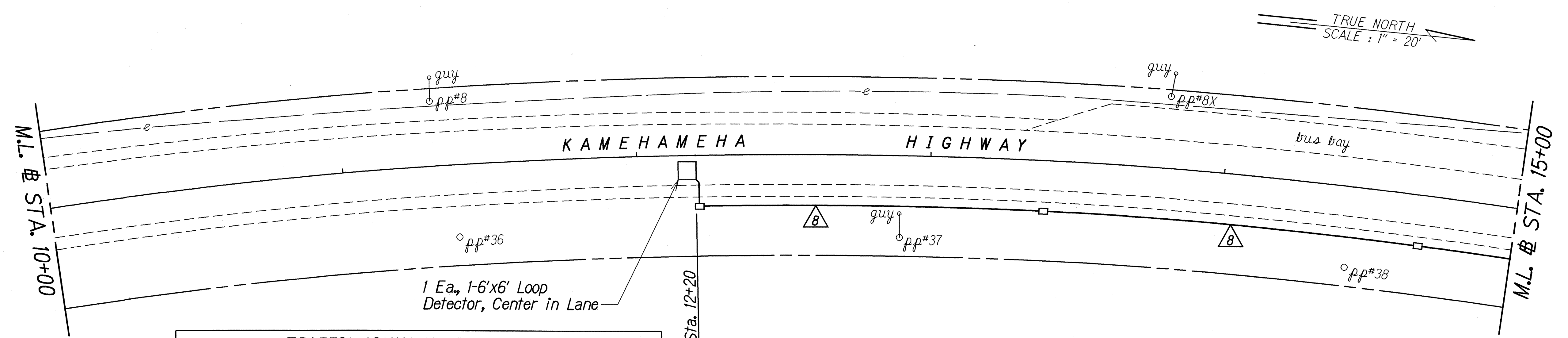
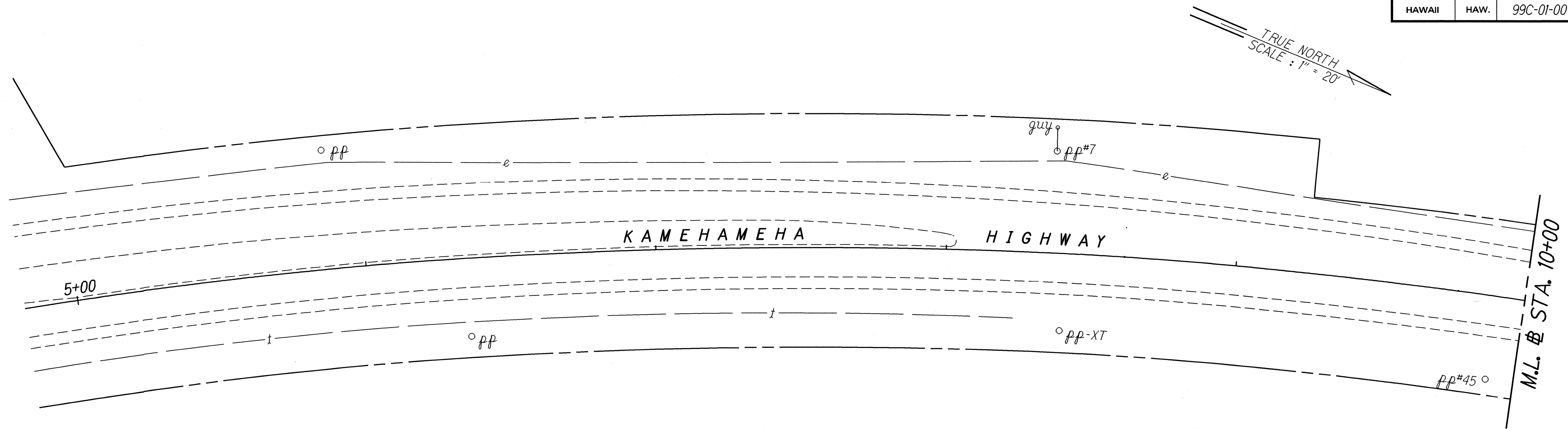
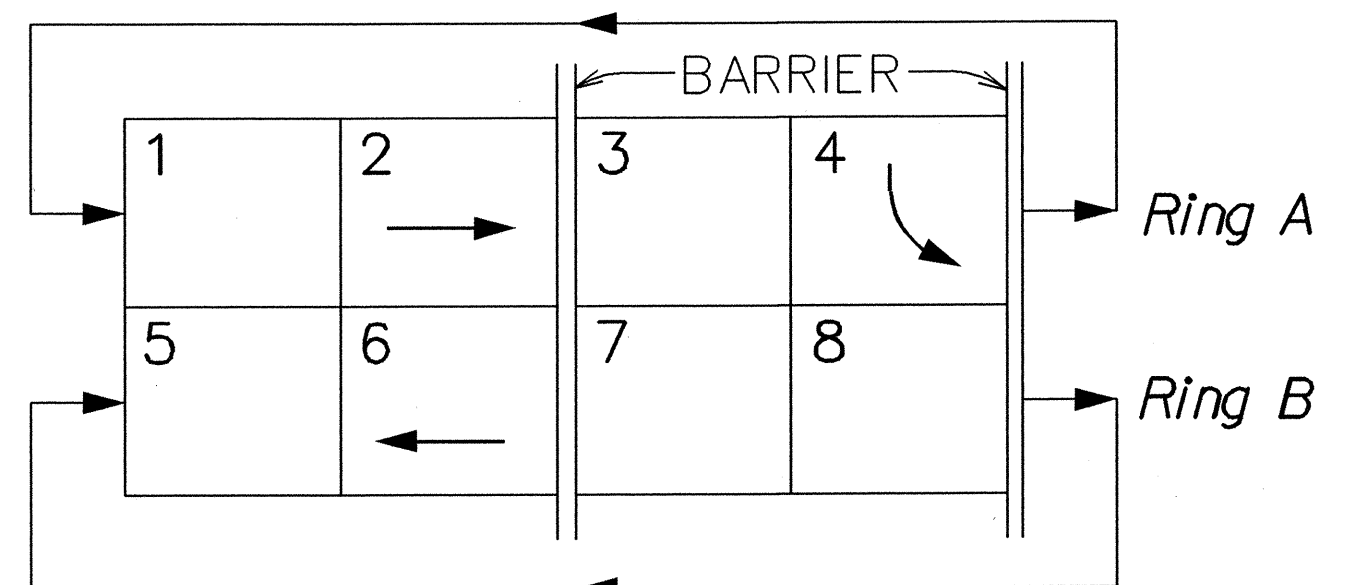


FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	99C-01-00	2002	12	21



TRAFFIC SIGNAL HEAD SCHEDULE			
Traffic Signal Head Type and Description	<div>Ⓡ Ⓨ ⬅</div>	<div>Ⓡ Ⓨ ⬆</div>	<div>Ⓡ Ⓨ ⓖ</div>
Pole Letter-Signal Head Number	B-1 C-3	A-1 A-2 A-3 B-2 C-1 C-2 D-2	D-1



PHASE DIAGRAM

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

TRAFFIC SIGNAL PLAN

KAMEHAMEHA HIGHWAY

Intersection Improvements at

Kamanui Road

Project No. 99C-01-00

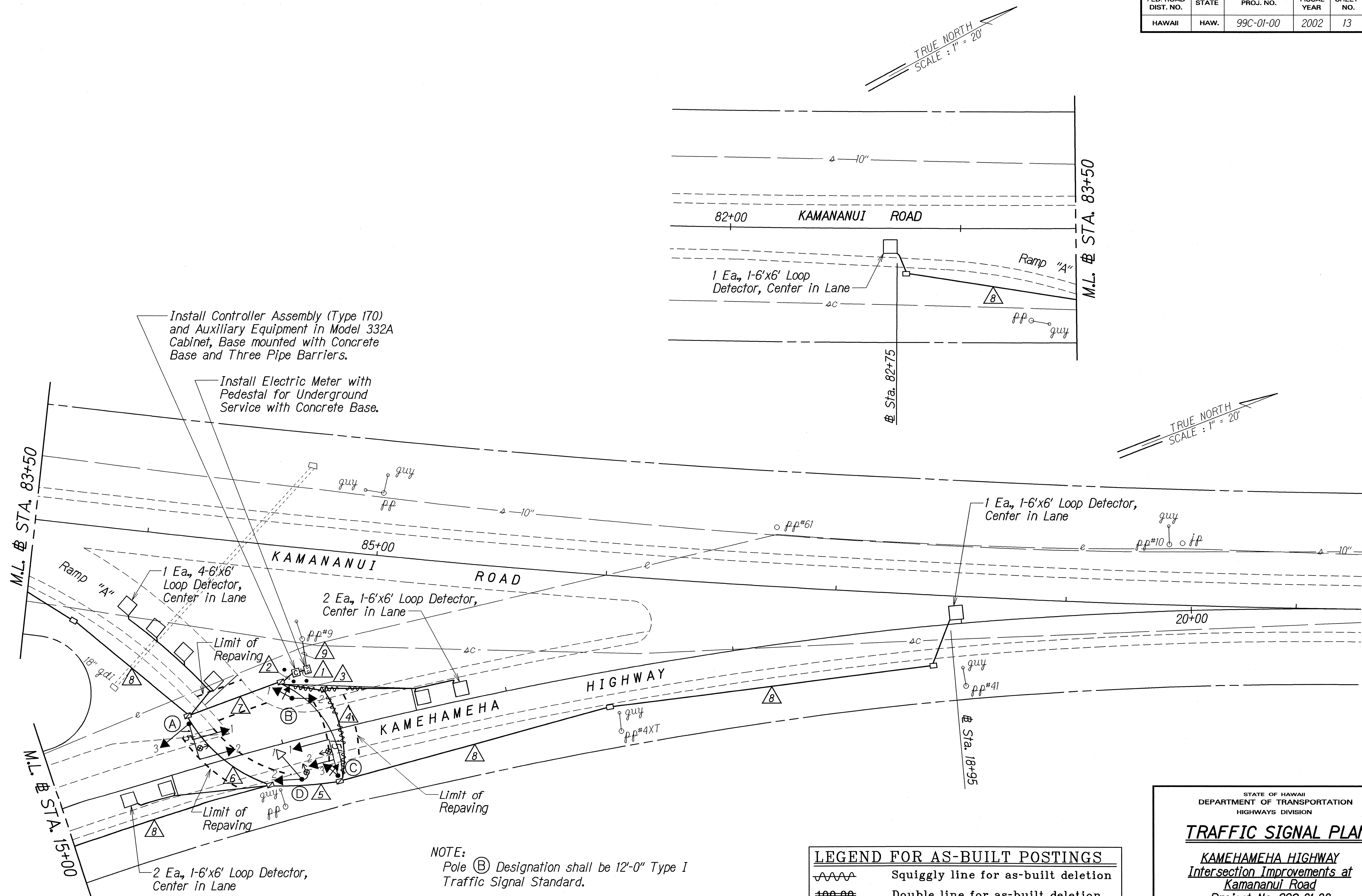
Scale: 1" = 20'

Date: Oct. 2001

SHEET No. 2 OF 8 SHEETS

SURVEY PLOTTED BY	DATE
PLAN	12/20/00
DESIGNED BY	
TRACED BY	
NOTED BY	
QUANTITIES BY	
CHECKED BY	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	99C-01-00	2002	13	21



"AS-BUILT"

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

1	Conduits (Conc. Encased)	Cable
	2"	1 - 3c #6 (Type 6)

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

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

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

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

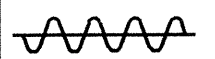
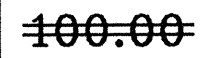
6	Conduits (Conc. Encased)	Cable
	2"	1 - 26c #14 (Type 1)
	2"	2 - 2c #14 (Type 2)
	2"	1 - Spare

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

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

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

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	DESIGNED BY	
	CHECKED BY	
NOTE BOOK	NOTED BY	
	DESIGNED BY	
	CHECKED BY	
	CHECKED BY	

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL SCHEDULE

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

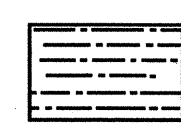
Date: Oct. 2001

SHEET No. 4 OF 8 SHEETS

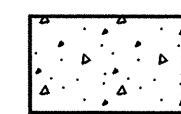
"AS-BUILT"

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	99C-01-00	2002	15	21

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.

