FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	33	105

TRUE NORTH
SCALE : 1" = 20'

DON'T WALK
WALK

A-1
A-2

SIGNAL INDICATION

NOTE:
Temp. Traffic Signal System to remain unless as noted in the Plans.

Tie into Exist. and make all necessary adjustments.

CONDUIT	CABLE
1-2"	1-Type I
1-2"	4-Type 2
1-2"	1-Type 7
1-2"	Spare

Concrete Encased

256+00
257+00
258+00
255+00
254+00

6 Ea., 1-6'x6' Loop Detectors Centered in Lane

1 Ea., 4-6'x6' Loop Detectors Centered in Lane

Remove and Dispose Exist. Cables. Abandon Exist. Conduits in Place.

(PV)

Abandon Exist. Loop Detectors in Place or Remove and Dispose as Required.

Reposition Exist. Traffic Signal Heads in line with the path of that movement. This work shall be considered incidental to the various contract items.

Install New Type B Pullbox and Match to Exist. Grade.

HALAWA ST

Relocated tsp
(C.C.O. No. 8)

CONDUIT	CABLE
1-2"	1-Type I
1-2"	3-Type 2
1-2"	1-Type 7
1-2"	Spare

Concrete Encased

Install New R10-4b(R¢L) Push Button w/Sign.

Ⓐ Install New Type I Traffic Signal Standard w/Pedestrian Heads and Push Button.

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

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY M. Fadul	
NOTE BOOK	TRACED BY	
	DESIGNED BY Glen Kakehi	
QUANTITIES BY		
CHECKED BY		

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL PLAN

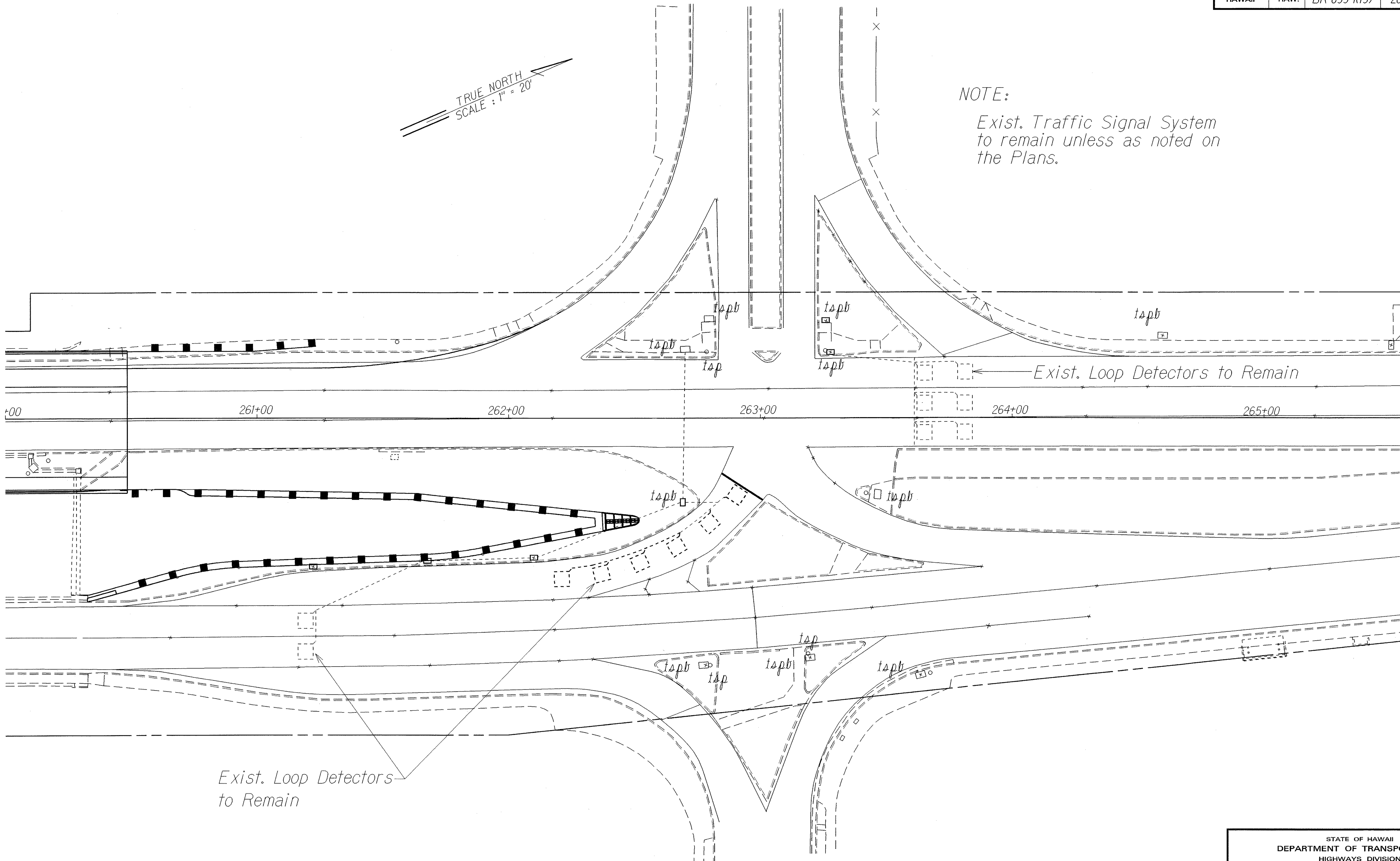
KAMEHAMEHA HIGHWAY
Halawa Stream Bridge (Inbound) Replacement
Federal Aid Project No. BR-099-1(19)

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

SHEET No. T8 OF 14 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	34	105



NOTE:

Exist. Traffic Signal System to remain unless as noted on the Plans.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL PLAN

KAMEHAMEHA HIGHWAY

Halawa Stream Bridge (Inbound) Replacement

Federal Aid Project No. BR-099-1(19)

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

SHEET No. T9 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	35	105

STANDARDS, SIGNAL HEADS AND APPURTENANCES (KAMEHAMEHA HIGHWAY & HALAWA STREET INTERSECTION)

POLE NO.	STANDARD TYPE	COMMENTS	MOUNT TYPE	SIGNAL HEAD & APPURTENANCES		
				NEW	EXISTING TO REMAIN	EXISTING TO SALVAGE
A	I	EXISTING	II II IV	PED. PUSH BUTTON W/SIGN	RY← RYG PED. HEAD	
B	I	EXISTING	I IV	PED. PUSH BUTTON W/SIGN	RYG PED. HEAD	
c	II	EXISTING TO SALVAGE	IV VI VI V			RY← RYG RYG PED. HEAD (2 Ea.)
d	I	EXISTING TO DISPOSE	I			PED. HEAD (DISPOSE)
E	II	NEW	VI VI VI IV MA-EVP	RY←(PV) RY↑ RYG PED. HEAD W/PUSH BUTTON & SIGN EVP		
F	I	EXISTING	I IV	PED. PUSH BUTTON W/SIGN	RYG PED. HEAD	
G	I	EXISTING	II II IV		RY←(REPOSITION HEAD) RYG PED. HEAD	
H	HWY LIGHT	EXISTING	IV	PED. PUSH BUTTON W/SIGN	PED. HEAD	
I	I	EXISTING	II II IV	PED. PUSH BUTTON W/SIGN	RYG RYG PED. HEAD	
J	I	EXISTING	II II IV	PED. PUSH BUTTON W/SIGN	RY←(REPOSITION HEAD) RY↑ (REPOSITION HEAD) PED. HEAD	
K	II	EXISTING	VI		RYG (REPOSITION HEAD)	
L	I	EXISTING	II II	PED. PUSH BUTTON W/SIGN PED. PUSH BUTTON W/SIGN	PED. HEAD PED. HEAD	

