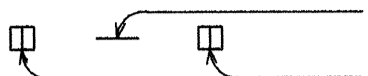
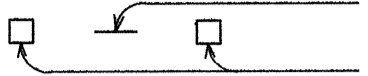
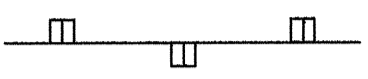
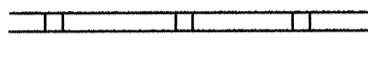


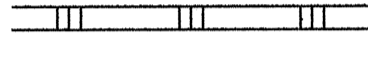



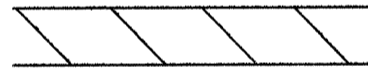
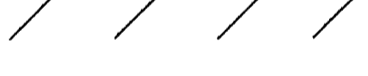

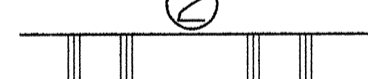

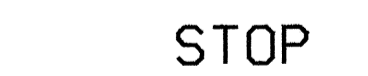
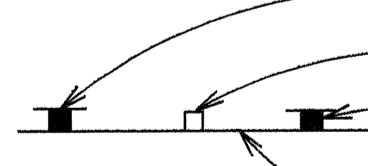
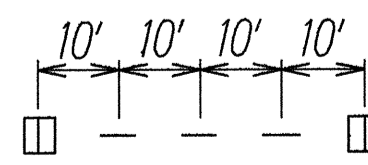


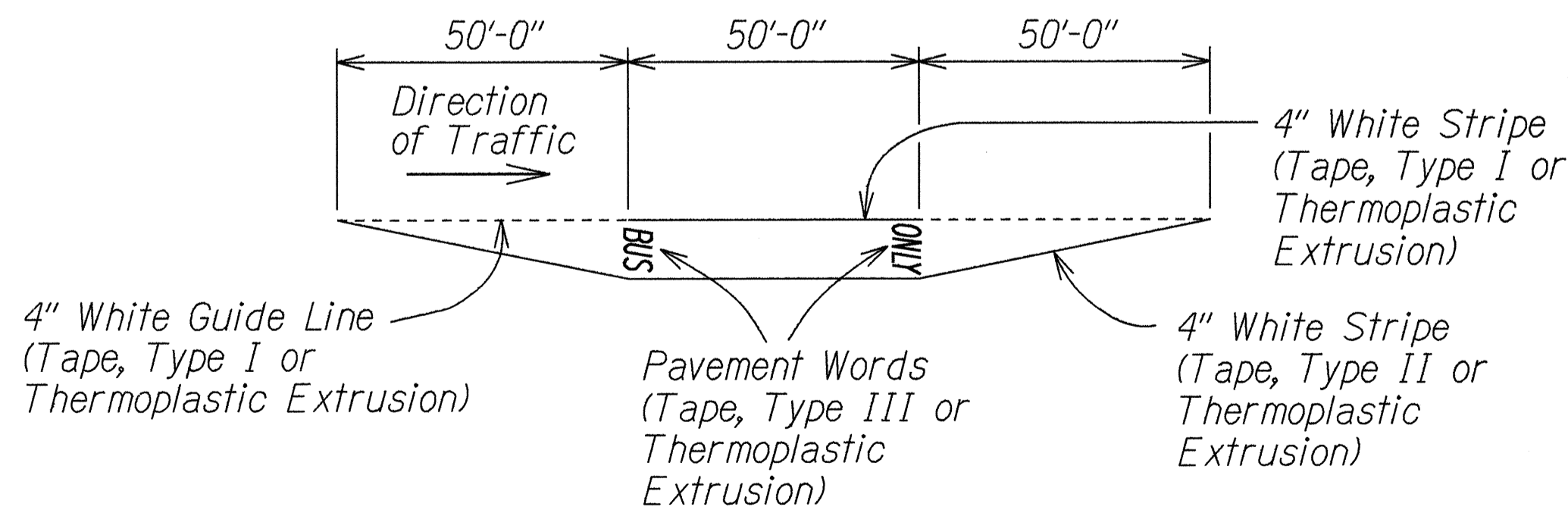
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-099-1(9)	1994	26	54

LEGEND

-  4 each Type A Raised Pavement Markers
Type C Raised Pavement Markers @ 40'-0" o.c.
-  4 each Type J Raised Pavement Markers
Type D Raised Pavement Markers @ 40'-0" o.c.
-  8" White Stripe with Type C Raised Pavement Markers @ 20'-0" o.c. (Tape, Type I or Thermoplastic Extrusion)
-  4" Double Solid Yellow with Type D Raised Pavement Markers @ 20'-0" o.c. (Tape, Type I or Thermoplastic Extrusion)
-  4" Double Solid Yellow Stripes with Type H Raised Pavement Markers @ 20'-0" o.c. (Tape, Type II or Thermoplastic Extrusion)
-  4" Yellow Edge Stripe with Type H Raised Pavement Markers @ 40'-0" o.c. (Tape, Type II or Thermoplastic Extrusion)
-  4" Double Solid White Stripes with Type C Raised Pavement Markers @ 20'-0" o.c. (Tape, Type I or Thermoplastic Extrusion)
-  Lane Change Restriction Marking
4 each Type A Raised Pavement Markers
Type C Raised Pavement Markers @ 20'-0" o.c.
4" White Stripe (Tape, Type I or Thermoplastic Extrusion)
-  4" or 8" White Edge Stripe with Type C Raised Pavement Markers @ 40'-0" o.c. (Tape, Type II or Thermoplastic Extrusion)
-  4" White Guide Lines (Tape, Type III or Thermoplastic Extrusion except for bus bays)
-  Transverse Median Marking (Tape, Type II or Thermoplastic Extrusion)
-  Transverse Shoulder Marking (Tape, Type II or Thermoplastic Extrusion)
-  Channelizing Island or Deceleration Lane Gore (Tape, Type II or Thermoplastic Extrusion)
-  Crosswalk and Stop Line. All Stop Lines shall be 10'-0" from Crosswalk unless otherwise noted. The circled number indicates the number of lanes for payment (Tape, Type III or Thermoplastic Extrusion)
-  Pavement Arrow (Tape, Type III or Thermoplastic Extrusion)
-  Pavement Word (Tape, Type III or Thermoplastic Extrusion)
-  4 Each Type J Raised Pavement Markers
Type D Raised Pavement Markers @ 40'-0" o.c.
Type H Raised Pavement Markers (Reflective Surface facing no-passing direction)
4" Single Solid Yellow Stripe (Tape, Type I or Thermoplastic Extrusion)
-  Extension of Edge Line, 4" Wide x 2'-0" Long White Stripe @ 10'-0" o.c. w/Type C Markers @ 40'-0" o.c. (Tape, Type III or Thermoplastic Extrusion)

NOTES

1. Layout of pavement markings and striping shall be done by the Contractor and approved by the Engineer prior to any installation work.
2. Existing pavement markings not incorporated in the final traffic pattern shall be removed as directed by the Engineer. Costs shall be incidental to the various pavement marking items.
3. Raised pavement markers shall not be installed within crosswalks.
4. Final locations of all signs shall be approved by the Engineer prior to any installation work.
5. Existing signs not shown on these plans shall remain as posted unless otherwise directed by the Engineer. Removal and disposal of existing signs and/or posts as designated on these plans shall be incidental to the various signing items.
6. Final locations of all Stop Lines shall be approved by the Engineer prior to installation.
7. All pavement striping shall be as noted on the Legend or plans.
8. All preformed pavement marking tapes over existing pavement shall be applied with an approved primer as recommended by the tape manufacturer and as approved by the Engineer. The primer shall be allowed to dry to the tacky stage prior to tape application.



TYPICAL BUS BAY STRIPING
Not to Scale

DATE	1/24
DESIGNED BY	J. B. Hill
CHECKED BY	G. Keleni
QUANTITIES BY	
NOTED TO	
PLAN	
ORIGINAL	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**PAVEMENT MARKING
LEGEND, DETAILS & NOTES**

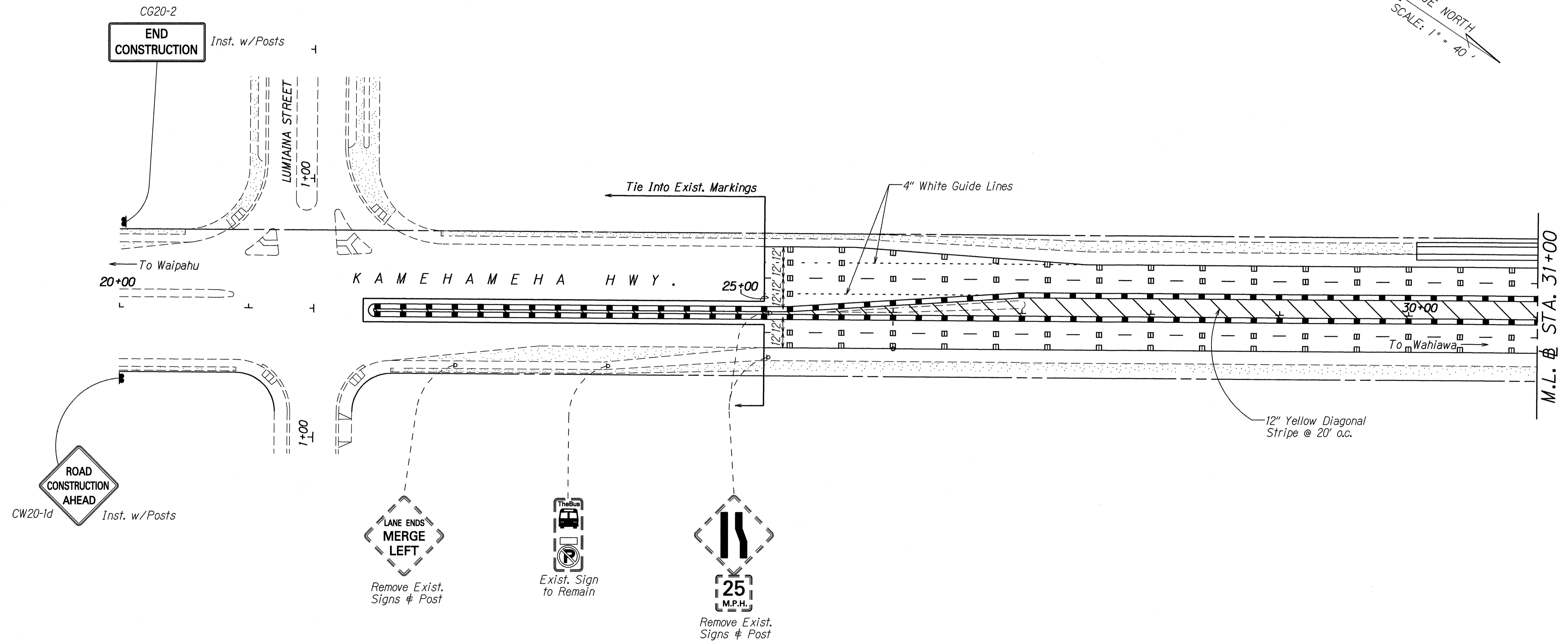
KAMEHAMEHA HIGHWAY WIDENING
Lumiaina St. to Waipio Uka St.
F.A.P. No. NH-099-1(9)

Date: Jan., 1994

SHEET No. 26 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-099-1(9)	1994	27	54

TRUE NORTH
SCALE: 1" = 40'



SURVEY PLOTTED BY	DATE
DESIGNED BY	1/24
TRACED BY	
NOTE BOOK	
QUANTITIES BY	
CHECKED BY	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

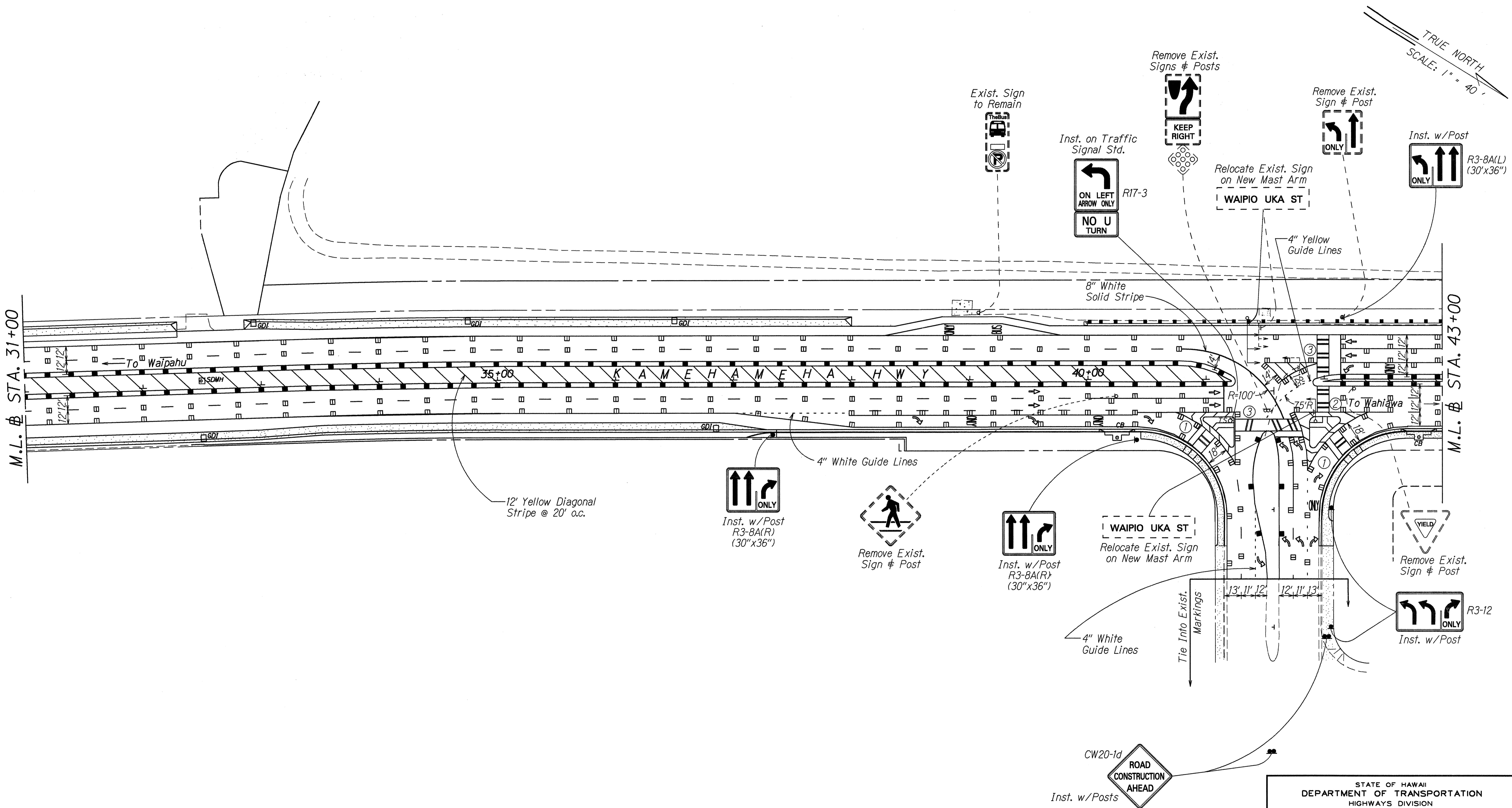
**PAVEMENT MARKING &
SIGNING PLAN**

KAMEHAMEHA HIGHWAY WIDENING
Lumiaina St. to Waipio Uka St.
F.A.P. No. NH-099-1(9)

