FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	72C-01-19	2019	26	48

GENERAL NOTES FOR FOUNDATION DETAILS

Governing Codes

1. AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals 1st Edition w/ 2017 Interim Revisions
2. AASHTO Bridge Design Specifications 2017 Edition
3. International Building Code, 2012 Edition
4. American Concrete Institute ACI 318-14 Building Code Requirements for Structural Concrete

Materials

Concrete	F'c (At 28 days)	Unit Weight
Drilled Shaft and Pedestal	4,500 (NWC)	145 PCF

Reinforcing

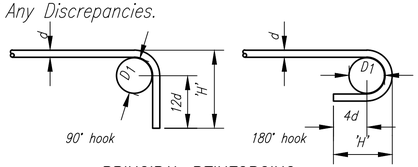
Reinforcing Steel (Typ)	ASTM A615, GR 60
Reinforcing to be Welded	ASTM A706, GR 60

Foundations

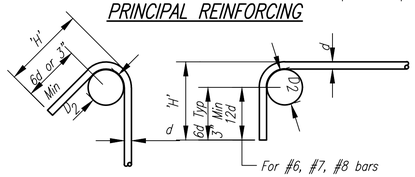
Drilled Shaft Foundations Have Been Designed in Accordance with The Recommendations in the Soils Report Titled "_____" dated 2019-xx-xx. The Contractor Shall Verify the Site Conditions Prior to Construction and notify the EOR of Any Discrepancies.

HOOK LENGTHS (H) (IN INCHES)

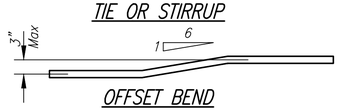
BAR SIZE	STANDARD HOOKS		STIRRUP OR TIE HOOK			
	90° HOOK	180° HOOK	90° HOOK	135° HOOK	D_2	D_1
#3	6	4	3-1/2	4	1-1/2	2-1/4
#4	8	4-1/2	4-1/2	4-1/2	2	3
#5	10	5	5-1/2	5-1/2	2-1/2	3-3/4
#6	12	6	12	7-1/2	4-1/2	4-1/2
#7	14	7	14	9	–	5-1/2
#8	16	8	–	–	–	6
#9	19	10	–	–	–	9
#10	22	11-1/2	–	–	–	10
#11	24	13	–	–	–	11-1/4



PRINCIPAL REINFORCING



TIE OR STIRRUP



OFFSET BEND

NOTE:
All Bends Shall Be Made Cold.

FOOTING, BEAM & COLUMN MINIMUM SPLICE LENGTHS (INCHES)
GRADE 60

f'c	4500 PSI		
BAR SIZE	OTHER BAR	TOP BAR	
#3	18	23	
#4	24	31	
#5	29	38	
#6	35	46	
#7	51	66	
#8	58	76	
#9	66	85	
#10	73	95	
#11	80	104	

NOTES:

1. Top Bars are Horizontal Reinforcement So Placed That More Than 12" of Fresh Concrete is Cast Below the Splice.
2. Center to Center Bar Spacing Shall be ≥ 4db. If Spacing is ≤ 4db, Use Congested Beam Splices.

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

Single Mast Arm Pole Foundation Detail Notes:

1. See Civil Drawings for Additional Information and Details.
2. Traffic Signal Standard Manufacturer's Recommendations Shall be Followed.

Factored Design Loads At Base of Traffic Signal Standard

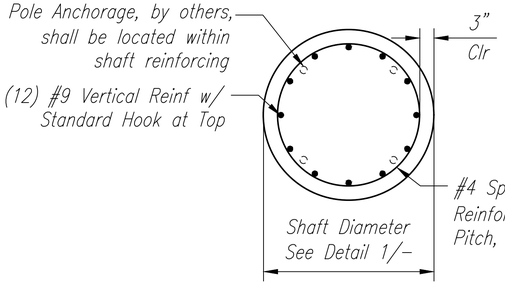
Mast Arm Length (ft)	P_D (kips)	M_{D+W} (k-ft)	V_W (kips)	T_W (k-ft)
55	4.31	134.89	5.27	122.79

