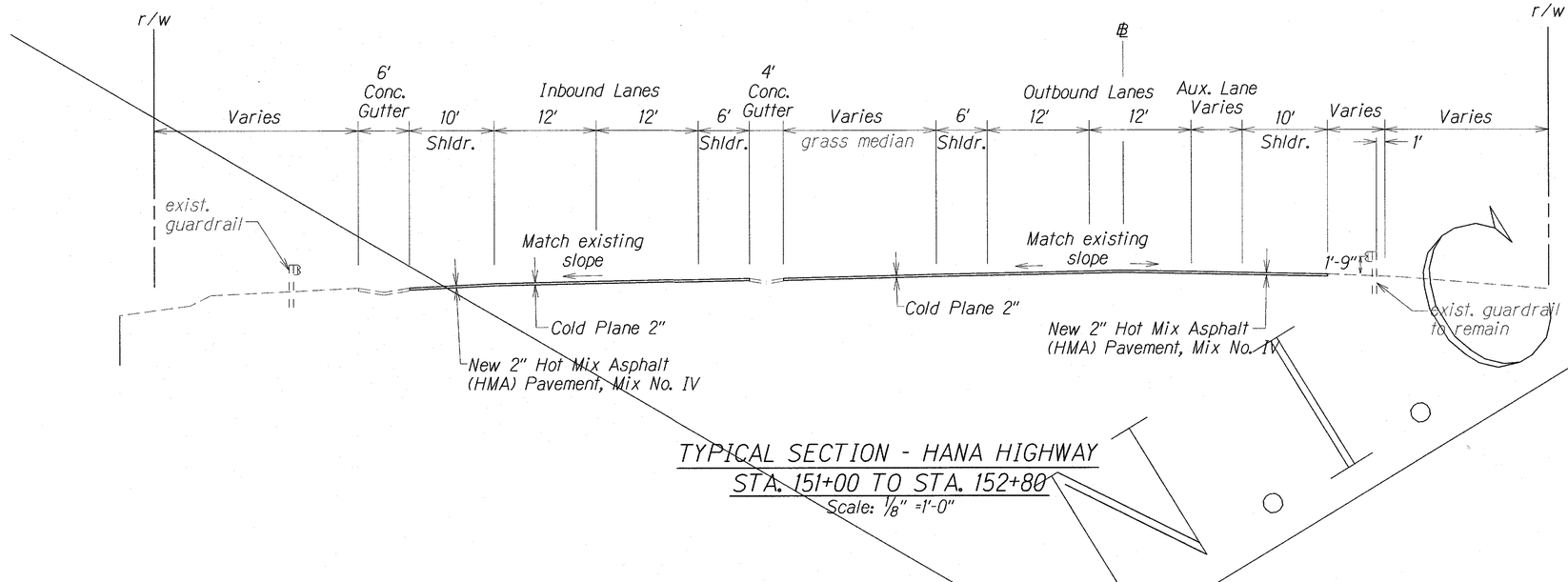
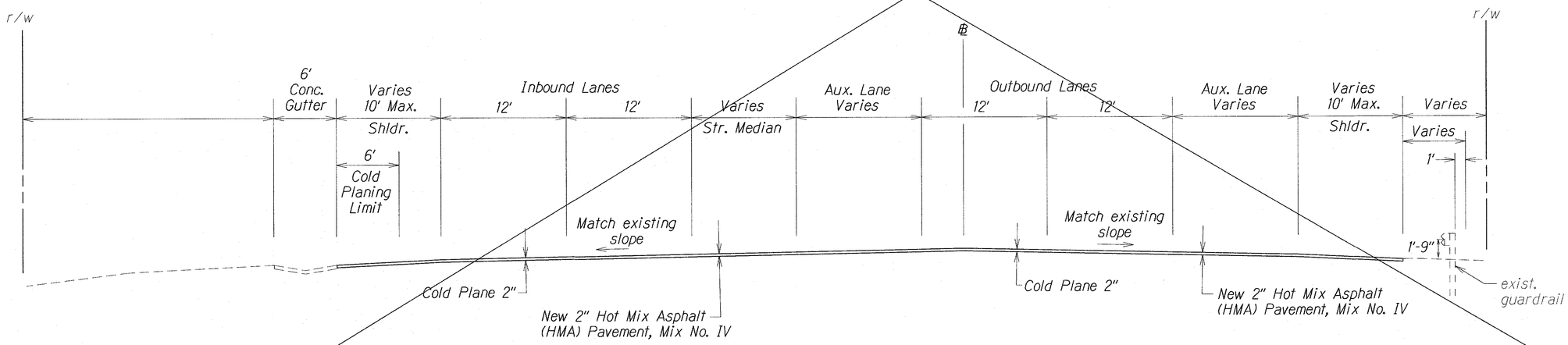
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-01-15M	2015	7	41



TYPICAL SECTION - HANA HIGHWAY
STA. 151+00 TO STA. 152+80
Scale: 1/8" =1'-0"



TYPICAL SECTION - HANA HIGHWAY
STA. 152+80 TO STA. 173+65
Scale: 3/16" =1'-0"

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

LEGEND FOR AS-BUILT POSTINGS

~~	Squiggly line for as-built deletion
~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

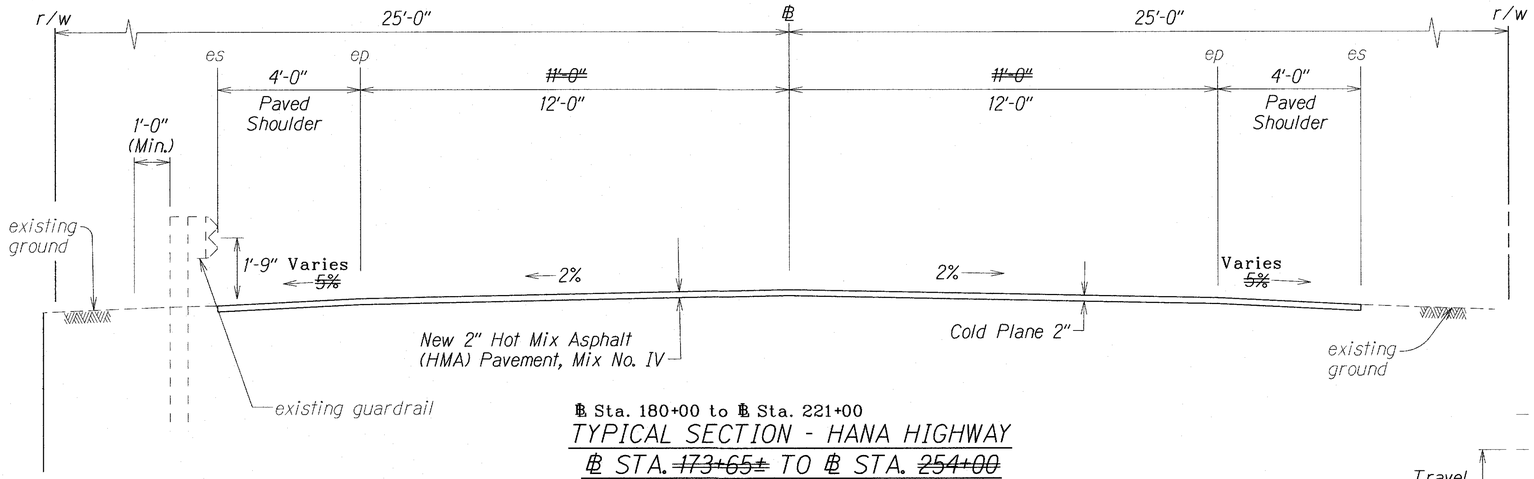
TYPICAL SECTIONS
HANA HIGHWAY RESURFACING
Haleakala Highway to Paia and
HALEAKALA HIGHWAY RESURFACING
Hana Highway to North Firebreak Rd.
Project No. HWY-M-01-15M

Scale: As Shown Date: March, 2015

SHEET No. 1 OF 5 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-01-15M	2015	8	41

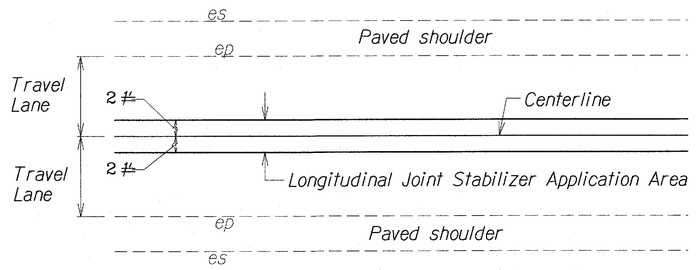


℄ Sta. 180+00 to ℄ Sta. 221+00

TYPICAL SECTION - HANA HIGHWAY

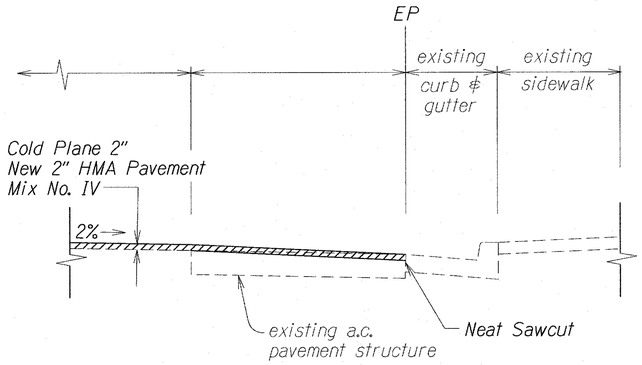
℄ STA. ~~173+65±~~ TO ℄ STA. ~~254+00~~

Scale: ½"= 1'-0"



TYPICAL SECTION FOR LONGITUDINAL JOINT STABILIZER

Not To Scale

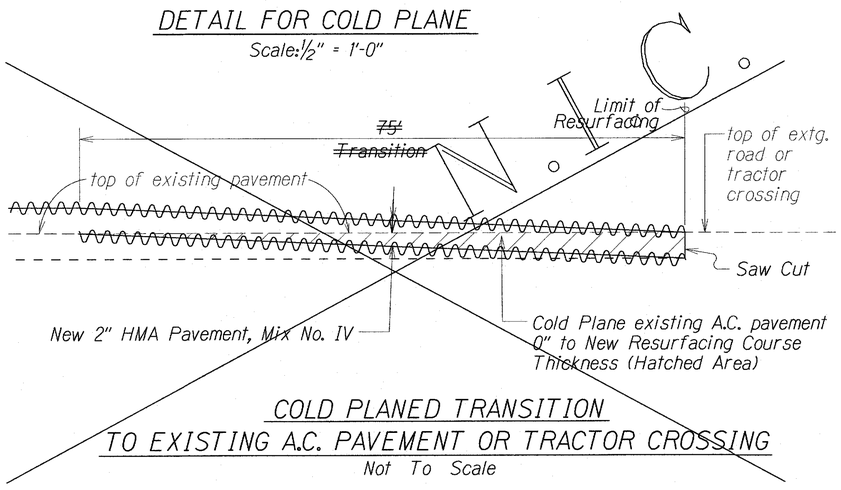


Note: In cold planing the pavement over the structure, the Contractor shall exercise care not to damage any portion of the structure, especially the slab, joints, drainage pipes or reinforcement. Any damage to the structure during the cold planing operations shall be repaired by the Contractor at his expense. Repair work shall be directed by the Engineer. The Contractor shall verify the thickness of the pavement by taking several measurements throughout the structure.

