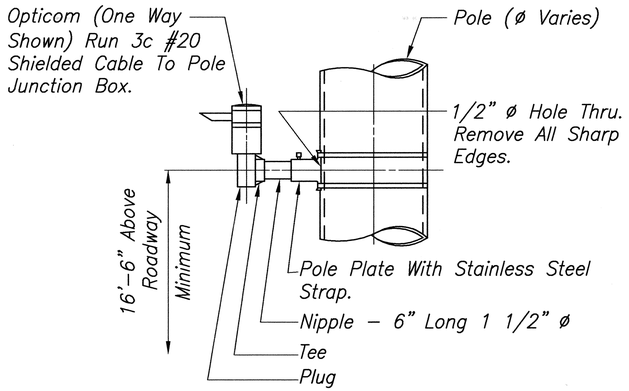
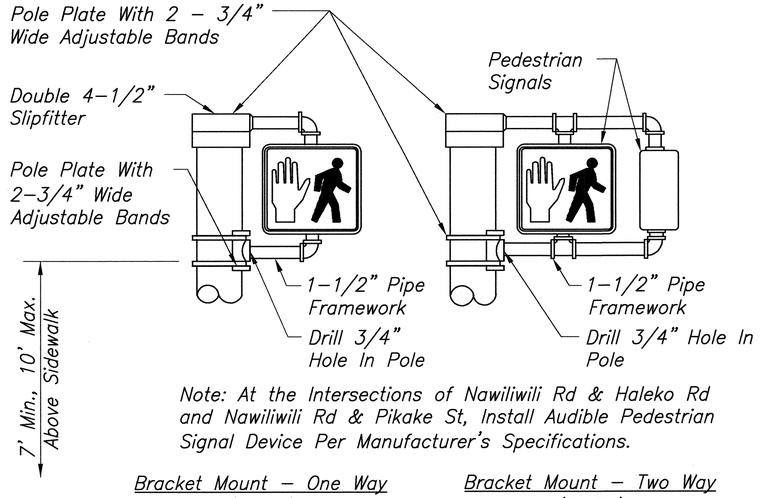
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-700(45)R	2004	25	44



TYPICAL VERTICAL MOUNT OF OPTICOM
Not To Scale

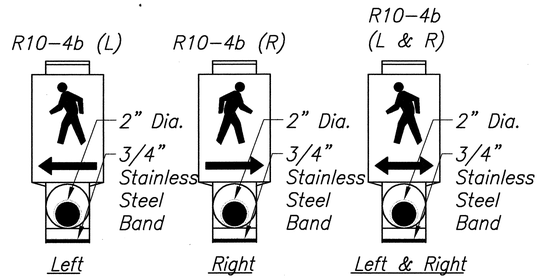


Note: At the Intersections of Nawiliwili Rd & Haleko Rd and Nawiliwili Rd & Pikake St, Install Audible Pedestrian Signal Device Per Manufacturer's Specifications.

Bracket Mount - One Way (B-1W)

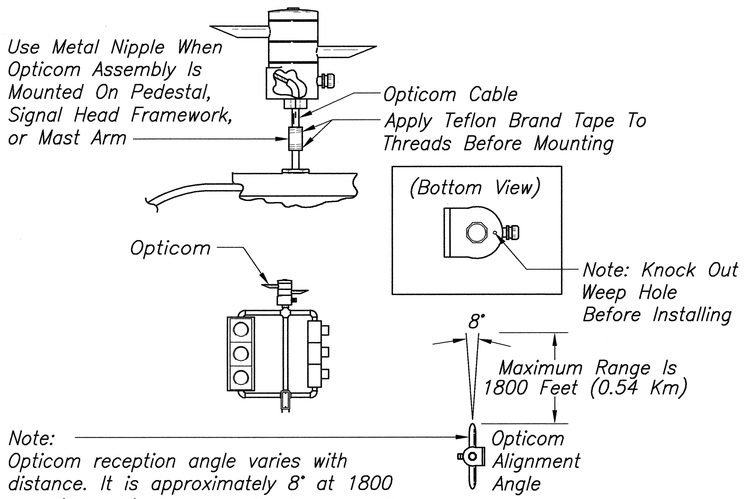
Bracket Mount - Two Way (B-2W)

PEDESTRIAN SIGNAL MOUNTINGS
Not To Scale



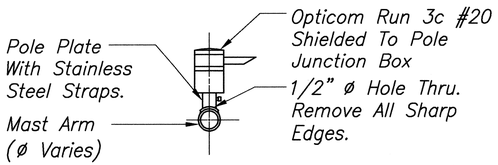
Note: On Plan Sheet, Use Applicable Detail The Color Scheme Shall be:
White - Man, Arrow and Push Button
Black - Background

PEDESTRIAN PUSH BUTTON SIGN
Not To Scale

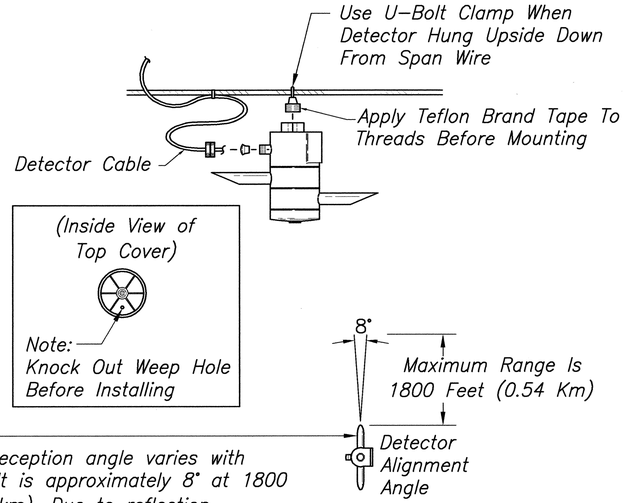


Note:
Opticom reception angle varies with distance. It is approximately 8° at 1800 feet (0.54km). Due to reflection, reception angle is increased at close range. The opticom must be aligned within 8° of the farthest point where priority vehicles is to be sensed.

TYPICAL PEDESTAL/MAST ARM INSTALLATION OF OPTICOM
Not To Scale



TYPICAL HORIZONTAL MOUNT OF OPTICOM
Not To Scale



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.

TYPICAL SPAN WIRE INSTALLATION OF OPTICOM
Not To Scale

ORIGINAL PLAN
SURVEY PLOTTED BY — DATE 10/2/02
DRAWN BY — DATE 10/2/02
TRACED BY
DESIGNED BY
NOTEBOOK
QUANTITIES BY
No.
CHECKED BY — DATE 10/2/02

PETE G. PASCUA
LICENSED PROFESSIONAL ENGINEER
No. 7263-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MISCELLANEOUS DETAILS

TRAFFIC SIGNAL MODERNIZATION
At Various Highway Locations, Kauai
Federal Aid Project No. CMAQ-700(45)R

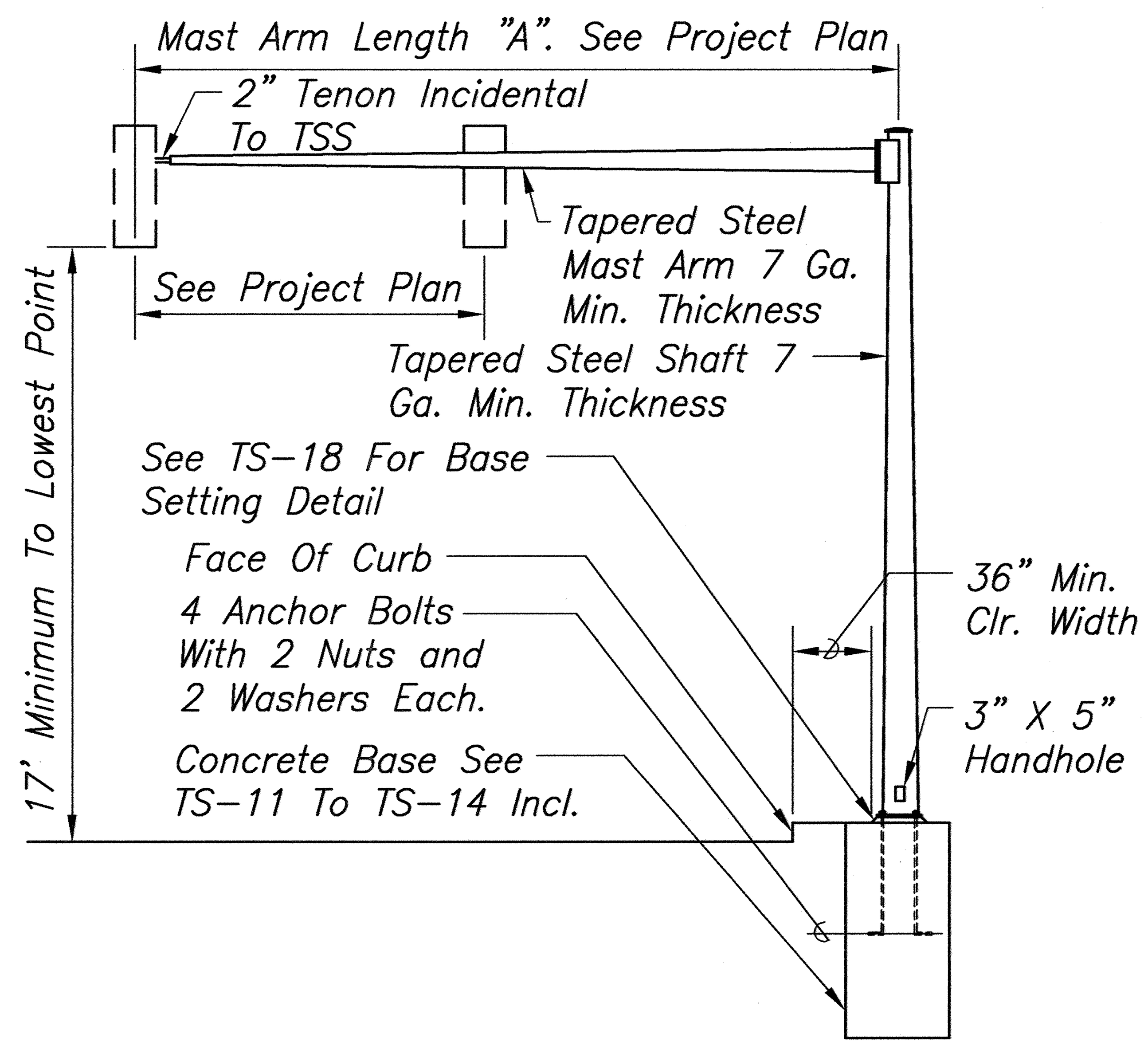
Scale: As Noted Date: July 2003

SHEET No. 1 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-700(45)R	2004	26	44

Types Of Signal Faces

12(R-Y-G)	12 Inch, 3-Section: Red, Yellow, Green
12(R-Y-GA)	12 Inch, 3-Section: Red, Yellow, Green Arrow
12(R-Y-G-GA)	12 Inch, 4-Section: Red, Yellow, Green, and Green Arrow
12P(R-Y-G)	12 Inch, Programmed Visibility, 3-Section: Red, Yellow, and Green
12(R-Y-G-BGA)	12 Inch, 4-Section: Red, Yellow, Green, and Bi-Modal Green Arrow/Yellow Arrow