ORIGINAL PLAN
NOTE BOOK t62my No. 2kmhlsd3
SURVEY PLOTTED BY
DRAWN BY M. Fukutaki
TRACED BY Gary Kaaehi
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL PLAN

KAMEHAMEHA HIGHWAY
Halawa Stream Bridge (Inbound) Replacement
Federal Aid Project No. BR-099-1(19)

Date: June, 2000

SHEET No. T10 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	36	105

STATE RIGHT-OF-WAY BACKFILL NOTES

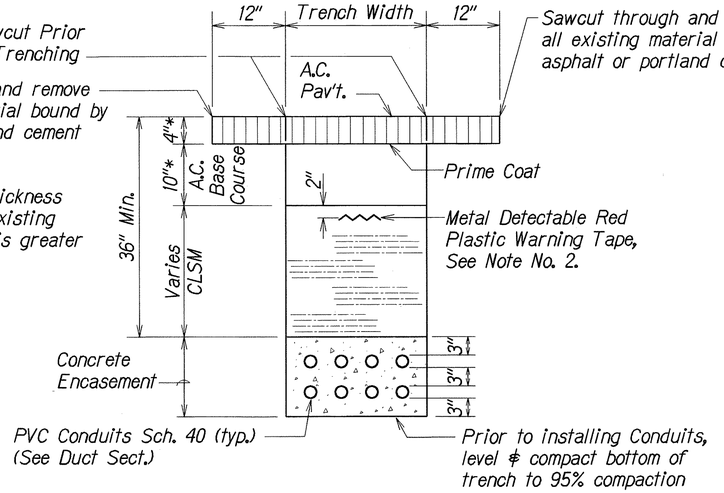
Controlled Low Strength Material (CLSM)
Approximately 50-150 psi compressive strength at 28 days. CLSM shall comply with Sections 313 and 601 of the Special Provisions.

Concrete
3000 psi compressive strength @ 28 days.

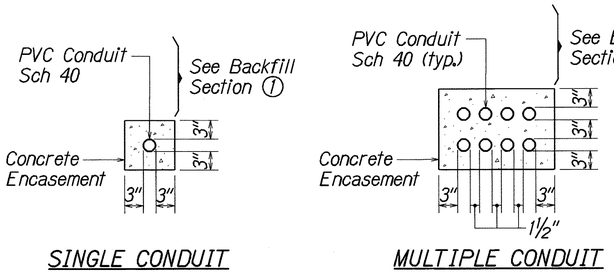
NOTE: Base Course & Sub-Base Course per 1994 State Standard Specifications for Highway Construction.

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" trench backfill material. (Trench Backfill Material "A" consists of beach sand, earth, or earth and gravel. If earth and gravel is 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. Rock shall not exceed 1" ø.)
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 before the concrete reaches 2500 psi compressive strength but after concrete has hardened sufficiently enough that backfilling will not damage the concrete jacket.
4. Maximum four (4) Conduits per row for multiple conduit duct section. Ducts shall be installed with spacers and anchored to the ground before pouring concrete. Spacers shall be a maximum of 5' apart. Joints shall be staggered.
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.

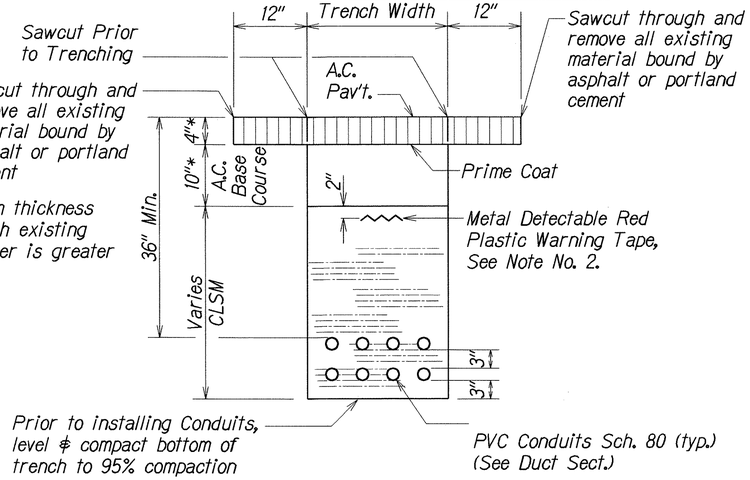


① TYPICAL BACKFILL SECTION WITH CONCRETE ENCASED DUCTS

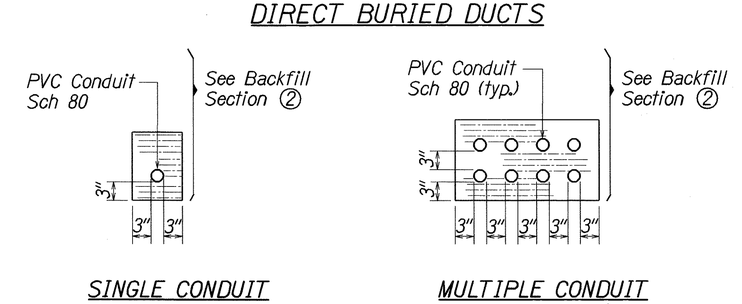


SINGLE CONDUIT — MULTIPLE CONDUIT

DUCT SECTIONS - CONC. ENCASED

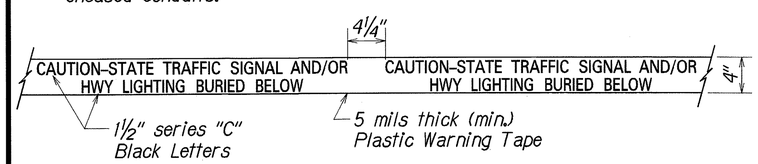


② TYPICAL BACKFILL SECTION DIRECT BURIED DUCTS



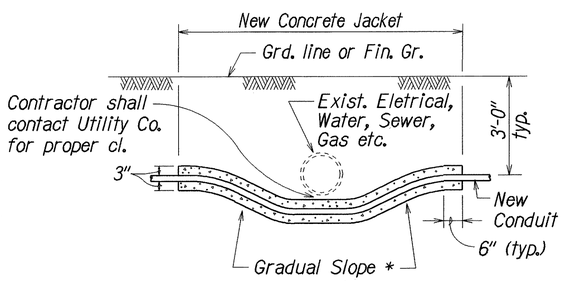
SINGLE CONDUIT — MULTIPLE CONDUIT

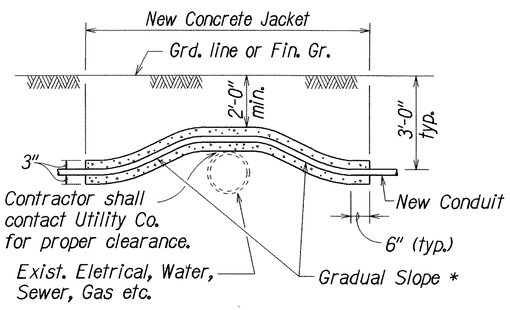
DUCT SECTIONS - DIRECT BURIED



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 M. Takafuji | TRACED BY | DESIGNED BY Gary Kakesh | QUANTITIES BY | CHECKED BY | NOTE BOOK dated May 24, 2000 | DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS

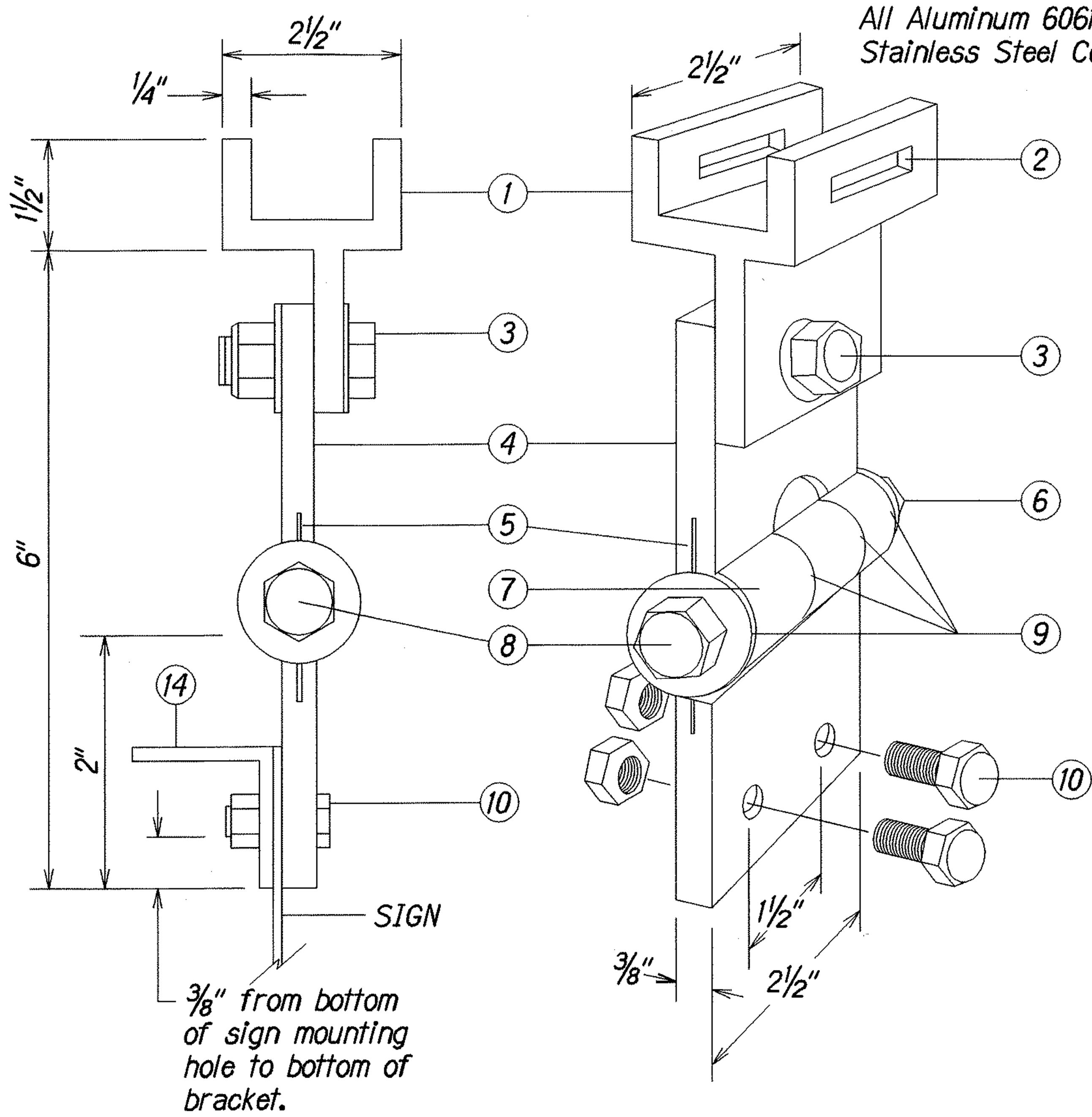
KAMEHAMEHA HIGHWAY
Halawa Stream Bridge (Inbound) Replacement
Federal Aid Project No. BR-099-1(19)

Not to Scale — Date: June, 2000

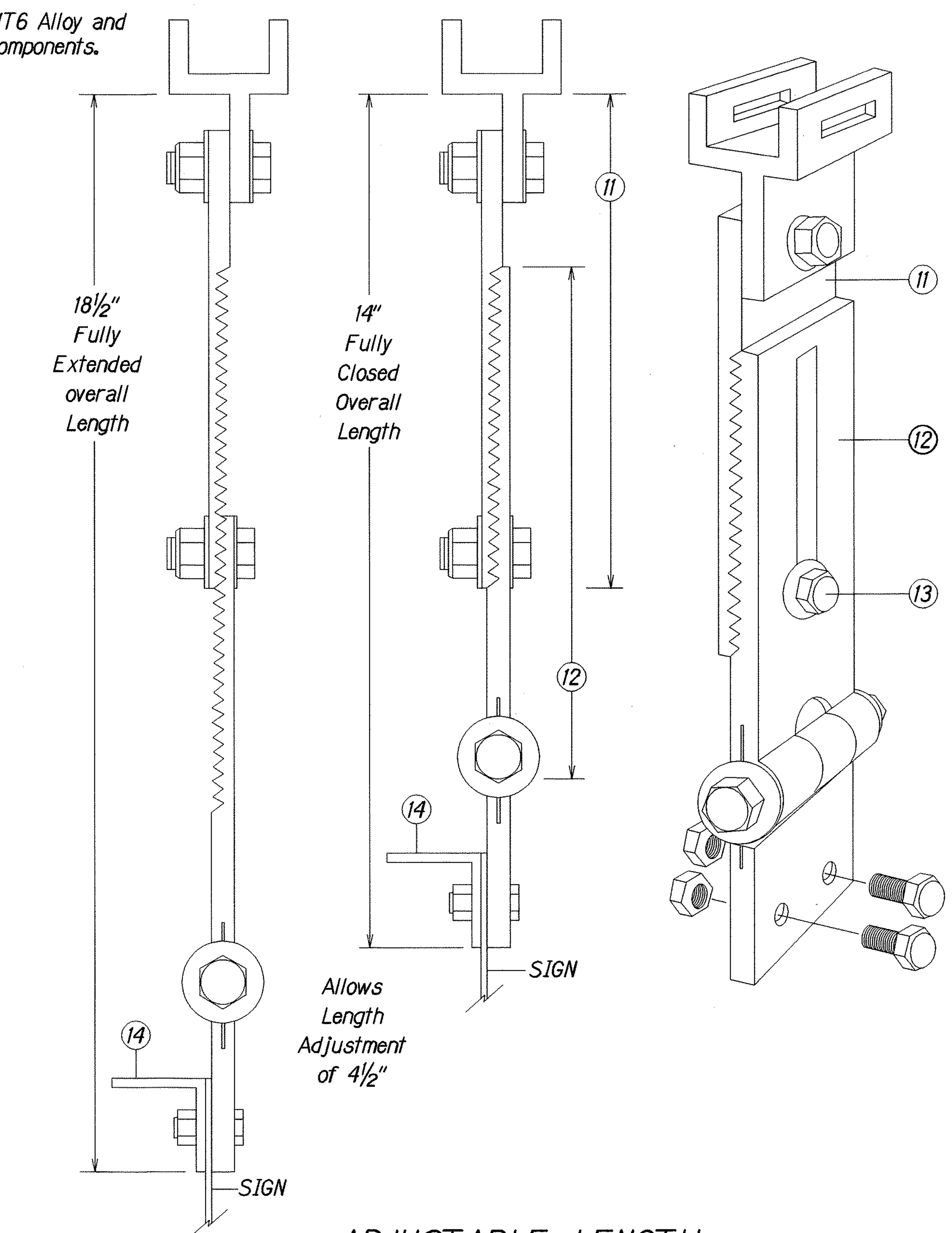
SHEET No. T11 OF 14 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	37	105

All Aluminum 6061T6 Alloy and Stainless Steel Components.