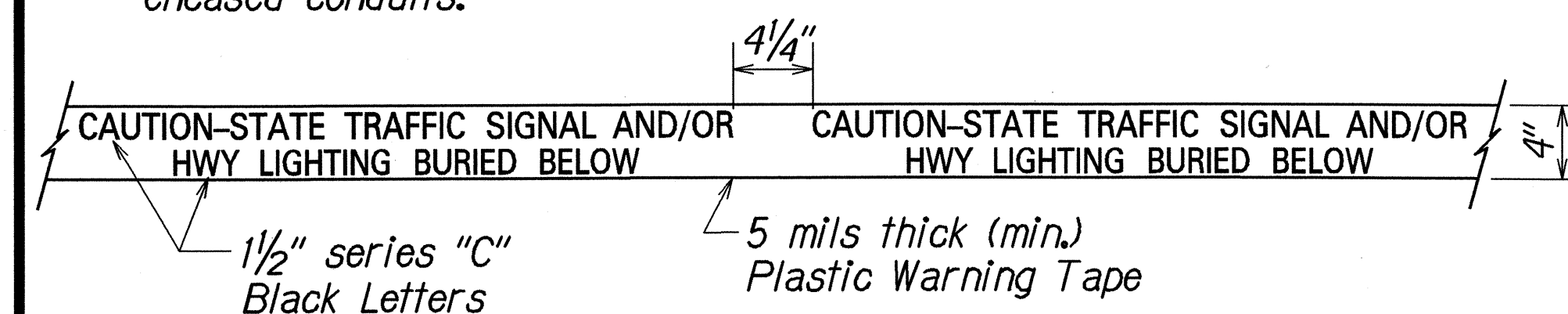


Concrete
3000 psi compressive strength @ 3 days.

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

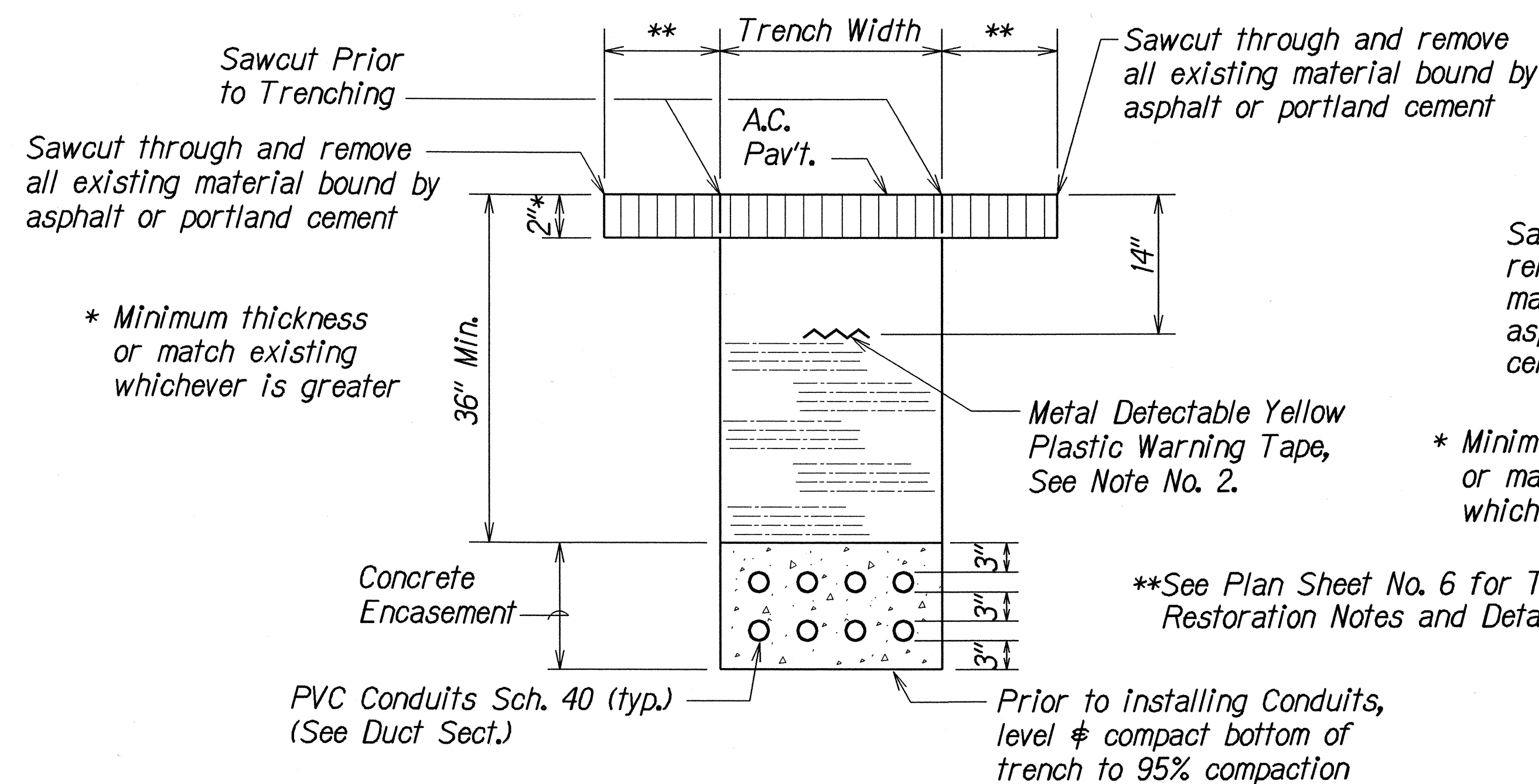
GENERAL NOTES

- If trench is located on unpaved area, the Contractor shall replace A.C. Base Course and A.C. Pavement with Type "A" backfill material.
- 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 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.
- 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.
- 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.
- 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.

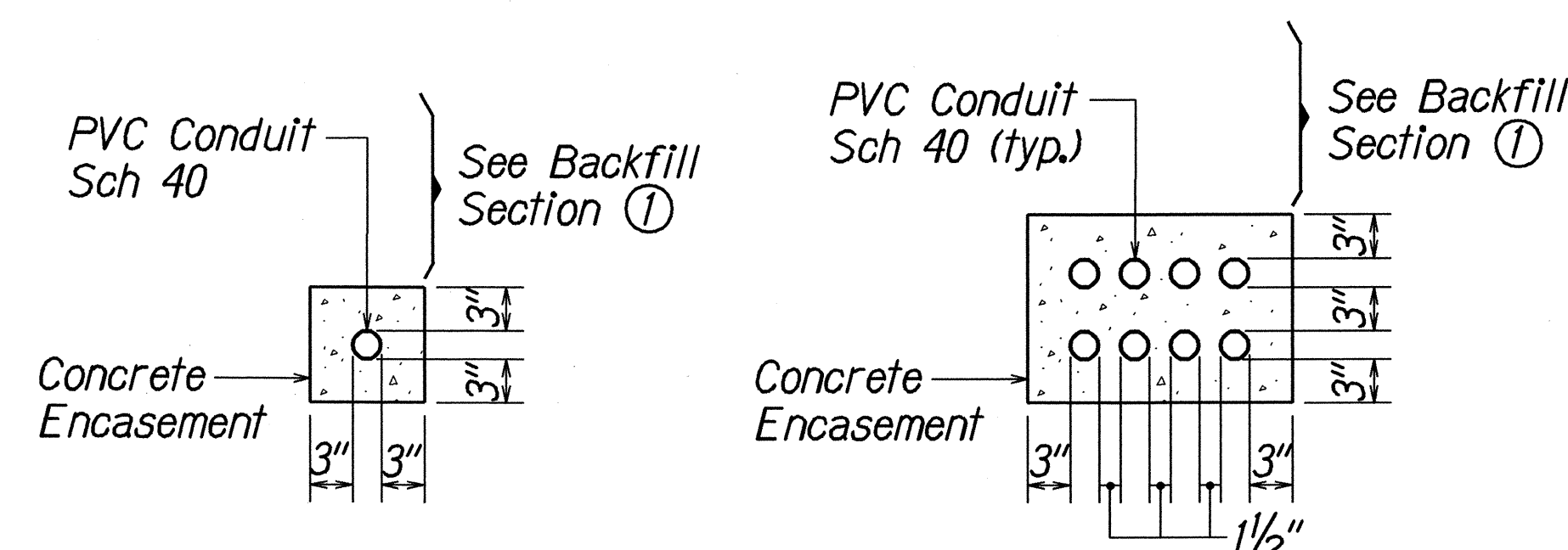


For additional information see note no. 2.

