DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	127	186

GENERAL NOTES

1. All materials shall conform to the drawings, Hawaii Standard Specifications for Road, Bridge and Public Works Construction (2005 Edition) and Special Provisions for Federal Aid Project No. NH-0300(160) Freeway Management System Interstate H-1 Phase 2.
2. The Contractor shall verify the location of all existing utility lines and notify the respective owners before commencing with work. See Civil drawings for additional information.
3. Standard detail drawings refer to structures in general except for modifications as may be required for special conditions. For such modifications refer to corresponding detailed drawings.
4. The Contractor shall provide all measures necessary to protect the structure during construction. Such measures shall include, but not be limited to, bracing, shoring for loads due to construction be equipment, winds, seismic, etc.
5. The Contractor shall be solely responsible for all excavation and dewatering procedures including lagging, shoring and protection of streets and utilities, including treatment and discharge of pumped water.
6. The Contractor shall be solely responsible for coordinating the work of all trades and shall check all dimensions. All discrepancies shall be called to the attention of the Engineer and be resolved before proceeding with the work.
7. Shop drawings required by the standard specifications and special provisions shall be submitted to the Engineer for review prior to fabrication or ordering of materials. Shop drawings shall not be reproduction of contract drawings.
8. Notes and details on drawings shall take precedence over General Notes unless stricter requirements are noted in General Notes. Special provisions shall take precedence over Standard Specifications.
9. Except as otherwise noted, all vertical dimensions are measured plumb.
10. Variable Message Sign shall not exceed 6,000 lbs or be greater than 31'-0" x 8'-6" in size.
11. Design Criteria

    A. Codes:
    AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals, 2015, 1st Edition and AASHTO LRFD Bridge Design Specifications, 6th Edition, 2012

    Design Criteria for Bridges and Structures, August 8 2014 State of Hawaii Department of Transportation Highways Division w/ changes dated January 9, 2018

    B. Design Live Loads:
    Walkway Maximum Uniform Load = 100 psf
    Walkway Maximum Concentrated Load = 300 lbs
    Walkway Maximum Total Load = 900 lbs

    C. Seismic Design Category: D

    D. Wind:

Wind Design Properties			
Location	Pole Ht (Ft)	K_{ZT}	V_{ULT} (Mph)
Kunia West CCTV	50	1.25	145
Kualakai CCTV	50	1.25	145
Palailai CCTV	50	1.20	145
Kualakai VMS	≈30	1.25	145
MAC and Speed Reader Pole Location 3	25	1.20	145
MAC and Speed Reader Pole Location 4	25	1.20	145

    E. Fatigue:
    Importance Factor, IF, shall be based on Fatigue Category I.

    VMS Structures shall be designed for a truck induced gust based on a truck speed of 20 mph over posted speed limit

FOUNDATION NOTES

1. Foundation Design is based on Geotechnical report by Geolabs, Inc., dated June 9 2018.
2. Contractor shall provide for design and installation of all cribbing, sheathing, and shoring necessary to safely retain excavations and earth banks.
3. All excavations shall be properly backfilled. Do not place backfill before concrete has attained full design strength.
4. Contractor shall submit drilled shaft construction installation procedure to Engineer for review.

STRUCTURAL STEEL

1. All structural steel shall be detailed, fabricated and erected in accordance with the Specifications.
2. Structure Materials shall be as follows:

VMS Monotube	ASTM A53 Gr B
Steel Plates	AASHTO M270 (ASTM A572, Grade 50)
Bolts (except Anchor Bolts)	AASHTO M164 (ASTM F1852 and ASTM A325, Type 1)
Anchor Bolts	AASHTO M-314, Grade 55 ksi (ASTM F1554, Grade 55 ksi)
Nuts for Anchor Bolts	AASHTO M292 (ASTM A563, Grade A)
Washers for Anchor Bolts	AASHTO M293 (ASTM F436, Type 1)
Stainless Steel Screws	AISI, Type 316
Wide Flange	ASTM A992, Grade 50
Hollow Structural Sections (HSSx)	ASTM A500, Grade B

3. All welding shall conform to American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (current edition). Electrodes shall be E70.
4. All Steel items shall be galvanized as follows:

All Nuts, Bolts and Washers	AASHTO M232 (ASTM F2329)
All other steel items (including Pole & Monotube Arm)	AASHTO M111 (ASTM A123)

5. Except for Anchor Bolts, all bolt hole diameters shall be equal to the bolt diameter plus 1/16 ", prior to galvanizing. Hole diameters for Anchor Bolts shall not exceed the bolt diameter plus 1/4 ".
6. Variable message signs attached to the Monotube shall be located as shown on the construction documents.
7. The Pole shall be installed plumb vertically and level horizontally. Arm Camber shall be accounted for when installing walkways and variable message signs.
8. All Variable Message Signs shall be installed vertically.
9. Monotube Arm & Poles shall be fabricated from round pipe.
10. All structural steel shall be hot dip zinc coated after fabrication.
11. All holes including bolt holes and drainage holes shall be pre-punched before coating steel.
12. All anchor bolts, threaded rods and other hardware, including nuts and washers, which connect steel to concrete shall conform to ASTM F1554 Grade 55 as noted and shall be hot dip galvanized.
13. All bolts which connect steel to steel shall be high-strength bolts conforming to AASHTO M164 (ASTM A325) and shall be "Twist off" typ ASTM F1852, unless otherwise noted. All bolts, nuts and washers shall be hot dip zinc coated. All bolts shall be pre-loaded to slip critical tension per special provisions Section 718 Steel Fasteners.
14. Paint per Special Provisions Section 708. Epoxy primer and intermediate coat with Fluorourethane top coats "Dark Green".
15. Stainless steel surfaces in contact with galvanized structural steel shall be isolated with neoprene material pre-reviewed by the Engineer or coated with epoxy. Aluminum shall be isolated from dissimilar metals per Standard Specification Section 715.02
16. All threaded rods shall be cut off clean between 3 and 6 threads past the nut and ground smooth. Threads shall be spoiled and all terminations shall be neat and consistent.

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
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GEORGE O. GUTIERREZ JR. LICENSED PROFESSIONAL ENGINEER NO. 12107-S HAWAII, U.S.A.

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APRIL 30, 2020
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STRUCTURAL GENERAL NOTES

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

SHEET No. S0-1 OF 186 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	128	186

CONCRETE

1. Schedule of Structural Concrete 28-Day strength and water cement ratio:

Concrete Barriers	= 5,000 psi (W/C = 0.45)
Drilled Shafts and Pile Caps	= 5,500 psi (W/C = 0.40)
Concrete Pedestal (Aala)	= 5,000 psi (W/C = 0.45)

2. Non-Shrink Grout shall have a minimum 28-day compressive strength of 9,000 psi and shall be nonmetallic and nonstaining. See Specification Table 712.04-02 for additional information. Grout at the base of uprights shall be installed a minimum of 7 days prior to the installation of signals or sign panels. The standoff distance (the distance between the bottom of the leveling nut and the top of the foundation) shall not exceed one anchor bolt diameter.

3. Concrete mix design shall be submitted to the Engineer for review.

4. Minimum clear coverage of concrete over outer reinforcing bars or ties shall be as follows, unless otherwise noted. See Standard Specification Table 602.03-2 for additional information.

Pile Caps and Drilled Shafts	3"
Concrete directly against Earth	3"
All other exterior concrete	2"

5. Concrete admixtures containing chloride salts shall not be used.

6. All roughened surfaces in concrete shall be made with a minimum amplitude of 1/4".

7. Unless otherwise noted on drawings, all exterior corners and re-entrant angles 90 degrees or less in concrete work shall be chamfered 3/4"x3/4".

REINFORCING STEEL

1. Reinforcing steel bars shall be ASTM A-615 Grade 60, typical unless otherwise noted.

2. Reinforcing steel bars shall be uncoated, unless otherwise noted.

3. Reinforcing steel splices shall be made only where indicated on the drawings.

4. All reinforcing steel bars, anchor bolts, dowels and other embedded items shall be securely tied in place before concrete pour.

5. All reinforcing steel bar bends shall be made cold.

6. Welding of reinforcing steel shall not be permitted unless otherwise shown on the drawings. Welding of reinforcing steel shall conform to AWS D1.4-05 "AWS Structural Welding Code - Reinforcing Steel" of the American Welding Society.

GENERAL NOTES FOR EPOXY GROUTED DOWELS & BOLTS

1. See Special Provisions Section 503 Concrete Structures and Standard Specifications Section 656 for reinforcing steel dowels.

2. Contractor shall locate existing reinforcing prior to drilling holes for new epoxy grouted reinforcing steel dowels and steel anchor bolts. Do not damage existing reinforcing.

3. Epoxy grout for reinforcing steel dowels and steel anchor bolts shall conform to Standards Specifications Section 712.04(B).

4. Clean holes of all dust and residue before filling holes with epoxy grout.

5. Where noted on drawings, installation of epoxy grout and reinforcing dowels and steel anchor bolts shall be inspected by the Engineer.

6. Epoxy grouted reinforcing steel dowels shall be incidental to Section 602 reinforcing steel and will not be paid for separately.

7. Epoxy grouted steel anchor bolts shall be incidental to Section 501 Steel Structures and will not be paid for separately.

8. All drilled holes shall be cleaned, filled with epoxy, and reinforcing dowels and anchor bolts installed prior to end of work day.

EXISTING & DEMOLITION GENERAL NOTES

1. Demolition work shall be coordinated with construction of new work. Contractor shall submit proposed schedule and sequence of demolition work for Engineer's review prior to commencing with demolition work.

2. Known existing conditions are shown on the drawings. Dimensions and member sizes where shown on the drawings are based on available as-built plans. Existing dimensions shown may not be exact and are provided for information only. Contractor shall field verify all existing dimensions prior to construction. All discrepancies shall be promptly called to the attention of the Engineer and shall be resolved prior to proceeding with the demolition work.

3. As-built plans are available for review from the State of Hawaii Department of Transportation, Highways Division, Design Branch, Kakuhihewa Building Room 609, 601 Kamokila Boulevard, Kapolei, Hawaii 96707, Phone no. 808-692-7585.

4. Protect from damage existing structures to remain. Protect from damage and clean existing reinforcing steel to be incorporated in new concrete work. See Standard Specifications Section 202 "Removal of Structures and Obstructions".

5. Where existing reinforcing steel is not required to be incorporated in new concrete work, cut ends of reinforcing steel shall be recessed 1-1/2" minimum below existing concrete surface. Resulting pockets in existing concrete shall be filled with non-shrink grout. This work shall be incidental to Section 202 "Removal of Structures and Obstructions".

INSPECTION REQUIREMENTS

1. Contractor shall refer to Standard Specifications Section 105.11 - "Inspection of the Work and Materials."

2. The work items that will require inspection by the Engineer shall be, but not be limited to, the following items:

   A. Reinforcing steel
   B. Concrete
   C. Epoxy grouted reinforcing dowels and steel anchor bolts
   D. Anchor bolts cast-in concrete
   E. High-strength bolting
   F. Field welding
   G. Drilled Shaft

Contractor shall notify the Engineer at least 7 working days prior to the above inspections

ABBREVIATIONS

Bm	Beam	Jt	Joint
Bot	Bottom	Manu	Manufacturer
CC	Center to Center	Max	Maximum
Clr	Clear	MAC	Media Access Controls
Col	Column	Min	Minimum
Conc	Concrete	(N)	New
Cont	Continuous	Open'g	Opening
Dia	Diameter	SS	Stainless Steel
Diag	Diagonal	Std	Standard
DO	Ditto	T&B	Top and Bottom
El	Elevation	Thk	Thick
(E), exist	Existing	Typ	Typical
ES	Each Side	UON	Unless Otherwise Noted
Flr	Floor	Vert	Vertical
Ga	Gauge	W	Width
H	Height	W/	With
Horiz	Horizontal		

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

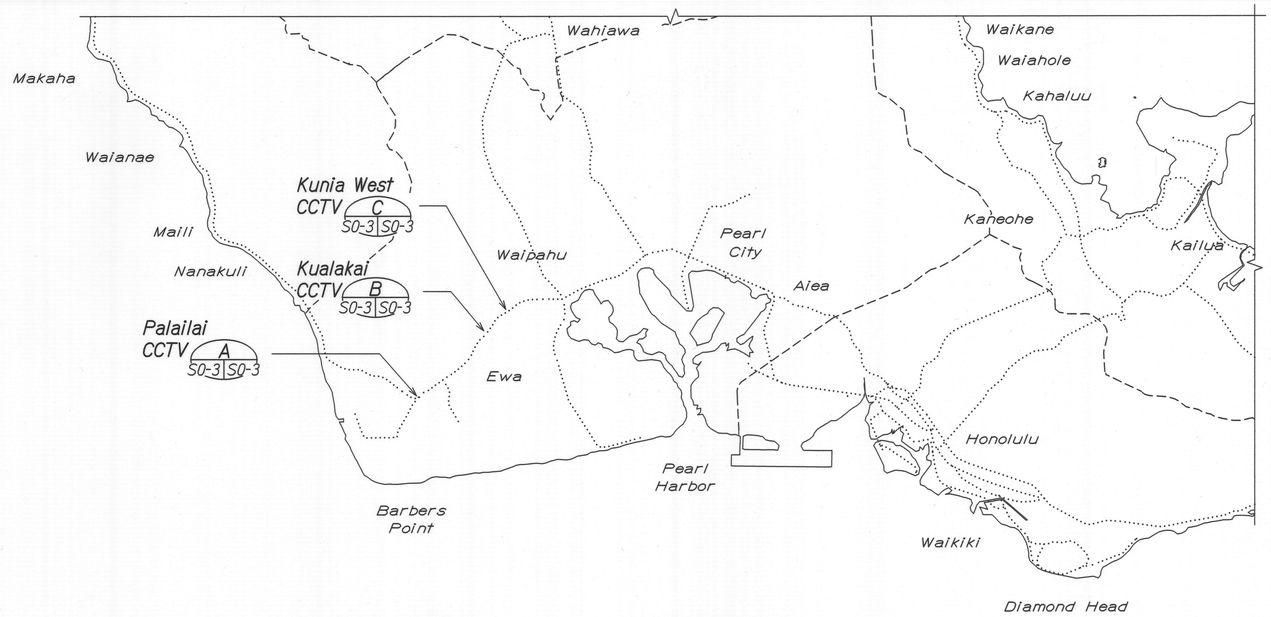
STRUCTURAL GENERAL NOTES

Freeway Management System,
Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

SHEET No. S0-2 OF 186 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	129	186



A PALAILAI CCTV LOCATION MAP

B KUALAKAI CCTV LOCATION MAP

C KUNIA WEST CCTV LOCATION MAP

Note:

See Civil drawings for station and additional information.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

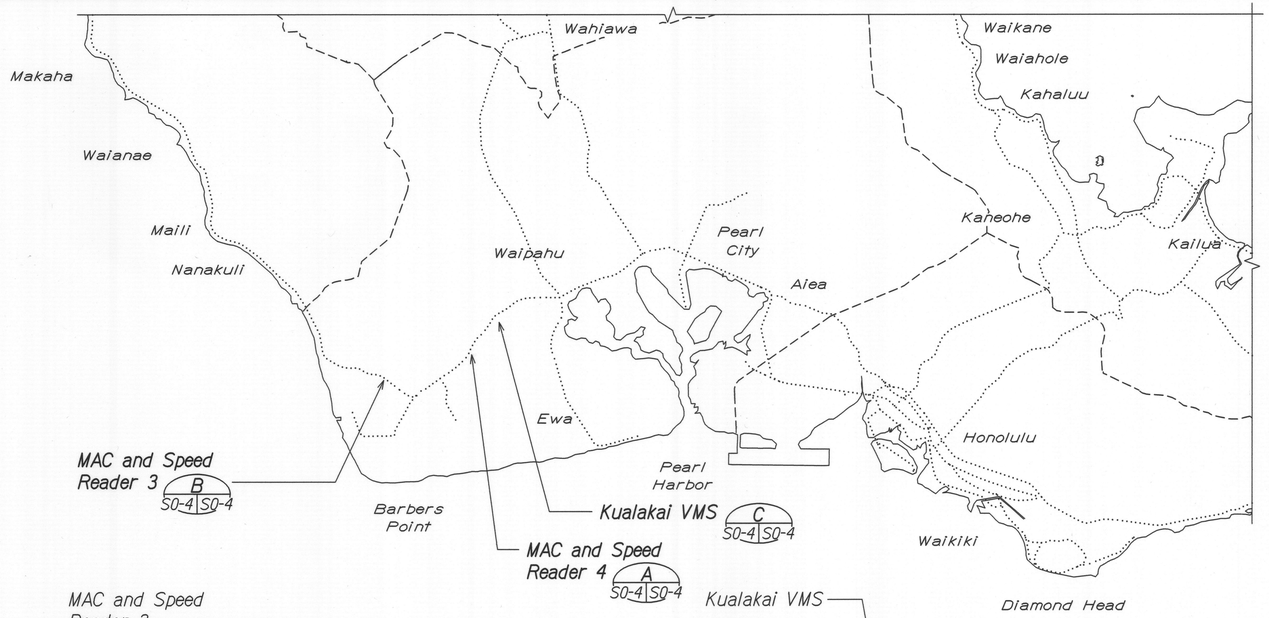
GENERAL SITE MAP

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

SHEET No. S0-3 OF 186 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	130	186



