TRAFFIC SIGNAL NOTES

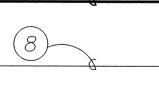
- 1. The Locations of the Traffic Signal Standards, Traffic Signal Standards W/Mast Arms, Pedestrian Push Buttons, Traffic Controller, Pullboxes, Conduits and Loop Detectors Shall Be Staked Out in the Field By the Contractor and Approval of the Locations Shall Be Obtained From the Engineer Prior to Construction and Installation.
- 2. All Splicing Shall Be Done in the Pullboxes.
- 3. Furnishing and Installing the Conduit Stubouts (Pullboxes to Edge of Pavement) Will Not Be Paid For Separately But Shall Be Considered Incidental to the Various Control Items.
- 4. A Solid #8 Bare Copper Wire Shall Be Pulled With the Traffic Signal Control Cable For Equipment Ground. Cost Shall Be Incidental to the Installation of the Control Cable.
- 5. All Traffic Signal Controller Equipment Shall Be Completely Wired in the Cabinet and Shall Control the Traffic Signals as Called For in the Plans.
- 6. The Contractor Shall Install One Meter Socket and 50 Amp. Breaker as Shown On the Plans in Accordance With MECO Requirements. The Meter Shall Be Mounted On Concrete Pedestal. Between 5 Feet and 6 Feet Above Ground. For Details, See Electrical Drawings Meter Socket Shall Be 4-Prong, Complete With a Manual Circuit Closing Device.
- 7. The Loop Amplifier Units Furnished For This Project Shall Be Capable of Operating the Loop Detector Configurations Shown On the Plans. Cost For the Loop Amplifier Shall Be Incidental to the Installation of the Loop Detector.
- 8. Should Any Defect Be Encountered During the Warranty Period, the Manufacturer Will Be Notified and He Shall Promptly Correct Such Defect. Service Call (By Factory Qualified Representative) During the Warranty Period For Repairs or Other Maintenance Shall Be Answered Within 24 Hours and Shall Be Done At No Expense to the State. All Repairs Shall Be Done As Soon As Possible.
- 9. All Traffic Signal Work Shall Conform to the Requirements Of the "Manual On Uniform Traffic Control Devices For Streets and Highways", Federal Highway Administration (2000) and Amendments.
- 10. Locations Of Traffic Markings and Markers (Lane Lines, Stop Lines, Crosswalk, Etc.) Shown On the Plans Shall Be Verified With the Engineer Prior to the Installation Of the Traffic Signal System.
- 11. Installation of the Opticum Receiver Shall Conform to the Standard Details and Standard Specifications of the State Department of Transportation.
- 12. All Work Relating to Hawaiian Telephone Shall Be Done in Accordance With HTCO's Underground Specifications, Dated May 1992.
- 13. Provide All New Non-programmable Traffic Signal Heads and Pedestrian Signal Heads With LED Signal Assemblies.
- 14. Traffic Signals, Traffic Standards and Mast Arms Shall Conform with AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals, 2001, 4th Edition and Subsequent Interim Revistions, for 105 mph winds.

TRAFFIC SIGNAL LEGENDS

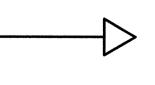
New Traffic Signal Controller



New Traffic Signal Conduits & Cables



Existing Traffic Signal Conduits & Cables



New 12" RYG Traffic Signal Head

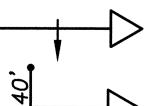


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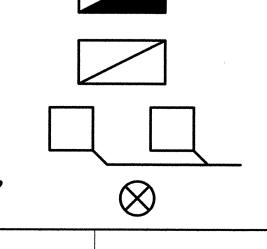
ORIGINAL PLAN NOTE BOOK

New 12" RY | Traffic Signal Head

Unless Indicated Otherwise.



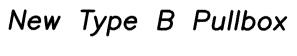
New 12" RY—Traffic Signal Head New Type II Traffic Signal Standard (Mast Arm Length, and Signal Head Spacing as Specified),



New Type I Traffic Signal Standard (height-10') Signal Heads as Specified



New Type A Pullbox

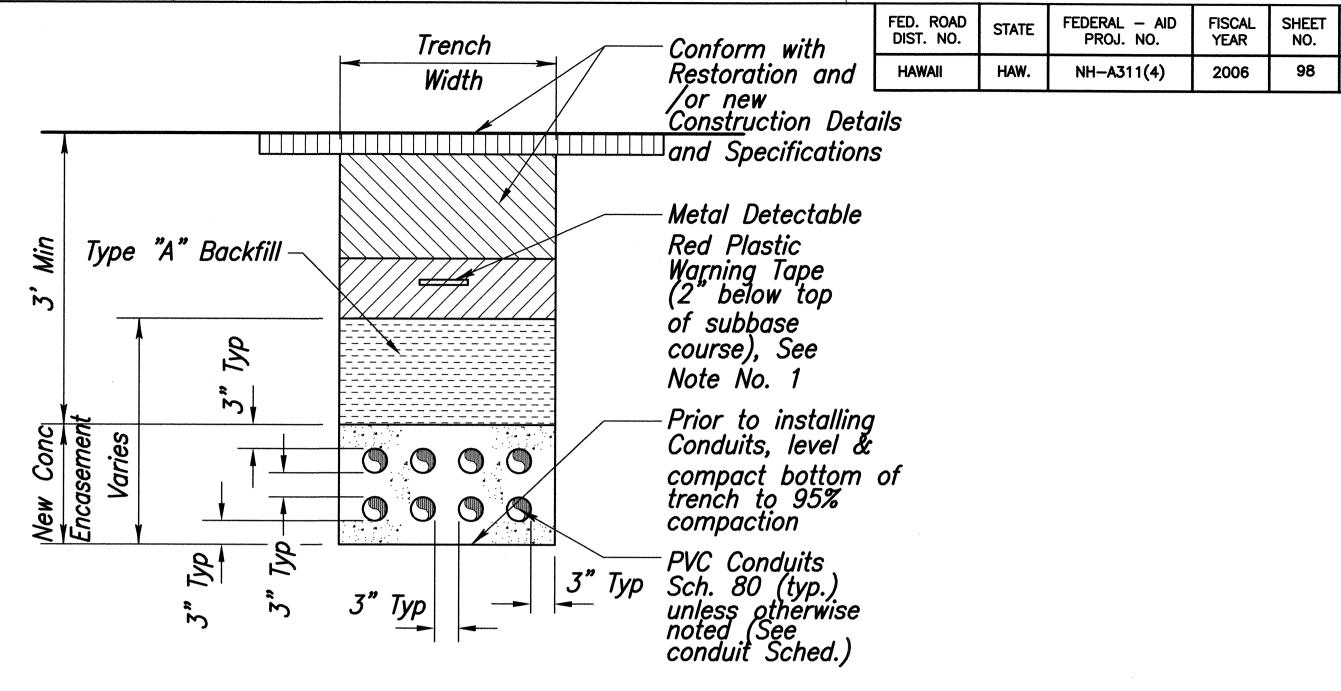




New Type B Pullbox (street Lighting)

New Loop Detectors

Opticom Receiver



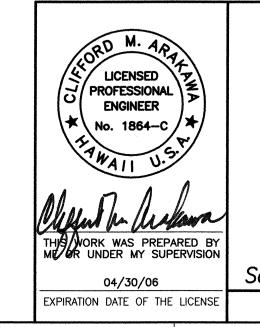
TRAFFIC SIGNAL SYSTEM CONDUIT TRENCH SECTION Not to Scale

TRAFFIC SIGNAL NOTES CONTINUE

15. Maintain 36" Clearance Between Control Duct Lines and Loop Detectors.

NOTES:

- 1. The Metal Detectable Red Plastic Warning Tape shall be a minimum 5 mils thick and 4" wide with a continuous metallic backing and corrosion resistant 1± mil thick foil core. The message on the tape shall read, "CAUTION - STATE TRAFFIC SIGNAL AND/OR HWY. LIGHTING BURIED BELOW," utilizing 1 1/2" inches series "C" black lettering. The message will be repeated with a 4 1/2" spacing between top line of message and start of next repeat. Tape shall be considered incidental to ductline cost.
- 2. The Contractor may begin backfilling the conduit trench when the concrete reaches 2000 psi compressive strength after 3 days.
- 3. Maximum four (4) Conduits per row for multiple conduit duct section.
- 4. After installing all the traffic signal cables, the Contractor shall duct seal all conduits in the pullboxes, traffic signal standards and traffic signal controller cabinet concrete base. The duct seal material shall be approved by the Traffic Signal Inspector/Engineer and shall not be paid for separately but considered incidental to the direct buried and /or concrete encased conduits.



