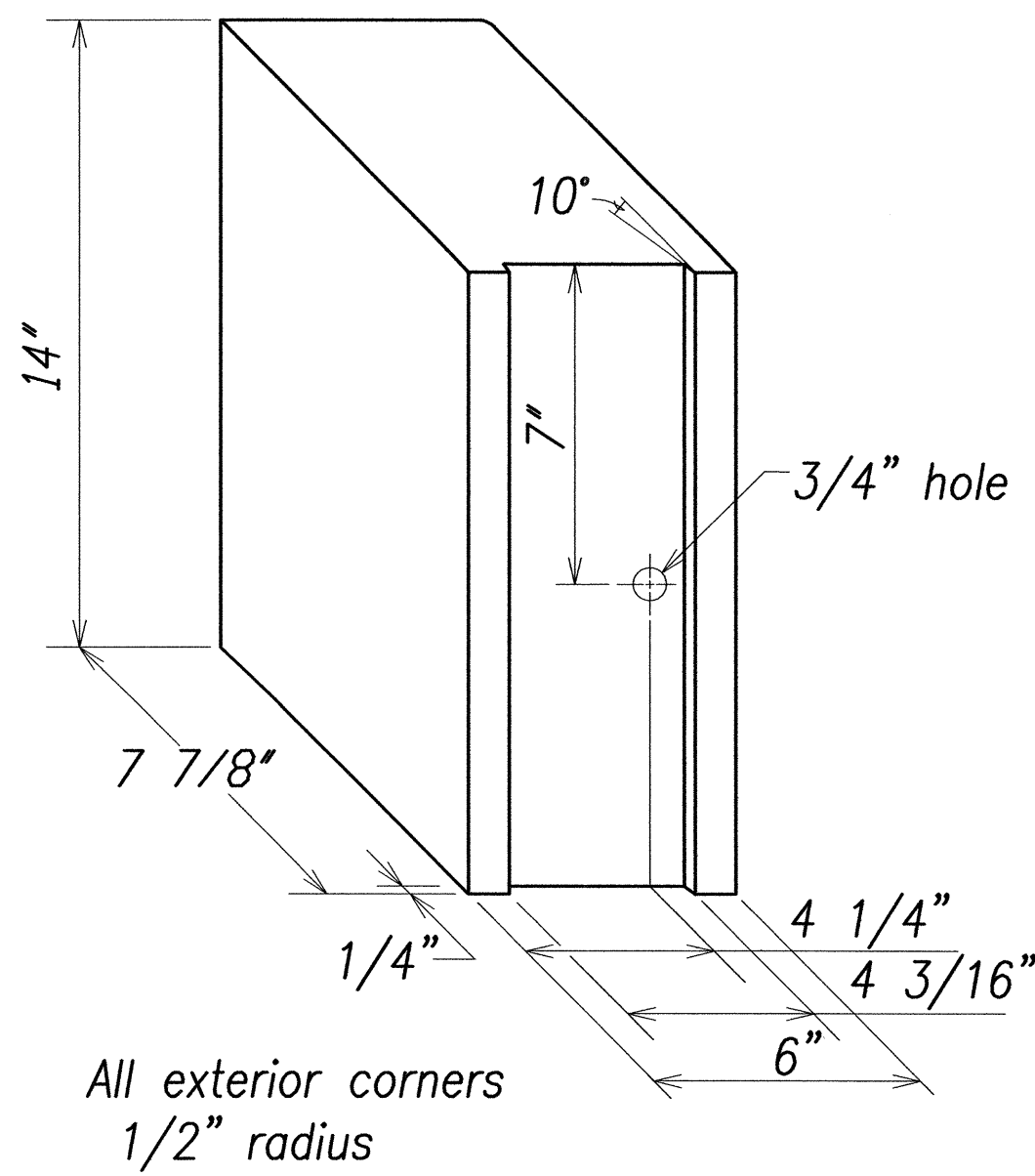
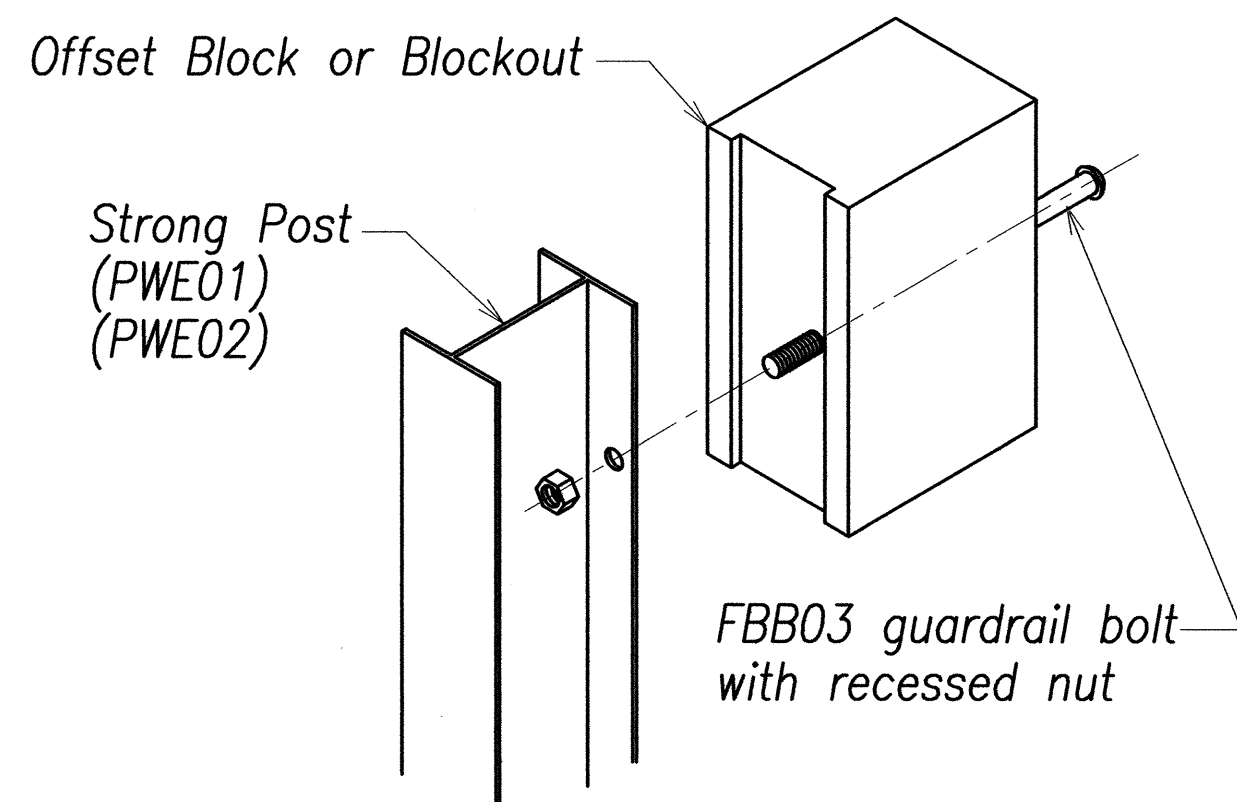


RECYCLED PLASTIC BLOCKOUT (TYPE I)

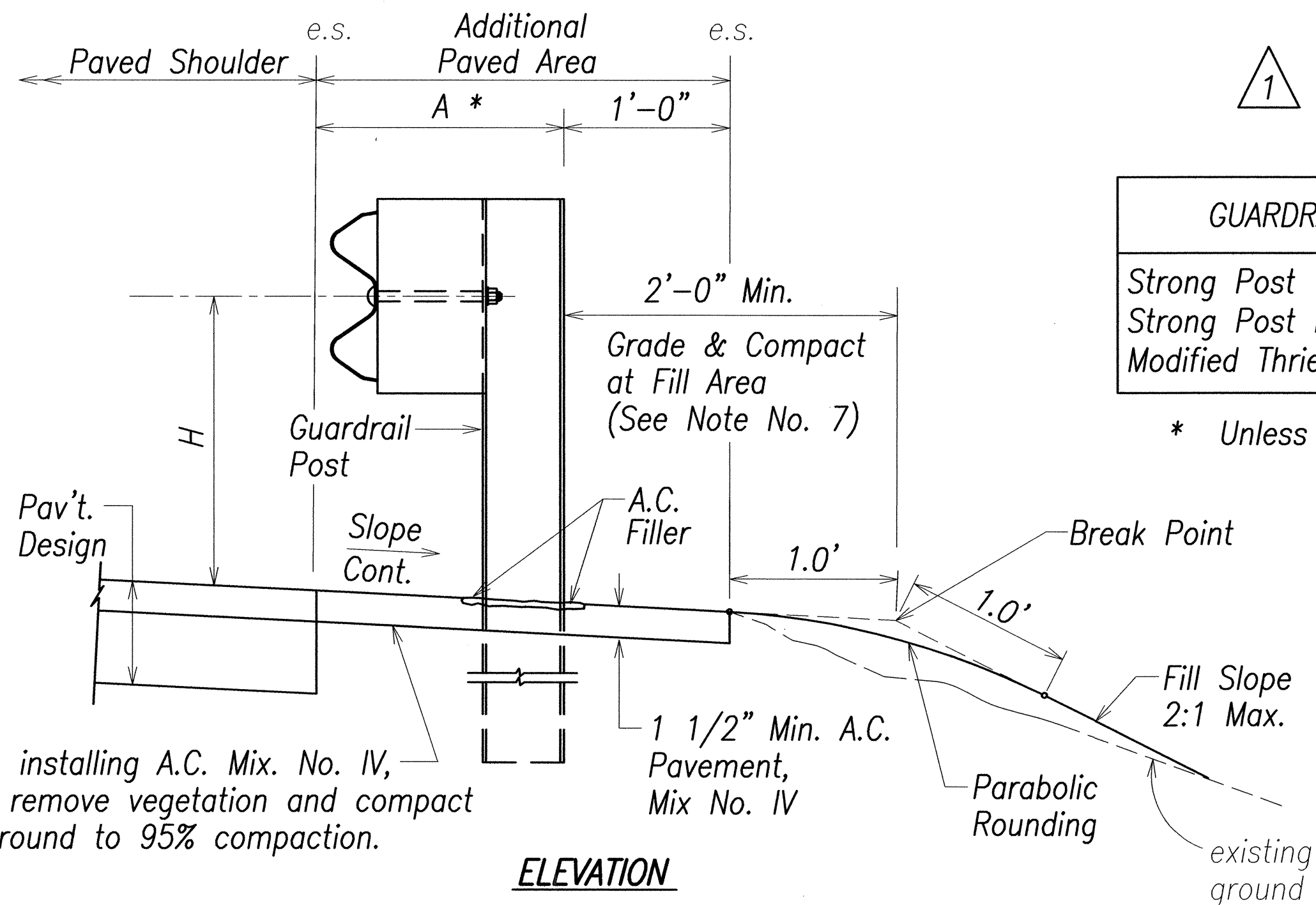
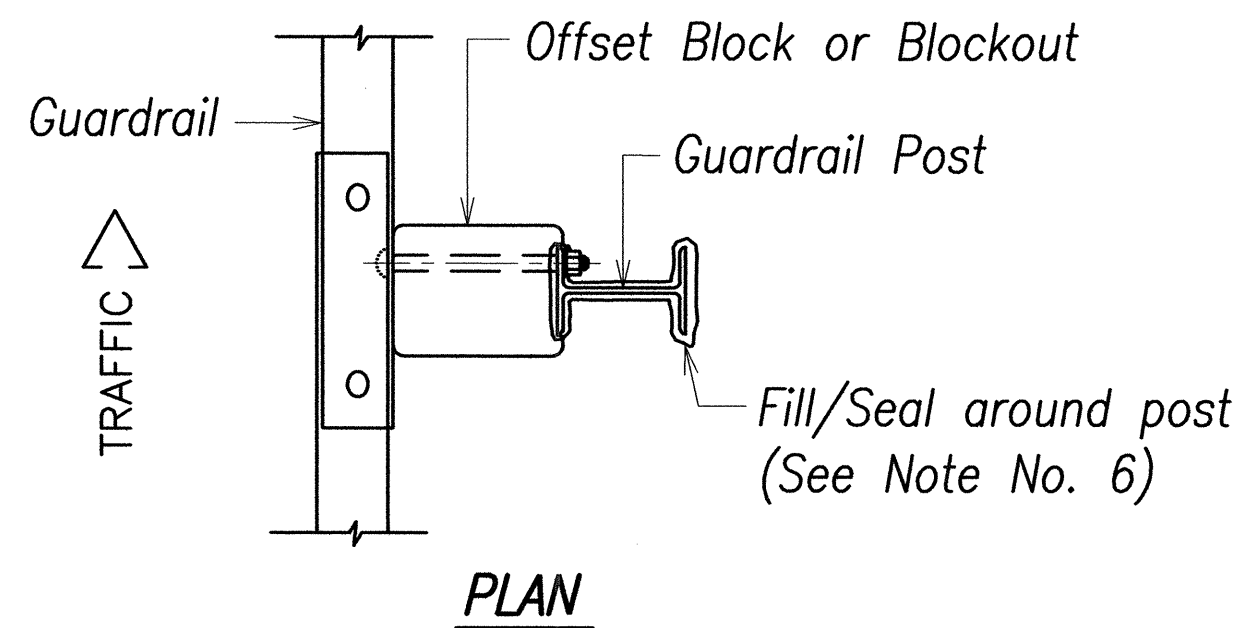


RECYCLED POLYETHYLENE
OFFSET BLOCK (TYPE II)



EXPLODED VIEW
(Rail, washer and reflector not shown)

STEEL POST AND BLOCK DETAIL



TYPICAL GUARDRAIL INSTALLATION

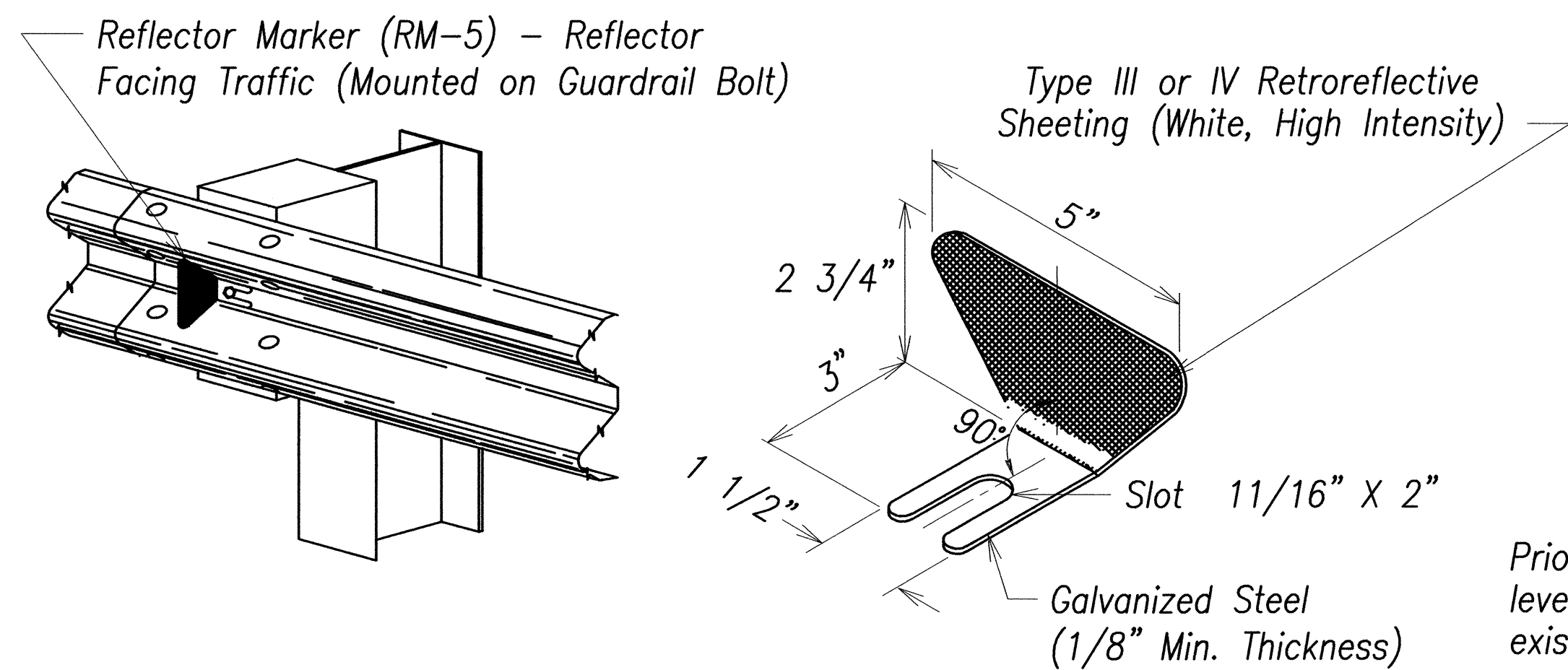
GENERAL NOTES:

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, 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. 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 cost 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 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. Furnishing and installing of RM-5 shall be considered incidental to the adjacent guardrail system.

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

* Unless noted otherwise on plans.

DATE
DESIGNED BY
CHECKED BY
NO.