(A) MAC AND SPEED READER 4 LOCATION MAP

NORTH

MAC and Speed Reader 3

(B) FARRINGTON VMS, MAC AND SPEED READER 4 LOCATION MAP

NORTH

Kualakai VMS

(C) KUALAKAI VMS LOCATION MAP

NORTH

Note:

See Civil drawings for station and additional information.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

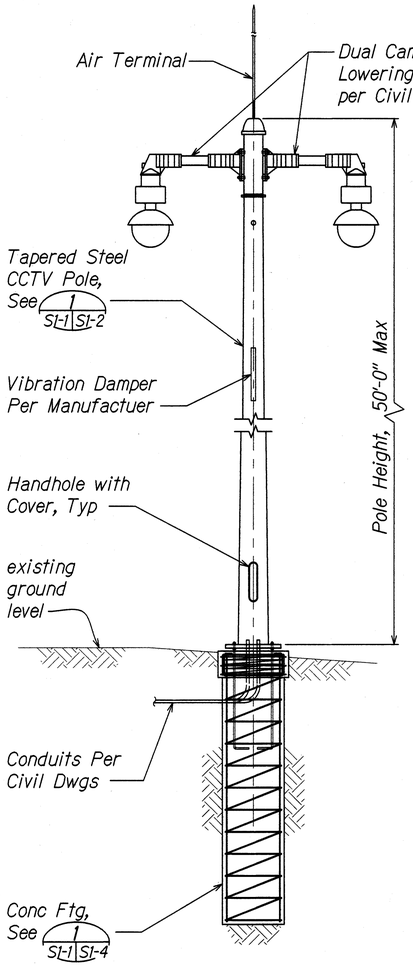
GENERAL SITE MAP

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

SHEET No. S0-4 OF 186 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	131	186



1 S1-1 S1-1 CCTV TYPICAL POLE DETAIL
Scale: 1/4" = 1'-0"

CCTV GENERAL NOTES

1. Galvanizing/Painting:
   - A. Poles, plates and bases shall be hot dipped galvanized per AASHTO M 111 (ASTM A 123).
   - B. Hardware and anchors bolts shall be per ASTM A307 and AASHTO M 314 (ASTM F1554, Gr 55), respectively, and hot dipped galvanized per AASHTO M 111 (ASTM A 123).
   - C. CCTV Poles shall be painted per Special Provisions Section 708 - Paints. Color shall be "Aluminum" to match Aluminum light poles.
2. Materials
   - A. 50' pole shall be ASTM A572 Grade 65 with a yield stress of 65 ksi.
   - B. Base plates, shall be AASHTO M270 GR 50.
3. Welds:
   - A. All welding shall conform to American Welding Society Structural Welding Code (Steel) ANSI/AWS D1.1 (Current Edition).
   - B. Longitudinal seam welds by submerged arc at 75% penetration and circumferential butt welds at complete penetration shall conform to section 5.15 of the AASHTO Standard Specifications For Structural Supports For Highway Signs, Luminaries. and Traffic Signals (Latest Edition) and have optional back up rings. All exposed butt welds shall be ground flush.
   - C. Deburr all sharp edges for wire protection.
4. All poles shall have first and/or second mode vibration dampers as required by manufacturer.
5. An internal camera lowering device and pole shall be used for each CCTV camera installation, unless otherwise noted. Camera installation details shall be provided by manufacturer. Details to be approved by the Engineer before installation.
6. Pole mounted details for cabinet shall be provided by manufacturer. Details to be approved by the Engineer before installation.
7. The contractor shall verify, in the field all dimensions, elevations, and details pertaining to the structures before proceeding with the work. Any discrepancies shall be brought to the attention of the Engineer.
8. Pole shall be located outside of roadway clear zone or protected behind barrier per AASHTO Roadside Design Guide (Latest Edition). Where potential for vehicle impact exists, and only VDS are mounted on pole, control cabinet shall be mounted downstream of traffic flow.

CCTV DESIGN DATA

Design is in accordance with the AASHTO "Standard Specifications For Structural Supports For Highway Signs, Luminaries and Traffic Signals." 1st Edition, 2015 with 2017 Interim Provisions.

Wind Velocity:	: See Wind Table on S0-1
Gust Effect Factor, G	: 1.14
Exp Cat	: C
CCTV Camera Face Area	= 2 Sq Ft
CCTV Camera Wind Drag Coefficient, C_d	= 1.2
CCTV Camera Weight	= 40 LBS
Cabinet Dimensions	= 24" x 24" x 36"
Maximum Pole Deflection	= 1" at 30 MPH, non-gust
Maximum Pole Deflection	= 2" at 70 MPH, non-gust

Cabinet weight including equipment contents not to exceed 500 LBS.

Camera Lowering Device Design Data

Camera lowering device arm, disconnect, and camera caries weight of 96 LBS and EPA of 2.00 Sq Ft. This weight does not include the cable.

Camera Lowering Device
Wind Drag Coefficient, C_d = 1.10

Vehicle Detection Unit Design Data

Face Area	= 2 Sq Ft
Wind Drag Coefficient, C_d	= 1.7
Weight	= 35 LBS

GRAPHIC SCALE
0 1' 2' 4' 8' 12'
1/4"=1'-0"

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HIGHWAYS DIVISION

CCTV TYPICAL DETAIL AND GENERAL NOTES

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

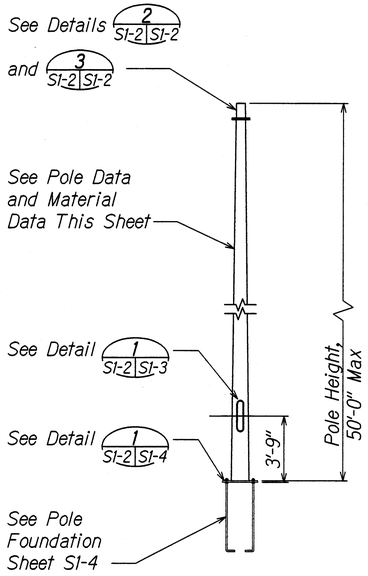
Scale: As Shown Date: June 29, 2018

SHEET No. S1-1 OF 186 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	132	186

Notes:

1. See Civil drawings for camera orientation details.



POLE DATA				
Pole Height (Ft)	TUBE			
	Min Base Diameter O.D. (In)	Min Top Diameter O.D. (In)	Min Thickness (In)	Taper (In/Ft)
50	21	13.1	0.250	0.06

MATERIAL DATA		
Component	ASTM Designation	Min Yield (KSI)
Pole Shaft - 50'	A 572, Gr 65	65
Base Plates	M270 Gr 50	50
Pole Top Plate	M270 Gr 50	50
Tenon Tubing	M270 Gr 50	50
Anchor Bolts	F1554, Gr 55	55
Galvanizing - Structure	A 123	--
Galvanizing - Hardware	A 153	--

1 CCTV POLE = 50' AND LESS

SI-1, SI-2 SI-2 Scale: 1/4" = 1'-0"
SI-6

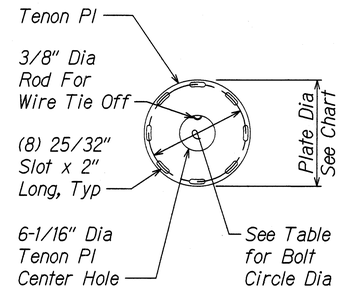
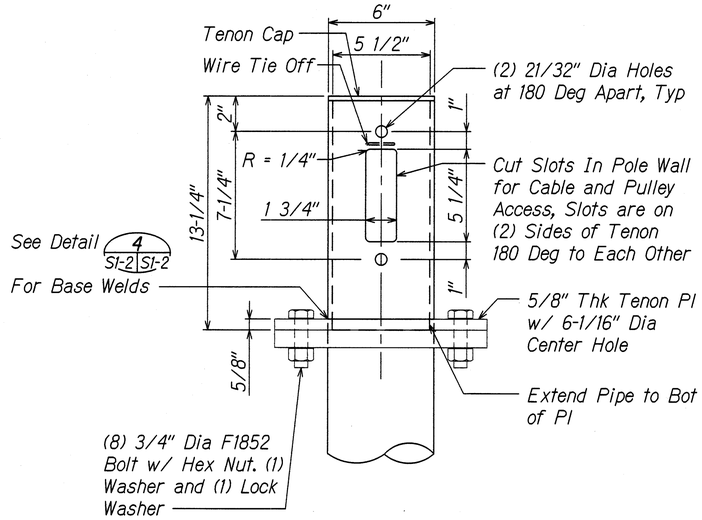
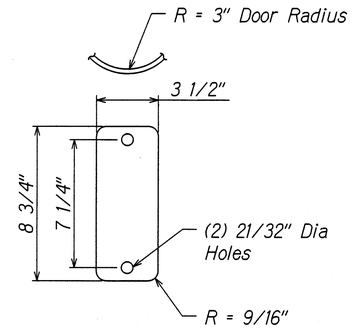


Table - Pole Top Plate Properties			
Pole Height (Ft)	Pole Top Diameter (In)	Plate Diameter (In)	Bolt Circle (In)
50	13.1	19	17





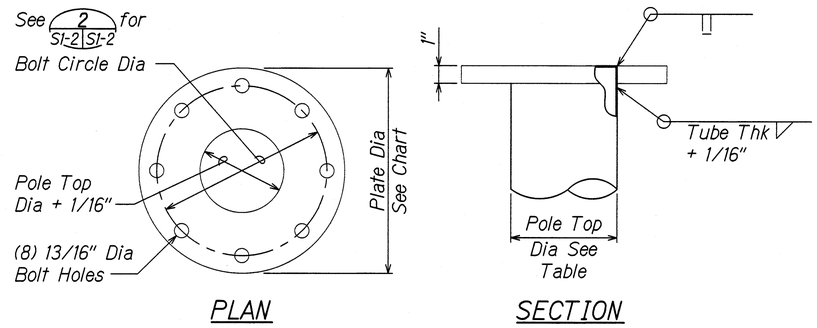
TENON DOOR DETAIL

Note:

One Door Required Per Tenon Plate. To Be Secured Using (2) 1/2" x 1-1/4" Galvanized Bolts and (2) Nuts and Lock Washers. Door Thickness No Greater than 1/4" or Less Than 1/16".

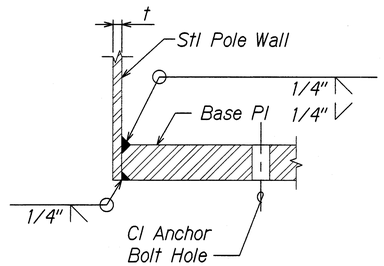
2 DETAIL - TENON ASSEMBLY

SI-2 SI-2 Scale: 3" = 1'-0"



3 DETAIL - POLE TOP PLATE

SI-2 SI-2 Scale: 3" = 1'-0"



4 DETAIL - BASE WELD DETAIL TOP PLATE (SIM)

SI-2, SI-4 SI-2 Not To Scale

GRAPHIC SCALE

0 1' 2' 4' 8' 12'
1/4"=1'-0"
0 1" 2" 4" 8" 1'
3"=1'-0"

0 1 2
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CCTV TYPICAL DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

SHEET No. SI-2 OF 186 SHEETS

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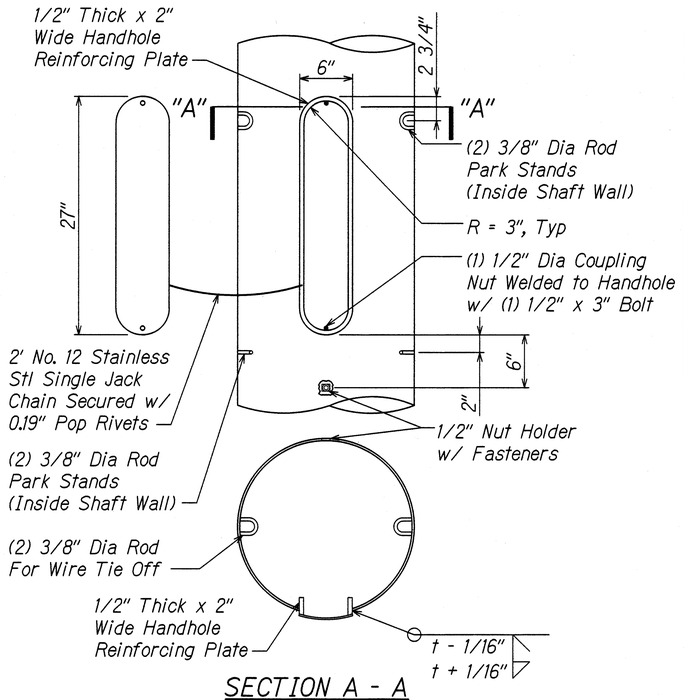

SECTION A - A

HANDHOLE NOTES:

Handhole reinforcement shall be AASHTO M270 Grade 50.

Reinforcement shall be welded to the post shaft in the 90 degree location, prior to galvanizing pole shaft. Cover shall be fabricated from 3/16" steel. Steel Cover is galvanized according to ASTM A 153. Cover shall be equipped with two (2) AISI 304 stainless steel 1/4" - 20UNC x 3/4" LB hex cap screw and two (2) captive washers.

Provision for internal grounding shall be provided by a tapped hole.

1 / S1-2 | S1-3 DETAIL - CAMERA LOWERING DEVICE HANDHOLE

Scale: 1-1/2" = 1'-0"

GRAPHIC SCALE

0 1' 2'

1-1/2"=1'-0"

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	DRAWN BY	
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	CHECKED BY	

0 1 2

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

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NO. 12107-S
HAWAII, U.S.A.

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APRIL 30, 2020
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

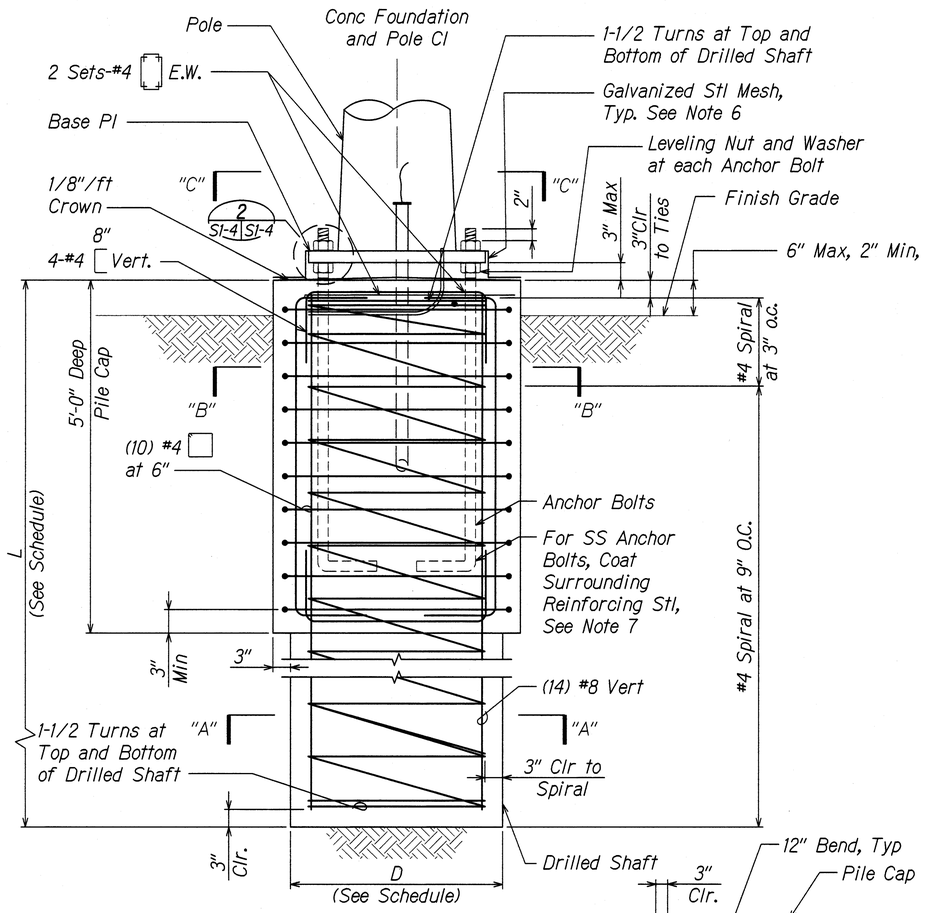
CCTV TYPICAL DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

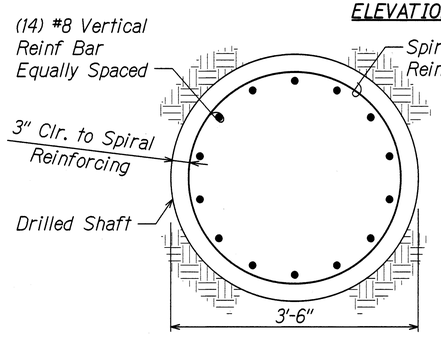
Scale: As Shown Date: June 29, 2018

SHEET No. S1-3 OF 186 SHEETS

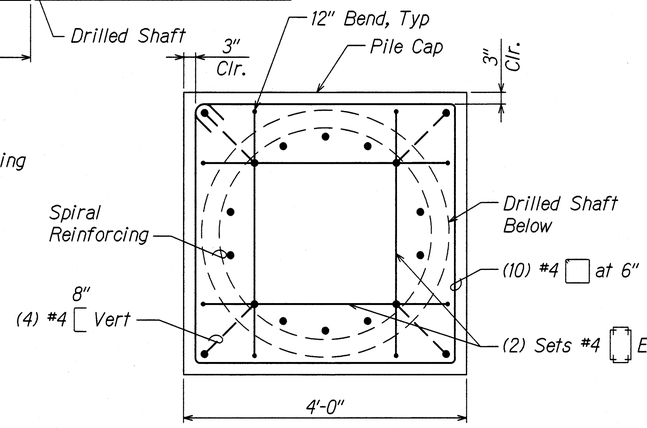
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	134	186



