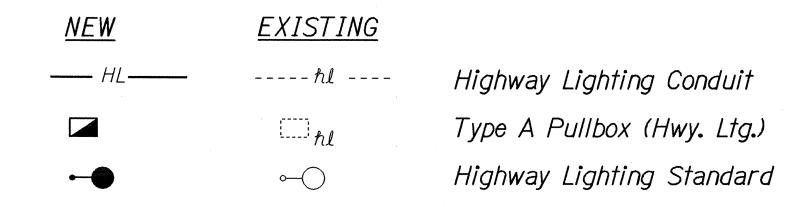
TRAFFIC SIGNAL NOTES

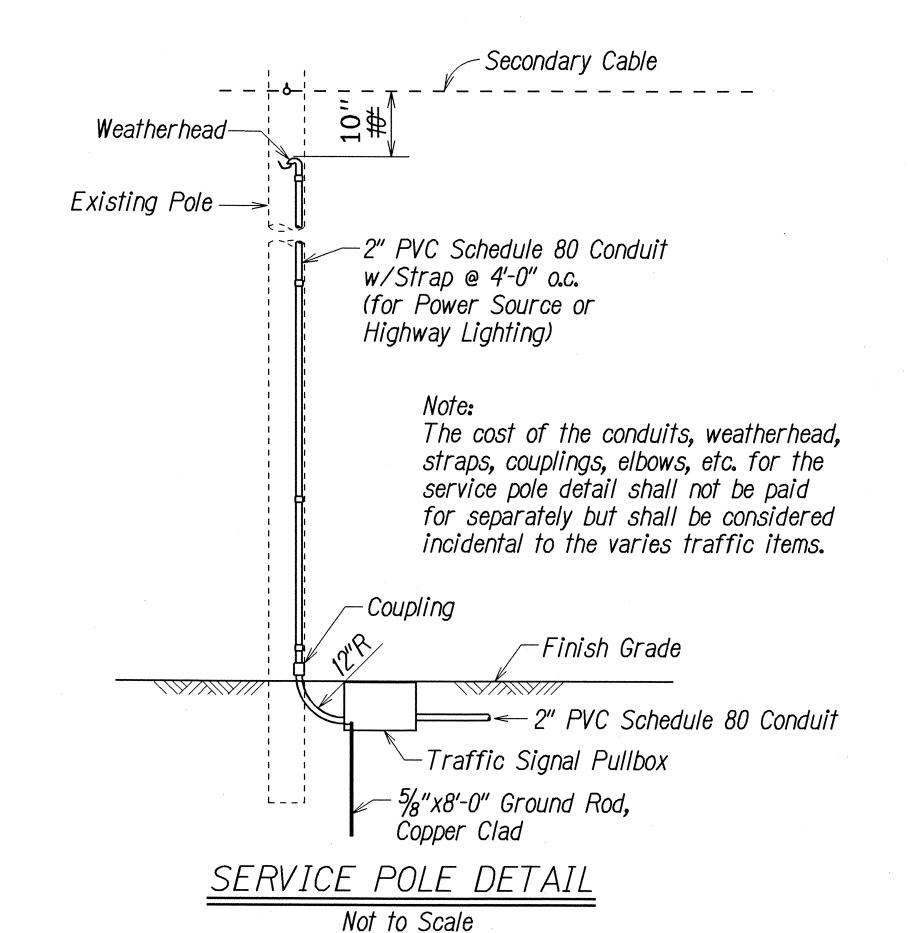
- 1. The locations of the Traffic Signal Standards, Traffic Signal Standards w/Mast Arms, Pedestrian Push Buttons, Traffic Controller, Pullboxes, Conduits and Loop Detectors shall be staked out in the field by the Contractor and approval of the locations shall be obtained from the Engineer prior to construction and installation.
- 2. All splicing shall be done in the pullboxes.
- 3. Furnishing and installing the conduit stubouts (pullboxes to edge of pavement) will not be paid for separately but shall be considered incidental to the various contract items.
- 4. A solid #8 bare copper wire shall be pulled with the traffic signal control cable for equipment ground. Cost shall be incidental to the installation of the control cable.
- 5. All Traffic signal controller equipment shall be completely wired in the cabinet and shall control the traffic signals as called for in the plans.
- 6. The loop amplifier units furnished for this project shall be capable of operating the loop detector configurations shown on the plans. Cost for the loop amplifier shall be incidental to the installation of the loop detector.
- 7. Should any defect be encountered during the warranty period, the manufacturer will be notified and he shall promptly correct such defect. Service call (by factory qualified representative) during the warranty period for repairs or other maintenance shall be answered within 24 hours and shall be done at no expense to the State. All repairs shall be done as soon as possible.
- 8. All traffic signal work shall conform to the requirements of the "Manual On Uniform Traffic Control Devices For Streets And Highways", Federal Highway Administration (1988) and Amendments.
- 9. Locations of traffic markings and markers (lane lines, Stop lines, crosswalk, etc.) shown on the plans shall be verified with the Engineer prior to the installation of the traffic signal system.
- 10. All Conduits between pullboxes and Traffic Signal/Highway Lighting Standards shall not be paid for separately but shall be considered incidental to the various contract items.
- 11. All Signal-Drop Cables (Type 5 Cables) from the various Types of Traffic Signal Head on the traffic signal standards and mast arms to the pullboxes shall not be paid for separately but considered incidental to the Traffic Signal Head.
- 12. 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.
- 13. After installing the Traffic Signal System, the Contractor shall apply grease to all parts of the Traffic Signal System (i.e. fittings, brackets, nipples, elbows, screws, signal head assemblies, bolts, hinges, etc.) as directed by the Traffic Signal Inspector, to prevent rust and corrosion. The grease material shall be approved by the Signal Inspector, and shall not be paid for separately but considered incidental to the various Traffic Signal items.
- 14. Connecting into existing traffic signal system and making all necessary adjustments shall not be paid for separately, but considered incidental to the various traffic signal contract items.
- 15. The Contractor shall notify the Traffic Signal Branch, Department of Transportation Services, City & County of Honolulu, (phone no. 523-4589) two weeks prior to commencing any work on the traffic signal system.
- 16. The Department of Transportation Services, City & County of Honolulu, will assist the Engineer in construction inspection for the traffic signal system. The Contractor shall notify the Electrical and Maintenence Services Division, Department of Transportation Services, three (3) working days prior to commencing work on the traffic signal system (phone no. 523-4589).

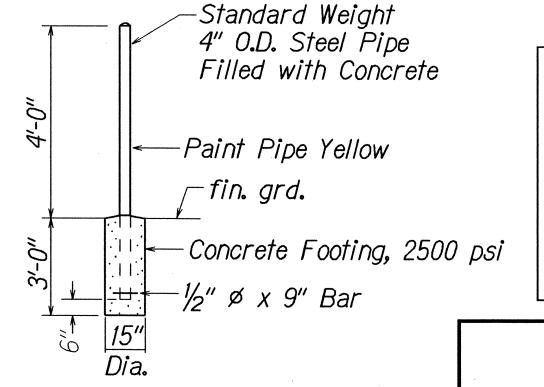
17. The concrete jacket for the Conduit By-Pass Details shown on Sheet X, shall not be paid for separately but considered incidental to the various contract items. The Engineer shall determine if a concrete jacket is required.