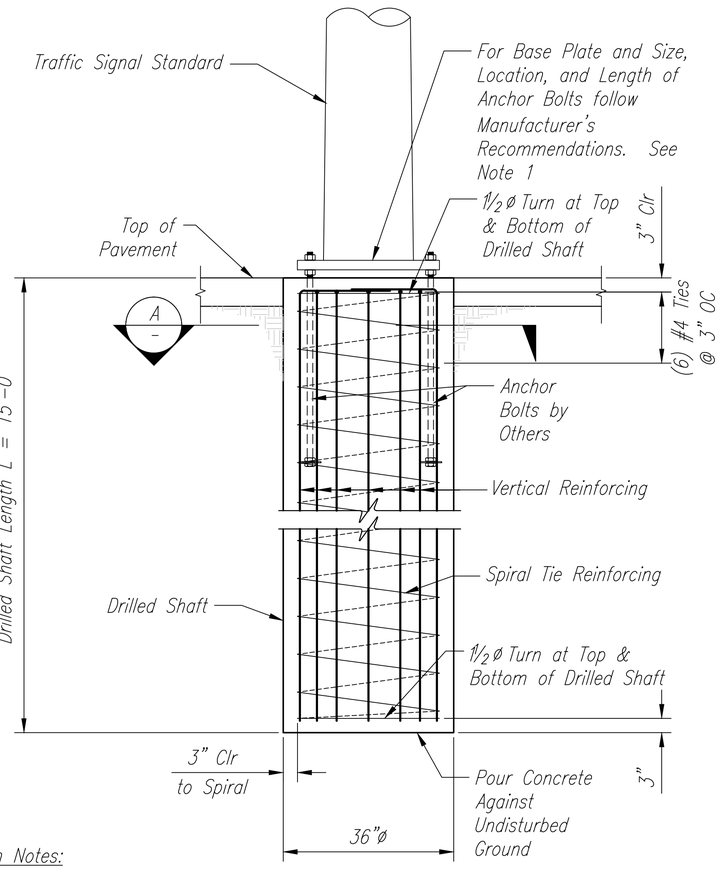
P_D is Downward Gravity Load at Base.
M_{D+W} is Base Moment at Base Due to Wind Perpendicular to Mast Arm and Eccentric Dead Load.
V_W is Base Shear in Direction Parallel to Wind Direction.
T_W is Base Torsion About Vertical Axis of Pole.

Factored Design Loads Provided by Traffic Signal Pole Manufacturer (Ameron Poles) Designed in Accordance with 2015 AASHTO LRFD for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.

Basic wind speed:	145 mph
Mean recurrence interval:	1700 years
Natural wind gust:	Yes
Truck induced:	Yes
Truck speed:	35 mph

3. The Groundwater Table (GWT) Was Not Encountered During the Geotechhnical Investigations. If the GWT is Found During Drilling at This Location, Stop Work and Notify the EOR Immediately.





Section Notes:

1. Traffic Signal Standard and Its Anchorage Are Provided By Others and Installed by the Contractor. The Anchorage Shall Be Able To Support the Required Loads Due to Its Own Weight and Wind. Manufacturer Shall Determine if Reinforcing is Adequate to Develop Their Anchorage.
2. If Required, Spiral Lap Splices Shall be Full-Welded or Full-Mechanical and Shall Provide a Minimum Resistance Not Less Than 125% of the Specified Yield Strength of the Bar in Tension or Compression as Required.

SECTION A – 3/4"=1'-0"

SINGLE MAST ARM POLE FOUNDATION 1 – 3/4"=1'-0"

MARK A. HOLTER LICENSED PROFESSIONAL ENGINEER No. 10993-S HAWAII U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE 03/31/21 EXPIRATION DATE OF LICENSE