DEPARTMENT OF TRANSPORTATION

TRAFFIC SIGNAL PLAN

MOKULELE HIGHWAY WIDENING Vicinity of Kealia Pond Driveway

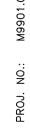
Piilani Highway Federal - Aid Project No. NH-A311(4)

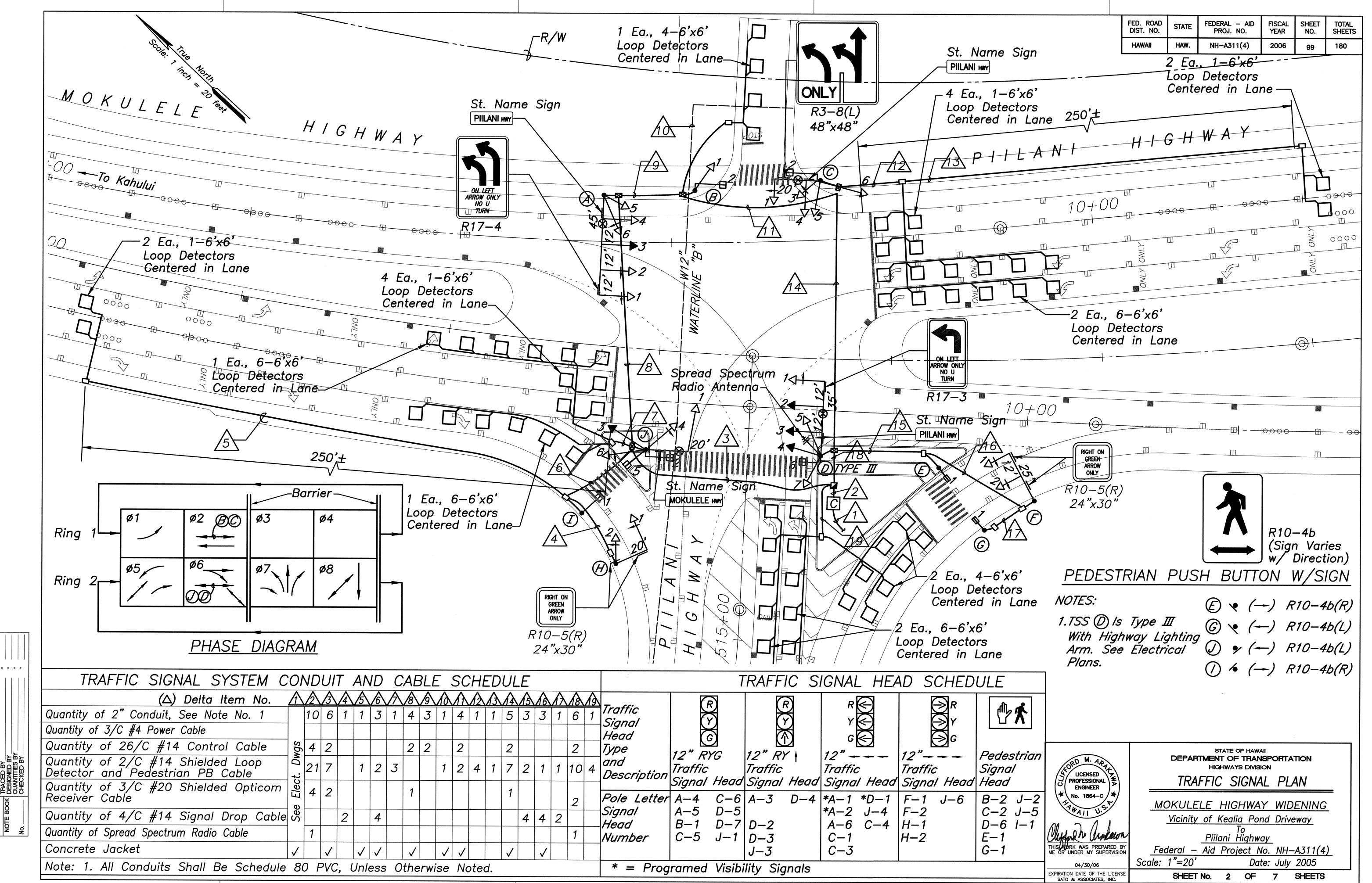
Scale: AS NOTED Date: July 2005

SHEET No. 1

OF **7** 98

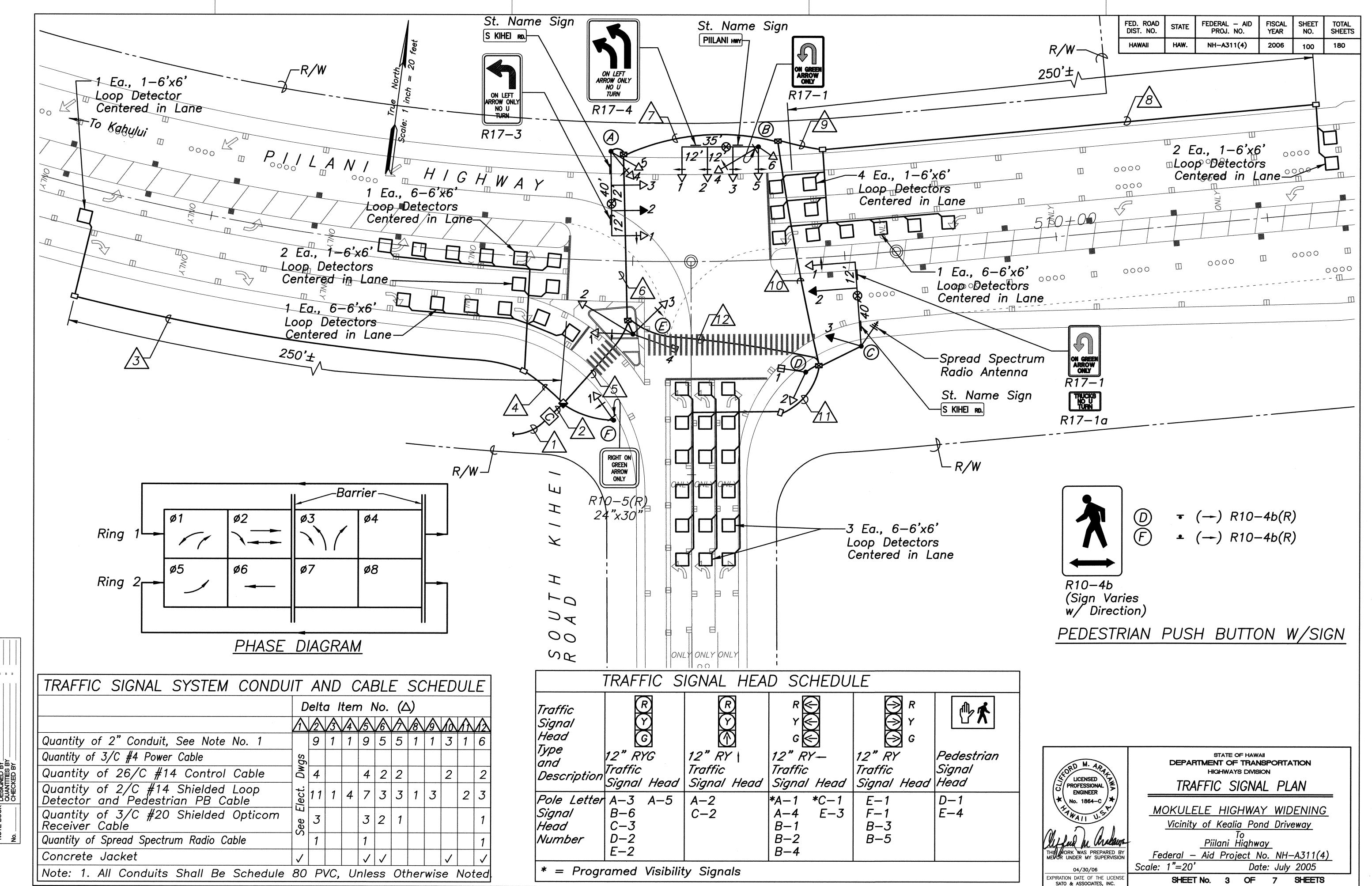
SHEETS

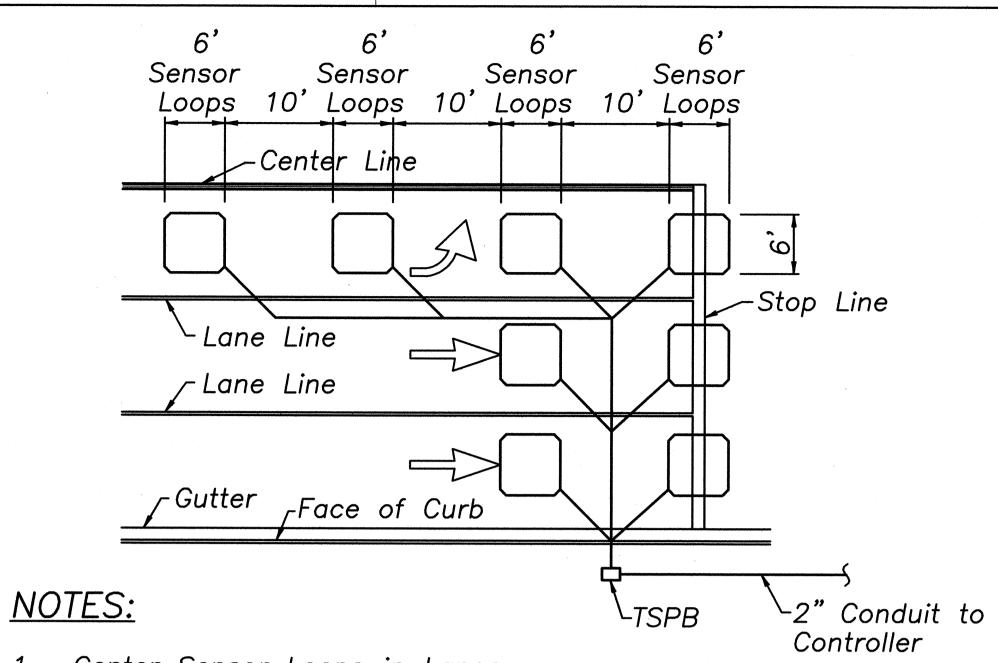




PROJ. NO.: M9901.00

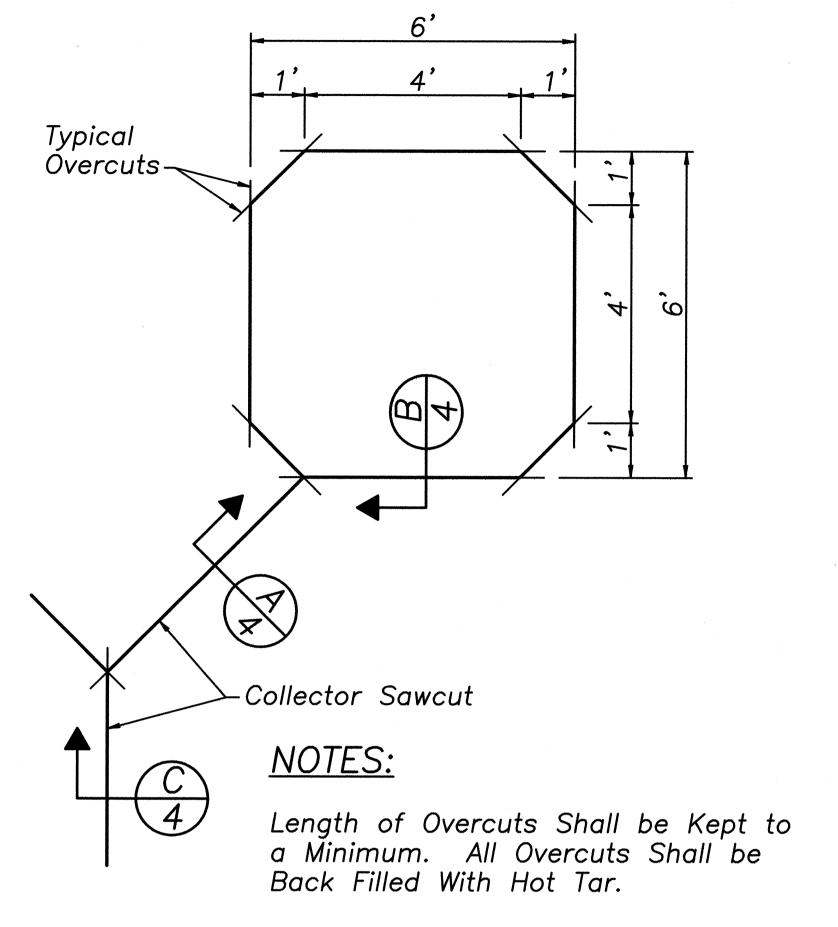
99

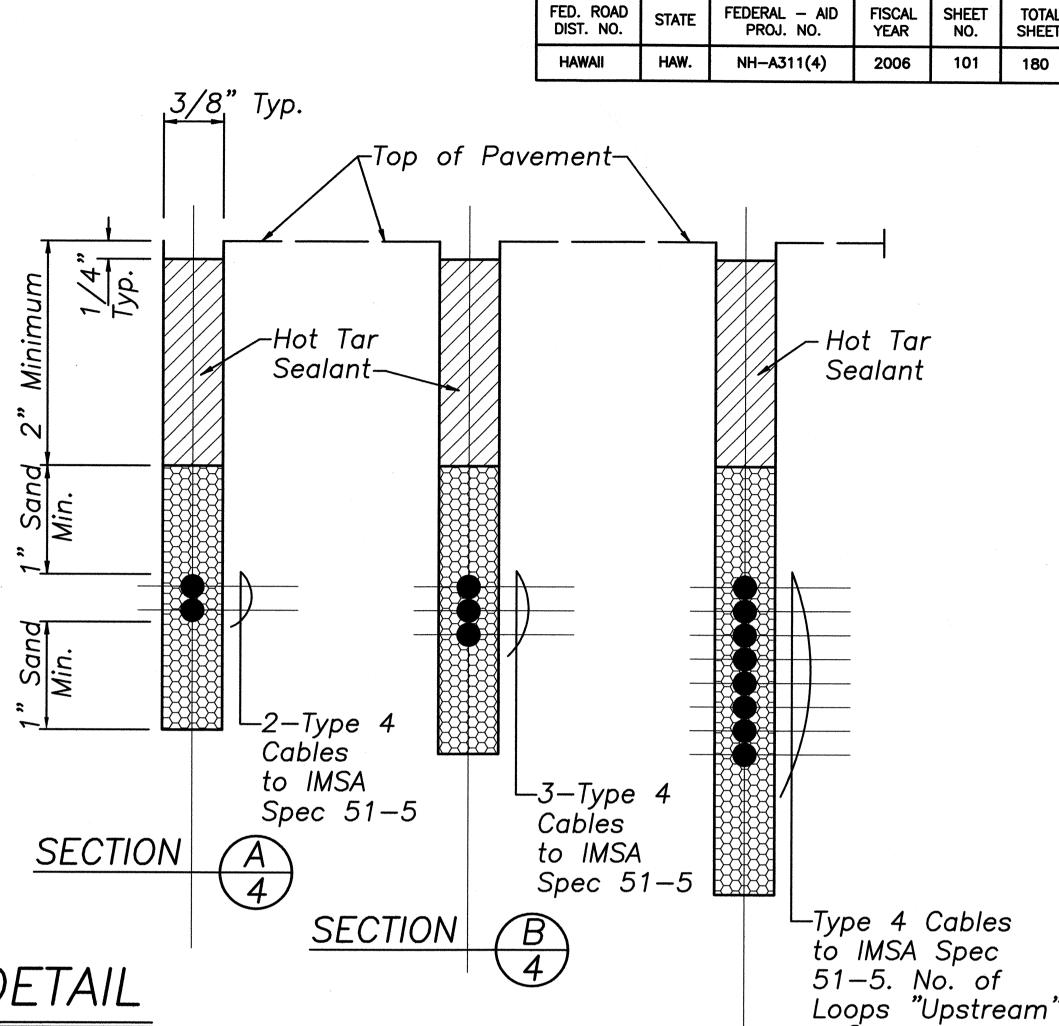




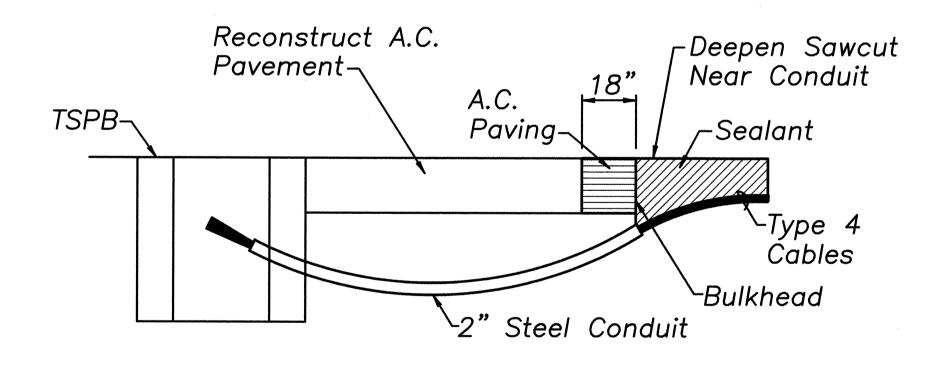
- 1. Center Sensor Loops in Lanes.
- 2. Collector Cables Shall Be Twisted 2 Turns Per Foot.