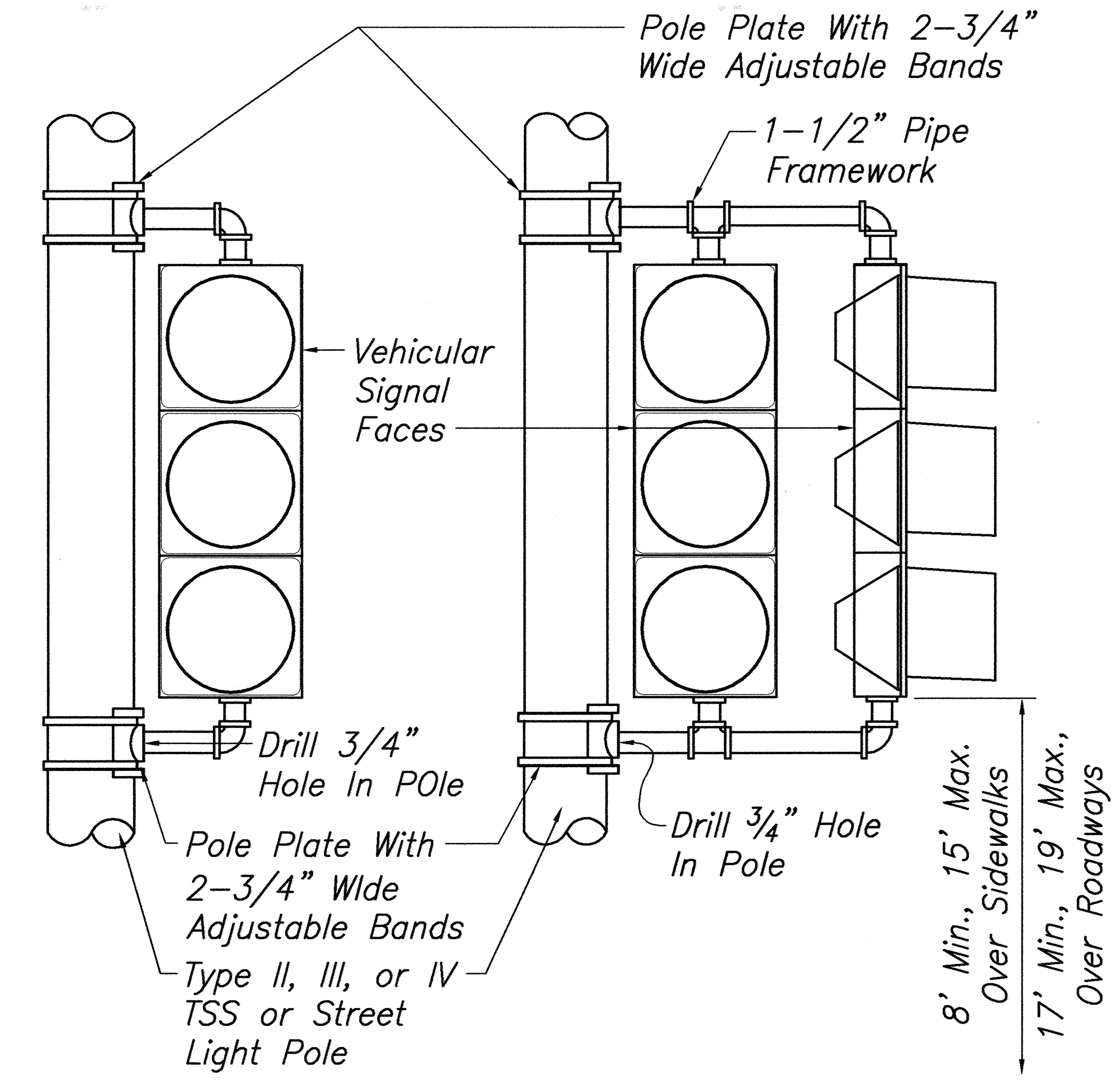


NOTES:

1. Standards shall be designed in accordance with "Standard Specifications For Structural Supports For Highway Signs, Luminaires, and Traffic Signals".
2. Mounting for signals at intermediate locations on the mast arm shall be of the adjustable type.
3. Signals shall be centered over lane lines.
4. Submit shop drawings for approval.
5. The minimum clear width for single wheelchair passage shall be 32" at a point and 36" continuously in accordance with ADA Ord. 4.2.1 and the minimum clear width of an accessible route shall be 36" in accordance with ADA Ord. 4.3.3

TYPE II - "A" TRAFFIC SIGNAL STANDARD (TSS)

Not To Scale

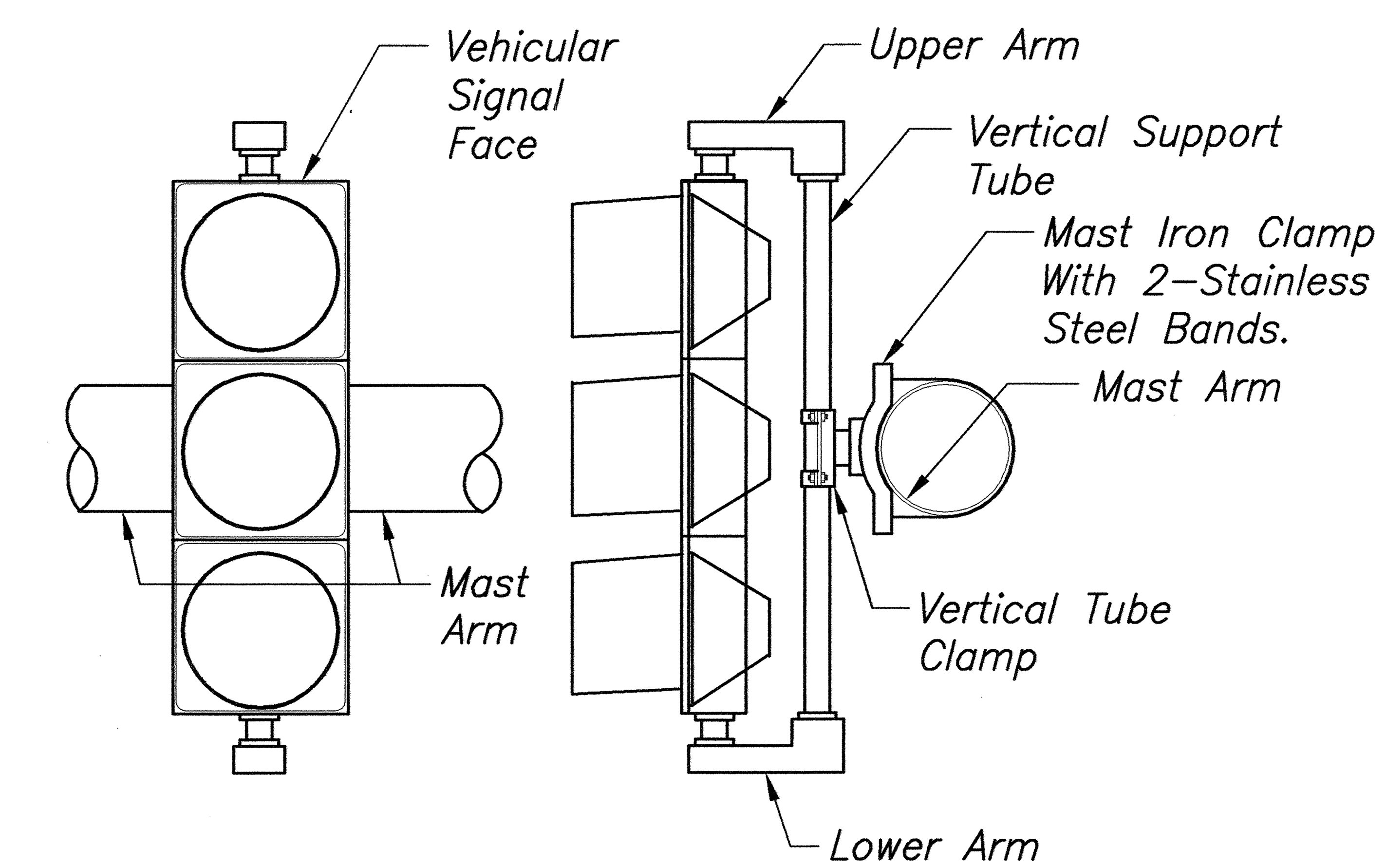


Bracket Mount - One Way (B-1W)

Bracket Mount - Two Way (B-2W)

VEHICULAR SIGNAL MOUNTING

Not To Scale



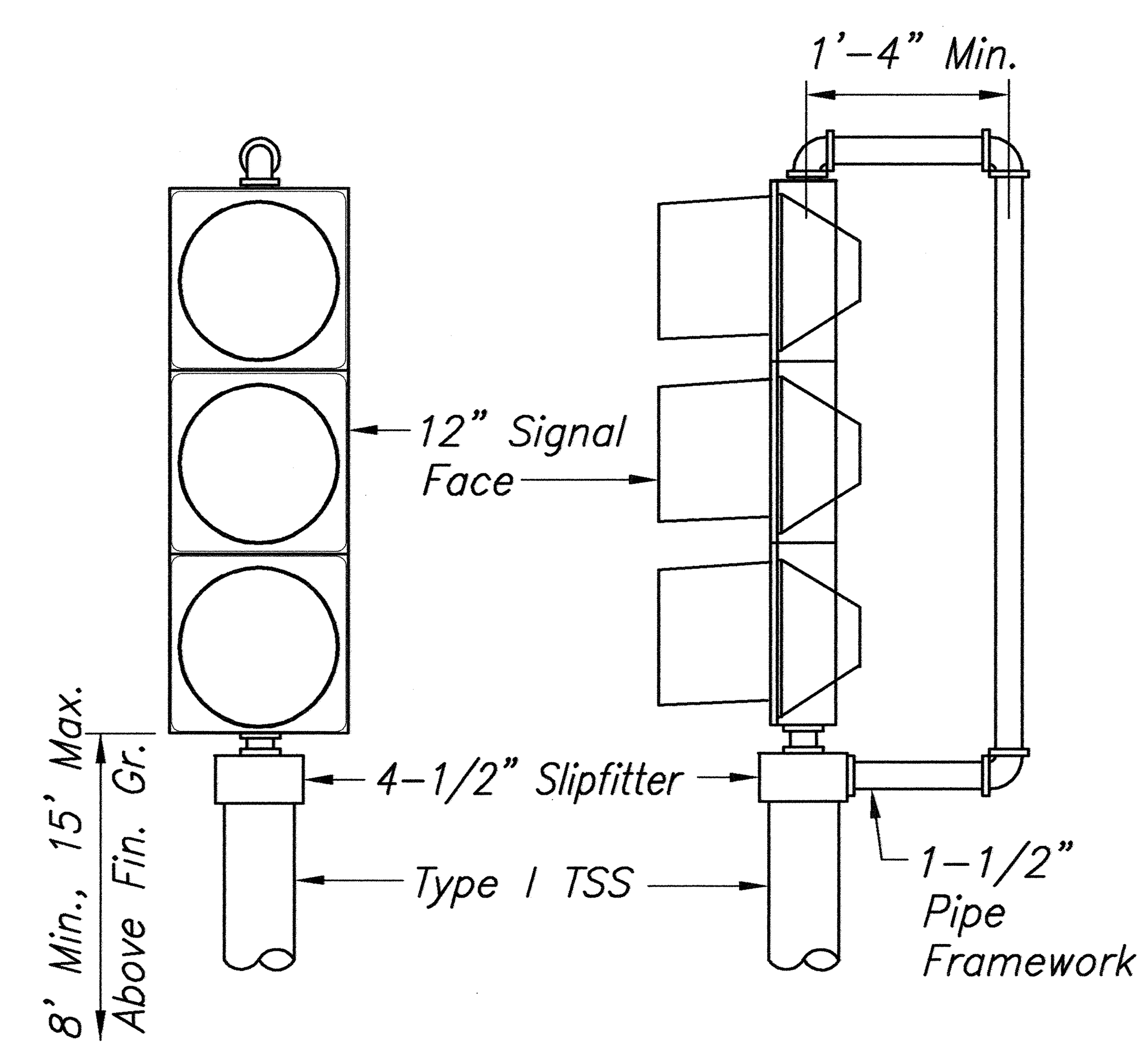
ADJUSTABLE
MAST ARM ONE WAY MOUNTING AT INTERMEDIATE POINT
MA-1W(I)

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.

