FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	7101A-02-99	2000	21	32

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.
14. Connecting into existing and or new 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 Control 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. 527-5007).

TRAFFIC SIGNAL NOTES (CONTINUED)

17. Existing Traffic Signal Poles, Pullboxes, Mast Arms, Signal Heads and Pedestrian Push Buttons with Signs, which are removed and not incorporated into the new Traffic Signal System shall be disposed of or salvaged as determined by the Engineer. Salvable materials shall be delivered to C&C of Honolulu, DTS, Traffic Signals Section, 160 Koula St., Honolulu, Hawaii. Cost of removing, disposing and delivering shall be incidental to the various Traffic Signal Items.
18. The Traffic Signals shall be kept operational during construction. Any relocation required shall be approved by the Electrical and Maintenance Services Division, Department of Transportation Services, and paid for by the Contractor.
19. Existing Cables which are removed and not incorporated into the new Traffic Signal System shall be disposed of as directed by the Engineer. Removal and disposal shall be considered incidental to the various Traffic Signal Items.
20. Existing conduits not to be incorporated in the new Traffic Signal System shall remain in place unless otherwise noted on plans or directed by the Engineer.

TRAFFIC SIGNAL LEGEND

NEW	EXISTING	
———	- - - - - - - - - -	Traffic Signal Conduit
1 2 3	1 2 3	Conduit Run Numbers
A B C	A B C	Equipment description, installation or item no.
M	M	Traffic Signal Master Controller Door Indicates Front of Cabinet
C	C	Traffic Signal Controller Door Indicates Front of Cabinet
		Meter Pedestal
		12" RYG Traffic Signal Head
		12" RY↑ Traffic Signal Head
		12" RY← Traffic Signal Head
		12" RY← Traffic Signal Head (Programmed Visibility)
		Type I Standard and Attached Signals
24' 12'		Type II Standard with Signal Mast Arm and Attached Signals (Nos. indicates mast arm length & distance between signal heads as specified on plans)
		Opticom Receiver (Arrow indicates direction detector faces)
		Pipe Guard
		Pedestrain Signal Head
	tspb	Type A Pullbox
	tspb	Type B Pullbox
	tspb	Type C Pullbox
		Loop Detectors

ORIGINAL PLAN

NOTE BOOK dd/dy mm/dd/yy

SURVEY PLOTTED BY DATE
DRAWN BY X
TRACED BY
DESIGNED BY X
QUANTITIES BY
CHECKED BY

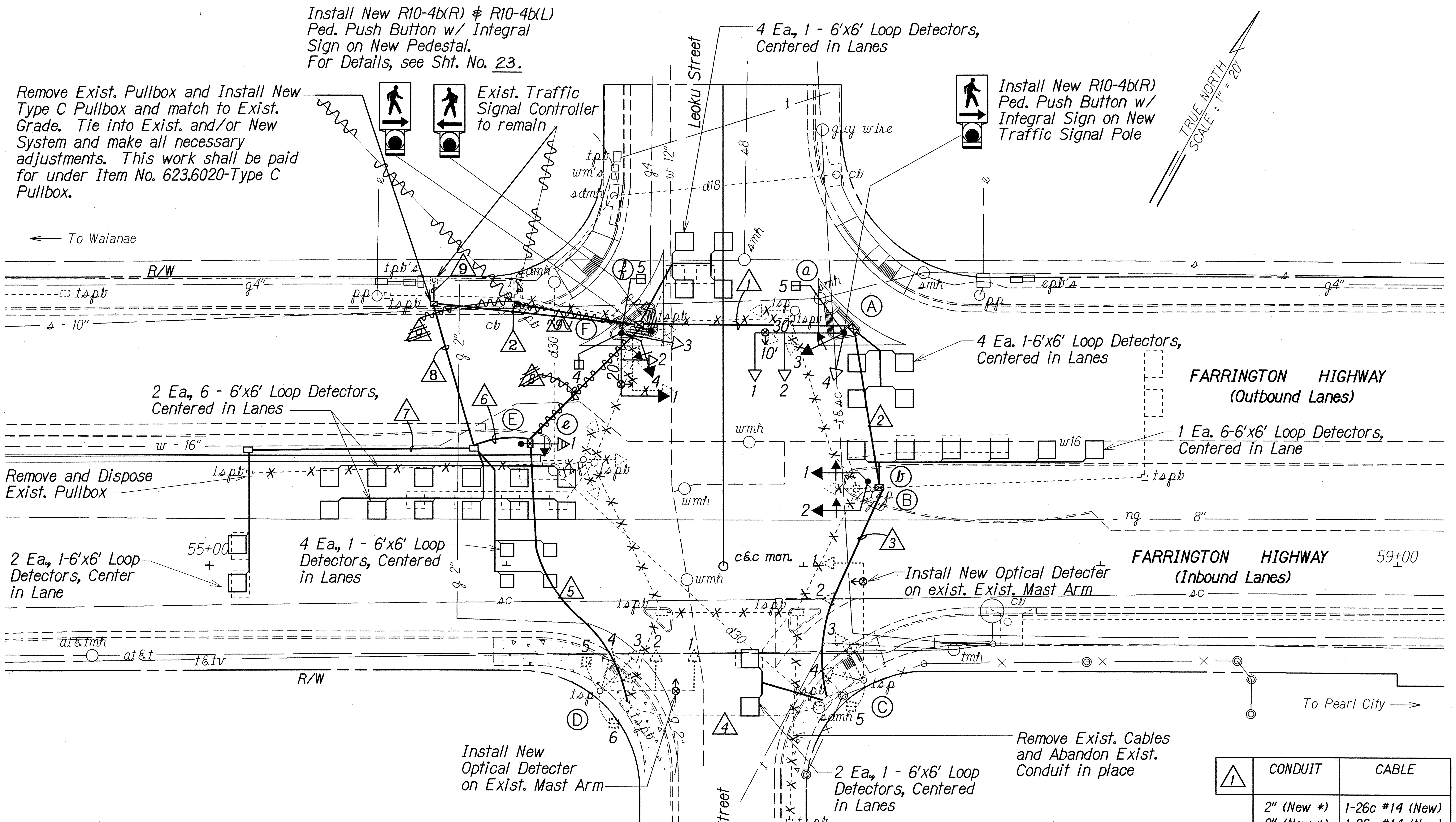
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL LEGEND AND NOTES