Scale: 1"=40' Date: Jan., 1994

SHEET No. T2 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-099-1(9)	1994	C.O. 28	54



TRUE NORTH
SCALE: 1" = 40'

SURVEY PLOTTED BY	DATE
DRAWN BY M. Howells / R. Acti	1/24
NOTE BOOK	
DESIGNED BY G. Kato	
QUANTITIES BY	
CHECKED BY	

DATE	REVISION
5/18/95	Revised right turn lane deceleration lane pavement markings and sign R3-8A(R) location.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

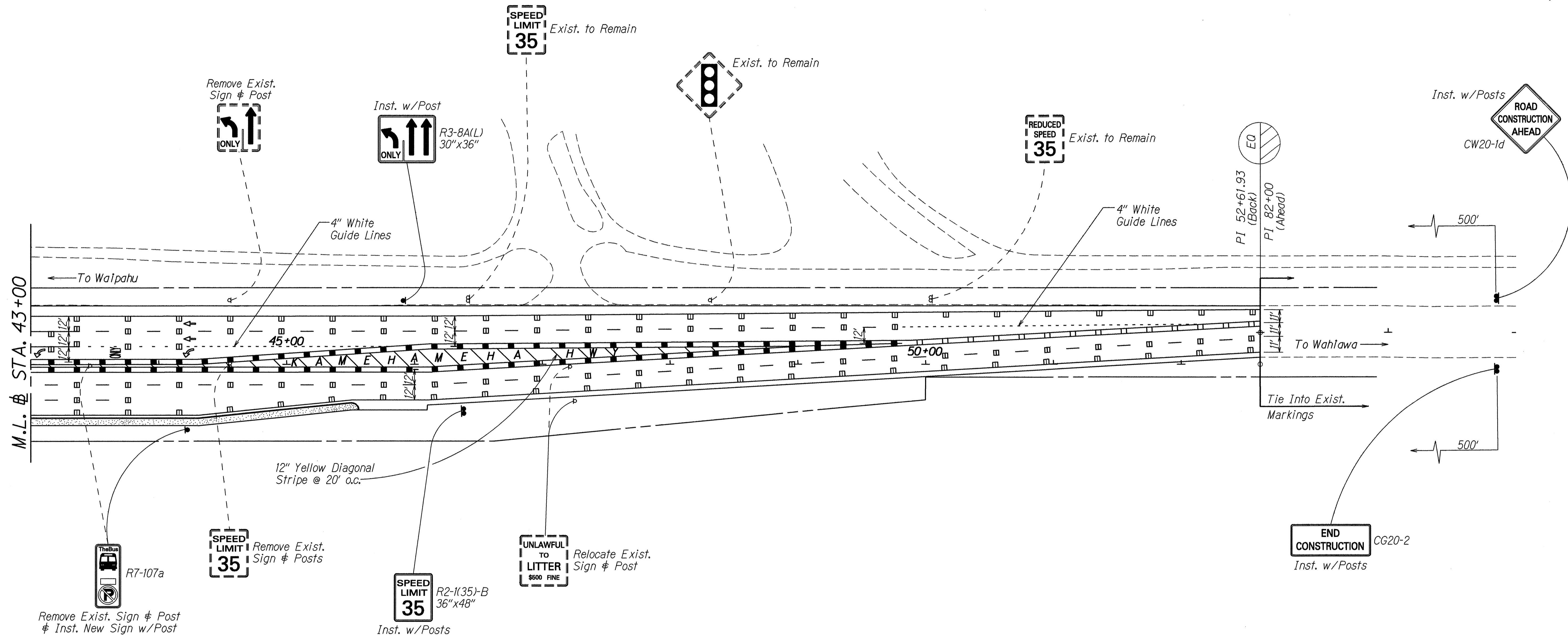
PAVEMENT MARKING & SIGNING PLAN

KAMEHAMEHA HIGHWAY WIDENING
Lumiaina St. to Waipio Uka St.
F.A.P. No. NH-099-1(9)

Scale: 1"=40' Date: Jan., 1994
SHEET No. T3 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-099-1(9)	1994	29	54

TRUE NORTH
SCALE: 1" = 40'



DATE: 1/24
 SURVEY PLOTTED BY: [Signature]
 DRAWN BY: M. Howells / R. Arji
 TRACED BY: G. Kashi
 CHECKED BY: [Signature]
 ORIGINAL PLAN
 NOTE BOOK
 10/mike
 2/24/94

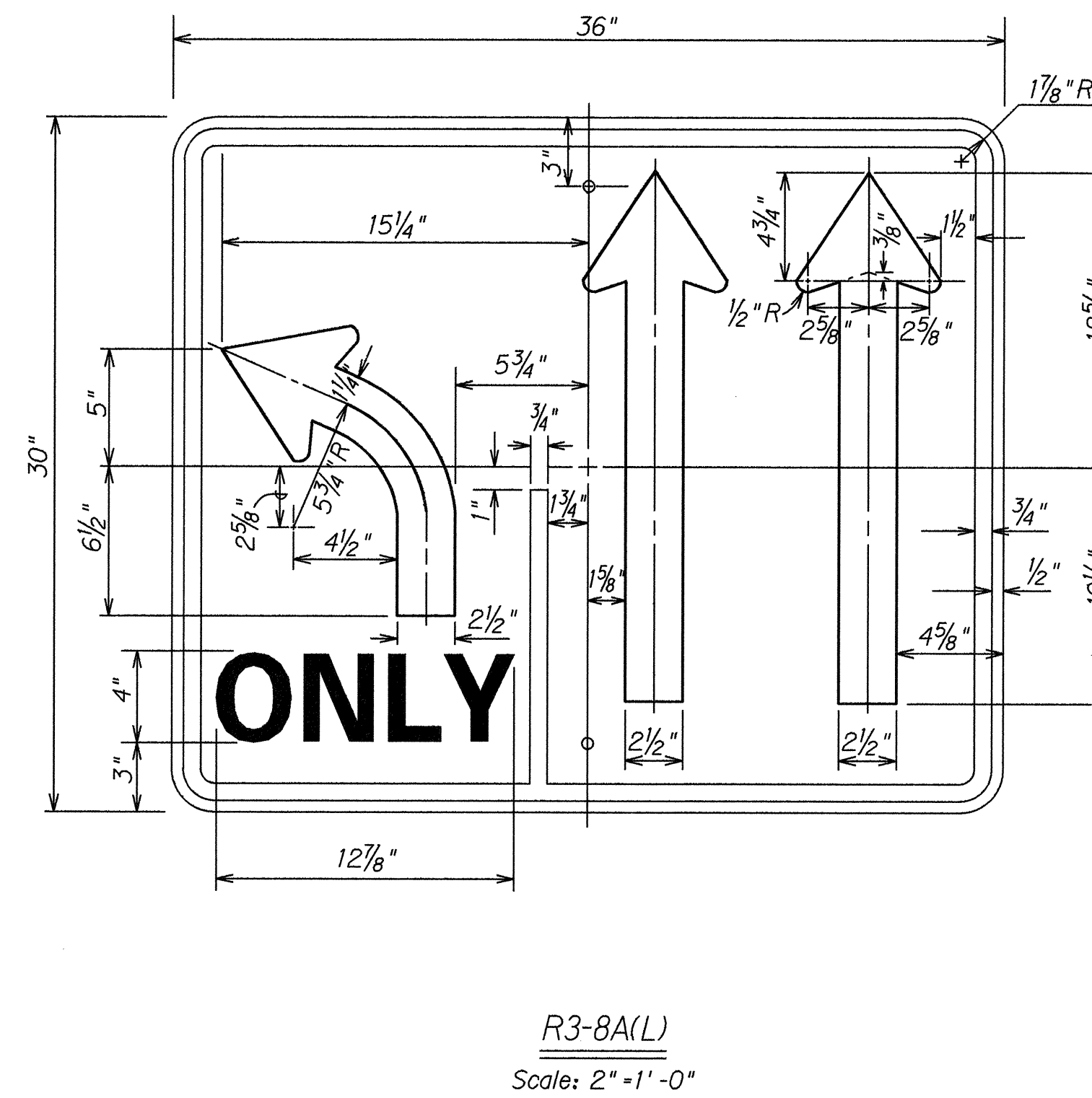
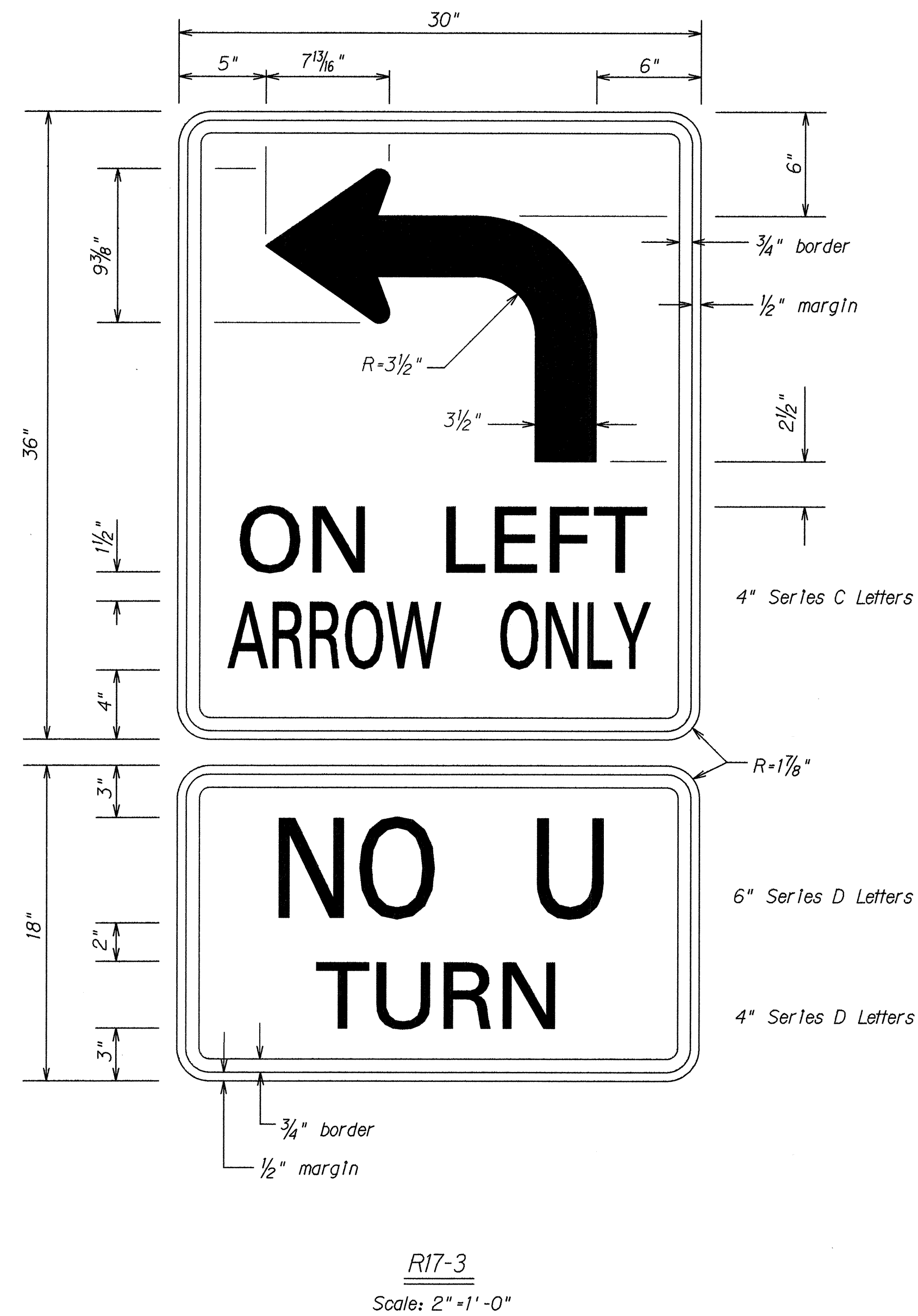
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

**PAVEMENT MARKING &
 SIGNING PLAN**

KAMEHAMEHA HIGHWAY WIDENING
 Lumiaina St. to Waipio Uka St.
 F.A.P. No. NH-099-1(9)