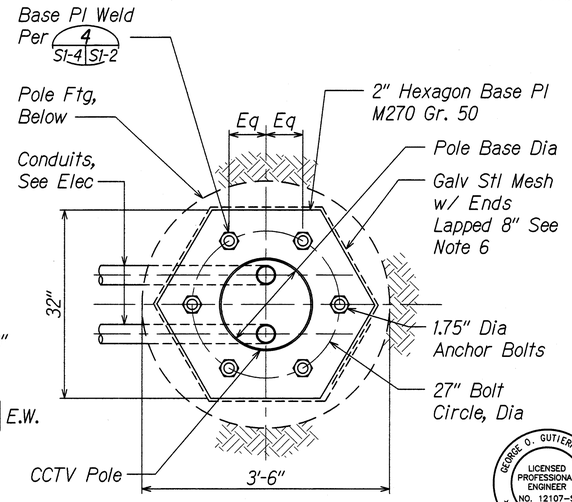
ELEVATION



SECTION A - A



SECTION B - B



SECTION C - C

DETAIL - DRILLED SHAFT FOUNDATION FOR CCTV POLE (50' MAX)

1 S1-4 S1-4

S1-1, S1-2, Not To Scale

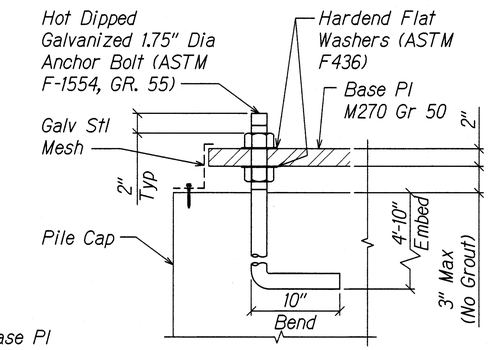
LINE IS 2 INCHES AT FULL SIZE (if not 2 inches: scale accordingly)

CCTV AND MAC AND SPEED READER POLE FOUNDATION GENERAL NOTES:

1. Reinforcing steel (rebar) shall conform to AASHTO M 31 (ASTM A 615) Grade 60. Dimensions refer to the centerline of reinforcing steel unless otherwise noted on the plans. All reinforcing shall be incidental to concrete.
2. Anchor Bolts shall be ASTM F1554 Grade 55. Provide a top hex nut, bottom leveling nut, and 2 washers for each bolt at base plate. Bolts shall be galvanized.
3. Prior to tightening anchor bolts, leveling nuts shall be adjusted so that they bear uniformly against the base plates.
4. Tighten the anchor bolt nuts two or more times in the cross patterns (tightening nuts diametrically opposite) to ensure even tightening. The bolts shall be torqued according to the specifications.
5. After torquing, tack weld the top of nuts to the anchor bolts to ensure that the nuts will not loosen.
6. Provide 2x2 galvanized steel mesh with 0.063" wire diameter. 1" lap on top of base plate, 3" bottom lap at concrete. Attached with 1/4" self tapping SS screws at 9" OC around perimeter of base plate. See Structural Steel Note 15 on S0-1.
7. When stainless steel anchor bolts are used in foundation. Reinforcing steel shall be coated with epoxy coating. The epoxy coating shall extend 6 inches past stainless steel anchor bolts.

CCTV Drilled Shaft Depths		
Location	Diameter, D (Ft)	Length, L (Ft)
Kunia West CCTV	3'-6"	16'-0" Min
Kualakai CCTV	3'-6"	16'-0" Min
Palailai CCTV	3'-6"	16'-0" Min

MAC and Speed Reader Pole Drilled Shaft Depths		
Location	Diameter, D (Ft)	Length, L (Ft)
Location 3	3'-6"	15'-0"
Location 4	3'-6"	15'-0"



2 S1-4 S1-4 ANCHOR BOLT DETAIL

Scale: 1-1/2" = 1'-0"

GRAPHIC SCALE

0 3" 6" 1' 2'

1-1/2"=1'-0"

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APRIL 30, 2020 LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CCTV FOUNDATION DETAILS

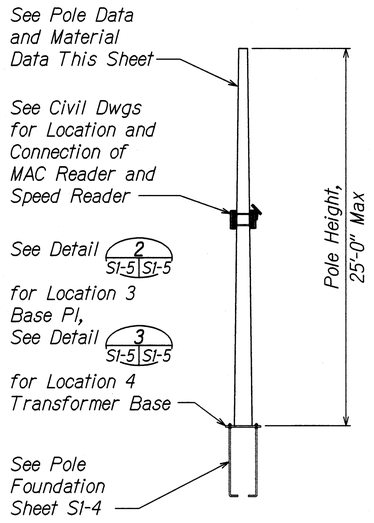
Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

SHEET No. S1-4 OF 186 SHEETS

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

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	135	186



Notes:

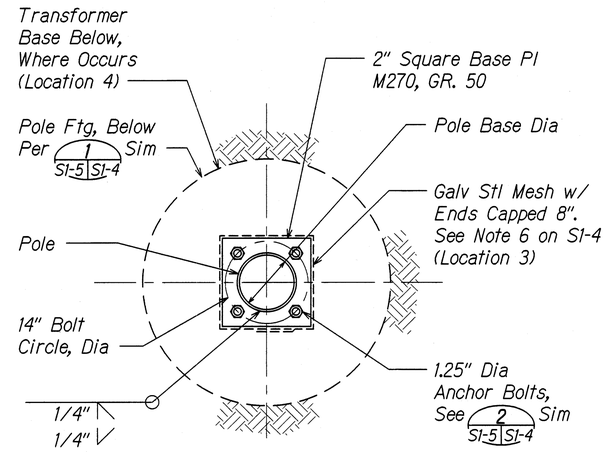
1. See Civil drawings for location of MAC reader and Speed reader.

POLE DATA				
Pole Height (Ft)	TUBE			
	Min Base Diameter O.D. (In)	Min Top Diameter O.D. (In)	Min Thickness (In)	Taper (In/Ft)
25	10	6.5	0.250	0.140

MATERIAL DATA		
Component	ASTM Designation	Min Yield (KSI)
Pole Shaft - 25'	A 572, Gr 65	65
Base Plates	M270 Gr 50	50
Pole Top Plate	M270 Gr 50	50
Anchor Bolts (Location 3)	F1554, Gr 55	55
Anchor Bolts (Location 4)	F593, Type 316, Gr 60	60
Galvanizing - Structure	A 123	--
Galvanizing - Hardware	A 153	--

1 S1-1, S1-5 S1-5 MAC AND SPEED READER POLE = 25'

Scale: 1/4" = 1'-0"

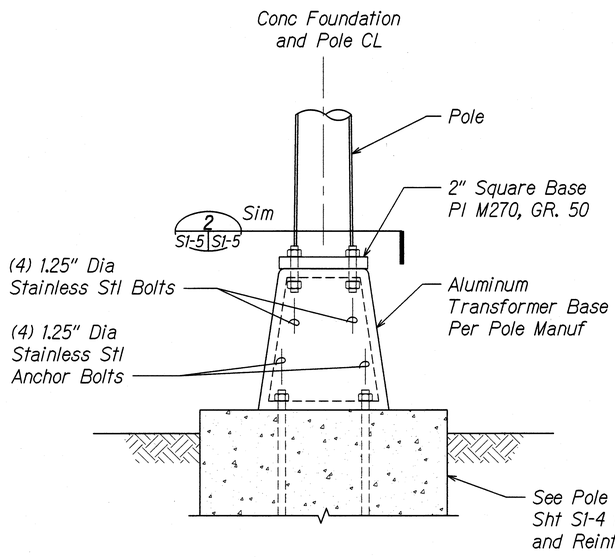


Note:

See 3 S1-5 S1-5 for transformer base at location 4.

2 S1-4 S1-5 DETAIL - BASE WELD DETAIL (LOCATION 3)

Scale: 1" = 1'-0"



TRANSFORMER BASE DATA			
Height (In)	Min Base Width (In)	Min Top Width (In)	Min Thickness (In)
17	16.5	15	0.750

Notes:

1. Breakaway support (Transformer Base) at Location 4 only.
2. See Structural Steel Note 15.
3. For additional information see Standard Plan TE-47.

3 S1-4 S1-5 DETAIL - BREAKAWAY BASE (LOCATION 4)

Scale: 1" = 1'-0"

GRAPHIC SCALE

0 1' 2' 4' 8' 12'

1/4"=1'-0"

0 3"6"9"1' 2' 3'

1"=1'-0"

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0 1 2

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

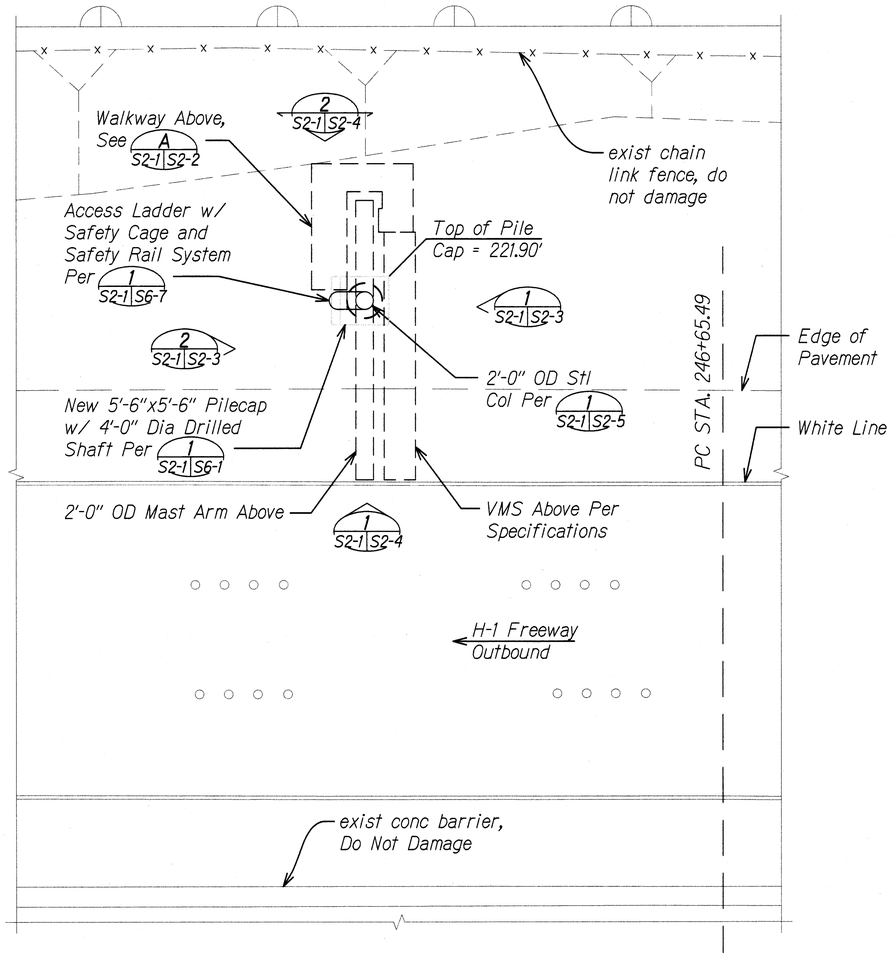
MAC AND SPEED READER TYPICAL DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

SHEET No. S1-5 OF 186 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	136	186



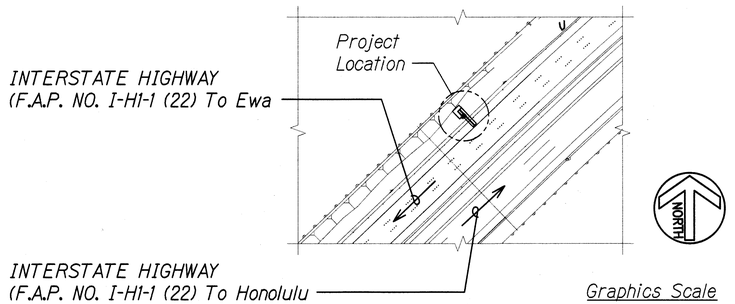
A S2-1|S2-1 H-1 KUALAKAI VMS - FOUNDATION PLAN

Scale: 1/8" = 1'-0"

NOTES:

1. Refer to general notes on sheets S0-1 and S0-2, typical details on sheets S6-1 through S6-10 and cantilever type details on sheets S7-1 through S7-6 for additional information.
2. Refer to civil drawings for VMS location, dimensions and other information not shown on structural drawings.
3. Refer to electrical and telecommunication drawings for locations of all pipes, conduits, equipment, etc.
4. Contractor shall field verify all existing dimensions and clearances. Any discrepancies shall be brought to the attention of the engineer prior to fabrication.

Keyplan



Graphics Scale

0 1' 2' 4' 6' 8' 16' 24'

1/8"=1'-0"

ORIGINAL PLAN | NOTE BOOK | No.

SURVEY PLOTTED BY ..... DATE .....
DRAWN BY .....
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0 1 2

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

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HIGHWAYS DIVISION

H-1 KUALAKAI VMS - FOUNDATION PLAN

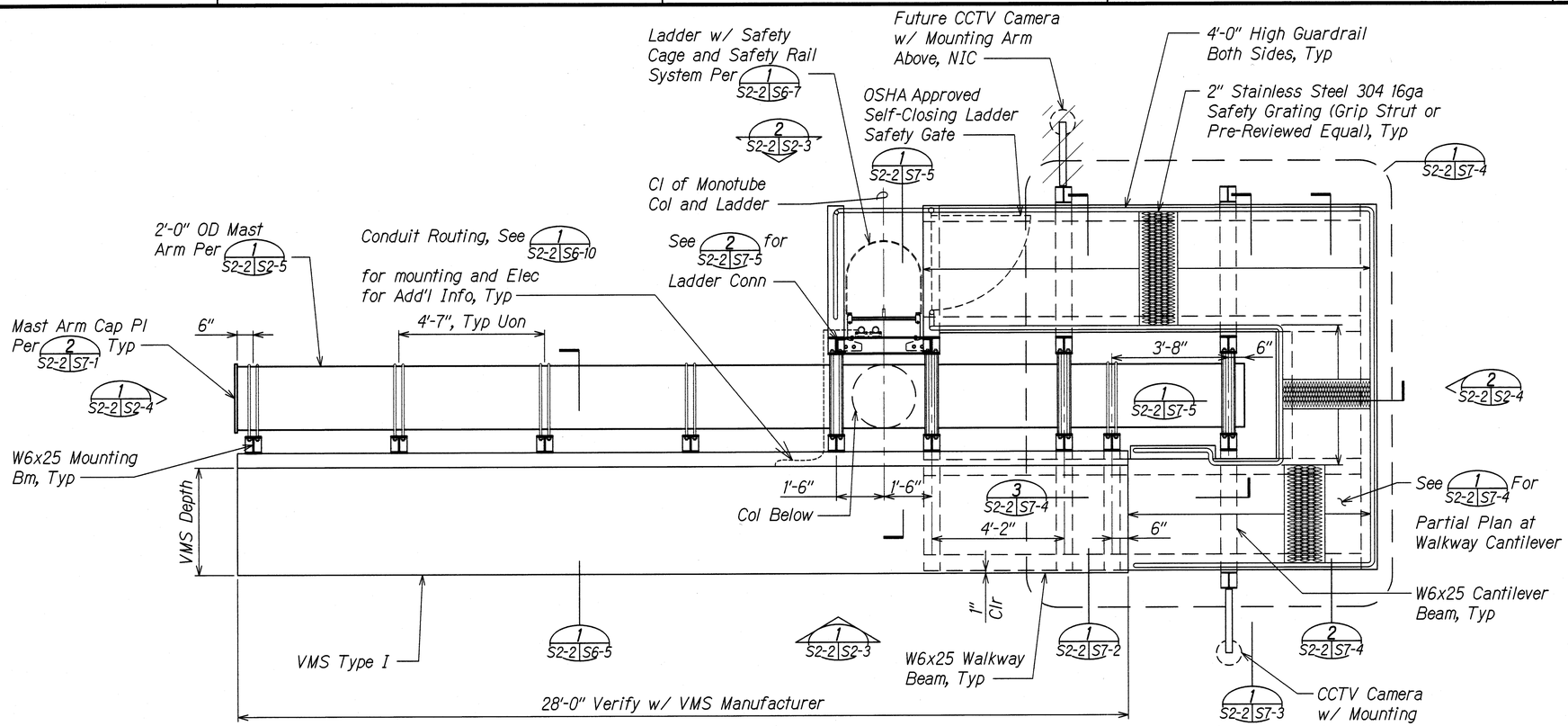
Freeway Management System, Phase 2

Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

SHEET No. S2-1 OF 186 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	137	186



A S2-1 S2-2 *H-1 KUALAKAI VMS - WALKWAY FRAMING PLAN*

Scale: 1/2" = 1'-0"

NOTES:

1. Refer to general notes on sheets S0-1 and S0-2, typical details on sheets S6-1 through S6-10 and cantilever type details on sheets S7-1 through S7-6 for additional information.
2. Refer to civil drawings for VMS location, dimensions and other information not shown on structural drawings.
3. Refer to electrical and telecommunication drawings for locations of all pipes, conduits, equipment, etc.
4. Contractor shall field verify all existing dimensions and clearances. Any discrepancies shall be brought to the attention of the engineer prior to fabrication.