LEGEND FOR AS-BUILT POSTINGS	
~~^^^^~~	Squiggly line for as-built deletion
~~100.00~~	Double line for as-built deletion
Roadway	Text for as-built posting

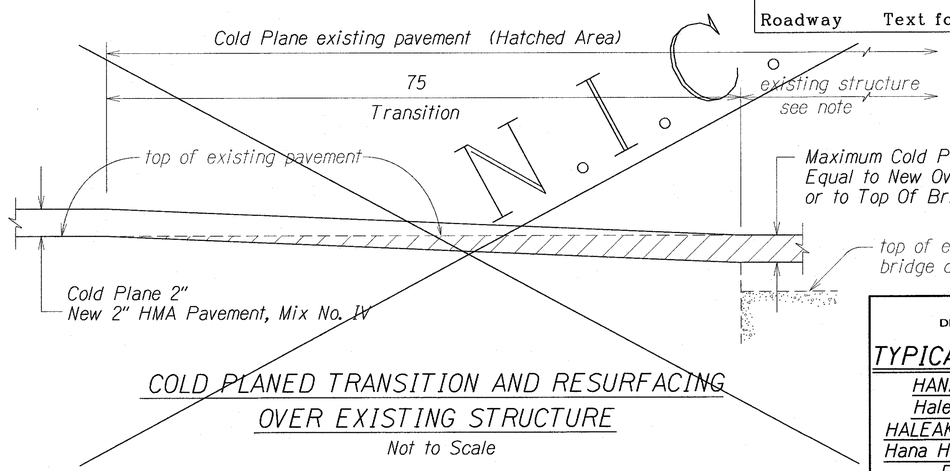
DETAIL FOR COLD PLANE

Scale: ½" = 1'-0"



COLD PLANED TRANSITION TO EXISTING A.C. PAVEMENT OR TRACTOR CROSSING

Not To Scale



COLD PLANED TRANSITION AND RESURFACING OVER EXISTING STRUCTURE

Not to Scale

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL SECTIONS & DETAILS

HANA HIGHWAY RESURFACING
Haleakala Highway to Paia and
HALEAKALA HIGHWAY RESURFACING
Hana Highway to North Firebreak Rd.
Project No. HWY-M-01-15M

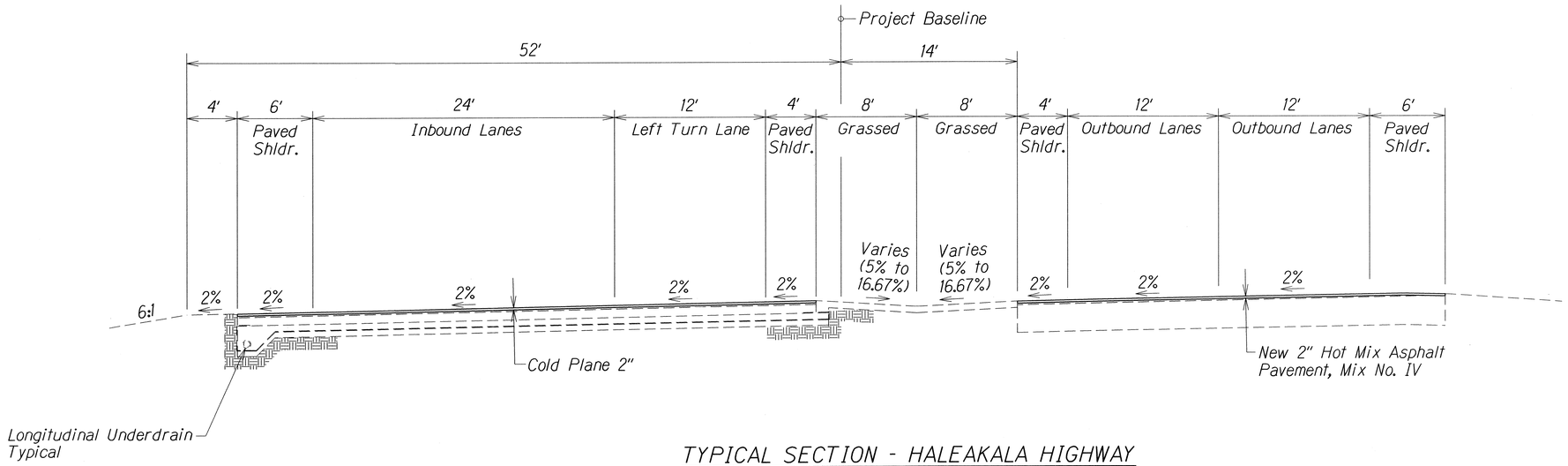
Scale: As Shown Date: March, 2015

SHEET No. 2 OF 5 SHEETS

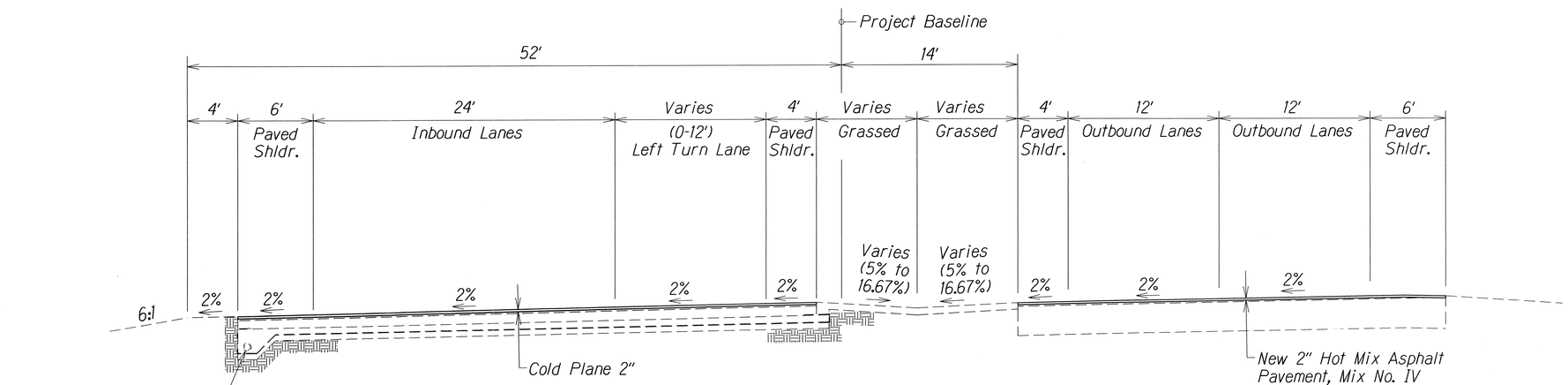
ORIGINAL PLAN
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE
NOTE BOOK
No.

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-01-15M	2015	9	41



TYPICAL SECTION - HALEAKALA HIGHWAY
STA. 34+00 TO STA. 42+20.79
Scale: 1" =5'



TYPICAL SECTION - HALEAKALA HIGHWAY
STA. 42+20.79 TO STA. 43+97.71
Scale: 1" =5'

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

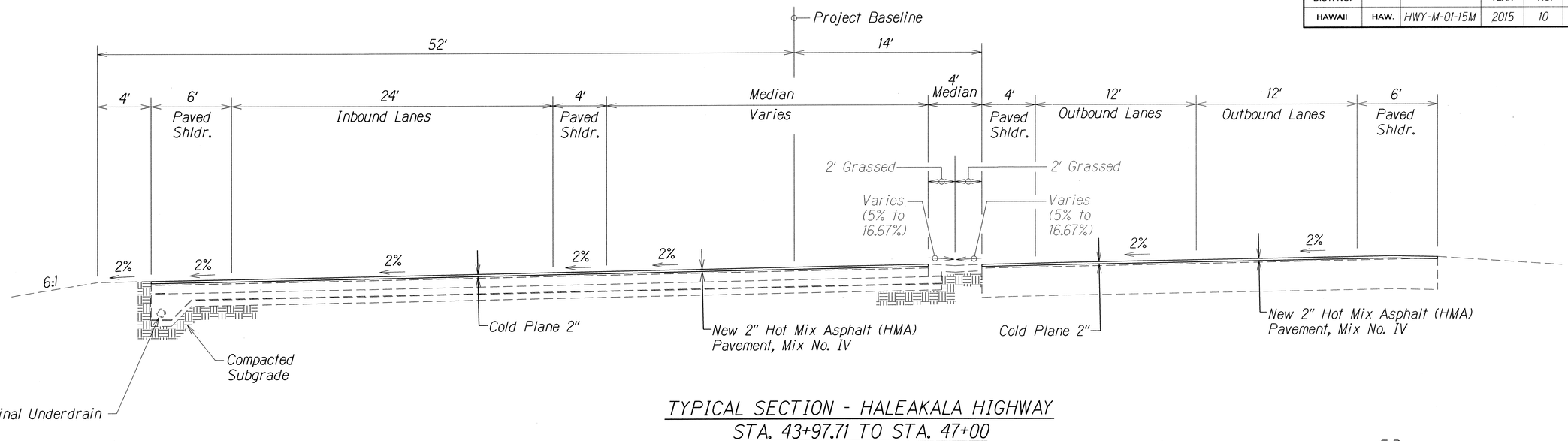
TYPICAL SECTIONS

HANA HIGHWAY RESURFACING
Haleakala Highway to Paia and
HALEAKALA HIGHWAY RESURFACING
Hana Highway to North Firebreak Rd.
Project No. HWY-M-01-15M