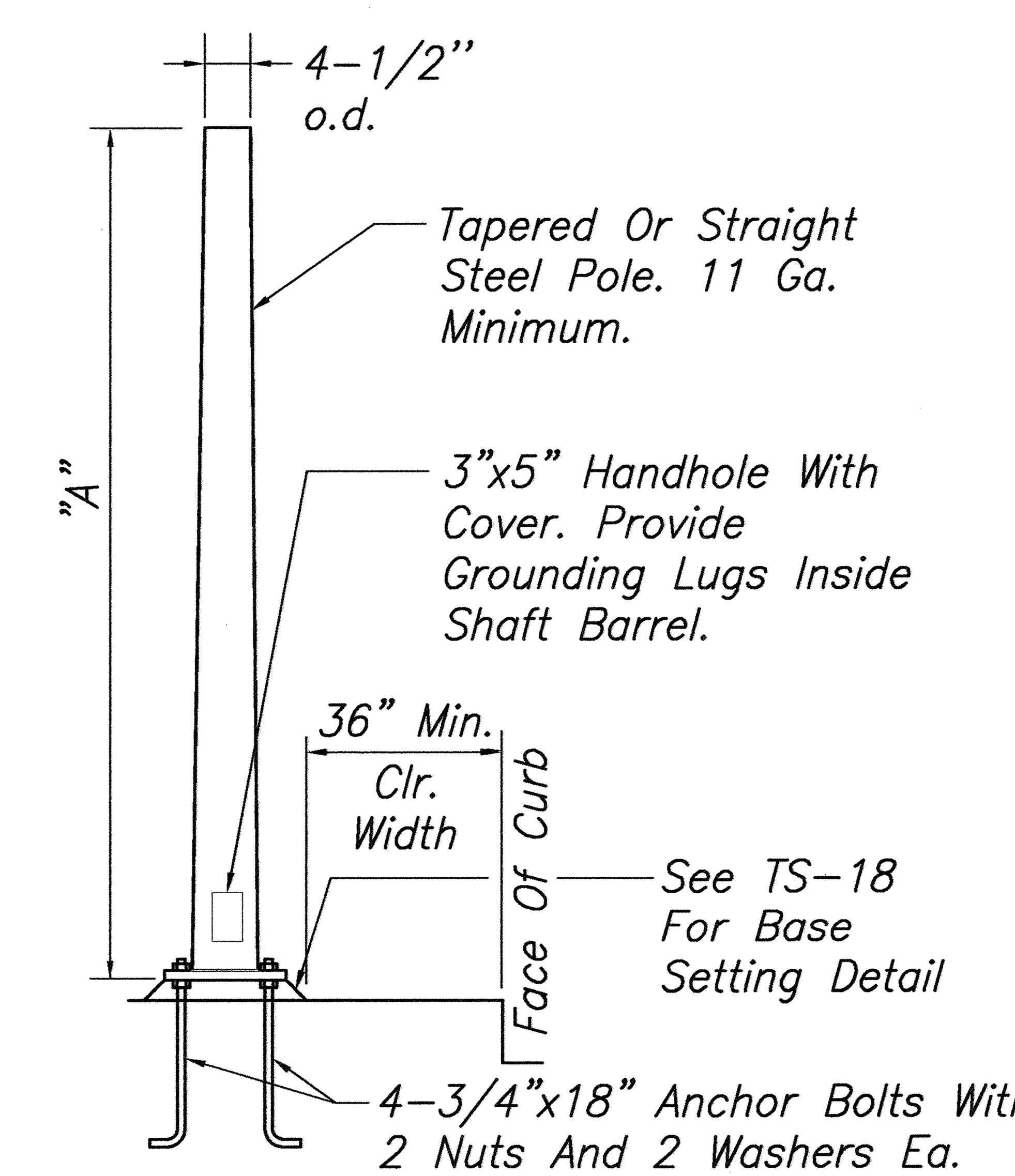
VEHICULAR SIGNAL MOUNTING

Not To Scale



VEHICULAR SIGNAL TOP OF POLE - ONE WAY MOUNTING (TP-1W)

Not To Scale



TYPE I TRAFFIC SIGNAL STANDARD

Not To Scale

Type I Standards	
Type Of Standard	Height "T"
Type I-10	10'-0"
Type I-7	7'-0"
Type I-3	3'-0"

Notes:
The minimum clear width for single wheelchair passage shall be 32" at a point and 36" continuously in accordance with ADA Ord. 4.2.1 and the minimum clear width of an accessible route shall be 36" in accordance with ADA Ord. 4.3.3.

ORIGINAL PLAN	SURVEY PLOTTED BY ___ DATE ___
	DRAWN BY JG, JR " 10/7/02
NOTEBOOK jkmskmd02.dgn	TRACED BY ___ " ___
	DESIGNED BY IQ " 10/7/02
No. ___	QUANTITIES BY ___ " ___
	CHECKED BY PP " 10/7/02

PETE G. PASCUA
LICENSED PROFESSIONAL ENGINEER
No. 7263-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

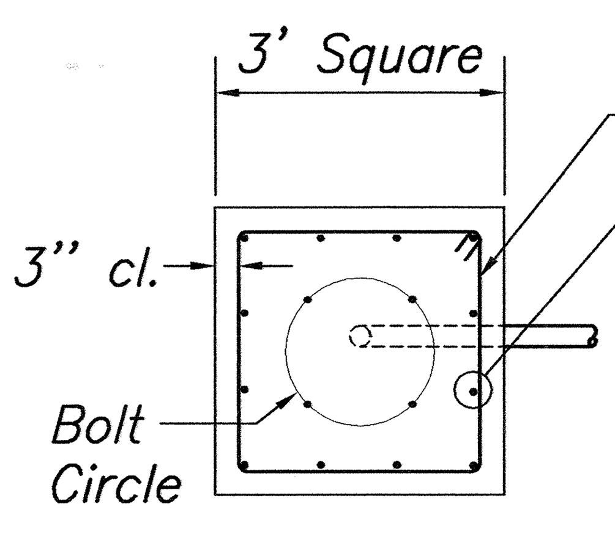
MISCELLANEOUS DETAILS

TRAFFIC SIGNAL MODERNIZATION
At Various Highway Locations, Kauai
Federal Aid Project No. CMAQ-700(45)R

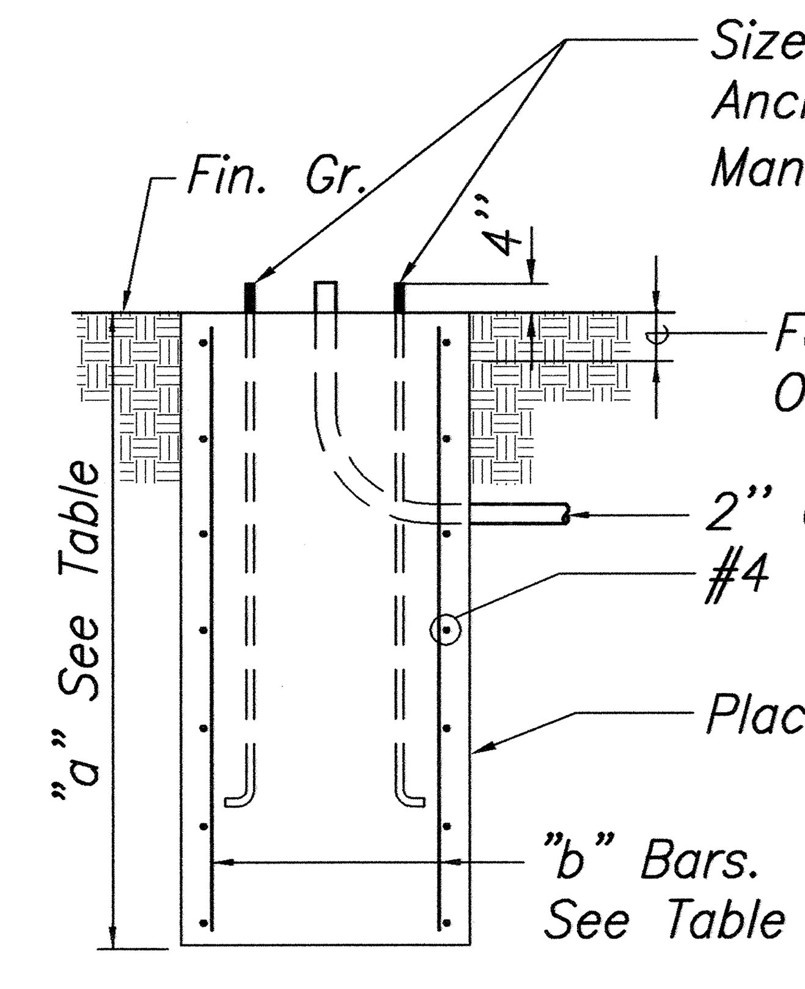
Scale: As Noted Date: July 2003

SHEET No. 2 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-700(45)R	2004	27	44



Notes:
1. Concrete shall be class "B".
2. Type "B" 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.

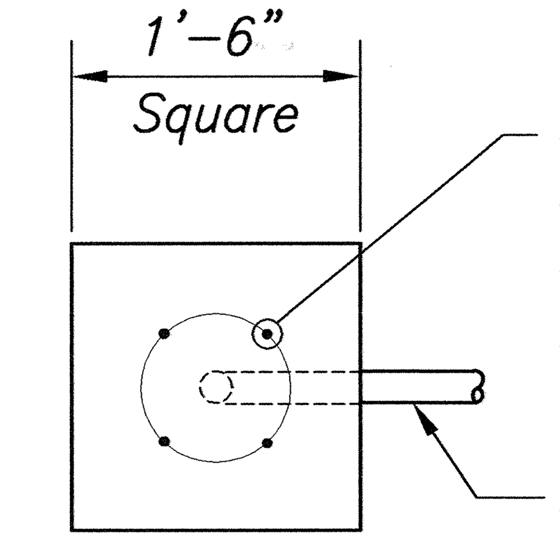


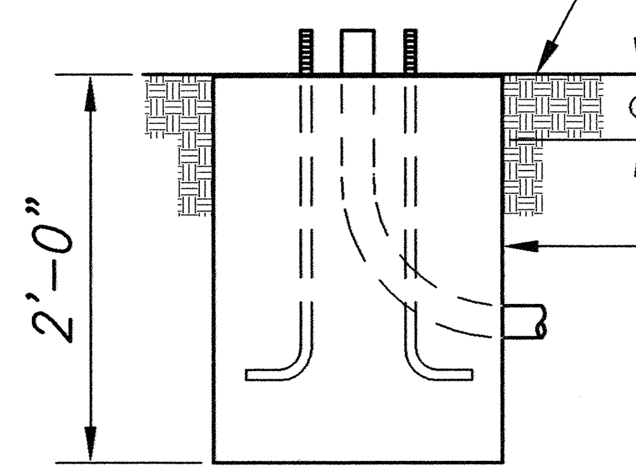
Type "C" Concrete Base		
Type of Standard	"a"	"b" Bars
II – 18	5'-0"	12-#6
II – 20	5'-6"	12-#6
II – 25	6'-0"	12-#6
II – 30	6'-6"	12-#8
II – 35	6'-6"	12-#8
II – 40	7'-0"	12-#8
III – 18	5'-0"	12-#6
III – 20	5'-6"	12-#6
III – 25	6'-0"	12-#6
III – 30	6'-6"	12-#8
III – 35	6'-6"	12-#8
III – 40	7'-0"	12-#8