ORIGINAL PLAN
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No.
DATE

Graphics Scale

0 6" 1' 2' 4' 6'

1/2"=1'-0"

0 1 2

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

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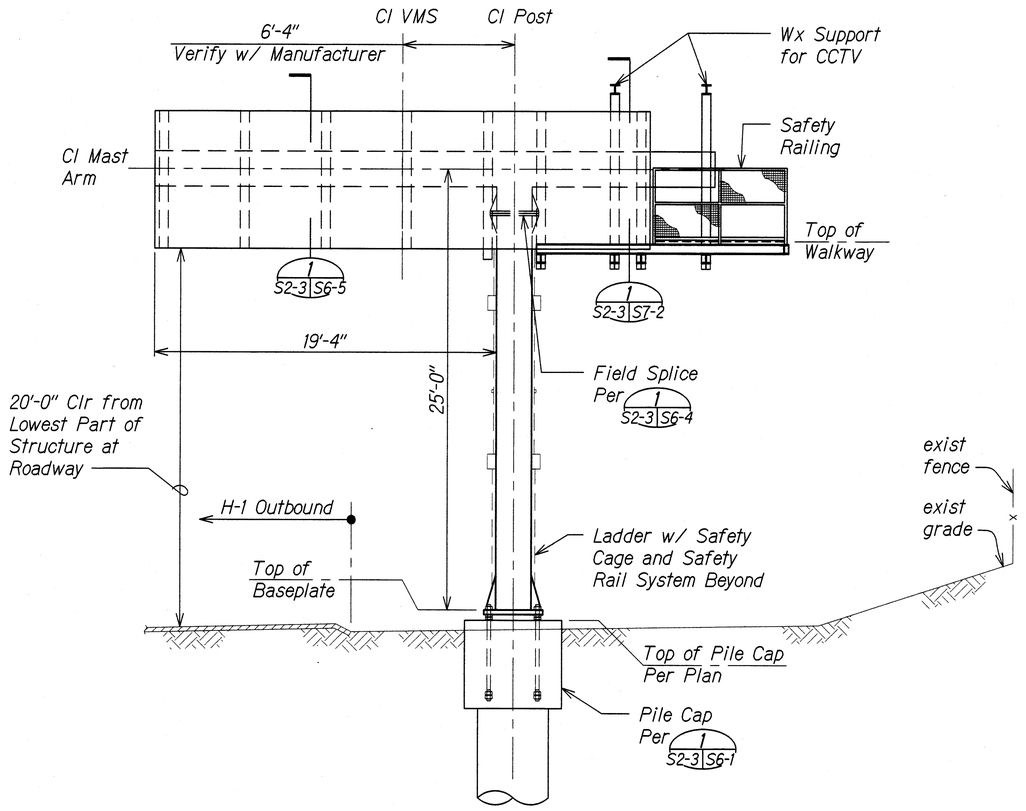
H-1 KUALAKAI VMS - WALKWAY PLAN

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

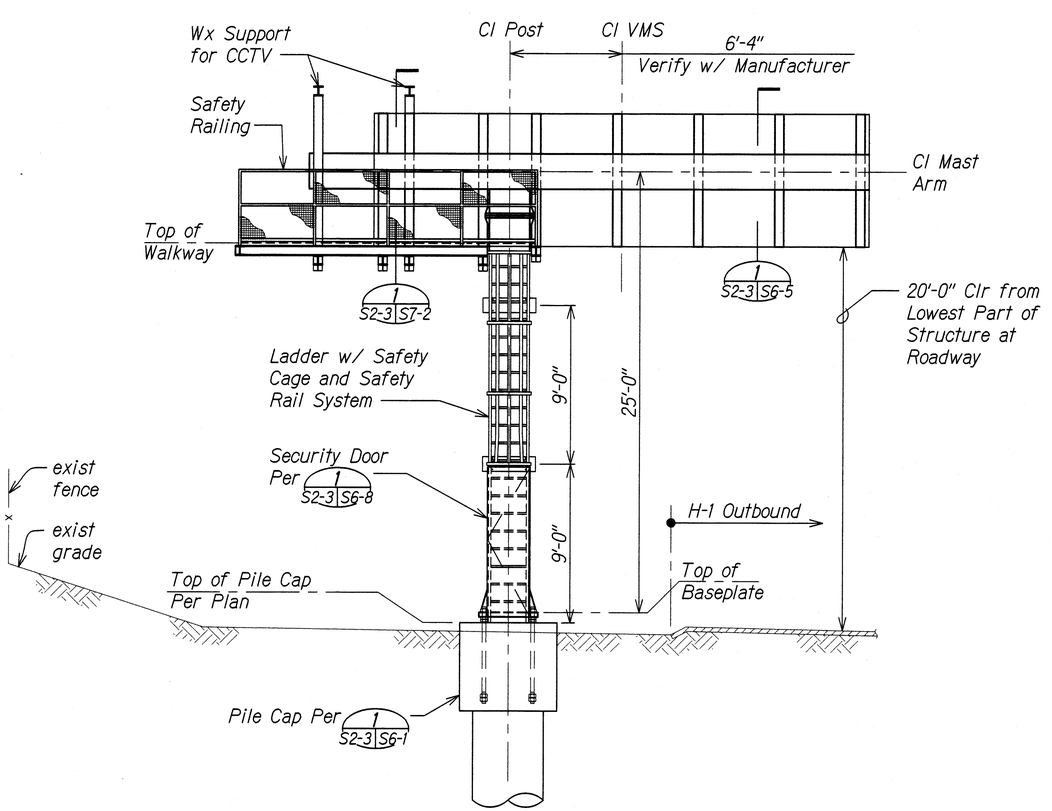
SHEET No. S2-2 OF 186 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	138	186



1 S2-1, S2-2 | S2-3 H-1 KUALAKAI VMS - EAST ELEAVATION

Scale: 1/4" = 1'-0"



2 S2-1, S2-2 | S2-3 H-1 KUALAKAI VMS - WEST ELEVATION

Scale: 1/4" = 1'-0"

Graphics Scale

0 1' 2' 4' 8' 12'

1/4"=1'-0"

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

0 1 2

LINE IS 2 INCHES AT FULL SIZE
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H-1 KUALAKAI VMS - EAST AND WEST ELEVATION

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

SHEET No. S2-3 OF 186 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
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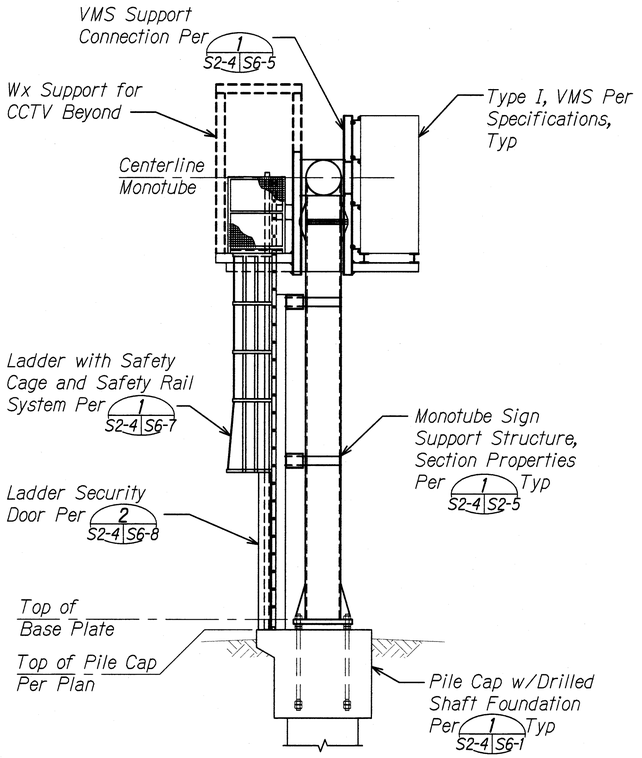
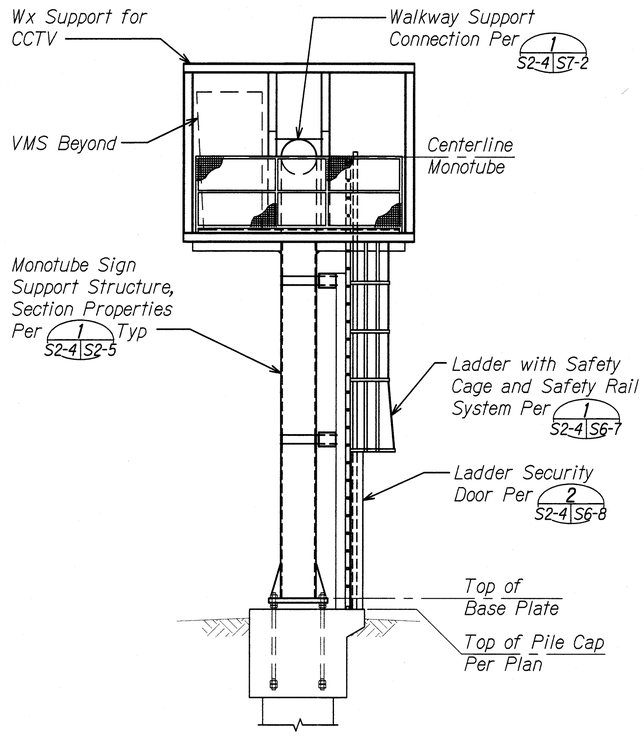


1 S2-1, S2-2 S2-4 H-1 KUALAKAI VMS - SOUTH ELEVATION
Scale: 1/4" = 1'-0"



2 S2-1, S2-2 S2-4 H-1 KUALAKAI VMS - NORTH ELEVATION
Scale: 1/4" = 1'-0"

Graphics Scale

0 1' 2' 4' 8' 12'
1/4"=1'-0"

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

0 1 2
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H-1 KUALAKAI VMS - NORTH AND SOUTH ELEVATION
Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

SHEET No. S2-4 OF 186 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
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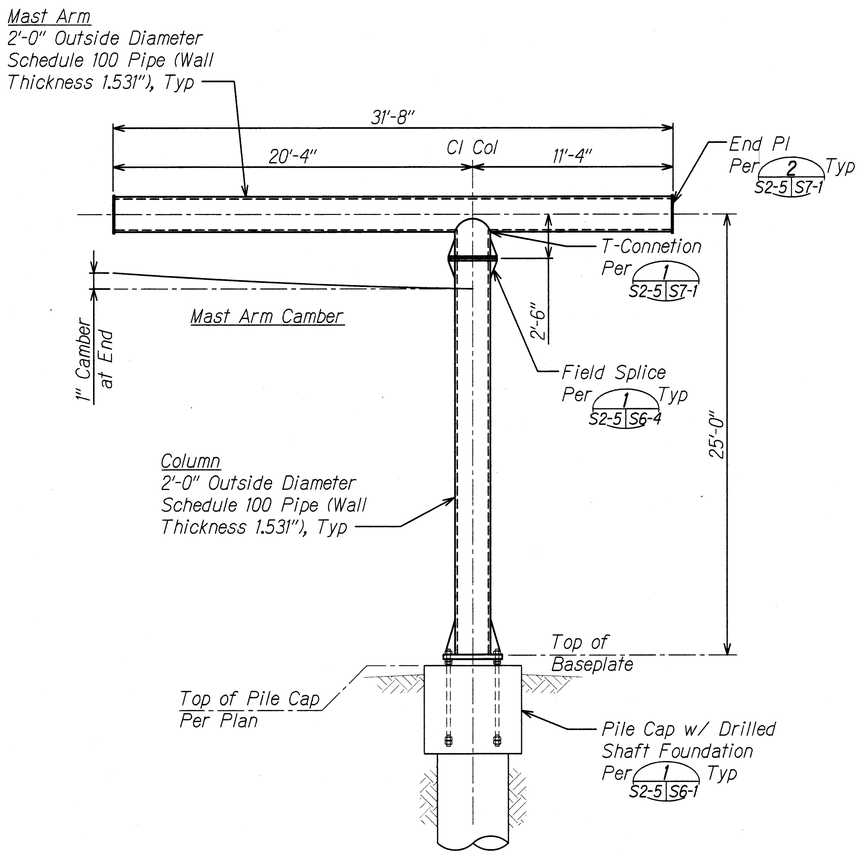

1 / S2-1, S2-2, S2-4 | S2-5 — H-1 KUALAKAI VMS - MONOTUBE ELEVATION

Scale: 1/4" = 1'-0"

Monotube Notes:

1. Monotube shall be welded or seamless steel pipe conforming to ASTM A53 Grade B.
2. Welding of steel shall conform to the requirement of AWS D1.1. All areas to be welded shall be ground to bright metal. No butt weld splices will be permitted. All welding and required testing shall be complete before any material is galvanized. All circumferential and stiffener welds shall be non-destructively tested using the enhanced magnetic particle method in accordance with subsection 509.18(d). All monotube seam welds within 16" of full-penetration circumferential groove welds shall be full penetration groove welds and shall be inspected as specified above. Maximum weld undercut shall be 0.01".
3. Notch toughness of all structural steel members and plates greater than 1/2" thick shall conform to Zone 2 requirements of AASHTO M270 Supplementary Requirement S5 (ASTM A709 Supplementary Requirement S83).
4. Monotube members shall be hot-dipped galvanized inside and outside after fabrication per ASTM A123.

Graphics Scale

0 1' 2' 4' 8' 12'

1/4"=1'-0"

ORIGINAL PLAN
NOTE BOOK No.
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0 1 2
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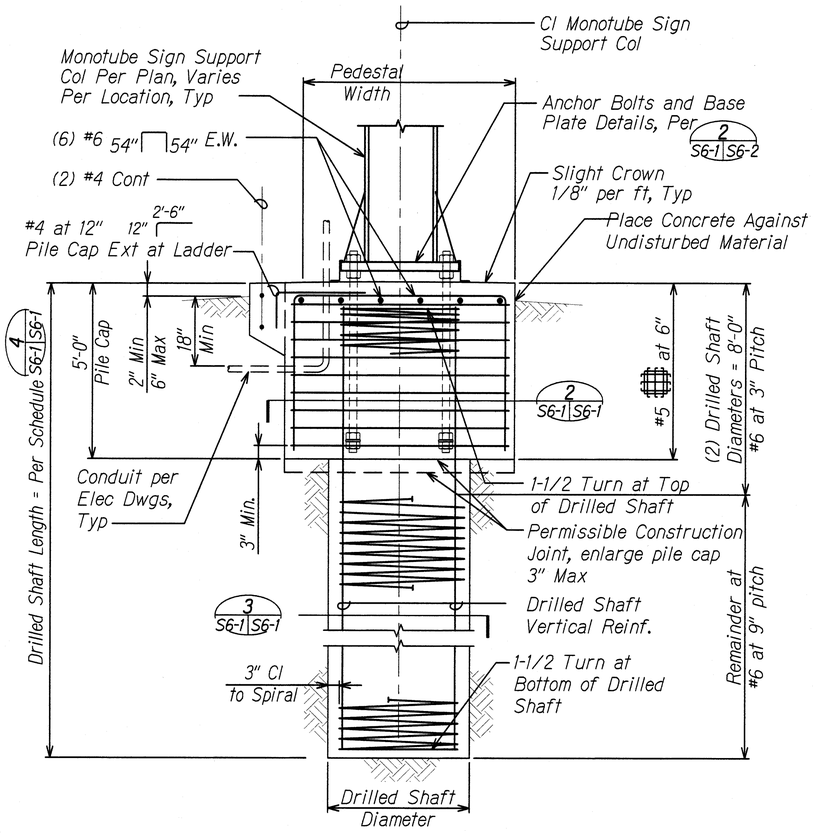
H-1 KUALAKAI VMS - MONOTUBE DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

SHEET No. S2-5 OF 186 SHEETS

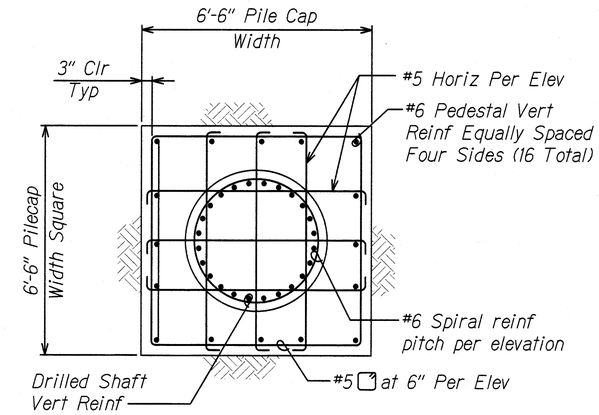
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	141	186



1 S6-1|S6-1 PILE CAP AND DRILLED SHAFT ELEVATION

Scale: 1/2" = 1'-0"

