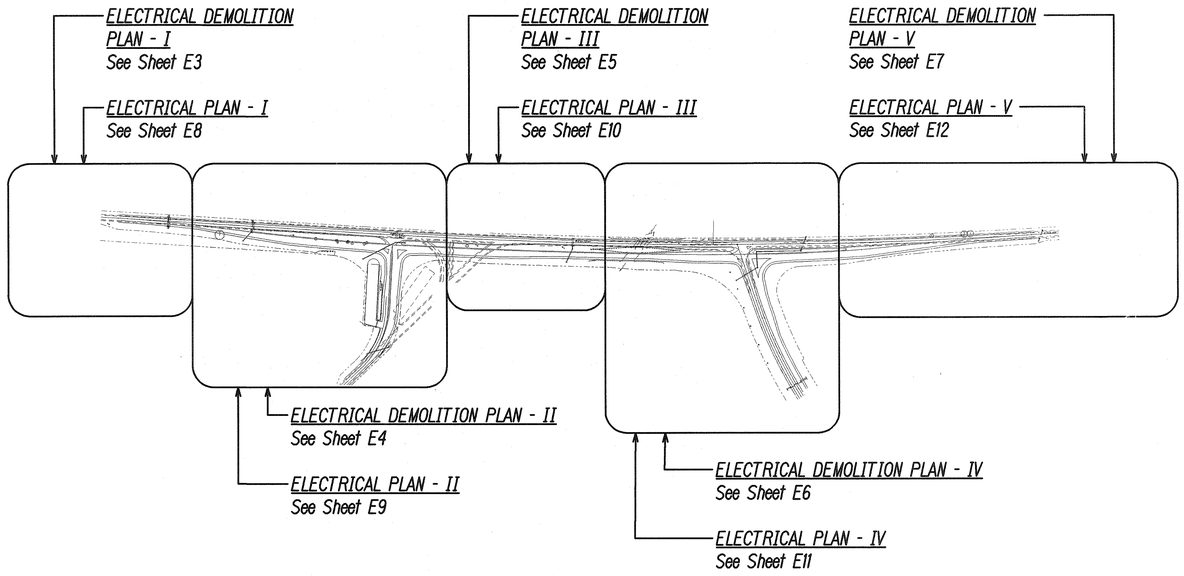
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	105	139

ELECTRICAL SYMBOLS

Symbol	Description
	Standard 12" RYG Traffic Signal Head
	Dashed Indicates Existing
	Standard 12" RYGA Traffic Signal Head
	Dashed Indicates Existing
	12" RYGA Programmed Visibility Type Traffic
	Signal Head. Dashed Indicates Existing
	Standard 12" RYGA Traffic Signal Head
	Dashed Indicates Existing
	Opticom Receiver
	Detector Loop
	Dashed Indicates Existing
A	10' Type I Signal Standard;
	Pole "A" Indicated
B 20' 12'	Type II Signal Standard with Traffic Signal
	Heads Mtd on Mast Arm Standard;
	Pole "B" with 20' Mast Arm & 12' Spacing
	Between Traffic Signal Heads Indicated
C	existing type I signal standard;
	pole "C" indicated
D	existing type II signal standard;
	pole "D" indicated
M	Traffic Signal Master Controller,
	Model 170 with 332A Cabinet
	Traffic Signal Controller,
	Model 170 with 332A Cabinet
	existing Traffic signal controller
	Metering Equipment, see Detail C/E15
M	existing meter
X	"X" ed Out Indicates Remove, See Demolition
	Notes Sheet E2
/	"/" ed Out Indicates Relocate
	existing utility pole to be removed by
	respective utility company
#50	existing utility pole, pole #50 indicated
	Utility Pole, Provided by MECo
	existing pole mounted transformer
	Pole Mounted Transformer Provided by MECo
	existing anchor guy
	Anchor Guy Provided by MECo
	existing anchor guy to be removed by
	respective utility company

Symbol	Description
	MECo 2' x 4' Precast Concrete Pullbox with
	Precast Concrete Cover per MECo
	Standard Drawings, see Detail A/E15
	Type "A" Traffic Signal Pullbox, see Detail A/E22
	Type "B" Traffic Signal Pullbox, see Detail B/E22
	Type "C" Traffic Signal Pullbox, see Detail C/E22
	existing type "A" traffic signal pullbox
	existing type "B" traffic signal pullbox
	Parking Lot Light, 150 Watt HPS Single Luminaire,
	Metal Standard and Bracket Arm, Provided by MECO,
	Concrete Foundation by Contractor, see Detail A/E16
	Street Light, 250 Watt HPS Single Luminaire,
	Metal Standard and Bracket Arm, Provided by MECO,
	Concrete Foundation by Contractor, see Detail A/E16
	Street Light, 250 Watt HPS Twin Luminaire,
	Metal Standard and Bracket Arm, Provided by MECO,
	Concrete Foundation by Contractor, see Detail A/E16
	existing street light
	Dynamic Message System
	Stanchion, see Detail D/E16
E	Electric Ductline
e/ug	existing u.g. elec/signal ductline and wiring
	remove existing wiring; cap ends of
e/ug	existing elec/signal ducts and abandon
	in place
TS	Traffic Signal Ductline and Wiring
ts	existing u.g. traffic signal ductline
SL	Street Light Ductline and Wiring
s l	existing u.g. street light ductline and wiring
E/OH	Overhead Elec/Signal Lines to be Provided
	by Respective Utility Company
e/oh	existing overhead elec/signal lines
t/oh	existing tel overhead lines
e/oh	existing overhead elec/signal lines to be
	removed by respective utility co.
A IL	Duct Section Designator, Type "A" Ductline and
	Type "IL" Duct Indicated, see Sheet E17 for
	Duct Sections and Conduit Schedule

Warning:
Project Site Contains Existing Electrical Lines (Both Overhead & Underground), Energized at Various Low (Below 600v) and Medium Voltages. The Contractor shall Assume that those Lines cannot be De-Energized and shall Include in His Work such Equipment/Materials/Procedures/ Methods of Construction to Protect His Employees, the Public, Employees of the State & Utilities, and any Existing Utilities, Facilities, Etc.



ELECTRICAL SITE PLAN
Not to Scale

North

Street Light Standard Identification Legend:

Legend		Description
1	121+93	Station Number
2	2	Street Light Pole Number
3	14'	Pole Clear Setback from Edge of Pavement.
4	15'	Luminaire Arm Span in Feet
5	TB	Pole Base Mounting Type, see Note No. 2 below
6	30'	Luminaire Mounting Height above Pavement

Symbol Notes:

1. "X" Through Dashed Item Indicates Existing Item to be Removed.
2. "TB" Indicates Transformer Base Mounting.
3. "BG" Indicates Pole Located Behind Guardrail. Pole Shall Be Located Minimum 4'-4" Clear From Front of Guardrail.
4. "CL" Indicates Pole Located Center of Island.

GARY I. FUNASAKI LICENSED PROFESSIONAL ENGINEER No. 4185-E HAWAII, U.S.A.

24 May 2000

This Work was Prepared by Me or Under My Supervision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL SITE PLAN, ELECTRICAL SYMBOLS

HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: None Date: Apr. 2000

SHEET No. E1 OF 22 SHEETS

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

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	106	139

General Notes - Traffic Signal System:

1. Locations of Existing Underground Structures and Utilities such as Pipe-Lines, Conduits, Cables, Etc., shown on Plans are Approximate only. It is not the intent of these Plans to show the exact Location of all Under-Ground Utilities and Structures. It is the Responsibility of the Contractor to verify the Locations of all Existing Utilities with the Respective Owners. Existing Utilities Damaged by the Contractor shall be Repaired by the Contractor at His Own Cost.

2. All Traffic Signal Work shall Conform to the Requirements of the "Manual on Uniform Traffic Control Devices for Streets and Highways", Federal Highway Administration, Latest Edition, and Amendments.

3. The Locations of the Traffic Signal Standards, Traffic Signal Standards with Mast-Arm, Pedestrian Push Buttons, Traffic Controller, Pullboxes, Conduits, Barriers & Loop Detectors shall be Staked Out in the Field by Contractor & Approval of the Locations Obtained from the Engineer Prior to Construction & Installation. Locations shown on the Plans shall be Adjusted as Necessary to Prevent Conflicts with Existing or New Facilities.

4. All New Conduits Under Roadway shall be PVC Schedule 80. Contractor shall have the Option of Using PVC Schedule 40 for New Conduits not Under Roadway, Unless Otherwise Noted.

5. In Addition to the Conduits Indicated in the "Conduit and Cable Schedule". Install One 3-Inch Conduit in the Footings of all Signal Controllers. Conduit shall be Stubbed-Out 12 Inches from Footing and shall be Capped.

6. A Solid #8 Bare Copper Wire shall be Installed in the Entire Traffic Signal Conduit System for Use as a System Ground.

7. Lead-in Wires in Pullbox near Loops shall be Tagged with Loop Number(s).

8. Locations of Pavement striping and Markings (Lane Lines, Stop Lines, Cross-Walk, Etc.) Shown on the Plans shall be verified with the Engineer prior to the Installation of the Traffic Signal System.

9. All Traffic Signal Controller Equipment shall be Completely Wired in the Cabinet and shall Control the Traffic Signals as called for in the Plans.

10. Signal Indications During Clearance Interval:

    a. If a Signal is G or ←G– and will Remain G or ←G– During the Next Phase, it shall be G or ←G– During the Clearance Interval.

    b. If a Signal is G or ←G– and will Become R or Extinguished During the Next Phase, it shall be Y or ←Y– During the Clearance Interval.

    c. If the Signal is R and will Remain R or Becomes G During the Next Phase, it shall Remain R During the Clearance Interval.

11. Salvage and Deliver Existing Traffic Signal Equipment (Signal Heads, Pedestrian Pushbuttons, Controller, Enclosures Etc) to DOT's Base Yard as Directed by the Engineer. The Work shall be Considered Incidental to the Various Contract Items.

12. Existing Traffic Signal System shall be Maintained and Kept Operational Until the New Traffic Signal System is in Operation.

General Electrical Notes

1. Electrical Work shall be New Unless Otherwise Noted.

2. "Wiring" Indicates Insulated Wires in Conduit.

3. Contractor shall Tone to Determine Exact Location of Existing Utilities & Adjust His Work Accordingly.

4. The Locations of the Various Existing Utilities Shown on the Contract Drawings were Determined on the Basis of Best Available Information. Therefore, No Assurance is Provided that the Actual Locations will be Precisely as Shown on the Contract Drawings. The Contractor shall verify the Locations and Depths of the Facilities and Exercise Proper Care in Excavating the Area. The Contractor shall be Held Responsible for any Damages to the Facilities.

5. In Performing All Work, the Contractor shall Exercise Due Care and Caution Necessary to Avoid any Damage to and Impairment in the use of any Existing Utility Line. Any Damage Inflicted on Existing Utility Lines Resulting from the Contractor's Operations shall be Immediately Repaired or Restored as Directed by the State at the Contractor's Expense.

6. All Electric/Signal Ducts shall have a Vertical Clearance of 1'-0" when Crossing Water/Sewer Lines.

7. All Dimensions are Nominal. Verify Exact Dimensions & Equipment Requirements with the Successful Supplier.

8. The Contractor shall be Liable for any Damage to Maui Electric Co. Facilities and shall Immediately Report such Damages to Maui Electric Co.'s Trouble Dispatcher at 871-7777.

9. All Maui Electric Co. Overhead Facilities shown on these Plans or whose Approximate Locations within the Project Boundaries have been made known by any Reasonable Means at any time to the Contractor shall be Protected at all Times by the Contractor during Construction. Costs for the Damages to Maui Electric Co. Facilities will be Borne by the Contractor. This Repair Work shall be done by Maui Electric Co. or by the Contractor under Maui Electric Co.'s Supervision.

10. Any Work Required to Remove/Relocate Maui Electric Co. Facilities shall be done by Maui Electric Co. The Contractor shall be Responsible for Coordination.

11. The Project Site Contains Various Maui Electric Co. Lines Operated at 69KV, 23KV, 12.47KV and Various other Secondary Voltages. These Lines must Remain Active. Therefore, the Contractor shall Utilize such Methods, Equipment, Etc., Necessary to Protect His Personnel, the Public, State Personnel, Property, Equipment, Etc.

12. Due to Ongoing Construction & Maintenance, Conditions Indicated in these Drawings may have Changed. Therefore, the Contractor shall verify all Existing Conditions prior to Work.

Demolition Notes

1. Work shall be done in Phases. Verify with Engineer for Phasing Sequence. Provide all Wiring and Connections, per NEC, State, Utility Requirements, to Ensure Continuity of Service to Traffic Signal Equipment and Sreet Light Equipment to Remain in use at No Additional Cost to the State.

2. The Contractor shall verify all Existing Circuit Wiring prior to any Demolition Work.

3. Remove all Abandoned Wires.

4. Where Contract Documents Indicate Wiring is to be Removed:
    A. Remove Existing Cables In Conduit. Remove Sensor Loop Cables that will Interfere with New Work, otherwise Abandon Loop Cables Concealed below Finished Grade.
    B. Remove Conduits that will Interfere with Work. Abandon Conduits that are Concealed below Finished Grade.
    C. Break and Remove Pullboxes/Handholes. Fill Holes with Base Course and Repair to Match Adjacent Surfaces.

5. Remove All Traffic Standard, Traffic Signal and Street Light Standard Concrete Bases by Breaking Bases to 24 Inches below Finish Grade. Fill Holes with Base Course and Repair to Match Adjacent Surfaces.

6. For Circuit(s) where Existing Electrical Equipment shall be Removed, The Contractor Shall Provide all Necessary Raceways, Wires, Boxes, Etc., per NEC Requirements, to Ensure Circuit Continuity to and Proper Operation of the Remaining Component(s).

7. Demolition and Removal Work shall be Considered Incidental to the Various Contract Items.

GARY I. FUNASAKI
LICENSED PROFESSIONAL ENGINEER
No. 4195-E
HAWAII, U.S.A.

24 MAY 2000

This Work was Prepared by Me or Under My Supervision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL NOTES

HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: None   Date: Apr. 2000

SHEET No. E2 OF 22 SHEETS

ORIGINAL PLAN | SURVEY PLOTTED BY ____ DATE ____
NOTE BOOK | DRAWN BY ____
No. ____ | TRACED BY ____
DESIGNED BY ____
QUANTITIES BY ____
CHECKED BY ____

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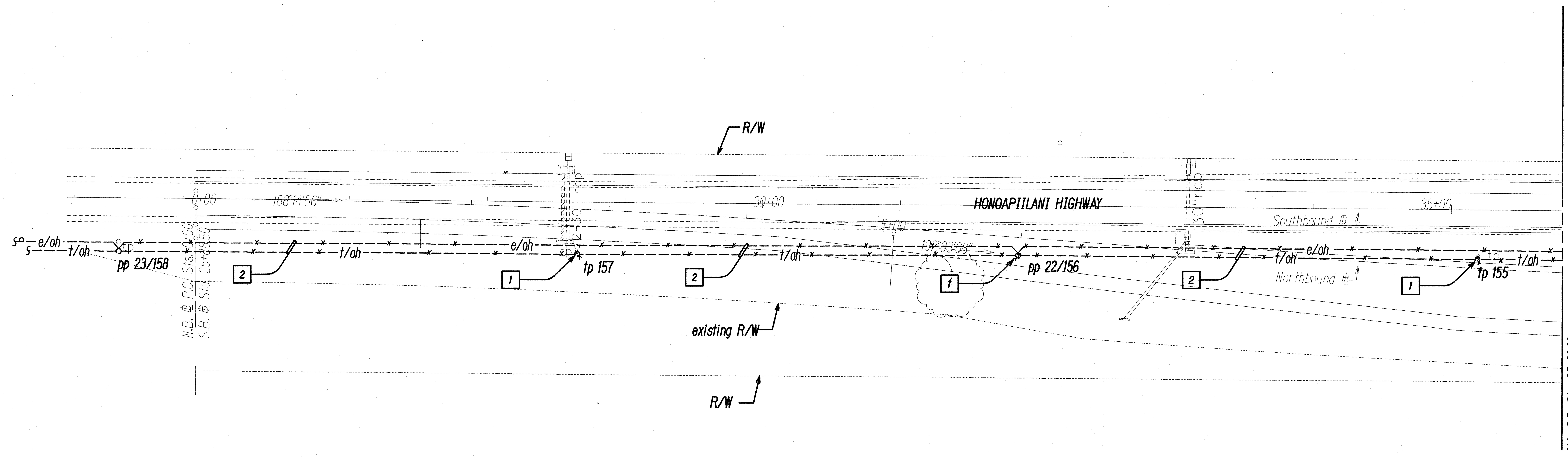
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	107	139



Existing electrical equipment in-use during construction

1. Existing traffic signal equipment and existing street lights are in-use and must remain in operation during the construction until the proposed permanent facilities are completed and in service. Any cost for temporary relocations arising during construction shall be borne by the Contractor.

2. Work by the Contractor in areas with energized electrical equipment or conductors shall be performed with extreme caution to prevent accidents and to avoid disturbing or damaging this equipment or conductors or any temporary supports or protective guards that are constructed. The Contractor shall have the sole responsibility for maintaining safe and efficient working conditions and procedures in these areas.

3. The Contractor shall be responsible for the protection of existing surface and subsurface utilities and poles within and abutting the project site. Any utilities that the contractor encounters during the progress of the work, such as telephone ducts, electric ducts, traffic signal ducts or cables, water lines, sewer lines, electrical lines, gas lines, cable tv, and drainage pipes, whether or not shown on the plans, shall not be disturbed or damaged unless otherwise instructed in the plans or specifications. The Contractor shall notify the engineer and the affected agencies or utility company immediately of any damaged or disturbed utility. Any existing or new facilities including equipment or conductors, damaged by the Contractor shall be replaced at the Contractor's expense.

North

ELECTRICAL DEMOLITION PLAN - I

Scale: 1"=40'-0"

Notes:

[1] Existing utility pole to be removed/relocated by respective utility company.

[2] Existing utility overhead lines to be removed/relocated by respective utility company.

40' 20' 0 40' 80' 120'

Scale: 1"=40'

Graphic Scale

GARY I. FUNASAKI LICENSED PROFESSIONAL ENGINEER No. 4195-E HAWAII, U.S.A.