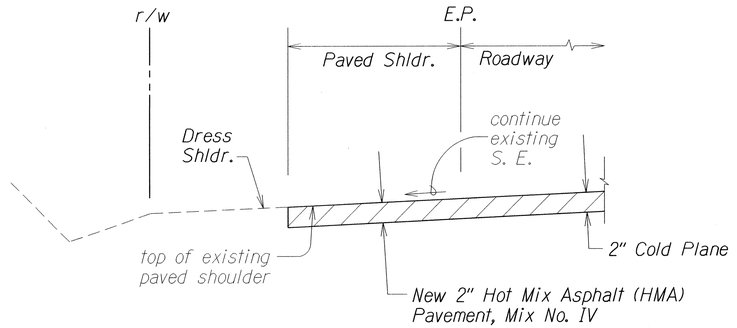
Scale: As Shown Date: March, 2015

SHEET No. 3 OF 5 SHEETS

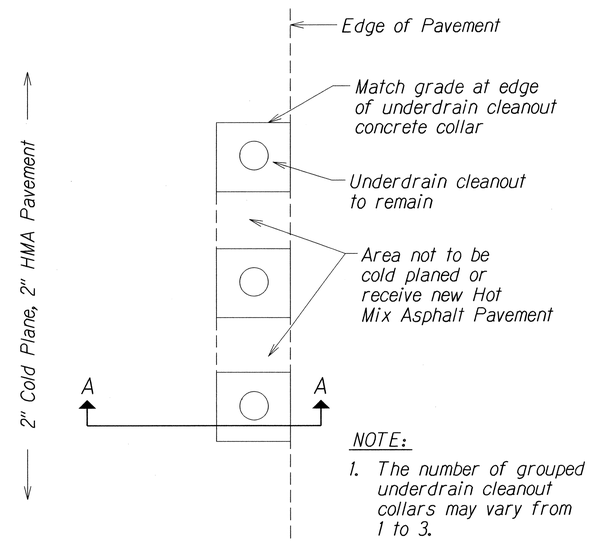
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-01-15M	2015	10	41



TYPICAL SECTION - HALEAKALA HIGHWAY
STA. 43+97.71 TO STA. 47+00
Scale: 1/4" =1'-0"



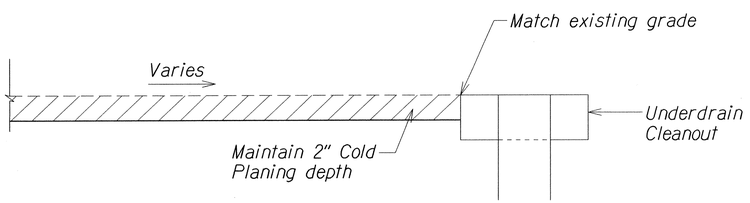
RESURFACING AT PAVED SHOULDERS DETAIL
Not To Scale



NOTE:
1. The number of grouped underdrain cleanout collars may vary from 1 to 3.

RESURFACING AROUND UNDERDRAIN CLEANOUT COLLARS
Not To Scale

NOTES:
1. Apply tack coat to all cold planed surfaces prior to placement of Hot Mix Asphalt Pavement.



SECTION A-A
Not to Scale

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

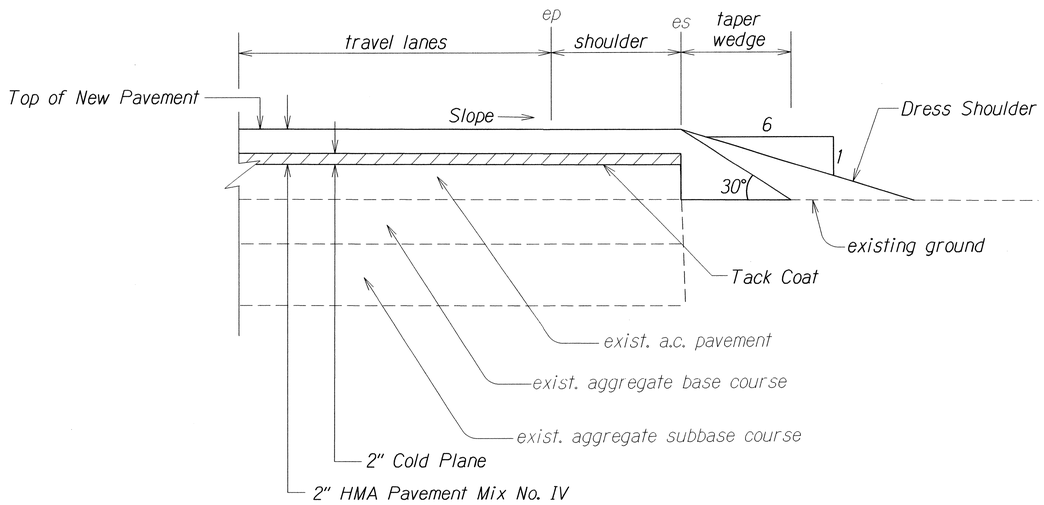
TYPICAL SECTIONS & DETAILS

HANA HIGHWAY RESURFACING
Haleakala Highway to Paia and
HALEAKALA HIGHWAY RESURFACING
Hana Highway to North Firebreak Rd.
Project No. HWY-M-01-15M

Scale: As Shown Date: March, 2015

SHEET No. 4 OF 5 SHEETS

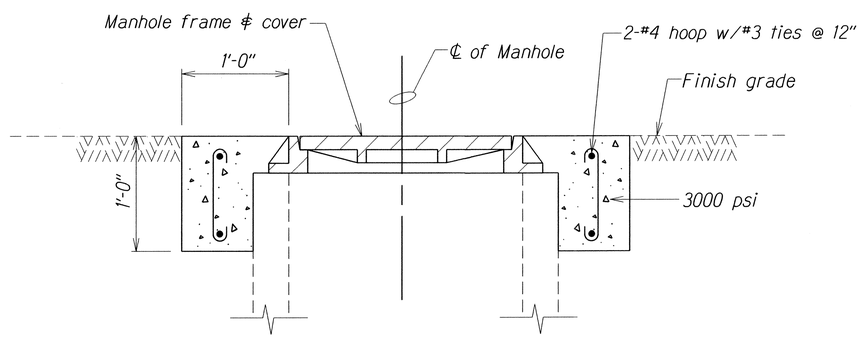
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-01-15M	2015	11	41



Note: Contractor shall mount a device directly on the paver screed extension to provide a 30° beveled shoulder edge.

TYPICAL PAVEMENT EDGE DETAIL

Not To Scale



DETAIL - CONCRETE COLLAR FOR AJUSTMENTS OF MANHOLES AND VALVE BOX

Not To Scale

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

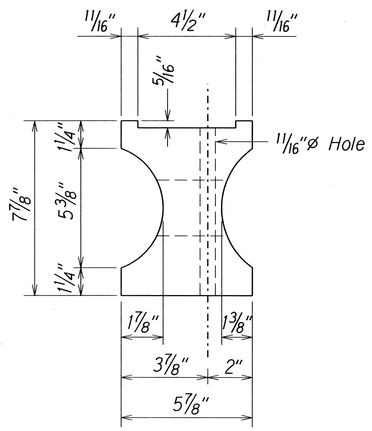
TYPICAL SECTIONS & DETAILS

HANA HIGHWAY RESURFACING
Haleakala Highway to Paia and
HALEAKALA HIGHWAY RESURFACING
Hana Highway to North Firebreak Rd.
Project No. HWY-M-01-15M

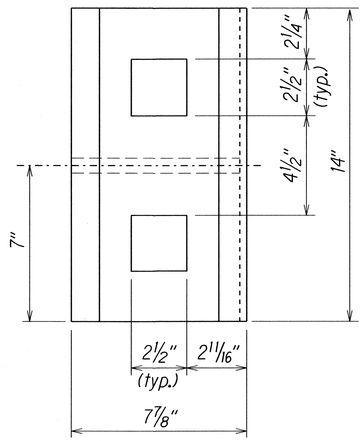
Scale: As Shown Date: March, 2015

SHEET No. 5 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-01-15M	2016	ADD.11S-1	41

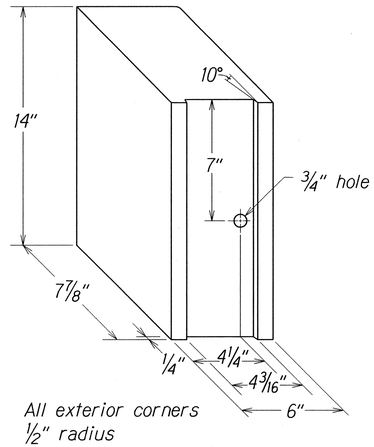


TOP

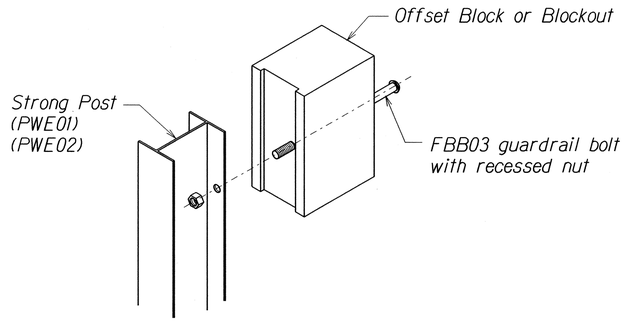


SIDE

RECYCLED PLASTIC BLOCKOUT (TYPE I)

