

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	260	288

GENERAL NOTES – ELECTRICAL:

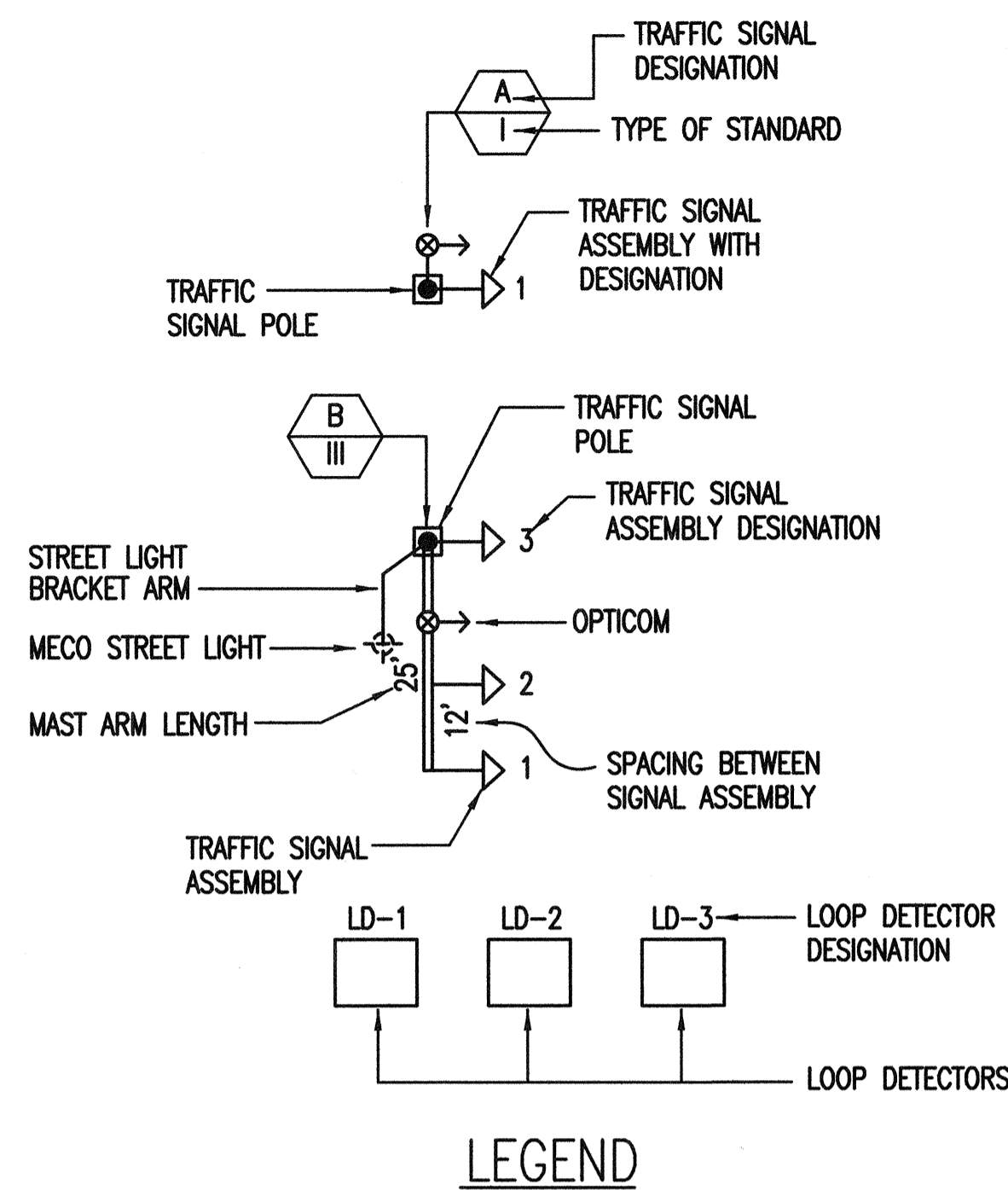
- THE SCOPE OF WORK FOR THIS PROJECT SHALL CONSIST OF INSTALLING NEW HIGHWAY LIGHTING, NEW TRAFFIC SIGNAL SYSTEMS WITH APPURTENANCES, EMERGENCY OPTICAL PREEMPTION SYSTEM, DISCONNECTING AND REMOVAL OF EXISTING TRAFFIC SIGNAL SYSTEMS, AND STREET LIGHTING SYSTEMS, AND INTERFACING BETWEEN NEW AND EXISTING SYSTEMS.
- THE CONTRACTOR IS REMINDED OF THE REQUIREMENTS OF SUBSECTION 108.01 – SUBLETTING OF CONTRACT, WHICH REQUIRES HIM TO PERFORM WORK ACCOUNTING TO NOT LESS THAN 50 PERCENT OF THE TOTAL CONTRACT COST LESS DEDUCTIBLE ITEMS. NON-COMPLIANCE WITH THIS SUBSECTION MAY BE GROUNDS FOR REJECTION OF BID.
- THE CONTRACTOR'S ATTENTION IS DIRECTED TO THE FOLLOWING SECTIONS OF THE SPECIAL PROVISIONS:
 SUBSECTION 107.13 – PUBLIC CONVIENCE AND SAFETY
 SUBSECTION 107.21 – CONTRACTOR'S RESPONSIBILITY FOR UTILITY PROPERTY AND SERVICES SECTION 645 – TRAFFIC CONTROL
- ALL NECESSARY PERMITS SHALL BE OBTAINED BY THE CONTRACTOR AT HIS OWN COST.
- THE CONTRACTOR SHALL COMPLY WITH THE STATE OF HAWAII'S OCCUPATIONAL SAFETY AND HEALTH LAW (DOSHS).
- LOCATIONS OF EXISTING UNDERGROUND STRUCTURES AND UTILITIES SUCH AS PIPELINES, CONDUITS, CABLES, MANHOLES, MONUMENTS, AND STRUCTURES SHOWN ON THE PLANS ARE APPROXIMATE ONLY. IT IS NOT THE INTENT OF THESE PLANS TO SHOW THE EXACT LOCATION OF ALL UNDERGROUND UTILITIES AND STRUCTURES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY THE LOCATIONS OF EXISTING UTILITIES WITH THE RESPECTIVE OWNERS. EXISTING UTILITIES DAMAGED BY THE CONTRACTOR SHALL BE REPAIRED BY THE CONTRACTOR AT HIS OWN COST.
- ALL WORK SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE FOLLOWING CONSTRUCTION STANDARDS AND SPECIFICATIONS:
 - GENERAL ORDER NO. 6 AND NO. 10 PUBLIC UTILITIES COMMISSION, STATE OF HAWAII, CURRENT EDITION.
 - CONSTRUCTION STANDARDS OF DEPARTMENT OF TRANSPORTATION, STATE OF HAWAII.
 - CURRENT STANDARD SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION, STATE OF HAWAII.
 - STANDARD DETAILS FOR PUBLIC WORKS CONSTRUCTION, DEPARTMENT OF PUBLIC WORKS, COUNTY OF MAUI.
 - CONSTRUCTION STANDARD AND SPECIFICATIONS OF VERIZON HAWAII TELEPHONE COMPANY, INC.
 - CONSTRUCTION STANDARDS AND SPECIFICATIONS OF THE MAUI ELECTRIC LIGHT COMPANY.
- IT IS NOT THE INTENT OF THESE PLANS AND SPECIFICATIONS TO INDICATE THAT ALL EXISTING UTILITIES ARE SHOWN ON THE PLANS. THE INFORMATION ON THE EXISTING UTILITIES ARE BASED ON AVAILABLE PLANS. THE LOCATIONS ARE APPROXIMATE ONLY AND THE CONTRACTOR SHALL VERIFY THE LOCATION AND DEPTH OF THE FACILITIES AND EXERCISE PROPER CARE IN EXCAVATING IN THIS AREA. ALL EXISTING UTILITIES WHETHER OR NOT SHOWN ON THE PLANS SHALL BE PROTECTED AT ALL TIME BY THE CONTRACTOR UNLESS SPECIFIED ON THE PLANS TO BE ABANDONED OR DEMOLISHED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES TO THE FACILITIES WHETHER SHOWN OR NOT SHOWN ON PLANS. ANY REPAIR WORK SHALL BE PROVIDED AT NO ADDITIONAL COST TO THIS PROJECT.
- THE CONTRACTOR SHALL EXERCISE PROPER CARE WHEN EXCAVATING IN AREAS WITH EXISTING UNDERGROUND FACILITIES. DAMAGES TO THE EXISTING FACILITIES SHALL BE IMMEDIATELY REPORTED TO THE RESPECTIVE UTILITY COMPANIES, COUNTY OR STATE AGENCY. THE REPAIR WORK SHALL BE PROVIDED AT NO ADDITIONAL COST TO THIS PROJECT.
- CONTRACTOR SHALL INSTALL 3/16" POLYPROPYLENE PULL LINE IN ALL EMPTY DUCTS. PLUG ALL DUCTS WITH NON-CORRODIBLE PLUGS MANUFACTURED FOR THIS PURPOSE.

STREET LIGHTING NOTES:

- CONTRACTOR SHALL CONSTRUCT CONCRETE FOUNDATION, PULLBOXES, AND DUCTLINE FOR MAUI ELECTRIC COMPANY (MECO) STREET LIGHT SYSTEM.
- CONTRACTOR SHALL OBTAIN MECO SUPPLIED 1" DIA. x 36" LONG GALVANIZED STEEL ANCHOR BOLTS (4/POLE) FROM MECO KAHULUI WAREHOUSE.
- MECO WILL PROVIDE NECESSARY WIRES, POLES, BRACKET ARMS & LUMINAIRES TRANSFORMER BASES, AND LAMPS.
- CONSTRUCTION AND POURING OF CONCRETE FOUNDATION REQUIRES INSPECTION BY MECO INSPECTOR (PHONE: 871-8461 EXT. 213)
- ARRANGE WITH HECO FOR REMOVAL OF EXISTING STREET LIGHTING POLE, BRACKET ARM, LUMINAIRE AND WIRING.

NOTES FOR HIGHWAY SIGNS AND TRAFFIC SIGNALS:

- ALL TRAFFIC SIGNAL EQUIPMENT SHALL BE COMPLETELY WIRED IN THE CABINET AND SHALL CONTROL THE TRAFFIC SIGNALS AS CALLED FOR IN THE PLANS.
- THE LOOP DETECTOR AMPLIFIER UNITS SUPPLIED FOR THIS PROJECT SHALL BE CAPABLE OF OPERATING THE LOOP DETECTOR CONFIGURATIONS SHOWN ON THE PLANS.
- RESTORATION OF EXISTING PAVEMENTS AND IMPROVEMENTS UNAVOIDABLY DAMAGED SHALL BE INCIDENTAL TO THE VARIOUS CONTRACT ITEMS. RESTORATION SHALL BE EQUAL TO ORIGINAL OR BETTER THAN ORIGINAL CONDITION.
- ALL TRAFFIC SIGNAL WORK SHALL CONFORM TO THE REQUIREMENTS OF THE "MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES FOR STREET AND HIGHWAYS," FEDERAL HIGHWAY ADMINISTRATION (2000) AND AMENDMENTS.
- MAINTENANCE OF TRAFFIC THROUGH THE CONSTRUCTION AREA SHALL BE IN ACCORDANCE WITH PART VI OF THE "MANUAL ON THE UNIFORM TRAFFIC CONTROL DEVICES FOR STREETS AND HIGHWAYS," FEDERAL HIGHWAY ADMINISTRATION (2000) AND AS SPECIFIED IN THE SPECIAL PROVISIONS. THE CONTRACTOR SHALL FURNISH AND MAINTAIN ADEQUATE BARRICADES, BLINKERS, CONSTRUCTION SIGNS, ETC., FOR THE SAFETY OF THE MOTORING PUBLIC.
- THE CONTRACTOR SHALL PROVIDE OFF-DUTY POLICE OFFICER(S) TO CONTROL THE FLOW OF TRAFFIC AS REQUIRED BY THE ENGINEER.
- SHOULD ANY DEFECT BE ENCOUNTERED DURING THE WARRANTY PERIOD, THE CONTRACTOR WILL BE NOTIFIED AND SHALL PROMPTLY CORRECT SUCH DEFECT. SERVICE CALL (BY FACTORY QUALIFIED REPRESENTATIVE) DURING THE WARRANTY PERIOD FOR REPAIRS OR OTHER MAINTENANCE SHALL BE ANSWERED IMMEDIATELY AND SHALL BE DONE AT NO EXPENSE WHATSOEVER TO THE STATE.
- EXISTING PULLBOXES AND CONDUITS NOT INCORPORATED INTO THE NEW TRAFFIC SIGNAL SYSTEM SHALL BE ABANDONED IN PLACE. ABANDONED CONDUITS SHALL BE PLUGGED WITH CONCRETE.
- STRUCTURAL SUPPORT FOR HIGHWAY SIGNS, AND TRAFFIC SIGNALS SHALL BE DESIGNED AND MANUFACTURED IN ACCORDANCE WITH AASHTO STANDARD SPECIFICATIONS AND AS MODIFIED IN THE FOLLOWING:
 - BASIC WIND SPEED [ARTICLE 3.8.2] TO DETERMINE THE DESIGN WIND PRESSURE SHALL BE 105 MPH. FOR UNUSUAL OR DIFFERING EXPOSURE CONDITIONS, THE BASIC WIND SPEED SHOULD BE INCREASED USING RATIONAL PROCEDURES AND SOUND ENGINEERING JUDGEMENT ALTERNATIVELY, THE DESIGN WIND PRESSURE MAY BE INCREASED BY USING A HIGHER WIND IMPORTANCE FACTOR [TABLE 3-2] CORRESPONDING TO A RECURRENCE INTERVAL OF AT LEAST ONE LEVEL GREATER THAN RECOMMENDED.
 - WIND IMPORTANCE FACTOR [ARTICLE 3.8.3] NOTED IN TABLE 3-2 USED TO DETERMINE THE DESIGN WIND PRESSURE FOR OVERHEAD CANTILEVERED SIGN SUPPORT STRUCTURES OVER:
 - FREEWAYS SHALL BE BASED ON A RECURRENCE INTERVAL OF 100 YEARS.
 - RAMPS AND OTHER HIGHWAYS WITH "HIGH" ADT SHALL BE BASED ON A RECURRENCE INTERVAL OF 100 YEARS UNLESS OTHERWISE DIRECTED.
 - HEIGHT AND EXPOSURE FACTOR [ARTICLE 3.8.4]. FOR SIGN AND TRAFFIC SIGNAL SUPPORT STRUCTURES ON BRIDGES, THE HEIGHT AND EXPOSURE FACTOR SHALL BE DETERMINED BASED ON THE MAXIMUM HEIGHT THEY ARE ABOVE THE SURROUNDING GROUND. FOR SEVERE EXPOSURE CONDITIONS SUCH AS ALONG THE COASTLINE, THE FACTOR SHALL BE INCREASED BASED ON THE LATEST ASCE STANDARD NO. 7, MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES.
 - FATIGUE IMPORTANCE FACTORS [ARTICLE 11.6] NOTED IN TABLE 11-1 FOR OVERHEAD CANTILEVERED SIGN, AND TRAFFIC SIGNAL SUPPORT STRUCTURES SHALL BE BASED ON THE FOLLOWING:
 - FATIGUE CATEGORY I – FOR ALL STRUCTURES WHERE FAILURE WOULD RESULT IN THE STRUCTURE FALLING ONTO THE TRAVEL WAY.
 - FATIGUE CATEGORY II – FOR ALL OTHERS.
 - GALLOPING [ARTICLE 11.7.1]. OVERHEAD CANTILEVERED SIGN AND TRAFFIC SIGNAL SUPPORT STRUCTURES SHALL BE DESIGNED FOR GALLOPING-INDUCED CYCLIC LOADS UNLESS APPROVED VIBRATION MITIGATION DEVICES ARE INSTALLED. AS ALONG THE COASTLINE, THE FACTOR SHALL BE INCREASED BASED ON THE LATEST ASCE STANDARD NO. 7, MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES.
 - VORTEX SHEDDING [ARTICLE 11.7.2]. NONTAPERED TRAFFIC SIGNAL STRUCTURES SHALL BE DESIGNED TO RESIST VORTEX SHEDDING-INDUCED LOADS INCLUDING CANTILEVERED MAST ARMS AND LIGHTING STRUCTURES THAT HAVE TAPERS LESS THAN 0.14 IN/FT.
 - NATURAL WIND GUST [ARTICLE 11.7.3]. OVERHEAD CANTILEVERED SIGN, TRAFFIC SIGNAL, AND LIGHTING SUPPORT STRUCTURES SHALL BE DESIGNED TO RESIST AN EQUIVALENT STATIC NATURAL WIND GUST PRESSURE. FOR UNUSUAL OR DIFFERING EXPOSURE CONDITIONS, THE EQUIVALENT STATIC NATURAL WIND GUST PRESSURE SHOULD BE INCREASED USING REFERENCES NOTED IN THE SPECIFICATIONS.
 - TRUCK-INDUCED GUST [ARTICLE 11.7.4]. OVERHEAD CANTILEVERED SIGN AND TRAFFIC SIGNAL SUPPORT STRUCTURES SHALL BE DESIGNED TO RESIST AN EQUIVALENT STATIC TRUCK GUST PRESSURE RANGE BASED ON A TRUCK SPEED OF 65 MPH. AT THE OPTION OF THE STATE DOT, A LOWER TRUCK SPEED MAY BE USED IN AREAS WITH DESIGN SPEEDS NOT EXCEEDING 45 MPH.



