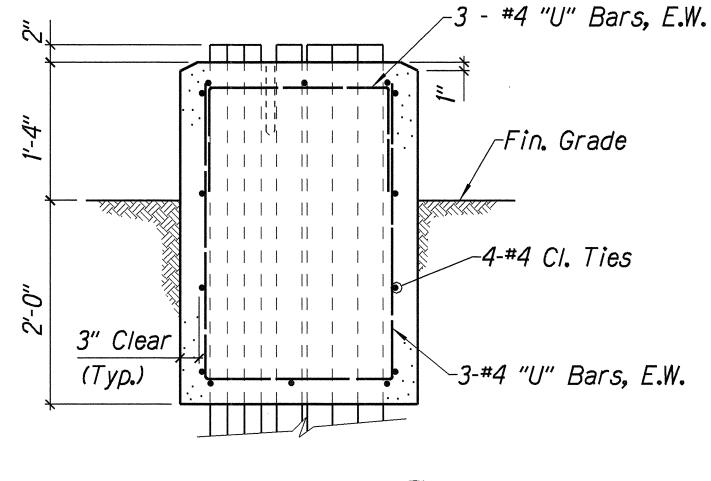
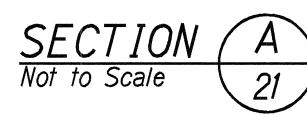
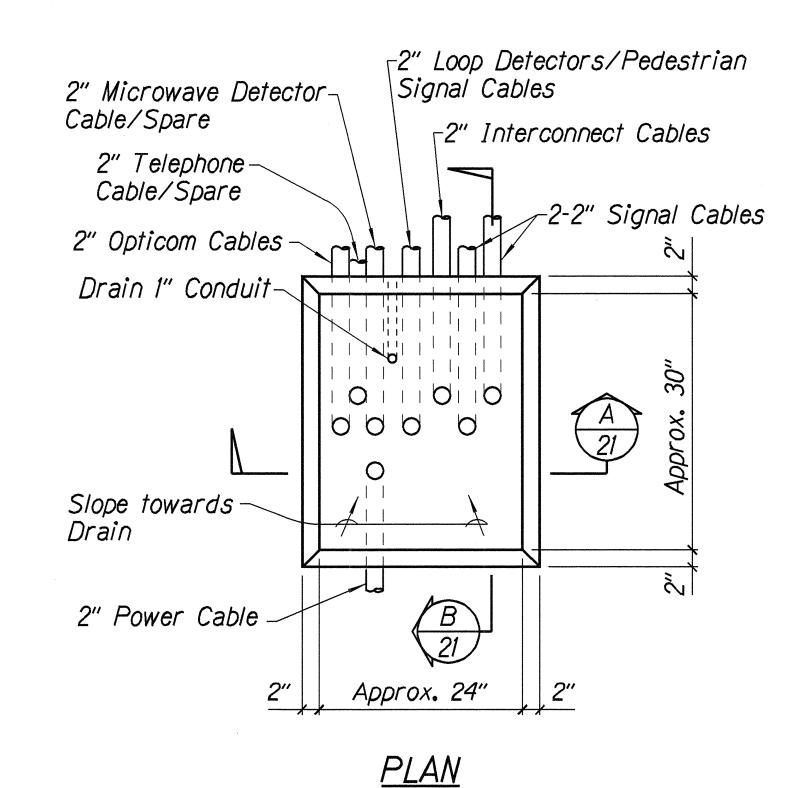
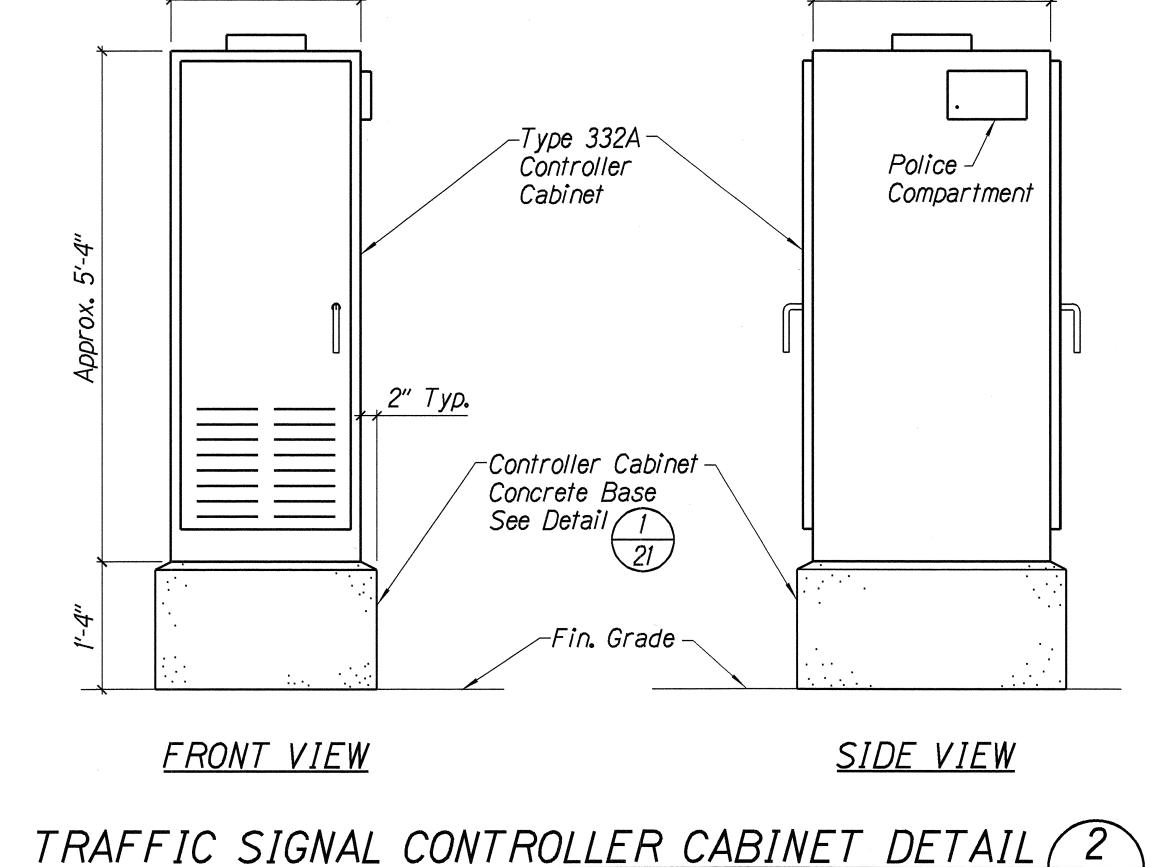
NOTES FOR CONTROLLER CONCRETE BASE:

- 1. Concrete shall be class "B".
- 2. Dimensions shall be altered to suit controller cabinet actually furnished.
- 3. Conduits, bends, and drain are incidental to concrete base.
- 4. Refer to Cabinet Manufacturer's Specifications for details of anchor bolts and base settings.
- 5. All exposed surfaces of concrete base shall be given a class 2, rubbed finish.
- 6. All Conduits shall be galv. steel.









Approx. 24"

Not to Scale

FED. ROAD DIST. NO.