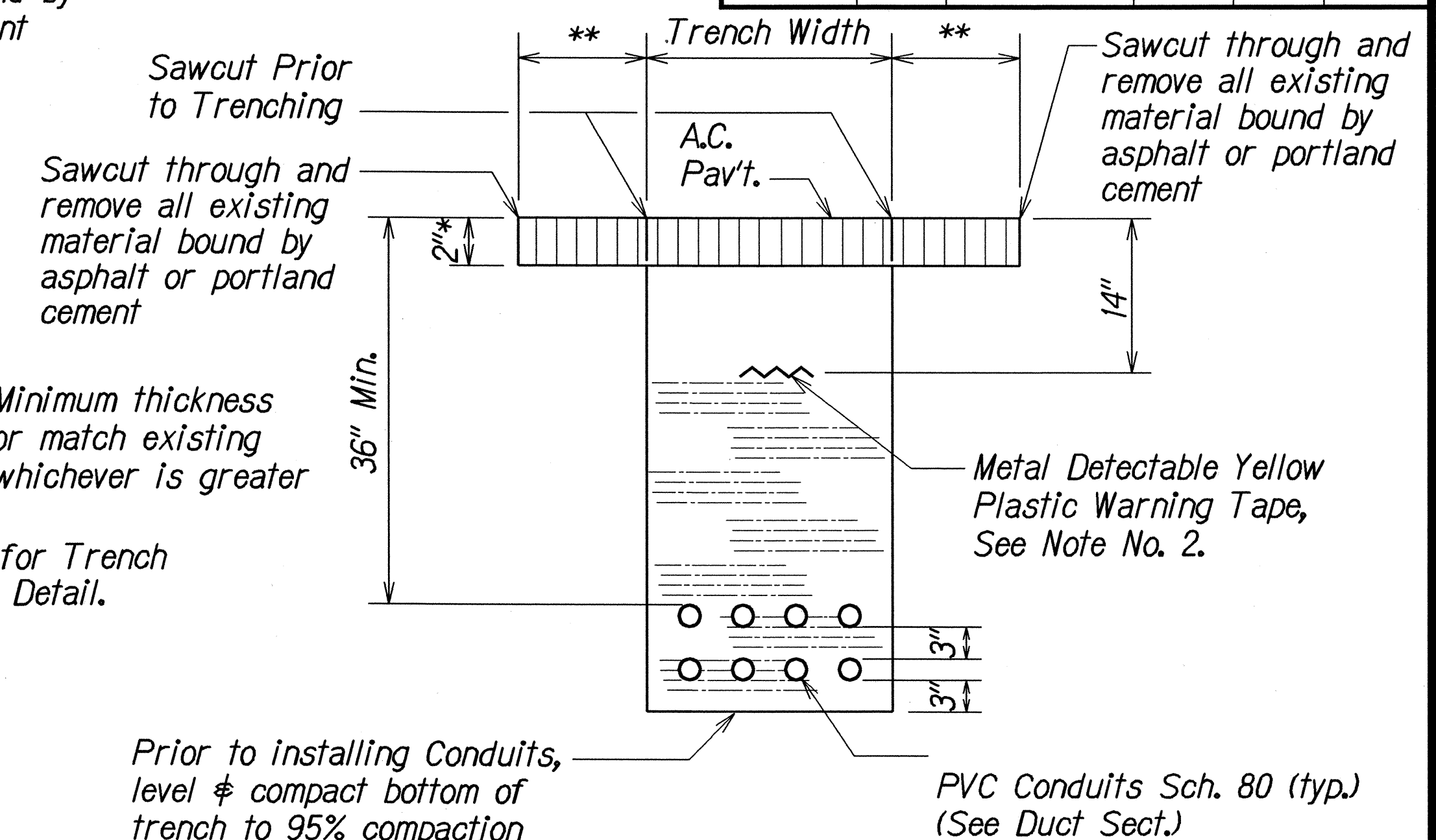
METAL DETECTABLE YELLOW PLASTIC WARNING TAPE



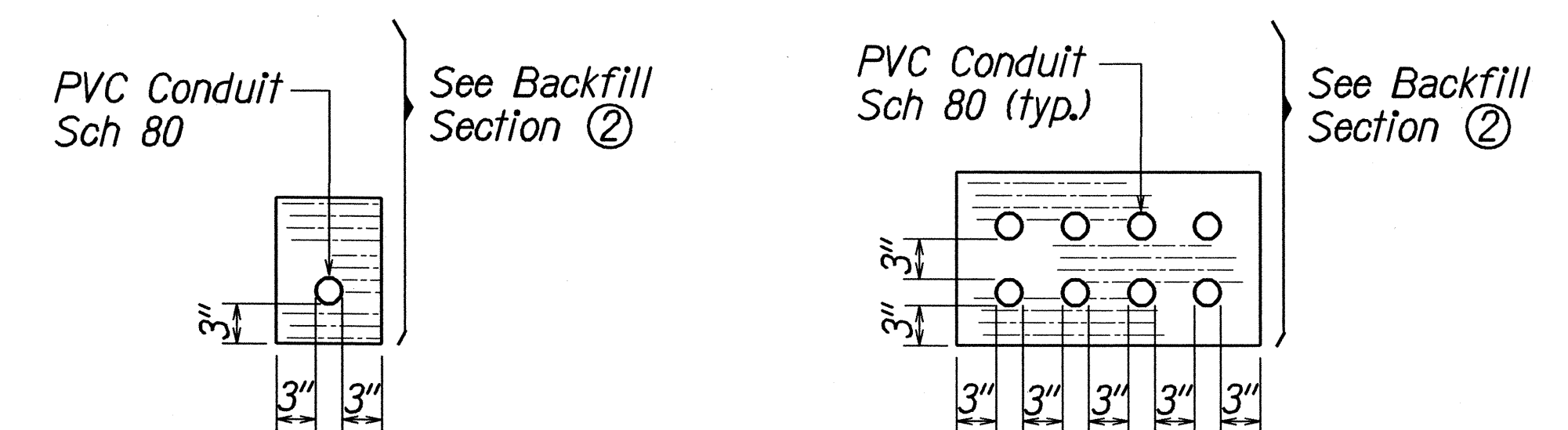
① TYPICAL BACKFILL SECTION
WITH CONCRETE ENCASED DUCTS



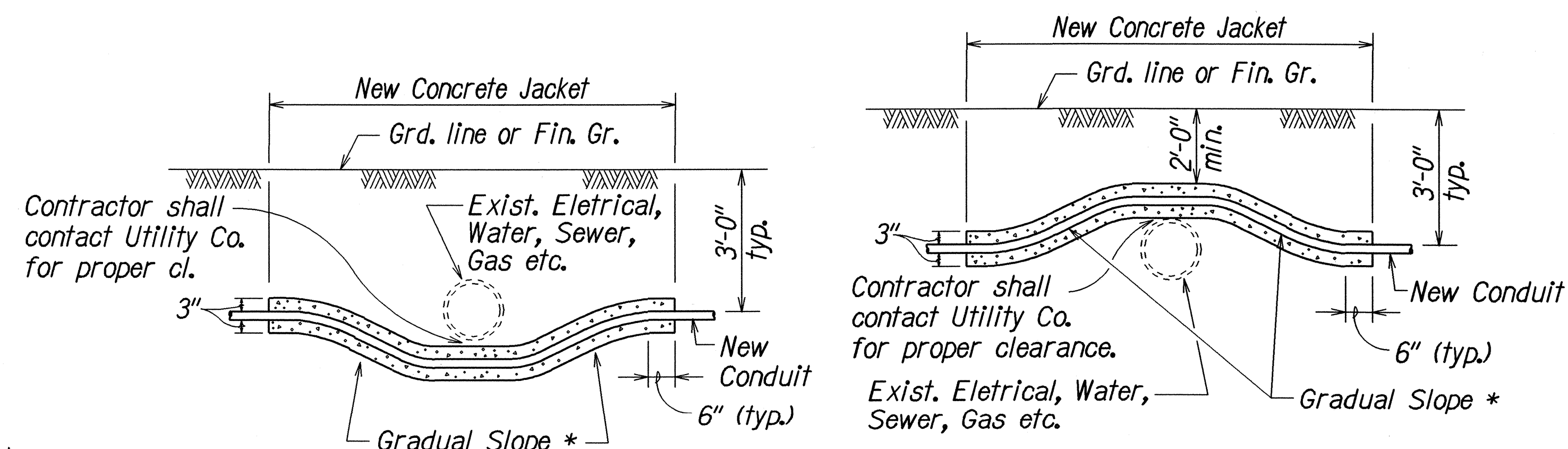
SINGLE CONDUIT
MULTIPLE CONDUIT
DUCT SECTIONS - CONC. ENCASED



② TYPICAL BACKFILL SECTION
DIRECT BURIED DUCTS



SINGLE CONDUIT
MULTIPLE CONDUIT
DUCT SECTIONS - DIRECT BURIED



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

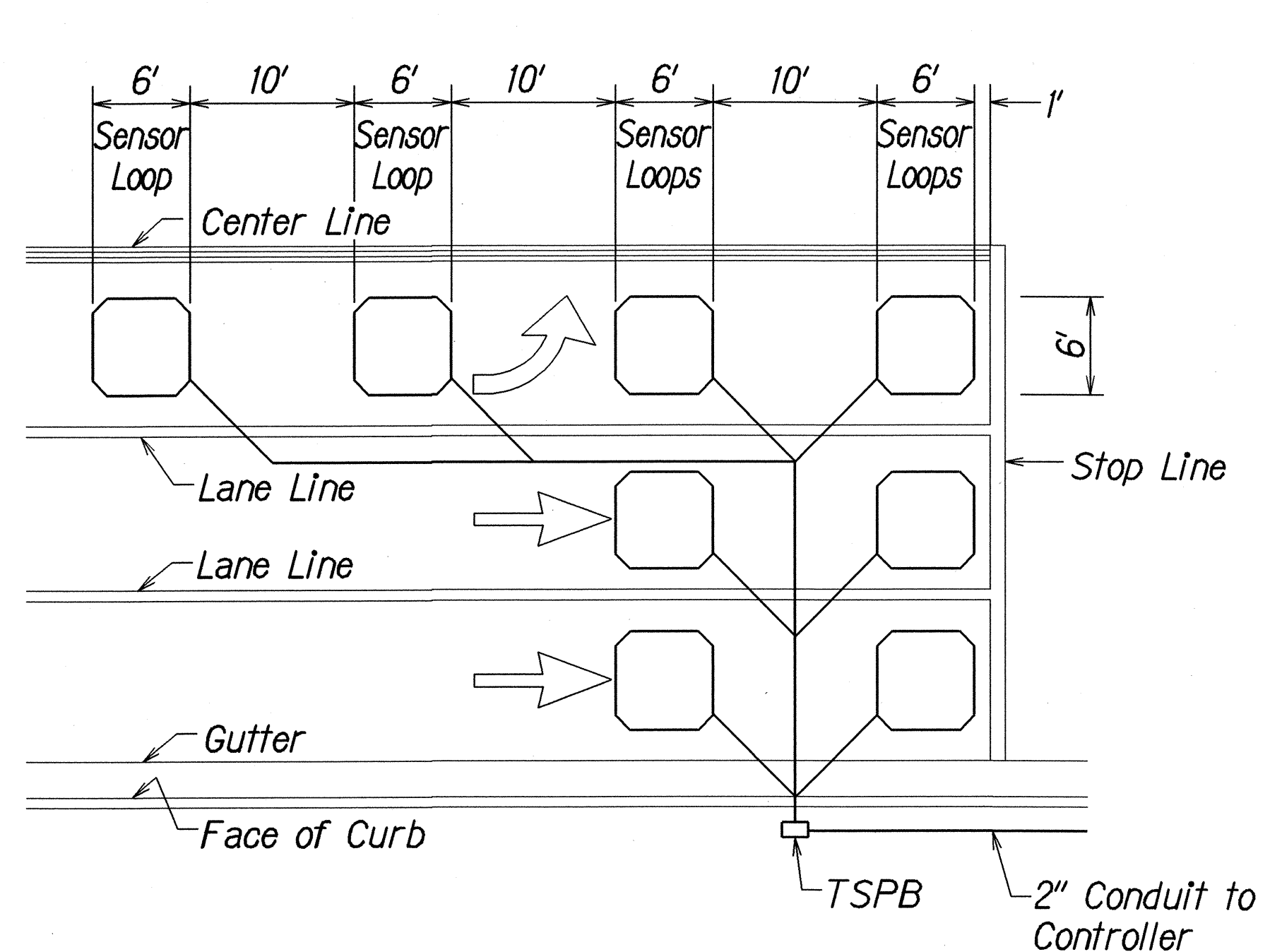
Not to Scale

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
TRAFFIC SIGNAL DETAILS
KAMEHAMEHA HIGHWAY
Intersection Improvements at
Kalanianʻōhale Road
Project No. 99C-01-00

Not to Scale Date: Oct. 2001

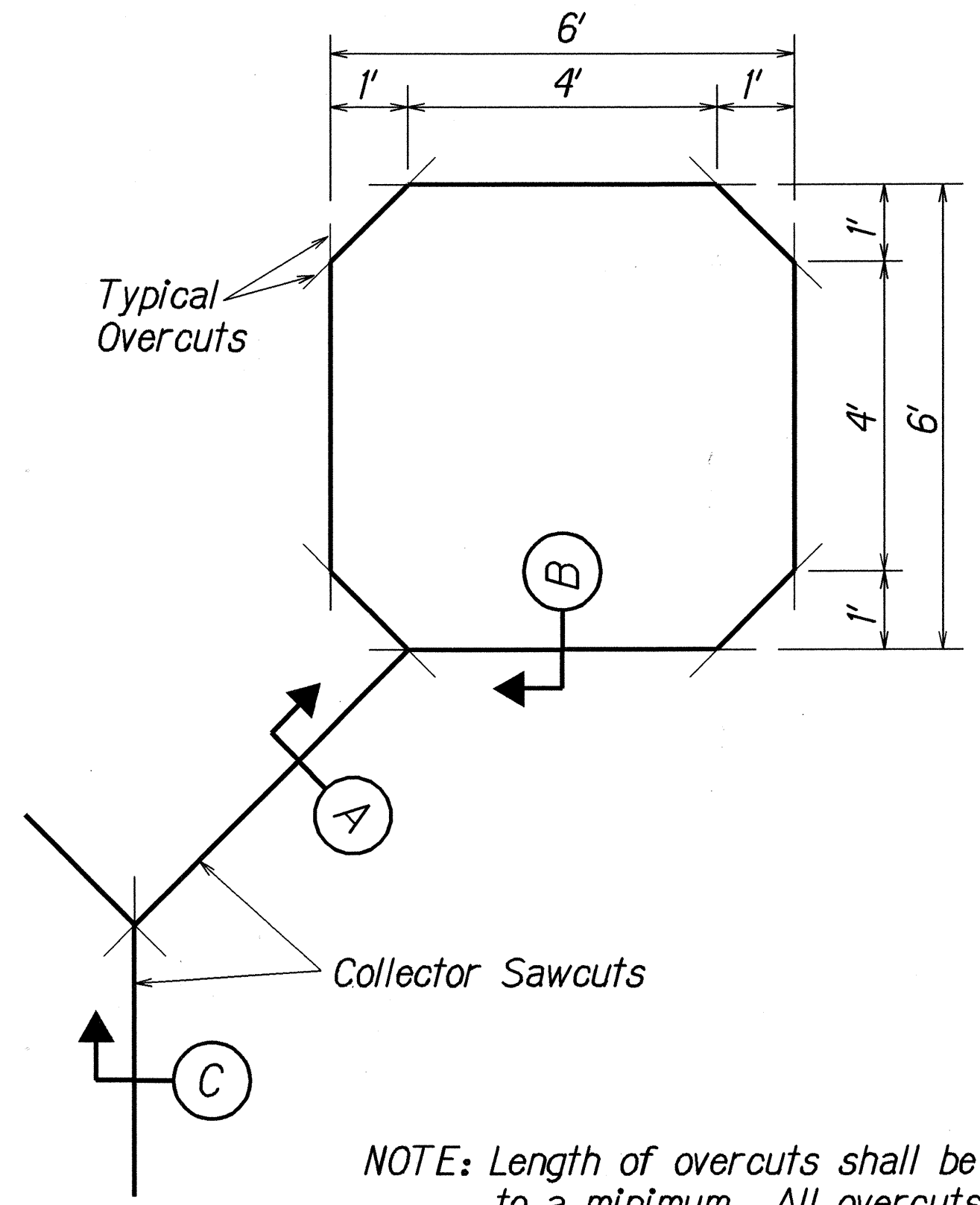
SHEET No. 5 OF 8 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	99C-01-00	2002	17	21



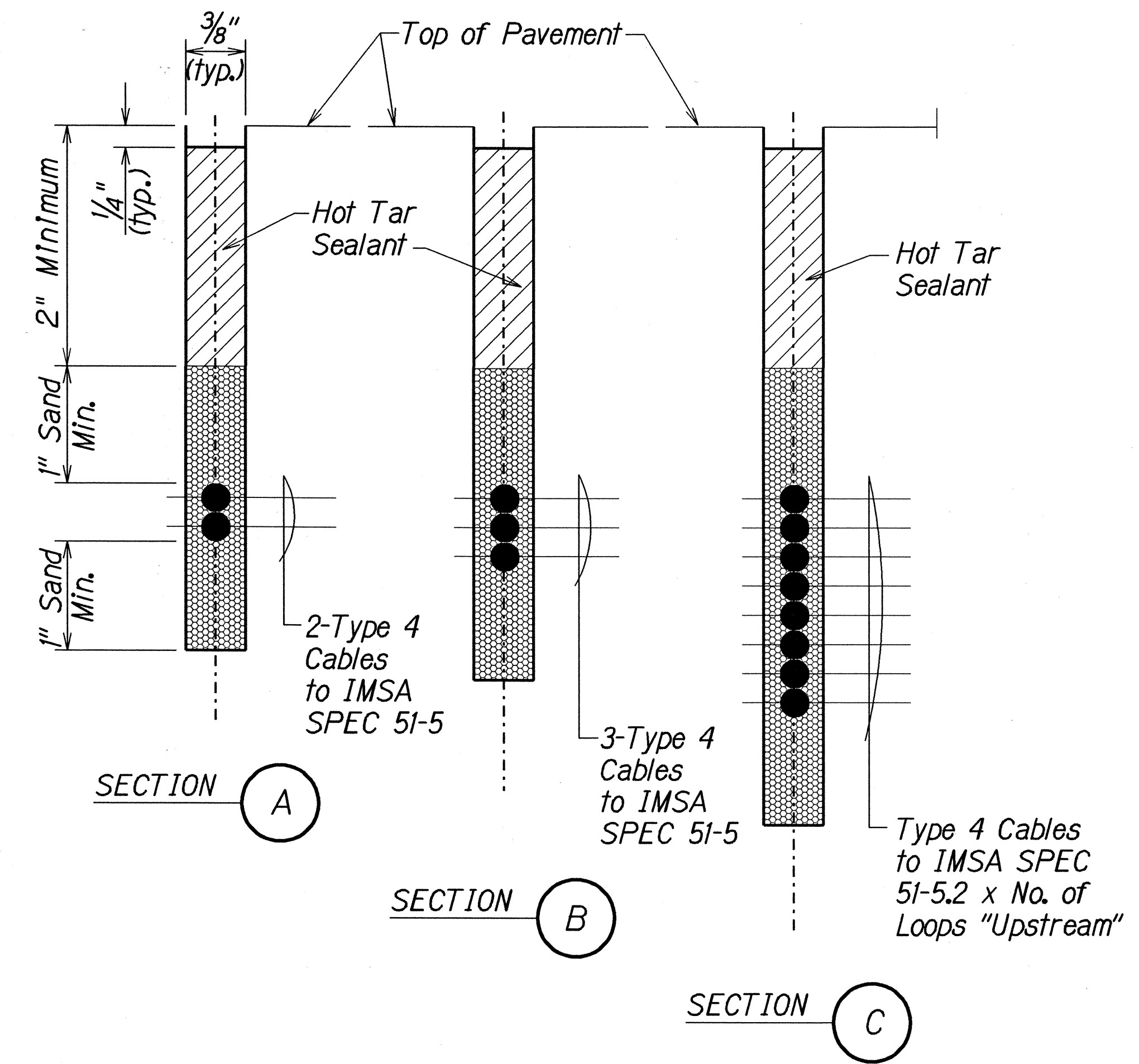
- NOTES:
- Center sensor loops in lanes.
 - Collector cables shall be twisted 2 turns per foot.
 - Number of loops and locations vary. See project plans.
 - Number and locations of collector sawcuts may be varied in the field to suit.

TYPICAL SENSOR LOOP LAYOUT

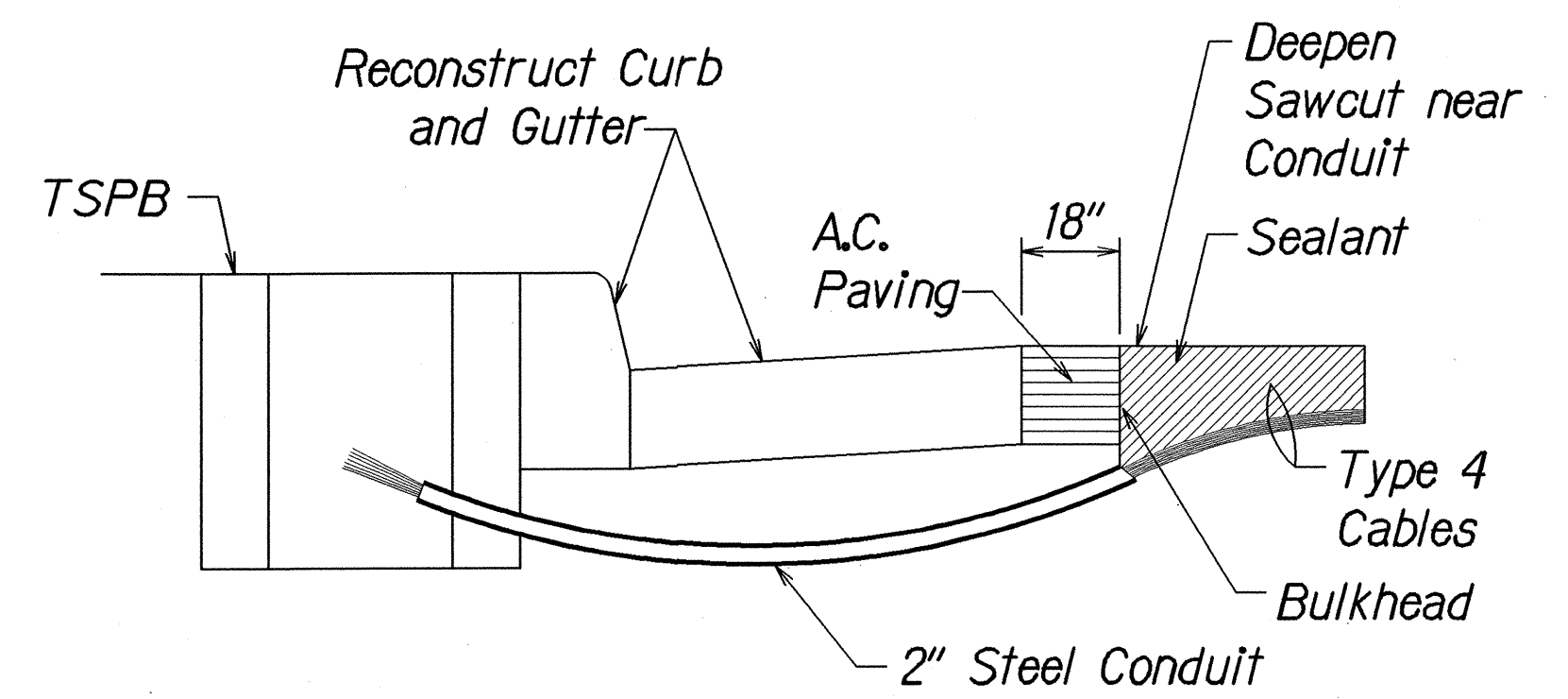


NOTE: Length of overcuts shall be kept to a minimum. All overcuts shall be back filled with hot tar.