REFLECTOR MARKER (RM-5) DETAIL AND TYPICAL INSTALLATION

1

05/13/04

REVISED NOTES

DATE

REVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

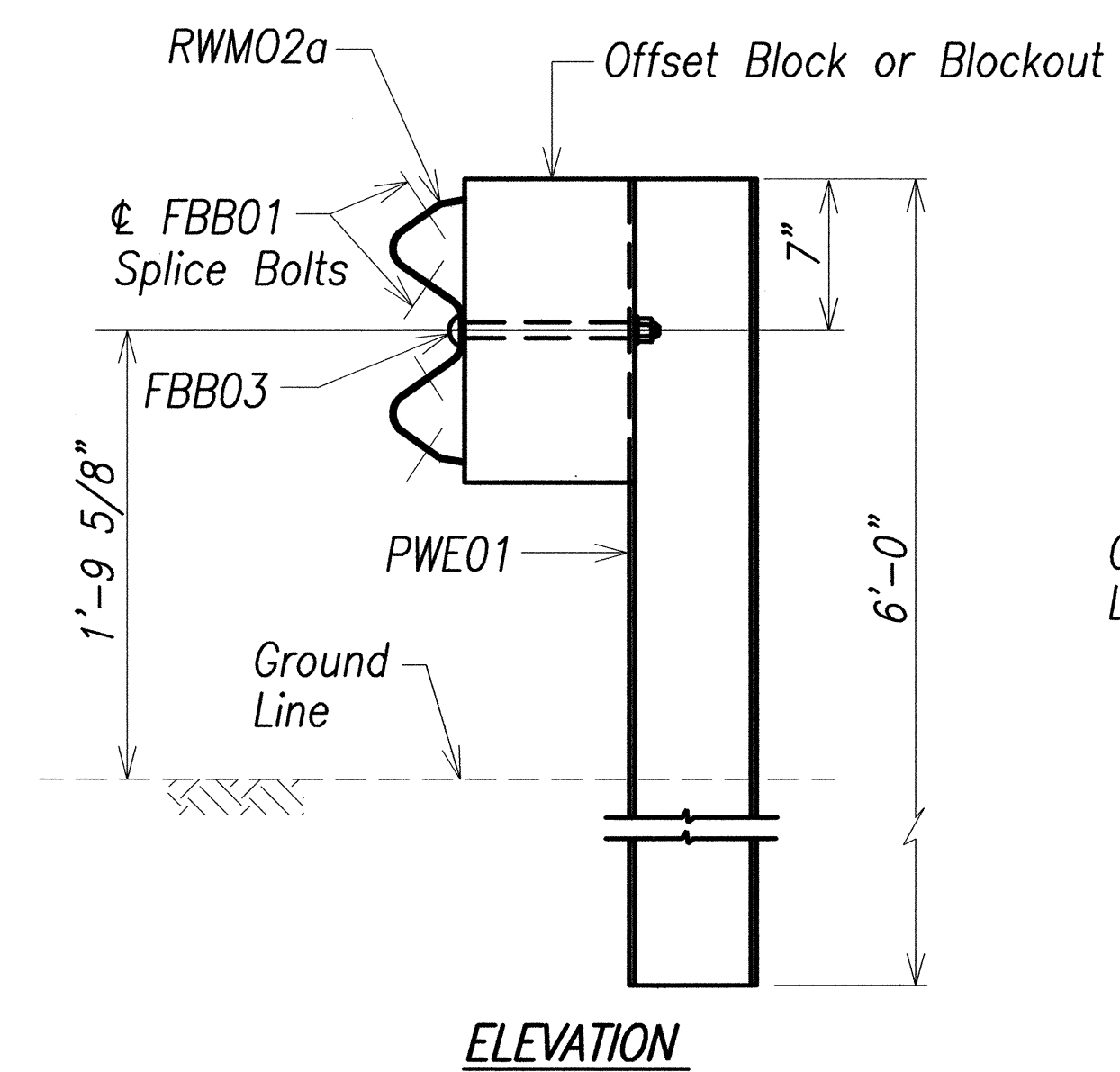
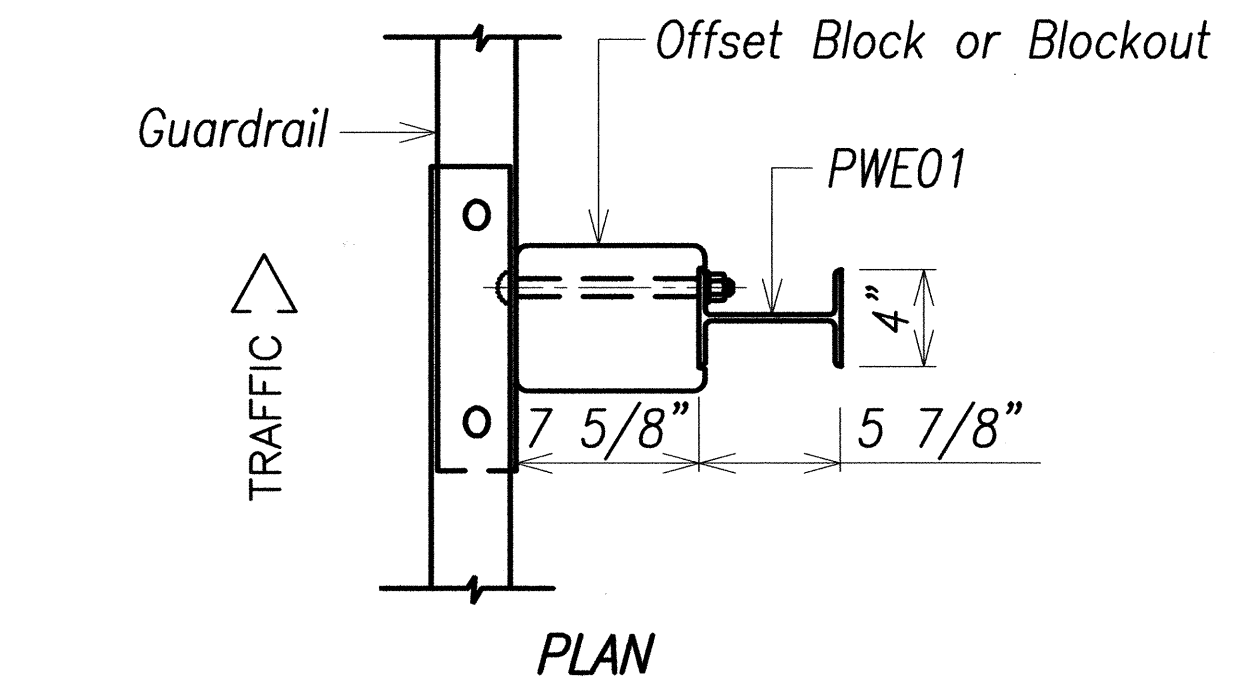
**GUARDRAIL DETAILS
AND NOTES**

KUHIO HIGHWAY IMPROVEMENTS
Extension Of Temporary Kapaa Bypass Road
Project No. 56A-03-00

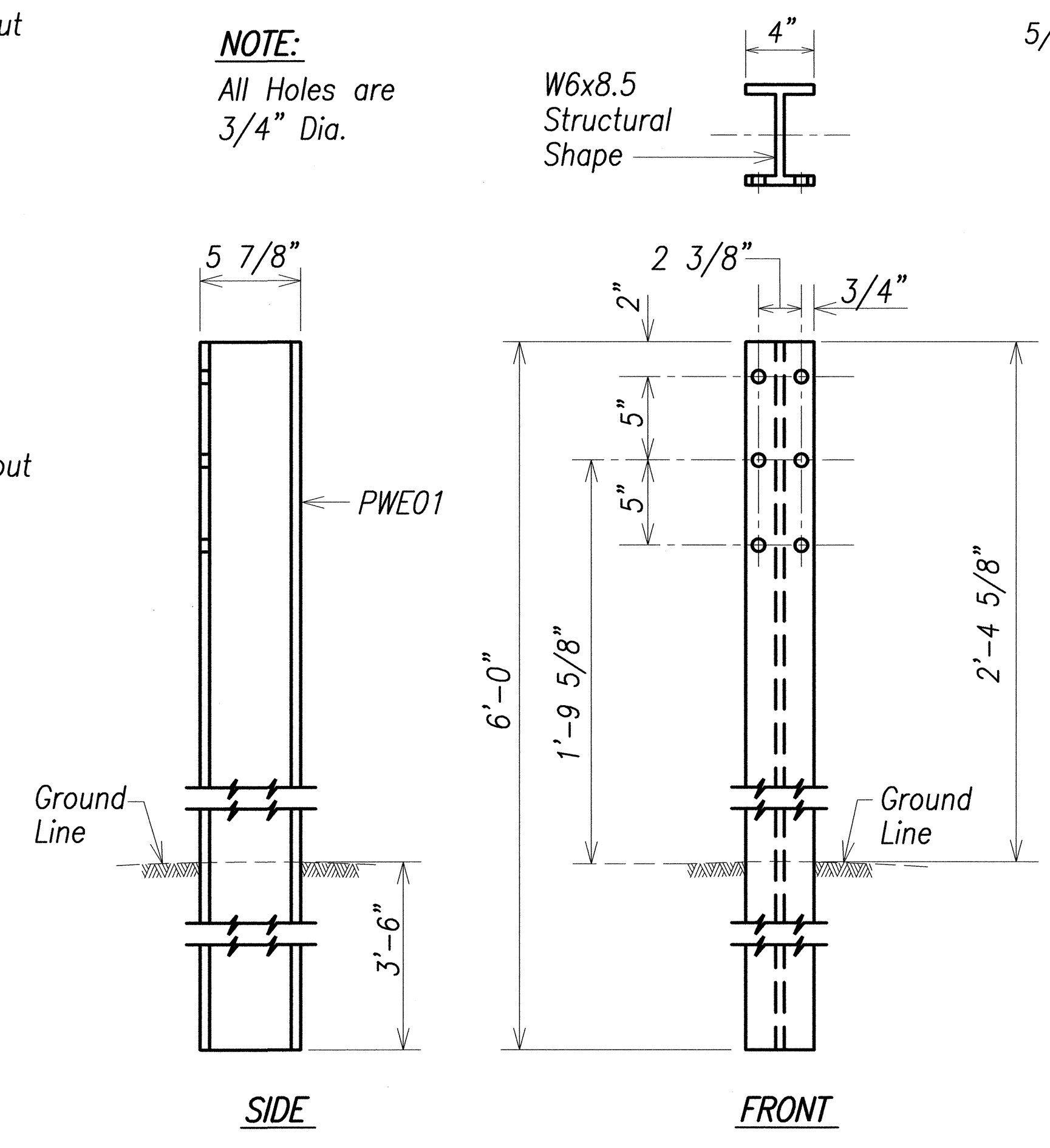
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SHEET No. 1 OF 6 SHEETS

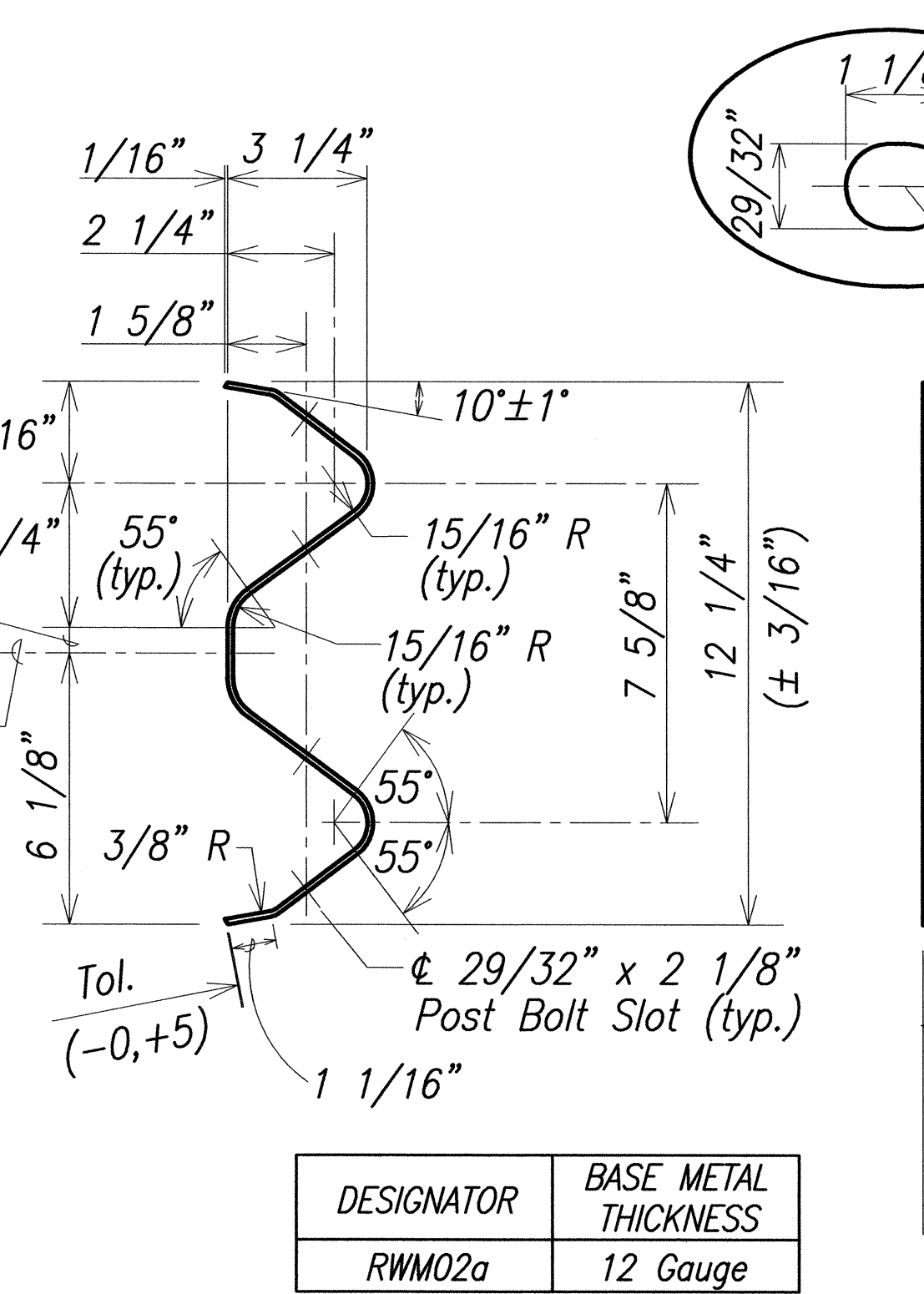
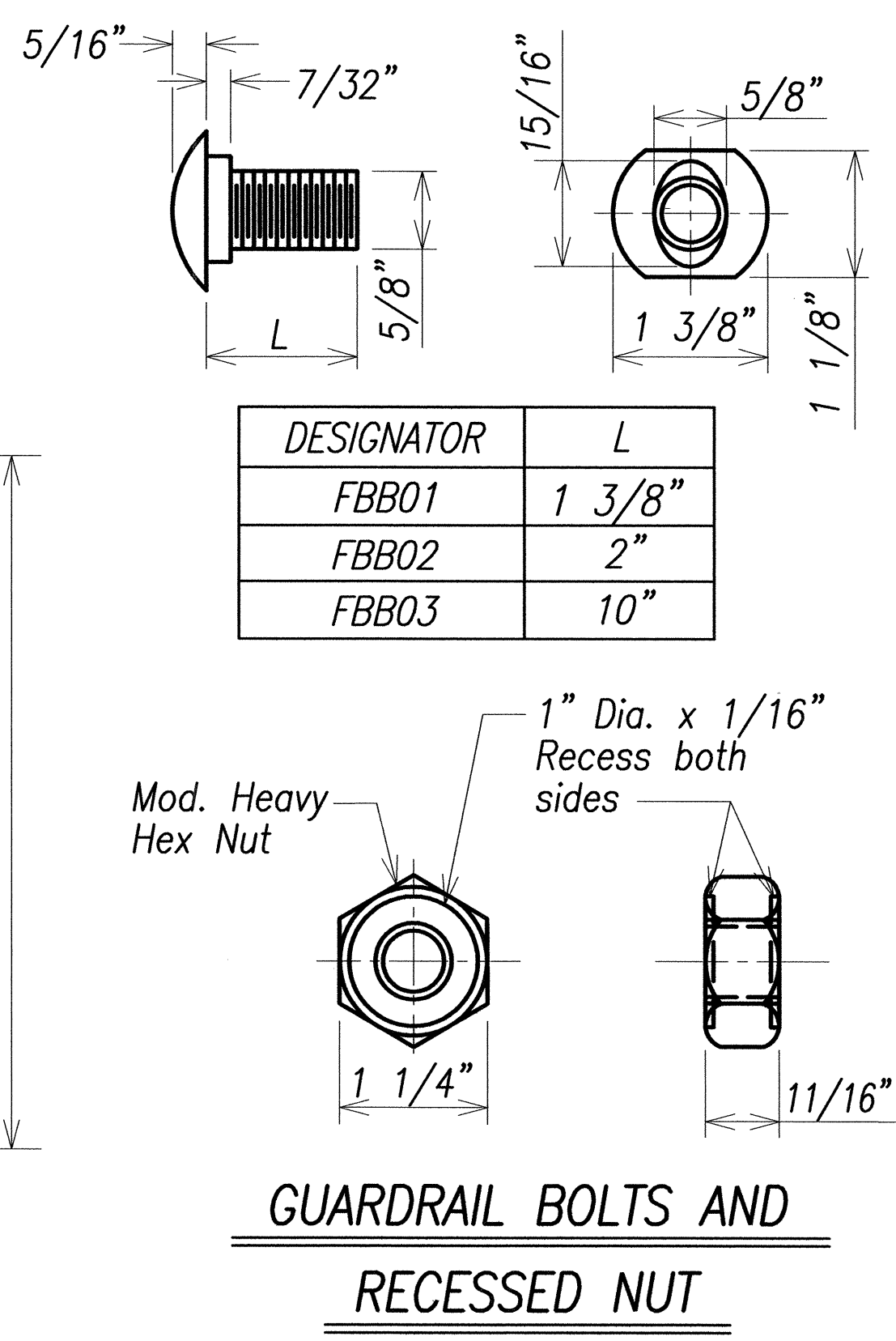
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	56A-03-00	2004	31	66