- 3. Number and Loops and Locations Vary. See Project Plans.
- 4. Number and Locations of Collector Sawcuts May Be Varied in the Field to Suit.

TYPICAL SENSOR LOOP LAYOUT





TYPICAL SENSOR LOOP SAWCUT DETAIL

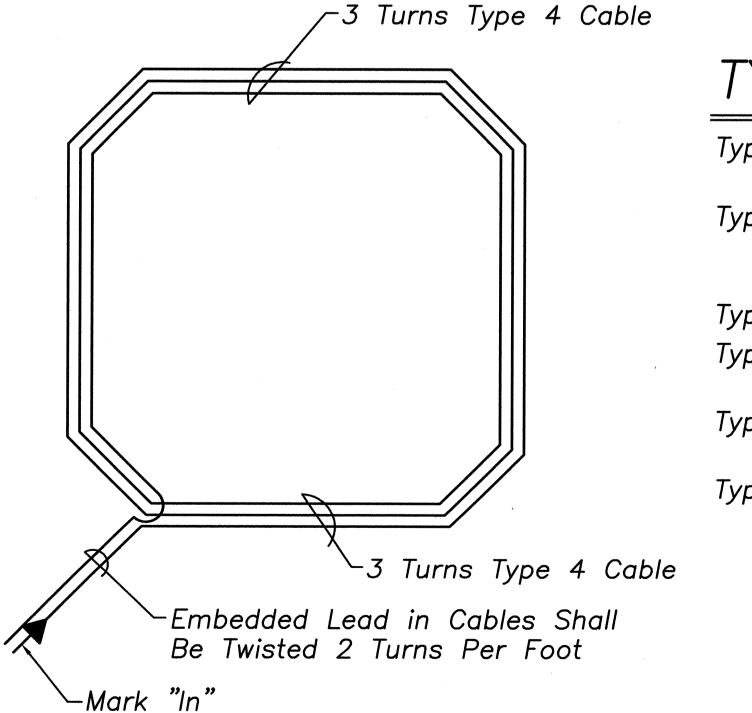


NOTES ON CONSTRUCTION AT END OF SAWCUT

- 1. Seal Roadway End of Conduit After Installation of Conductors.
- 2. Install Bulkhead Across Conduit Trench.
- 3. Place Hot Tar in Sawcut.
- 4. Backfill Over Conduit With New A.C.
- 5. Reconstruct Curb and Gutter as Required.

DETAIL OF SENSOR LOOP INSTALLATION

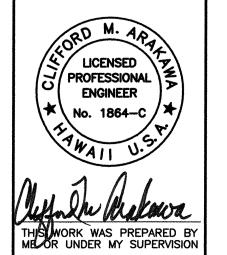
AT EDGE OF ROADWAY



TYPES OF CABLE

Type 1	Signal	Loop	Cable:	_ Stranded	No.	14
	26 C	onduct	tors			

- Type 2 Detector Lead—In Cable and Pedestrian Push Button Circuit Cable: Stranded, No. 14, 2 Conductors
- Type 3 Interconnect Cable: Solid No. 19, 12 Pairs
- Type 4 Loop Sensor Cable: Stranded No. 12, Single Conductor to IMSA Spec 51-5
- Type 5 Cable From Signal Loop to Signal Head: Stranded, No. 14, 4 Conductor
- Type 6 Service Cable: Solid, Size as Shown, 3 Conductors



04/30/06
EXPIRATION DATE OF THE LICENSE

DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL PLAN

MOKULELE HIGHWAY WIDENING

Vicinity of Kealia Pond Driveway

Piilani Highway

Federal — Aid Project No. NH—A311(4)