LEGEND

ABBREVIATIONS:

A	AMPERE
AC	ALTERNATING CURRENT
AIC	AMPERE INTERRUPTING CAPACITY
C	CONDUIT
CAB	CABINET
CL	CENTERLINE
CMU	CONCRETE MASONRY UNIT
DWG	DRAWING
ELEC	ELECTRIC, ELECTRICAL
ENCL	ENCLOSURE
EP	ELECTRICAL PRIMARY
EQUIP	EQUIPMENT
ES	ELECTRICAL SECONDARY
EX, EXIST	EXISTING
ELEC	ELECTRIC, ELECTRICAL
GND, GRD	GROUND
HC & S	HAWAIIAN COMMERCIAL & SUGAR COMPANY
HH	HANDHOLE
HTCO	VERIZON HAWAII
JB	JUNCTION BOX
KVA	KILO-VOLT AMPERE
KWH	KILO-WATT HOUR
MECO	MAUI ELECTRIC COMPANY
MIN	MINIMUM
MISC	MISCELLANEOUS
N	NEUTRAL
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
OH	OVERHEAD
P	POLE
PB	PULLBOX
PFB	PROVISIONS FOR FUTURE BREAKER
PH	PHASE
PL	PROPERTY LINE
RSC	RIGID METAL CONDUIT (STEEL)
PVC	RIGID NON-METALLIC CONDUIT (SCH. 40 PVC UNLESS OTHERWISE INDICATED)
R/W	RIGHT OF WAY
SLPB	STREET LIGHT PULLBOX
T, TEL	TELEPHONE
TSPB	TRAFFIC SIGNAL PULLBOX
TYP	TYPICAL
UG	UNDERGROUND
V	VOLTS
W	WIRE(S)
WHM	WATT-HOUR METER
WP	WEATHERPROOF

ELECTRICAL SYMBOL LIST

EXISTING	NEW	DESCRIPTION
[C]	[C]	TRAFFIC SIGNAL CONTROLLER AND CABINET.
[M]	[M]	ELECTRIC METER INSTALLATION.
[H]	[H]	TRAFFIC SIGNAL HEAD WITH 12" LENS.
[S]	[S]	TYPE I TRAFFIC SIGNAL STANDARD WITH TRAFFIC SIGNAL ASSEMBLY AS SPECIFIED.
[T]	[T]	TYPE II TRAFFIC SIGNAL STANDARD WITH MAST ARM AND TRAFFIC SIGNAL ASSEMBLIES.
[U]	[U]	TYPE III TRAFFIC SIGNAL STANDARD WITH MAST ARM, TRAFFIC SIGNAL ASSEMBLIES, STREET LIGHT BRACKET, AND MECO STREET LIGHT LUMINAIRE.
[A]	[A]	TRAFFIC SIGNAL PULLBOX, TYPE "A".
[B]	[B]	TRAFFIC SIGNAL PULLBOX, TYPE "B".
[C]	[C]	TRAFFIC SIGNAL PULL BOX, TYPE "C".
[LD]	[LD]	LOOP DETECTOR.
[OR]	[OR]	OPTICOM RECEIVER.
[BPL]	[BPL]	TRAFFIC SIGNAL ASSEMBLY WITH BACK PLATE.
[FC]	[FC]	STREET LIGHT CONCRETE FOUNDATION FOR MAUI ELECTRIC COMPANY (MECO) STREET LIGHT STANDARD.
[W]	[W]	WOOD POLE OR STEEL POLE AS DESIGNATED.
[EUG]	[EUG]	RACEWAY, CONCEALED BELOW FINISH FLOOR, NUMBER OF HASHMARKS INDICATE NUMBER OF WIRES WITHIN.
[EOH]	[EOH]	OVERHEAD ELECTRIC LINES. (MECO)
[TS]	[TS]	TRAFFIC SIGNAL RACEWAY, UNDERGROUND.
[SL]	[SL]	STREET LIGHT RACEWAY, UNDERGROUND.
[DI]	[DI]	DETAIL INDICATOR UPPER HALF: DETAIL NUMBER. LOWER HALF: SHEET NUMBER, DETAIL LOCATION.
[DSI]	[DSI]	DUCT SECTION INDICATOR.
[NI]	[NI]	NOTE INDICATOR.
[SLPB]	[SLPB]	STREET LIGHT PULLBOX, PRE-CAST, 2x4

DATE	_____
SURVEY PLOTTED BY	_____
DRAWN BY	_____
DESIGNED BY	_____
QUANTITIES BY	_____
CHECKED BY	_____
NO.	_____

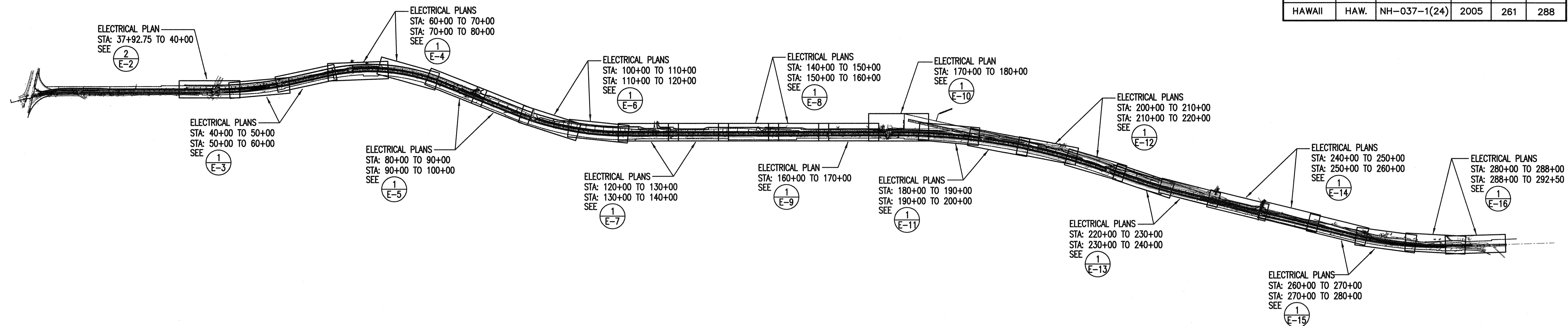
B. T. ITOZAKI
 LICENSED PROFESSIONAL ENGINEER
 No. 9058-E
 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
 SIGNATURE
 EXPIRATION DATE OF THE LICENSE: 04/30/08

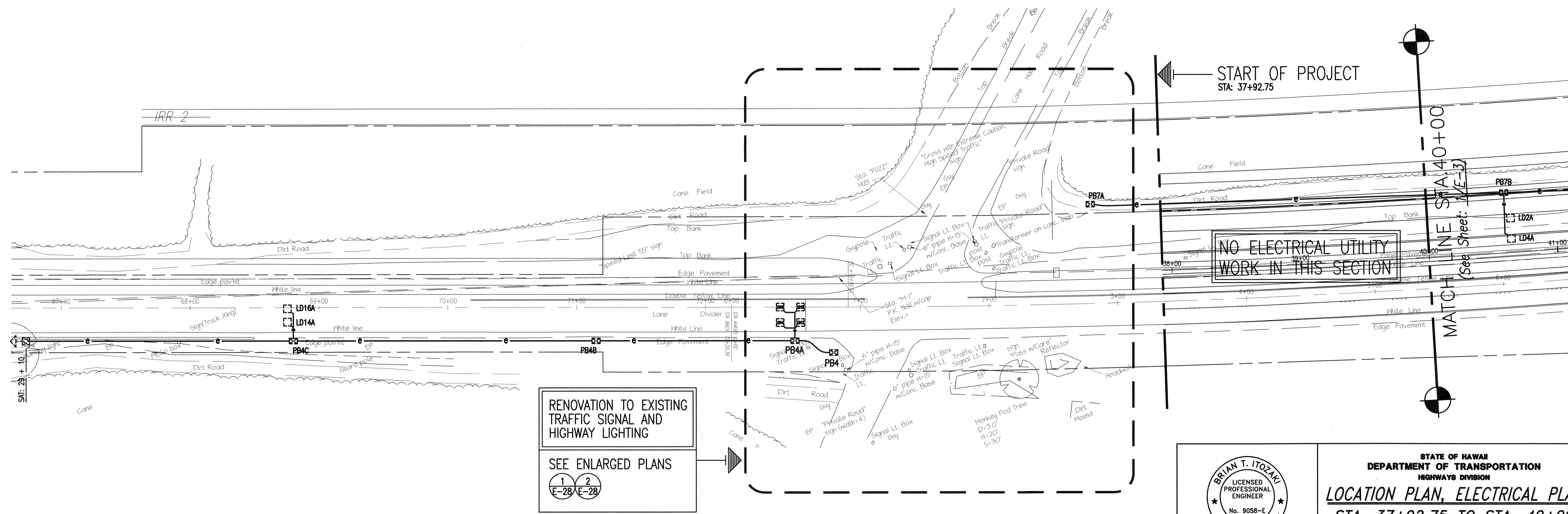
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
NOTES, LEGEND, ABBREVIATIONS & ELECTRICAL SYMBOL LIST
 HALEKALA HIGHWAY WIDENING, PHASE 2
 HANA HIGHWAY TO PUKALANI BYPASS
 FED. AID PROJ. NO. NH-037-1(24)
 SCALE: AS NOTED DATE: MAY, 2005
SHEET No. E-1 OF 29 SHEETS

E-1

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	261	288

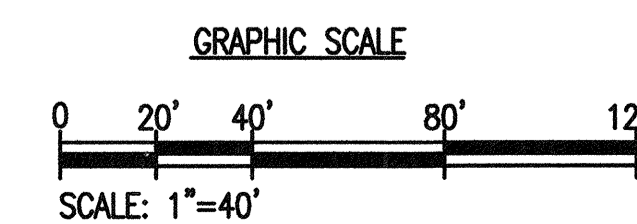


1 OVERALL LOCATION PLAN
E-2 SCALE: 1" = 1200'



RENOVATION TO EXISTING TRAFFIC SIGNAL AND HIGHWAY LIGHTING
SEE ENLARGED PLANS
1 E-28 2 E-28

2 ELECTRICAL PLAN - STA: 37+92.75 TO STA: 40+00
E-2 SCALE: 1" = 40'-0"



BRIAN T. ITOZAKI
LICENSED PROFESSIONAL ENGINEER
No. 9058-E
HAWAII, U.S.A.

SIGNATURE: *[Signature]*
EXPIRATION DATE OF THE LICENSE: 04/30/06

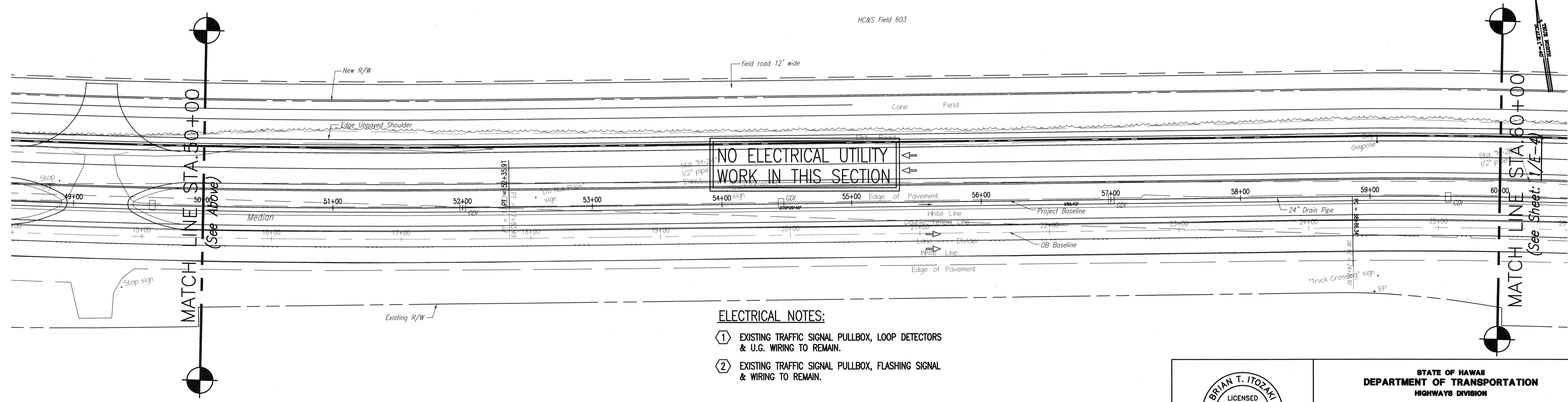
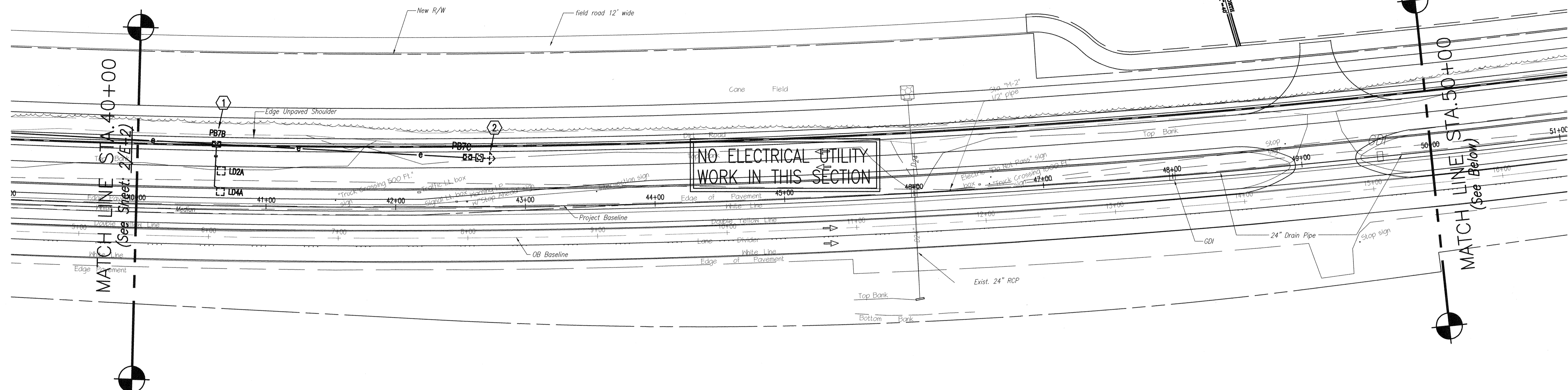
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

LOCATION PLAN, ELECTRICAL PLAN
STA. 37+92.75 TO STA. 40+00
HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY, 2005
SHEET No. E-2 OF 29 SHEETS

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

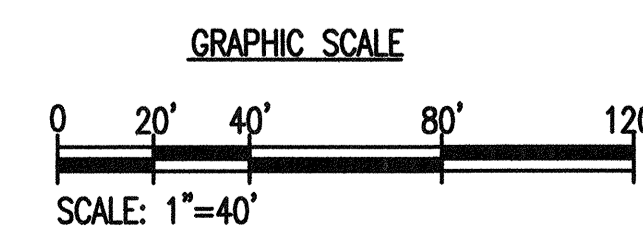
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ELECTRICAL NOTES:

- ① EXISTING TRAFFIC SIGNAL PULLBOX, LOOP DETECTORS & U.G. WIRING TO REMAIN.
- ② EXISTING TRAFFIC SIGNAL PULLBOX, FLASHING SIGNAL & WIRING TO REMAIN.

1
E-4 ELECTRICAL PLANS - STA: 40+00 TO STA: 60+00
SCALE: 1" = 40'-0"



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B. Itozaki
SIGNATURE

EXPIRATION DATE OF THE LICENSE: 04/30/08

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL PLANS
STA. 40+00 TO STA. 60+00
HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

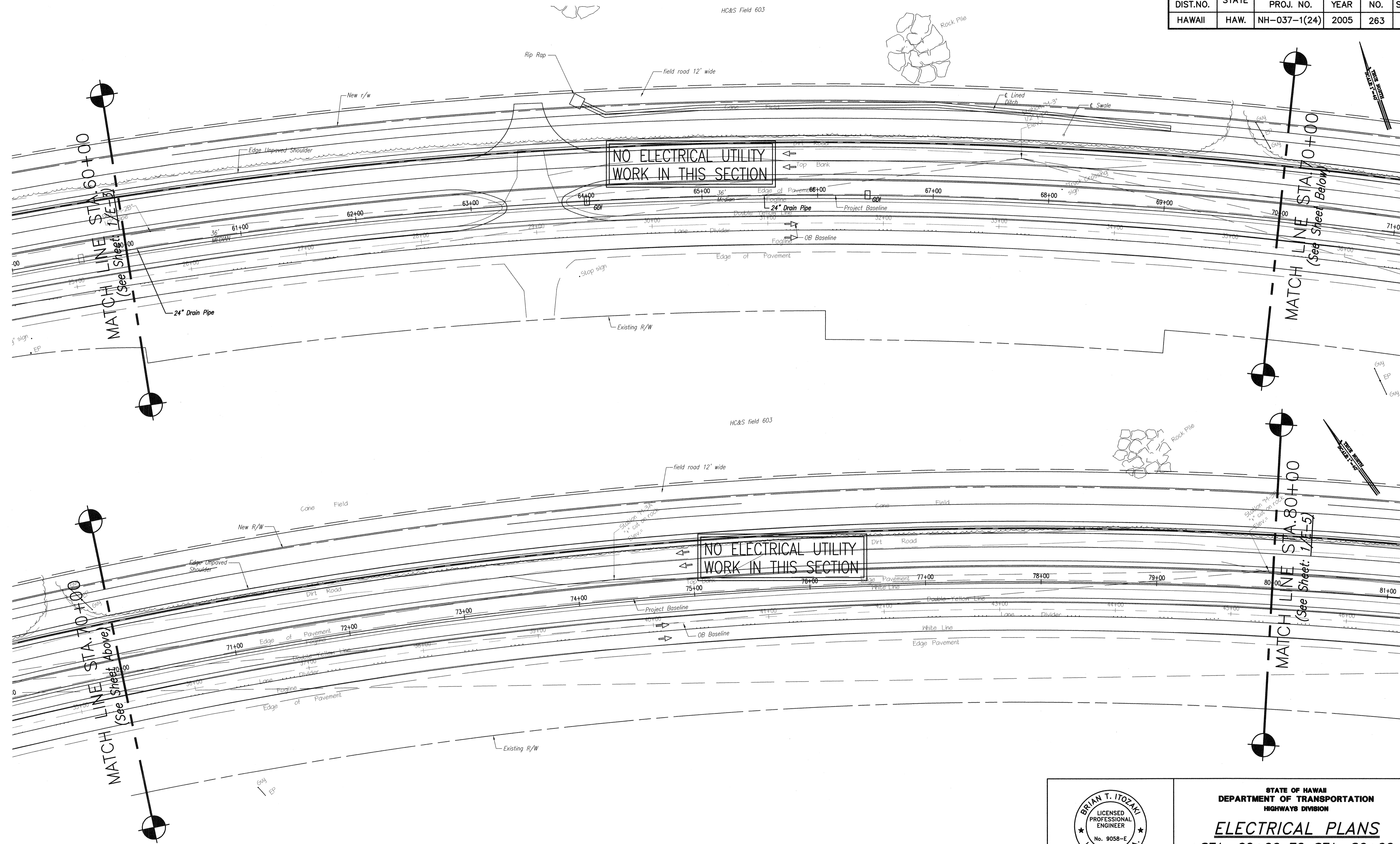
SCALE: AS NOTED DATE: MAY, 2005

SHEET No. E-3 OF 29 SHEETS

ORIGINAL PLAN	DATE
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DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
No.	