0 1 2 3
Scale: 3/4"=1' Feet

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

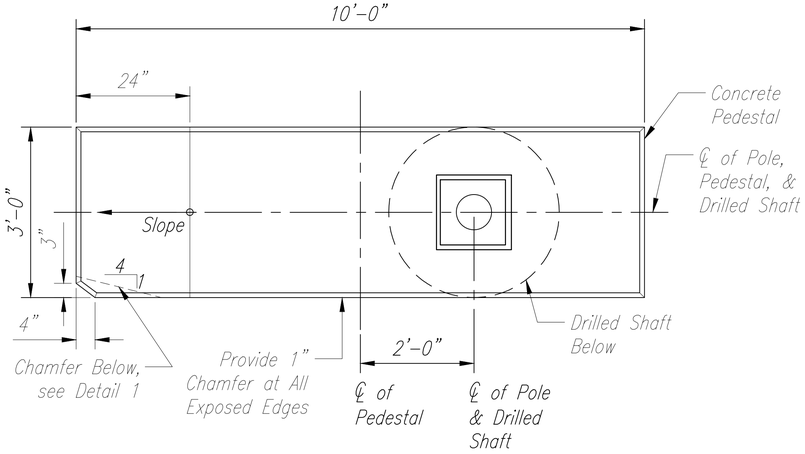
TRAFFIC SIGNAL FOUNDATION DETAILS

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

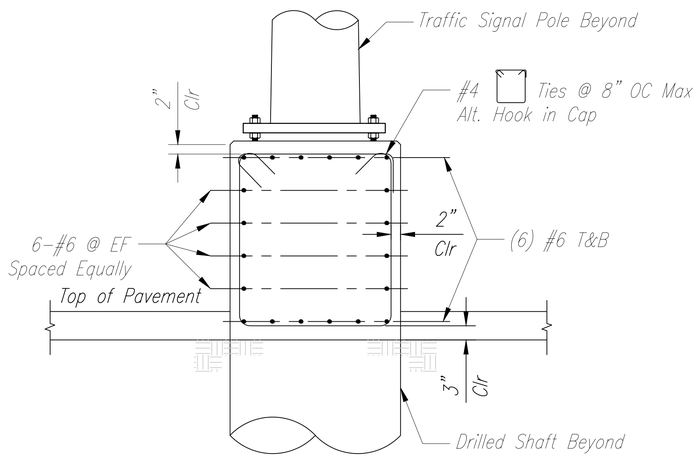
Scale: As Shown Date: August 2019

SHEET No. 1 OF 2 SHEETS

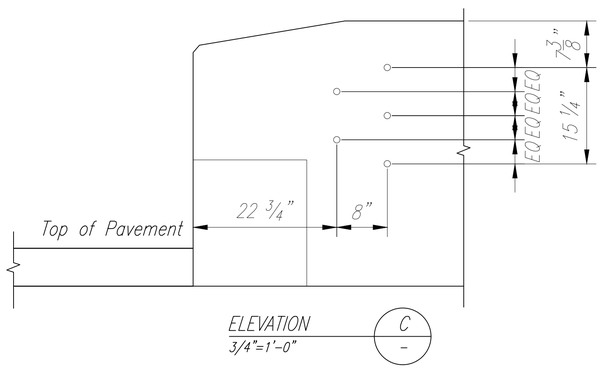
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	72C-01-19	2019	27	48



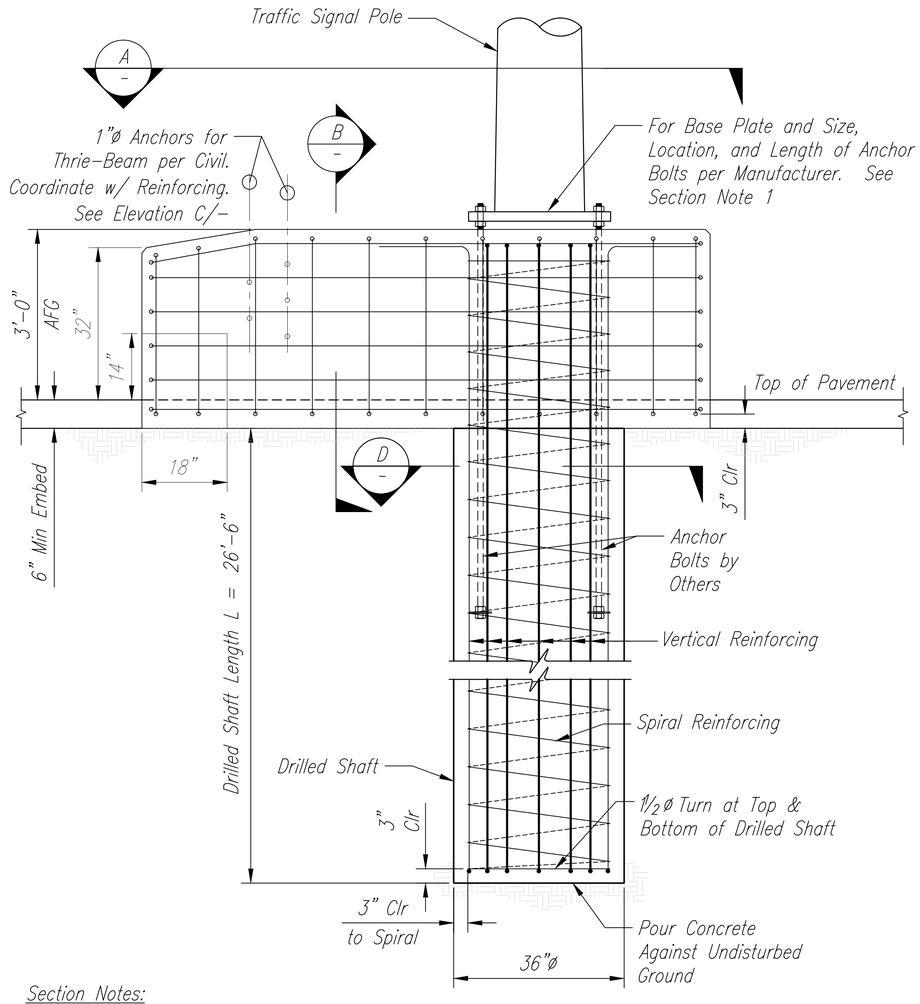
PLAN A
3/4"=1'-0"