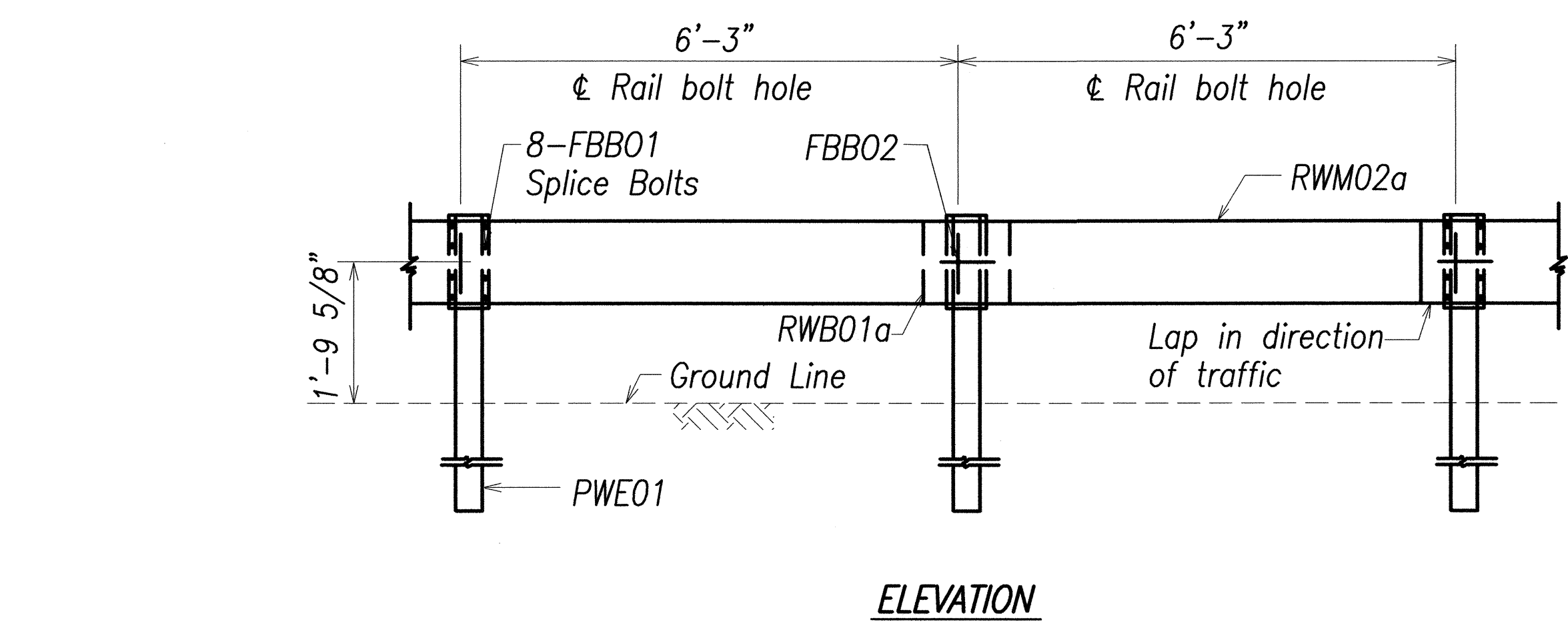
STRONG POST W-BEAM GUARDRAIL
(SGR04a)



W-BEAM STRONG POST (PWE01)



W-BEAM BACK-UP-PLATE (RWB01a)



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

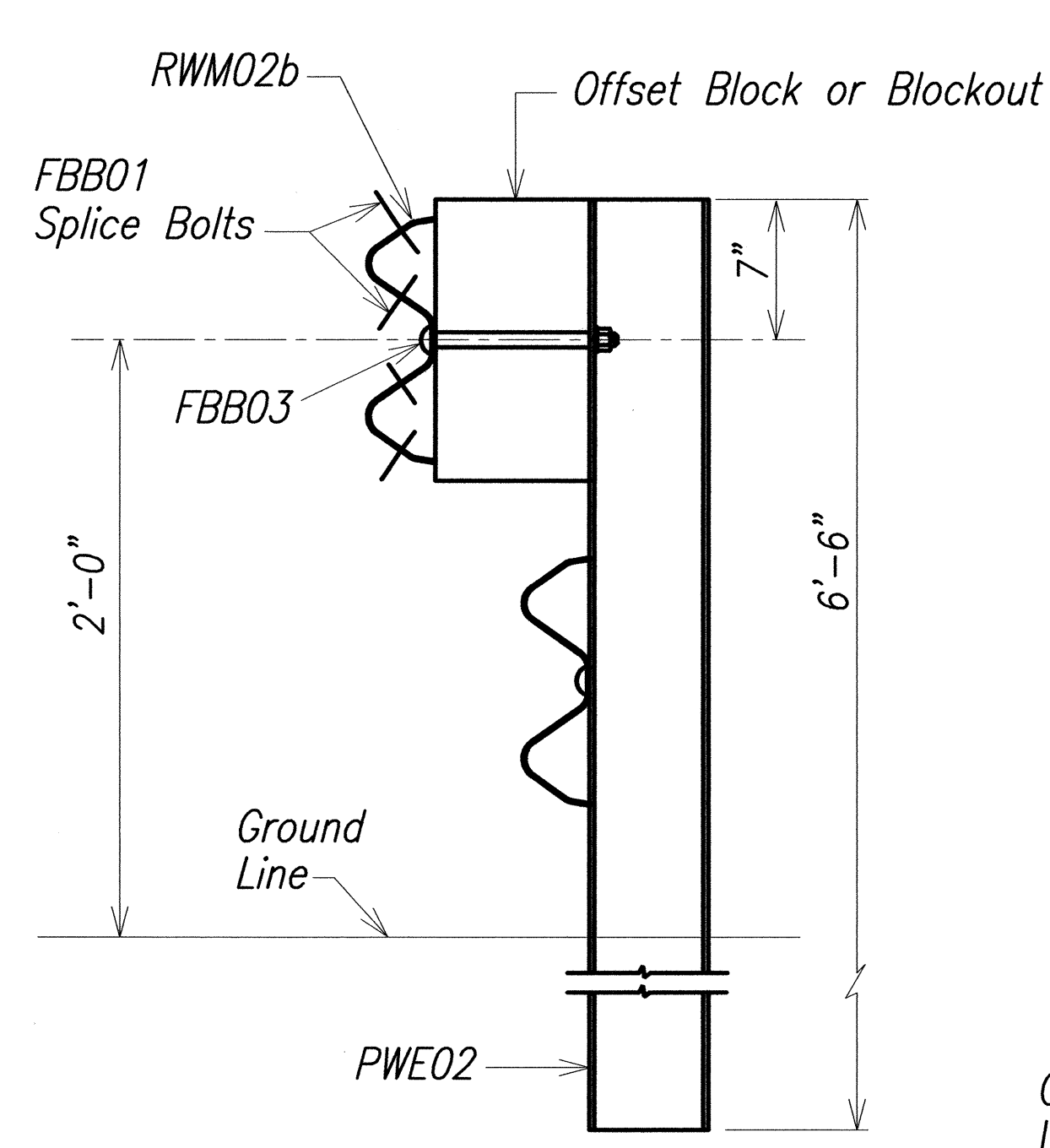
2 SPACE W-BEAM GUARDRAIL (RWM02a)

ORIGINAL PLAN
DATE
SURVEY PLOTTED BY
DRAWN BY
NOTED BY
DESIGNED BY
CHECKED BY
No.

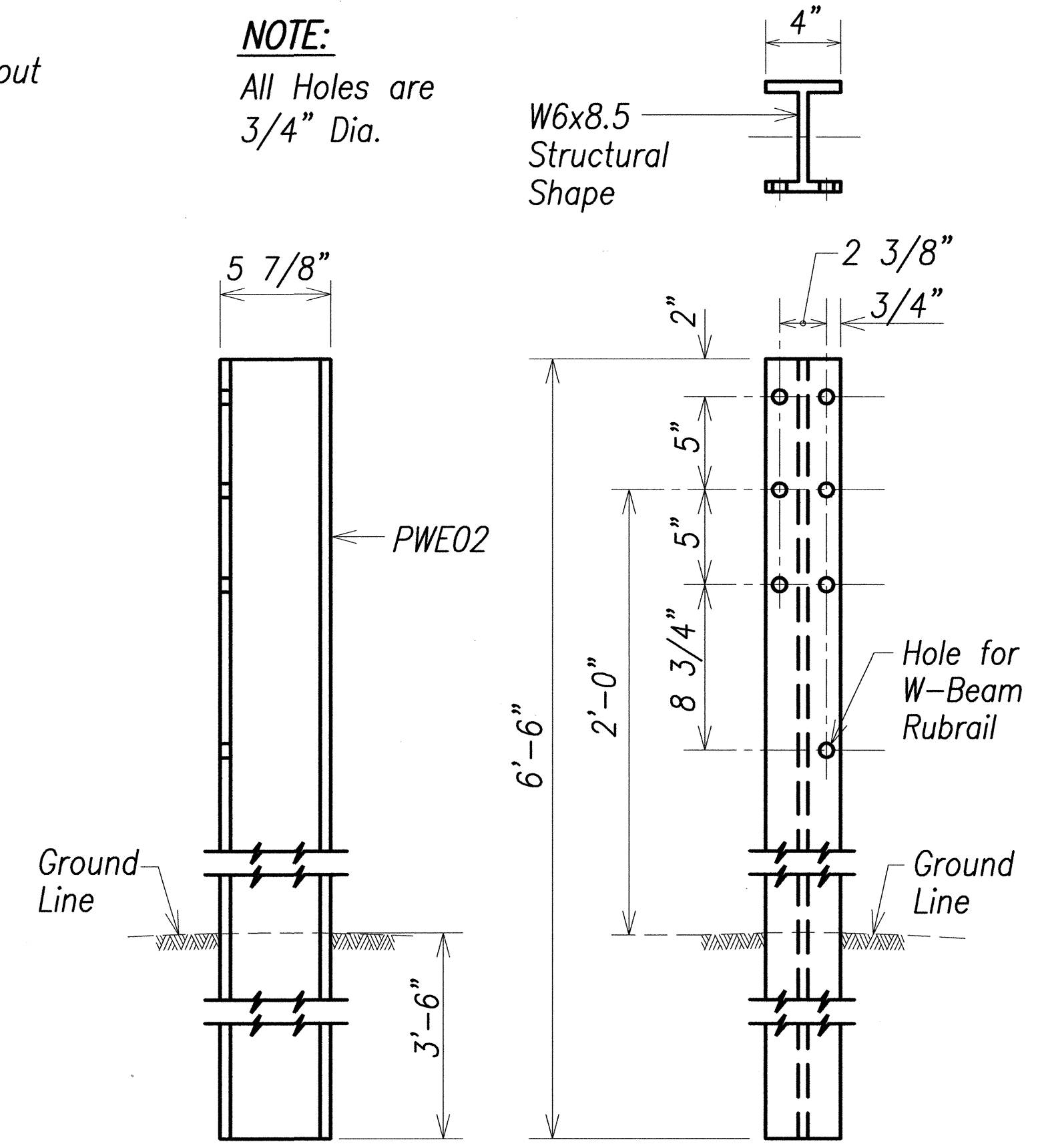
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRONG POST W-BEAM
GUARDRAIL
KUHIO HIGHWAY IMPROVEMENTS
Extension Of Temporary Kapaa Bypass Road
Project No. 56A-03-00
Scale: No Scale
Date: Mar 2004

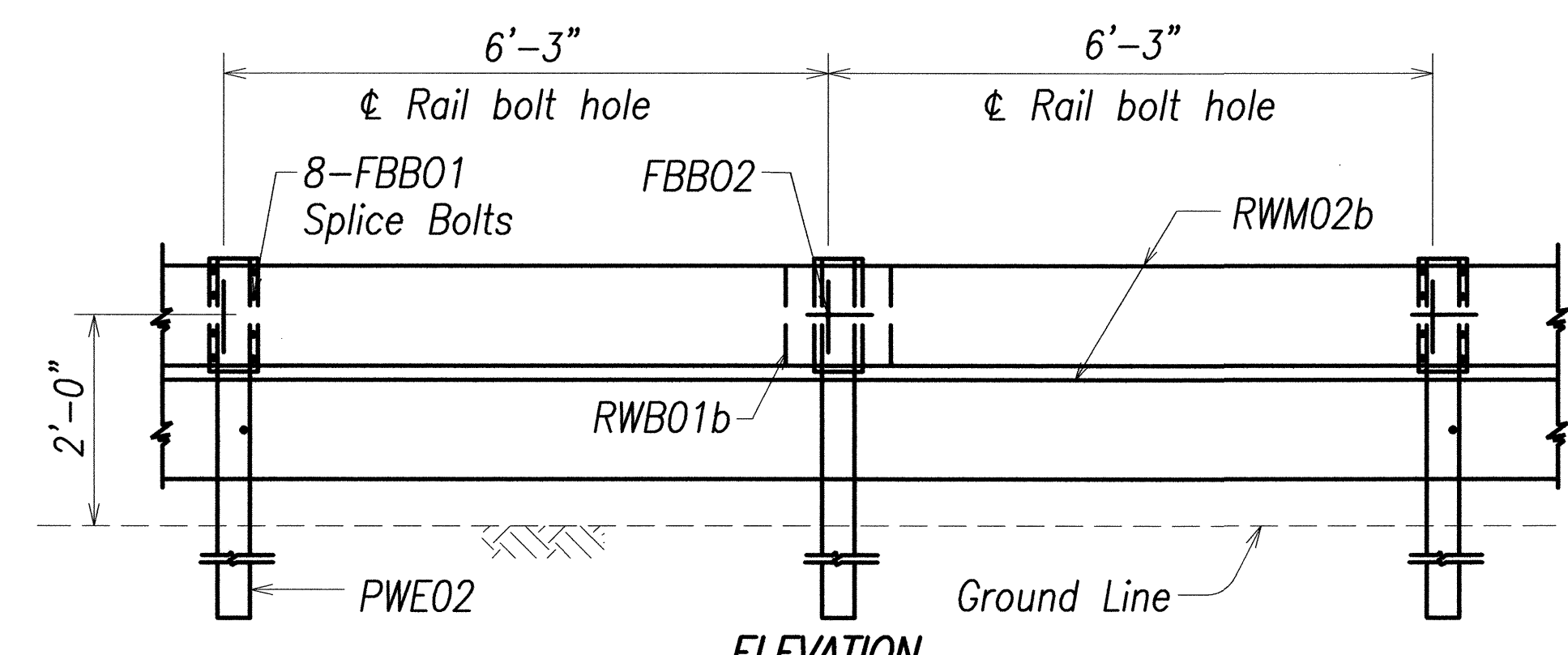
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HAWAII	HAW.	56A-03-00	2004	32	66



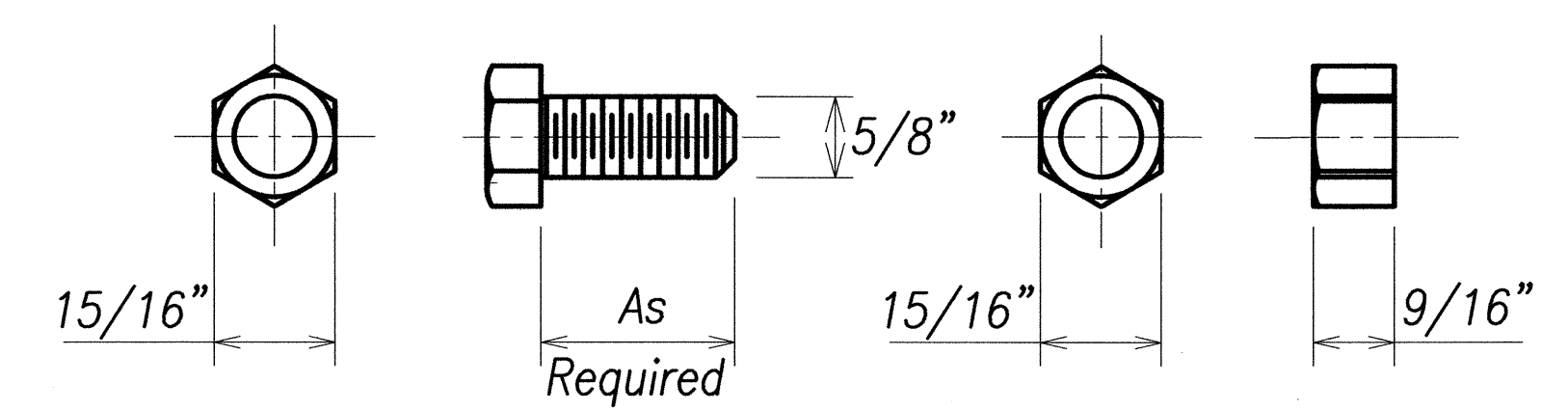
ELEVATION
STRONG POST RUBRAIL
(W-BEAM) GUARDRAIL



SIDE
FRONT
W-BEAM STRONG POST (PWE02)