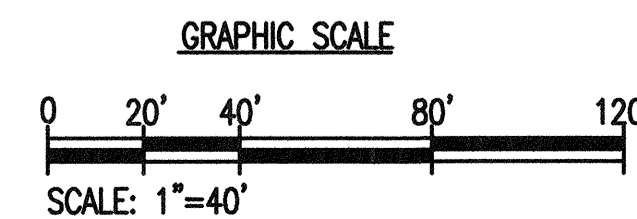
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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	263	288



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

1 ELECTRICAL PLANS - STA: 60+00 TO STA: 80+00
 E-4 SCALE: 1" = 40'-0"



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EXPIRATION DATE OF THE LICENSE: 04/30/06

STATE OF HAWAII
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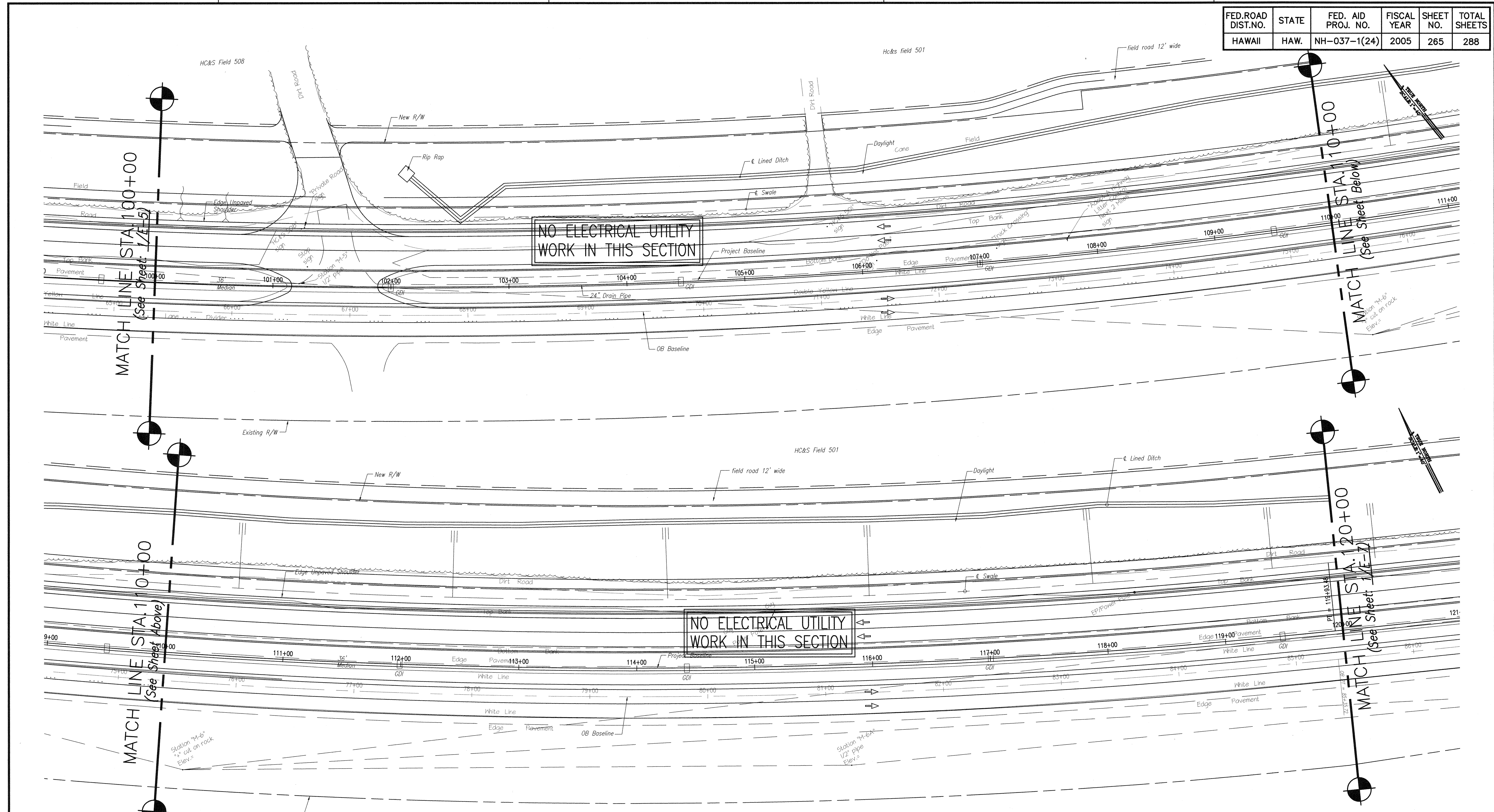
ELECTRICAL PLANS
 STA. 60+00 TO STA. 80+00
 HALEAKALA HIGHWAY WIDENING, PHASE 2
 HANA HIGHWAY TO PUKALANI BYPASS
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SCALE: AS NOTED DATE: MAY, 2005

SHEET No. E-4 OF 29 SHEETS

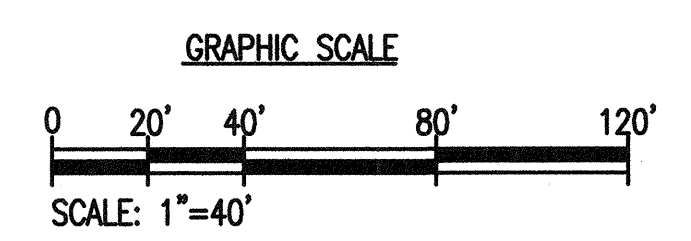
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HAWAII	HAW.	NH-037-1(24)	2005	265	288



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DESIGNED BY	
QUANTITIES BY	
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ORIGINAL PLAN	No.
NOTE BOOK	

1 ELECTRICAL PLANS - STA: 100+00 TO STA: 120+00
 E-6 SCALE: 1" = 40'-0"



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 Signature: *B. Itozaki*
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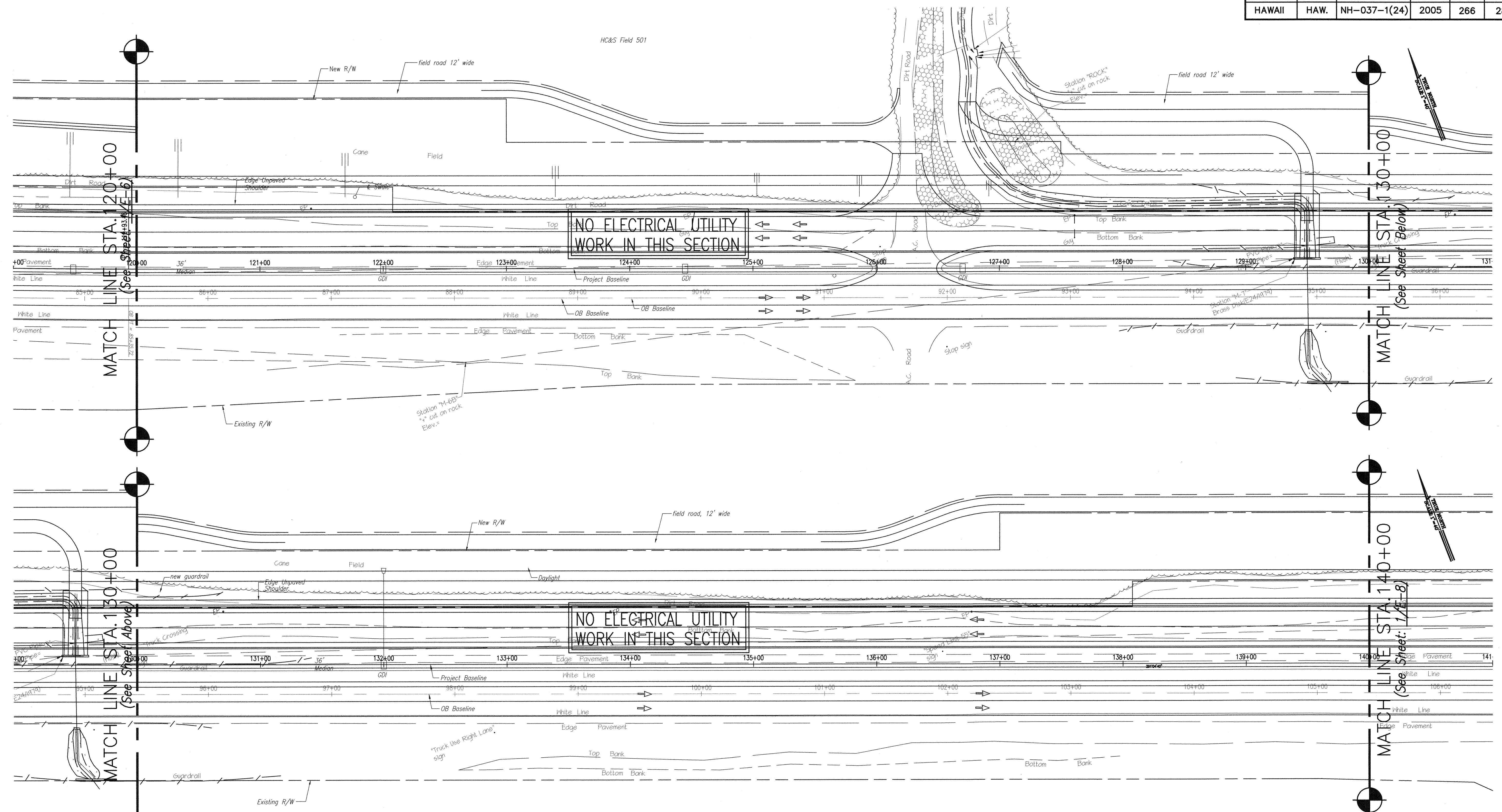
STATE OF HAWAII
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ELECTRICAL PLANS
 STA. 100+00 TO STA. 120+00
 HALEAKALA HIGHWAY WIDENING, PHASE 2
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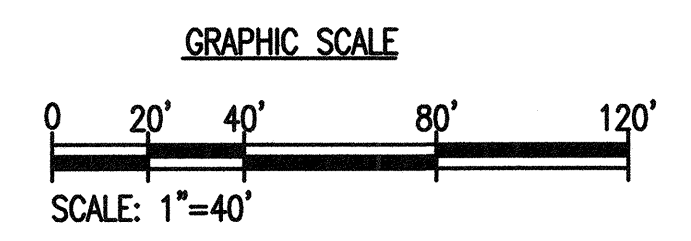
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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
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QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN No.	
NOTE BOOK No.	

1 ELECTRICAL PLANS - STA: 120+00 TO STA: 140+00
 E-7 SCALE: 1" = 40'-0"

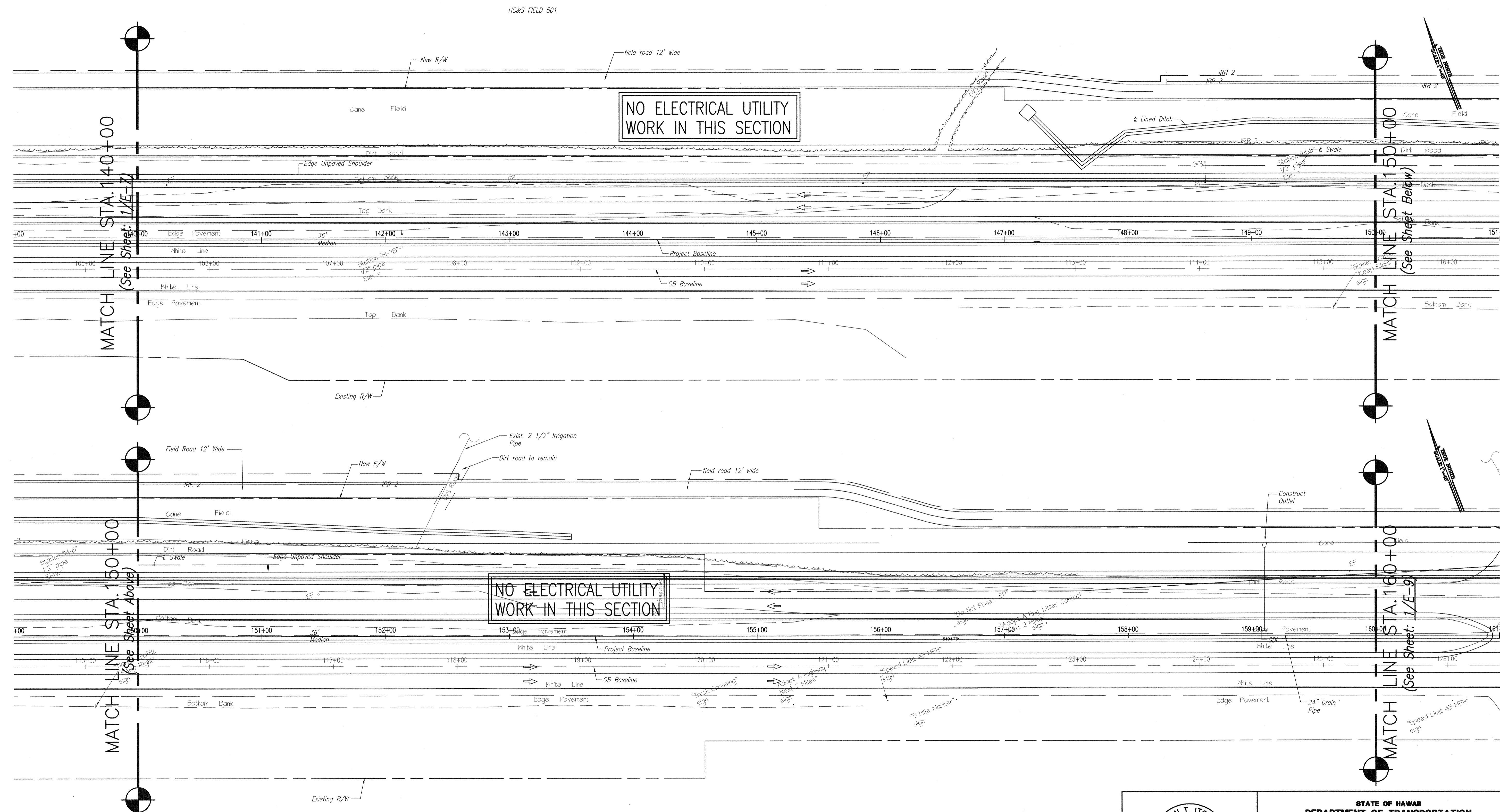


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STATE OF HAWAII
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 HIGHWAYS DIVISION
ELECTRICAL PLANS
 STA. 120+00 TO STA. 140+00
 HALEAKALA HIGHWAY WIDENING, PHASE 2
 HANA HIGHWAY TO PUKALANI BYPASS
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 SCALE: AS NOTED DATE: MAY, 2005
 SHEET No. E-7 OF 29 SHEETS

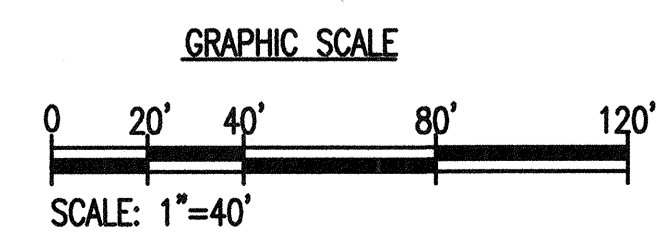
E-7

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
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NOTE BOOK	

1 ELECTRICAL PLANS - STA: 140+00 TO STA: 160+00
E-8 SCALE: 1" = 40'-0"



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[Signature]
SIGNATURE

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
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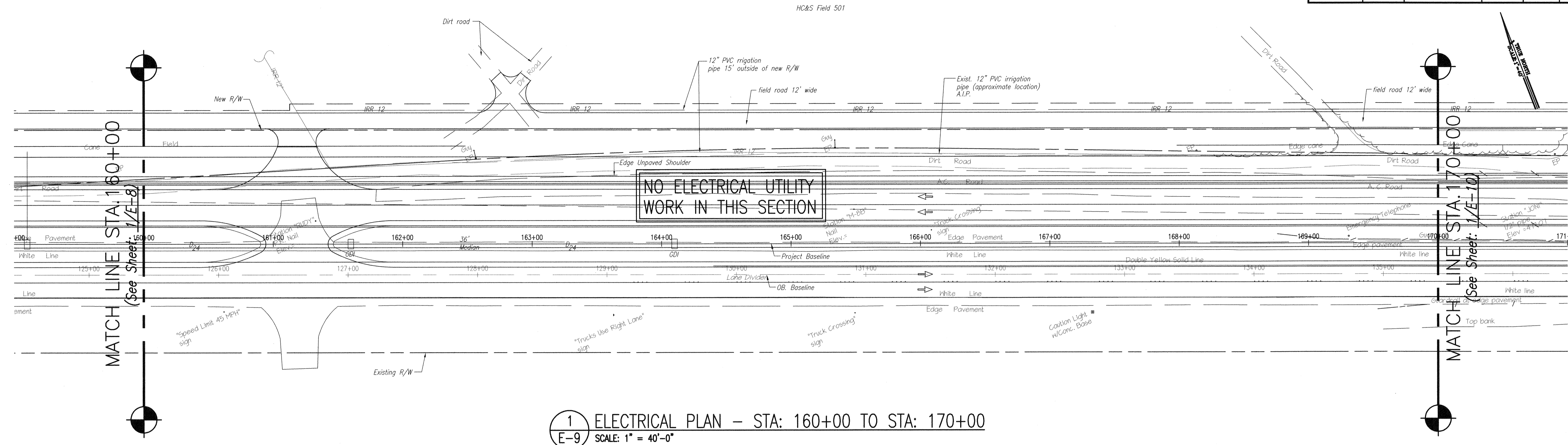
ELECTRICAL PLANS
STA. 140+00 TO STA. 160+00
HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY, 2005

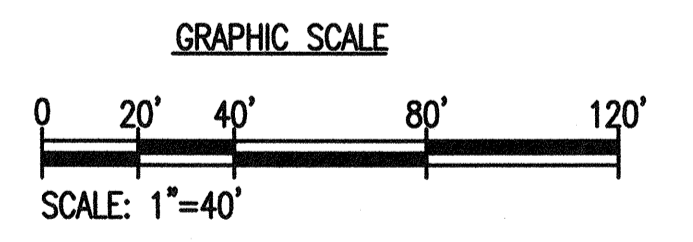
SHEET No. E-8 OF 29 SHEETS

E-8

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	268	288



1
E-9 ELECTRICAL PLAN - STA: 160+00 TO STA: 170+00
SCALE: 1" = 40'-0"



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

BRIAN T. ITOZAKI
LICENSED PROFESSIONAL ENGINEER
No. 9058-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Brian T. Itozaki
SIGNATURE

EXPIRATION DATE OF THE LICENSE: 04/30/06

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL PLAN

STA. 160+00 TO STA. 170+00
HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