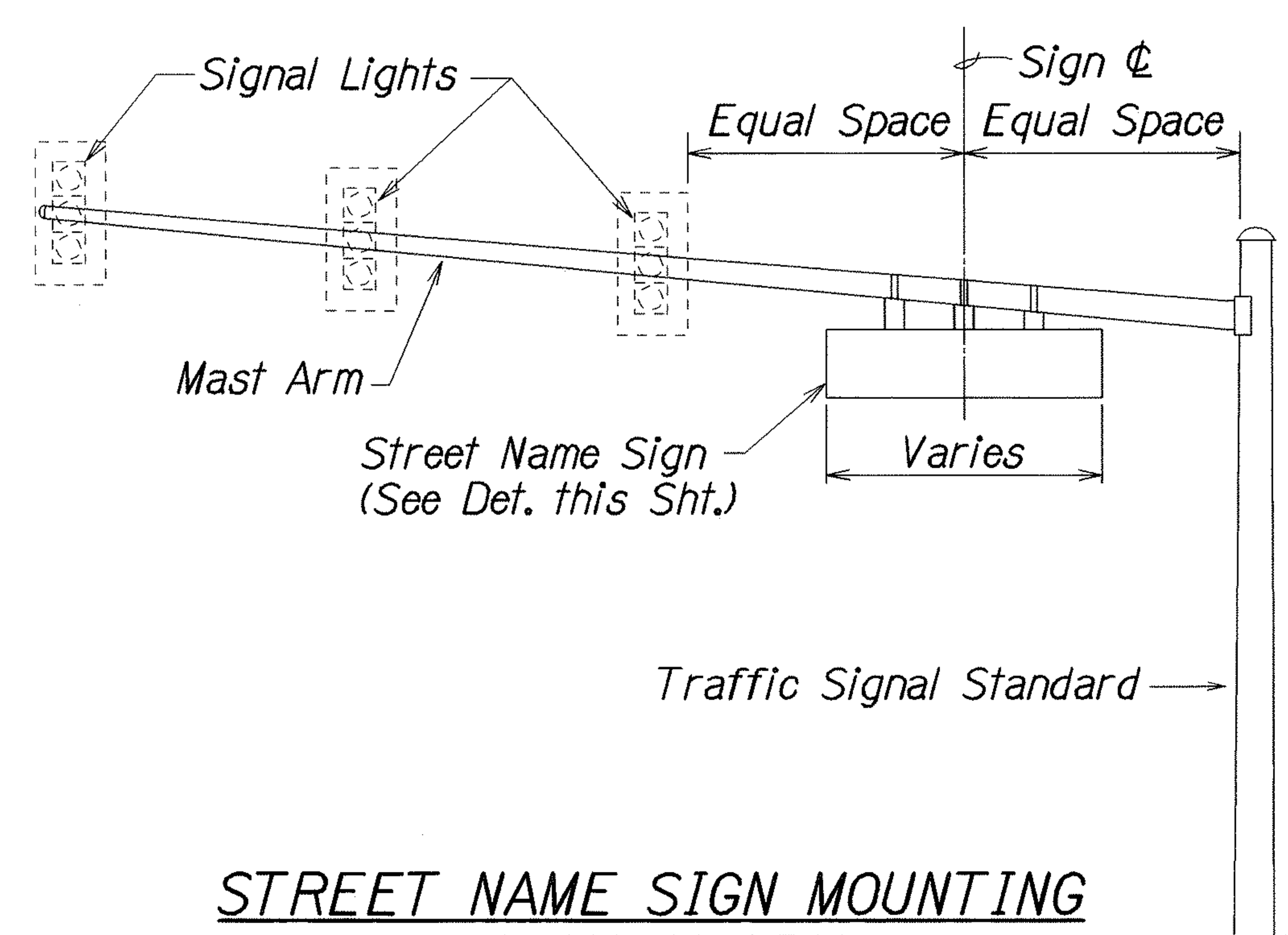
FIXED LENGTH NON-ADJUSTABLE SWING SIGN BRACKET



ADJUSTABLE LENGTH SWING SIGN BRACKET

1. Pivotal Upper Bracket
2. 1⅝" x ¼" Slot for double strapping to electrolier mast arm. (M2G-34S(HD) .030" x ¾" Heavy Duty Stainless Steel Strap with M2G-34B(HD) Buckle recommended.)
3. ½" - 13 x 1½" Stainless Steel Hex Head Bolt with Stainless Steel Hex Lock Nut and 1/16" Stainless Steel Washer (both sides). Allows upper bracket to pivot and align with electrolier mast arm.
4. 6" Overall drop with Fixed Length Sign Bracket
5. Stainless Steel Dampener Spring (Removable)
6. Stainless Steel Hex Lock Nut with 1/16" Stainless Steel Washer
7. 1" O.D. Axle Housing
8. ½" - 13 x 4" Stainless Steel Hex Head Bolt with 1/16" Stainless Steel Washer
9. Oilite Bushing
10. Sign Mounting Sets, consisting of two each 5/16" - 18 x 1" Stainless Steel Hex Head Bolt with Stainless Steel Hex Lock Nut. Two holes on 1½" centers provide positive lock sign mounting to bracket.
11. 8¼" overall length Upper Adjustable Sign Bracket section
12. 9" overall length Lower Adjustable Sign Bracket section, including Axle Housing (8" overall length to top of Axle Housing)
13. ½" - 13 x 1½" Stainless Steel Hex Bolt with Stainless Steel Hex Lock Nut and 1/16" Stainless Steel Washers (both sides). Loosen lock nut, adjust bracket teeth to level sign.
14. 1¼" x 1¼" x ⅛" Aluminum Angle