Type
Typical Standard Designation: II – 25
Mast Arm Length

TYPE "C" CONCRETE BASE

Not To Scale

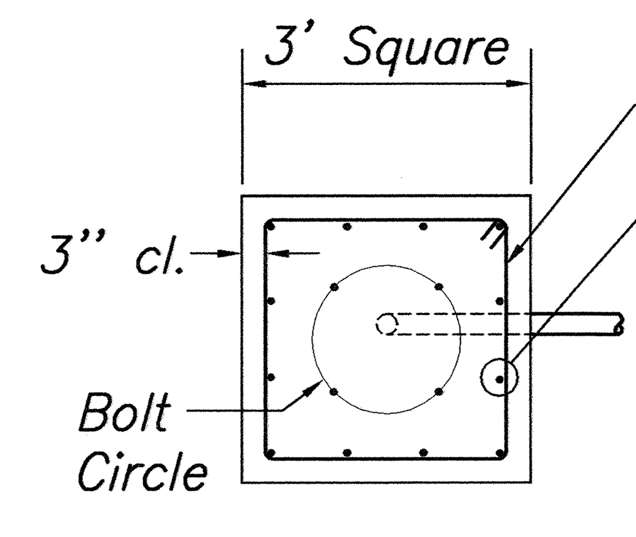




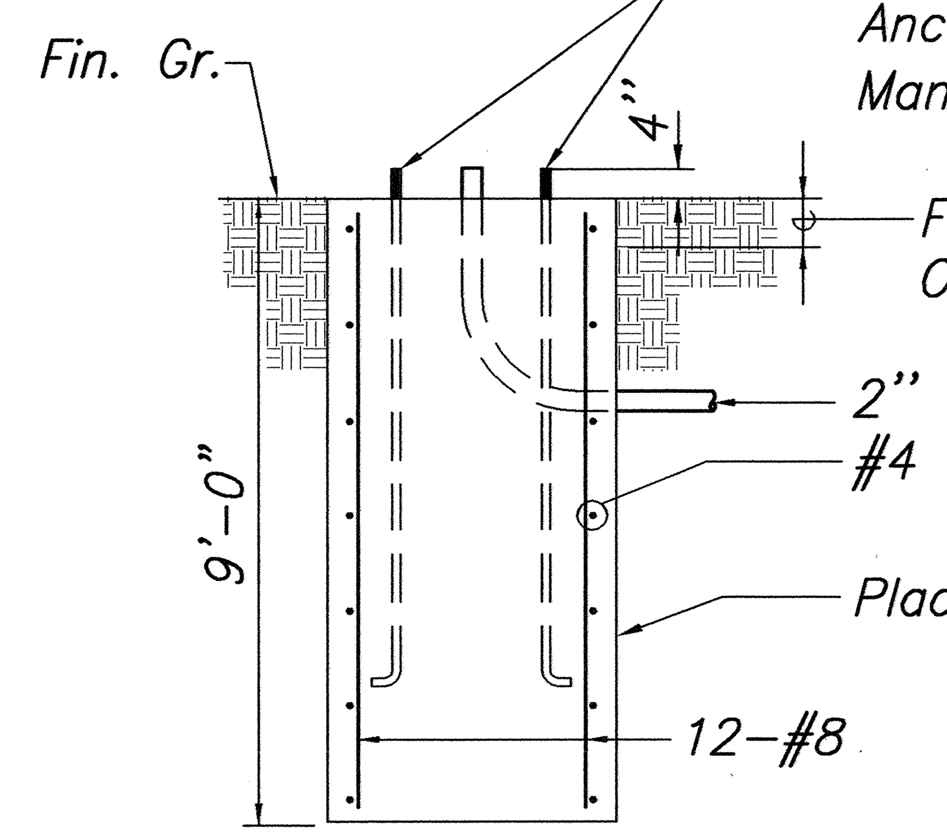
NOTE:
Concrete shall be class "B".
Type "A" concrete base shall be used for Type I-10, I-7, and I-3 traffic signal standards.
Conduit bend is incidental to concrete base.

TYPE "A" CONCRETE BASE

Not To Scale

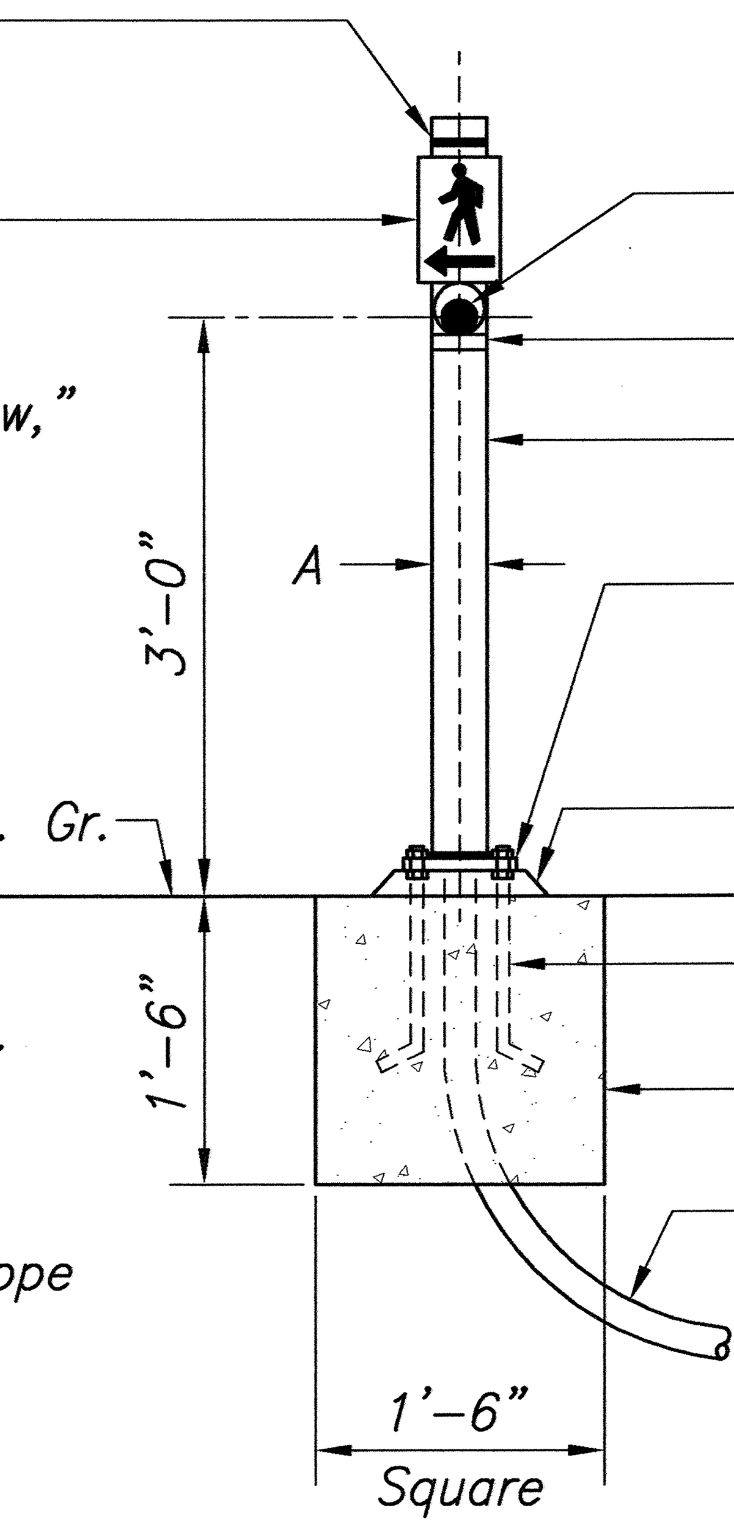


NOTES:
1. Concrete shall be class "B".
2. Type "B" concrete base shall be used for types II and III traffic signal standards.
3. Design lateral pressure: 1,500 psf.
4. Conduit bend is incidental to concrete base.



CONCRETE BASE FOR 45' MAST ARM

Not To Scale

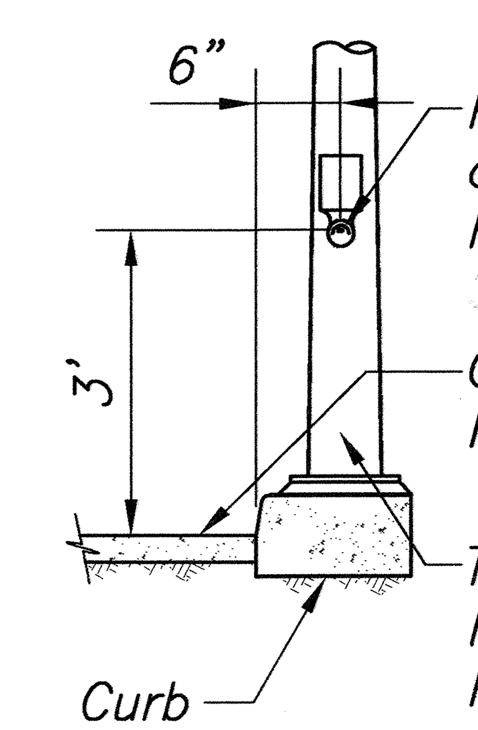


NOTES:
1. Conduits shall protrude 2" max. above finished surface of foundation.
2. Conduits shall slope away from post foundation

PPB POST AND FOOTING DETAIL

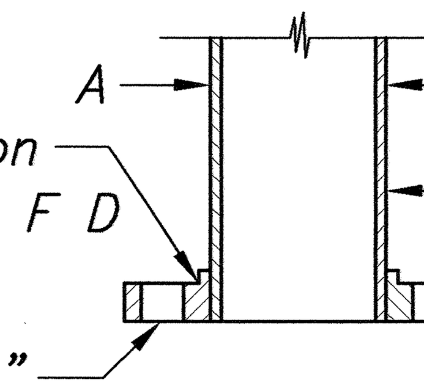
Not To Scale

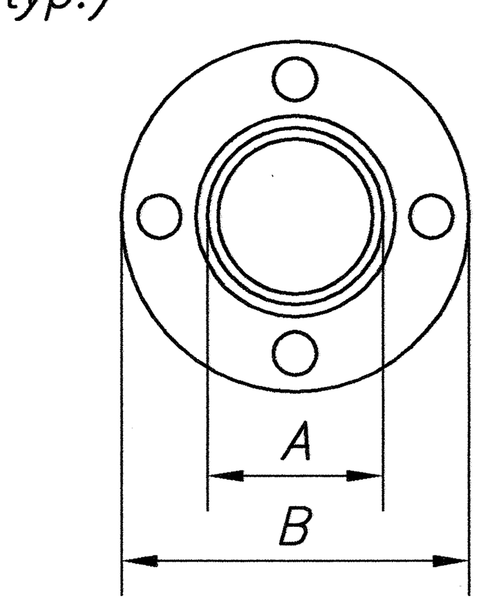
DATA TABLE AND FOOTING DETAIL		
AMOUNT OF PPB	DIMENSIONS	
	A	B
1	3 1/2"	8"
2 → 3	4 1/2"	9"



PPB DETAIL

Not to Scale





FLANGE DETAIL

Not To Scale

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MISCELLANEOUS DETAILS

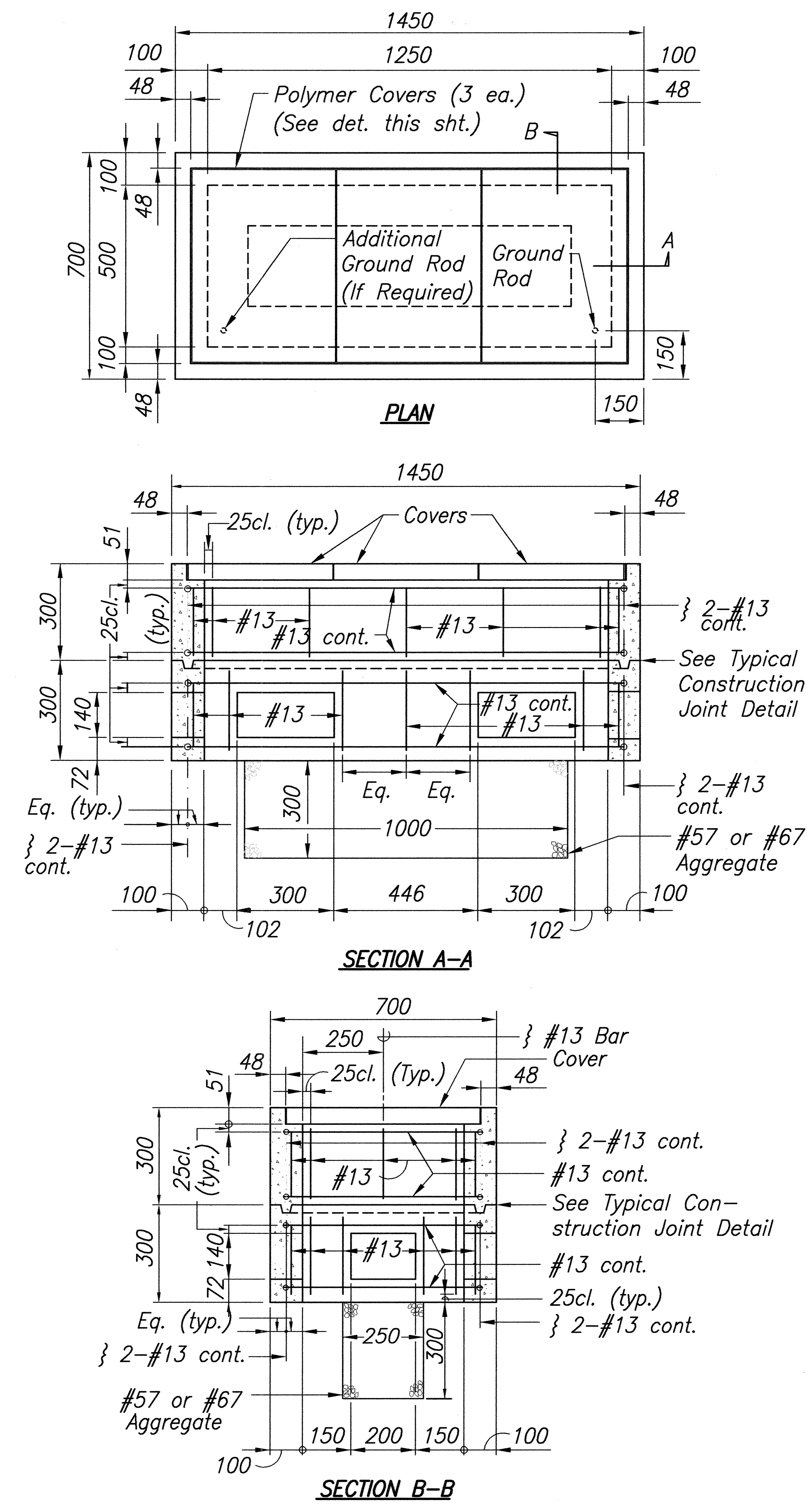
TRAFFIC SIGNAL MODERNIZATION
At Various Highway Locations, Kauai
Federal Aid Project No. CMAQ-700(45)R