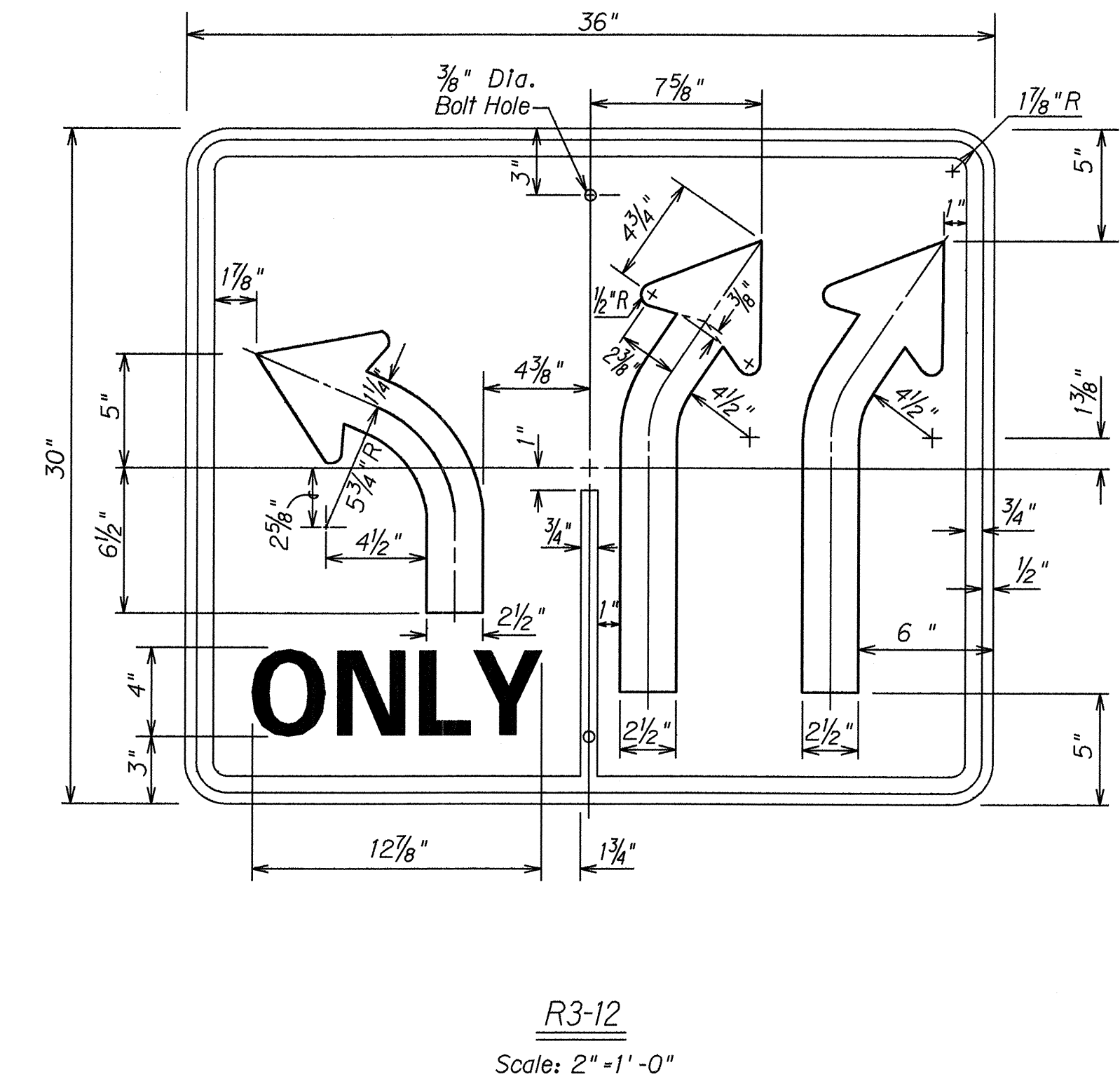
Scale: 1"=40' Date: Jan., 1994
 SHEET No. 74 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-099-1(9)	1994	30	54



R3-8A(R) MIRROR IMAGE

NOTE:
Use Series "D" Letters.
Black Legend on Reflectorized
White Background



NOTE:
Use Series "D" Letters.
Black Legend on Reflectorized
White Background

GENERAL NOTES

1. Sign details shall conform to the latest editions of FHWA publications "Manual on Uniform Traffic Control Devices for Streets and Highways," and "Standard Highway Signs," and as amended.
2. All regulatory signs shall be reflectorized unless otherwise specified.
3. All regulatory signs shall have 3/8" bolt holes drilled at appropriate locations.

ORIGINAL PLAN	DATE
DESIGNED BY	1/94
CHECKED BY	
QUANTITIES BY	
NOTED BY	
REVISIONS	

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MISCELLANEOUS SIGN DETAILS

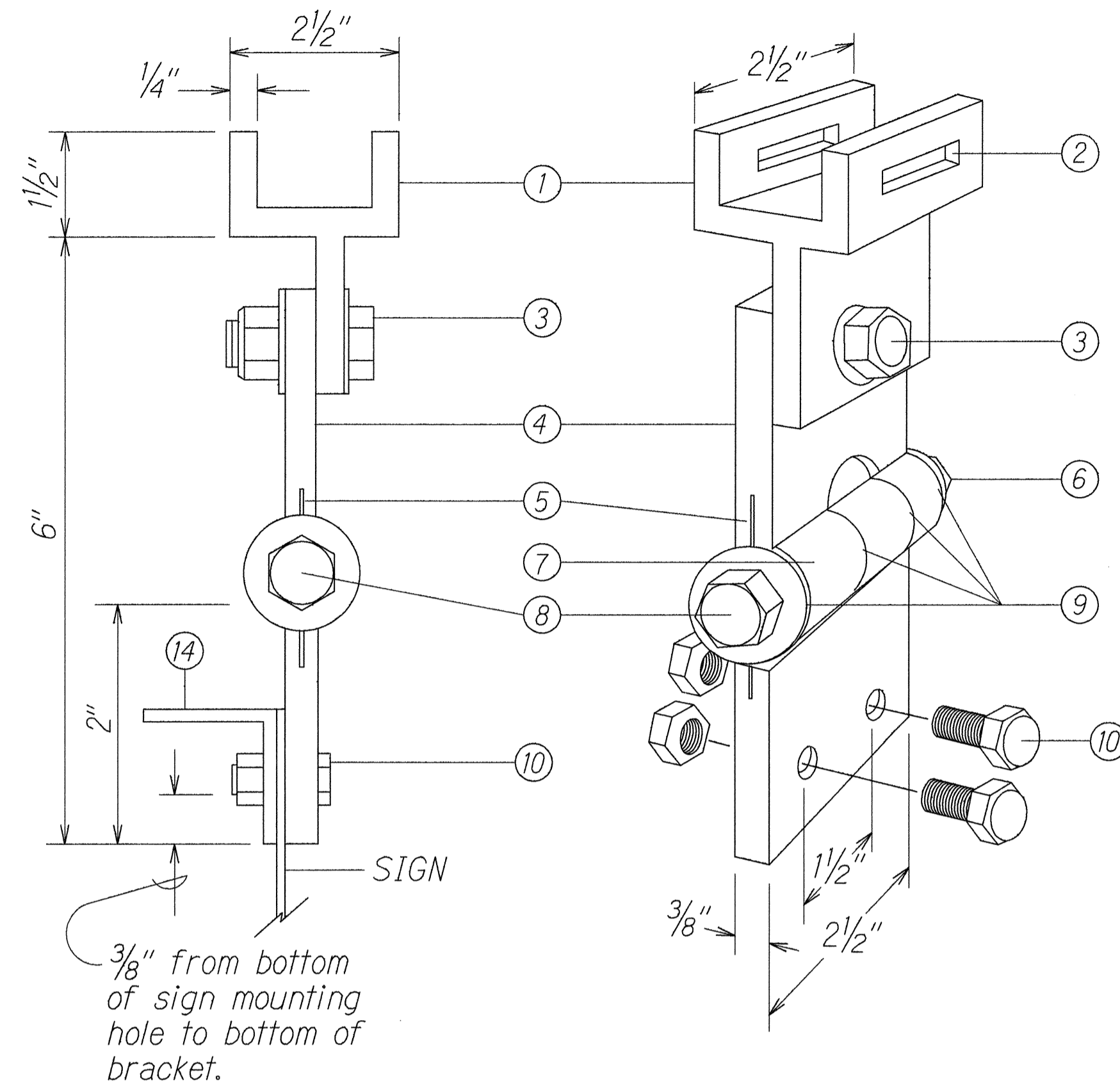
KAMEHAMEHA HIGHWAY WIDENING
Luniaina St. to Waipio Uka St.
F.A.P. No. NH-099-1(9)

Scale: 2"=1'-0" Date: Jan., 1994

SHEET No. 75 OF 7 SHEETS

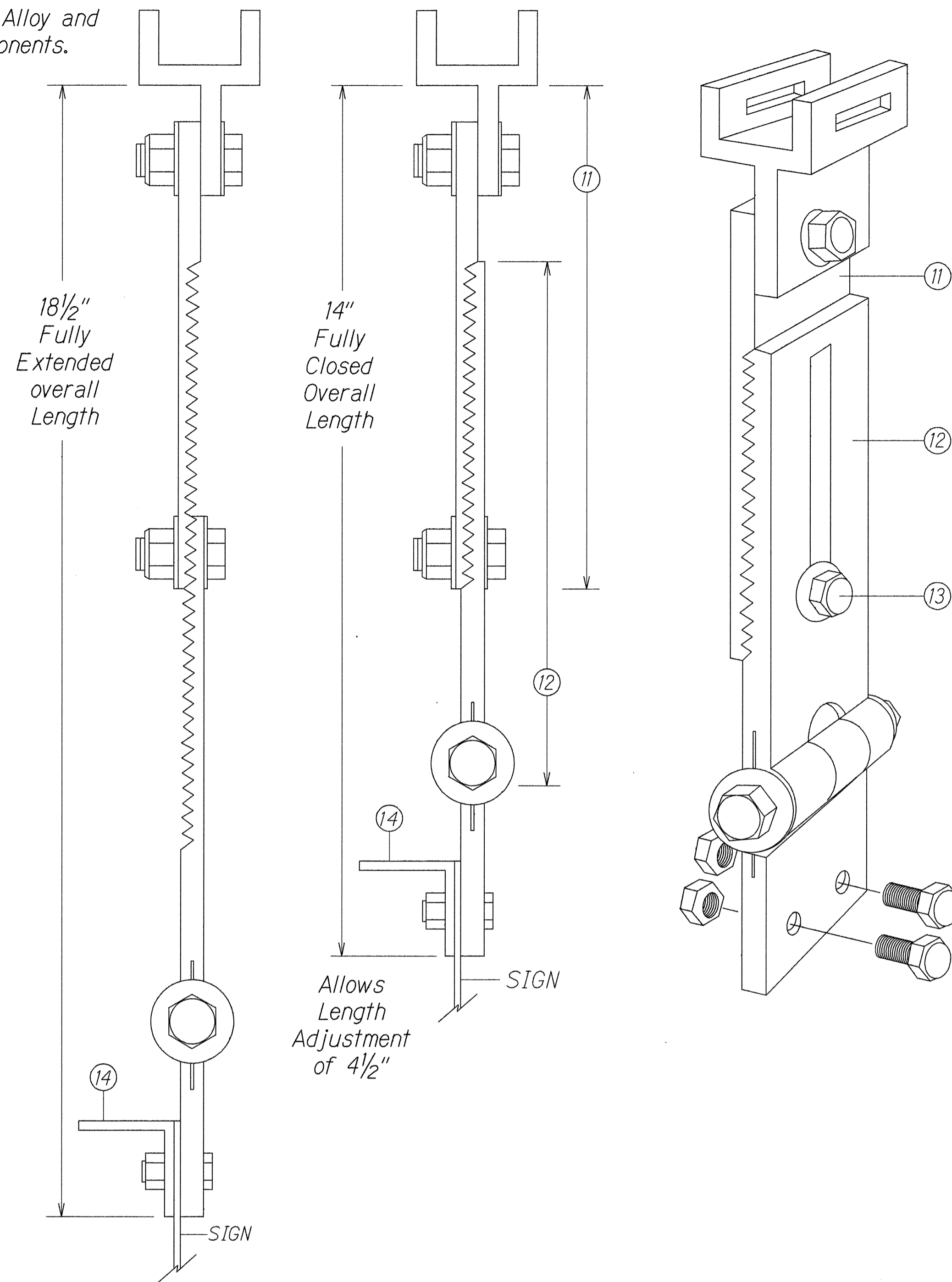
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-099-1(9)	1994	31	54

All Aluminum 6061T6 Alloy and Stainless Steel Components.