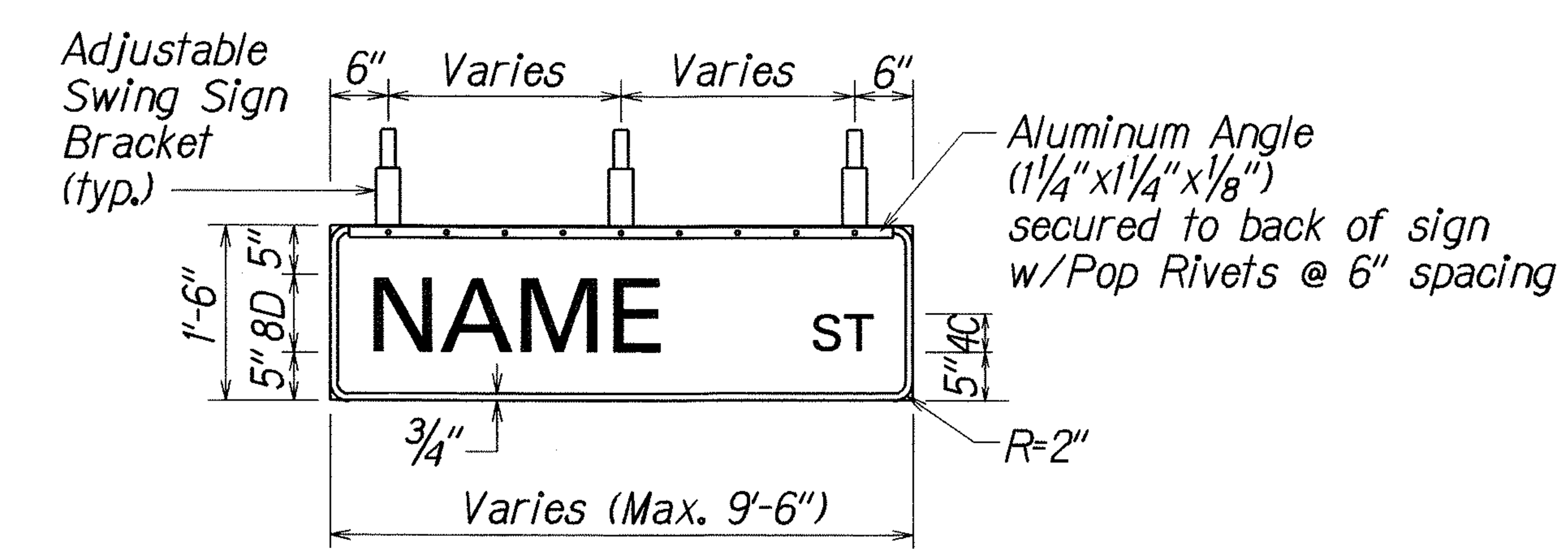
Note: Dimensions may vary slightly.



STREET NAME SIGN MOUNTING ON MAST ARM

STREET NAME (D3) SIGN NOTES:

1. Sign D3-1 shall be a new Street Name Sign. The Contractor shall provide the same message on the front and back side of the sign. Payment will not be made separately but shall be considered as one unit.
2. Colors:
   Legend - White (Reflectorized)
   Background - Green (Reflectorized)
3. All panels shall be reflectorized with Type III or IV retroreflective sheeting in accordance with Section - 712.20 of the Standard Specifications.
4. All signs shall conform to section 621 of the Standard Specifications and the latest editions and amendments of the following FHWA publications:
   a. "Manual on Uniform Traffic Control Devices for Streets and Highways" (MUTCD)
   b. "Standard Highway Signs"
   c. "Standard Alphabets for Highway Signs"
5. Borders and messages shall conform to details as shown on the plans and as specified in the MUTCD.
6. Sign mounting brackets, aluminum angle, fixtures, fasteners and all necessary hardware, and equipment, tools, labor, materials and other incidentals for installation, will not be paid for separately but shall be considered incidental to street name sign installation.
7. Number of Swing Sign Brackets required per Sign Panel:
   3 Brackets - Panel length 7' or less
   4 Brackets - Panel length greater that 7' with a maximum length of 9'-6"
8. Diacritical marks for Street Name are not authorized.



(Rear View)

PANEL & SWING BRACKET LAYOUT FOR STREET NAME SIGN

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SIGN MOUNTING DETAIL

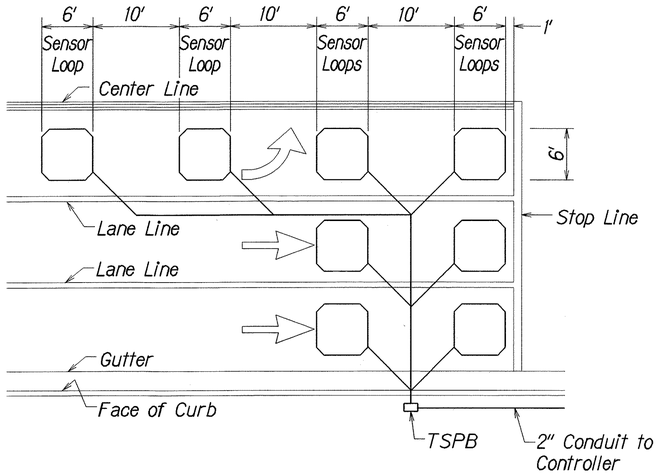
KAMEHAMEHA HIGHWAY
Halawa Stream Bridge (Inbound) Replacement
Federal Aid Project No. BR-099-1(19)

Not to Scale Date: June, 2000

SHEET No. T12 OF 14 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY J. Takafuji	
	TRACED BY Gary Kaseki	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

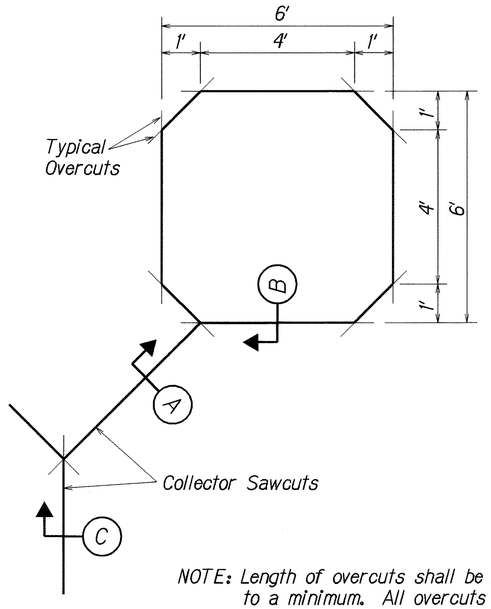
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	38	105



NOTES:

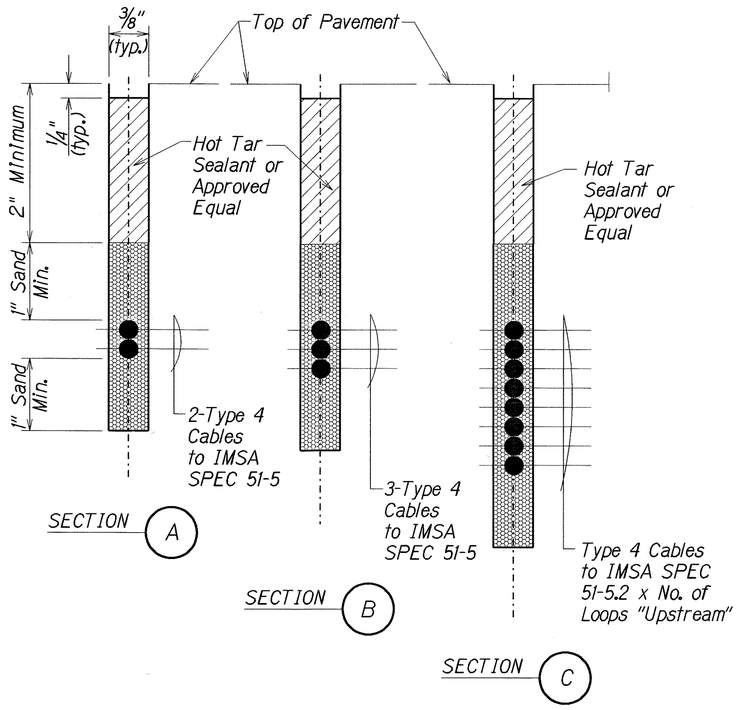
1. Center sensor loops in lanes.
2. Collector cables shall be twisted 2 turns per foot.
3. Number of loops and locations vary. See project plans.
4. Number and locations of collector sawcuts may be varied in the field to suit.