Scale: As Noted Date: July 2003

SHEET No. 3 OF 7 SHEETS

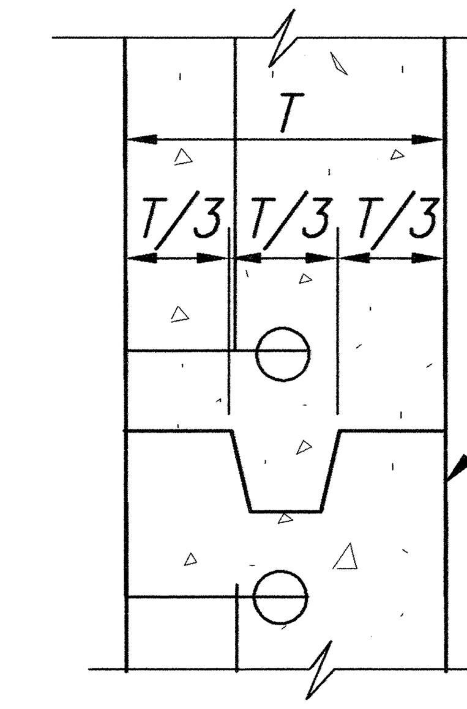
ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY JG, JR 10/7/02 | TRACED BY | DESIGNED BY JO 10/7/02 | QUANTITIES BY | CHECKED BY PP 10/7/02 | NOTEBOOK jkmskmd03.dgn | No.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-700(45)R	2004	28	44



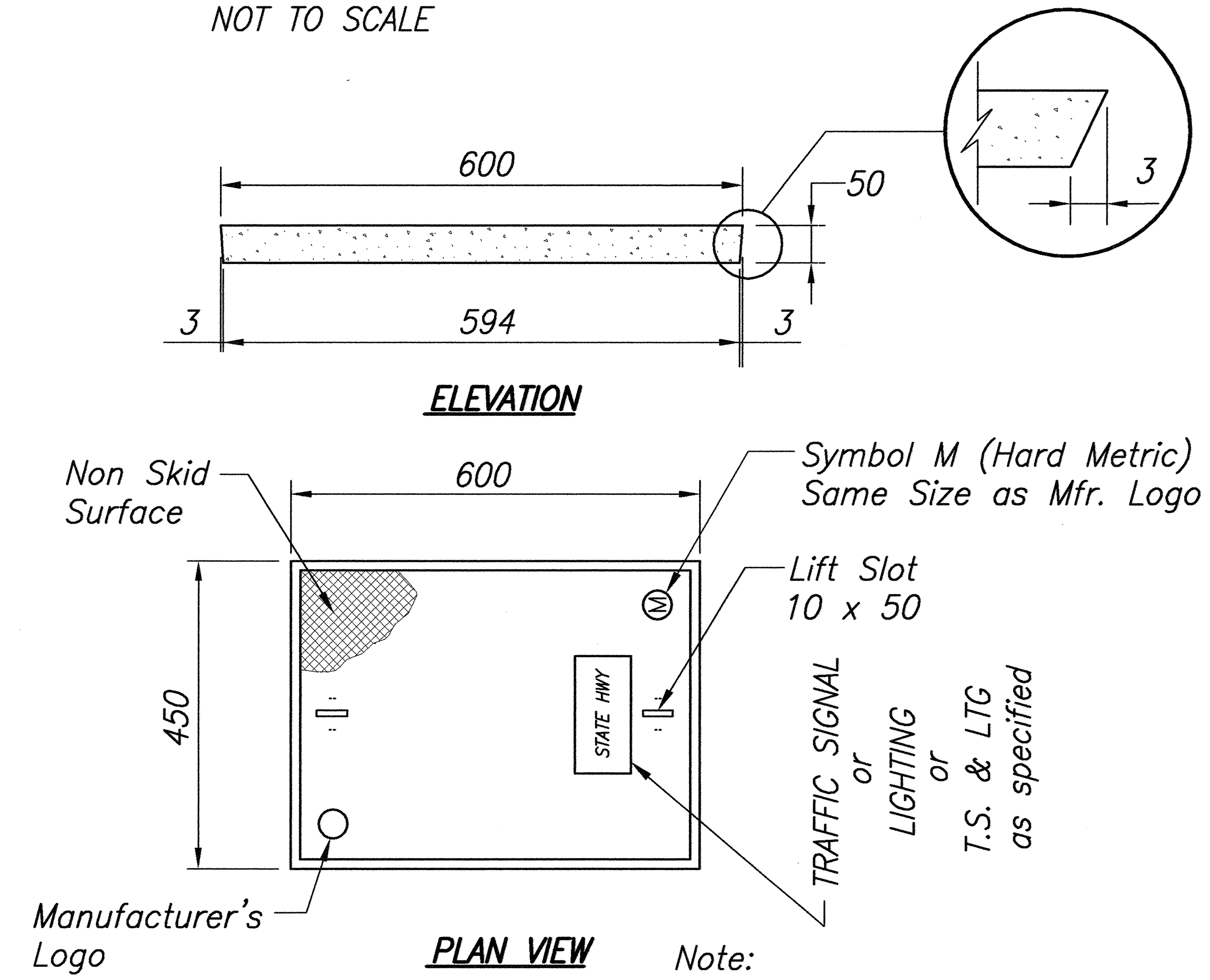
TYPE "C" PULLBOX (OLD TYPE "D")

NOT TO SCALE



TYPICAL CONSTRUCTION JOINT DETAIL

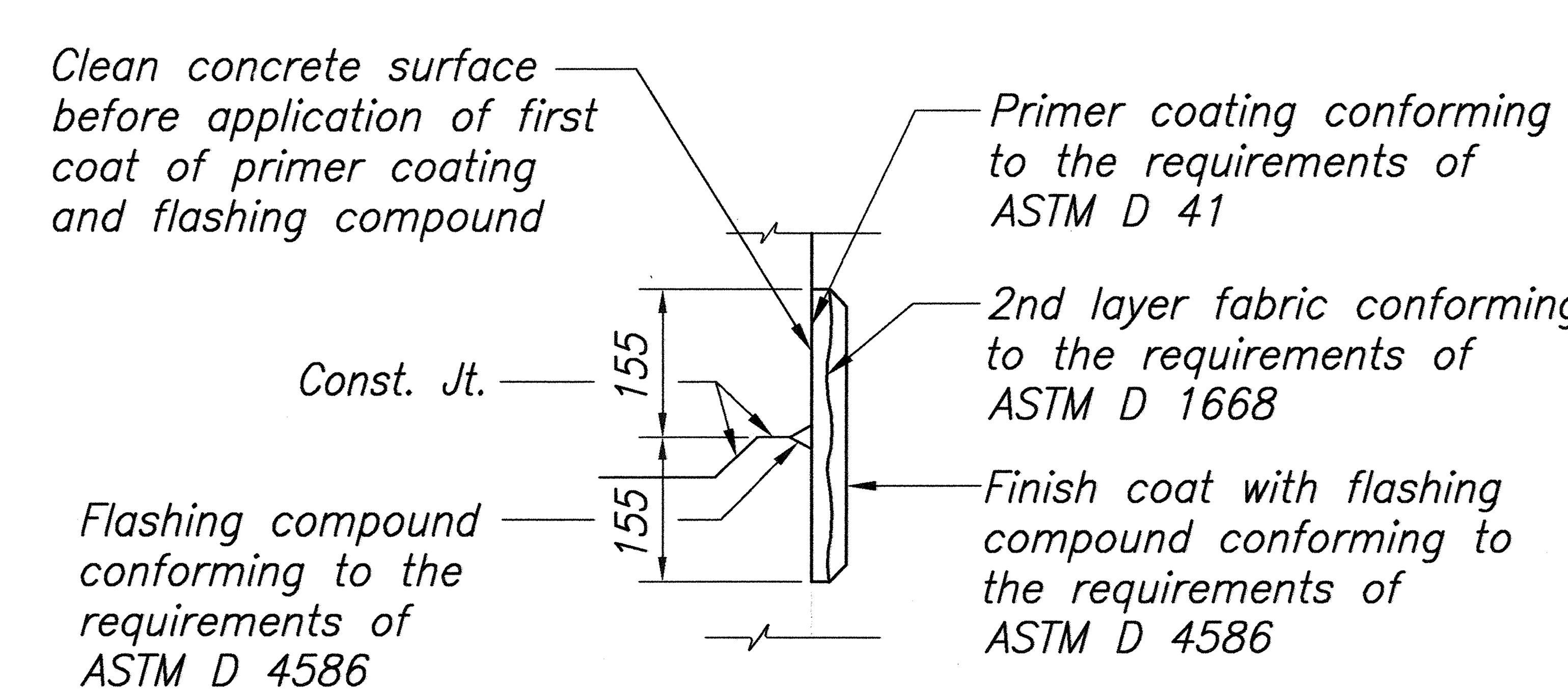
NOT TO SCALE



Note:
Dimensions are in millimeters

POLYMER CONCRETE COVER

NOT TO SCALE



TYPICAL FLASHING COMPOUND WATERPROOFING DETAIL

NOT TO SCALE

NOTES:

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 (21MPa, 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).
12. Dimensions are in millimeters, unless otherwise noted.

PETE G. PASCUA LICENSED PROFESSIONAL ENGINEER No. 7263-C HAWAII, U.S.A.