FED. ROAD DIST. NO. FISCAL SHEET TOTAL YEAR NO. SHEETS STATE PROJ. NO. 99C-01-00 2002 | 11 HAW.

HIGHWAY LIGHTING LEGEND







AS-BUILT POSTINGS \sim

NOTE: Cost of the conc. filled galvanized pipe guard shall be incidental to other items of work.

> TYPICAL PIPE GUARD ELEVATION DETAIL Not to Scale

100.00 Roadway **DEPARTMENT OF TRANSPORTATION**

> HIGHWAYS DIVISION TRAFFIC SIGNAL LEGEND AND NOTES

STATE OF HAWAII

LEGEND FOR

posting

Squiggly line for as-built deletion

as-built deletion

Text for as-built

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KAMEHAMEHA HIGHWAY Intersection Improvements at Kamananui Road Project No. 99C-01-00

Date: Oct. 2001 OF 8 SHEETS SHEET No. 1

TRAFFIC SIGNAL LEGEND

NEW **EXISTING** Traffic Signal Conduit $\sqrt{1}$ $\sqrt{2}$ $\sqrt{3}$ $\sqrt{1}$ $\sqrt{2}$ $\sqrt{3}$ Conduit Run Numbers Equipment description, installation A B C (A) (B) (C) or item no. Traffic Signal Master Controller M/ M Door Indicates Front of Cabinet Traffic Signal Controller Door Indicates Front of Cabinet 00 0 0 Meter Pedestal 12" RYG Traffic Signal Head 12" RY↑ Traffic Signal Head 12" RY← Traffic Signal Head 4 12" RY← Traffic Signal Head (Programmed Visibility) 12" RYG $\stackrel{G}{\checkmark_{Y}}$ Fiber Optic Traffic Signal Head Type I Standard and Attached Signals

> Type II Standard with Signal Mast Arm and Attached Signals (Nos. indicates mast arm length ♦ distance between signal heads as specified on plans)

> Type III Standard with Luminaire and Signal Mast Arm and Attached Signals (Nos. indicates mast arm lengths ♦ distance between signal heads as specified on plans)

Flashing Beacon, One Signal Section, "Y" indicates 12" Yellow Lens

Opticom Receiver (Arrow indicates direction detector faces)

Pipe Guard

Pedestrain Signal Head

Type A Pullbox

Type B Pullbox [...] topb [...] topb

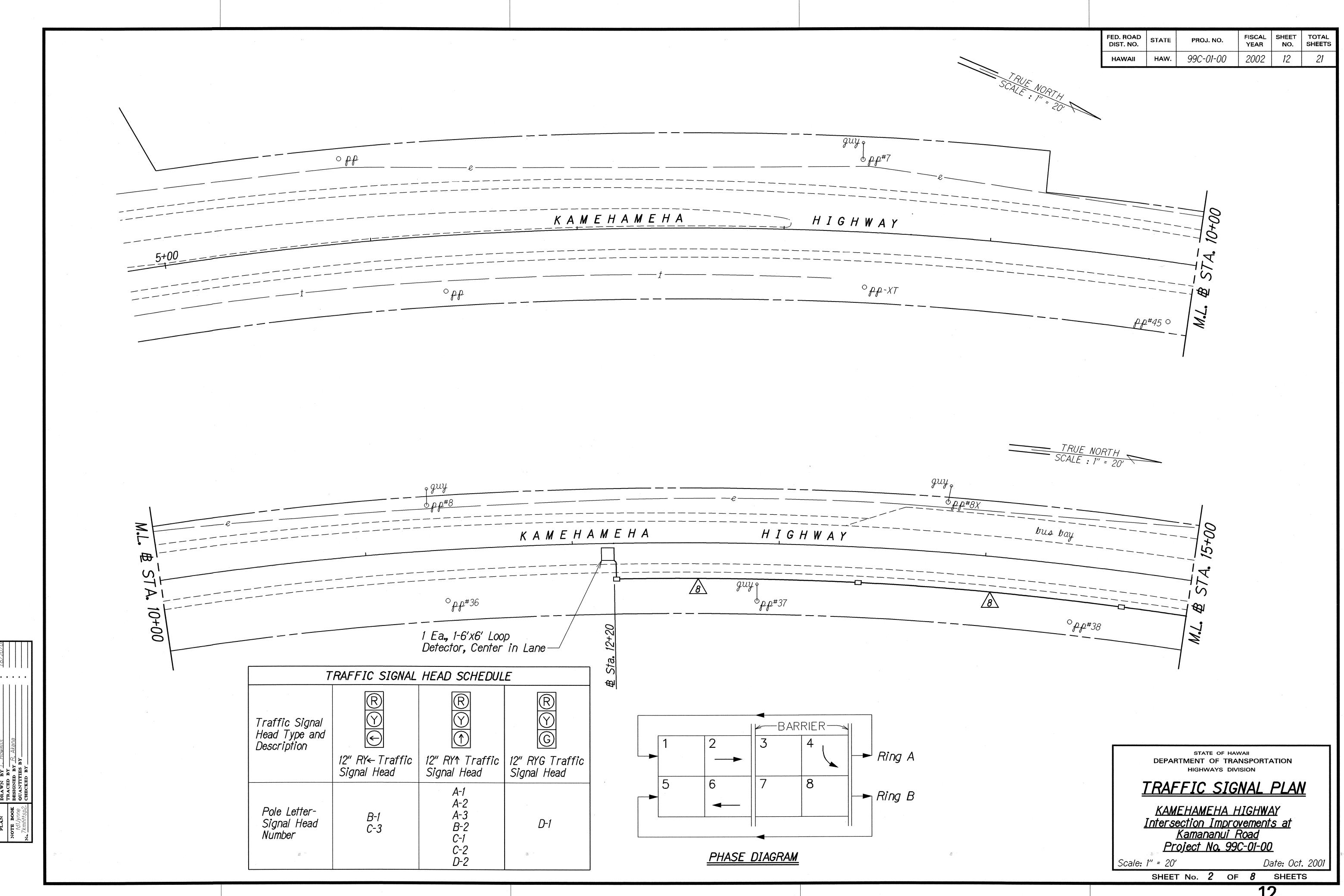
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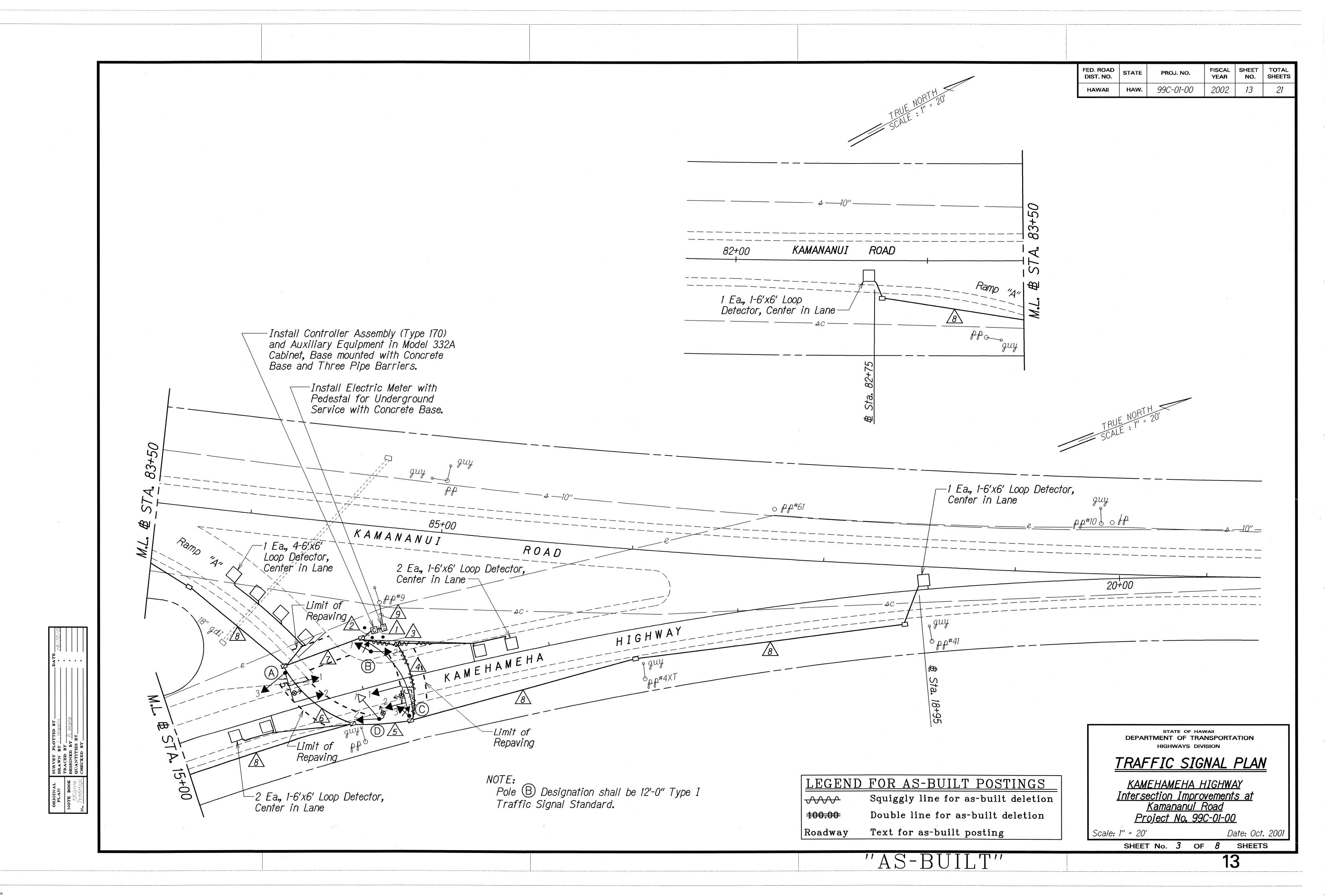
*(8)

