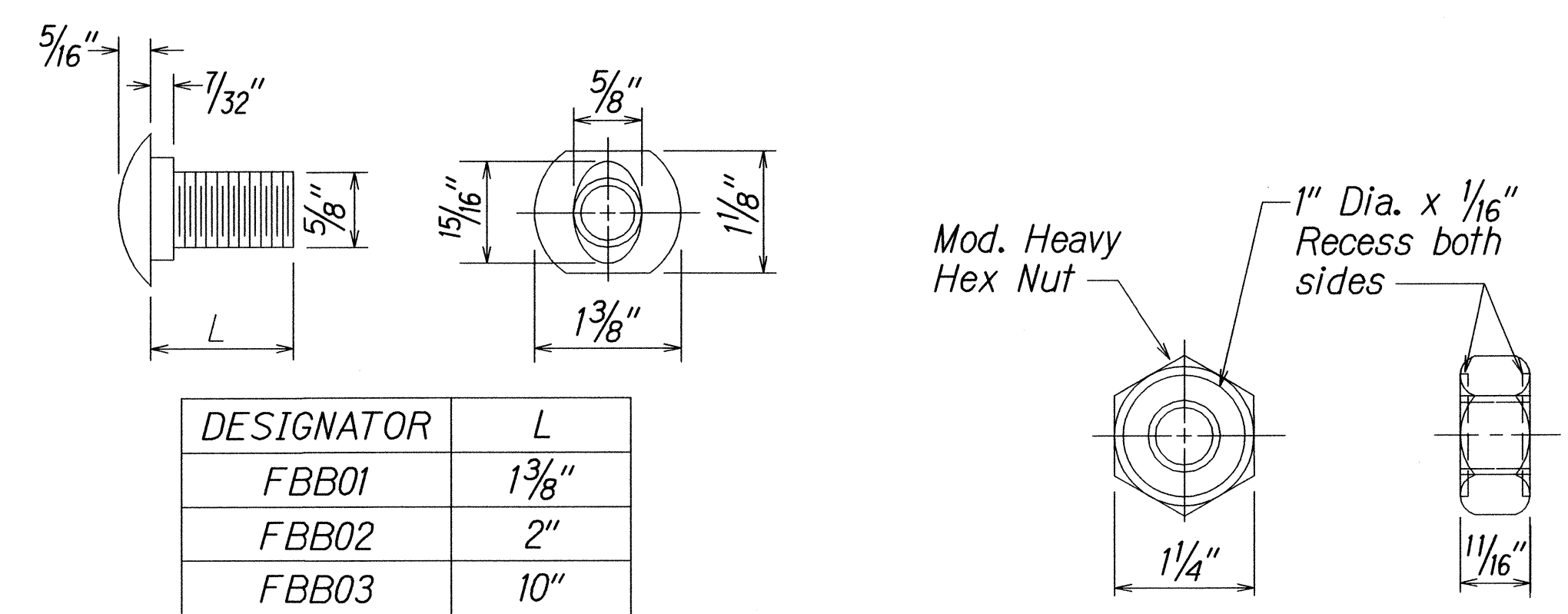
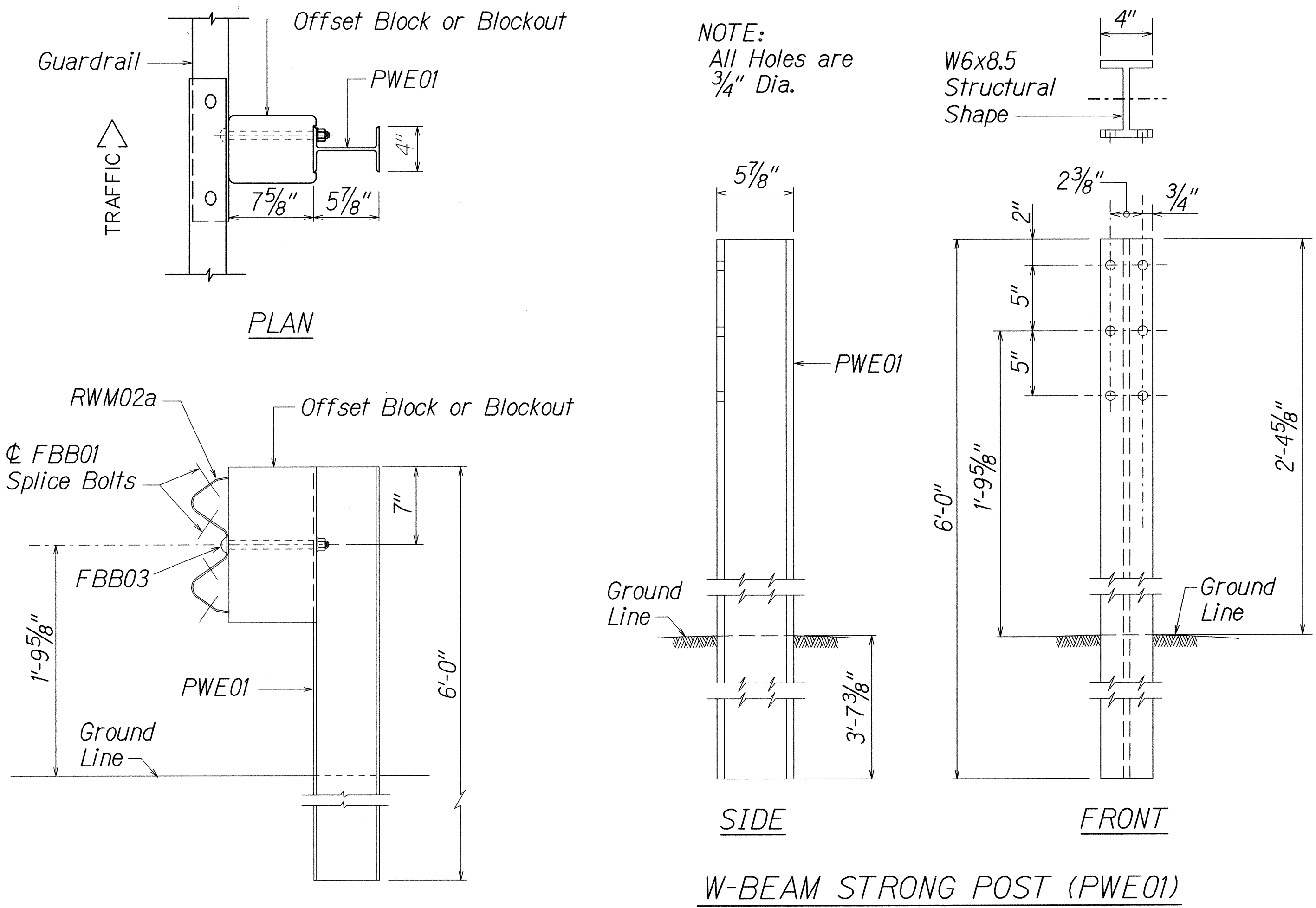
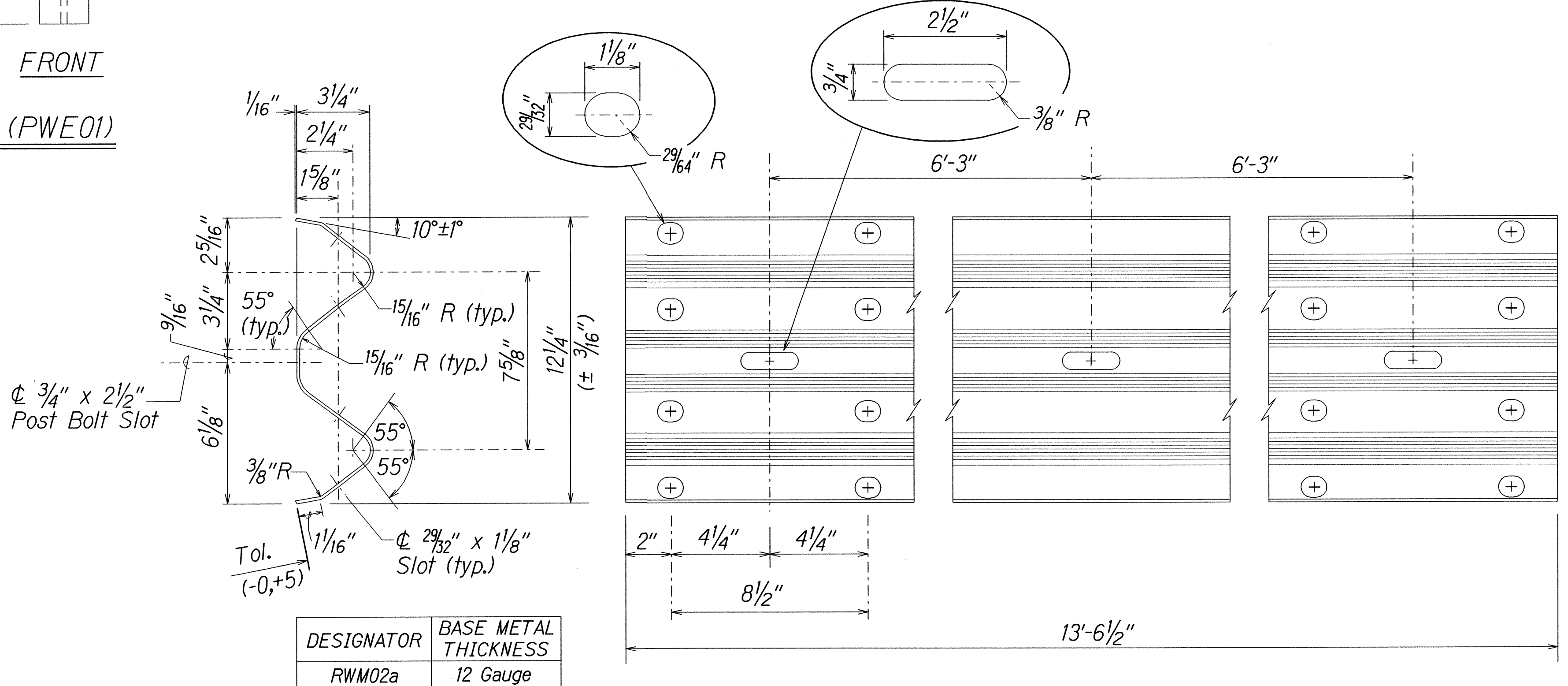
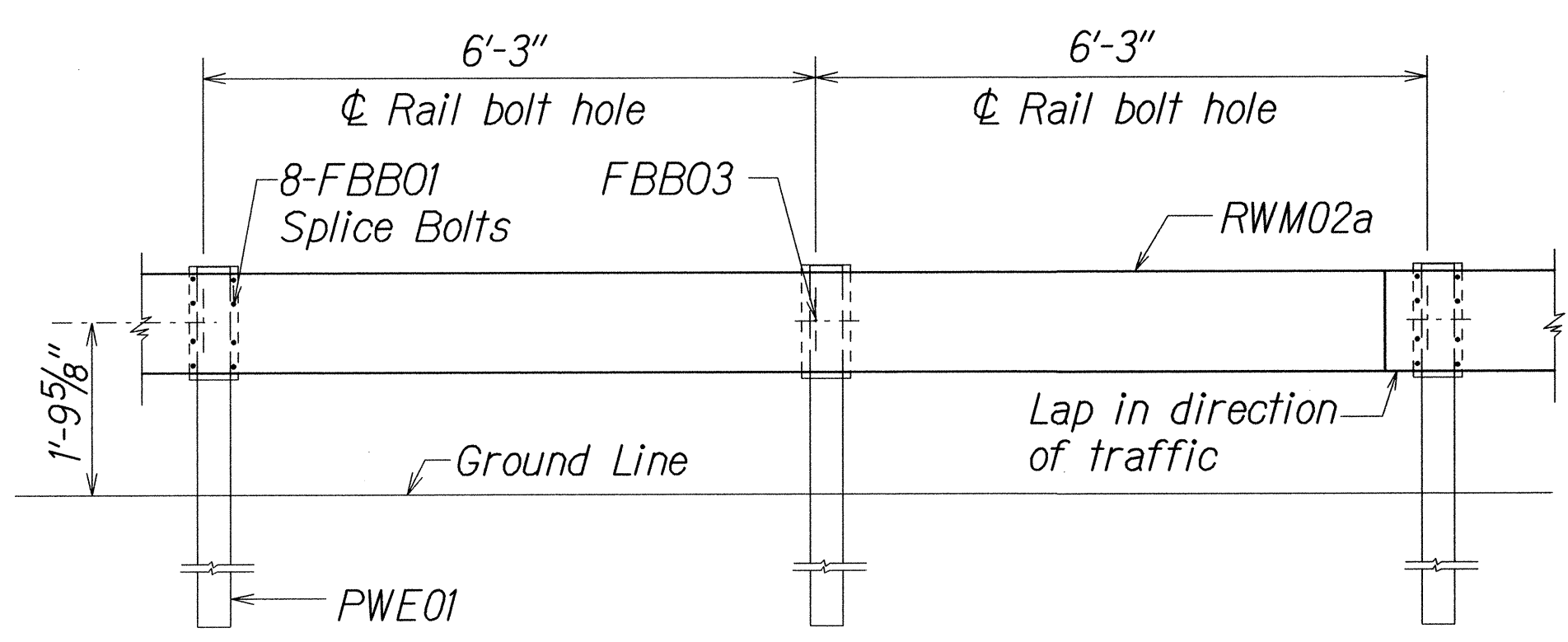