FARRINGTON HIGHWAY
Intersection Improvements at Leoku Street
Project No. 7101A-02-99
Date: April, 2000

SHEET No. T3 OF 8 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	7101A-02-99	2000	22	32



△3 CONDUIT	CABLE
2" (New *)	1-26c #14 (New)
2" (New *)	1-26c #14 (New)
2" (New *)	Spare

△4 CONDUIT	CABLE
2" (Exist.)	1-26c #14 (New)
2" (Exist.)	1-26c #14 (Exist.)
2" (Exist.)	1-26c #14 (Exist.)
2" (Exist.)	1-3c #20 (New)

△5 CONDUIT	CABLE
2" (New *)	1-26c #14 (New)
2" (New *)	1-26c #14 (New)
2" (New *)	3-2c #14 (New)
2" (New *)	2-3c #20 (New)
2" (New *)	Spare

△6 CONDUIT	CABLE
2" (New)	4-2c #14 (New)

△7 CONDUIT	CABLE
2" (New)	1-2c #14 (New)

△8 CONDUIT	CABLE
2" (New *)	1-26c #14 (New)
2" (New *)	1-26c #14 (New)
2" (New *)	4-2c #14 (New)
2" (New *)	3-2c #14 (New)
2" (New *)	2-3c #20 (New)
2" (New *)	Spare

△9 CONDUIT	CABLE
2" (New *)	1-26c #14 (New)
2" (New *)	1-26c #14 (New)
2" (New *)	1-26c #14 (New)
2" (New *)	1-26c #14 (New)
2" (New *)	4-2c #14 (New)
2" (New *)	4-2c #14 (New)
2" (New *)	4-2c #14 (New)
2" (New *)	4-3c #20 (New)
2" (New *)	Spare

△1 CONDUIT	CABLE
2" (New *)	1-26c #14 (New)
2" (New *)	1-26c #14 (New)
2" (New *)	4-2c #14 (New)
2" (New *)	1-3c #20 (New)
2" (New *)	Spare

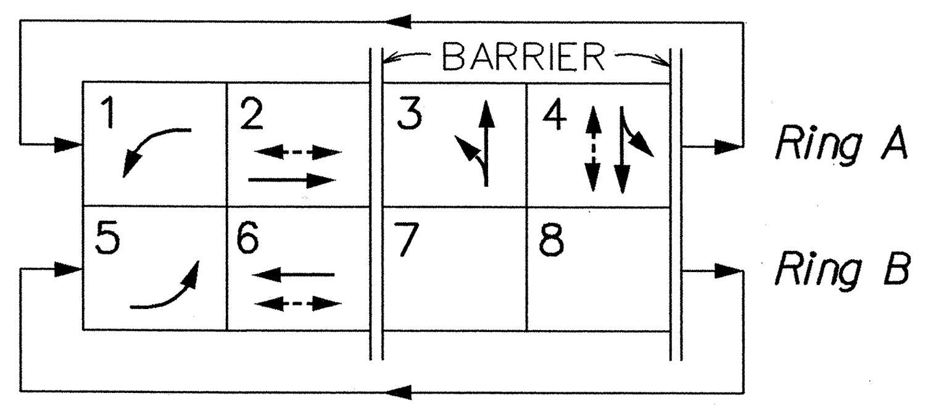
△2 CONDUIT	CABLE
2" (New *)	1-26c #14 (New)
2" (New *)	1-26c #14 (New)
2" (New *)	2-2c #14 (New)
2" (New *)	Spare

* Concrete Encased

TRAFFIC SIGNAL HEAD SCHEDULE

Traffic Signal Head Type and Description	12" RYG Traffic Signal Head	12" RY↑G Traffic Signal Head	12" RY←G Traffic Signal Head	Pedestrian Signal Head
Pole Letter Signal Head Number	A-1 A-2 A-4 C-2 (exist.) C-4 (exist.) D-1 (exist) D-2 (exist) D-4 (exist.) F-2 F-3	C-1 (exist.) F-1	A-3 B-1 B-2 C-3 (exist.) D-3 (exist.) E-1* F-4	A-5 C-5 (exist.) D-5 (exist.) D-6 (exist.) F-4 F-5

* With Programmed Visibility



PHASE DIAGRAM

NOTE:

1. Remove all existing signal standards, mast arms, signal & pedestrian heads, pullboxes, and foundations with poles designated ⓐ, ⓑ, ⓔ, & ⓕ not part of the new traffic signal system.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL PLAN

FARRINGTON HIGHWAY
Intersection Improvements at Leoku Street
Project No. 7101A-02-99

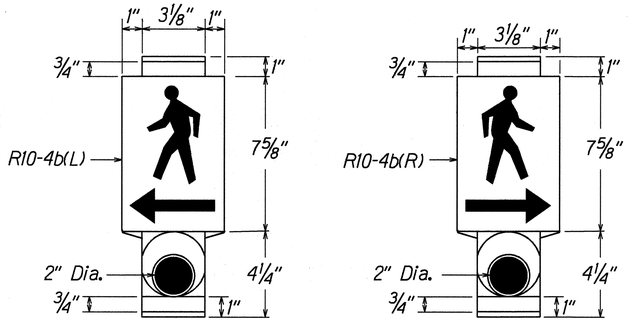
Scale: 1"=20'   Date: April, 2000

SHEET No. T4 OF 8 SHEETS

ORIGINAL PLAN		DATE
SURVEY PLOTTED BY		10/7/99
DRAWN BY	R. Arii	
TRACED BY		
DESIGNED BY	S. Yoshida	
QUANTITIES BY		
CHECKED BY		
NOTE BOOK	fd/ruby m/arts	

"AS-BUILT"

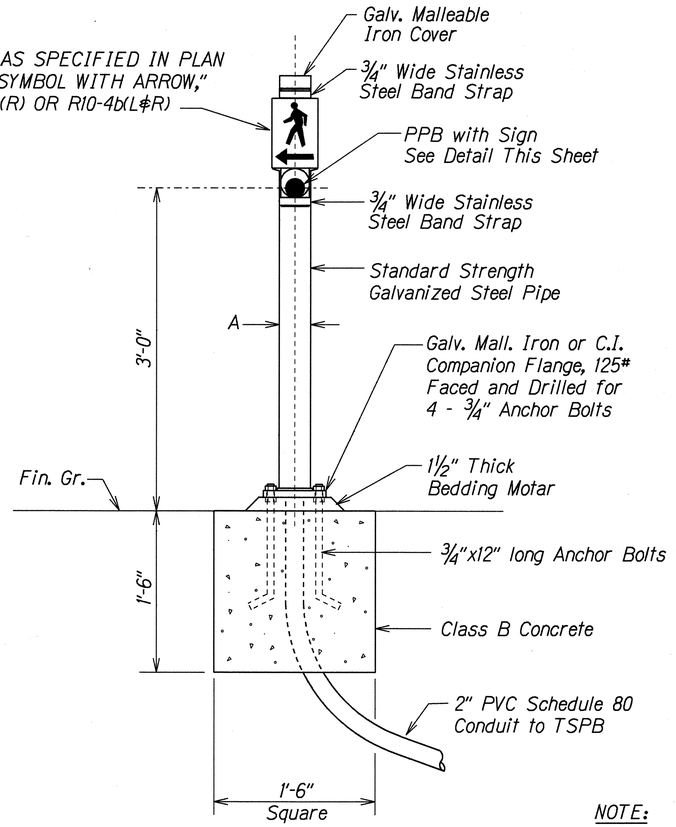
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	7101A-02-99	2000	23	32



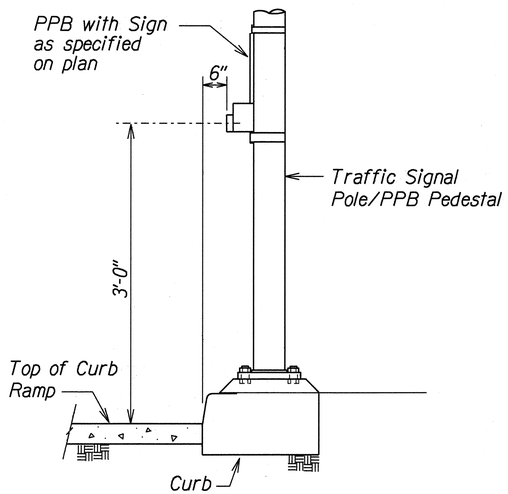
Left Right

PEDESTRIAN PUSH BUTTON WITH SIGN

Man, Arrow & Push Button - White
Background - Black



PPB POST AND FOOTING DETAIL

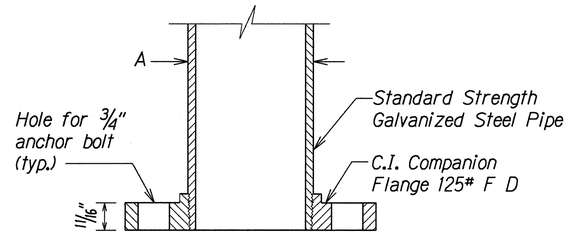


PEDESTRIAN PUSH BUTTON MOUNTING DETAIL

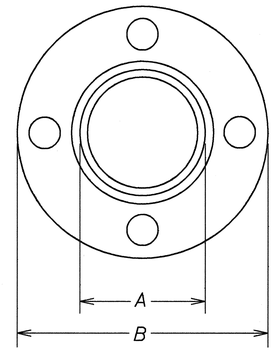
DATA TABLE FOR PPB POST		
AMOUNT OF PPB	DIMENSIONS	
	A	B
1	3 1/2"	8"
2→3	4 1/2"	9"

NOTE:

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



SECTION



TOP VIEW

FLANGE DETAIL

ORIGINAL PLAN
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE
NOTE BOOK

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

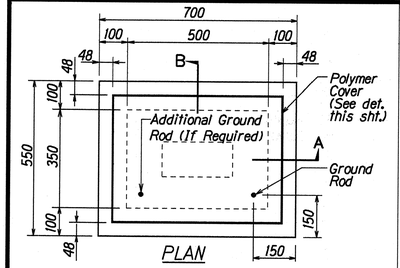
TRAFFIC SIGNAL SYSTEM
PEDESTRIAN PUSHBUTTON DETAILS

FARRINGTON HIGHWAY
Intersection Improvements at Leoku Street
Project No. 7101A-02-99

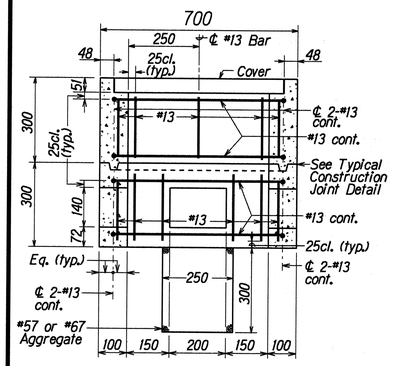
Scale: Not to scale Date: April, 2000

SHEET No. T5 OF 8 SHEETS

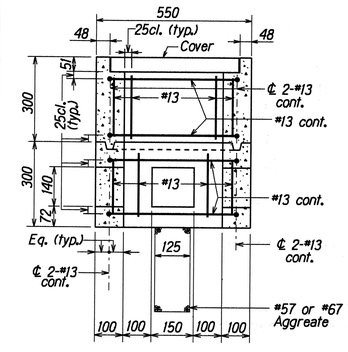
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	7101A-02-99	2000	24	32



PLAN



SECTION A-A

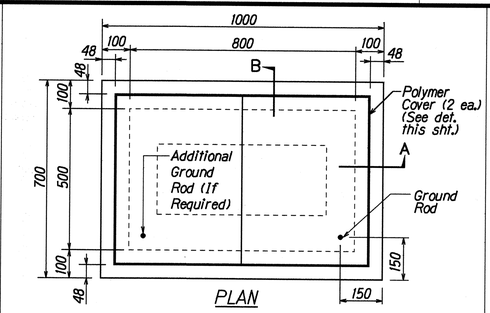


SECTION B-B

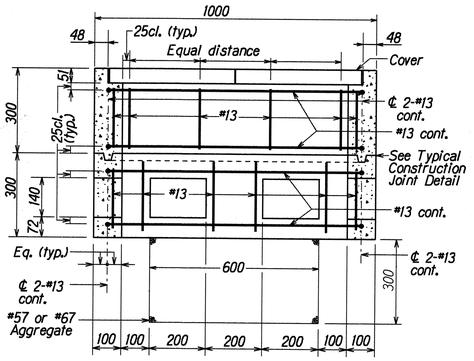
TYPE "A" PULLBOX

(Old Type "B")

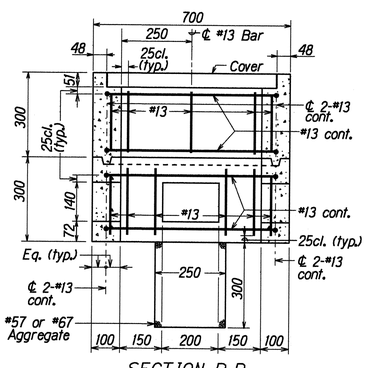
Scale: 1:10



PLAN



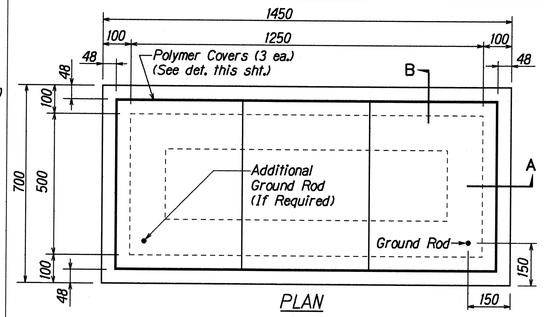
SECTION A-A



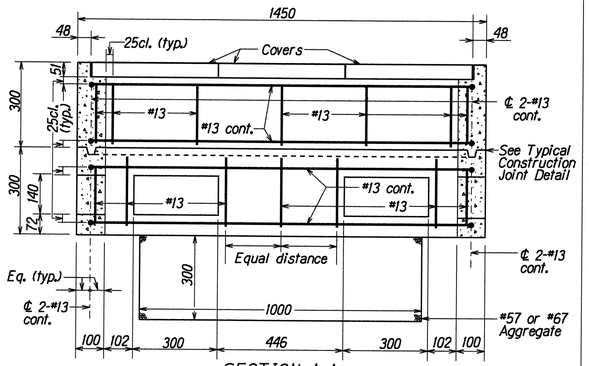
SECTION B-B

TYPE "B" PULLBOX (Old Type "C")

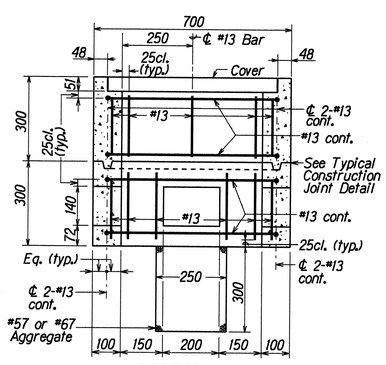
Scale: 1:10



PLAN



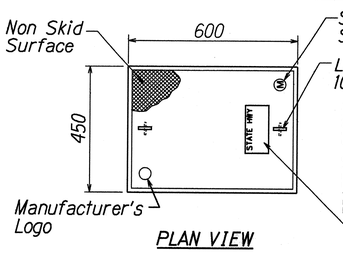
SECTION A-A



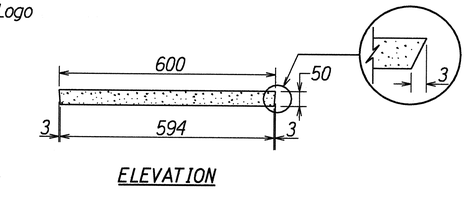
SECTION B-B

TYPE "C" PULLBOX (Old Type "D")

Scale: 1:10



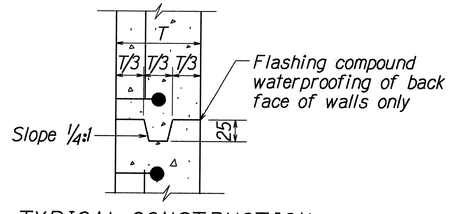
PLAN VIEW



ELEVATION

POLYMER CONCRETE COVER

Not to Scale

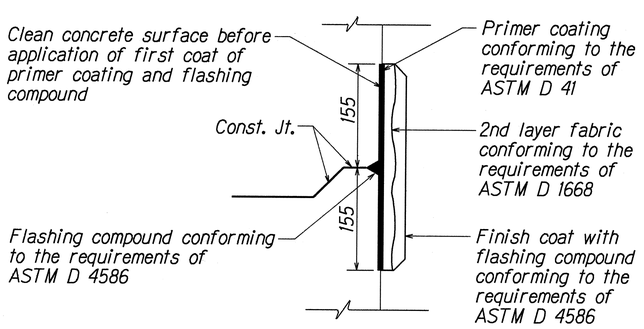


TYPICAL CONSTRUCTION JOINT DETAIL

Not to Scale

GENERAL NOTES

1. Provide a minimum of one 16 ø 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).



TYPICAL FLASHING COMPOUND WATERPROOFING DETAILS

Not to Scale

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PULLBOX & COVER DETAILS

FARRINGTON HIGHWAY
Intersection Improvement at Leoku Street
Project No. 7101A-02-99

Scale: As Shown Date: April, 2000

SHEET No. T6 OF 8 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK dated	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	7101A-02-99	2000	25	32

STATE RIGHT-OF-WAY BACKFILL NOTES

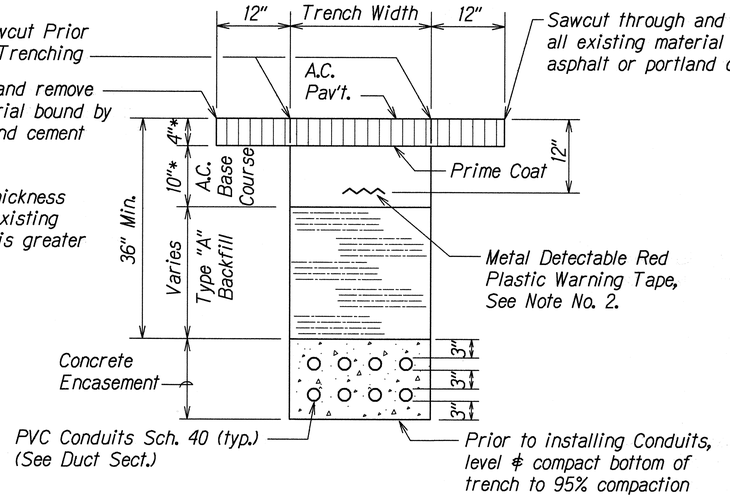
Trench Backfill Material "A"
Beach Sand, Earth, or Earth and Gravel. If Earth and Gravel used, the maximum shall contain not more than 50% by volume of rock particles. Maximum 8" loose fill per lift. Obtain 95% compaction for each lift.

Concrete
3000 psi compressive strength @ 3 days.

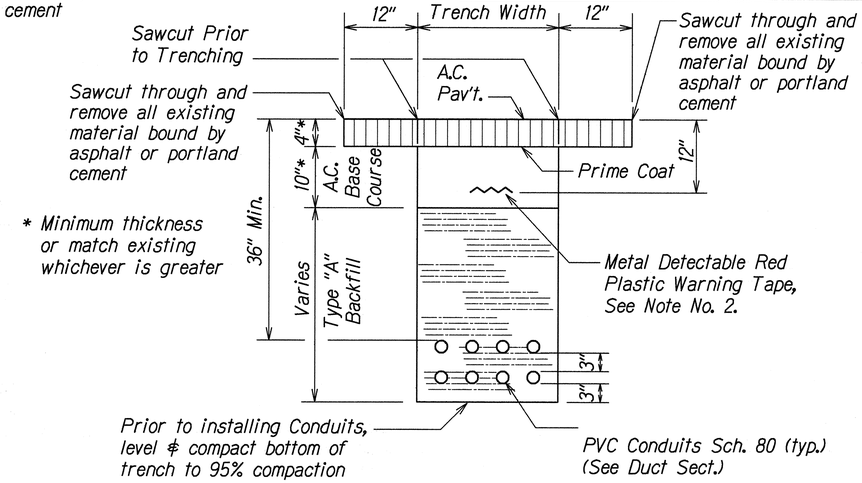
NOTE: Base Course & Sub-Base Course per 1994 State Standard Specifications for Highway Construction.

GENERAL NOTES

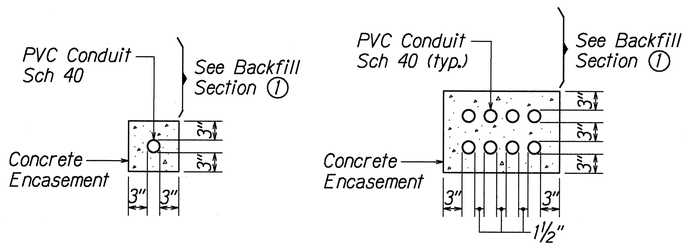
1. If trench is located on unpaved area, the Contractor shall replace 10" A.C. Base Course and 4" A.C. Pavement with Type "A" backfill material.
2. The Metal Detectable Red Plastic Warning Tape shall be a minimum 5 mils thick and 4" wide with a continuous metallic backing and corrosion resistant 1± mil thick foil core. The message on the tape shall read, "CAUTION - STATE TRAFFIC SIGNAL AND/OR HWY LIGHTING BURIED BELOW," utilizing 1½ inches series "C" black lettering. The message will be repeated with a 4¼" 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.



① TYPICAL BACKFILL SECTION WITH CONCRETE ENCASED DUCTS

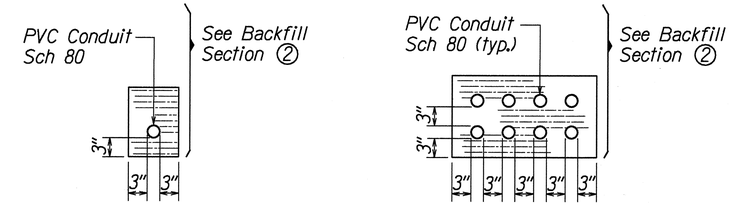


② TYPICAL BACKFILL SECTION DIRECT BURIED DUCTS



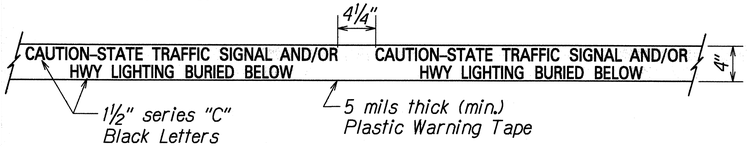
SINGLE CONDUIT — MULTIPLE CONDUIT

DUCT SECTIONS - CONC. ENCASED



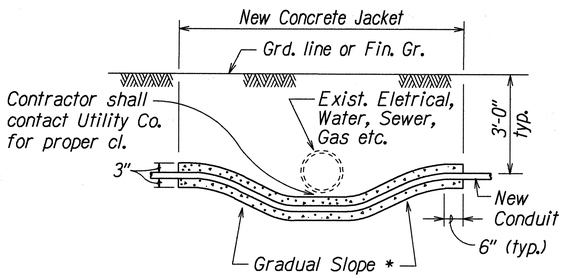
SINGLE CONDUIT — MULTIPLE CONDUIT

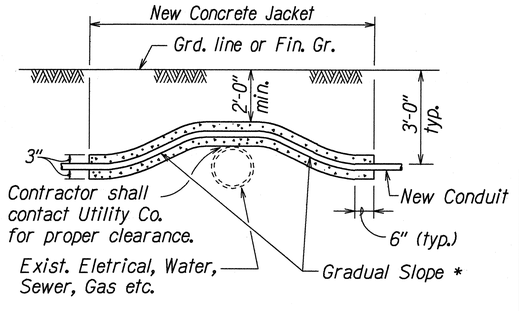
DUCT SECTIONS - DIRECT BURIED



For additional information see note no. 2.

METAL DETECTABLE RED PLASTIC WARNING TAPE





* To be determined by County Electrical Inspector/Engineer

CONDUIT BY-PASS DETAIL AT VARIOUS UTILITIES

Not to Scale

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY X | TRACED BY | DESIGNED BY X | QUANTITIES BY | CHECKED BY | DATE X
NOTE BOOK dated by

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

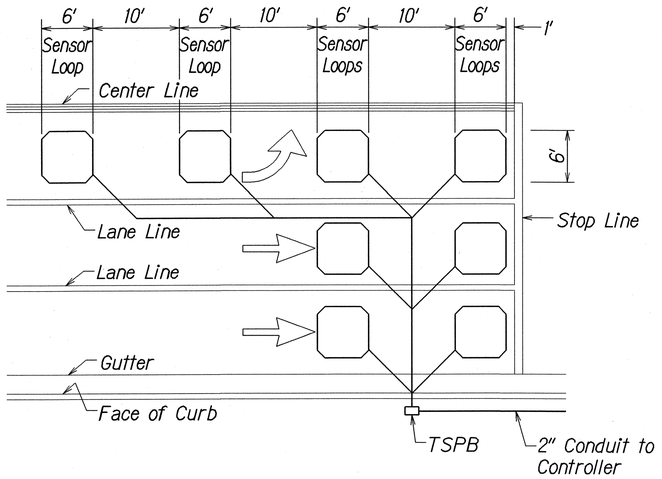
TRAFFIC SIGNAL DETAILS

FARRINGTON HIGHWAY
Intersection Improvements at Leoku Street
Project No. 7101A-02-99