24 MAY 2000

This Work was Prepared by Me or Under My Supervision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL DEMOLITION PLAN-I

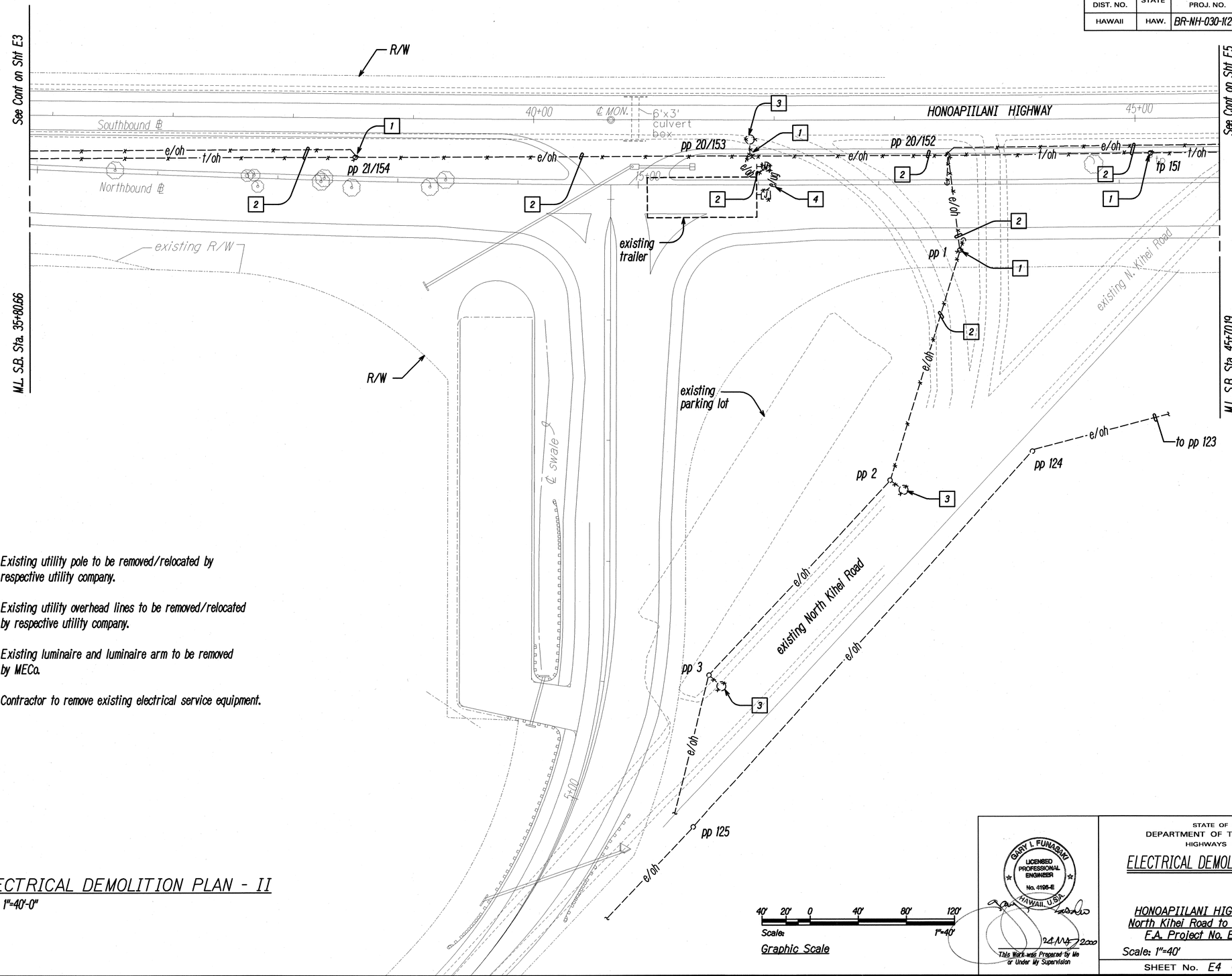
HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: 1"=40' Date: Apr. 2000

SHEET No. E3 OF 22 SHEETS

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | NOTE BOOK | No. | DATE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	108	139



Notes:

1. *Existing utility pole to be removed/relocated by respective utility company.*
2. *Existing utility overhead lines to be removed/relocated by respective utility company.*
3. *Existing luminaire and luminaire arm to be removed by MECo.*
4. *Contractor to remove existing electrical service equipment.*

North

ELECTRICAL DEMOLITION PLAN - II

Scale: 1"=40'-0"

SURVEY PLOTTED BY ____ DATE
DRAWN BY ____ .
TRACED BY ____ .
DESIGNED BY ____ .
QUANTITIES BY ____ .
CHECKED BY ____ .

ORIGINAL PLAN
NOTE BOOK
No. ____

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

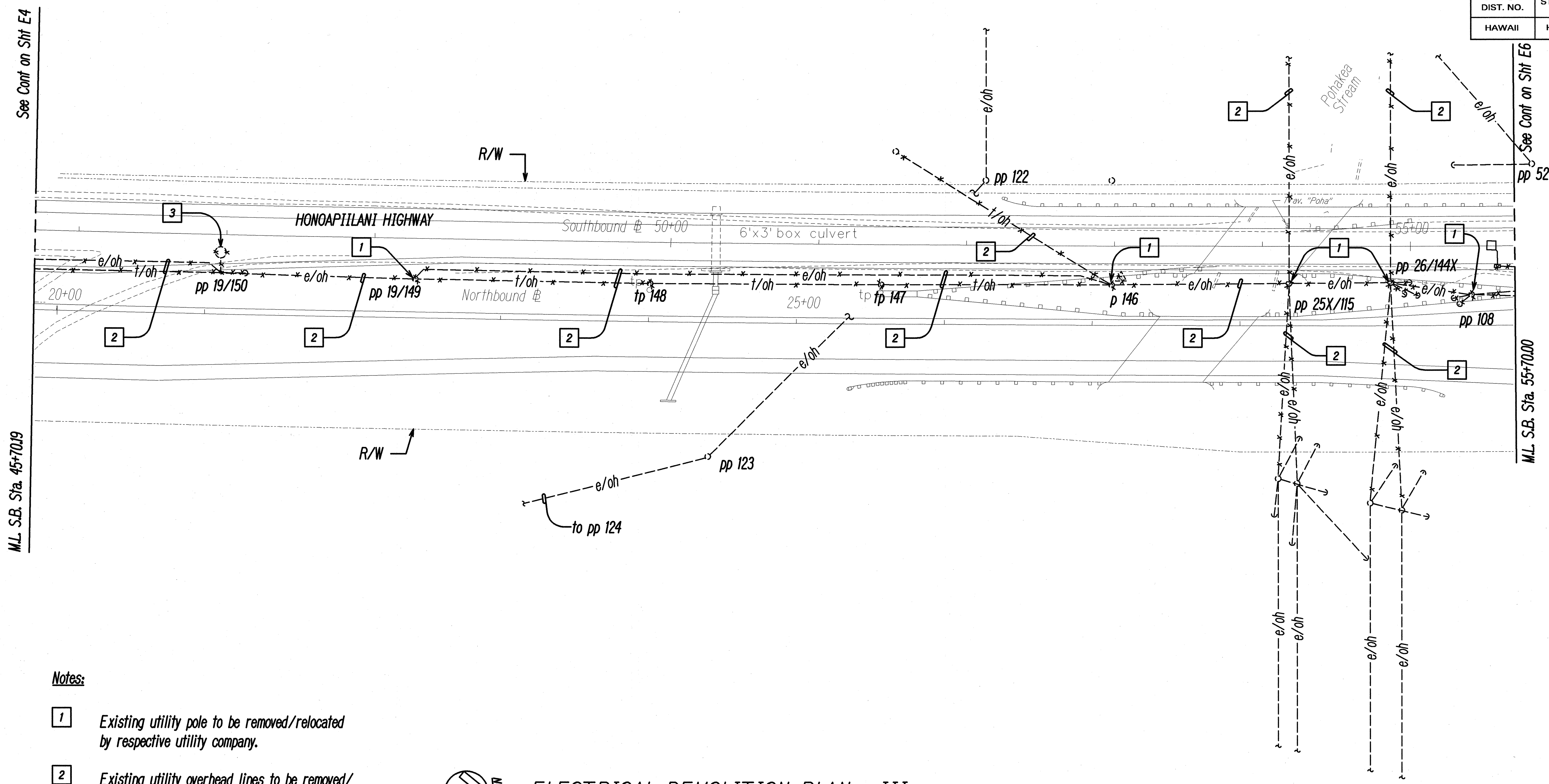
ELECTRICAL DEMOLITION PLAN - II

HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: 1"=40' Date: Apr. 2000

SHEET No. E4 OF 22 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	109	139



<u>Notes:</u>

1. Existing utility pole to be removed/relocated by respective utility company.
2. Existing utility overhead lines to be removed/ relocated by respective utility company.
3. Existing luminaire and luminaire arm to be remove by MECo.

North

ELECTRICAL DEMOLITION PLAN - III

Scale: 1"=40'-0"

40' 20' 0 40' 80' 120'
Scale: 1"=40'
Graphic Scale

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL DEMOLITION PLAN - III

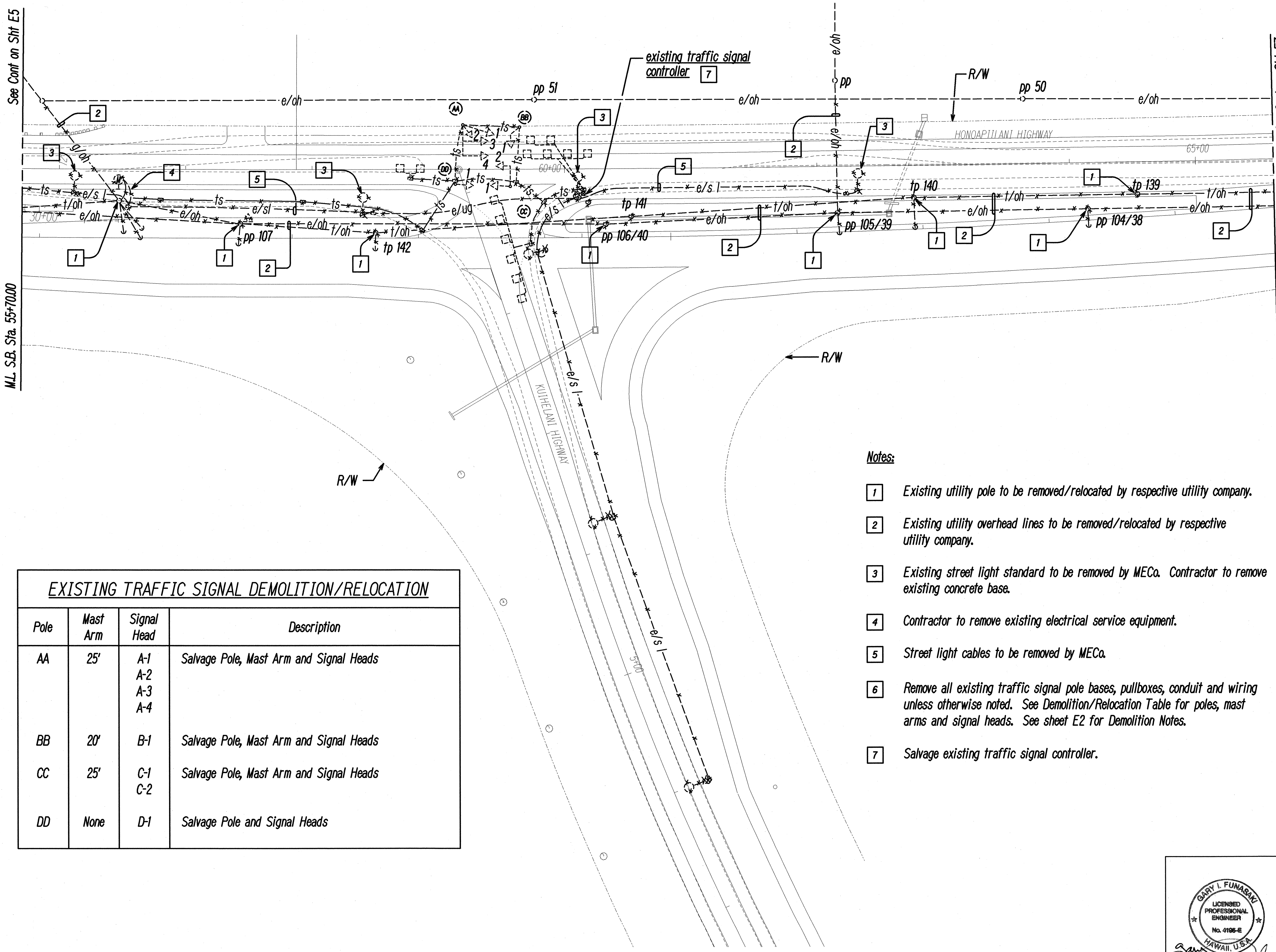
HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: 1"=40' Date: Apr. 2000

SHEET No. E5 OF 22 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY / TRACED BY / DESIGNED BY / QUANTITIES BY / CHECKED BY	
No.		

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	110	139



EXISTING TRAFFIC SIGNAL DEMOLITION/RELOCATION

Pole	Mast Arm	Signal Head	Description
AA	25'	A-1 A-2 A-3 A-4	Salvage Pole, Mast Arm and Signal Heads
BB	20'	B-1	Salvage Pole, Mast Arm and Signal Heads
CC	25'	C-1 C-2	Salvage Pole, Mast Arm and Signal Heads
DD	None	D-1	Salvage Pole and Signal Heads

Notes:

1. Existing utility pole to be removed/relocated by respective utility company.
2. Existing utility overhead lines to be removed/relocated by respective utility company.
3. Existing street light standard to be removed by MECo. Contractor to remove existing concrete base.
4. Contractor to remove existing electrical service equipment.
5. Street light cables to be removed by MECo.
6. Remove all existing traffic signal pole bases, pullboxes, conduit and wiring unless otherwise noted. See Demolition/Relocation Table for poles, mast arms and signal heads. See sheet E2 for Demolition Notes.
7. Salvage existing traffic signal controller.

ELECTRICAL DEMOLITION PLAN - IV 6

North

Scale: 1"=40'-0"

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | NOTE BOOK | No. | DATE

GARY L. FUNASAKI LICENSED PROFESSIONAL ENGINEER No. 4195-E HAWAII, U.S.A.

This Work was Prepared by Me or Under My Supervision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

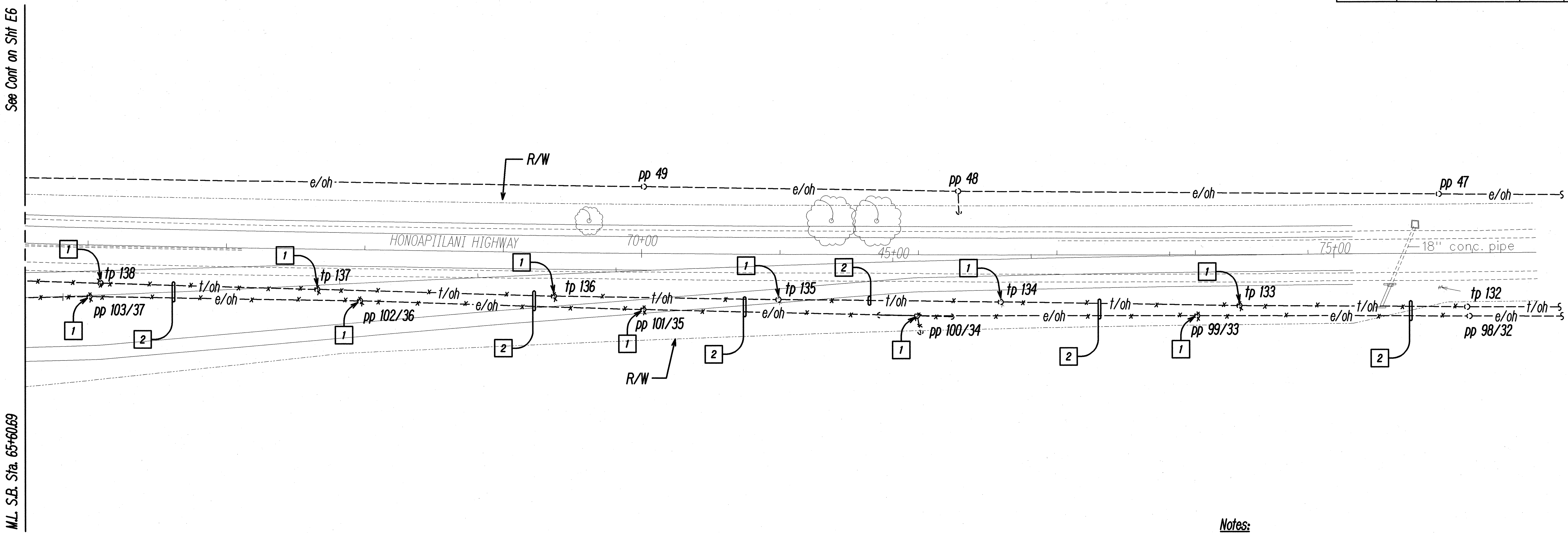
ELECTRICAL DEMOLITION PLAN - IV

HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: 1"=40' | Date: Apr. 2000

SHEET No. E6 OF 22 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	111	139



Notes:

1 Existing utility pole to be removed/relocated by respective utility company.

2 Existing utility overhead lines to be removed/relocated by respective utility company.

North

ELECTRICAL DEMOLITION PLAN - V

Scale: 1"=40'-0"

40' 20' 0 40' 80' 120'

Scale: 1"=40'

Graphic Scale

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This Work was Prepared by Me or Under My Supervision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL DEMOLITION PLAN - V

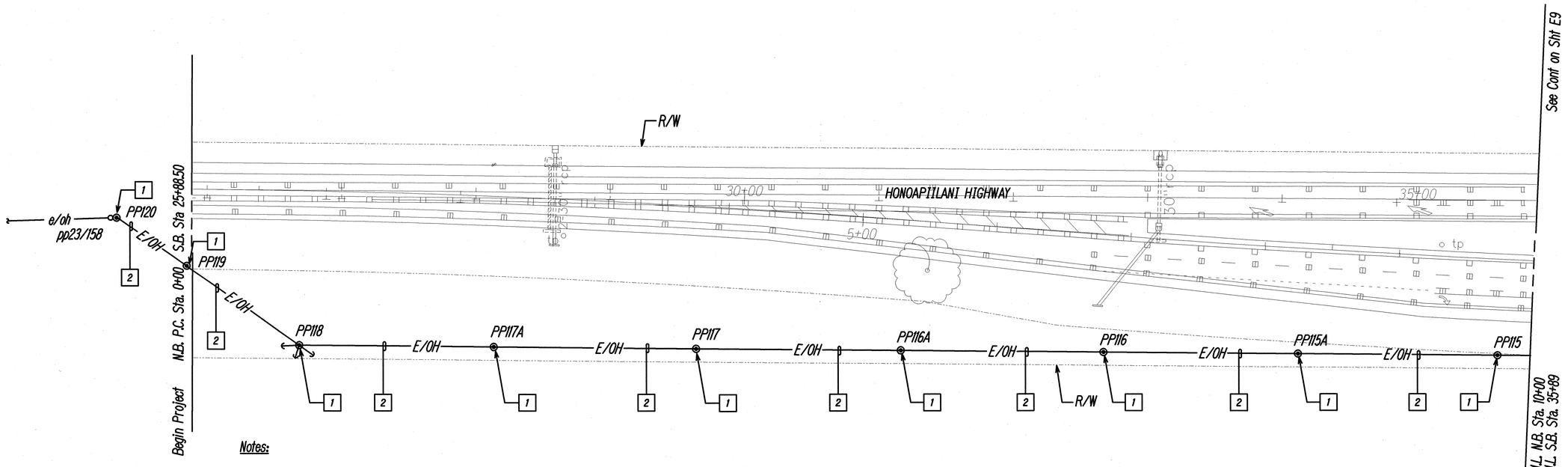
HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: 1"=40' Date: Apr. 2000

SHEET No. E7 OF 22 SHEETS

ORIGINAL PLAN	SURVEY	PLOTTED BY	DATE
NOTE BOOK	DRAWN BY		
	TRACED BY		
	DESIGNED BY		
No.	QUANTITIES BY		
	CHECKED BY		

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	112	139



Notes:

1. Utility pole provided by MECO.
2. Overhead utility lines provided by respective utility company.

North

ELECTRICAL PLAN - I

Scale: 1"=40'-0"

ORIGINAL PLAN
SURVEY PLOTTED BY ____ DATE
DRAWN BY ____ .
TRACED BY ____ .
DESIGNED BY ____ .
QUANTITIES BY ____ .
CHECKED BY ____
NOTE BOOK ____
No. ____

