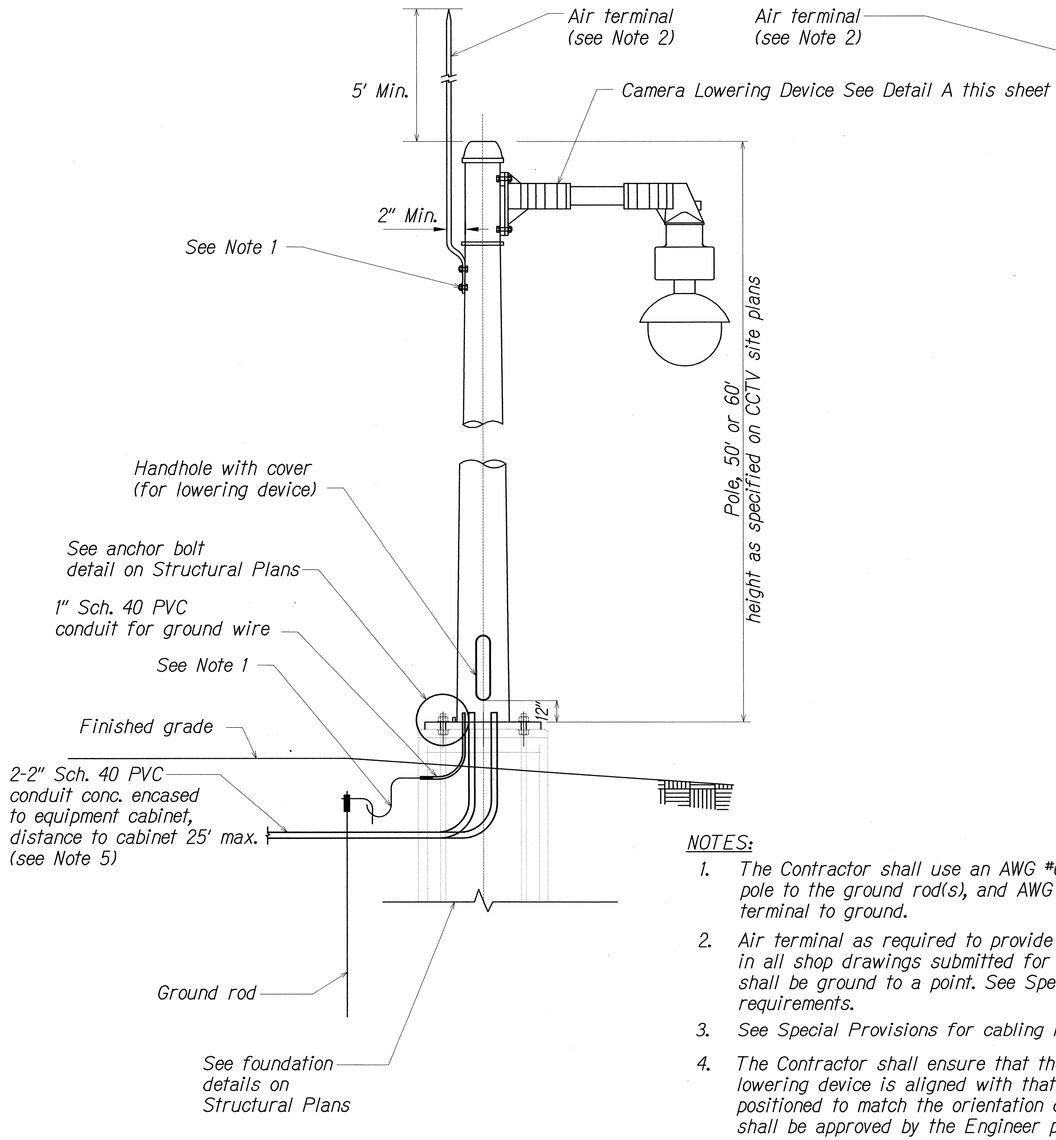
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-0300(138)	2014	25	220

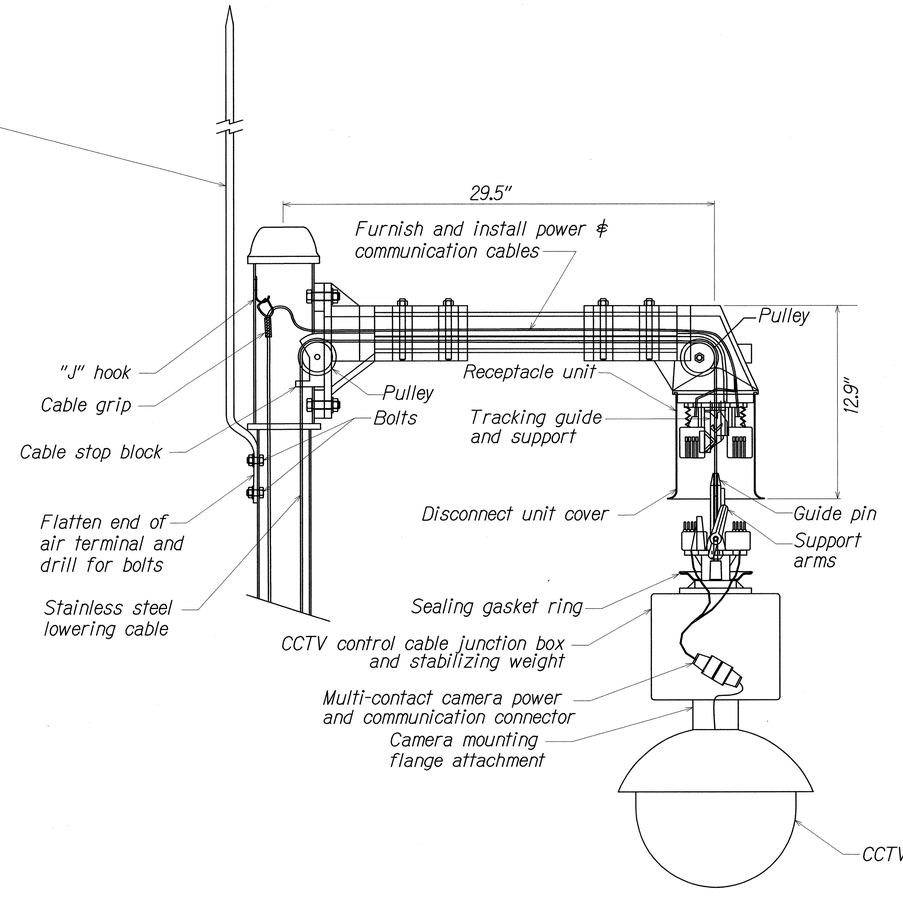


1 CCTV POLE DETAIL

C3.1, C3.2, C3.4-C3.9 C4.1 Not To Scale

NOTES:

1. The Contractor shall use an AWG #6 solid, bare copper wire to bond the pole to the ground rod(s), and AWG #2 solid, bare copper wire from air terminal to ground.
2. Air terminal as required to provide lightning protection shall be included in all shop drawings submitted for approval. The tip of the air terminal shall be ground to a point. See Special Provisions for additional requirements.
3. See Special Provisions for cabling requirements.
4. The Contractor shall ensure that the orientation of the camera lowering device is aligned with that of the bolt circle pattern to be positioned to match the orientation detail on the site plans. This shall be approved by the Engineer prior to installation.
5. Refer to State of Hawaii, Department of Transportation, Highways Division, Standard Plans 2008, TE-36 for trench details.



DETAIL A

CAMERA LOWERING DEVICE AND CCTV CAMERA

Not To Scale

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	"
NOTEBOOK	TRACED BY	"
No.	DESIGNED BY	"
	QUANTITIES BY	"
	CHECKED BY	"

FN:X:\96-46\96-46-27\DWG\C4-1 POLE DETAILS R1.DWG Oct 13, 2014-9:35 AM

NEAL H. KASAMOTO
LICENSED PROFESSIONAL ENGINEER
No. 6931-C
HAWAII, U.S.A.