S2-1 to S2-5 | S6-1
S3-1 to S3-5
S4-1 to S4-6
S6-2, S6-4, S6-8

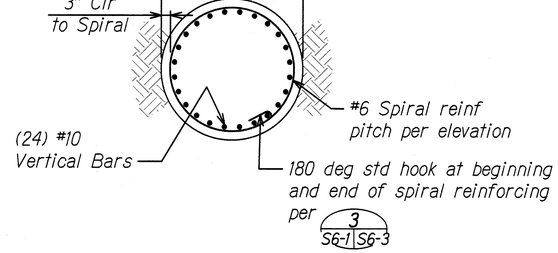


2 S6-1|S6-1 SECTION - PILE CAP

Scale: 1/2" = 1'-0"

LOCATION	DIAMETER	DEPTH
Kualakai VMS	4'-0"	20'-0"

4 S6-1|S6-1 DRILLED SHAFT SCHEDULE



3 S6-1|S6-1 SECTION - DRILLED SHAFT

Scale: 1/2" = 1'-0"

Graphics Scale

0 6" 1' 2' 4' 6'

1/2"=1'-0"

0 1 2

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PILECAP AND DRILLED SHAFT DETAILS AND SCHEDULE

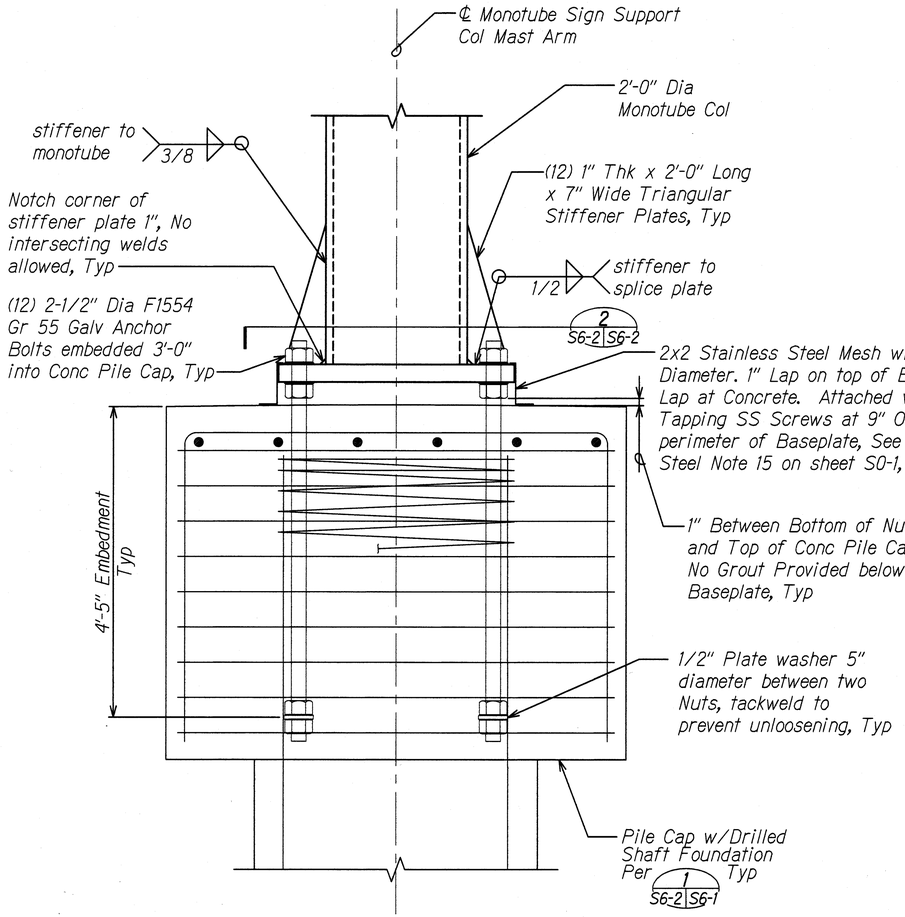
Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

SHEET No. S6-1 OF 186 SHEETS

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

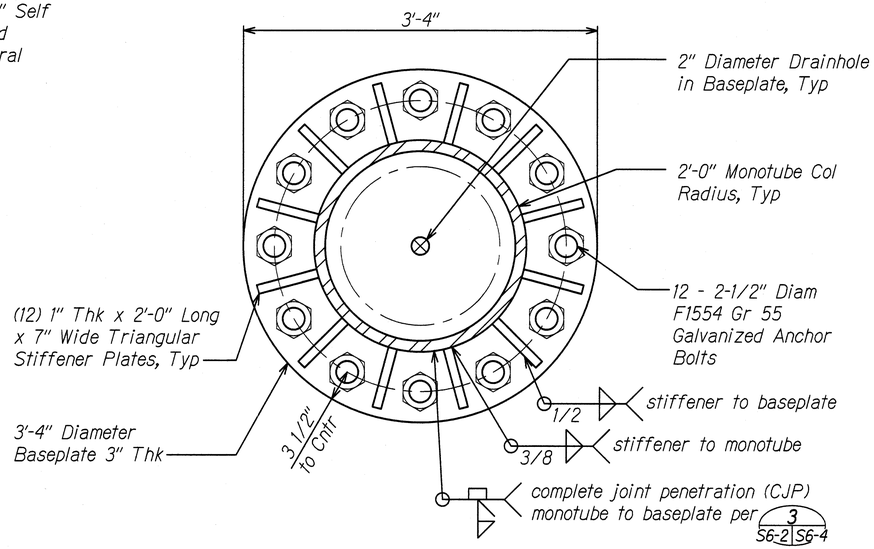
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	142	186



1 SECTION - BASEPLATE
S2-5, S3-5, S4-5 S6-2, S6-1, S6-8 Scale: 1" = 1'-0"

Base Plate Notes:

1. *Thread upper 10" of the anchor bolts.*
2. *Anchor bolts shall be set with a steel template until the concrete has cured.*
3. *Anchor bolts shall be provided with top bolt with washer and bottom bolt with washer.*
4. *There shall be no grout pad installed on top of the foundations unless otherwise noted. Grout shall be provided below baseplates when baseplates are encased in concrete below grade.*
5. *The anchor bolts shall be tightened using the turn-of-nut method or provided with direct tension indicator washers. If the turn of nut method is used. The anchor bolts shall first be tightened to snug tight. The upper and lower nuts shall each then be rotated an additional 1/12 turn. Top nuts shall then be rotated an additional 2/3 turn (240 degrees). Minimum anchor rod pretension shall be 116,000 lbs for 2 1/4" anchor rods. See Specification Section 718.05 for additional information. Please note that the turn of nut method requires testing with Skidmore-Wihelm Calibrator or pre-reviewed equivalent device.*



2 DETAIL - BASEPLATE
S6-2, S6-8 S6-2 Scale: 1-1/2" = 1'-0"

Graphics Scale

0 3" 6" 9" 1' 2' 3'
1"=1'-0"

0" 3" 6" 1' 2'
1-1/2"=1'-0"

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

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

GEORGE O. GUTIERREZ JR. LICENSED PROFESSIONAL ENGINEER NO. 12107-S HAWAII, U.S.A.

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APRIL 30, 2020 LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

BASEPLATE DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

SHEET No. S6-2 OF 186 SHEETS

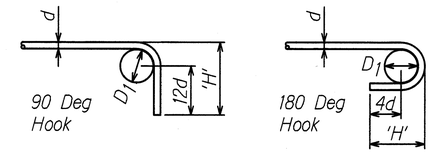
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	143	186

HOOK LENGTHS (H) (IN INCHES), UON

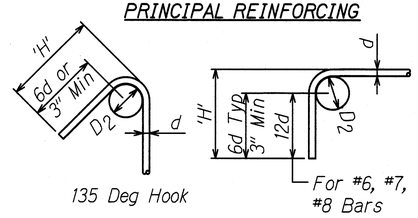
Bar Size	Standard Hooks		Stirrup or Tie Hook			
	90 Deg. Hook	180 Deg. Hook	90 Deg. Hook	135 Deg. Hook	D_2	D_1
#3	6	4	3-1/2	4	1-1/2	2-1/4
#4	8	4-1/2	4-1/2	4-1/2	2	3
#5	10	5	5-1/2	5-1/2	2-1/2	3-3/4
#6	12	6	12	7-1/2	4-1/2	4-1/2
#7	14	7	14	9	-	5-1/2
#8	16	8	-	-	-	6
#9	19	10	-	-	-	9
#10	22	11-1/2	-	-	-	10

Note:

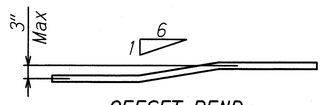
1. All bends shall be made cold.



PRINCIPAL REINFORCING



TIE OR STIRRUP



OFFSET BEND

1 / S6-1 | S6-3 BAR BEND AND HOOKS

Scale: Not to Scale

TENSION LAP SPLICE LENGTHS (CLASS B) (INCHES)

GRADE 60

f'c / Bar Size	Min C TO C Bar Spacing	5000 PSI
#3	1.4"	17
#4	2.0"	22
#5	2.5"	28
#6	3.0"	33
#7	3.5"	48
#8	4.0"	55
#9	4.5"	62
#10	5.1"	69

Note:

1. Splices based on minimum cover as shown on plans.

2 / S6-3 | S6-3 CONCRETE SPLICE TABLE

Scale: Not to Scale

Graphics Scale

0 3" 6" 1' 2' 3'

1"=1'-0"

0 1 2

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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CONCRETE DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

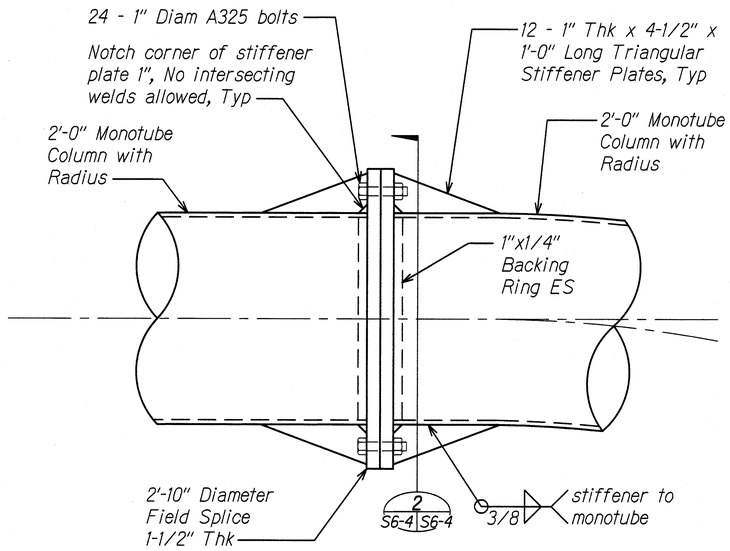
SHEET No. S6-3 OF 186 SHEETS

ORIGINAL PLAN

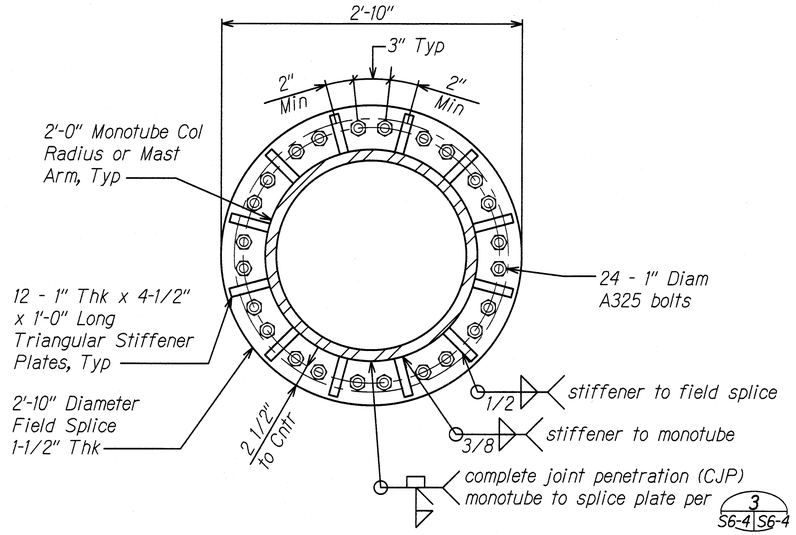
SURVEY PLOTTED BY / DRAWN BY / TRACED BY / DESIGNED BY / QUANTITIES BY / CHECKED BY / DATE

NOTE BOOK / No.

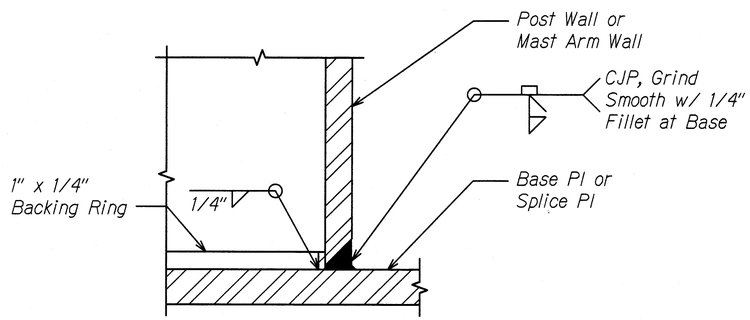
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	144	186



1 DETAIL - FIELD SPLICE
S2-2, S2-3, S2-5, S6-4 Scale: 1-1/2" = 1'-0"
S2-6, S3-2, S3-3,
S3-5, S4-3, S4-5,
S7-1, S7-6



2 DETAIL - FIELD SPLICE
S6-4, S7-1 S6-4 Scale: 1-1/2" = 1'-0"



3 WELD DETAIL
S6-2, S6-4 S6-4 Scale: 3" = 1'-0"

Field Splice Notes:

1. Field splice bolts shall be tightened using "twist off" F1852 bolts to achieve Slip Critical Pre-Tension. Field splice plate surface shall be galvanized Class C surface (roughened by wire brush).

2. Welding of steel shall conform to the requirement of AWS D1.1. All areas to be welded shall be ground to bright metal. No butt weld splices will be permitted. All welding and required testing shall be complete before any material is galvanized. All circumferential and stiffener welds shall be non-destructively tested using the enhanced magnetic particle method in accordance with subsection 509.18(d). All monotube seam welds within 16" of full-penetration circumferential groove welds shall be full penetration groove welds and shall be inspected as specified above. Maximum weld undercut shall be 0.01".

Graphics Scale

0 3" 6" 1' 2'
1-1/2"=1'-0"

0" 1" 2" 3" 6" 1'
3"=1'-0"

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

0 1 2
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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

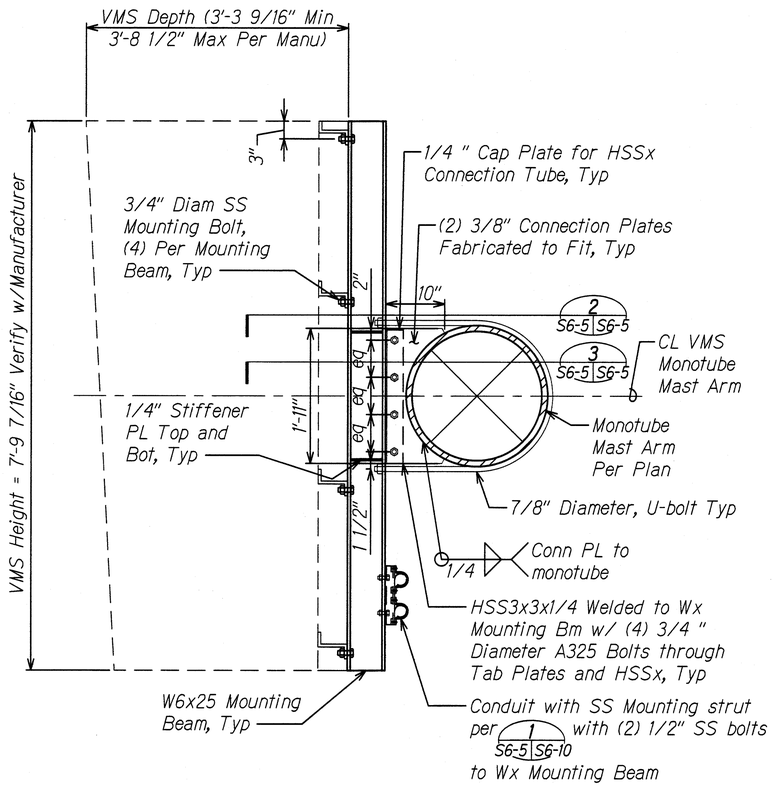
MONOTUBE DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

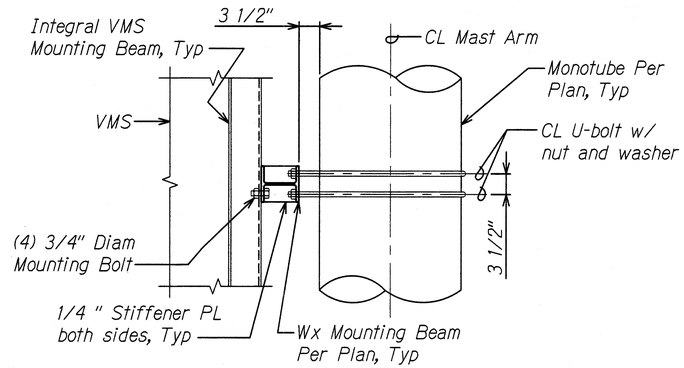
SHEET No. S6-4 OF 186 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	145	186