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(067)	2014	31	41



STRONG POST W-BEAM GUARDRAIL (SGR04a)



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRONG POST W-BEAM GUARDRAIL

HAWAII BELT ROAD RESURFACING
Pepeekeo to Hakalau
Federal Aid Project No. NH-019-2(067)

Scale: NTS Date: March, 2014

SHEET No. 2 OF 10 SHEETS

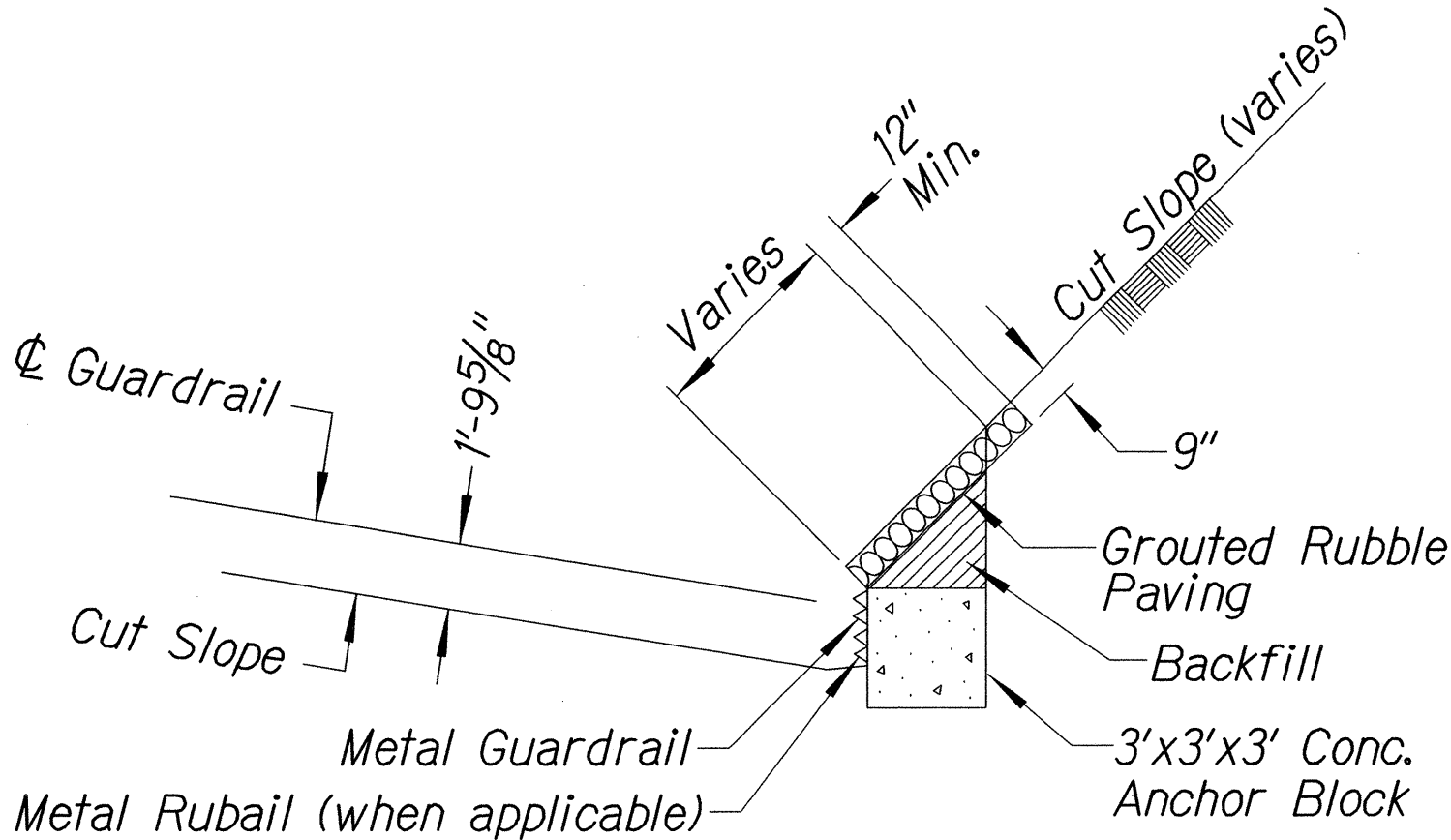
ORIGINAL PLAN	DATE	BY
SURVEY PLOTTED BY		
DRAWN BY		
TRACED BY		
QUANTITIES BY		
CHECKED BY		

Standard Plan TE-50 (03/06/87)