LICENSE EXPIRES: 4/30/16

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS. STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CCTV POLE DETAILS

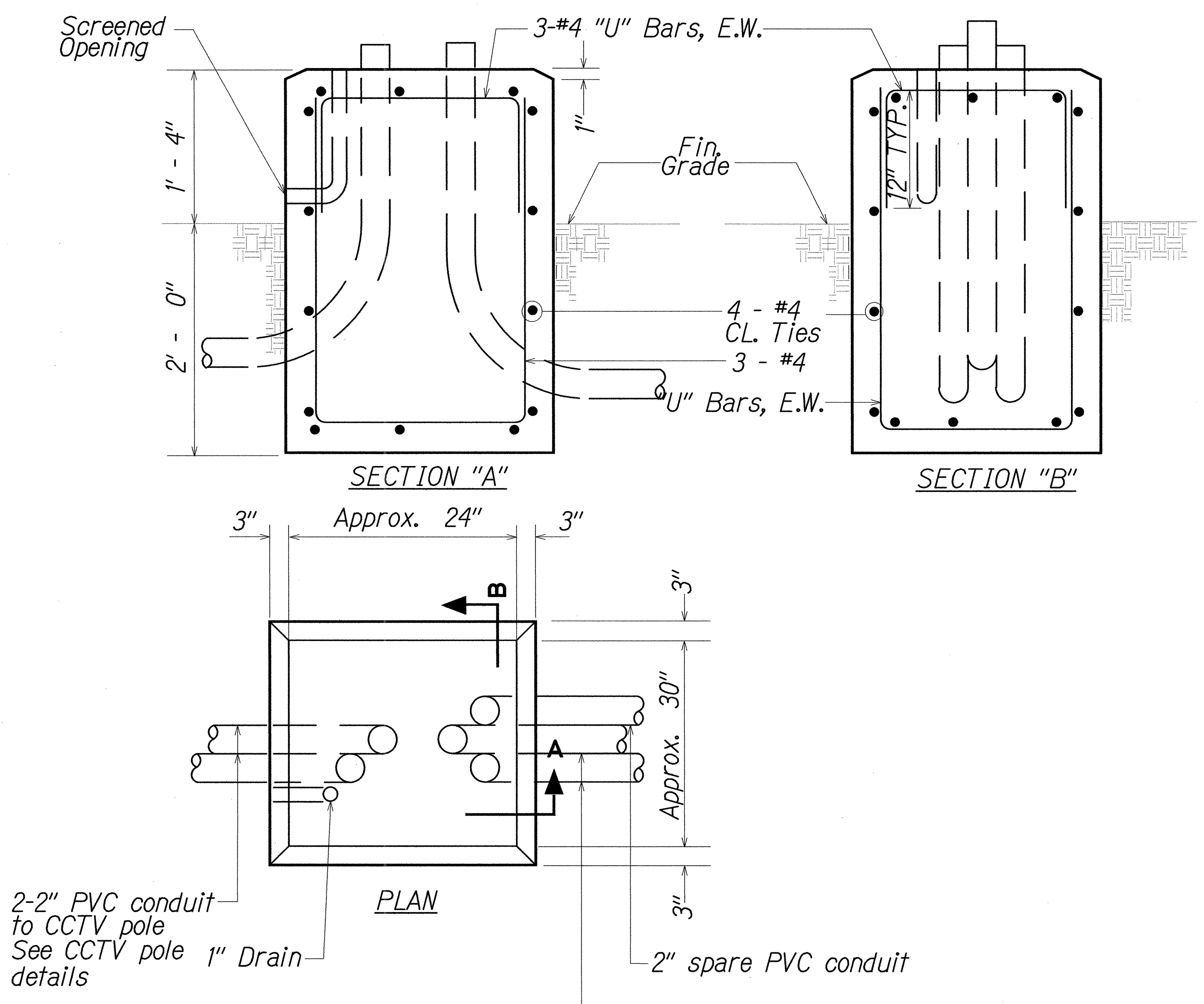
Freeway Management System, Interstate H-1, H-2 & Moanalua Freeway (H-201) Phase IC, Part 2
Federal Aid Project No. IM-0300(138)

Scale: NTS Date: 8/7/14

0 1 2
LINE IS 2 INCHES AT FULL SIZE
(if not 2 inches: scale accordingly)

SHEET No. C4.1 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-0300(138)	2014	26	220