FIXED LENGTH NON-ADJUSTABLE SWING SIGN BRACKET

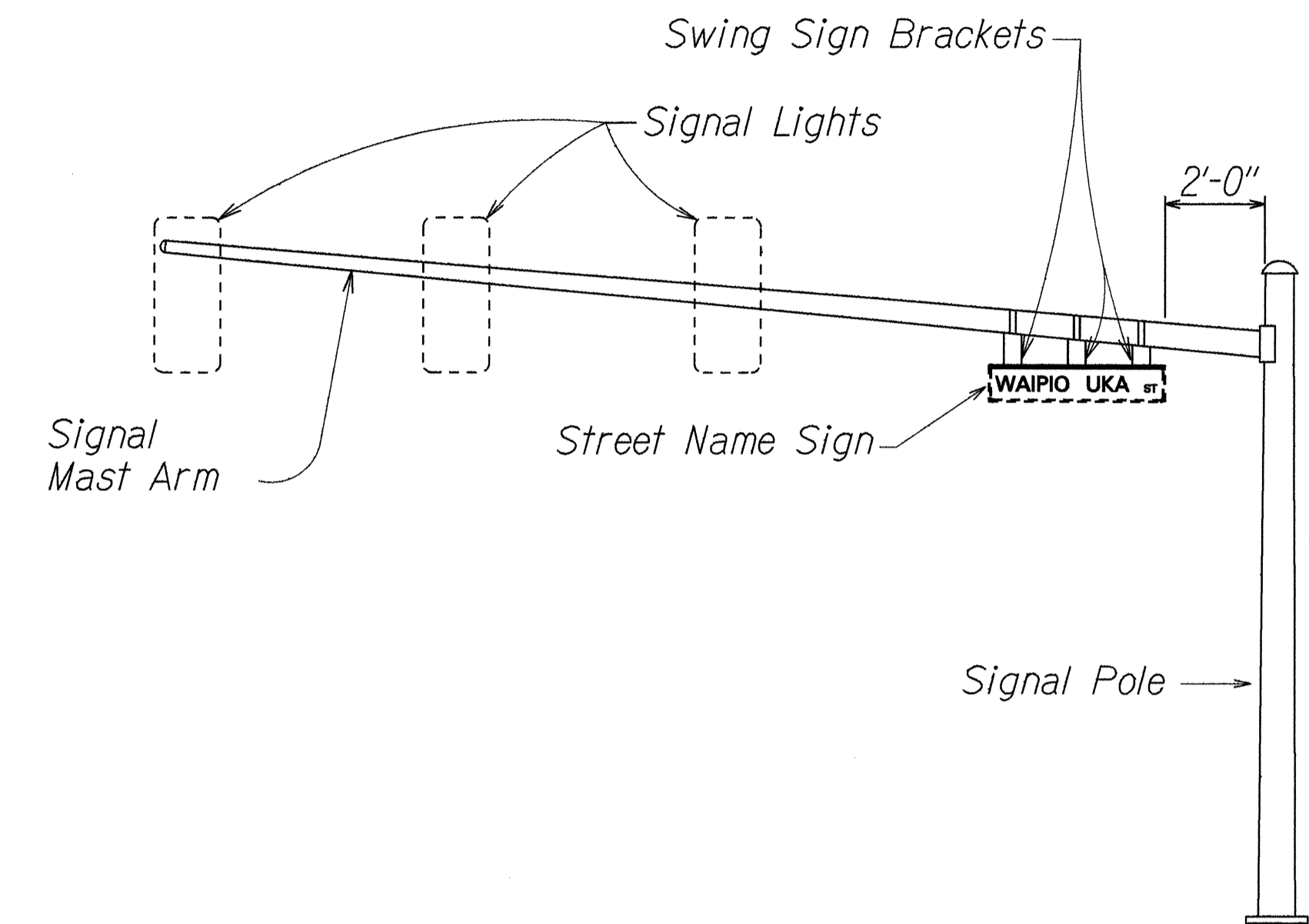
- ① Pivotal Upper Bracket
- ② 1 5/8" x 1/4" Slot for double strapping to electrolier mast arm. (M2G-34S(HD) .030" x 3/4" Heavy Duty Stainless Steel Strap with M2G-34B(HD) Buckle recommended.)
- ③ 1/2" - 13 x 1 1/2" Stainless Steel Hex Head Bolt with Stainless Steel Hex Lock Nut and 1/16" Stainless Steel 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 1/2" - 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 1/2" centers provide positive lock sign mounting to bracket.



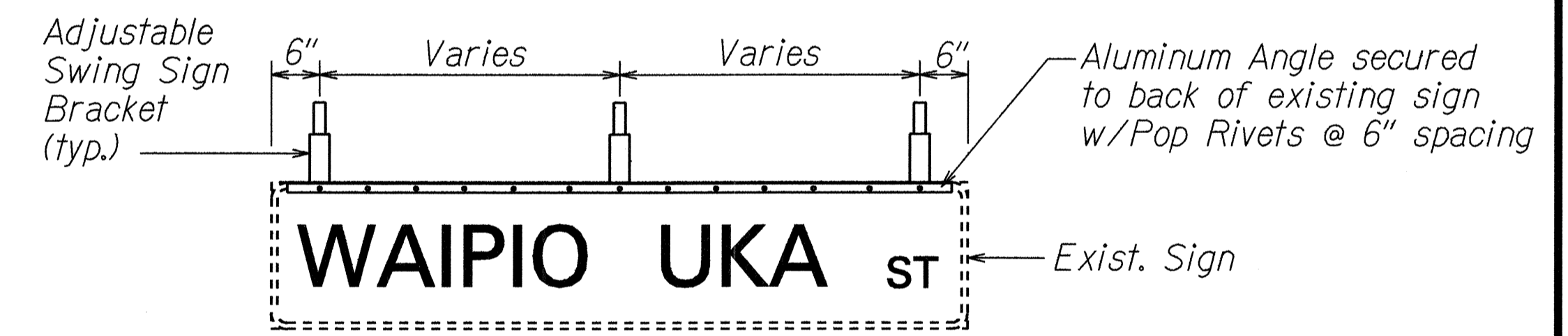
ADJUSTABLE LENGTH SWING SIGN BRACKET

- ⑪ 8 1/4" 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 1/2" - 13 x 1 1/2" 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 1/4" x 1/4" x 1/8" Aluminum Angle

Note: Dimensions may vary slightly.



STREET NAME SIGN MOUNTING ON MAST ARM



(Rear View)

PANEL & SWING BRACKET LAYOUT FOR STREET NAME SIGN

SURVEY PLOTTED BY: DATE: 1/94
 DRAWN BY: J. Edwards
 NOTE BOOK DESIGNED BY: G. Kakahi
 QUANTITIES BY: K. Williams
 CHECKED BY: K. Williams

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SIGN MOUNTING DETAIL

KAMEHAMEHA HIGHWAY WIDENING
Lumaina St. to Waipio Uka St.
F.A.P. PROJECT NO. NH-099-1(9)

Scale: Not to Scale Date: Jan., 1994

SHEET No. T6 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-099-1(9)	1994	32	54

PAVEMENT MARKING SUMMARY	
DESCRIPTION	QUANTITY
PAVEMENT MARKERS	
TYPE A _____	520 EACH
TYPE CL _____	330 EACH
TYPE DL _____	14 EACH
TYPE HL _____	280 EACH
TAPE - TYPE I OR THERMOPLASTIC EXTRUSION	
4-INCH PAVEMENT STRIPE (WHITE) _____	50 LIN.FT.
8-INCH PAVEMENT STRIPE (WHITE) _____	600 LIN.FT.
DOUBLE 4-INCH PAVEMENT STRIPE (YELLOW) _____	300 LIN.FT.
TAPE - TYPE II OR THERMOPLASTIC EXTRUSION	
4-INCH PAVEMENT STRIPE (WHITE) _____	5700 LIN.FT.
4-INCH PAVEMENT STRIPE (YELLOW) _____	300 LIN.FT.
8-INCH PAVEMENT STRIPE (WHITE) _____	550 LIN.FT.
12-INCH PAVEMENT STRIPE (WHITE) _____	200 LIN.FT.
12-INCH PAVEMENT STRIPE (YELLOW) _____	2500 LIN.FT.
DOUBLE 4-INCH PAVEMENT STRIPE (YELLOW) _____	5600 LIN.FT.
TAPE - TYPE III OR THERMOPLASTIC EXTRUSION	
4-INCH PAVEMENT STRIPE (WHITE) _____	1500 LIN.FT.
4-INCH PAVEMENT STRIPE (YELLOW) _____	100 LIN.FT.
12-INCH PAVEMENT STRIPE (WHITE) _____	120 LIN.FT.
CROSSWALK MARKINGS _____	10 LANE
PAVEMENT ARROW _____	18 EACH
PAVEMENT WORD _____	6 EACH

CONSTRUCTION SIGN SUMMARY				
SIGN NO.	LOCATION	MESSAGE	W/POSTS	W/O POST
CG20-2	STA. 20+00± LT.	END CONSTRUCTION	1	
CW20-1d	STA. 20+00± RT.	ROAD CONSTRUCTION AHEAD	1	
CW20-1d	WAIPIO UKA STA. 1+00± LT.	ROAD CONSTRUCTION AHEAD	1	
CW20-1d	WAIPIO UKA STA. 2+00± LT.	ROAD CONSTRUCTION AHEAD	1	
CW20-1d	STA. 87+00± LT.	ROAD CONSTRUCTION AHEAD	1	
CG20-2	STA. 87+00± RT.	END CONSTRUCTION	1	
TOTAL			6	0

TRAFFIC SIGN SUMMARY						
SIGN NO.	MESSAGE	QUANTITY				
		10 SQ. FT. OR LESS W/POST	10 SQ. FT. OR LESS W/O POST	GREATER THAN 10 SQ. FT. W/POST	GREATER THAN 10 SQ. FT. W/O POST	RELOCATE W/POST
R2-1(35)-B	SPEED LIMIT 35			1		
R3-8A(L)	↪ ONLY ↑↑	2				
R3-8A(R)	↑↑ ↪ ONLY	2				
R3-12	↪↪ ↪ ONLY	2				
R7-107a	TheBus Symbol	1				
R17-3	↪ ON LEFT ARROW ONLY NO U TURN				1	
(EXISTING)	UNLAWFUL TO LITTER \$500 FINE					1
TOTAL		7	0	1	1	1

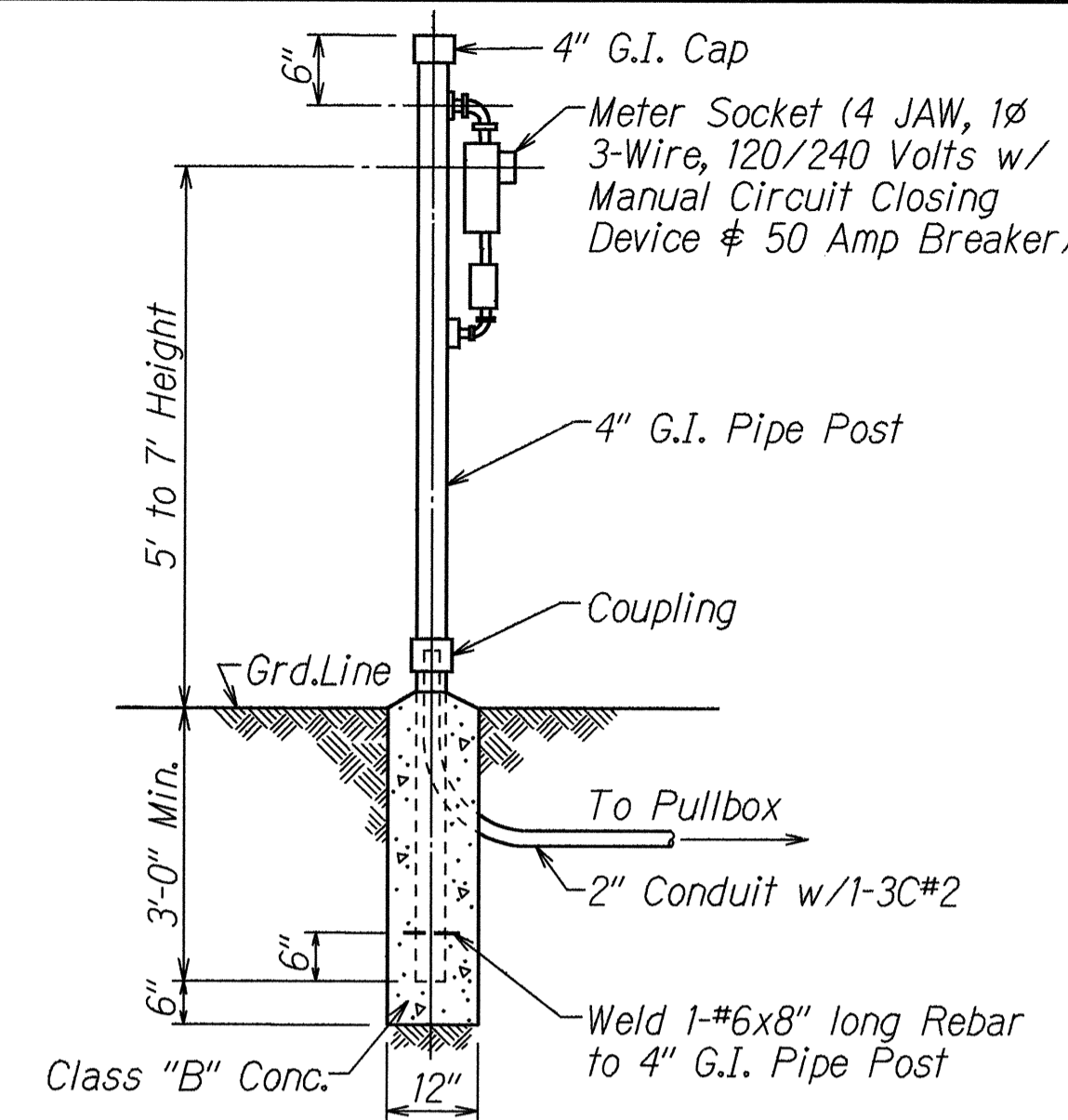
SURVEY PLOTTED BY _____ DATE 1/24
 PLAN _____
 DESIGNED BY _____
 CHECKED BY _____
 QUANTITIES BY _____
 NOTE BOOK _____
 ORIGINAL _____

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
**MISCELLANEOUS TRAFFIC
 SUMMARIES**
 KAMEHAMEHA HIGHWAY WIDENING
 Lumiaina St. to Waipio Uka St.
 F.A.P. No. NH-099-1(9)
 Date: Jan., 1994
 SHEET No. 77 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-099-1(9)	1994	33	54

TRAFFIC SIGNAL NOTES

- The locations of the traffic signal standards, traffic signal standards with mast-arm, 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.
- All traffic signal controller equipment shall be completely wired in the cabinet and shall control the traffic signals as called for in the plans.
- The Contractor shall install each meter socket and 50 Amp. breaker on meter socket standard as shown on the plans in accordance with HECO requirements. Meter shall be mounted between 5 feet and 7 feet above ground. Meter socket shall be 4-prong, complete with a manual circuit closing device.
- All splicing shall be done in the pullboxes.
- Furnishing and installing controller barriers, risers on poles and conduit stubouts (pullboxes to edge of pavement) will not be paid for separately but shall be considered incidental to the various contract items.
- The Contractor shall notify the Traffic Signal Branch, Department of Transportation Services, City & County of Honolulu (Phone 527-5004), 2 weeks prior to commencing any work on the traffic signal system.
- Department of Transportation Services, City & County of Honolulu, will assist the Engineer in construction inspection for the traffic signal system.
- 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.
- The cost of installing two pipe guards around the new Traffic Controller shall not be paid for separately but considered incidental to the various Traffic Signal items.
- All existing Pull Boxes, Traffic Signal Poles and Controller Bases not incorporated into the new Traffic Signal System shall be removed to 6 inches below grade.
- Existing Loop Detectors and conduits not incorporated into the new Traffic Signal System shall be abandoned in place. Abandoned conduits shall be plugged with concrete. Remove unused existing cables.
- Existing Traffic Signal Poles, Mast Arms, Heads and Controllers which are removed and not incorporated into the new Traffic Signal System shall be disposed of as directed by the Engineer. Cost shall be incidental to the various Traffic Signal items.
- Detector assignment shall be per California Department of Transportation "Traffic Signal Control Local Intersection Program." July 1978.
- 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.
- The contractor shall be responsible for any damages to existing Traffic Signal Facilities. Including the Traffic Signal Interconnect System, and any and all damages to these facilities shall be repaired by the contractor at his cost in accordance with the requirements of the City and County of Honolulu.
- Installation of optical detector shall conform in accordance with the standard Details of the Department of Transportation Services, City & County of Honolulu, Electrical and Maintenance Services Division and all subsequent amendments and additions.