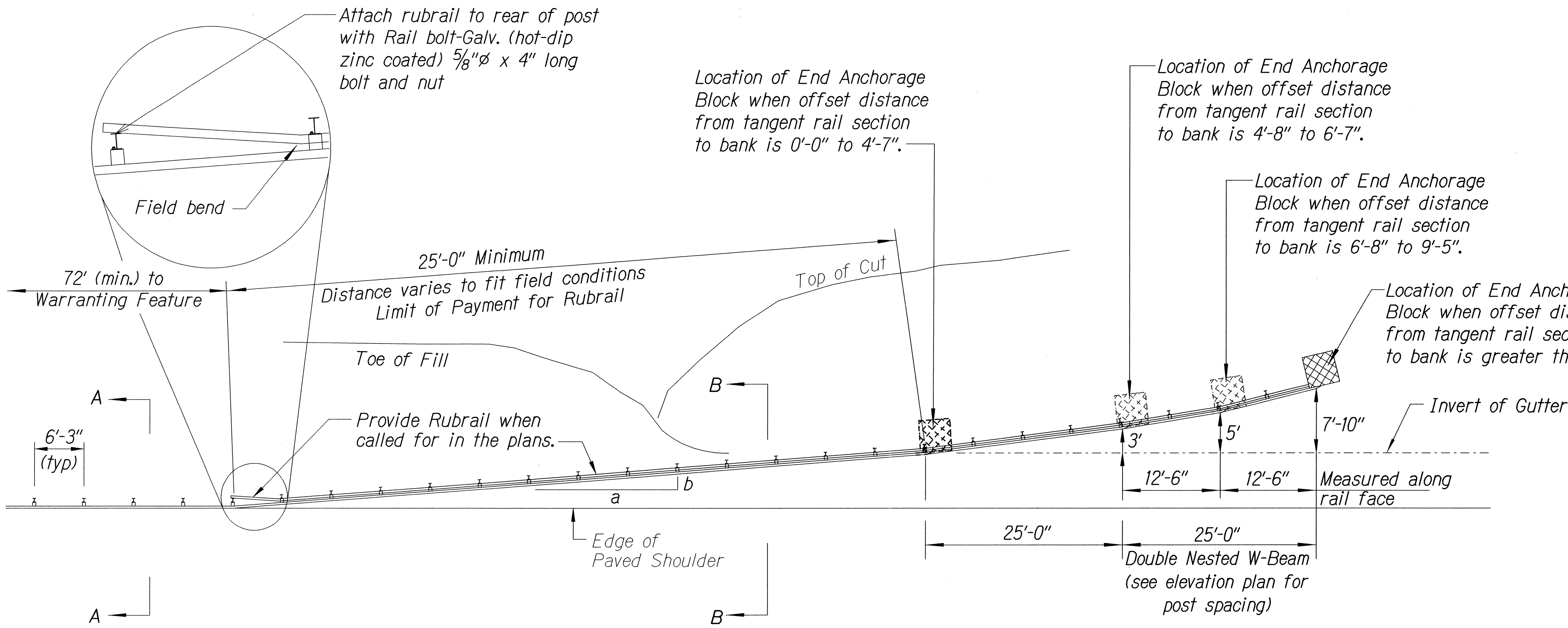
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(067)	2014	33	41

General Notes

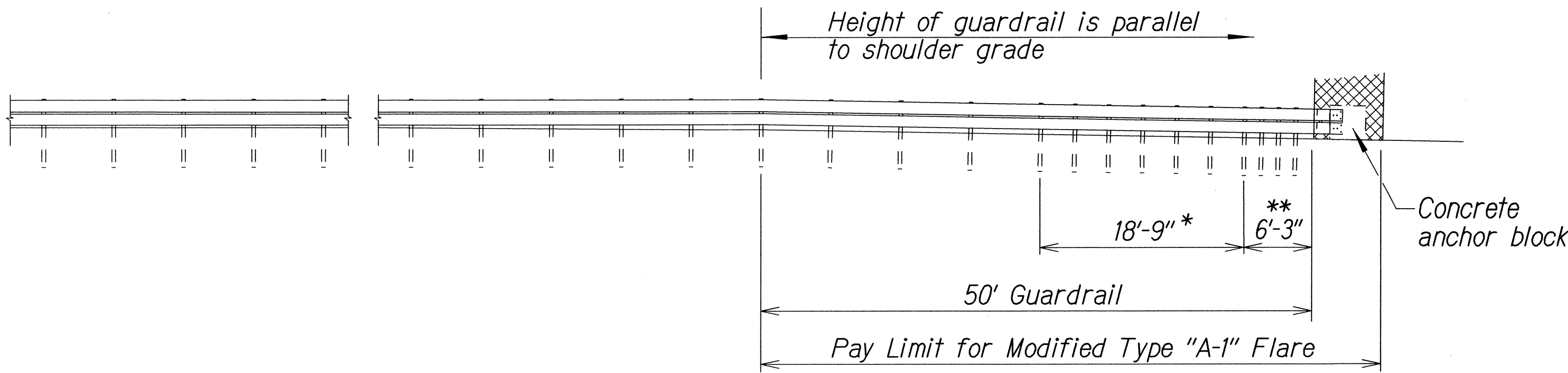
1. All posts are 6'-0" in length within the 50'-0" pay limit for the Modified Type "A-1" Flare without rubrail.
2. Whenever swales or a change in grade is encountered within the 50'-0" pay limit for the Modified Type "A-1" Flare, a rubrail shall be installed and all posts shall have a minimum embedment of 4'-0". Post lengths shall be adjusted to provide the minimum embedment.
3. 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.
4. Limit of payment for Modified Type "A-1" Flare shall be 50'-0" from End Shoe including Rubrail (when applicable), Anchor Block and GRP work.
5. Excavation, Anchor Block, Backfill and GRP work shall be considered incidental to the Modified Type "A-1" Flare.



ANCHOR BLOCK IN CUT SECTION

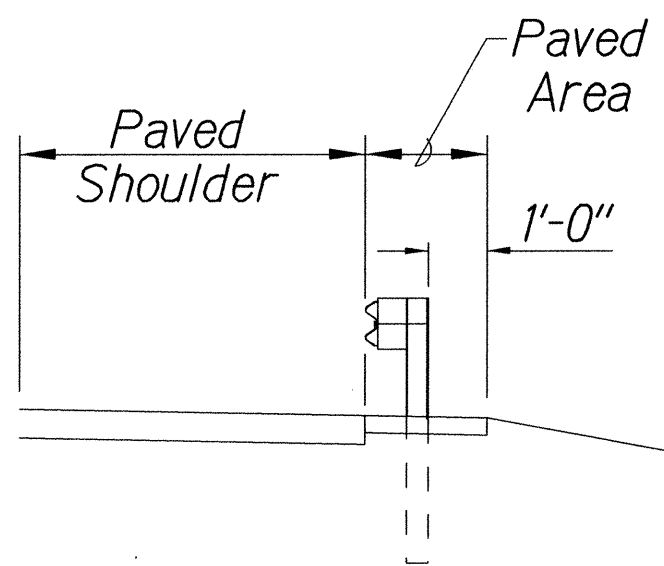


PLAN

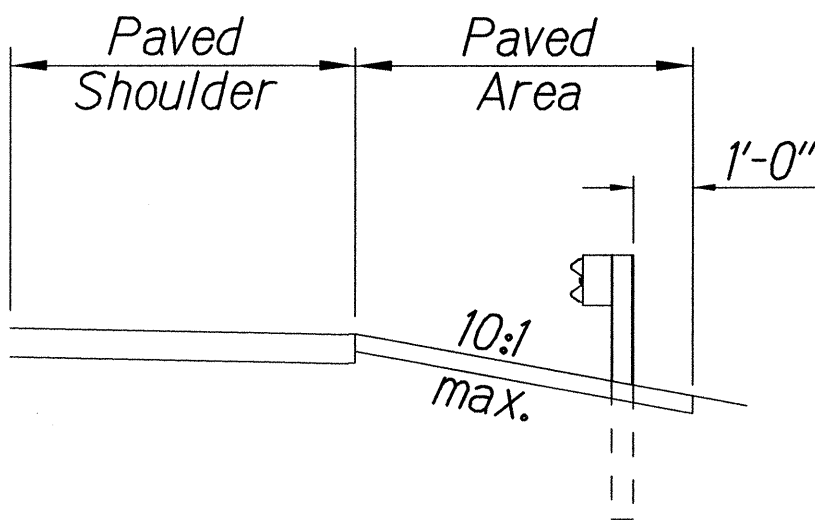


ELEVATION (Profile Along Rail)

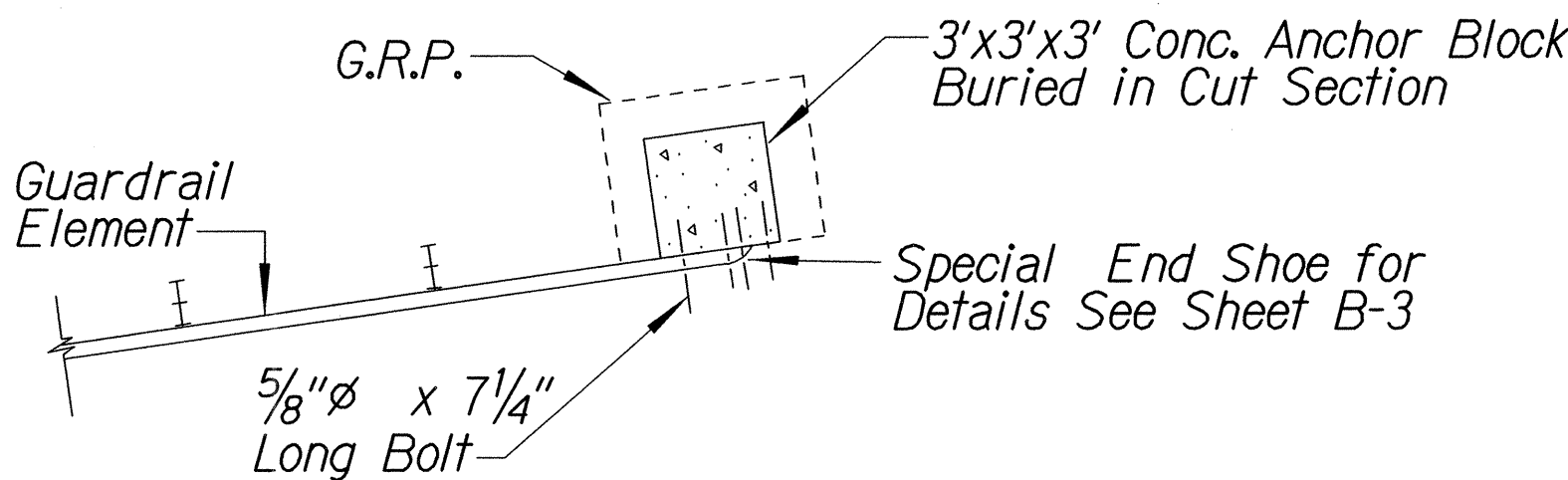
- * Posts at 3'-1 1/2" o.c.
- ** Posts at 1'-6 3/4" o.c.