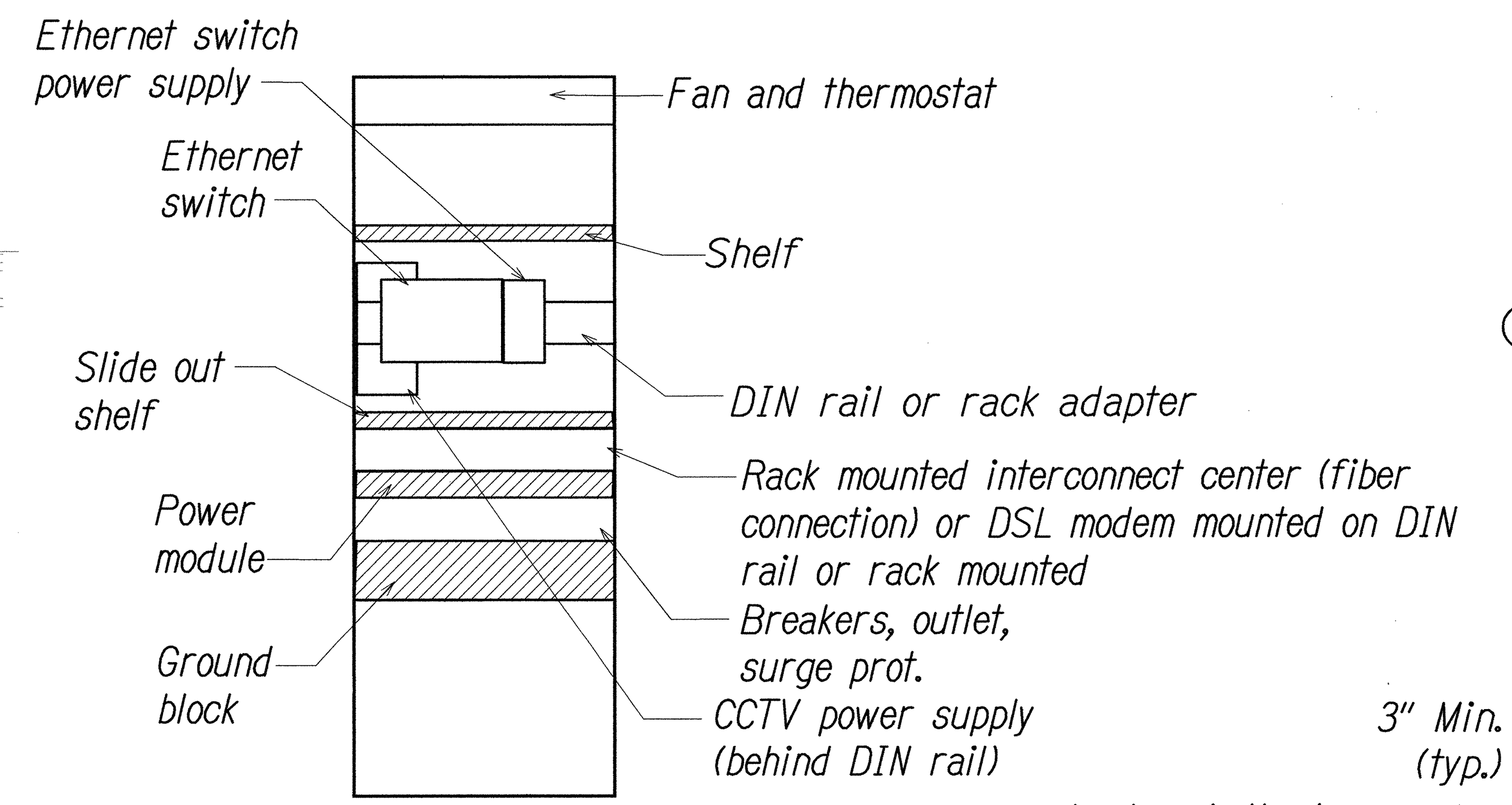


CONCRETE BASE FOR EQUIPMENT CABINET

Not To Scale

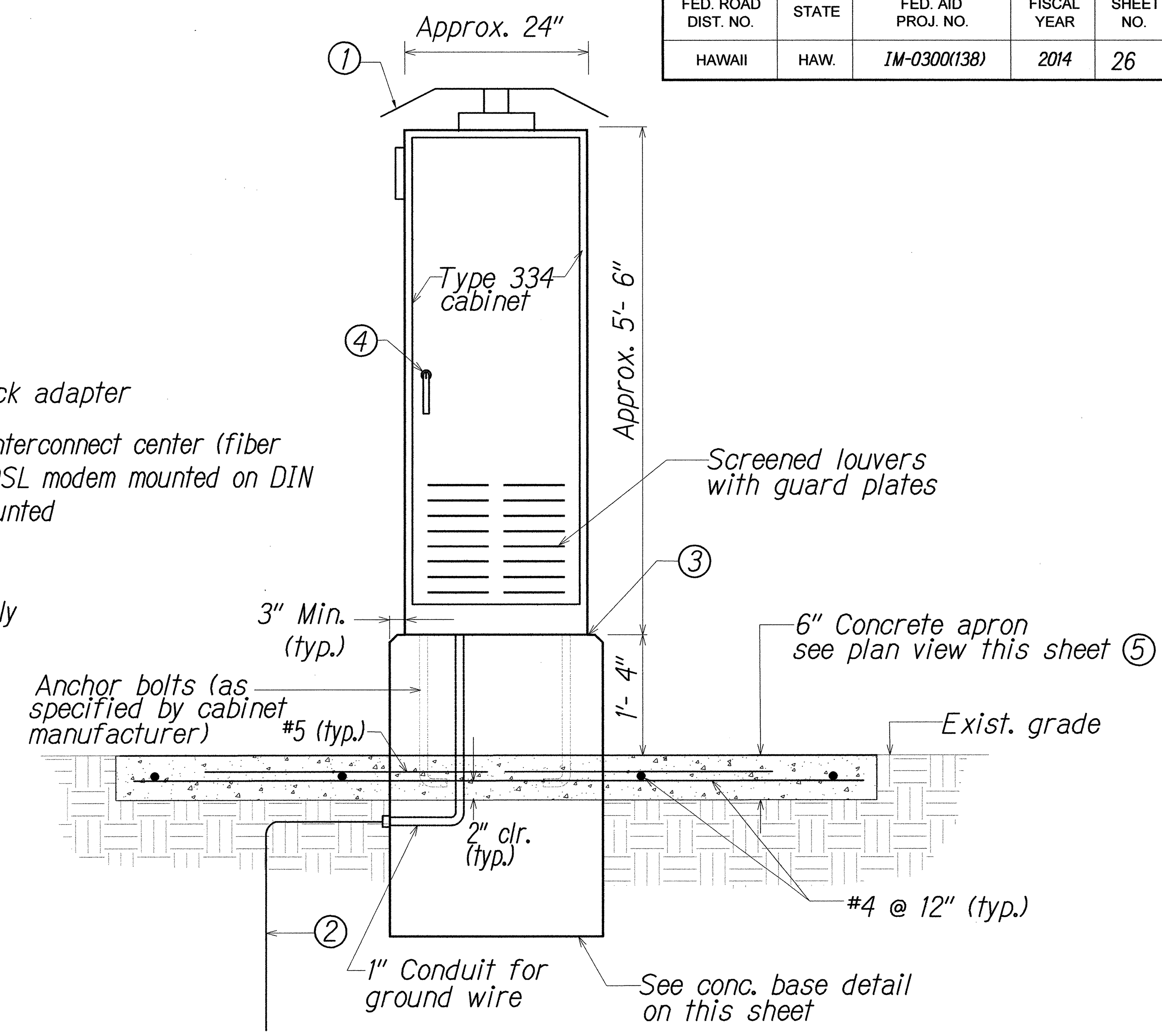
NOTES:

1. Concrete shall be Class "B".
2. Dimensions shall be altered to suit controller cabinet actually furnished.
3. Conduit bends and drain are incidental to concrete base.
4. Refer to cabinet manufacturer's specifications for details of anchor bolts and base setting.
5. All exposed surfaces of concrete base shall have a Class 2, rubbed finish.



CABINET DEVICE LAYOUT DETAIL

Not To Scale

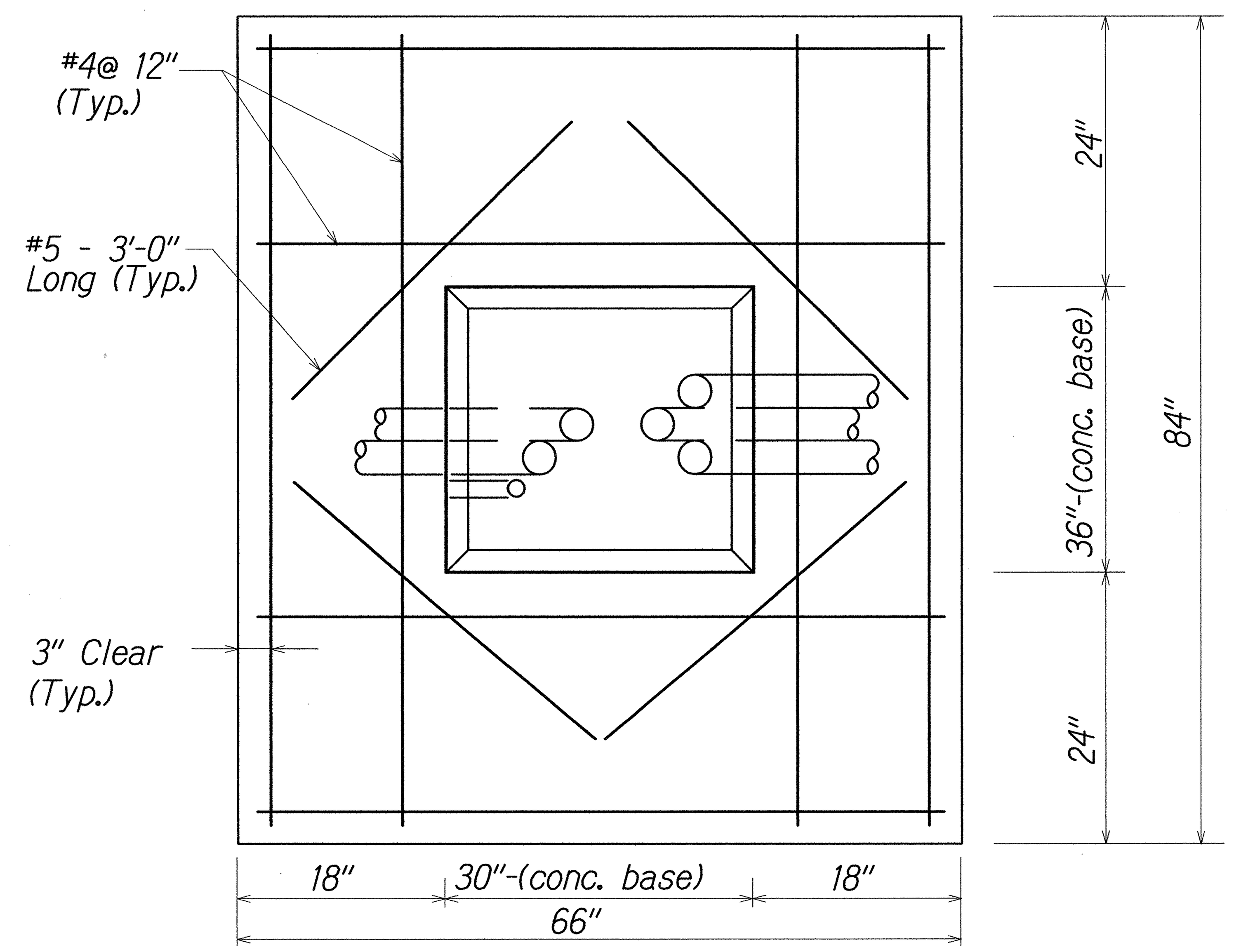


2 EQUIPMENT CABINET

C3.1, C3.2, C3.4-C3.9 C4.2 Not To Scale

NOTES:

1. Sunshields on top and all sides of cabinet.
2. Ground rod, 3/4" dia. x 8' min. if subsurface conditions exist. which prohibit the placement of the ground rod in a vertical position, at the direction of the Engineer, the rod may be driven at an oblique angle not to exceed 45 degrees from vertical or buried in a trench at least 30" deep. connection to ground rod shall be cadwelded.
3. Silicone caulk between cabinet and base and apron and base
4. Door lock on each door
5. Conc. apron shall be Class "B"



PLAN VIEW OF CONCRETE APRON FOR EQUIPMENT CABINET

Not To Scale

NEAL H. KASAMOTO LICENSED PROFESSIONAL ENGINEER No. 6931-C HAWAII, U.S.A.

LICENSE EXPIRES: 4/30/16

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS, STATE OF HAWAII

0 1 2

LINE IS 2 INCHES AT FULL SIZE (if not 2 inches: scale accordingly)

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

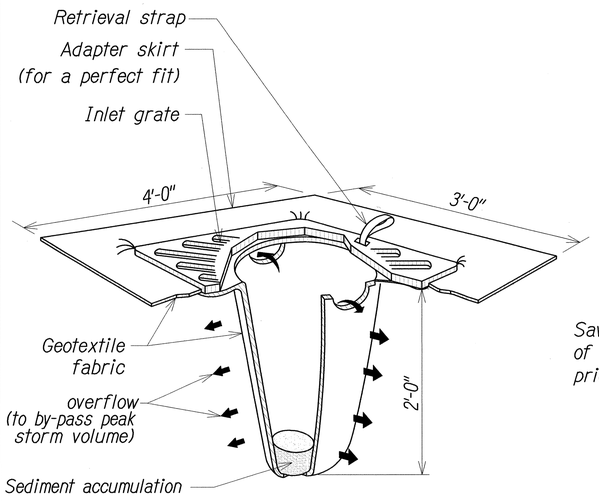
CCTV CABINET DETAILS

Freeway Management System, Interstate H-1, H-2 & Moanalua Freeway (H-201) Phase IC, Part 2
Federal Aid Project No. IM-0300(138)

Scale: NTS Date: 8/7/14

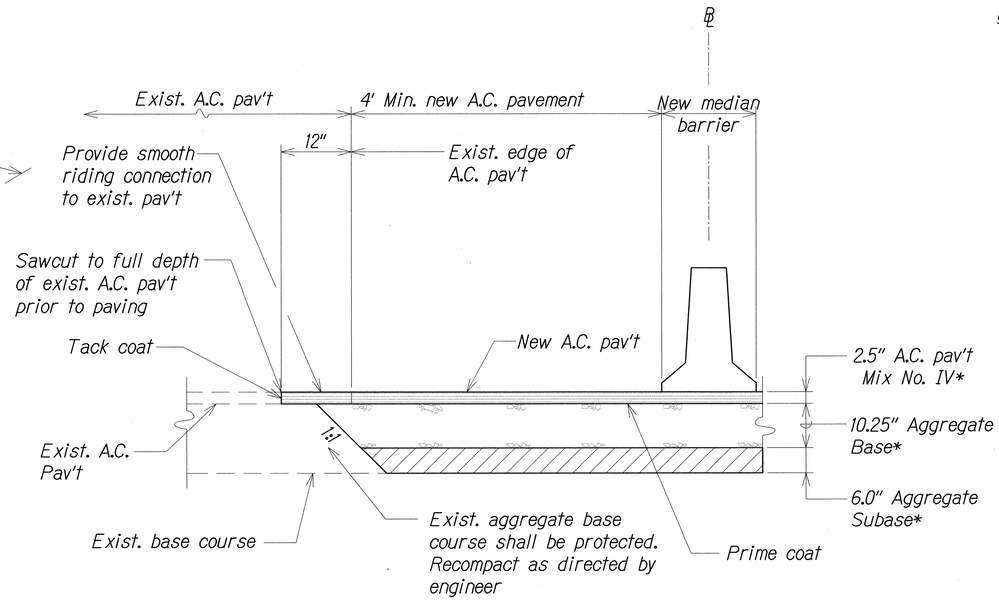
SHEET No. C4.2 OF 6 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-0300(138)	2014	27	220



NOTES:
1. All inlet protection on road shoulders shall be protected from damage by vehicular traffic with Type II barricades with amber flashers.
2. Contractor shall check the condition of the filter at the beginning and ending of each work day and repair/ clean as necessary.

TEMPORARY SEDIMENT BARRIER AT DRAIN INLET
Not To Scale



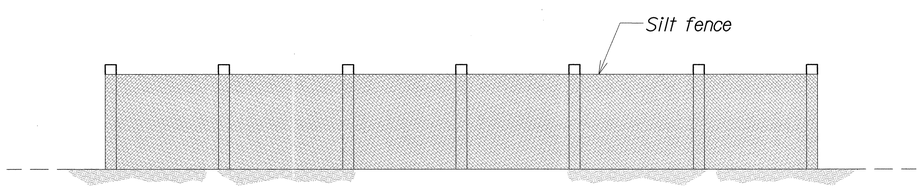
* Min. thickness or replace to exist. thickness if greater

A.C. PAVEMENT RESTORATION DETAIL AT MEDIAN BARRIER
Not To Scale

EROSION CONTROL/BEST MANAGEMENT PRACTICES NOTES:

1. Erosion control measures to be installed prior to start of work, and be maintained until completion of project.
2. Contractor to periodically inspect catch basin filter especially during heavy rainfall.
3. Remove filter at times of above normal rainfall events and replace them when the event has passed.
4. The final lift of each day's work shall be compacted to prevent erosion of fill material.
5. Good housekeeping shall be utilized to ensure protection of roadways from mud, dirt, and debris.
6. The Contractor shall ensure that all tires of construction vehicles are sufficiently cleaned off so that dirt or debris is not tracked off the construction site. Washing off tires with water will not be acceptable unless the runoff is contained and does not enter the storm drain system.
7. Any dirt or grassed area disturbed shall be restored by seeded hydromulch.
8. At the end of construction operations and at the completion of the project, Contractor shall inspect all catch basin, drain inlet and drain manhole surrounding the project site. Any accumulated sediment and debris found in storm drain structures shall be removed. Please note that flushing into the drain structures is prohibited.
9. Contractor shall submit proposed storm drain and sediment barrier for acceptance prior to installation.

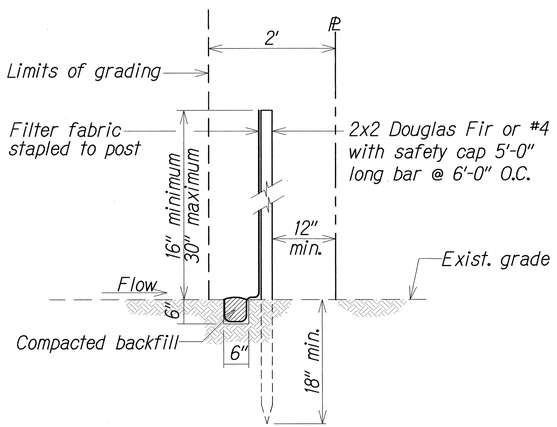
NOTE:
Contractor to install at all existing catch basins or drain inlets adjacent to and immediately down stream of all work areas.



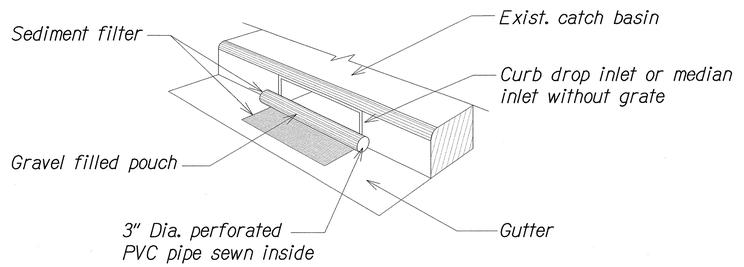
ELEVATION

NOTES:
Filter fabric shall be a pervious sheet of polypropylene, nylon, polyester or ethylene yarn with UV inhibitors and stabilizers.

SILT FENCE DETAIL
Not To Scale



SECTION



TEMPORARY STORM DRAIN PROTECTION
Not To Scale

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

FN:\96-46\96-46-27.DWG\C4.3 EROSION CONTROL 82.DWG Oct 13, 2014-9:38 AM

0 1 2
LINE IS 2 INCHES AT FULL SIZE
(if not 2 inches: scale accordingly)

NEAL H. KASAMOTO
LICENSED PROFESSIONAL ENGINEER
No. 6931-C
HAWAII, U.S.A.
LICENSE EXPIRES: 4/30/16
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS, STATE OF HAWAII

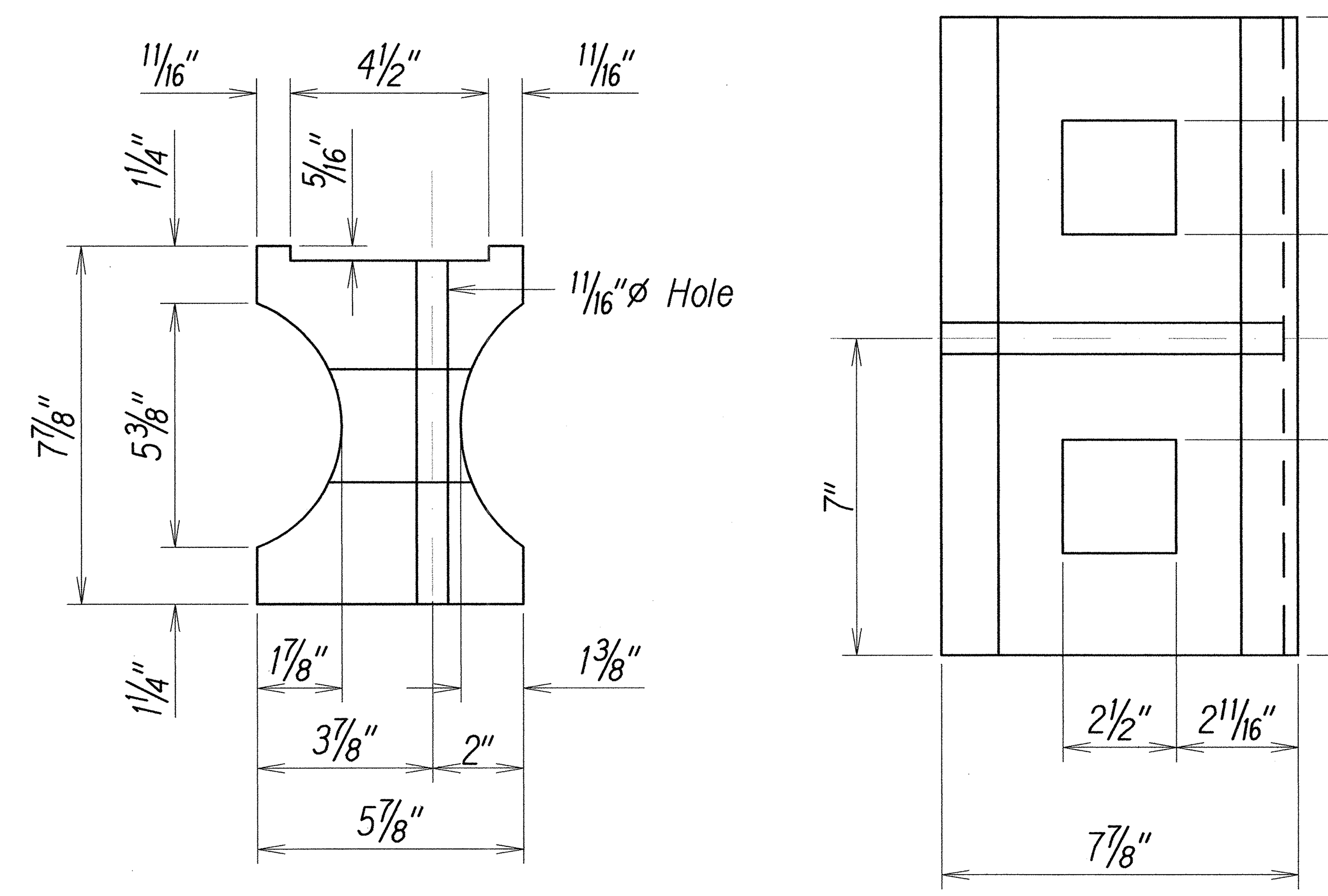
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

EROSION CONTROL DETAILS

Freeway Management System, Interstate H-1, H-2 & Moanalua Freeway (H-201)
Phase IC, Part 2
Federal Aid Project No. IM-0300(138)

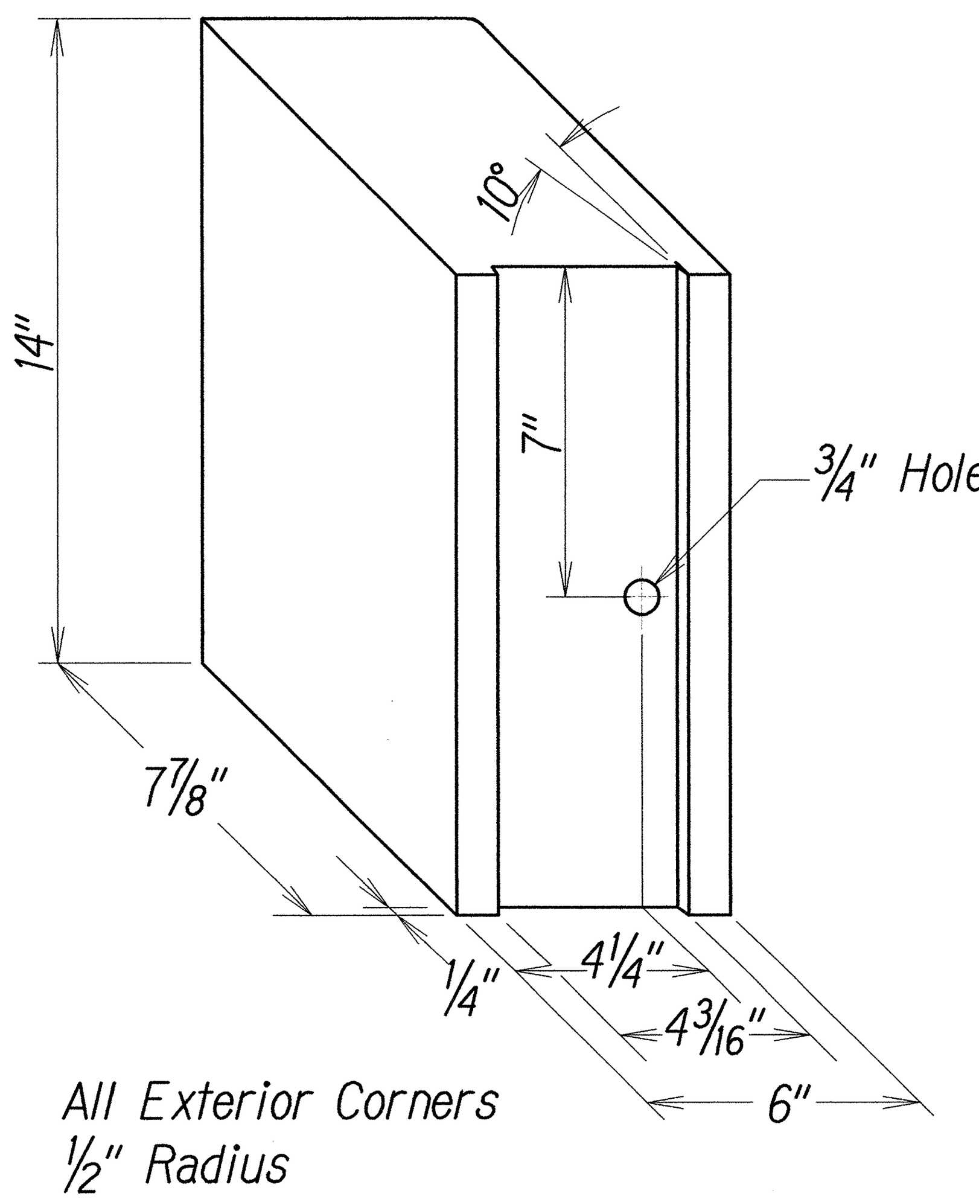
Scale: NTS Date: 8/7/14

SHEET No. C4.3 OF 6 SHEETS

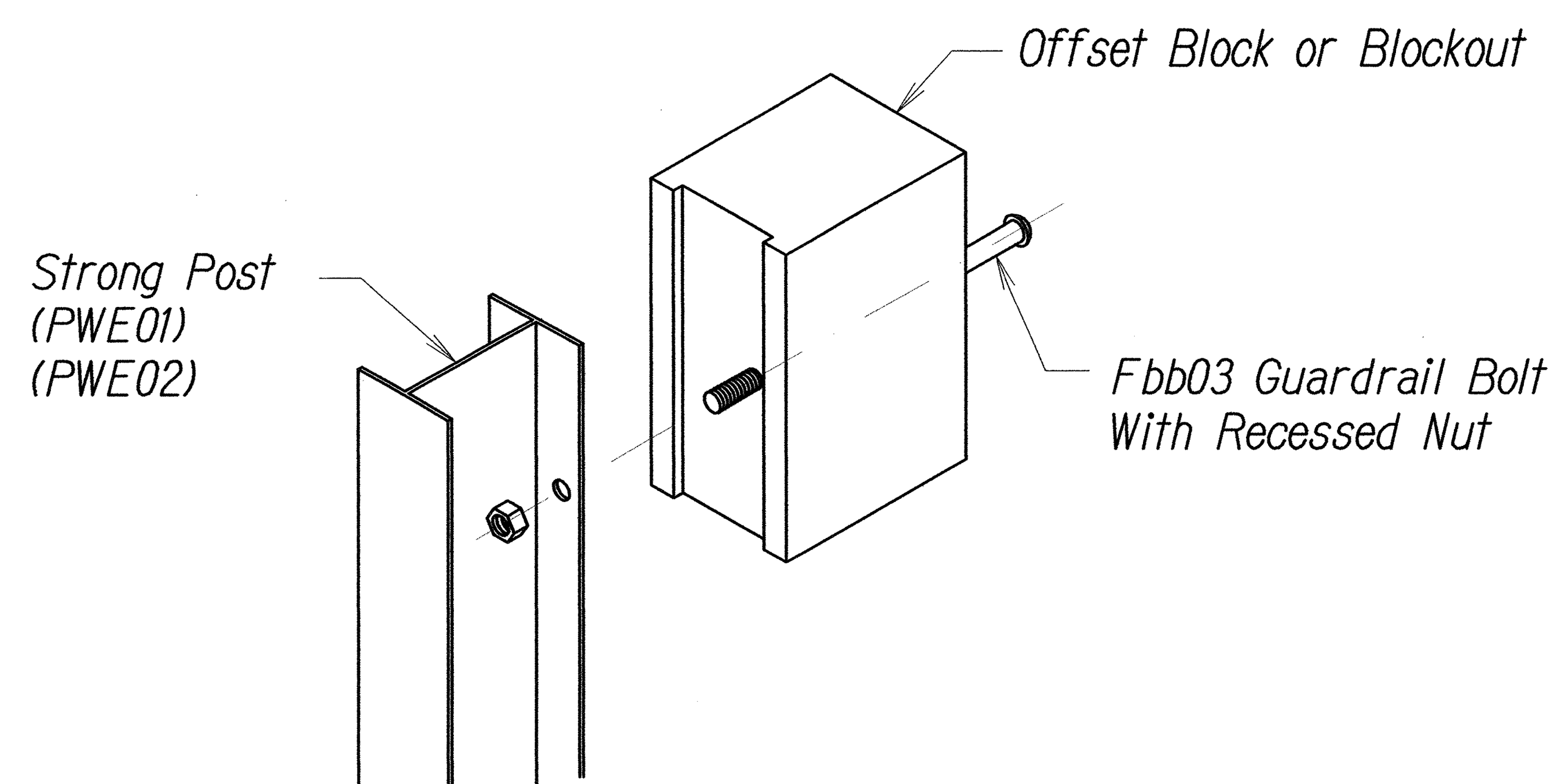


TOP SIDE

RECYCLED PLASTIC BLOCKOUT (TYPE I)