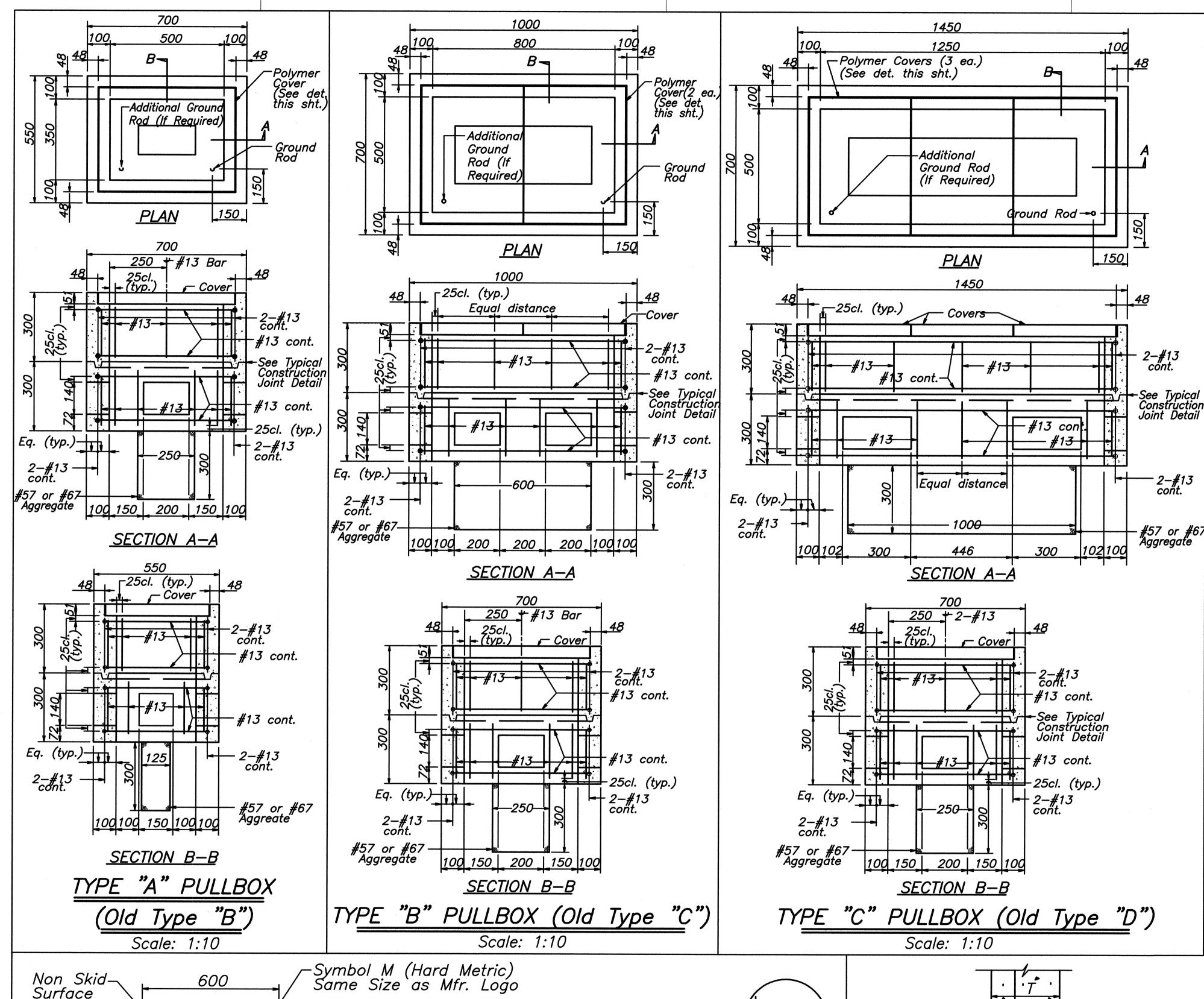
Scale: AS NOTED Date: July 2005

SHEET No. 4 OF 7 SHEETS

SECTION C



TYPICAL SENSOR LOOP WIRING DIAGRAM

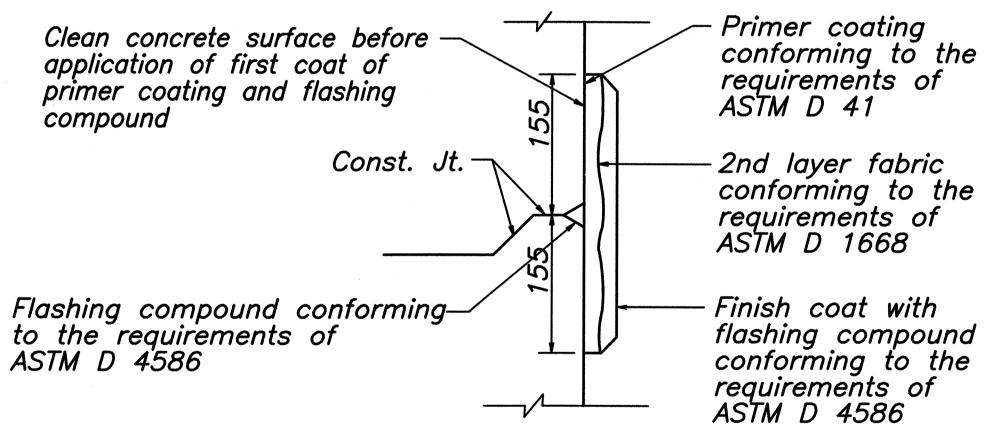


FED. ROAD DIST. NO. STATE FEDERAL - AID PROJ. NO. FISCAL SHEET NO. SHEETS

HAWAII HAW. NH-A311(4) 2006 102 180

GENERAL NOTES

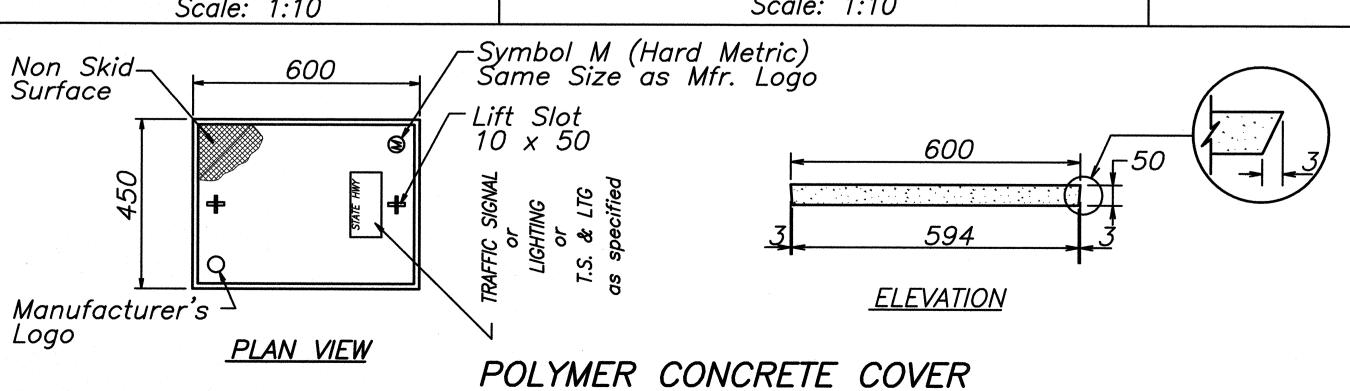
- 1. Provide a minimum of one 16mm x 2.5m Copperweld Ground Rod in each pullbox. When directed by the Traffic Signal Inspector/Engineer, install additional Ground Rods. Cost of Ground Rods shall be incidental to the pullboxes.
- 2. All pre-cast concrete pullboxes shall be manufactured in two pieces.
- 3. The pullbox and cover shall be capable of supporting an MS 18 Loading.
- 4. The maximum weight of the pullbox cover shall not exceed 27 kilograms.
- 5. The openings for the conduits on all pullboxes shall be pre-cast concrete knockouts.
- 6. After installing the conduits in the openings of the pullboxes, the Contractor shall fill the excess opening in the pre—cast knockouts with concrete mortar.
- 7. Prior to installing the pullboxes, the Contractor shall level the bottom of the trench and achieve a minimum of 95% relative compaction of the bottom of the trench.
- 8. All concrete shall be Class A (21 MPa (3,000 psi), min.)
-). Rebars shall be Grade 300 and all lapped splices shall be 360mm minimum.
- 10. The #57 or #67 size aggregate shall conform to latest version of AASHTO M43 (ASTM D 448).
- 11. Type "C" Pullbox shall be installed in a location protected from vehicular traffic (i.e. raised sidewalk, behind A.C. curbs, traffic signal standard or pipe guards).



TYPICAL FLASHING COMPOUND WATERPROOFING DETAILS

Not to Scale

NOTE: All dimensions and rebar sizes are in metric.