40' 20' 0 40' 80' 120'
Scale: 1"=40'
Graphic Scale

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

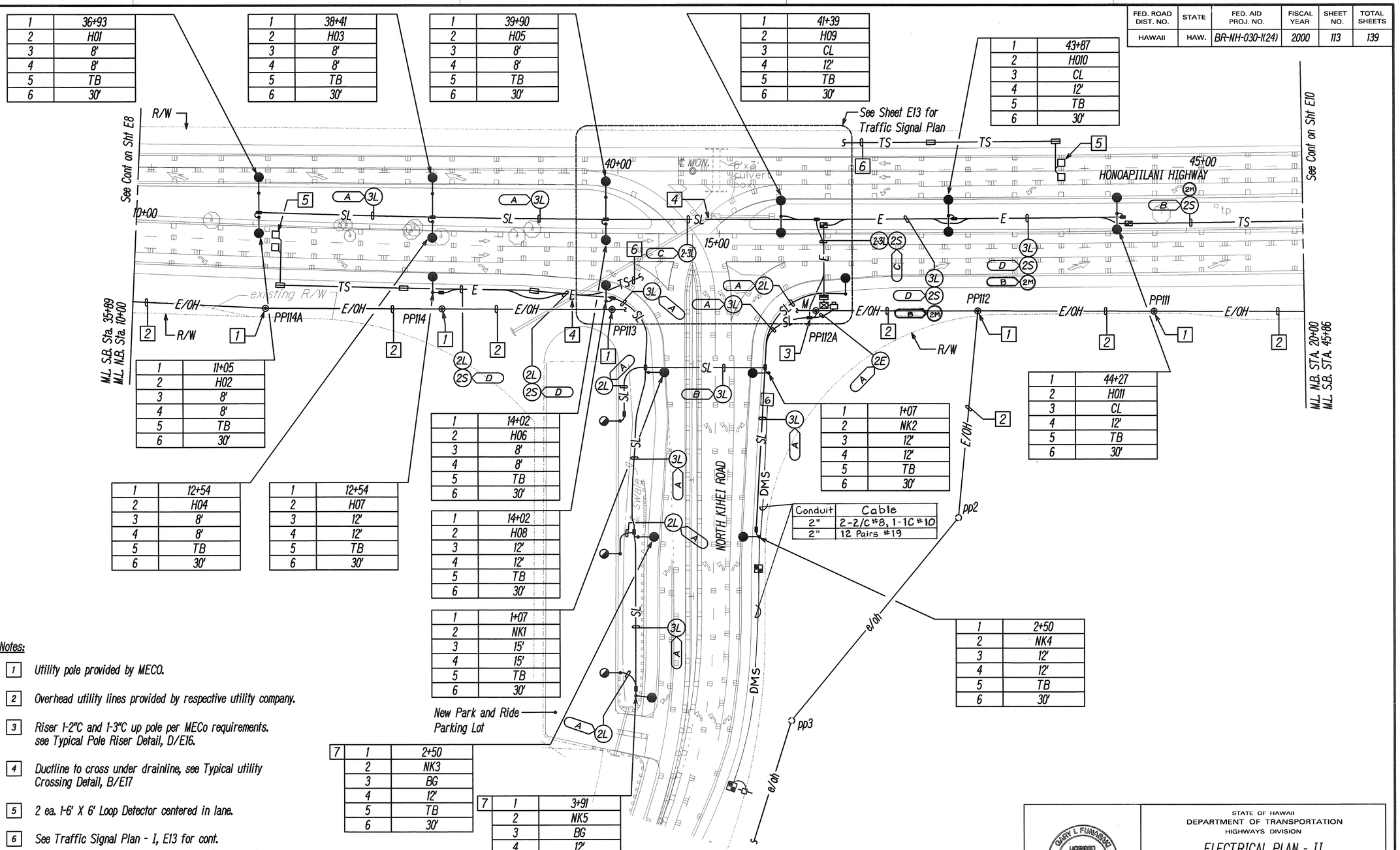
ELECTRICAL PLAN - I

HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: 1"=40' Date: Apr. 2000

SHEET No. E8 OF 22 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	113	139



1	36+93
2	H01
3	8'
4	8'
5	TB
6	30'

1	38+41
2	H03
3	8'
4	8'
5	TB
6	30'

1	39+90
2	H05
3	8'
4	8'
5	TB
6	30'

1	41+39
2	H09
3	CL
4	12'
5	TB
6	30'

1	43+87
2	H010
3	CL
4	12'
5	TB
6	30'

1	11+05
2	H02
3	8'
4	8'
5	TB
6	30'

1	14+02
2	H06
3	8'
4	8'
5	TB
6	30'

1	1+07
2	NK2
3	12'
4	12'
5	TB
6	30'

1	44+27
2	H011
3	CL
4	12'
5	TB
6	30'

1	12+54
2	H04
3	8'
4	8'
5	TB
6	30'

1	12+54
2	H07
3	12'
4	12'
5	TB
6	30'

1	14+02
2	H08
3	12'
4	12'
5	TB
6	30'

1	1+07
2	NK1
3	15'
4	15'
5	TB
6	30'

7	1	2+50
	2	NK3
	3	BG
	4	12'
	5	TB
	6	30'

7	1	3+91
	2	NK5
	3	BG
	4	12'
	5	TB
	6	30'

1	2+50
2	NK4
3	12'
4	12'
5	TB
6	30'

Conduit	Cable
2"	2-2/C #8, 1-1C #10
2"	12 Pairs #19

Notes:

1. Utility pole provided by MECO.
2. Overhead utility lines provided by respective utility company.
3. Riser 1-2"C and 1-3"C up pole per MECo requirements. see Typical Pole Riser Detail, D/E16.
4. Ductline to cross under drainline, see Typical utility Crossing Detail, B/E17
5. 2 ea. 1-6' X 6' Loop Detector centered in lane.
6. See Traffic Signal Plan - I, E13 for cont.
7. Provide 2'-0" minimum clearance between Guardrail Post and Street Light Standard.

North

ELECTRICAL PLAN - II

Scale: 1"=40'-0"

40' 20' 0 40' 80' 120'

Scale: 1"=40'

Graphic Scale

SURVEY PLOTTED BY ____ DATE
DRAWN BY ____
TRACED BY ____
DESIGNED BY ____
QUANTITIES BY ____
CHECKED BY ____
ORIGINAL PLAN
NOTE BOOK
No. ____

GARY I. FUNASAKI
LICENSED PROFESSIONAL ENGINEER
No. 3195-E
HAWAII, U.S.A.

This Work was Prepared by Me or Under My Supervision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL PLAN - II

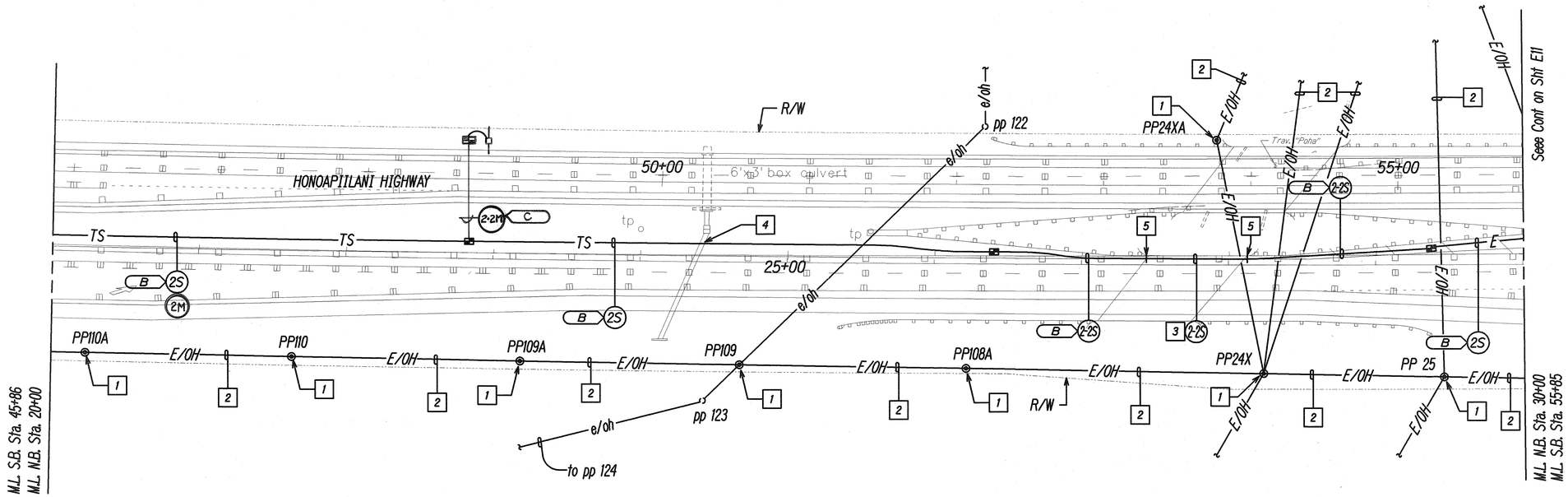
HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: 1"=40' Date: Apr. 2000

SHEET No. E9 OF 22 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	114	139



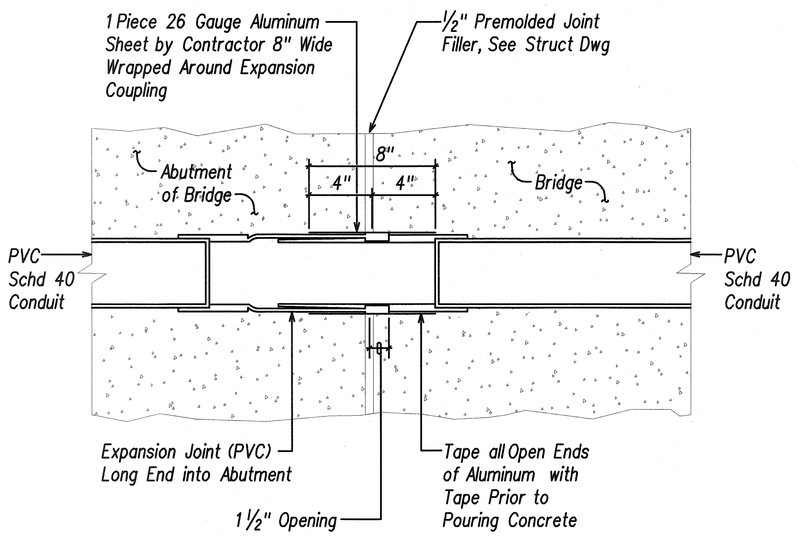
North

ELECTRICAL PLAN - III

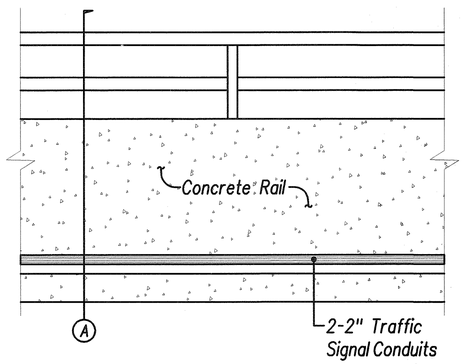
Scale: 1"=40'-0"

Notes:

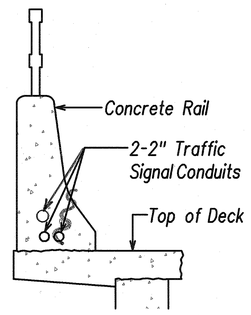
1. Utility pole provided by MECO.
2. Overhead utility lines provided by respective utility company.
3. Ductline routed in bridge concrete rail, see B/E17.
4. Ductline to cross under drainline, see Typical Utility Crossing Detail, A/E17.
5. Provide conduit expansion couplings at bridge transition, see Typical Expansion Fitting Detail, A/E10.



A / E10 TYPICAL EXPANSION FITTING DETAIL
Not to Scale



ELEVATION



SECTION (A)

B / E10 CONCRETE RAIL DUCT ROUTING DETAIL
Not to Scale

40' 20' 0 40' 80' 120'
Scale: 1"=40'

Graphic Scale

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
NOTE BOOK	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	
No.		

GARY I. FUNASAKI
LICENSED PROFESSIONAL ENGINEER
No. 4165-E
HAWAII, U.S.A.
24 MAY 2000
This Work was Prepared by Me or Under My Supervision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL PLAN - III

HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: 1"=40' Date: Apr. 2000

SHEET No. E10 OF 22 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	115	139

1	32+84
2	H014
3	CL
4	12'
5	TB
6	30'

1	30+04
2	H012
3	8'
4	8'
5	TB
6	30'

1	30+04
2	H013
3	15'
4	12'
5	TB
6	30'

1	31+42
2	H016
3	12'
4	12'
5	TB
6	30'

1	~~59+68~~ 58+38
2	H015
3	CL
4	12'
5	TB
6	30'

1	60+28
2	H018
3	8'
4	8'
5	TB
6	30'

1	60+28
2	H019
3	8'
4	8'
5	TB
6	30'

1	61+73
2	H020
3	8'
4	8'
5	TB
6	30'

1	32+84
2	H017
3	12'
4	12'
5	TB
6	30'

1	2+44
2	KU1
3	12'
4	12'
5	TB
6	30'

1	4+00
2	KU3
3	12'
4	12'
5	TB
6	30'

1	2+70
2	KU2
3	12'
4	12'
5	TB
6	30'

1	4+00
2	KU4
3	12'
4	12'
5	TB
6	30'

1	61+73
2	H021
3	8'
4	8'
5	TB
6	30'

1	63+24
2	H022
3	CL
4	12'
5	TB
6	30'

HONOAPIILANI HIGHWAY

KUIHELANI HIGHWAY

PP52 PP106 PP105A PP105 PP104A PP104 PP103A PP103

E/OH TS SL E

M.L. S.B. Sta. 55+85
M.L. N.B. Sta. 30+00

M.L. S.B. Sta. 65+80
M.L. N.B. Sta. 40+00

See Cont on Sht E10

See Cont on Sht E12

See Sht E14 for Traffic Signal Plan - II

R/W

guy wire

60+00 35+00 5+00 65+00

Notes:

1. Utility pole provided by MECO.
2. Overhead utility lines provided by respective utility company.
3. Riser 1-2"C and 1-3"C Up pole per MECO requirements. See Typical Pole Riser Detail, C/E16
4. Ductline to cross under drainline, see Typical Utility crossing Detail, A/E17
5. 2 ea. 1-6' X 6' Loop Detector Centered in Lane.
6. See Traffic Signal Plan - II, Sheet E14 for cont.

North

ELECTRICAL PLAN - IV

Scale: 1"=40'-0"

40' 20' 0 40' 80' 120'

Scale: 1"=40'

Graphic Scale

ORIGINAL PLAN

SURVEY PLOTTED BY _____ DATE _____
DRAWN BY _____
TRACED BY _____
DESIGNED BY _____
NOTE BOOK QUANTITIES BY _____
CHECKED BY _____
No. _____

GARY I. FUNASAKI
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No. 11196-E
HAWAII, U.S.A.

24 May 2000

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL PLAN - IV

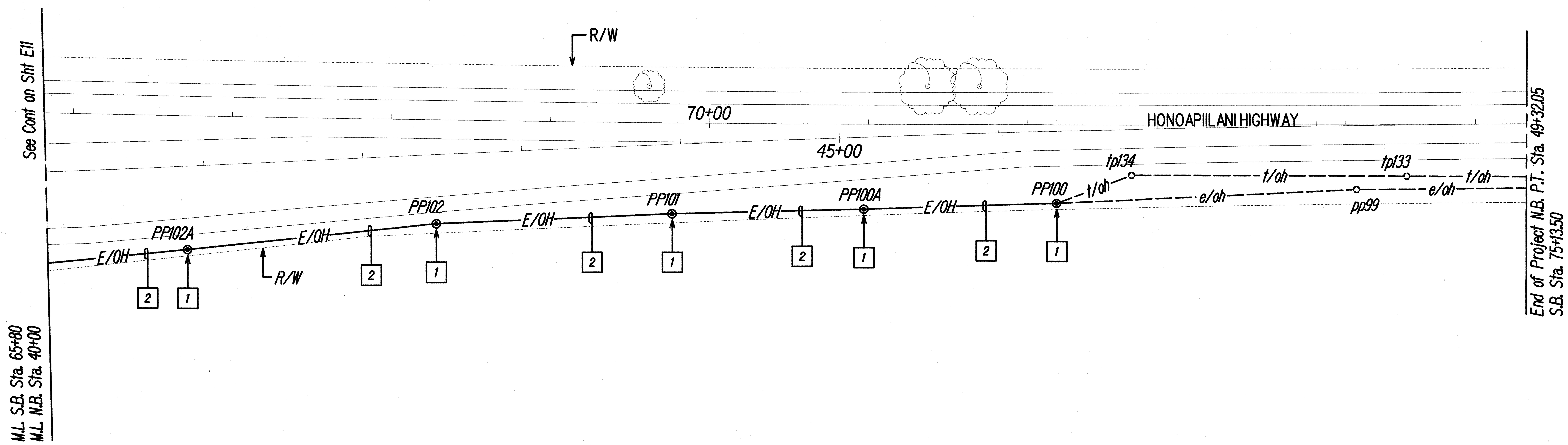
HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: 1"=40' Date: Apr. 2000

SHEET No. E11 OF 22 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	116	139



Notes:

[1] Utility pole provided by MECO.

[2] Overhead utility lines provided by respective utility company.

ELECTRICAL PLAN - V

Scale: 1"=40'-0"

Graphic Scale — Scale: 1"=40'

GARY I. FUNASAKI — LICENSED PROFESSIONAL ENGINEER — No. 4195-E — HAWAII, U.S.A.

This Work was Prepared by Me or Under My Supervision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL PLAN - V

HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: 1"=40' Date: Apr. 2000

SHEET No. E12 OF 22 SHEETS

ORIGINAL PLAN | SURVEY PLOTTED BY / DRAWN BY / TRACED BY / DESIGNED BY / QUANTITIES BY / CHECKED BY | DATE
NOTE BOOK
No.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	117	139

List of Materials

Pole Letter	Standard Type	Mounting Type	Signal Faces & Opticom Receivers
A	II - 36	Mast Arm - One Way Mast Arm - One Way Mast Arm - One Way Mast Arm - Hor.	R-Y-G ↑ R-Y-G ↑ R-Y-G ← Opticom
B	I - 10	Slipfitter - Two Way	R-Y-G ↑ , R-Y-G ←
C	I - 10	Slipfitter - Two Way Tp - Evp.	R-Y-G ←, R-Y-G ← Opticom
D	II - 20	Mast Arm - One Way Mast Arm - One Way Bracket Arm - One Way Bracket Arm - Vertical Mast Arm - Hor.	R-Y-G ↑ R-Y-G ↑ R-Y-G Opticom Opticom
E	I - 10	Slipfitter - Two Way	R-Y-G , R-Y-G ←

Note:

1. See Electrical Plan - II, Sheet E9 for Cont.
2. Ductline to cross under Drainline, see Typical utility crossing Detail, B/E17
3. Stub-out and Cap Conduit 12" Min from Footing.

R/W

HONOAPIILANI HIGHWAY

NORTH KIHEI ROAD

4 ea. 1-6' X 6' Loop Detector Centered in Lane

1 ea. 6-6' X 6' Loop Detectors Centered in Lane

4 ea. 1-6' X 6' Loop Detector Centered in Lane

2 ea. 4-6' X 6' Loop Detectors Centered in Lane

6'x3' culvert box

TS

DMS

36'

20'

Conduit	Cable
2"	1-26C#14
2"	Spare

Conduit	Cable
2"	3-4/C#14 1-3/C#20
2"	Spare

Conduit	Cable
2"	2-4/C#14

Conduit	Cable
2"	1-2C#14

Conduit	Cable
2"	1-26C#14 2-2C#14 Spare

Conduit	Cable
2"	1-2C#14

Conduit	Cable
2"	1-26C#14 1-3C#20 Spare

Conduit	Cable
2"	2-4/C#14 1-3/C#20

Conduit	Cable
2"	1-26C#14 2-2C#14 1-3C#20 Spare

Conduit	Cable
2"	2-2C#8, 1-1C#10

Conduit	Cable
2"	12 Pairs #19
2"	2-2C#8, 1-1C#10

Conduit	Cable
2"	1-26C#14 1-26C#14 7-2C#14 4-3C#20 12 Pairs #19 Spare

Conduit	Cable
3"	Spare

Conduit	Cable
2"	3#6, #8 GND

Conduit	Cable
2"	Cables by MECO

Conduit	Cable
2"	Cables by MECO

Conduit	Cable
2"	1-26C#14 1-26C#14 7-2C#14 4-3C#20 Spare

Conduit	Cable
2"	3-4/C#14 2-3/C#20 Spare

Conduit	Cable
2"	2-2C#8, 1-1C#10
2"	12 Pair #19

Traffic Signal Head Schedule

Traffic Signal Head Type and Description	12" RYG Traffic Signal Head	12" RYG ← Traffic Signal Head	12" RYG ↑ Traffic Signal Head
Pole Letter Signal Head Number	D-1 E-1	A-3 * B-2 C-1 * C-2 E-2	A-1 A-2 B-1 D-2 D-3

* Programmable Visibility Head

PHASE DIAGRAM

01 02 03 04 05 06 07 08

North

TRAFFIC SIGNAL PLAN - I

Scale: 1"=20'

Scale: 20' 10' 0 20' 40' 60' 1"=20'

Graphic Scale

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

ORIGINAL PLAN
NOTE BOOK
No.