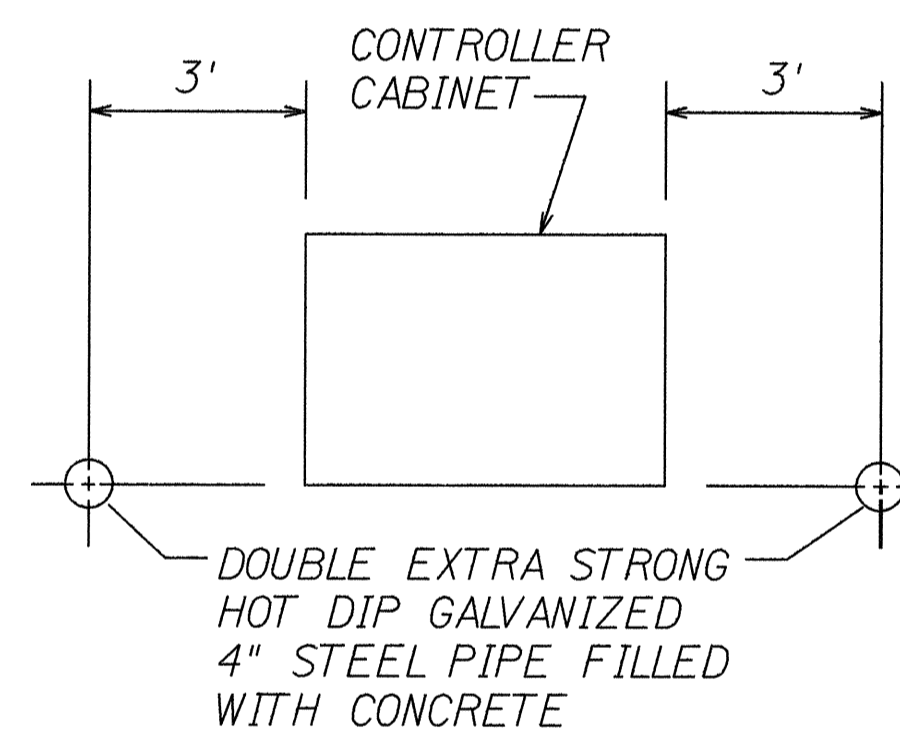


METER SOCKET STANDARD

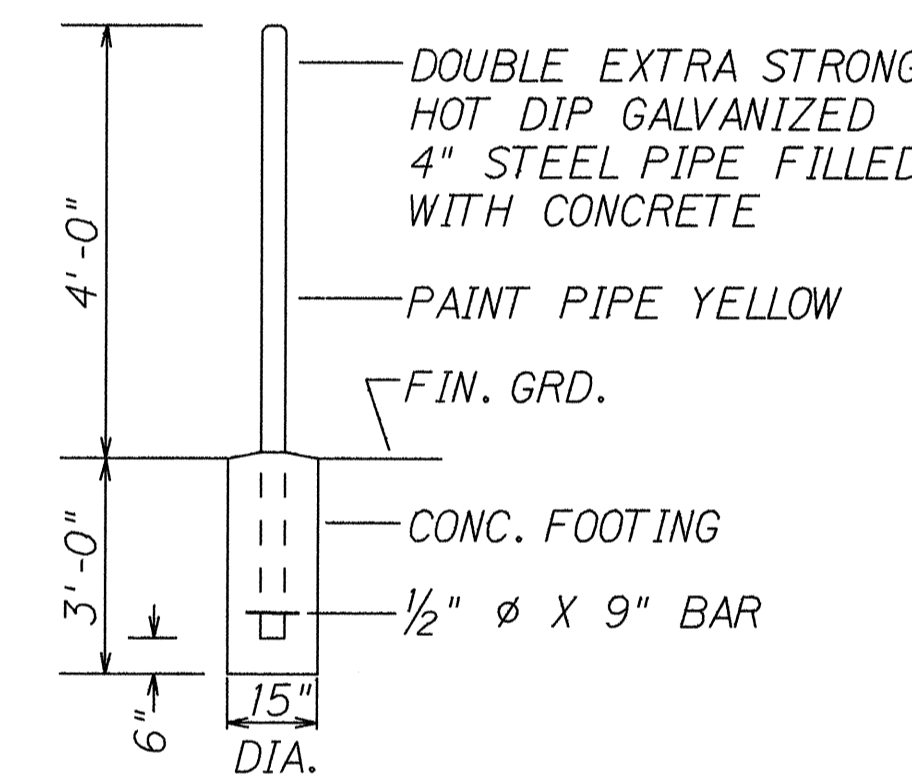
Not to Scale

NOTE:

COST OF CONC. FILLED GALVANIZED POSTS SHALL BE INCIDENTAL TO CONTROLLER ASSEMBLY



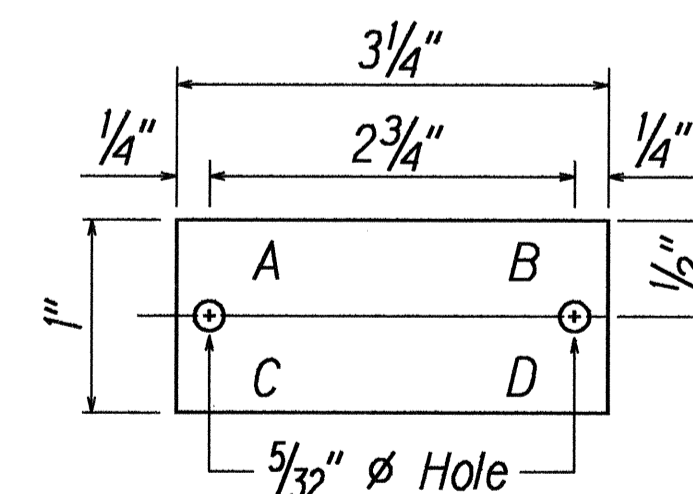
PLAN



TYP. ELEVATION

PIPE GUARD DETAIL

Not to Scale

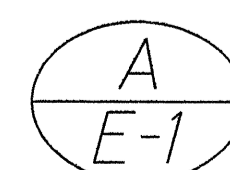


LEGEND

- A- Contract Number
- B- Light Number See Plan
- C- Lamp Data N for H.P.S.
- D- Refractor Date

NOTES:

- Tag shall be made from 3 ply black-white-black laminated plastic.
- Attach to steel pole w/no. 7 cadmium plated drive screws no. 29 drill holes in pole.
- Attach to fiberglass pole per manufacturer's recommendation.
- Letters, no. 5 reduction 1/3" engraved.



HIGHWAY LIGHT ID TAG DETAIL

Not to scale

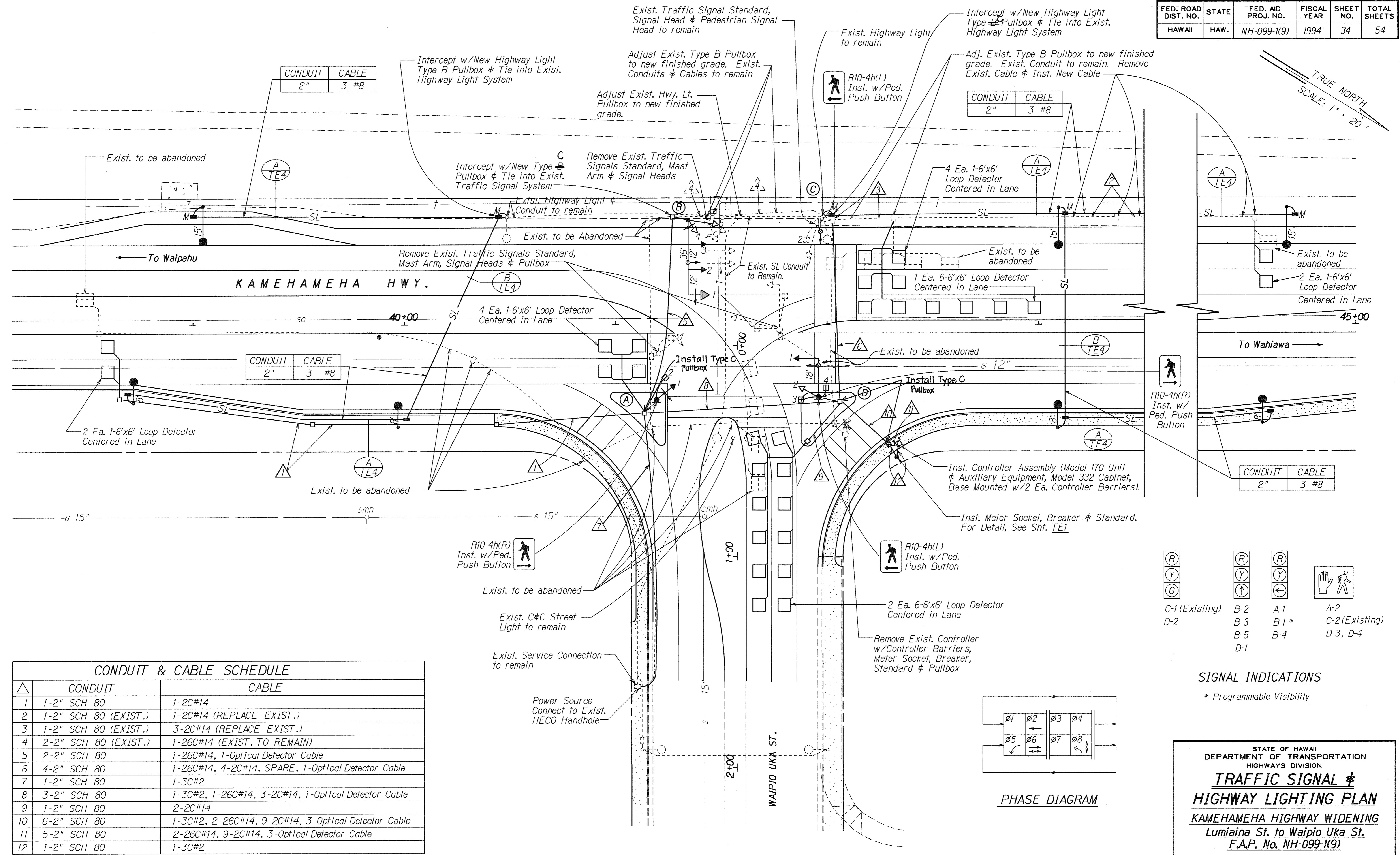
TRAFFIC SIGNAL & HIGHWAY LIGHTING LEGEND

- New Traffic Signal Controller
- Existing Traffic Signal Controller
- New Traffic Signal Conduits and Cables
- Existing Traffic Signal Conduits and Cables
- New 12" RYG Traffic Signal Head
- Existing 12" RYG Traffic Signal Head
- New 12" RY↑ Traffic Signal Head
- New 12" RY← Traffic Signal Head
- New 12" RY← Traffic Signal Head (Programmable Visibility)
- New Type II Traffic Signal Standard w/Mast Arm and Traffic Signal Heads
- Existing Type II Traffic Signal Standard w/Mast Arm and Traffic Signal Heads
- Optical Detector
- New Pedestrian Signal Head
- Existing Pedestrian Signal Head
- New Type A Pullbox
- Existing Type A Pullbox
- New Type B Pullbox (Traffic Signal)
- Existing Type B Pullbox
- New Type B Pullbox (Highway Lighting)
- New Type B Pullbox with Modified Cover (Highway Lighting)
- New Loop Detector
- Existing Loop Detector
- New Pipe Guard
- Existing Pipe Guard
- New Meter Socket Standard
- Existing Meter Socket Standard
- New Highway Light Standard, 250 Watt High Pressure Sodium

SURVEY PLOTTED BY: DATE: 1/24
 ORIGINAL PLAN
 TRACED BY: M. L. LINDALE
 NOTE BOOK
 DESIGNED BY: G. KAKIHI
 QUANTITIES BY: S. M. SUGIYAMA
 CHECKED BY:

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
TRAFFIC SIGNAL & HWY. LIGHTING
LEGEND, DETAILS & NOTES
 KAMEHAMEHA HIGHWAY WIDENING
 Lumiala St. to Waipio Uka St.
 F.A.P. PROJECT NO. NH-099-1(9)
 Scale: Not to Scale Date: Jan., 1994
 SHEET No. TE1 OF 5 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-099-1(9)	1994	34	54

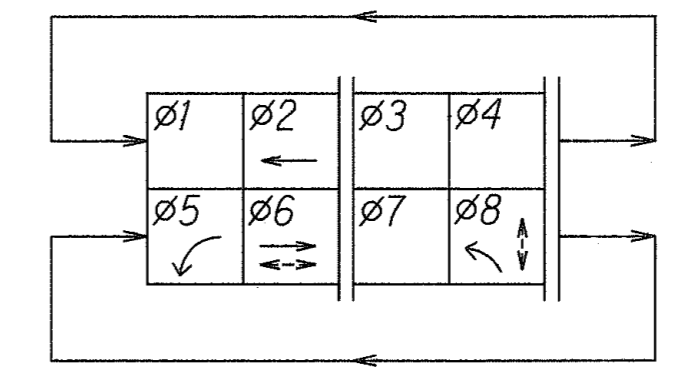


(R)	(R)	(R)	(R)
(Y)	(Y)	(Y)	(Y)
(G)	(G)	(G)	(G)