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

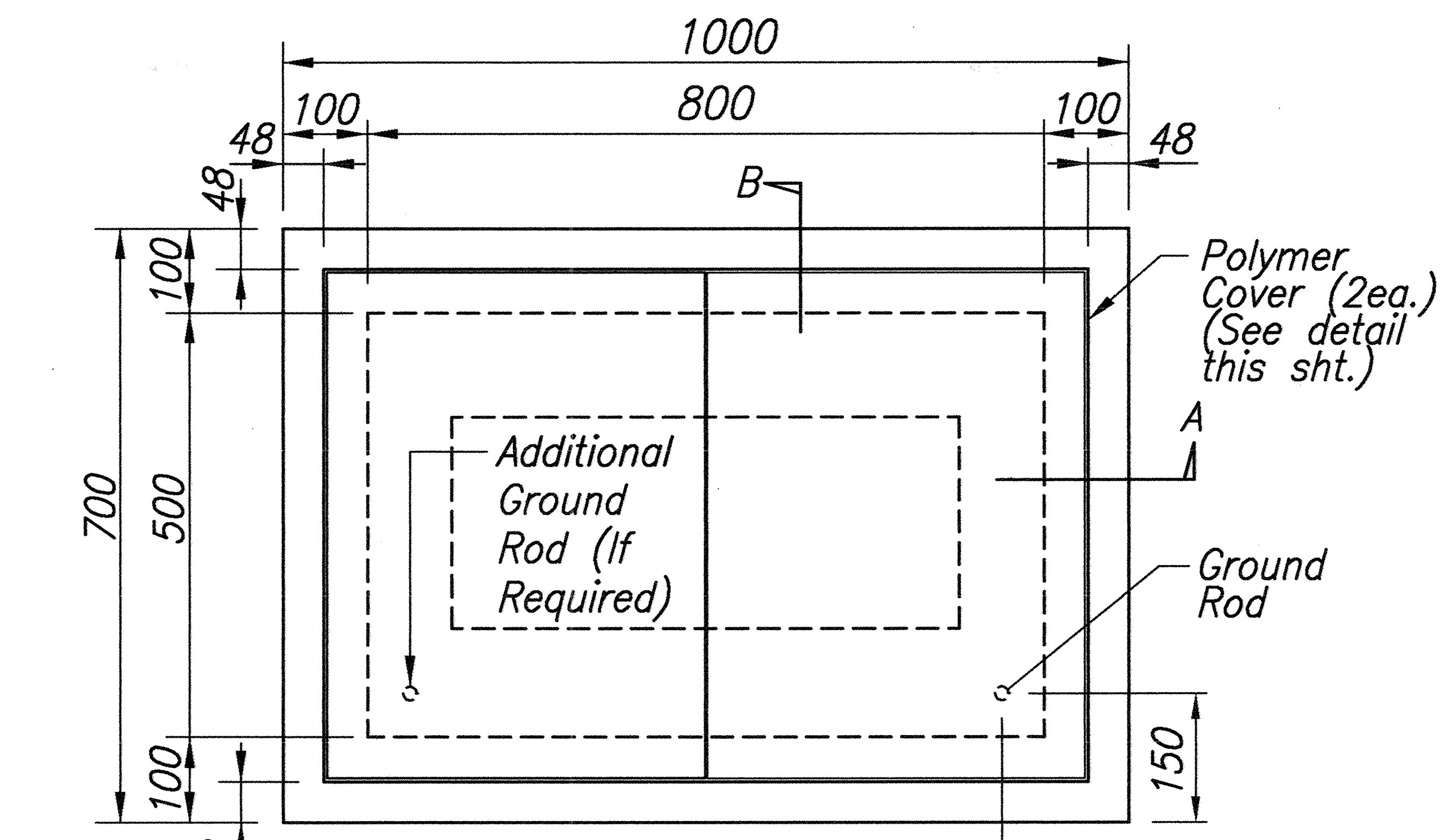
MISCELLANEOUS DETAILS

TRAFFIC SIGNAL MODERNIZATION
At Various Highway Locations, Kauai
Federal Aid Project No. CMAQ-700(45)R

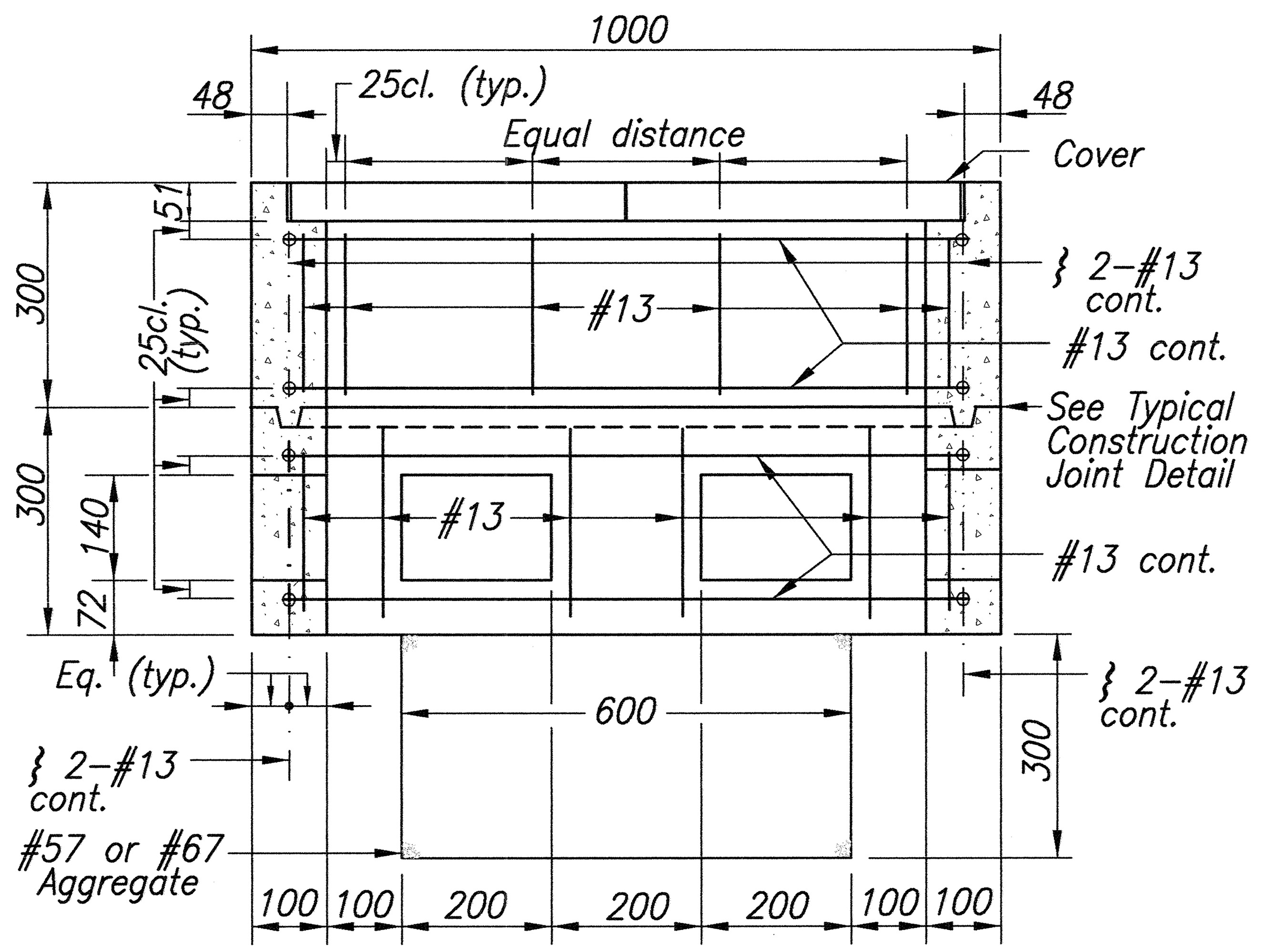
Scale: As Noted   Date: July 2003

ORIGINAL PLAN: SURVEY; PLOTTED BY; DRAWN BY JG, JR; TRACED BY; DESIGNED BY JG; QUANTITIES BY; CHECKED BY PP — DATE 10/7/02, 10/7/02, 10/7/02
NOTEBOOK jkmskmd04.dgn

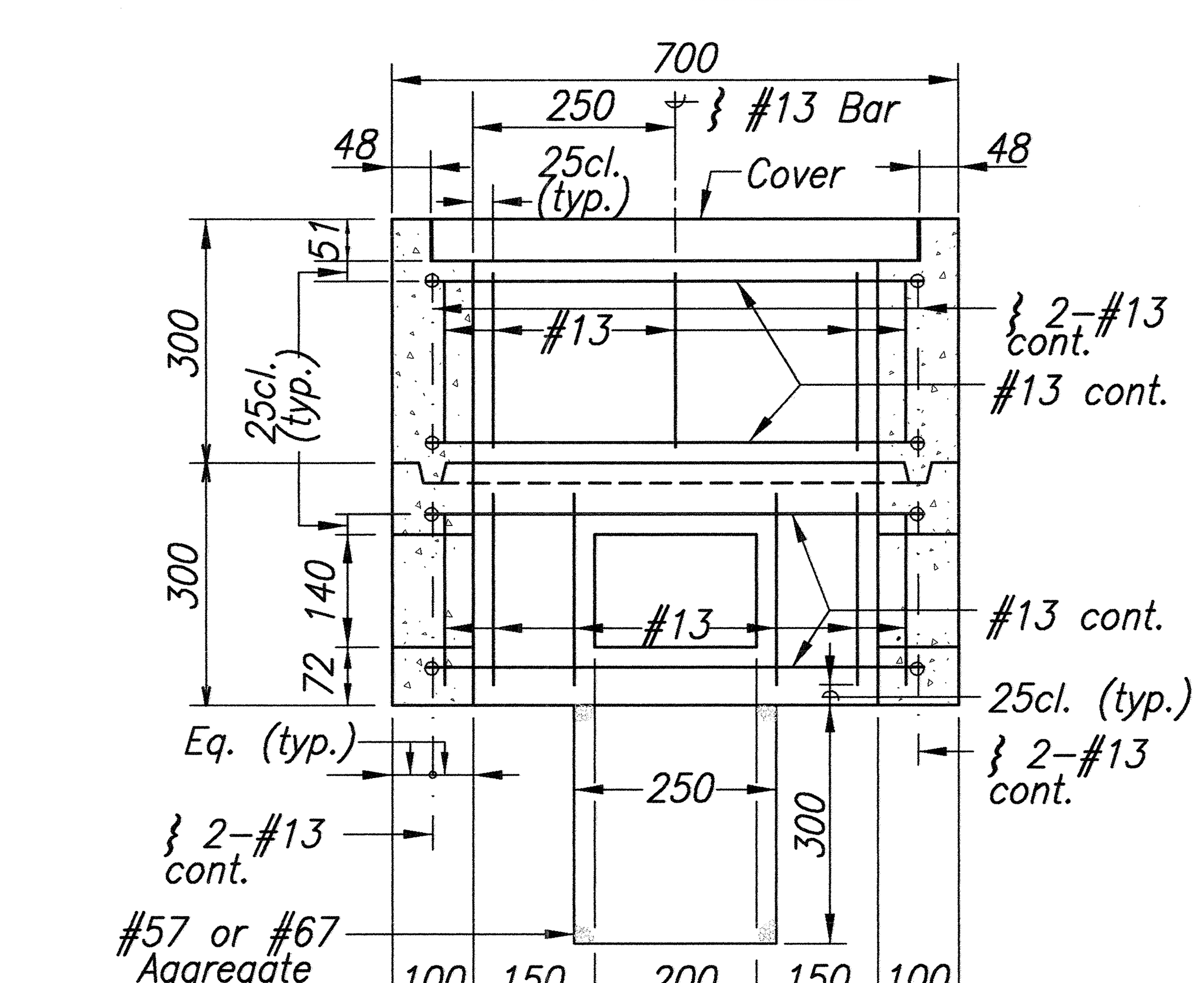
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-700(45)R	2004	29	41