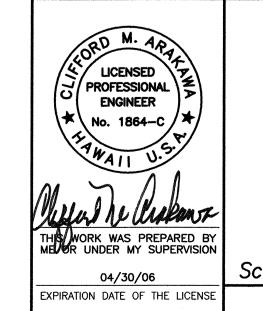
Not to Scale

Flashing compound waterproofing of back face of walls only

TYPICAL CONSTRUCTION

JOINT DETAIL

Not to Scale



DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PULLBOX & COVER DETAILS

MOKULELE HIGHWAY WIDENING

Vicinity of Kealia Pond Driveway

To Piilani Highway

Federal - Aid Project No. NH-A311(4)
Scale: AS NOTED Date: July 2005

SHEET No. 5

OF 7 SHEETS 102

INGINAL SURVEY PLOTTED BY DATE

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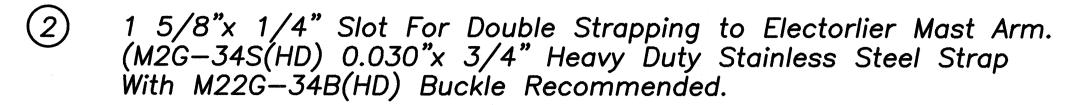
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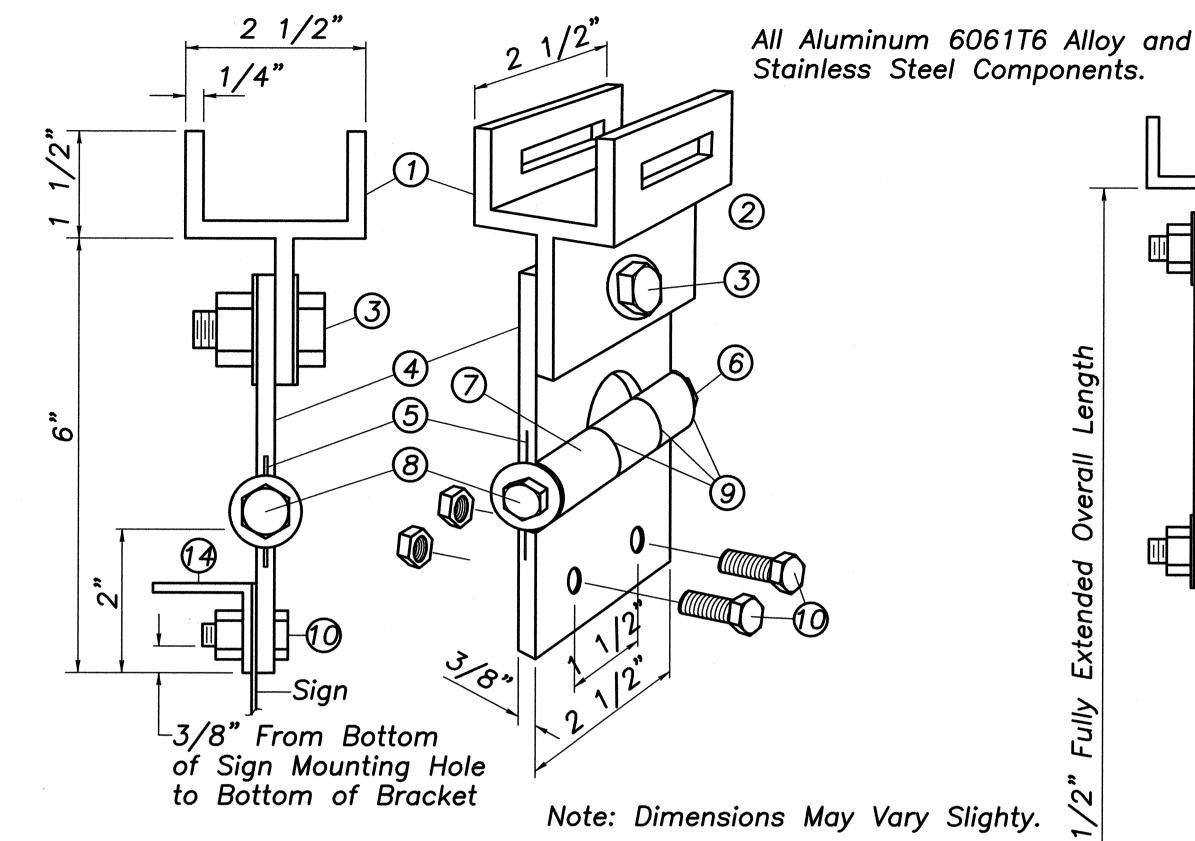
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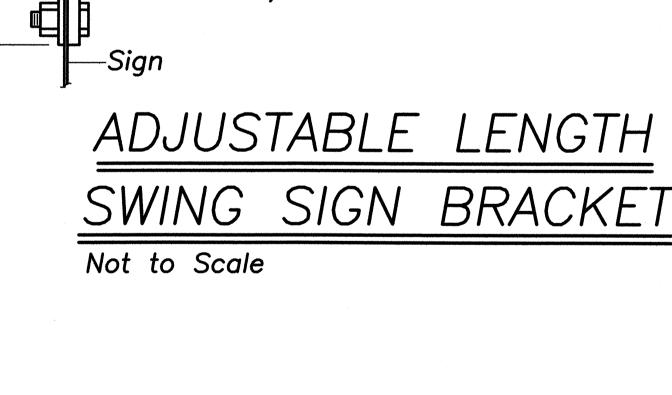
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY



- 1/2"— 13 x 1 1/2" Stainless Steel Hex Head Bolt With Stainless Steel Hex Lock Nut and 1/16" Stainless Steel Washer (Both Sides). Allow Upper Bracket to Pivot and Align With Electrolier Mast Arm.
- 6" Overall Drop With Fixed Length Sign Bracket. (4)
- Stainless Steel Dampener Spring (removable).
- Stainless Steel Hex Lock Nut With 1/16" Stainless Steel Washer.
- 1" O.D. Axle Housing.
- 1/2" 13 x 4" Stainless Steel Hex Head Bolt With 1/16" Stainless Steel Washer.
- Oilite Bushing.
- Sign Mounting Sets, Consisting of Two Each 5/16"— 18 x 1" Stainless Steel Hex Head Bolt With Stainless Steel Hex Lock Nut. Two Holes On 1 1/2" Centers Provide Positive Lock Sign Mounting to Bracket.
- 8 1/4" Overall Length Upper Adjustable Sign Bracket Section.
- 9" Overall Length Lower Adjustable Sign Bracket Section, Including Axle Housing (8" Overall Length to Top of Housing).
- 1/2"— 13 x 1 /12" Stainless Steel Hex Bolt With Stainless Steel Hex Lock Nut and 1/16" Stainless Steel Washers (Both sides). Loosen Lock Nut, Adjust Bracket Teeth to Level sign.
- (14) 1 1/4" x 1 1/4" x 1/8" Aluminum Angle.



FIXED LENGTH NON-ADJUSTABLE SWING SIGN BRACKET Not to Scale



Allows Length

Adjustment

Of 4 1/2'

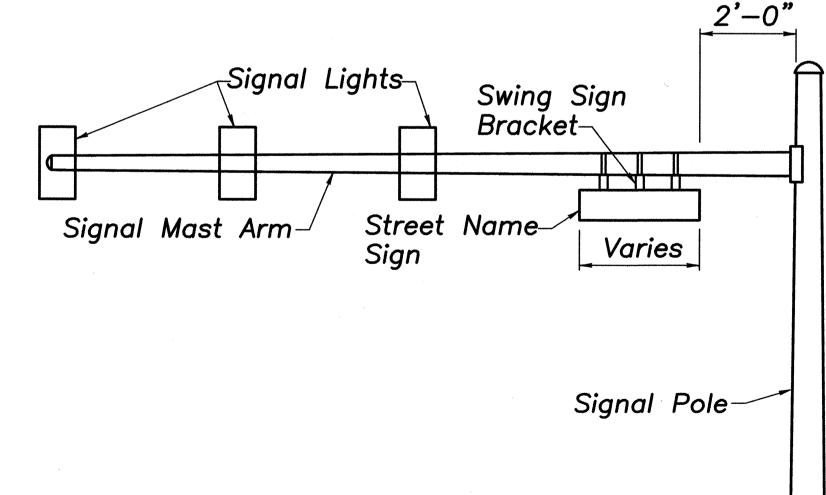
-Sign

FED. ROAD DIST. NO.