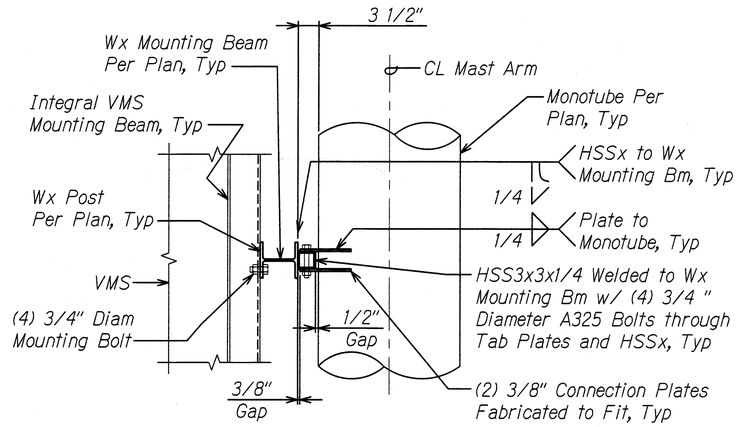
1 S2-2 to S2-4 S6-5 S3-2 to S3-4 S4-2 to S4-4 S6-5, S7-2, S7-3 — MONOTUBE VMS DETAIL

Scale: 1" = 1'-0"



2 S6-5 S6-5 — DETAIL - MOUNTING BEAM CONNECTION

Scale: 1" = 1'-0"



3 S6-5 S6-5 — DETAIL - MOUNTING BEAM CONNECTION

Scale: 1" = 1'-0"

Graphics Scale

0 3" 6" 1' 2' 3'
1"=1'-0"

0 3" 6" 1' 2'
1-1/2"=1'-0"

0 1" 2" 4" 8" 1'
3"=1'-0"

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

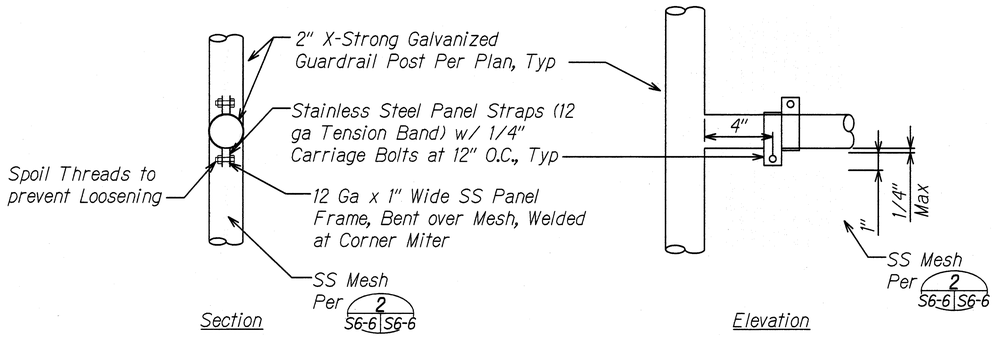
CONNECTION DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

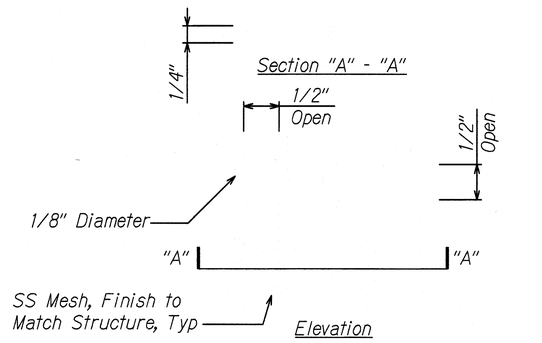
Scale: As Shown Date: June 29, 2018

SHEET No. S6-5 OF 186 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	146	186



1 DETAIL - GUARDRAIL INFILL PANEL
S7-2, S7-3, S7-4 S6-6, S7-5, S7-6
Scale: 3" = 1'-0"



2 DETAIL - CRIMPED MTL MESH
S6-6 S6-6
Scale: 12" = 1'-0"

Graphics Scale

0 1" 2" 4" 8" 1'
3"=1'-0"

0 1" 2"
12"=1'-0"

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

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

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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

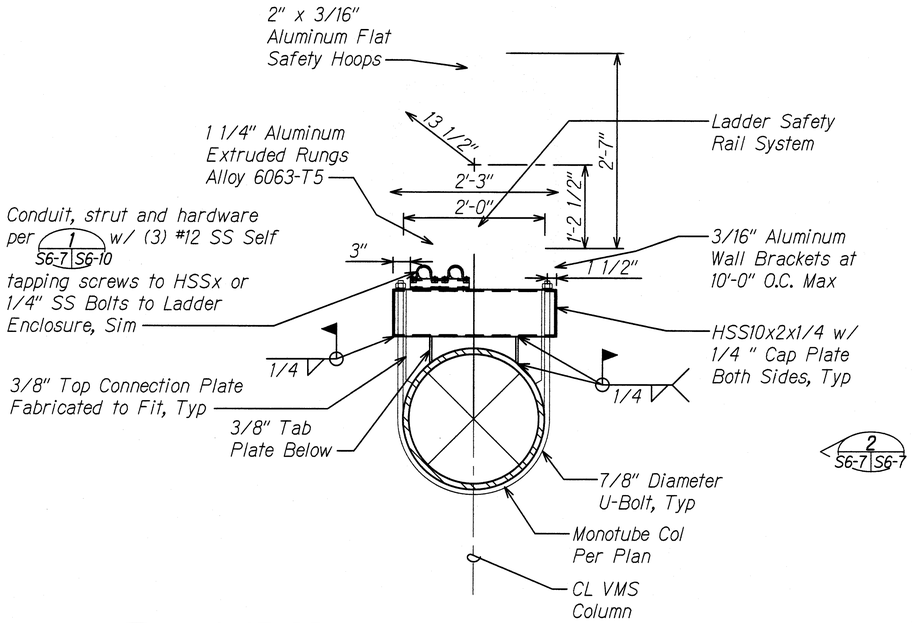
GUARDRAIL DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

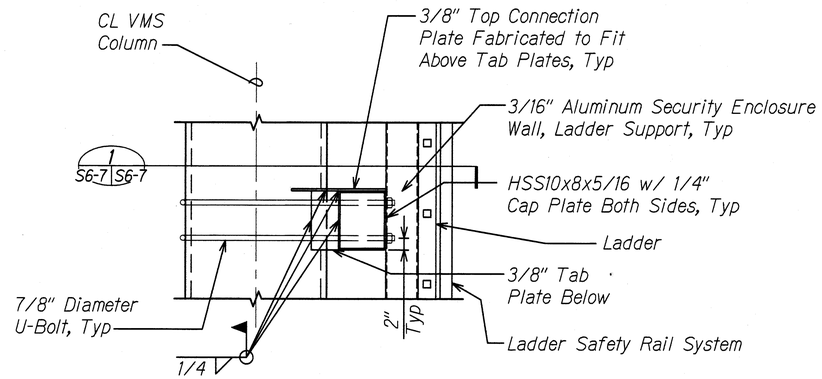
Scale: As Shown Date: June 29, 2018

SHEET No. S6-6 OF 186 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	147	186



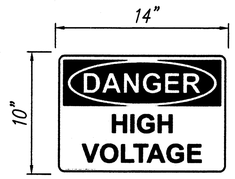
1 MONOTUBE LADDER CONN DETAIL
S2-1 to S2-4 S6-7 Scale: 1" = 1'-0"
S3-1 to S3-4
S4-1 to S4-5
S6-7, S6-8, S7-5, S7-6



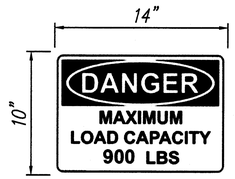
2 MONOTUBE LADDER CONN DETAIL
S6-7, S6-8 S6-7 Scale: 1" = 1'-0"

SIGNAGE NOTES:

1. All signs shall be sheet aluminum with minimum thickness 0.063 in per ASTM B 209, alloy 6061-T6 and painted per standard DOT specification 750.
2. Signs shall be isolated from steel structure with neoprene washers.
3. Maximum load capacity signs shall be attached to exterior screen with stainless steel fasteners.
4. High voltage sign shall be attached to Wx mounting beam with (4) self tapping stainless screws (#10).



High Voltage Sign



Maximum Load Capacity Sign

3 SIGNAGE
S6-7 S6-7 Not To Scale

LADDER NOTES:

1. Ladder shall be O'Keeffe's Aluminum Standard Safety Cage Ladder or Pre-reviewed equal. All components shall be aluminum, all hardware shall be stainless steel.
2. Security door shall be provided on the back and the front at the base of the ladder per 1 S6-7 S6-8 and 2 S6-7 S6-8.
3. Safety rail system shall be Miller Saf-T-Climb Ladder System or Pre-Reviewed equal.

Graphics Scale
0 3" 6" 1' 2' 3'
1"=1'-0"

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

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

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APRIL 30, 2020 LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

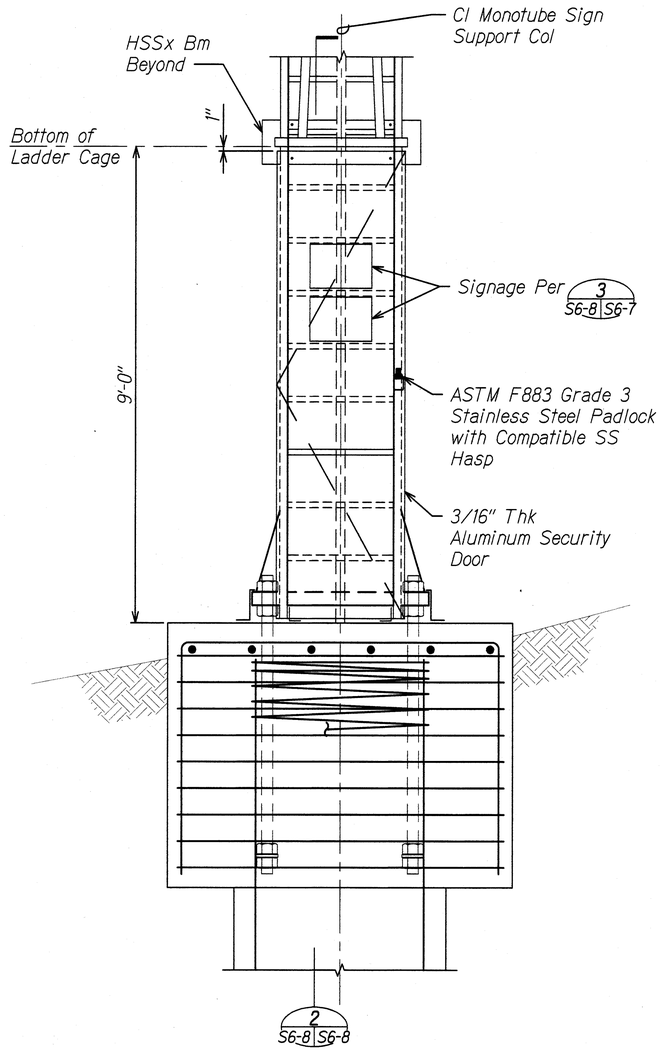
LADDER DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

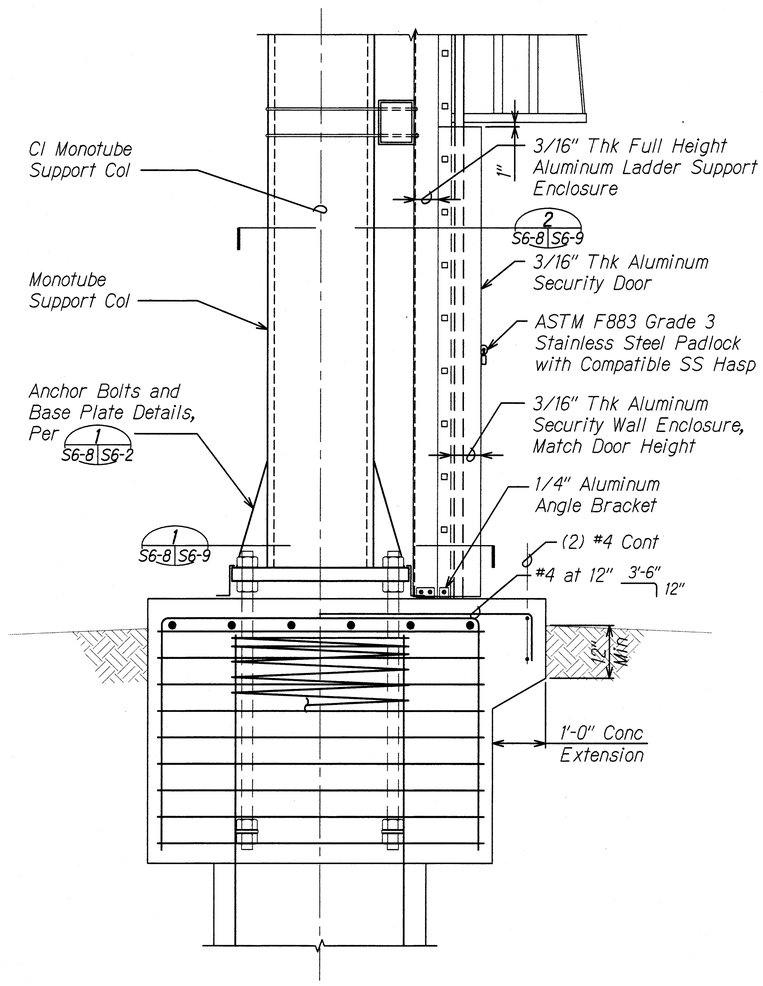
Scale: As Shown Date: June 29, 2018

SHEET No. S6-7 OF 186 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	148	186



1 SECURITY DOOR ELEVATION
S2-3, S3-3, S6-8
S4-3, S6-7
Scale: 3/4" = 1'-0"



2 SECURITY DOOR SECTION
S2-4, S3-4, S6-8
S4-5, S6-7
Scale: 3/4" = 1'-0"

Graphics Scale

0" 3" 6" 1' 2'
1-1/2"=1'-0"

0 6" 1' 2' 4'
3/4"=1'-0"

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

0 1 2
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

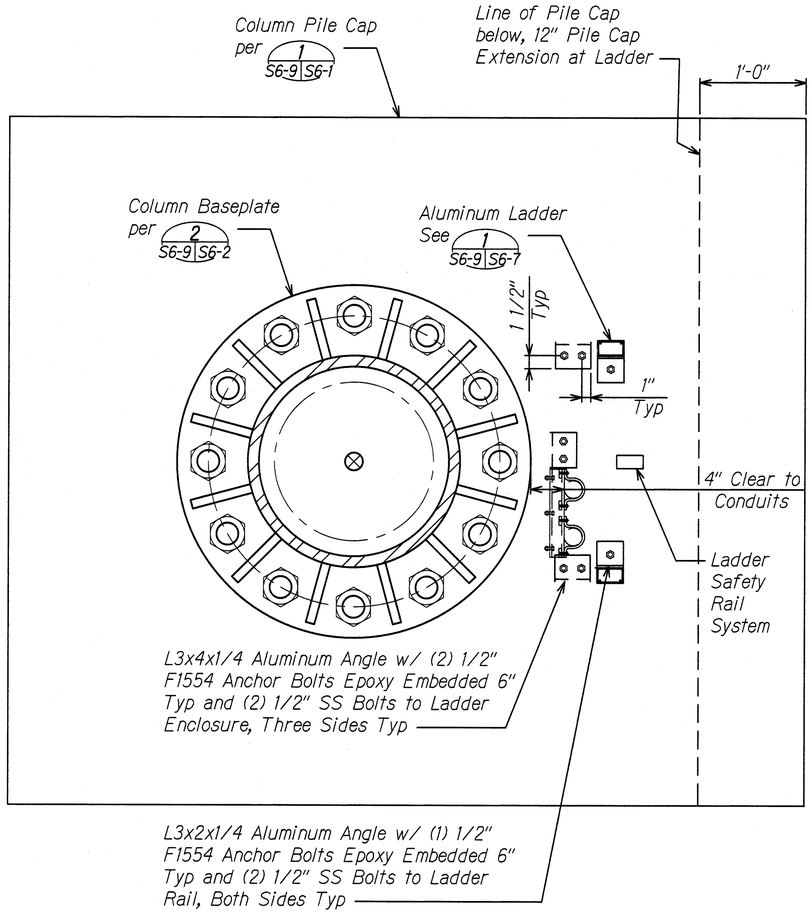
LADDER DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

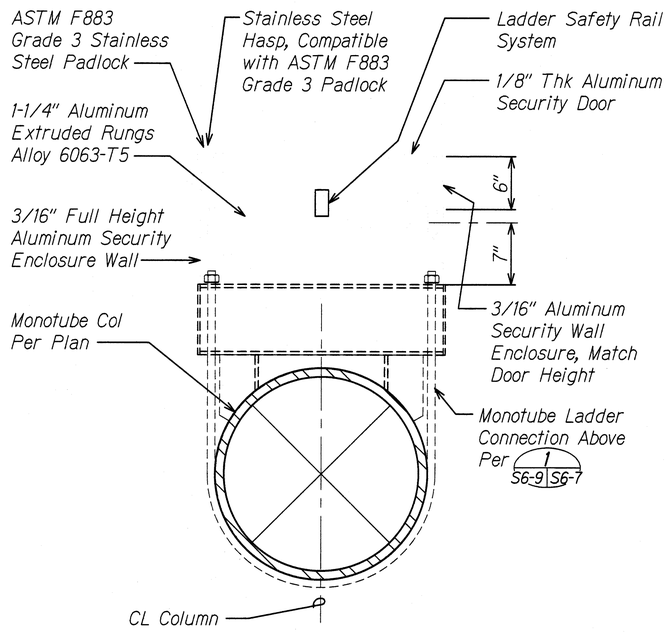
Scale: As Shown Date: June 29, 2018

SHEET No. S6-8 OF 186 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	149	186



