FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-0300(87)	2002	75	145

ELECTRICAL SYMBOLS

SYMBOL	DESCRIPTION
	EXST. 150W HPS STREET LIGHT
	REMOVE EXST. STREET LIGHT STANDARD, DEMOLISH EXST. CONC. BASE 2 FT. BELOW FINISH GRADE. BACKFILL PIT TO 95% COMPACTION; RESTORE SIDEWALK OR GRASS PER CITY REQUIREMENTS
	RELOCATED STREET LIGHT STANDARD, SEE DETAILS A/E-18 & B/E-18
	RELOCATED TRAFFIC SIGNAL HEAD, PROVIDE NECESSARY MTG. BRACKETS AND ACCESSORIES
NEW	NEW TRAFFIC SIGNAL HEAD RYG, PROVIDE NECESSARY MOUNTING BRACKETS AND ACCESSORIES
	EXST. TRAFFIC SIGNAL HEAD TO REMAIN
	RELOCATE TRAFFIC SIGNAL HEAD
	RELOCATED RYG ↑ TRAFFIC SIGNAL HEAD, PROVIDE NECESSARY MTG. BRACKETS AND ACCESSORIES
	EXST. RYG ↑ TRAFFIC SIGNAL HEAD TO REMAIN
	RELOCATE RYG ↑ TRAFFIC SIGNAL HEAD
	EXST. OPTICON DETECTOR TO REMAIN
	RELOCATE OPTICON DETECTOR
	RELOCATED PEDESTRIAN TRAFFIC SIGNAL HEAD, PROVIDE NECESSARY MTG. BRACKETS AND ACCESSORIES
NEW	NEW PEDESTRIAN TRAFFIC SIGNAL HEAD, PROVIDE NECESSARY MTG. BRACKETS AND ACCESSORIES
	EXST. PEDESTRIAN TRAFFIC SIGNAL HEAD TO REMAIN
	RELOCATE PEDESTRIAN TRAFFIC SIGNAL HEAD, PROVIDE NECESSARY MTG. BRACKETS AS REQUIRED
	RELOCATED OPTICON DETECTOR, PROVIDE NECESSARY MTG. BRACKETS AND ACCESSORIES
NEW	NEW OPTICON DETECTOR, PROVIDE NECESSARY MOUNTING BRACKETS AND ACCESSORIES, SEE DET. E-16
	NEW PEDESTRIAN PUSHBUTTON SHALL MEET CURRENT AMERICAN WITH DISABILITIES ACT (ADA) ACCESSIBILITY GUIDELINES AND WILL BE SUBJECT TO ENGINEER'S APPROVAL SEE SHEETS E-14, E-17
	EXST. CCTV SYSTEM CAMERA TO REMAIN
	REMOVE EXST PEDESTRIAN PUSHBUTTON

SYMBOL	DESCRIPTION
A	NEW TYPE "A" METRIC TRAFFIC SIGNAL PULLBOX (APPROX. 22" X 28"), SEE DETAIL A/E-10
B	NEW TYPE "B" METRIC TRAFFIC SIGNAL PULLBOX (APPROX. 28" X 40"), SEE DETAIL B/E-10
C	NEW TYPE "C" METRIC TRAFFIC SIGNAL PULLBOX (APPROX. 28" X 57"), SEE DETAIL C/E-10
	EXST. PULLBOX OR HANDHOLE, SEE PLAN FOR SIZE
T	EXST. TRAFFIC SIGNAL CONTROLLER
T	RELOCATED TRAFFIC SIGNAL CONTROLLER
	EXST. PULLBOX TO BE DEMOLISHED, BACKFILL PIT TO 95% COMPACTION
—sl—	EXST. STREET LIGHT DUCTLINE & WIRING TO REMAIN
—t—	EXST. TRAFFIC SIGNAL DUCTLINE & WIRING TO REMAIN
—t—	EXST. TRAFFIC SIGNAL CONDUITS & WIRING TO REMAIN
—t—	EXST. TRAFFIC SIGNAL CONDUIT & WIRING, WIRING TO BE REMOVED AND CONDUIT ABANDONED IN PLACE.
—T—	NEW TRAFFIC SIGNAL CONDUIT & WIRING
—T—	NEW TRAFFIC SIGNAL CONDUIT & WIRING. SAWCUT AND PATCH EXST. AC PAVEMENT, SIDEWALK, CURB & GUTTER, SEE NOTE 1 ON PLAN SHEET
—t-oh—	EXST. OVERHEAD TRAFFIC SIGNAL CABLES TO REMAIN
---e---	EXST. UNDERGROUND ELEC./SIGNAL CONDUITS & CABLES TO REMAIN
—SL—	STREET LIGHT DUCTLINE & WIRING, SEE DUCT SECTIONS
—E—	EXST. UNDERGROUND ELEC/SIGNAL CONDUITS WITH NEW WIRE AND CABLES BY OTHERS
	BREAK LINE TO BEGIN AND END DUCT SECTION TYPE
2E A	ELECTRIC/SIGNAL DUCTLINE WITH DESIGNATORS; INDICATES TYPE "A" DUCT SECTION WITH "1-2 ELEC" DUCTS. SEE SHEET E-2 FOR DUCT SECTION AND CONDUIT SCHEDULES
SL	NEW TYPE "A" METRIC STREET LIGHTING PULLBOX. (APPROX. 22" X 28"), SEE DETAIL A/E-10
	ADJUST EXISTING PULLBOX TO BE FLUSH WITH NEW FINISH GRADE

SYMBOL	DESCRIPTION
NEW ●	NEW TYPE 1 TRAFFIC SIGNAL STANDARD, SEE PLAN FOR HEIGHT, SEE DET. A/E-14, AND SHEETS E-12, E-13, E-14, E-17
●	RELOCATED TYPE 1 TRAFFIC SIGNAL STANDARD, PROVIDE NEW CONC. BASE PER C&C STANDARDS & DET. A/E-15, AND SHEETS E-12, E-13, E-14, E-17
○	EXST. TYPE 1 TRAFFIC SIGNAL STANDARD TO REMAIN
	REMOVE TYPE 1 TRAFFIC SIGNAL STANDARD, DEMOLISH EXST. CONC. BASE 2 FT. BELOW FINISH GRADE. BACKFILL PIT TO 95% COMPACTION; RESTORE SIDEWALK OR GRASS PER STATE REQUIREMENTS
	RELOCATED TYPE II TRAFFIC SIGNAL STANDARD, WITH NEW TRAFFIC SIGNAL HEADS AND NECESSARY MOUNTING BRACKETS AND ACCESSORIES
30'	NEW TYPE II TRAFFIC SIGNAL STANDARD, WITH NEW TRAFFIC SIGNAL HEADS AND NECESSARY MOUNTING BRACKETS AND ACCESSORIES (WITH NEW 30' MAST ARM INDICATED)

Date	Revision

LICENSED PROFESSIONAL ENGINEER No. 4340-E ANDREW L. MIYASATO HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Andrew L. Miyasato 12-13-02

RONALD N. S. HO & ASSOC., INC. ELECTRICAL ENGINEERS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL SYMBOLS

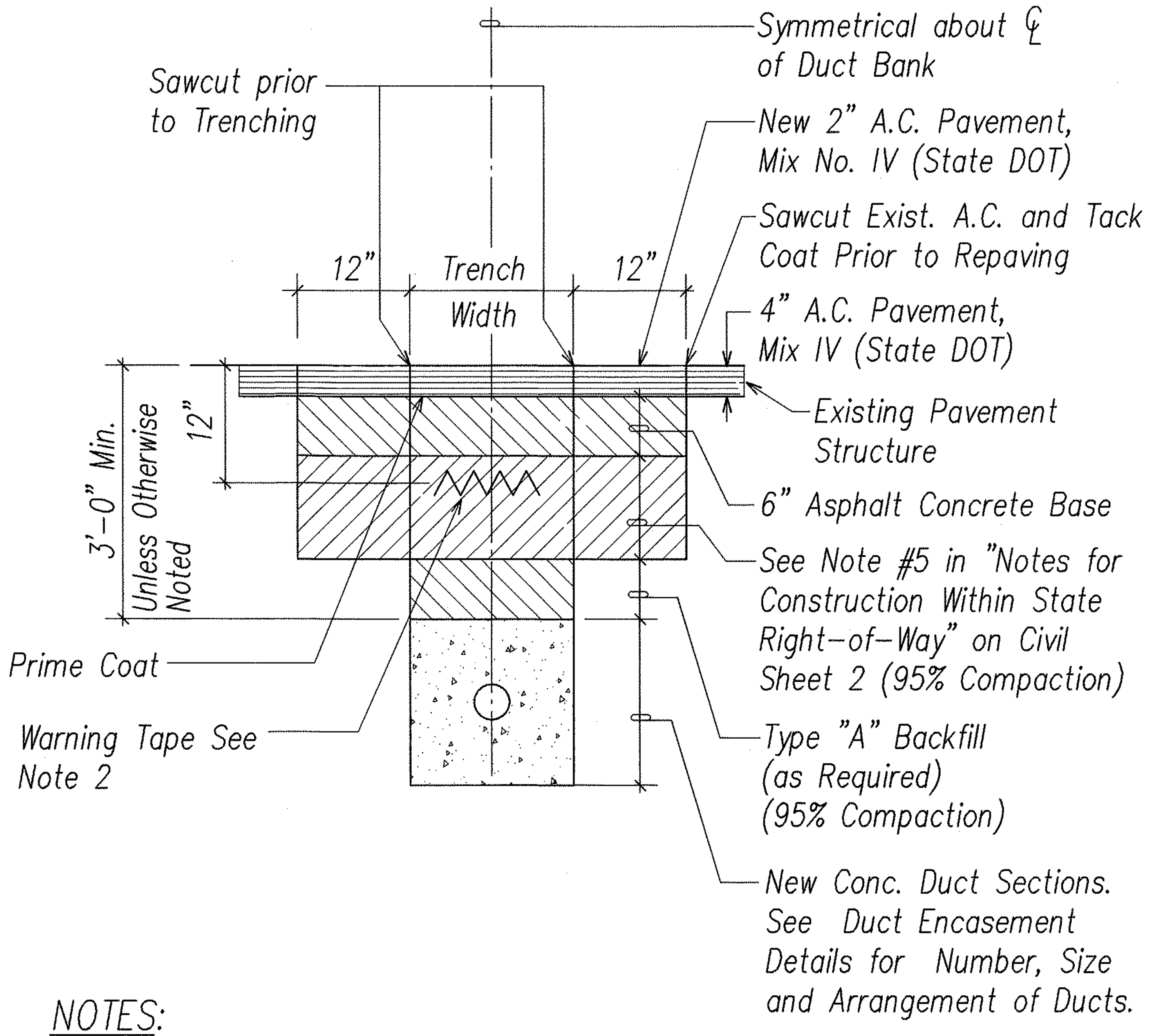
PEDESTRIAN FACILITIES and ADA COMPLIANCE
At Various Locations On Oahu, Phase II
Federal Aid Project No. CMAQ-0300(87)

SCALE: AS NOTED DATE:

SHEET No. E-1 OF 18 SHEETS

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

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-0300(87)	2002	76	145

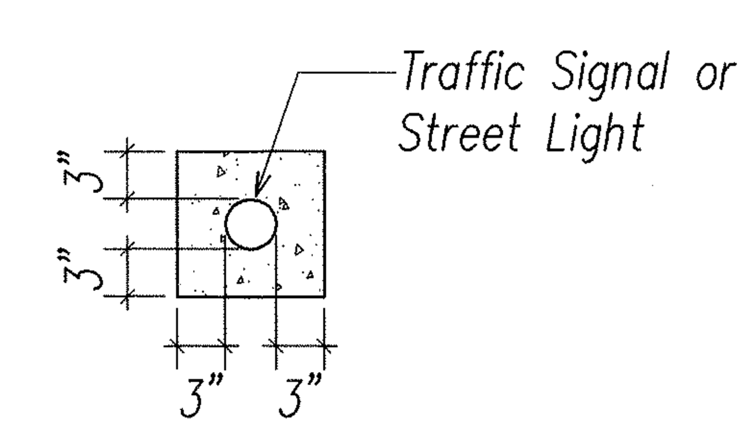


NOTES:

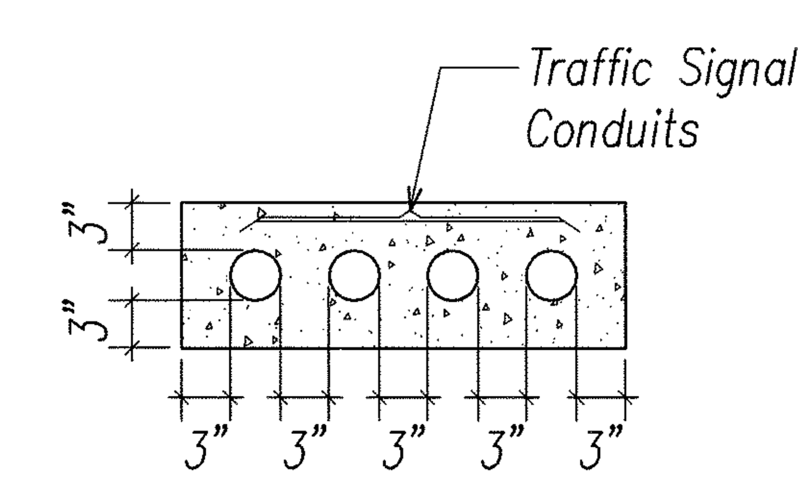
1. Provide Pavement Structure as Shown or Match Existing Pavement Structure, Whichever is Greater.
2. Install 8 Mil. Thick Orange Color Warning Tape 4" Wide, Entire Length. Tape should read "Warning – Stop Digging – Call Verizon Hawaii. Communications Cable Below. Failure to Comply could result in Legal Action".

TYPICAL TRENCH RESTORATION DETAIL

NOT TO SCALE



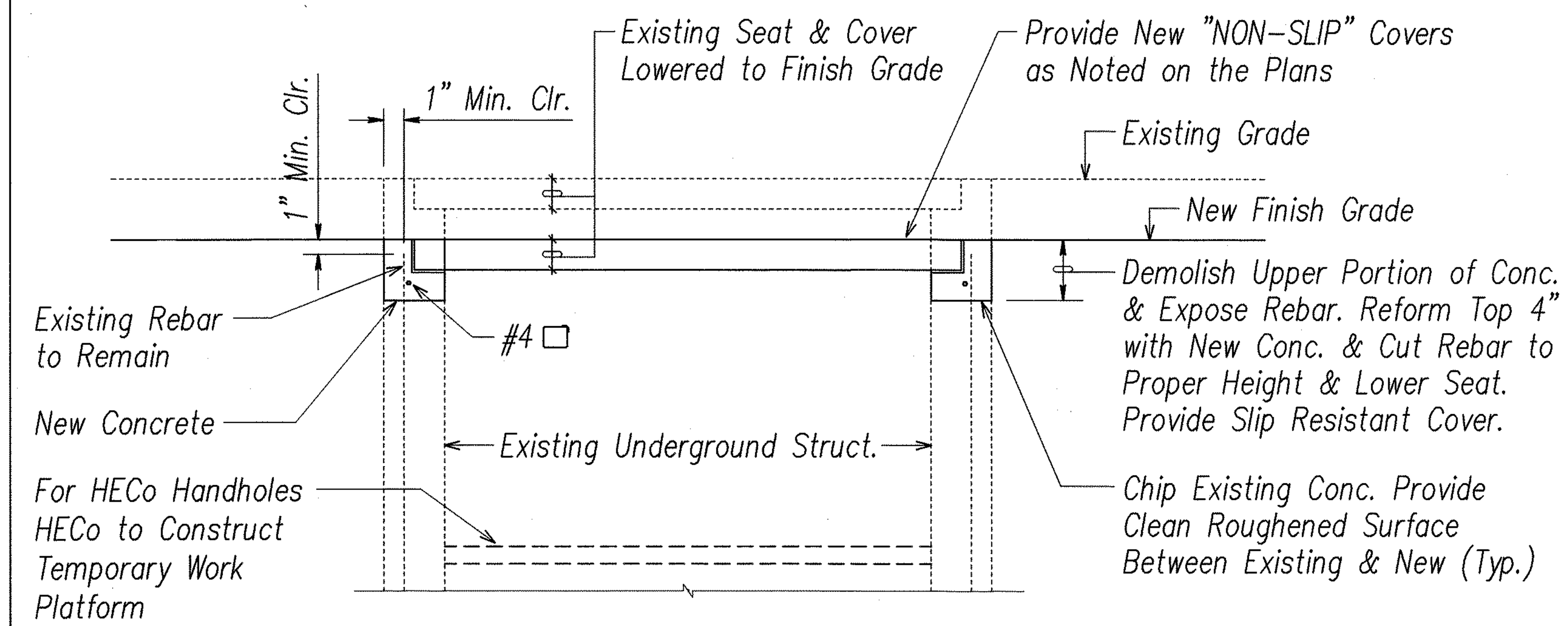
SECTION (A)



SECTION (B)

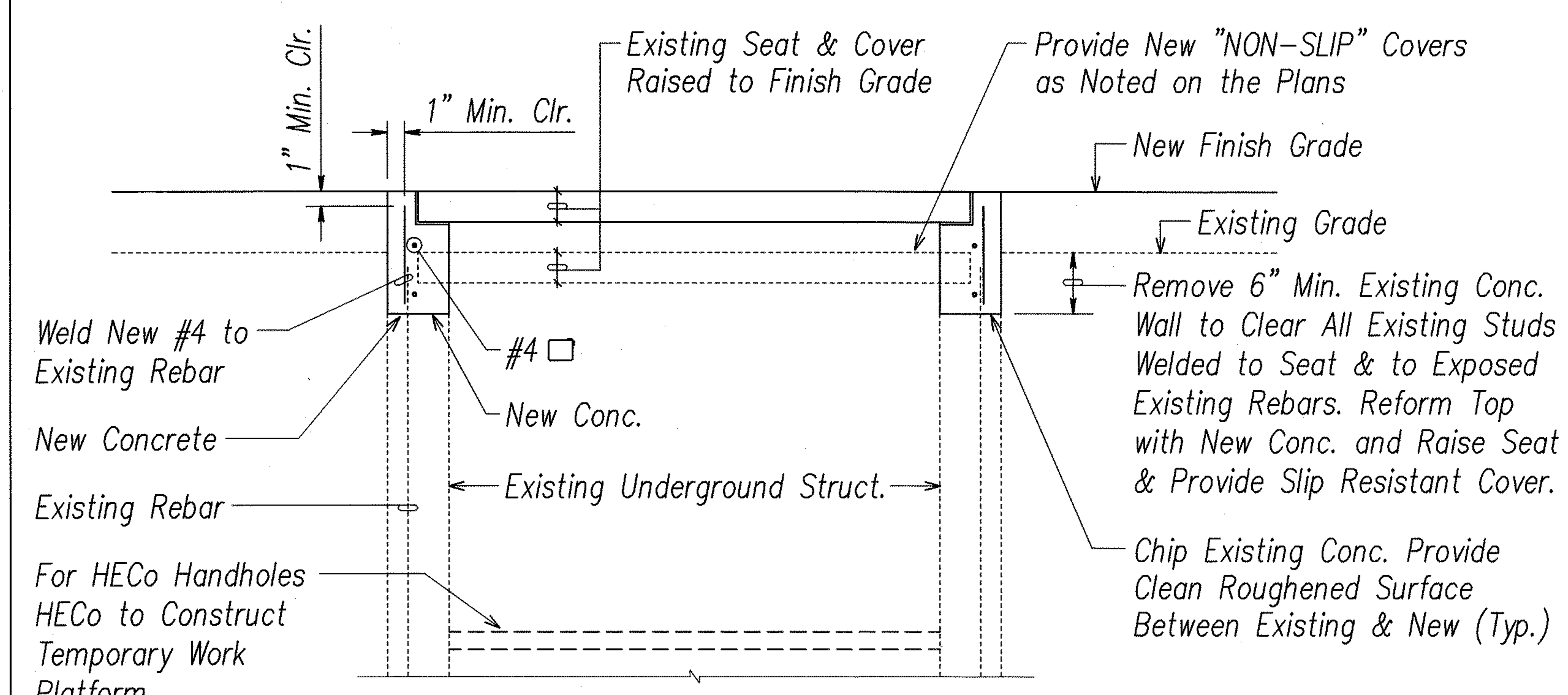
DUCT ENCASEMENT DETAILS

NOT TO SCALE



TYP. LOWER HANDHOLE & SEAT ADJUSTMENT DETAIL

NOT TO SCALE



TYP. RAISED HANDHOLE & SEAT ADJUSTMENT DETAIL

NOT TO SCALE

GENERAL CONSTRUCTION NOTES

A. Trenching to be by hand digging near and across existing utility lines.

B. Unless otherwise requested by the Board of Water Supply, minimum clearance between water lines and conduits shall be:
Horizontal = 3 feet
Vertical = 6 inches

C. Adjust new conduit alignment, if required to provide clearances. If conduit cannot be realigned, adjustments to existing water system shall be performed in accordance with standards of the Board of Water Supply.

D. Minimum clearance between highway light standards and fire hydrants shall be 3 feet.

E. Underground utilities shown hereon are for information only. No guarantee is made on the accuracy or completeness of said information.

F. All new and existing concrete pullbox and handhole covers which are located in new finished sidewalks shall be provided with new exposed aggregate concrete covers to match new exposed aggregate concrete sidewalk finish.

G. Where necessary, reconstruction of sidewalk, gutter and driveway areas shall conform to the standard details of the governmental agency having jurisdiction over the work.

H. The Contractor shall be responsible for removal of all silt and debris resulting from his work and deposited in drainage facilities, roadways and other areas. The cost for any necessary remedial action by the Chief Engineer shall be payable by the Contractor.

I. The Contractor, at his own expense, shall keep the project area free from dust nuisance. The work shall be in conformance with the air pollution control standards and regulations of the State Department of Health.

Date	Revision

ANDREW I. MIYASATO LICENSED PROFESSIONAL ENGINEER No. 4340-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

12-17-02

RONALD N. S. HO & ASSOC., INC. ELECTRICAL ENGINEERS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL CONSTRUCTION AND HECO NOTES I

PEDESTRIAN FACILITIES and ADA COMPLIANCE
At Various Locations On Oahu, Phase II
Federal Aid Project No. CMAQ-0300(87)

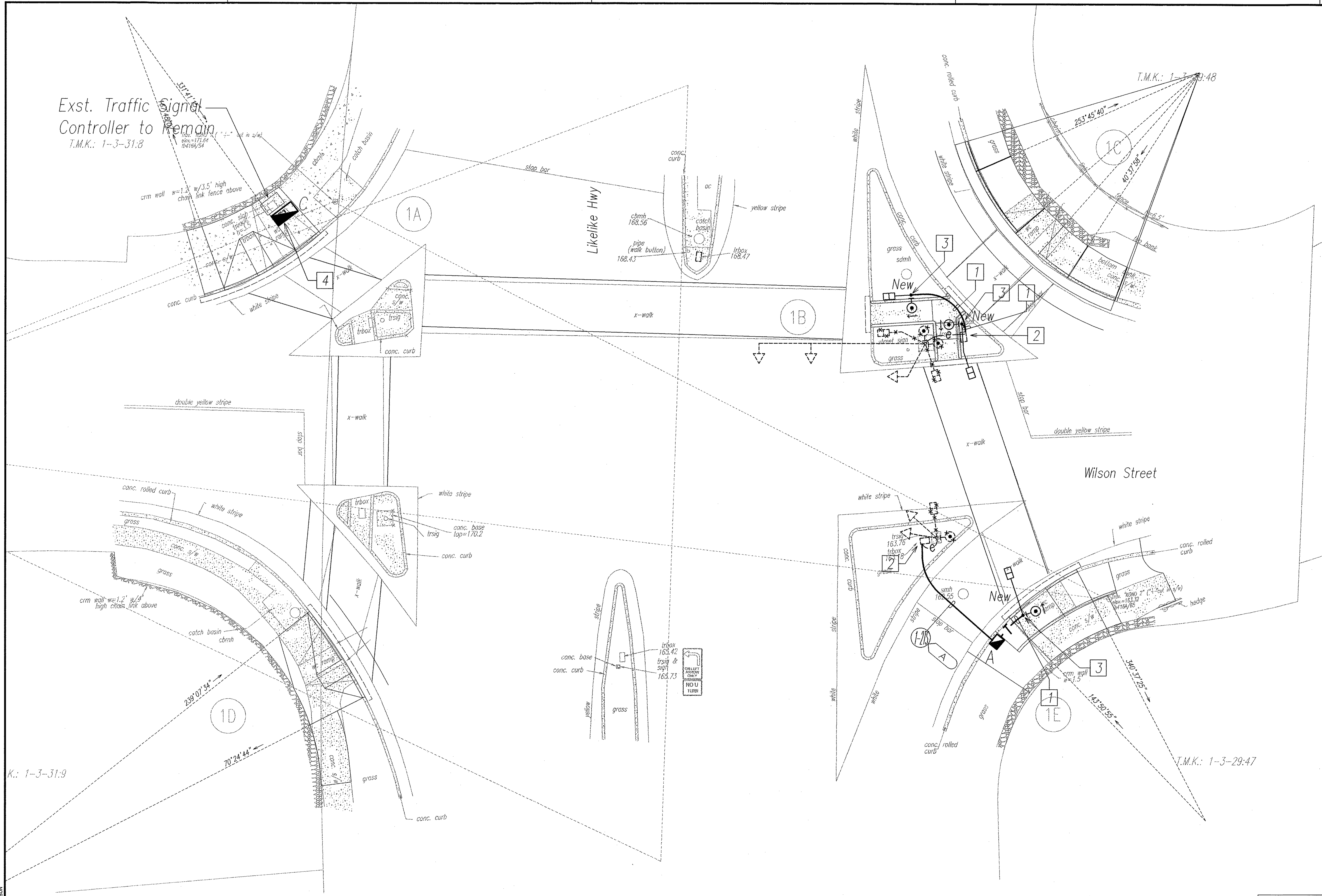
SCALE: AS NOTED DATE:

SHEET No. E-2 OF 18 SHEETS

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

LAST SAVE: 12/05/02 @ 07:23:22 BY: RH PLOT SC 1"=1'

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-0300(87)	2002	77	145



Electrical Plan Notes:

1. 1-2"C With Cable Complement Required for Pedestrian and Traffic Signal Heads and Push Buttons, See Duct Section A, Sheet E-2.
2. Penetrate Handhole for New Conduit Entry. Repair to Match Exst.
3. Provide Type 1-10 Standard Installed. Provide New Necessary Mounting Equipment & Accessories as Required and as Shown on the Plans. Relocate Traffic Signal Heads onto Pole. Provide New ADA Compliant Pedestrian Push Button, See Details on Sheets E-12, E-13, E-14, E-17.
4. Replace Existing Traffic Signal Pullbox with New Type C Pullbox, Flush with New Finish Grade.