[...] topb

Type C Pullbox Loop Detectors

SURVEY
DRAWN
TRACED
DESIGNE
QUANTIT





D1 - Traffic Design Section

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	99C-01-00	2002	14	21

	$\triangle \uparrow$	Conduits (Conc. Encased)	Cable	
•		2"	1 - 3c #6 (Type 6)	

2	Conduits	Cable
	2" 2" 2" 2" 2"	1 - 26c #14 (Type 1) 1 - 26c #14 (Type 1) 4 - 2c #14 (Type 2) 2 - 2c #14 (Type 2) 3 - 3c #20 (Type 7) 1 - Spare

3	Conduits	Cable	
	2" 2" 2" 2"	1 - 26c #14 (Type 1) 2 - 2c #14 (Type 2) 2 - 3c #20 (Type 7) 1 -Spare	

4	Conduits (Conc. Encased)	Cable	
	2" 2" 2" 2"	1 - 26c #14 (Type 1) 2 - 3c #20 (Type 7) 1 -2c #14 (Type 2) 1 -Spare	

5	Conduits (Conc. Encased)	Cable
	2" 2" 2"	1 - 26c #14 (Type 1) 1 - 3c #20 (Type 7) 1 - Spare

6	Conduits (Conc. Encased)	Cable
	2" 2" 2"	1 - 26c #14 (Type 1) 2 - 2c #14 (Type 2) 1 - Spare

<u>/</u> 7	<u>. </u>	Conduits (Conc. Encased)	Cable
		2" 2" 2" 2"	1 - 26c #14 (Type 1) 4 - 2c #14 (Type 2) 1 - 3c #20 (Type 7) 1 - Spare

	8	Conduits	Cable
•		2"	1 - 2c #14 (Type 2)

	9	Conduits (Conc. Encased)	Cable	
•		2"	HECO Cable	

LEGEND FOR AS-BUILT POSTINGS Squiggly line for as-built deletion 100.00 Double line for as-built deletion Text for as-built posting

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL SCHEDULE

KAMEHAMEHA HIGHWAY
Intersection Improvements at
Kamananui Road
Project No. 99C-01-00

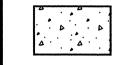
Date: Oct. 2001

SHEET No. 4 OF 8 SHEETS

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.



Concrete 3000 psi compressive strength @ 3 days.

NOTE: Base Course ♦ Sub-Base Course per 1994 State Standard Specifications for Highway Construction.