SECTION B
3/4"=1'-0"



ELEVATION C
3/4"=1'-0"

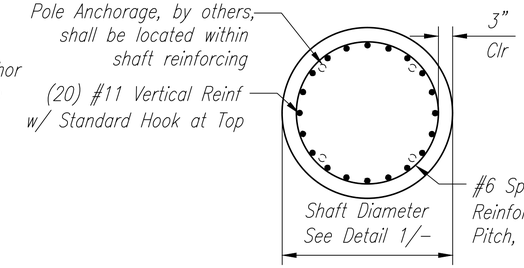


Section Notes:

1. Traffic Signal Standard and Its Anchorage Are Provided By Others and Installed by the Contractor. The Anchorage Shall Be Able To Support the Required Loads Due to Its Own Weight and Wind. Manufacturer Shall Determine if Reinforcing is Adequate to Develop Their Anchorage.

2. If Required, Spiral Lap Splices Shall be Full-Welded or Full-Mechanical and Shall Provide a Minimum Resistance Not Less Than 125% of the Specified Yield Strength of the Bar in Tension or Compression as Required.

DOUBLE MAST ARM POLE FOUNDATION 1
3/4"=1'-0"



SECTION D
3/4"=1'-0"

Double Mast Arm Pole Foundation Detail Notes:

1. See Civil Drawings for Additional Details.
2. Traffic Signal Standard Manufacturer's Recommendations Shall be Followed.

Factored Design Loads At Base of Traffic Signal Standard

Mast Arm Length (ft)	P_D (kips)	M_{D+W} (k-ft)	V_W (kips)	T_W (k-ft)
45 + 25	6.3	181.25	8.79	72.48

P_D is Downward Gravity Load at Base.
M_{D+W} is Base Moment at Base Due to Wind Perpendicular to Mast Arm and Eccentric Dead Load.
V_W is Base Shear in Direction Parallel to Wind Direction.
T_W is Base Torsion About Vertical Axis of Pole.

Factored Design Loads Provided by Traffic Signal Pole Manufacturer (Ameron Poles) Designed in Accordance with 2015 AASHTO LRFD for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.

Basic wind speed:	145 mph
Mean recurrence interval:	1700 years
Natural wind gust:	Yes
Truck induced:	Yes
Truck speed:	35 mph

Vehicular Collision Design Force per AASHTO Test Level TL-4
Ft = 80 kips over 3.5 linear feet
He = 32 inch

3. The Groundwater Table (GWT) Was Encountered at 10'-0" Below the Ground Surface During the Geotechnical Investigations. If the GWT is Found During Drilling at This Location To Be Above 10'-0", Stop Work and Notify the EOR Immediately.

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

0 1 2 3
Scale: 3/4"=1' Feet

MARK A. HOLTER
LICENSED PROFESSIONAL ENGINEER
No. 10993-S
HAWAII U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE 03/31/21 EXPIRATION DATE OF LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL FOUNDATION DETAILS

KALANIANAOLE HIGHWAY
TRAFFIC SIGNAL INSTALLATION AT WAA ST.
Project No. 72C-01-19

Scale: As Shown Date: August 2019

SHEET No. 2 OF 2 SHEETS