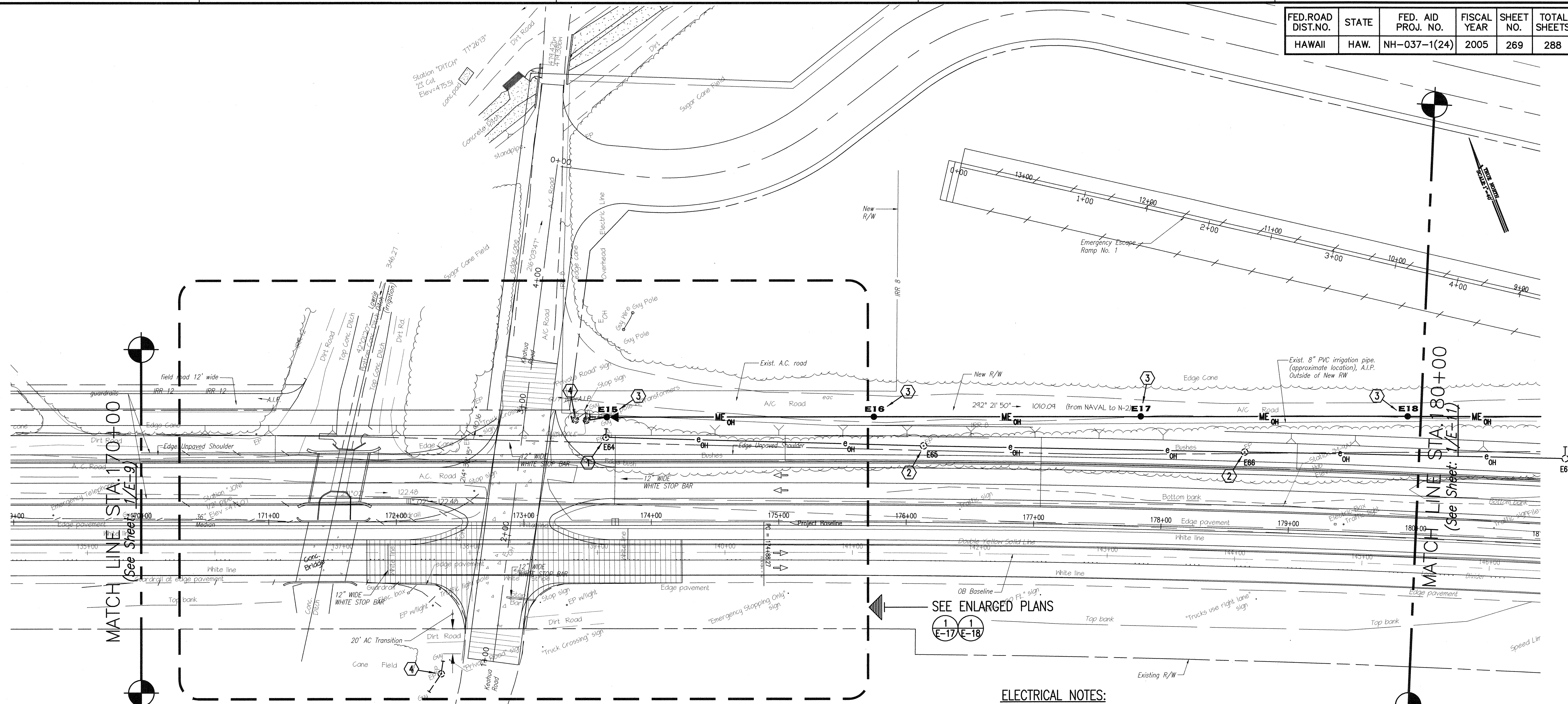
SCALE: AS NOTED DATE: MAY, 2005

SHEET No. E-9 OF 29 SHEETS

E-9

245.036

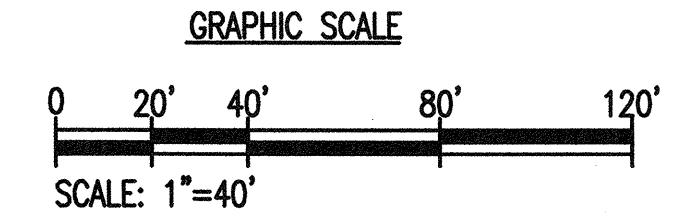
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	269	288



1 ELECTRICAL PLAN - STA: 170+00 TO STA: 180+00
 E-10 SCALE: 1" = 40'-0"

ELECTRICAL NOTES:

- ① EXISTING WOOD POLE, OVERHEAD LINES, GUY AND ANCHOR TO BE REMOVED BY UTILITY COMPANY (MECO).
- ② EXISTING WOOD AND OVERHEAD LINES TO BE REMOVED BY UTILITY COMPANY (MECO).
- ③ PROPOSED LOCATION OF MECO WOOD POLE AND OVERHEAD LINES.
- ④ EXISTING HC&S WOOD POLE AND OVERHEAD LINES TO REMAIN.
- ⑤ EXISTING WOOD POLE, STREET LIGHT, AND WIRING TO BE REMOVED BY HC & S.



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

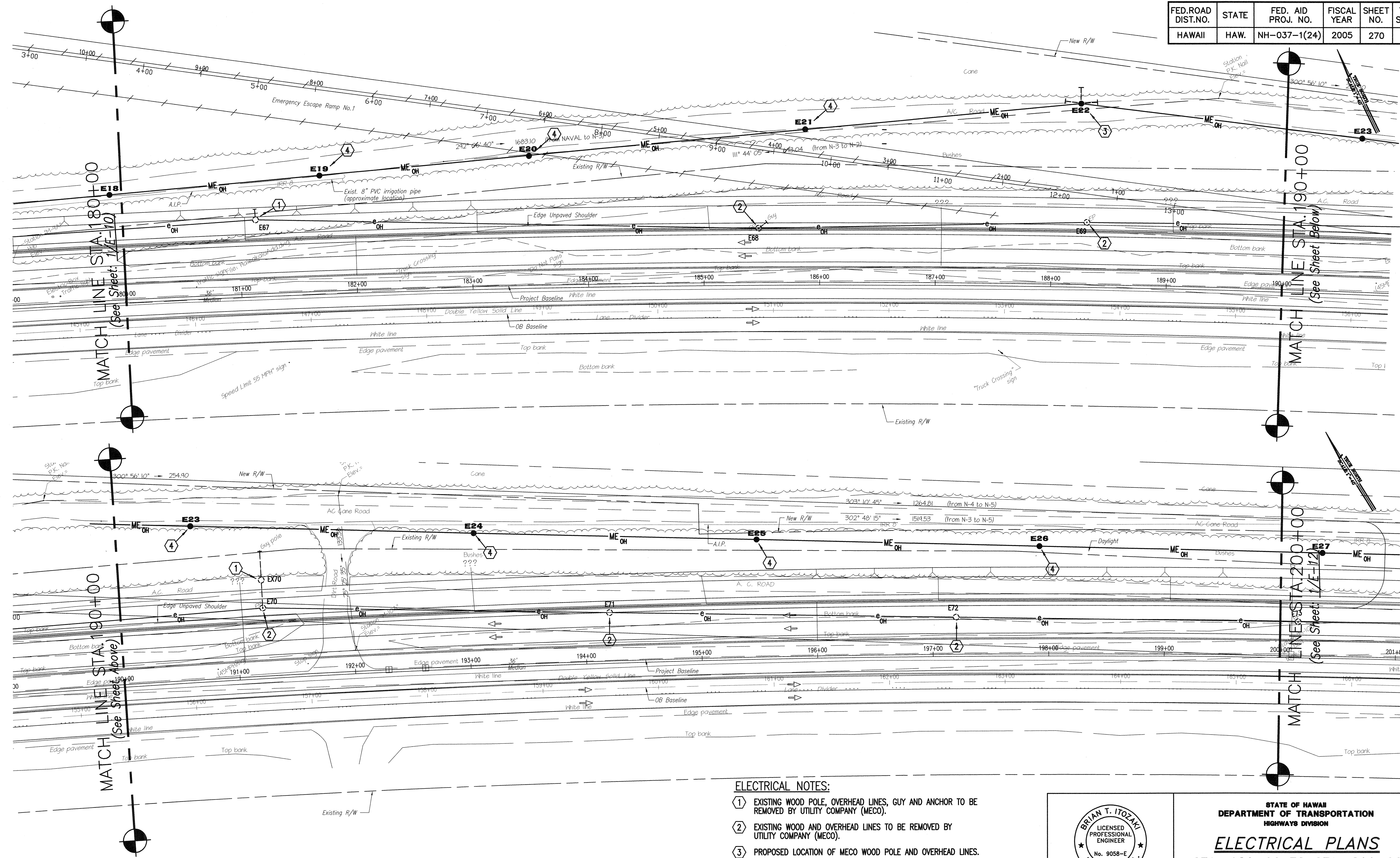
B. Itozaki
 SIGNATURE
 EXPIRATION DATE OF THE LICENSE: 04/30/06

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
ELECTRICAL PLAN
 STA. 170+00 TO STA. 180+00
 HALEAKALA HIGHWAY WIDENING, PHASE 2
 HANA HIGHWAY TO PUKALANI BYPASS
 FED. AID PROJ. NO. NH-037-1(24)
 SCALE: AS NOTED DATE: MAY, 2005
 SHEET No. E-10 OF 29 SHEETS

E-10

245.036

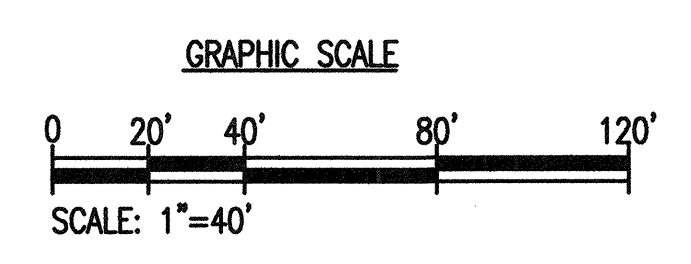
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	270	288



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

1 ELECTRICAL PLANS - STA: 180+00 TO STA: 200+00
E-11 SCALE: 1" = 40'-0"

- ELECTRICAL NOTES:**
- ① EXISTING WOOD POLE, OVERHEAD LINES, GUY AND ANCHOR TO BE REMOVED BY UTILITY COMPANY (MECO).
 - ② EXISTING WOOD AND OVERHEAD LINES TO BE REMOVED BY UTILITY COMPANY (MECO).
 - ③ PROPOSED LOCATION OF MECO WOOD POLE AND OVERHEAD LINES.
 - ④ EXISTING HC&S WOOD POLE AND OVERHEAD LINES TO REMAIN.

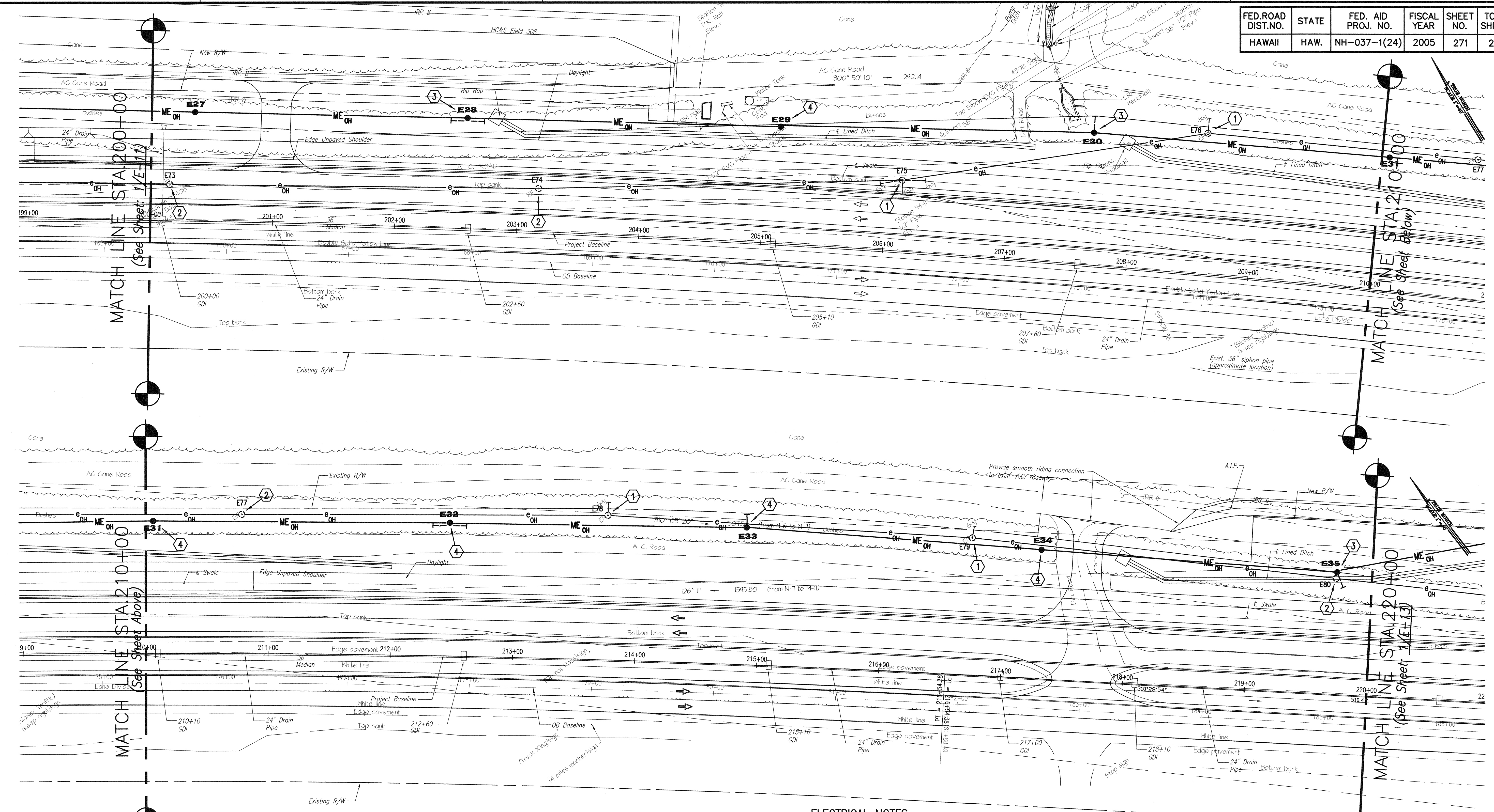


BRIAN T. ITOZAKI
 LICENSED PROFESSIONAL ENGINEER
 No. 9058-E
 HAWAII, U.S.A.
 THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
 SIGNATURE
 EXPIRATION DATE OF THE LICENSE: 04/30/06

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
ELECTRICAL PLANS
 STA. 180+00 TO STA. 200+00
 HALEAKALA HIGHWAY WIDENING, PHASE 2
 HANA HIGHWAY TO PUKALANI BYPASS
 FED. AID PROJ. NO. NH-037-1(24)
 SCALE: AS NOTED DATE: MAY, 2005
SHEET No. E-11 OF 29 SHEETS

E-11

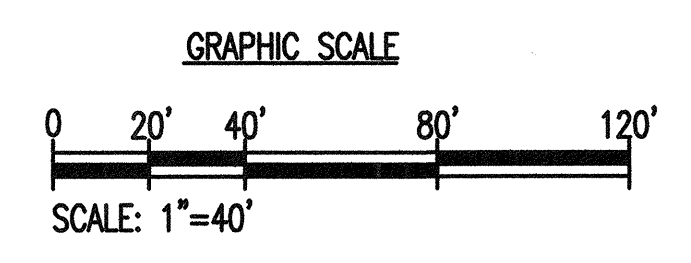
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	271	288



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

1 ELECTRICAL PLANS - STA: 200+00 TO STA: 220+00
E-12 SCALE: 1" = 40'-0"

- ELECTRICAL NOTES:**
- ① EXISTING WOOD POLE, OVERHEAD LINES, GUY AND ANCHOR TO BE REMOVED BY UTILITY COMPANY (MECO).
 - ② EXISTING WOOD AND OVERHEAD LINES TO BE REMOVED BY UTILITY COMPANY (MECO).
 - ③ PROPOSED LOCATION OF MECO WOOD POLE, ANCHOR AND OVERHEAD LINES.
 - ④ PROPOSED LOCATION OF MECO WOOD POLE AND OVERHEAD LINES.



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HAWAII, U.S.A.