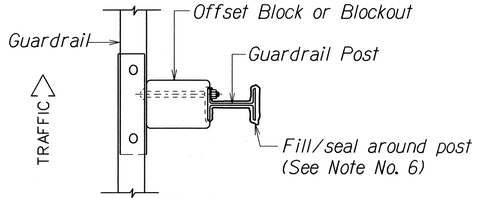


RECYCLED POLYETHYLENE OFFSET BLOCK (TYPE II)

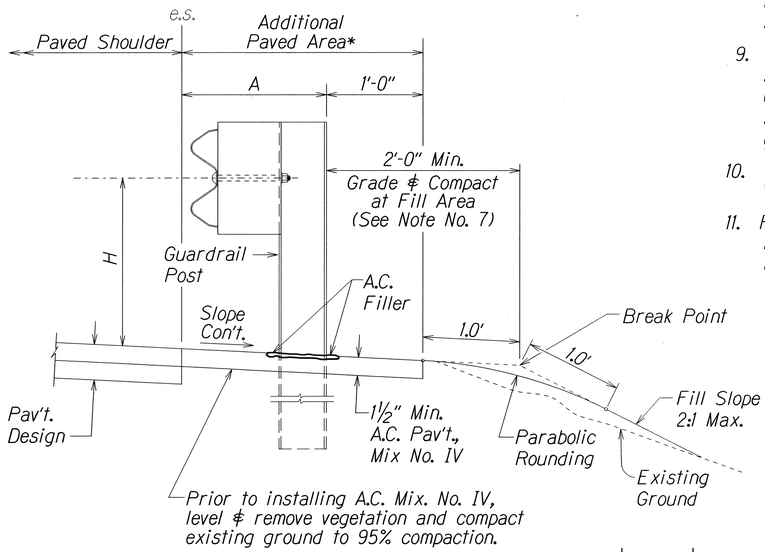


Exploded View
(Rail and washer not shown)

STEEL POST AND BLOCK DETAIL

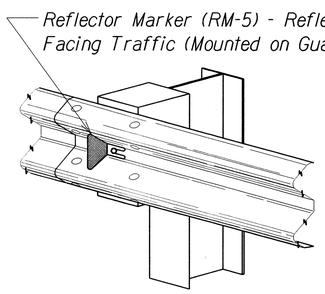


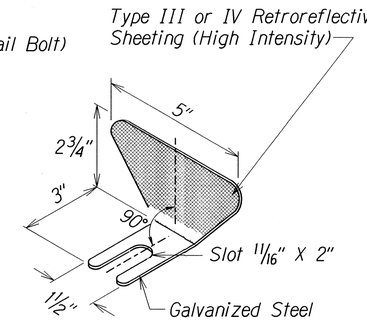
PLAN



ELEVATION

TYPICAL GUARDRAIL INSTALLATION





REFLECTOR MARKER (RM-5) DETAIL AND TYPICAL 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 fastners, posts and rail elements have been converted from metric units into their present form.
4. The Recycled Plastic Block or Offset Block shall be approved by the State.
5. All new guardrail areas, shoulder shall be grubbed, graded and paved as shown on the plan. Paved shoulder width shall be determined in the field and approved by the Engineer. This work will not be paid separately but shall be made under Item 401.0100 A.C. Pavement, Mix IV.
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. This work will not be paid separately but shall be made under Item No. 401.0100 A.C. Pavement, Mix IV.
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 on new guardrail shall be incidental to guardrail pay item.
10. Type G end terminals shall be paid for under Strong Post W-Beam Guardrail.
11. Removed guardrails and post shall be delivered to State Highways baseyard, Kahului. This work shall not be paid separately but shall be considered incidental to guardrail pay items.

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"

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

tdt:ruby/guardrail/te50rev.dgn (standard plan TE-50 rd9/01/00)
8/21/01

DATE	REVISION
4-12-16	Additional Details of Guardrail.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL DETAILS & NOTES

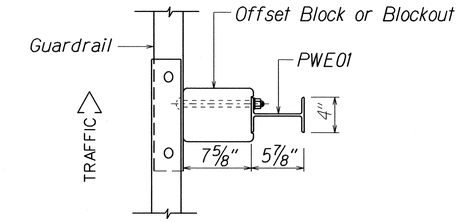
HANA HIGHWAY RESURFACING
Haleakala Highway to Paia and
HALEAKALA HIGHWAY RESURFACING
Hana Highway to North Firebreak Rd.
Project No. HWY-M-01-15M

Scale: As Shown Date: April, 2016

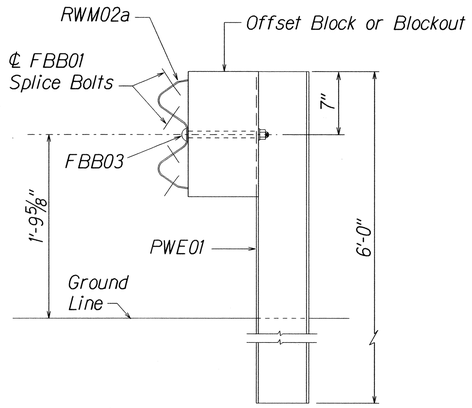
SHEET No. 1 OF 5 SHEETS

ADD. 11S-1

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-01-15M	2016	ADDJIS-2	41



PLAN

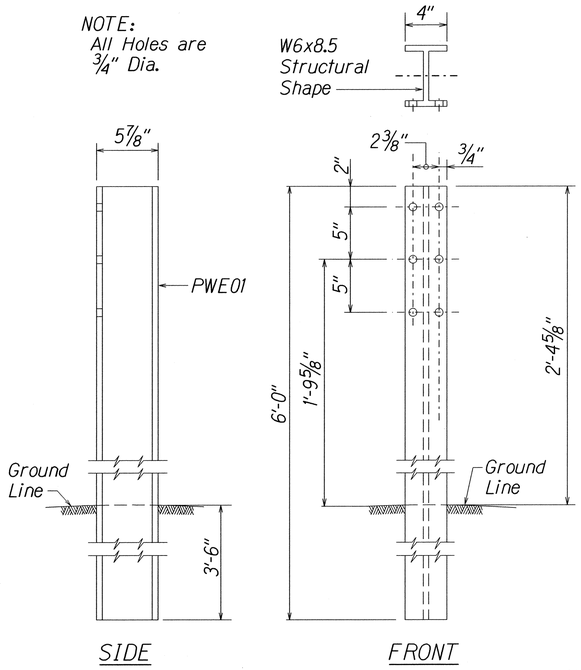


ELEVATION

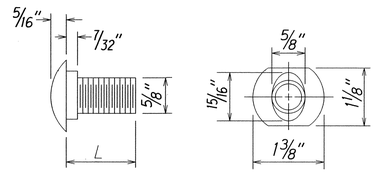
STRONG POST W-BEAM GUARDRAIL

(SGR04a)

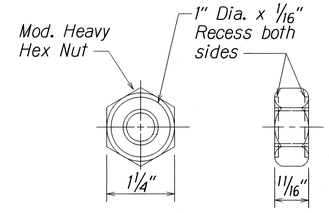
NOTE:
All Holes are 3/4" Dia.



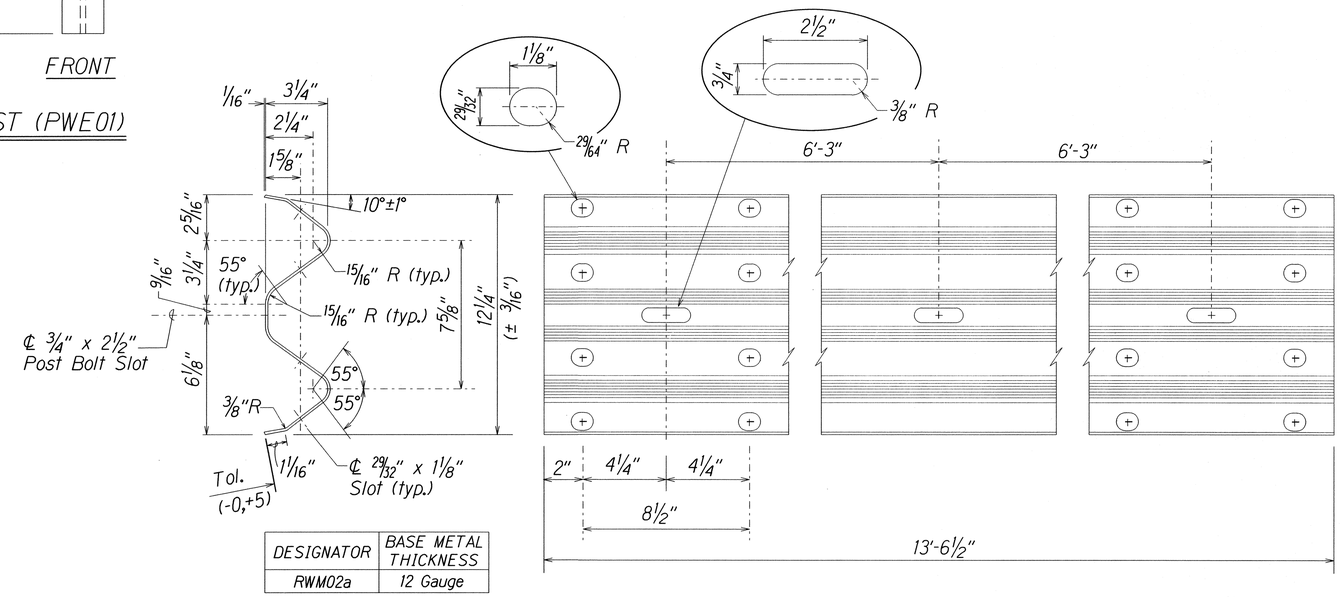
W-BEAM STRONG POST (PWE01)



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

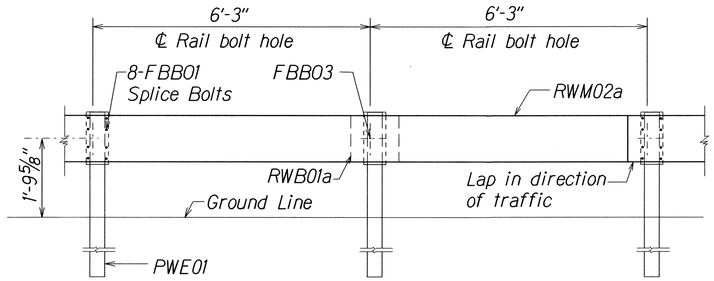


GUARDRAIL BOLTS AND RECESSED NUT



DESIGNATOR	BASE METAL THICKNESS
RWM02a	12 Gauge

2 SPACE W-BEAM GUARDRAIL (RWM02a)



ELEVATION

STRONG POST W-BEAM GUARDRAIL WITH RECYCLED OFFSET BLOCK OR PLASTIC BLOCKOUT

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

r3/24/03 tdl:ruby/guardrail/wbeamstp.dgn (standard plan TE-90 r03/06/87)