Section A-A



Section B-B



PLAN - ANCHOR BLOCK IN CUT SECTION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MODIFIED TYPE "A-1" FLARE
HAWAII BELT ROAD RESURFACING
Pepeekeo to Hakalau
Federal Aid Project No. NH-019-2(067)
Scale: NTS
Date: March, 2014

SHEET No. 4 OF 10 SHEETS

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
FILE/Leave	
8/21/01	

Standard plan TE-59 07/01/95, TE-59 01/03/99 & TE-59 07/01/96

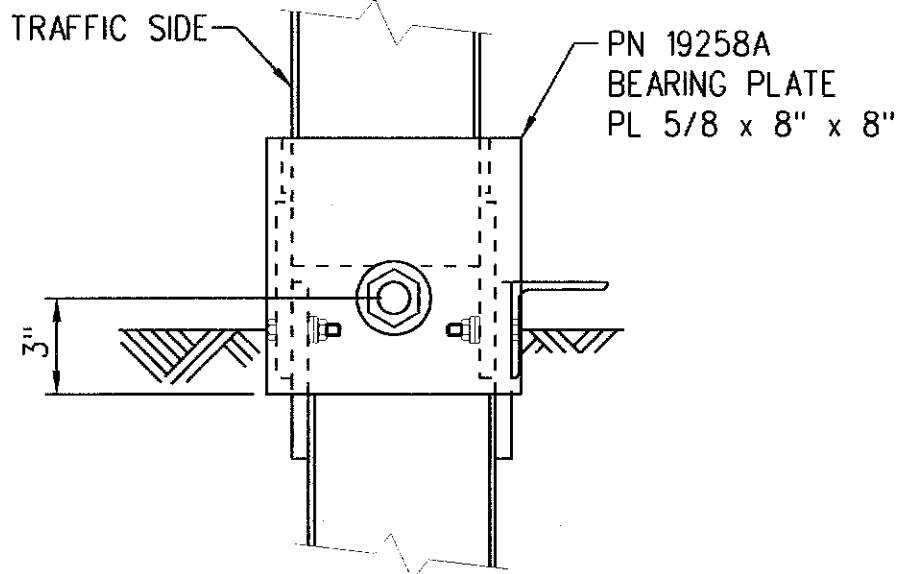
18/21/01

te-59 guardrail/flare.al.lcgn

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(067)	2014	36	41

BILL OF MATERIAL		
PN	QTY	DESCRIPTION
32G	1	12/12'-6/6'3/S ANC (GUARDRAIL)
704A	1	CABLE ANCHOR BRACKET
995A	1	ET-PLUS EXTRUDER
3000G	1	CABLE 3/4 x 6'6"
3340G	9	5/8" HEX NUT
3360G	9	5/8"~ x 1 1/4" SPLICE BOLT
3701G	2	3/4" FLAT WASHER
3704G	2	3/4" HEX NUT
3717G	2	3/4"~ x 2 1/2" HEX HD BOLT
3900G	2	1" FLAT WASHER
3910G	2	1" HEX NUT
4254G	4	3/8" FLAT WASHER
4255G	2	3/8" FENDER WASHER (1 1/2 OD)
4258G	2	3/8" LOCKWASHER
4261G	2	3/8"~ x 1 1/2" HEX HD BOLT
4389G	2	7/16" FLAT WASHER
4390G	2	7/16"~ x 1 1/2" HEX HD BOLT
4393G	2	7/16" LOCK WASHER
4396G	2	7/16" HEX NUT
4699G	2	3/4" LOCK WASHER
6321C	2	3/8"~ x 2" HEX HD BOLT
6405G	4	3/8" HEX NUT
6668B	1	OBJECT MARKER
14578C	1	POST SYT #2
19258A	1	5/8" x 8" x 8" BEARING PLATE
33795G	1	ANGLE STRUT (ET/SYTP/HBA)
33871A	1	POST ET PLUS HBA #1 TOP
33873A	1	POST ET PLUS HBA #1 BOTTOM

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



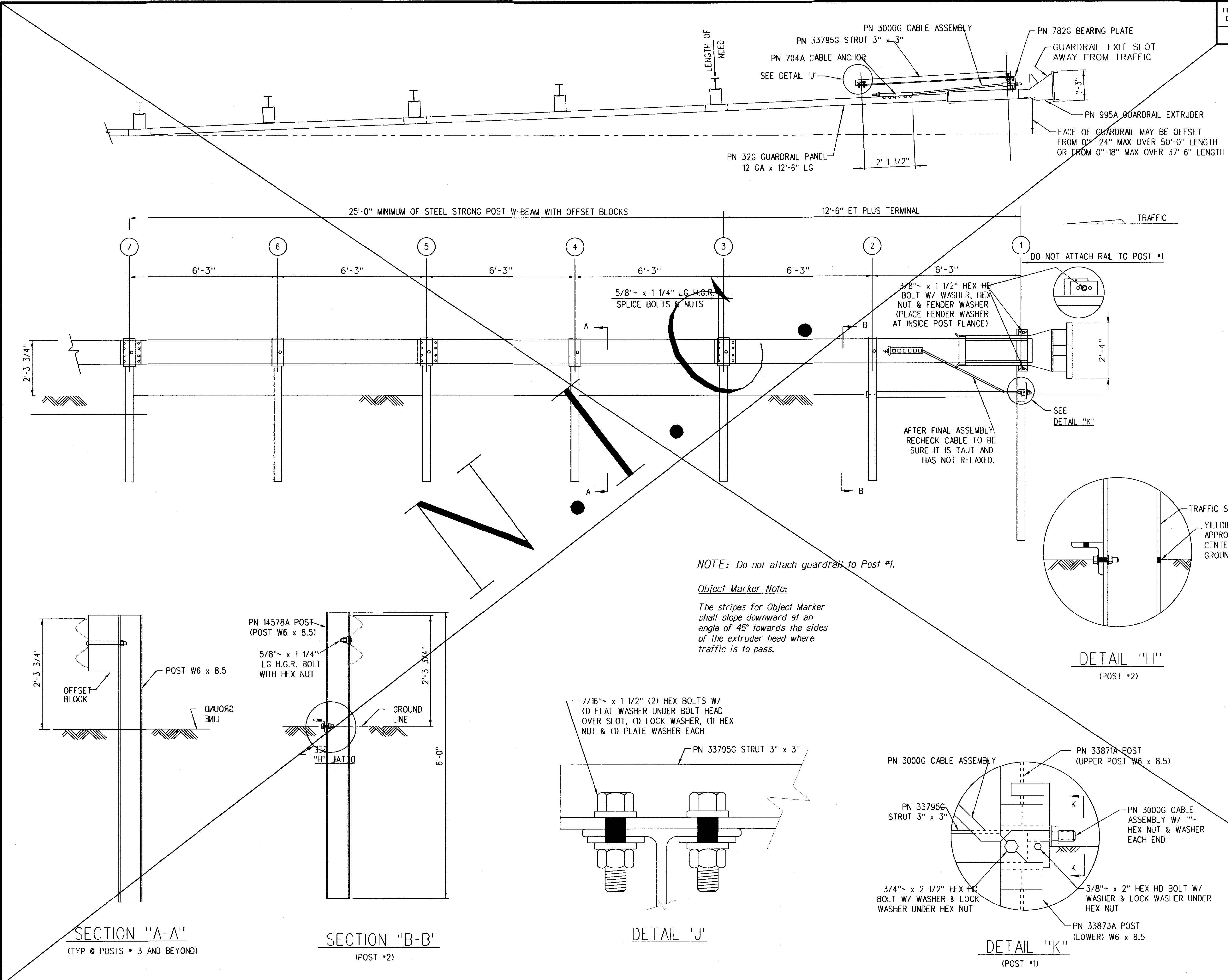
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ET-PLUS (TL-3)

HAWAII BELT ROAD RESURFACING
Pepeekeo to Hakalau
Federal Aid Project No. NH-019-2(067)