TYPICAL SENSOR LOOP LAYOUT

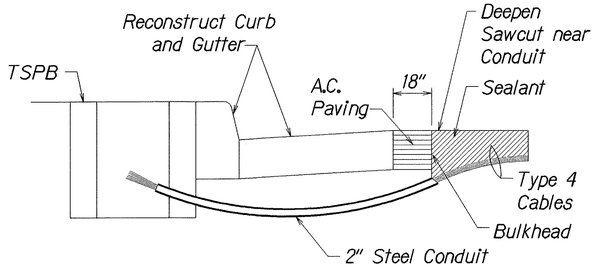


NOTE: Length of overcuts shall be kept to a minimum. All overcuts shall be back filled with hot tar.

TYPICAL SENSOR LOOP SAWCUT DETAIL



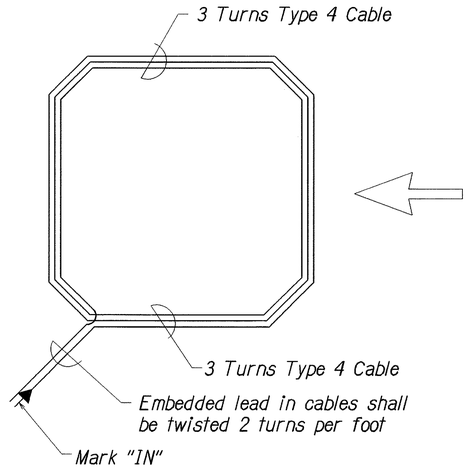
TYPICAL SECTION THROUGH SENSOR LOOP



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
SIGNAL PLOTTED BY
SIGNAL DRAWN BY
SIGNAL TRACED BY
SIGNAL DESIGNED BY
SIGNAL QUANTITIES BY
SIGNAL CHECKED BY
DATE

NOTE BOOK
QUANTITIES BY
CHECKED BY

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

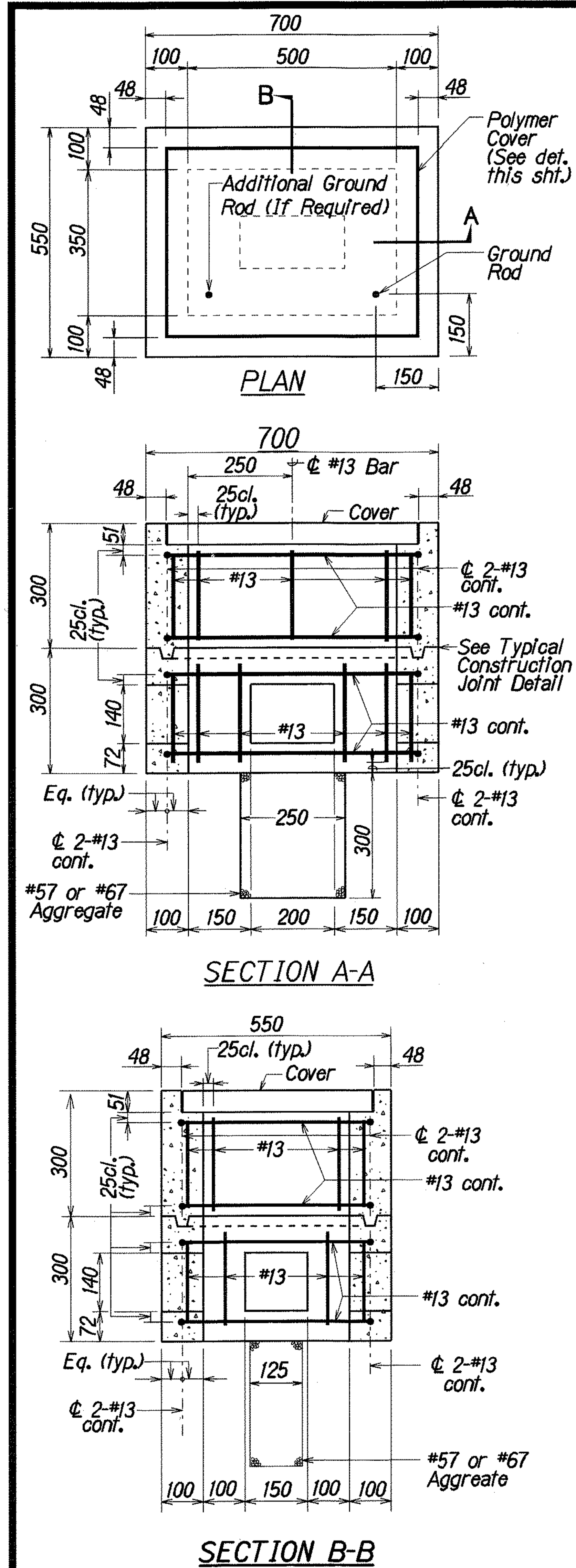
LOOP DETECTOR DETAILS

KAMEHAMEHA HIGHWAY
Halawa Stream Bridge (Inbound) Replacement
Federal Aid Project No. BR-099-1(19)

Not to Scale Date: June, 2000

SHEET No. T13 OF 14 SHEETS

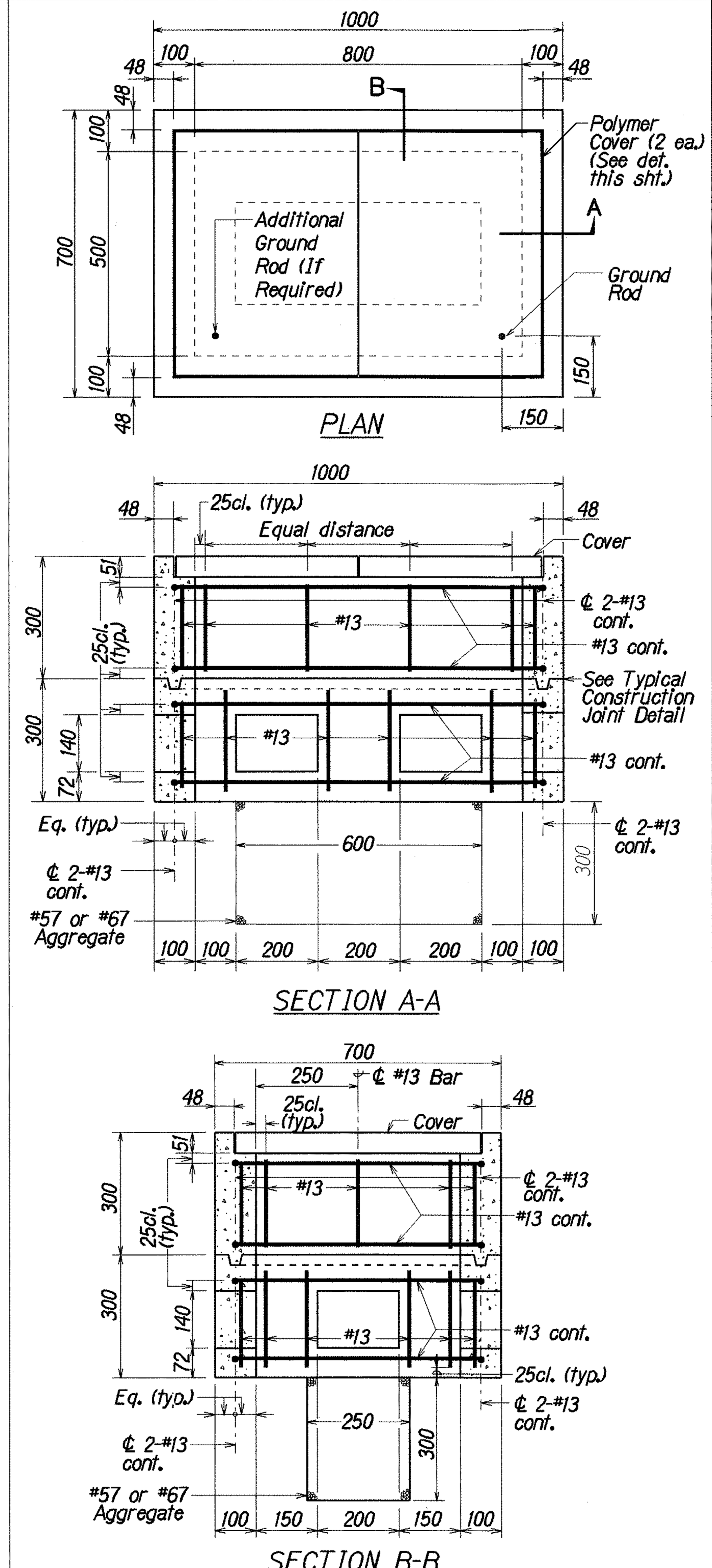
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-099-1(19)	2001	39	105