Date	Revision

NORTH

LIKELIKE HWY/WILSON STREET TRAFFIC SIGNAL PLAN
SCALE: 1"=10'

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

ANDREW I. MIYASATO LICENSED PROFESSIONAL ENGINEER No. 4340-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

12-13-02

RONALD N. S. HO & ASSOC., INC. ELECTRICAL ENGINEERS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

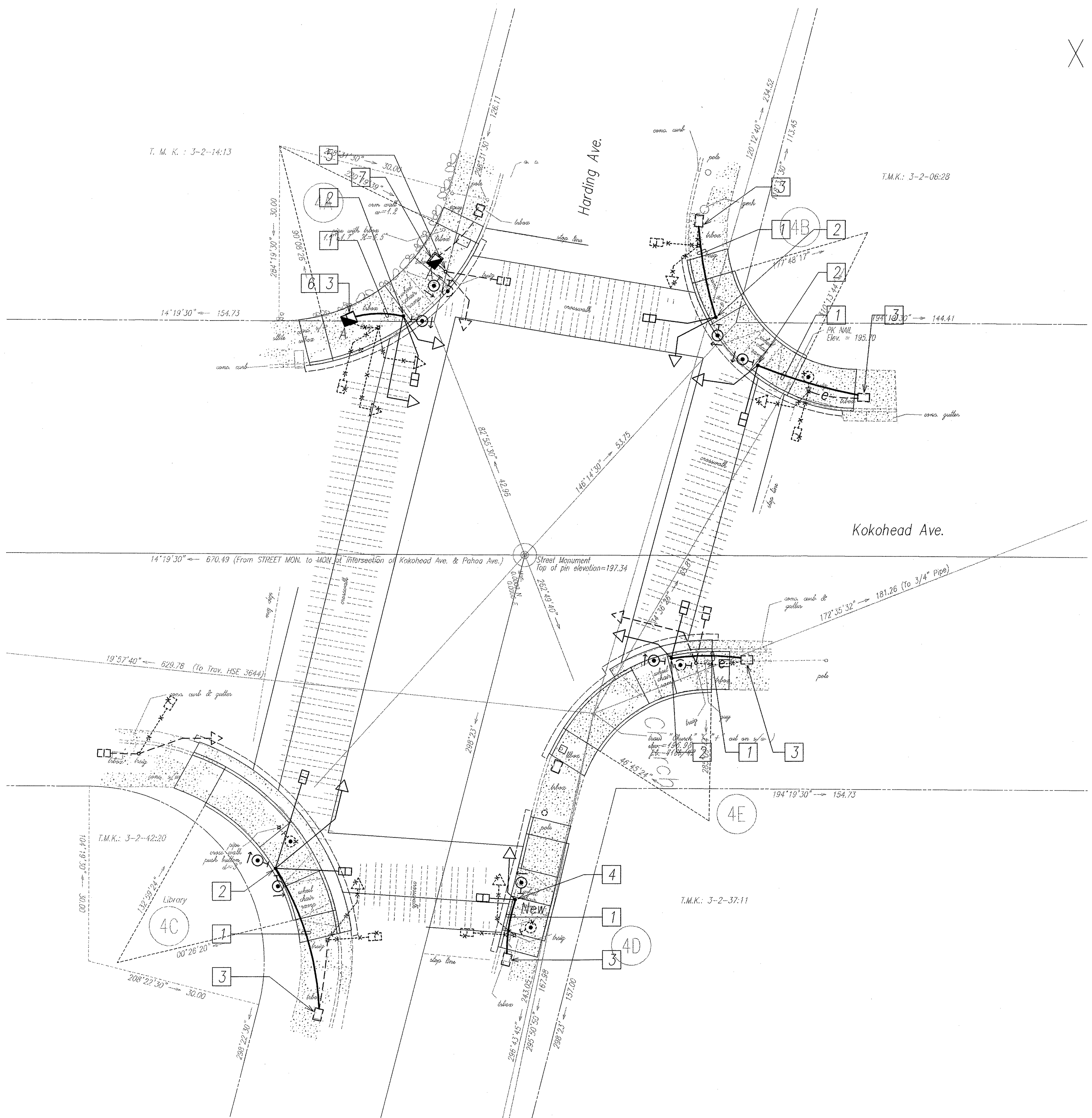
LAYOUT PLAN - 1
LIKELIKE HIGHWAY/WILSON STREET
TRAFFIC SIGNAL PLAN

PEDESTRIAN FACILITIES and ADA COMPLIANCE
At Various Locations On Oahu, Phase II
Federal Aid Project No. CMAQ-0300(87)

SCALE: AS NOTED DATE:

SHEET No. E-3 OF 18 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-0300(87)	2002	78	145



KOKO HEAD AVENUE/HARDING AVENUE TRAFFIC SIGNAL PLAN

SCALE: 1"=10'

Electrical Plan Notes:

[1] 1-2"C With Cable Complement Required for Pedestrian and Traffic Signal Heads and Push Buttons, See Duct Section A, Sheet E-2.

[2] Relocate Exst Traffic Signal Standard onto New Concrete Base. Provide New Necessary Mounting Equipment & Accessories as Required and as shown on the Plans, and Relocate Traffic Signal Heads as shown on the Plans, onto New Concrete Base. Demolish Exst Concrete Base 2Ft Below Finish Grade. Remove Exist Pedestrian Push Button and Provide New ADA Compliant Pedestrian Push Buttons. See Details on Sheets E-12, E-13, E-14, E-17.

[3] Penetrate Handhole for New Conduit Entry. Repair to Match Exst.

[4] Provide Type 1-10 Standard Installed. Provide New Necessary Mounting Equipment & Accessories as Required and as Shown on the Plans. Relocate Traffic Signal Heads onto Pole. Provide new ADA Compliant Pedestrian Push Button, See Details on Sheets E-12, E-13, E-14, E-17.

[5] Exst Traffic Signal Standard to Remain, Contractor shall Provide Necessary Accessories as Directed by City Inspector to Adjust Standard to New Finish Grade. Provide New Necessary Mounting Equipment & Accessories as Required and as shown on the Plans, and Relocate Traffic Signal Heads as shown on the Plans, Provide New ADA Compliant Pedestrian Push Button, See Details on Sheets E-12, E-13, E-14, E-17. Coordinate Push Button Location With New Ramp Contractor.

[6] Replace Existing Traffic Signal Pullbox with New Type A Pullbox, Flush with New Finish Grade.

[7] Intercept Existing Traffic Signal Conduits with New Type "C" Traffic Signal Handhole. Demolish Existing Traffic Signal Pullbox.

Date	Revision

ANDREW I. MIYASATO — LICENSED PROFESSIONAL ENGINEER — No. 4340-E — HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

12-13-02

RONALD N. S. HO & ASSOC., INC. ELECTRICAL ENGINEERS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LAYOUT PLAN 4
KOKOHEAD AVENUE/HARDING AVENUE
TRAFFIC SIGNAL PLAN
PEDESTRIAN FACILITIES and ADA COMPLIANCE
At Various Locations On Oahu, Phase II
Federal Aid Project No. CMAQ-0300(87)

SCALE: AS NOTED DATE:

SHEET No. E-4 OF 18 SHEETS

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

LAST SAVE: 12/05/02 @ 07:41:34 BY: RN PLOT SC 1=10
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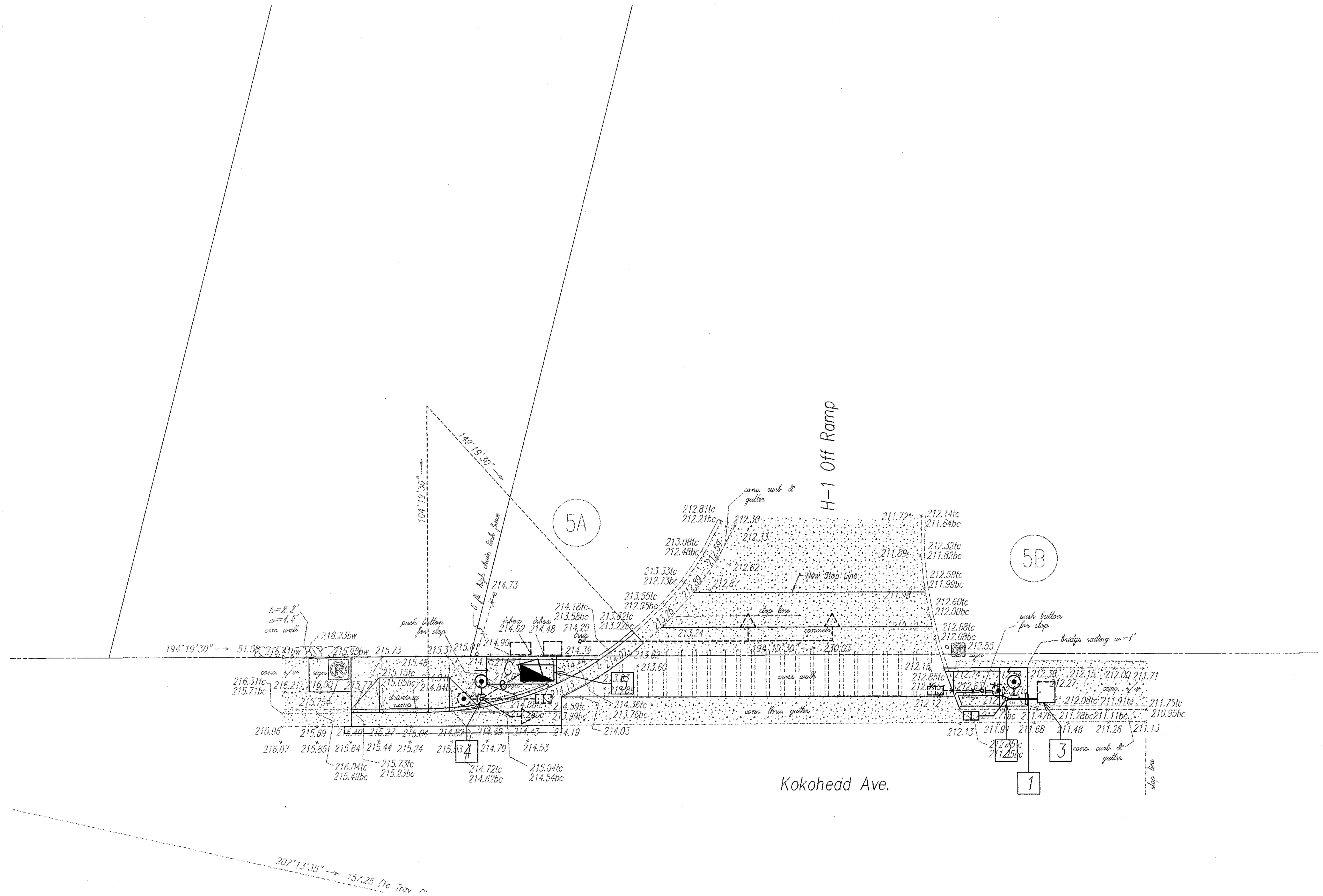
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-0300(87)	2002	79	145



KOKO HEAD AVENUE/H-1 OFF RAMP TRAFFIC SIGNAL PLAN
SCALE: 1"=10'

Electrical Plan Notes:

1 1-2"C With Cable Complement Required for Pedestrian and Traffic Signal Heads and Push Buttons, See Duct Section A, Sheet E-2.

2 Relocate Exst Traffic Signal Standard onto New Concrete Base. Provide New Necessary Mounting Equipment & Accessories as Required and as shown on the Plans, and Relocate Traffic Signal Heads as shown on the Plans, onto New Concrete Base. Demolish Exst Concrete Base 2Ft Below Finish Grade. Remove Exist Pedestrian Push Button and Provide New ADA Compliant Pedestrian Push Buttons. See Details on Sheet E-12, E-13, E-14, E-17.

3 Penetrate Handhole for New Conduit Entry. Repair to Match Exst.

4 Exst Traffic Signal Standard to Remain, Contractor shall Provide Necessary Accessories as Directed by City Inspector to Adjust Standard to New Finish Grade. Provide New Necessary Mounting Equipment & Accessories as Required and as shown on the Plans, and Relocate Traffic Signal Heads as shown on the Plans, Provide New ADA Compliant Pedestrian Push Button, See Details on Sheets E-12, E-13, E-14, E-17. Coordinate Push Button Location With New Ramp Contractor.

5 Replace Existing Traffic Signal Pullbox with New Type C Pullbox, Flush with New Finish Grade.

Date	Revision

ANDREW L MIYASATO LICENSED PROFESSIONAL ENGINEER No. 4340-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

12-13-02

RONALD N. S. HO & ASSOC., INC. ELECTRICAL ENGINEERS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LAYOUT PLAN 5
KOKOHEAD AVENUE/H-1 OFF RAMP
TRAFFIC SIGNAL PLAN

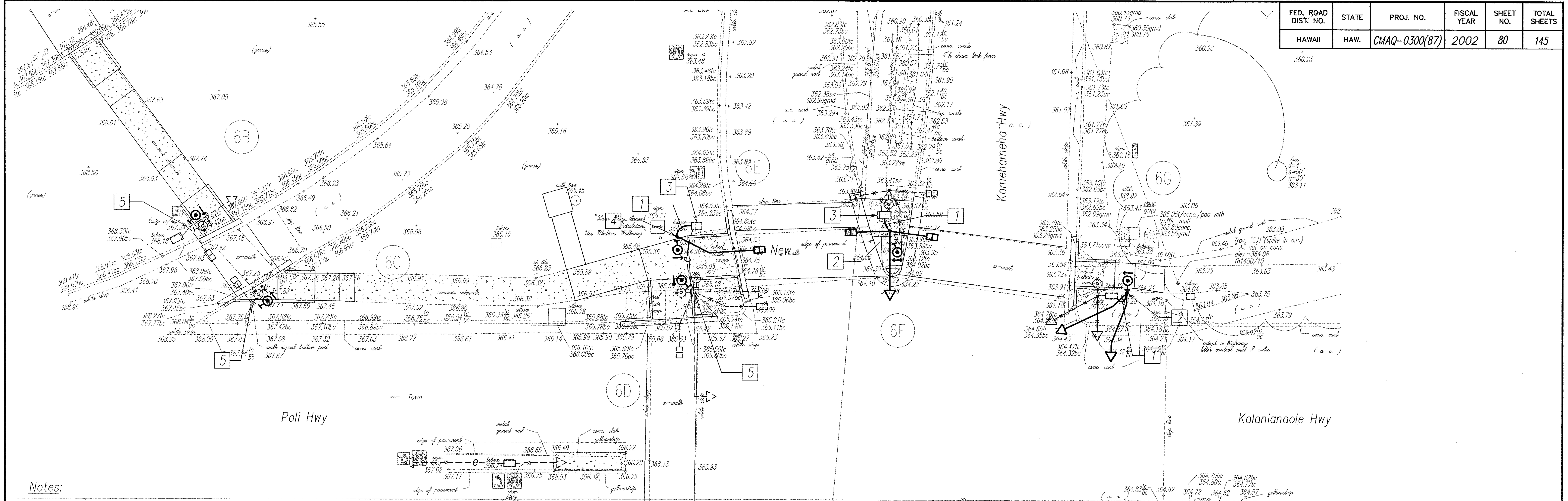
PEDESTRIAN FACILITIES and ADA COMPLIANCE
At Various Locations On Oahu, Phase II
Federal Aid Project No. CMAQ-0300(87)

SCALE: AS NOTED DATE:

SHEET No. E-5 OF 18 SHEETS

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

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-0300(87)	2002	80	145



Notes:

[1] 1-2"C With Cable Complement Required for Pedestrian and Traffic Signal Heads and Push Buttons, See Duct Section A, Sheet E-2.

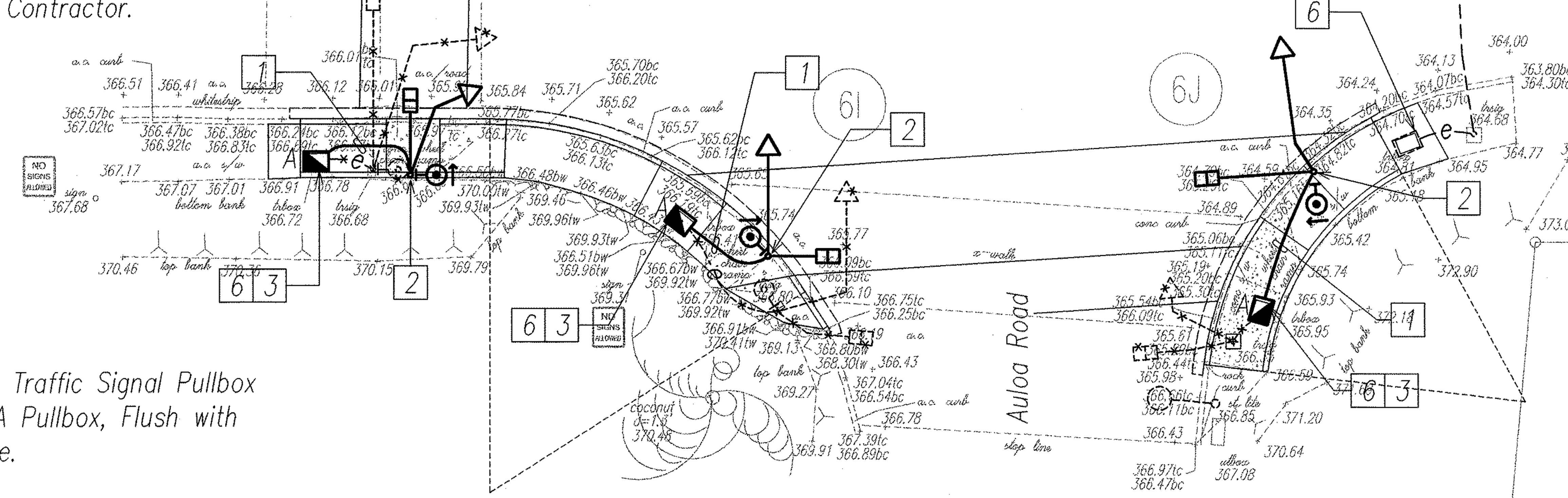
[2] Relocate Exst Traffic Signal Standard onto New Concrete Base. Provide New Necessary Mounting Equipment & Accessories as Required and as shown on the Plans, and Relocate Traffic Signal Heads as shown on the Plans, onto New Concrete Base. Demolish Exst Concrete Base 2Ft Below Finish Grade. Remove Exist Pedestrian Push Button and Provide New ADA Compliant Pedestrian Push Buttons. See Details on Sheets E-12, E-13, E-14, E-17.

[3] Penetrate Handhole for New Conduit Entry. Repair to Match Exst.

[4] Provide Type 1-10 Standard Installed. Provide New Necessary Mounting Equipment & Accessories as Required and as Shown on the Plans. Relocate Traffic Signal Heads onto Pole. Provide new ADA Compliant Pedestrian Push Button, See Details on Sheets E-12, E-13, E-14, E-17.

[5] Exst Traffic Signal Standard to Remain, Contractor shall Provide Necessary Accessories as Directed by City Inspector to Adjust Standard to New Finish Grade. Provide New Necessary Mounting Equipment & Accessories as Required and as shown on the Plans, and Relocate Traffic Signal Heads as shown on the Plans, Provide New ADA Compliant Pedestrian Push Button, See Details on Sheets E-12, E-13, E-14, E-17. Coordinate Push Button Location With New Ramp Contractor.

[6] Replace Existing Traffic Signal Pullbox with New Type A Pullbox, Flush with New Finish Grade.



NORTH

CASTLE JUNCTION TRAFFIC SIGNAL PLAN
SCALE: 1"=10'

10' 5' 0 10' 20' 30'
SCALE: 1"=10'
GRAPHIC SCALE

Date	Revision

ANDREW I. MIYASATO LICENSED PROFESSIONAL ENGINEER No. 4340-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

RONALD N. S. HO & ASSOC., INC. ELECTRICAL ENGINEERS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LAYOUT PLAN 6
CASTLE JUNCTION
TRAFFIC SIGNAL PLAN

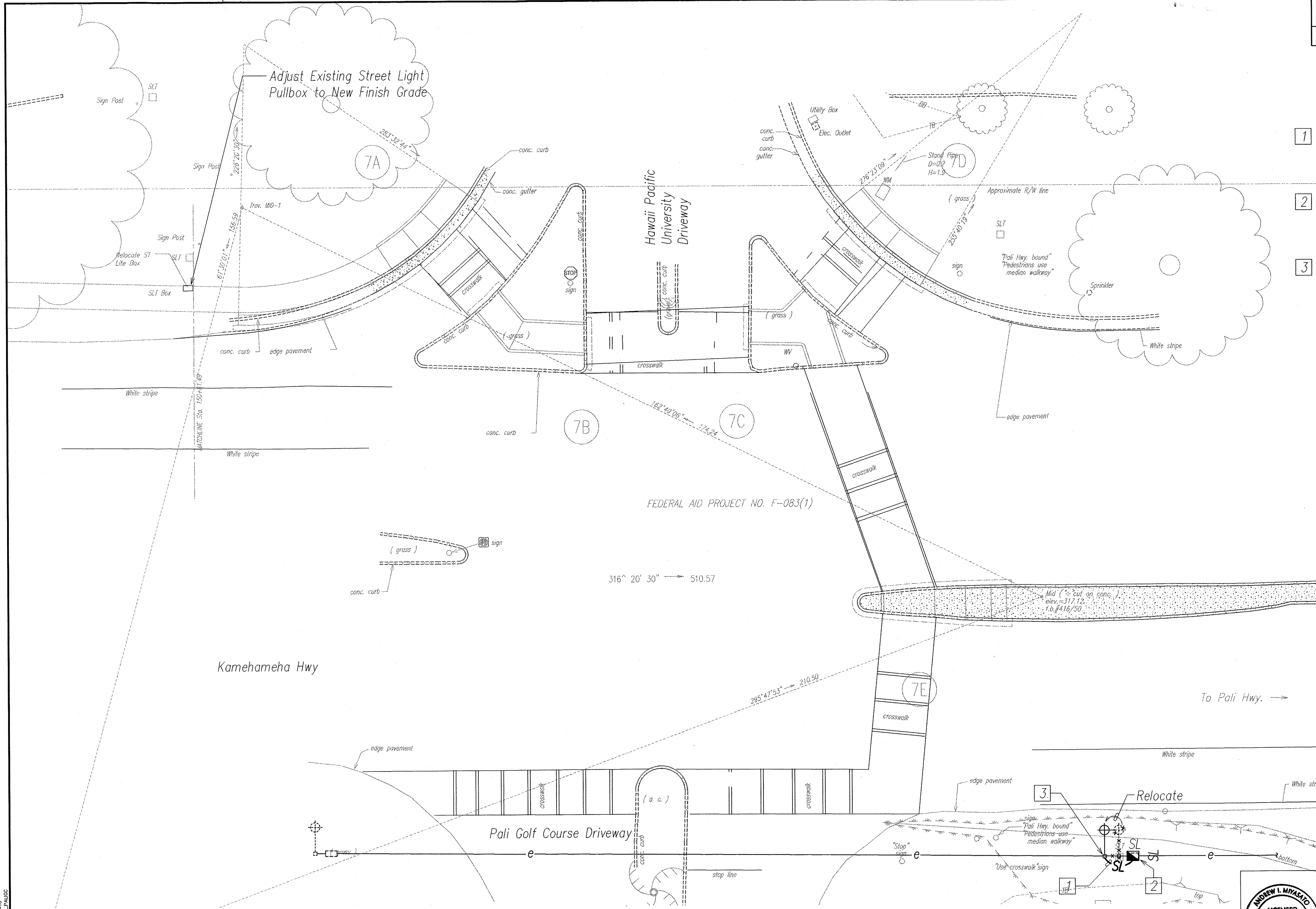
PEDESTRIAN FACILITIES and ADA COMPLIANCE
At Various Locations On Oahu, Phase II
Federal Aid Project No. CMAQ-0300(87)

SCALE: 1"=10' DATE:

SHEET No. E-6 OF 18 SHEETS

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

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-0300(87)	2002	81	145



KAMEHAMEHA HIGHWAY/HAWAII PACIFIC UNIVERSITY ELECTRICAL PLAN

SCALE: 1"=10'

10' 5' 0 10' 20' 30'

SCALE: 1"=10'

GRAPHIC SCALE

Electrical Plan Notes:

1. 1-2"C with Cable Complement Required for Street Light Connection, See Duct Section A, Sheet E-2.
2. Locate Existing Street light Pullbox, Replace with New Type A Pullbox, Flush with New Finish Grade.
3. Relocate Existing Street Light, Provide New Concrete Base, Wiring and Conneciton, Complete and in Place.