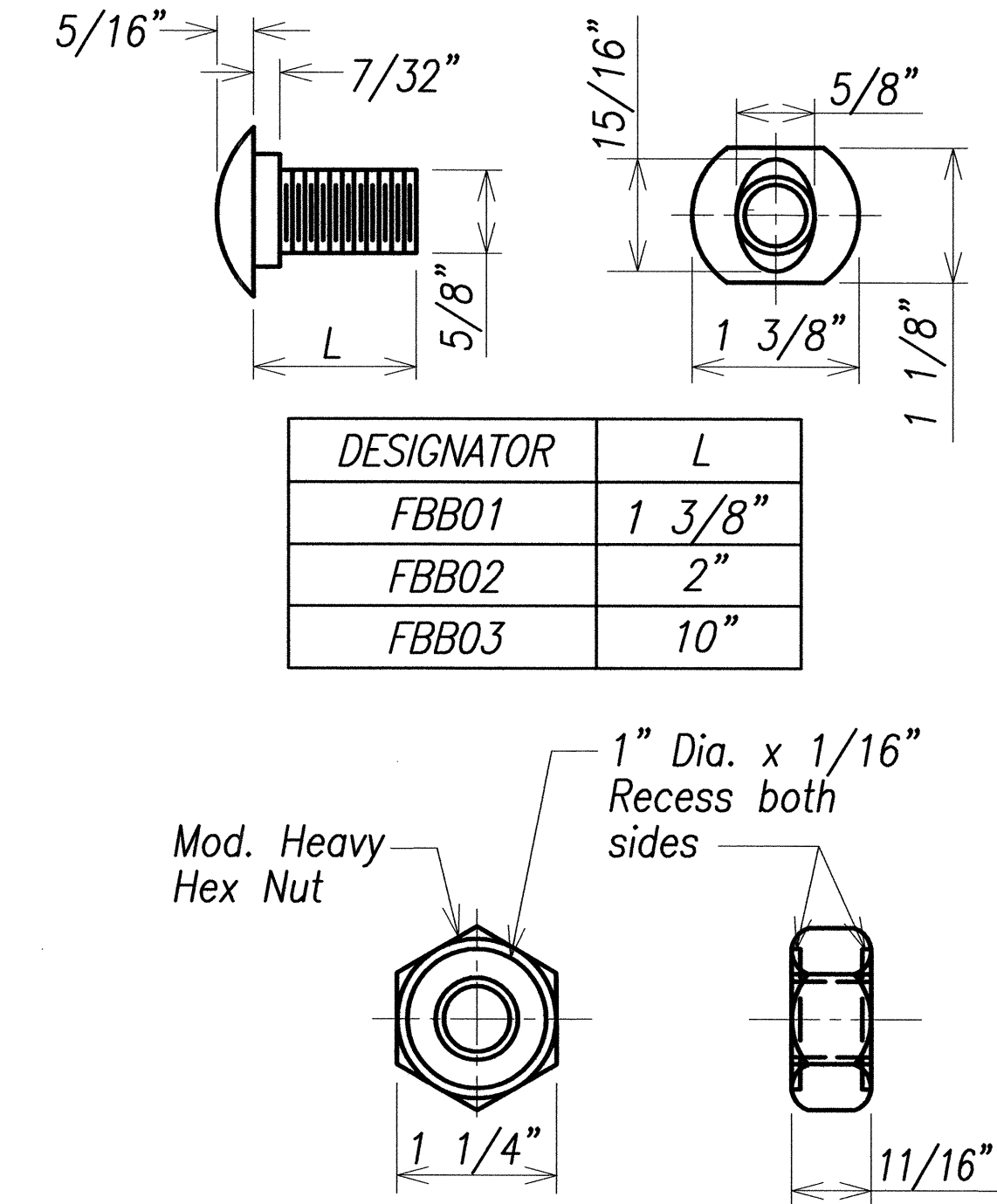
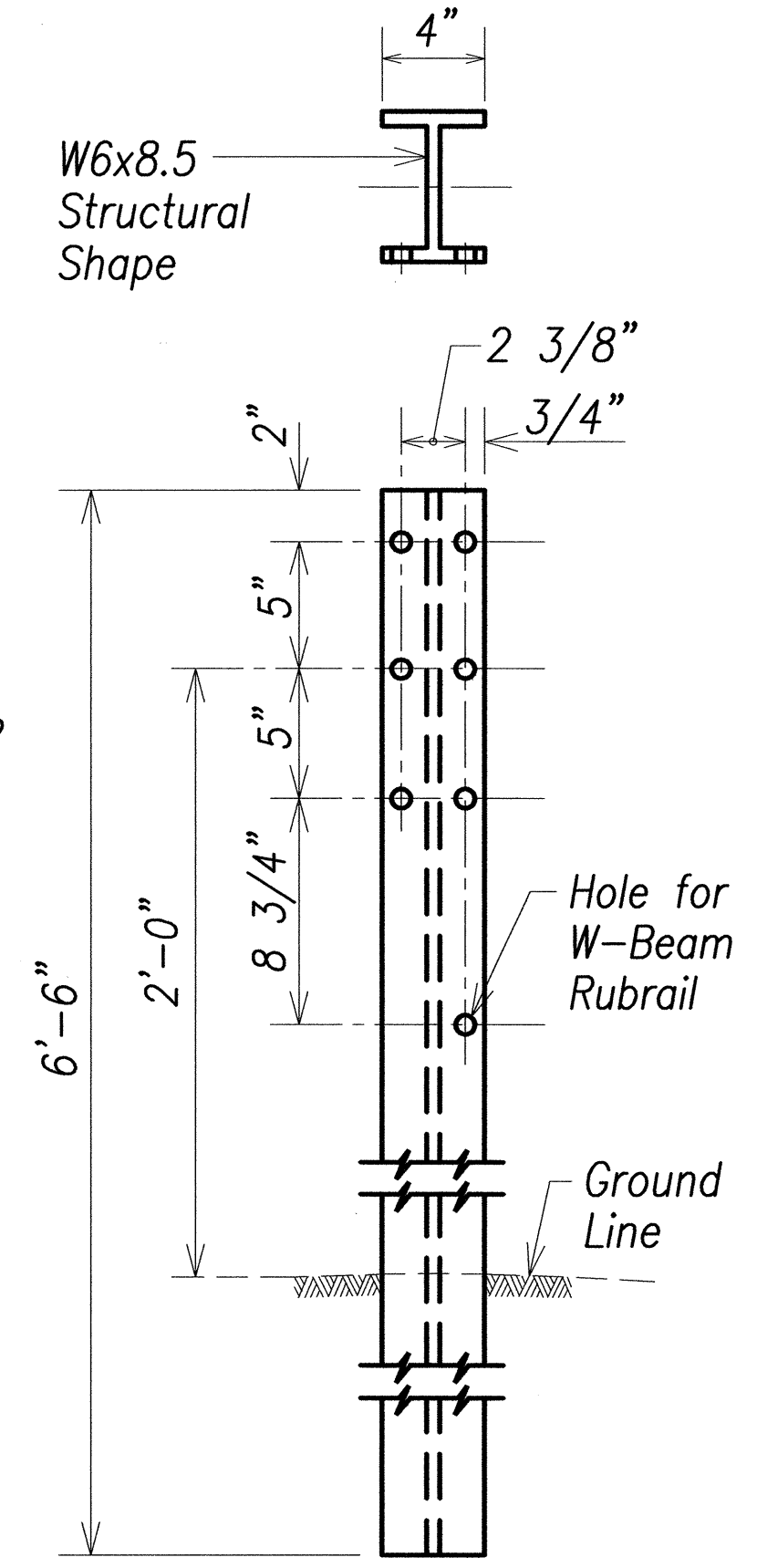


ELEVATION
STRONG POST RUBRAIL (W-BEAM) GUARDRAIL WITH
RECYCLED OFFSET BLOCK OR PLASTIC BLOCKOUT



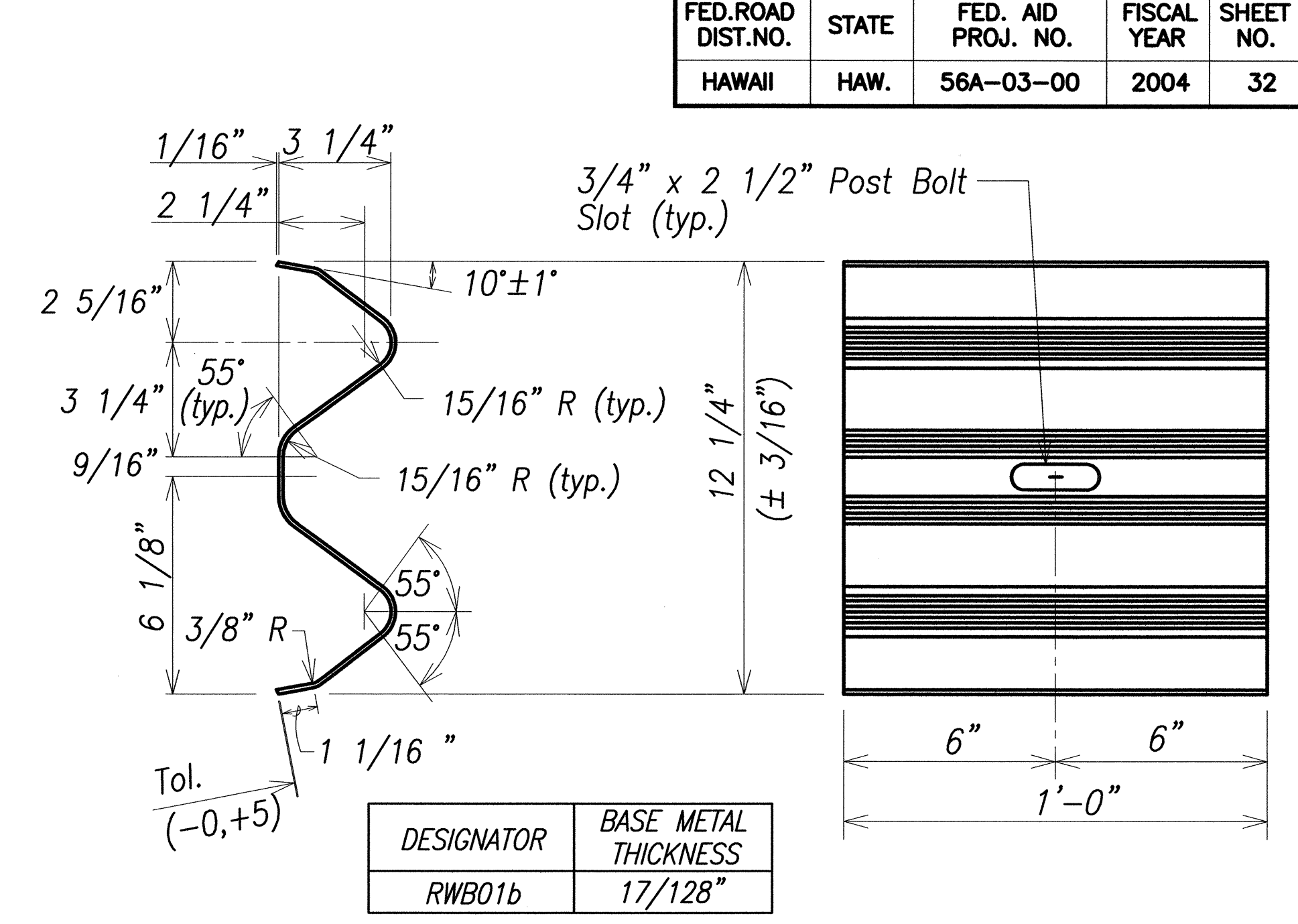
HEX BOLT & NUT (FBX16a)

NOTE:
All Holes are
3/4" Dia.



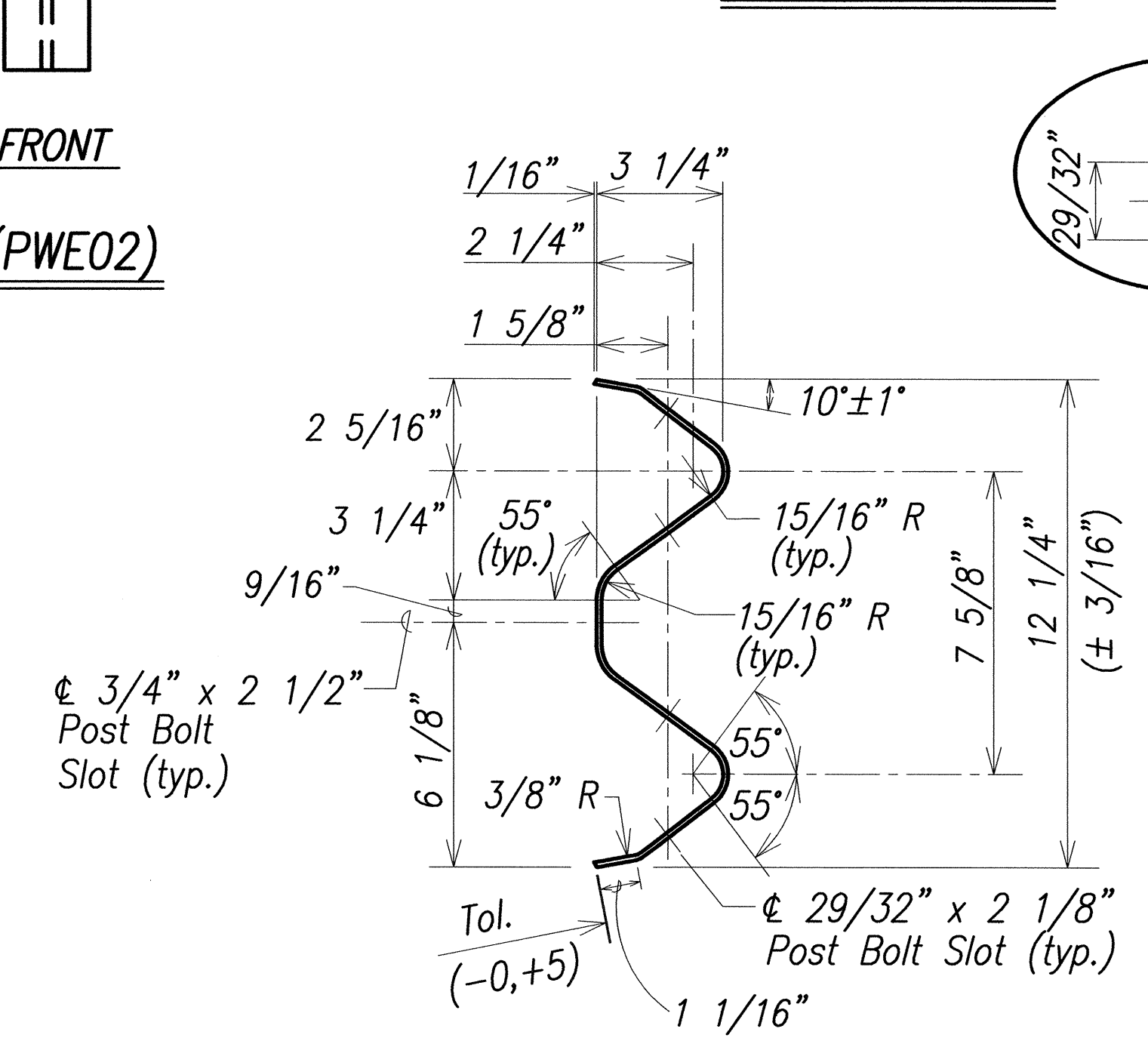
DESIGNATOR	L
FBB01	1 3/8"
FBB02	2"
FBB03	10"

GUARDRAIL BOLTS AND
RECESSED NUT



DESIGNATOR	BASE METAL THICKNESS
RWB01b	17/128"

W-BEAM BACK-UP-PLATE (RWB01b)



DESIGNATOR	BASE METAL THICKNESS
RWM02b	17/128"