DATE	REVISION
4-12-16	Additional Details of Guardrail.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRONG POST W-BEAM GUARDRAIL

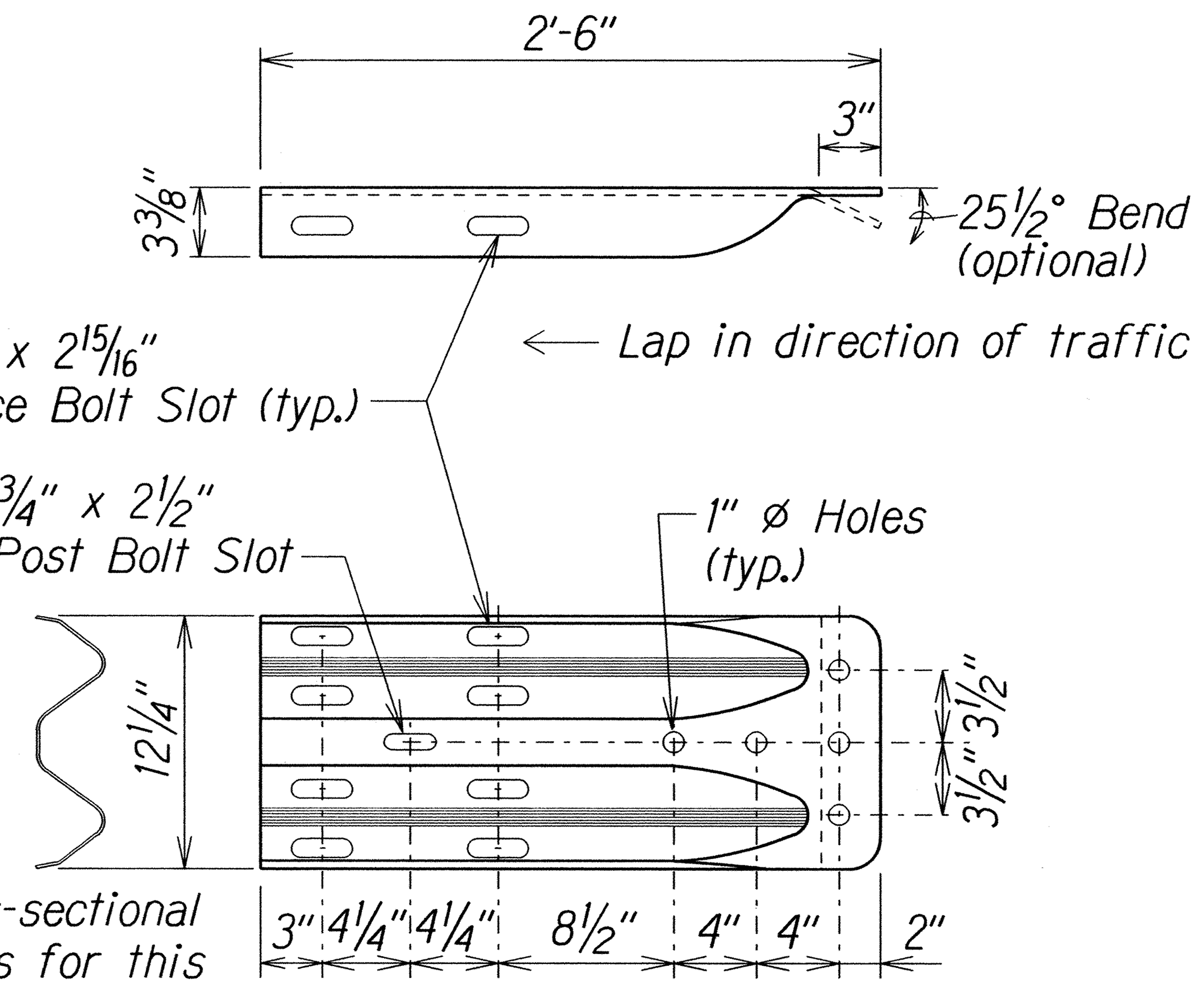
HANA HIGHWAY RESURFACING
Haleakala Highway to Paia and
HALEAKALA HIGHWAY RESURFACING
Hana Highway to North Firebreak Rd.
Project No. HWY-M-01-15M

Scale: As Shown Date: April, 2016

SHEET No. 2 OF 5 SHEETS

ADD. 11S-2

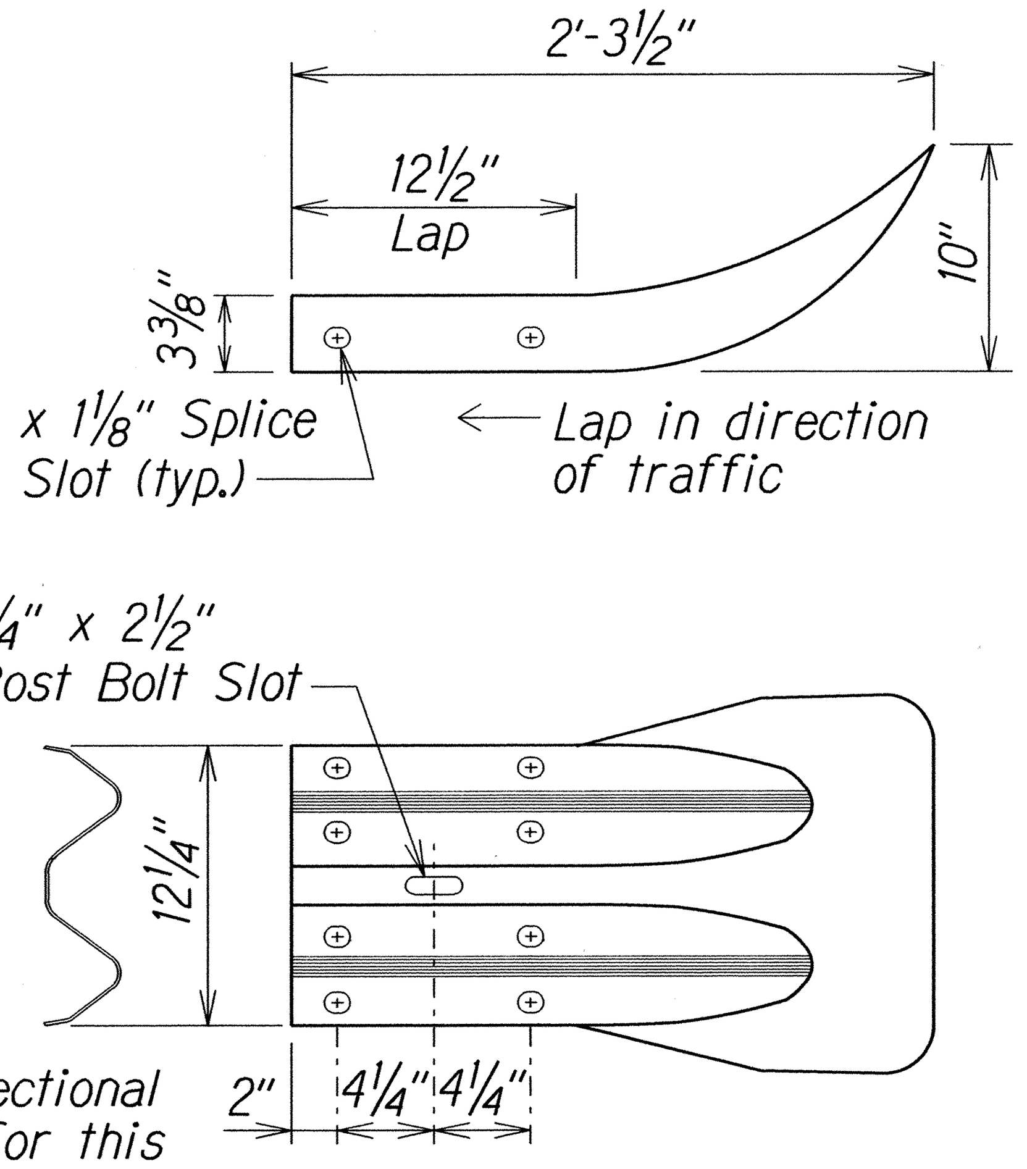
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-01-15M	2016	ADDJ1S-3	41