Date	Revision

ANDREW I. MIYASATO LICENSED PROFESSIONAL ENGINEER No. 4340-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

12-13-02

RONALD N. S. HO & ASSOC., INC. ELECTRICAL ENGINEERS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LAYOUT PLAN - 7
KAMEHAMEHA HIGHWAY/HAWAII PACIFIC UNIVERSITTY ELECTRICAL PLAN

PEDESTRIAN FACILITIES and ADA COMPLIANCE
At Various Locations On Oahu, Phase II
Federal Aid Project No. CMAQ-0300(87)

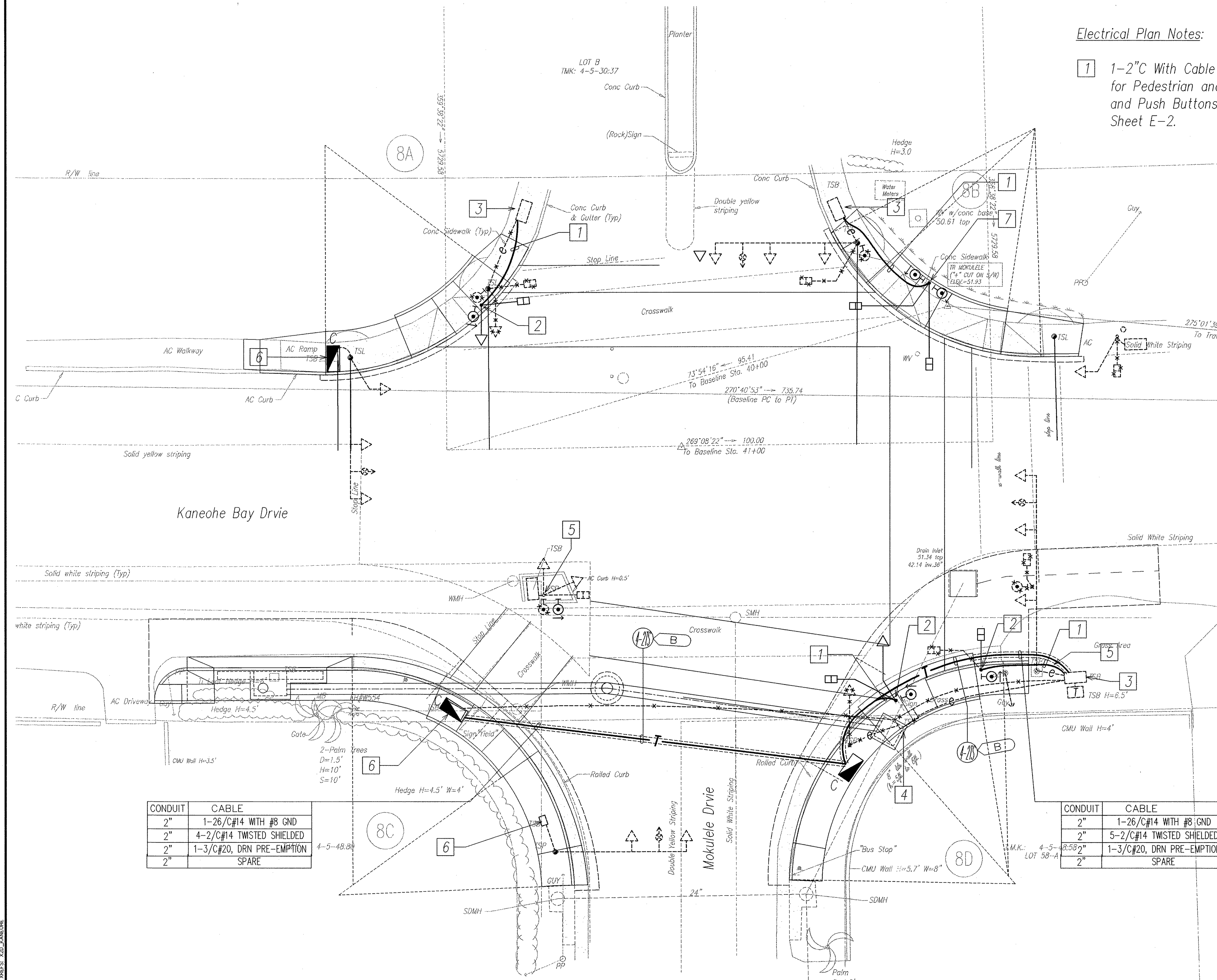
SCALE: AS NOTED DATE:

SHEET No. E-7 OF 18 SHEETS

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

LAST SAVE: 12/13/02

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-0300(87)	2002	82	145



CONDUIT	CABLE
2"	1-26/C#14 WITH #8 GND
2"	4-2/C#14 TWISTED SHIELDED
2"	1-3/C#20, DRN PRE-EMPTION
2"	SPARE

CONDUIT	CABLE
2"	1-26/C#14 WITH #8 GND
2"	5-2/C#14 TWISTED SHIELDED
2"	1-3/C#20, DRN PRE-EMPTION
2"	SPARE

NORTH

KANEOHE BAY DRIVE/MOKULELE DRIVE TRAFFIC SIGNAL PLAN

SCALE: 1"=10'

10' 5' 0 10' 20' 30'

SCALE: 1"=10'

GRAPHIC SCALE

Electrical Plan Notes:

1. 1-2"C With Cable Complement Required for Pedestrian and Traffic Signal Heads and Push Buttons, See Duct Section A, Sheet E-2.
2. Relocate Exst Traffic Signal Standard onto New Concrete Base. Provide New Necessary Mounting Equipment & Accessories as Required and as shown on the Plans, and Relocate Traffic Signal Heads as shown on the Plans, onto New Concrete Base. Demolish Exst Concrete Base 2Ft Below Finish Grade. Remove Exist Pedestrian Push Button and Provide New ADA Compliant Pedestrian Push Buttons. See Details on Sheet E-12, E-13, E-14, E-17.
3. Penetrate Handhole for New Conduit Entry. Repair to Match Exst.
4. Demolish Exst Traffic Signal Pullbox
5. Exst Traffic Signal Standard to Remain, Contractor shall Provide Necessary Accessories as Directed by City Inspector to Adjust Standard to New Finish Grade. Provide New Necessary Mounting Equipment & Accessories as Required and as shown on the Plans, and Relocate Traffic Signal Heads as shown on the Plans, Provide New ADA Compliant Pedestrian Push Button, See Details on Sheets E-12, E-13, E-14, E-17. Coordinate Push Button Location with New Ramp Contractor.
6. Replace Existing Traffic Signal Pullbox with New Type C Pullbox, Flush with New Finish Grade.
7. Provide Type 1-10 Traffic Signal Standard Installed. Provide New Necessary Mounting Equipment & Accessories as Required and as Shown on the Plans. Provide New Traffic Signal Heads onto Pole. Provide New ADA Compliant Pedestrian Pushbutton, See Details on Sheets E-22, E-23, E-30, E-31.

Date	Revision

LICENSED PROFESSIONAL ENGINEER No. 4349-E ANDREW I. MIYASATO HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

12-13-02

RONALD N. S. HO & ASSOC., INC. ELECTRICAL ENGINEERS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LAYOUT PLAN - 8
KANEOHEBAY DRIVE/MOKULELE DRIVE
TRAFFIC SIGNAL PLAN

PEDESTRIAN FACILITIES and ADA COMPLIANCE
At Various Locations On Oahu, Phase II
Federal Aid Project No. CMAQ-0300(87)

SCALE: AS NOTED DATE:

SHEET No. E-8 OF 18 SHEETS

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

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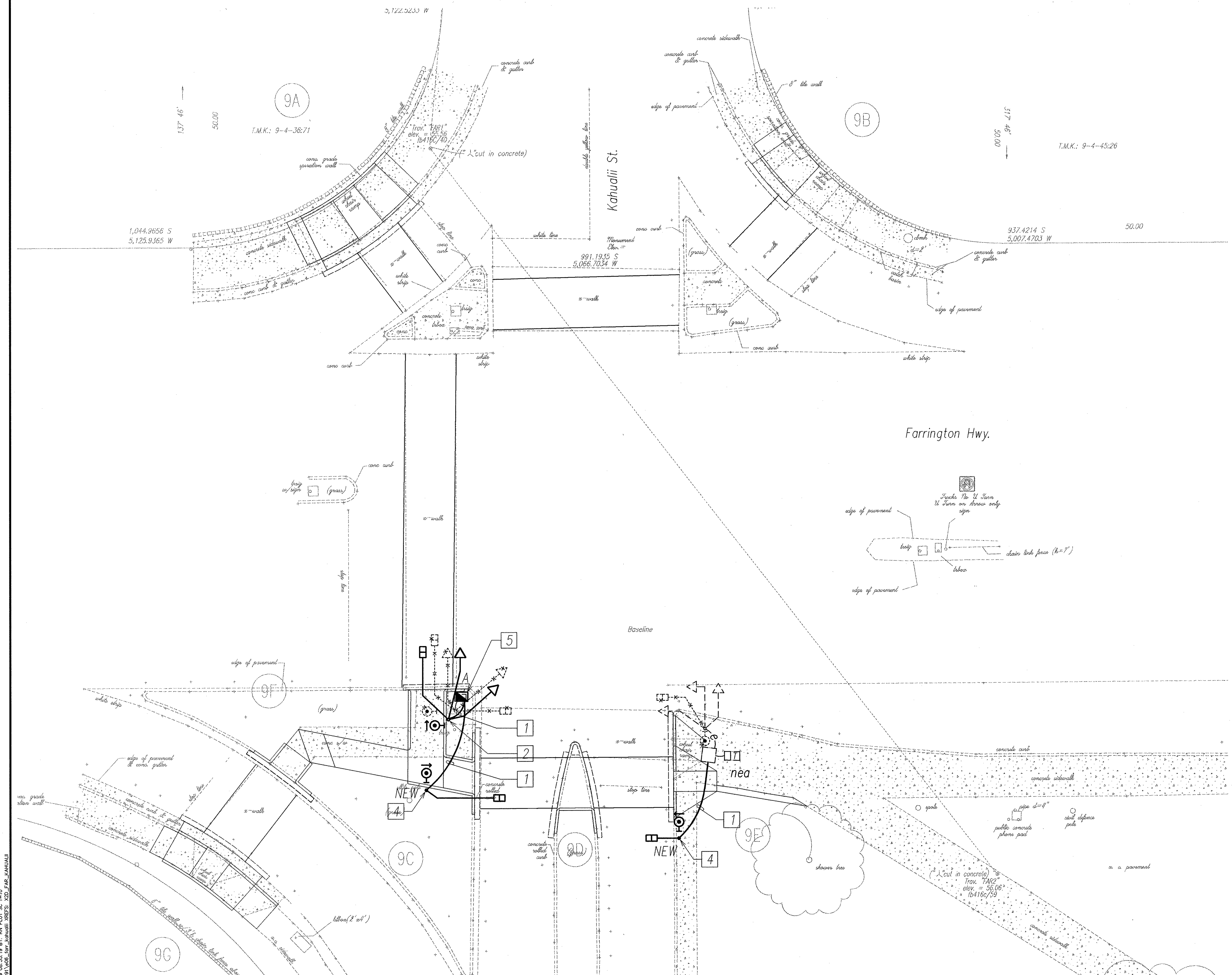
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-0300(87)	2002	83	145



NORTH

FARRINGTON HIGHWAY/KAHUALII STREET TRAFFIC SIGNAL PLAN

SCALE: 1"=10'

Electrical Plan Notes:

1. 1-2"C With Cable Complement Required for Pedestrian and Traffic Signal Heads and Push Buttons, See Duct Section A, Sheet E-2.
2. Relocate Exst Traffic Signal Standard onto New Concrete Base. Provide New Necessary Mounting Equipment & Accessories as Required and as shown on the Plans, and Relocate Traffic Signal Heads as shown on the Plans, onto New Concrete Base. Demolish Exst Concrete Base 2Ft Below Finish Grade. Remove Exist Pedestrian Push Button and Provide New ADA Compliant Pedestrian Push Buttons. See Details on Sheets E-12, E-13, E-14, E-17.
3. Penetrate Handhole for New Conduit Entry. Repair to Match Exst.
4. Provide Type 1-10 Standard Installed. Provide New Necessary Mounting Equipment & Accessories as Required and as Shown on the Plans. Relocate Traffic Signal Heads onto Pole. Provide new ADA Compliant Pedestrian Push Button, See Details on Sheets E-12, E-13, E-14, E-17.
5. Replace Existing Traffic Signal Pullbox with New Type A Pullbox, Flush with New Finish Grade.

Date	Revision

ANDREW I. MIYASATO LICENSED PROFESSIONAL ENGINEER No. 4340-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

12-17-02

RONALD N. S. HO & ASSOC., INC. ELECTRICAL ENGINEERS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LAYOUT PLAN - 9
FARRINGTON HIGHWAY/KAHUALII STREET
TRAFFIC SIGNAL PLAN

PEDESTRIAN FACILITIES and ADA COMPLIANCE
At Various Locations On Oahu, Phase II
Federal Aid Project No. CMAQ-0300(87)

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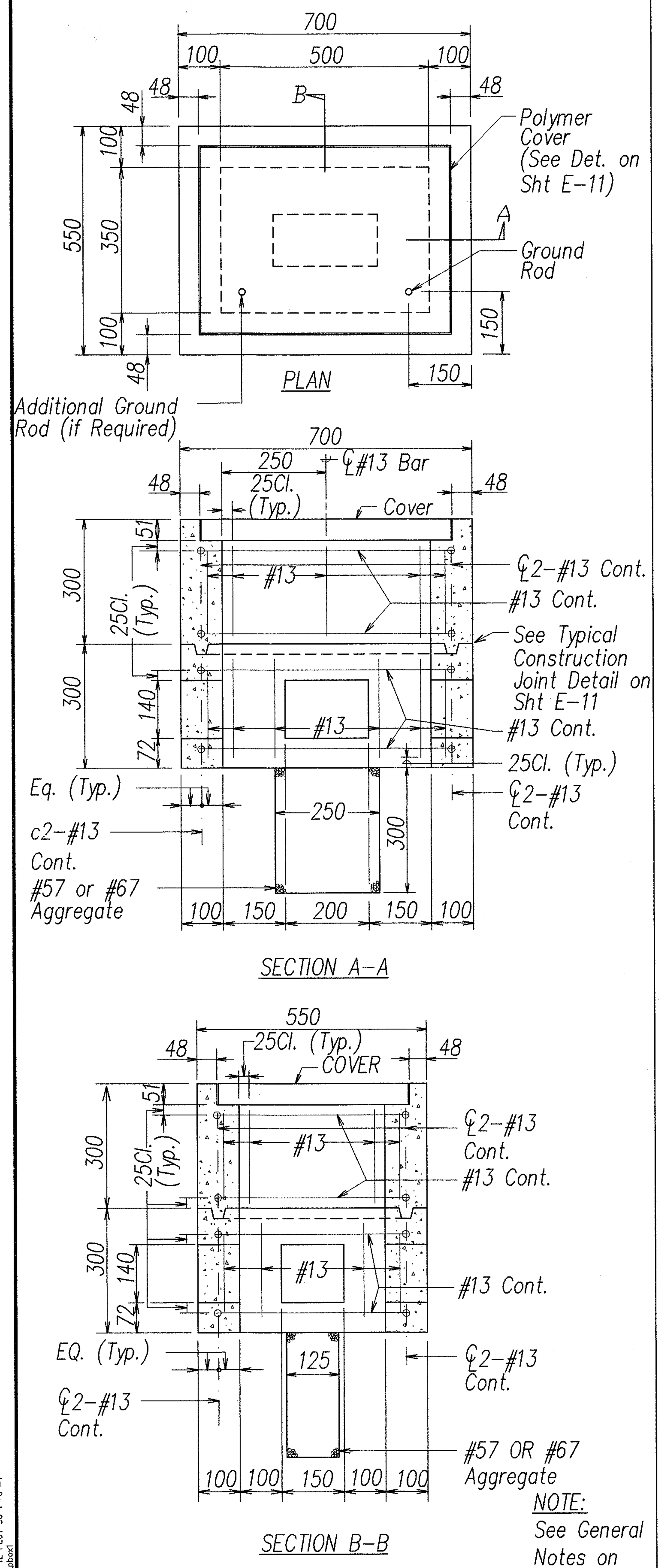
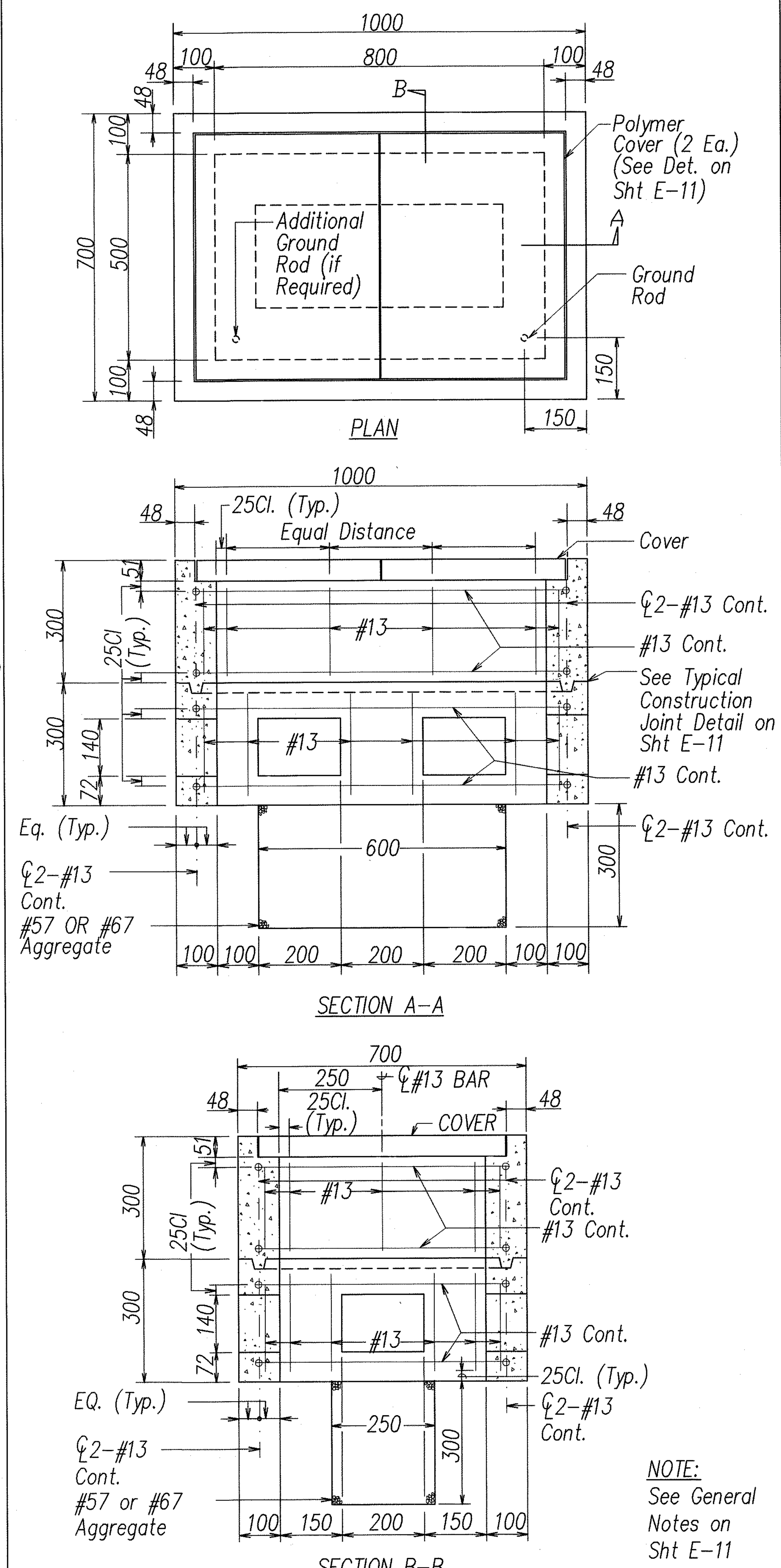


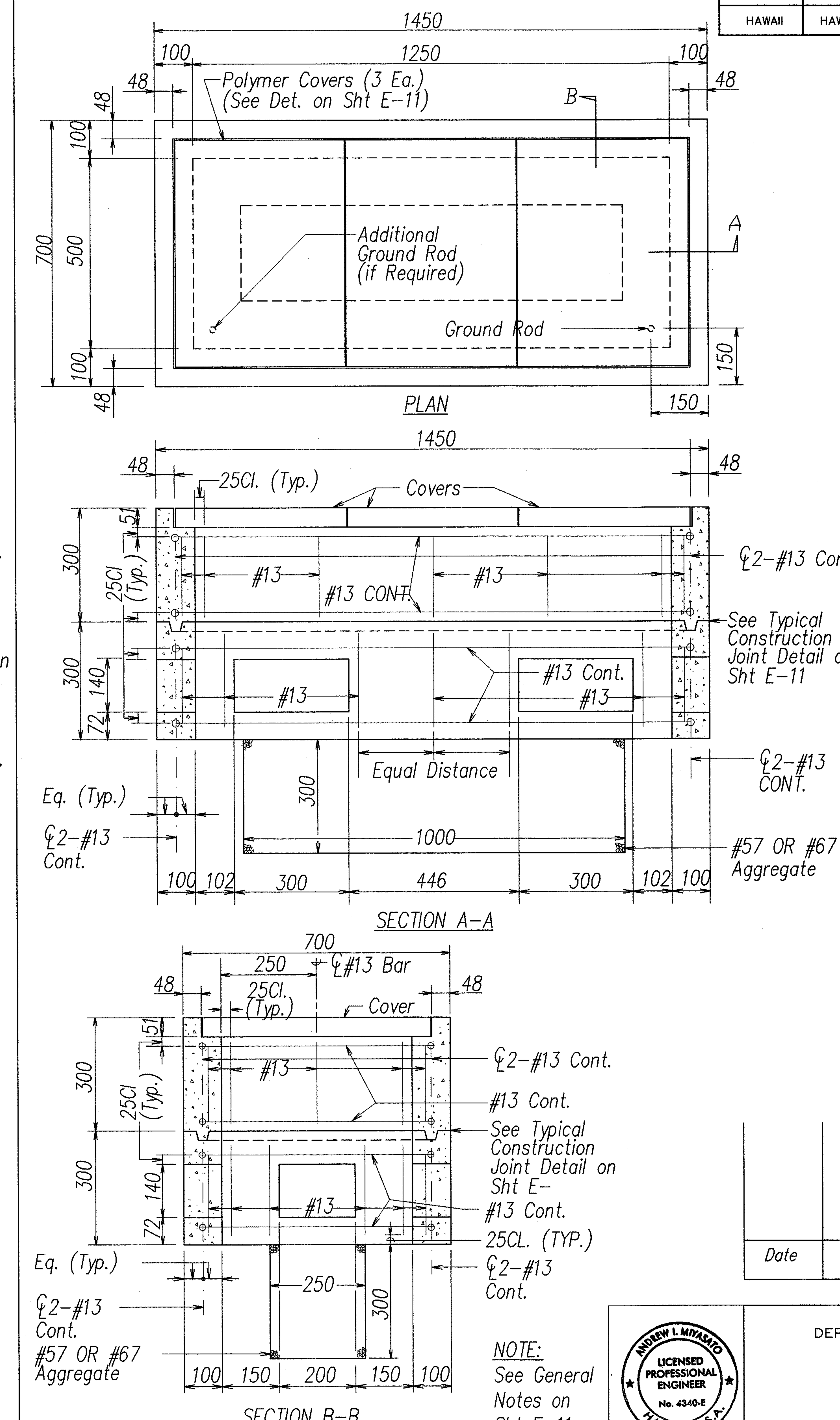
(A / E-10) TYPE "A" PULLBOX OLD TYPE "B"

NOT TO SCALE



(B / E-10) TYPE "B" PULLBOX (OLD TYPE "C")

NOT TO SCALE



(C / E-10) TYPE "C" PULLBOX (OLD TYPE "D")

NOT TO SCALE

All Dimensions on this Sheet are in Millimeters

Date	Revision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL PULLBOX DETAILS I

PEDESTRIAN FACILITIES and ADA COMPLIANCE
At Various Locations On Oahu, Phase II
Federal Aid Project No. CMAQ-0300(87)

ANDREW I. MIYASATO, LICENSED PROFESSIONAL ENGINEER, No. 4340-E, HAWAII, U.S.A.