Scale: NTS Date: March, 2014

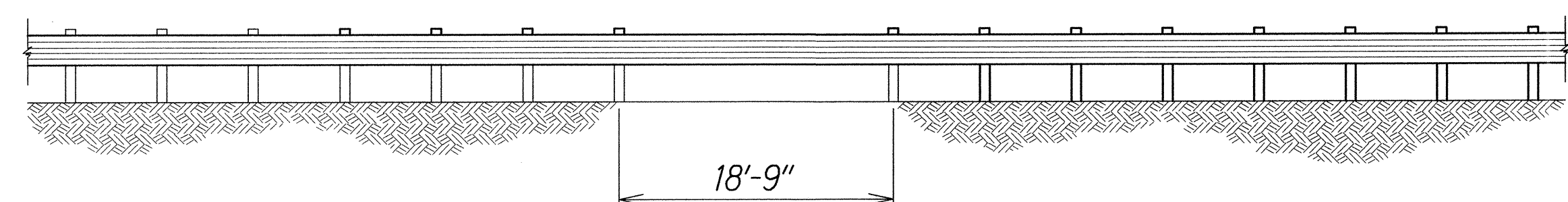
SHEET No. 7 OF 10 SHEETS



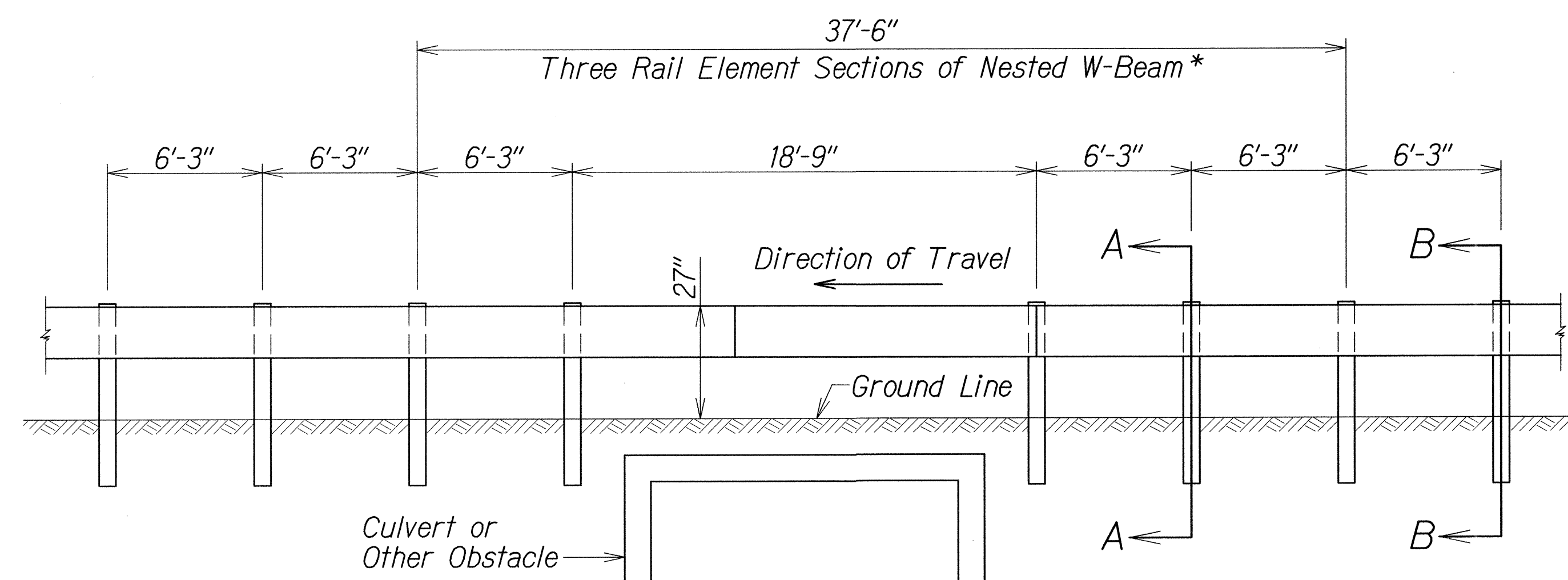
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DESIGNED BY	
QUANTITIES BY	CHECKED BY	
DATE		

"AS-BUILT"

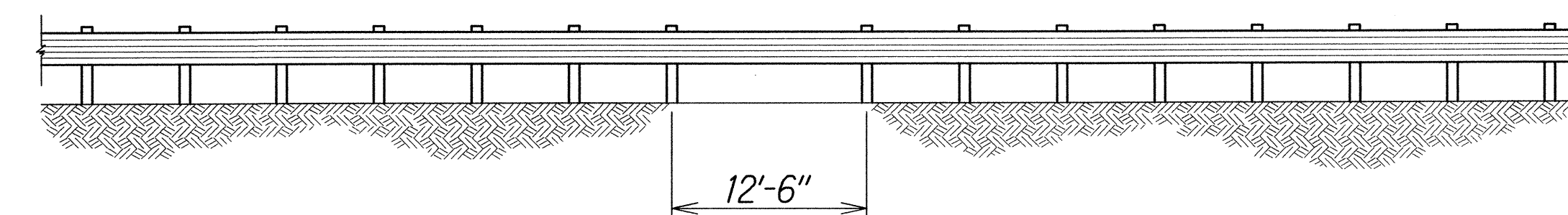
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(067)	2014	37	41



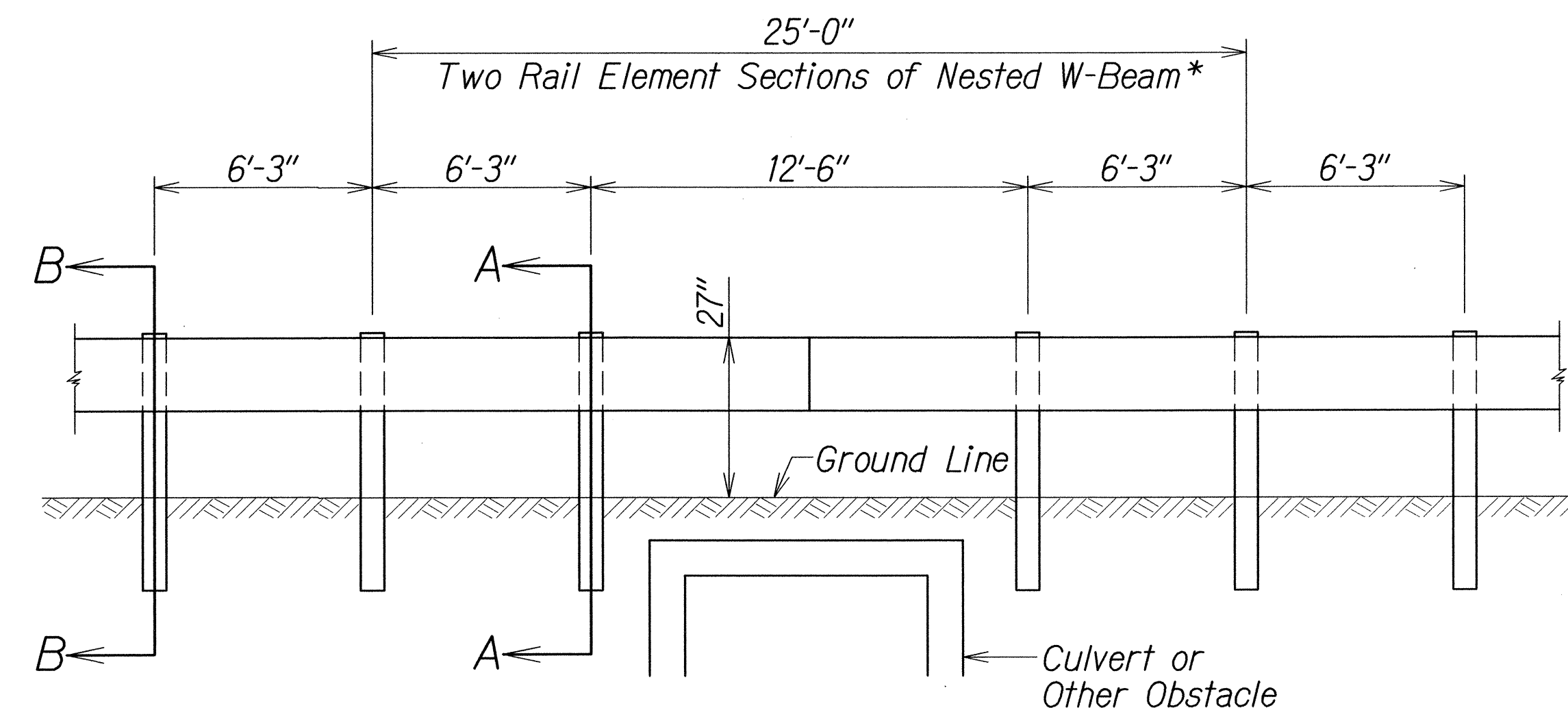
LONG SPAN OVER CULVERT



NESTED LONG SPAN STRONG POST
W-BEAM GUARDRAIL OVER 18'-9" CULVERT
(MAXIMUM DYNAMIC DEFLECTION OF 3.2 FT.)