PLAN



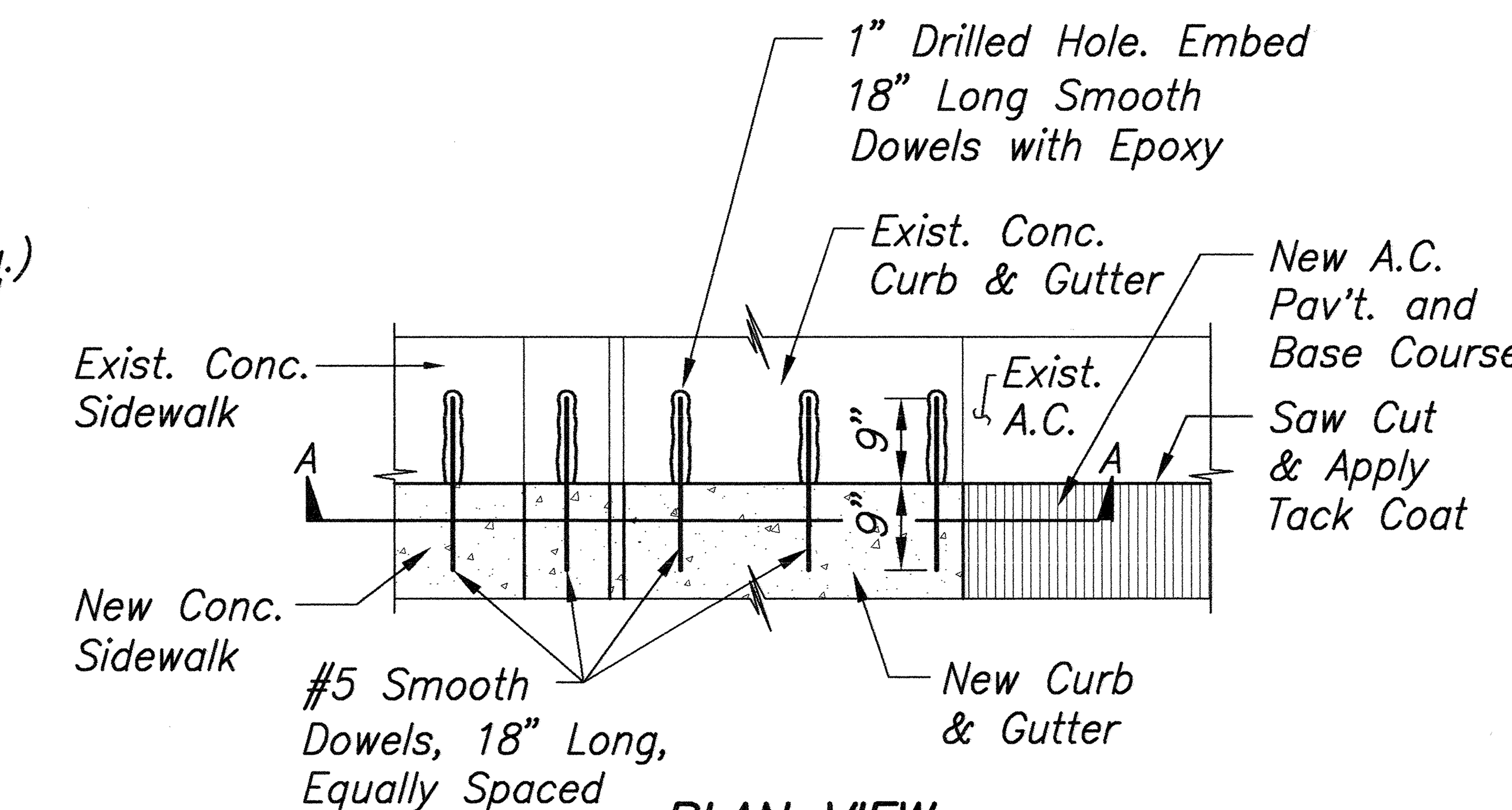
SECTION A–A



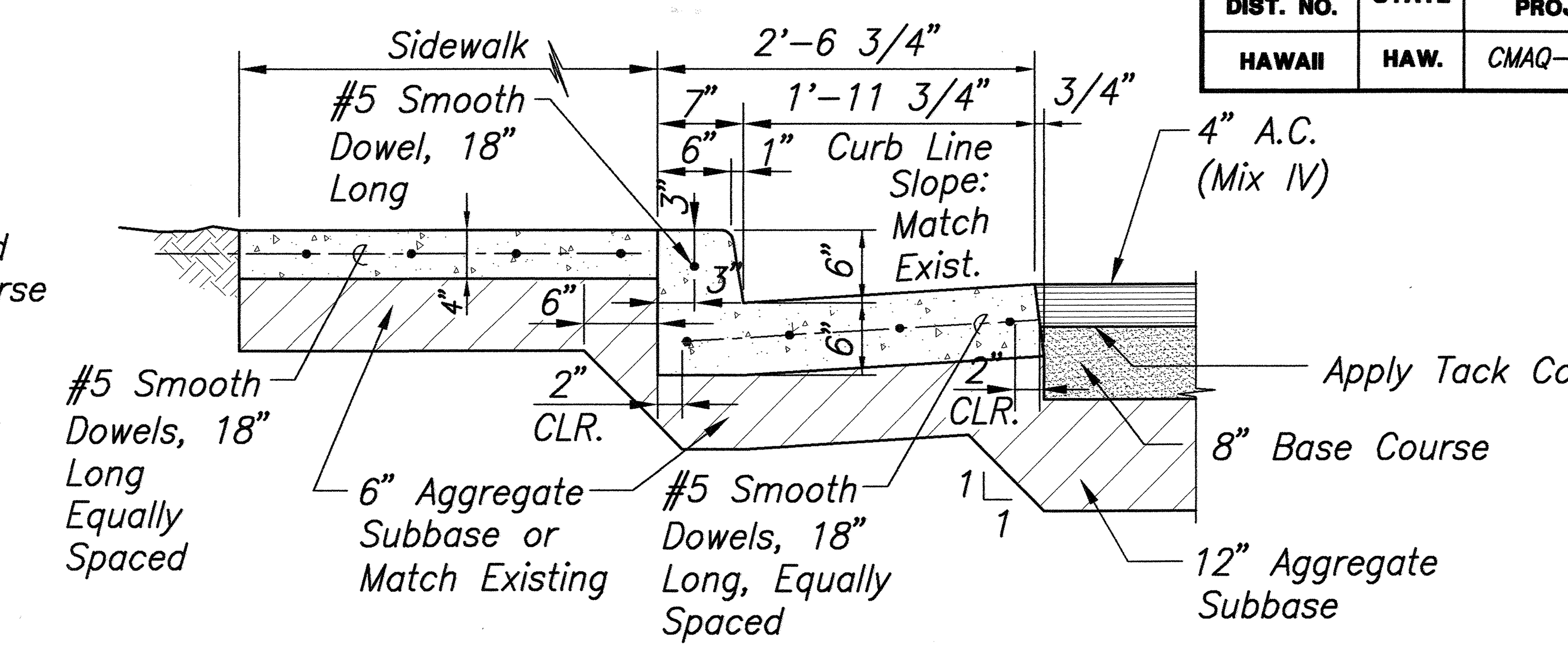
SECTION B–B

TYPE "B" PULLBOX (OLD TYPE "C")

NOT TO SCALE



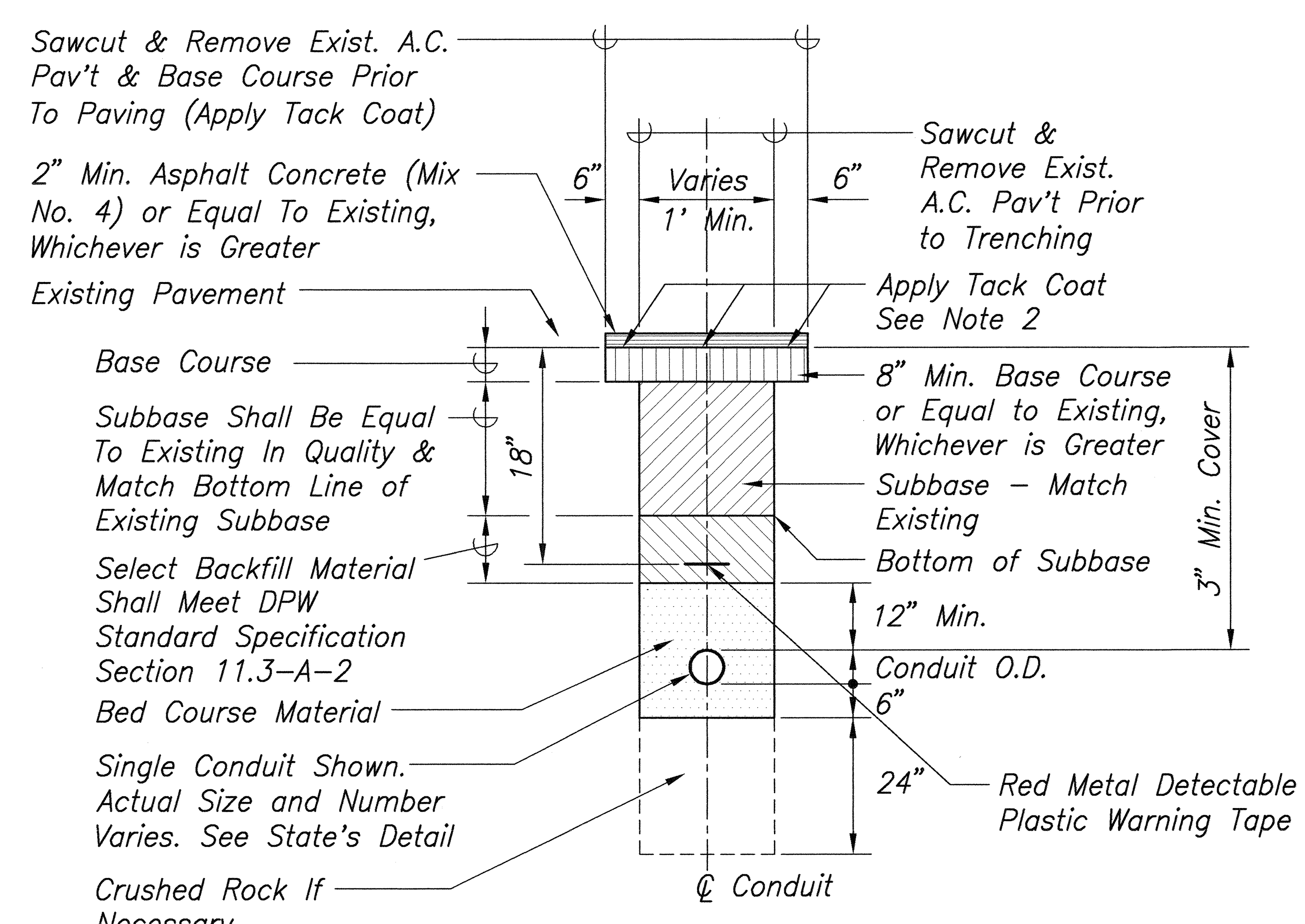
PLAN VIEW



SECTION A–A

SIDEWALK, CURB & GUTTER CONNECTION DETAIL

Not To Scale



(WITHIN COUNTY RIGHT-OF-WAY)

TYPICAL TRENCH RESTORATION DETAIL

Not To Scale

NOTES:

1. Pavement Structure Shall Be Equal or Better Than Existing In Thickness & Quality.
2. For Road Grades 0% to 7.99% and Tack Coat Is Not Available, None Required. If Tack Coat Is Available, Use Tack Coat.
3. 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.