GENERAL NOTES

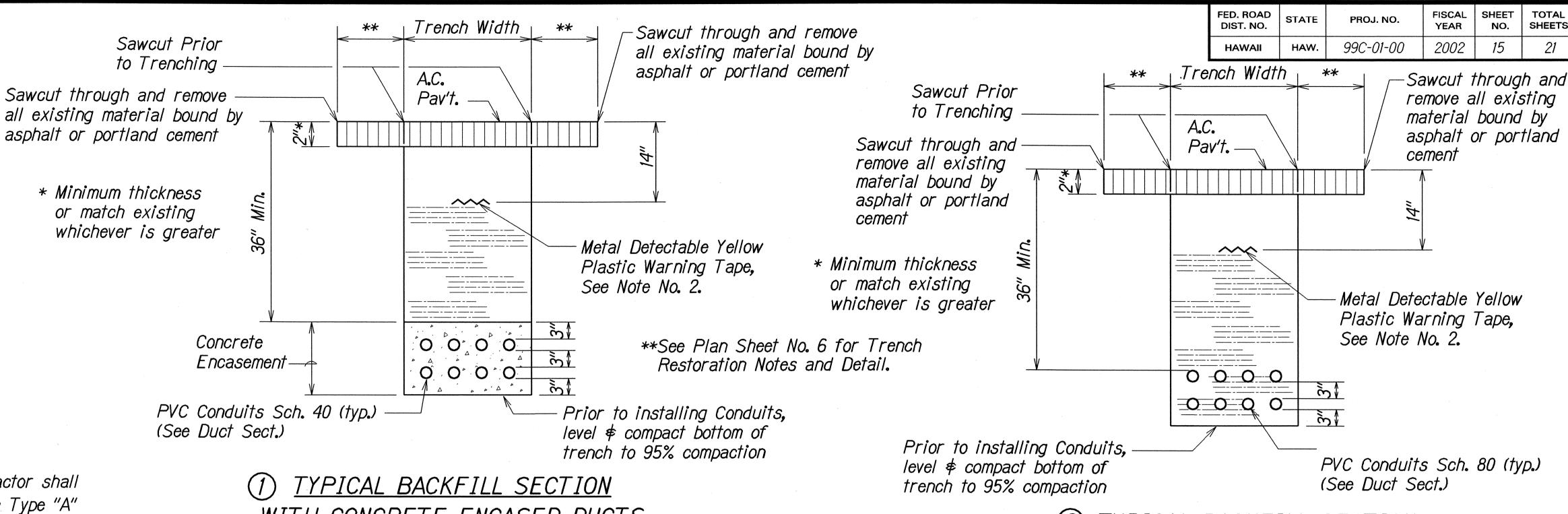
Black Letters

- 1. If trench is located on unpaved area, the Contractor shall replace A.C. Base Course and A.C. Pavement with Type "A" backfill material.
- 2. The Metal Detectable Yellow 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 inches series "C" black lettering. The message will be repeated with a 41/4" 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.
- 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.

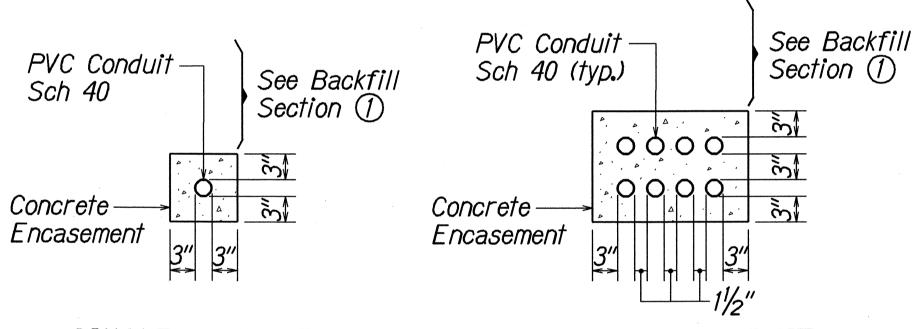
CAUTION-STATE TRAFFIC SIGNAL AND/OR / HWY LIGHTING BURIED BELOW CAUTION-STATE TRAFFIC SIGNAL AND/OR HWY LIGHTING BURIED BELOW ∠5 mils thick (min.) 1½" series "C" Plastic Warning Tape

For additional information see note no. 2.

METAL DETECTABLE YELLOW PLASTIC WARNING TAPE

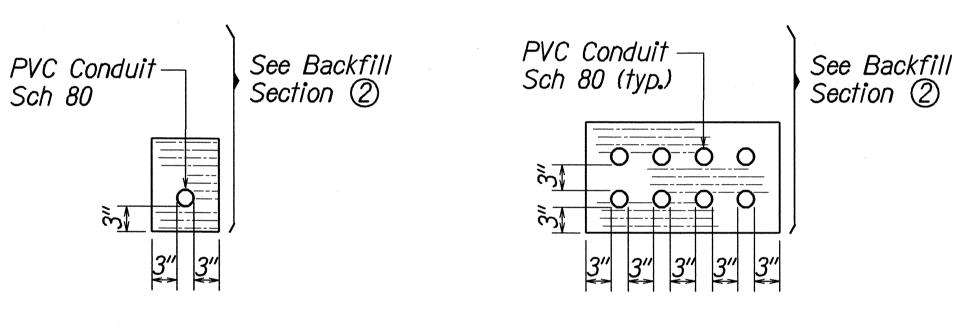


WITH CONCRETE ENCASED DUCTS

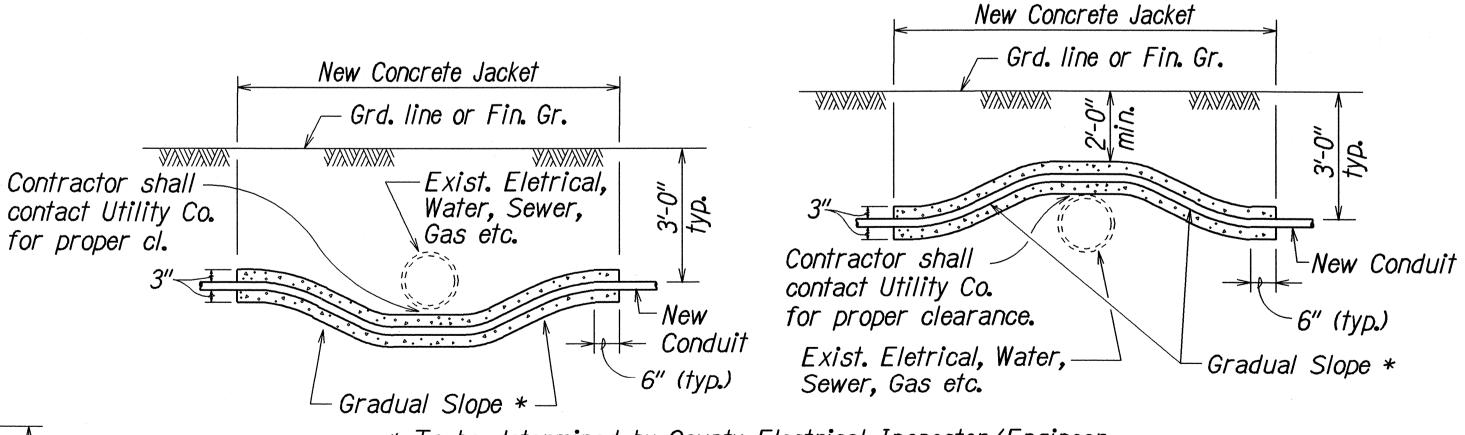


SINGLE CONDUIT MULTIPLE CONDUIT DUCT SECTIONS - CONC. ENCASED

TYPICAL BACKFILL SECTION DIRECT BURIED DUCTS



SINGLE CONDUIT MULTIPLE CONDUIT <u>DUCT SECTIONS - DIRECT BURIED</u>



* To be determined by County Electrical Inspector/Engineer CONDUIT BY-PASS DETAIL AT VARIOUS UTILITIES

Not to Scale

DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS

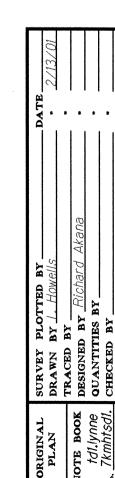
KAMEHAMEHA HIGHWAY Intersection Improvements at Kamananui Road Project No. 99C-01-00

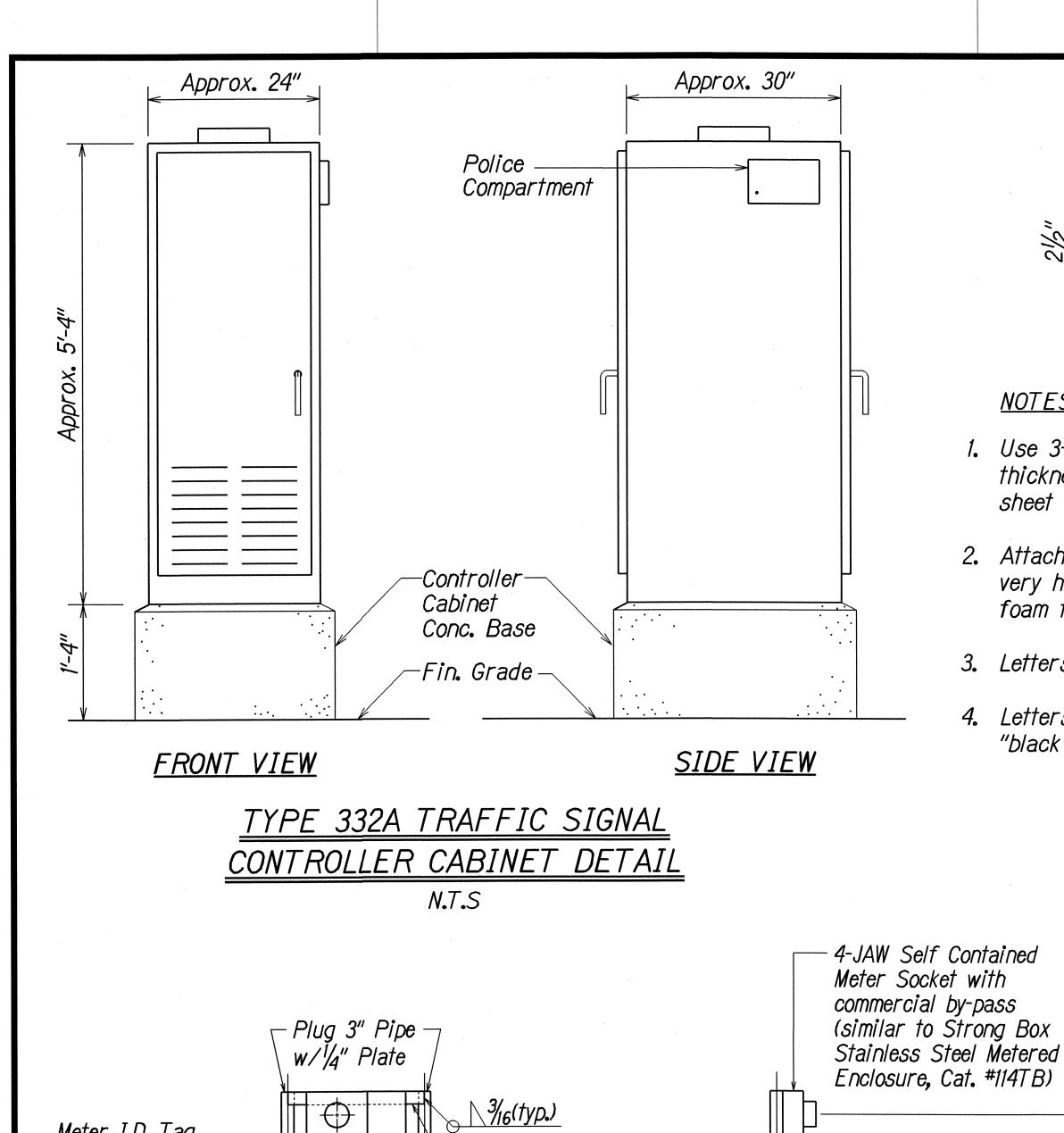
Not to Scale

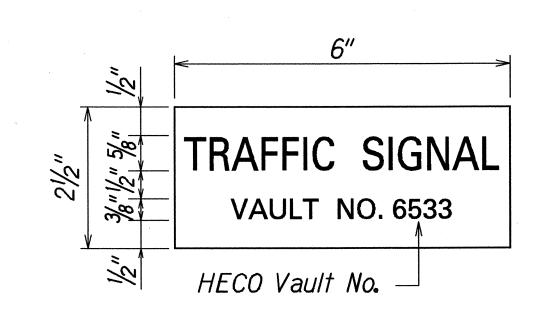
SHEET No. 5 OF 8 SHEETS

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Date: Oct. 2001



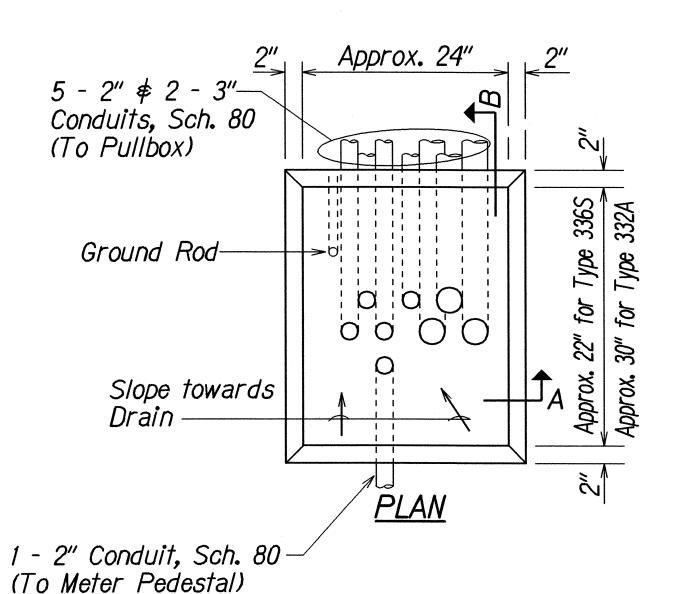




NOTES:

- 1. Use 3-ply laminated flexible plastic, black-white-black thickness: black cap sheet - 0.010", white base sheet - 0.052", black base sheet - 0.010".
- 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.

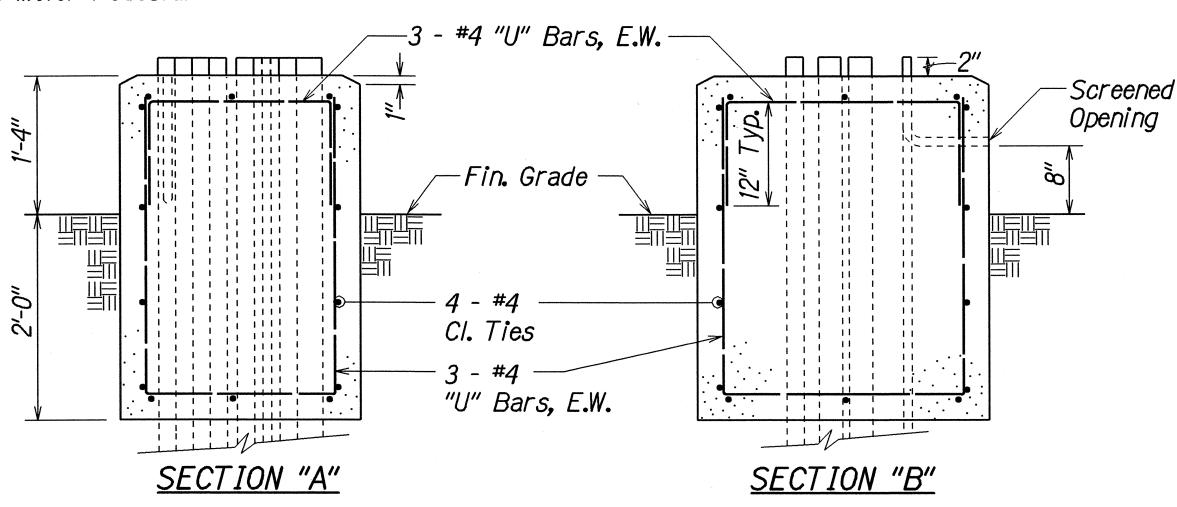
METER ID TAG DETAIL N.T.S



FISCAL YEAR SHEET NO. FED. ROAD DIST. NO. PROJ. NO. 99C-01-00 2002 HAWAII HAW.

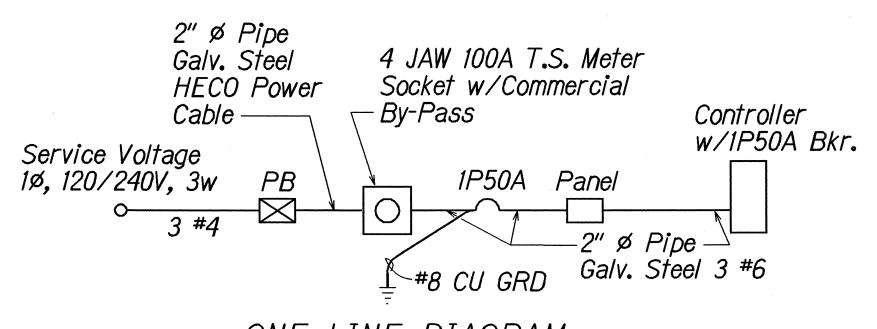
NOTES:

- Concrete shall be class "B".
- 2. Dimensions shall be altered to suit controller cabinet actually furnished.
- Conduits bends and drain are incidental to concrete base
- 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.



CONTROLLER CABINET CONCRETE BASE

N.T.S



ONE LINE DIAGRAM

STATE OF HAWAII

CONTROLLER CABINET DETAILS

KAMEHAMEHA HIGHWAY Intersection Improvements at Kamananui Road Project No. 99C-01-00

DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION

Date: Oct. 2001 Not to Scale

SHEET No. 6 OF 8

Meter I.D. Tag (see det. this sht.) -- 2½"x2¼"x¼"L Stainless Steel Welded to Pipe 6"Dx10"Wx12"H Meter Enclosure Pullbox Pullbox (Stainless Steel) –3"ø Pipe Galv. Steel NEMA 4X* --2" ø Pipe Galv. Steel-#8 Cu Grd. Wire - Conc. Base 2500 psi -1/2" C, #8 Grd. -Coupling 👸 Exist. Gr. Thermoweld 5/8"øx8' Long Copperweld -Grd. Rod Coupling (typ.) -To Traffic (typ.) -2" ø PVC, Sch. 40-90° Bend, 36" Radius Controller 2" PVC Conduit, Sch. 40 -2" PVC, Sch. 40 To Power Conc. Encased Conc. Encased Source or Pullbox FRONT ELEVATION SIDE ELEVATION

METER PEDESTAL FOR UNDERGROUND SERVICE

N.T.S.

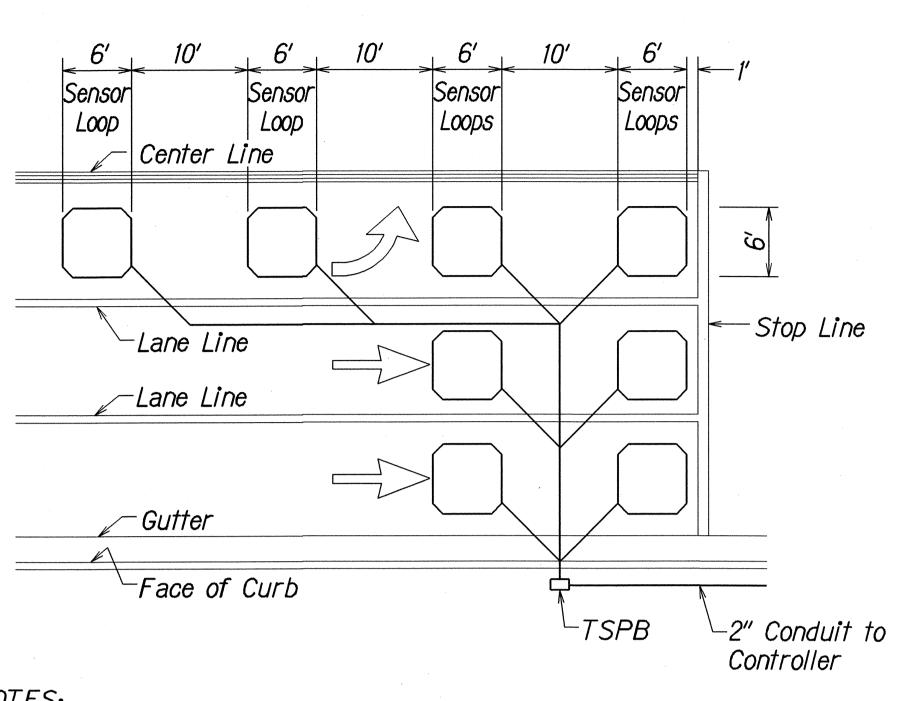
NOTES:

- Contractor shall make all electrical connections to controller, provide 2-IP50A breaker, ground and concrete-encased 2" conduit.
- 2. All conduits to contain a polyolefin pull line (Jet Line cat. #232 or equivalent).
- 3. Pedestal conduits shall be hot-dipped galv. after fabrication.
 - a. All fastening bolts, nuts & washers shall be stainless steel.
 - b. Provide 4' cl. in front of meter.
 - c. * Sealable enclosure 6"Dx10"Wx12"H.

ELECTRICAL SERVICE DETAIL

16

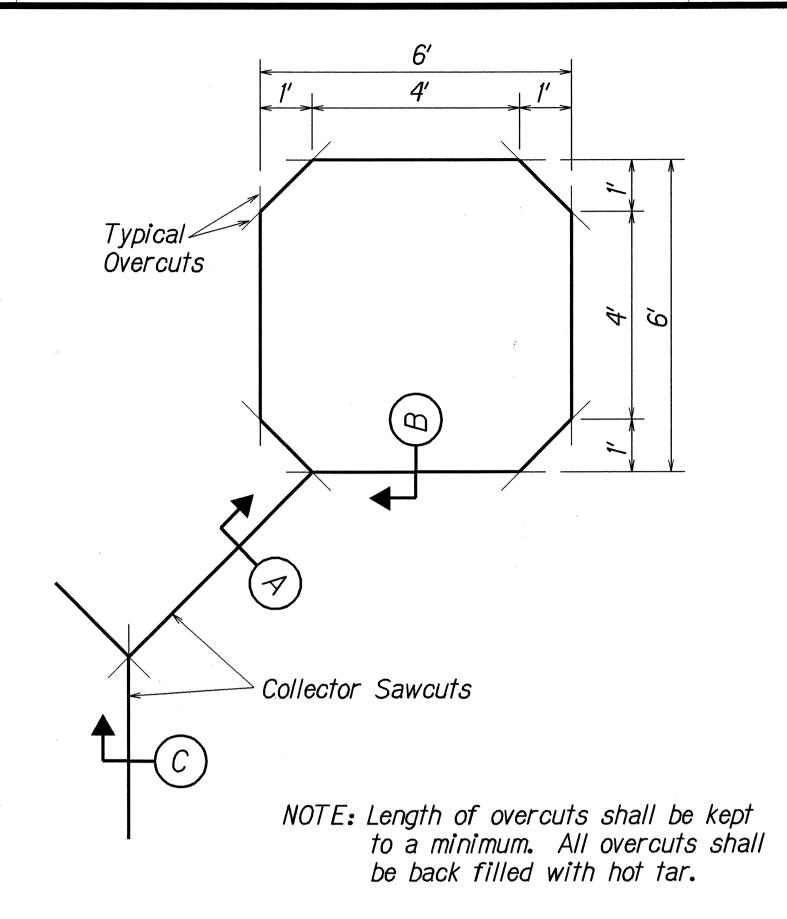
SHEETS



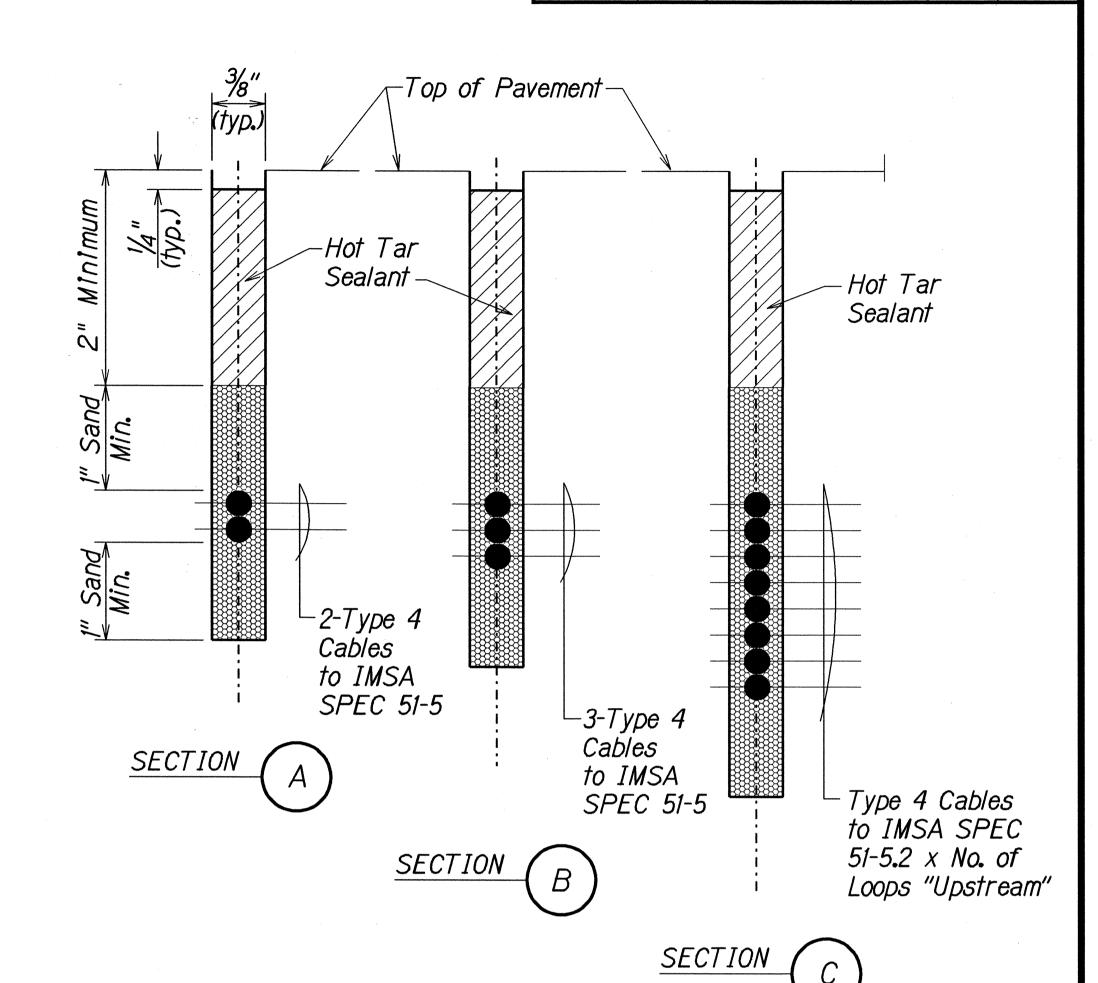
NOTES:

- 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



TYPICAL SENSOR LOOP SAWCUT DETAIL



FED. ROAD DIST. NO.

HAW.

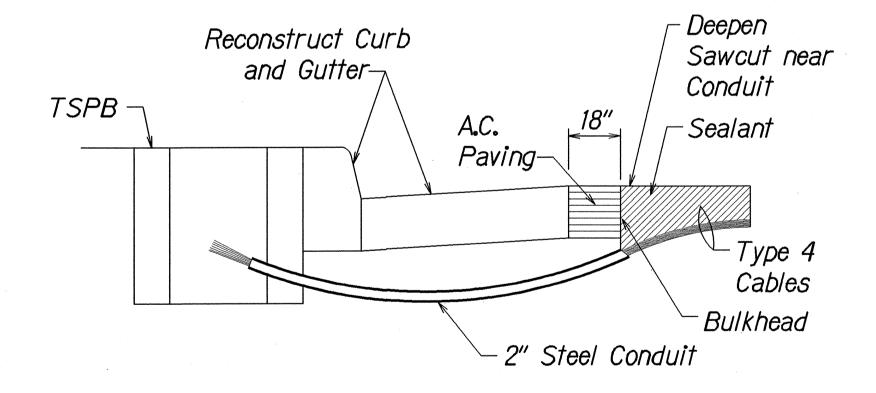
FISCAL SHEET YEAR NO.

2002

PROJ. NO.

99C-01-00

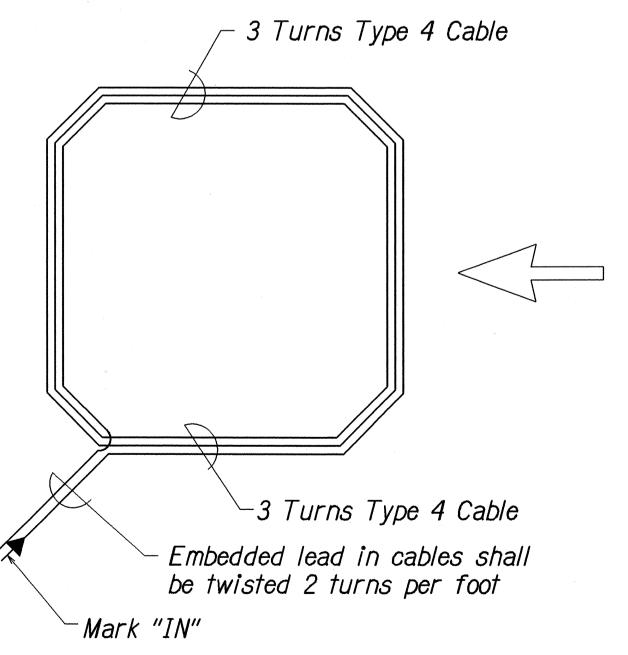
TYPICAL SECTION THROUGH SENSOR LOOP



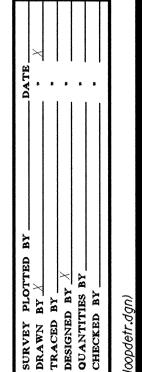
NOTES ON CONSTRUCTION AT END OF SAWCUT

- 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



TYPICAL SENSOR LOOP WIRING DIAGRAM



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

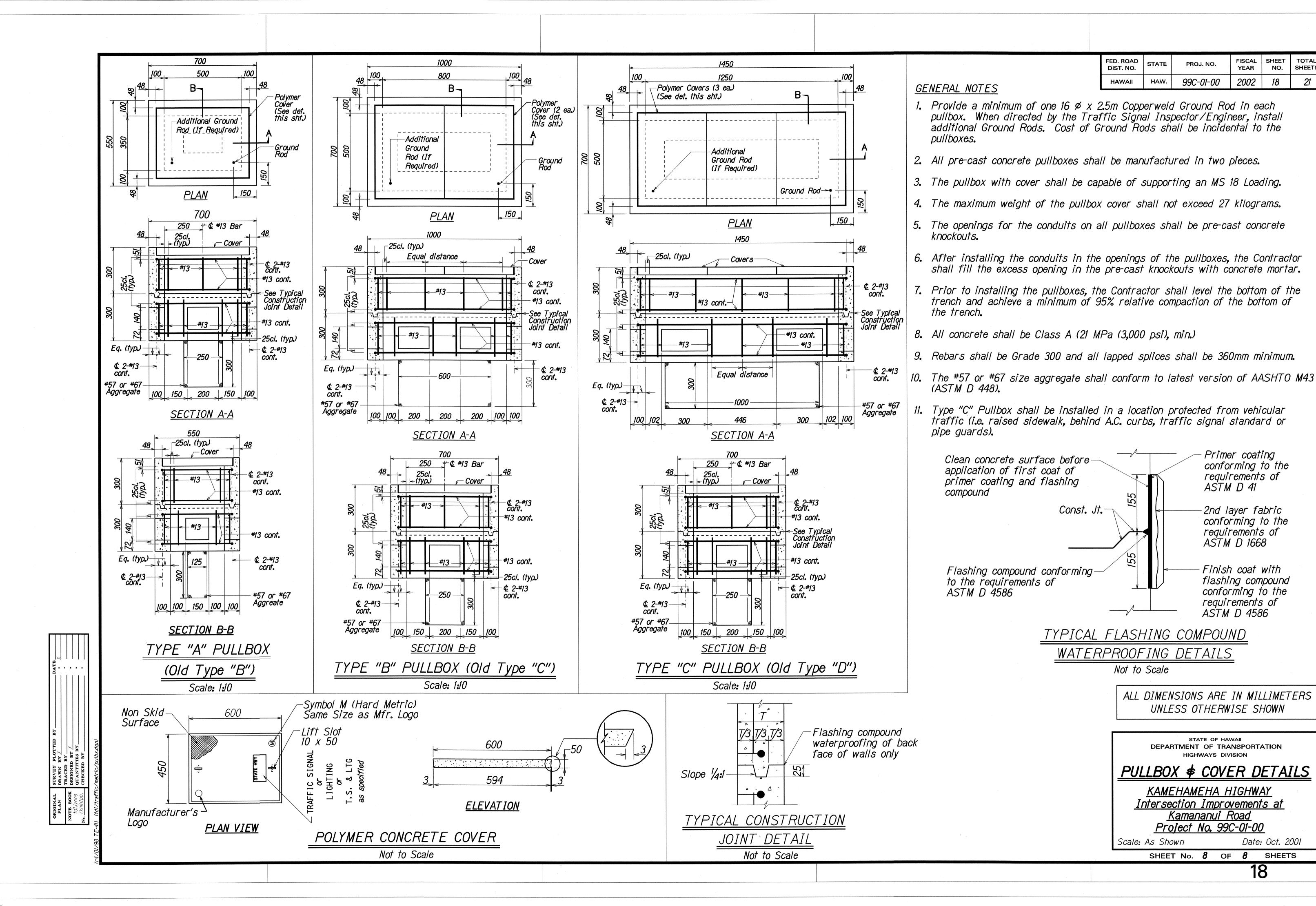
LOOP DETECTOR DETAILS

KAMEHAMEHA HIGHWAY
Intersection Improvements at
Kamananui Road
Project No. 99C-01-00

Not to Scale

Date: Oct. 2001

SHEET No. 7 OF 8 SHEETS



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Date: Oct. 2001

SHEETS

FISCAL SHEET YEAR NO.

18

2002