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B. Itozaki
SIGNATURE

EXPIRATION DATE OF THE LICENSE: 04/30/06

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

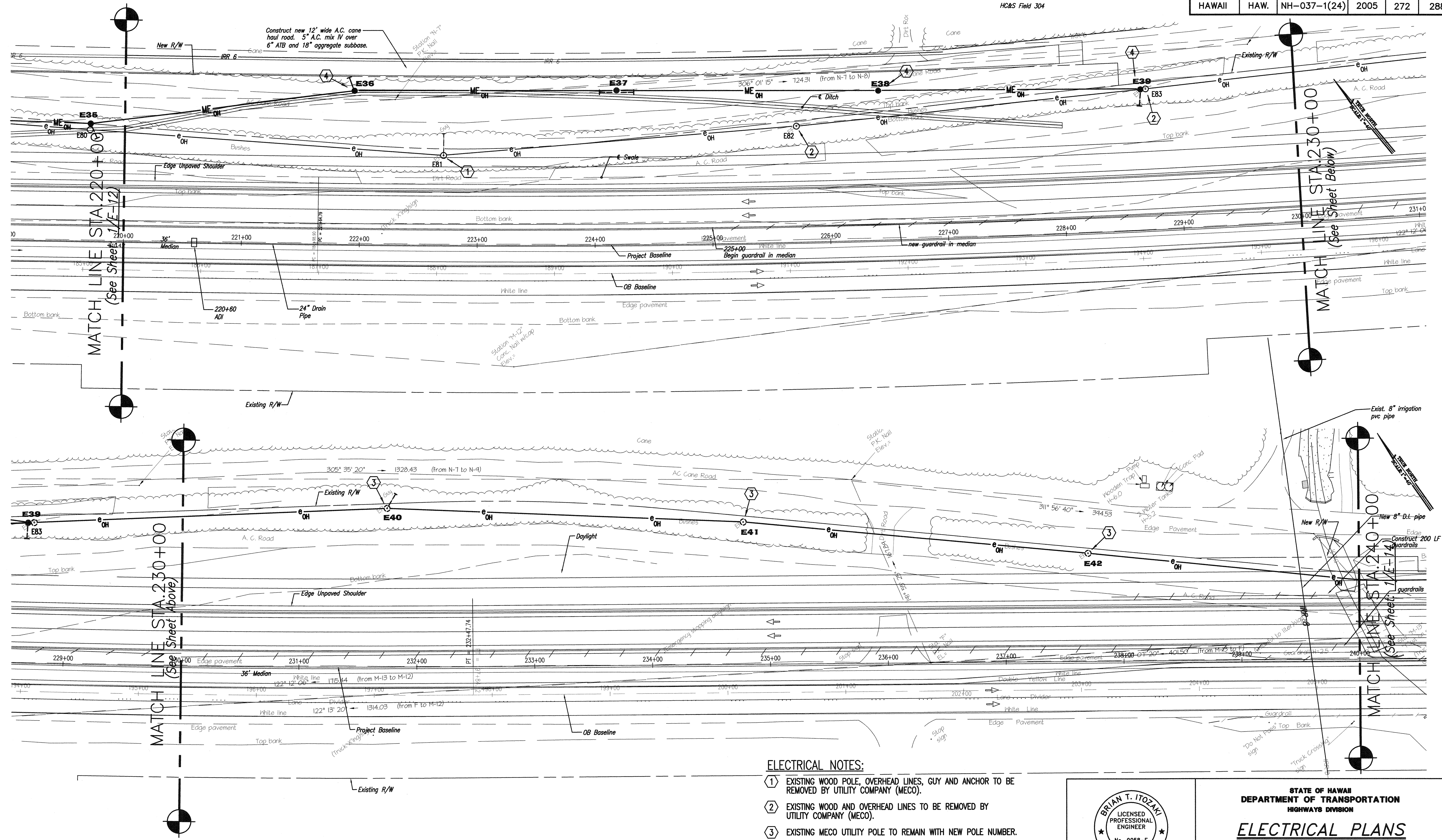
ELECTRICAL PLANS
STA. 200+00 TO STA. 220+00
HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY, 2005

SHEET No. E-12 OF 29 SHEETS

E-12

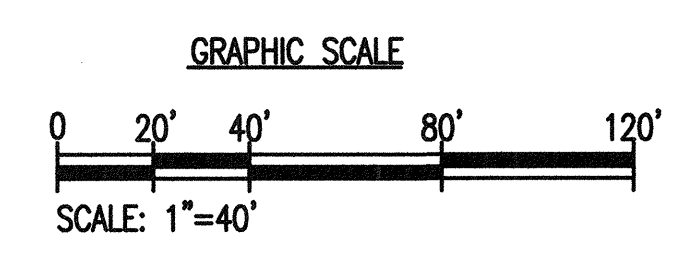
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	272	288



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

1 ELECTRICAL PLANS - STA: 220+00 TO STA: 240+00
E-13 SCALE: 1" = 40'-0"

- ELECTRICAL NOTES:**
- EXISTING WOOD POLE, OVERHEAD LINES, GUY AND ANCHOR TO BE REMOVED BY UTILITY COMPANY (MECO).
 - EXISTING WOOD AND OVERHEAD LINES TO BE REMOVED BY UTILITY COMPANY (MECO).
 - EXISTING MECO UTILITY POLE TO REMAIN WITH NEW POLE NUMBER.
 - PROPOSED LOCATION OF MECO WOOD POLE AND OVERHEAD LINES.



E-13

BRIAN T. ITOZAKI
LICENSED PROFESSIONAL ENGINEER
No. 9058-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Signature: *Brian T. Itozaki*

EXPIRATION DATE OF THE LICENSE: 04/30/06

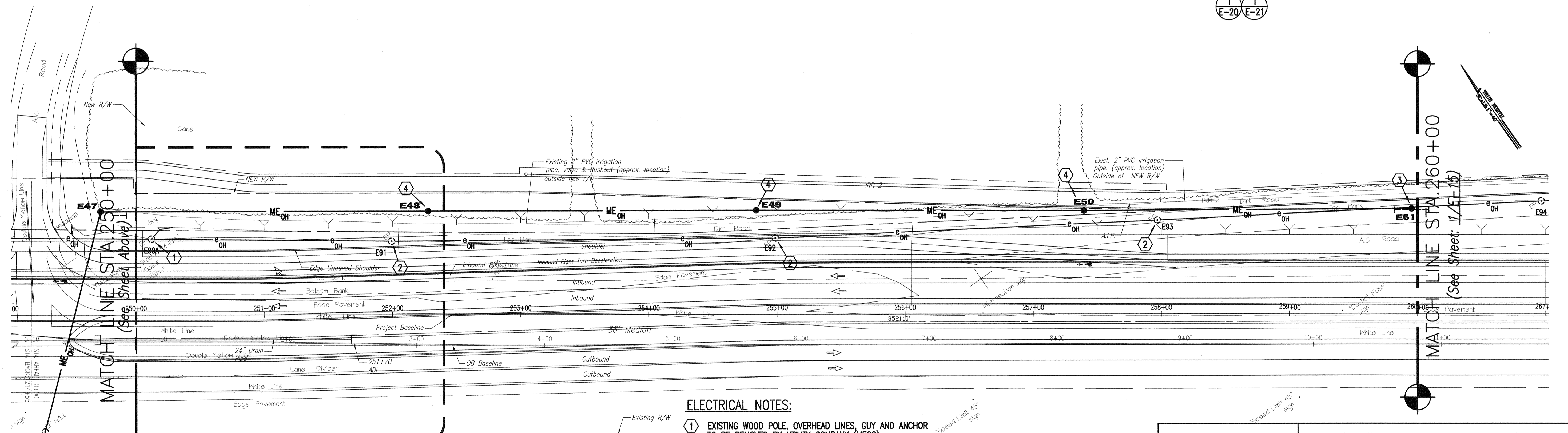
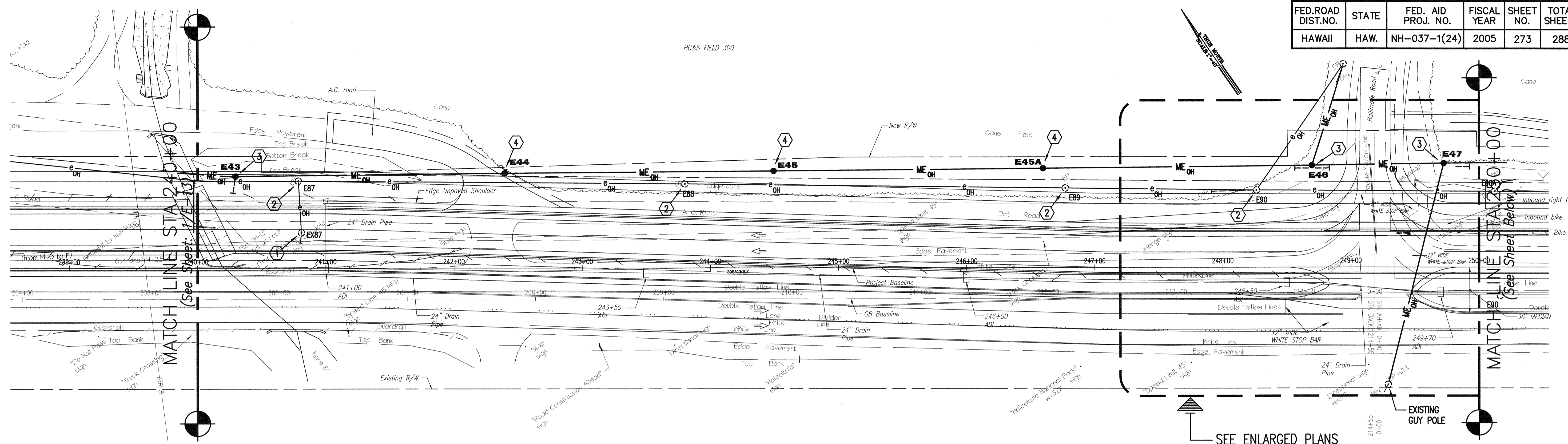
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL PLANS
STA. 220+00 TO STA. 240+00
HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

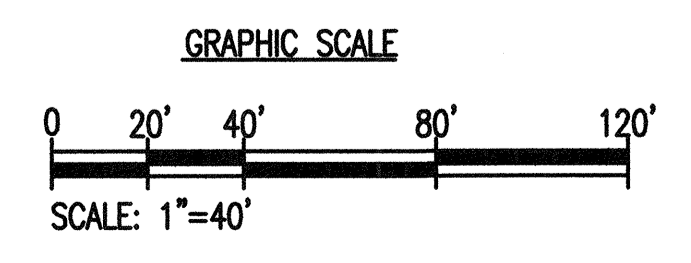
SCALE: AS NOTED DATE: MAY, 2005

SHEET No. E-13 OF 29 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	273	288



- ELECTRICAL NOTES:**
- ① EXISTING WOOD POLE, OVERHEAD LINES, GUY AND ANCHOR TO BE REMOVED BY UTILITY COMPANY (MECO).
 - ② EXISTING WOOD POLE AND OVERHEAD LINES TO BE REMOVED BY UTILITY COMPANY (MECO).
 - ③ PROPOSED LOCATION OF MECO WOOD POLE, ANCHOR AND OVERHEAD LINES.
 - ④ PROPOSED LOCATION OF MECO WOOD POLE AND OVERHEAD LINES.



BRIAN T. ITOZAKI
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 HAWAII, U.S.A.

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Brian T. Itozaki
 SIGNATURE

EXPIRATION DATE OF THE LICENSE: 04/30/06

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

ELECTRICAL PLANS
 STA. 240+00 TO STA. 260+00
 HALEAKALA HIGHWAY WIDENING, PHASE 2
 HANA HIGHWAY TO PUKALANI BYPASS
 FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY, 2005

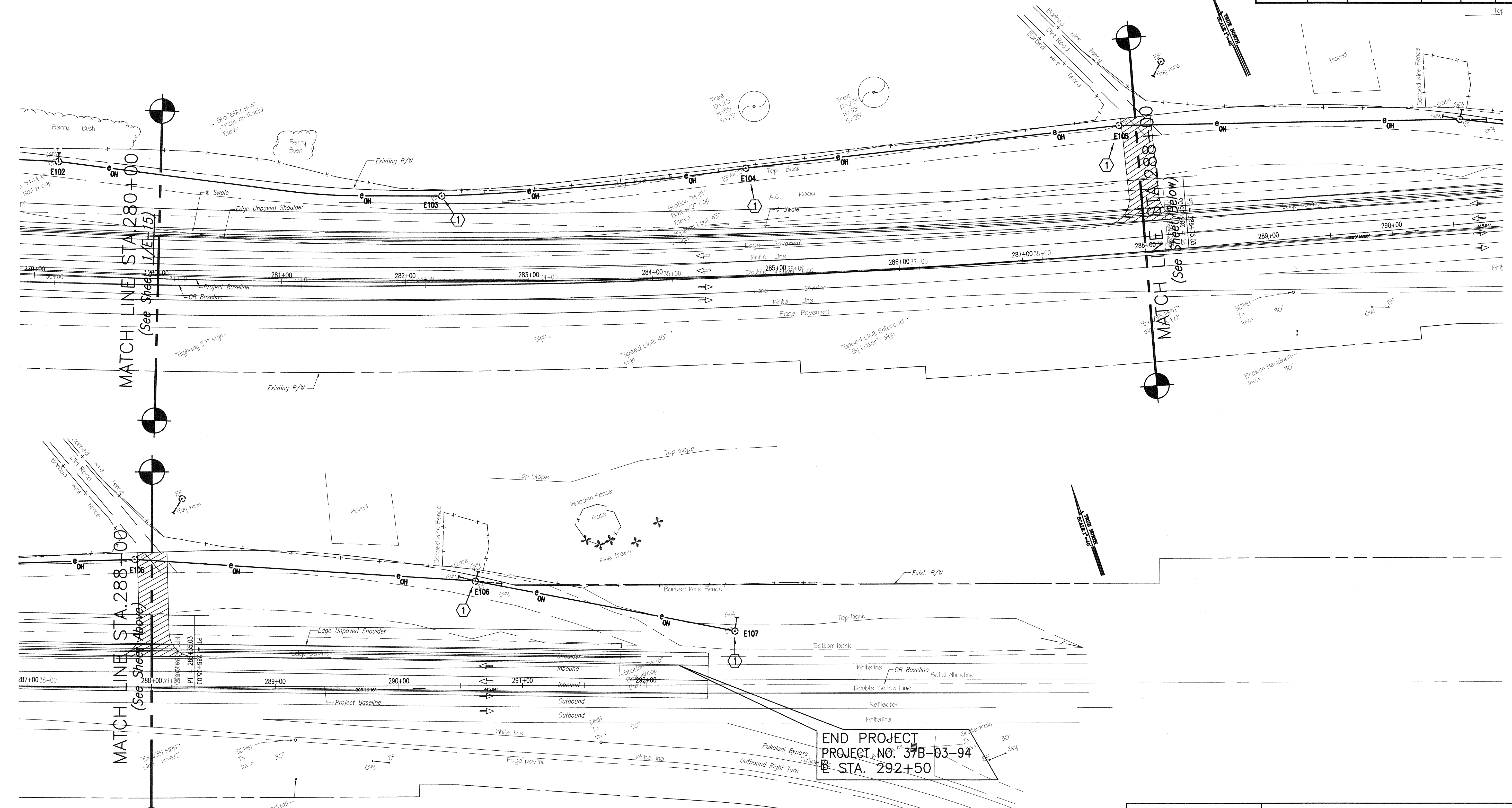
SHEET No. E-14 OF 29 SHEETS

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

① ELECTRICAL PLANS - STA: 240+00 TO STA: 260+00
 E-14 SCALE: 1" = 40'-0"

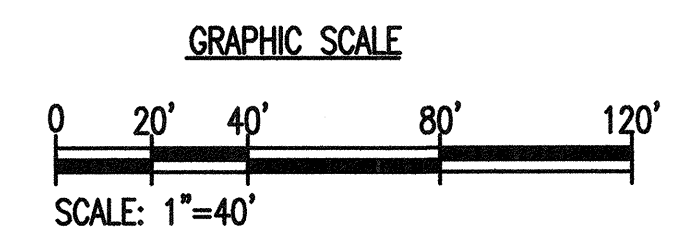
E-14

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	275	288



ELECTRICAL NOTE (EXISTING/REMOVAL WORK):
 ① EXISTING UTILITY POLE TO REMAIN.

1 ELECTRICAL PLANS - STA: 280+00 TO STA: 292+50
 E-16 SCALE: 1" = 40'-0"



E-16

BRIAN T. ITOZAKI
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 No. 9058-E
 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
 SIGNATURE: *Brian T. Itozaki*
 EXPIRATION DATE OF THE LICENSE: 04/30/06

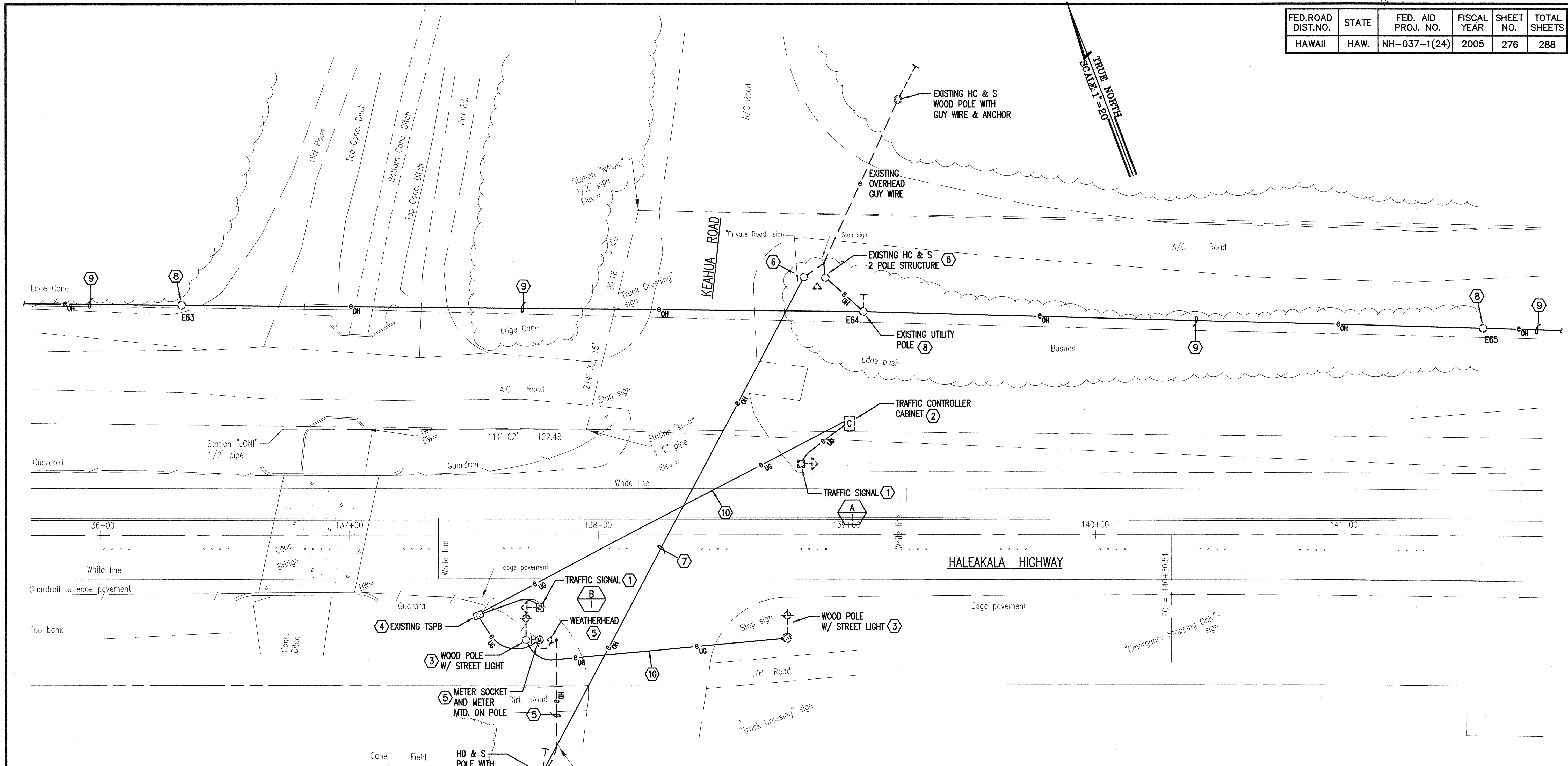
STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

ELECTRICAL PLANS
 STA. 280+00 TO STA. 292+50
 HALEAKALA HIGHWAY WIDENING, PHASE 2
 HANA HIGHWAY TO PUKALANI BYPASS
 FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY, 2005
 SHEET No. E-16 OF 29 SHEETS

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

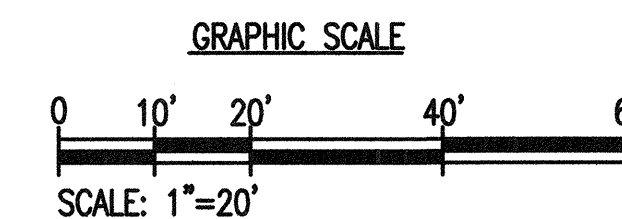
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	276	288



ELECTRICAL NOTES -- EXISTING/REMOVAL WORK:

- ① DISCONNECT AND REMOVE EXISTING TRAFFIC SIGNAL STANDARD AND WIRING TO TSPB. DEMOLISH CONCRETE BASE.
- ② EXISTING TRAFFIC CONTROLLER TO BE REMOVED.
- ③ REMOVE EXISTING WOOD POLE, STREET LIGHT AND WIRING.
- ④ EXISTING TSPB TO BE REMOVED.
- ⑤ DISCONNECT AND REMOVE EXISTING OVERHEAD SERVICE DROP, METER SOCKET AND WIRING.
- ⑥ EXISTING HC & S UTILITY POLE TO REMAIN.
- ⑦ EXISTING HC & S OVERHEAD UTILITY LINES TO REMAIN.
- ⑧ EXISTING UTILITY POLE TO BE REMOVED BY MECO.
- ⑨ EXISTING OVERHEAD UTILITY LINES TO BE REMOVED BY MECO.
- ⑩ REMOVE CABLES, ABANDON RACEWAY.