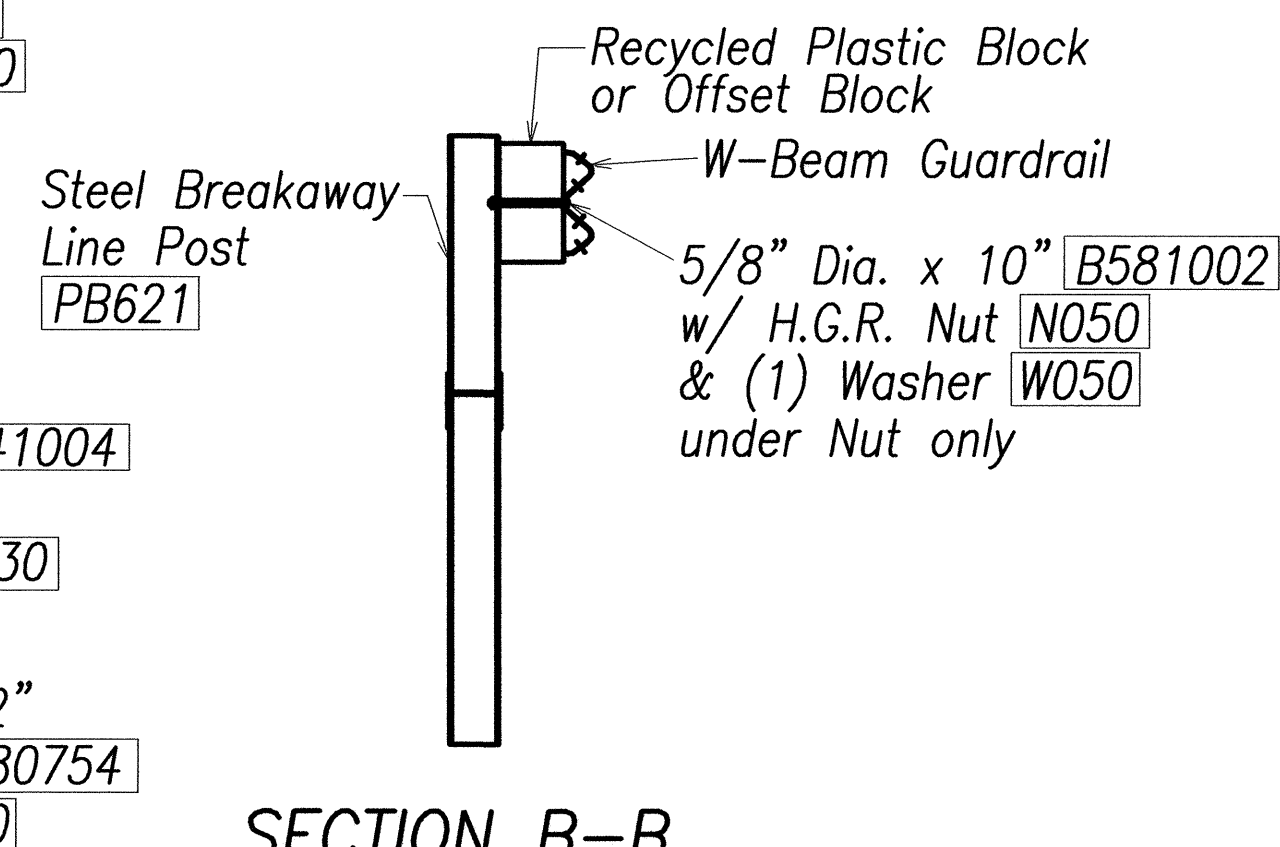
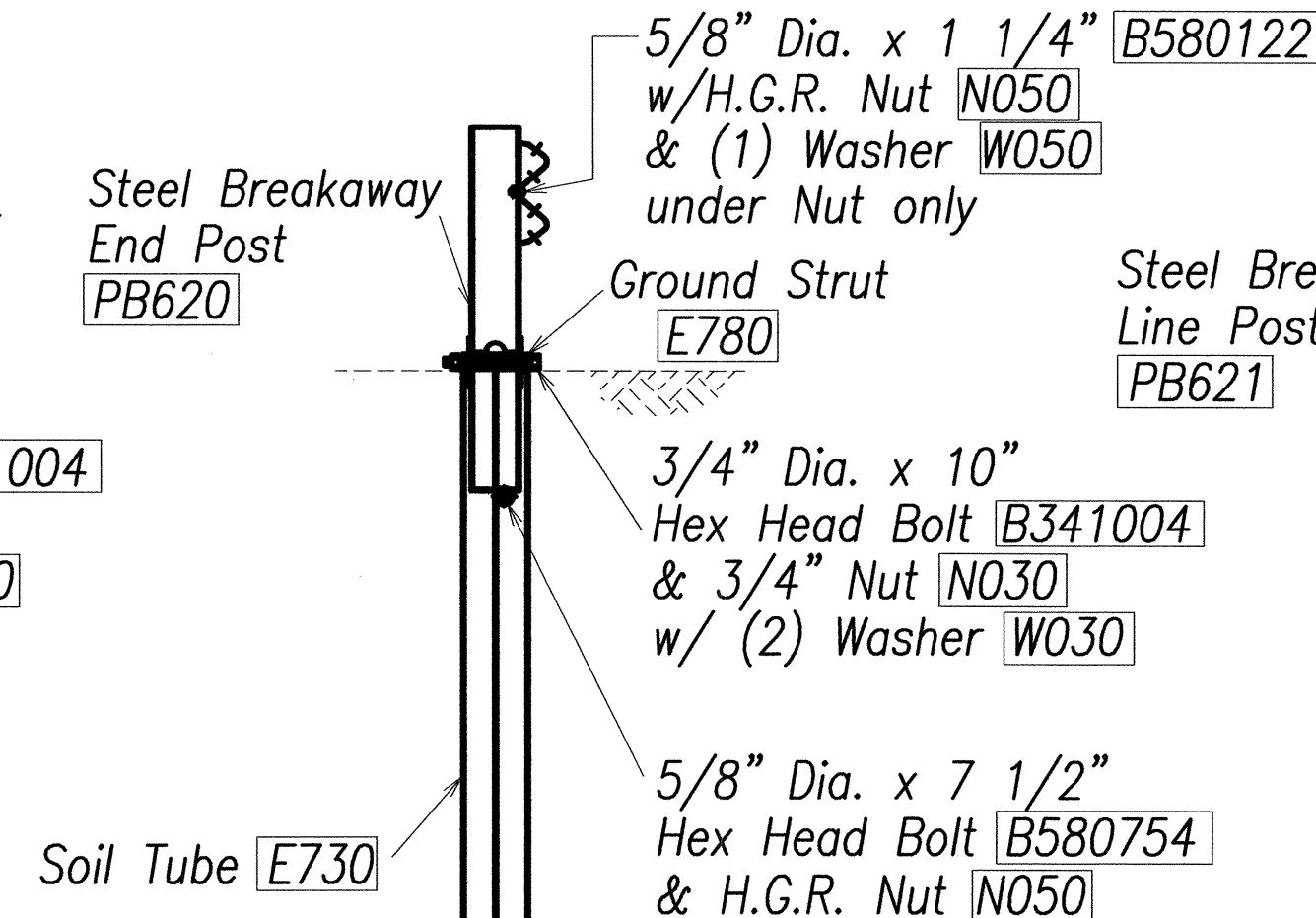
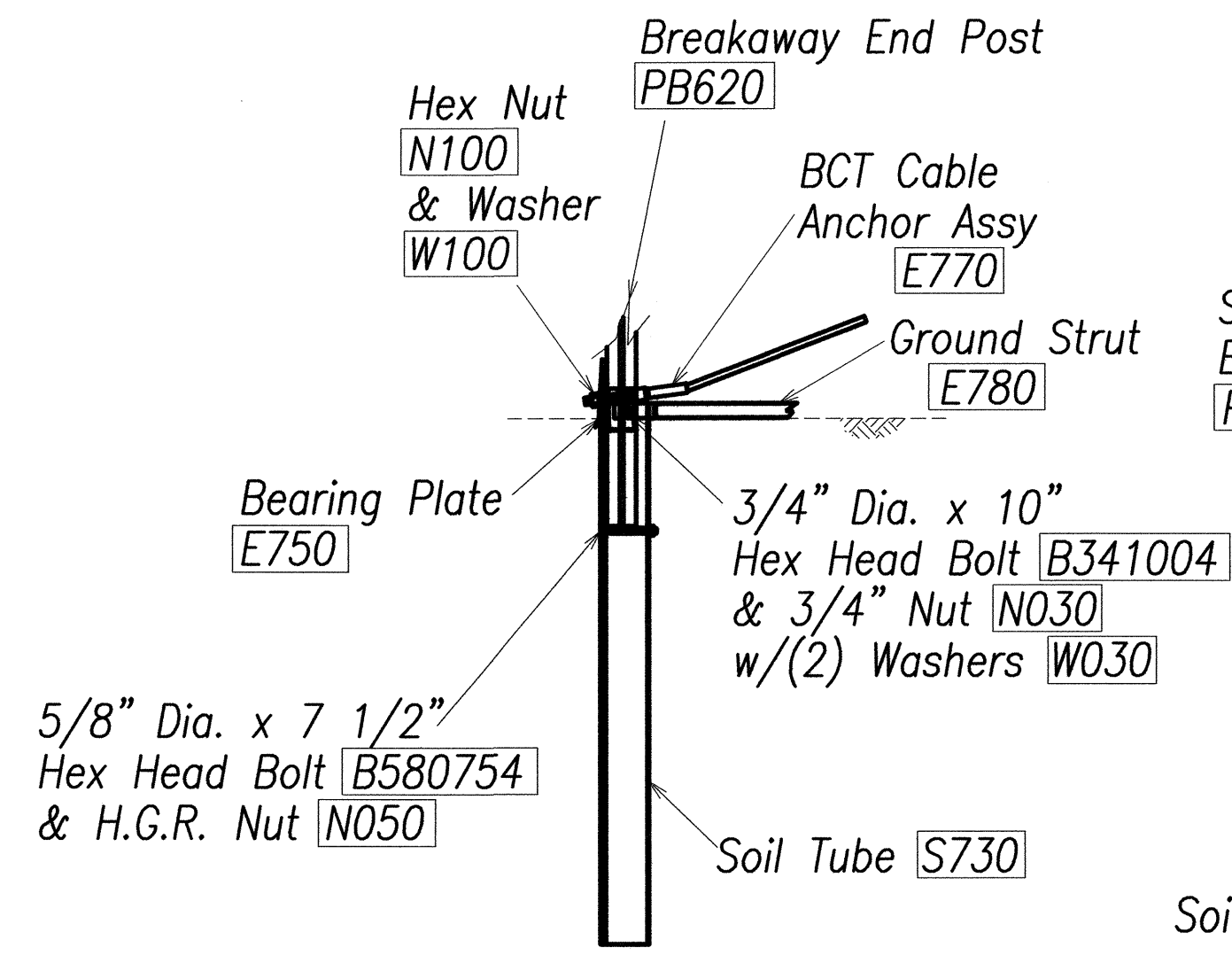
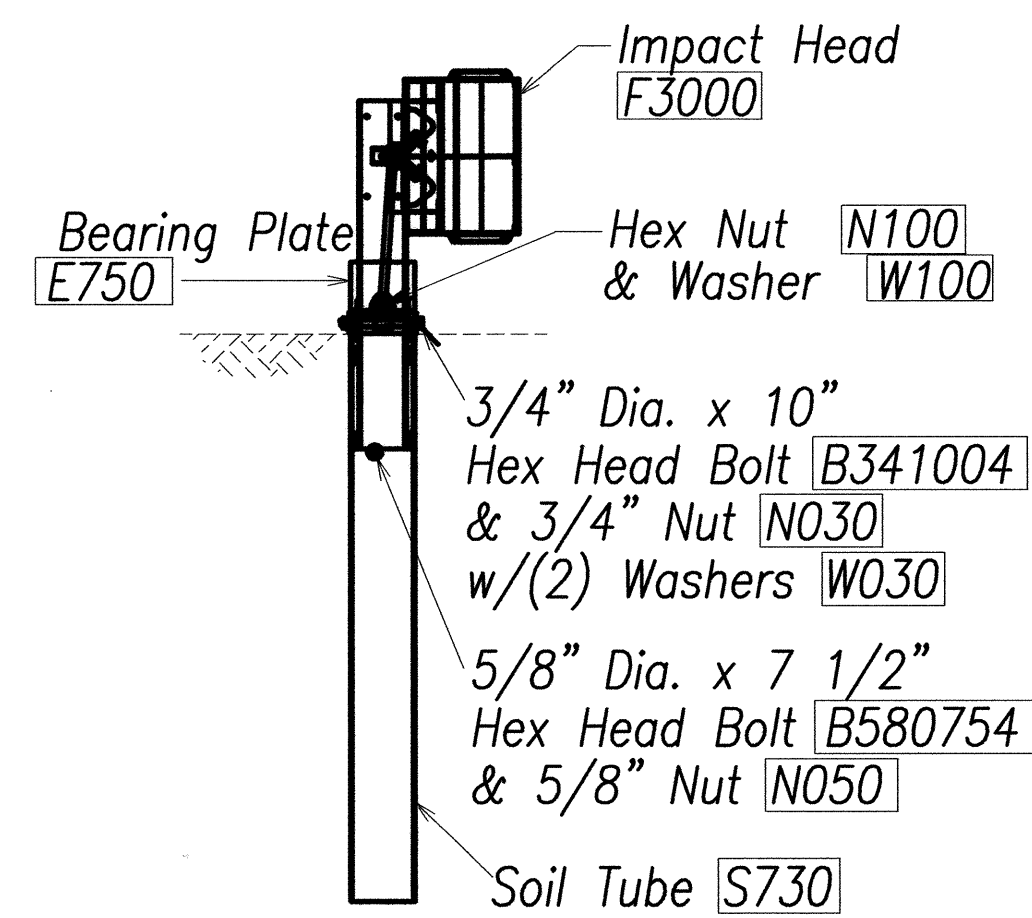
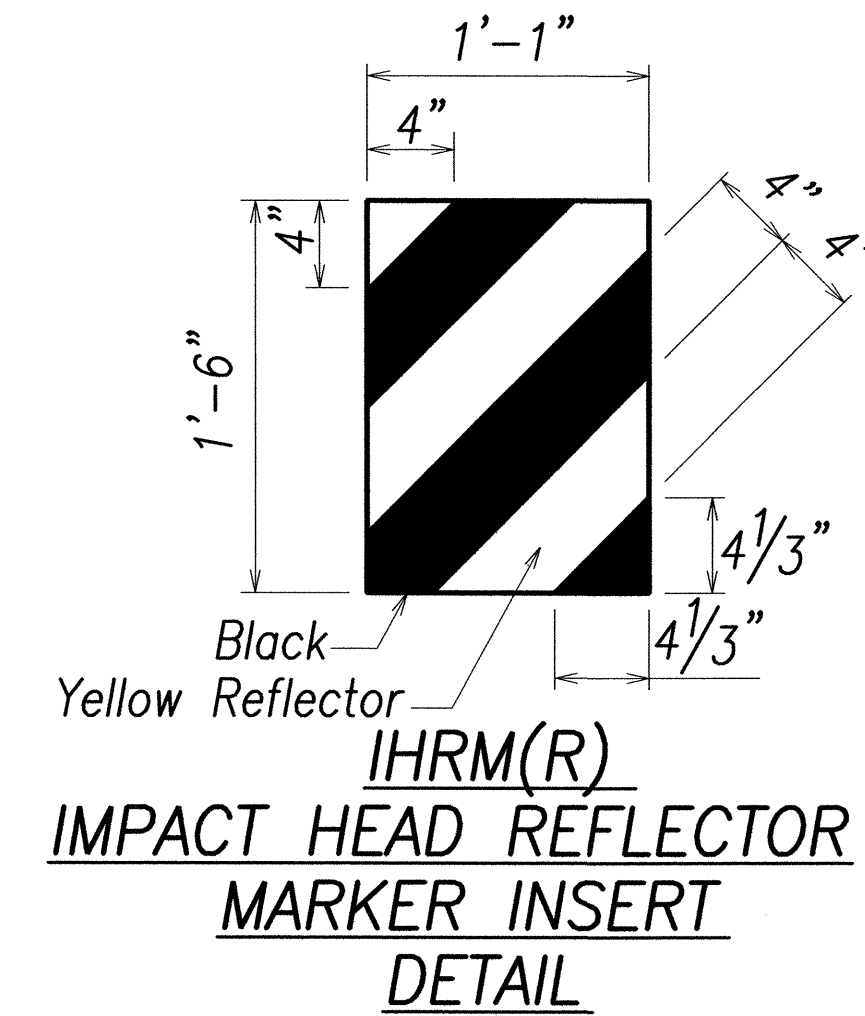
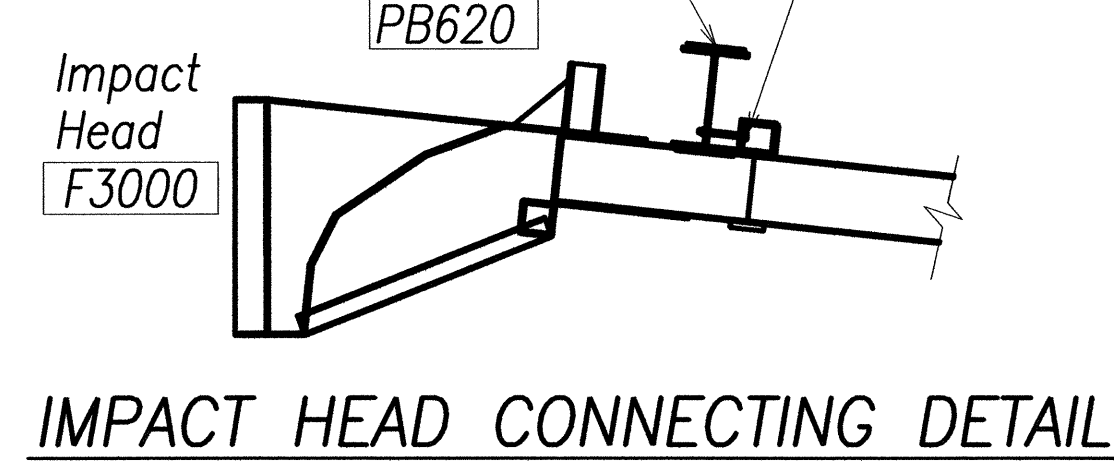
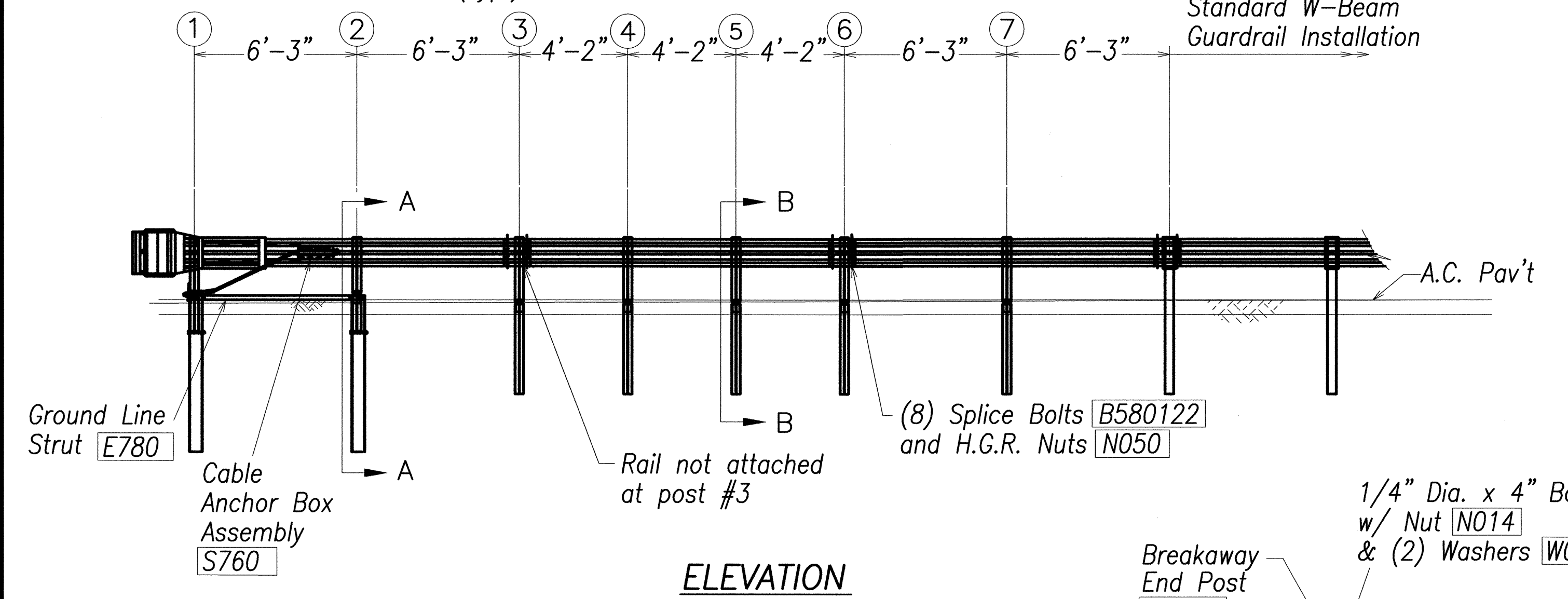
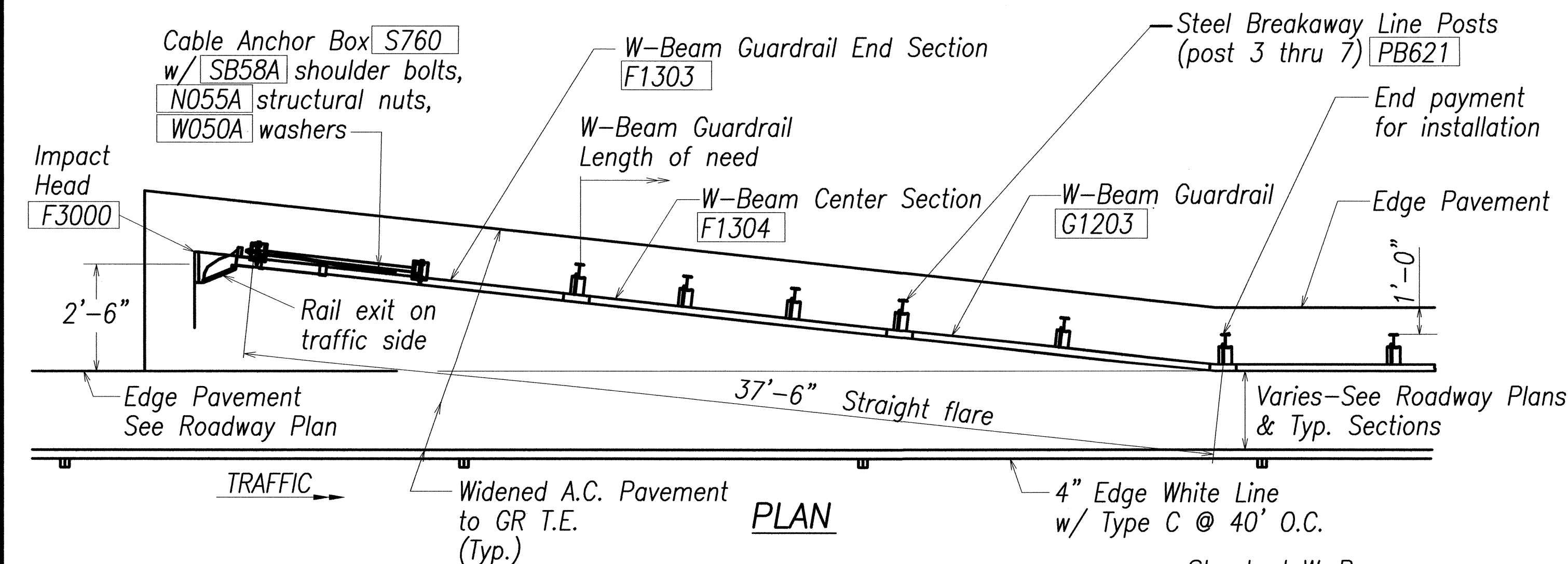
2 SPACE W-BEAM GUARDRAIL (RWM02b)

