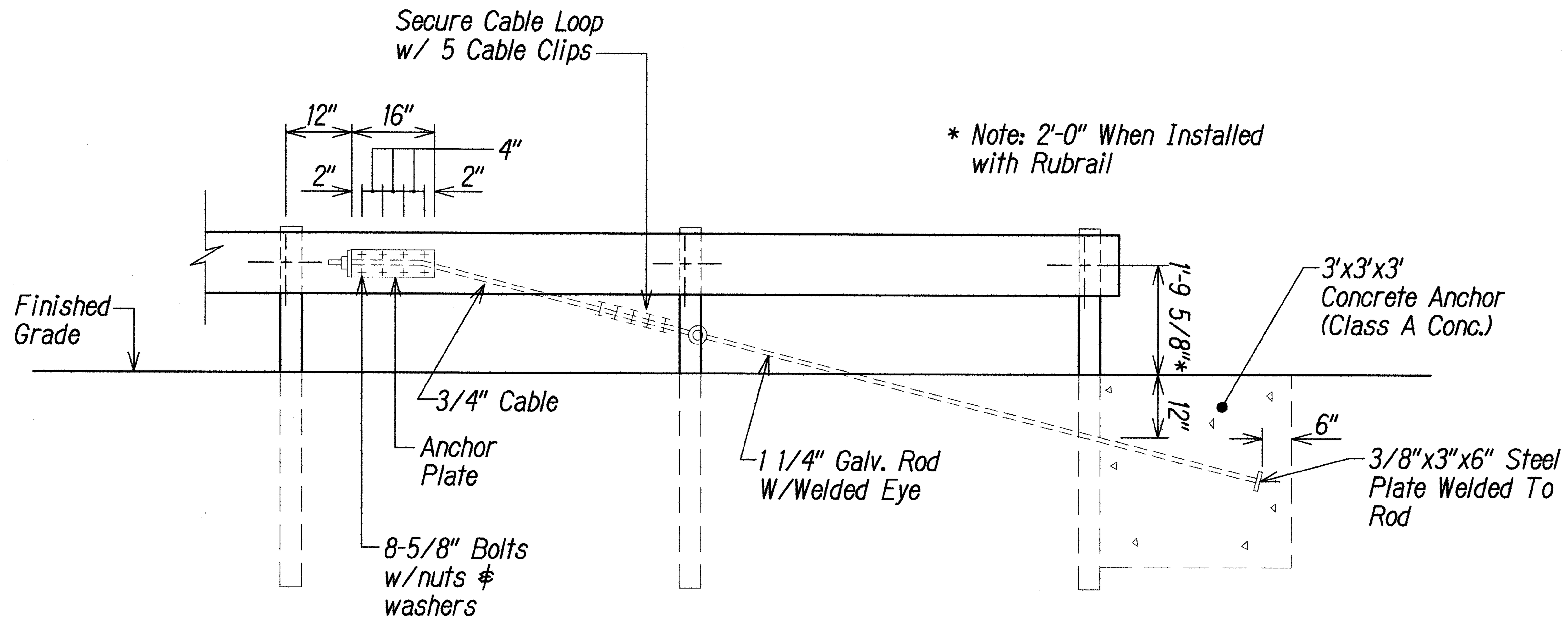
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	550AB-01-06	2009	18	34