① EXISTING INTERSECTION ELECTRICAL PLAN (REMOVAL WORK)
 E-17 SCALE: 1" = 20'
 (HALEAKALA HWY. & KEAHUA ROAD)



E-17

BRIAN T. ITOZAKI
 LICENSED PROFESSIONAL ENGINEER
 No. 9058-E
 HAWAII, U.S.A.

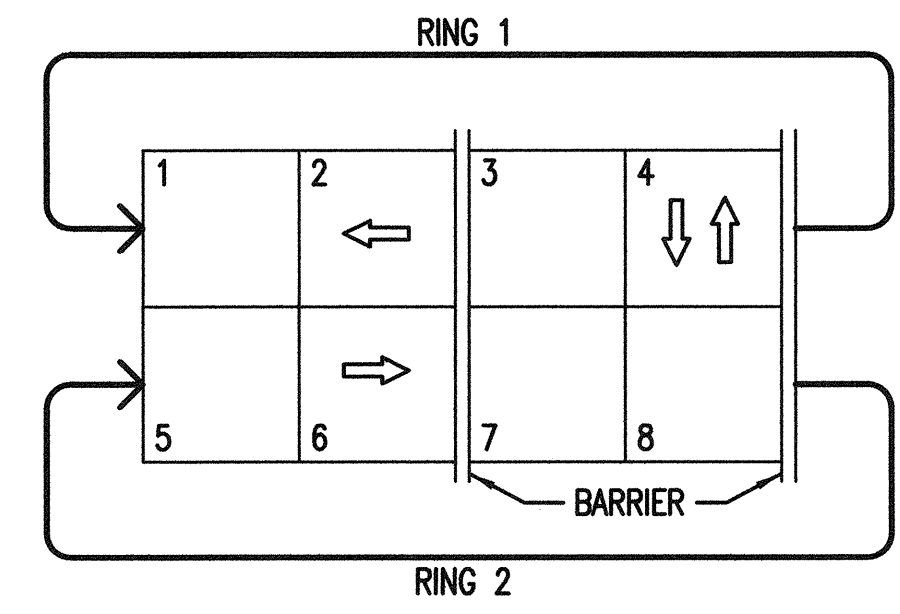
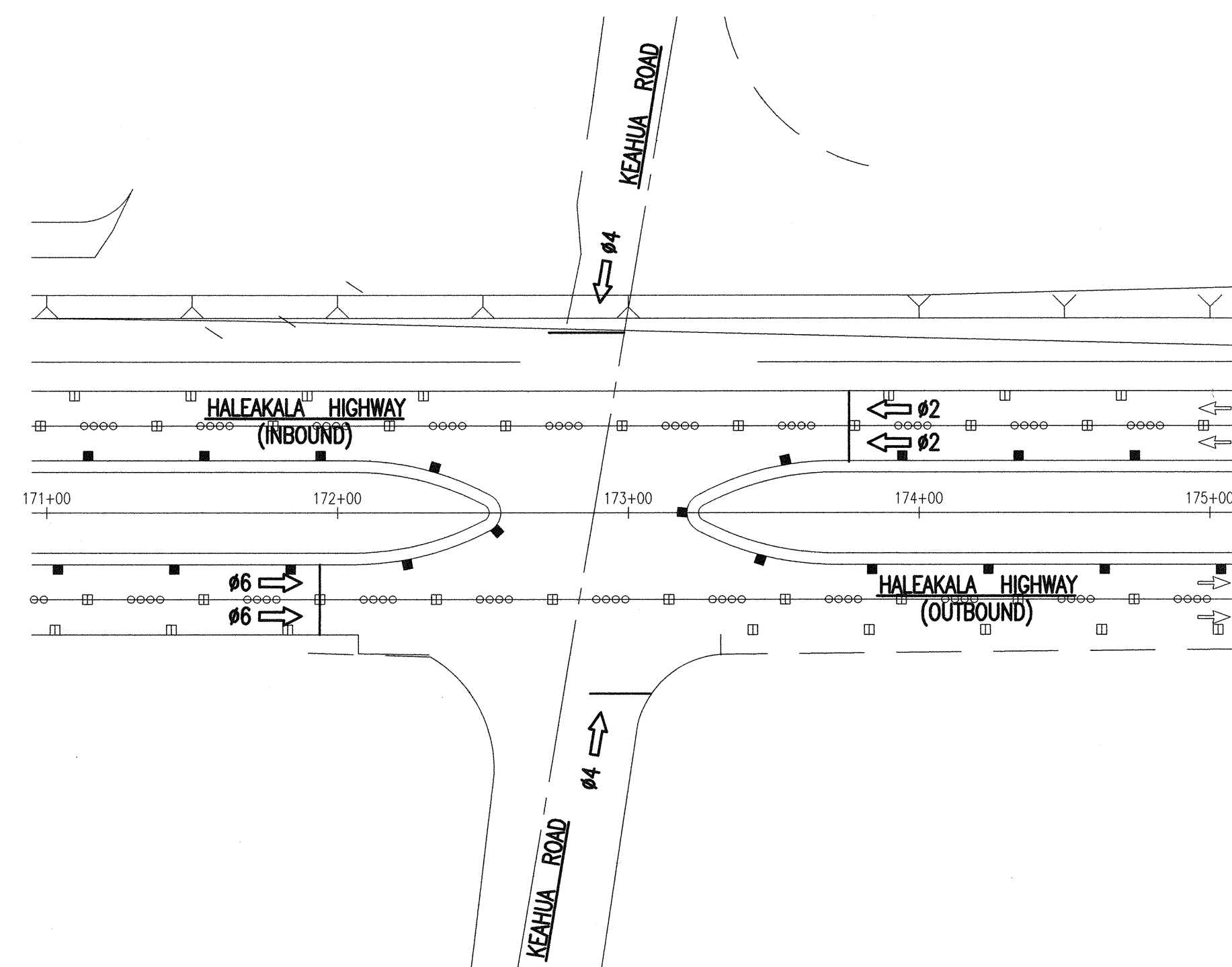
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SIGNATURE
 EXPIRATION DATE OF THE LICENSE: 04/30/06

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
EXISTING INTERSECTION ELECTRICAL PLAN (REMOVAL WORK)
 HALEAKALA HIGHWAY WIDENING, PHASE 2
 HANA HIGHWAY TO PUKALANI BYPASS
 FED. AID PROJ. NO. NH-037-1(24)
 SCALE: AS NOTED DATE: MAY, 2005
 SHEET No. E-17 OF 29 SHEETS

Reserved 10/27/05 ET

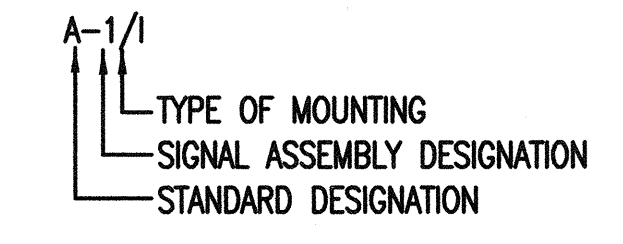
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	278	288



PHASE ASSIGNMENT DIAGRAM

1 PLAN - PHASE ASSIGNMENTS
E-19

NOTES:
R = RED
Y = YELLOW
G = GREEN
← = ARROW



					SIGNAL HEAD TYPE
12" RYG TRAFFIC SIGNAL HEAD (L.E.D. SIGNAL ASSEMBLY)					DESCRIPTION
A-1-I B-1-VI (a) B-2-VI (a) C-1-V C-2-V D-1-I E-1-V F-1-VI (a) F-2-VI (a) G-1-V G-2-V H-1-I					POLE LETTER - SIGNAL HEAD NUMBER - MOUNTING TYPE

(a) PROVIDE BACK PLATE FOR SIGNAL HEAD.

NOTE: PROVIDE ADHESIVE TYPE II OBJECT MARKERS ON STANDARDS A, B, C, D, E, F, G & H. INSTALL TWO (2) MARKERS PER STANDARD.

2 TRAFFIC SIGNAL ASSEMBLY SCHEDULE
E-19

LOOP DETECTOR SCHEDULE

LD-#	AMPLIFIER	CHANNEL	PHASE-NOTES
1 & 2	A	1	Ø2 & Ø6
3 & 4	A	2	Ø2 & Ø6
5 & 6	B	1	Ø4
7 & 8	A	3	Ø2 & Ø6
9 & 10	A	4	Ø2 & Ø6
11 & 12	B	2	Ø4
2A & 4A	C	2	PROGRAMABLE EXTEND
6A & 6B	B	3	PROGRAMABLE EXTEND
8A & 10A	C	3	PROGRAMABLE EXTEND
12A & 12B	C	4	PROGRAMABLE EXTEND

CONDUIT/CABLE SCHEDULE

FROM	TO	MAIN CONTROL		SIGNAL CONTROL		DETECTORS (VEH)		OPTICOM		SPARE	REMARKS
		CONDUIT 2"	CABLE 26/C #14	CONDUIT 2"	CABLE 4/C #14	CONDUIT 2"	CABLE 2/C #16	CONDUIT 2"	CABLE 3/C #20		
UTILITY	CONT.	--	--	--	--	--	--	--	--	--	CE (2"C, 2-#6 & 1-#8)
CONT.	PB1	2	2	--	--	1	12	1	2	1	CE
PB1	PB2	1	1	--	--	1	10	--	--	--	CE
PB2	A	--	--	1	1	--	--	--	--	--	CE
PB2	2A	--	--	--	--	1	2	--	--	--	CE
PB2A	PB2B	--	--	--	--	1	2	--	--	--	CE
PB2	PB3	2	2	--	--	1	6	1	1	1	CE
PB3	PB4	1	1	--	--	1	6	--	--	--	CE
PB3	B	--	--	1	2	--	--	1	1	--	CE
PB4	C	--	--	1	2	--	--	--	--	--	CE
PB4	PB4A	--	--	--	--	1	2	--	--	--	CE
PB4A	PB4B	--	--	--	--	1	1	--	--	--	CE
PB4	PB5	1	1	--	--	1	4	--	--	--	CE
PB5	D	--	--	1	1	--	--	--	--	--	CE
PB5	PB6	1	1	--	--	1	4	--	--	--	CE
PB6	E	--	--	1	1	--	--	--	--	--	CE
PB6	PB6A	--	--	--	--	1	2	--	--	--	CE
PB6A	PB6B	1	1	--	--	1	1	--	--	--	CE
PB6	PB7	--	--	--	--	--	--	--	--	2	CE
PB7	PB8	1	1	--	--	--	--	1	1	--	CE
PB7	F	--	--	1	2	--	--	1	1	--	CE
PB8	PB9	1	1	--	--	1	2	1	1	--	CE
PB8	G	--	--	1	2	--	--	--	--	--	CE
PB8	PB8A	--	--	--	--	1	2	--	--	--	CE
PB8A	PB8B	--	--	--	--	1	1	--	--	--	CE
PB9	PB1	1	1	--	--	1	2	1	1	--	CE
PB9	H	--	--	1	1	--	--	--	--	--	CE

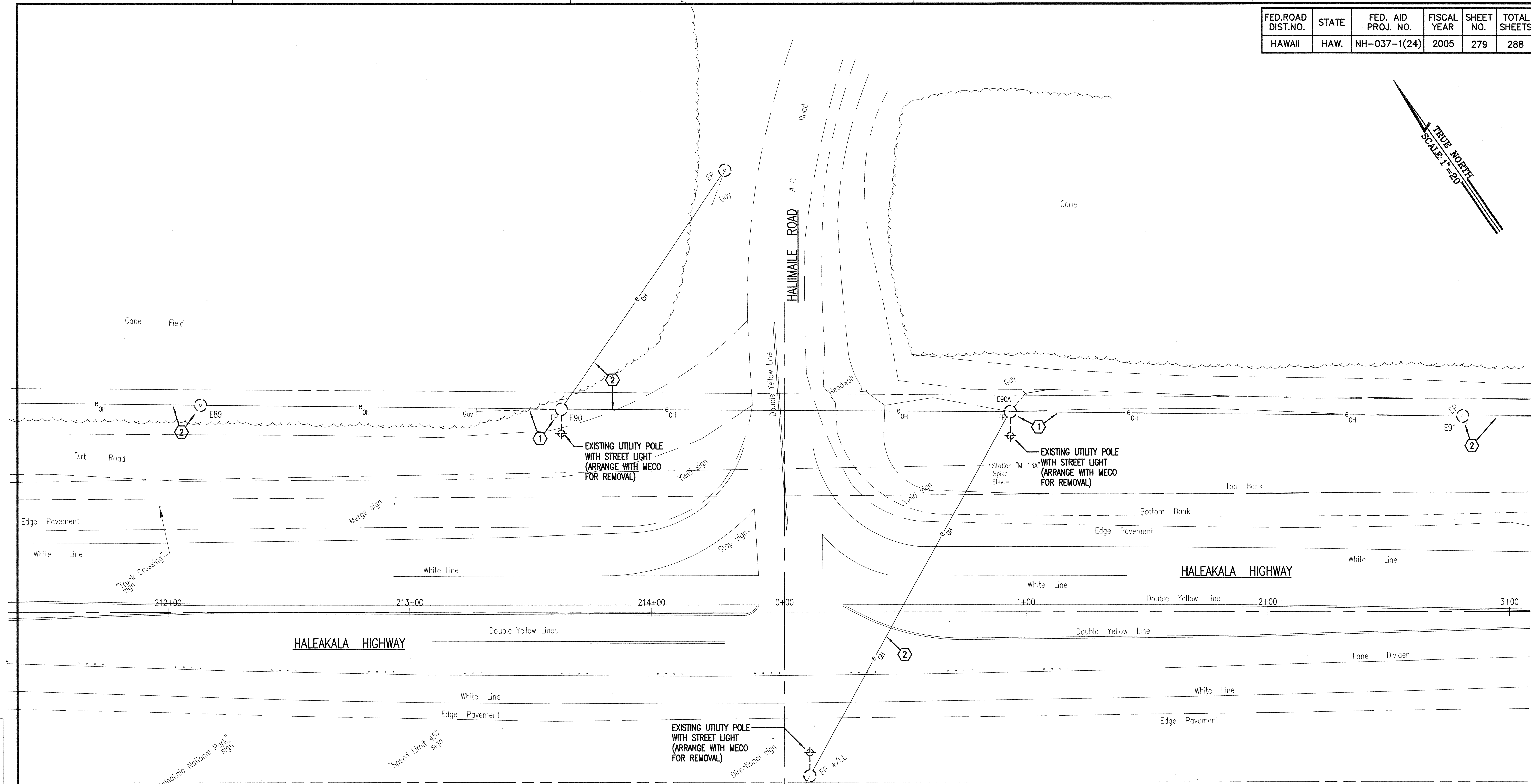
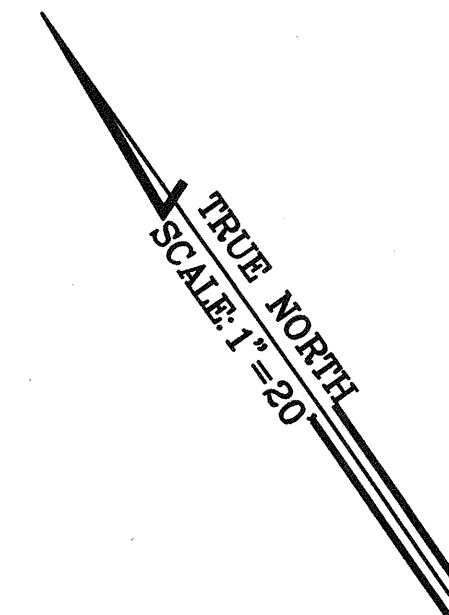
SURVEY PLOTTED BY _____ DATE _____
 DRAWN BY _____
 DESIGNED BY _____
 QUANTITIES BY _____
 CHECKED BY _____
 No. _____

E-19

BRIAN T. ITOZAKI
 LICENSED PROFESSIONAL ENGINEER
 No. 9058-E
 HAWAII, U.S.A.
 THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
 SIGNATURE
 EXPIRATION DATE OF THE LICENSE: 04/30/06

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
**TRAFFIC SIGNAL ASSEMBLY SCHEDULE,
 PHASE PLAN & SCHEDULES**
 HALEAKALA HIGHWAY WIDENING, PHASE 2
 HANA HIGHWAY TO PUKALANI BYPASS
 FED. AID PROJ. NO. NH-037-1(24)
 SCALE: AS NOTED DATE: MAY, 2005
 SHEET No. E-19 OF 29 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	279	288



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

- ELECTRICAL NOTES:**
- ① EXISTING WOOD POLE, OVERHEAD LINES, GUY AND ANCHOR TO BE REMOVED BY UTILITY COMPANY (MECO).
 - ② EXISTING WOOD POLE AND OVERHEAD LINES TO BE REMOVED BY UTILITY COMPANY (MECO).