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

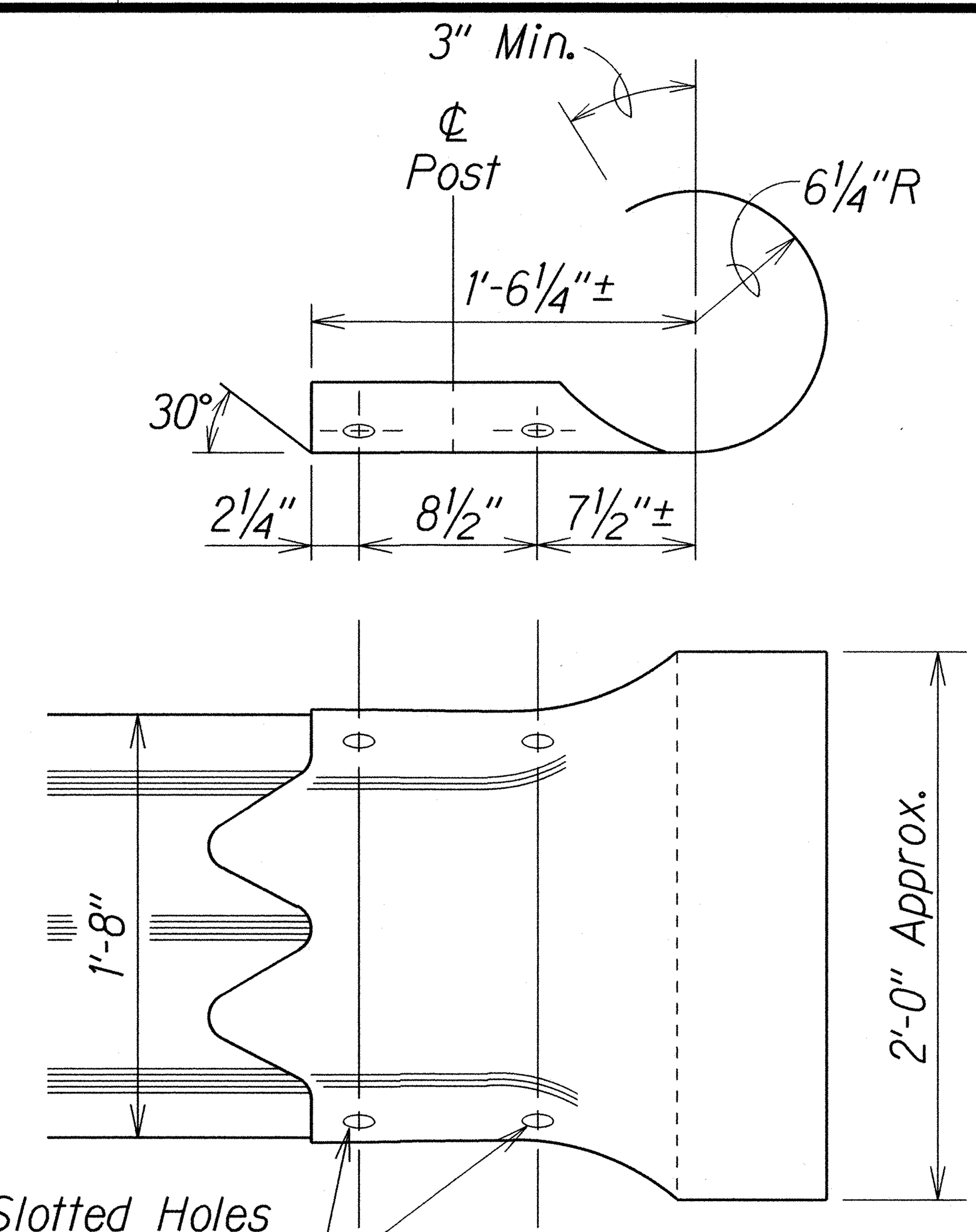
W-BEAM TERMINAL CONNECTOR (RWE02b)



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.

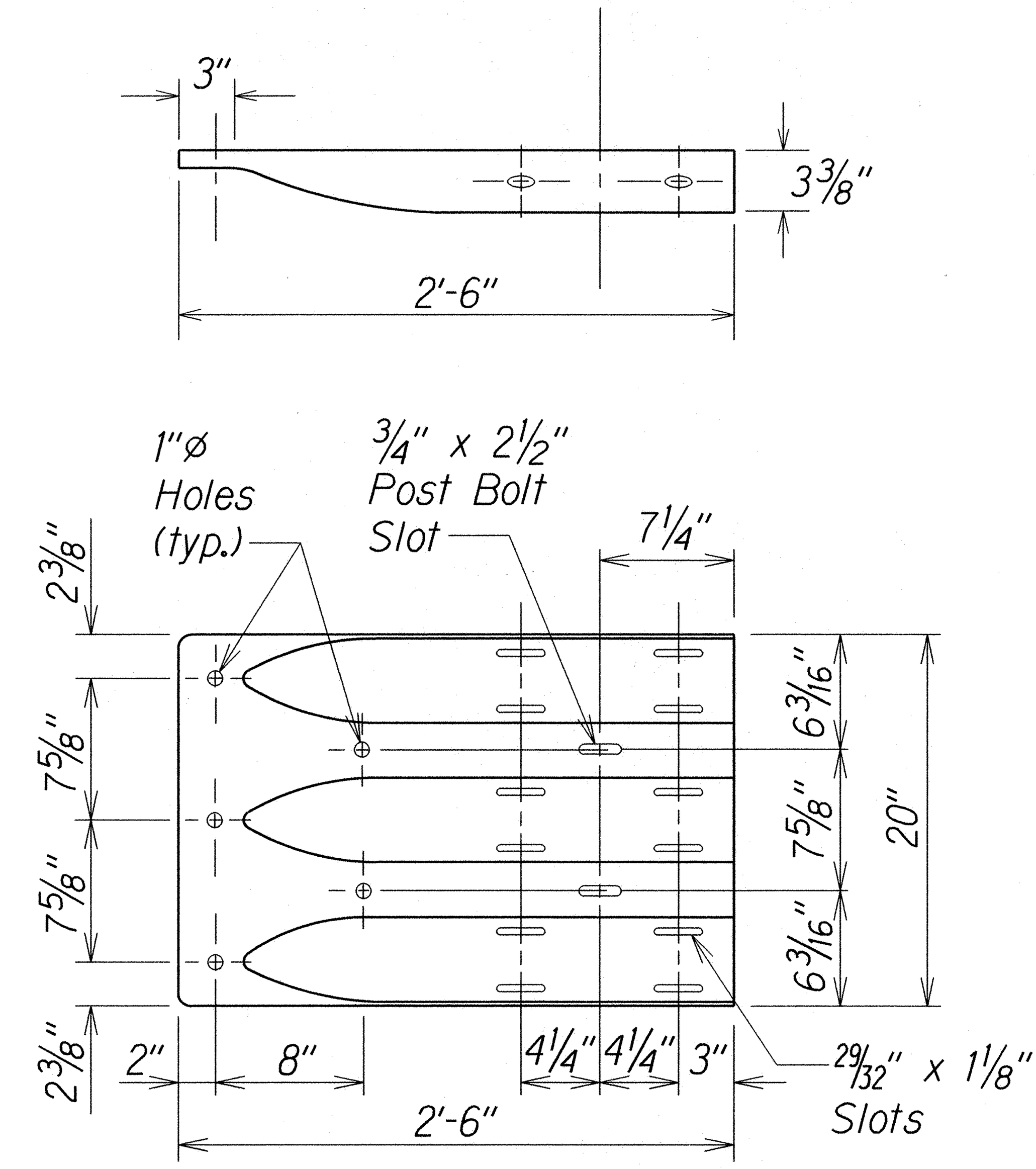
DESIGNATOR	BASE METAL THICKNESS
RWE01a	12 Gauge

W-BEAM END SECTION (FLARED RWE01a)



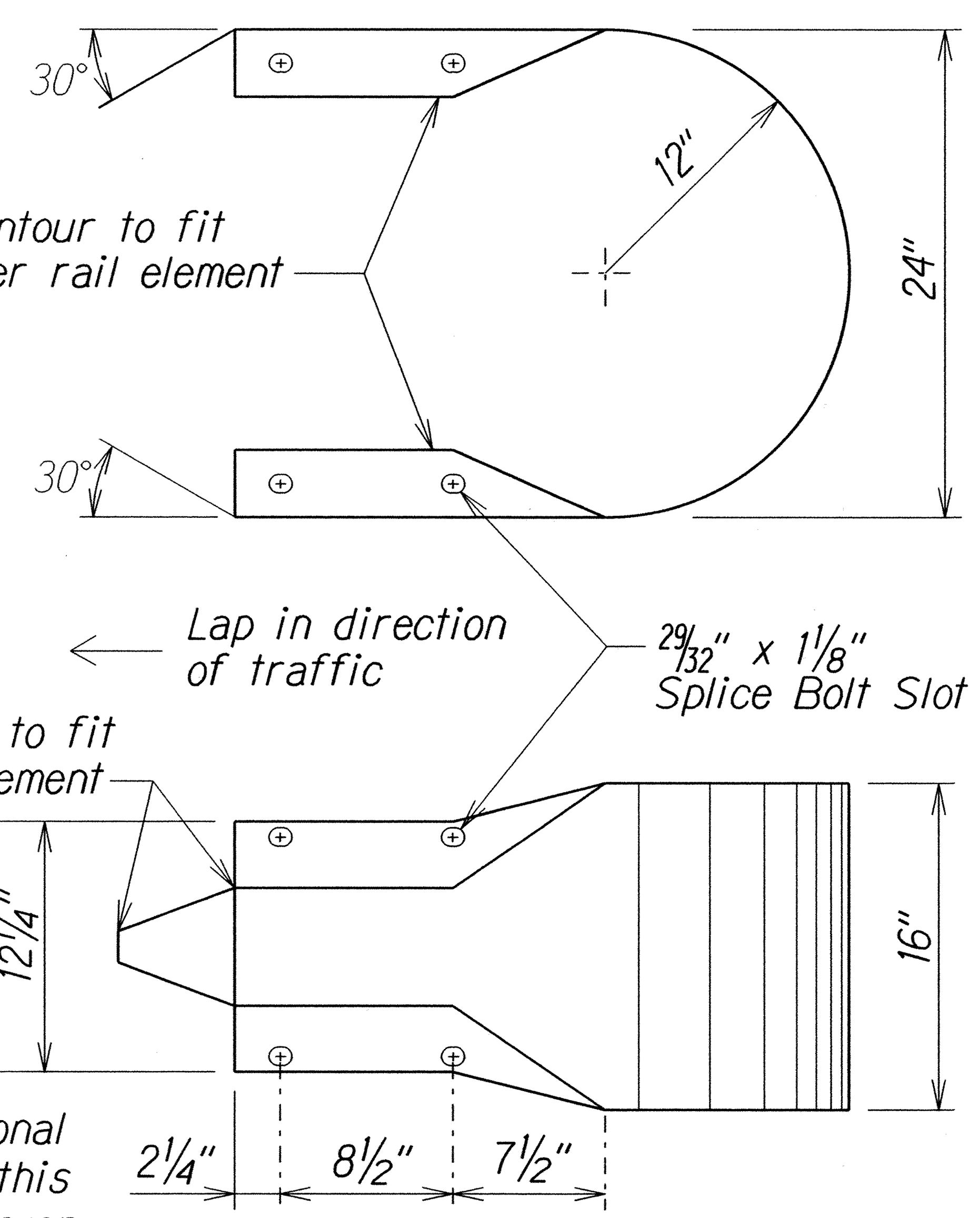
DESIGNATOR	BASE METAL THICKNESS
RTE02b	10 Gauge