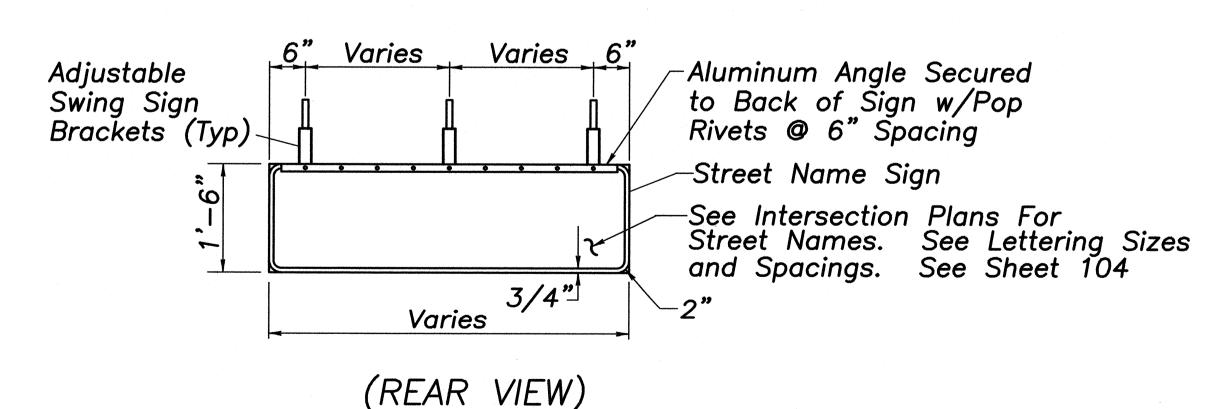
FEDERAL — AID PROJ. NO.

NH-A311(4)

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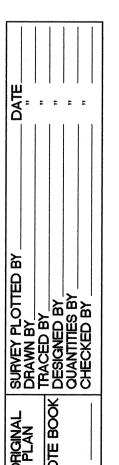


STREET NAME SIGN MOUNTING ON MAST ARM



PANEL & SWING BRACKET LAYOUT FOR STREET NAME SIGN

Not to Scale



EXPIRATION DATE OF THE LICENS

LICENSED PROFESSIONAL

★ \ No. 1864-C /

04/30/06

TRAFFIC SIGNAL PLAN MOKULELE HIGHWAY WIDENING

DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

Vicinity of Kealia Pond Driveway

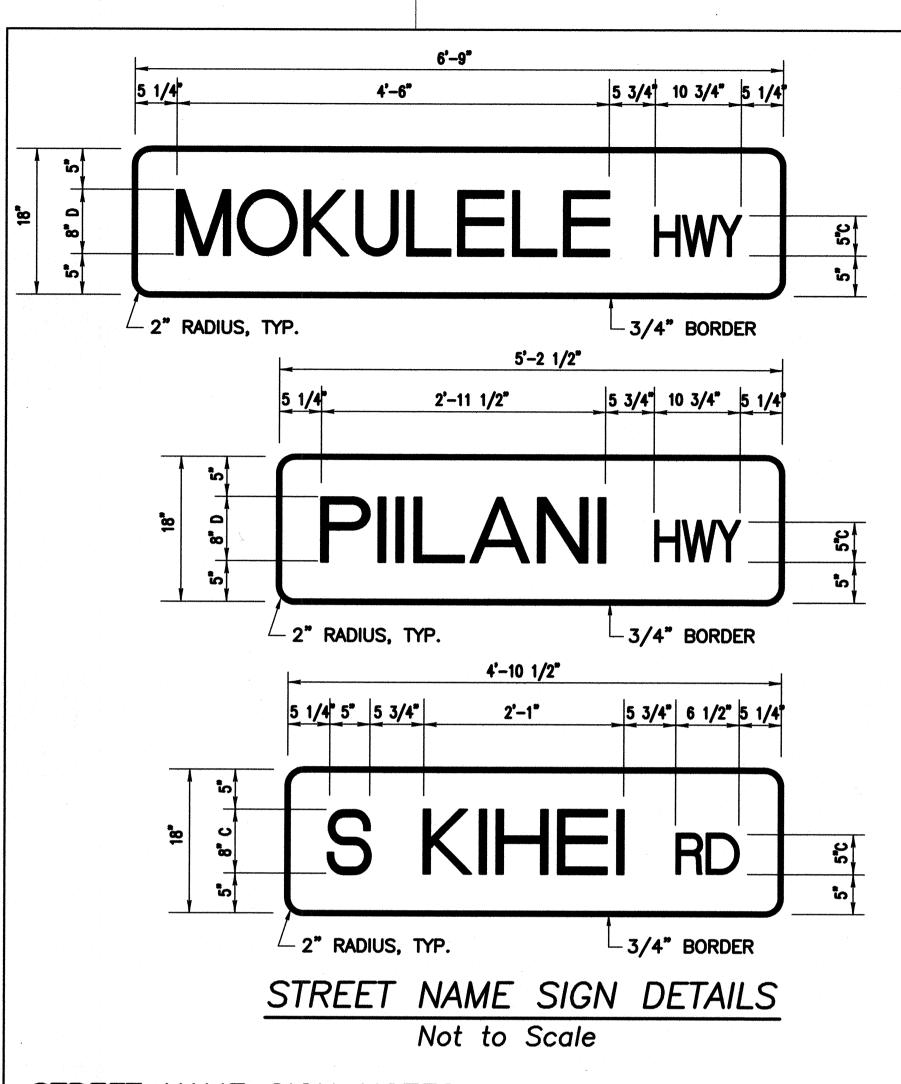
Piilani Highway Federal - Aid Project No. NH-A311(4) Scale: AS NOTED Date: July 2005

SHEET No. 6

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OF 7 SHEETS

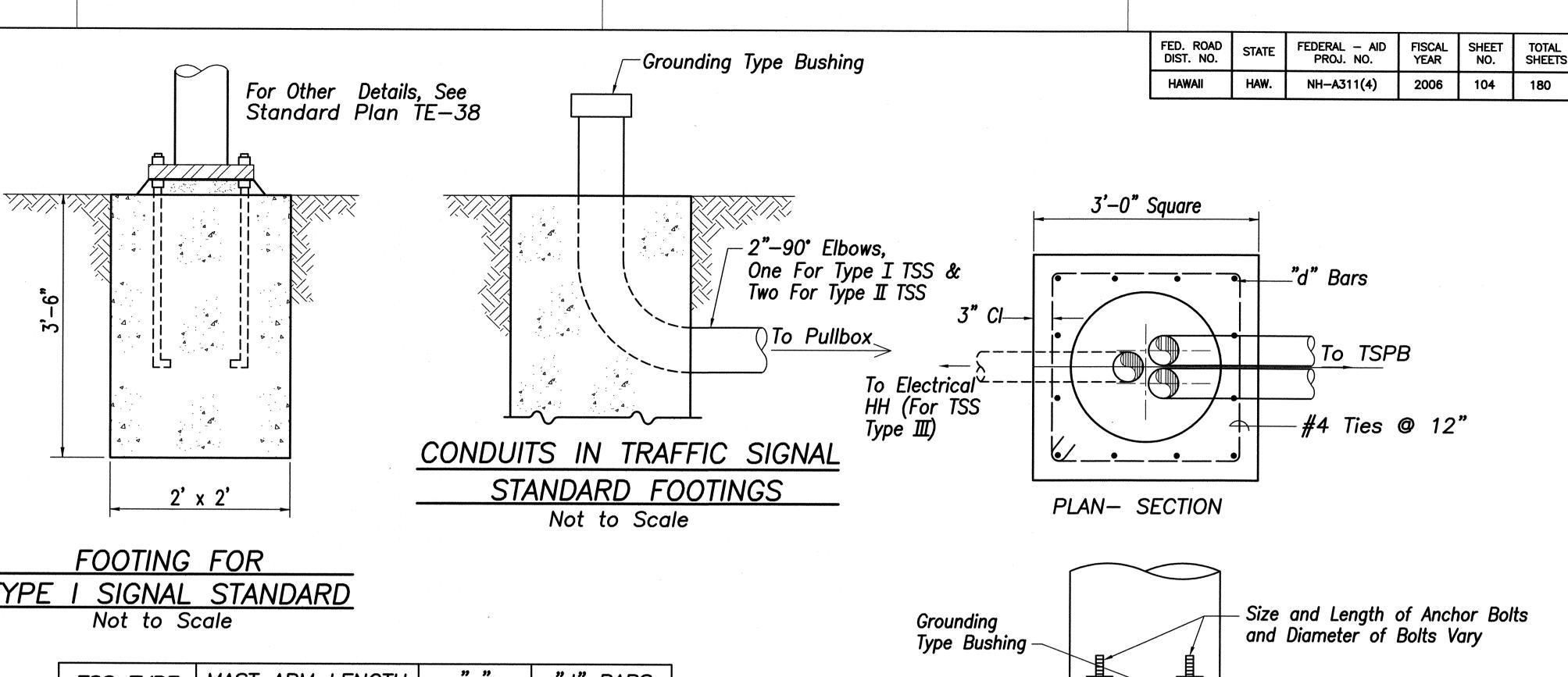
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STREET NAME SIGN NOTES