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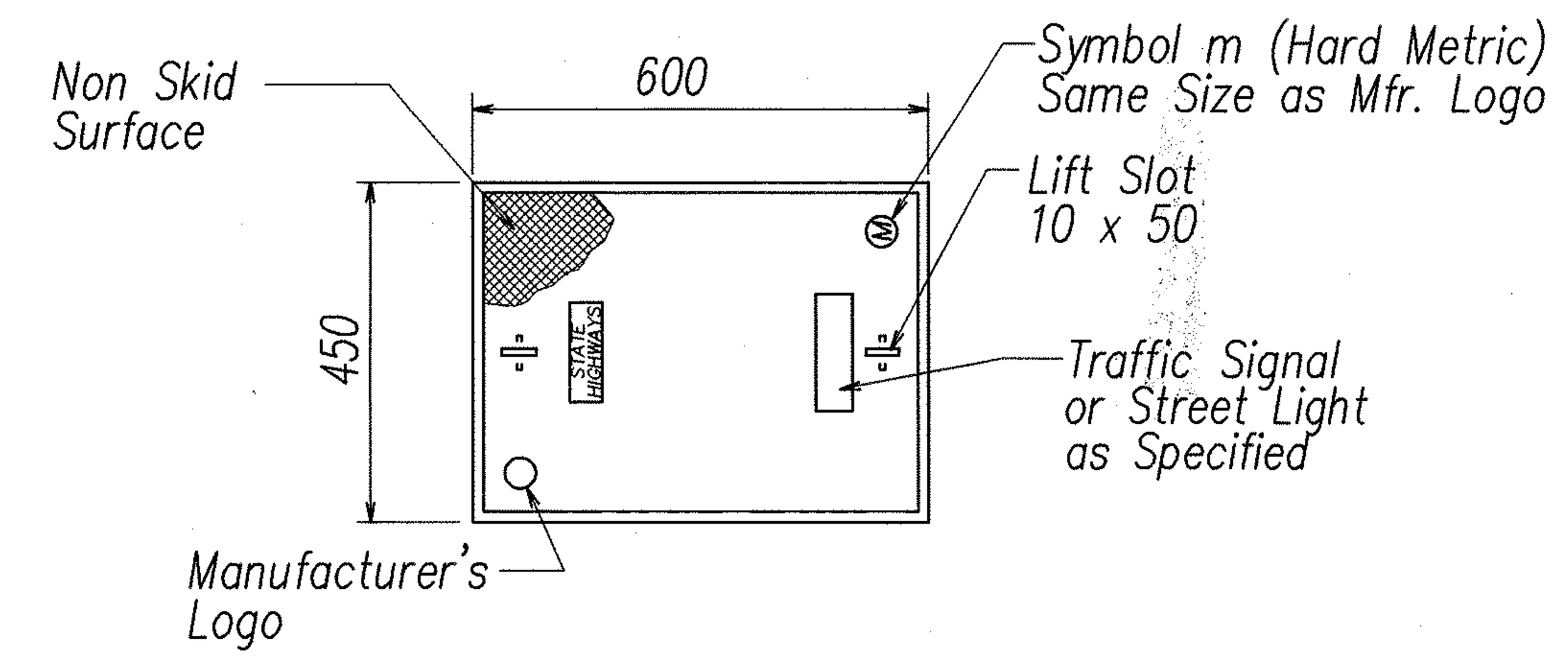
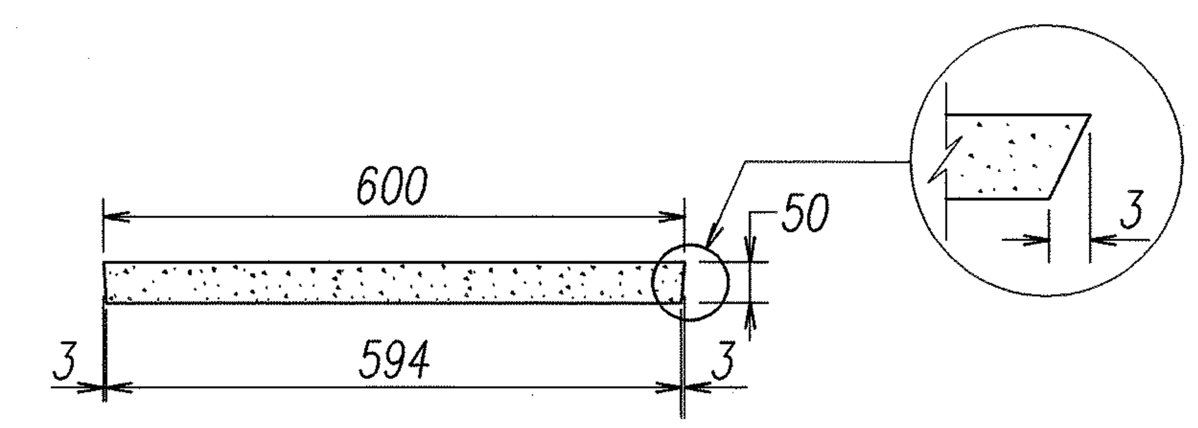
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-0300(87)	2002	85	145

GENERAL NOTES FOR TRAFFIC SIGNAL PULLBOX DETAILS ON SHEET E-10

1. Provide a minimum of one 16 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 with 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 (25MPA, min.)
9. 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).



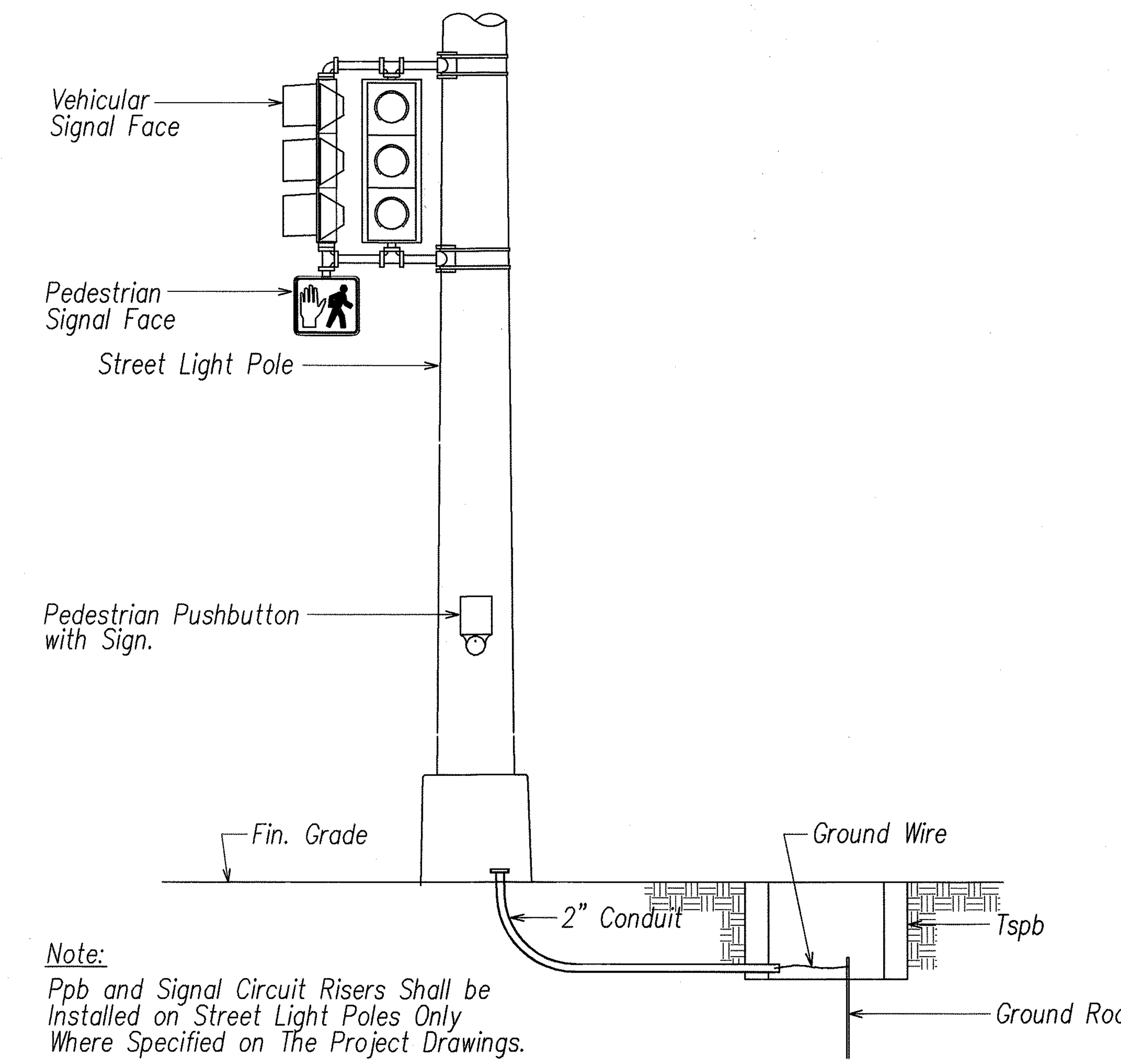
PLAN VIEW



ELEVATION

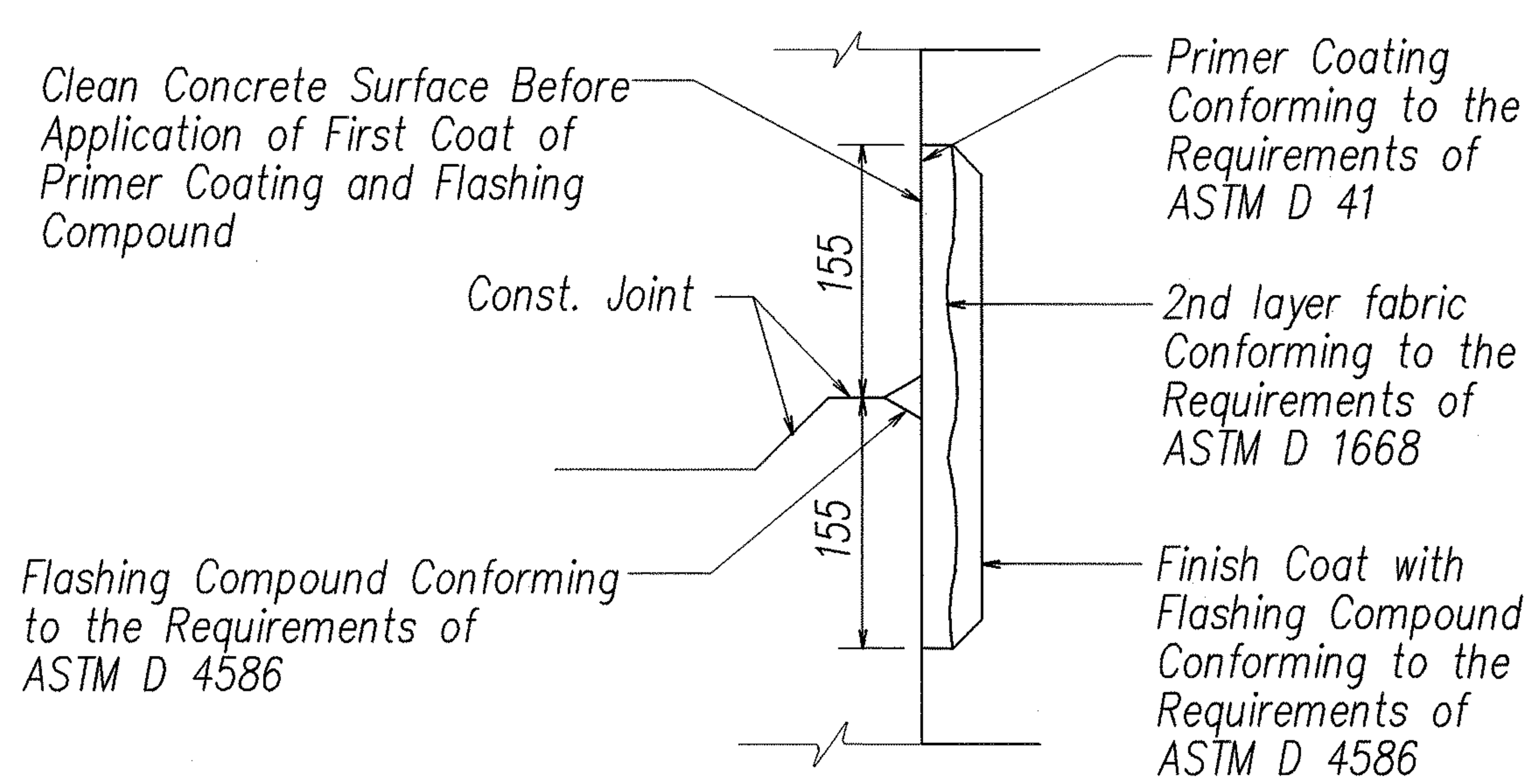
Note: See Highway Lighting and Traffic Signal Pullbox Details on Sht E-10

B / E-11 POLYMER CONCRETE COVER
NOT TO SCALE

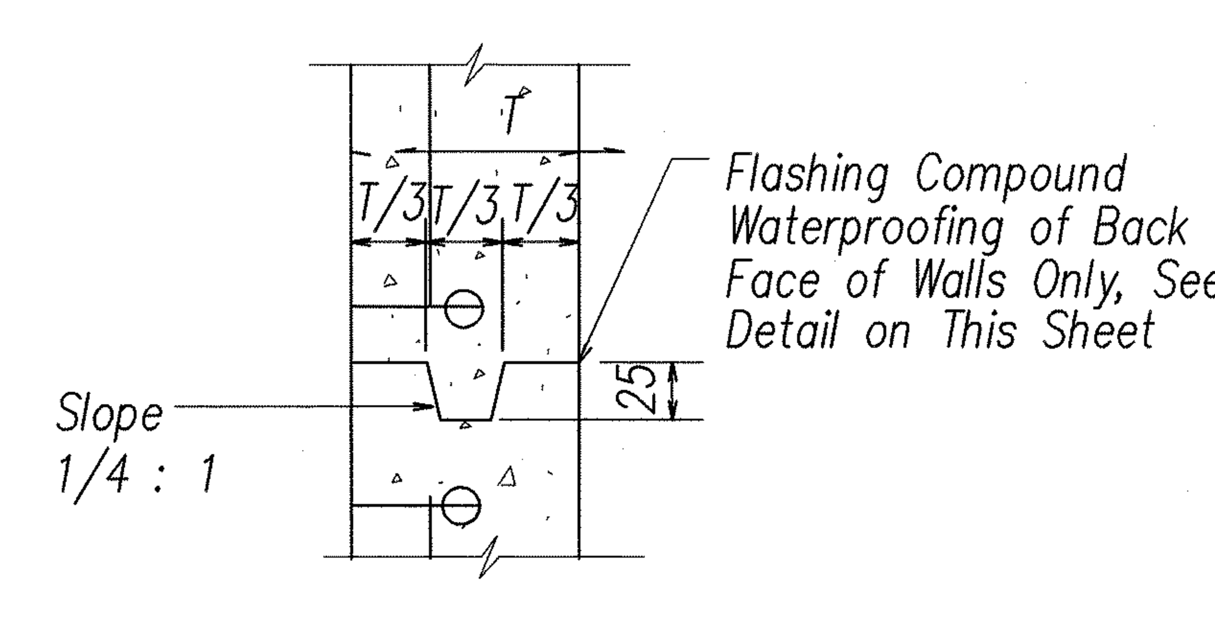


Note:
Ppb and Signal Circuit Risers Shall be Installed on Street Light Poles Only Where Specified on The Project Drawings.

C / E-11 STREET LIGHT POLE RISER DETAIL
NOT TO SCALE



A / E-11 TYPICAL FLASHING COMPOUND WATERPROOFING DETAILS
NOT TO SCALE



Note: See Highway Lighting and Traffic Signal Pullbox Details on Sht E-_

D / E-11 TYPICAL CONSTRUCTION JOINT DETAIL
NOT TO SCALE

All Dimensions on this Sheet are in Millimeters Unless Otherwise Shown

Date	Revision

ANDREW L. MIYASATO LICENSED PROFESSIONAL ENGINEER No. 4340-E HAWAII, U.S.A.

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12-13-02

RONALD N. S. HO & ASSOC., INC. ELECTRICAL ENGINEERS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL PULLBOX DETAILS II

PEDESTRIAN FACILITIES and ADA COMPLIANCE At Various Locations On Oahu, Phase II Federal Aid Project No. CMAQ-0300(87)

SCALE: AS NOTED DATE:

SHEET No. E-11 OF 18 SHEETS

ORIGINAL PLAN | SURVEY PLOTTED BY___ DATE___ | DRAWN BY___ | TRACED BY___ | DESIGNED BY___ | QUANTITIES BY___ | CHECKED BY___ | NOTE BOOK | No.___

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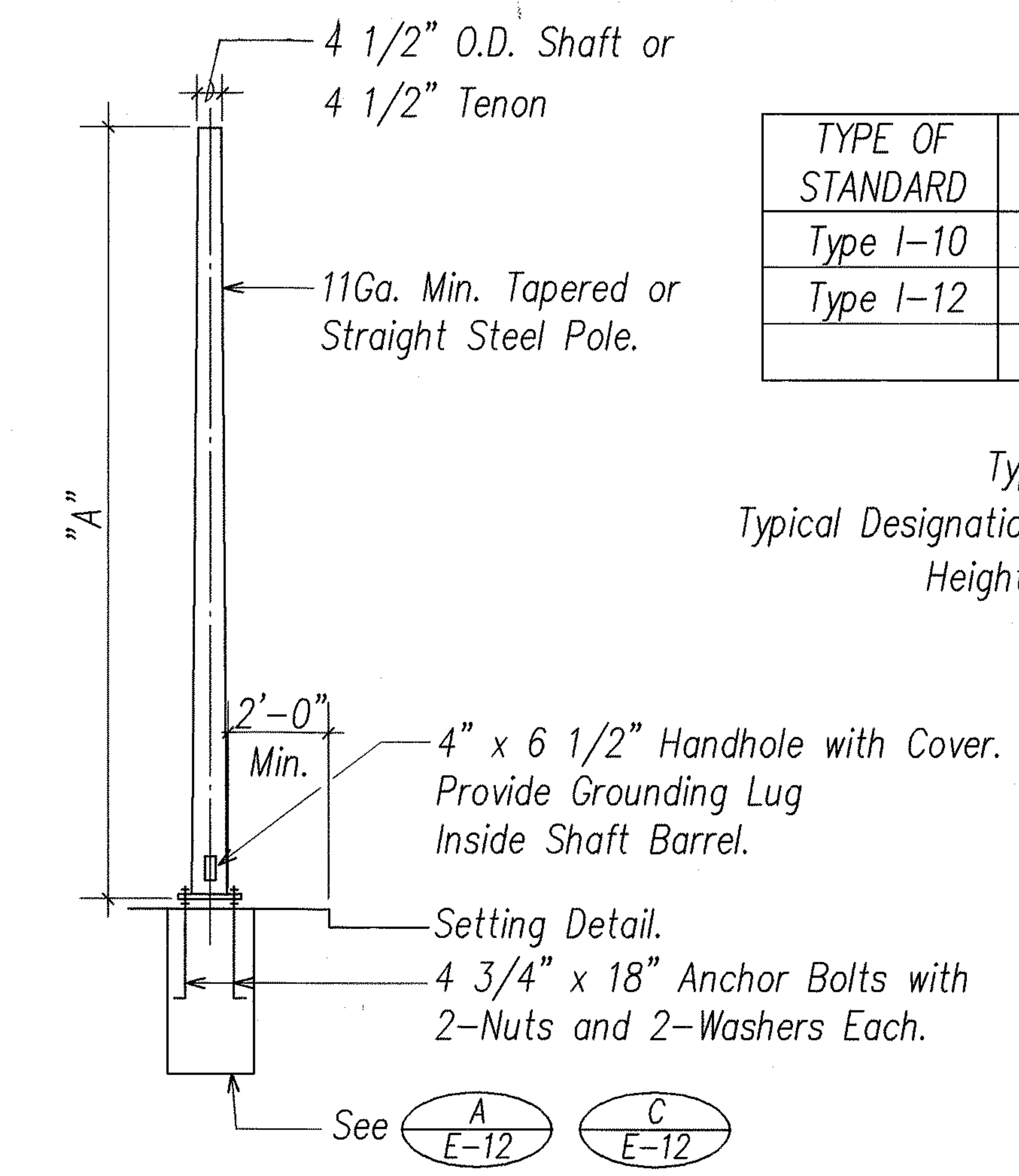
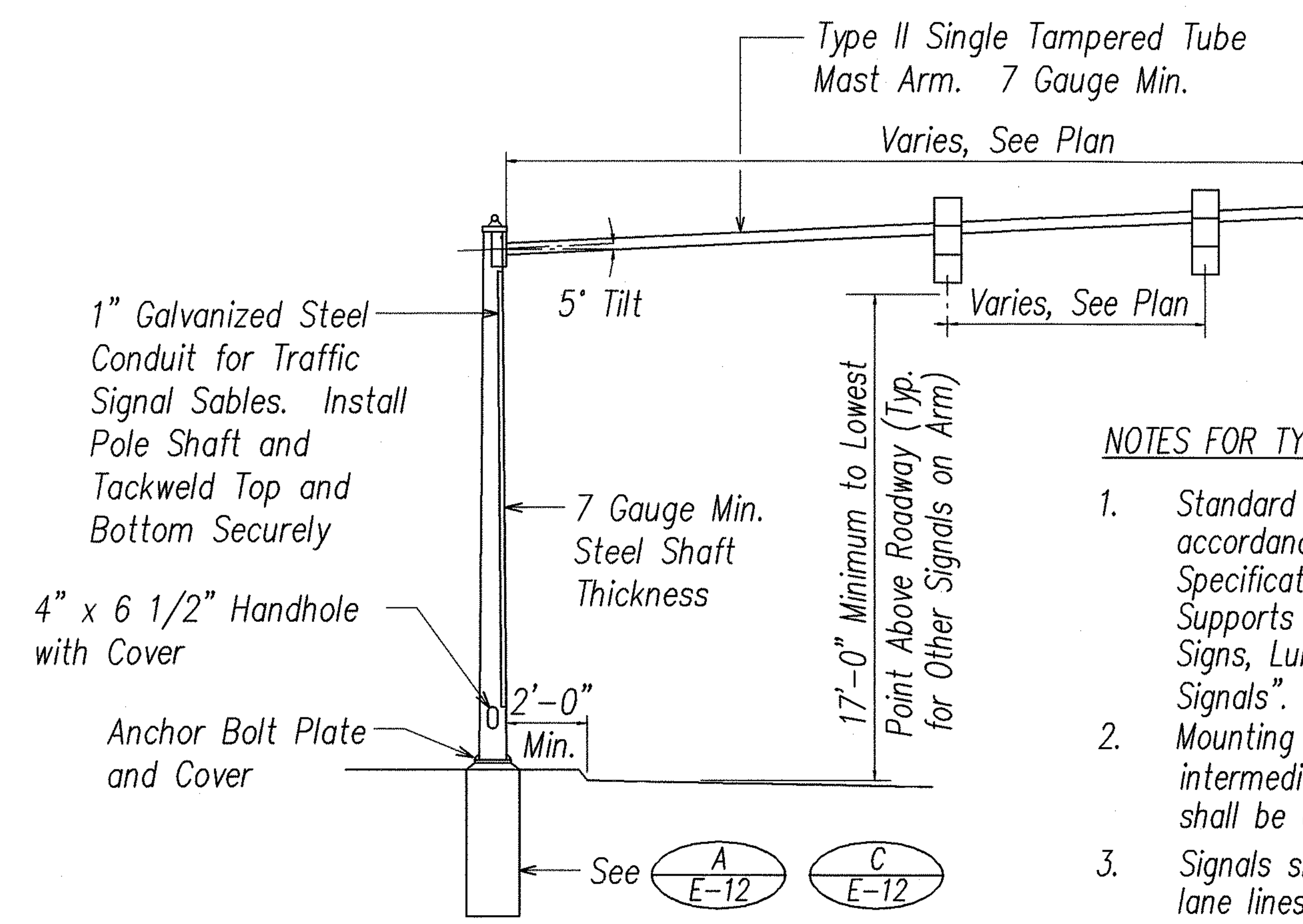


TYPE OF STANDARD	"A"
Type I-10	10
Type I-12	12

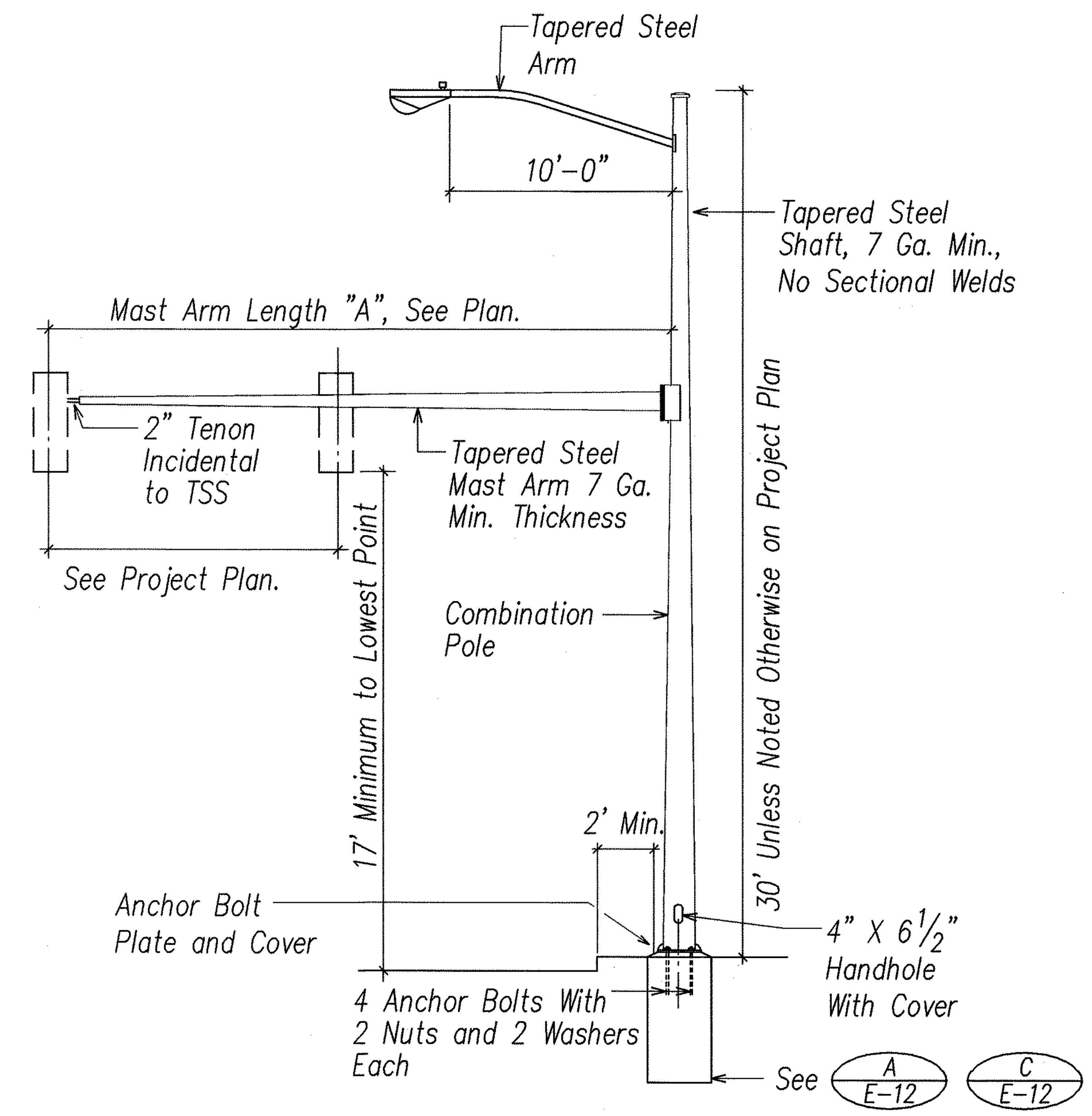
A E-12 TYPE I TRAFFIC SIGNAL STANDARD
NOT TO SCALE