Not to Scale — Date: April, 2000

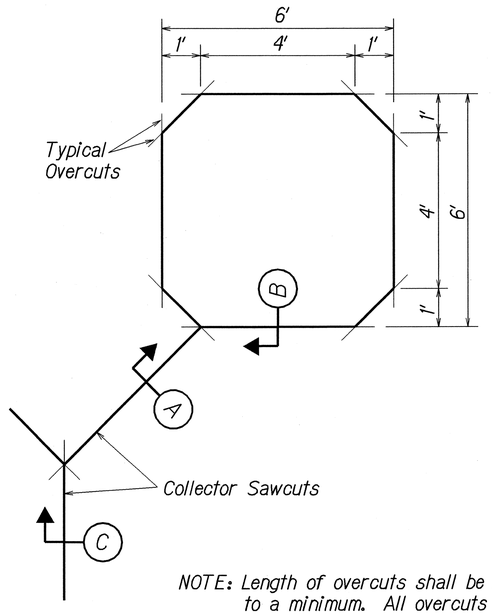
SHEET No. T7 OF 8 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	~~7101A-02-00~~ 7101A-02-99	2000	26	32



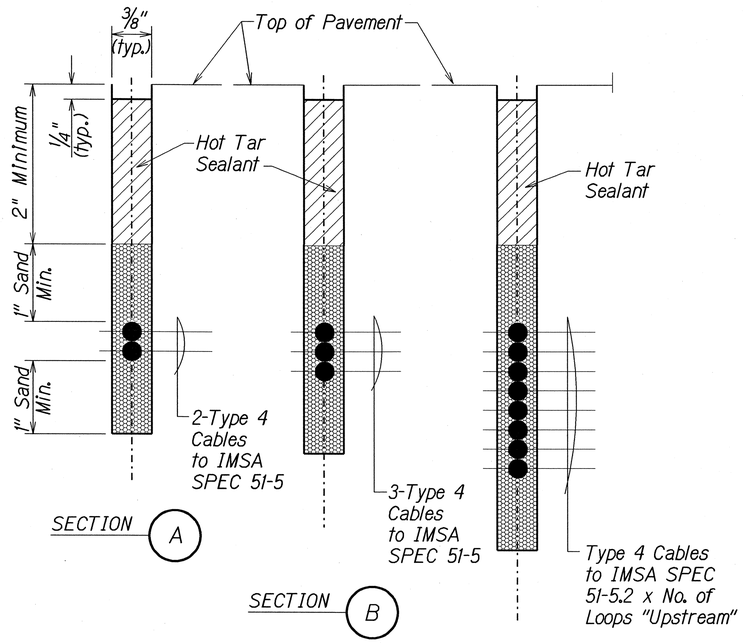
NOTES:
1. Center sensor loops in lanes.
2. Collector cables shall be twisted 2 turns per foot.
3. Number of loops and locations vary. See project plans.
4. Number and locations of collector sawcuts may be varied in the field to suit.

TYPICAL SENSOR LOOP LAYOUT

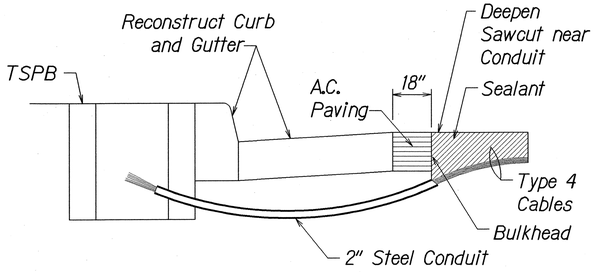


NOTE: Length of overcuts shall be kept to a minimum. All overcuts shall be back filled with hot tar.

TYPICAL SENSOR LOOP SAWCUT DETAIL



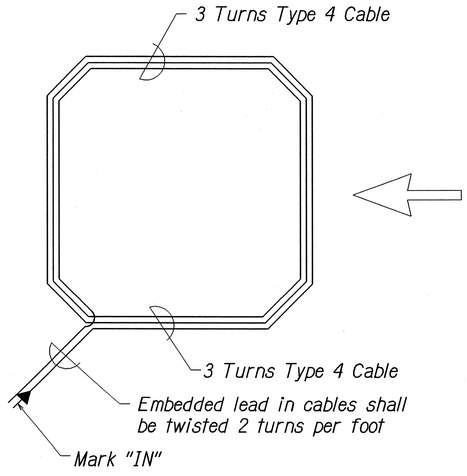
TYPICAL SECTION THROUGH SENSOR LOOP



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

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 10/12/00
	DRAWN BY X	
NOTE BOOK tdruby Waterfield	TRACED BY	
	DESIGNED BY X	
	QUANTITIES BY	
	CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LOOP DETECTOR DETAILS

FARRINGTON HIGHWAY
Intersection Improvements at Leoku Street
Project No. 7101A-02-99

Not to Scale Date: April, 2000

SHEET No. T8 OF 8 SHEETS

"AS-BUILT"