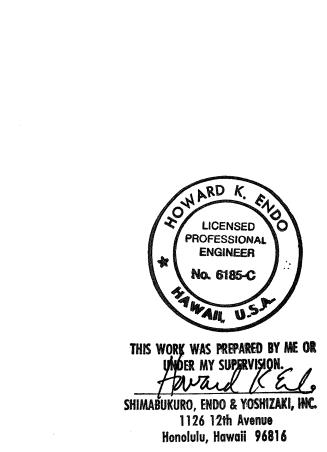
FISCAL YEAR

21

FED. AID PROJ. NO.

STP-050-1(20) 2000

Approx. 30"



LICENSED PROFESSIONAL

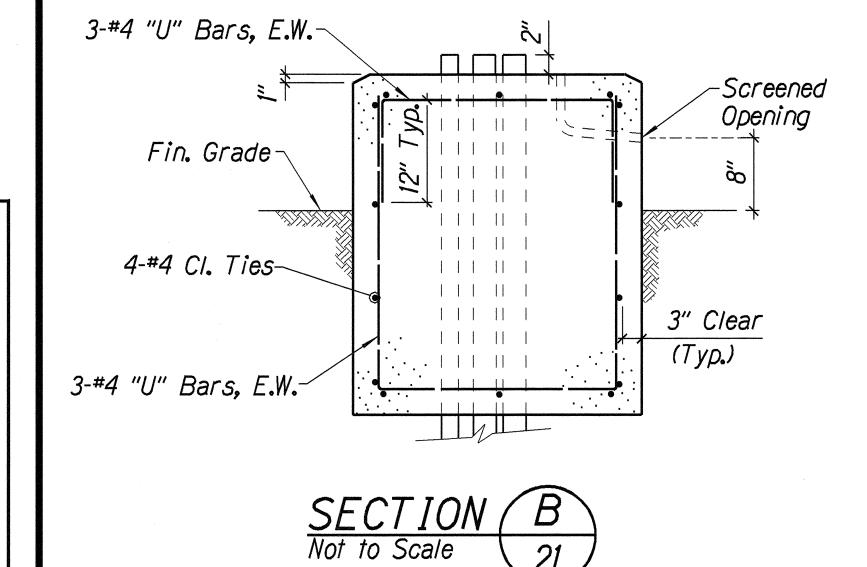
ENGINEER

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS

<u>Kaumualii Highway Traffic Signal</u> <u>Modernization at Various Locations</u> <u>Federal-Aid Project No. STP-050-1(20)</u>