THRIE-BEAM SECTION (ROUNDED) (RTE02b)



DESIGNATOR	BASE METAL THICKNESS
RTE01b	10 Gauge

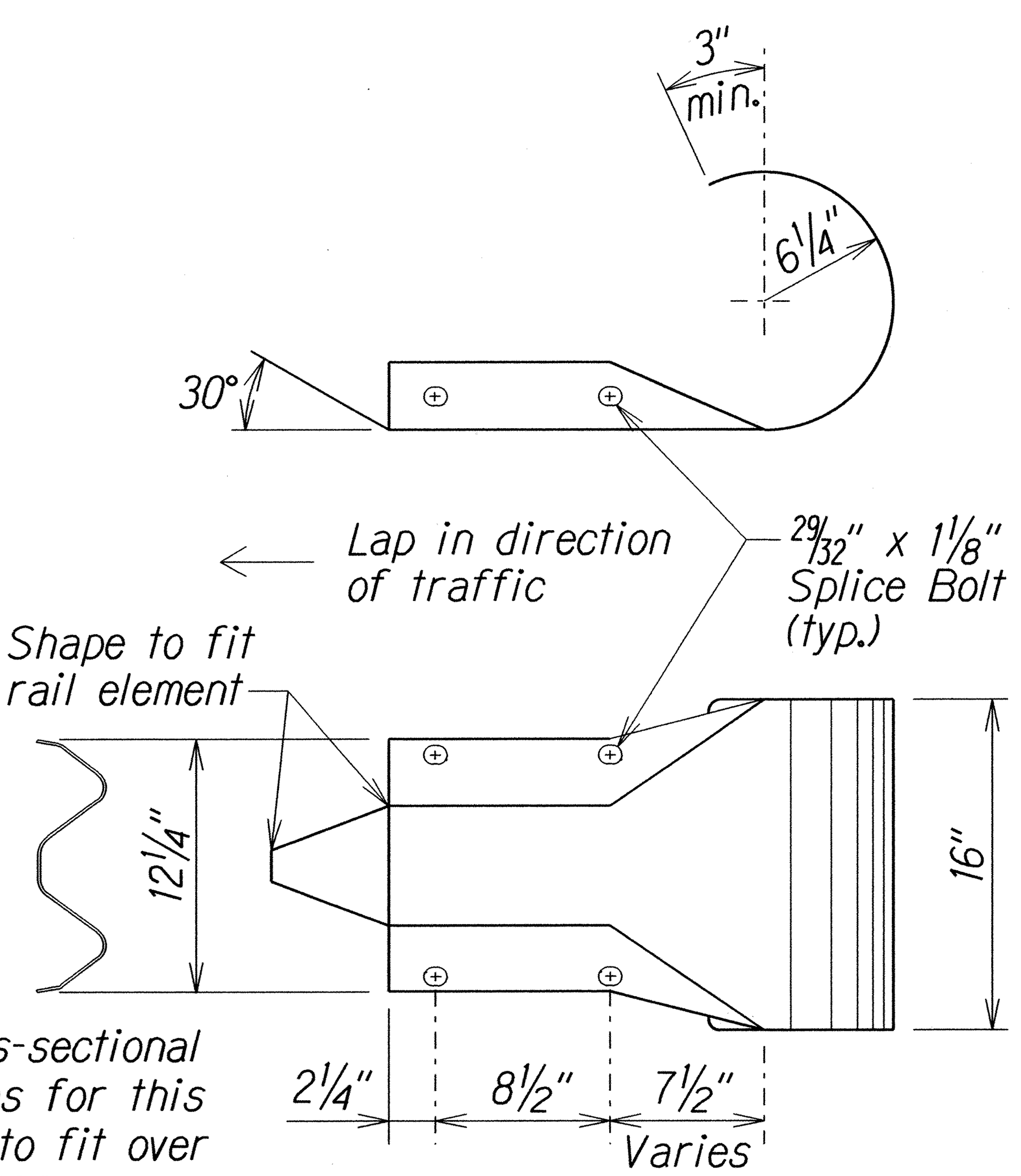
THRIE-BEAM TERMINAL CONNECTOR (RTE01b)



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

DESIGNATOR	BASE METAL THICKNESS
RWE06a	12 Gauge

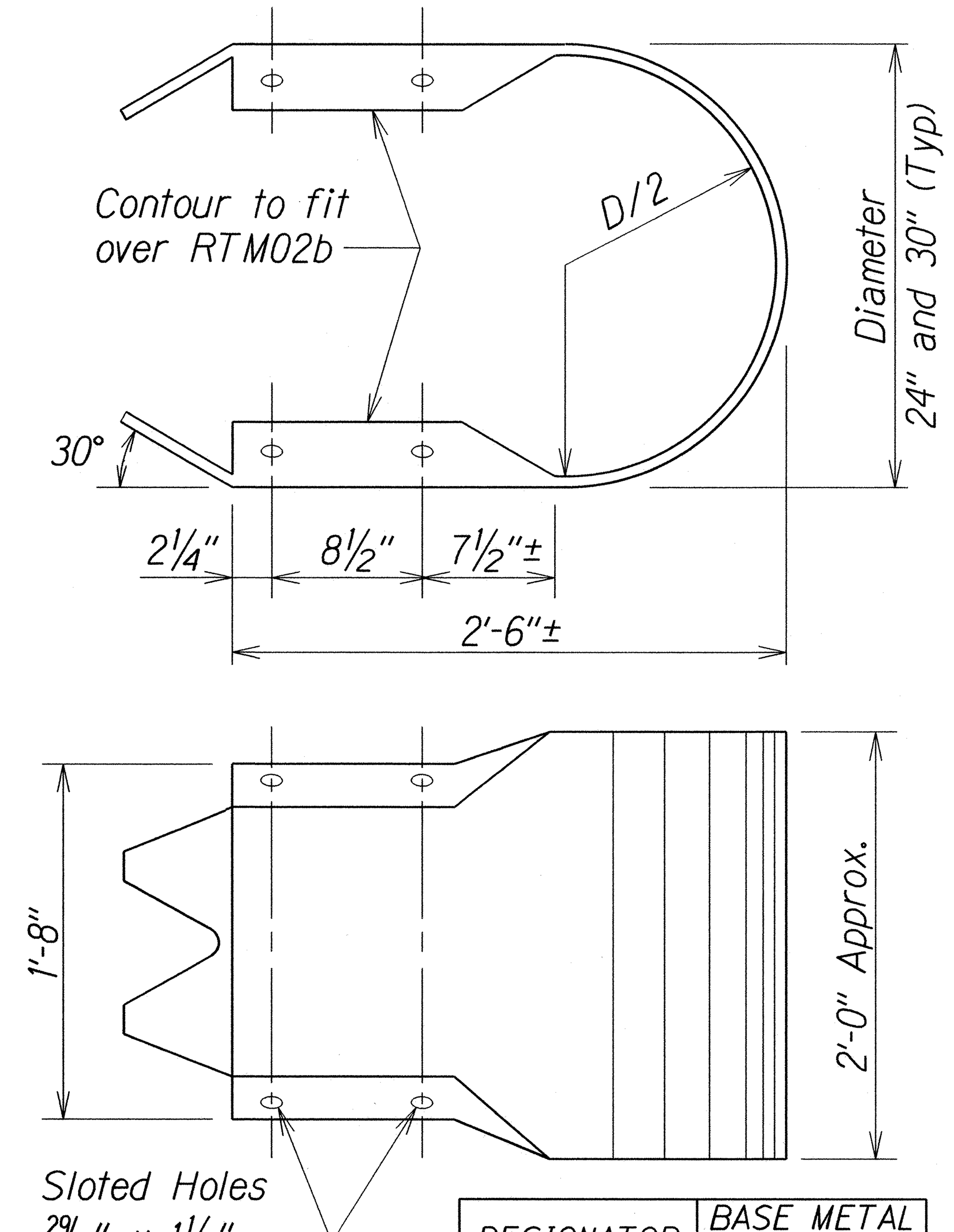
W-BEAM END SECTION (BUFFER RWE06a)



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)



DESIGNATOR	BASE METAL THICKNESS
RTE03b & RTE04b	10 Gauge

THRIE-BEAM END SECTION (BUFFER RTE03b or RTE04b)

	DATE	REVISION
3	4-12-16	Additional Details of Guardrail.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL TERMINAL CONNECTORS AND END SECTIONS

HANA HWY. RESURFACING, Haleakala Hwy. to Paia and HALEAKALA HIGHWAY RESURFACING Hana Highway to North Firebreak Rd.
Project No. HWY-M-01-15M