C-1 (Existing) B-2 A-1 A-2
D-2 B-3 B-1* C-2 (Existing)
 B-5 B-4 D-3, D-4
 D-1

SIGNAL INDICATIONS

* Programmable Visibility



PHASE DIAGRAM

CONDUIT & CABLE SCHEDULE		
△	CONDUIT	CABLE
1	1-2" SCH 80	1-2C#14
2	1-2" SCH 80 (EXIST.)	1-2C#14 (REPLACE EXIST.)
3	1-2" SCH 80 (EXIST.)	3-2C#14 (REPLACE EXIST.)
4	2-2" SCH 80 (EXIST.)	1-26C#14 (EXIST. TO REMAIN)
5	2-2" SCH 80	1-26C#14, 1-Optical Detector Cable
6	4-2" SCH 80	1-26C#14, 4-2C#14, SPARE, 1-Optical Detector Cable
7	1-2" SCH 80	1-3C#2
8	3-2" SCH 80	1-3C#2, 1-26C#14, 3-2C#14, 1-Optical Detector Cable
9	1-2" SCH 80	2-2C#14
10	6-2" SCH 80	1-3C#2, 2-26C#14, 9-2C#14, 3-Optical Detector Cable
11	5-2" SCH 80	2-26C#14, 9-2C#14, 3-Optical Detector Cable
12	1-2" SCH 80	1-3C#2

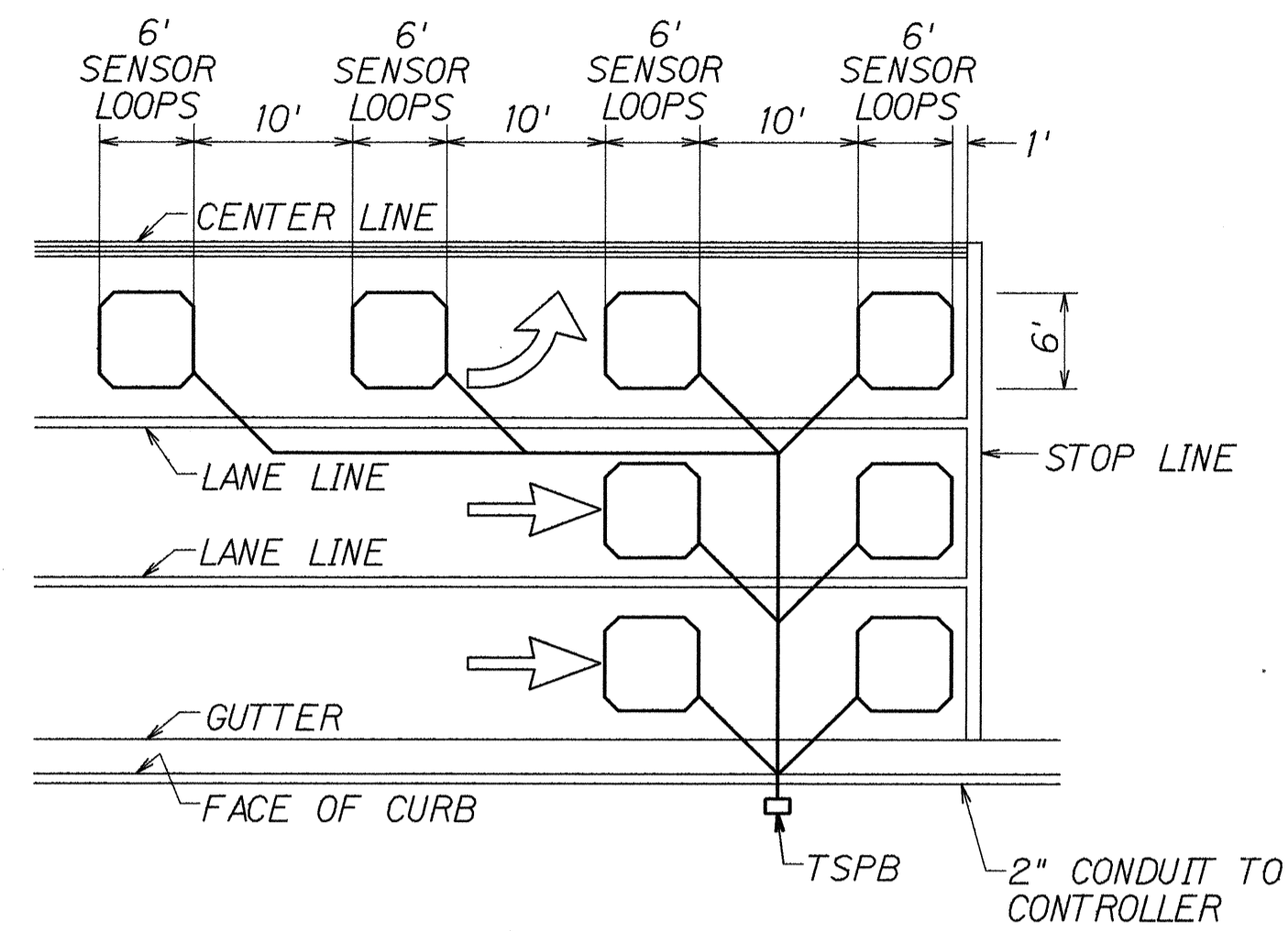
ORIGINAL PLAN DATE 1/94
 SURVEY PLOTTED BY M. Howells
 DRAWN BY M. Howells
 CHECKED BY G. Kenealy
 NOTE BOOK NO. 10/11/12
 QUANTITIES BY SK/mtk
 CHECKED BY SK/mtk

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
**TRAFFIC SIGNAL &
 HIGHWAY LIGHTING PLAN**
 KAMEHAMEHA HIGHWAY WIDENING
 Lumiaina St. to Waipio Uka St.
 F.A.P. No. NH-099-1(9)

Scale: 1"=20' Date: Jan., 1994
 SHEET No. TE2OF 5 SHEETS

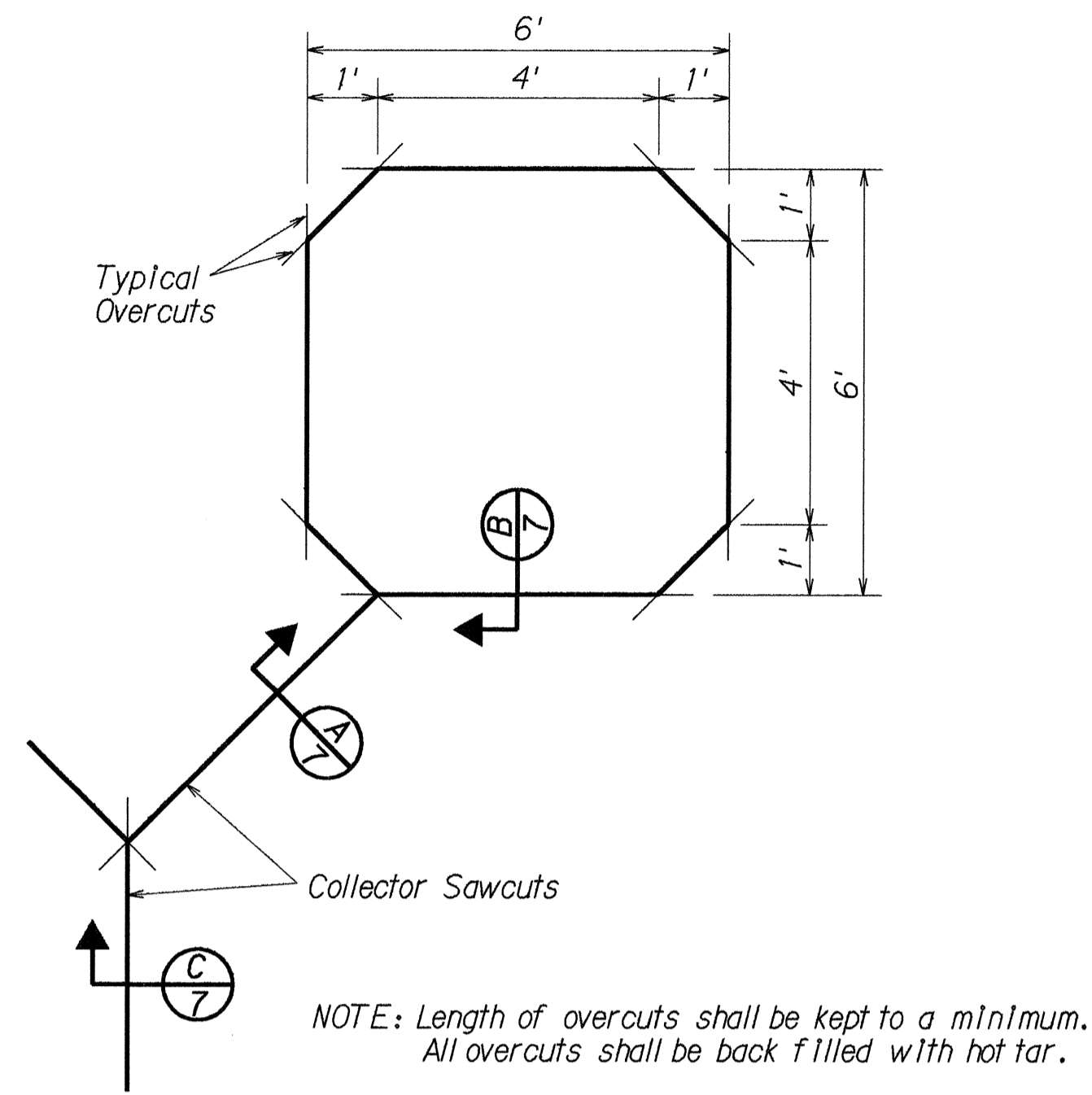
"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-099-1(9)	1994	35	54

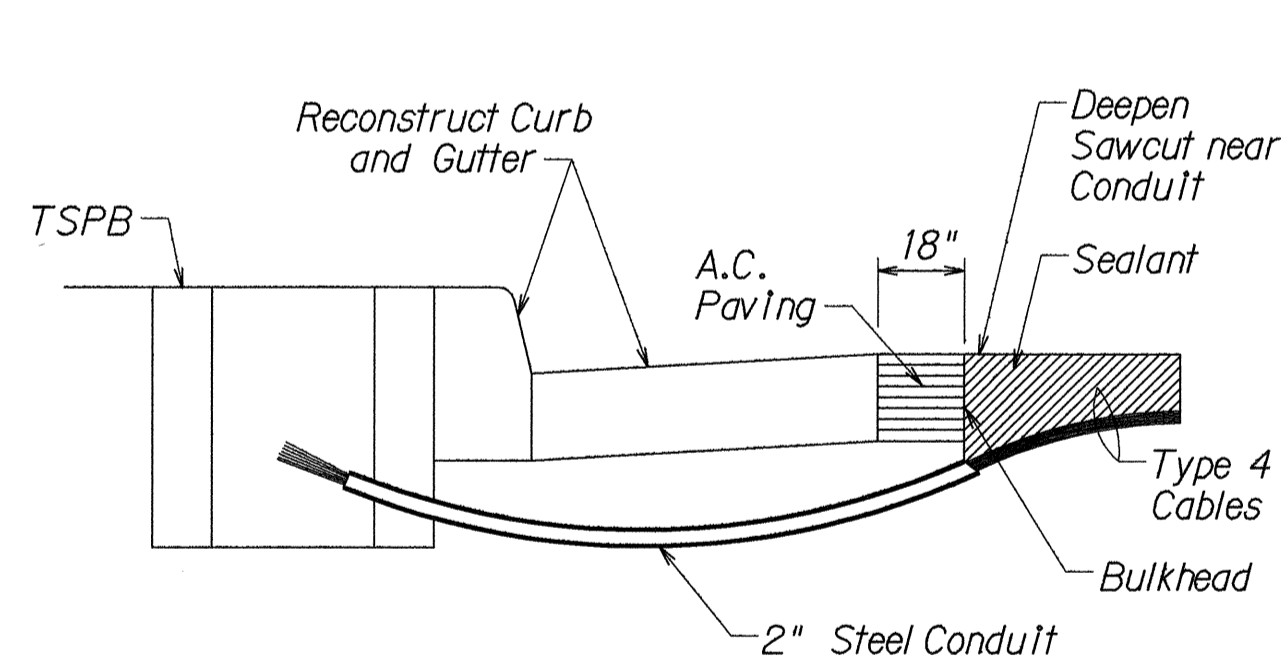
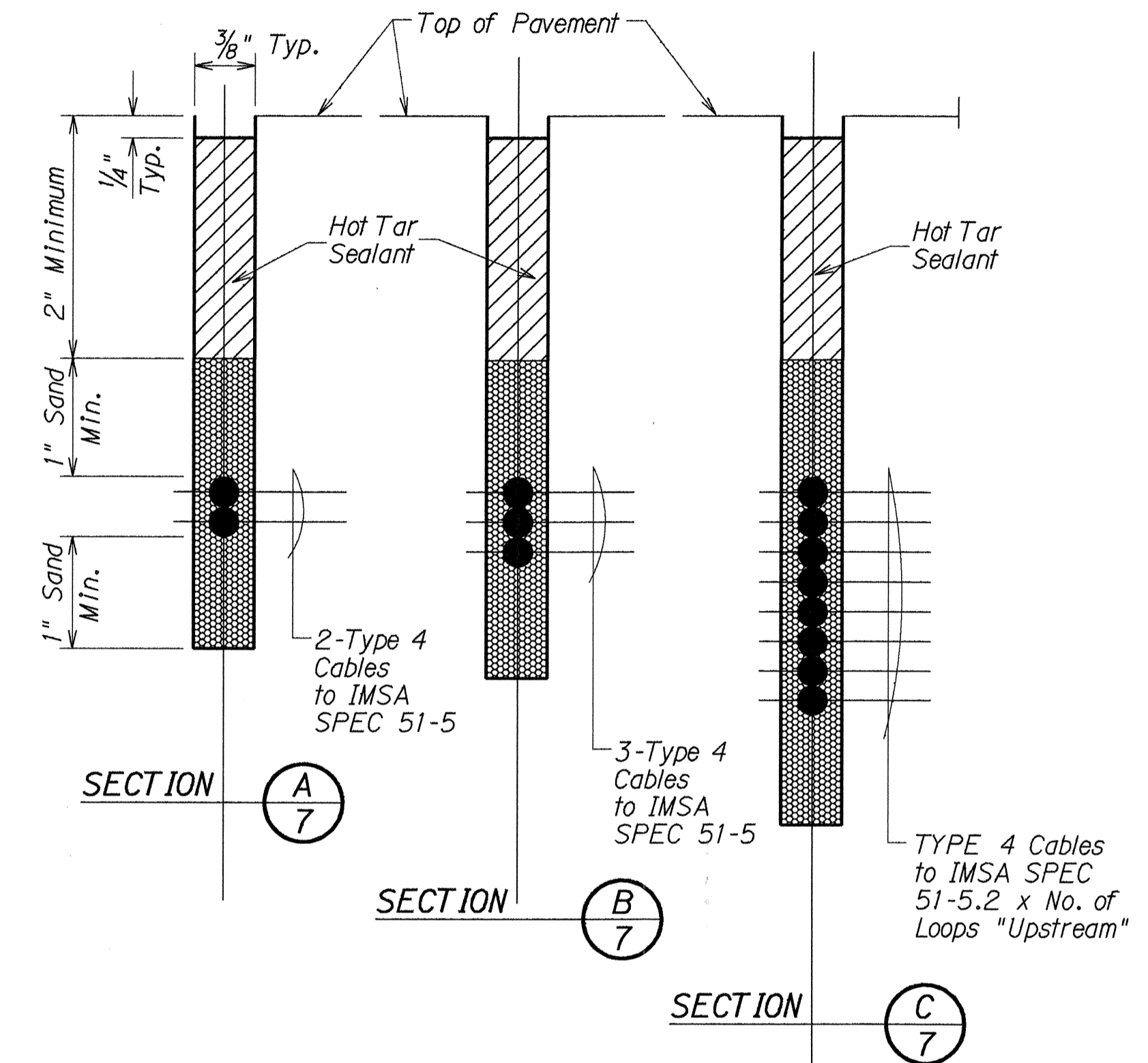


- NOTES:
- Center sensor loops in lanes.
 - Collector cables shall be twisted 2 turns per foot.
 - Number of loops and locations vary. See project plans.
 - Number and locations of collector sawcuts may be varied in the field to suit.