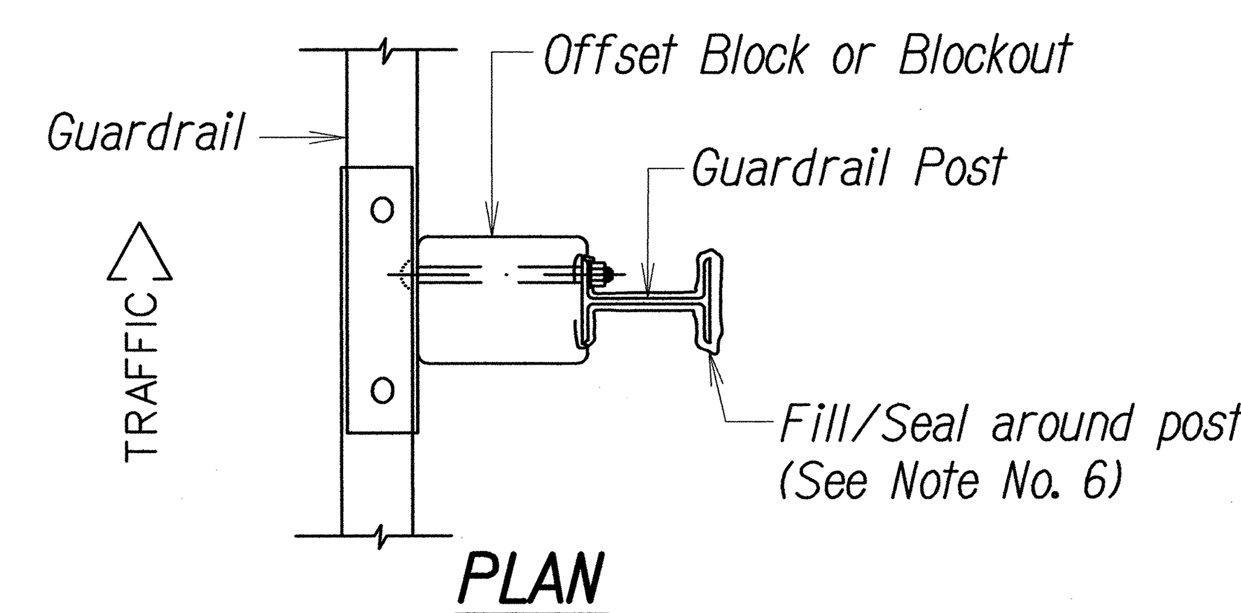
RECYCLED POLYETHYLENE OFFSET BLOCK (TYPE II)



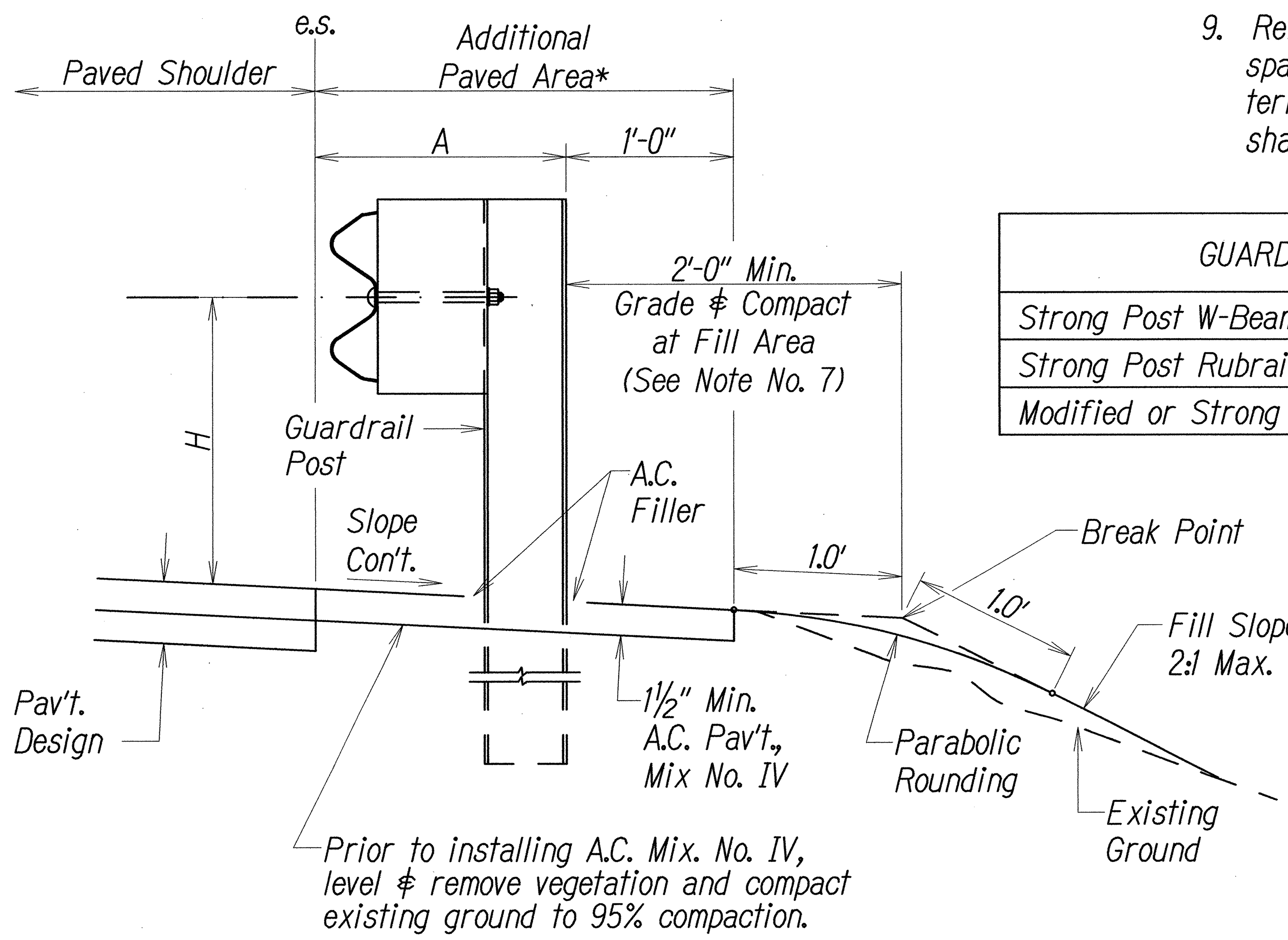
EXPLODED VIEW

(RAIL AND WASHER NOT SHOWN)

STEEL POST AND BLOCK DETAIL

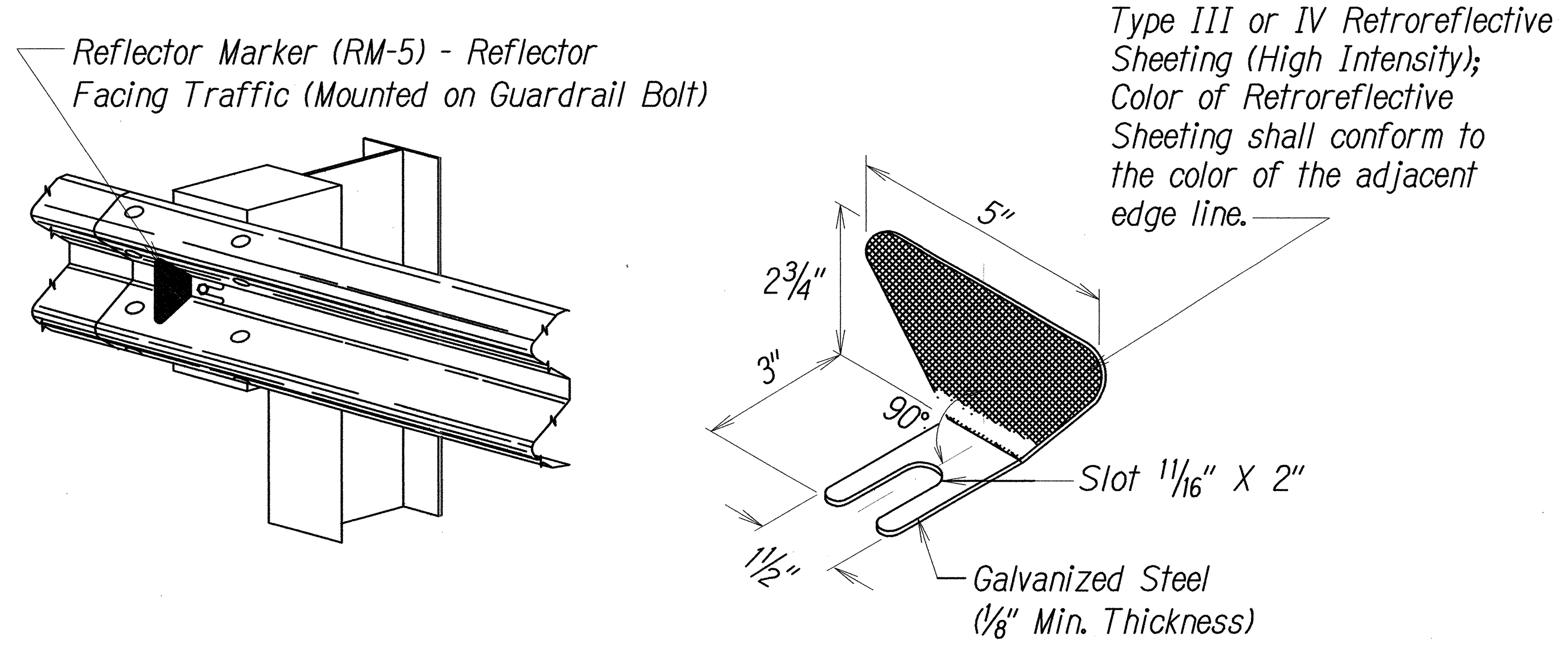


PLAN



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 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. RM-5's shall not be installed on terminal sections. Furnishing and installing of each RM-5 shall be considered incidental to the adjacent guardrail system.

GUARDRAIL TYPE	DIMENSION	
	H	A
Strong Post W-Beam	1'-9⅝"	1'-6"
Strong Post Rubrail (W-Beam)	2'-0"	1'-6"
Modified or Strong Post Thrie Beam	2'-0"	2'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

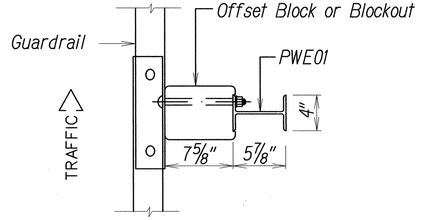
GUARDRAIL DETAILS & NOTES

Freeway Management System, Interstate H-1, H-2 & Moanalua Freeway (H-201) Phase IC, Part 2

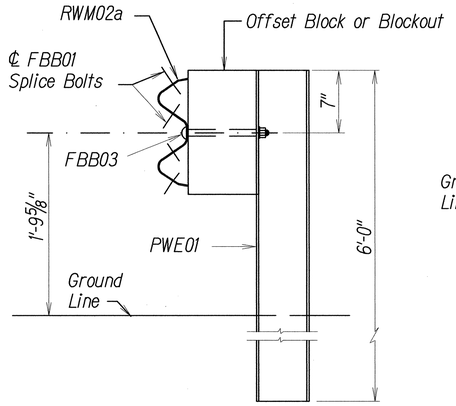
Federal Aid Project No. IM-0300(138)

Scale: NTS Date: 8/7/14

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-0300(138)	2014	29	220

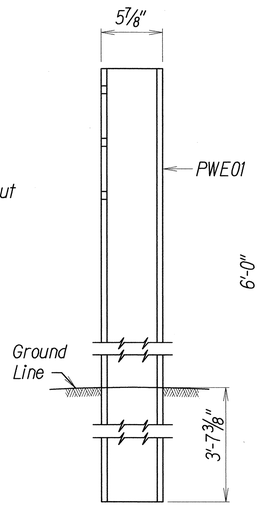


PLAN

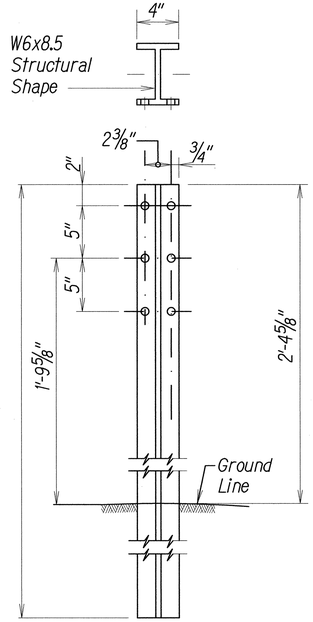


ELEVATION

NOTE:
All Holes are 3/4" Dia.

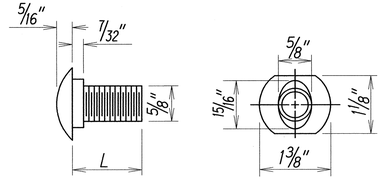


SIDE

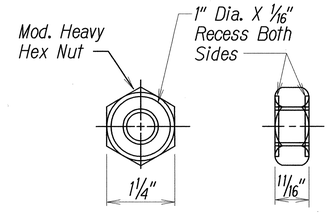


FRONT

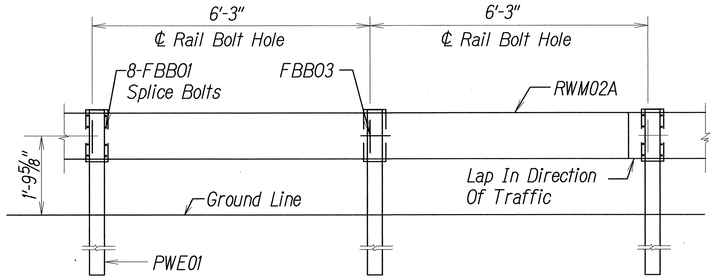
W-BEAM STRONG POST (PWE01)



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



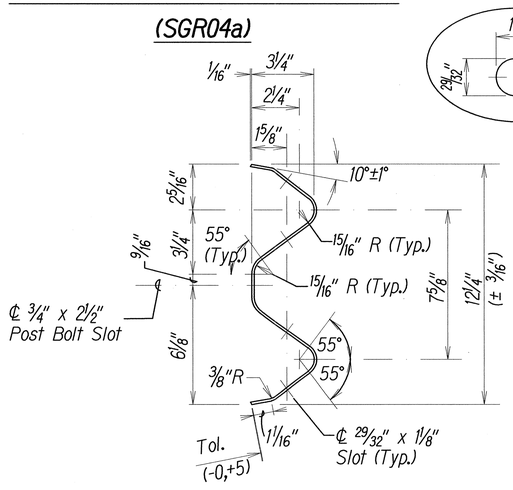
GUARDRAIL BOLTS AND RECESSED NUT



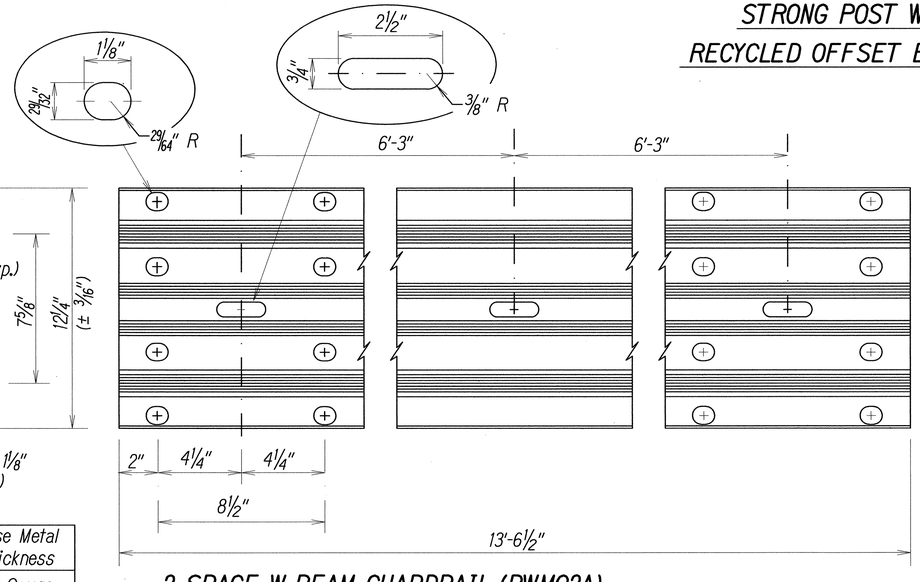
ELEVATION

STRONG POST W-BEAM GUARDRAIL

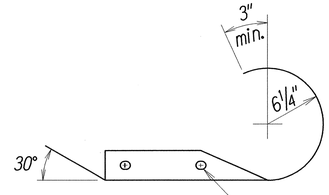
(SGR04a)



Designator	Base Metal Thickness
RWM02a	12 Gauge

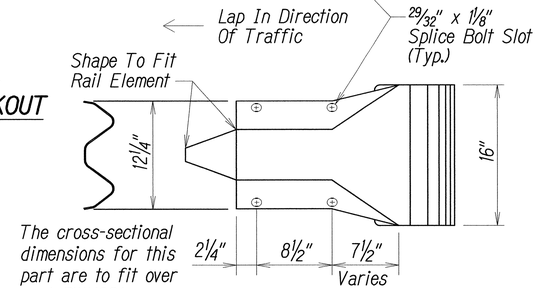


2 SPACE W-BEAM GUARDRAIL (RWM02A)



ELEVATION

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



Designator	Base Metal Thickness
RWE03a	12 Gauge

W-BEAM END SECTION (ROUNDED RWE03A)

NEAL H. KASAMOTO
LICENSED PROFESSIONAL ENGINEER
No. 6931-C
HAWAII, U.S.A.
LICENSE EXPIRES: 4/30/16

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS, STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GUARDRAIL DETAILS & NOTES

Freeway Management System, Interstate H-1, H-2 & Moanalua Freeway (H-201) Phase IC, Part 2
Federal Aid Project No. IM-0300(138)

Scale: NTS Date: 8/7/14

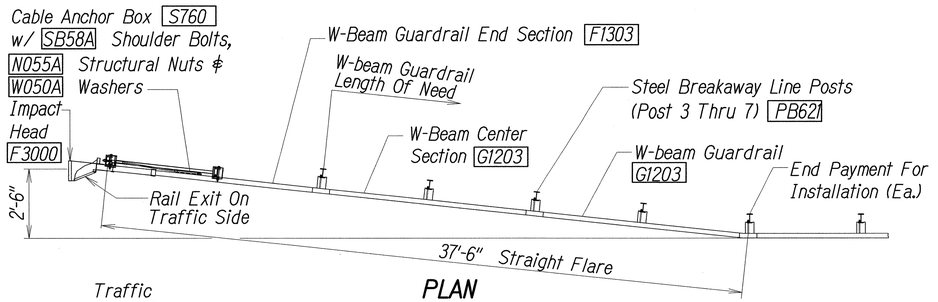
SHEET No. C4.5 OF 6 SHEETS

0 1 2
LINE IS 2 INCHES AT FULL SIZE
(if not 2 inches: scale accordingly)

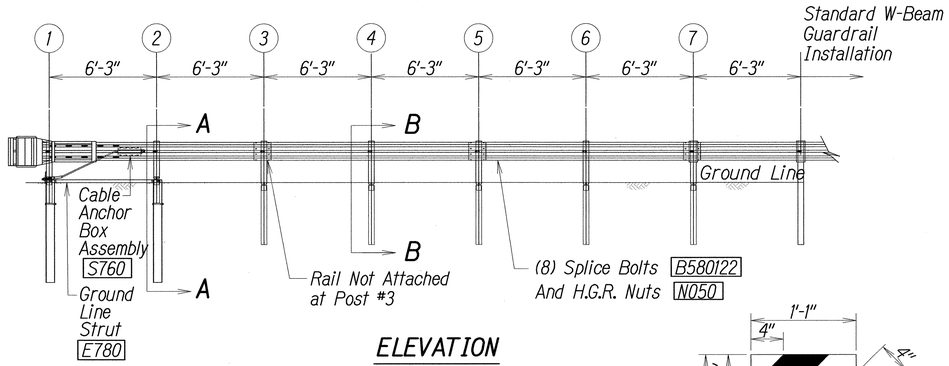
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTEBOOK	REVISED BY	
No.	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

D:\X\96-46\96-46.27\DWG\C4.5 GUARDRAIL DETAILS 2.DWG Oct 13, 2014-9:40 AM

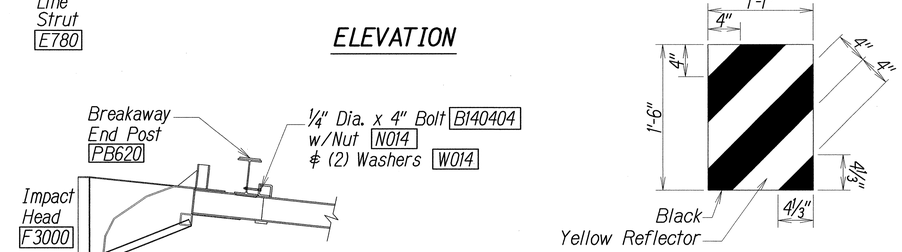
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-0300(138)	2014	30	220



PLAN



ELEVATION



IMPACT HEAD CONNECTING DETAIL

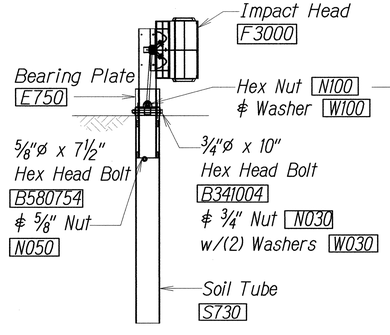
IHRM(R)
IMPACT HEAD REFLECTOR MARKER INSERT DETAIL

GENERAL NOTES

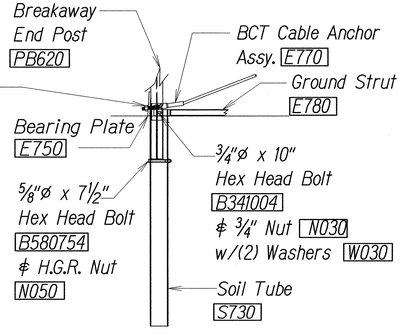
1. Breakaway Steel Posts are required with the Terminal.
2. All bolts, nuts, cable assemblies, cable anchors and bearing plates shall be galvanized.
3. The Soil Tubes shall not protrude more than 4" above ground (measured along a 5' cord). Site grading may be necessary to meet this requirement.
4. The 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 ½" 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 (I) 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.

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 (I)
		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

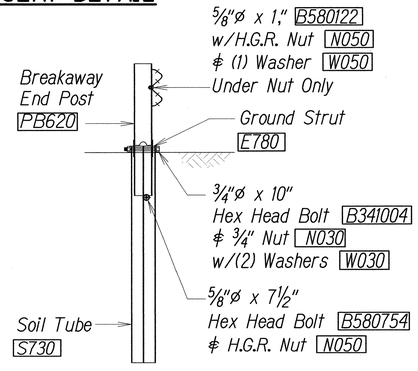
Foundation Tube Options For Posts 1 & 2
*6'-0" Split Foundation Tubes S730
*6'-0" Solid Foundation Tubes E731
*5'-0" Foundation Tubes S735 W/soil Plates Sp600
*4'-6" Foundation Tubes E735 W/soil Plates Sp600



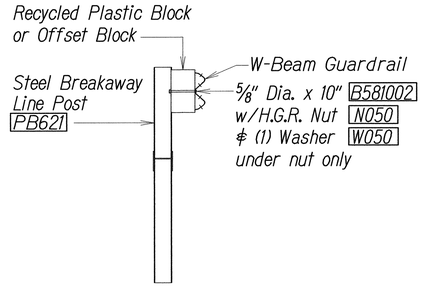
FRONT VIEW OF POST 1



PARTIAL VIEW OF POST 1



SECTION A - A
At Post #2



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

LINE IS 2 INCHES AT FULL SIZE (if not 2 inches: scale accordingly)

NEAL H. KASAMOTO
LICENSED PROFESSIONAL ENGINEER
No. 6931-C
HAWAII, U.S.A.
LICENSE EXPIRES: 4/30/16

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION AND CONSTRUCTION OF THIS PROJECT WILL BE UNDER MY OBSERVATION AS DEFINED IN HAR TITLE 16, CHAPTER 115, RULES OF THE BOARD OF PROFESSIONAL ENGINEERS, ARCHITECTS AND SURVEYORS. STATE OF HAWAII

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

FLARED
ENERGY ABSORBING TERMINAL

Freeway Management System, Interstate H-1, H-2 & Moanalua Freeway (H-201) Phase IC, Part 2
Federal Aid Project No. IM-0300(138)

Scale: NTS Date: 8/7/14

SHEET No. C4.6 OF 6 SHEETS

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

FN:X:\SF-461\SF-46.27\DWG\C4.6 GUARDRAIL DETAILS 3 - FLEA1350.DWG Oct 13, 2014-8:41 AM