GARY I. FUMASAKI LICENSED PROFESSIONAL ENGINEER No. 6188-E HAWAII, U.S.A.

This Work was Prepared by Me or Under My Supervision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL PLAN - I

HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: 1"=20' Date: Apr. 2000

SHEET No. E13 OF 22 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	118	139

List of Materials

Pole Letter	Standard Type	Mounting Type	Signal Faces & Opticom Receivers
A	I - 10	Slipfitter - One Way TP - EVP	R-Y-G ← Opticom
B	I - 10	Slipfitter - Two Way	RYG ↑, R-Y-G ←
C	I - 10	Slipfitter - One Way	R-Y-G ←
D	II - 33	Bracket Arm - Two Way Mast Arm - One Way Mast Arm - One Way Mast Arm - Hor.	R-Y-G, R-Y-G R-Y-G ← R-Y-G Opticom
E	*II - 40	Bracket Arm - One Way	R-Y-G ←
F	II - 35	TP - EVP Bracket Arm - One Way Mast Arm - One Way Mast Arm - One Way Mast Arm - One Way Mast Arm - Hor.	Opticom R-Y-G ← R-Y-G ↑ R-Y-G ↑ R-Y-G ← Opticom

* Provide Type II Standard for Future 40' Mast Arm

Notes:

1. See Electrical Plan - II, Sheet E11 for Cont.
2. Ductline to cross under Drainline. see Typical utility crossing Detail, B/E17
3. Stub-out and Cap Conduit 12" Min from Footing.

Conduit	Cable
2"	1-4/C#14 1-3/C#20

Conduit	Cable
2"	1-26C#14 1-3C#20 2-2" Spare

Conduit	Cable
2"	1-26C#14 Spare

Conduit	Cable
2"	2-4/C#14

1 Conduit	Cable
2"	12 Pairs #19

Conduit	Cable
2"	1-2C#14

Conduit	Cable
2"	1-4/C#14

Conduit	Cable
2"	1-26C#14 2-2C#14 2" 1-3C#20 2" Spare

Conduit	Cable
2"	4-4/C#14 2-3/C#20 2"

Conduit	Cable
2"	1-26C#14 3-2C#14 2" 1-3C#20 2" Spare

Conduit	Cable
2"	4-4/C#14 1-3/C#20 2" Spare

3 Conduit	Cable
3"	Spare

Conduit	Cable
2"	3#6, #8 Gnd

Conduit	Cable
2"	Cables by MECO

Conduit	Cable
2"	Cables by MECO

Conduit	Cable
2"	1-2C#14

Conduit	Cable
2"	1-26C#14 2-3C#20 2" 12 Pairs #19 2-2" Spare

Conduit	Cable
2"	1-4/C#14 2" Spare

Conduit	Cable
2"	1-2C#14

Conduit	Cable
2"	1-26C#14 2-2C#14 2" 3-3C#20 2" 12 Pairs #19 2" Spare

Conduit	Cable
2"	1-26C#14 1-26C#14 2" 7-2C#14 2" 4-3C#20 2" 12 Pairs #19 2-2" Spare

4 ea. 1-6' X 6' Loop Detector Centered in Lane

4 ea. 1-6' X 6' Loop Detector Centered in Lane

1 ea. 6-6' X 6' Loop Detectors Centered in Lane

2 ea. 4-6' X 6' Loop Detector Centered in Lane

R/W

TS

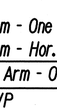
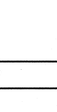
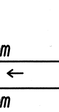
35'

33'

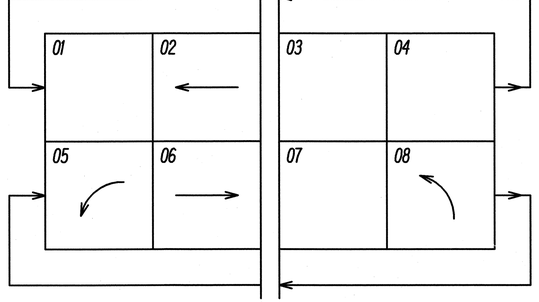
HONOAPIILANI HIGHWAY

KUIHELANI HIGHWAY

Traffic Signal Head Schedule

Traffic Signal Head Type and Description	 12" RYG Traffic Signal Head	 12" RYG ← Traffic Signal Head	 12" RYG ↑ Traffic Signal Head
Pole Letter Signal Head Number	D-2, D-3, D-4	A-1 B-2 C-1 E-1 F-3 * F-4	B-1 D-1 F1, F-2

* Programmable Visibility Head



PHASE DIAGRAM

North

TRAFFIC SIGNAL PLAN - II

Scale: 1"=20'

20' 10' 0 20' 40' 60'

Scale: 1"=20'

Graphic Scale

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE | NOTE BOOK | NO.

GARY I. FUNASUKI LICENSED PROFESSIONAL ENGINEER No. 4196-E HAWAII, U.S.A.

This Work was Prepared by Me or Under My Supervision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

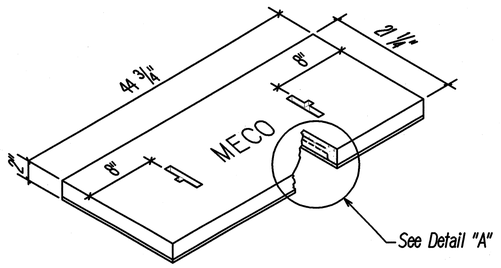
TRAFFIC SIGNAL PLAN - II

HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: 1"=20' Date: Apr. 2000

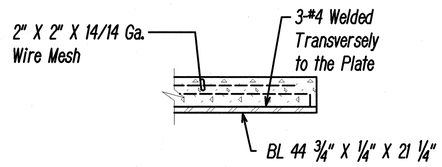
SHEET No. E14 OF 22 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	119	139

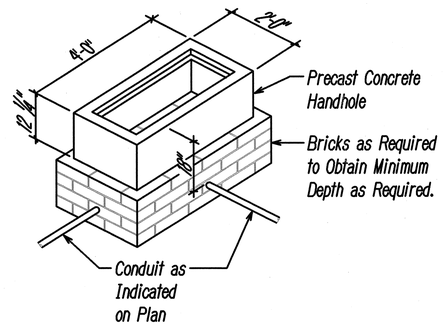


The Maui Electric Co, Inc. (MECO) Handholes shall be constructed by the Contractor as shown in these drawings & in accordance with the following standard drawings:

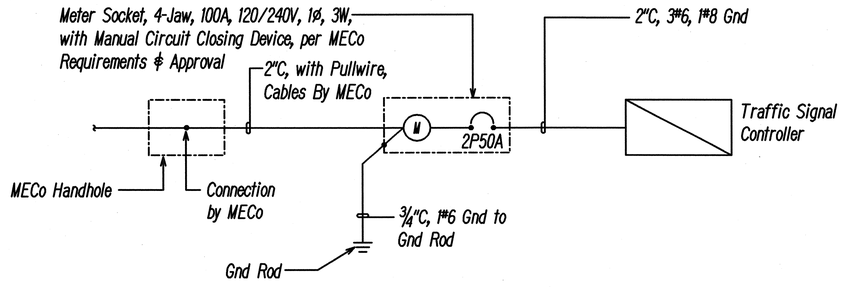
Type	Description
2' X 4' HECO Pullbox	2' X 4' Precast concrete pullbox with precast concrete cover, provided in accordance with HECO Standard Drawing No. 30-2005.



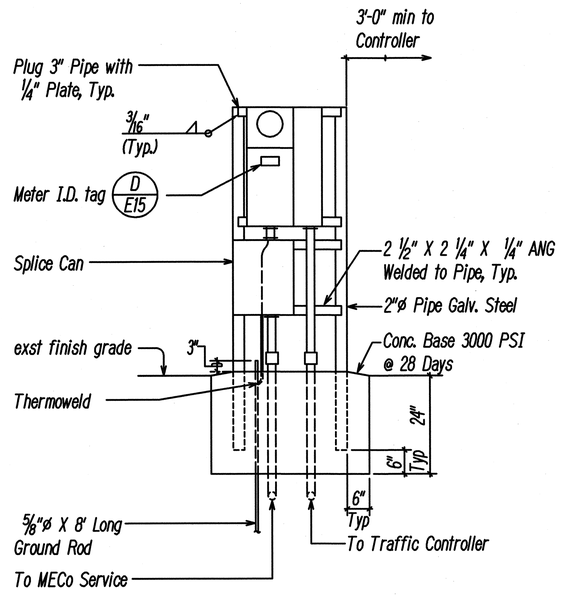
DETAIL "A"



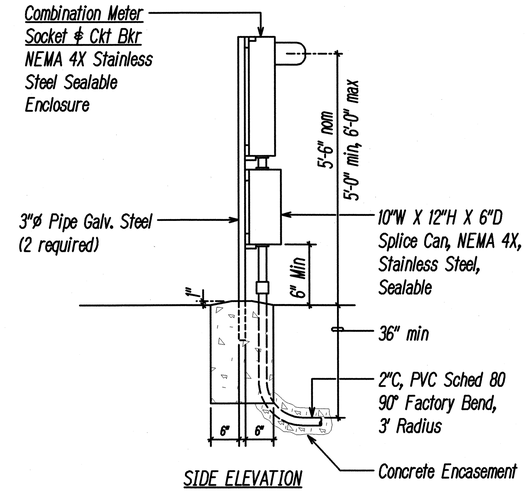
A / E15 2' X 4' MECO HANDHOLE DETAIL
Not to Scale



B / E15 TYPICAL ONE-LINE DIAGRAM

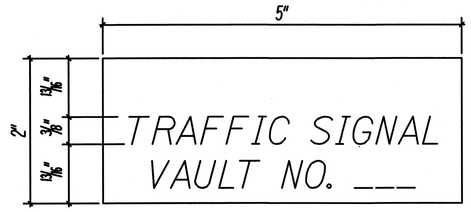


FRONT ELEVATION



SIDE ELEVATION

C / E15 ELECTRICAL SERVICE ELEVATION
Not to Scale



D / E15 METER I.D. TAG DETAIL
Not to Scale

Notes:

1. Use 3 Ply Laminated Flexible Plastic, Black-White-Black. Thickness: Black Cap & Base Sheet - 0.010", White Middle Sheet - 0.052".
2. Letters and Numbers shall be Engraved 3/8" High, 1/16" Stroke, White in Color.
3. Attach to Meter Socket using Scotch 3M Brand very High Bond (VHB) Double Coated Acrylic Foam Tape or Equivalent.
4. Letters and Numbers shall be Engraved through "Black Cap Sheet" to Expose "White" Letters.

ORIGINAL PLAN | NOTE BOOK | No. ____
SURVEY PLOTTED BY ____ DATE
DRAWN BY ____ .
TRACED BY ____ .
DESIGNED BY ____ .
QUANTITIES BY ____ .
CHECKED BY ____ .

GARY L. FUNASUKI LICENSED PROFESSIONAL ENGINEER No. 4196-E HAWAII, U.S.A.
This Work was Prepared by Me or Under My Supervision
2/NOV/2000

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

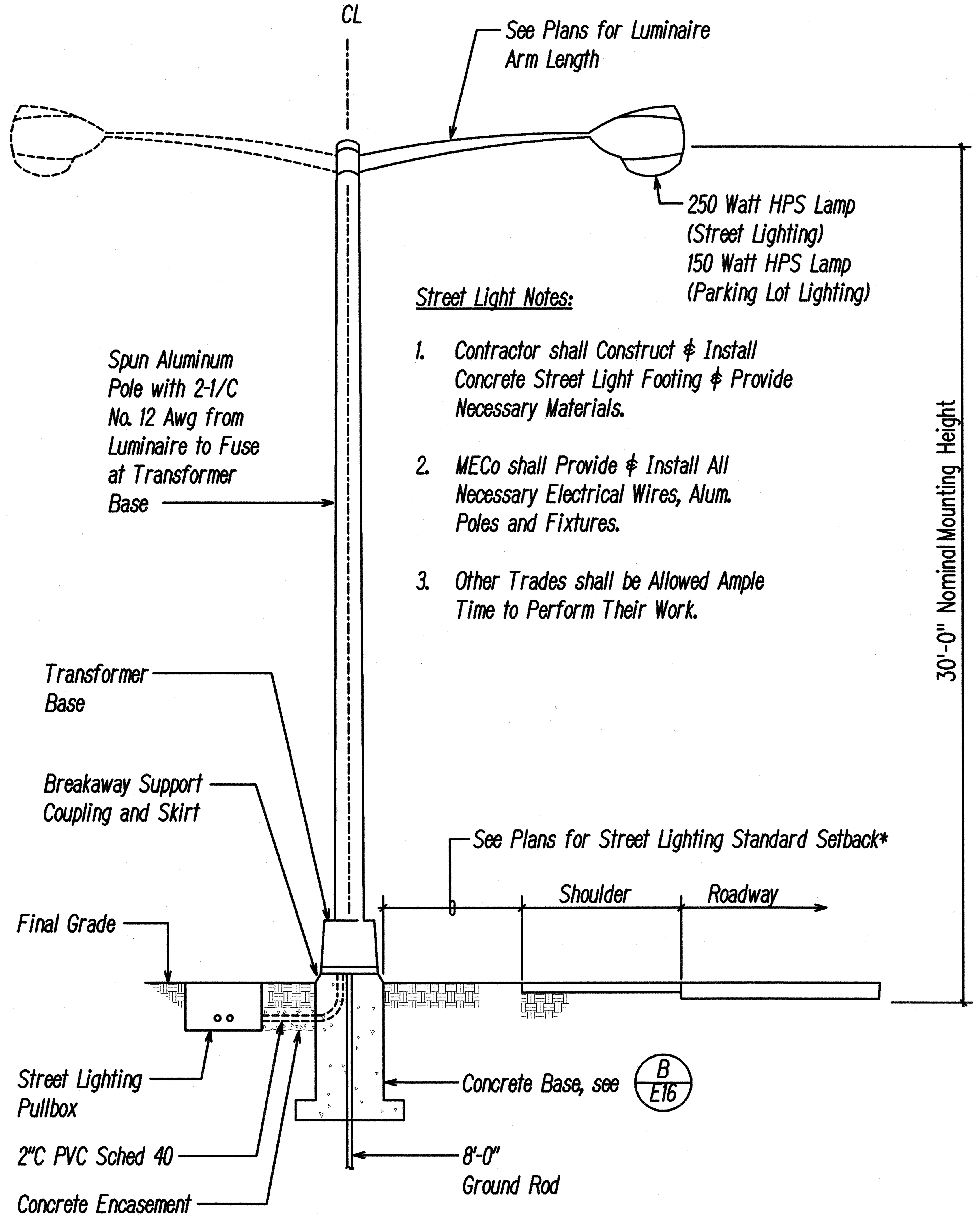
ONE-LINE DIAGRAM,
ELECTRICAL SERVICE ELEVATION, DETAILS

HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: None Date: Apr. 2000

SHEET No. E15 OF 22 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	120	139

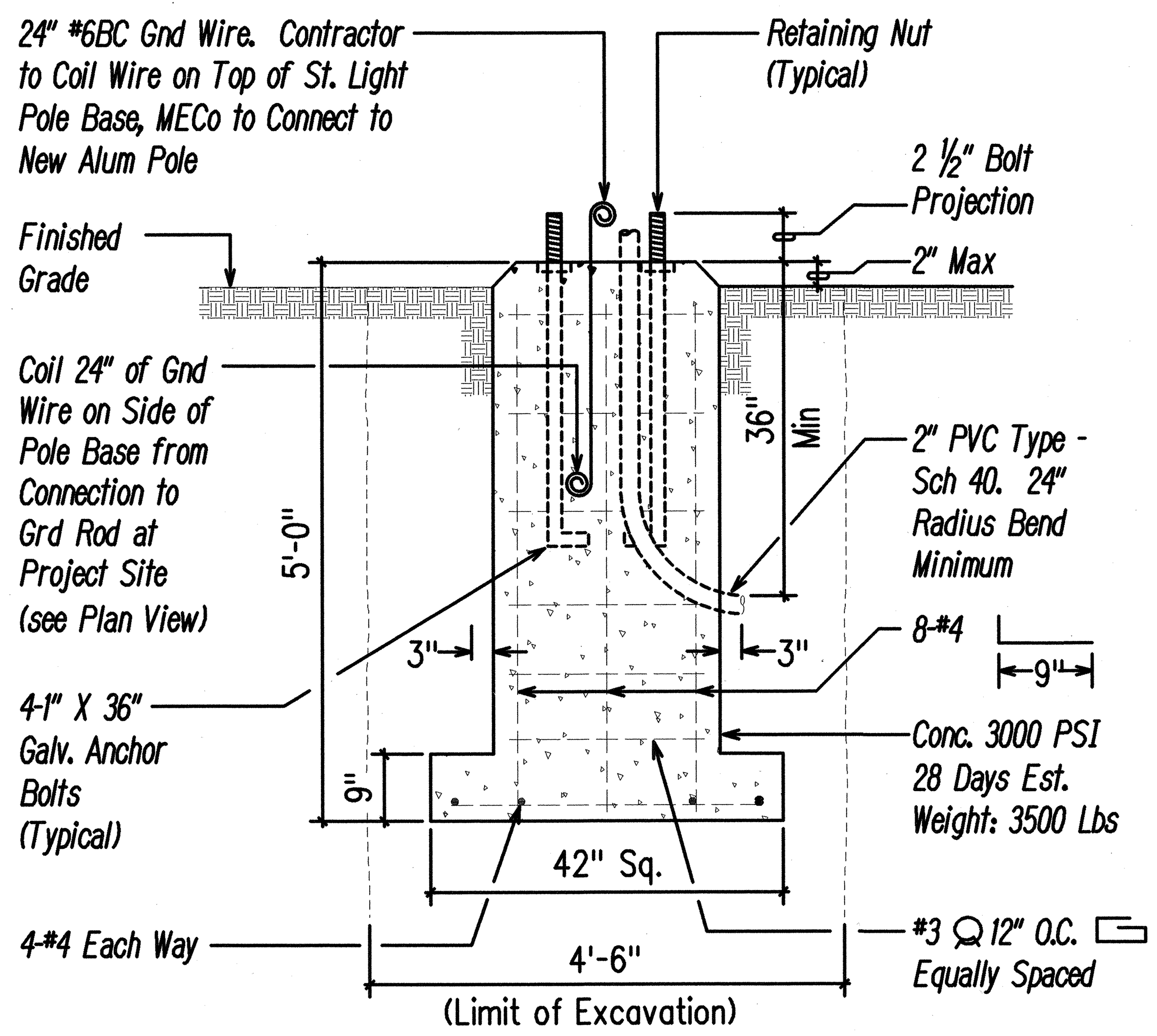


Street Light Notes:

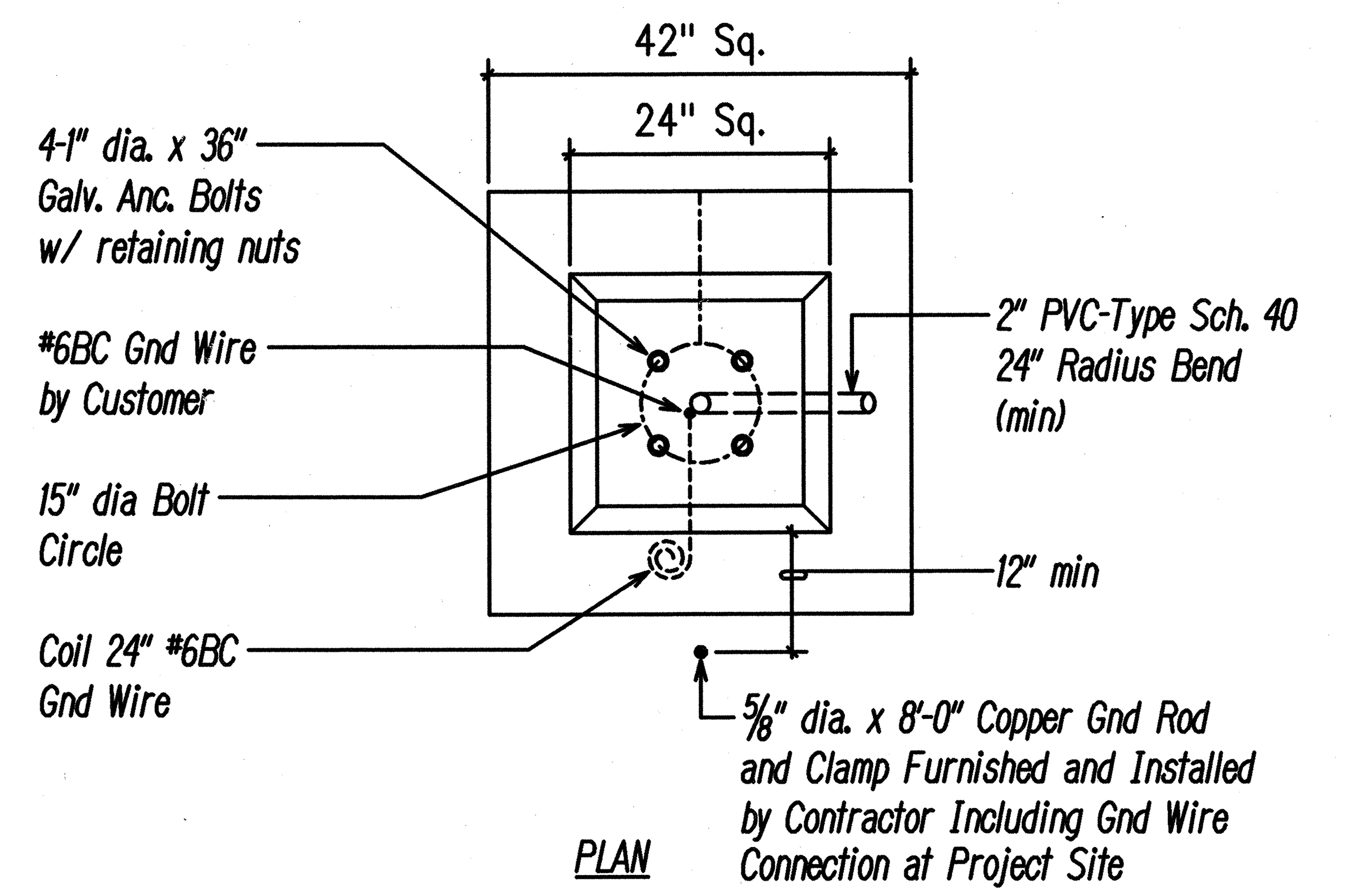
1. Contractor shall Construct & Install Concrete Street Light Footing & Provide Necessary Materials.
2. MECo shall Provide & Install All Necessary Electrical Wires, Alum. Poles and Fixtures.
3. Other Trades shall be Allowed Ample Time to Perform Their Work.

*Parking Lot Light Standard Setback 3'-0" clear from Edge of Parking Lot Pavement

A/E16 TYPICAL LIGHT STANDARD
Not to Scale



ELEVATION

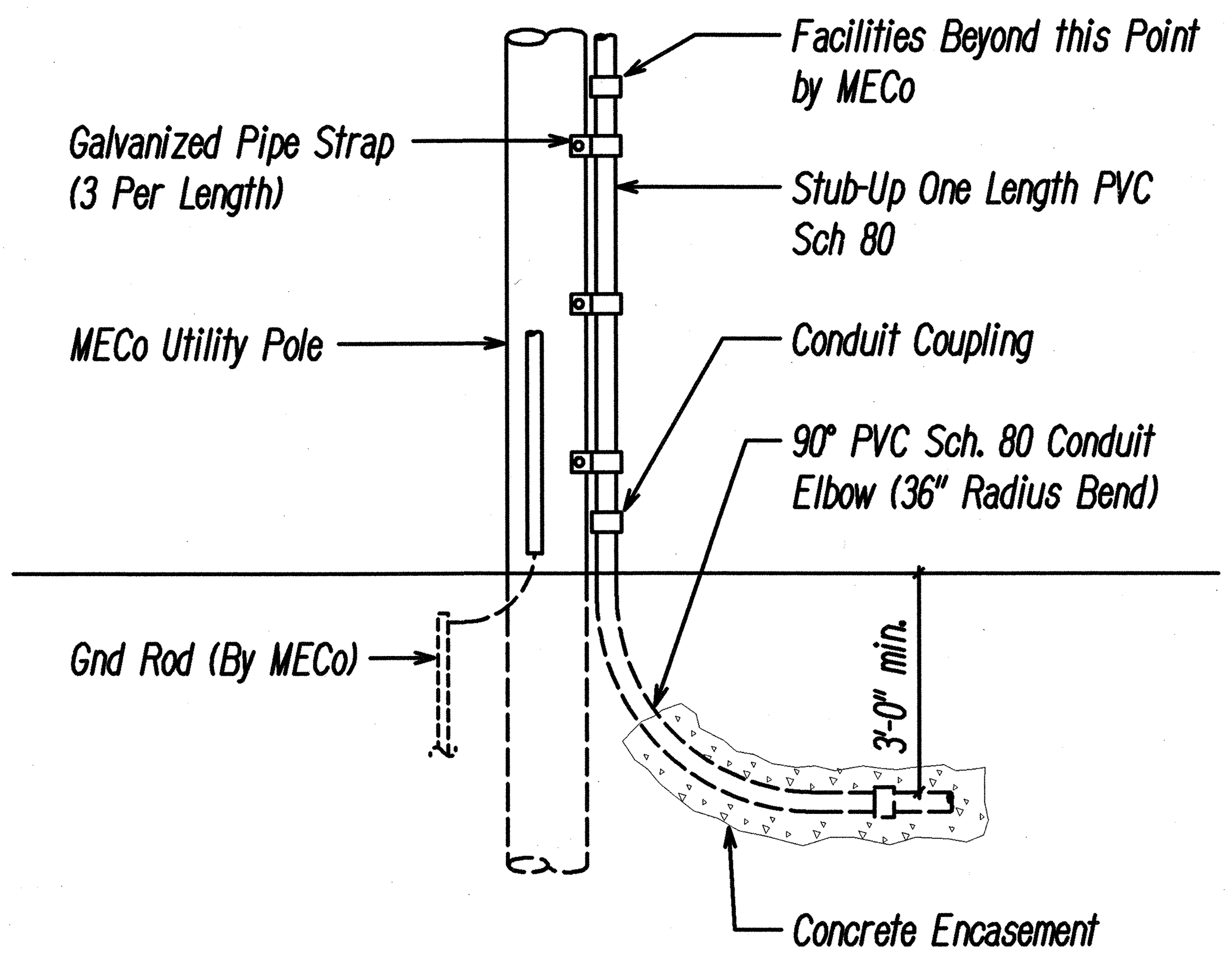


PLAN

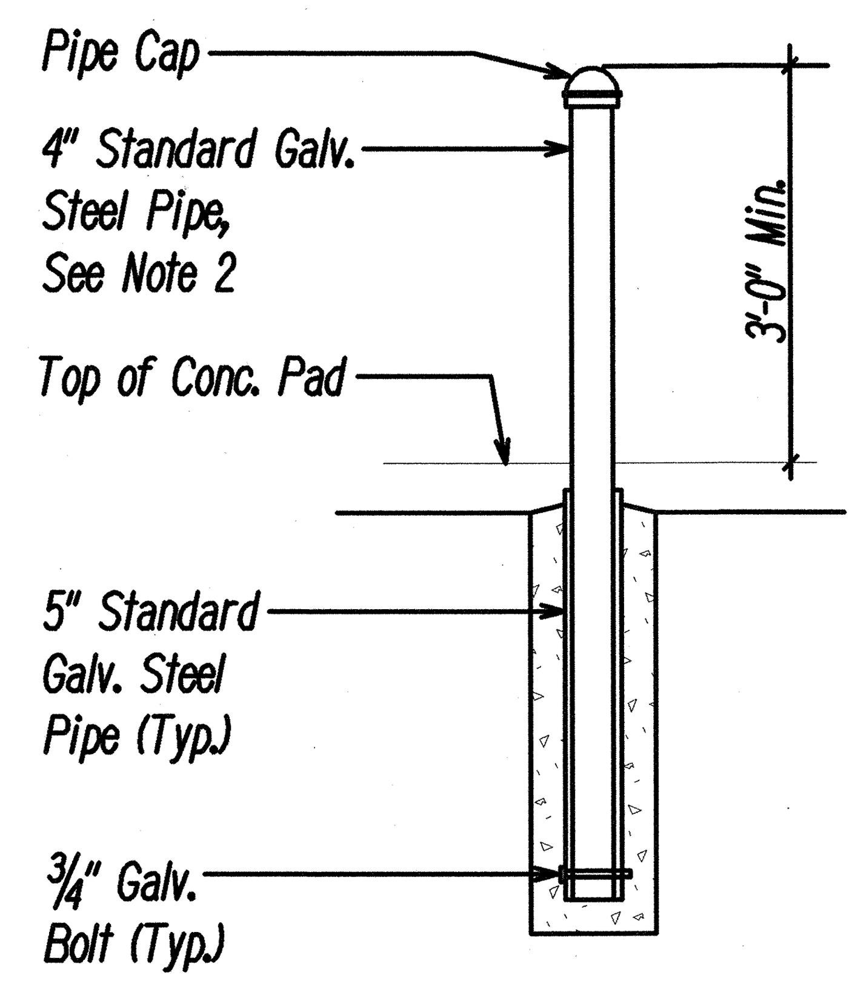
Notes:

1. Precast Concrete Footing is Prefabricated by Walker Industries at Ameron Maui, Ph: 877-5068.
2. MECo shall Provide 1" dia. X 36" Anchor Bolts (4 each) as Furnished by Manufacturer. Pick-up by Contractor at MECo's Kahului Warehouse.
3. Inspection by MECO Inspector Required Prior to Fabrication of Footing. Contact MECo Inspector (Ph: 871-8461)

B/E16 PRECAST CONCRETE FOOTING STREET LIGHT POLE BASE TRANSFORMER TYPE-WITH BREAKAWAY COUPLING (STATE HIGHWAY)
Not to Scale



C/E16 TYPICAL POLE RISER DETAIL
Not to Scale



Stationary Stanchion

Notes:

1. Stationary Galv. Pipe to be Filled with Concrete to Weigh Approximately 150 Lbs.
2. Stanchions shall be Painted Yellow per ANSI Spec. Z53.1 to Comply with OSHA Standards per Color Coding.
3. Stanchion shall Conform to ASTM A53.

D/E16 STANCHION DETAIL
Not to Scale

GARY I. FUNASAKI LICENSED PROFESSIONAL ENGINEER No. 4195-E HAWAII, U.S.A.
24 MAY 2000
This Work was Prepared by Me or Under My Supervision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

CONCRETE BASE AND STREET LIGHT DETAILS, POLE RISER DETAIL

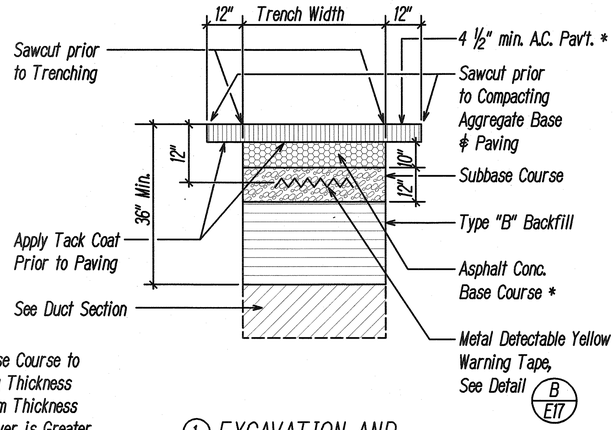
HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: None Date: Apr. 2000

SHEET No. E16 OF 22 SHEETS

ORIGINAL PLAN | NOTE BOOK | No. — SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY — DATE

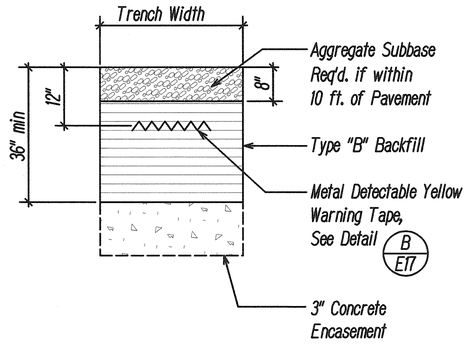
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	121	139



* A.C. and Base Course to Match existing Thickness or the Minimum Thickness shown, whichever is Greater.

① EXCAVATION AND BACKFILL SECTION

Within State Right-of-Way under existing Roadway & Paved Shoulder



② EXCAVATION AND BACKFILL SECTION

Within State Right-of-Way under Unpaved Shoulder

STATE RIGHT-OF-WAY BACKFILL NOTES

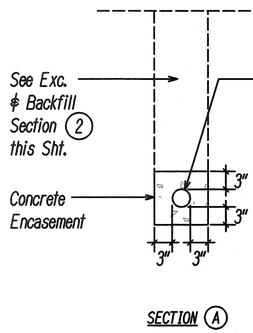
Not to Scale

- Trench Backfill Material "B"
  1. Sand Equivalent ≥ 2
  2. 8" max. Lift Loose
  3. 95% Compaction
- Trench Backfill Material "A"
  1. Sand Equivalent ≥ 20
  2. 8" max. Lift Loose
  3. 95% Compaction
- If Material below Duct is not Equivalent to Backfill Material "A", Excavate Material & Provide 3" Backfill Material "A". See above
- Concrete - 3" Encasement, 2500 PSI Compressive Strength @28 Days.

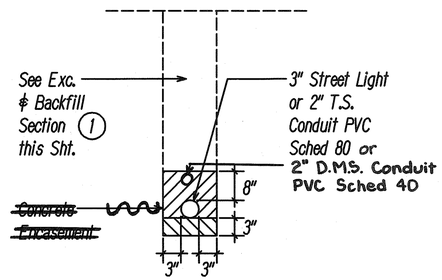
Note: Base Course & Sub-base Course per 1994 State Standard Specifications for Highway Construction.

CONDUIT SCHEDULE

Item	Description
2L	2"C, Street Lighting
3L	3"C, Street Lighting
2S	2"C, Traffic Signal
2E	2"C, MECo



SECTION (A)



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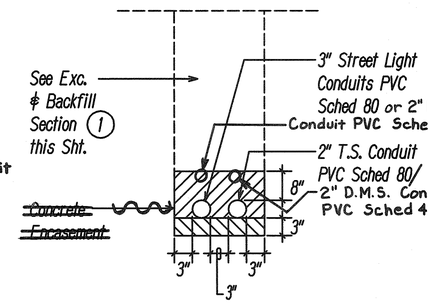

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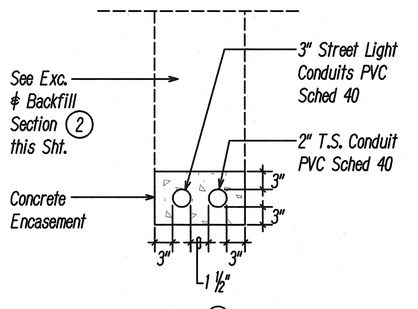
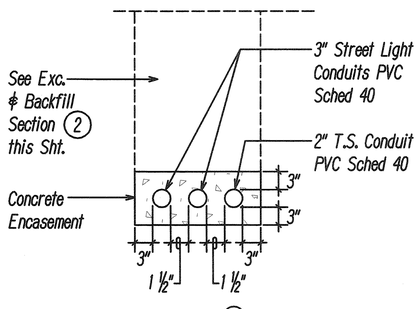


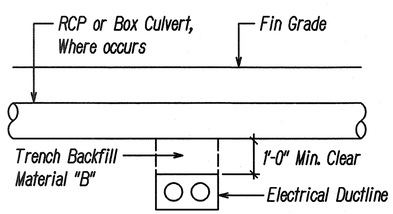
SECTION (D)



SECTION (E)

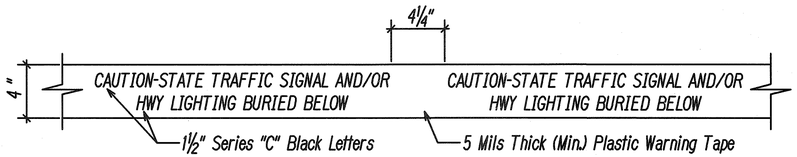
DUCT SECTION DETAILS

Not to Scale



(A) E17 TYPICAL UTILITY CROSSING DETAIL

Not to Scale



Note:

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 ±± 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.

(B) E17 METAL DETECTABLE RED PLASTIC WARNING TAPE

Not to Scale

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
NOTE BOOK | No.

GARY L. FUNASAKI LICENSED PROFESSIONAL ENGINEER No. 6933-E HAWAII, U.S.A.

24 May 2000

This Work was Prepared by Me or Under My Supervision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DUCT SECTIONS, DETAILS

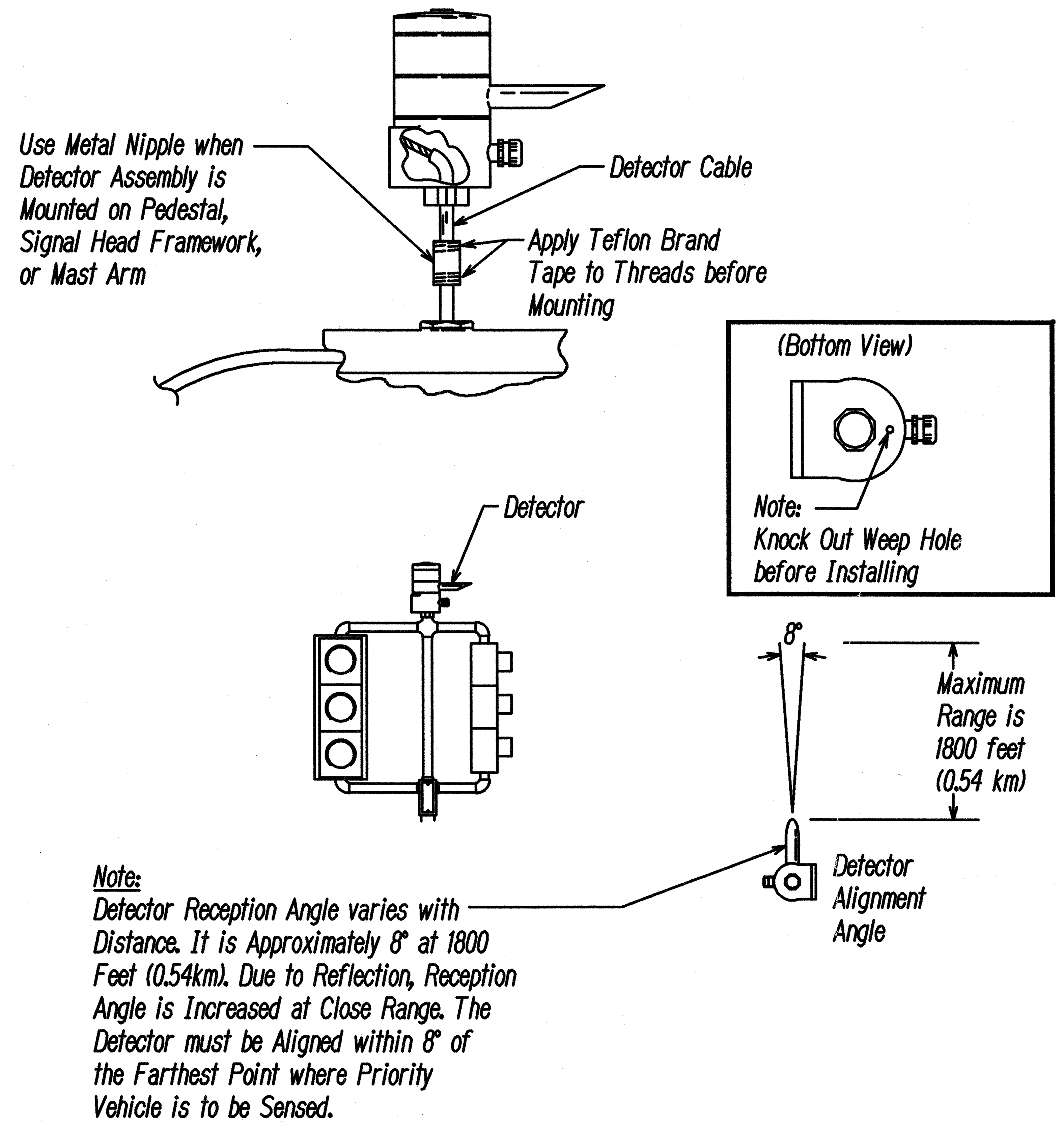
HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: None Date: Apr. 2000

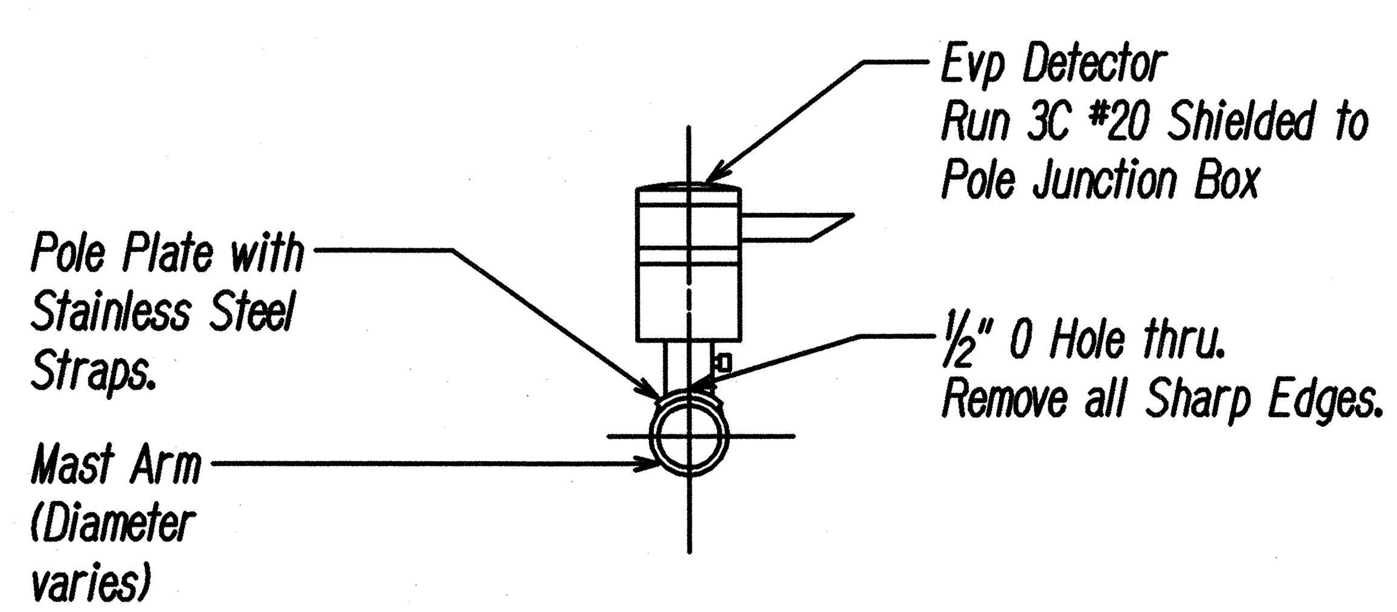
SHEET No. E17 OF 22 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	122	139

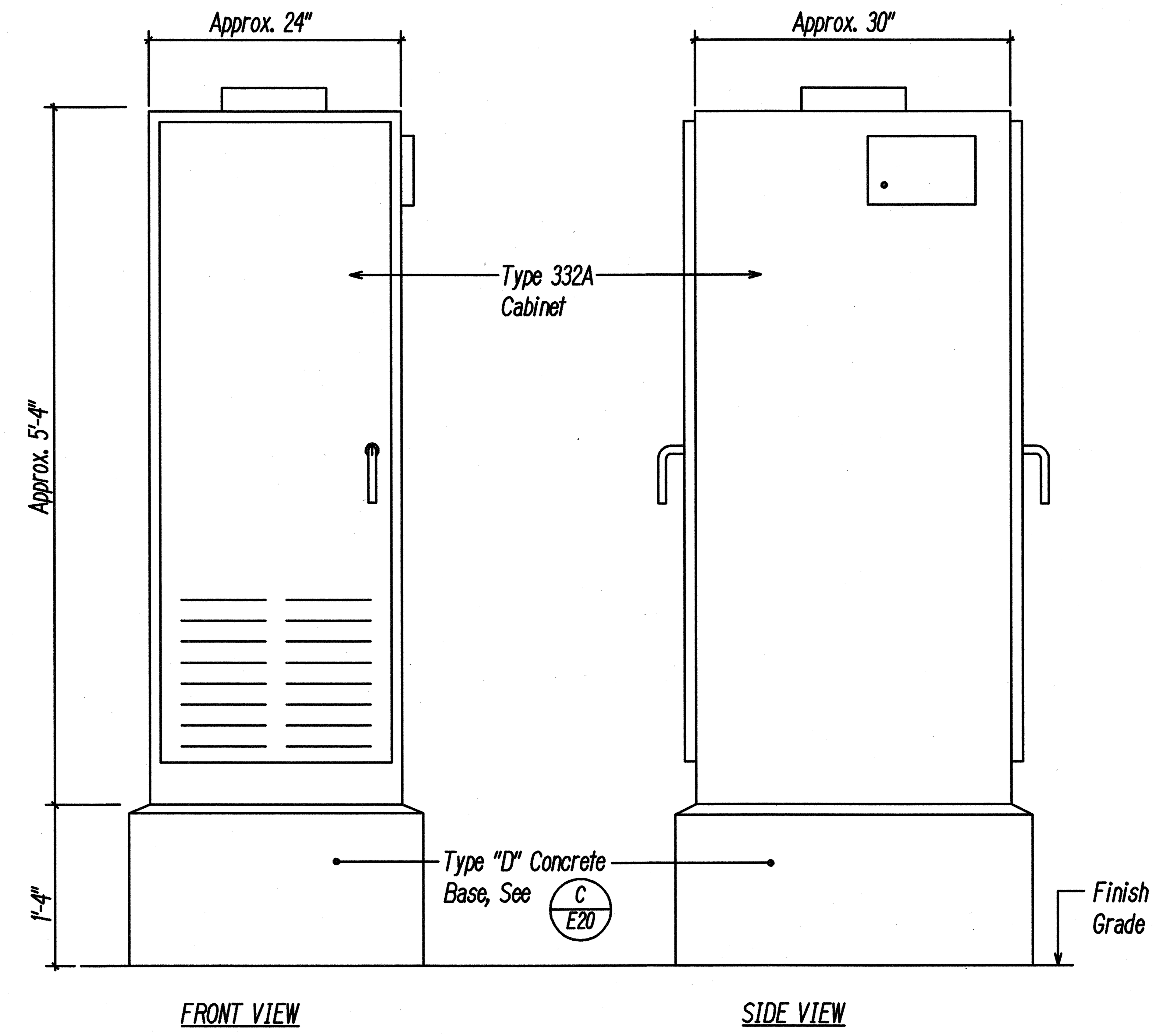


TYPICAL PEDESTAL/TYPE T.S.S. MOUNTING OF EVP DETECTOR



TYPICAL MAST ARM MOUNTING OF EVP DETECTOR

A/E18 EVP DETECTOR MOUNTING
Not to Scale



B/E18 TYPE 332A TRAFFIC SIGNAL CONTROLLER CABINET DETAIL
Not to Scale

ORIGINAL PLAN | SURVEY | PLOTTED BY | DATE
NOTE BOOK | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY
No.

GARY L FUNASAKI LICENSED PROFESSIONAL ENGINEER No. 4196-E HAWAII, U.S.A.
24 MAY 2000
This Work was Prepared by Me or Under My Supervision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

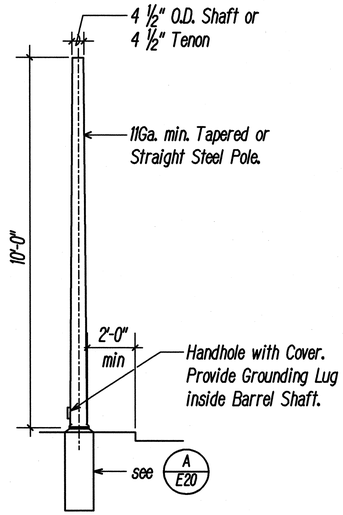
TRAFFIC SIGNAL EQUIPMENT ELEVATION, EVP DETECTOR MOUNTING DETAIL

HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: None Date: Apr. 2000

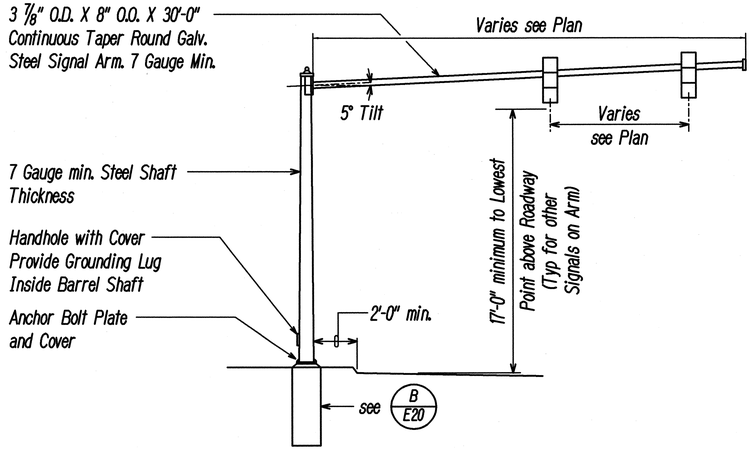
SHEET No. E18 OF 22 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	123	139



TYPE I TRAFFIC SIGNAL STANDARD

Not to Scale

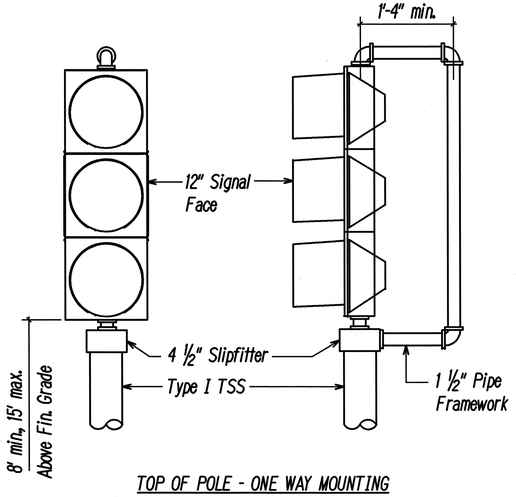


TYPE II TRAFFIC SIGNAL STANDARD

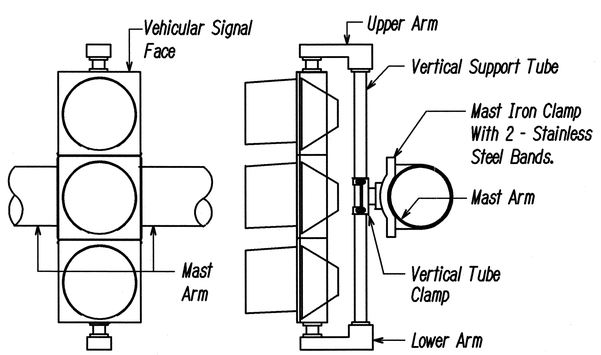
Not to Scale

Notes for Type II:

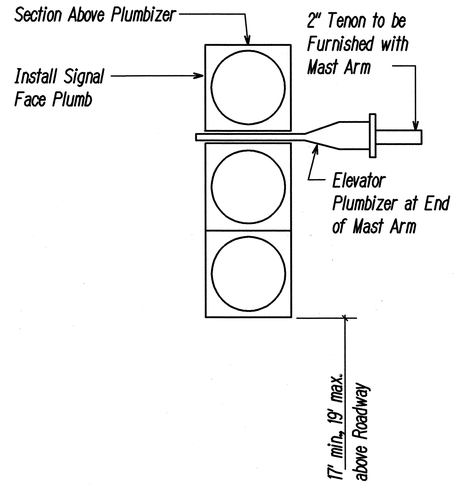
1. Standard shall be Designed in Accordance with "Standard Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals".
2. Mounting for Signals at Intermediate Points of Mast Arm shall be of the Adjustable Type.
3. See Standard Plan TE-38 for Additional Requirements
4. Submit Shop Drawings for Approval.



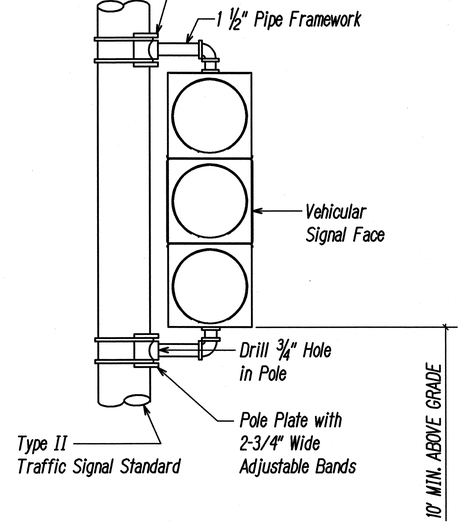
TOP OF POLE - ONE WAY MOUNTING



ADJUSTABLE MAST ARM ONE WAY MOUNTING AT INTERMEDIATE POINT



MAST ARM - ONE WAY MOUNTING AT ENDS



BRACKET ARM - ONE WAY

Notes:

1. Stainless Steel Bands shall be ½" Wide x .050" Thick, Minimum. Tensile Strength shall be 100,000 PSI Minimum.
2. Upper Arm, Lower Arm and Vertical Support Tube shall be of 356 Cast Aluminum.
3. All Wiring shall be Concealed.
4. Vertical Tube Clamp shall be of Malleable Iron, Grade 32510.
5. All Aluminum Parts shall have an Alodine 1200 Finish.

VEHICULAR SIGNAL MOUNTING DETAILS

Not to Scale

ORIGINAL PLAN
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE
NOTE BOOK
No.

GARY I. FUNASAKI
LICENSED PROFESSIONAL ENGINEER
No. 4195-E
HAWAII, U.S.A.
24 MAY 2000
This Work was Prepared by Me or Under My Supervision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

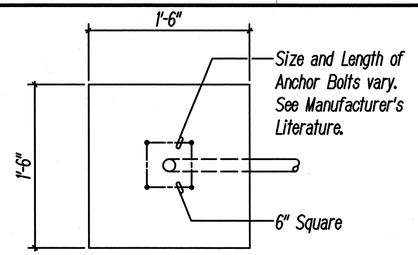
TRAFFIC SIGNAL STANDARD & VEHICULAR SIGNAL MOUNTING DETAILS

HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

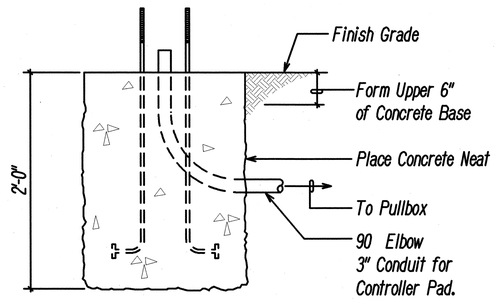
Scale: None Date: Apr. 2000

SHEET No. E19 OF 22 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	124	139



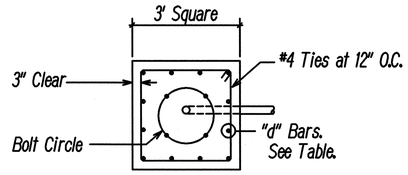
PLAN



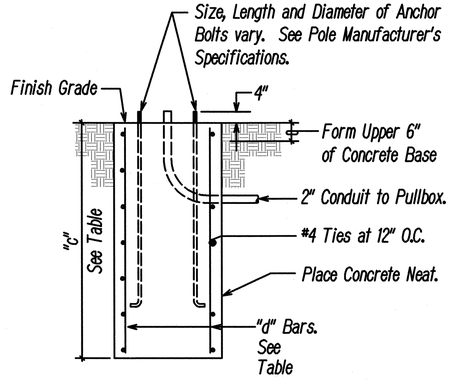
SECTION

Notes:

1. Concrete Shall be Class "B".
2. Type "A" Concrete Base shall be used for Type I-10 Standards.
3. Conduit Bend is Incidental to Concrete Base Construction.

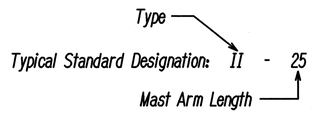


PLAN-SECTION



VERTICAL-SECTION

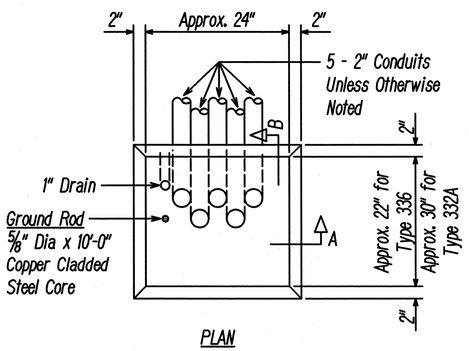
TYPE "C" CONCRETE BASE		
Type of Standard	"c"	"d" Bars
II - 18	5'-0"	12 - #6
II - 20	5'-6"	12 - #6
II - 25	6'-0"	12 - #6
II - 30	6'-6"	12 - #8
II - 35	7'-0"	12 - #8
II - 40	8'-0"	12 - #8
III - 18	5'-6"	12 - #6
III - 20	6'-0"	12 - #6
III - 25	6'-6"	12 - #8
III - 30	6'-6"	12 - #8
III - 35	7'-0"	12 - #8
III - 40	8'-0"	12 - #8



Notes:

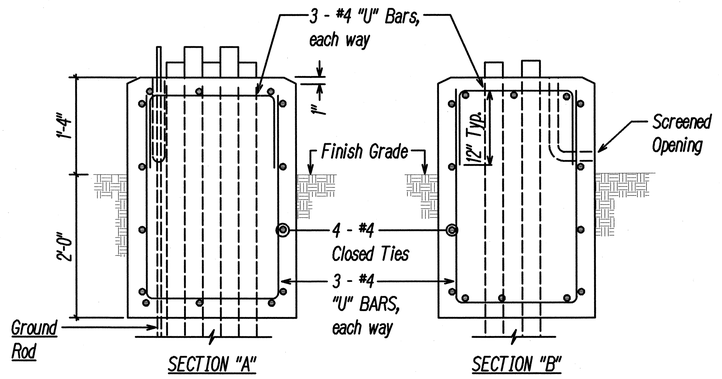
1. Concrete shall be Class "B".
2. Type "C" Concrete Base shall be used for Types II and III Traffic Signal Standards.
3. Design Lateral Pressure: 1,500 PSF.
4. Conduit bend is Incidental to Concrete Base.

A E20 TYPE "A" CONCRETE BASE
Not to Scale



PLAN

B E20 TYPE "C" CONCRETE BASE
Not to Scale



SECTION "A" SECTION "B"

C E20 TYPE "D" CONCRETE BASE
Not to Scale

Notes: See Standard Plan TE-39 for Additional Requirements

Notes:

1. Concrete shall be Class "B".
2. Dimensions shall be Altered to Suit Controller Cabinet Actually Furnished.
3. Conduit Bends and Drain are Incidental to Concrete Base.
4. 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.

ORIGINAL PLAN
SURVEY PLOTTED BY ____ DATE
DRAWN BY ____
TRACED BY ____
NOTE BOOK ____ DESIGNED BY ____
QUANTITIES BY ____
CHECKED BY ____
No. ____

GARY I. FUNASAKI LICENSED PROFESSIONAL ENGINEER No. 4198-E HAWAII, U.S.A.
24 NOV 2000
This Work was Prepared by Me or Under My Supervision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

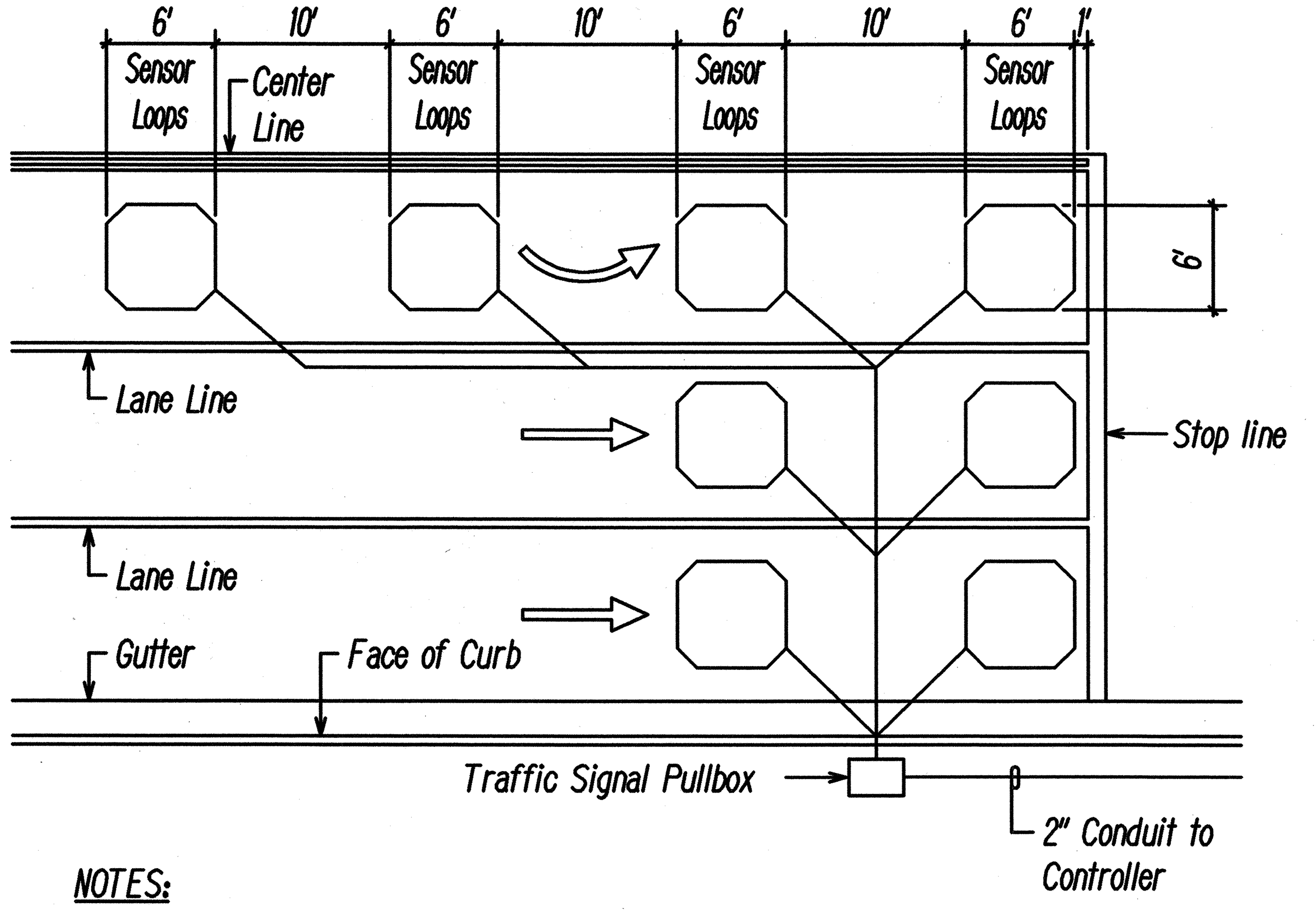
TRAFFIC SIGNAL BASE DETAILS

HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: None Date: Apr. 2000

SHEET No. E20 OF 22 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	BR-NH-030-1(24)	2000	125	139

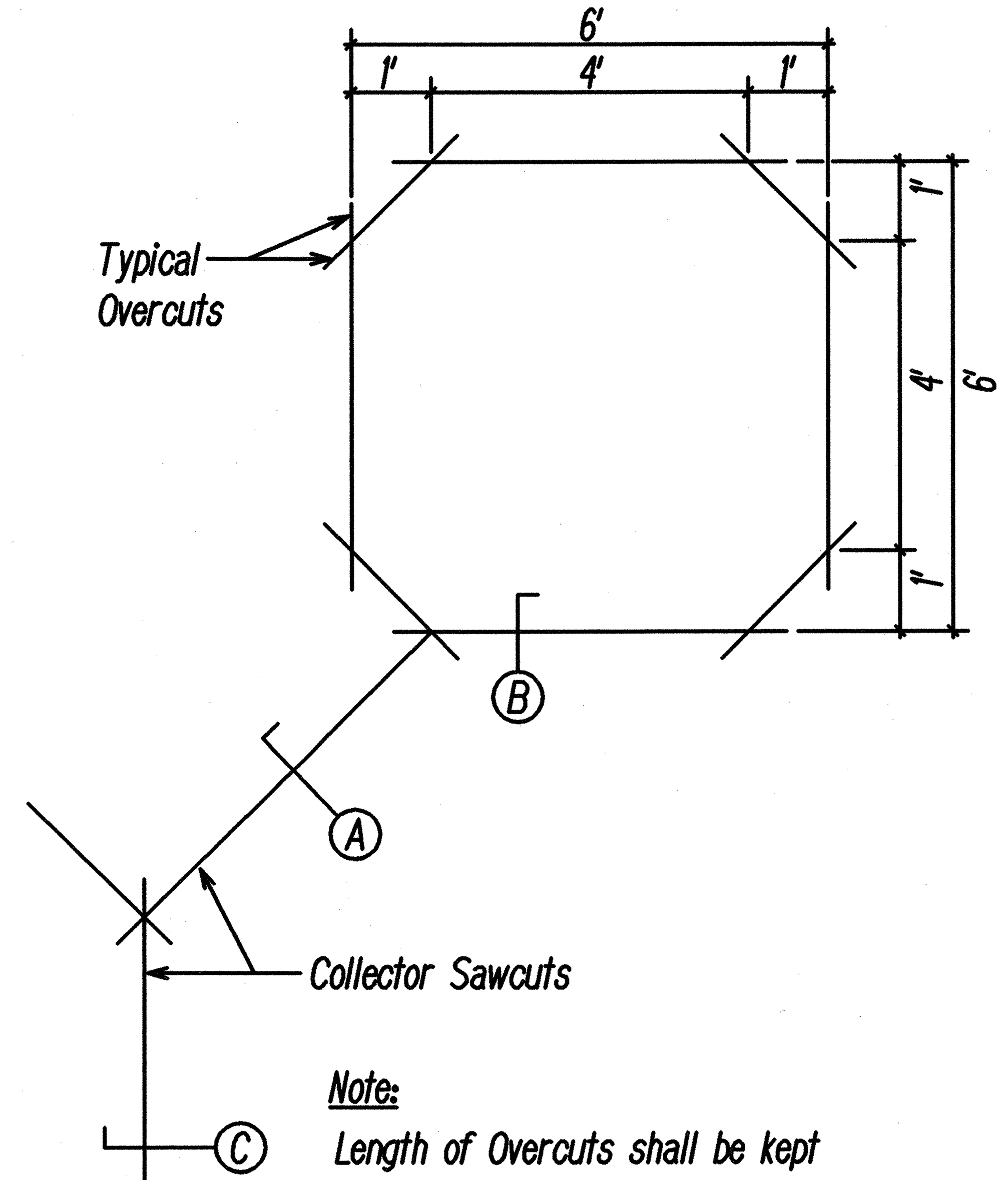


NOTES:

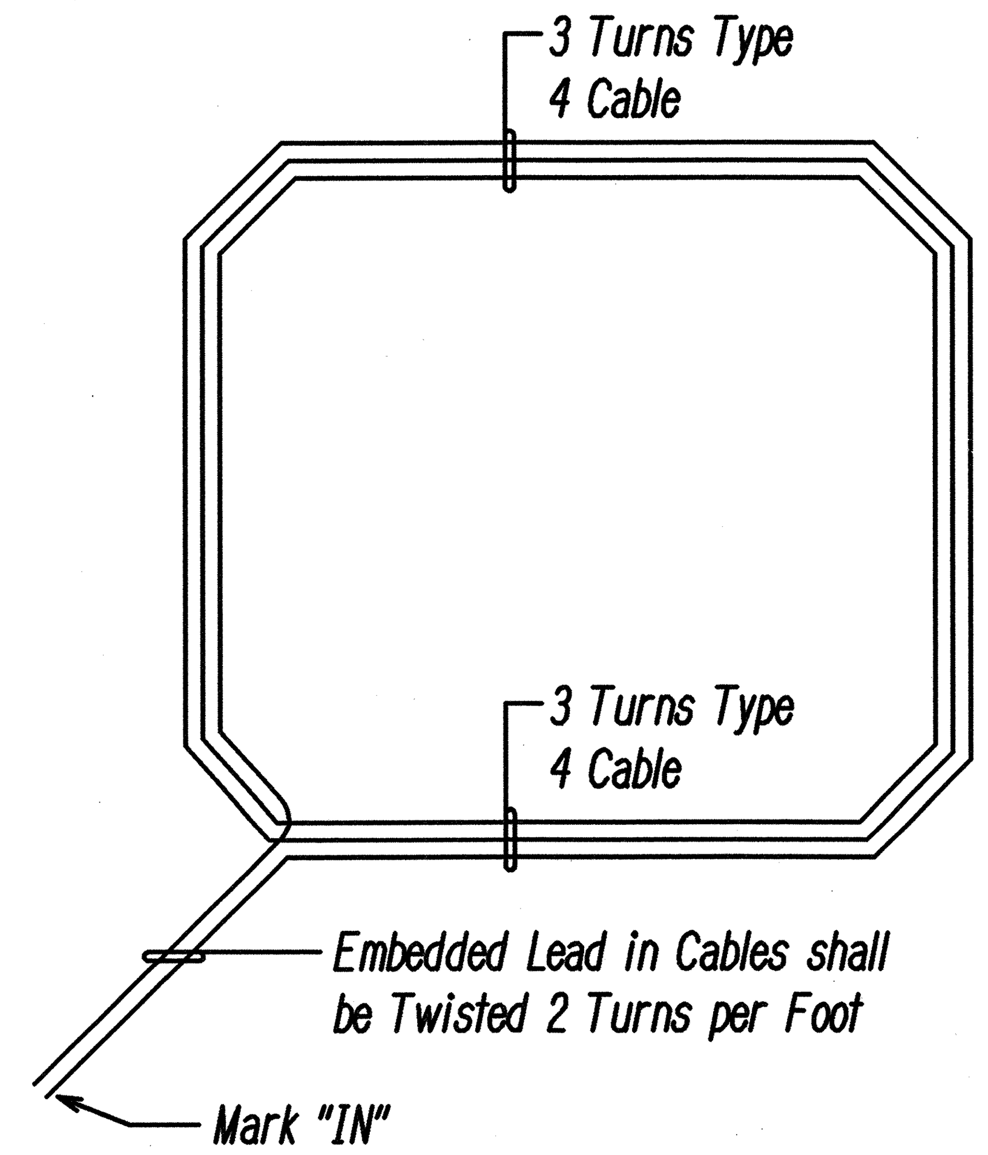
1. Center Sensor Loops in Lanes.
2. Collector Cables shall be Twisted 2 Turns per Foot.
3. Number of Loops and Locations vary. See Project Plans.
4. Number and Locations of Collector Sawcuts may be varied In the Field to Suit.

TYPICAL SENSOR LOOP LAYOUT

Not to Scale



Note: Length of Overcuts shall be kept to a Minimum. All Overcuts shall be Backfilled with Hot Tar Sealant.



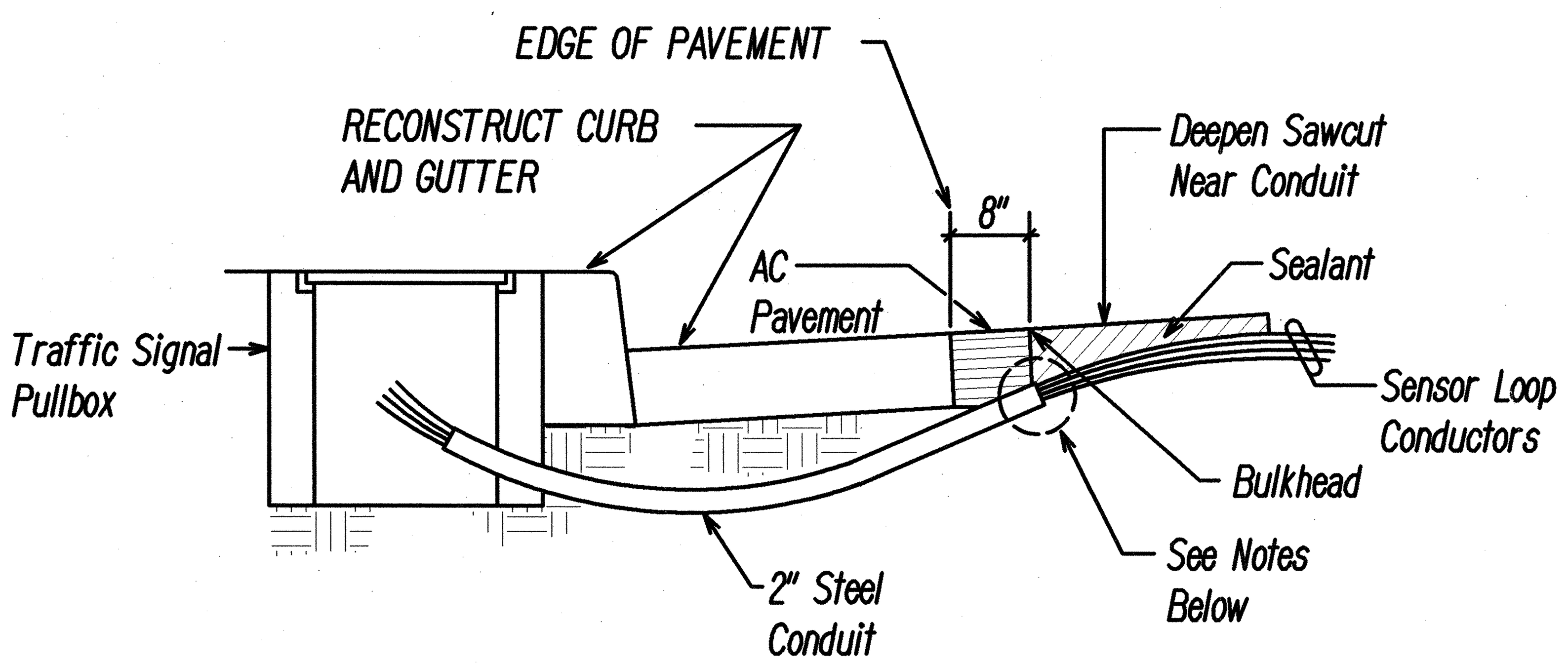
PLAN

Note: Type 4 Cable - Loop Sensor Cable: Solid No. 12, Single Conductor to IMSA Spec 51-5

TYPICAL SENSOR LOOP WIRING DIAGRAM

Not to Scale

Note: See Standard Plan TE-40 for Additional Requirements.

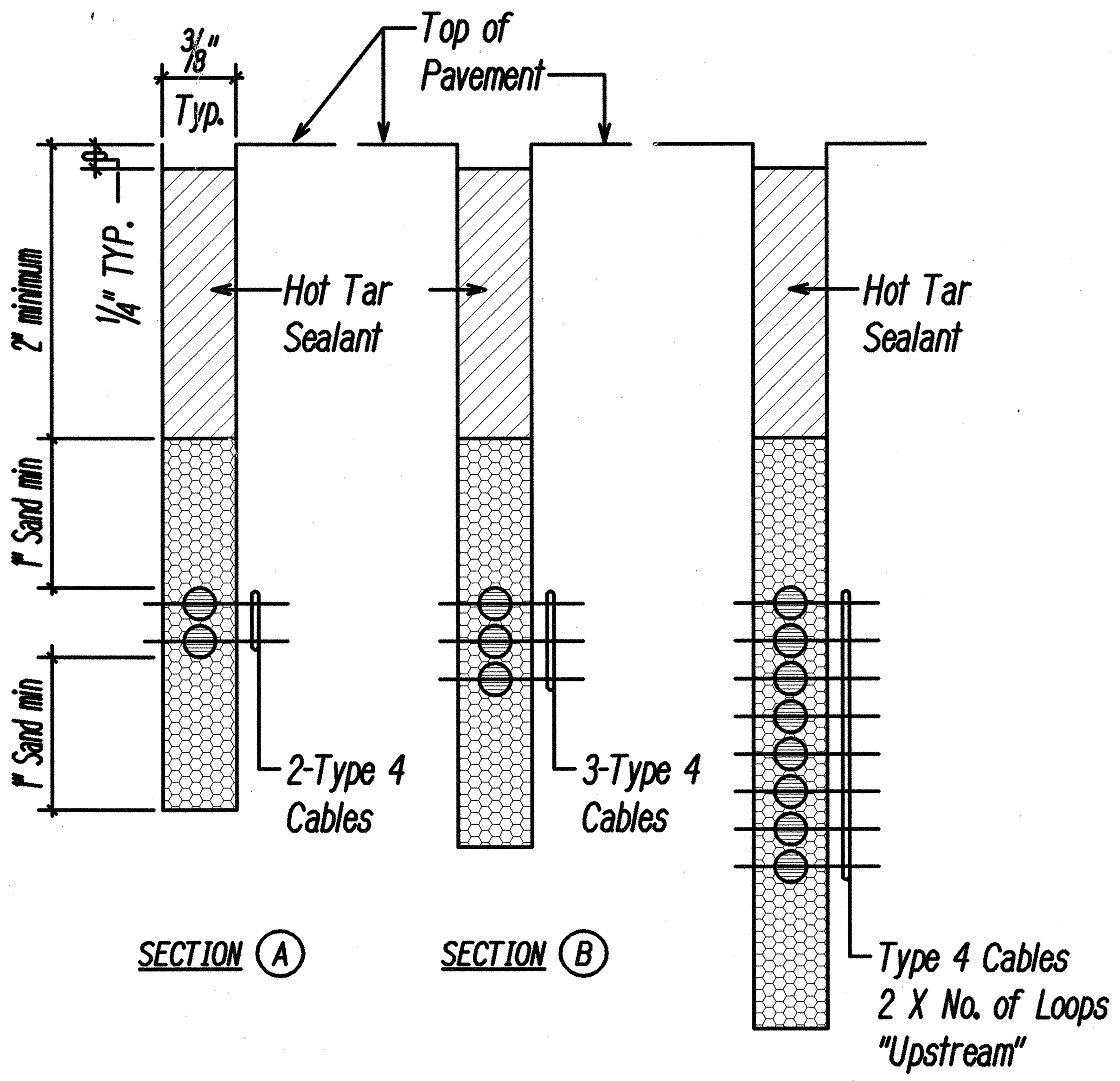


Notes:

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 Asphalt Concrete
5. Reconstruct Curb and Gutter as Required.

DETAIL OF SENSOR LOOP INSTALLATION AT EDGE OF ROADWAY

Not to Scale



TYPICAL SENSOR LOOP SAWCUT DETAIL

Not to Scale

GARY I. FUNABASHI LICENSED PROFESSIONAL ENGINEER No. 4195-E HAWAII, U.S.A.

24 MAY 2000

This Work was Prepared by Me or Under My Supervision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

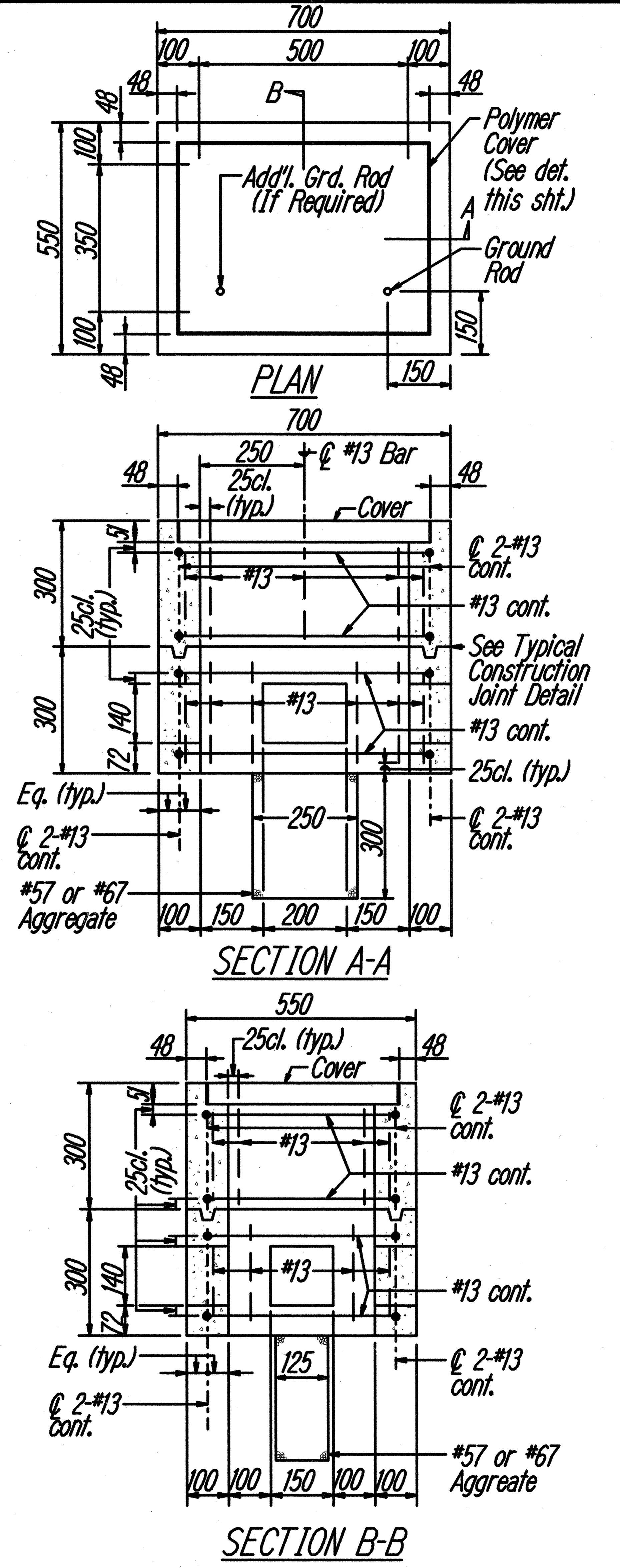
TRAFFIC SIGNAL SENSOR LOOP DETAILS

HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: As Noted | Date: Apr. 2000

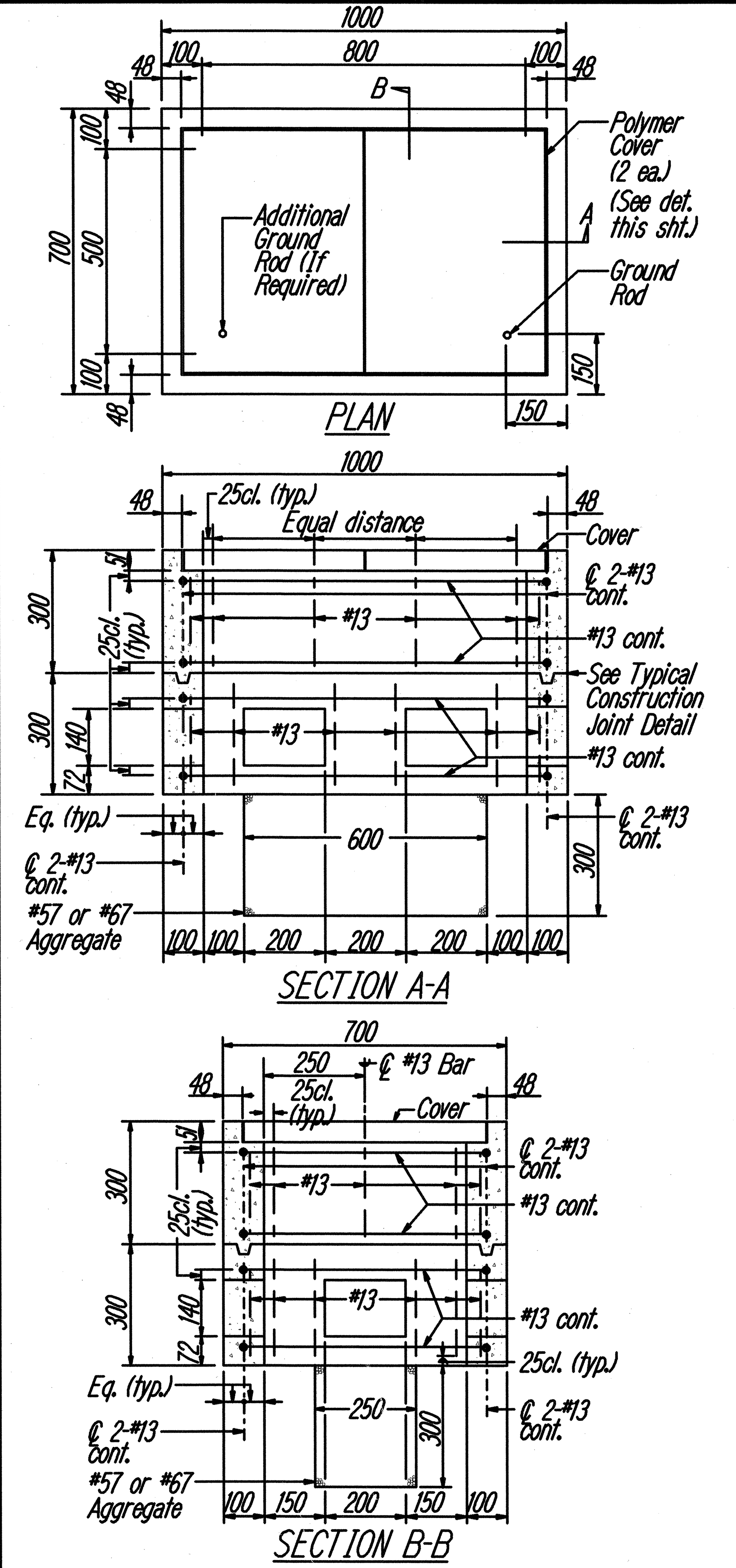
SHEET No. E21 OF 22 SHEETS

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE
NOTE BOOK | No.



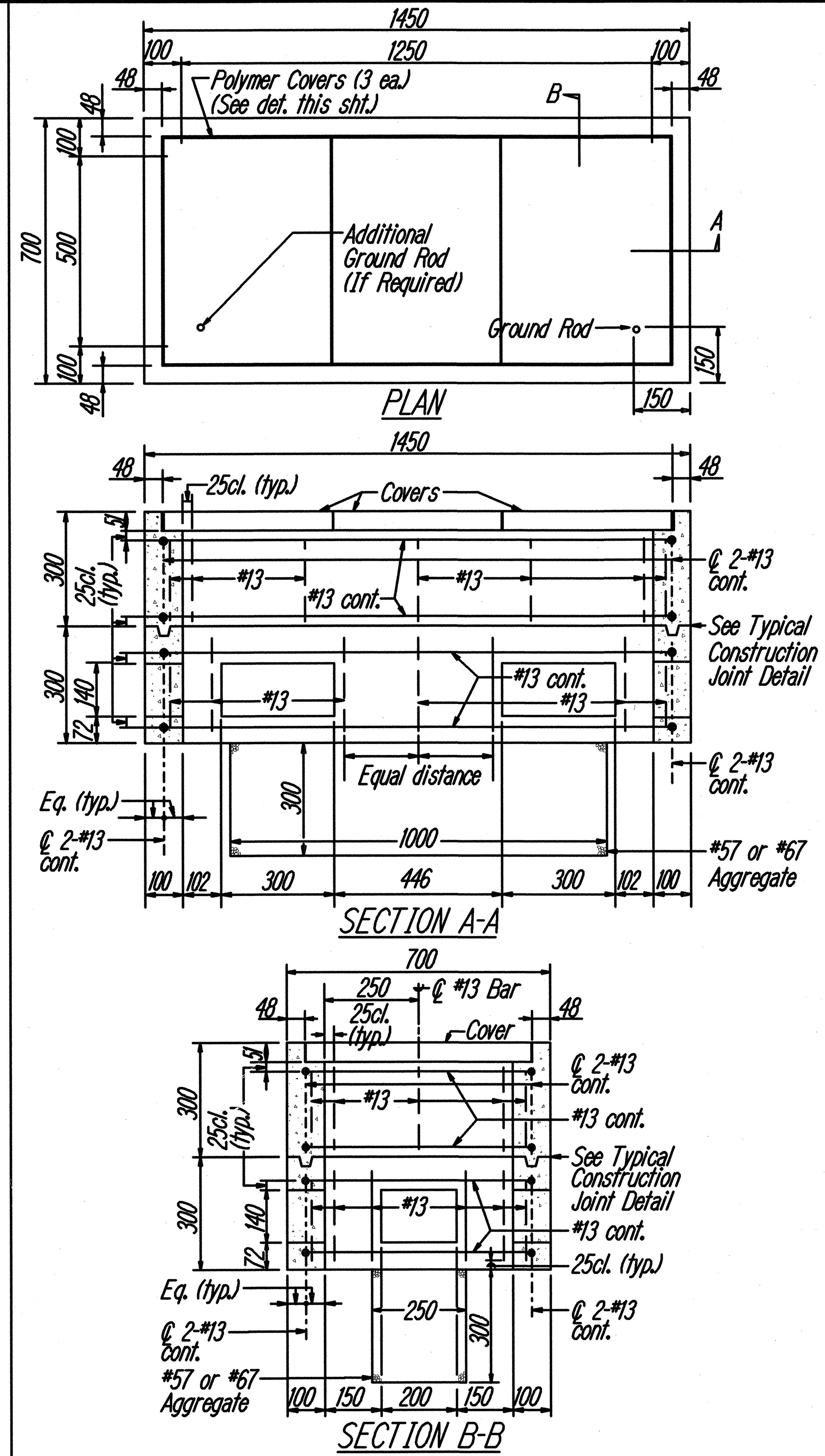
A / E22 TYPE "A" PULLBOX (Old Type "B")

N.T.S.



B / E22 TYPE "B" PULLBOX (Old Type "C")

N.T.S.

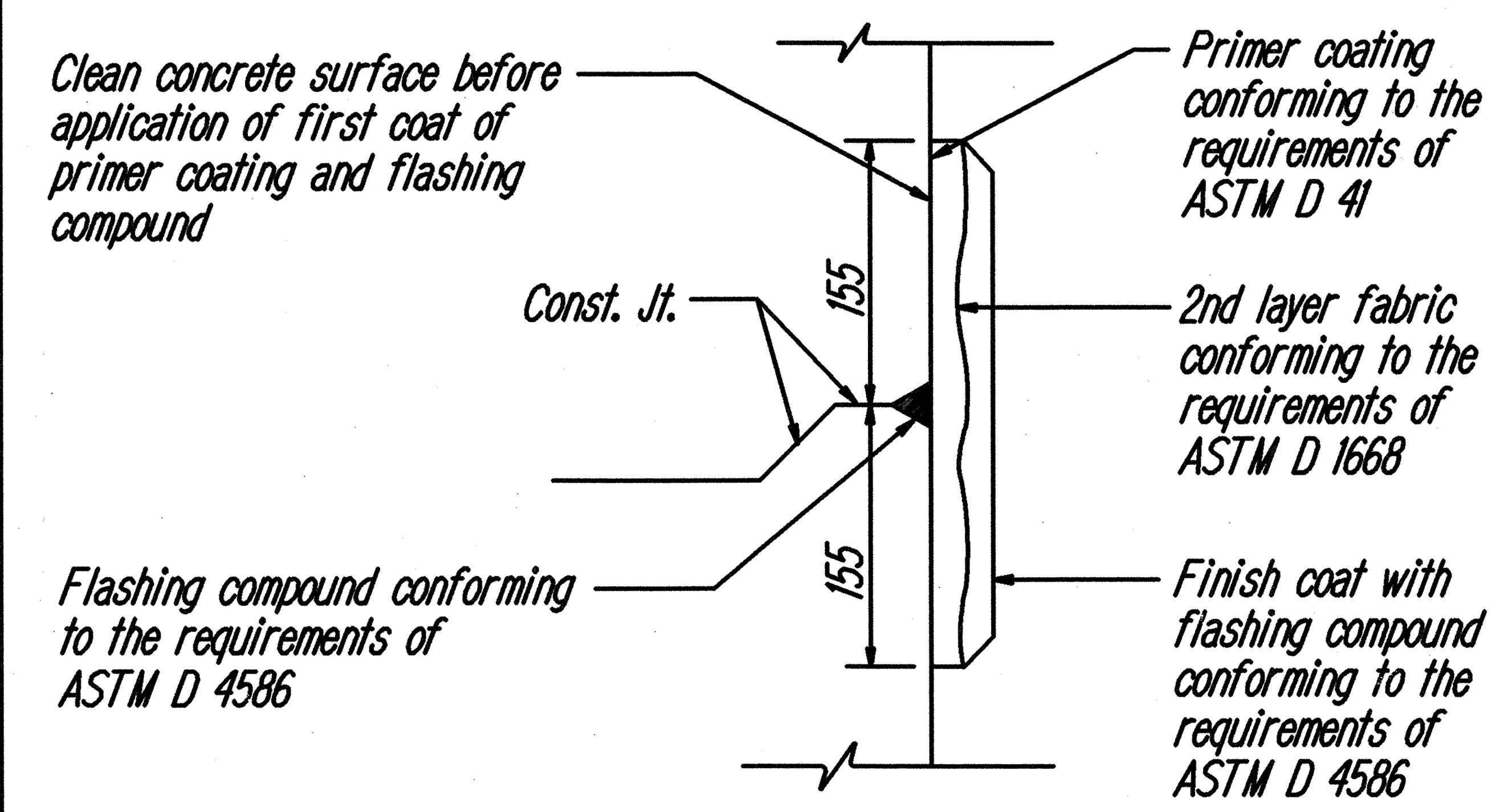


C / E22 TYPE "C" PULLBOX (Old Type "D")

N.T.S.

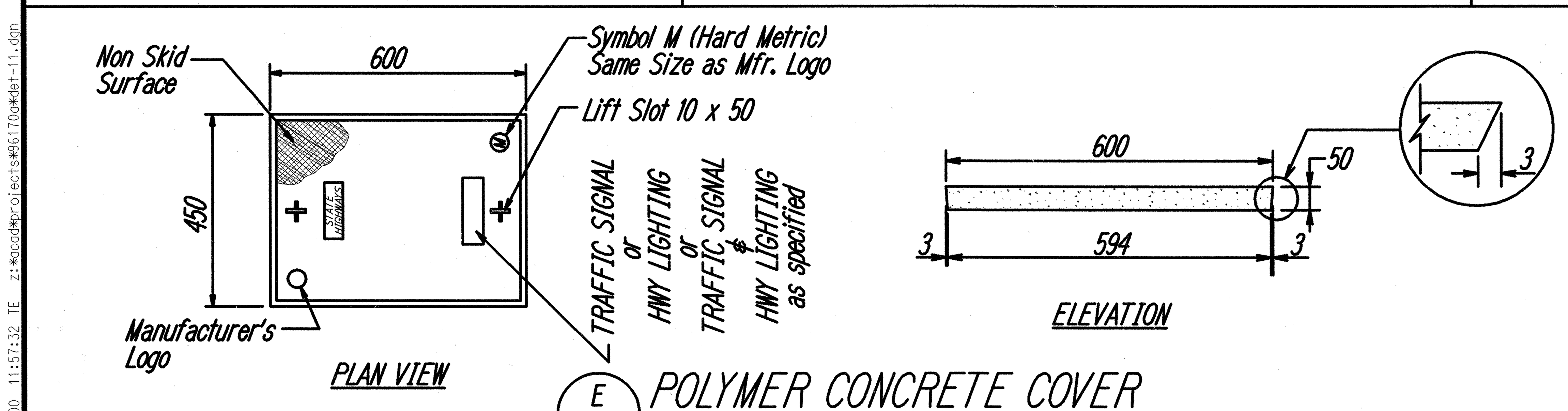
GENERAL NOTES

1. Provide a minimum of one 16 dia. 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).



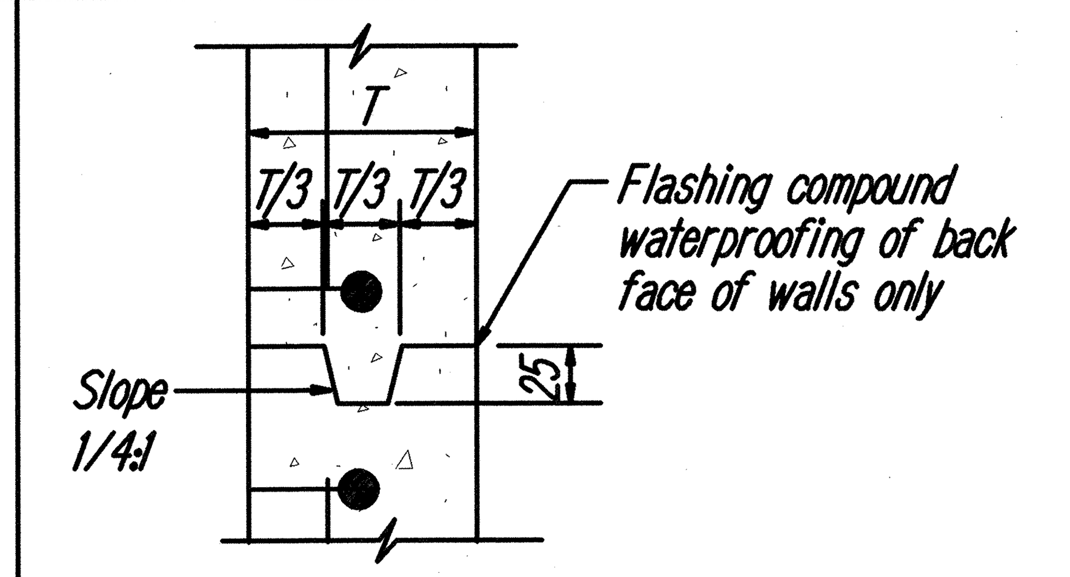
D / E22 TYPICAL FLASHING COMPOUND WATERPROOFING DETAILS

N.T.S.



E / E22 POLYMER CONCRETE COVER

N.T.S.



F / E22 TYPICAL CONSTRUCTION JOINT DETAIL

N.T.S.

All Dimensions are in Millimeters unless otherwise shown

GARY I. FUNASAKI, LICENSED PROFESSIONAL ENGINEER, No. 4195-E, HAWAII, U.S.A.

24 May 2000

This Work was Prepared by Me or Under My Supervision

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PULLBOX & COVER DETAILS

HONOAPIILANI HIGHWAY WIDENING
North Kihei Road to Kuihelani Highway
F.A. Project No. BR-NH-030-1(24)

Scale: As Noted   Date: Apr. 2000

SHEET No. E22 OF 22 SHEETS