1 S6-8 S6-9 PLAN - TOP OF PILE CAP
Scale: 1-1/2" = 1'-0"



2 S6-8 S6-9 LADDER SECURITY DOOR
Scale: 1-1/2" = 1'-0"

Graphics Scale
0" 3" 6" 1' 2'
1-1/2"=1'-0"

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK	TRACED BY	
	DESIGNED BY	
No.	QUANTITIES BY	
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STATE OF HAWAI'I
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

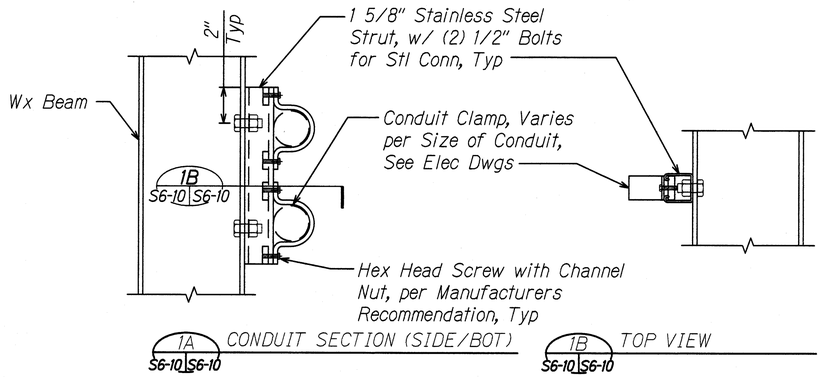
LADDER DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

SHEET No. S6-9 OF 186 SHEETS

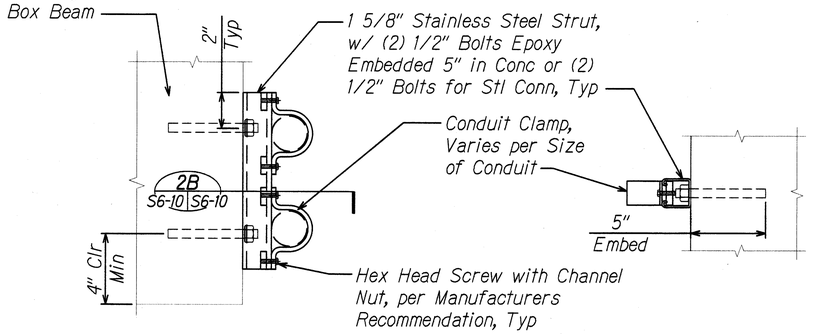
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	150	186



1 CONDUIT ATTACHMENT
S2-2, S3-2, S4-2, S6-10 Scale: 3" = 1'-0"
S5-2, S6-7

Notes:

1. *Threaded rods shall be extended 1/2" past nuts and be spoiled to prevent loosening.*
2. *Provide strut support at 5'-0" on center max.*



2 CONDUIT ATTACHMENT - CONCRETE
S2-2, S3-2, S4-2, S6-10 Scale: 3" = 1'-0"
S5-2, S6-7

Notes:

1. *Conduit attachments may be made to the side or bottom of existing concrete per Elec/Telcom drawings.*
2. *Contractor shall locate existing reinforcing in box beam using non-destructive testing.*
3. *Drilling equipment shall not consist of cutting bits capable of cutting reinforcing steel.*
4. *Threaded rods shall be extended 1/2" past nuts and be spoiled to prevent loosening.*
5. *Provide strut support at 5'-0" on center max.*

Graphics Scale

0 1" 2" 4" 8" 1'
3" = 1'-0"

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

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

GEORGE D. GUTIERREZ JR. LICENSED PROFESSIONAL ENGINEER NO. 12107-S HAWAII, U.S.A.

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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

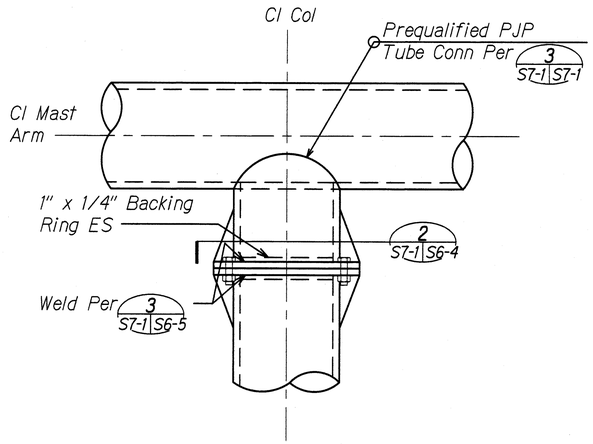
CONDUIT DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

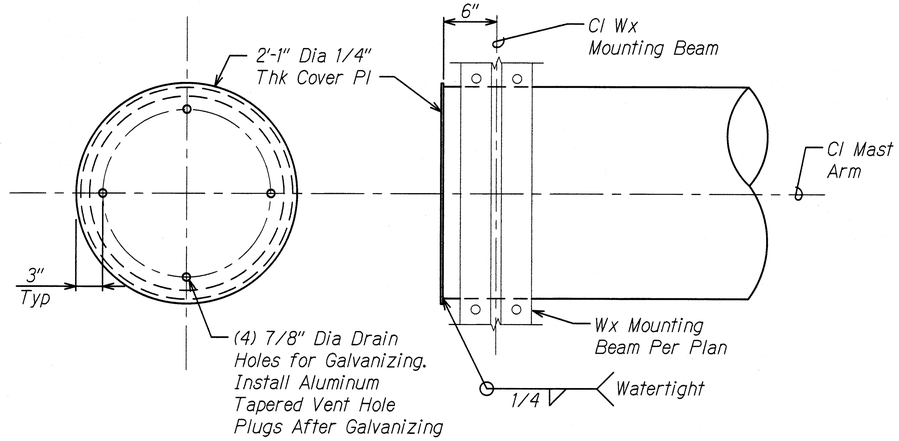
Scale: As Shown *Date: June 29, 2018*

SHEET No. S6-10 OF 186 SHEETS

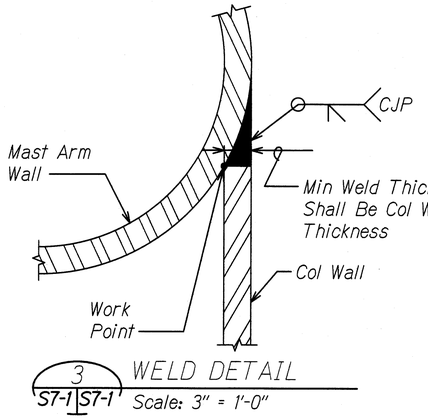
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	151	186



1 T-CONNECTION DETAIL
S2-3, S2-5, S3-3, S7-1, S3-5 Scale: 3/4" = 1'-0"



2 DETAIL - MAST ARM END
S2-2, S2-5, S3-2, S7-1, S3-5, S7-5 Scale: 1-1/2" = 1'-0"



3 WELD DETAIL
S7-1 | S7-1 Scale: 3" = 1'-0"

Note:

1. See 14th Edition AISC Table 8-2 for Additional Information.
2. Per Table 8-2 Prequalified Welded Joints PJP T-Connection tangent line at Working Point Exceeds 45 degrees, No Z Loss Dimension is required for Column Wall to Mast Arm Connection as Shown.

Graphics Scale

0 6" 1' 2' 3' 4'
3/4"=1'-0"

0 3" 6" 1' 2'
1-1/2"=1'-0"

0" 1" 2" 3" 6" 1'
3"=1'-0"

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

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

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APRIL 30, 2020
LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

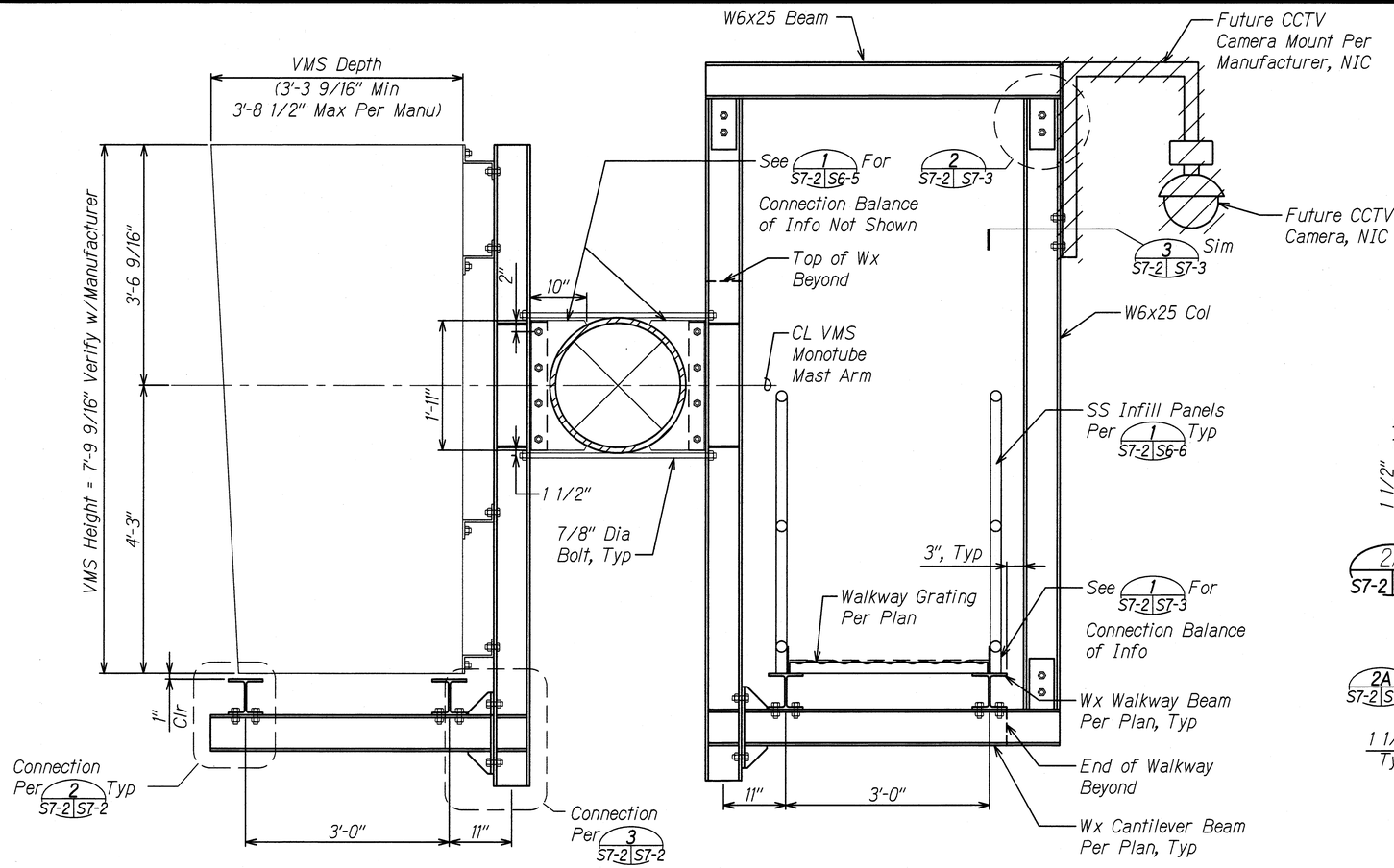
MONOTUBE DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

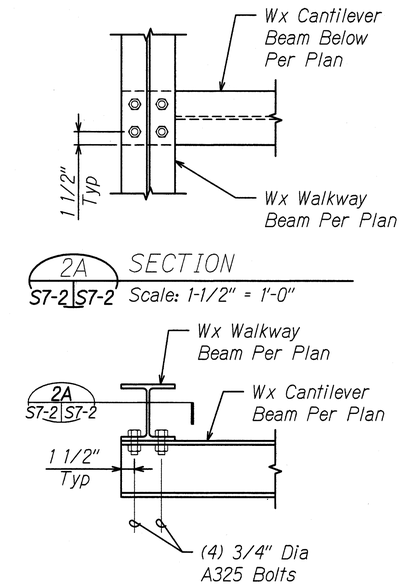
Scale: As Shown Date: June 29, 2018

SHEET No. S7-1 OF 186 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	152	186

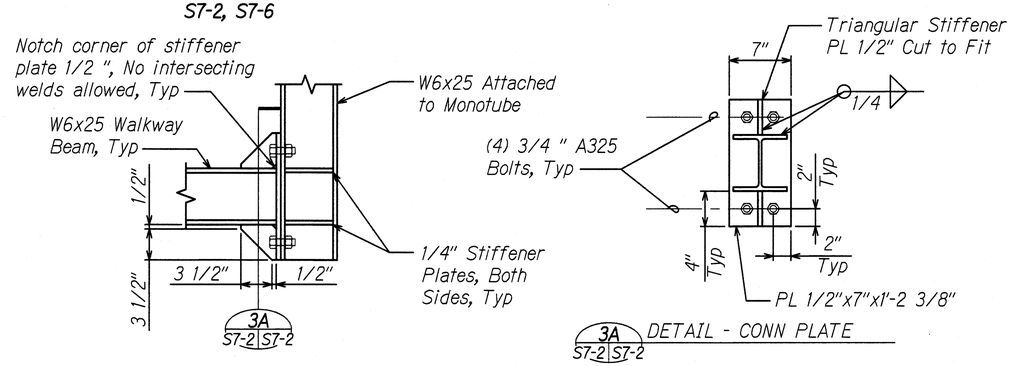


1 S2-2, S2-3, S2-4, S7-2 S3-2, S3-3, S3-4, S7-2, S7-6 VMS AND WALKWAY DETAIL
Scale: 1" = 1'-0"



2 S7-2, S7-3, S7-4, S7-2 DETAIL
Scale: 1-1/2" = 1'-0"

Graphics Scale
0 3" 6" 1' 2' 3'
1"=1'-0"
0 3" 6" 1' 2'
1-1/2"=1'-0"



3A S7-2 S7-2 DETAIL - CONN PLATE

3 S7-2, S7-3, S7-4, S7-2 S7-6 DETAIL - CANTILEVER CONN
Scale: 1-1/2" = 1'-0"

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

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

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APRIL 30, 2020 LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

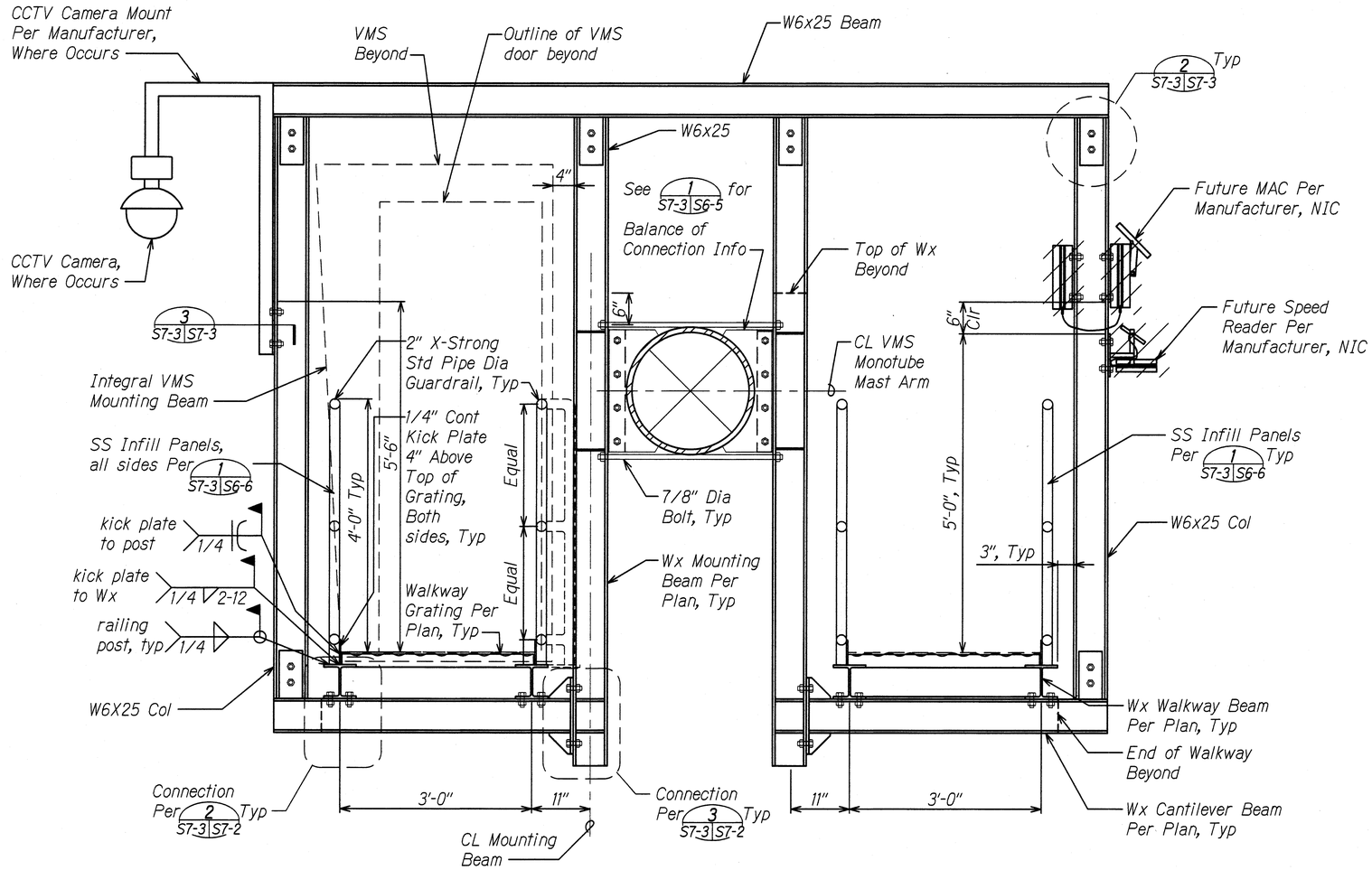
WALKWAY DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

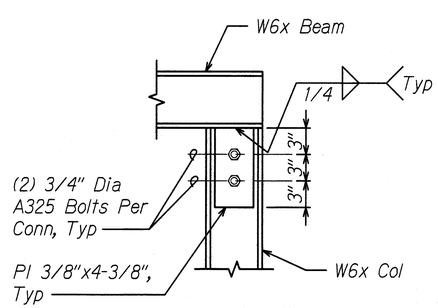
Scale: As Shown Date: June 29, 2018

SHEET No. S7-2 OF 186 SHEETS

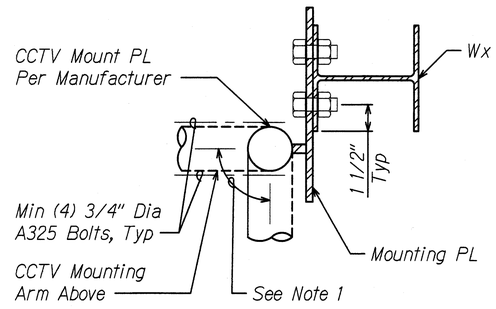
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	153	186



1 MONOTUBE WALKWAY DETAIL
S2-2, S4-2, S7-4|S7-3 Scale: 1" = 1'-0"



2 Wx CONNECTION
S7-2, S7-3|S7-3 Scale: 1-1/2" = 1'-0"



3 DETAIL - PLAN
S7-2, S7-3|S7-3 Scale: 3" = 1'-0"

Note:

1. Mount shall be able to swing minimum 90 degrees.

Graphics Scale

0 3" 6" 1' 2' 3'
1"=1'-0"

0 3" 6" 1' 2'
1-1/2"=1'-0"

0 1" 2" 4" 8" 1'
3" = 1'-0"

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

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

GEORGE O. GUTIERREZ JR
LICENSED PROFESSIONAL ENGINEER
No. 12107-S
HAWAII, U.S.A

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APRIL 30, 2020
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

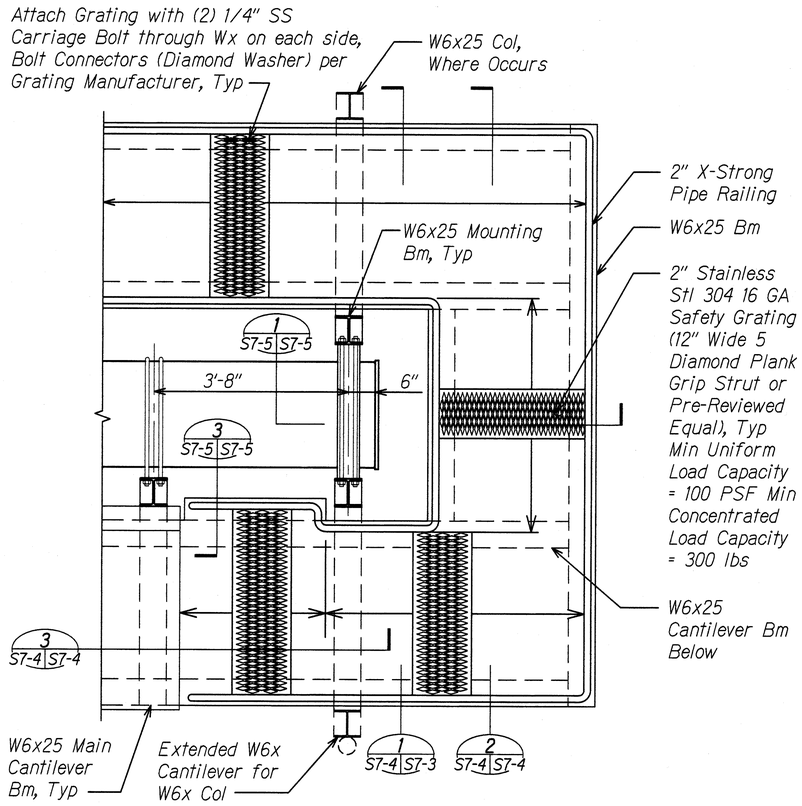
WALKWAY DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

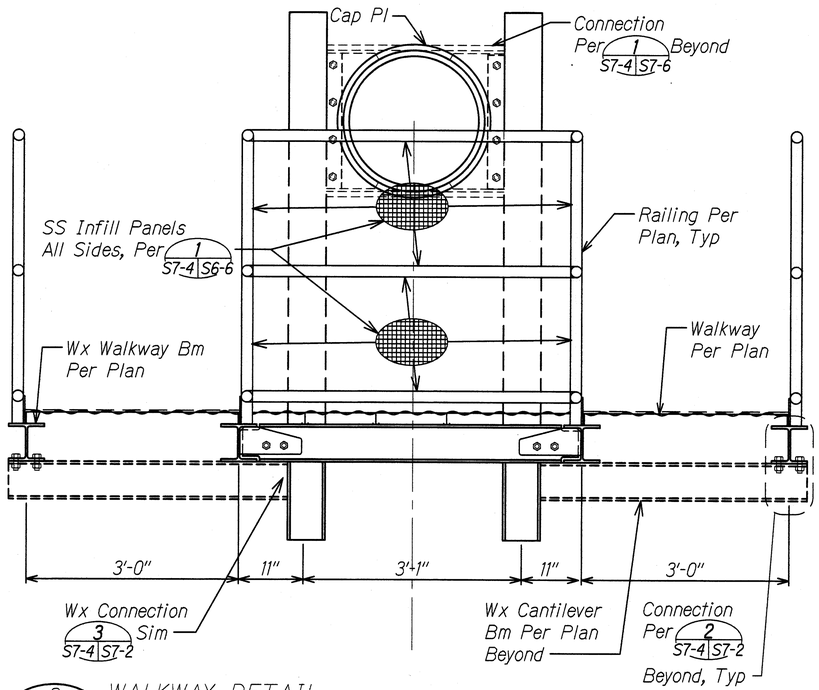
Scale: As Shown Date: June 29, 2018

SHEET No. S7-3 OF 186 SHEETS

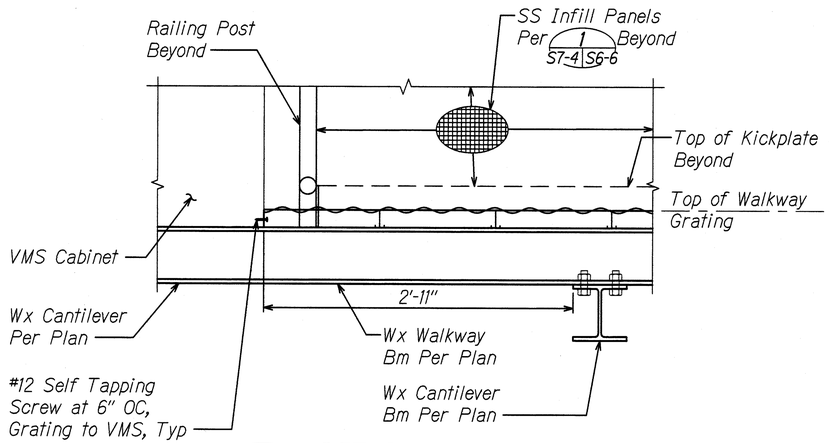
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	154	186



1 S2-2, S3-2, S7-4 PARTIAL PLAN - WALKWAY
Scale: 3/4" = 1'-0"



2 S2-2, S3-2, S7-4 S7-4 WALKWAY DETAIL
Scale: 1" = 1'-0"



3 S2-2, S3-2, S7-4 S7-4 DETAIL
Scale: 1-1/2" = 1'-0"

Graphics Scale

0 6" 1' 2' 3' 4'
3/4"=1'-0"

0 3" 6" 1' 2' 3'
1"=1'-0"

0 3" 6" 1' 2'
1-1/2"=1'-0"

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

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

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APRIL 30, 2020 LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

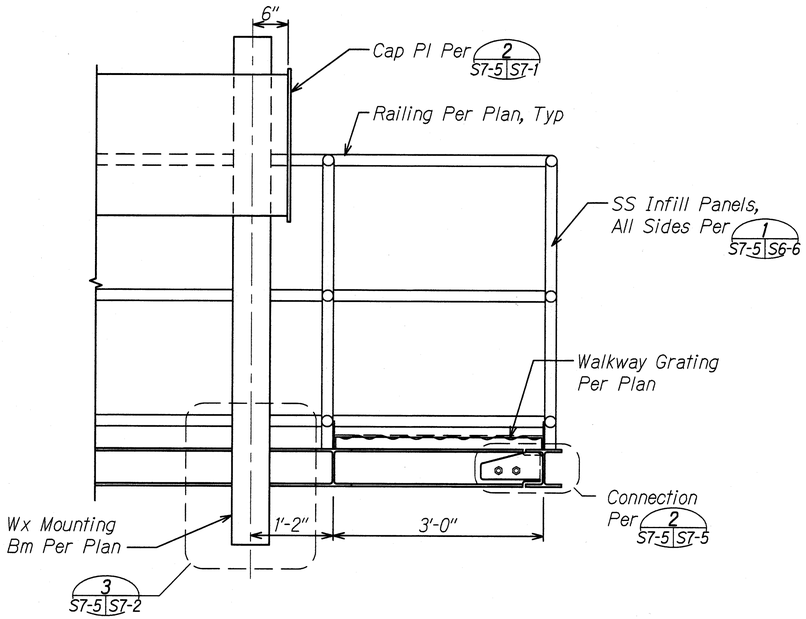
WALKWAY DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

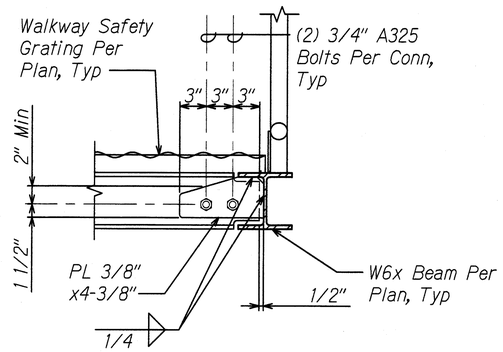
Scale: As Shown Date: June 29, 2018

SHEET No. S7-4 OF 186 SHEETS

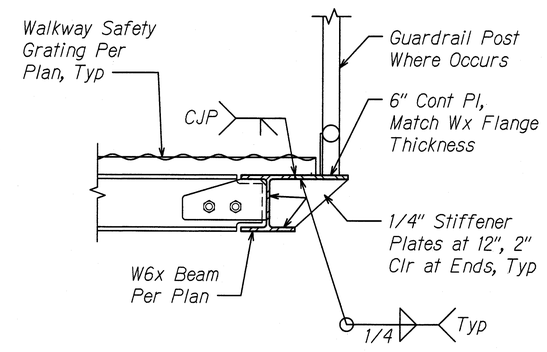
DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	155	186



1 WALKWAY DETAIL
S2-2, S3-2, S7-5 S7-5 Scale: 1" = 1'-0"



2 DETAIL - W6x BM TO BM CONN
S7-5, S7-6 S7-5 Scale: 1-1/2" = 1'-0"



3 DETAIL - WIDENED WALKWAY
S7-4 S7-5 Scale: 1-1/2" = 1'-0"

Graphics Scale

0 3" 6" 1' 2' 3'
1"=1'-0"

0 3" 6" 1' 2'
1-1/2"=1'-0"

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

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

GEORGE O. GUTIERREZ JR.
LICENSED PROFESSIONAL ENGINEER
NO. 12107-S
HAWAII, U.S.A.

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APRIL 30, 2020
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

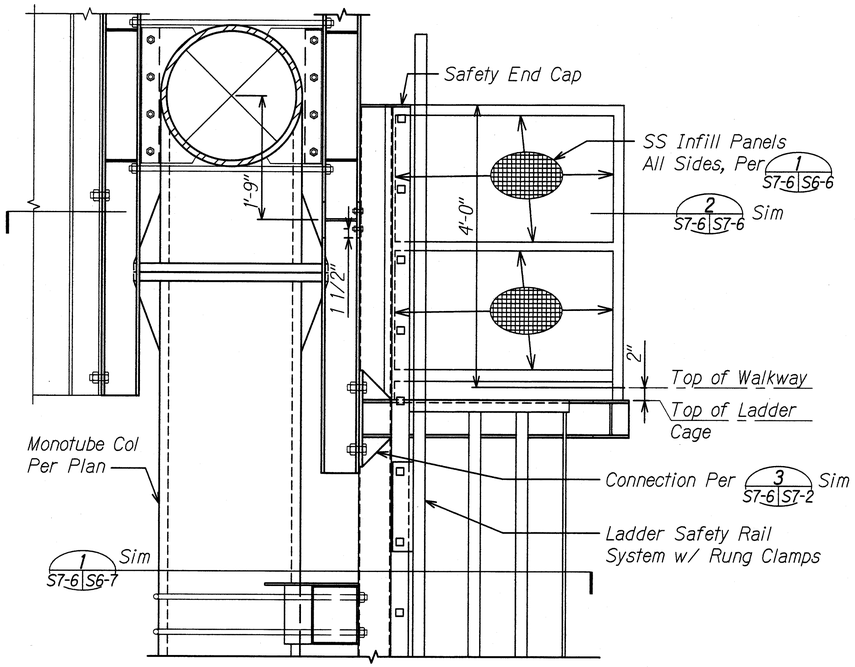
WALKWAY DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

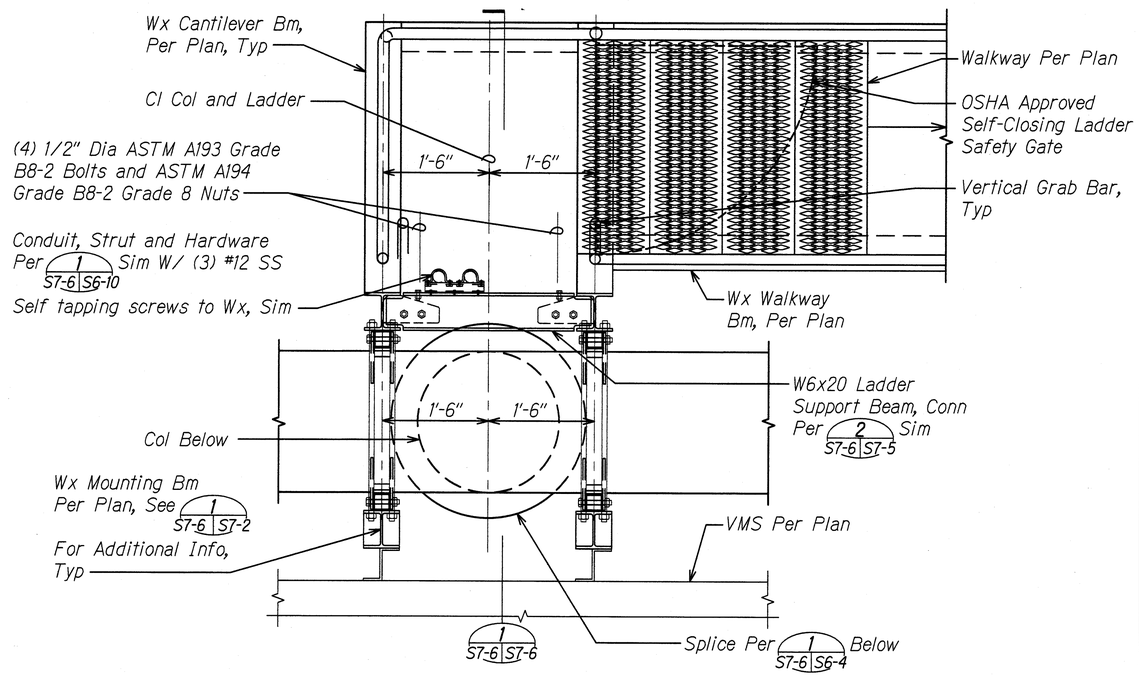
SHEET No. S7-5 OF 186 SHEETS

DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
OAHU	HAW.	NH-0300(160)	2018	156	186



1 WALKWAY LADDER DETAIL

S2-2, S3-2, S7-5, S7-6 S7-6 Scale: 1" = 1'-0"



2 PLAN - SECTION AT TOP

S2-2, S3-2, S7-6 S7-6 Scale: 1" = 1'-0"

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

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

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APRIL 30, 2020 LIC. EXP. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LADDER DETAILS

Freeway Management System, Phase 2
Federal Aid Project No. NH-0300(160)

Scale: As Shown Date: June 29, 2018

SHEET No. S7-6 OF 186 SHEETS