TYPICAL SENSOR LOOP SAWCUT DETAIL

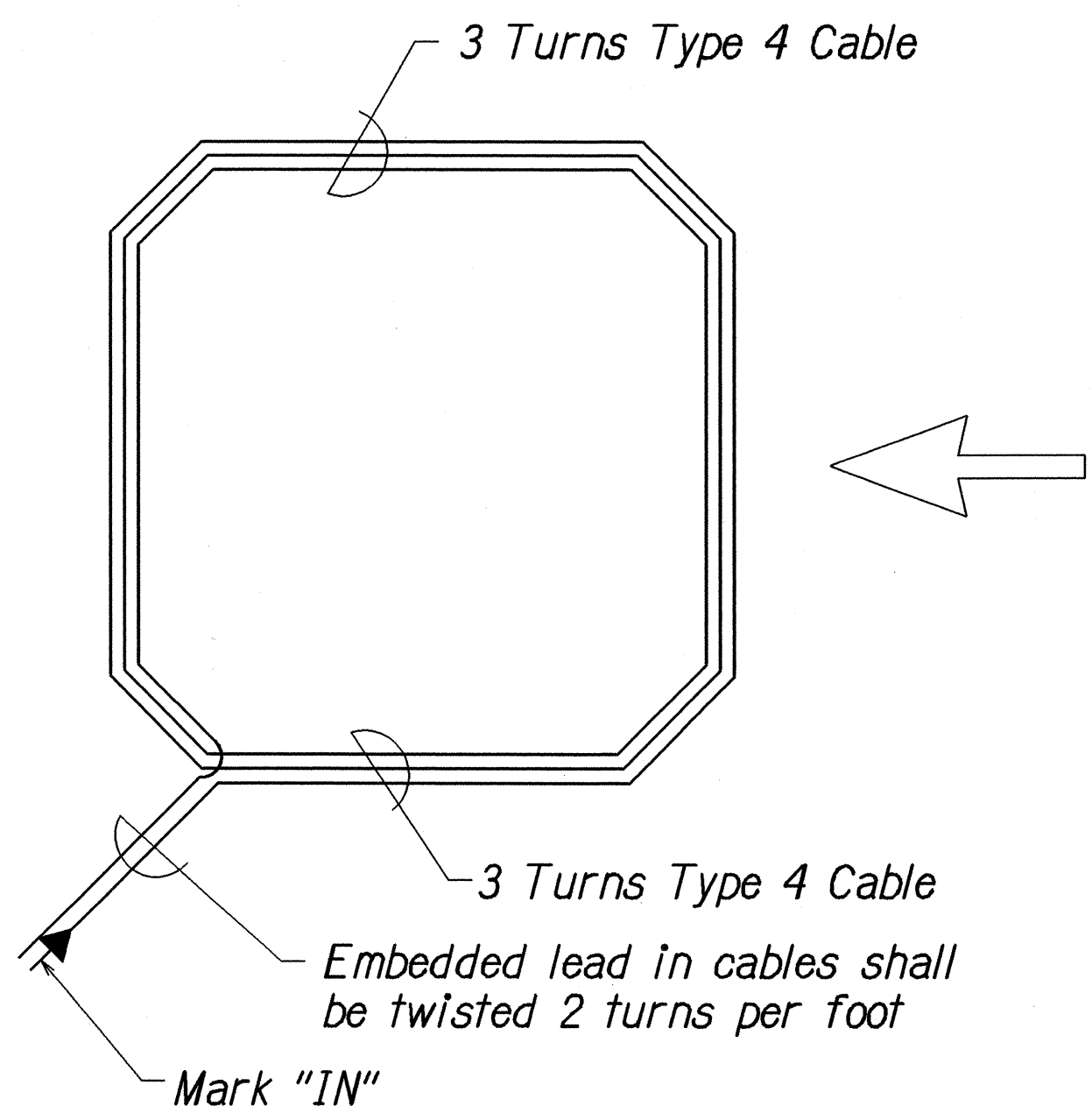


TYPICAL SECTION THROUGH SENSOR LOOP



- NOTES ON CONSTRUCTION AT END OF SAWCUT
- Seal roadway end of conduit after installation of conductors.
 - Install bulkhead across conduit trench.
 - Place hot tar in sawcut.
 - Backfill over conduit with new AC.
 - Reconstruct curb and gutter as required.

DETAIL OF SENSOR LOOP INSTALLATION AT EDGE OF ROADWAY



TYPICAL SENSOR LOOP WIRING DIAGRAM

DESIGNED BY	DATE
CHECKED BY	
IN CHARGE	
NOTED BY	
QUANTITIES BY	
REVISIONS	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LOOP DETECTOR DETAILS
KAMEHAMEHA HIGHWAY
Intersection Improvements at
Kamalanui Road
Project No. 99C-01-00

Not to Scale
Date: Oct. 2001

SHEET No. 7 OF 8 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	99C-01-00	2002	18	21

GENERAL NOTES

1. Provide a minimum of one 16 ϕ 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 (21 MPa (3,000 psi), 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).

Clean concrete surface before application of first coat of primer coating and flashing compound

Primer coating conforming to the requirements of ASTM D 41

2nd layer fabric conforming to the requirements of ASTM D 1668

Flashing compound conforming to the requirements of ASTM D 4586

Finish coat with flashing compound conforming to the requirements of ASTM D 4586

TYPICAL FLASHING COMPOUND WATERPROOFING DETAILS

Not to Scale

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

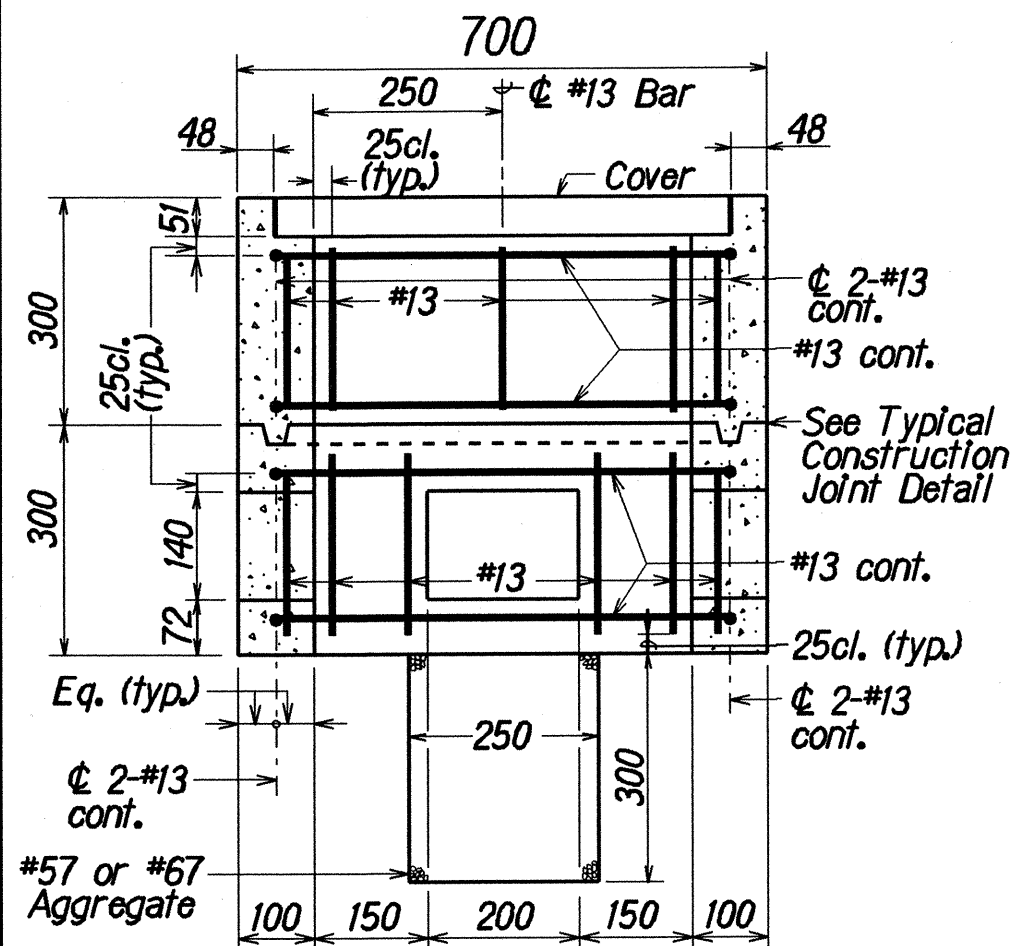
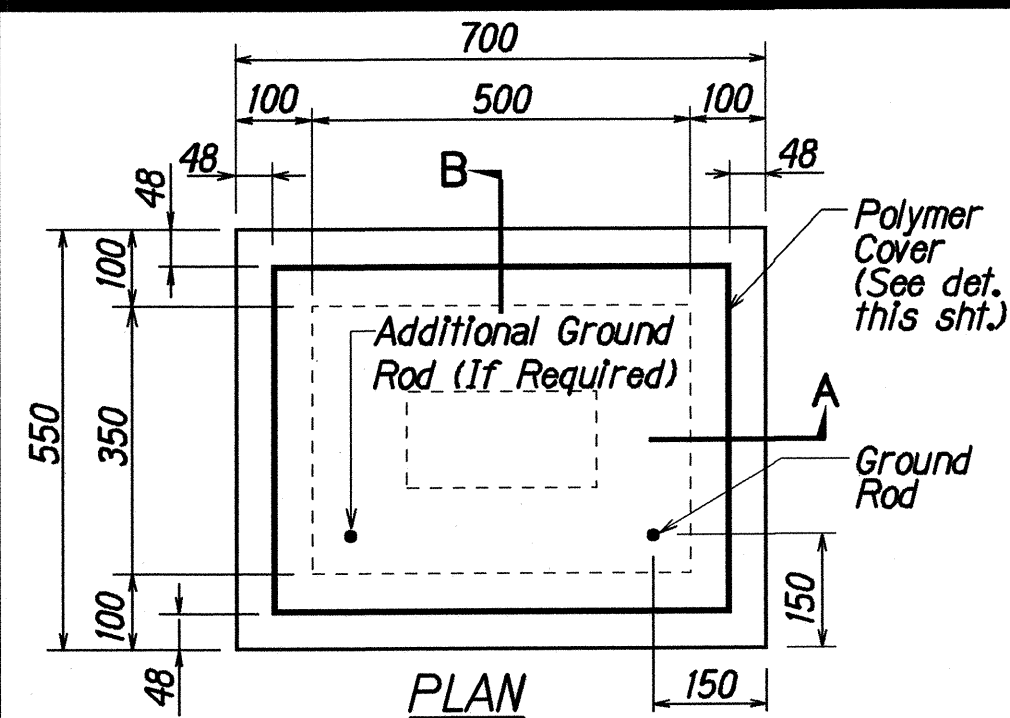
PULLBOX & COVER DETAILS