TYPE "A" PULLBOX

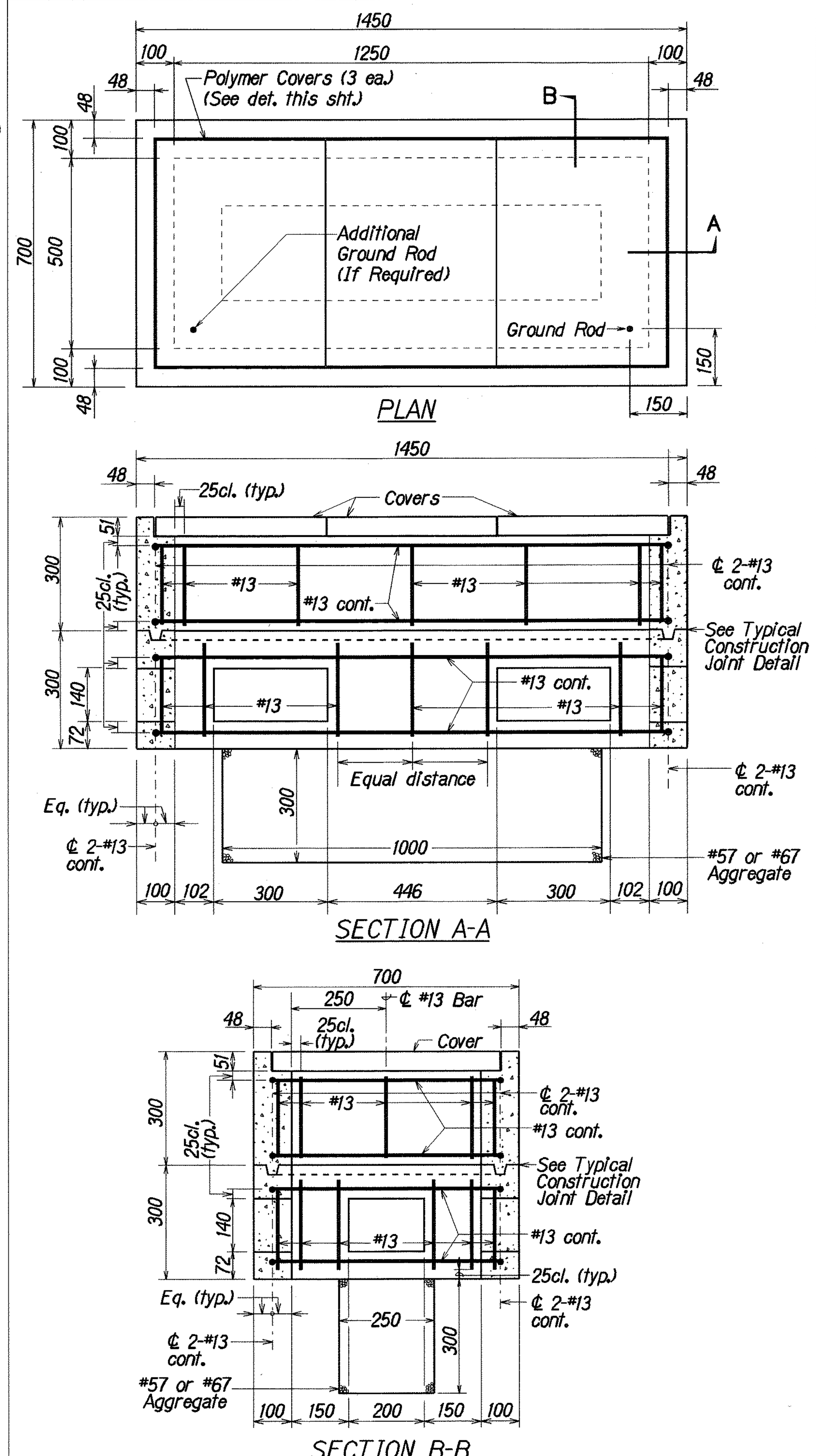
(Old Type "B")