LONG SPAN OVER CULVERT

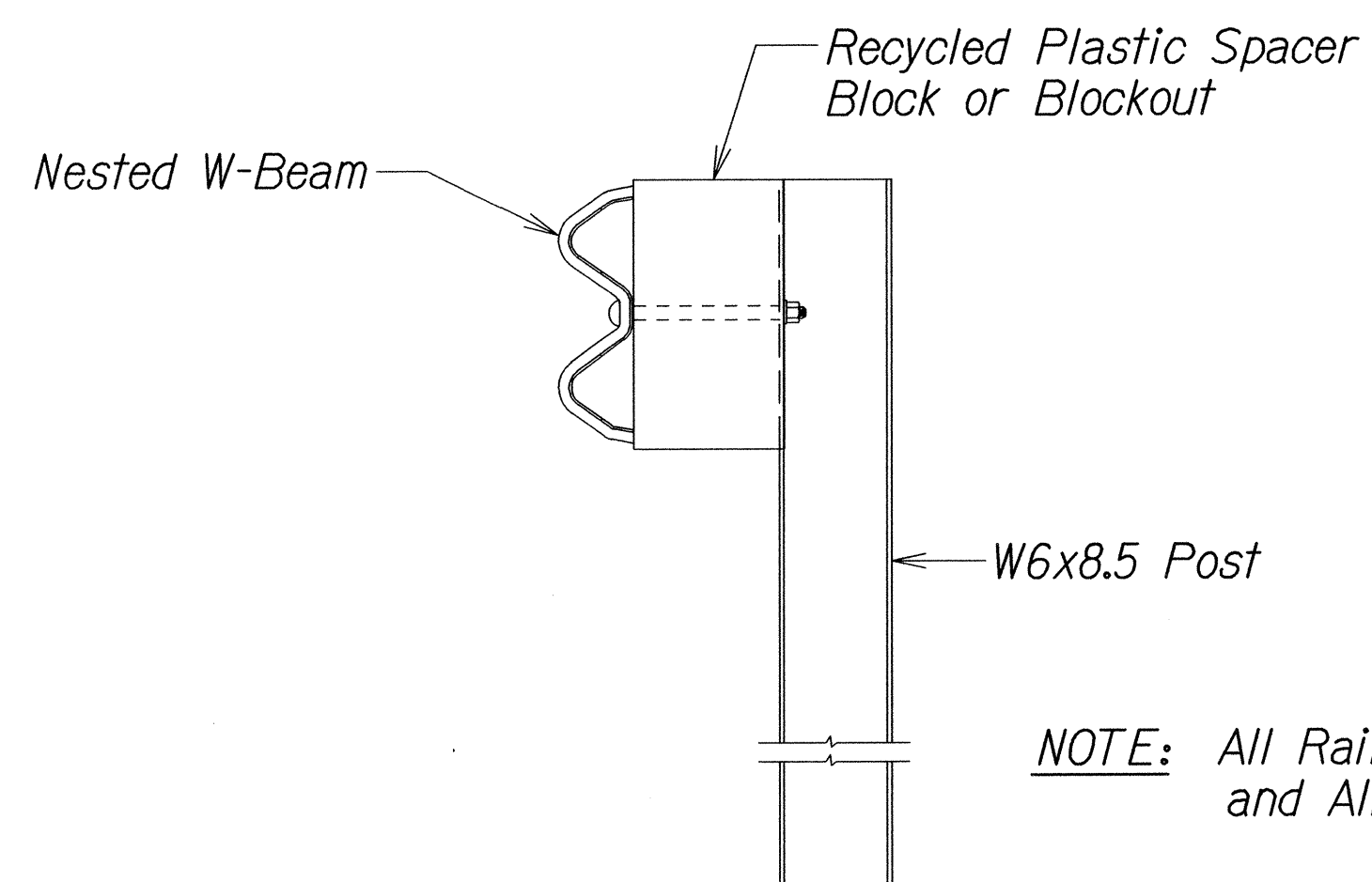


(SPlice IN CENTER OF 12'-6" SPACING)

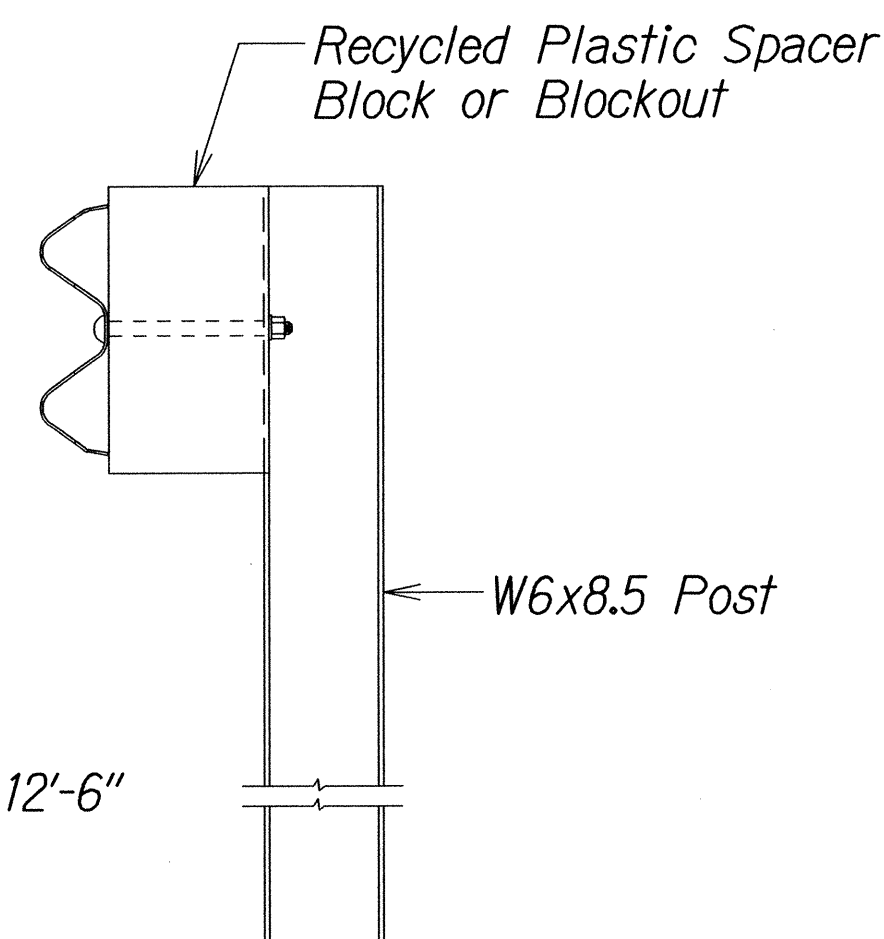
NESTED LONG SPAN STRONG POST

W-BEAM GUARDRAIL OVER 12'-6" CULVERT

(MAXIMUM DYNAMIC DEFLECTION OF 3.1 FT.)



SECTION A-A



SECTION B-B

* Note: All nested W-Beam splices points shall be staggered.
Additional rails may be required to meet minimum nested sections.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NESTED LONG SPAN STRONG POST
W-BEAM GUARDRAIL OVER CULVERT

HAWAII BELT ROAD RESURFACING
Pepeekeo to Hakalau

Federal Aid Project No. NH-019-2(067)

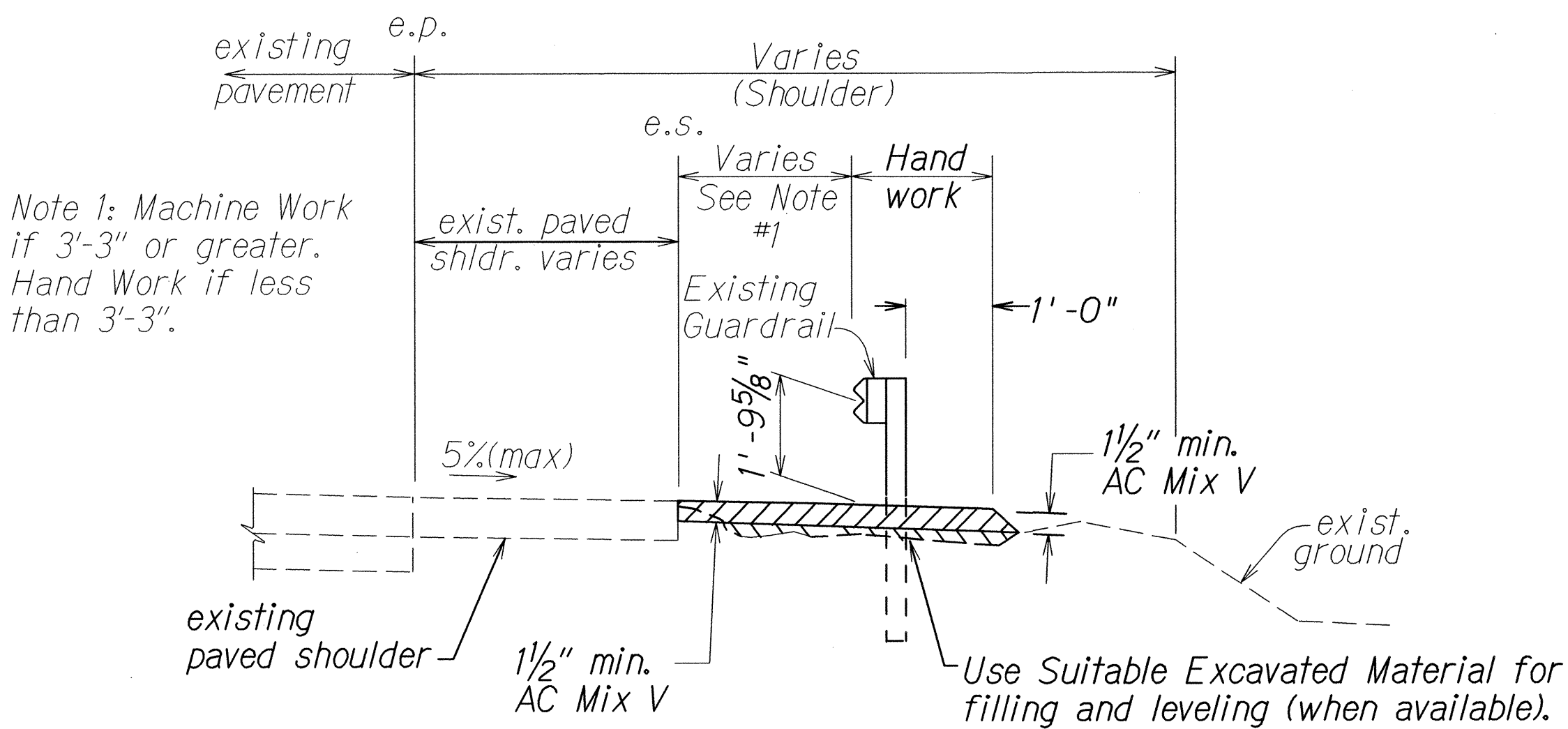
Scale: As Noted Date: March, 2014

SHEET No. 8 OF 10 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(067)	2014	38	41

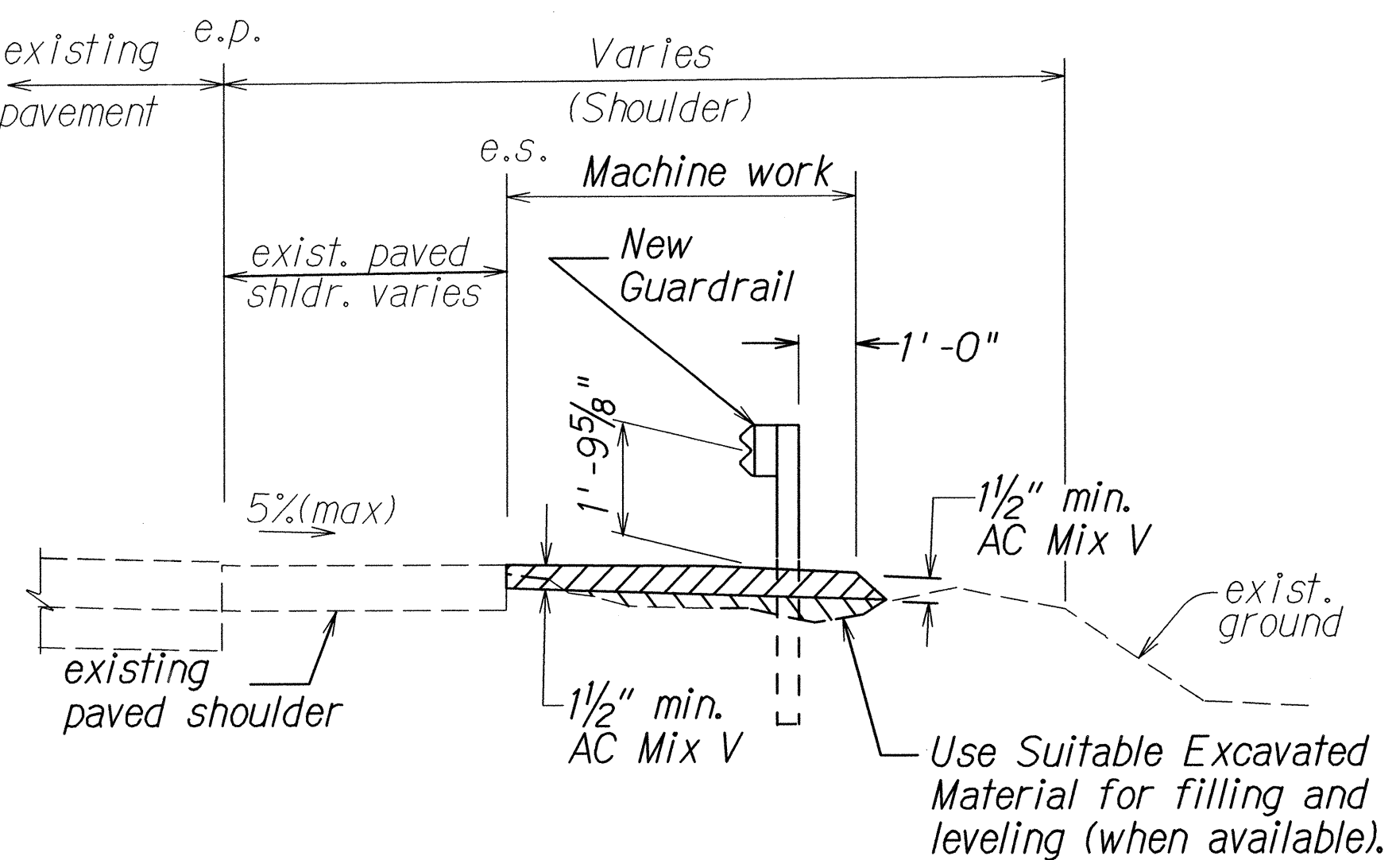
NOTES:

1. Pay limits for A.C. Mix V, Handwork, and A.C. Mix V, Machine work, are as shown.
2. AC Mix V, Handwork shall be paid for under Item No. 401.0501 - Asphalt Concrete Pavement, Mix No. V, Hand Paving under Guardrails. AC Mix V, Machine Work shall be paid for under Item No. 401.0502 - Asphalt Concrete Pavement, Mix No. V, Machine Paving Under Guardrails.
3. Excavating, placing, leveling, and compacting of suitable excavated material shall not be paid for separately, but shall be considered incidental to various contract items in Section 401 - Asphalt Concrete Pavement.
4. Compaction requirements of Cold Planed material shall be in accordance with Section 203 - Excavation and Embankment.
5. Maintain longitudinal drainage as shown on the plans or as directed by the Engineer.
6. Contractor's attention is called to the increase in the asphalt content and compaction requirements in Section 401 - Asphalt Concrete Pavement, Paragraph 401.05-(E)-(3) of the Special Provisions.



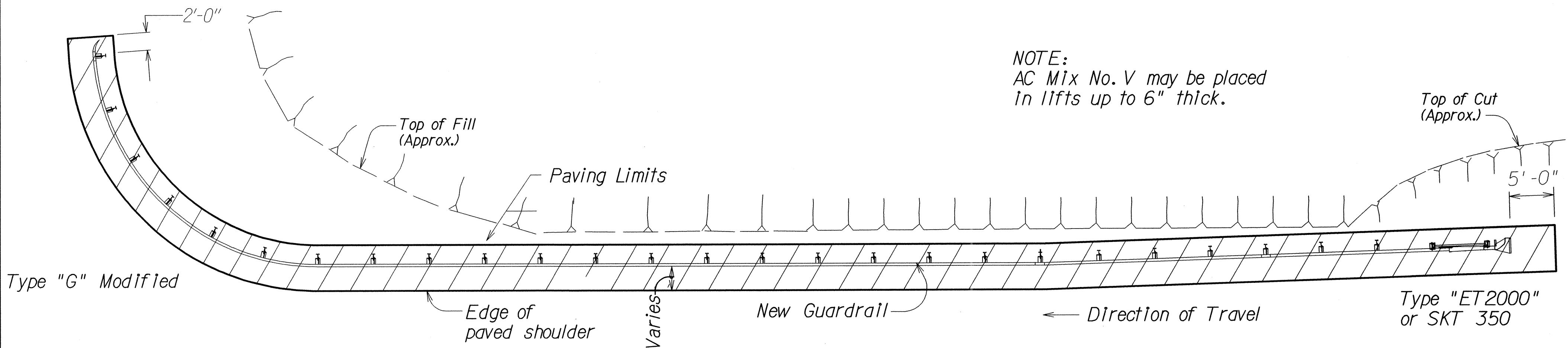
TYPICAL PAVING UNDER EXISTING GUARDRAIL

Not To Scale



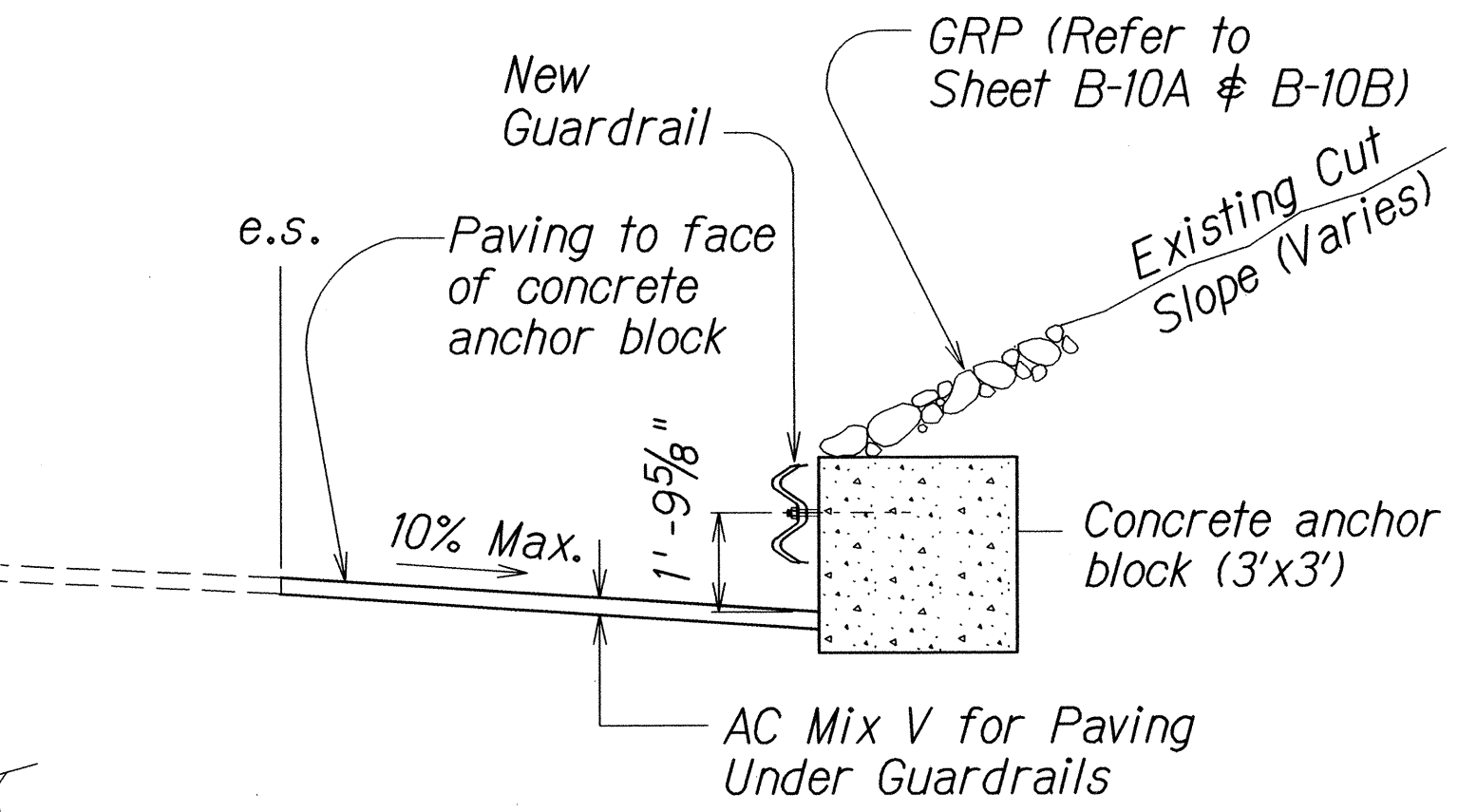
TYPICAL PAVING UNDER NEW GUARDRAIL

Not To Scale



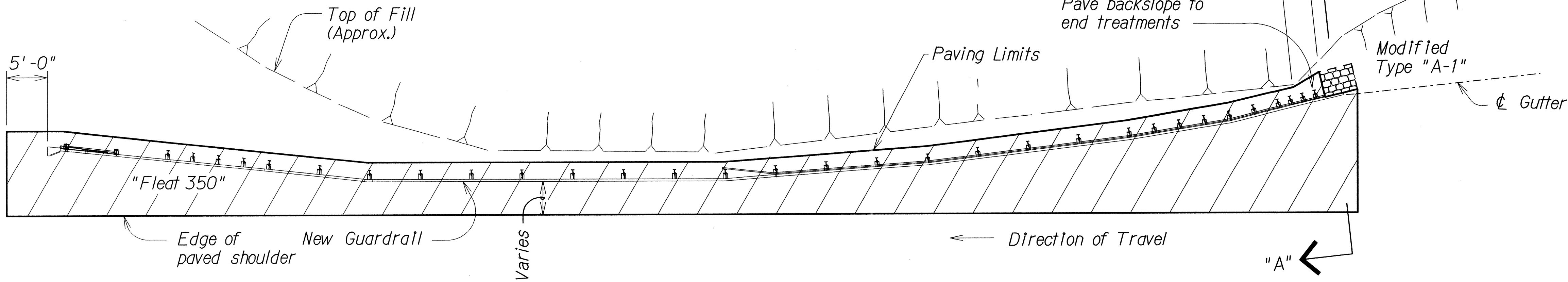
PLAN - PAVING UNDER GUARDRAIL

Not To Scale



SECTION "A-A"

Not To Scale



PLAN - PAVING UNDER GUARDRAIL

Not To Scale

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

TYPICAL GUARDRAIL PAVING DETAILS

FULL PAVING UNDER GUARDRAIL

HAWAII BELT ROAD RESURFACING

Pepeekeo to Hakalau

Federal Aid Project No. NH-019-2(067)

Scale: As Noted

Date: March, 2014

SHEET No. 9

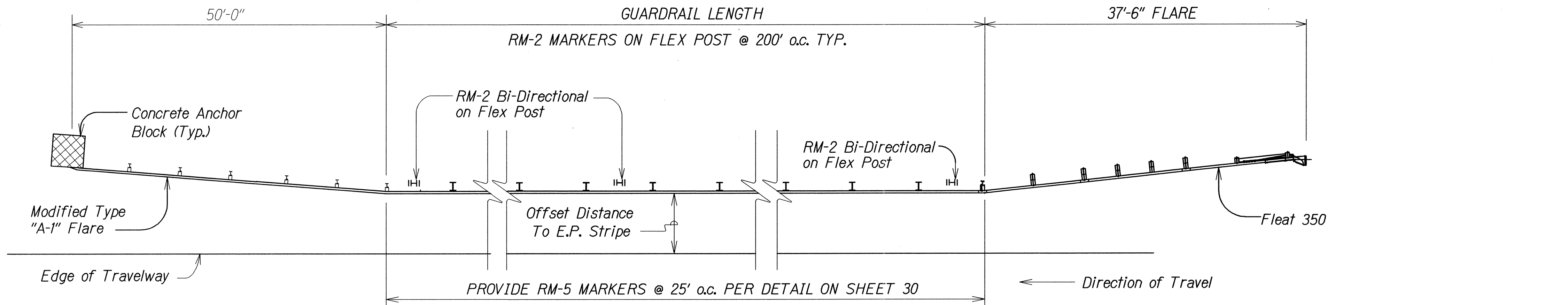
OF 10

SHEETS

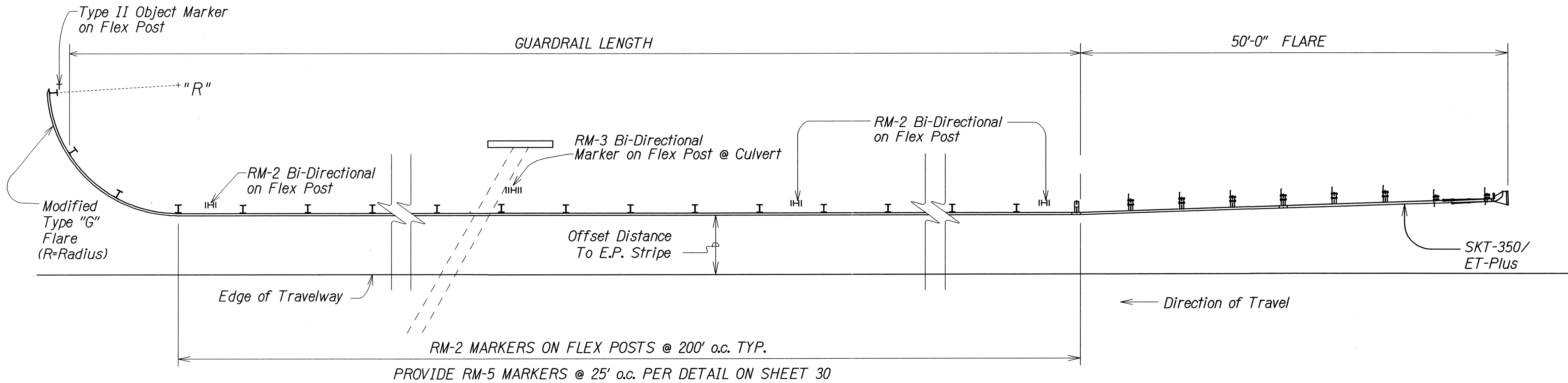
ORIGINAL PLAN	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	

3/25/02
NH-019-2(067)
HAWAII BELT ROAD RESURFACING
Pepeekeo to Hakalau
Federal Aid Project No. NH-019-2(067)

FED. ROAD DIST.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-019-2(067)	2014	39	41



TYPICAL @ "MODIFIED A" & "FLEAT 350" END TREATMENT



TYPICAL @ MODIFIED "G" & "SKT-350"/"ET-PLUS" END TREATMENT

TYPICAL GUARDRAIL REFLECTOR MARKER INSTALLATION

Not To Scale

NOTES:

- All reflector markers located behind guardrail and other locations shall be installed with flexible delineator posts.
- Exact location of Reflector Markers shall be determined in the field by the Engineer.
- Color of flexible delineator posts shall be white except for RM-3, RM-3 bidirectional, and RM-3/RM-2 combinations shall be yellow posts.
- RM-2 Bi- Directional shall be white in color.
- RM-5 shall be per Standard Guardrail Details.

Approximate Spacing for Delineators on Horizontal Curves	
Radius (R) Of Curve Of Curve (feet)	Approximate Spacing (S) on Curve (feet)
50	20
115	25
180	35
250	40
300	50
400	55
500	65
600	70
700	75
800	80
900	85
1000	90
Distances were rounded to the nearest 5 feet	

Spacing for specific radii may be interpolated from table. The minimum spacing should be 6.1 m (20 ft). The spacing on curves should not exceed 90 m (300 ft). In advance of or beyond a curve, and proceeding away from the end of the curve, the spacing of the first delineator is 2S, the second 3S, and the third 6S but not to exceed 90 m (300 ft.). S refers to the delineator spacing for specific radii computed from the formula $S=1.7 \sqrt{R-15}$ for metric units and $S=3 \sqrt{R-50}$ for english units.

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

GUARDRAIL REFLECTOR

MARKER DETAIL

HAWAII BELT ROAD RESURFACING

Pepeekeo to Hakalau

Federal Aid Project No. NH-019-2(067)

Scale: As Noted Date: March, 2014

SHEET No. 10 OF 10 SHEETS

ORIGINAL PLAN	DATE
DESIGNED BY	
NOTED BY	
CHECKED BY	

13/13/02 h23/02/2/Hawaii District Project Plans/Guardrail Details/04hwy10kdel.dgn