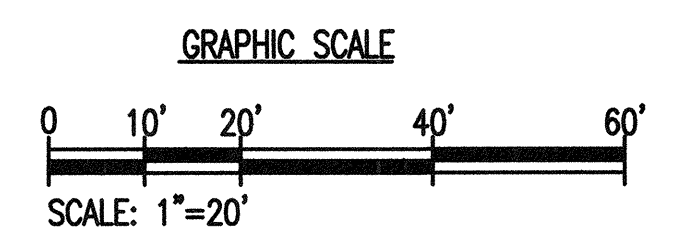
B. ITOZAKI
 LICENSED PROFESSIONAL ENGINEER
 No. 9058-E
 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

EXPIRATION DATE OF THE LICENSE: 04/30/08

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
PLAN - INTERSECTION
(EXISTING/REMOVAL WORK)
HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)
 SCALE: AS NOTED DATE: MAY, 2005
SHEET No. E-20 OF 29 SHEETS

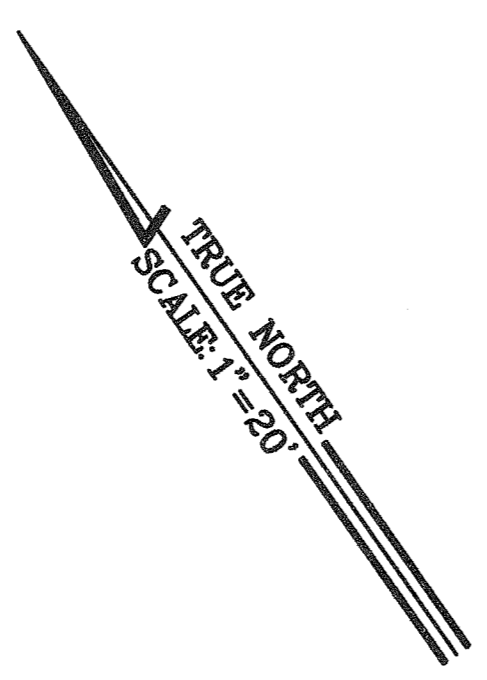
1 PLAN - INTERSECTION (EXISTING/REMOVAL WORK)
 E-20 SCALE: 1" = 20'
 (INTERSECTION OF HALEAKALA HWY. & N. HALIMAILE ROAD)



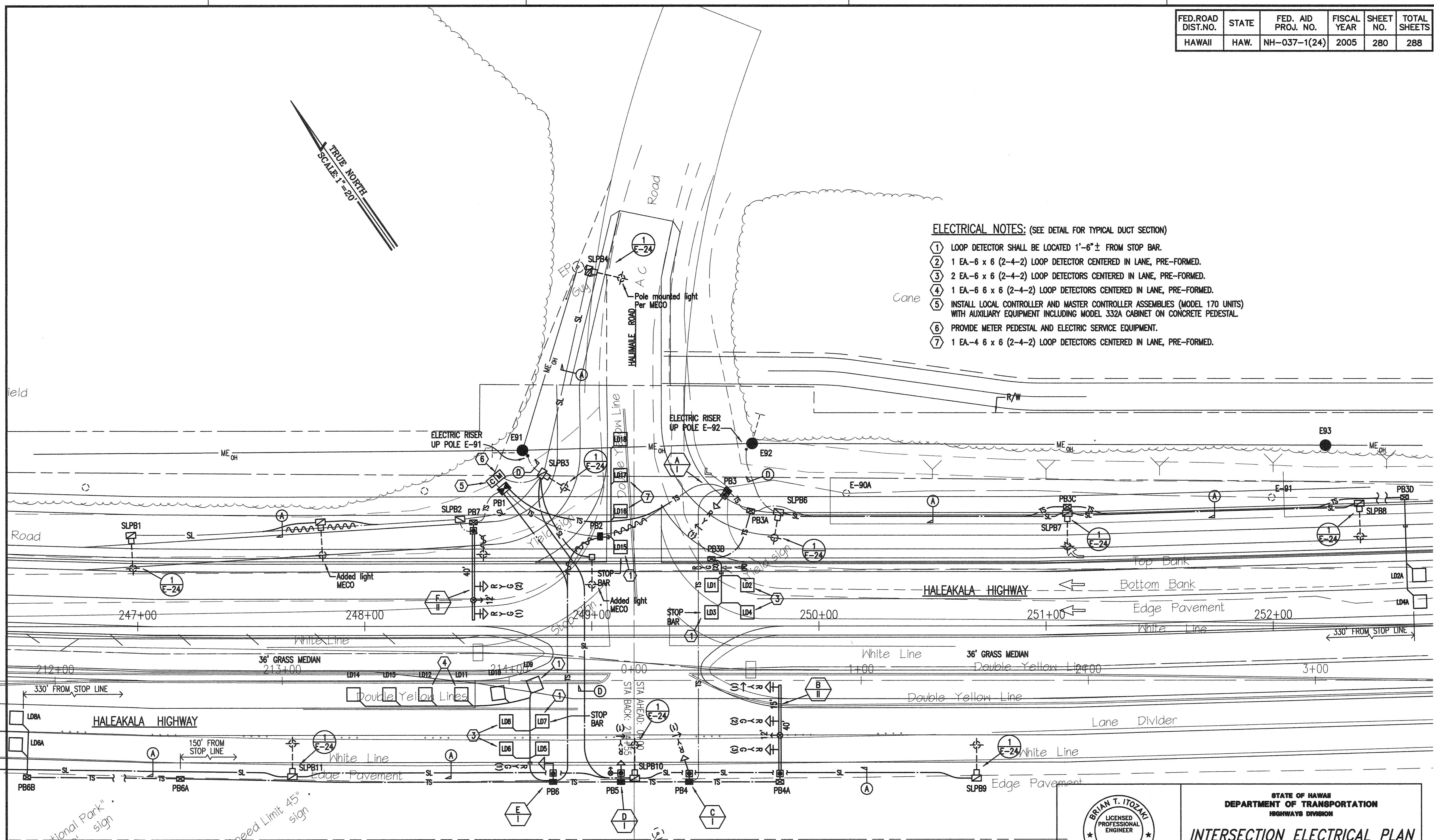
E-20

Reserved 10/21/03, EN

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	280	288



- ELECTRICAL NOTES:** (SEE DETAIL FOR TYPICAL DUCT SECTION)
- ① LOOP DETECTOR SHALL BE LOCATED 1'-6" ± FROM STOP BAR.
 - ② 1 EA.-6 x 6 (2-4-2) LOOP DETECTOR CENTERED IN LANE, PRE-FORMED.
 - ③ 2 EA.-6 x 6 (2-4-2) LOOP DETECTORS CENTERED IN LANE, PRE-FORMED.
 - ④ 1 EA.-6 x 6 (2-4-2) LOOP DETECTORS CENTERED IN LANE, PRE-FORMED.
 - ⑤ INSTALL LOCAL CONTROLLER AND MASTER CONTROLLER ASSEMBLIES (MODEL 170 UNITS) WITH AUXILIARY EQUIPMENT INCLUDING MODEL 332A CABINET ON CONCRETE PEDESTAL.
 - ⑥ PROVIDE METER PEDESTAL AND ELECTRIC SERVICE EQUIPMENT.
 - ⑦ 1 EA.-4 x 6 x 6 (2-4-2) LOOP DETECTORS CENTERED IN LANE, PRE-FORMED.



DATE
DESIGNED BY
QUANTITIES BY
CHECKED BY
ORIGINAL PLAN
NOTE BOOK

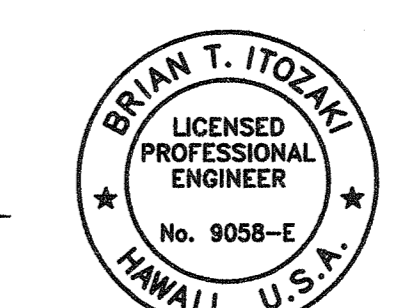
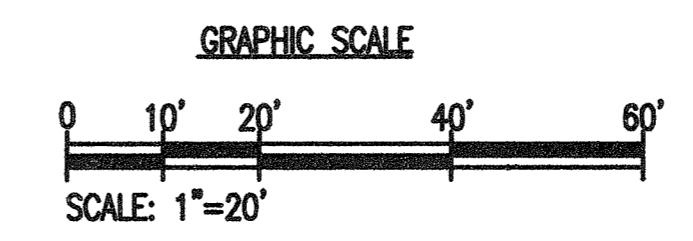
"National Park" sign
w=3.0'

"Speed Limit 45" sign

LEGEND FOR AS-BUILT POSTINGS

	Squiggly line for as-built deletion
	Double line for as-built deletion
	Text for as-built posting

① INTERSECTION ELECTRICAL PLAN
SCALE: 1" = 20'
(HALEAKALA HWY. & HALIMAILE ROAD)



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
SIGNATURE
EXPIRATION DATE OF THE LICENSE: 04/30/08

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

INTERSECTION ELECTRICAL PLAN

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

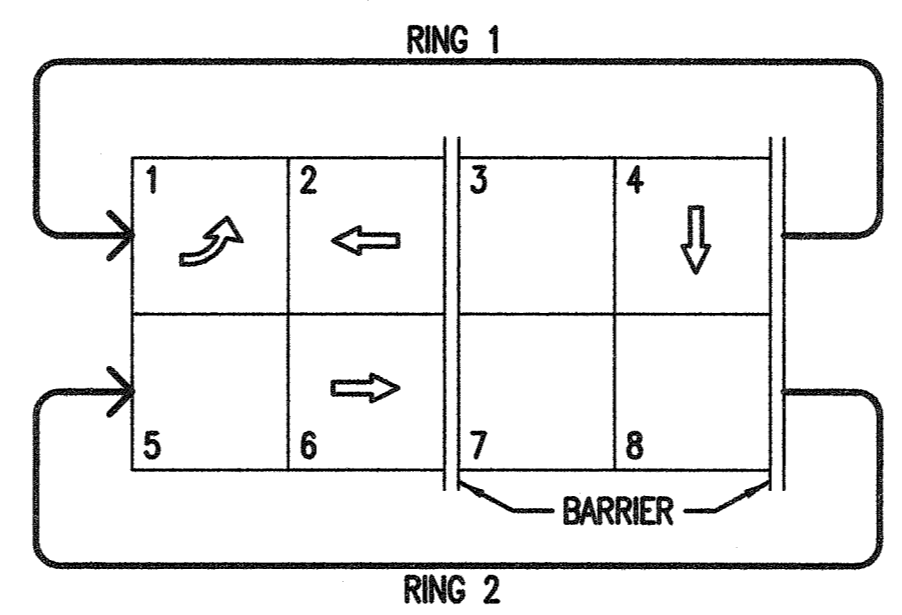
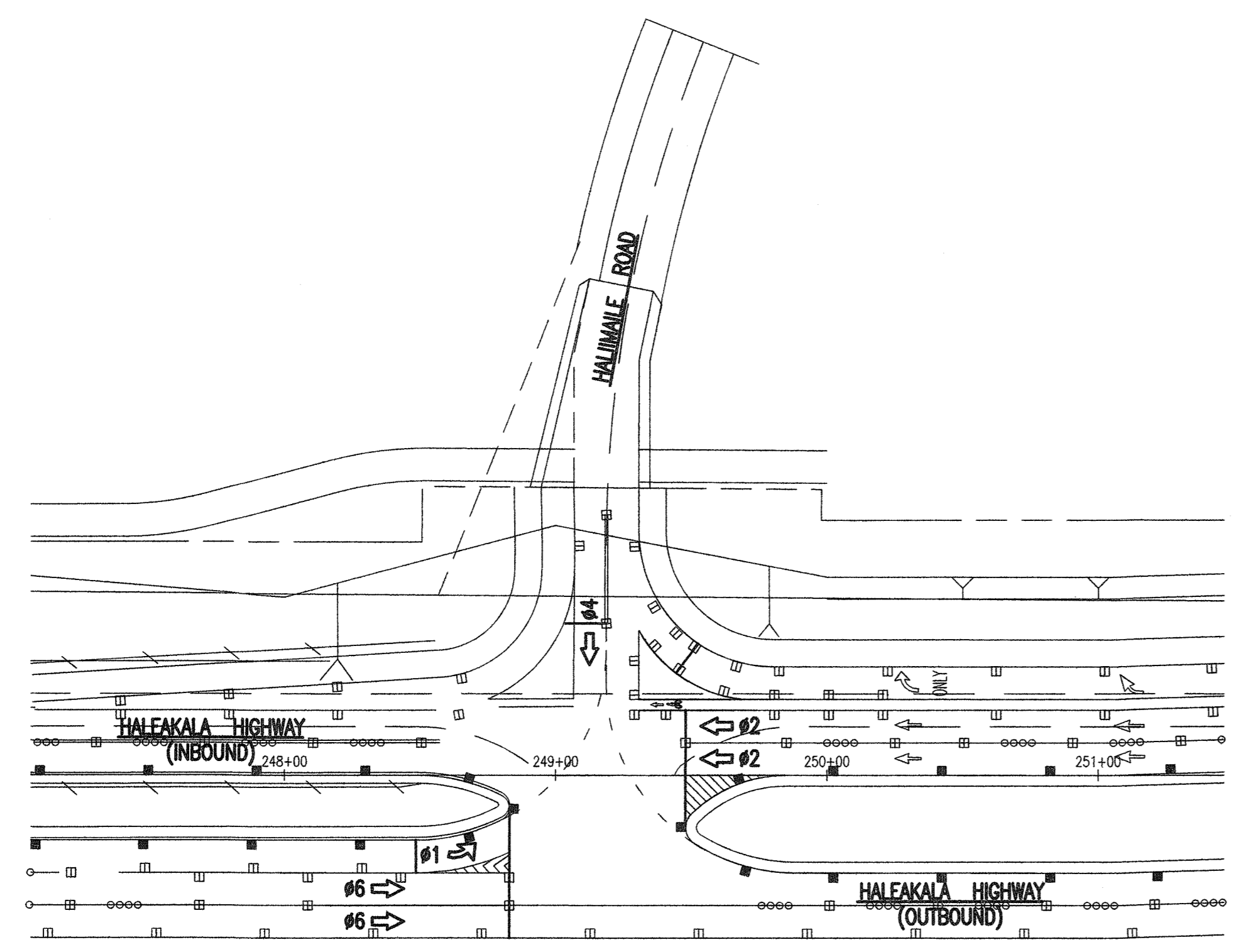
SCALE: AS NOTED DATE: MAY, 2005

SHEET No. E-21 OF 29 SHEETS

E-21

245.036

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	281	288



PHASE ASSIGNMENT DIAGRAM

1 PLAN - PHASE ASSIGNMENTS
E-22

NOTES:
R = RED
Y = YELLOW
G = GREEN
← = ARROW

A-1/1
TYPE OF MOUNTING
SIGNAL ASSEMBLY DESIGNATION
STANDARD DESIGNATION

		SIGNAL HEAD TYPE
12" RYG TRAFFIC SIGNAL HEAD (L.E.D. SIGNAL ASSEMBLY)	12" RYG TRAFFIC SIGNAL HEAD (L.E.D. SIGNAL ASSEMBLY)	DESCRIPTION
A-2- V B-2- VII (a) E-1- V F-1- VII (a) F-2- VII (a)	A-1- V B-1- VII (a)(b) C-1- V D-1- V	POLE LETTER - SIGNAL HEAD NUMBER - MOUNTING TYPE

(a) PROVIDE BACK PLATE FOR SIGNAL HEAD.
(b) PROGRAM VISIBILITY SIGNAL HEAD.

NOTE: PROVIDE ADHESIVE TYPE II OBJECT MARKERS ON STANDARDS A, B, C, D, E & F. INSTALL TWO (2) MARKERS PER STANDARD.

2 TRAFFIC SIGNAL ASSEMBLY SCHEDULE
E-22

LOOP DETECTOR SCHEDULE

LD-#	AMPLIFIER	CHANNEL	PHASE-NOTES
1 & 2	A	1	#2 & #6
3 & 4	A	2	#2 & #6
5 & 6	B	1	#2 & #1 (INTERNALLY SWITCHED)
7 & 8	B	2	#2 & #1 (INTERNALLY SWITCHED)
9 & 10	C	1	#1 QUEUE, W/ EXTERNALLY PROGRAMMABLE DELAY & EXHIBIT (INTERNALLY SWITCHED)
11, 12, 13, 14,	C	2	PROGRAMMABLE EXTEND
15, 16, 17, 18	D	1	#4 QUEUE, W/ EXTERNALLY PROGRAMMABLE DELAY & EXHIBIT (INTERNALLY SWITCHED)
2A & 4A	A	3	PROGRAMMABLE EXTEND
6A & 8A	B	3	PROGRAMMABLE EXTEND

CONDUIT/CABLE SCHEDULE

FROM	TO	MAIN CONTROL		SIGNAL CONTROL		DETECTORS (VEH)		OPTICOM		SPARE	REMARKS
		CONDUIT 2"	CABLE 26/C #14	CONDUIT 2"	CABLE 4/C #14	CONDUIT 2"	CABLE 2/C #16	CONDUIT 2"	CABLE 3/C #20		
SLPB3	METER	--	--	--	--	--	--	--	--	--	CE (2"C, 2-#6 & 1-# 8)
METER	CONTROLLER	--	--	--	--	--	--	--	--	--	CE (2"C, 2-#6 & 1-# 8)
CONTROLLER	PB1	2	2	--	--	1	10	1	3	1	CE
PB1	PB# 3	2	2	--	--	1	5	1	1	1	CE
PB2	PB# 1	*	*	--	--	1	*1	*	*	*	CE
PB3	A	--	--	1	1	--	--	--	--	--	CE
PB3	PB3A	--	--	--	--	1	4	--	--	--	CE
PB3A	PB3B	--	--	--	--	1	2	--	--	--	CE
PB3A	PB3C	--	--	--	--	1	2	--	--	--	CE
PB3C	PB3D	--	--	--	--	1	2	--	--	--	CE
PB3	PB4	1	1	--	--	--	--	1	1	1	CE
PB4	C	--	--	1	1	--	--	--	--	--	CE
PB4	PB4A	1	1	--	--	--	--	1	1	--	CE
PB4A	B	--	--	1	3	--	--	1	1	--	CE
PB4	PB5	--	--	--	--	--	--	--	--	1	CE
PB5	PB6	1	1	--	--	--	--	1	1	1	CE
PB5	D	--	--	1	1	--	--	--	1	--	CE
PB6	E	--	--	1	1	--	--	--	--	--	CE
PB6	PB6A	--	--	--	--	1	2	--	--	--	CE
PB6A	PB6B	--	--	--	--	1	2	--	--	--	CE
PB# 1	PB6	1	1	--	--	1	6	1	1	1	CE
PB1	PB7	1	1	--	--	--	--	1	1	--	CE
PB7	F	--	--	1	2	--	--	--	1	--	CE

LEGEND FOR AS-BUILT POSTINGS

	Squiggly line for as-built deletion
	Double line for as-built deletion
Roadway	Text for as-built posting