ANCHOR PLATE DETAILS

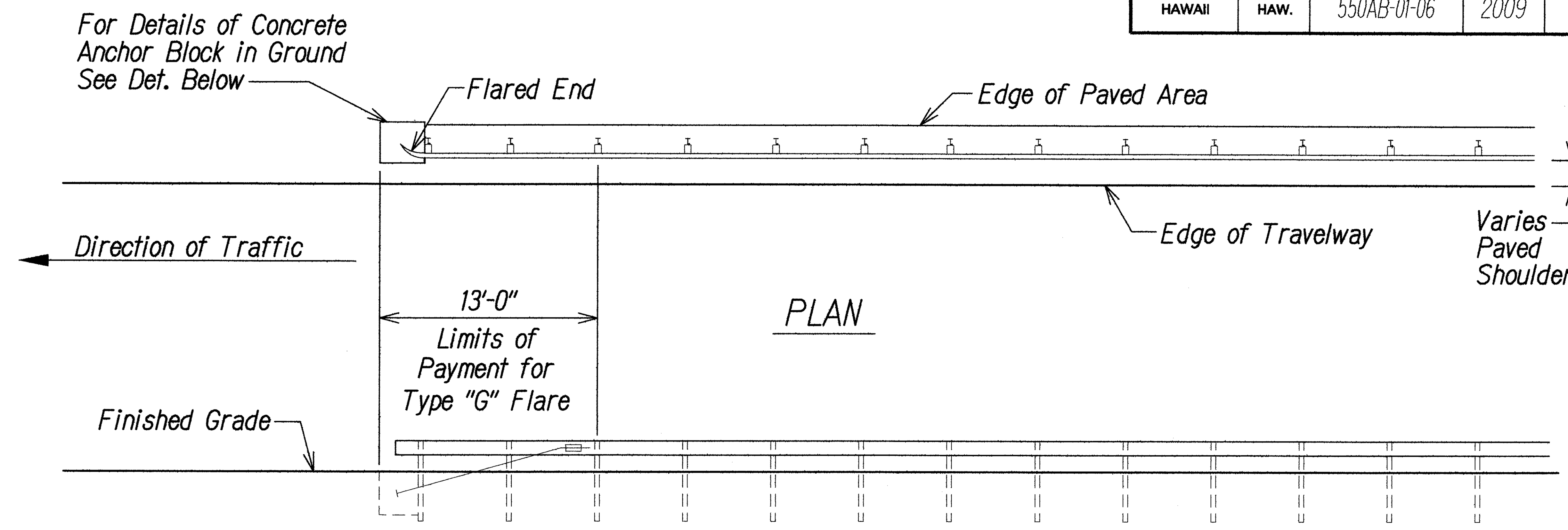


STANDARD SWAGED FITTING AND STUD



ANCHOR BLOCK DETAIL

1. Concrete, G.R.P., excavation, anchor rod and miscellaneous appurtenances necessary to anchor the guardrail ends shall be incidental to metal guardrail.



TYPE "G" FLARE END TERMINAL

NOTE:

Type "G" Modified End Terminal is a site specific end terminal with a taper and radial termini. A site specific detailed drawing is required for all Type "G" Modified End Terminal and must receive Engineer's approval.

The taper (flare rate) of the guardrail shall follow the latest edition of AASHTO'S Roadside Design Guide (currently, Table 5.6 - Suggested Flare Rate for Barrier Design, page 5-21, Jan. 1996 edition).

The radius of the radial termini is an Engineer's judgement based on the site evaluation. The Engineer shall consider safety (minimize the spearing & blunt end situation); degree and potential seriousness of the hazard; bicycle and pedestrian accessibility; maintenance equipment accessibility; Right-of-Way availability; the smallest radii the metal w-beam/thrie-beam railing can be constructed (check with supplier/contractor); posted speed limit; angle of vehicle impact; and aesthetics when designing the Type "G" Modified End Terminal.

During construction, the Contractor shall layout the proposed Type "G" Modified End Terminal and receive approval from the Construction Engineer prior to installation.

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THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