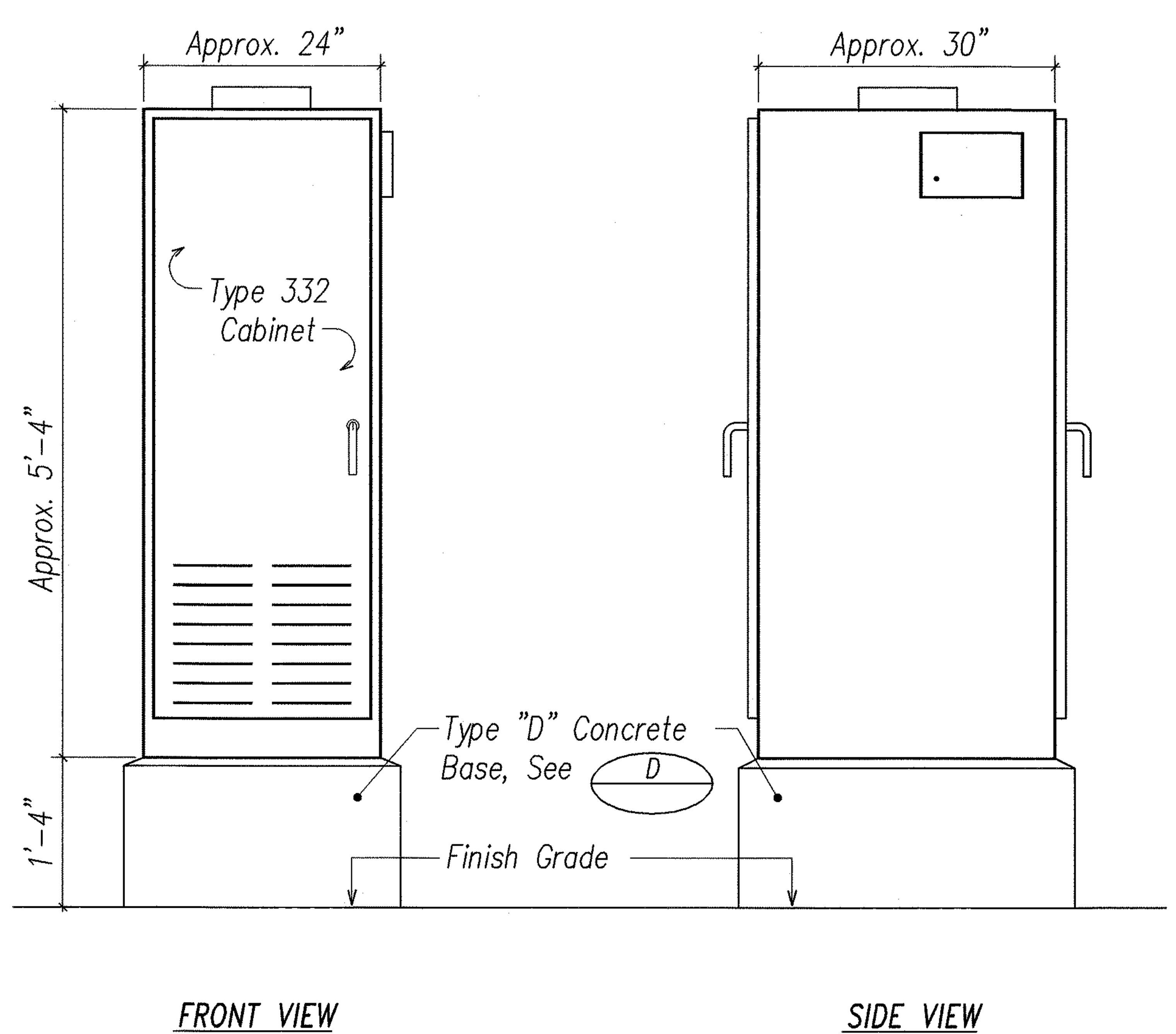
NOTES FOR TYPE II STANDARD:

1. Standard shall be designed in accordance with "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals".
2. Mounting for signals at intermediate points of mast arm shall be of the adjustable type.
3. Signals shall be centered over lane lines.
4. Submit shop drawings for approval.

B E-12 TYPE II TRAFFIC SIGNAL STANDARD
NOT TO SCALE



C E-12 TYPE III TRAFFIC SIGNAL STANDARD
NOT TO SCALE



D E-12 TYPE 332A TRAFFIC SIGNAL CONTROLLER CABINET DETAIL
NOT TO SCALE

Date	Revision

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS I

PEDESTRIAN FACILITIES and ADA COMPLIANCE
At Various Locations On Oahu, Phase II
Federal Aid Project No. CMAQ-0300(87)

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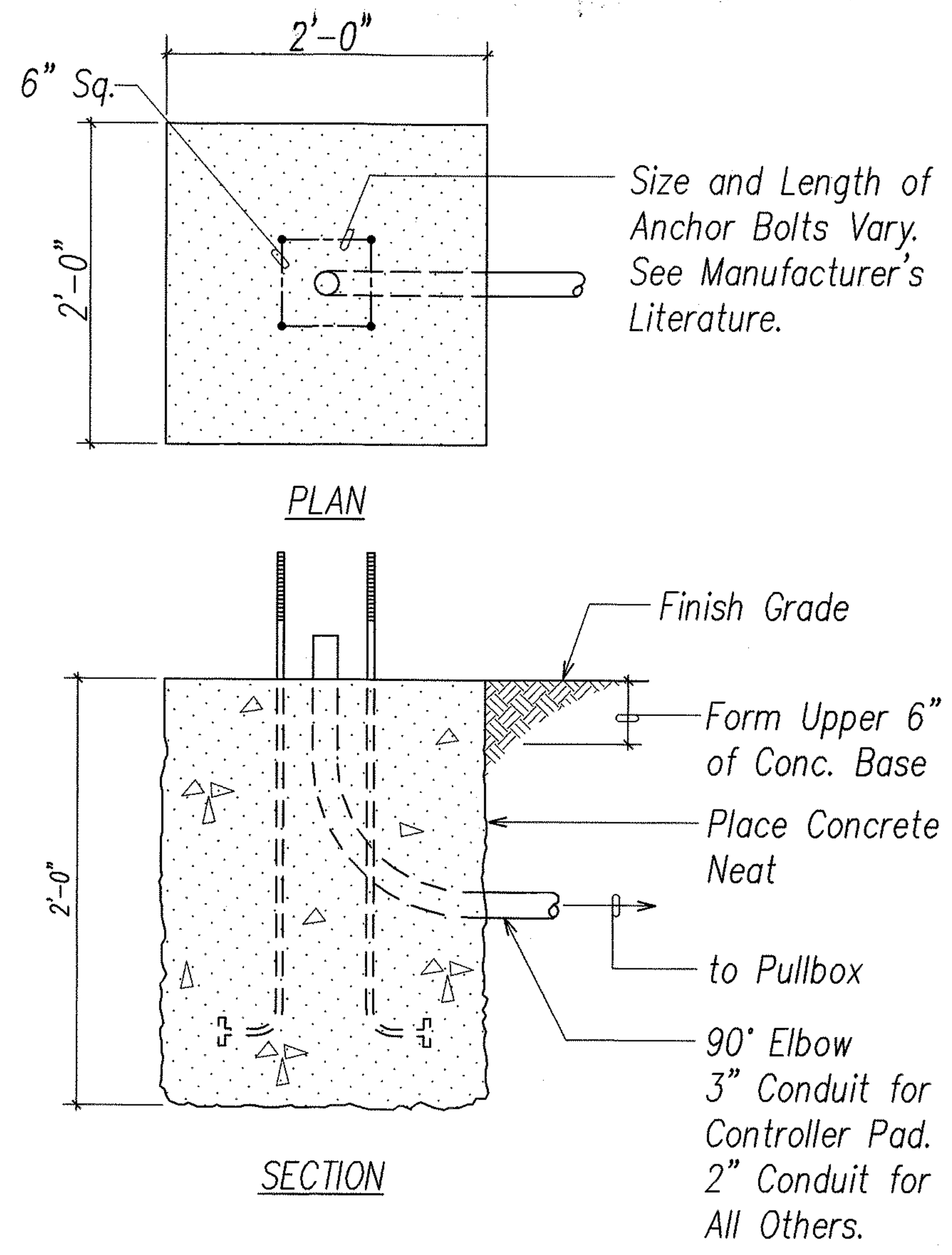
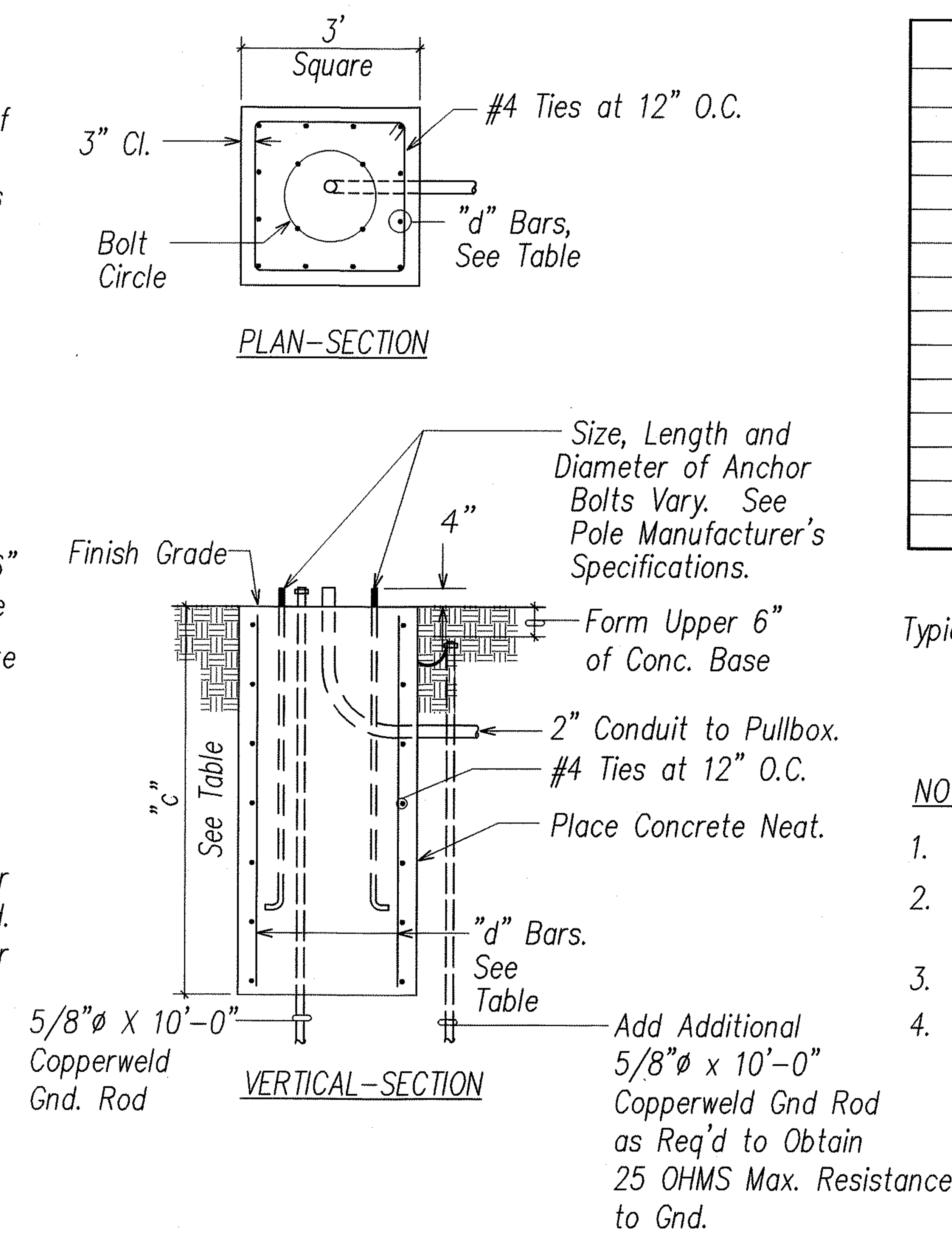
HAWAII	HAW.	CMAQ-0300(87)	2002	87	145



NOTES:

1. Concrete shall be class "B".
2. Type "A" concrete base shall be used for type I-10, I-7 and I-3 standards.
3. Conduit bend is incidental to concrete base construction.

A / E-13 TYPE "A" CONCRETE BASE
NOT TO SCALE



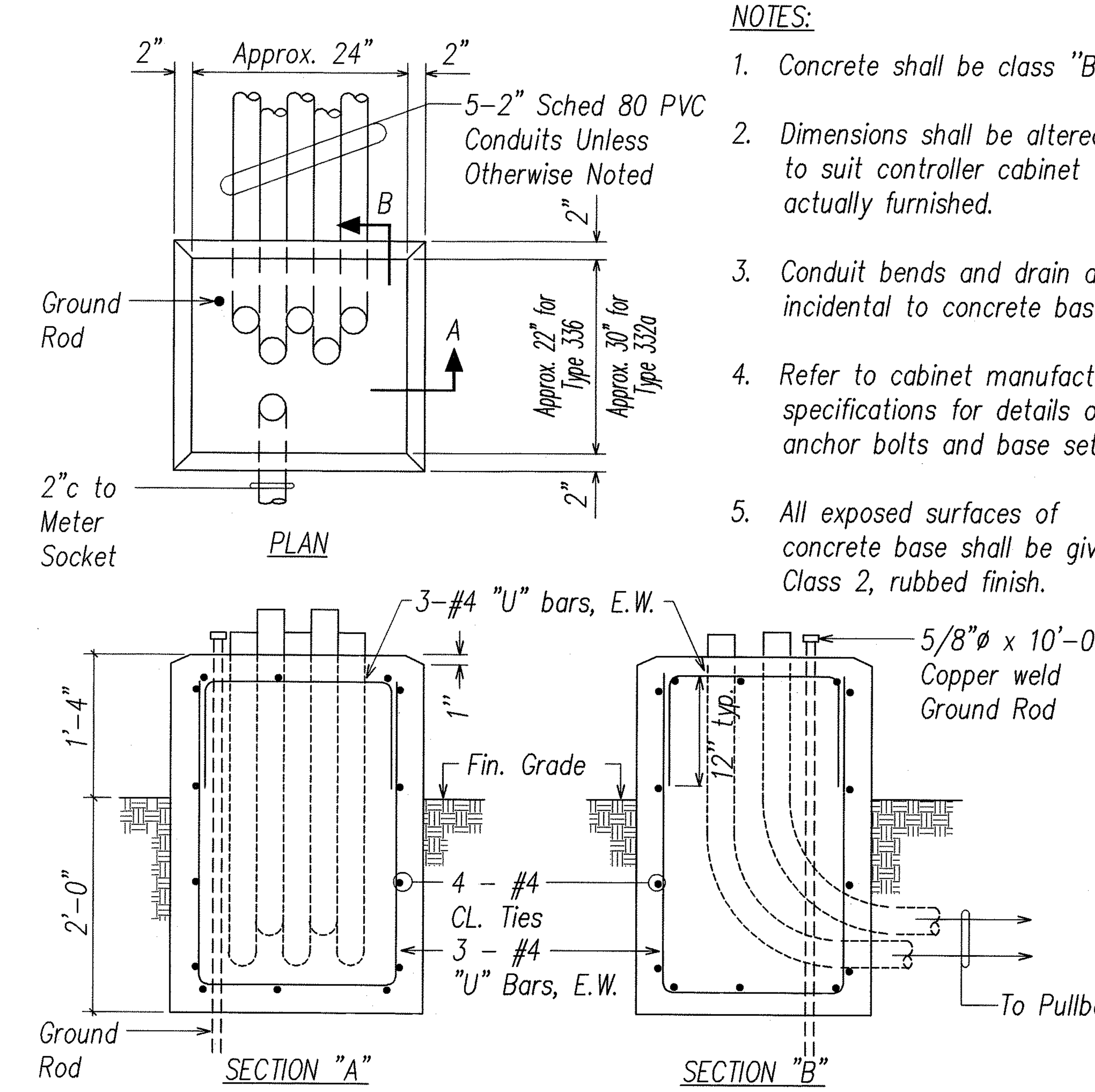
TYPE "C" CONCRETE BASE		
TYPE OF STANDARD	"c"	"d" BARS
II - 18	5'-0"	12 - #6
II - 20	5'-6"	12 - #6
II - 25	6'-0"	12 - #6
II - 30	6'-6"	12 - #8
II - 35	7'-0"	12 - #8
II - 40	8'-0"	12 - #8
III - 18	5'-6"	12 - #6
III - 20	6'-0"	12 - #6
III - 25	6'-6"	12 - #8
III - 30	6'-6"	12 - #8
III - 35	7'-0"	12 - #8
III - 40	8'-0"	12 - #8
III - 45	10'-0"	12 - #8

Typical Standard Designation: II - 25 (Type: II; Mast Arm Length: 25)

NOTES:

1. Concrete shall be class "B".
2. Type "C" concrete base shall be used for types II and III traffic signal standards.
3. Design lateral pressure: 1,500 psf.
4. Conduit bend is incidental to concrete base.

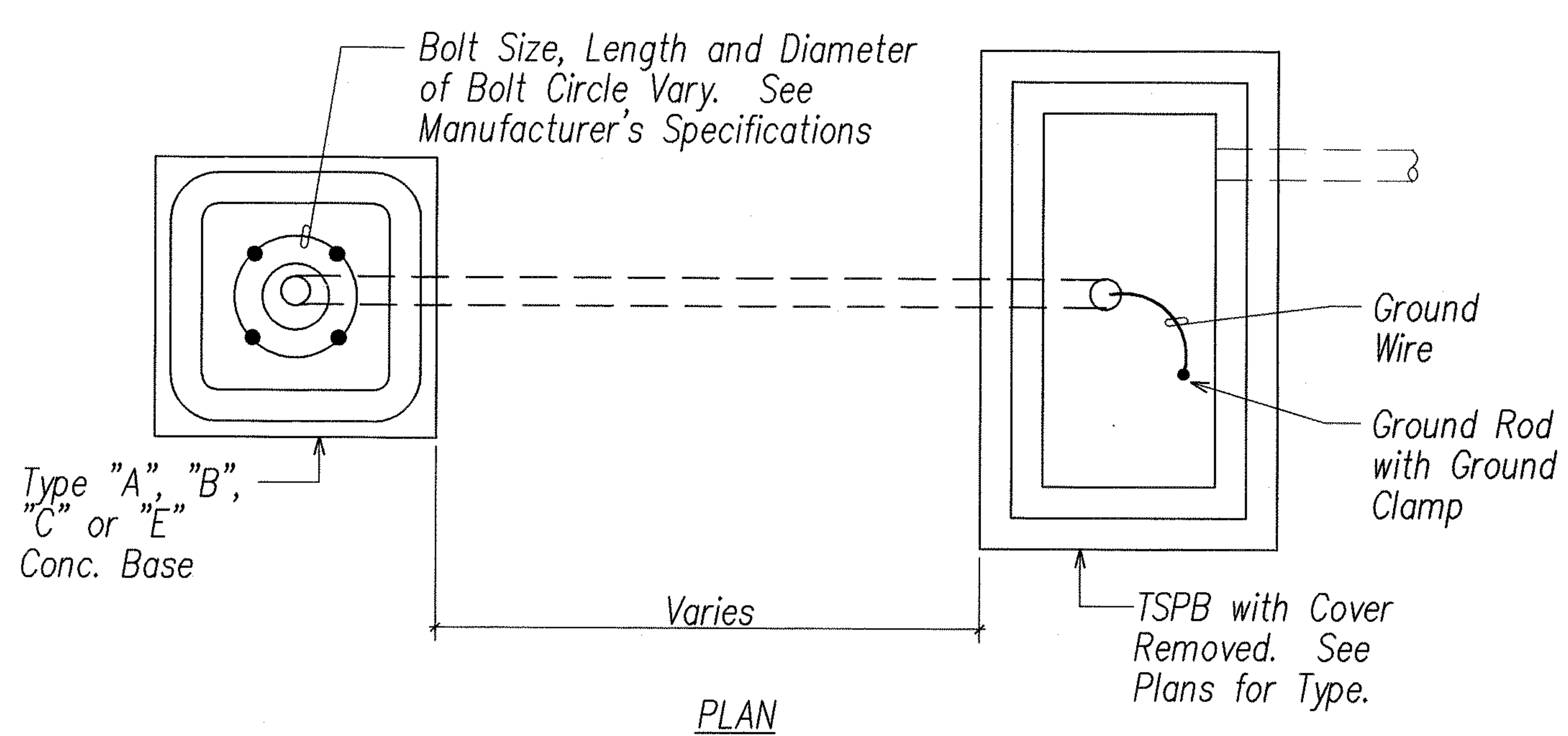
B / E-13 TYPE "C" CONCRETE BASE
NOT TO SCALE

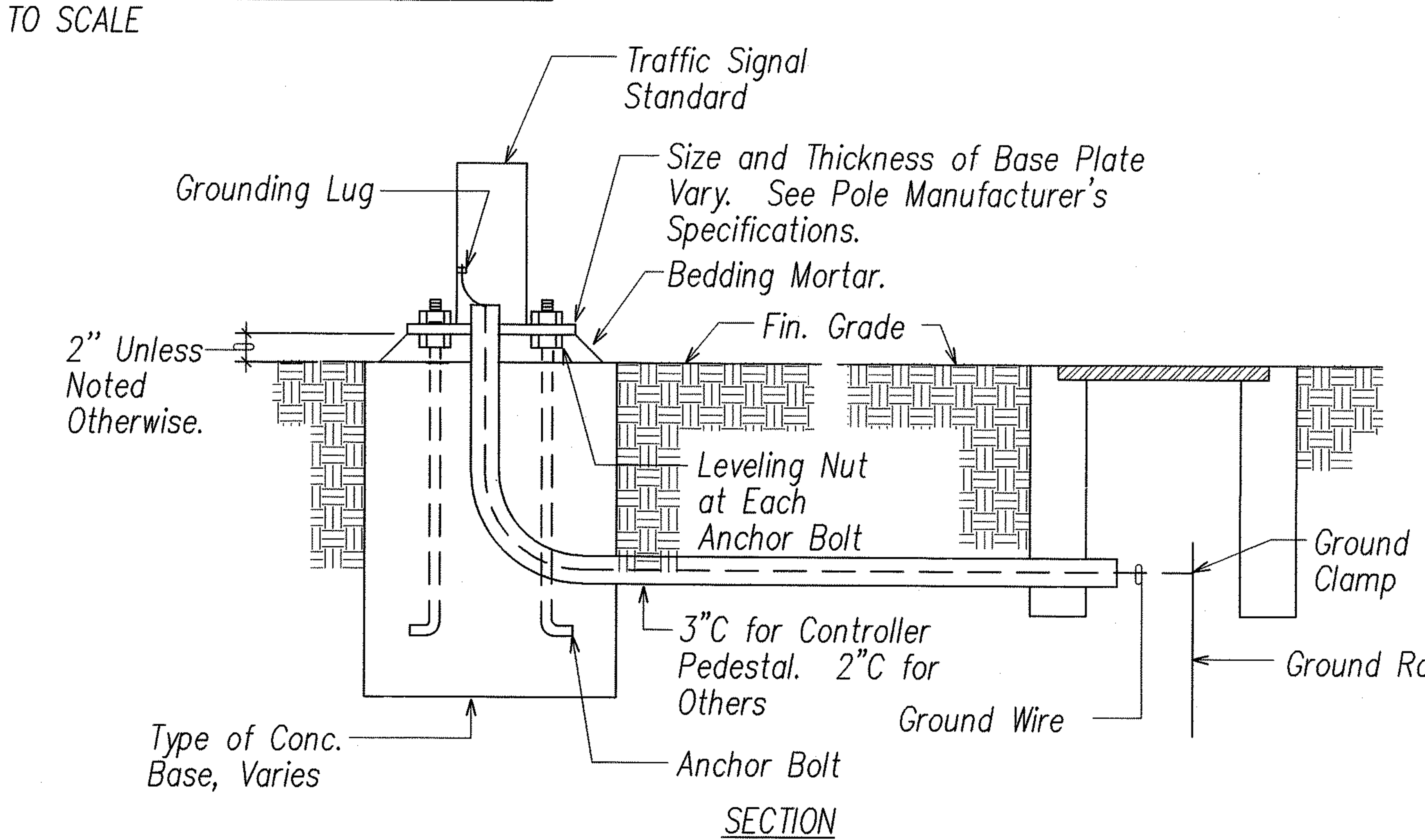


NOTES:

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

D / E-13 TYPE "D" CONCRETE BASE DETAIL
NOT TO SCALE





C / E-13 TYPICAL STANDARD & PEDESTAL DETAIL
NOT TO SCALE

Date	Revision

ANDREW I. MIYASATO LICENSED PROFESSIONAL ENGINEER No. 4340-E HAWAII, U.S.A.

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12-13-02
RONALD N. S. HO & ASSOC., INC. ELECTRICAL ENGINEERS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS II

PEDESTRIAN FACILITIES and ADA COMPLIANCE
At Various Locations On Oahu, Phase II
Federal Aid Project No. CMAQ-0300(87)

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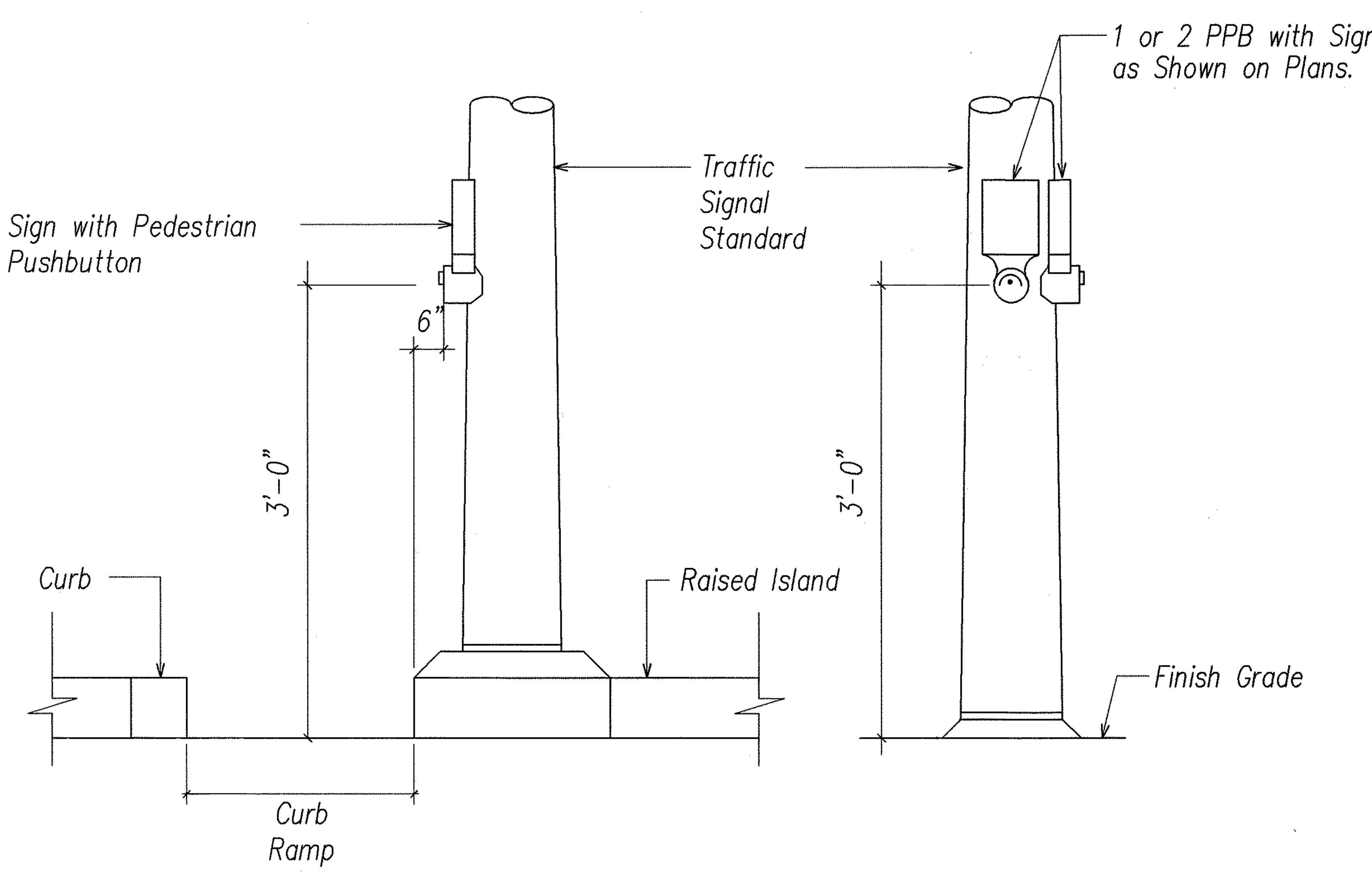
HAWAII	HAW.	CMAQ-0300(87)	2002	88	145

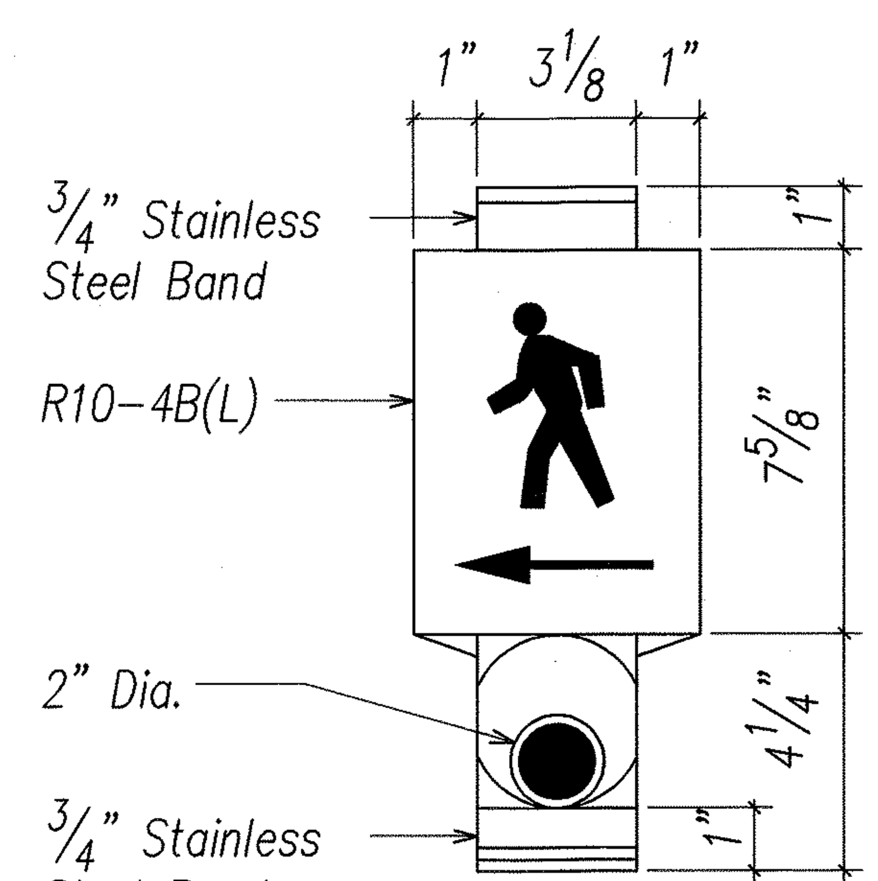


AT RAISED CONCRETE ISLAND

AT SHOULDER

DETAIL NOTES:

1. The pedestrian pushbutton unit shall consist of a one piece assembly with a raise walking man, arrow indication and push button.
2. The pushbutton activator shall be of the mushroom plunger type, ADA acceptable, 2 inches in diameter that requires less than 5 lbs. of pressure to activate.
3. The raised man and arrows shall be directional and match the directional indication as shown on the plans.
4. The pushbutton shall be tamper proof, weatherproof and constructed so that electrical shocks are impossible.
5. The color scheme shall be:
   White – Man, arrow and pushbutton
   Black – Background



A / E-14 PEDESTRIAN PUSHBUTTON DETAILS
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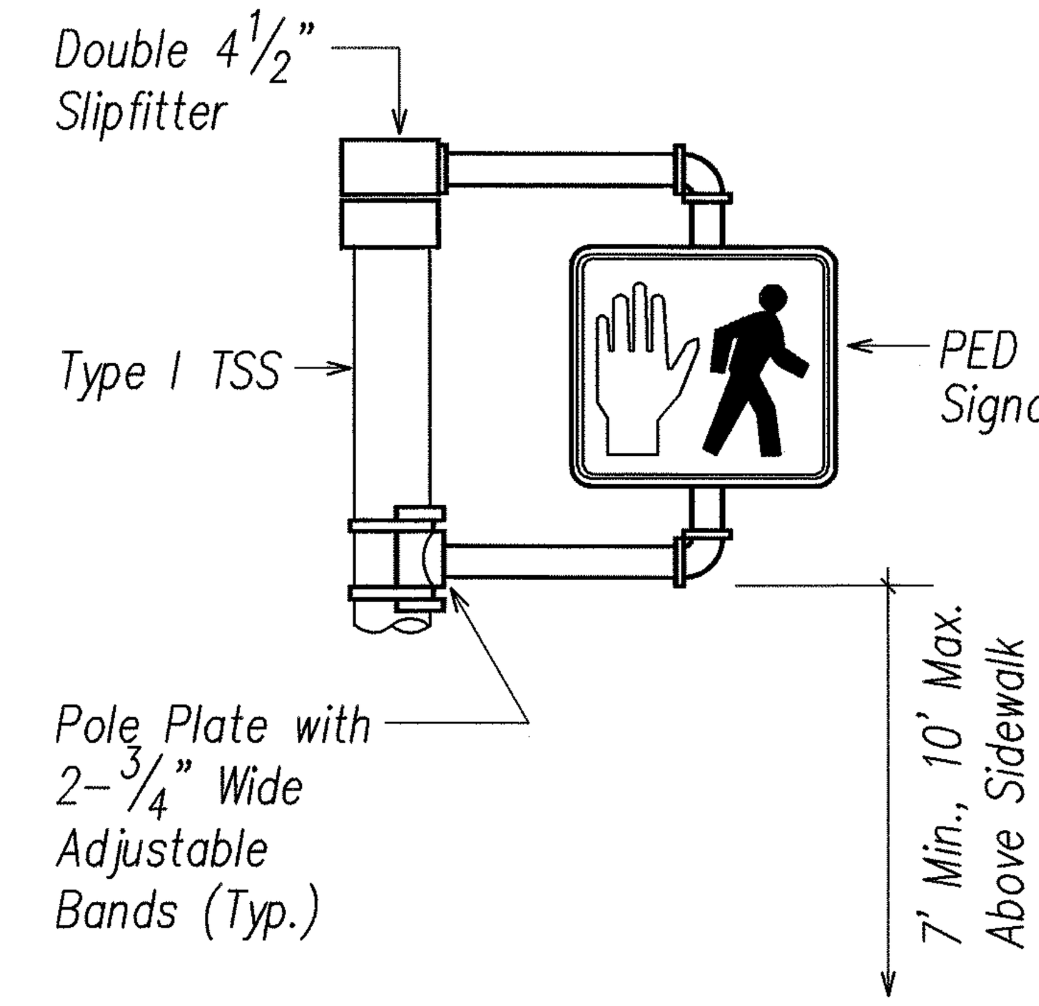
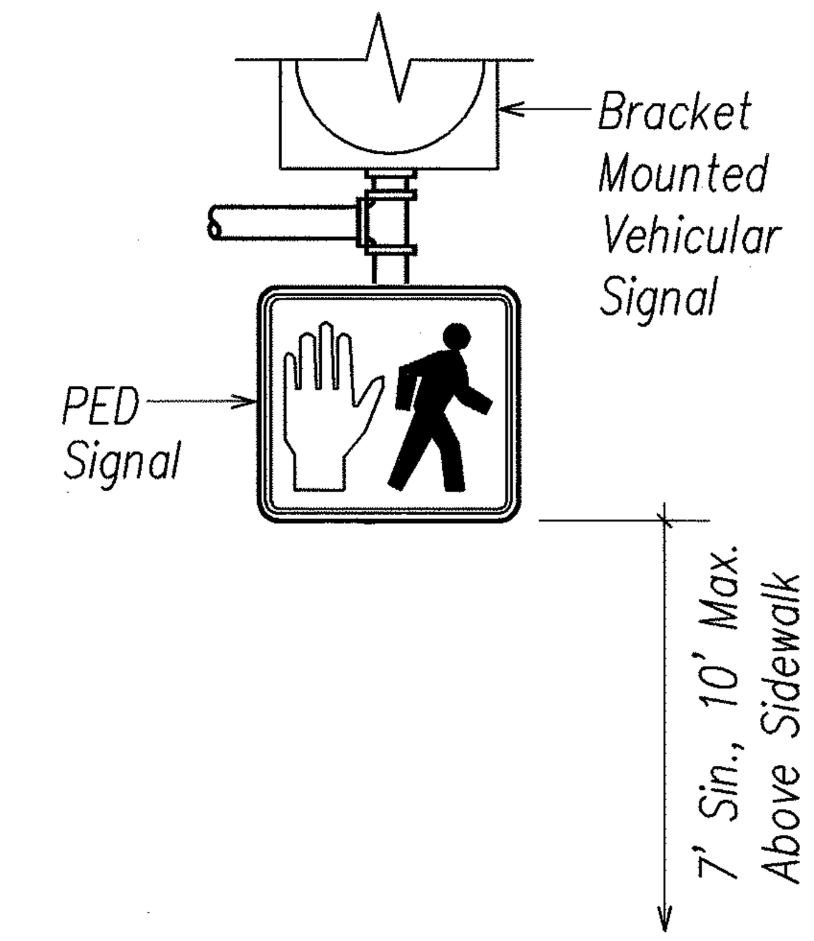
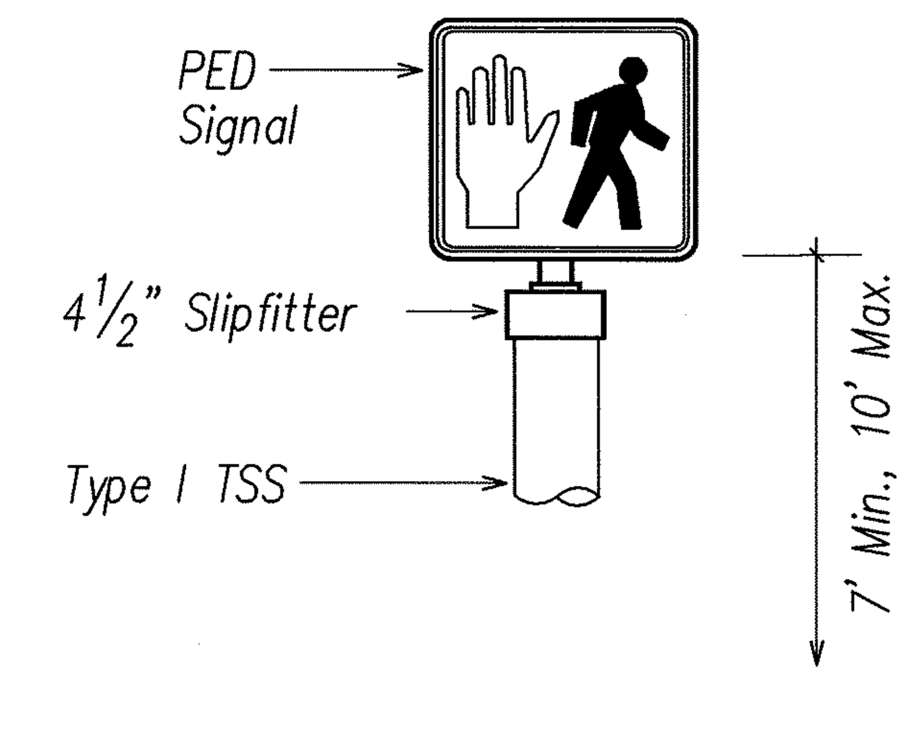


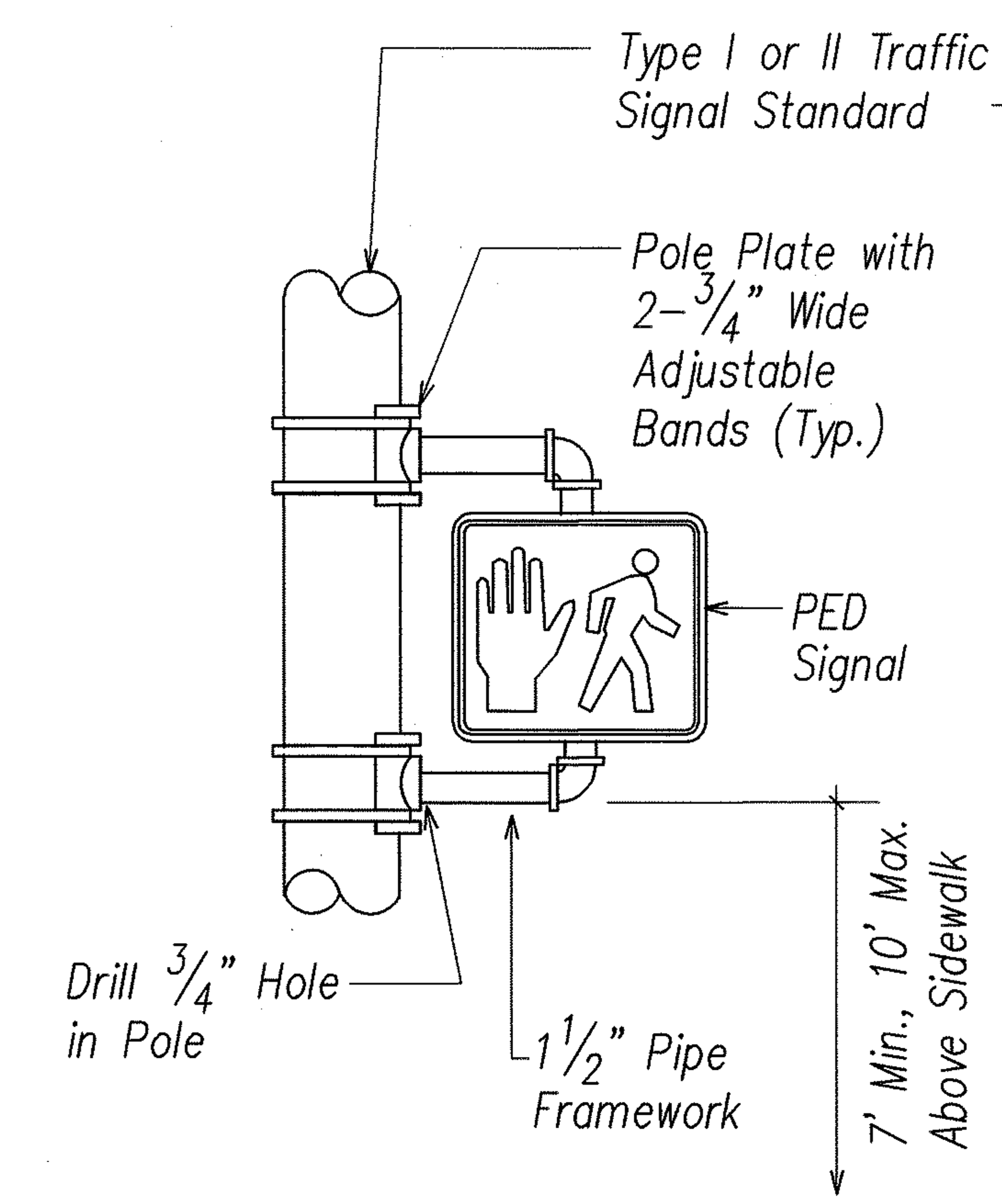
CANTILEVER – ONE WAY



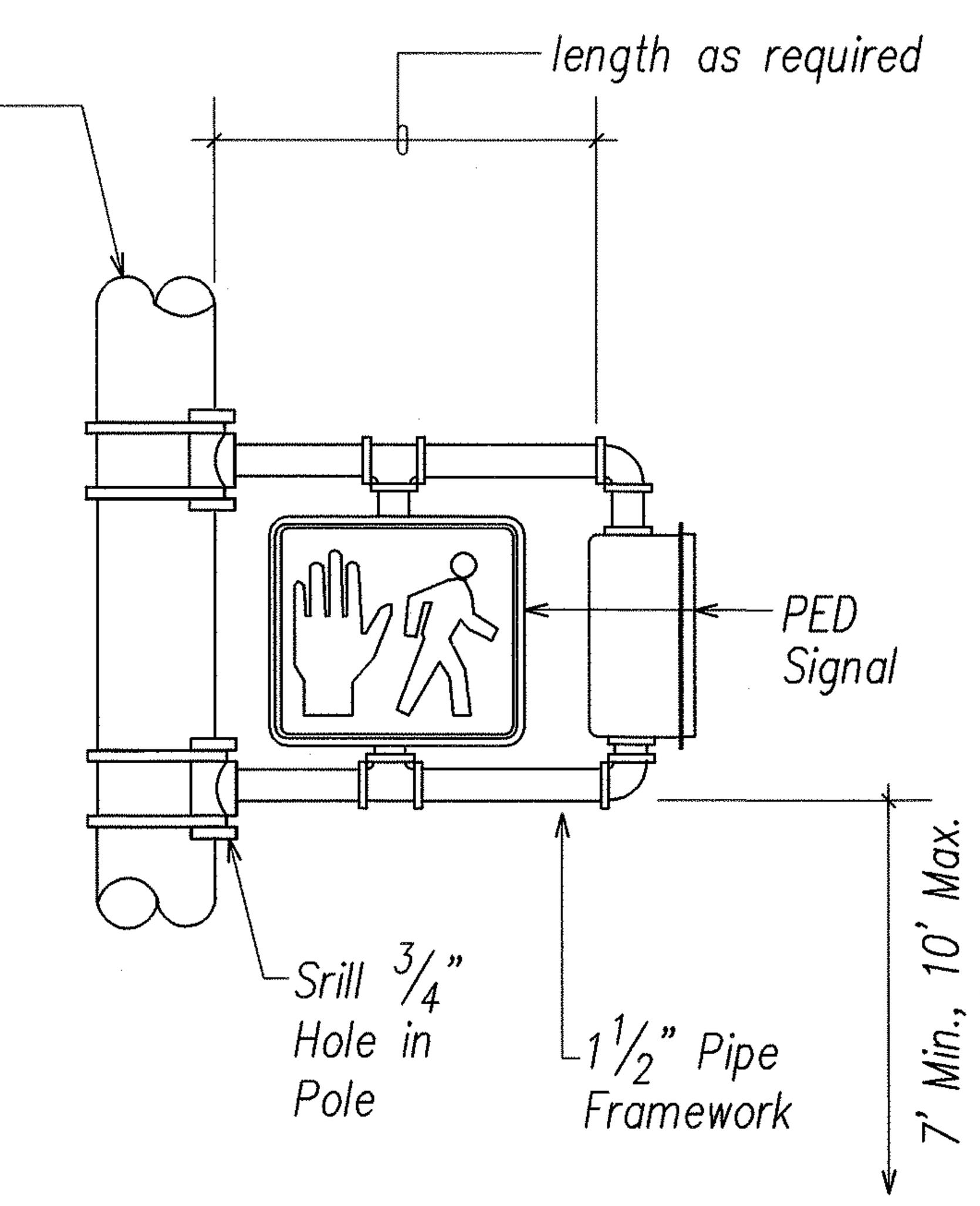
UNDERSLUNG – ONE WAY



TOP OF POLE – ONE WAY



BRACKET MOUNT – ONE WAY



BRACKET MOUNT – TWO WAY

NOTES:

1. Stainless steel bands shall be 1/2" wide x .050" thick, minimum. tensile strength shall be 100,000 psi minimum.
2. Upper arm, lower arm and vertical support tube shall be of 356 cast aluminum.
3. All wiring shAll be concealed.
4. Vertical tube clamp shall be of malleable iron, grade 32510.
5. All aluminum parts shAll have an alodine 1200 finish.
6. Signal as noted on plans.
7. Maintain 16" min. clearance at rear of all programmed faces.

B / E-14 PEDESTRIAN SIGNAL MOUNTING DETAILS
NOT TO SCALE

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12-13-02
RONALD N. S. HO & ASSOC., INC. ELECTRICAL ENGINEERS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

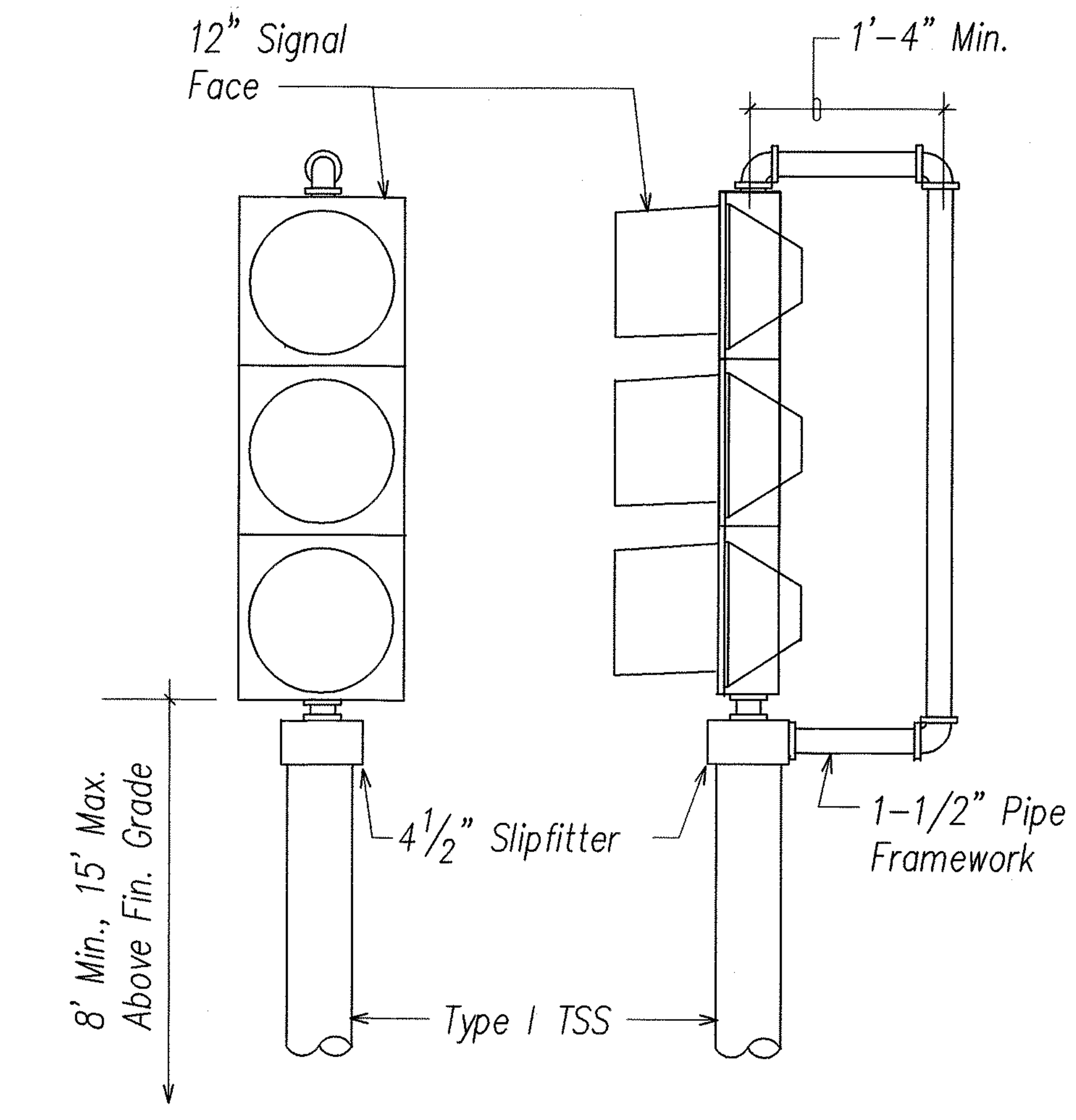
TRAFFIC SIGNAL DETAILS III

PEDESTRIAN FACILITIES and ADA COMPLIANCE
At Various Locations On Oahu, Phase II
Federal Aid Project No. CMAQ-0300(87)

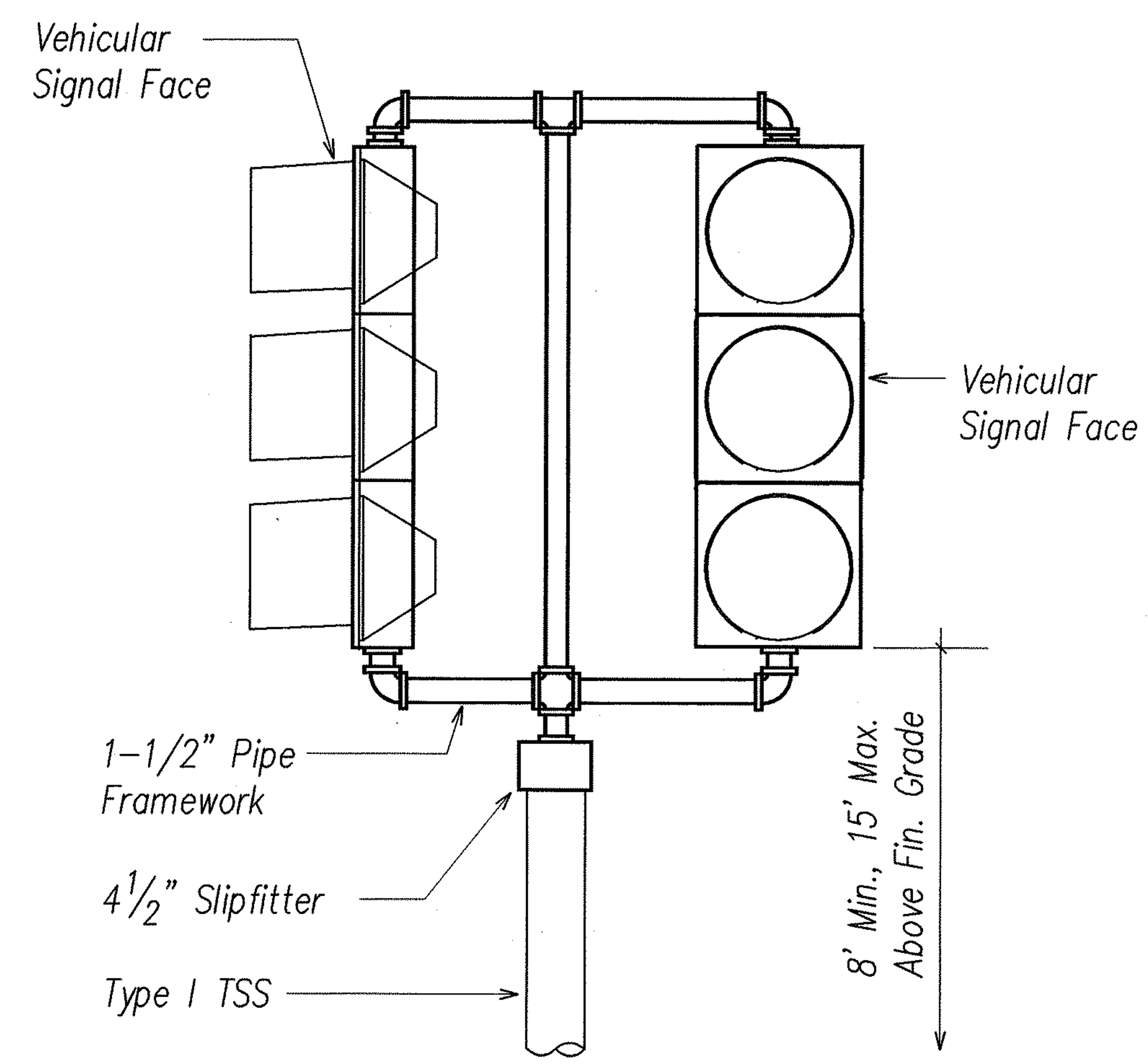
SCALE: AS NOTED DATE:

SHEET No. E-14 OF 18 SHEETS

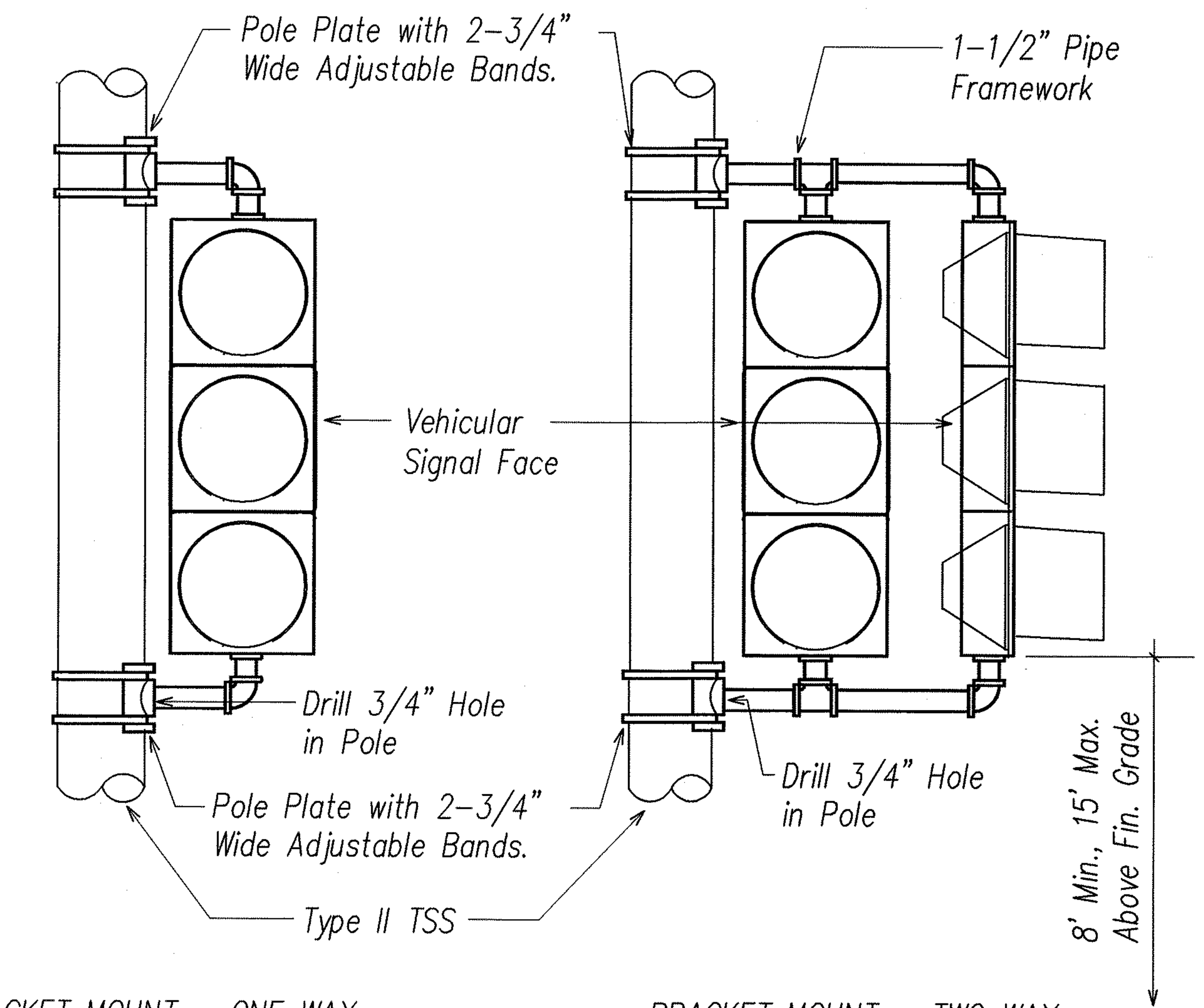
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-0300(87)	2002	89	145



TOP OF POLE – ONE WAY MOUNTING



TOP OF POLE – TWO WAY MOUNTING

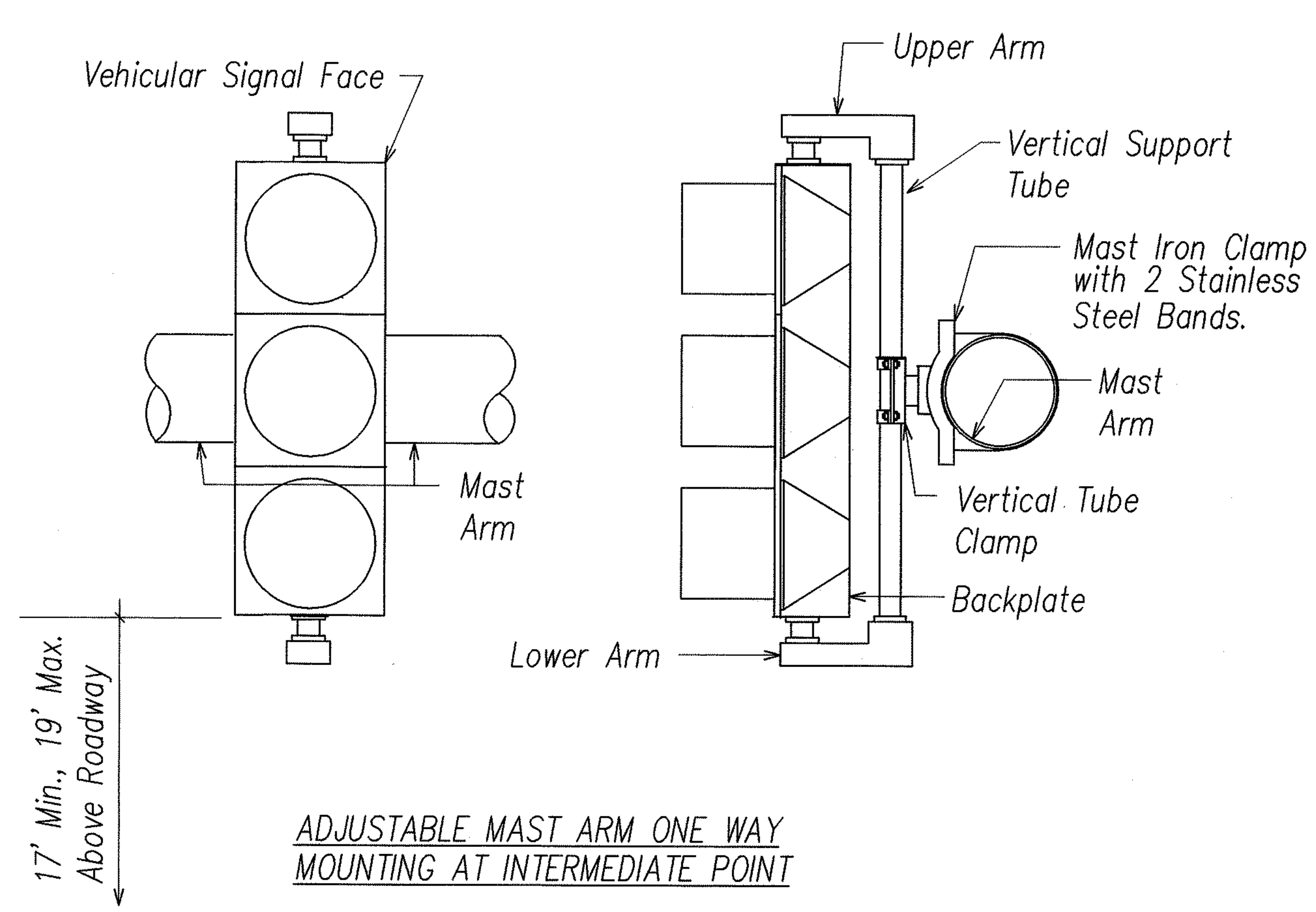


BRACKET MOUNT – ONE WAY

BRACKET MOUNT – TWO WAY

NOTES:

1. Stainless steel bands shall be 1/2" wide x .050" thick, minimum. tensile strength shall be 100,000 psi minimum.
2. Upper arm, lower arm and vertical sUpport tube shall be of 356 cast aluminum.
3. All wiring shAll be concealed.
4. Vertical tube clamp shall be of malleable iron, grade 32510.
5. All aluminum parts shAll have an alodine 1200 finish.
6. Signal as noted on plans.
7. Maintain 16" min. clearance at rear of all programmed faces.



ADJUSTABLE MAST ARM ONE WAY MOUNTING AT INTERMEDIATE POINT

A / E-15 VEHICULAR SIGNAL MOUNTING DETAILS

NOT TO SCALE

Date	Revision

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

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12-13-02

RONALD N. S. HO & ASSOC., INC. ELECTRICAL ENGINEERS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

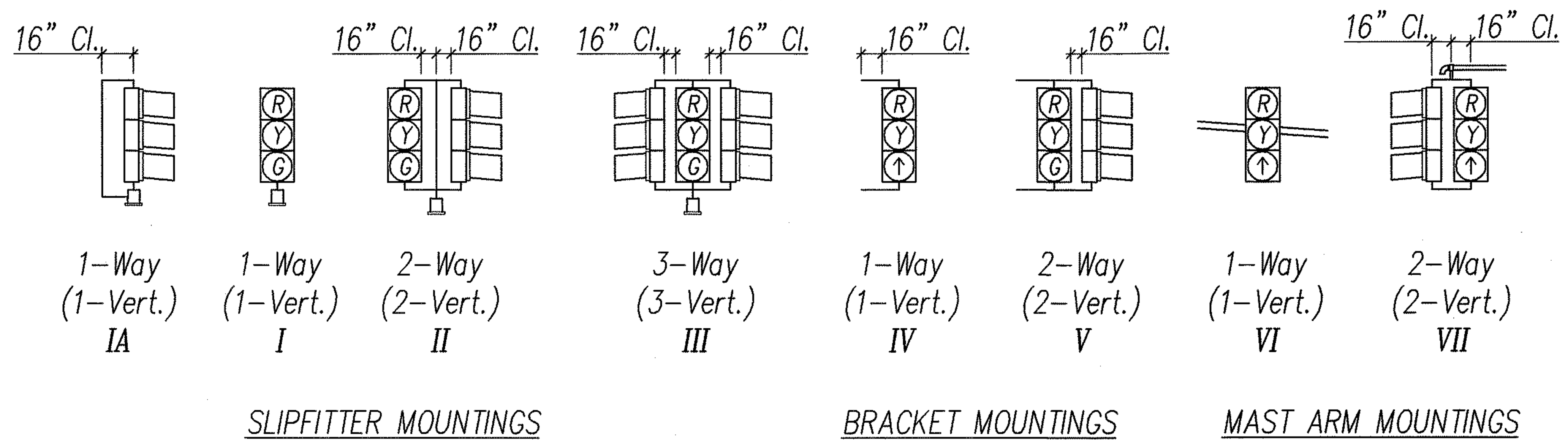
TRAFFIC SIGNAL DETAILS IV

PEDESTRIAN FACILITIES and ADA COMPLIANCE
At Various Locations On Oahu, Phase II
Federal Aid Project No. CMAQ-0300(87)

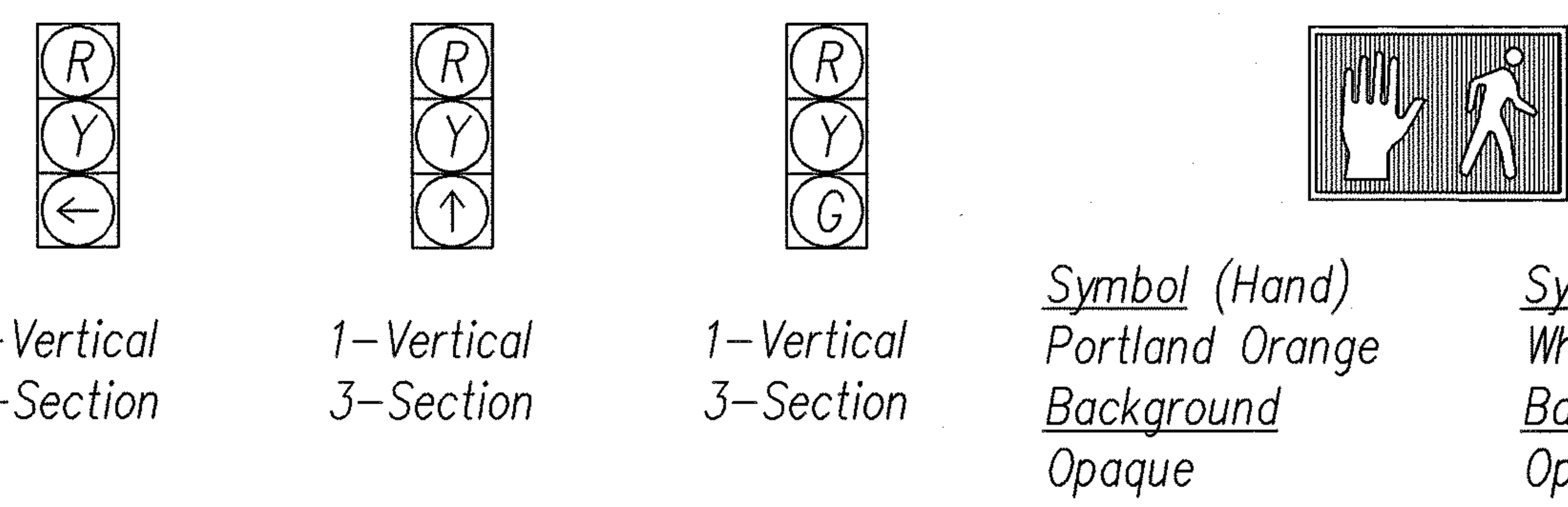
SCALE: AS NOTED DATE:

SHEET No. E-15 OF 18 SHEETS

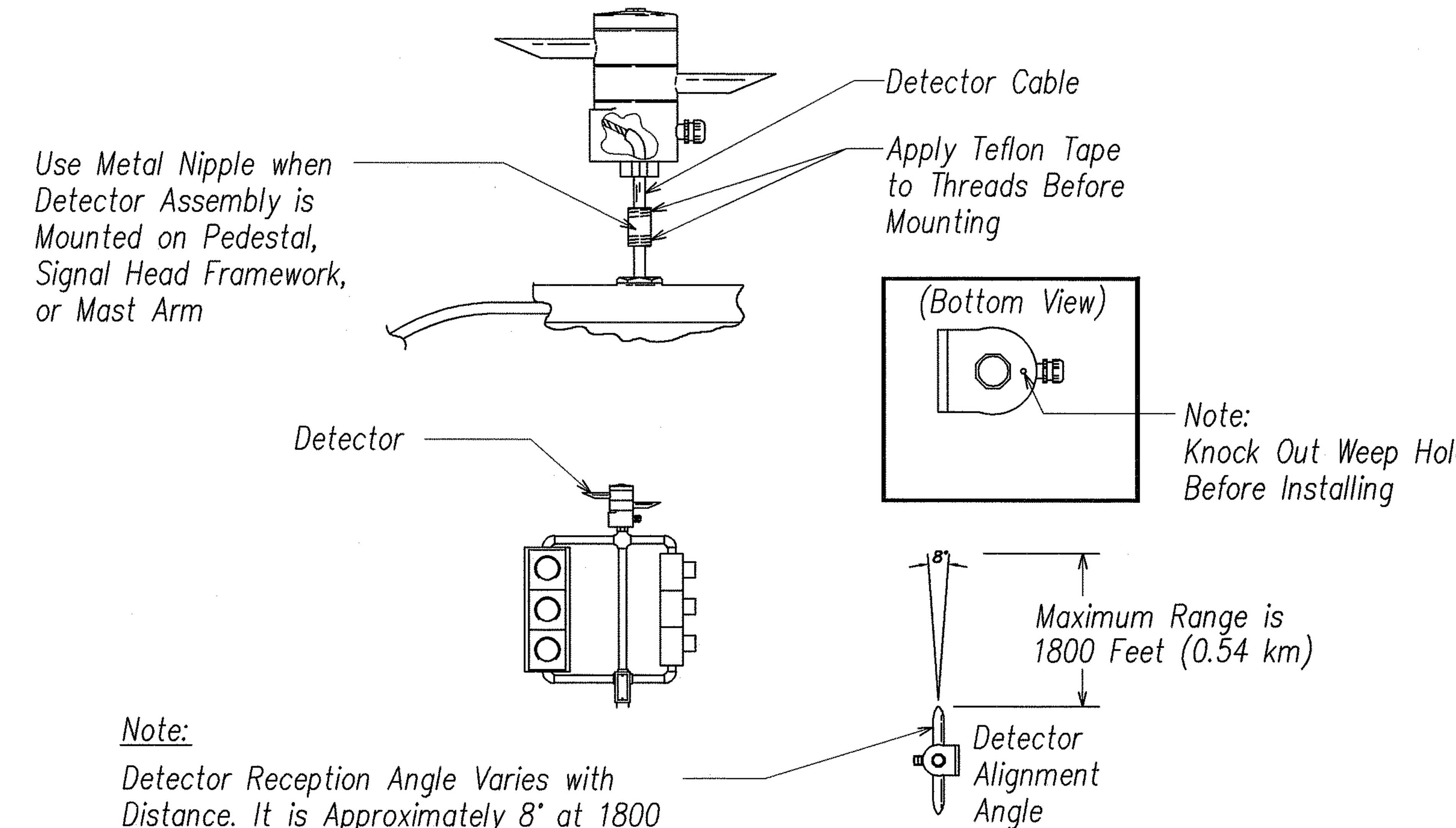
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-0300(87)	2002	90	145



TYPICAL VEHICULAR AND PEDESTRIAN SIGNAL MOUNTINGS

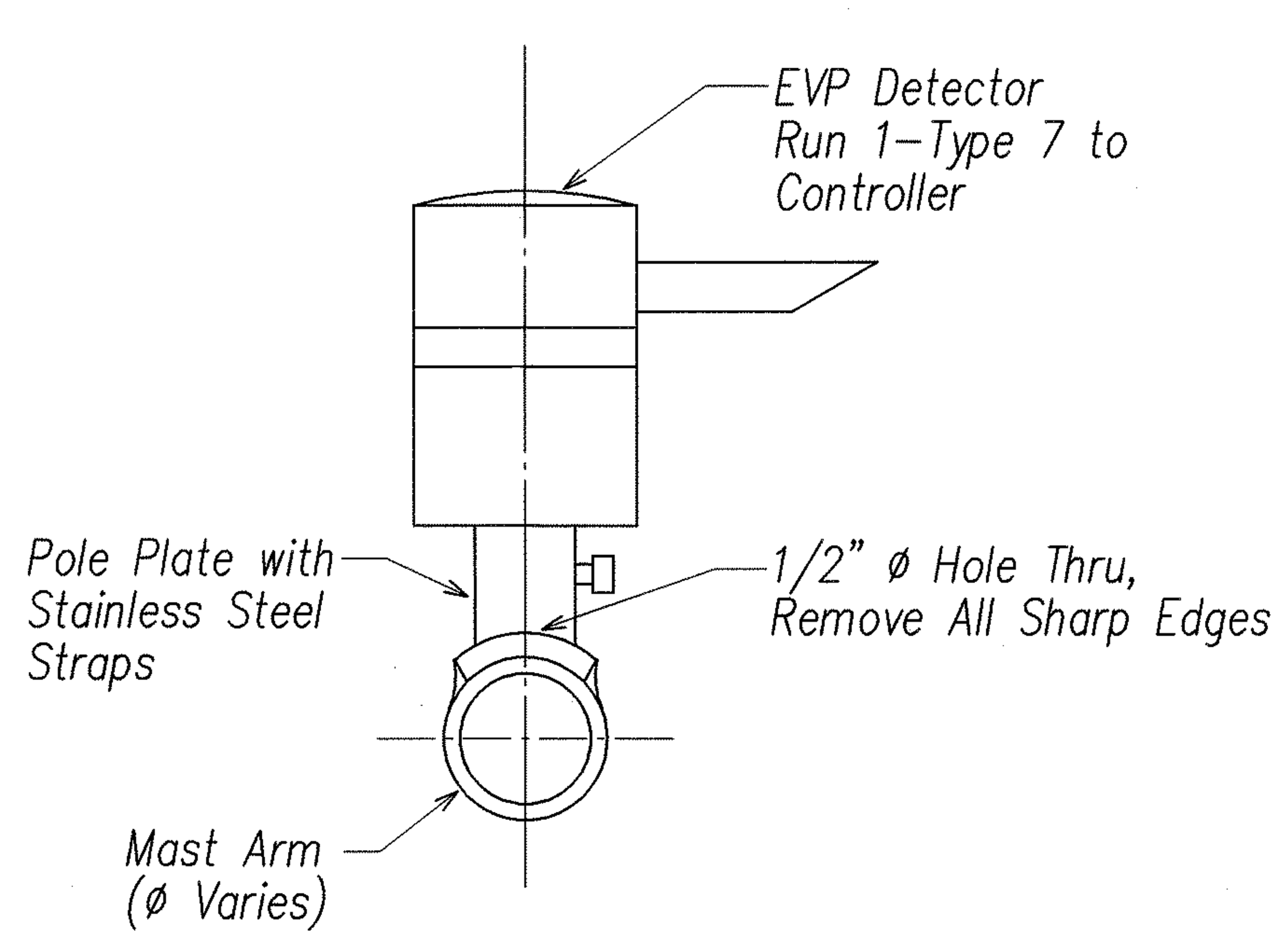


A / E-16 TYPICAL SIGNAL ARRANGEMENTS



Note:
Detector Reception Angle Varies with Distance. It is Approximately 8° at 1800 Feet (0.54km). Due to Reflection, Reception Angle is Increased at Close Range. The Detector Must be Aligned within 8° of the Farthest Point Where Priority Vehicle is to be Sensed.

B / E-16 TYPICAL PEDESTAL/MAST ARM INSTALLATION OF EVP DETECTOR
NOT TO SCALE



C / E-16 EVP DETECTOR HORIZONTAL MOUNTING DETAIL
NOT TO SCALE

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

Date	Revision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS V

ANDREW I. MIYASATO LICENSED PROFESSIONAL ENGINEER No. 4340-E HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

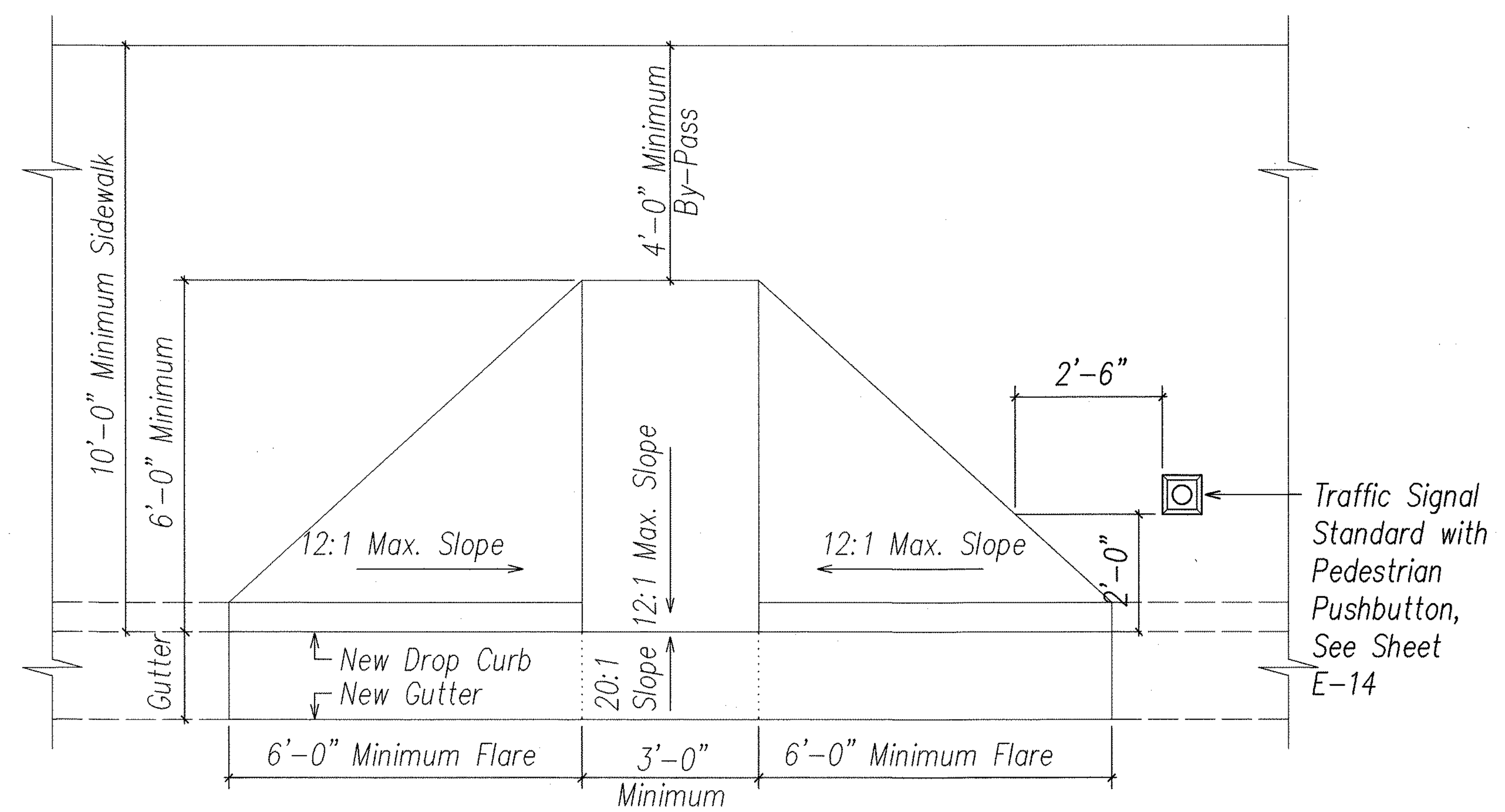
RONALD N. S. HO & ASSOC., INC. ELECTRICAL ENGINEERS

PEDESTRIAN FACILITIES and ADA COMPLIANCE
At Various Locations On Oahu, Phase II
Federal Aid Project No. CMAQ-0300(87)

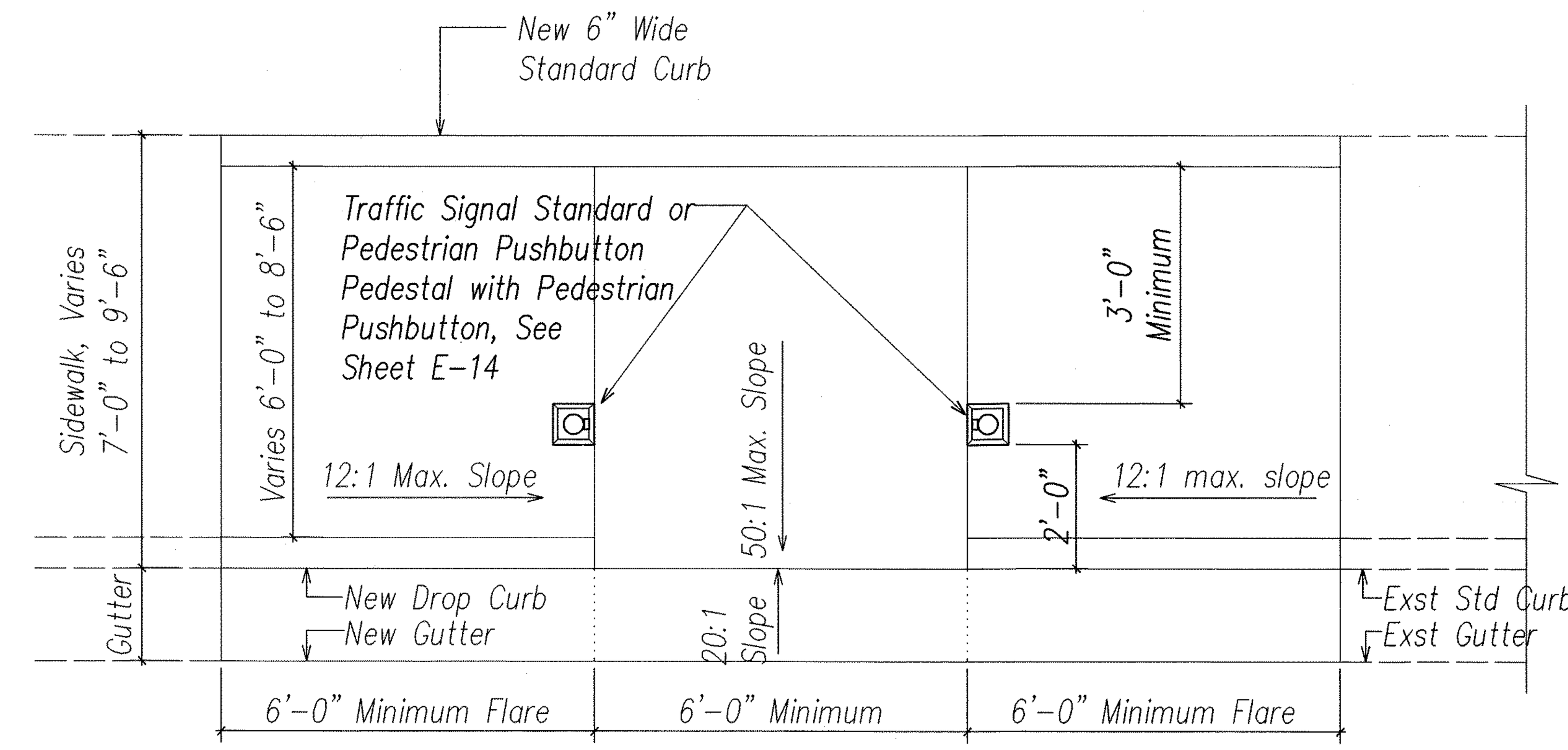
SCALE: AS NOTED DATE:

SHEET No. E-16 OF 18 SHEETS

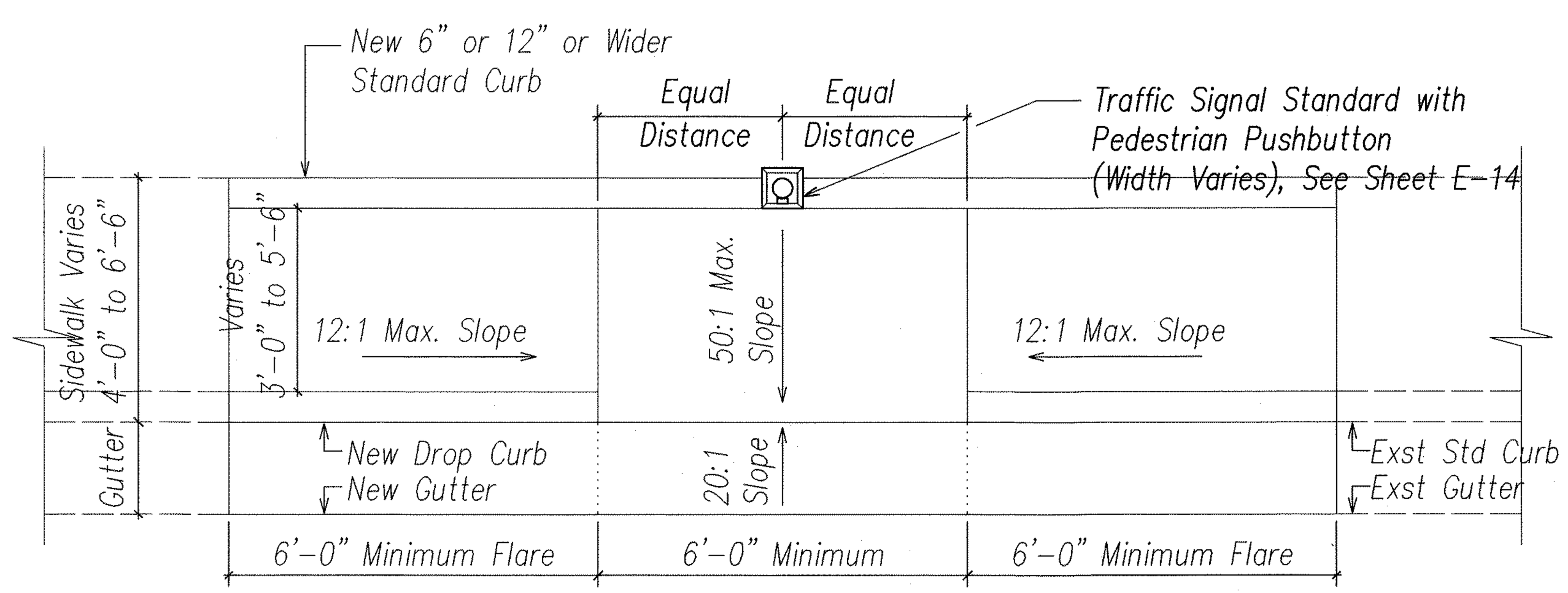
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-0300(87)	2002	92	145



A / E-17 TRAFFIC SIGNAL STANDARD LOCATION @ CURB RAMP TYPE "A"
NOT TO SCALE



B / E-17 TRAFFIC SIGNAL STANDARD LOCATION @ CURB RAMP TYPE "B" MODIFIED
NOT TO SCALE



C / E-17 TRAFFIC SIGNAL STANDARD LOCATION @ CURB RAMP TYPE "B"
NOT TO SCALE

Date	Revision

ANDREW I. MIYASATO LICENSED PROFESSIONAL ENGINEER No. 4340-E HAWAII, U.S.A.

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12-13-02
RONALD N. S. HO & ASSOC., INC. ELECTRICAL ENGINEERS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS VI

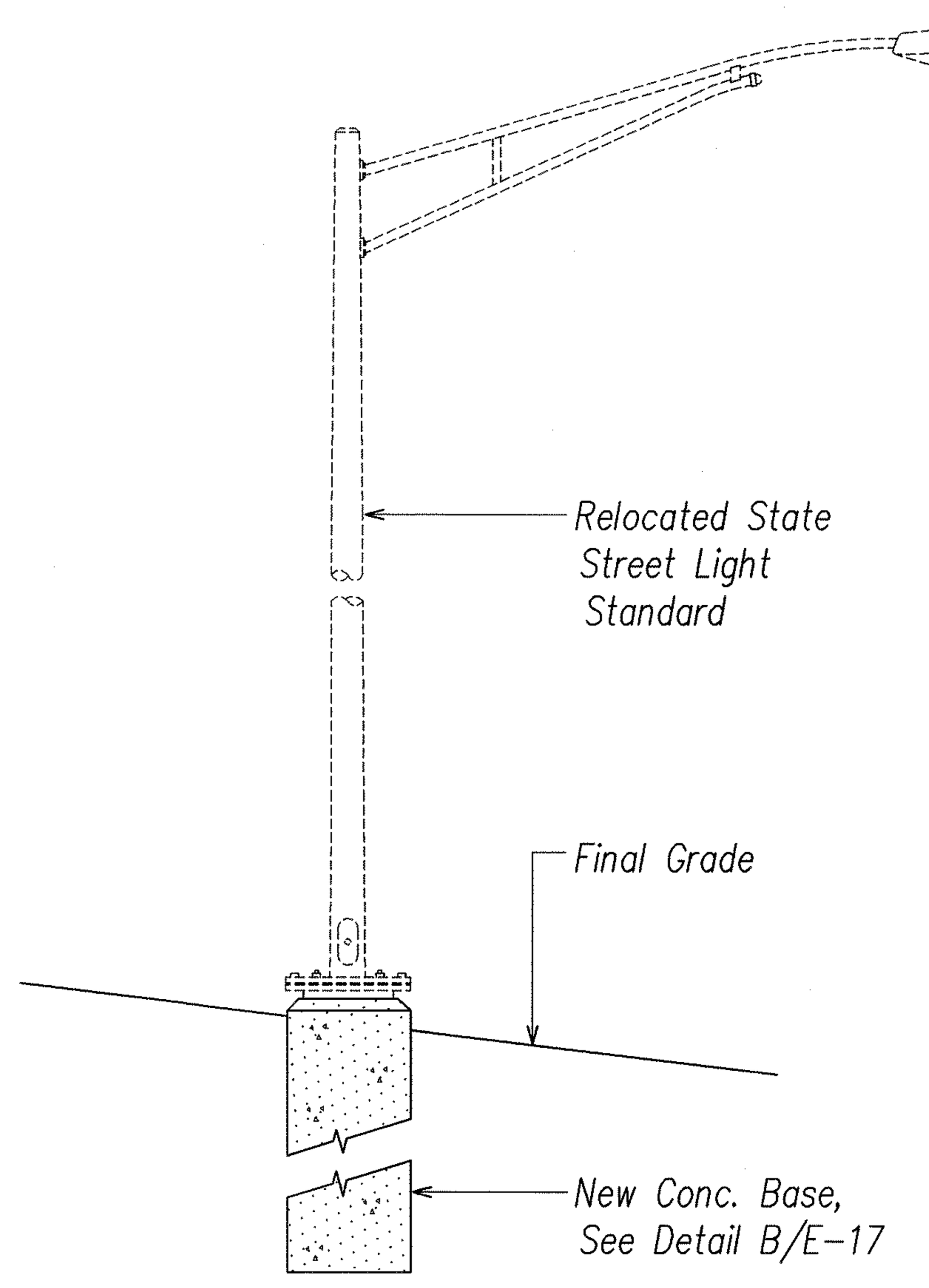
PEDESTRIAN FACILITIES and ADA COMPLIANCE
At Various Locations On Oahu, Phase II
Federal Aid Project No. CMAQ-0300(87)

SCALE: AS NOTED DATE:

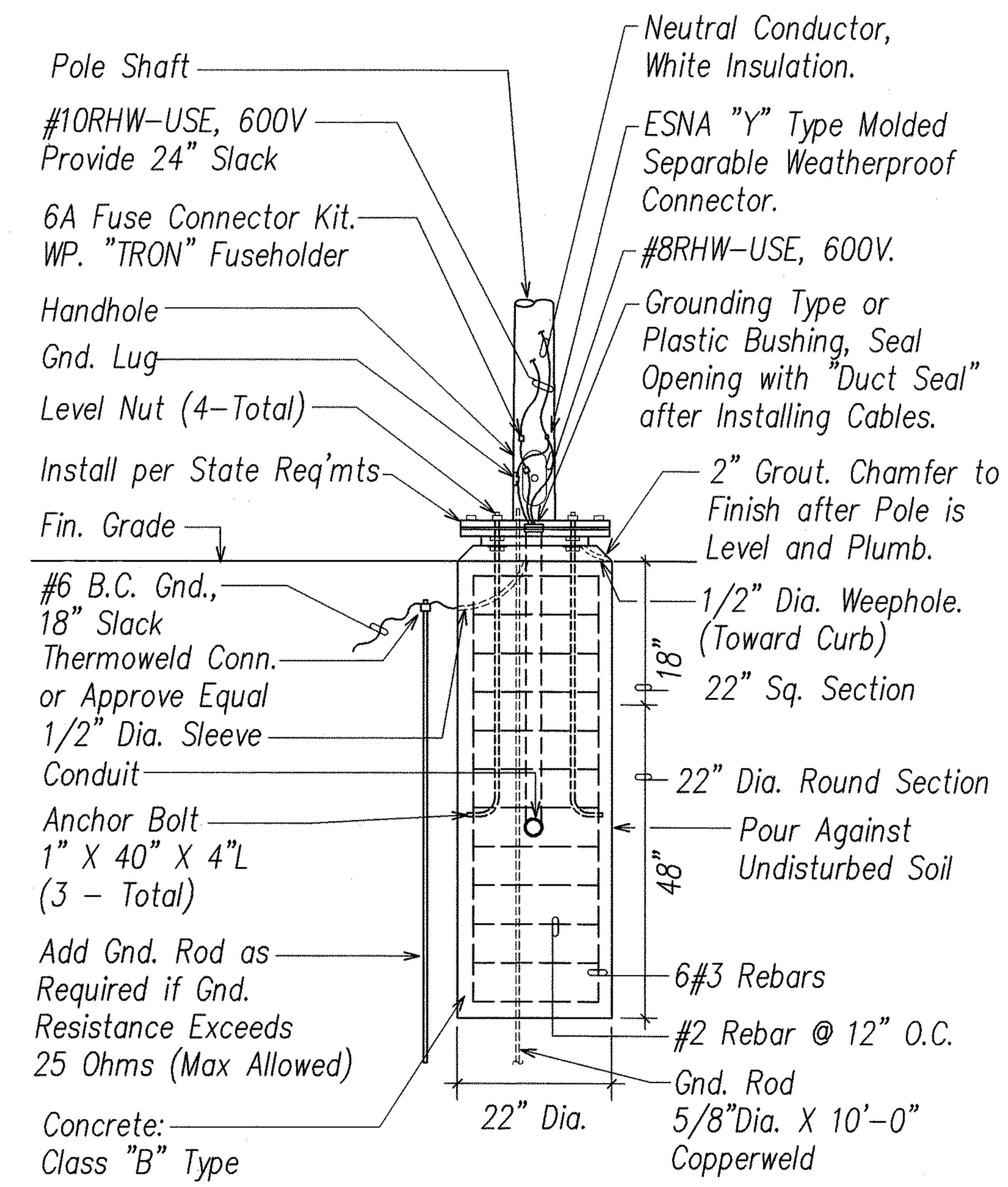
SHEET No. E-17 OF 18 SHEETS

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

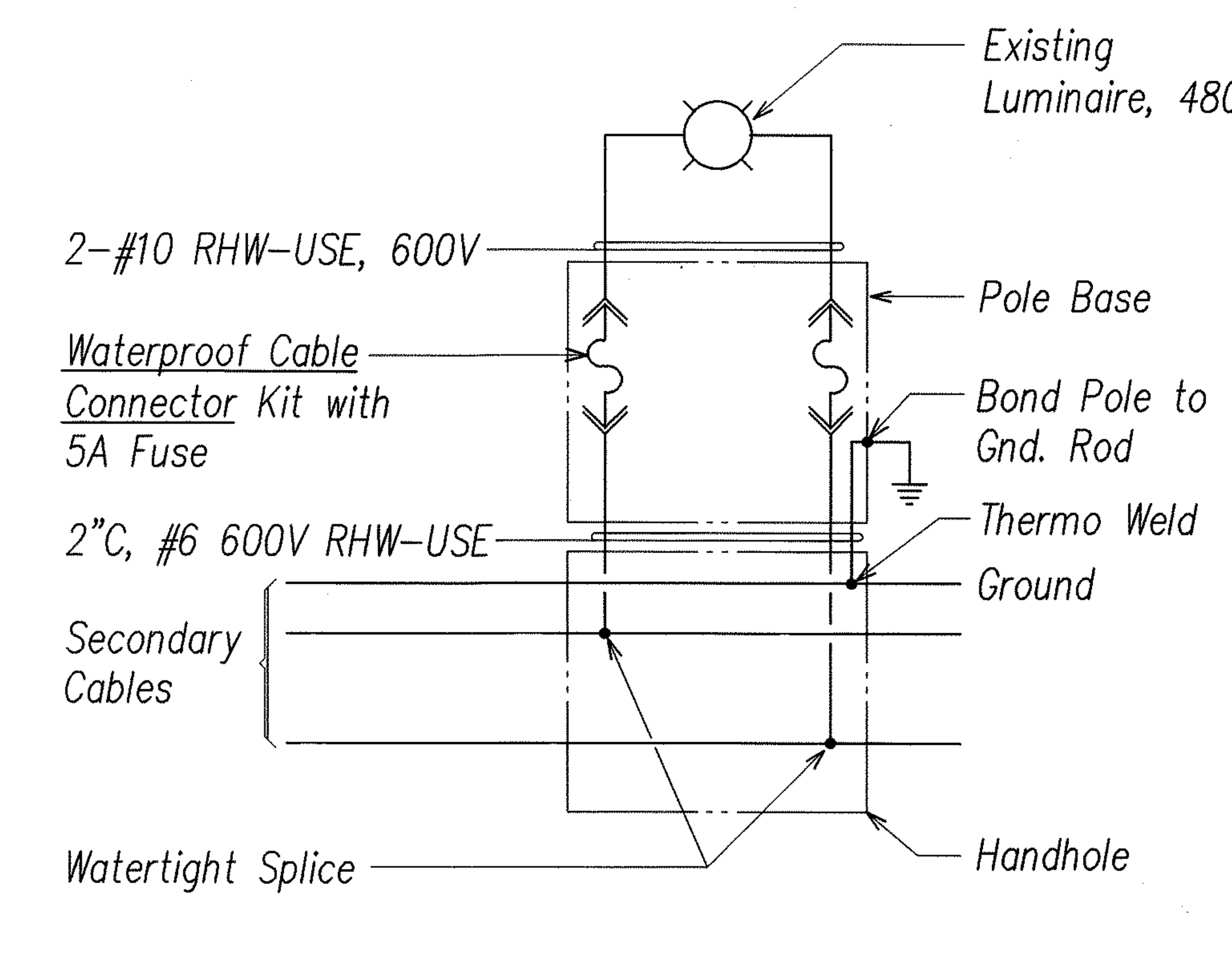
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-0300(87)	2002	75	145



A / E-18 **STREET LIGHT STANDARD (STATE)**
Not to Scale



B / E-18 **CONCRETE BASE ELEVATION (STATE)**
Not to Scale



Notes:

1. All secondary cables not shown for clarity.

C / E-18 **STREET LIGHT WIRING DIAGRAM**

Date	Revision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STREET LIGHTING DETAILS

PEDESTRIAN FACILITIES and ADA COMPLIANCE
At Various Locations On Oahu, Phase II
Federal Aid Project No. CMAQ-0300(87)

SCALE: AS NOTED DATE:

SHEET No. E-18 OF 18 SHEETS

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