Scale: 1 : 100



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

Scale: 1 : 100

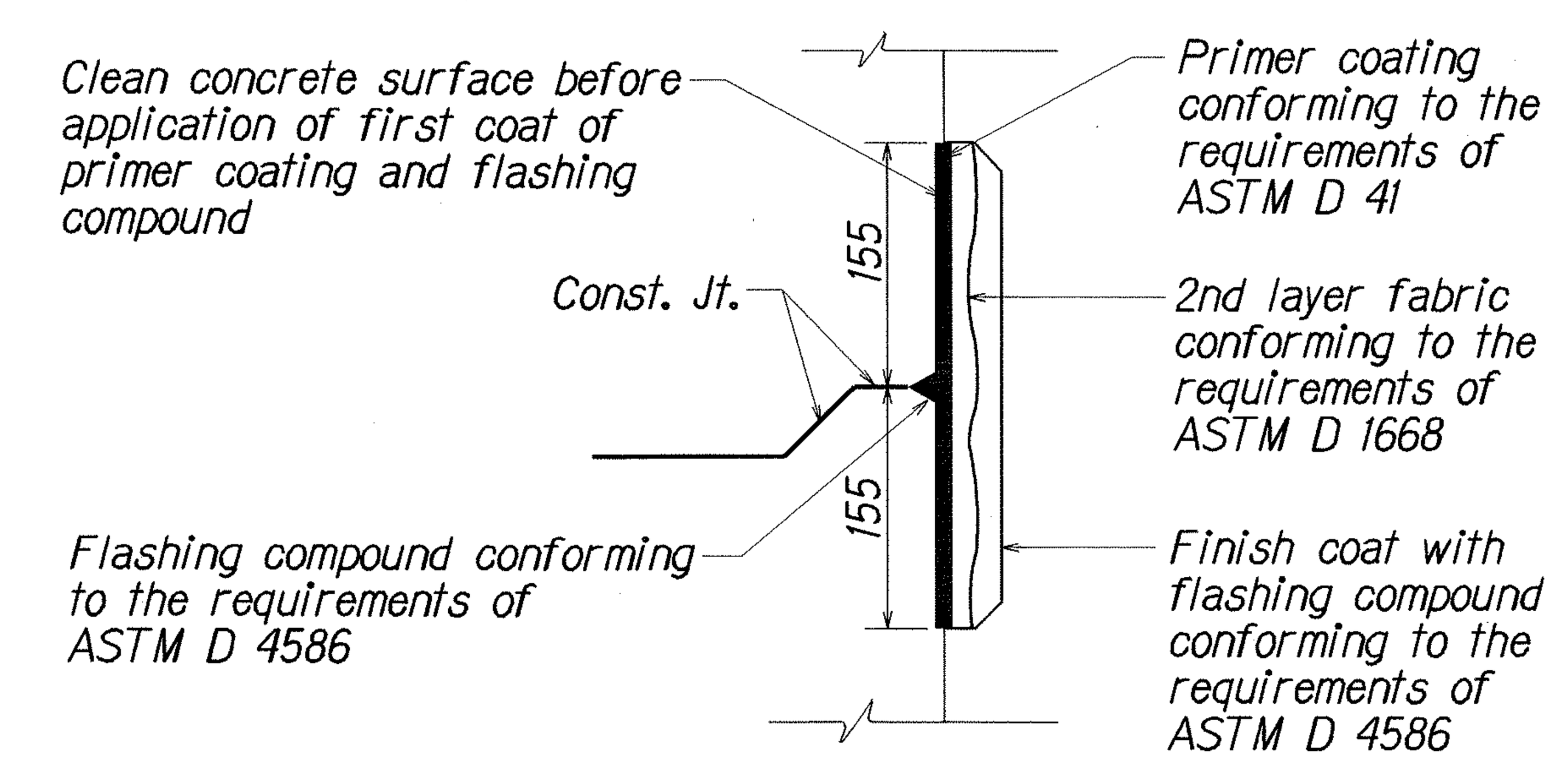


TYPE "C" PULLBOX (Old Type "D")

Scale: 1 : 100

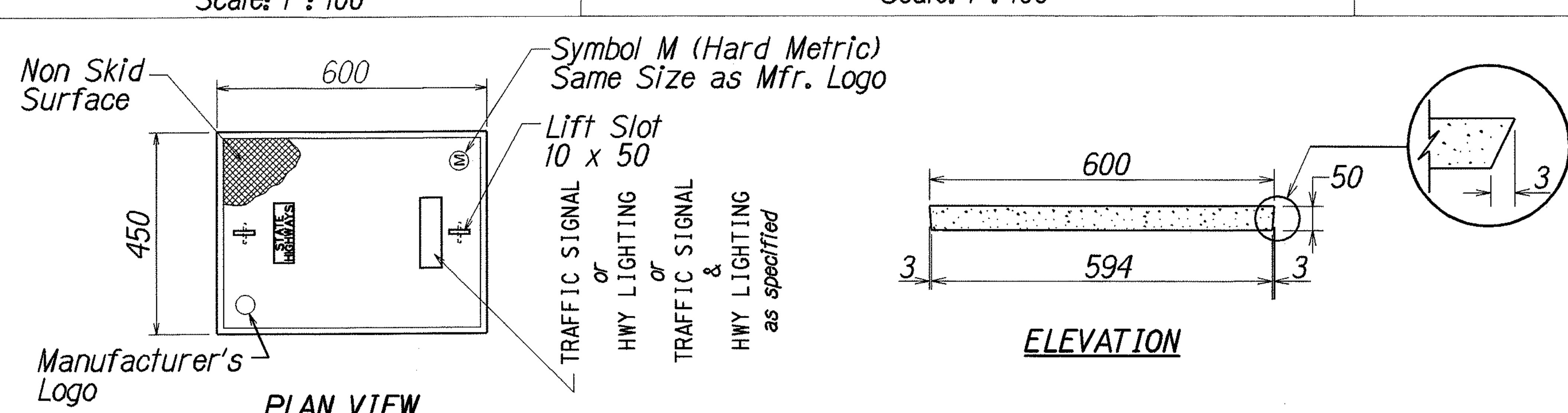
GENERAL NOTES

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).



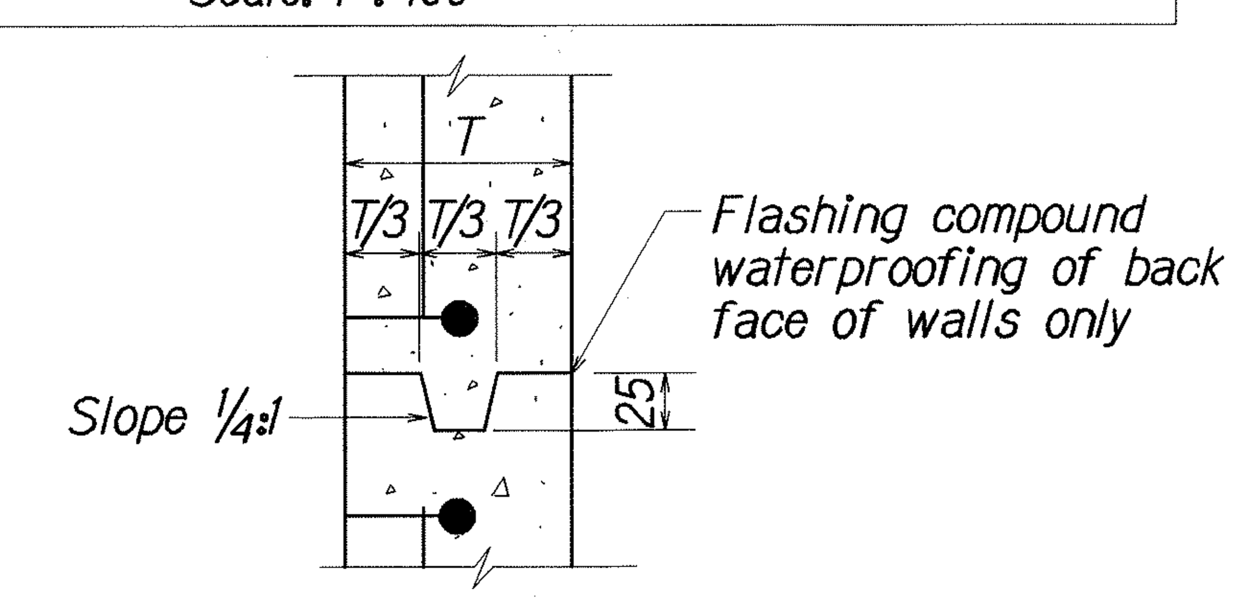
TYPICAL FLASHING COMPOUND WATERPROOFING DETAILS

Not to Scale



POLYMER CONCRETE COVER

Not to Scale



TYPICAL CONSTRUCTION JOINT DETAIL

Not to Scale

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PULLBOX & COVER DETAILS

KAMEHAMEHA HIGHWAY

Halawa Stream Bridge (Inbound) Replacement

Federal Aid Project No. BR-099-1(19)

Scale: As Shown Date: June, 2000

SHEET No. T14 OF 14 SHEETS