WILSON OKAMOTO CORPORATION — APRIL 30, 2010 LIC. EXP. DATE

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

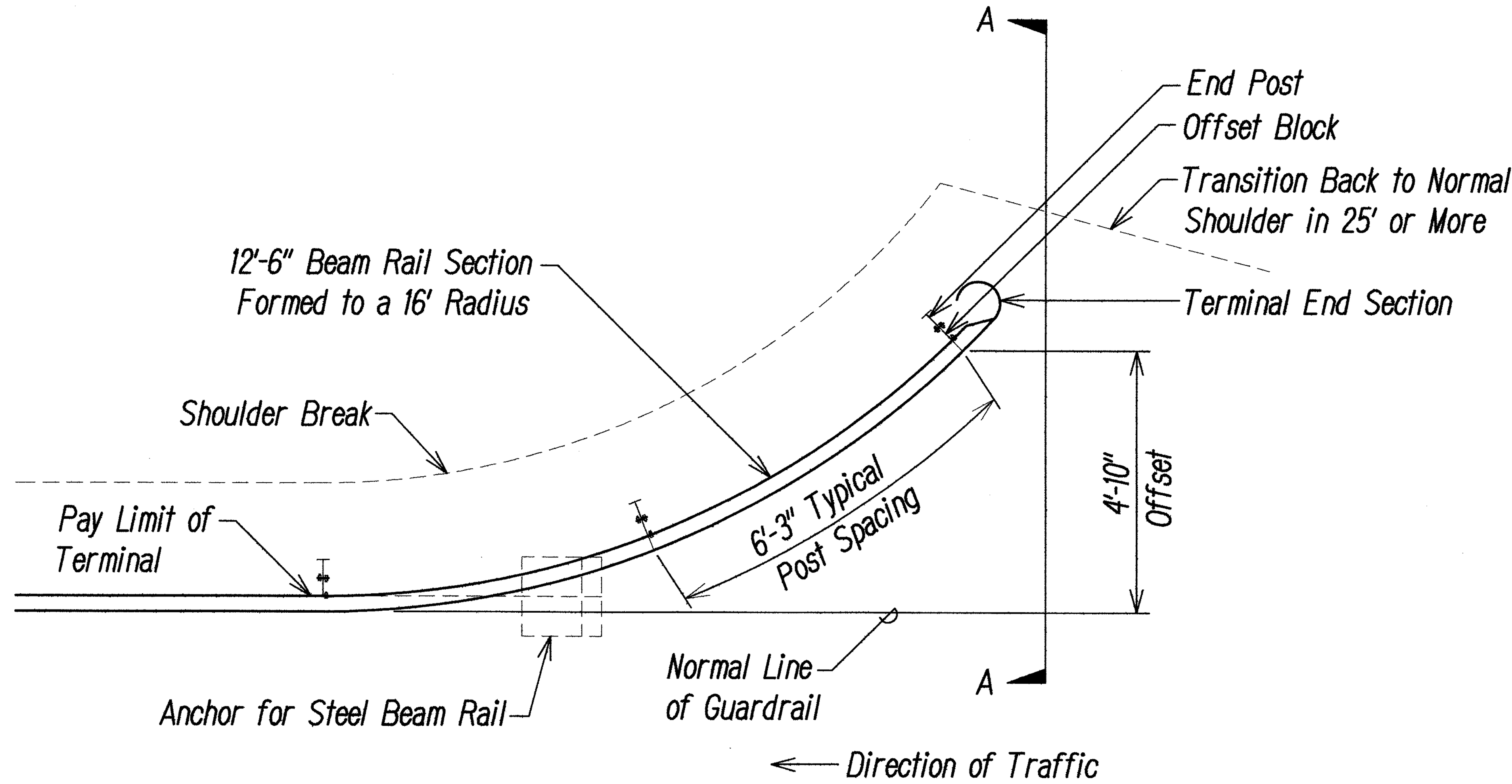
TYPE "G" TERMINAL END

WAIMEA CANYON DRIVE/KOKEE ROAD IMPROVEMENTS PHASE 1
MILE POST 0.80 TO MILE POST 4.60
Proj. No. 550AB-01-06

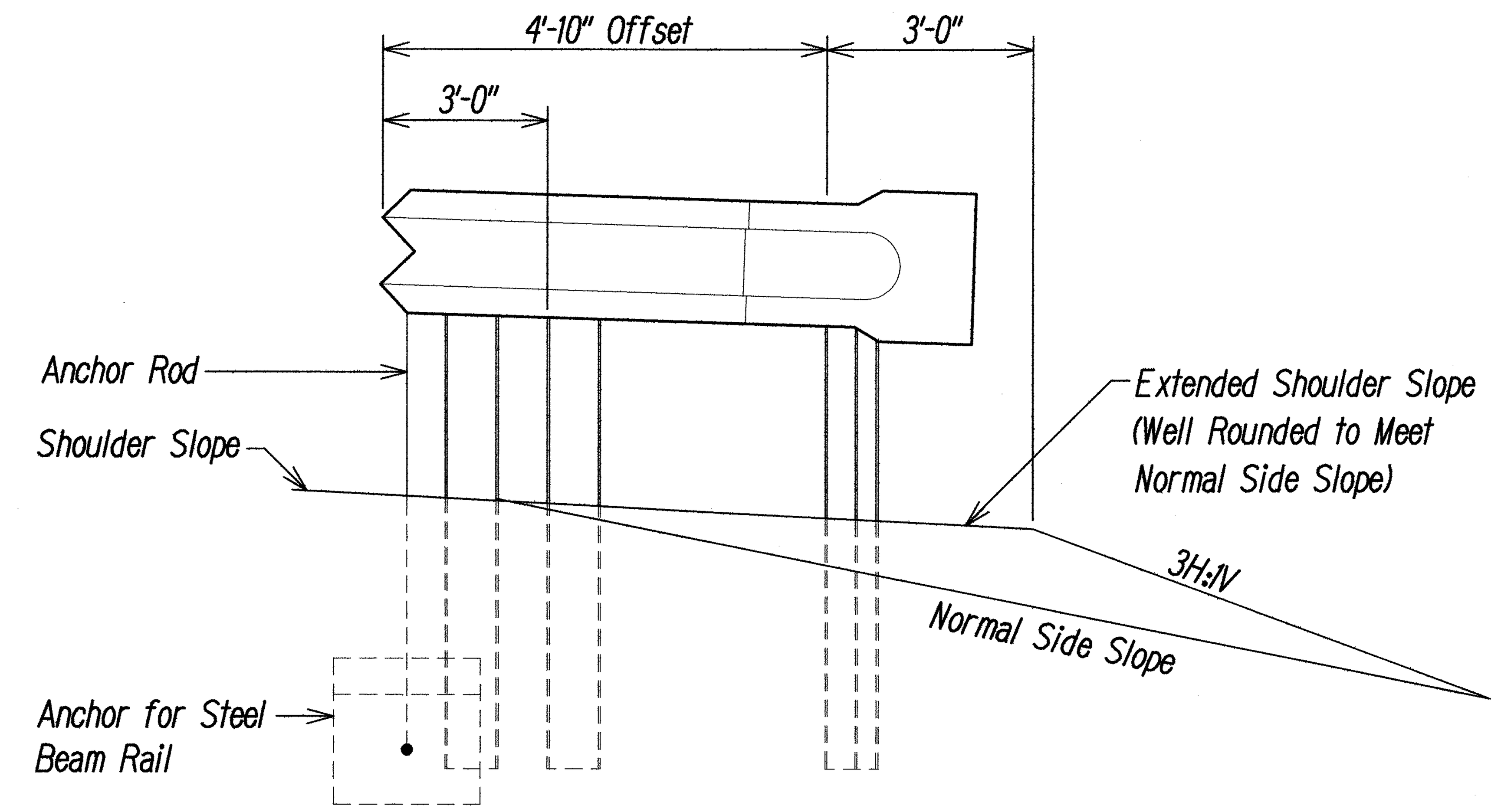
Scale: Not to Scale — Date: October 2008

SHEET No. 11 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	550AB-01-06	2009	19	34