COUNTY ENGINEER — DATE 11/8/02
DEPARTMENT OF PUBLIC WORKS
(FOR WORK WITHIN COUNTY RIGHT-OF-WAY)

PETE G. PASCUA — LICENSED PROFESSIONAL ENGINEER — No. 7263-C — HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTEBOOK	DRAWN BY	10/7/02
	TRACED BY	
No.	DESIGNED BY	10/7/02
	QUANTITIES BY	
	CHECKED BY PP	10/7/02

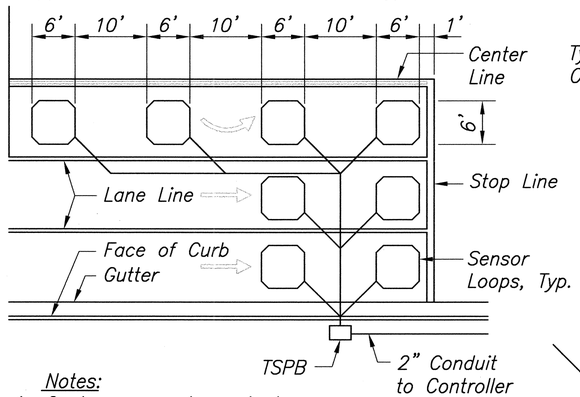
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MISCELLANEOUS DETAILS

TRAFFIC SIGNAL MODERNIZATION
At Various Highway Locations, Kauai
Federal Aid Project No. CMAQ-700(45)R

Scale: As Noted — Date: May 3, 2002

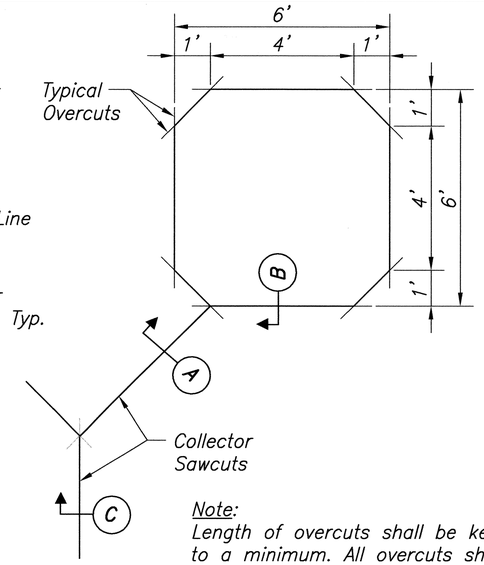
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-700(45)R	2004	30	44



Notes:
1. Center sensor loops in lanes.
2. Collector cables shall be twisted 2 turns per foot.
3. Number of 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

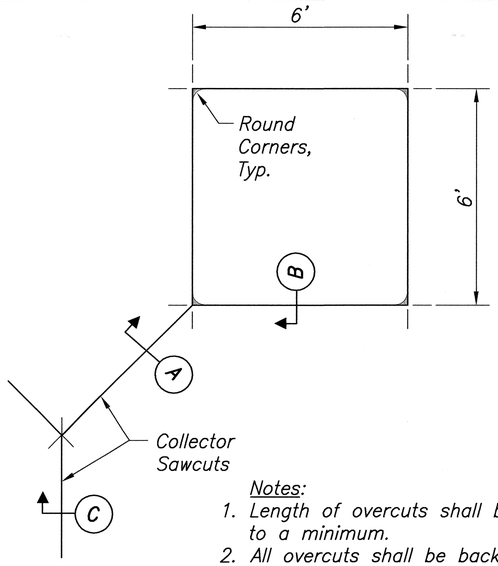
NOT TO SCALE



Note:
Length of overcuts shall be kept to a minimum. All overcuts shall be backfilled with hot tar.

TYPICAL SENSOR LOOP SAWCUT DETAIL

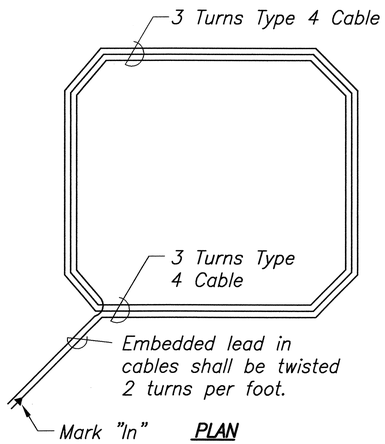
NOT TO SCALE



Notes:
1. Length of overcuts shall be kept to a minimum.
2. All overcuts shall be backfilled with hot tar.

ALTERNATE SENSOR LOOP SAWCUT DETAIL

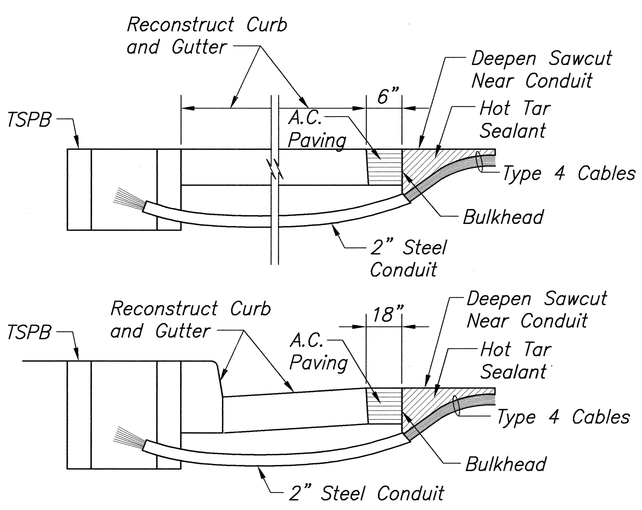
NOT TO SCALE



PLAN

TYPICAL SENSOR LOOP WIRING DIAGRAM

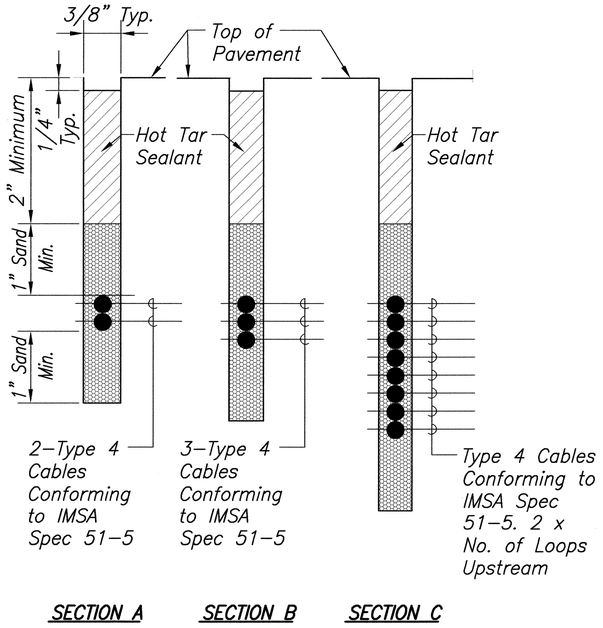
NOT TO SCALE



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

NOT TO SCALE



SECTION A SECTION B SECTION C

DETAIL OF SENSOR LOOP INSTALLATION AT EDGE OF ROADWAY

NOT TO SCALE

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY JG, JR	10/7/02
NOTEBOOK	TRACED BY JG	10/7/02
jkmisc06.dgn	DESIGNED BY JG	10/7/02
No.	QUANTITIES BY	
	CHECKED BY AP	

PETE G. PASCUA
LICENSED PROFESSIONAL ENGINEER
No. 7263-C
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

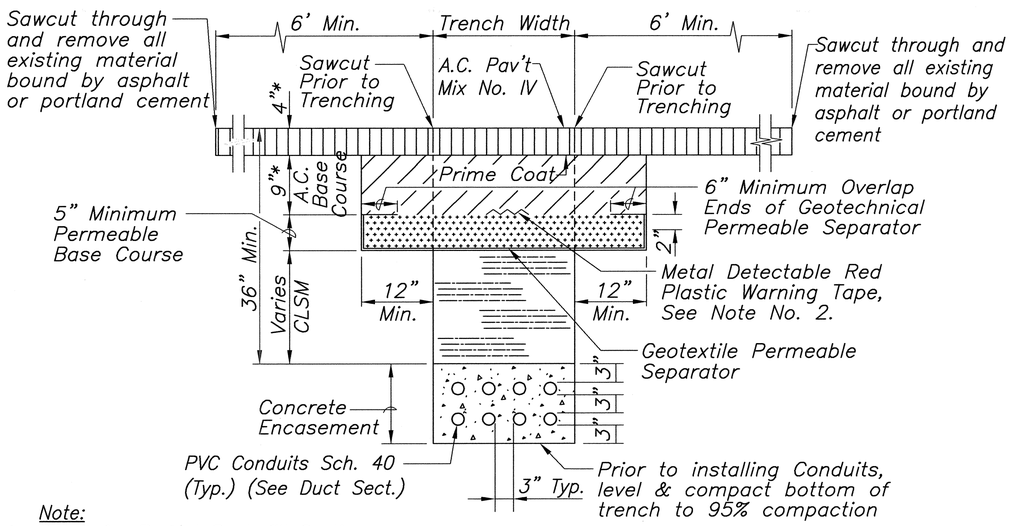
MISCELLANEOUS DETAILS

TRAFFIC SIGNAL MODERNIZATION
At Various Highway Locations, Kauai
Federal Aid Project No. CMAQ-700(45)R

Scale: As Noted Date: July 2003

SHEET No. 6 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMAQ-700(45)R	2004	31	44

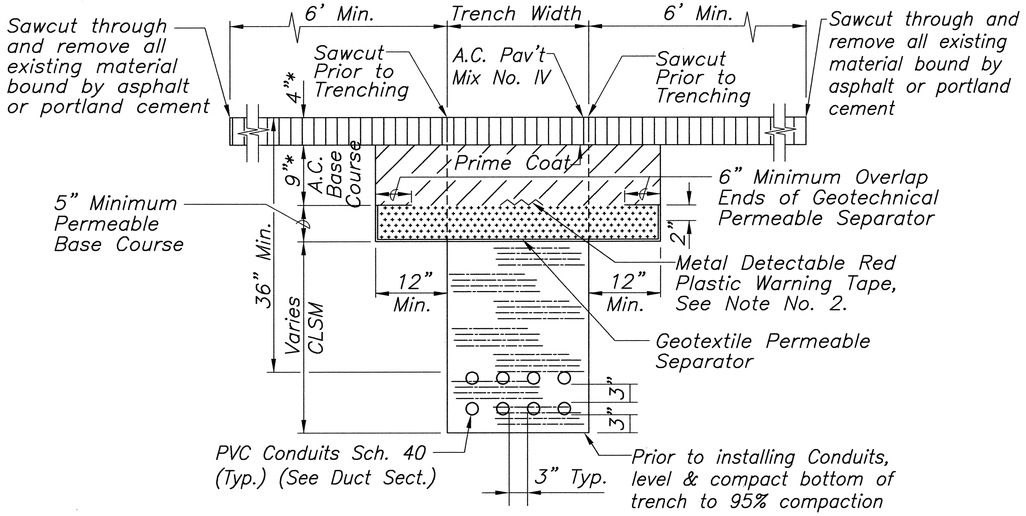


Note:

1. Detail for Typical Back fill Section w/Concrete Encased Ducts Within County-Right-of-Way Shall be Similar. See County Trench Detail Previous Sheet.

(WITHIN STATE RIGHT-OF-WAY)

TYPICAL BACKFILL SECTION WITH CONCRETE ENCASED DUCTS



(WITHIN STATE RIGHT-OF-WAY)

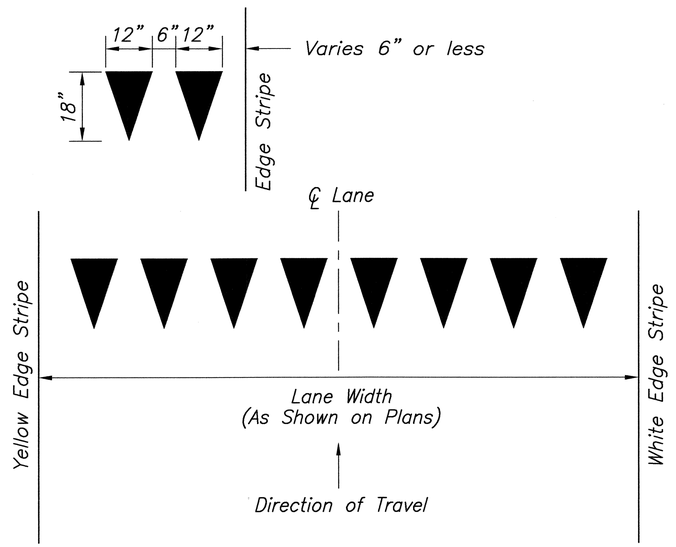
TYPICAL BACKFILL SECTION DIRECT BURIED DUCTS

Notes:

1. Detail for Single Conduit Trenches Shall be Similar.
2. Bed Course Material Shall be Black Sand, Beach Sand, Crushed Rock, or Finely Graded coral Passing a 1/2" Siere.

GENERAL NOTES

1. If trench is located on unpaved area, the Contractor shall replace 10" A.C. Base Course and 4" A.C. Pavement with Type "A" backfill material.
2. 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 1/4 " spacing between top line of message and start of next repeat.
3. The Contractor may begin backfilling the conduit trench when the concrete reaches 3000 psi compressive strength after 3 days.
4. Maximum four (4) Conduits per row for multiple conduit duct section.
5. For direct buried duct sections, the concrete jacket required at the conduit by-pass for various utilities, shall not be paid for separately but considered incidental to the direct buried conduits.
6. 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.



YIELD LINE DETAIL

NOT TO SCALE

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

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Scale: As Noted Date: July 2003

SHEET No. 7 OF 7 SHEETS