Scale: As Shown Date: Apr., 2000 SHEET No. 1 OF SHEETS

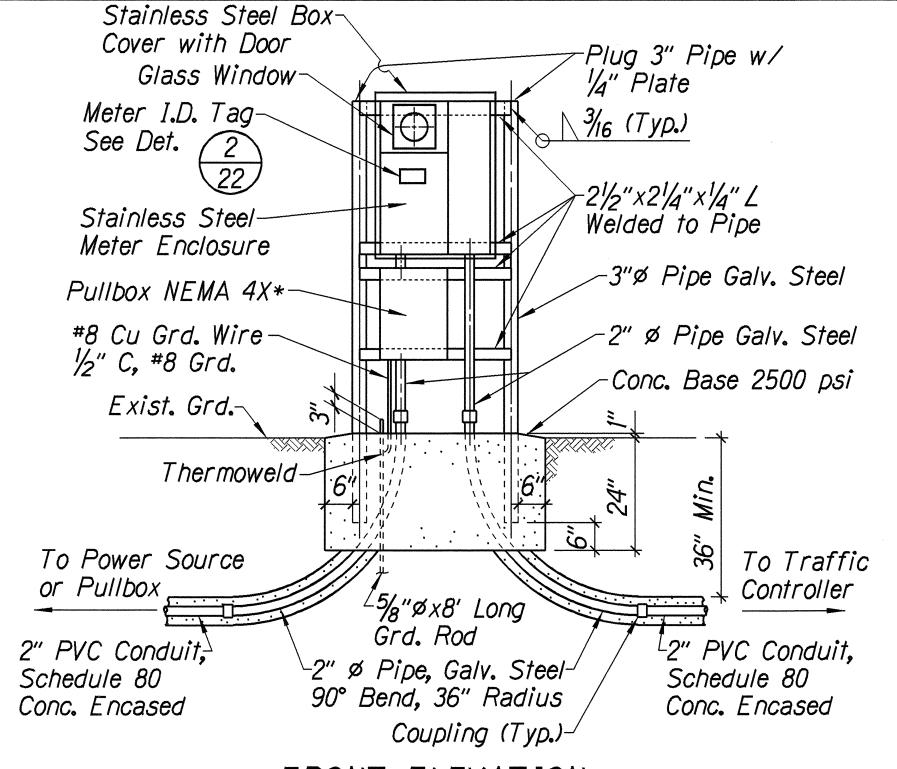


CONTROLLER CABINET BASE DETAIL CONCRETE Not to Scale

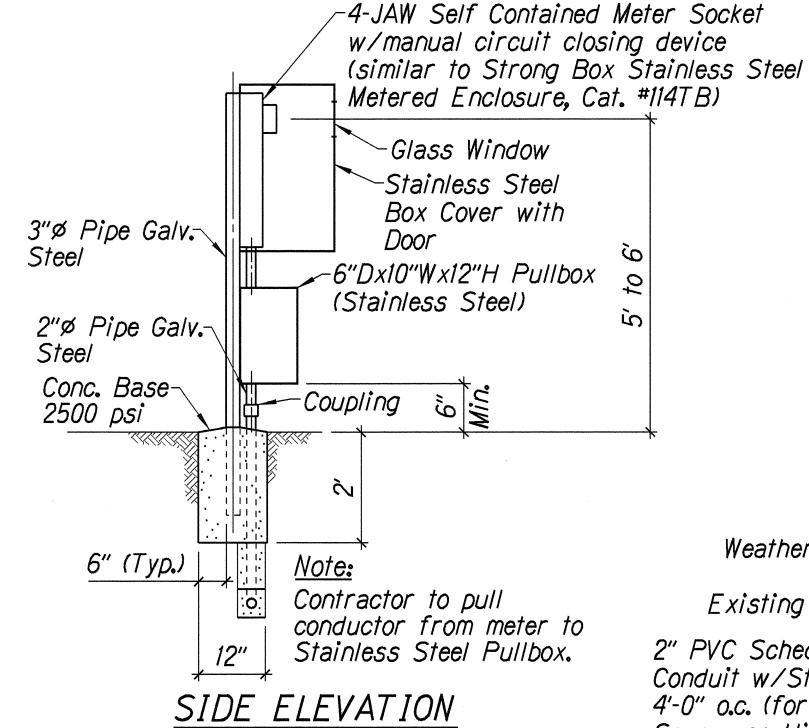
17 21

KAUAI ELECTRIC - UNDERGROUND CONSTRUCTION NOTES

- 1. Contractor shall contact Kauai Electric's ("KE") Quality Assurance Coordinator prior to start of work on KE facilities and for scheduling site inspections. [Westside: Dave Taylor @ 335-6223; Eastside: Bernard Naea Jr. @ 822-92041
- 2. Contractor shall contact KE's Distribution Engineer @ 335-6273 for design approvals, standard detailed drawings, and any items not addressed in these notes or drawings.
- 3. All contractors entering KE facilities containing high voltage lines must be approved by KE and must have proper licensing and insurance coverage. Contact KE Engineering Service Coordinator @ 246-4369 for details.
- 4. All trenches and pullboxes must be inspected by KE's inspector prior to backfilling and concrete-encasing operations.
- 5. The Contractor shall provide a Poly-Line 200 lb. test line or equivalent as a pulling wire in all conduits.
- 6. All conduits, pullboxes, handholes \$ manholes shall be cleaned and free from objectionable materials. Conduit ends shall be adequately covered until the conductor is installed by the electric company. (Covers shall be Carlon Plug with Pull Tab Series P258 equivalent or better.)
- 7. For detailed trenching and backfilling requirements refer to KE's Service Installation Manual.
- 8. For all conduit other than services, refer to conduit schedule on drawings.
- 9. For all services where the conductor is 3/0 or less, the distance from KE's handhole and Customer's meter is less than 125 feet and not crossing any driveways or roads. The conduit shall be 2-inch Schedule 40 PVC. Written approval from KE's Service Assurance Department is required for any deviations.
- 10. All primary and secondary conduits crossing state or county roadways shall be Schedule 40 PVC encased in a minimum 3-inch concrete jacket which shall extend a minimum of 12 inches outside of the edge of pavement.
- 11. Electrical supply ducts, when installed near communication cables, shall be separated from communication duct systems and buried communications cables or conductors by not less than 3 inches of concrete or 12 inches of earth when paralleling or crossing.
- 12. All conduits shall enter boxes at 90-degree angle, perpendicular and flush to the wall with bell ends to prevent cable damage.
- 13. 90-degree conduit bends shall be factory made with a minimum radius of 3 feet in trench runs.
- 14. Conduit bends exceeding 90 degrees will not be accepted.
- 15. A 36-inch minimum horizontal clearance shall be maintained when running KE conduits parallel to water and sewer lines. If clearance is less than 36 inches, KE conduit shall be concrete encased.
- 16. No foreign pullboxes, handholes, manholes, concrete slabs/boxes, structures, etc., are to be installed over KE facilities with the exception of HTCO, CATV or waterline conduit crossings. Such crossing must be approved by KE's Service Assurance Department and KE conduit to be concrete encased. Concrete encasement must be minimum 3-inch encasement and extend a minimum of 1 foot beyond crossing conduit or pipe.
- 17. Yellow marker tape to be placed 1 foot above electrical conduits in the trench during backfilling. (E-Z CODE WBT 6-inch wide, 4 Mill polyethylene Protect-A-Line Tape NA-0708 "ELECTRIC LINE" in yellow, equivalent or better.)
- 18. Unless otherwise noted, the top of all conduits shall be at a depth of 24 inches.
- 19. All handholes, pullboxes, and manholes shall meet KE's specifications and manufactured by a KE approved supplier.



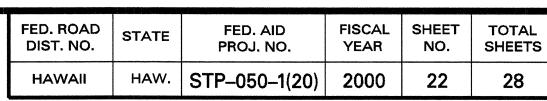
FRONT ELEVATION



METER PEDESTAL NOTES:

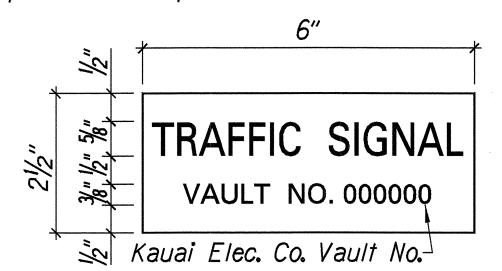
- 1. Pedestal shall be hot-dipped galvanized after fabrication
- 2. All fastening bolts, nuts \$ washers shall be stainless steel.
- 3. Provide 4 ft. clearance in front of meter.
- 4. Sealable Stainless Steel Enclosure 18"D x 20"W x 12"H.



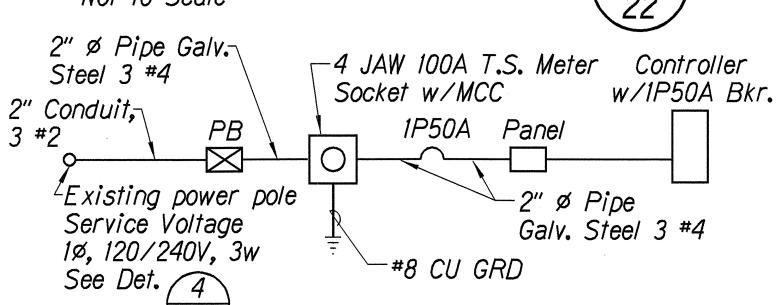


NOTES FOR METER I.D. TAG:

- 1. Use 3-ply laminated flexable plastic, black-white-black. Thickness: 0.010" - black cap sheet 0.052" - white base sheet 0.010" - black base sheet
- 2. Attach to Meter Socket using Scotch 3M Brand very high bond (VHB) double coated acrylic foam tape or equivalent.
- 3. Letters/Numbers shall be $\frac{1}{16}$ " stroke, (white in color).
- 4. Letters/Numbers area inscribed by cutting through "black cap sheet" to expose white letters/numbers.



METER I.D. TAG DETAIL Not to Scale



ONE LINE DIAGRAM Not to Scale

Secondary Cable

straps, couplings, elbows, etc. for the service pole detail shall not be paid Existing Pole—

2" PVC Schedule 80-Conduit w/Strap @ 4'-0" o.c. (for Power Source or Highway Lighting)

Weatherhead-

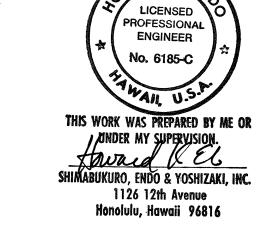
incidental to the various contract items. -Coupling r −2" PVC Schedule 80 Conduit Finish Grade