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

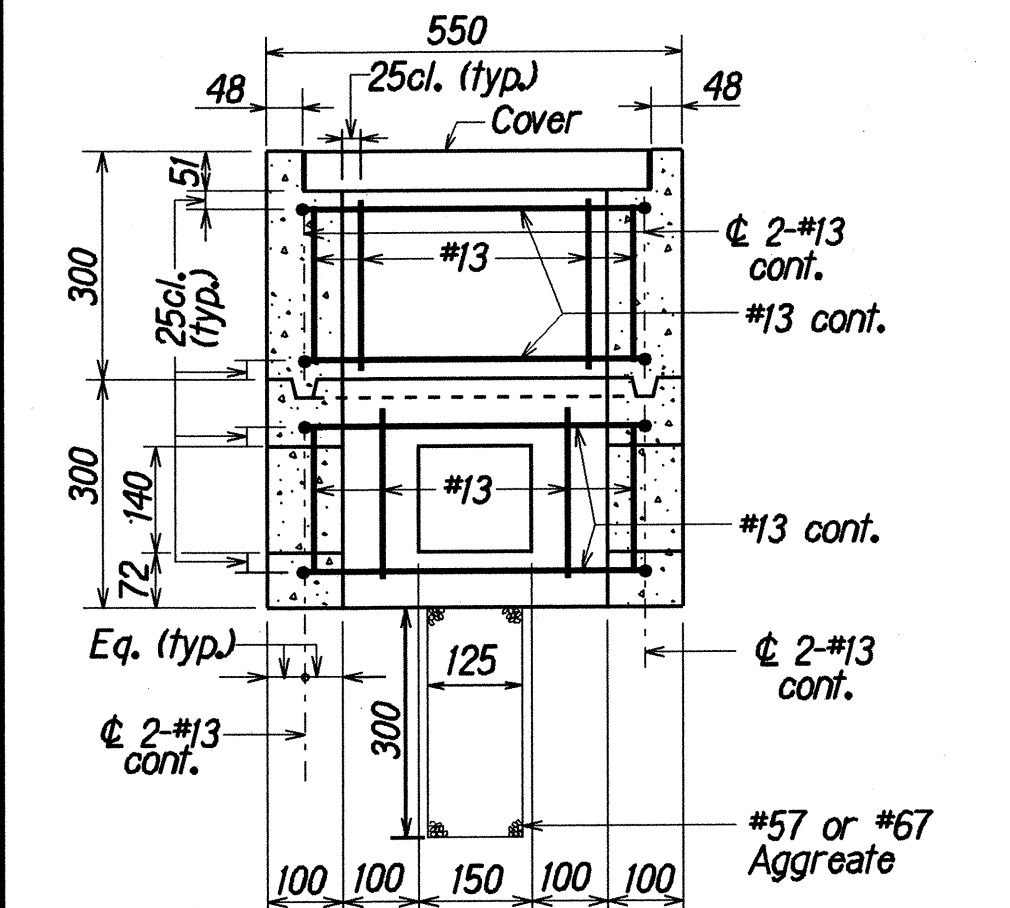
Scale: As Shown

Date: Oct. 2001

SHEET No. 8 OF 8 SHEETS



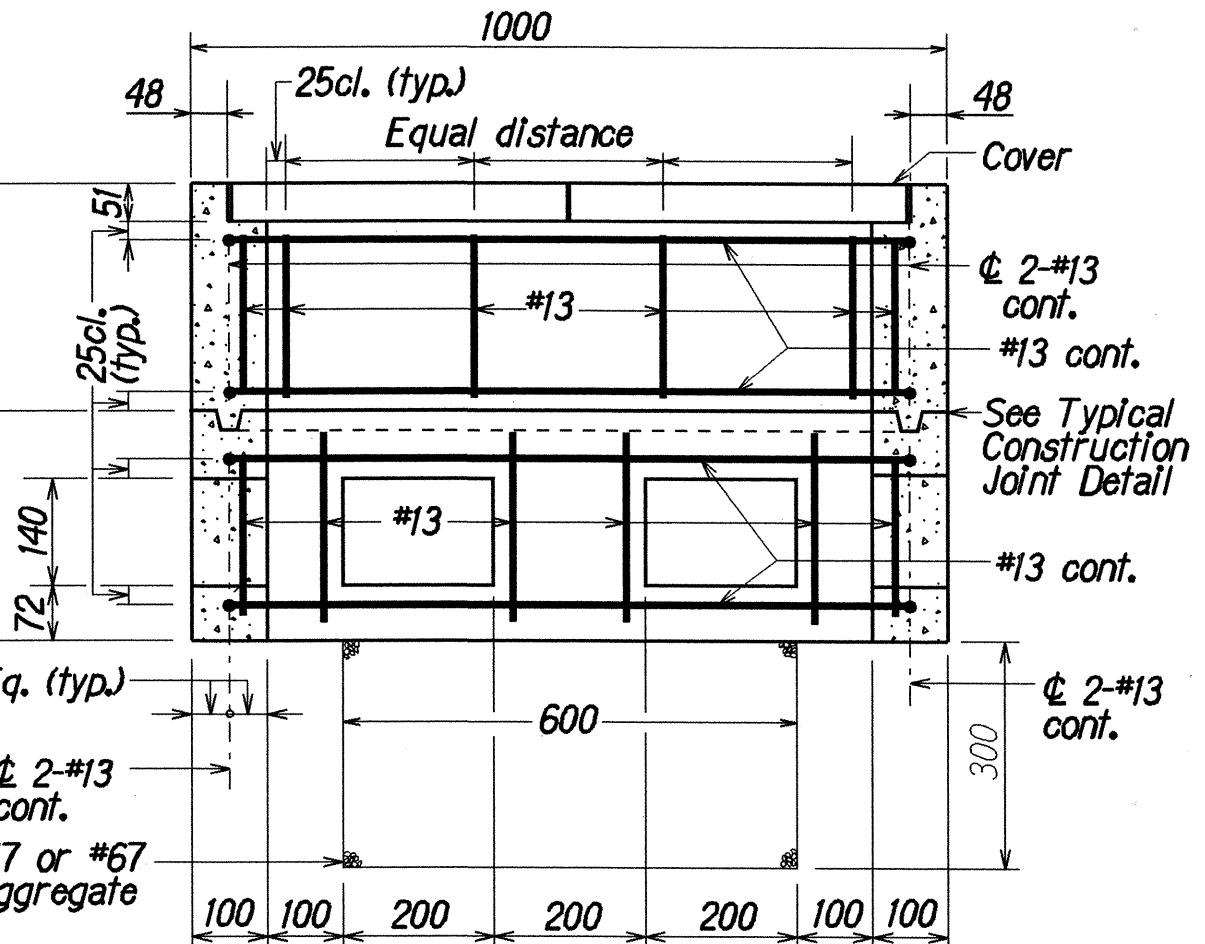
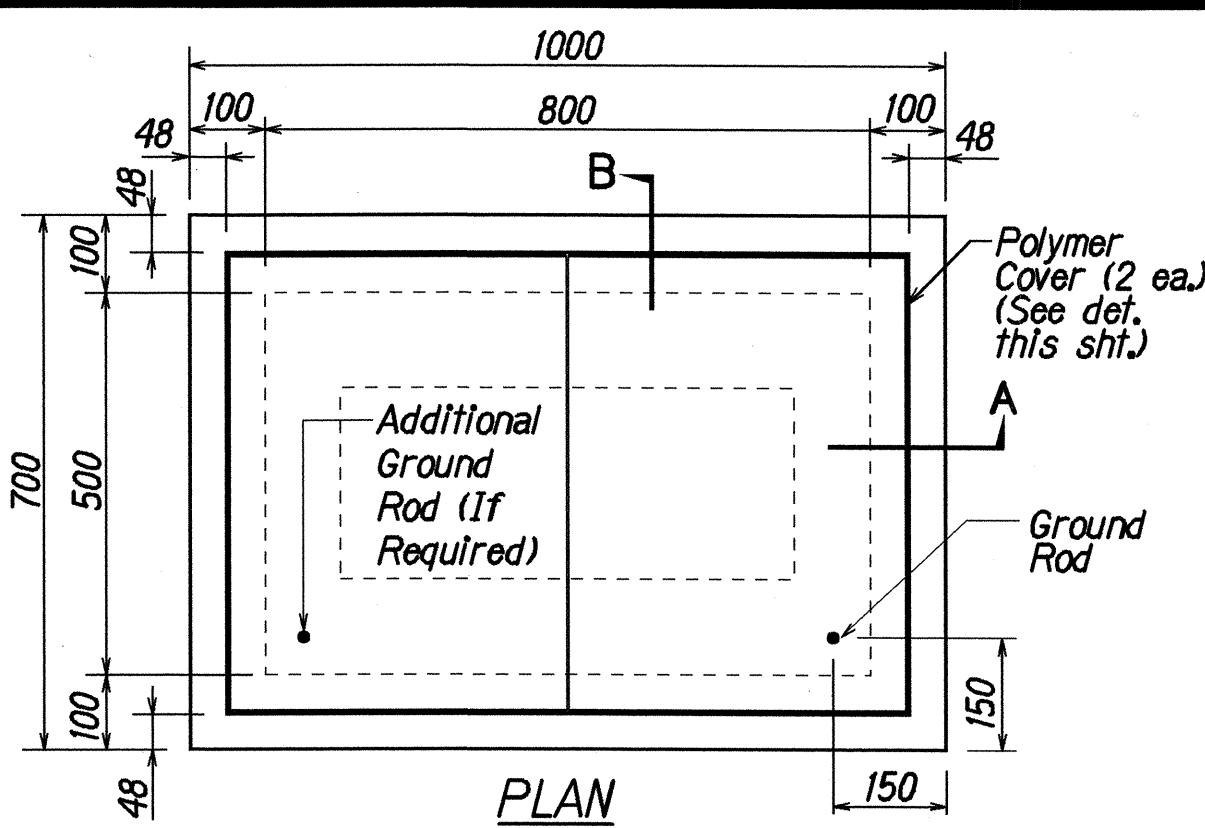
SECTION A-A