TYPICAL SENSOR LOOP LAYOUT

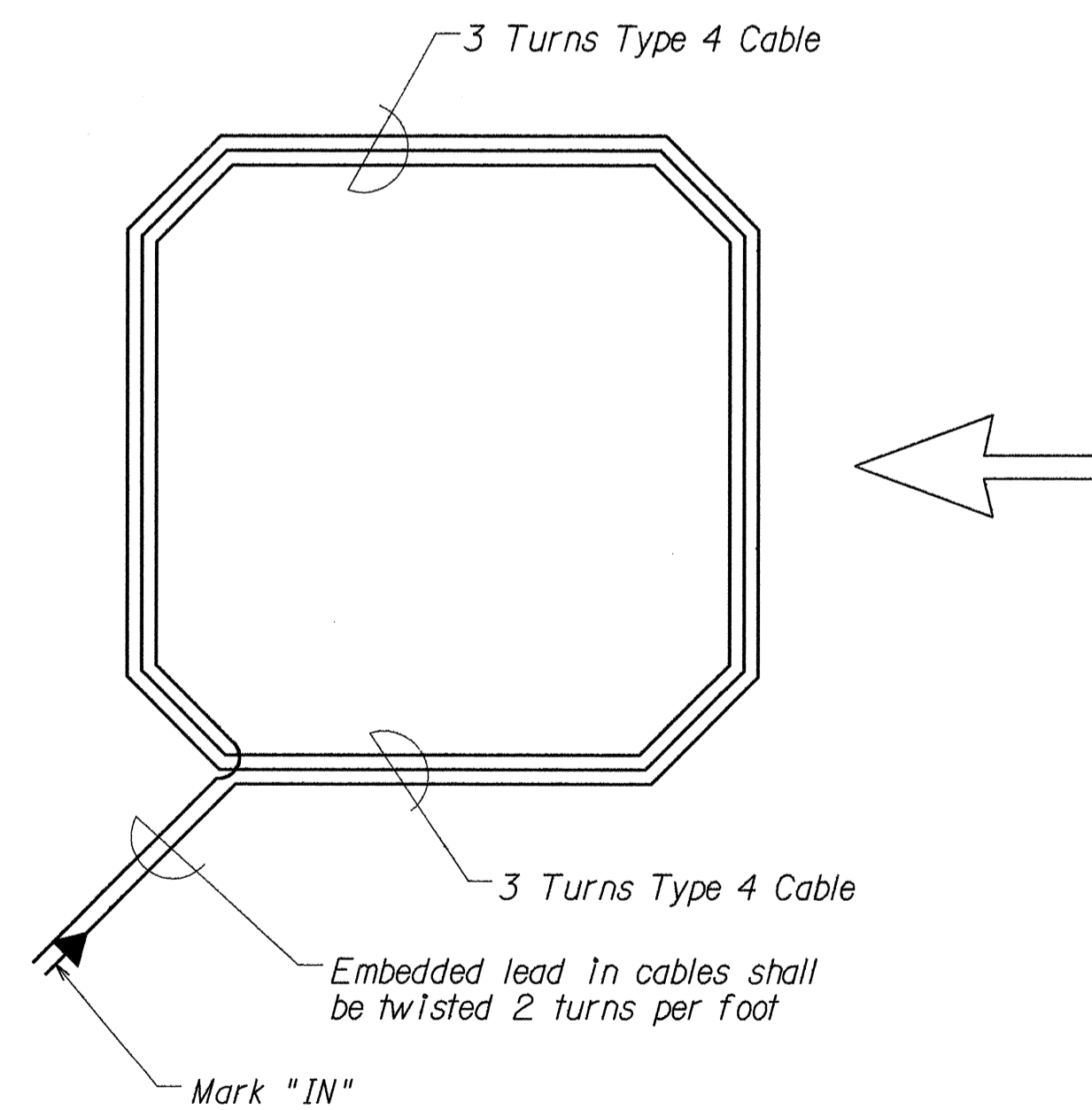


TYPICAL SENSOR LOOP SAWCUT DETAIL



- 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 A.C.
 - Reconstruct curb and gutter as required.

DETAIL OF SENSOR LOOP INSTALLATION AT EDGE OF ROADWAY



TYPICAL SENSOR LOOP WIRING DIAGRAM

TYPES OF CABLES

- TYPE 1 Signal Loop Cable: Stranded No. 14, 26 conductors
- TYPE 2 Detector Lead-In Cable and Pedestrian Push Button Circuit Cable: Stranded, No. 14, 2 Conductors
- TYPE 3 Interconnect Cable: Solid No. 20, 12 Pairs
- TYPE 4 Loop Sensor Cable: Solid No. 12, Single Conductor to IMSA SPEC 51-5
- TYPE 5 Cable from Signal Loop to Signal Head: Stranded, No. 14, Single Conductor
- TYPE 6 Service Cable: Solid, No. 6, 3 Conductors
- TYPE 7 Optical Detector Cable: 3 Conductor AWG No. 20 (7x28) Stranded, Individually Tinned copper

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**LOOP DETECTOR
DETAILS**

KAMEHAMEHA HIGHWAY WIDENING
Lumiaina St. to Waipio Uka St.
F.A.P. No. NH-099-1(9)

Not to Scale Date: Jan., 1994

SHEET No. TE3 OF 5 SHEETS

SURVEY PLANNED BY: DATE: 1/94
 TRACED BY: S. K. K. K.
 DESIGNED BY: S. K. K. K.
 QUANTITIES BY: S. K. K. K.
 CHECKED BY: S. K. K. K.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-099-1(9)	1994	36	54

NOTES:

- ALL STEEL SHAFTS, PLATES, MAST ARMS, BOLTS, SCREWS, NUTS AND WASHERS TO BE GALV. AFTER FABRICATION OR MODIFICATION.
- 4" X 6 1/2" HANDHOLE REINFORCED W/ #3 GA. RING 1 1/2" WIDE WELDED TO OUTSIDE OF POLE COVER OF 10 GA. PLATE LOCATE 90 DEGREES OF MAST ARM UNLESS SHOWN OTHERWISE.
- ROUND TAPERED STEEL TUBE W/MAX. TAPER OF 0.15"/FOOT.
- NO. 11 GAGE SHEET STEEL OF WELDABLE GRADE ACCEPTABLE IF STEEL AFTER FABRICATION HAS A MIN. YIELD STRENGTH OF 40,000 PSI.

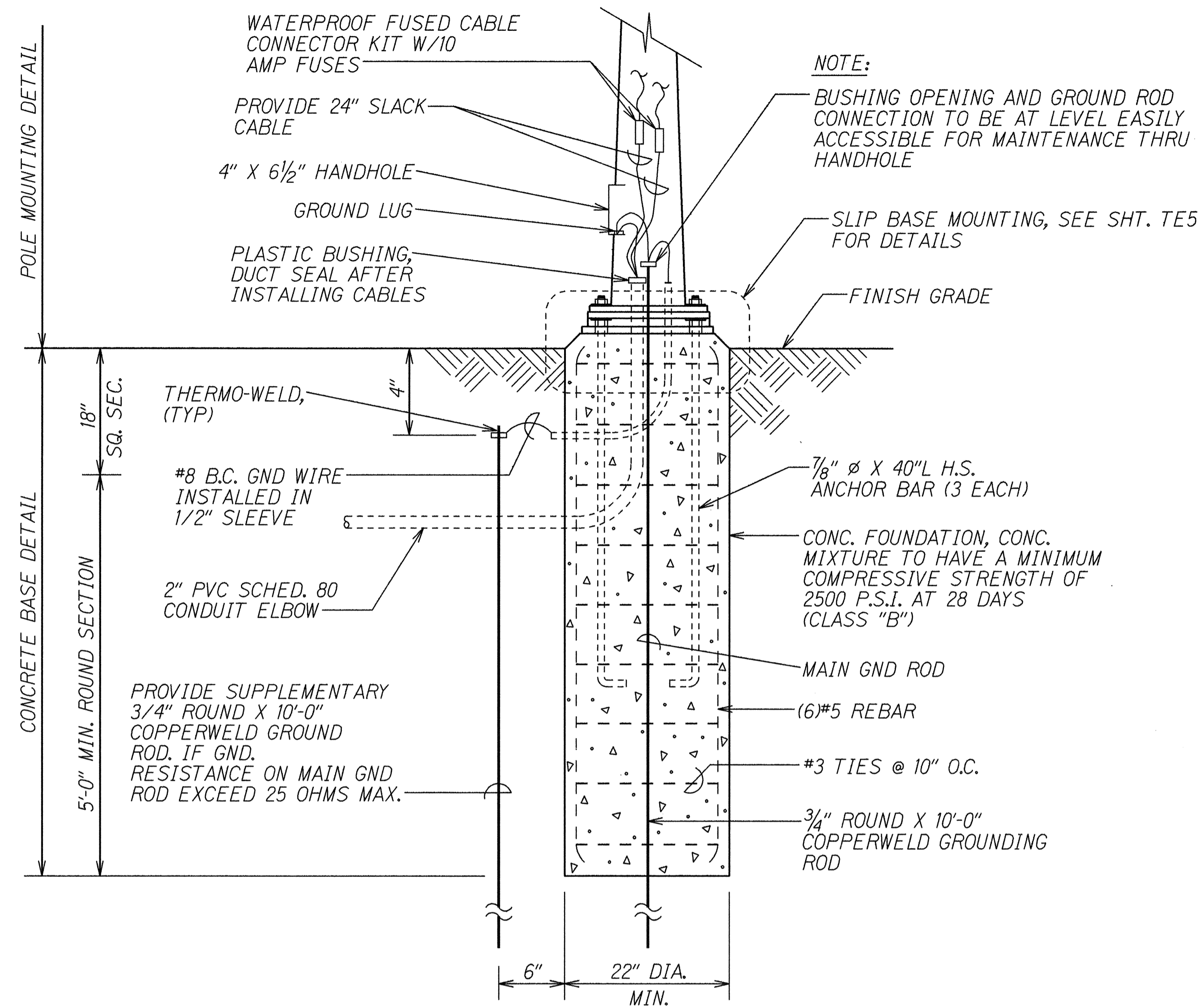
NOTES:

- ALL CONDUIT SHALL BE "PVC" SCHED. 80 FOR DIRECT BURIED OR CONCRETE ENCASEMENT, U.O.N.
- BACKFILL OVER CONCRETE DUCT SECTIONS SHALL BE TYPE "A"
- BACKFILL OVER DIRECT BURIED CONDUITS SHALL BE TYPE "B"
- IF THE NORMAL MATERIAL IN THE BOTTOM OF A TRENCH CONTAINING A DIRECT BURIAL CONDUIT IS NOT TYPE "B" AN ADDITIONAL 3" SHALL BE EXCAVATED AND TYPE "B" BACKFILL PROVIDED.
- CONCRETE FOR DUCTS TO BE 2500 P.S.I. IN 28 DAYS.