for separately but shall be considered

The cost of the conduits, weatherhead,

5/8"x8'-0" Ground-Rod, Copper Clad -Traffic Signal Pullbox, Type A

POLE SERVICE DETAIL (Not to Scale



STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

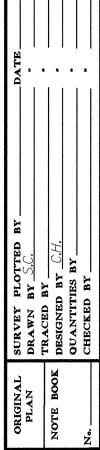
TRAFFIC SIGNAL DETAILS

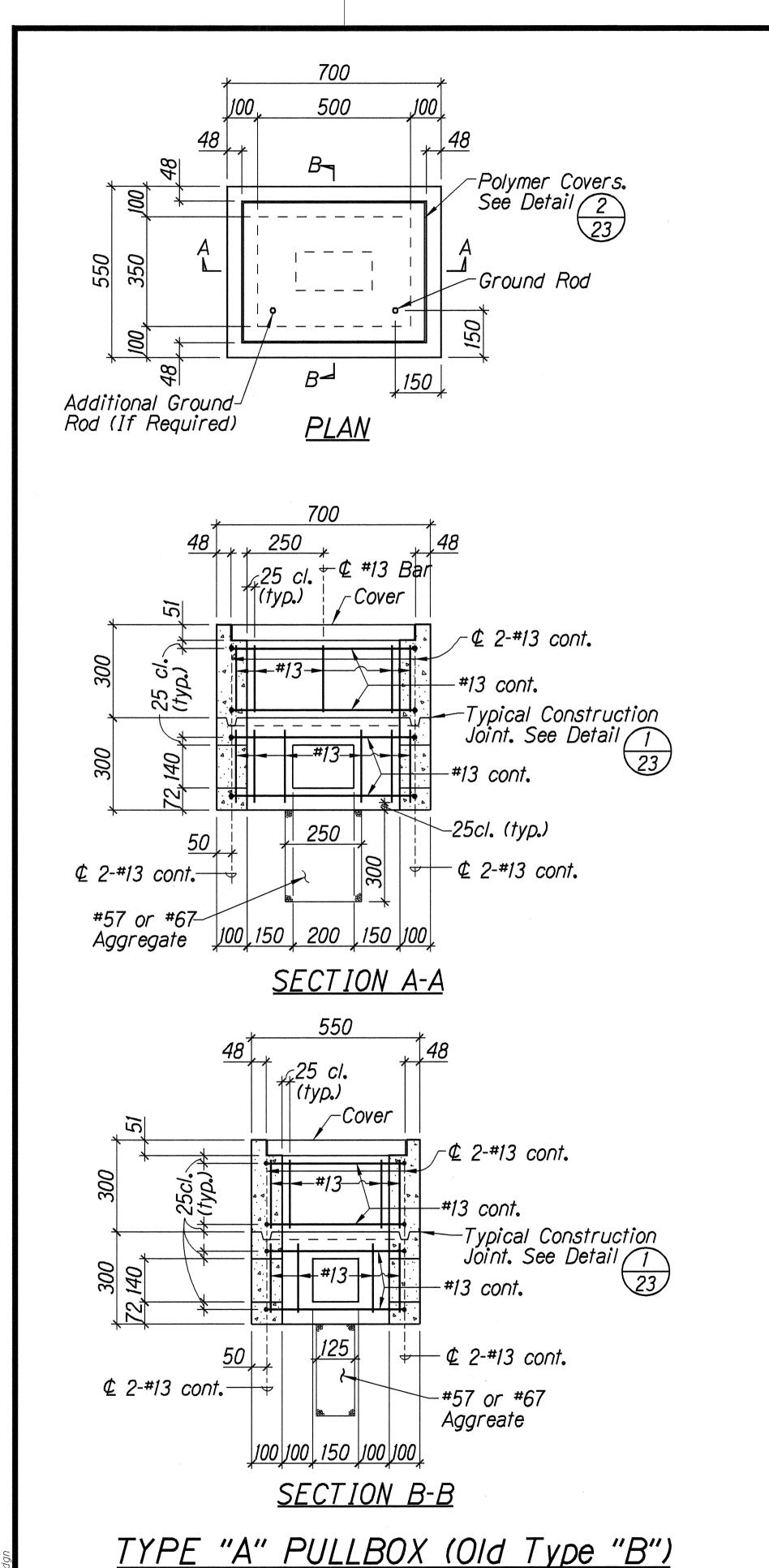
Kaumualii Highway Traffic Signal Modernization at Various Locations Federal-Aid Project No. STP-050-1(20)

Date: Apr., 2000 SHEET No. 2 OF 7

Scale: As Shown

SHEETS





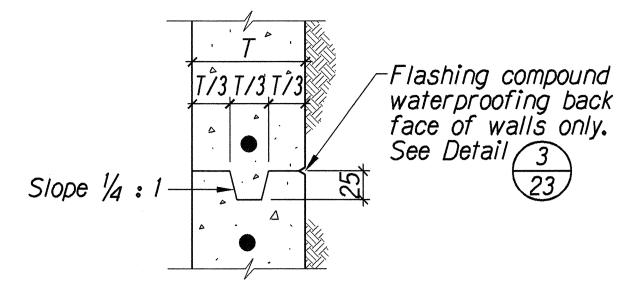
ORIGINAL SURVEY PLOTTED H
PLAN TRACED BY S.C.

NOTE BOOK DESIGNED BY C.H.

OUANTITIES BY

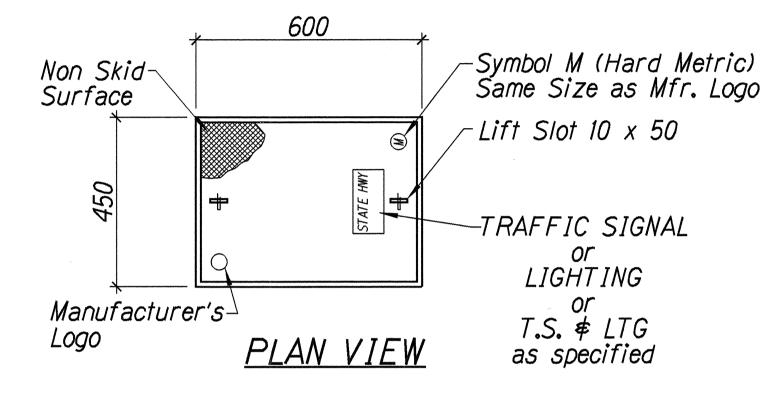
CHECKED BY

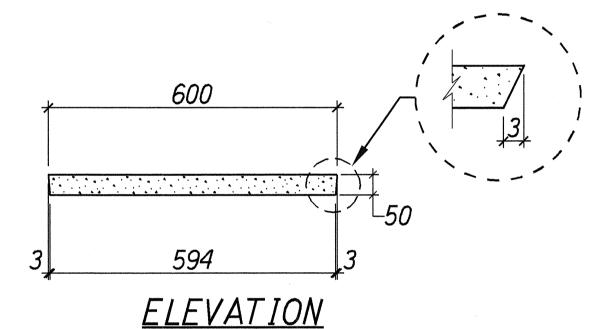
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TYP. CONSTRUCTION JOINT DETAIL 1

Not to Scale

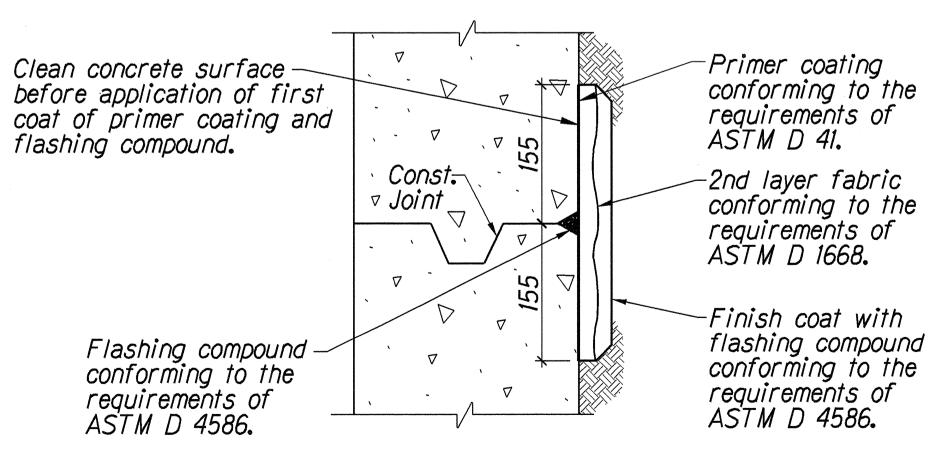




POLYMER CONCRETE COVER 2

Not to Scale

23
2423



TYPICAL FLASHING COMPOUND WATERPROOFING DETAILS

Not to Scale

23

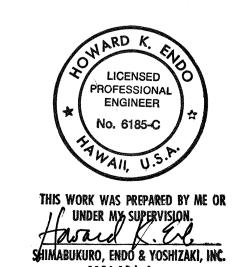
FED. ROAD DIST. NO. STATE FED. AID PROJ. NO. FISCAL YEAR NO. SHEETS

HAWAII HAW. STP-050-1(20) 2000 23 28

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.

METRIC PULLBOX NOTES:

- 1. Provide a minimum of one 16 0 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).



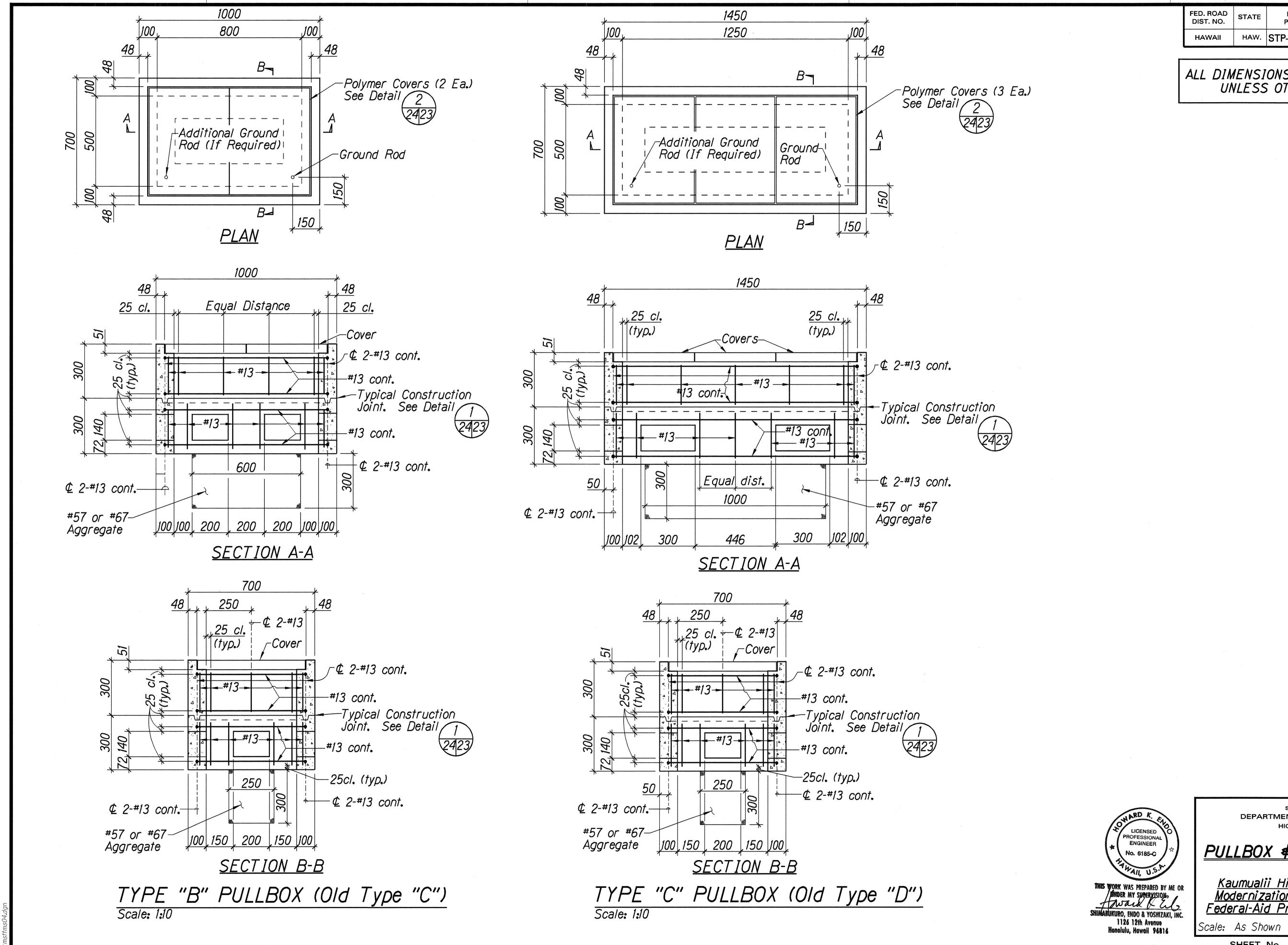
1126 12th Avenue Honolulu, Hawaii 96816 STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PULLBOX & COVER DETAILS

Kaumualii Highway Traffic Signal Modernization at Various Locations Federal-Aid Project No. STP-050-1(20)

Scale: As Shown Date: Apr., 2000

SHEET No. 3 OF 7 SHEETS



ORIGINAL SURVEY PLOTTE
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NOTE BOOK DESIGNED BY
QUANTITIES BY
CHECKED BY

FISCAL YEAR FED. AID PROJ. NO. HAW. STP-050-1(20) 2000 24

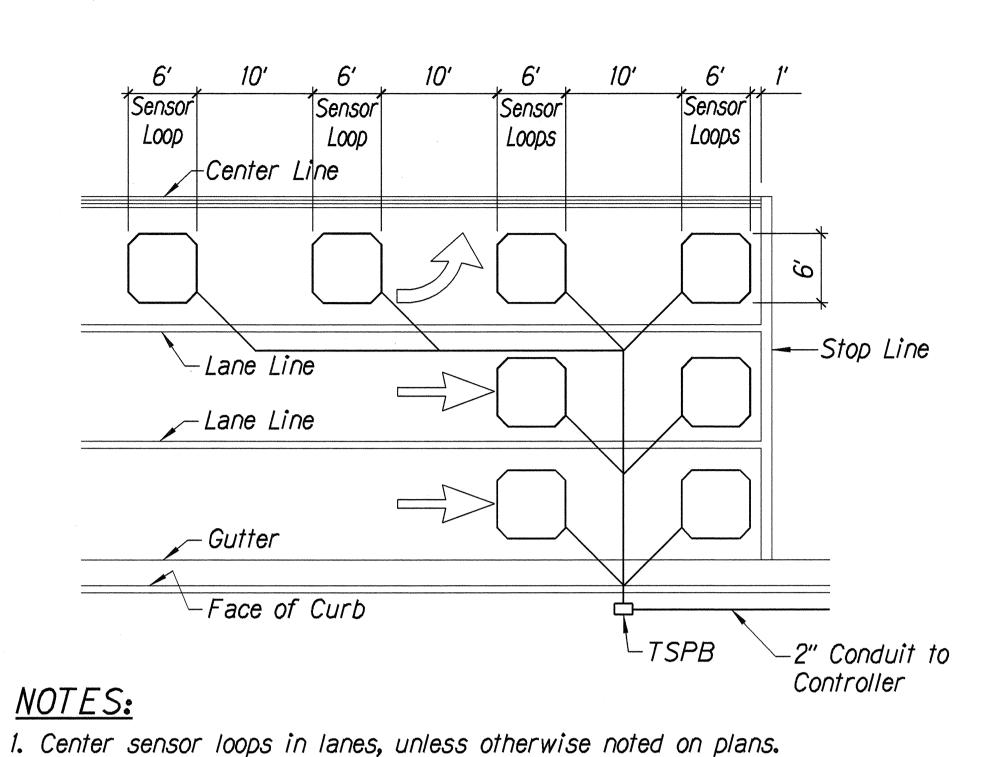
ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN.

> STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

Kaumualii Highway Traffic Signal Modernization at Various Locations Federal-Aid Project No. STP-050-1(20)

Date: Apr., 2000

SHEET No. 4 OF 7



Typical -**Overcuts** 4 6 B 25 -Collector Sawcuts **NOTES:** 25) Length of overcuts shall be kept to a minimum. All overcuts shall be back filled with hot tar.

Sealant -Hot Tar Sealant _2-Type 4 L3-Type 4 Cables to IMSA SPEC 51-5.2 Cables to IMSA SPEC 51-5.2 └Type 4 Cables to IMSA SPEC 51-5.2 x No. of Loops "Upstream" SECTION B Not to Scale 25 SECTION A SECTION C

FED. ROAD DIST. NO.

FISCAL SHEET YEAR NO.

FED. AID PROJ. NO.

Not to Scale 25

STP-050-1(20) 2000 25

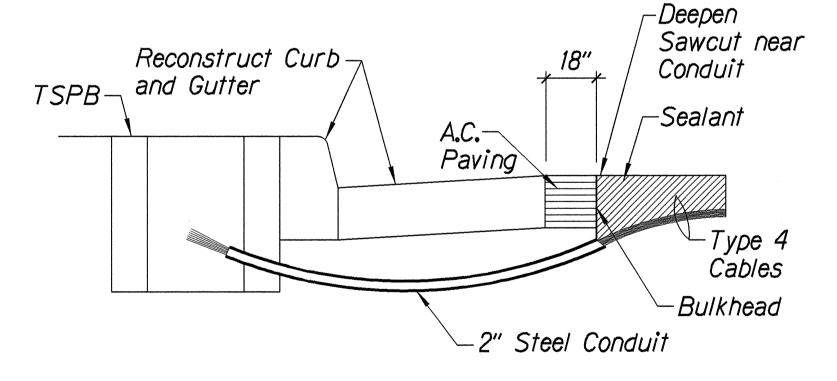
TYPICAL SENSOR LOOP LAYOUT Not to Scale

4. Number and locations of collector sawcuts may be varied in the field to suit.

2. Collector cables shall be twisted 2 turns per foot.

3. Number of loops and locations vary. See project plans.

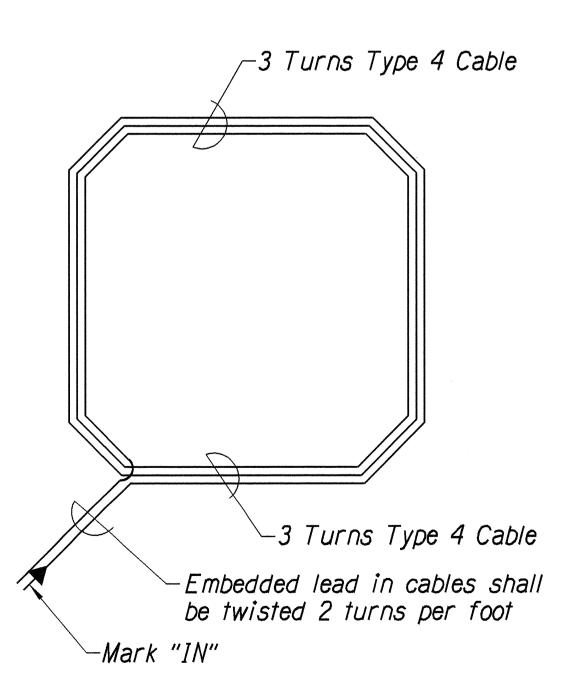
TYP. SENSOR LOOP SAWCUT DETAIL Not to Scale



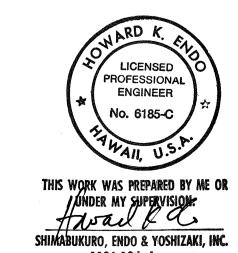
NOTES ON CONSTRUCTION AT END OF SAWCUT

- 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



TYP. SENSOR LOOP WIRING DIAGRAM Not to Scale



Not to Scale 25

DETECTOR LOOP DETAILS

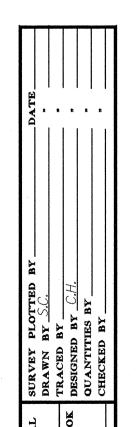
Kaumualii Highway Traffic Signal Modernization at Various Locations Federal-Aid Project No. STP-050-1(20)

STATE OF HAWAII

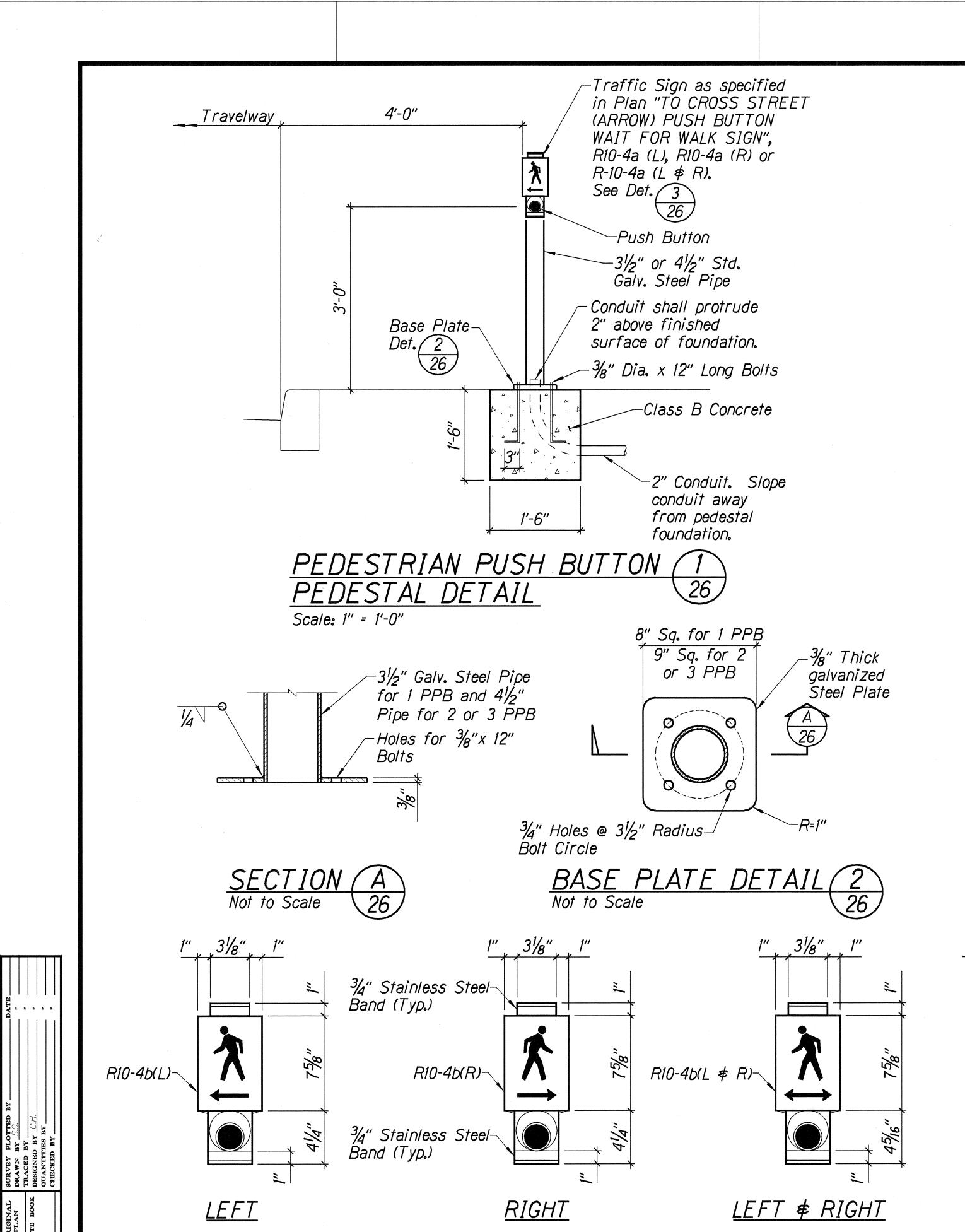
DEPARTMENT OF TRANSPORTATION

Scale: As Shown Date: Apr., 2000

SHEET No. 5 OF 7 SHEETS

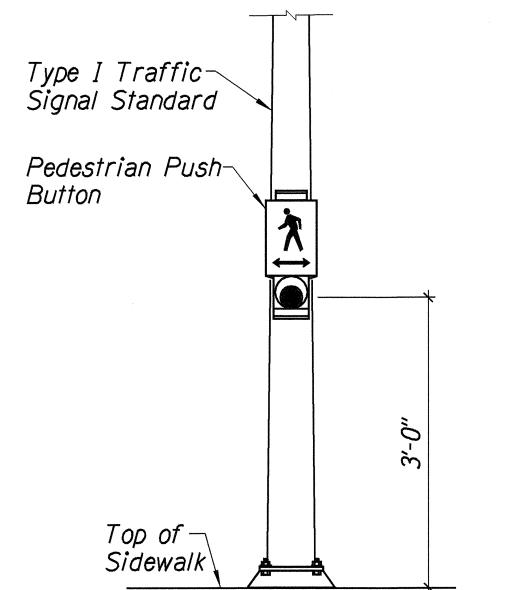


25



PEDESTRIAN PUSH BUTTON DETAILS (3)

Not to Scale

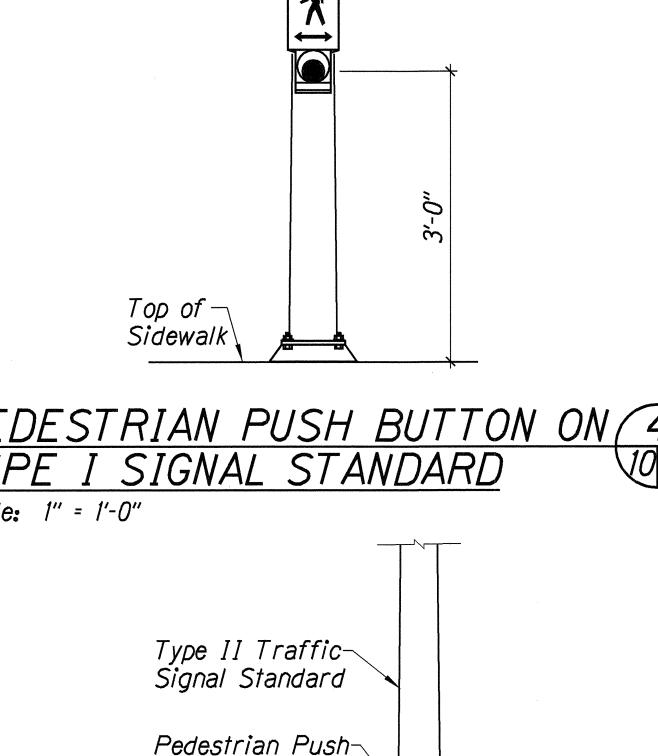


PEDESTRIAN PUSH BUTTON ON 4 TYPE I SIGNAL STANDARD

Button

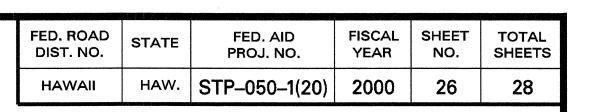
Curb, Type 2D√ Modified

Scale: 1" = 1'-0"



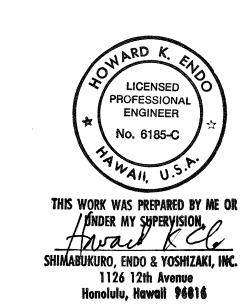
PEDESTRIAN PUSH BUTTON ON (5) TYPE II SIGNAL STANDARD

Scale: 1" = 1'-0"



NOTES:

- 1. The pedestrian push button unit shall consist of a one piece assembly with a raised walking man, arrow indication and push button.
- 2. The push button 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 push button shall be tamper proof, weatherproof and constructed so that electrical shocks are impossible.
- 5. The color scheme shall be: White - Man, Arrow and Push Button Black - Background
- 6. Pedestrian Push Button Standard shall be hot-dipped galvanized after fabrication.



DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS

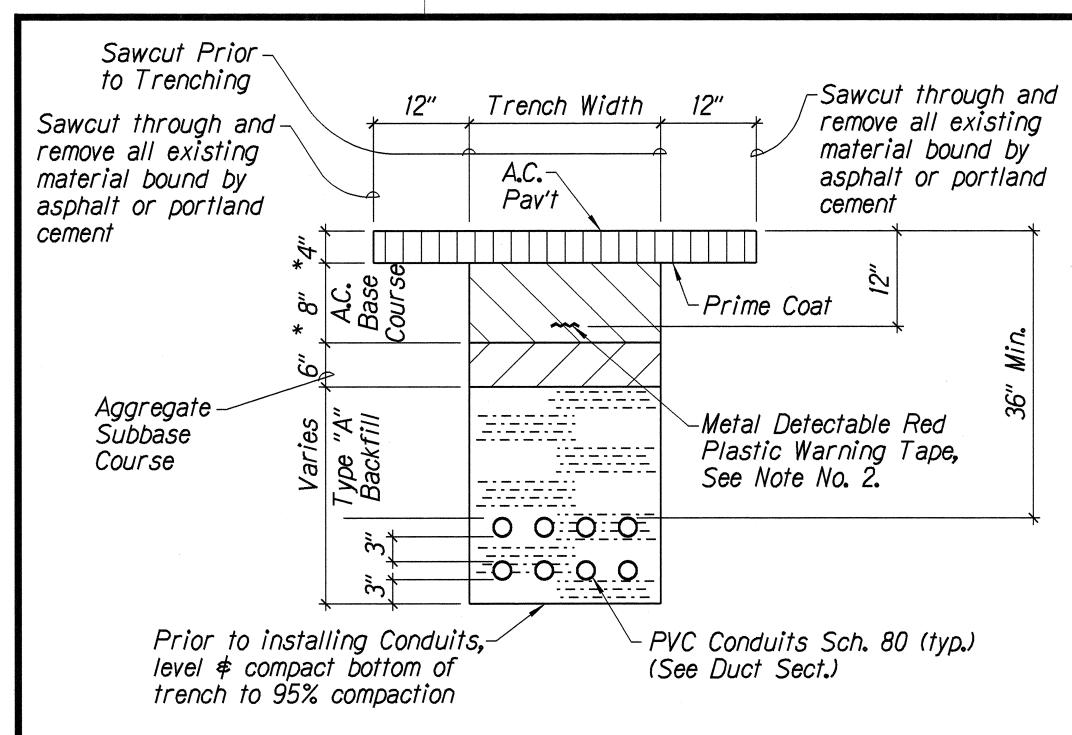
<u>Kaumualii Highway Traffic Signal</u> <u>Modernization at Various Locations</u> <u>Federal-Aid Project No. STP-050-1(20)</u>