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRONG POST RUBRAIL
(W-BEAM) GUARDRAIL
KUHIO HIGHWAY IMPROVEMENTS
Extension Of Temporary Kapaa Bypass Road
Project No. 56A-03-00
Scale: No Scale
Date: Mar 2004
SHEET No. 3 OF 6 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	56A-03-00	2004	33	66



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

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
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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

FLEAT-350

FLARED ENERGY ABSORBING TERMINAL

KUHIO HIGHWAY IMPROVEMENTS
Extension Of Temporary Kapaa Bypass Road
Project No. 56A-03-00

Scale: No Scale Date: Mar 2004

SHEET No. 4 OF 6 SHEETS

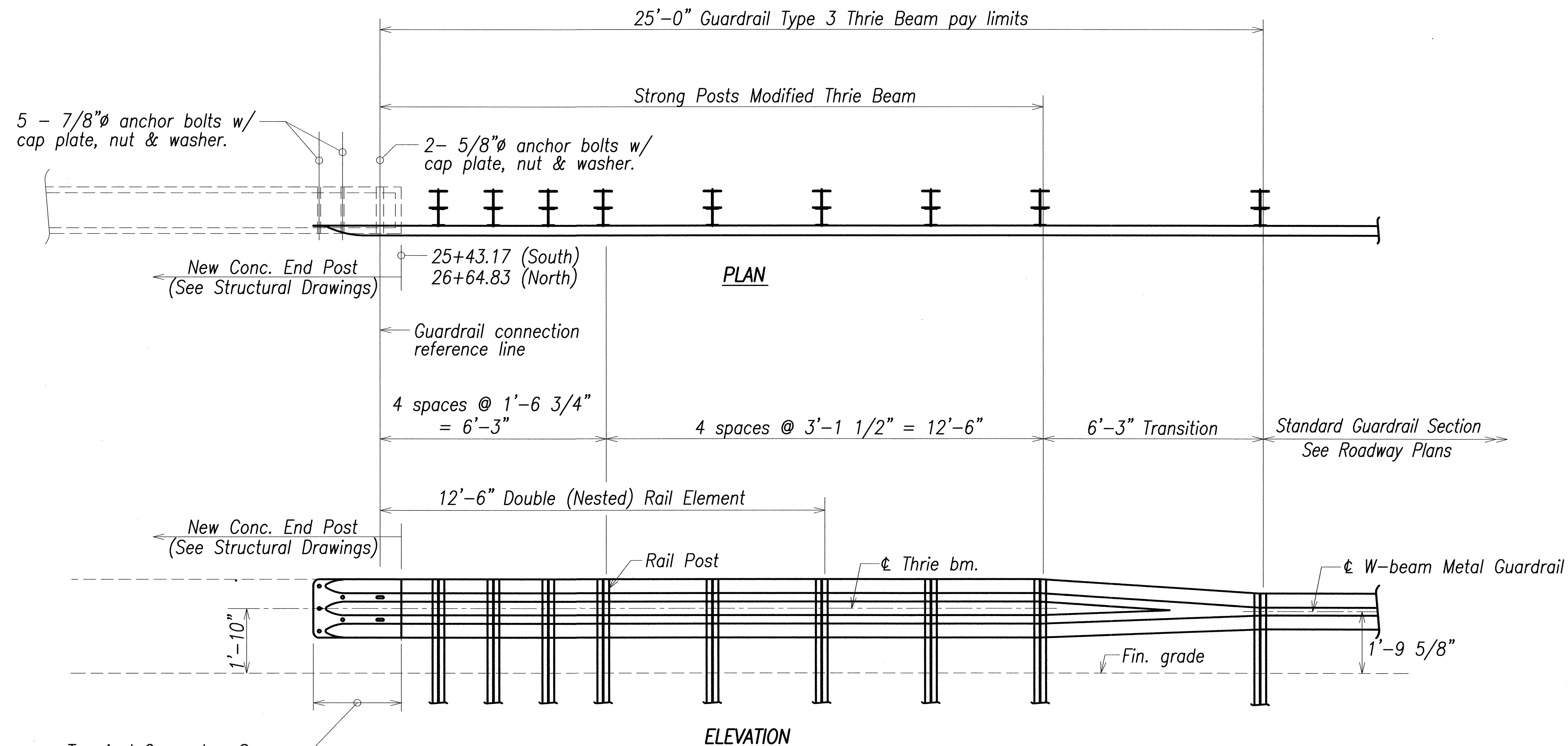
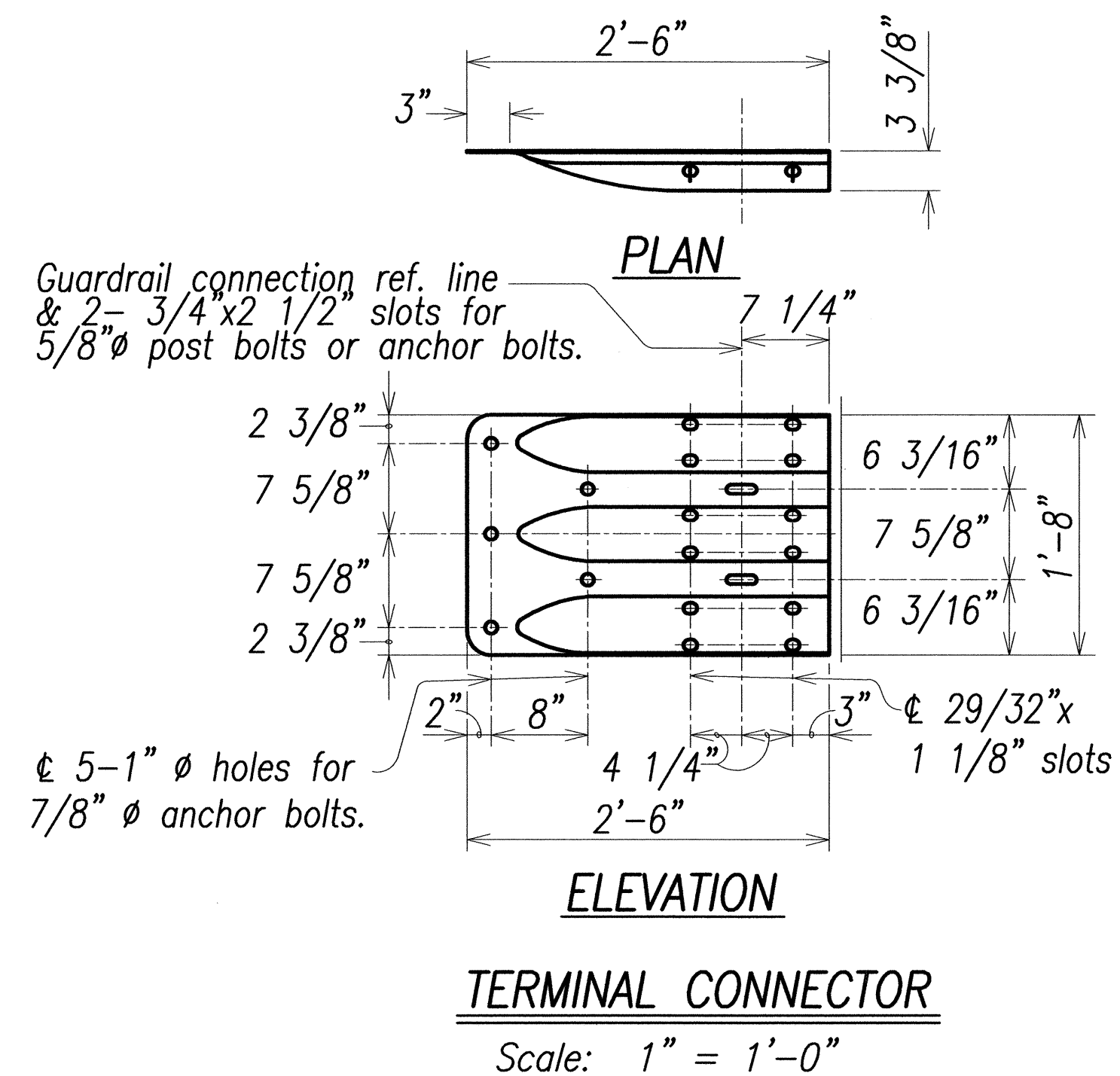
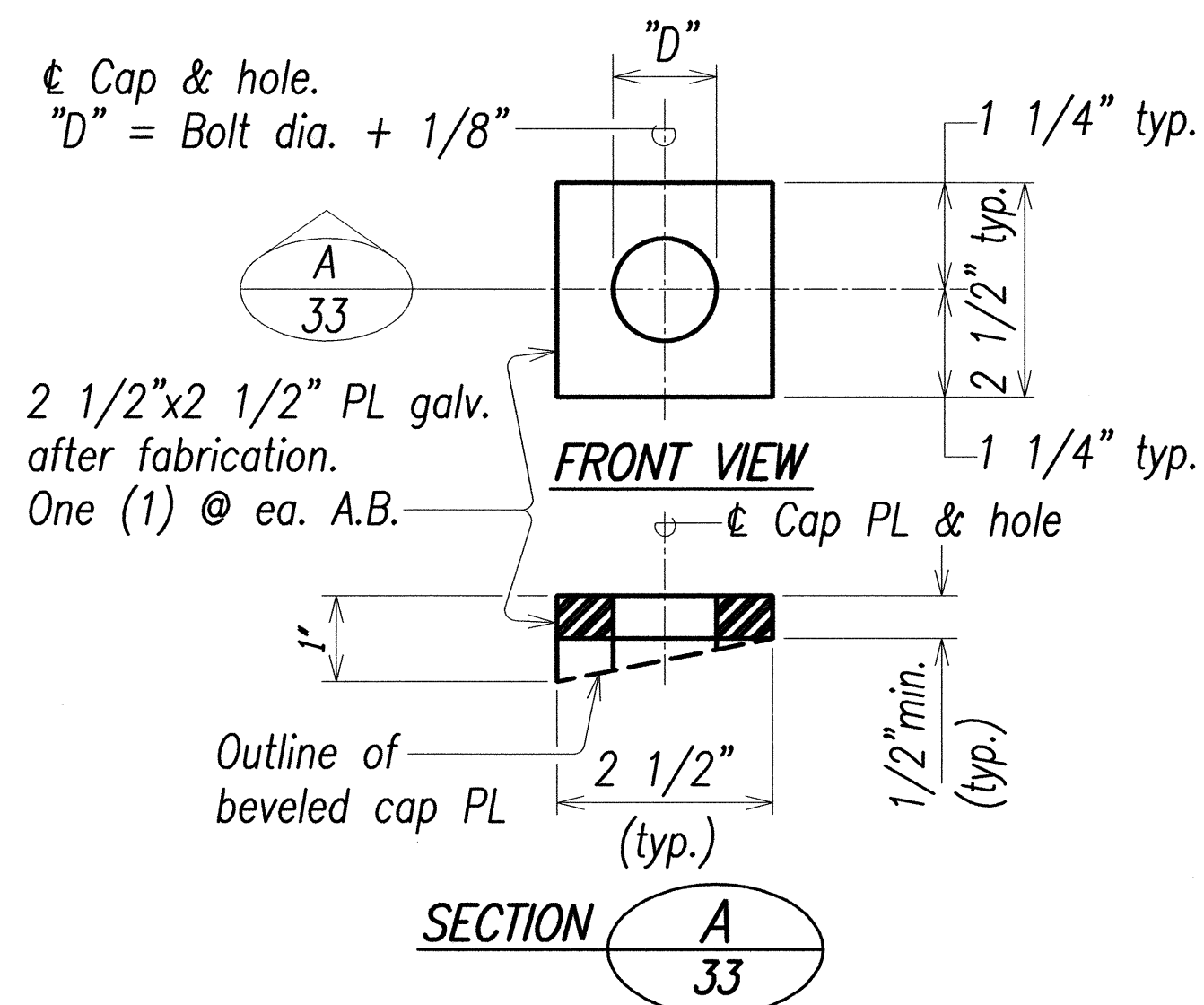
DATE: _____

DESIGNED BY: _____

CHECKED BY: _____

NO. _____

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	56A-03-00	2004	34	66



Terminal Connector, See Detail On This Sheet

NOTES:

- All work from guardrail connection reference line to standard guardrail, including transition section, terminal connector, and connection to standard guardrail shall be paid under Item No. 606.0020 - Guardrail, Type 3 Thrie Beam.
- See Plan Sheet No. 34 for thrie beam details.
- The work necessary to connect guardrail to concrete end post shall include all labor, materials, tools, equipment and incidentals necessary to complete the work and will not be paid for separately.
- Lap terminal connector and rail element in direction of traffic to prevent snagging.
- All anchor bolts shall be high strength bolts conforming to the requirements of ASTM 325 and Standard Specification, Section 713.04.
- Anchor bolt length shall be such that a snug fit of the elements and full thread engagement plus 1/4" (max.) is attained.
- "Terminal Connector", "Transition Section" and thrie beam shall be fabricated from 10 gauge steel conforming to the requirements of AASHTO M 180, Type II, Class B.
- "Terminal Connector" and standard spacer, including all anchor bolts, cap PL, nuts and washers, shall be hot-dip galvanized after fabrication.
- Cap PL shall be fabricated from ASTM A 36.
- First 25'-0" of guardrail adjoining "Terminal Connector" shall be galvanized steel and supports spaced as shown on the detail drawings. This section of rail shall be placed on tangent to end post or parallel to roadway, unless conditions at site renders it impossible to do so. Flare point to be determined in field.
- Double (nest 1st panel) thrie beam elements at all end post connections, except on highways with one-way traffic pattern, use single thrie beam elements at end post on trailing end only.
- Where double (nested) beam occur, 12" "Back-up Plate" not required.
- Heads of through anchor bolts shall be placed on the traffic side of the rail.
- All steel shapes, rails and plates shall conform to ASTM A 36 specifications.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

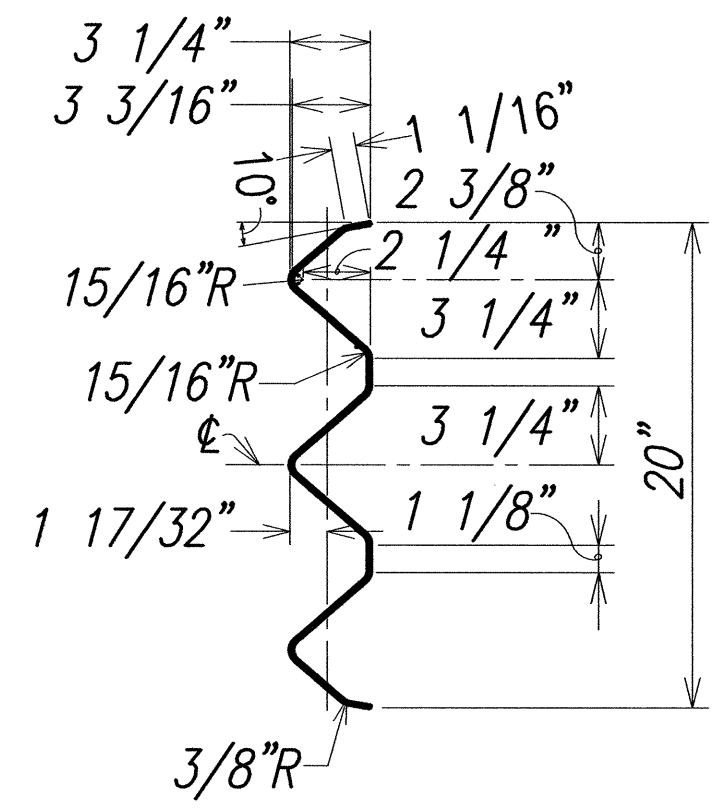
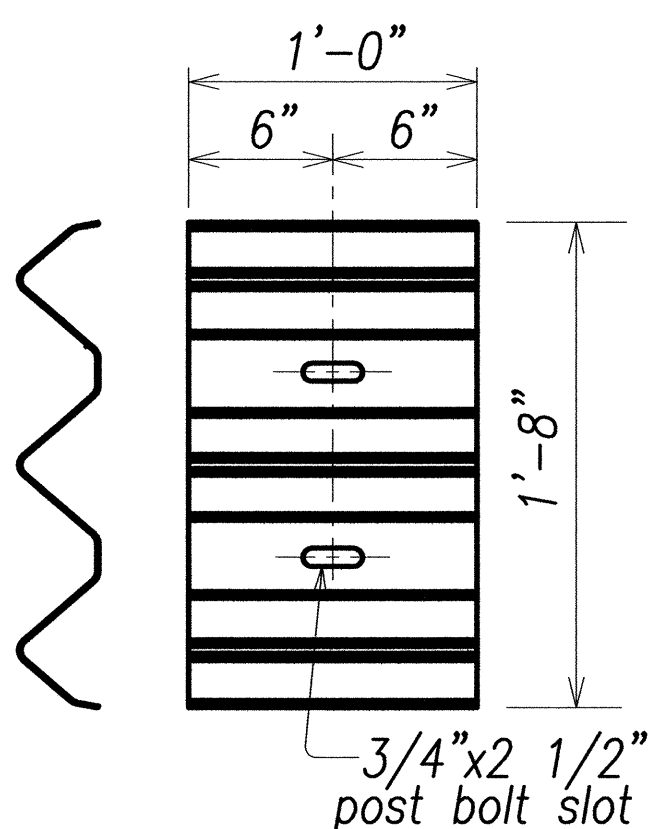
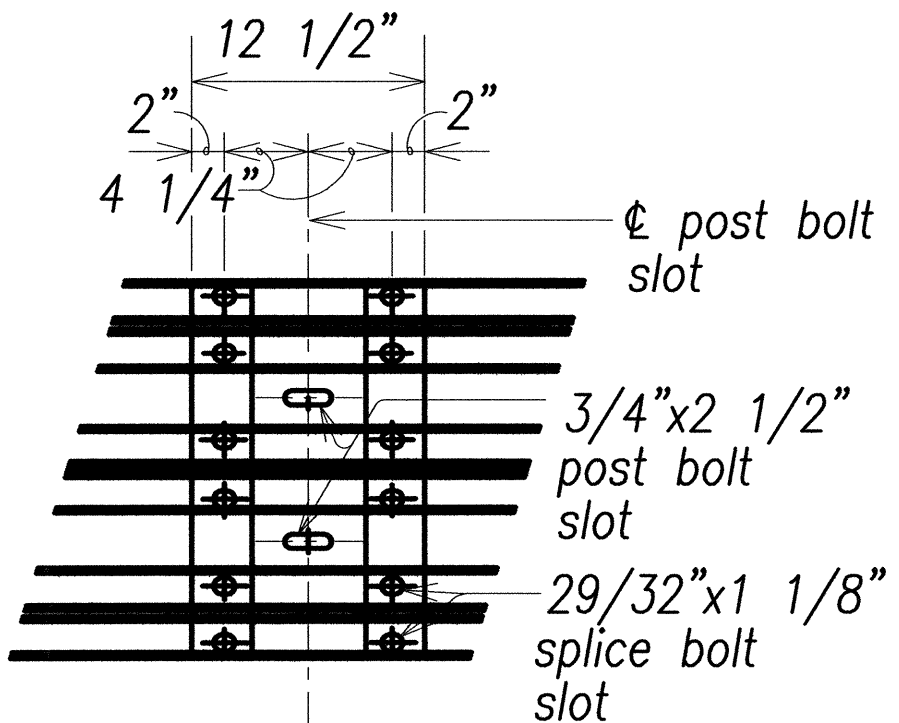
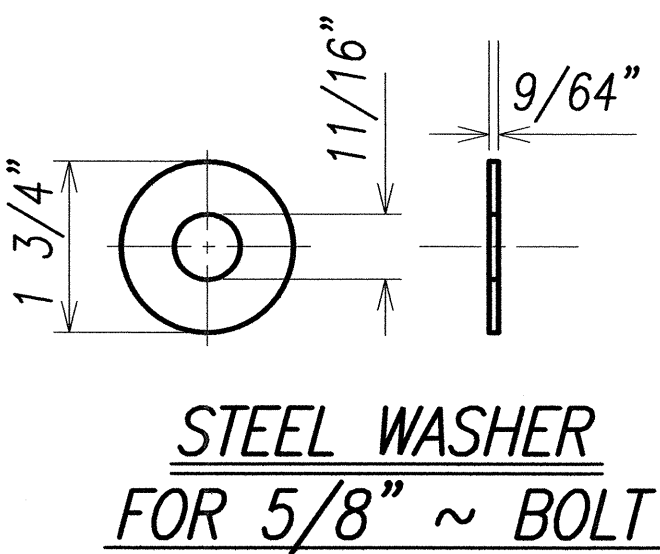
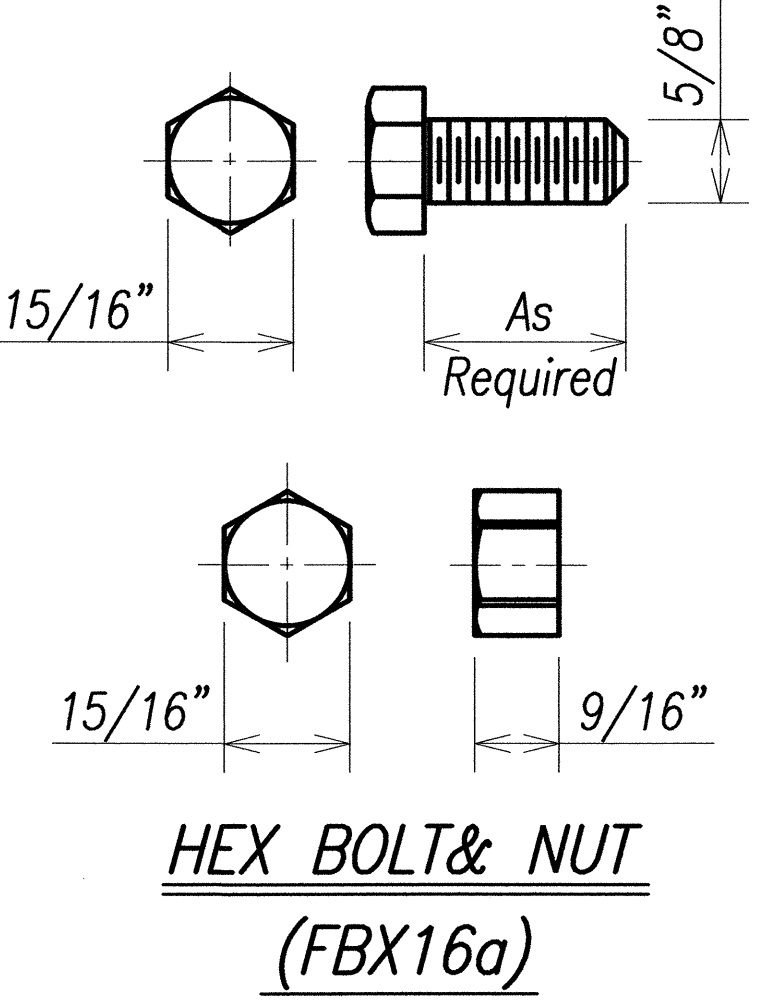
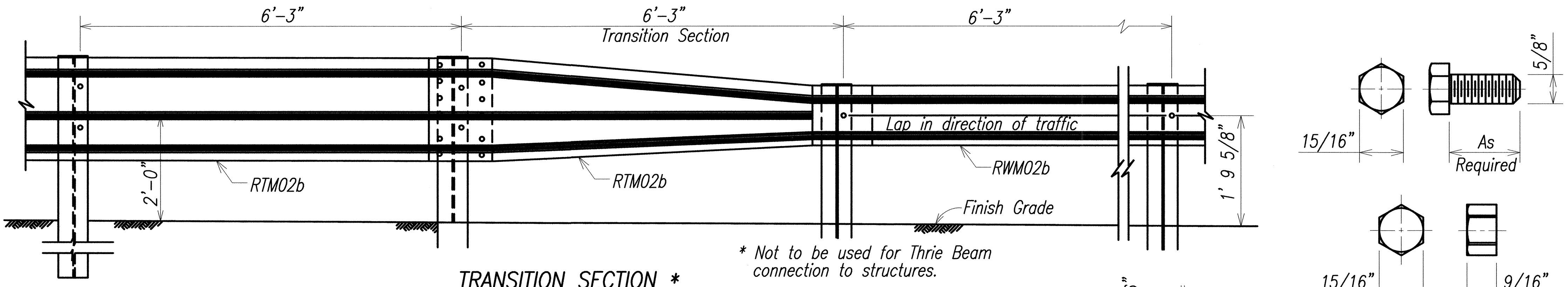
THRIE BEAM INSTALLATION

KUHIO HIGHWAY IMPROVEMENTS
Extension Of Temporary Kapaa Bypass Road
Project No. 56A-03-00

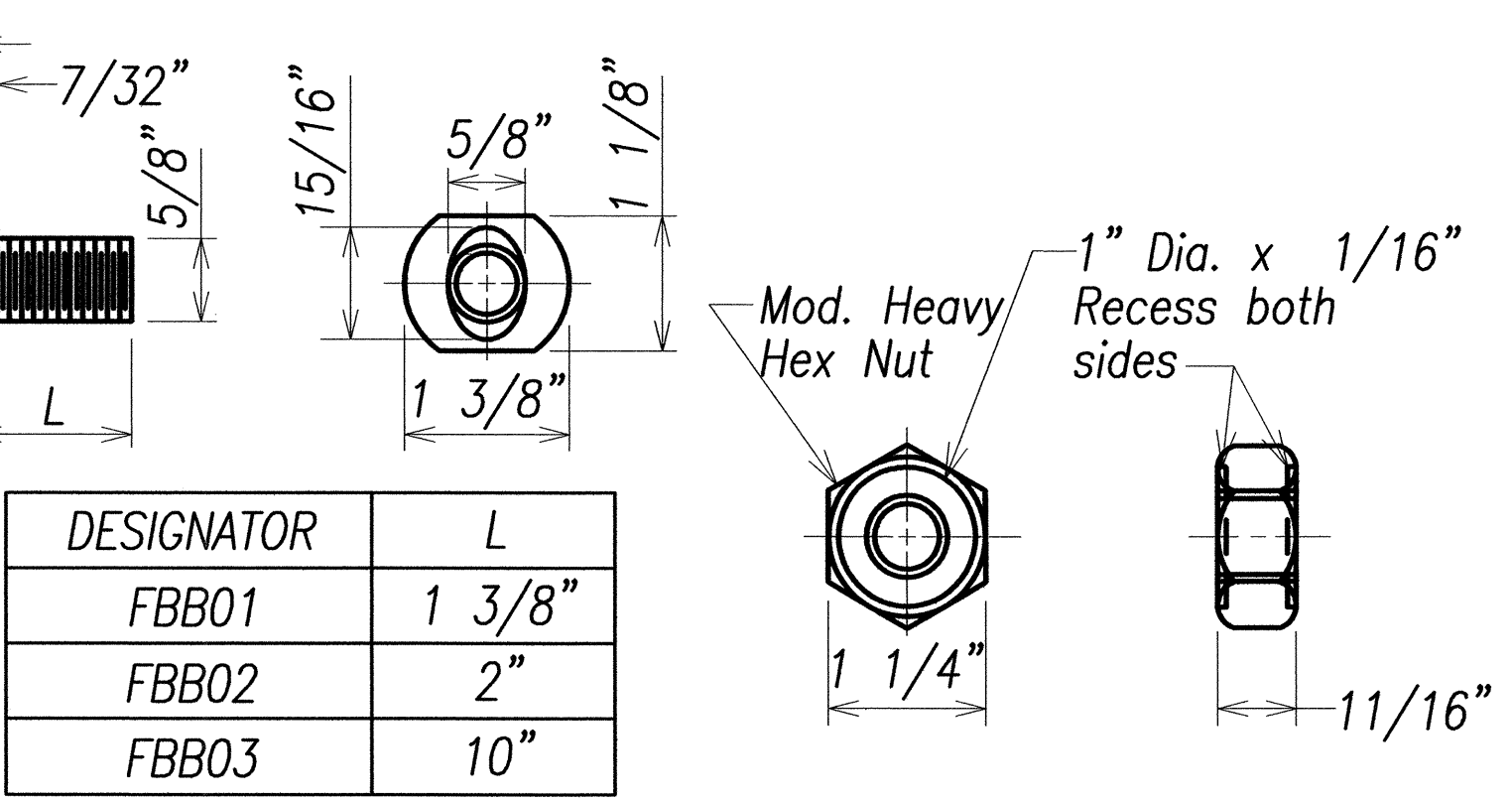
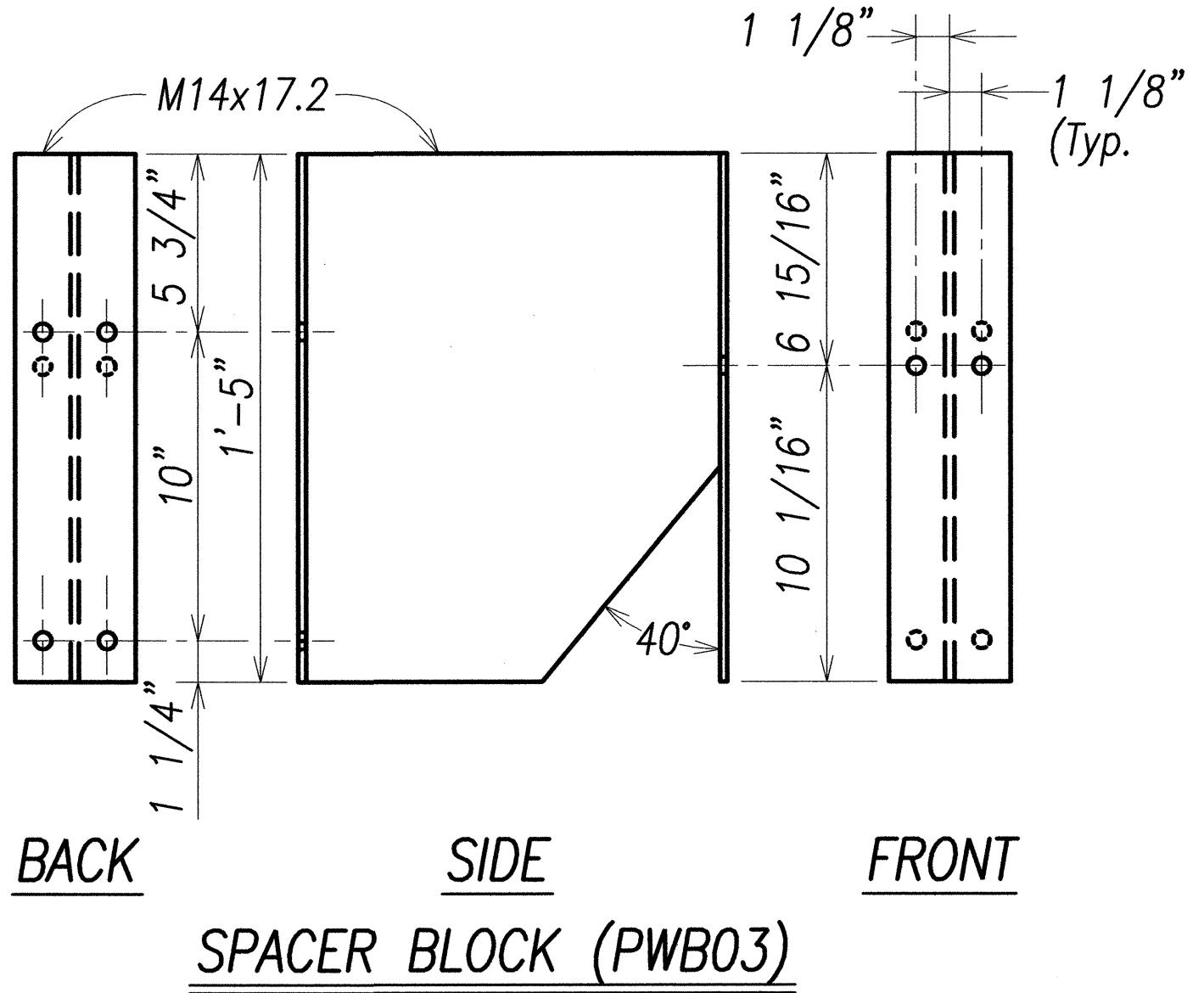
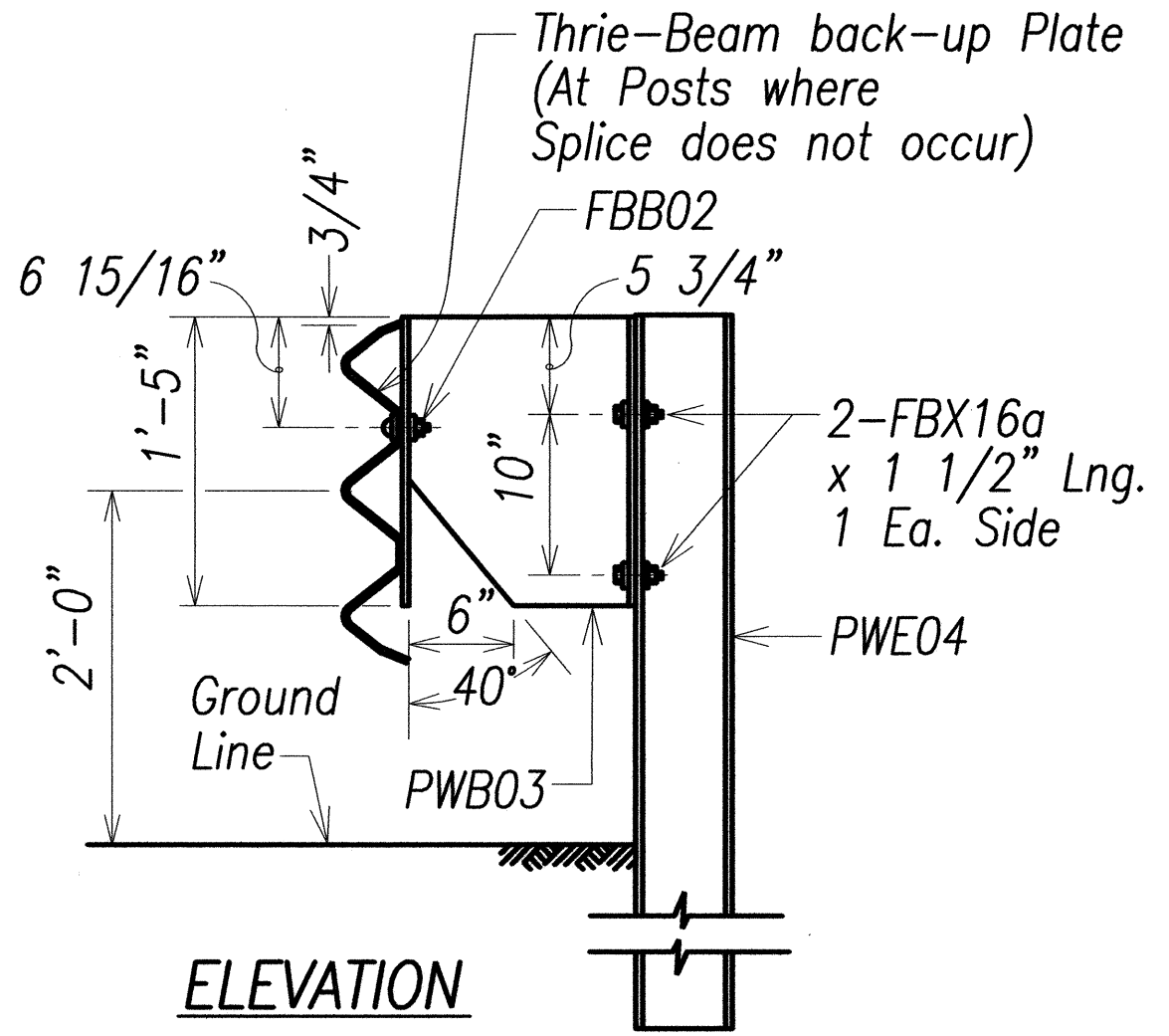
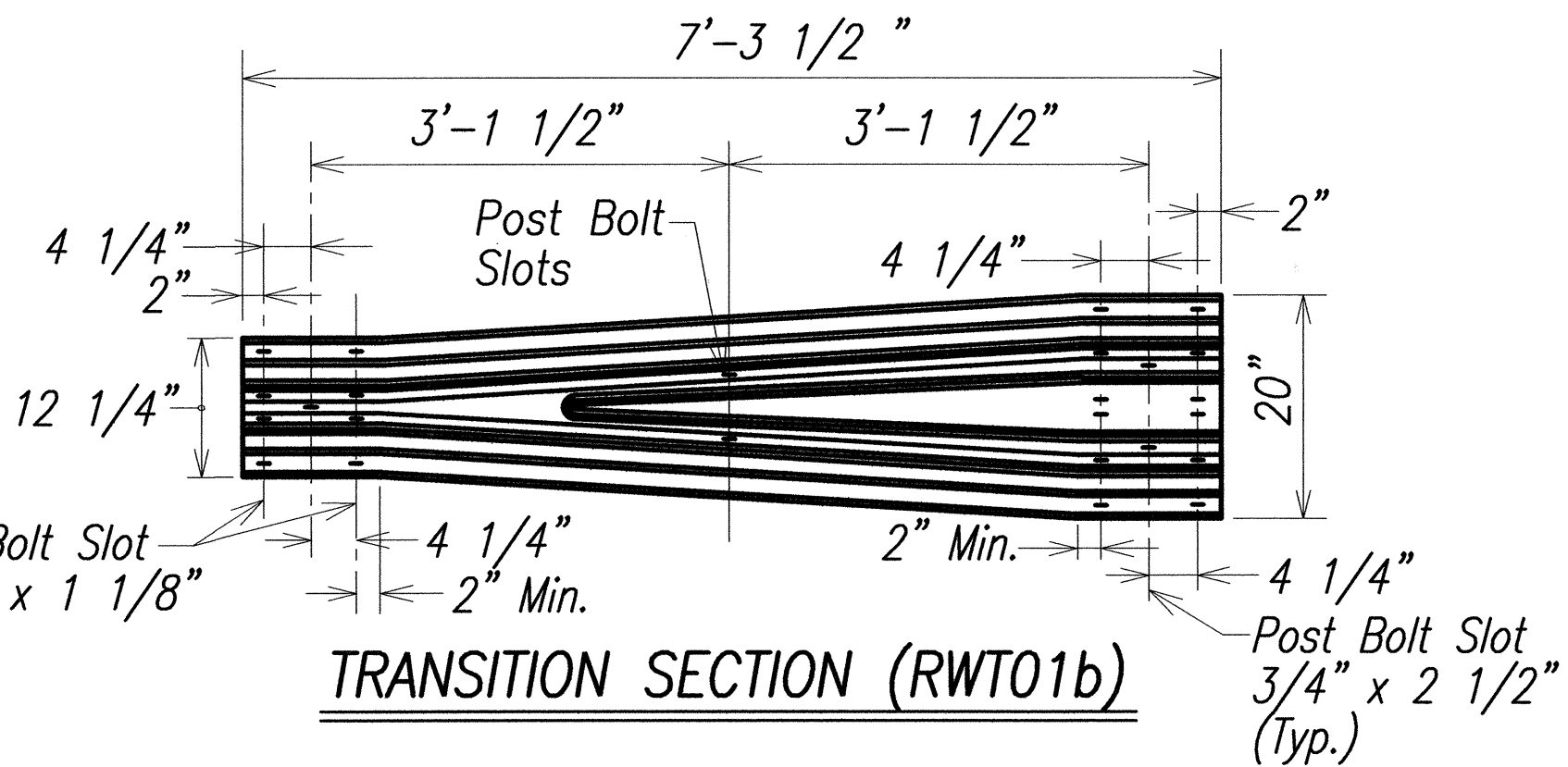
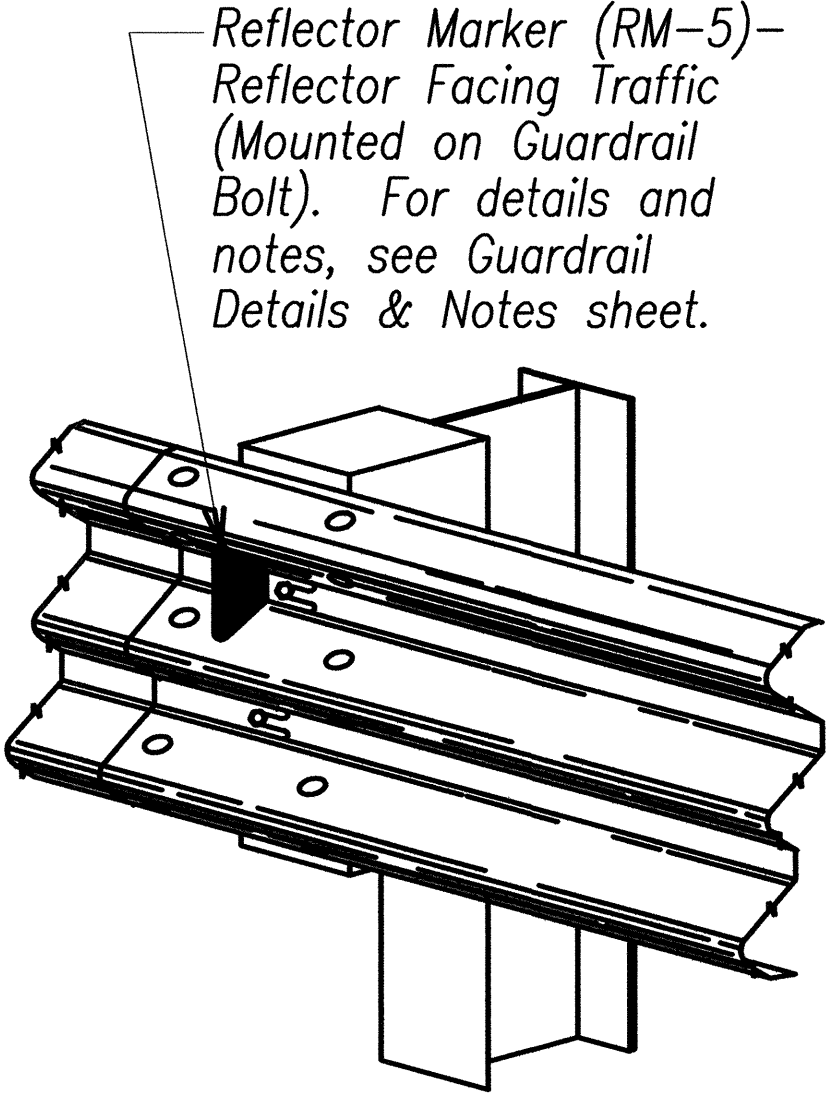
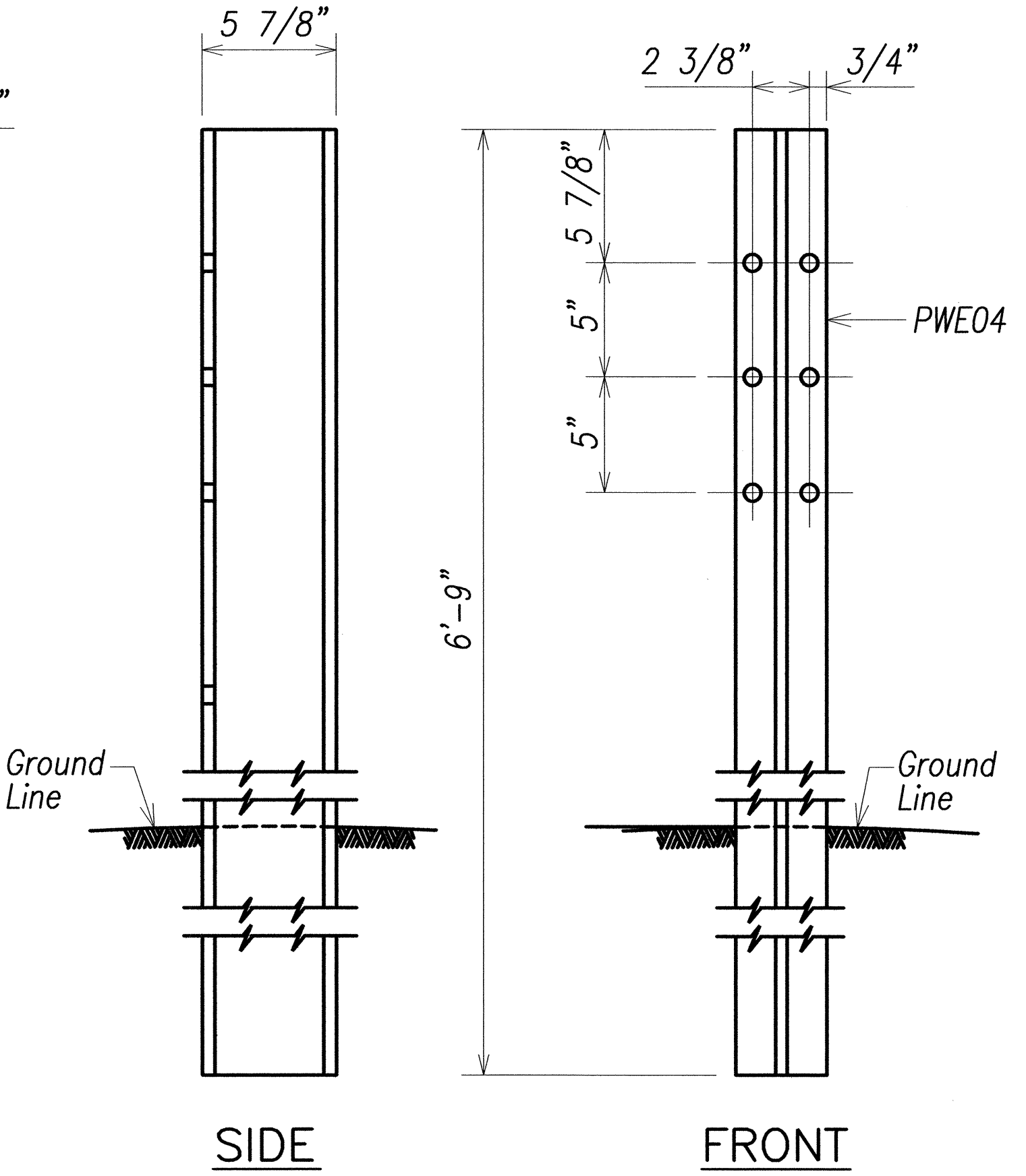
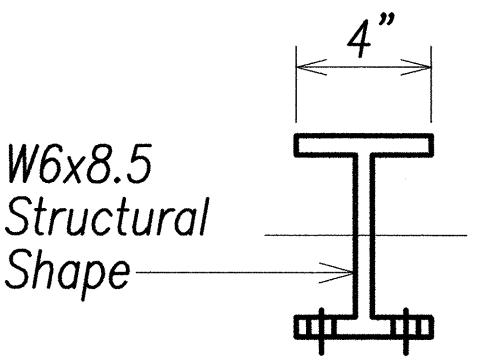
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SHEET No. 5 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	56A-03-00	2004	35	66



NOTE:
All Holes are
3/4" Dia.



DESIGNATOR	L
FBF01	1 3/8"
FBF02	2"
FBF03	10"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRONG POST MODIFIED
THRIE-BEAM GUARDRAIL
KUHIO HIGHWAY IMPROVEMENTS
Extension Of Temporary Kapaa Bypass Road
Project No. 56A-03-00
Scale: No Scale Date: Mar 2004
SHEET No. 6 OF 6 SHEETS

SURVEY PLOTTED BY _____ DATE _____
 DRAWN BY _____
 NOTE BOOK _____
 DESIGNED BY _____
 CHECKED BY _____
 No. _____