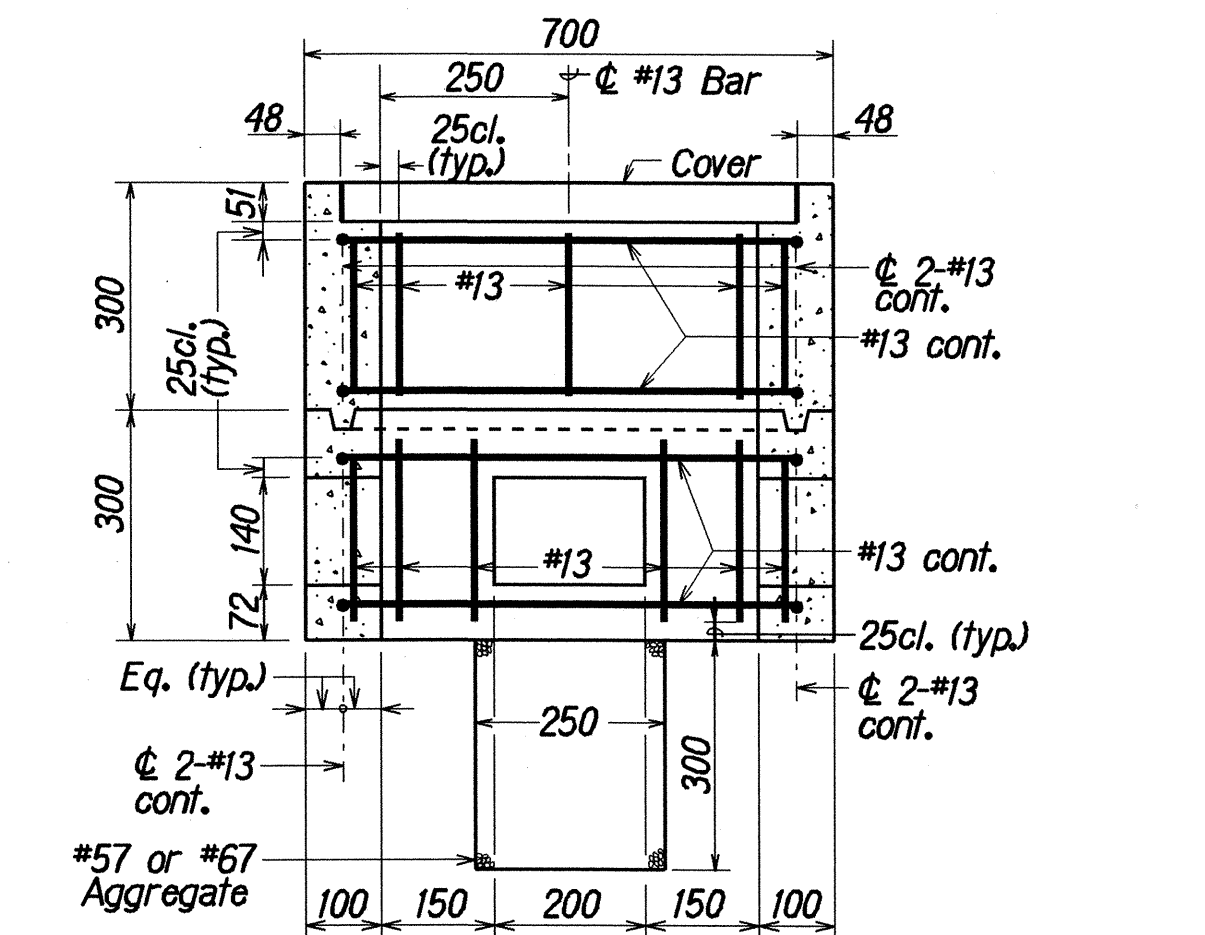
SECTION B-B

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

Scale: 1:10



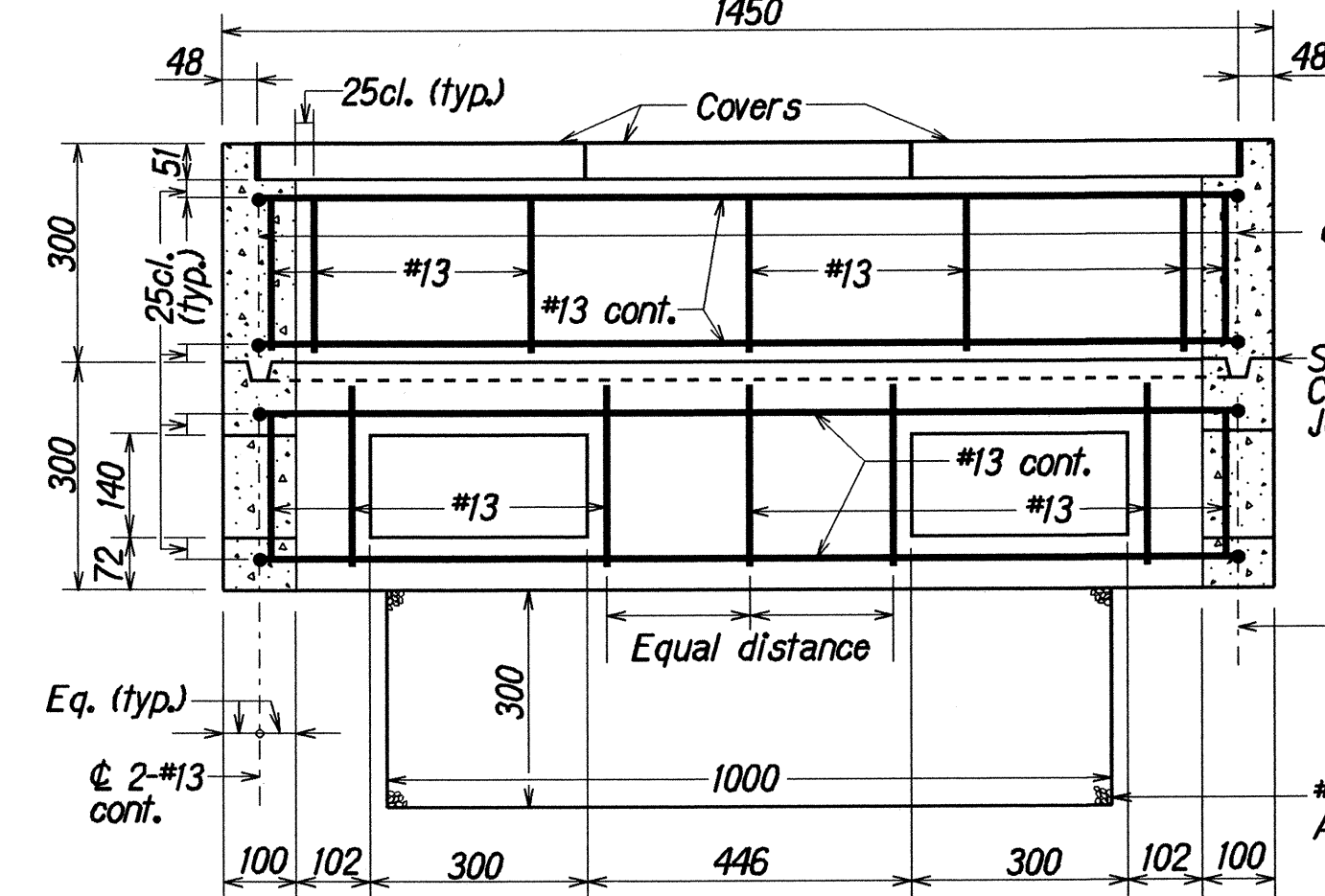
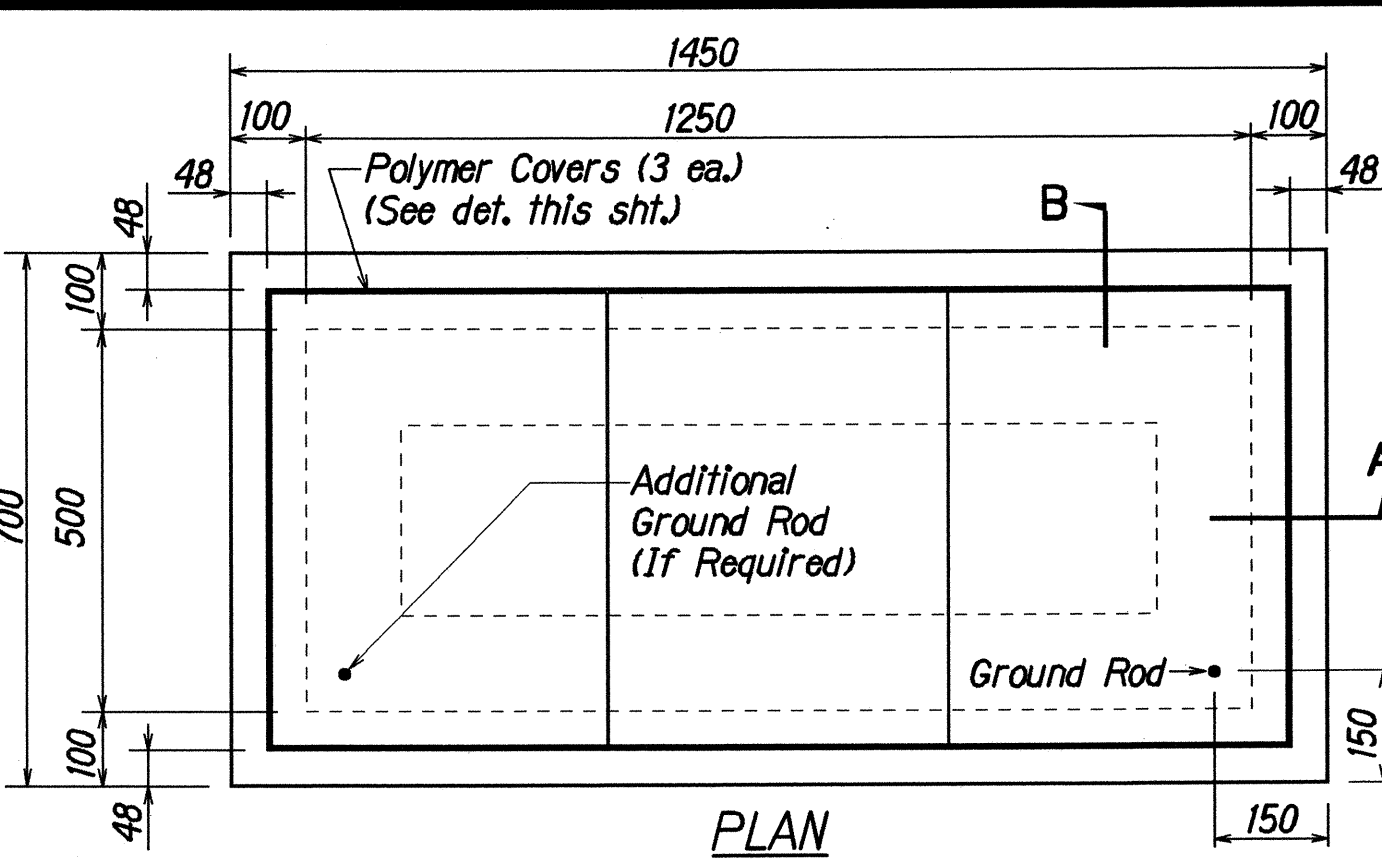
SECTION A-A



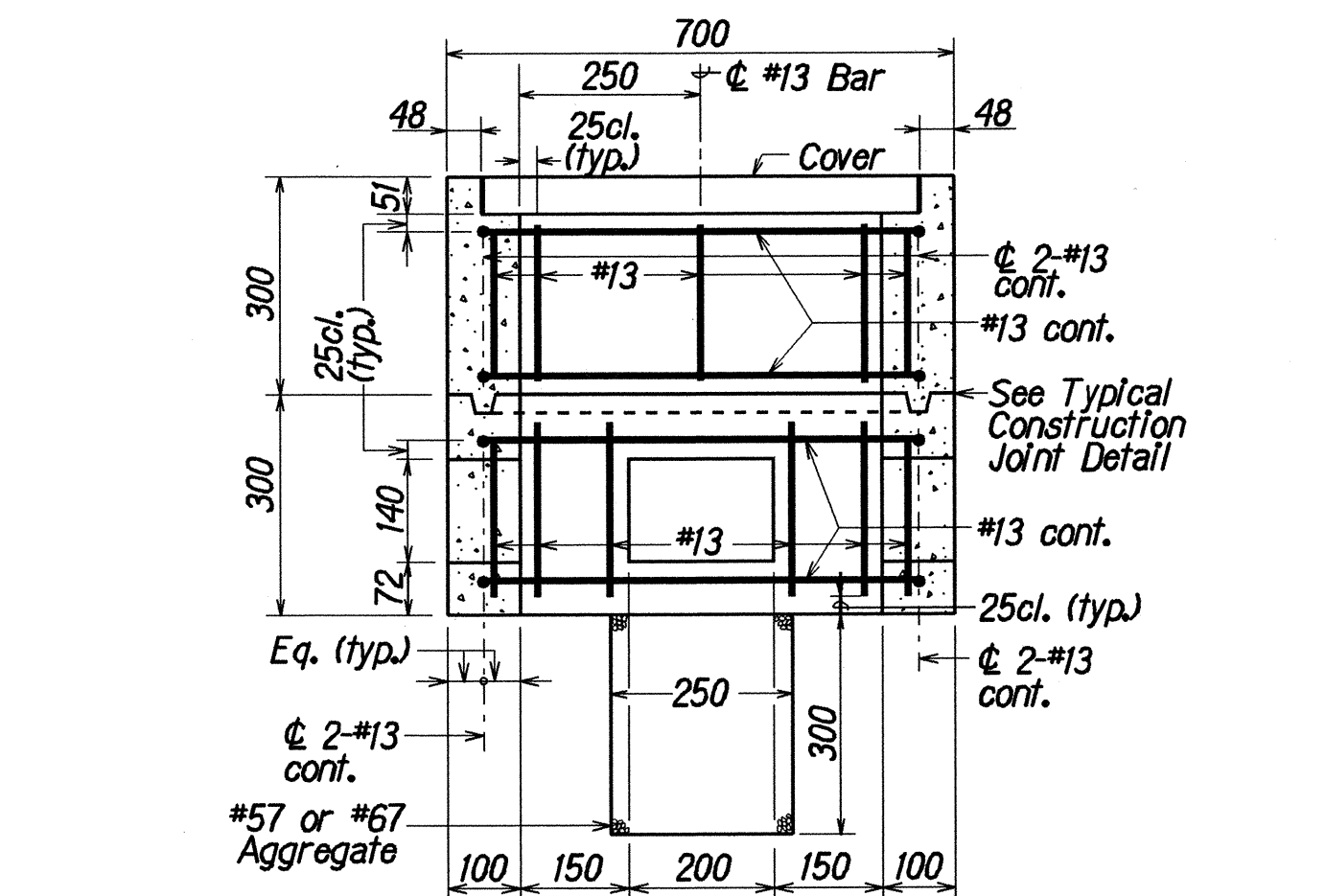
SECTION B-B

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

Scale: 1:10



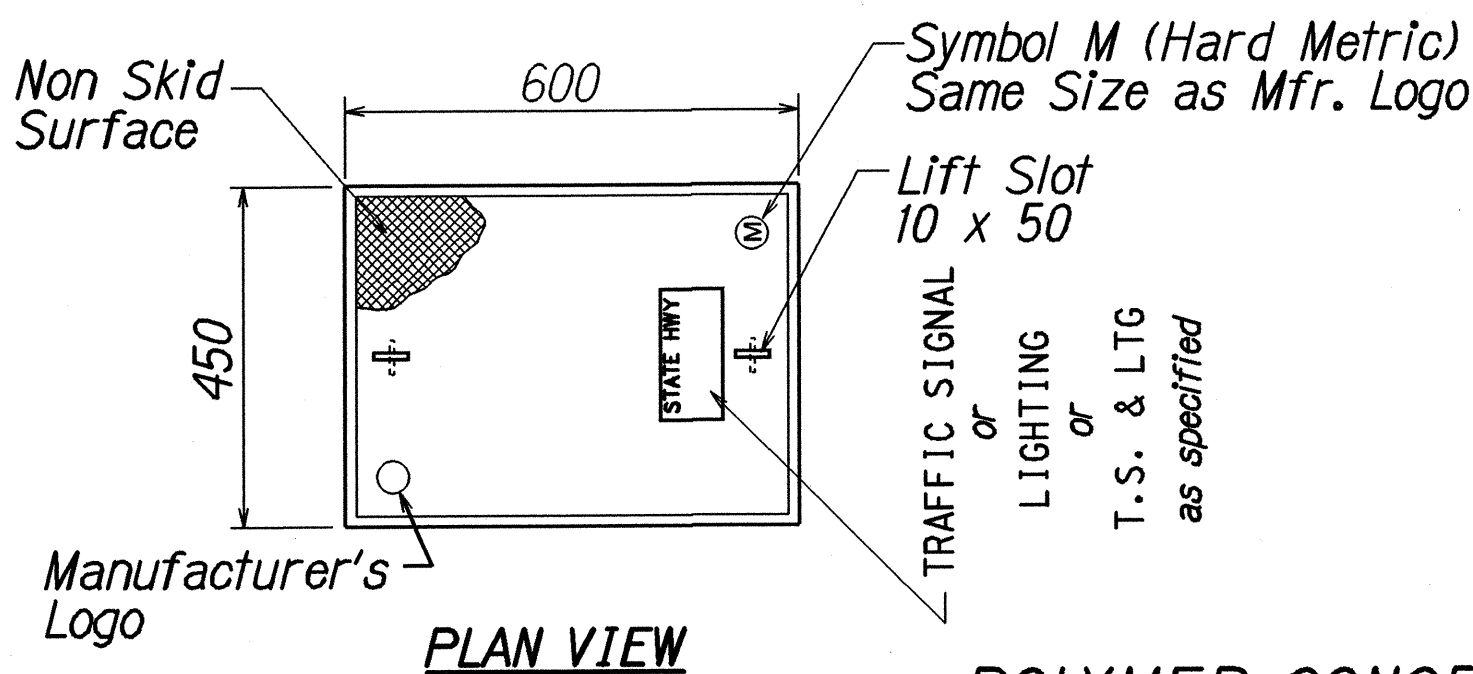
SECTION A-A



SECTION B-B

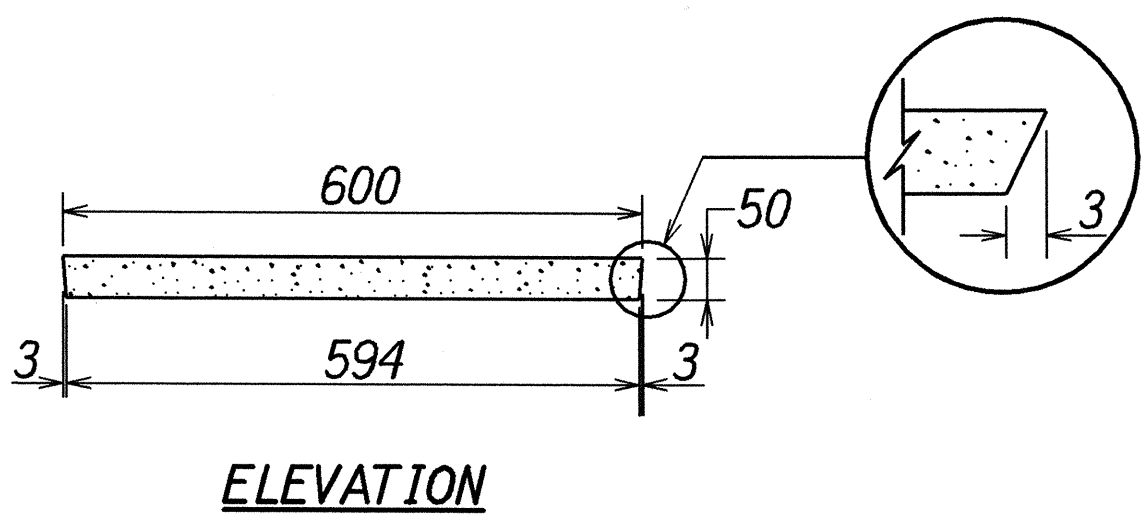
TYPE "C" PULLBOX (Old Type "D")

Scale: 1:10

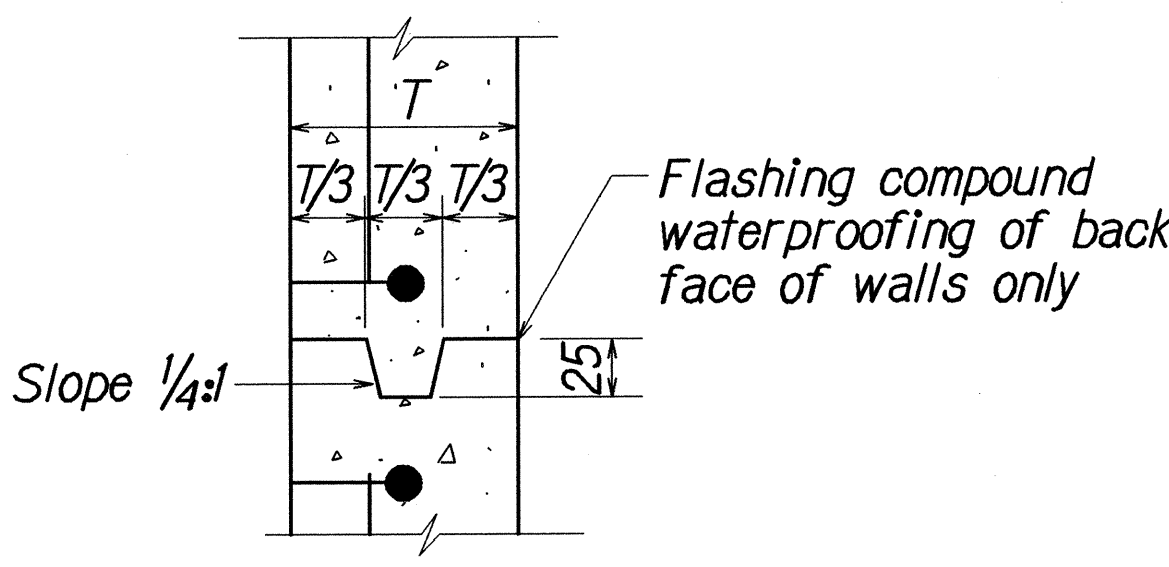


POLYMER CONCRETE COVER

Not to Scale



ELEVATION



TYPICAL CONSTRUCTION JOINT DETAIL

Not to Scale