Scale: As Shown

SHEET No. 6 OF SHEETS

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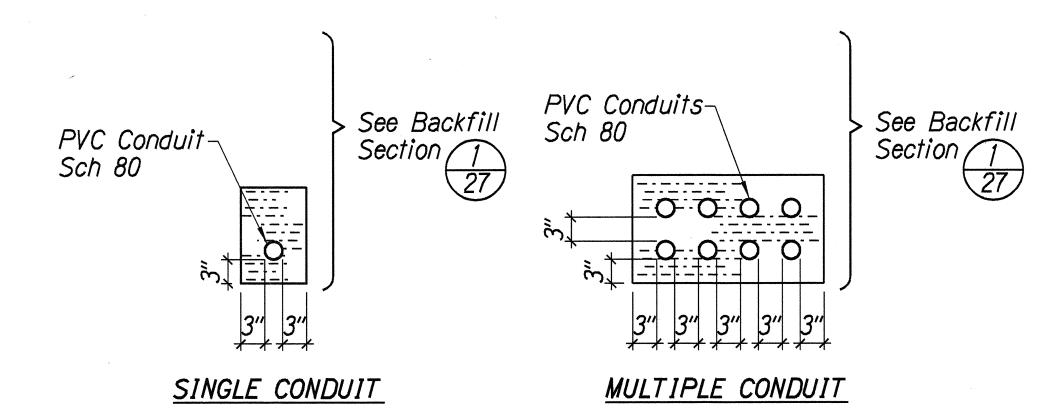
Date: Apr., 2000



* Minimum thickness or match existing, whichever is greater

TYP. PAVEMENT RESTORATION AND BACKFILL (1 SECTION FOR DIRECT BURIED DUCTS

Not to Scale



DUCT SECTIONS - DIRECT BURIED Not to Scale

STATE RIGHT-OF-WAY BACKFILL NOTES

 Trench Backfill Material "A" Beach Sand, Earth, or Earth and Gravel. If Earth and Gravel used, the maximum shall contain not more than 50% by volume of rock particles. Maximum 8" loose fill per lift. Obtain 95% compaction for each lift.

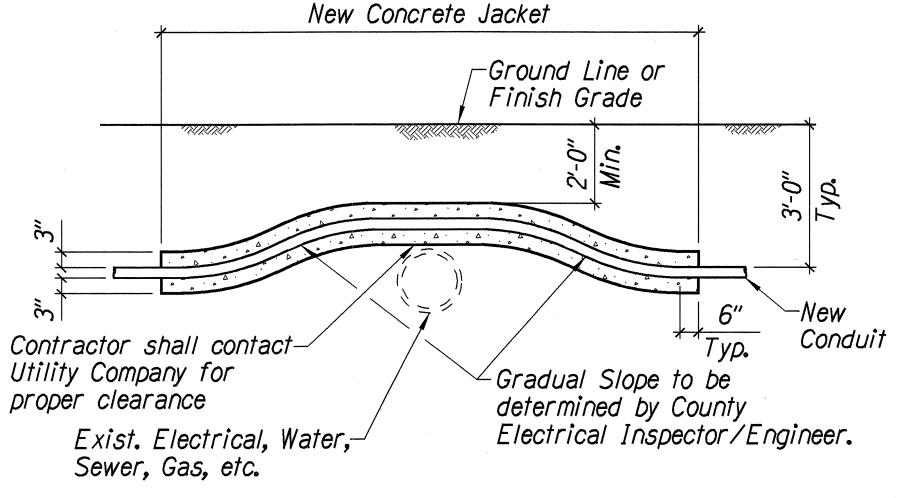
NOTE:

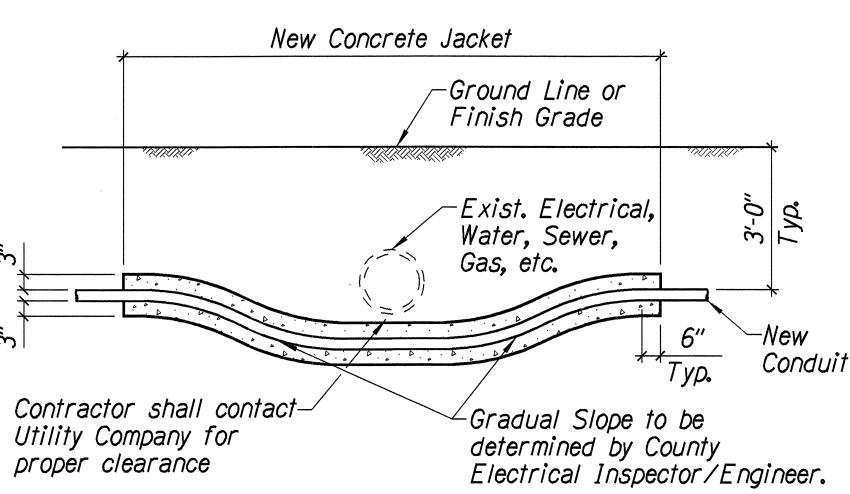
Base Course \$ Sub-Base Course per 1994 State Standard Specifications for Highway Construction.

<u>NOTES</u>

- 1. If trench is located on unpaved area, the Contractor shall replace 8" 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 1½" inches series "C" black lettering. The message will be repeated with a 4½" spacing between top line of message and start of next repeat.
- 3. The Contractor may begin backfilling the conduit trench when the concrete reaches 3000psi 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.

FED. ROAD DIST. NO. FISCAL SHEET TOTAL FED. AID PROJ. NO. HAW. STP-050-1(20) 2000 27

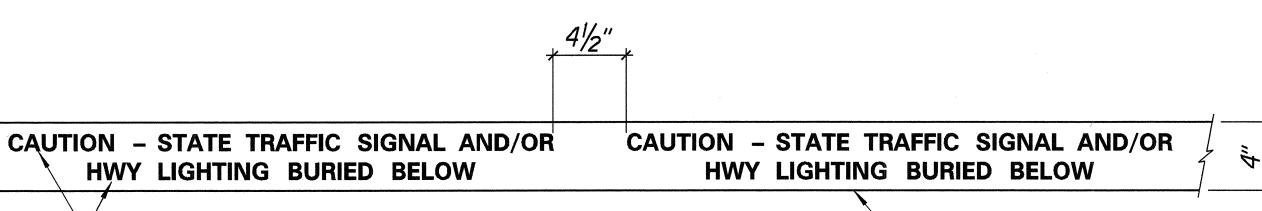




Note:

The Contractor shall provide 6" minimum clearance between water mains and the concrete jacket for traffic signal conduits.

CONDUIT BY-PASS DETAIL (4) AT VARIOUS UTILITIES Not to Scale



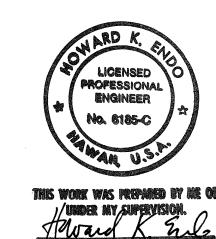
1½" series "C" Black Letters

5 mils thick (min.) Plastic Warning Tape

For additional information see note no. 2.

METALLIC DETECTABLE RED PLASTIC WARNING TAPE (3) Not to Scale

APPROVED: 2/14/00 Manager and Chilet Engineer, Dept. of Water Supply County of Kauai



DEPARTMENT OF TRANSPORTATION

TRAFFIC SIGNAL DETAILS

<u>Kaumualii Highway Traffic Signal</u> <u>Modernization at Various Locations</u> Federal-Aid Project No. STP-050-1(20)

Scale: As Shown

Date: Apr., 2000 SHEET No. 7 OF 7 SHEETS

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JUNDER MY SUPERVISION.

JUNIOR MY SUPERVISION.

ABUKURO, ENDO & YOSHIZAKI, INC.

1126 12th Avenue Honolulu, Hawaii 96816