- 1. Sign Shall Be New Street Name Sign. The Contractor Shall Provide The Same Message On The Front and Back Side of The Sign. Payment Will Not Be Made Separately But Shall Be Considered As One Unit.
- 2. Colors: Legend - White (Reflectorized)
- 3. All Panels Shall Be Reflectorized With Type III Or IV Retroreflective Sheeting In Accordance With Section - 712.20 Of The Standard Specifications.
- 4. All Signs Shall Conform To Section 621 Of The Standard Specifications and The Latest Editions and Amendments Of The Following FHWA Publications:
 a. "Manual On Uniform Traffic Control Devices For Streets and Highways"

 - b. "Standard Highway Signs"
 - c. "Standard Alphabets For Highway Signs"
- 5. Borders and Messages Shall Conform To Details As Shown On The Plans and As Specified In MUTCD.
- 6. sign Mounting Brackets, Aluminum Angle, Fixtures, Fasteners and All Necessary Hardware and Equipment, Tools, Labor, Materials and Other Incidentals For Installation, Will Not Be Paid For Separately But Shall Be Considered Incidental To Street Name Sign Installation.
- 7. Number Of Swing Sign Brackets Required Per Sign Panel: 3 Brackets Panel Length 7' Or Less 4 Brackets - Panel Length Greater Than 7' With A Miximum Length Of 9'-6"
- 8. Diacritical Marks For Street Name Are Not Authorized.



Finished Grade –

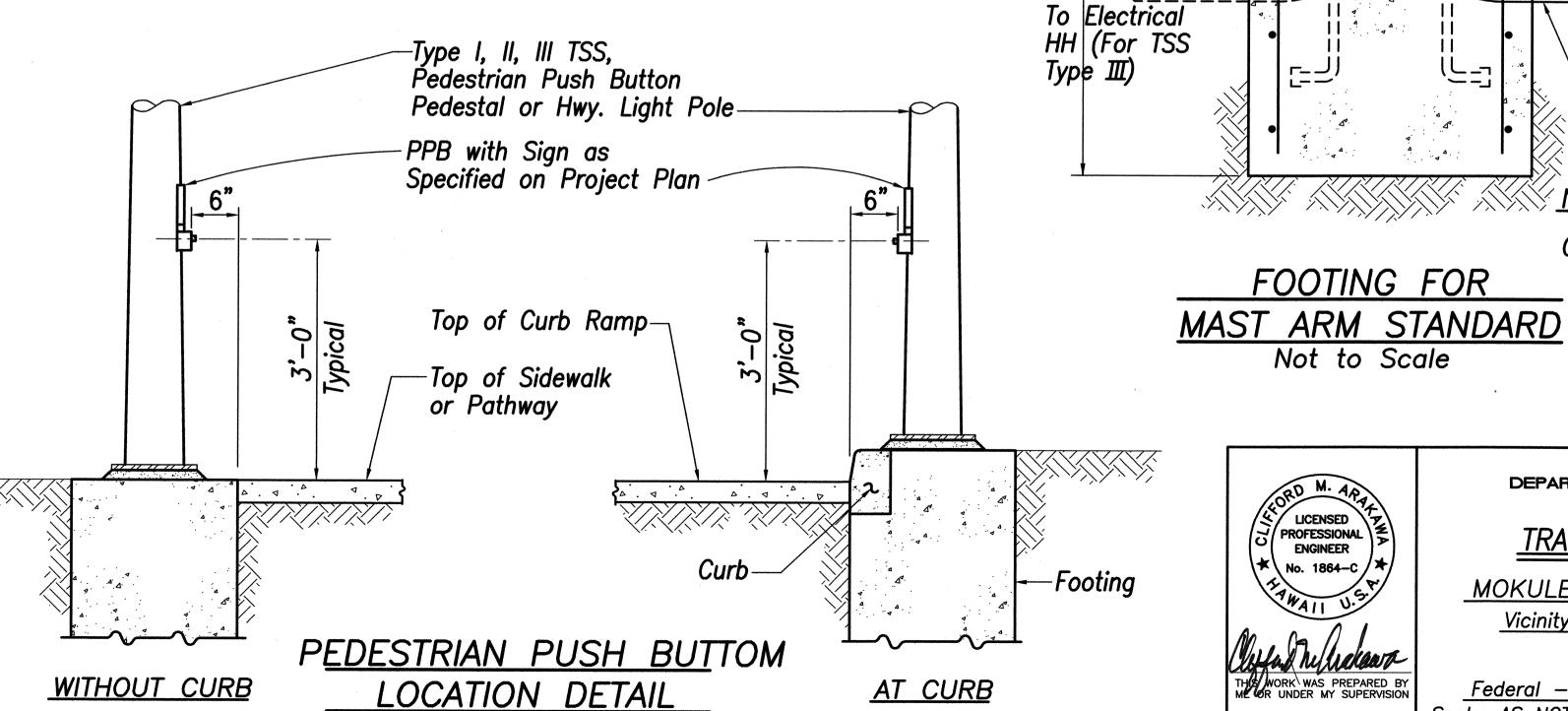
"d" Bars-

Place

Conc. Neat—

TSS TYPE	MAST ARM LENGTH	"c"	"d" BARS
${I\!\!I}$	15'-20'	7'-0"	12-#6
${I\!\!I}$	25'-30'	7'-6"	12-#6
$I\!\!I$	<i>3</i> 5'	8'-0"	12-#6
$I\!\!I$	40'-45'	8'-6"	12-#6
Ш	40'	8'-9"	12-#6

TYPE II FOOTINGS



Not to Scale

LICENSED PROFESSIONAL ENGINEER ▼ \ No. 1864-C / 本/ THE WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION 04/30/06

EXPIRATION DATE OF THE LICENSE

FOOTING FOR

Not to Scale

STATE OF HAWAII **DEPARTMENT OF TRANSPORTATION** HIGHWAYS DIVISION

NOTE:

Levelling Nuts

Form Upper 6" of Base

To T.S. Pullbox

_#4 Ties @ 12"

Two 2"-90° Elbows

Concrete Shall Be Class B

TRAFFIC SIGNAL PLAN

MOKULELE HIGHWAY WIDENING Vicinity of Kealia Pond Driveway

Piilani Highway Federal - Aid Project No. NH-A311(4)

Scale: AS NOTED Date: July 2005 OF 7 SHEETS SHEET No. 7

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