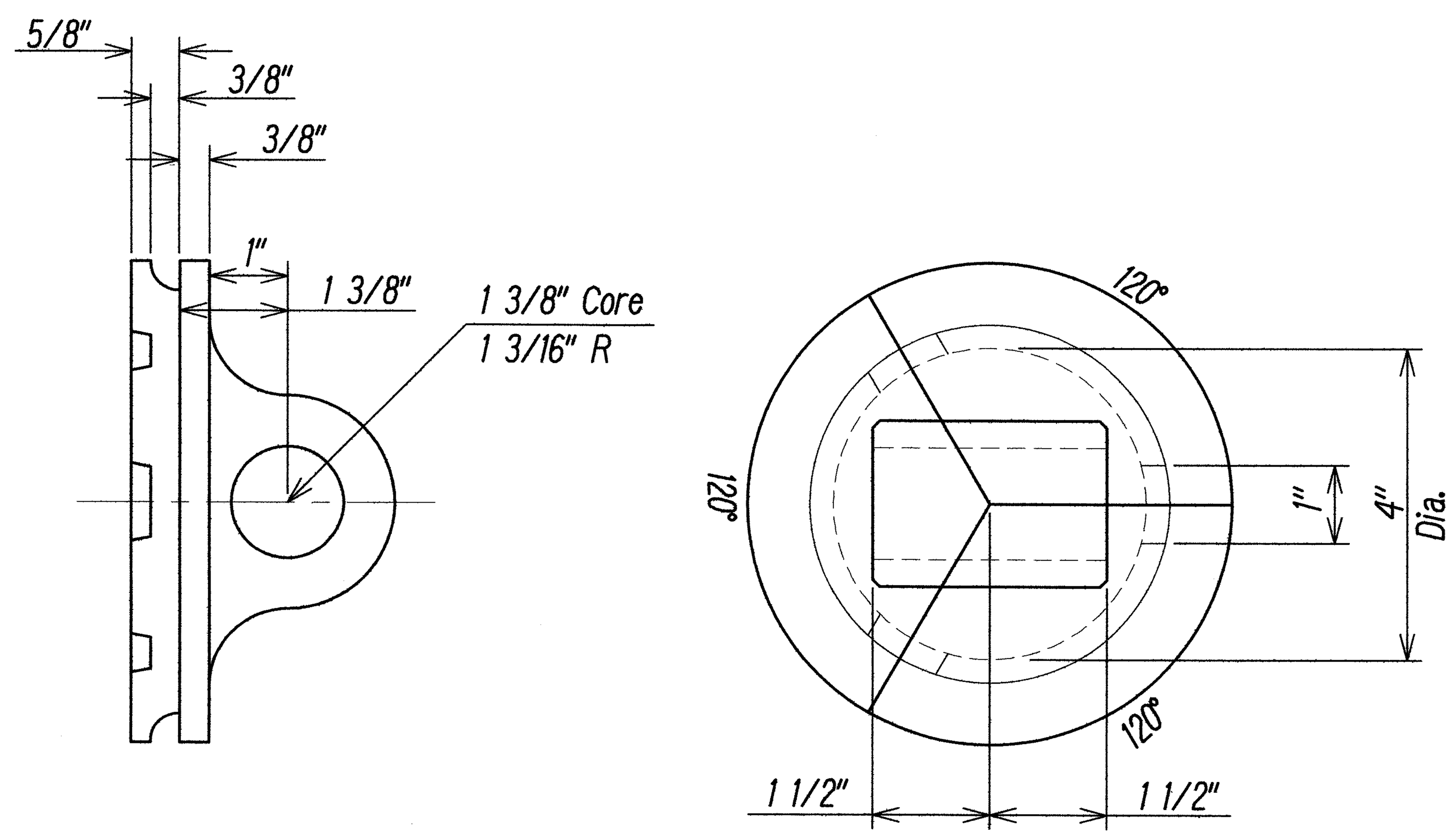
PLAN



SECTION A-A

APPROACH END DETAIL

(APPROVED FOR USE WHERE V < 45 MPH)



ANCHOR ROD CONNECTOR

(MALLEABLE IRON CASTING OR EQUAL)

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WILSON OKAMOTO CORPORATION APRIL 30, 2010 LIC. EXP. DATE

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

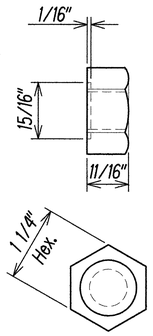
MODIFIED TYPE "G" TERMINAL END

WAIMEA CANYON DRIVE/KOKEE ROAD
IMPROVEMENTS PHASE I
MILE POST 0.80 TO MILE POST 4.60
Proj. No. 550AB-01-06

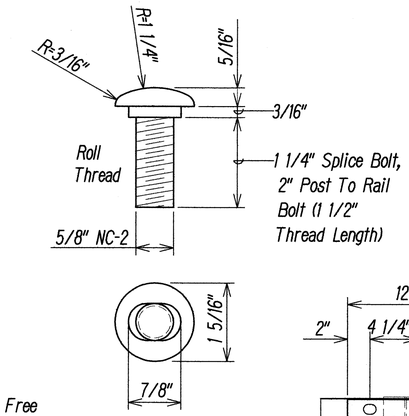
Scale: Not to Scale Date: October 2008

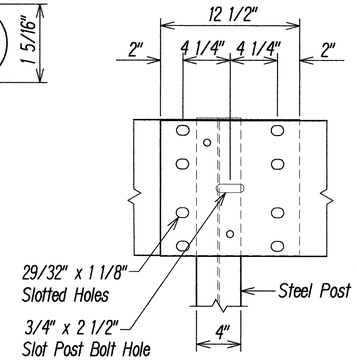
SHEET No. 12 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	550AB-01-06	2009	20	34

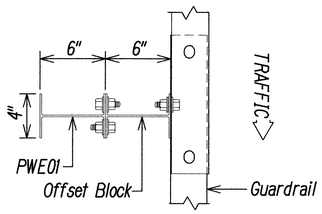


The Nut Must Be Free Running Fit On The Bolt After Galvanization.

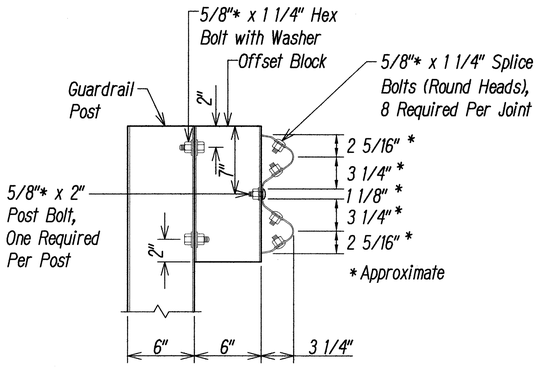




ELEVATION OF GUARDRAIL SPLICE AT POST

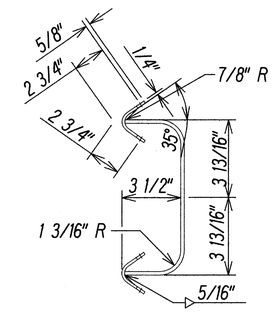


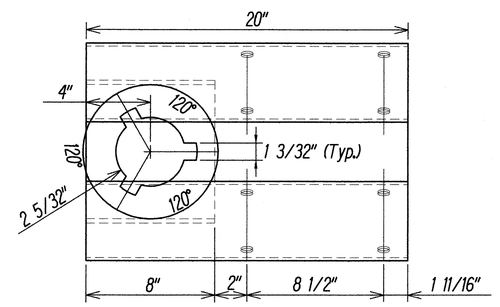
PLAN



CROSS SECTION

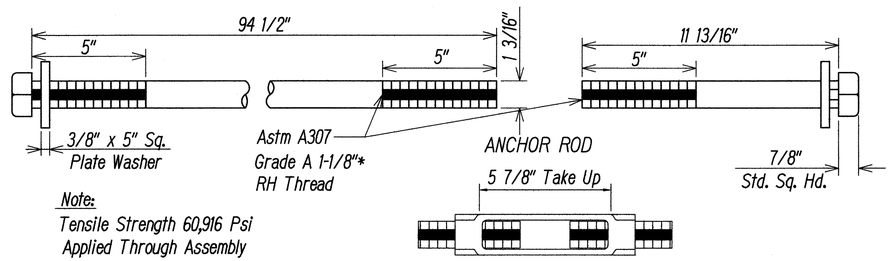
GUARDRAIL SPLICE





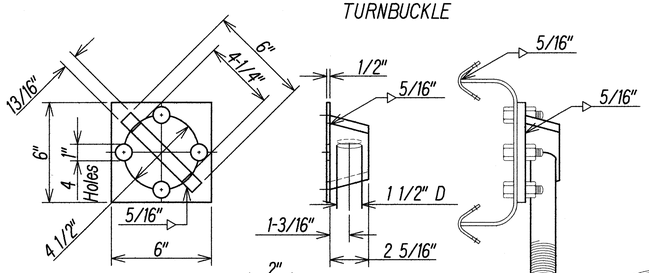
ANCHOR SPIDER

(WELDMENT)

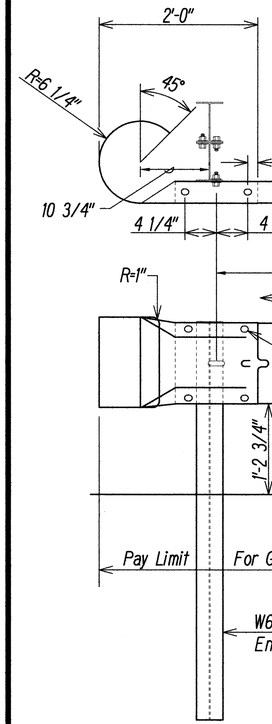


Note:
Tensile Strength 60,916 Psi Applied Through Assembly

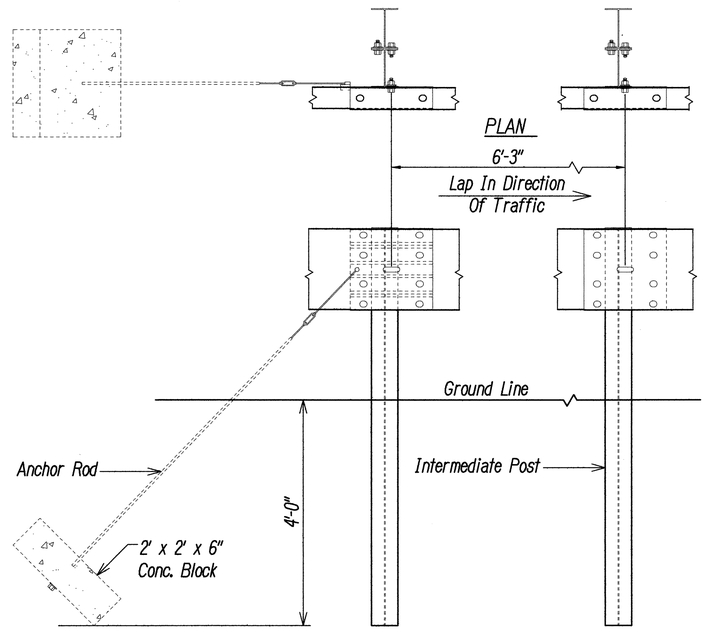
TURNBUCKLE



ALTERNATE ANCHOR ROD CONNECTOR



ASSEMBLY ELEVATION



ANCHOR FOR STEEL BEAM RAIL

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	PLANS PREPARED BY	
NOTE BOOK	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

BRIAN A. LOCK
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APRIL 30, 2010
WILSON OKAMOTO CORPORATION LIC. EXP. DATE

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

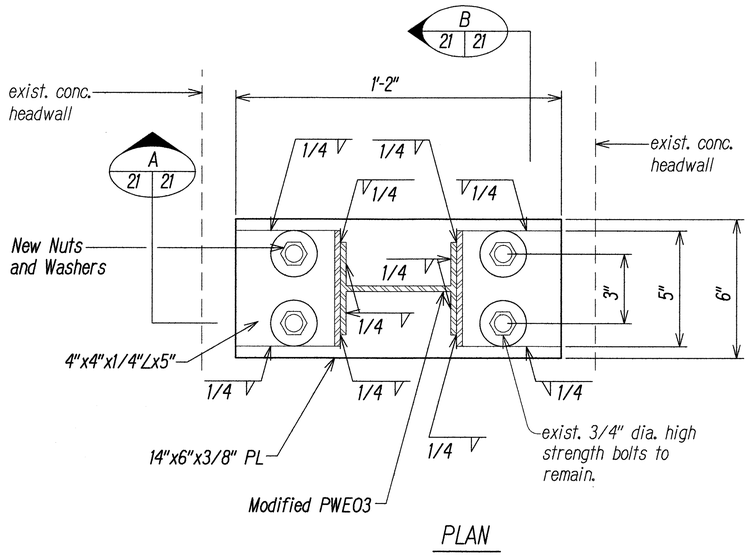
MODIFIED TYPE "G" TERMINAL END

WAIMEA CANYON DRIVE/KOKEE ROAD
IMPROVEMENTS PHASE 1
MILE POST 0.80 TO MILE POST 4.60
Proj. No. 550AB-01-06

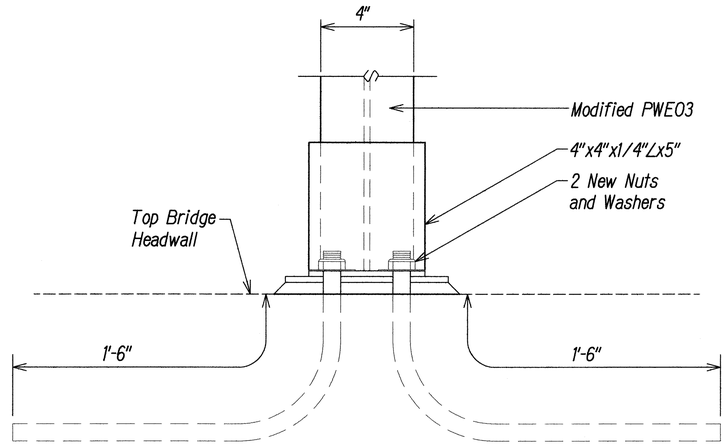
Scale: Not to Scale Date: October 2008

SHEET No. 13 OF 14 SHEETS

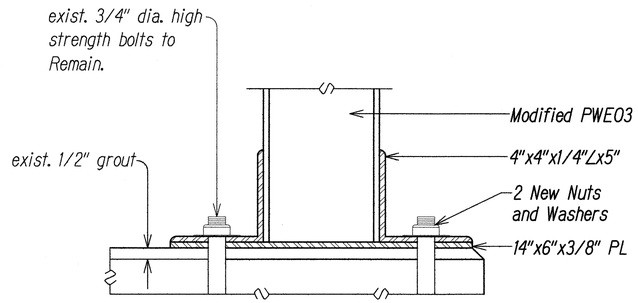
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	550AB-01-06	2009	21	34



PLAN



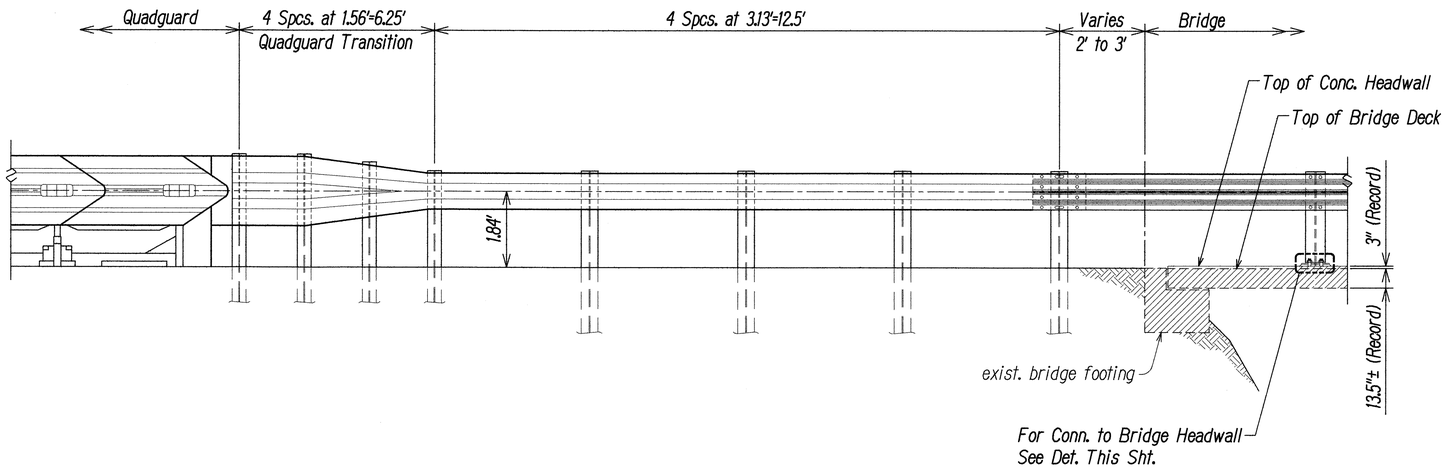
SECTION B 21 21



SECTION A 21 21

TYPICAL DETAIL FOR METAL GUARD RAIL POST ON CONCRETE BRIDGE HEADWALL

Not to Scale



ELEVATION - GUARDRAIL AT BRIDGE
℄ STA. 65+90± TO ℄ STA. 66+20±

Not to Scale

ORIGINAL PLAN — SURVEY PLOTTED BY — DRAWN BY — TRACED BY — DESIGNED BY — QUANTITIES BY — CHECKED BY — DATE

NOTE BOOK — No. [illegible]

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APRIL 30, 2010
WILSON OKAMOTO CORPORATION LIC. EXP. DATE

STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL MOUNTING DETAILS

WAIMEA CANYON DRIVE/KOKEE ROAD
IMPROVEMENTS PHASE 1
MILE POST 0.80 TO MILE POST 4.60
Proj. No. 550AB-01-06

Scale: Not to Scale Date: October 2008

SHEET No. 14 OF 14 SHEETS