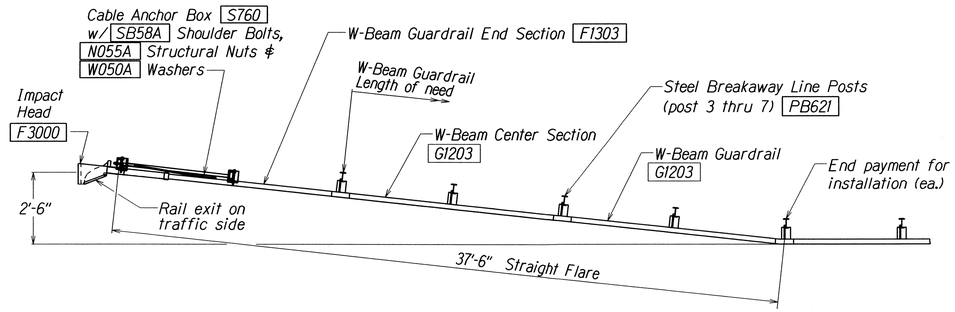
Scale: As Noted Date: April, 2016

SHEET No. 3 OF 5 SHEETS

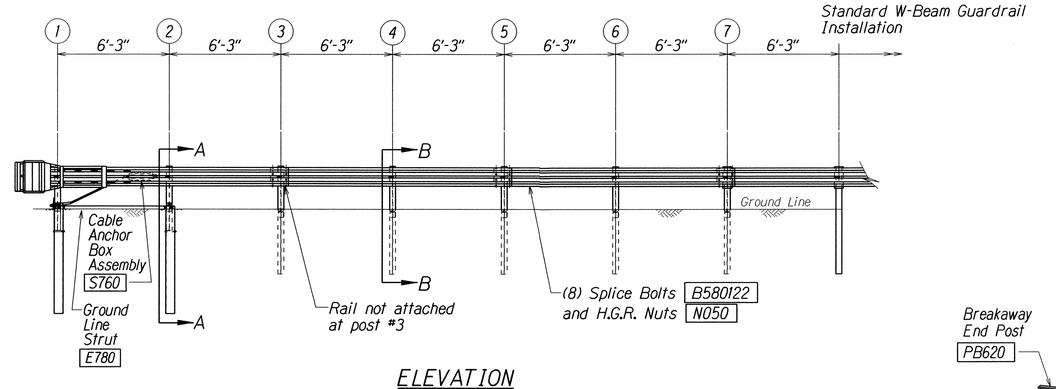
ADD. 11S-3

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

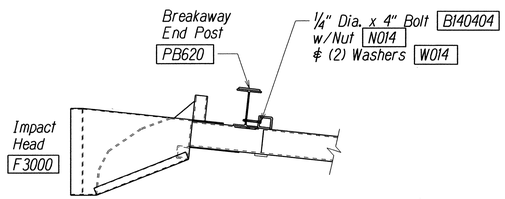
r6/21/01 tdl.ruby/guardrail/te51rev.dgn (standard plan TE-51 (09/01/87))



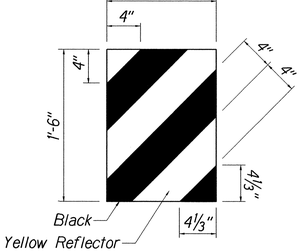
PLAN



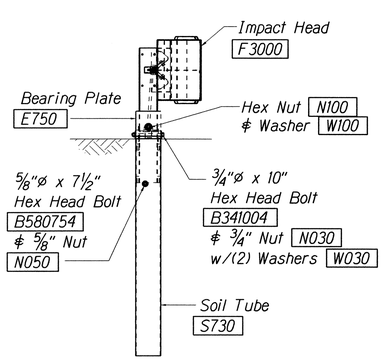
ELEVATION



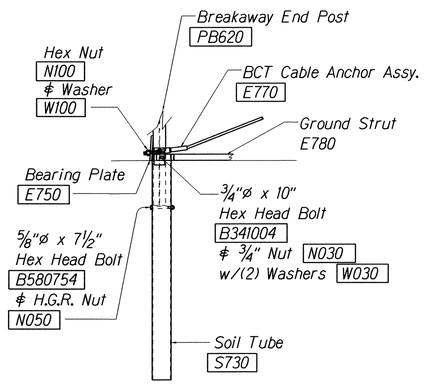
IMPACT HEAD CONNECTING DETAIL



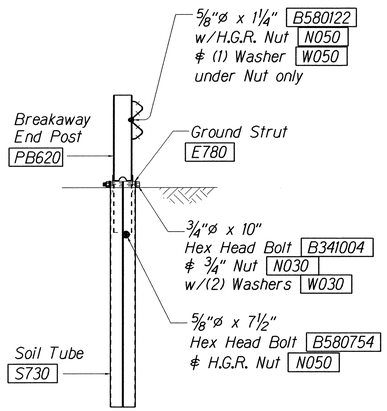
IHRM(R)
IMPACT HEAD REFLECTOR
MARKER INSERT
DETAIL



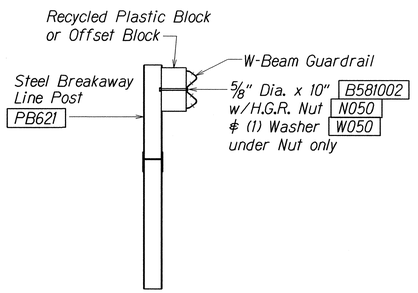
FRONT VIEW OF POST 1



PARTIAL VIEW OF POST 1



SECTION A-A
at Post #2



SECTION B-B
(Typical @ Post 3 - 7)
NOTE: RAIL NOT BOLTED @ POST #3

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 may be 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.	HWY-M-01-15M	2016	ADD11S-4	41

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
BI40404	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

DATE	REVISION
3 4-12-16	Additional Details of FLEAT-350.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

FLEAT-350
FLARED ENERGY ABSORBING TERMINAL

HANA HWY. RESURFACING, Haleakala Hwy. to Paia and
HALEAKALA HIGHWAY RESURFACING
Hana Highway to North Firebreak Rd.
Project No. HWY-M-01-15M

Scale: As Noted Date: April, 2016

SHEET No. 4 OF 5 SHEETS

ADD. 11S-4

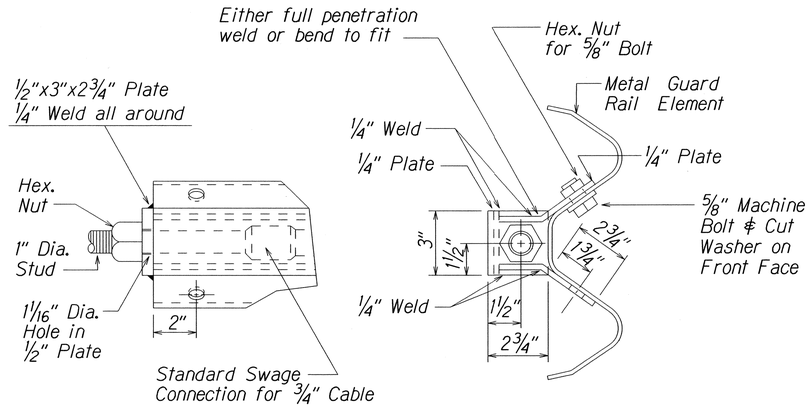
ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY X | TRACED BY | DESIGNED BY X | QUANTITIES BY | CHECKED BY | DATE X | NOTE BOOK | No.

(standard plan TE-61 rll/03/89 & TE-62 r09/01/87)

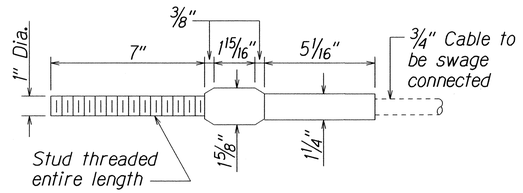
td:ruby/guardrail/fleat350.dgn

r8/12/02

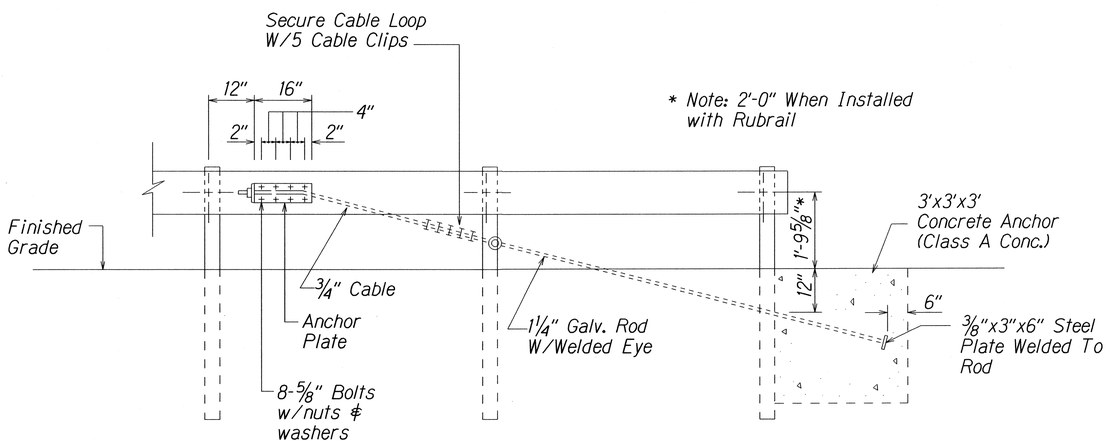
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-01-15M	2016	ADDJIS-5	41



ANCHOR PLATE DETAILS

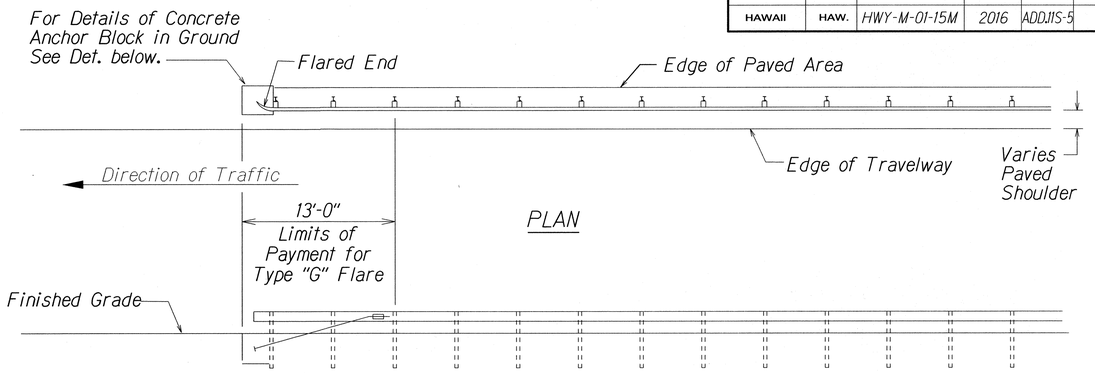


STANDARD SWAGED FITTING AND STUD



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.



ELEVATION

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.

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

c3/13/02 tdl:rdy/guardrail/te59revdgn (standard plan TE-59 rll/03/89)

DATE	REVISION
3 4-12-16	Additional Details of Type G End Terminal.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL DETAILS

HANA HIGHWAY RESURFACING
Haleakala Highway to Paia and
HALEAKALA HIGHWAY RESURFACING
Hana Highway to North Firebreak Rd.
Project No. HWY-M-01-15M

Scale: As Shown Date: April, 2016

SHEET No. 5 OF 5 SHEETS

ADD. 11S-5