BACKFILL TYPES ARE:

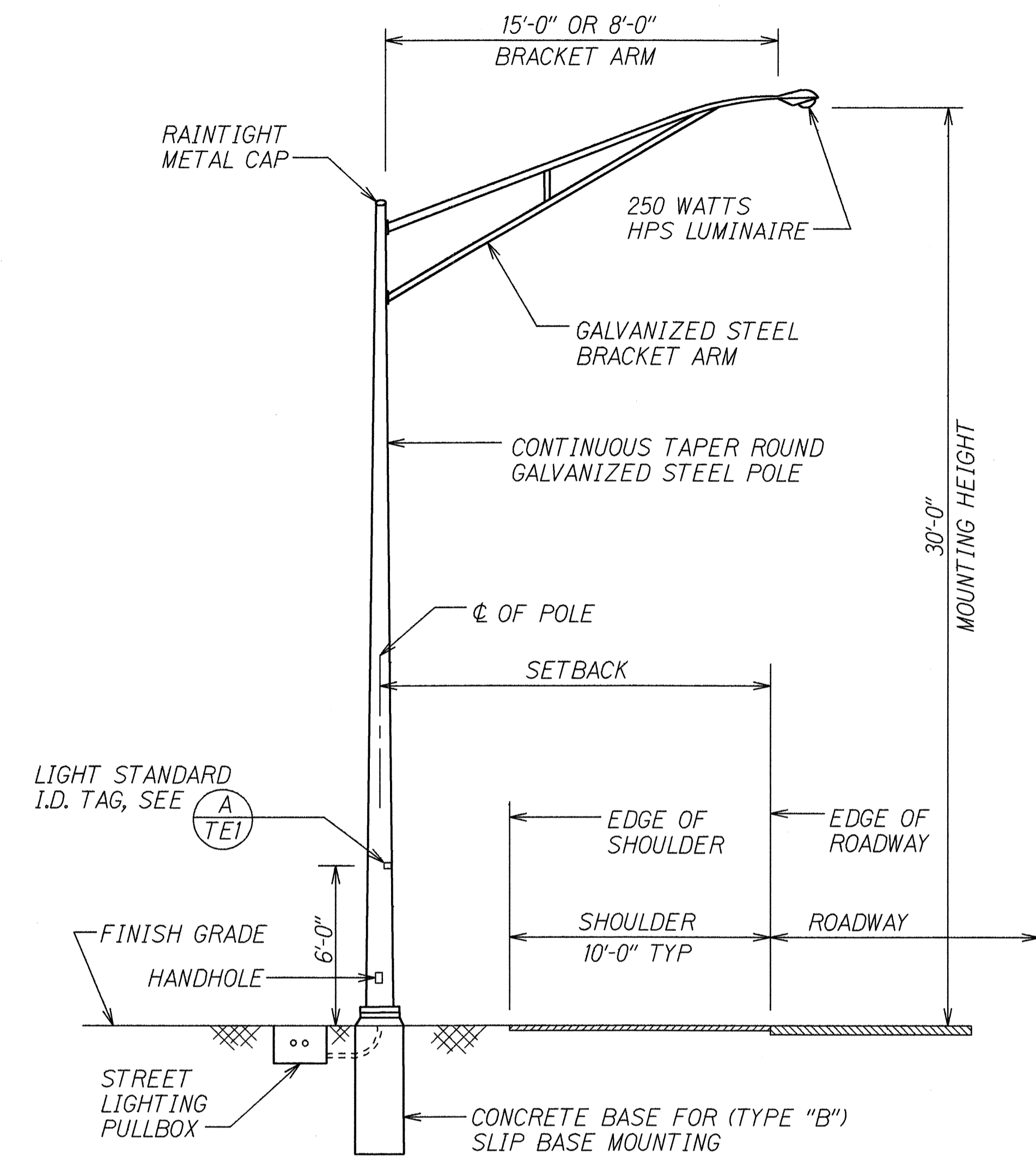
TYPE "A": BEACH SAND, EARTH, OR EARTH AND GRAVEL IF EARTH AND GRAVEL USED, THE MAXIMUM ROCK SIZE SHALL BE 1" AND THE MIXTURE SHALL CONTAIN NOT MORE THAN 50% BY VOLUME OF ROCK PARTICLES.

TYPE "B": BEACH SAND, EARTH, OR EARTH AND GRAVEL IF EARTH AND GRAVEL USED, MIXTURE MUST PASS A 1/2" MESH SCREEN AND CONTAIN NOT MORE THAN 20% BY VOLUME OF ROCK PARTICLES.



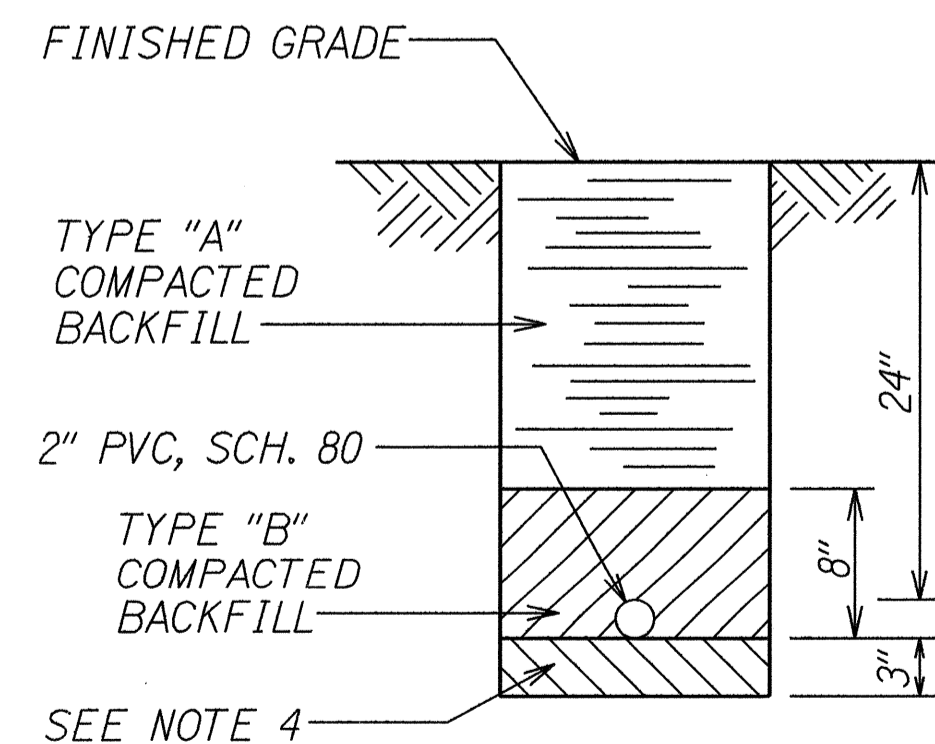
**CONCRETE BASE AND POLE MOUNTING DETAIL
SLIP BASE (TYPE "B")**

NOT TO SCALE



**TYPICAL LIGHT STANDARD INSTALLATION
SLIP BASE (TYPE "B")**

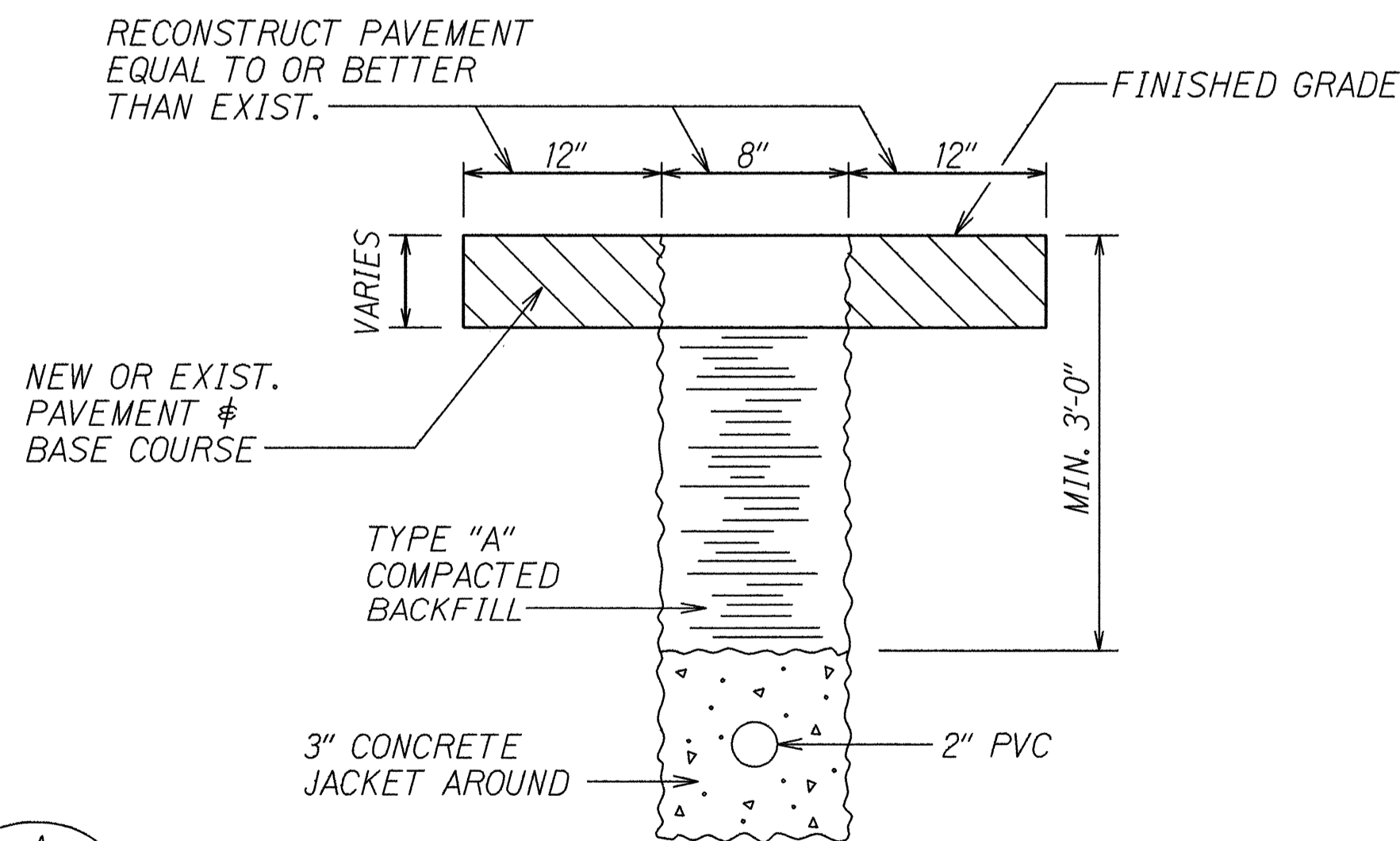
NOT TO SCALE



**TYPICAL STREET LIGHT DUCT SECTION
(DIRECT BURIED)**

NOT TO SCALE

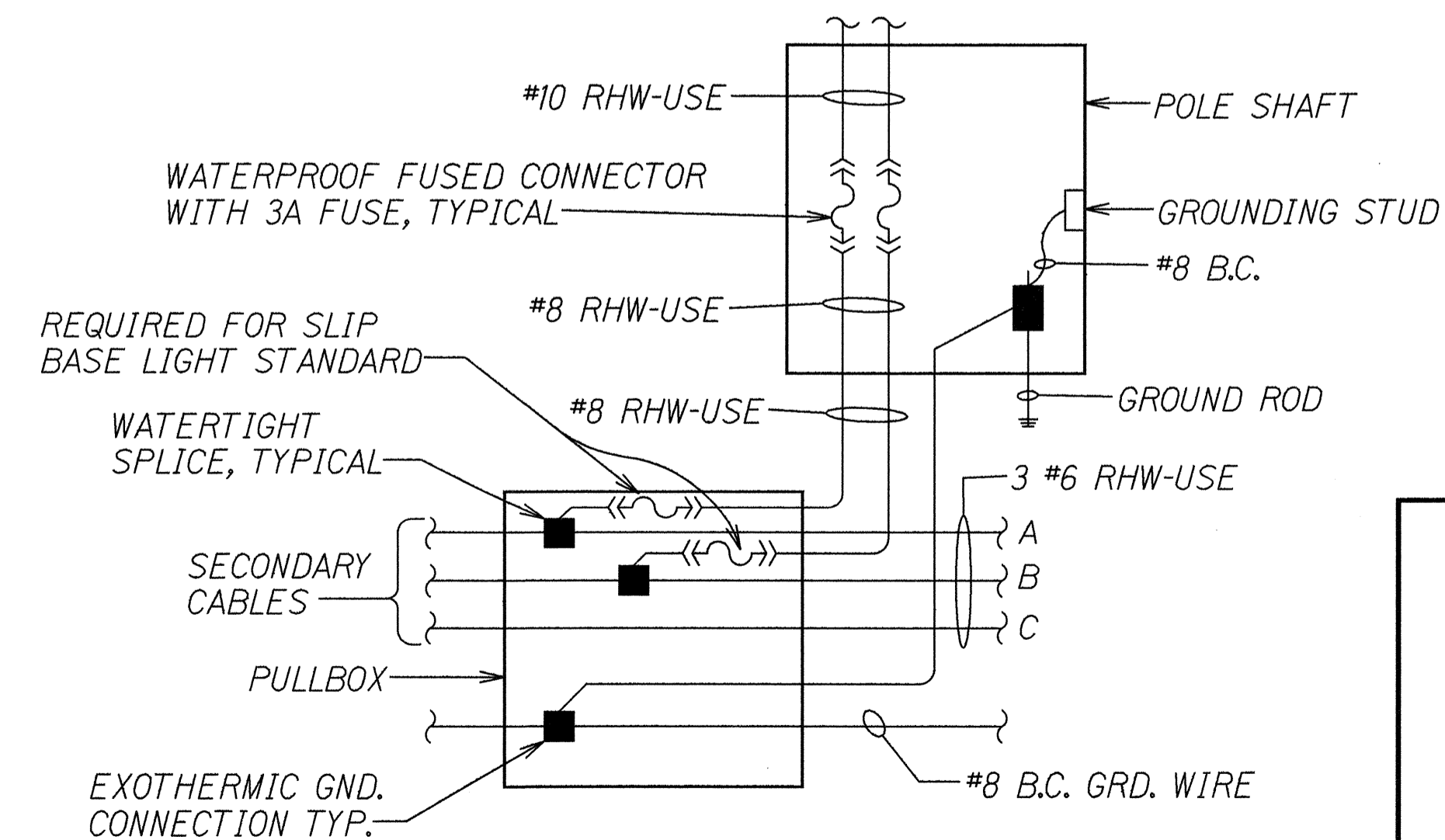
(A)
TE4



**TYPICAL DUCT SECTION
(CONCRETE ENCASED)**

NOT TO SCALE

(B)
TE4



WIRING CONNECTION DIAGRAM

NOT TO SCALE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**MISCELLANEOUS HIGHWAY
LIGHTING DETAILS**

KAMEHAMEHA HIGHWAY WIDENING
Lumaiina St. to Waipio Uka St.
F.A.P. No. NH-099-1(9)

Not to Scale Date: Jan., 1994
SHEET No. TE4 OF 5 SHEETS

SURVEY PLOTTED BY: DATE: 1/24
 PLAN: DESIGNED BY: G. K. K. K.
 NOTE BOOK: QUANTITIES BY:
 CHECKED BY:

