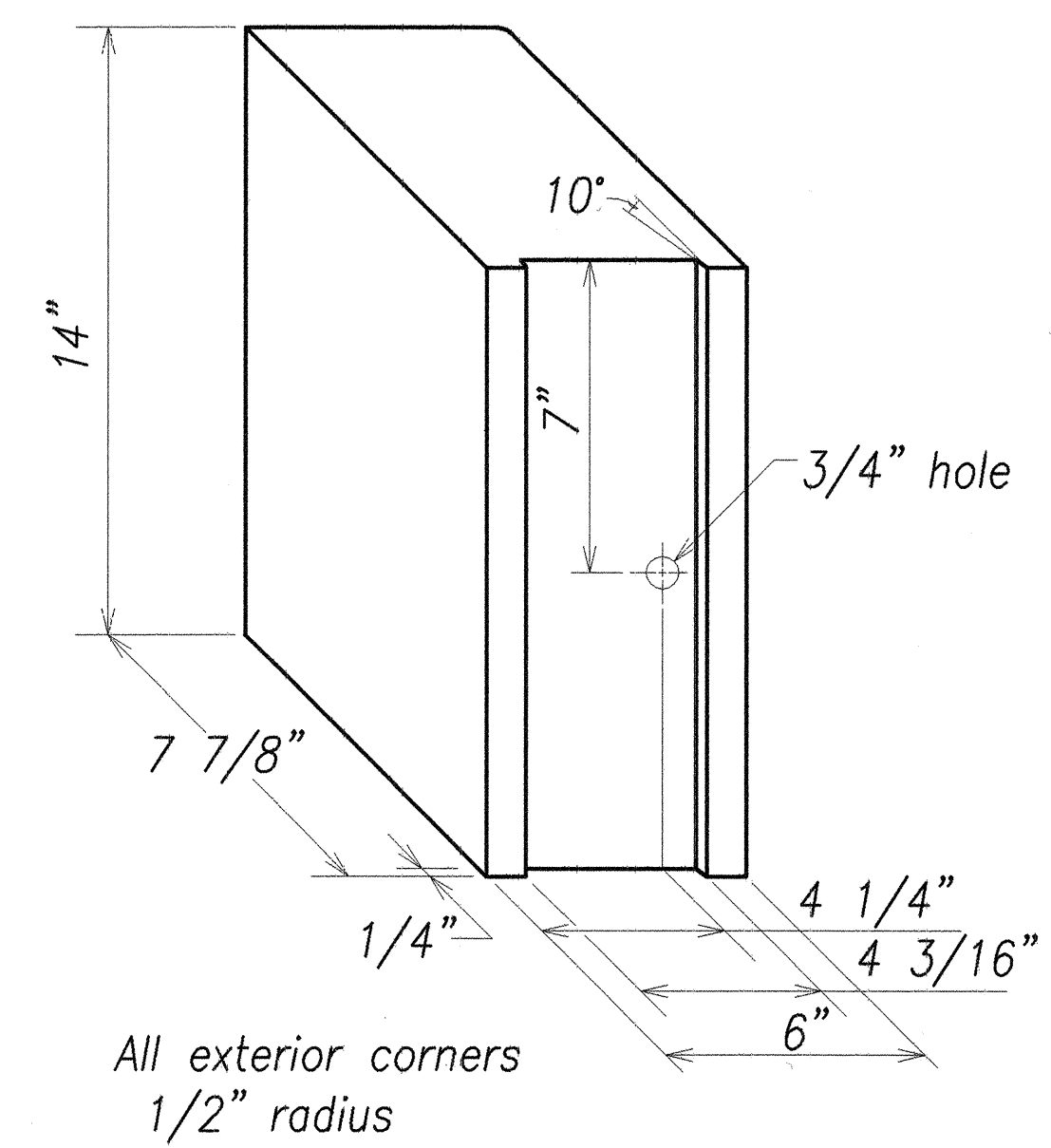


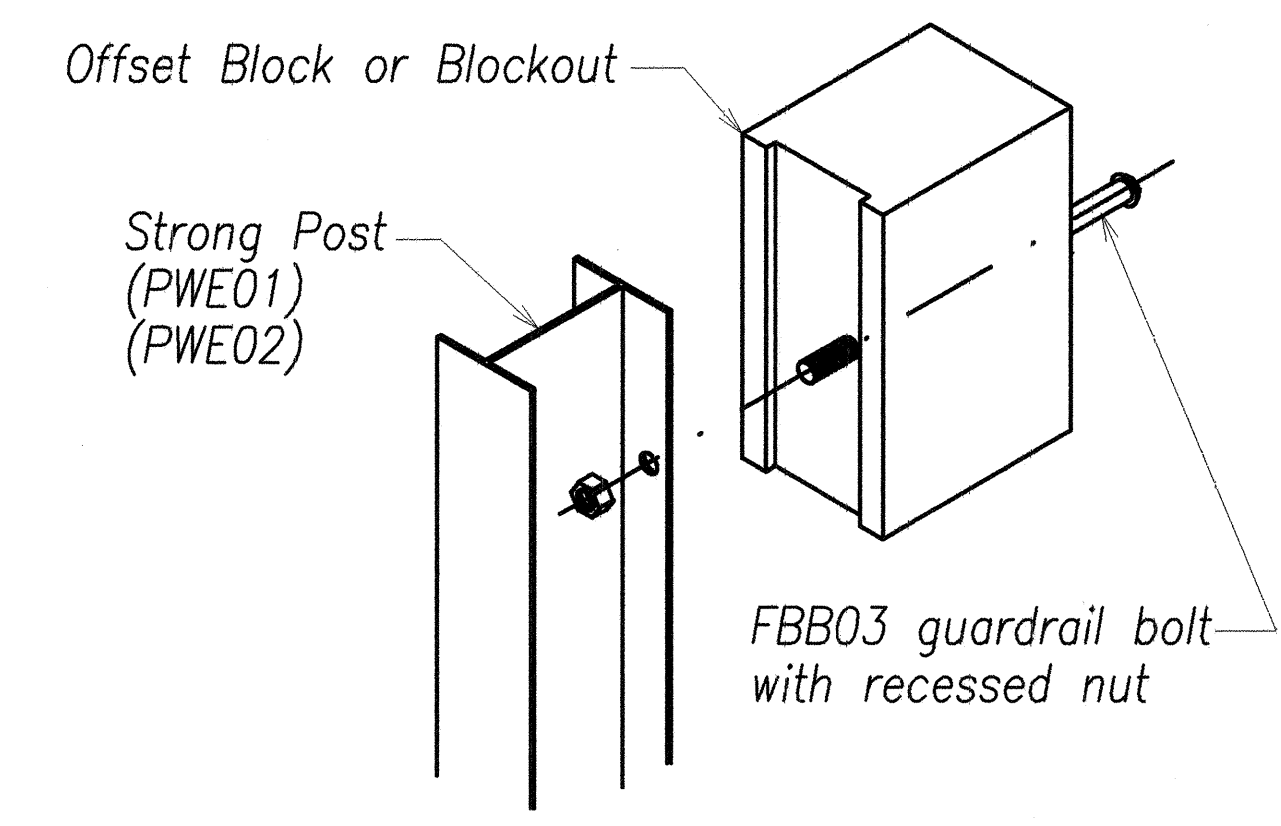
**RECYCLED PLASTIC BLOCKOUT (TYPE I)**



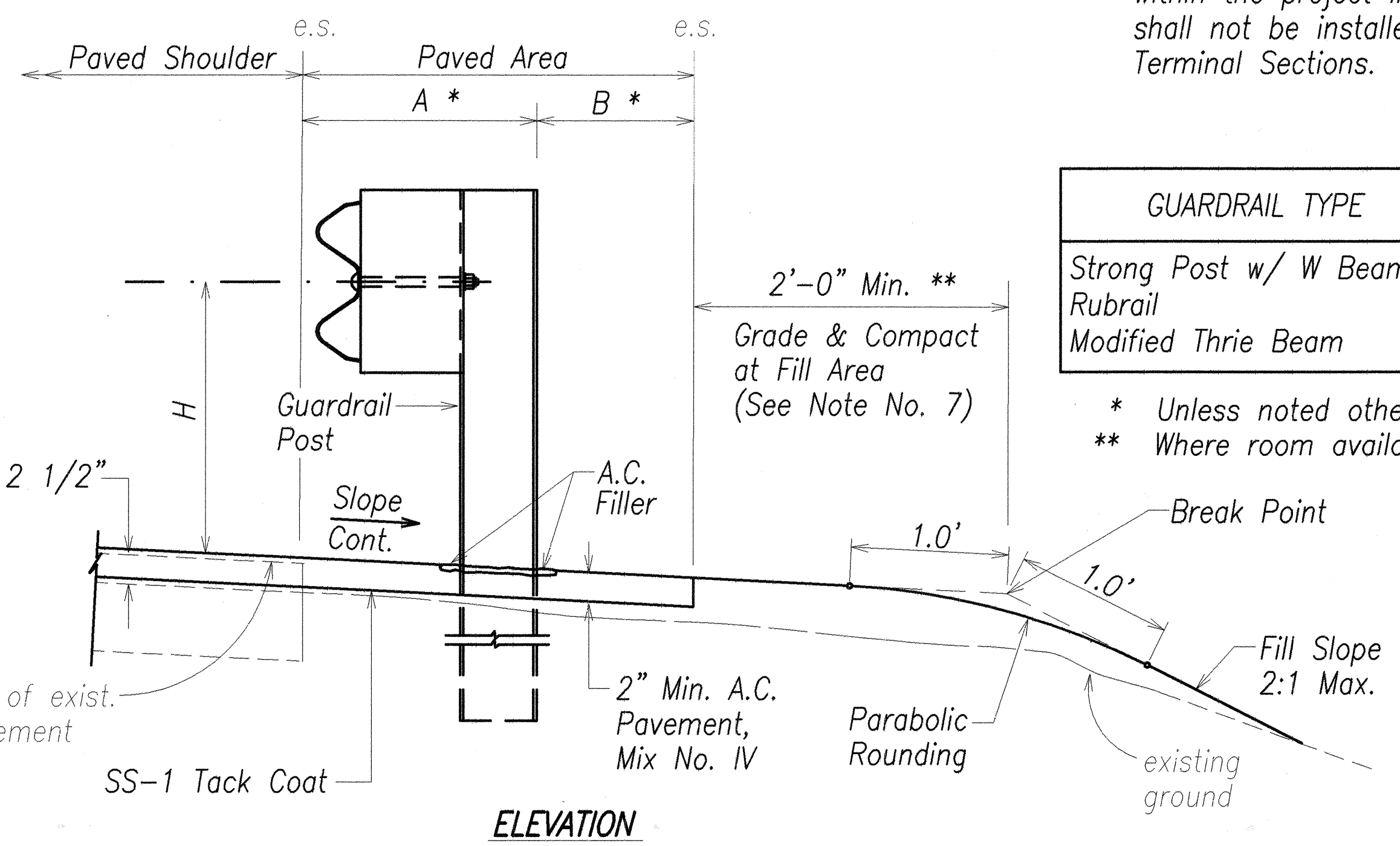
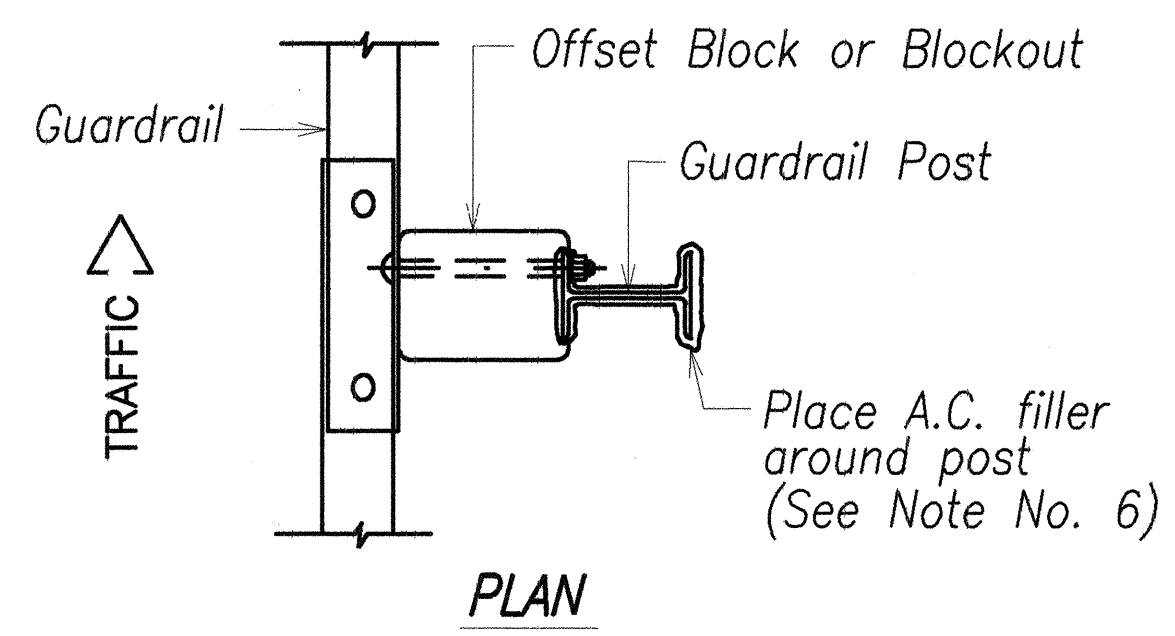
**RECYCLED POLYETHYLENE OFFSET BLOCK (TYPE II)**

**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, RWM02a, 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. Prior to installing A.C. Mix. No. IV, level & remove vegetation and compact existing ground to 95% compaction. New A.C. pavement at guardrails shall extend 6' longitudinally beyond terminal ends.
6. After the guardrail posts are installed in the paved area, the Contractor shall place A.C. filler around the guardrail post and seal all cracks in the paved area that was 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 placing A.C. filler. The cost for 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. Reflector Markers (RM-5) mounted on new and existing guardrails within the project limits shall be spaced every 50'-0". RM-5's shall not be installed on the FLEAT-350 or Type "G" Modified Terminal Sections. RM-5 shall be incidental to Item 606.0100.



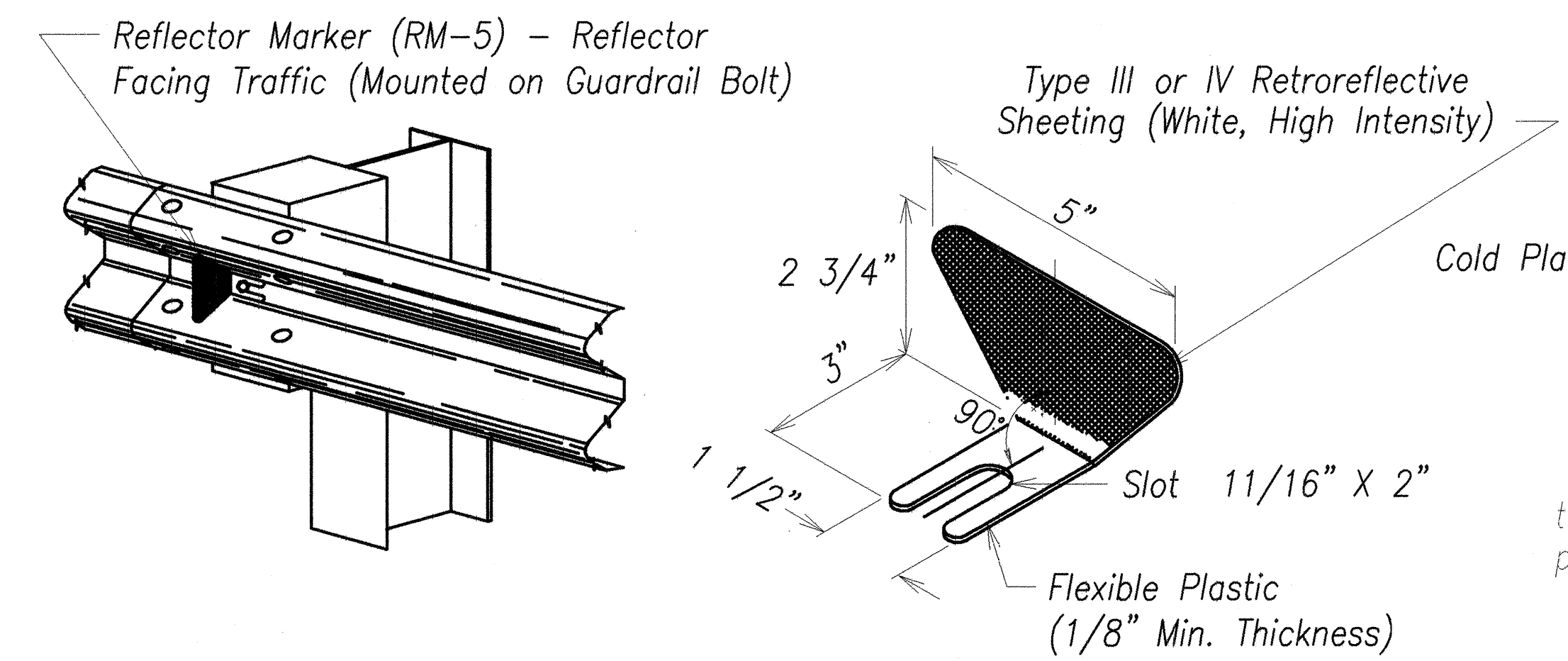
**EXPLODED VIEW**  
(Rail, washer and reflector not shown)  
**STEEL POST AND BLOCK DETAIL**



**ELEVATION**  
**TYPICAL GUARDRAIL INSTALLATION**

GUARDRAIL TYPE	DIMENSION		
	H	A*	B*
Strong Post w/ W Beam	1'-9 5/8"	1'-6"	1'-0"
Rubrail	2'-0"	1'-6"	2'-0"
Modified Thrie Beam	2'-0"	2'-0"	1'-0"

\* Unless noted otherwise on plans.  
\*\* Where room available.



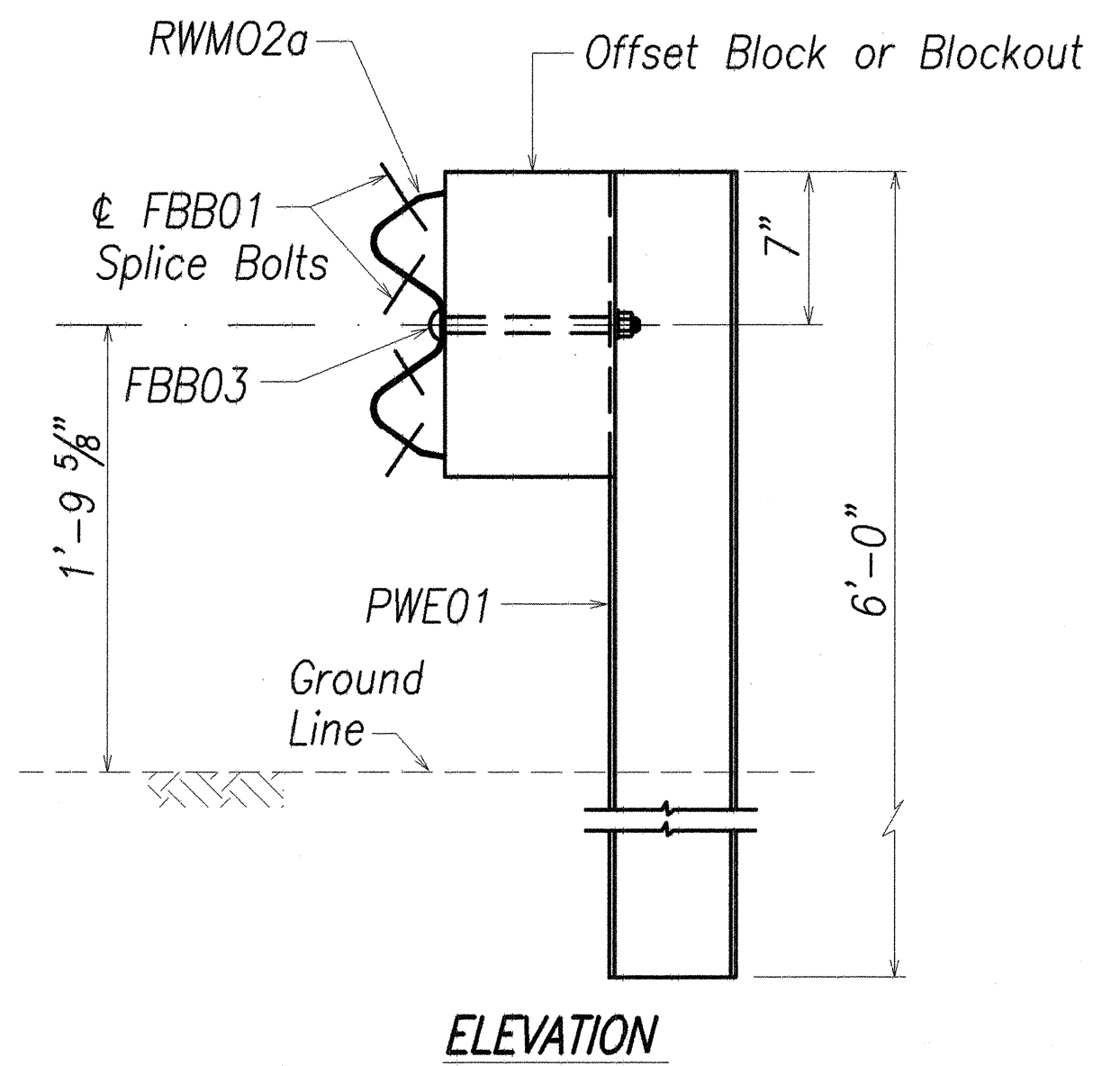
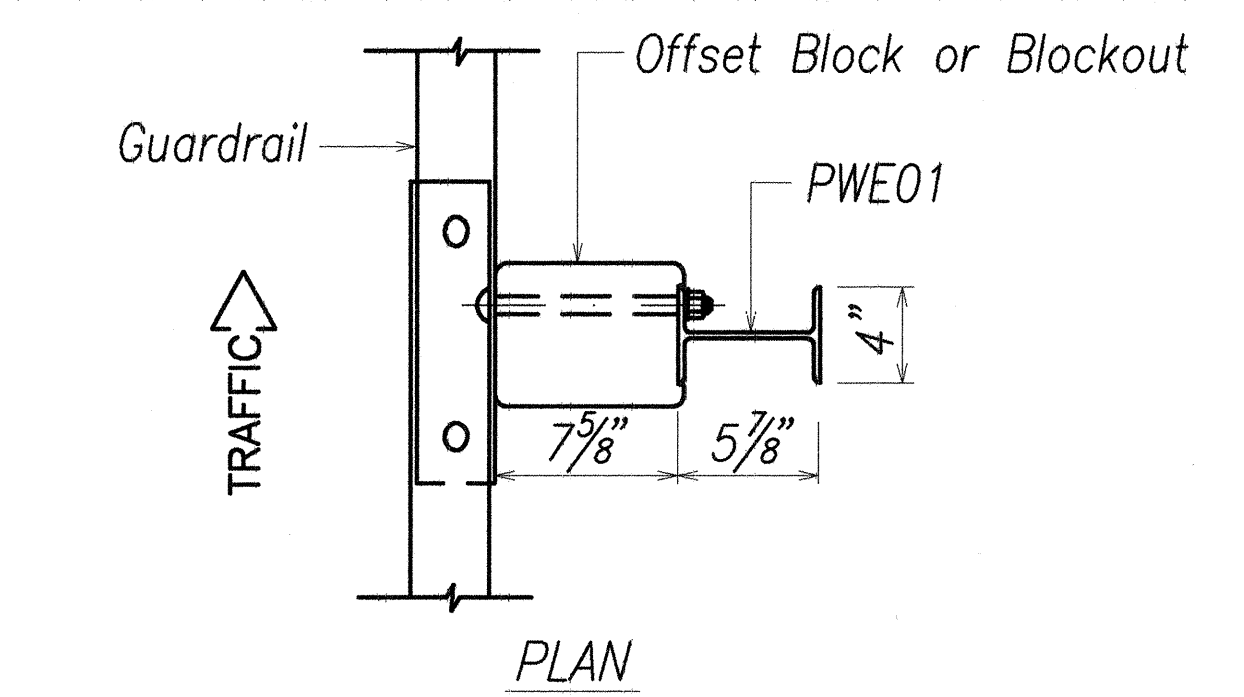
**REFLECTOR MARKER (RM-5) DETAIL AND TYPICAL INSTALLATION**

DATE \_\_\_\_\_  
SURVEY PLOTTED BY \_\_\_\_\_  
DRAWN BY \_\_\_\_\_  
CHECKED BY \_\_\_\_\_  
DESIGNED BY \_\_\_\_\_  
QUANTITIES BY \_\_\_\_\_  
No. \_\_\_\_\_

**BRIAN A. LOCK**  
LICENSED PROFESSIONAL ENGINEER  
No. 9867-C  
HAWAII, U.S.A.  
  
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.  
ENGINEERS SURVEYORS HAWAII, INC.

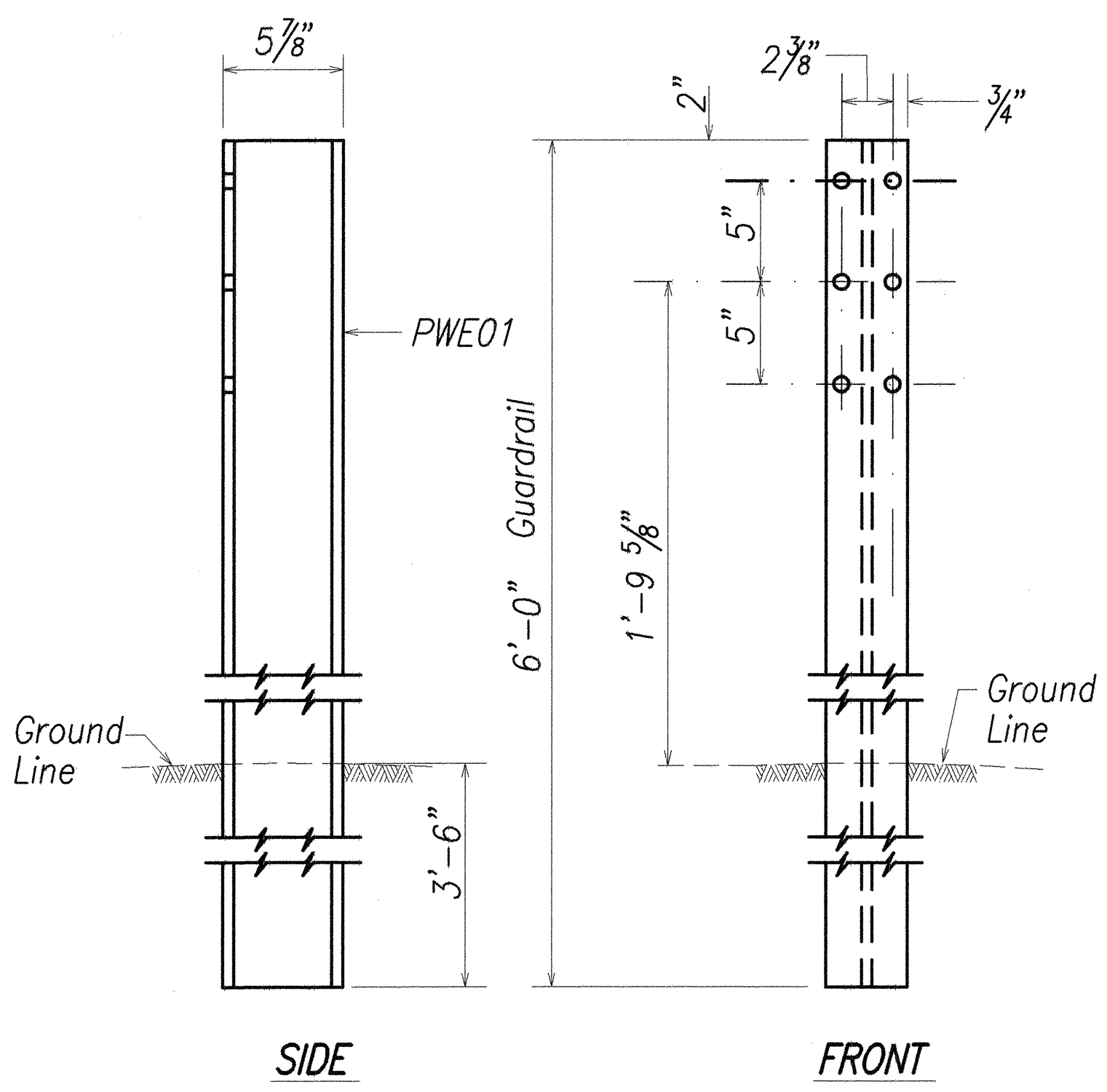
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**GUARDRAIL DETAILS AND NOTES**  
VOLCANO ROAD INTERSECTION IMPROVEMENTS AT HUINA ROAD  
State Project No. 11M-01-00  
Scale: Not to Scale Date: November 2001  
SHEET No. 1 OF 3 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	11M-01-00	2002	36	65

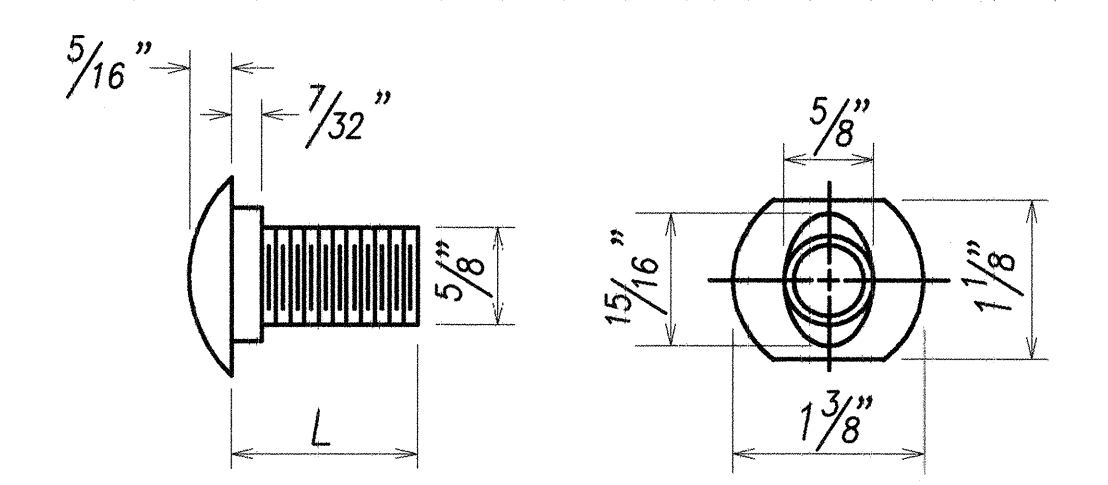


**STRONG POST W-BEAM GUARDRAIL (SGR04a)**

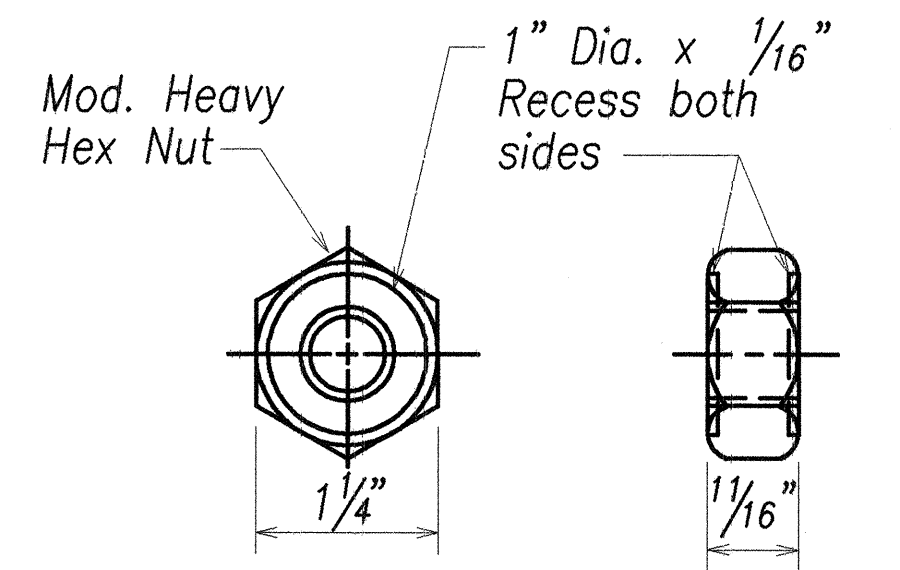
**NOTE:**  
All Holes are 3/4" Dia.  
W6x8.5 Structural Shape



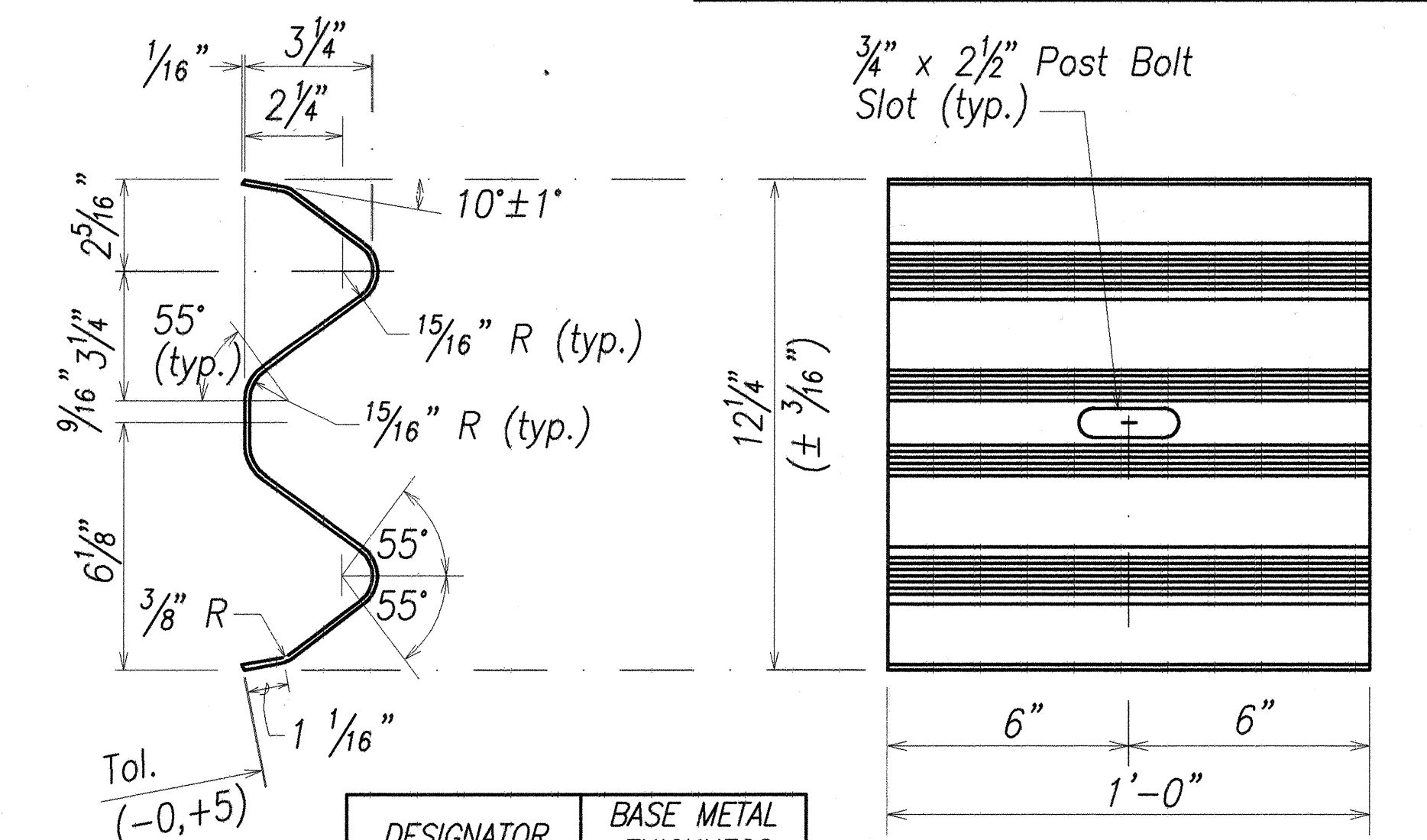
**W-BEAM STRONG POST (PWE01)**



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

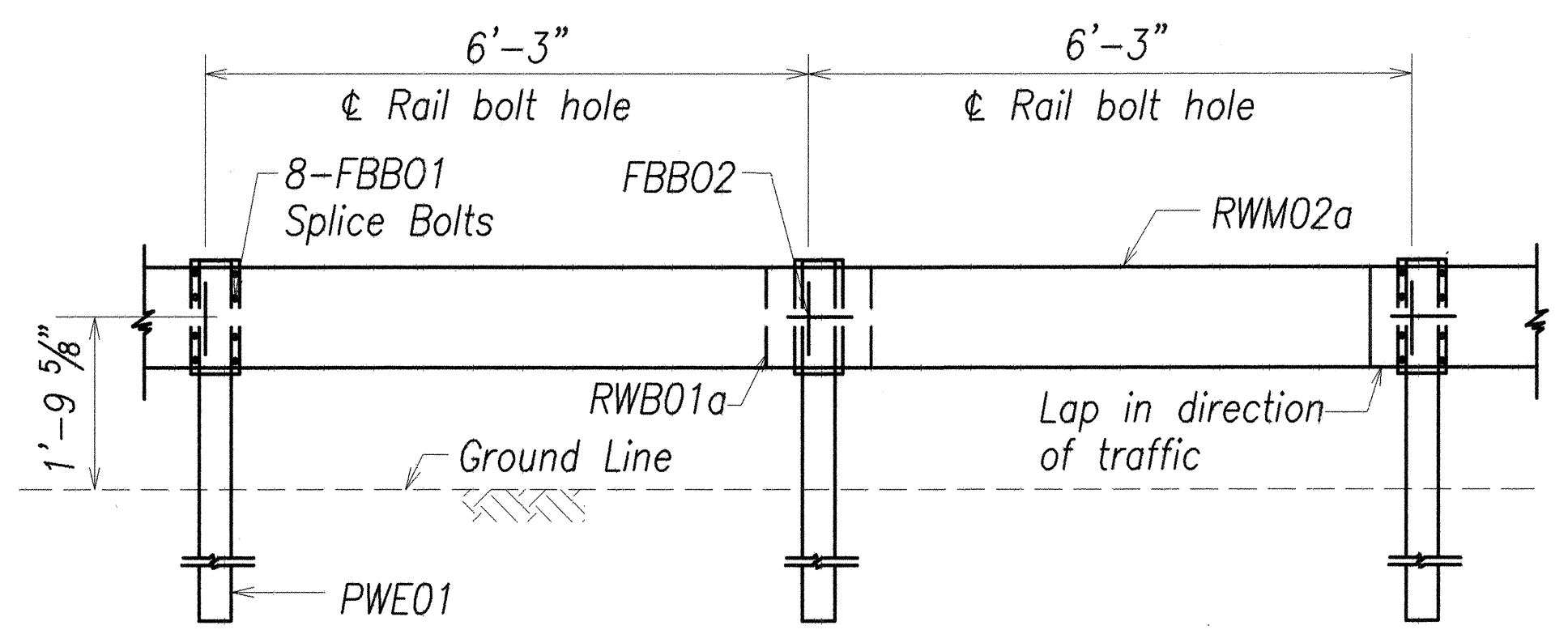


**GUARDRAIL BOLTS AND RECESSED NUT**

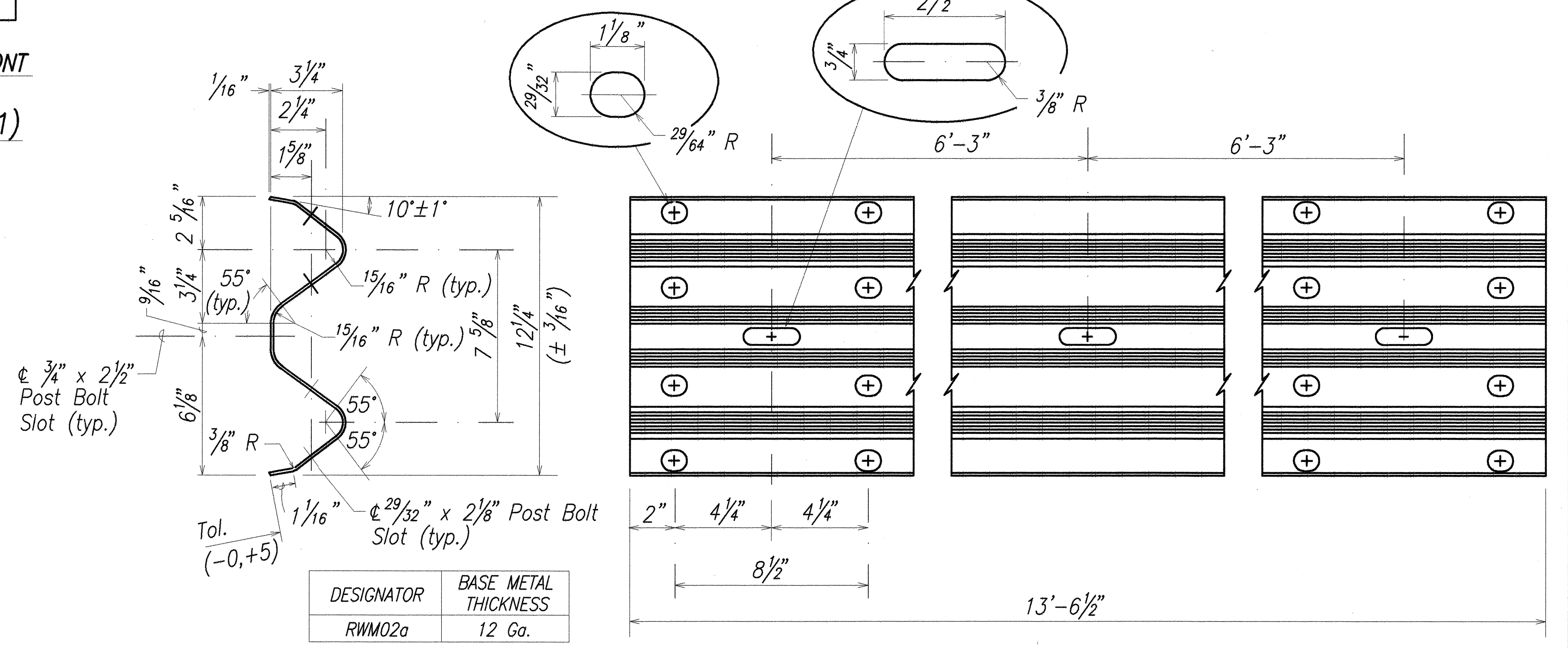


DESIGNATOR	BASE METAL THICKNESS
RWB01a	12 Ga.

**W-BEAM BACK-UP-PLATE (RWBO1a)**



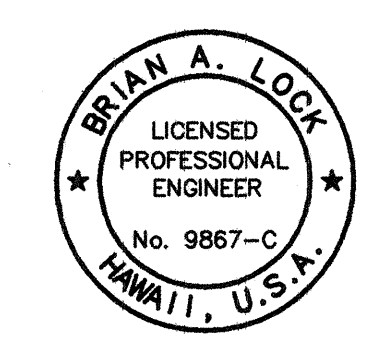
**STRONG POST W-BEAM GUARDRAIL WITH RECYCLED OFFSET BLOCK OR PLASTIC BLOCKOUT**



DESIGNATOR	BASE METAL THICKNESS
RWM02a	12 Ga.

**2 SPACE W-BEAM GUARDRAIL (RWM02a)**

ORIGINAL PLAN  
NO. \_\_\_\_\_  
DATE \_\_\_\_\_  
SURVEY PLOTTED BY \_\_\_\_\_  
DRAWN BY \_\_\_\_\_  
DESIGNED BY \_\_\_\_\_  
CHECKED BY \_\_\_\_\_

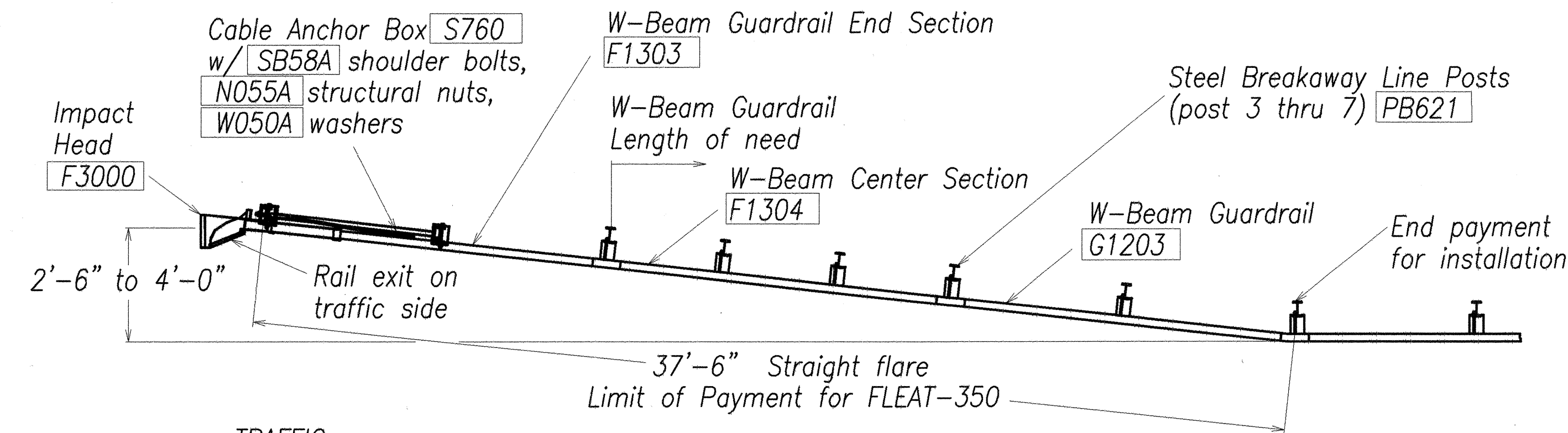


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ENGINEERS/SURVEYORS HAWAII, INC.

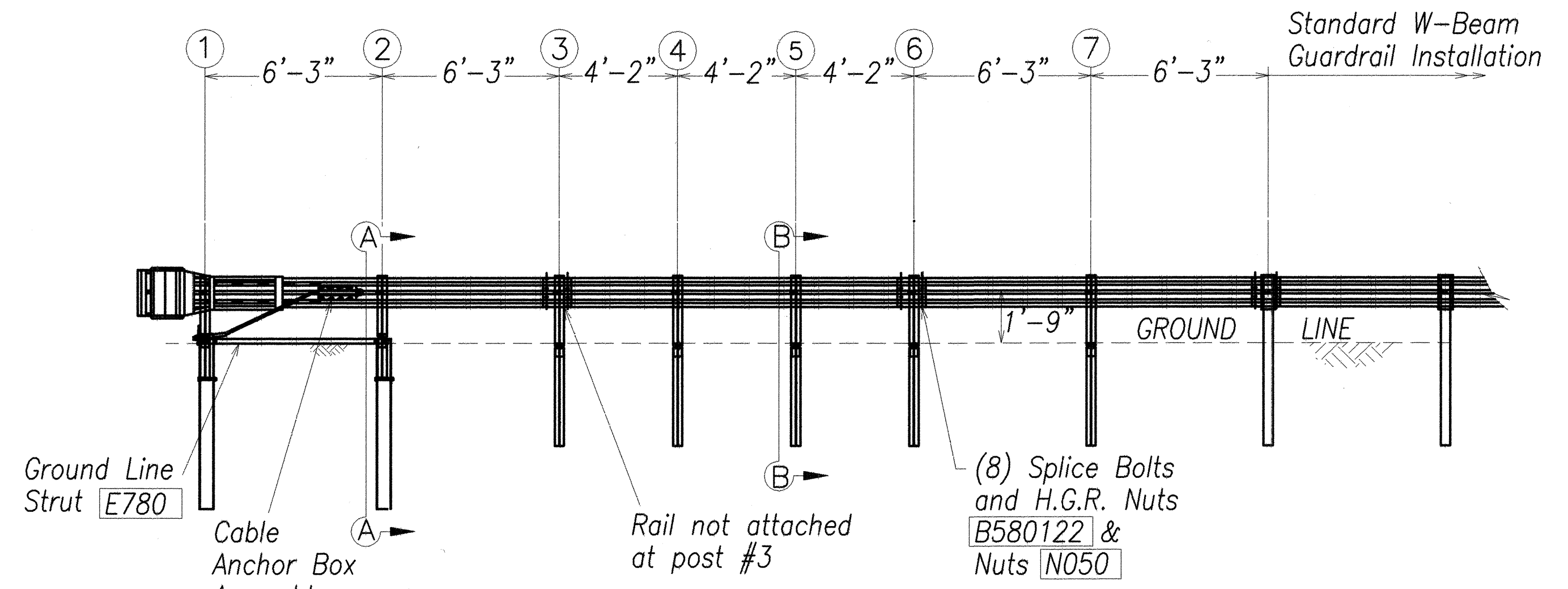
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**STRONG POST W-BEAM GUARDRAIL**

VOLCANO ROAD INTERSECTION IMPROVEMENTS AT HUINA ROAD  
State Project No. 11M-01-00  
Scale: Not to Scale Date: November 2001  
SHEET No. 2 OF 3 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	11M-01-00	2002	37	65



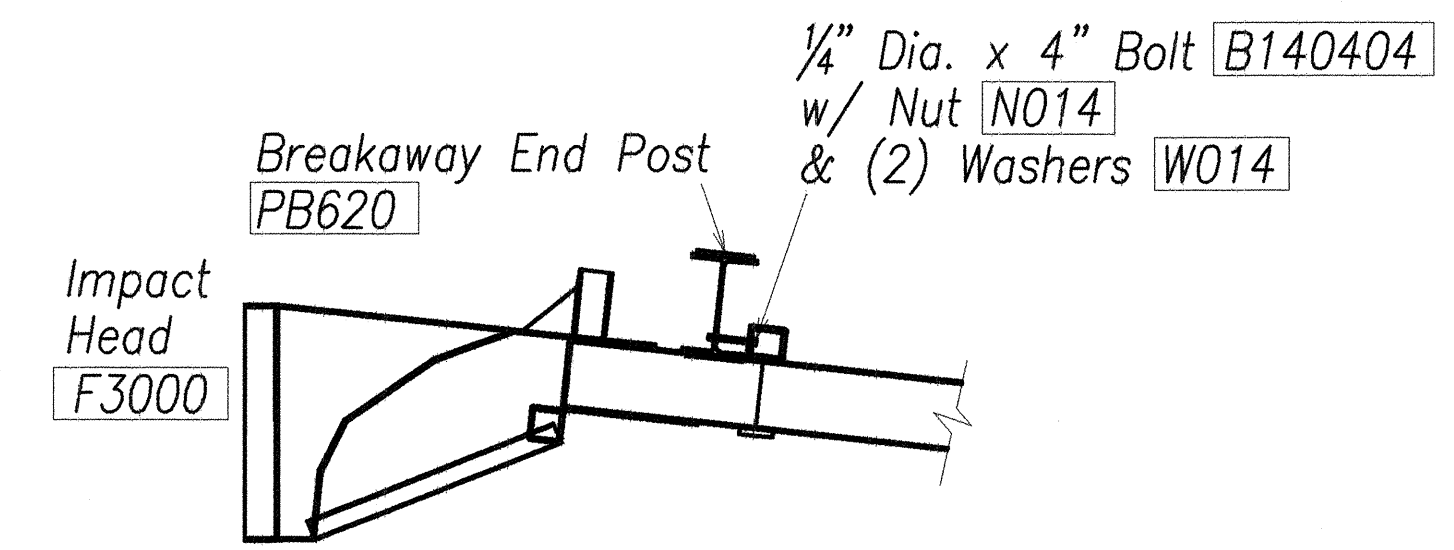
PLAN



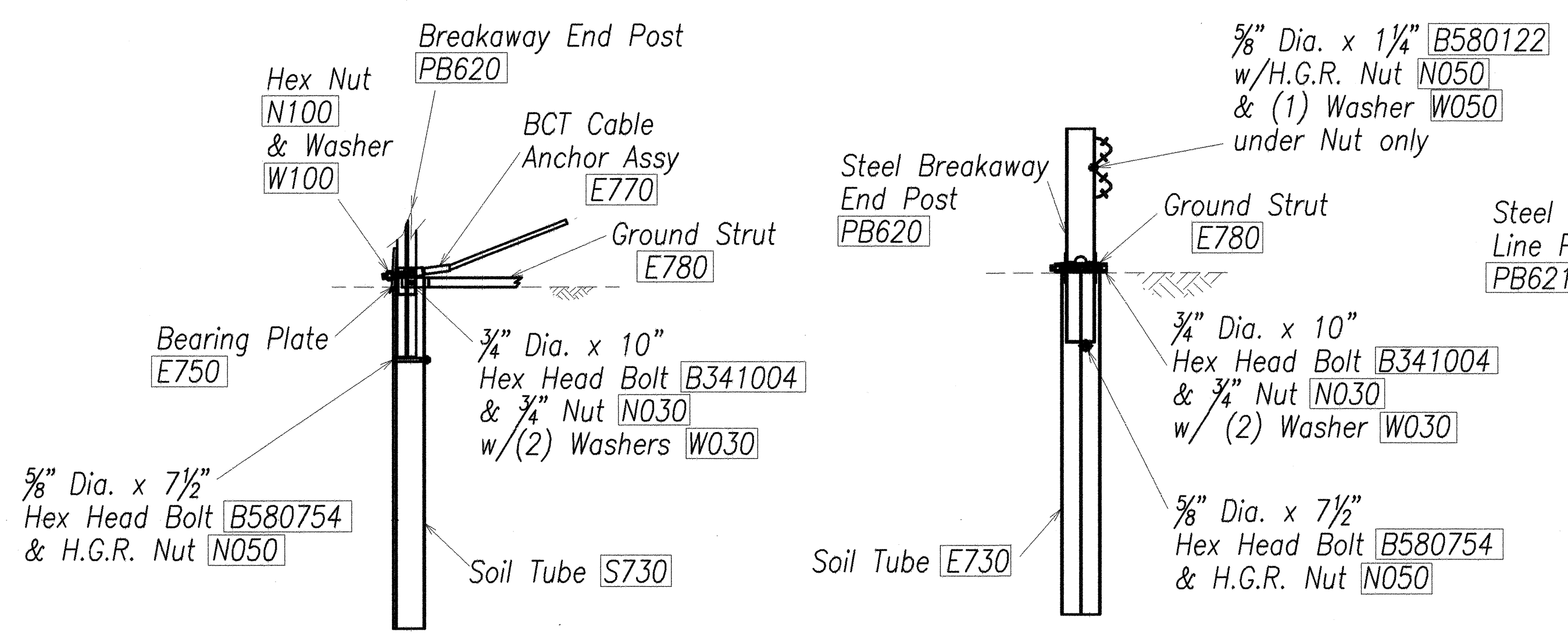
ELEVATION

GENERAL NOTES:

- Breakaway posts are required with the FLEAT Terminal.
- All bolts, nuts, cable assemblies, cable anchors and bearing plates shall be galvanized.
- 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.
- The soil tubes may be driven with an approved driving head. Soil tubes should 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.
- 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.
- 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.
- (R) or (L) indicates right or left Impact Head Reflector Marker (IHRM). Providing and installing of IHRM shall be considered incidental to end treatment.
- The stripes for IHRM shall slope downward at an angle of 45° towards the side of the end treatment that traffic is to pass.

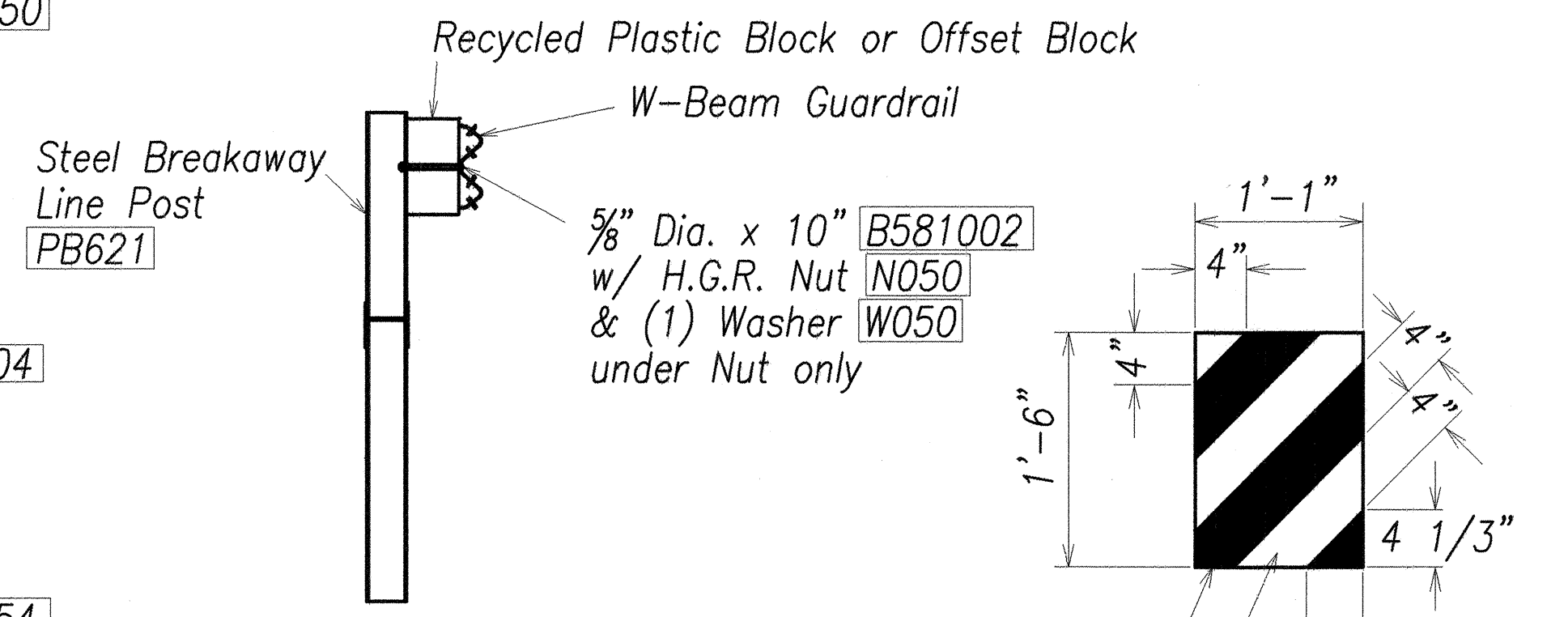


IMPACT HEAD CONNECTING DETAIL



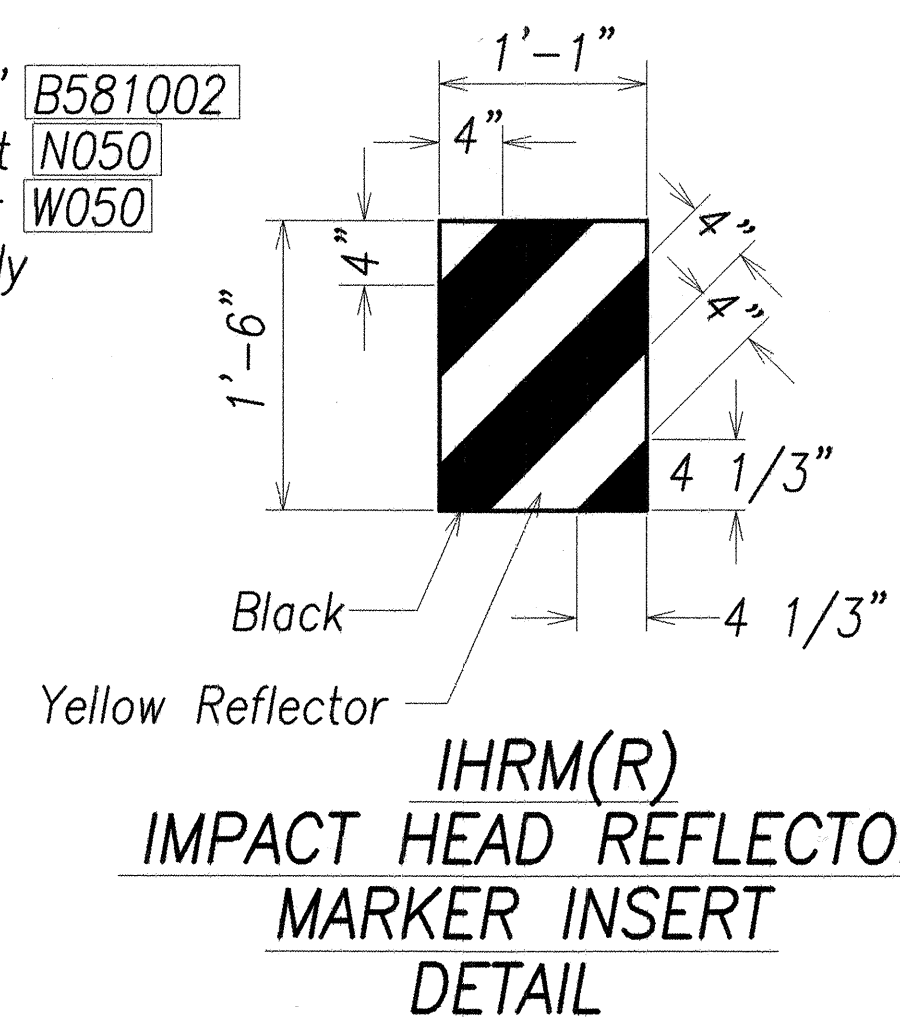
PARTIAL VIEW OF POST 1

SECTION A-A  
(@ Post #2)



SECTION B-B

(Typical @ Posts #3-7)  
Note: Rail Not Bolted @ Post #3



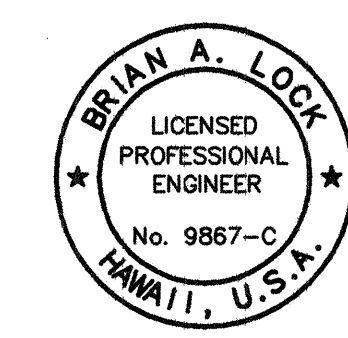
IHRM(R)  
IMPACT HEAD REFLECTOR  
MARKER INSERT  
DETAIL

ITEM NO.	QTY	BILL OF MATERIALS
F3000	1	IMPACT HEAD
F1303	1	W-BEAM GUARDRAIL END SECTION, 12 GA.
F1304	1	W-BEAM GUARDRAIL CENTER SECTION, 12 GA.
G1203	1	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-1 HRM (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

DATE \_\_\_\_\_  
 SURVEY PLOTTED BY \_\_\_\_\_  
 ORIGINAL PLAN \_\_\_\_\_  
 NOTE BOOK \_\_\_\_\_  
 DESIGNED BY \_\_\_\_\_  
 QUANTITIES BY \_\_\_\_\_  
 CHECKED BY \_\_\_\_\_  
 No. \_\_\_\_\_



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 ENGINEERS SURVEYORS HAWAII, INC.

STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION  
**FLEAT 350**  
**FLARED ENERGY ABSORBING TERMINAL**

VOLCANO ROAD INTERSECTION  
 IMPROVEMENTS AT HUINA ROAD  
 State Project No. 11M-01-00  
 Scale: Not to Scale Date: November 2001  
 SHEET No. 3 OF 3 SHEETS