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**TRAFFIC SIGNAL ASSEMBLY SCHEDULE,
PHASE PLAN & SCHEDULES**

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY, 2005

SHEET No. E-22 OF 29 SHEETS

BRIAN T. ITOZAKI
LICENSED PROFESSIONAL ENGINEER
No. 9058-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

EXPIRATION DATE OF THE LICENSE: 04/30/06

E-22

AS-BUILT

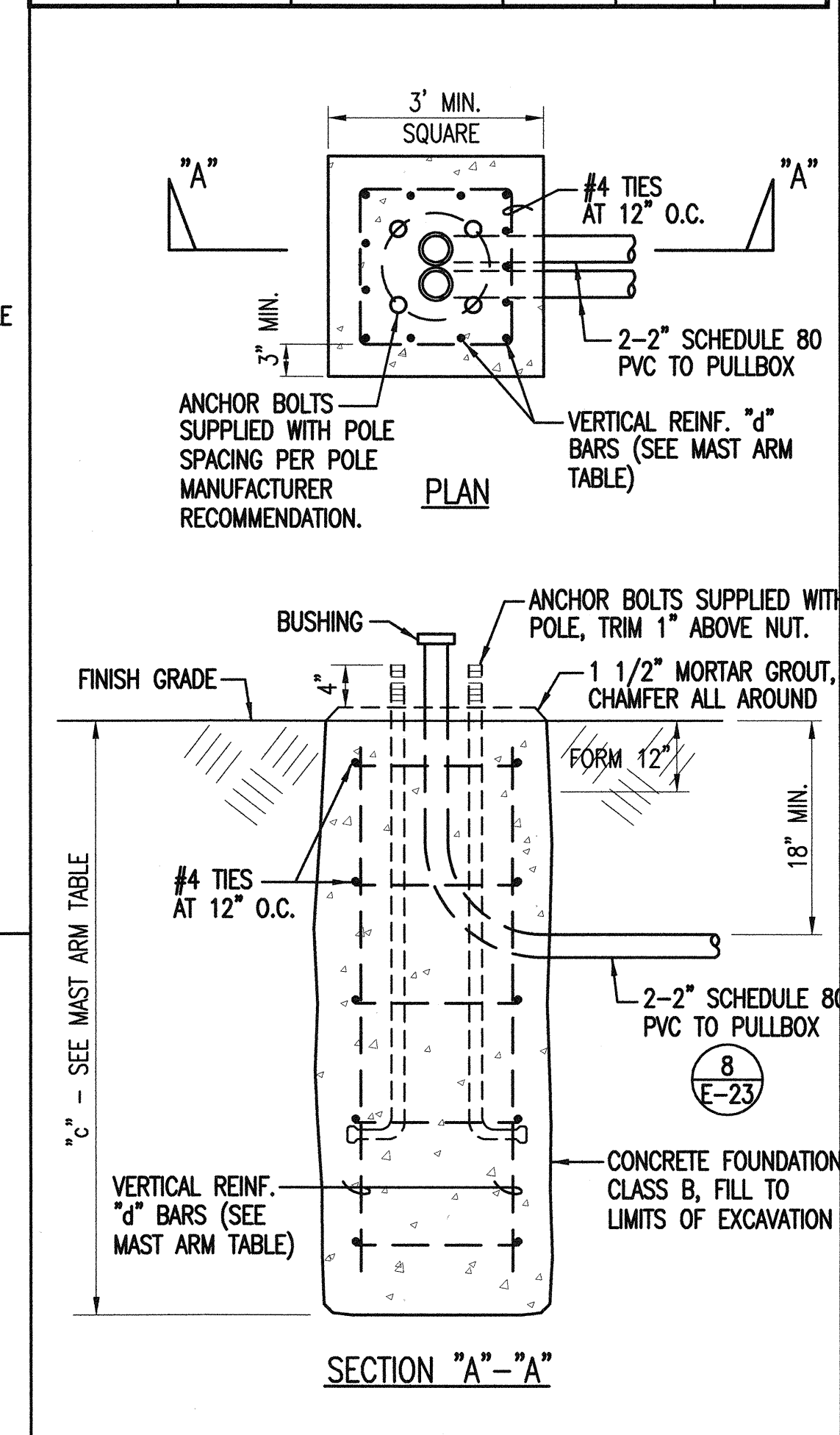
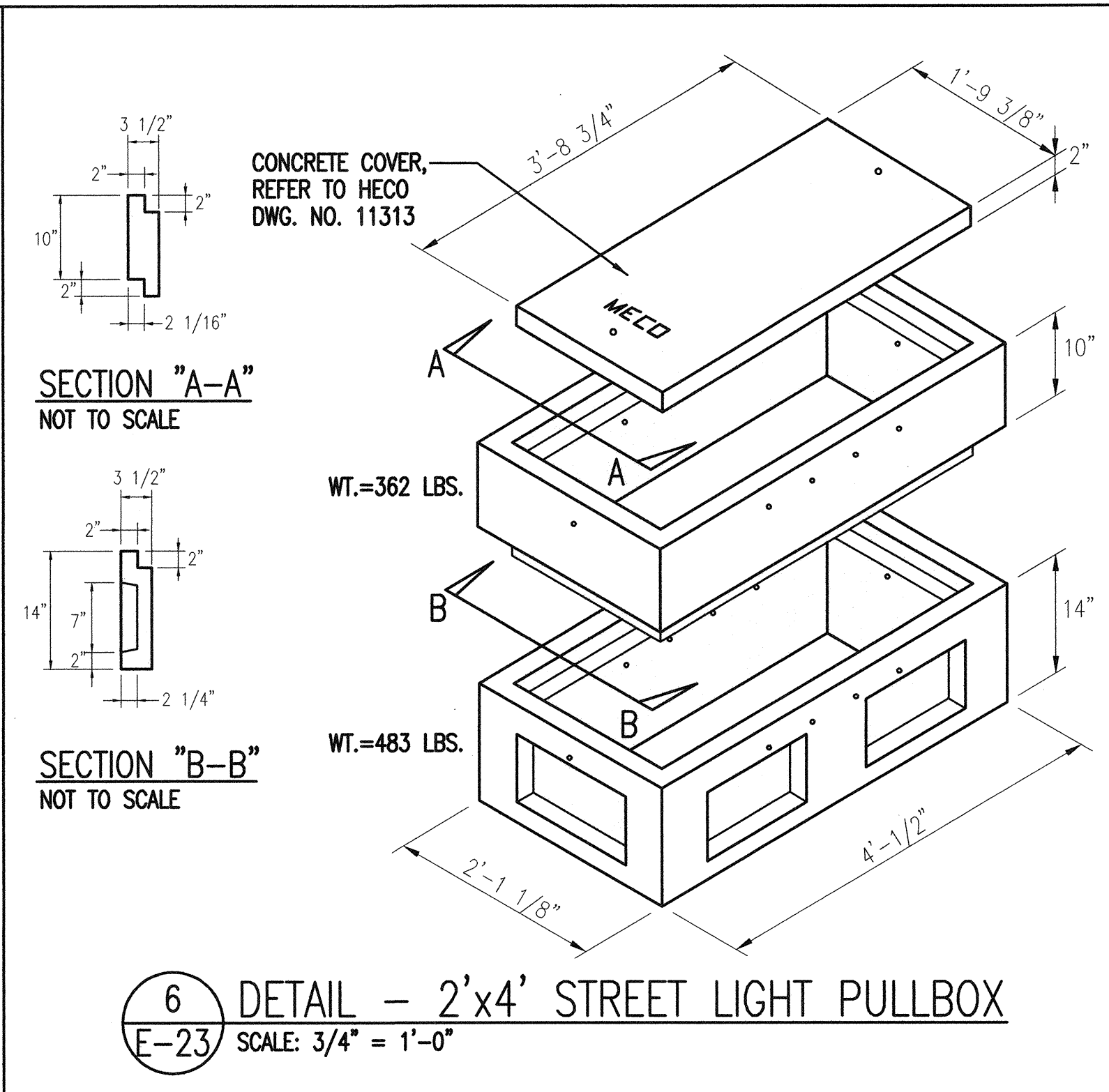
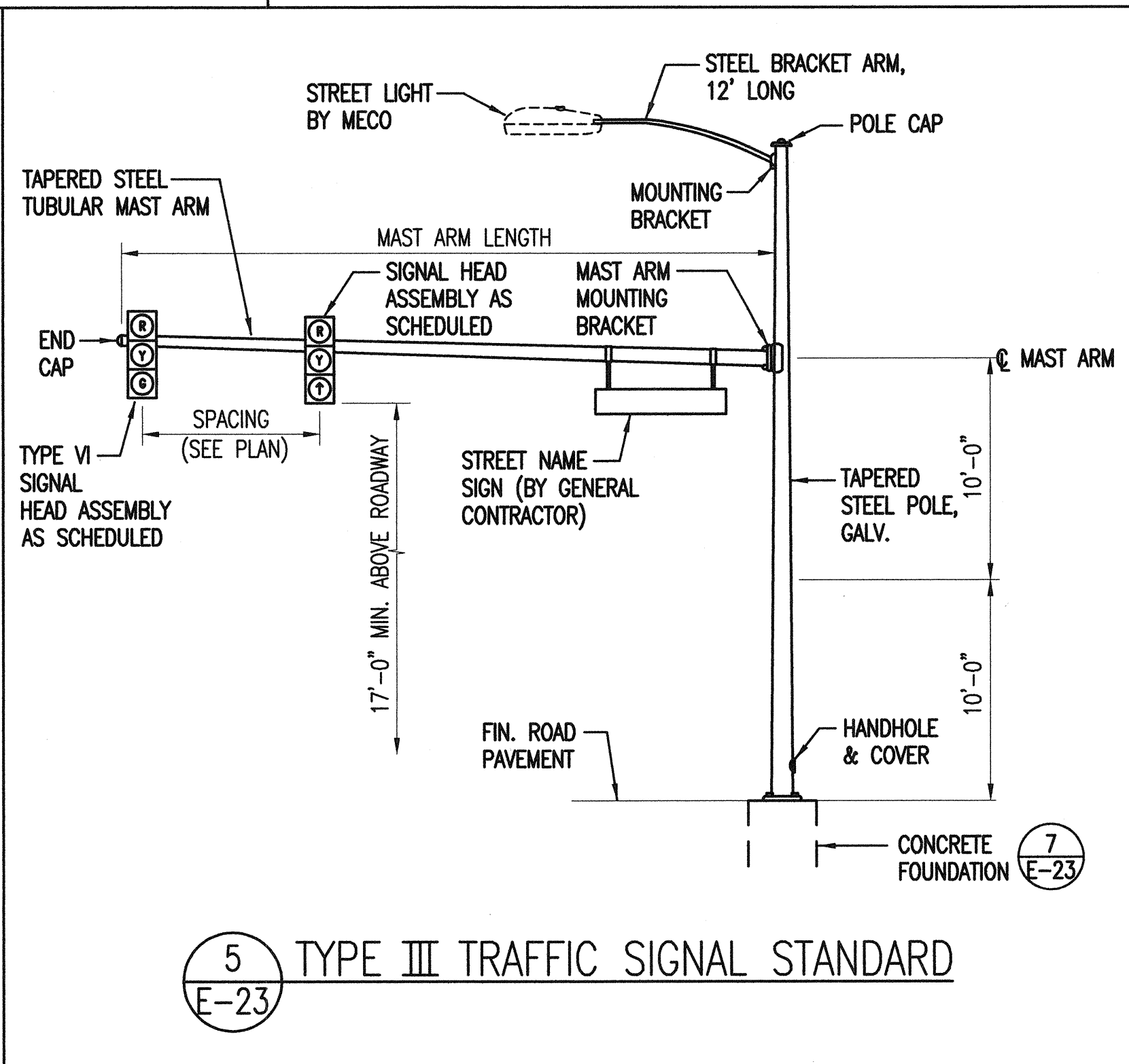
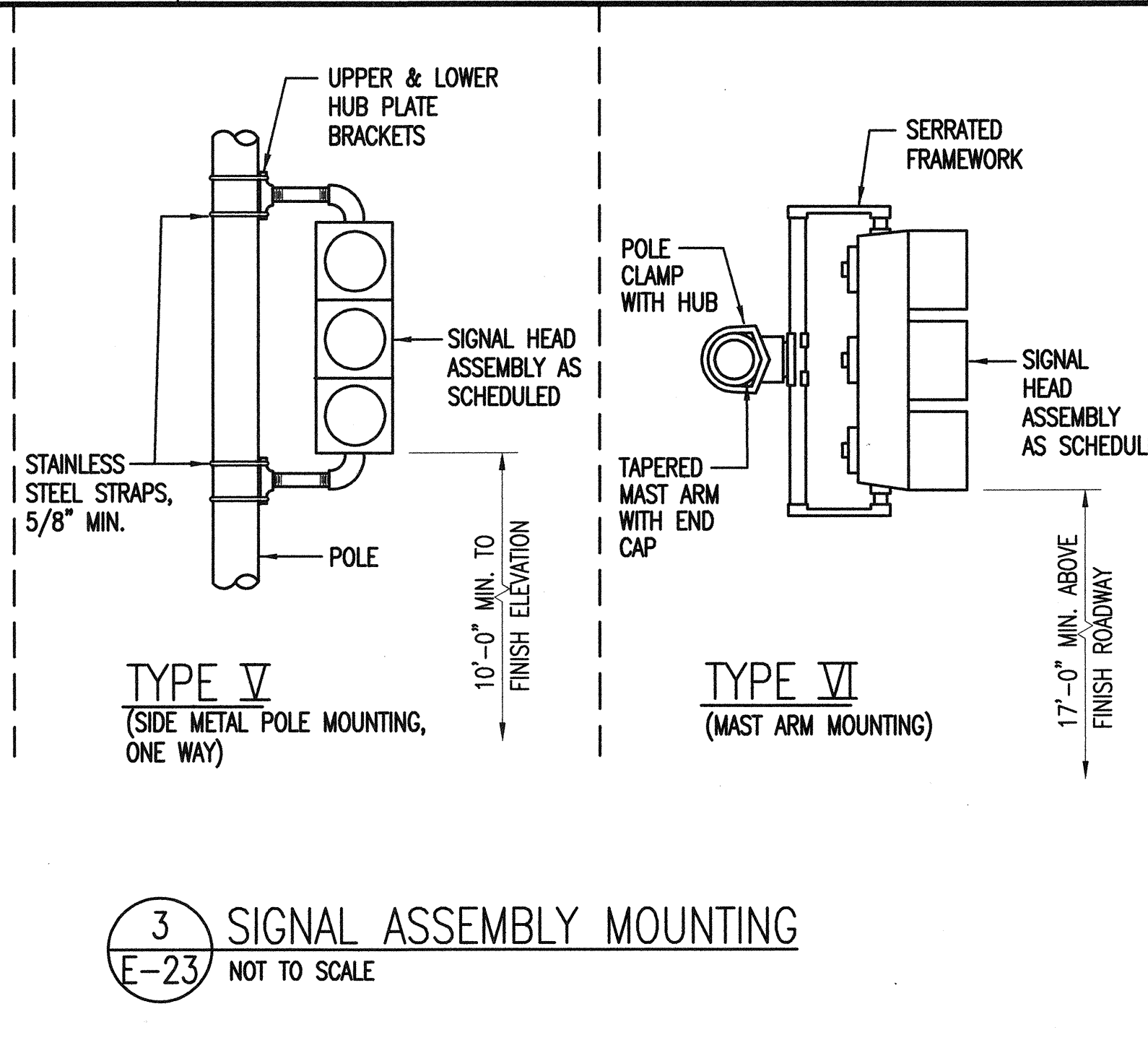
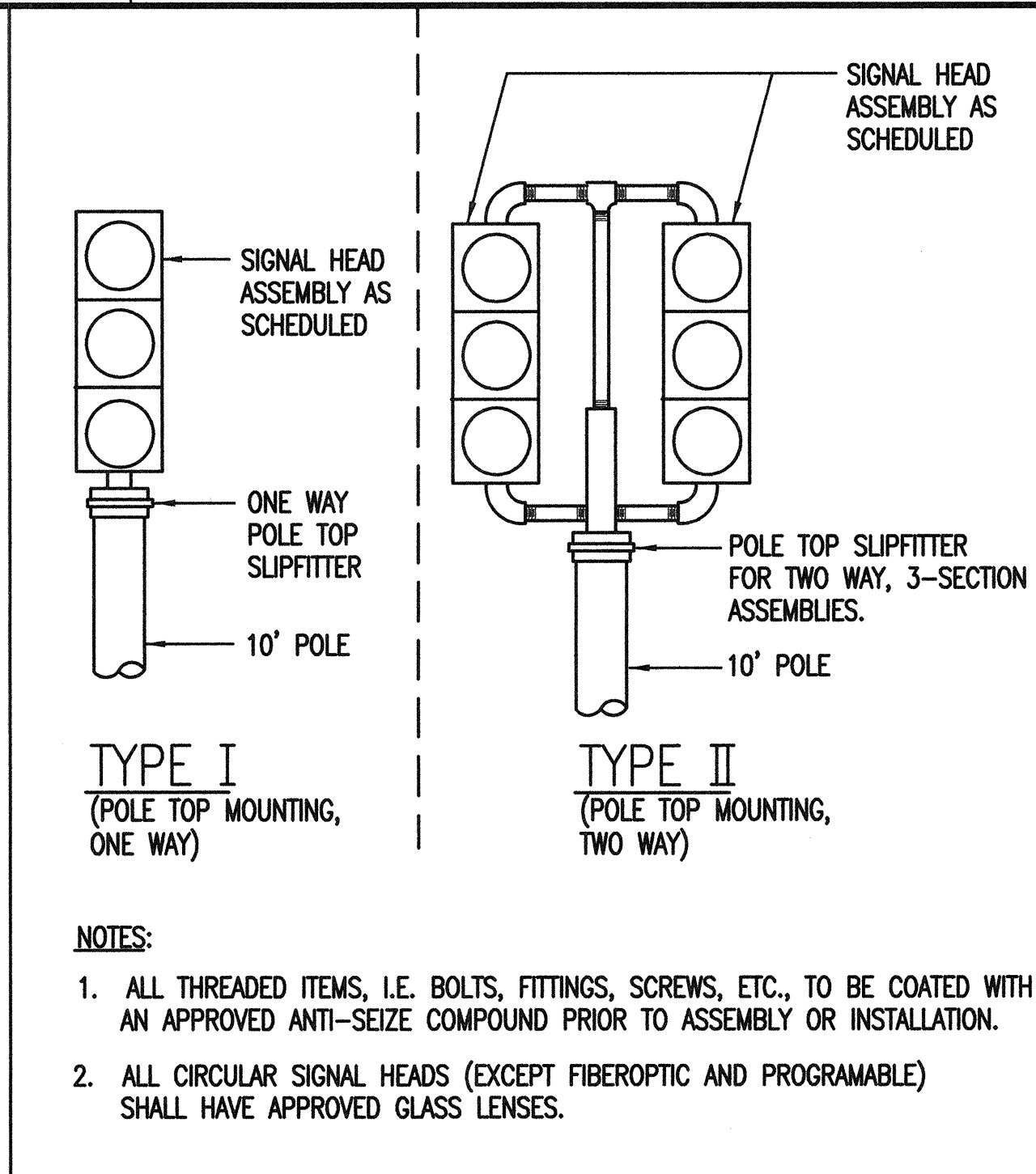
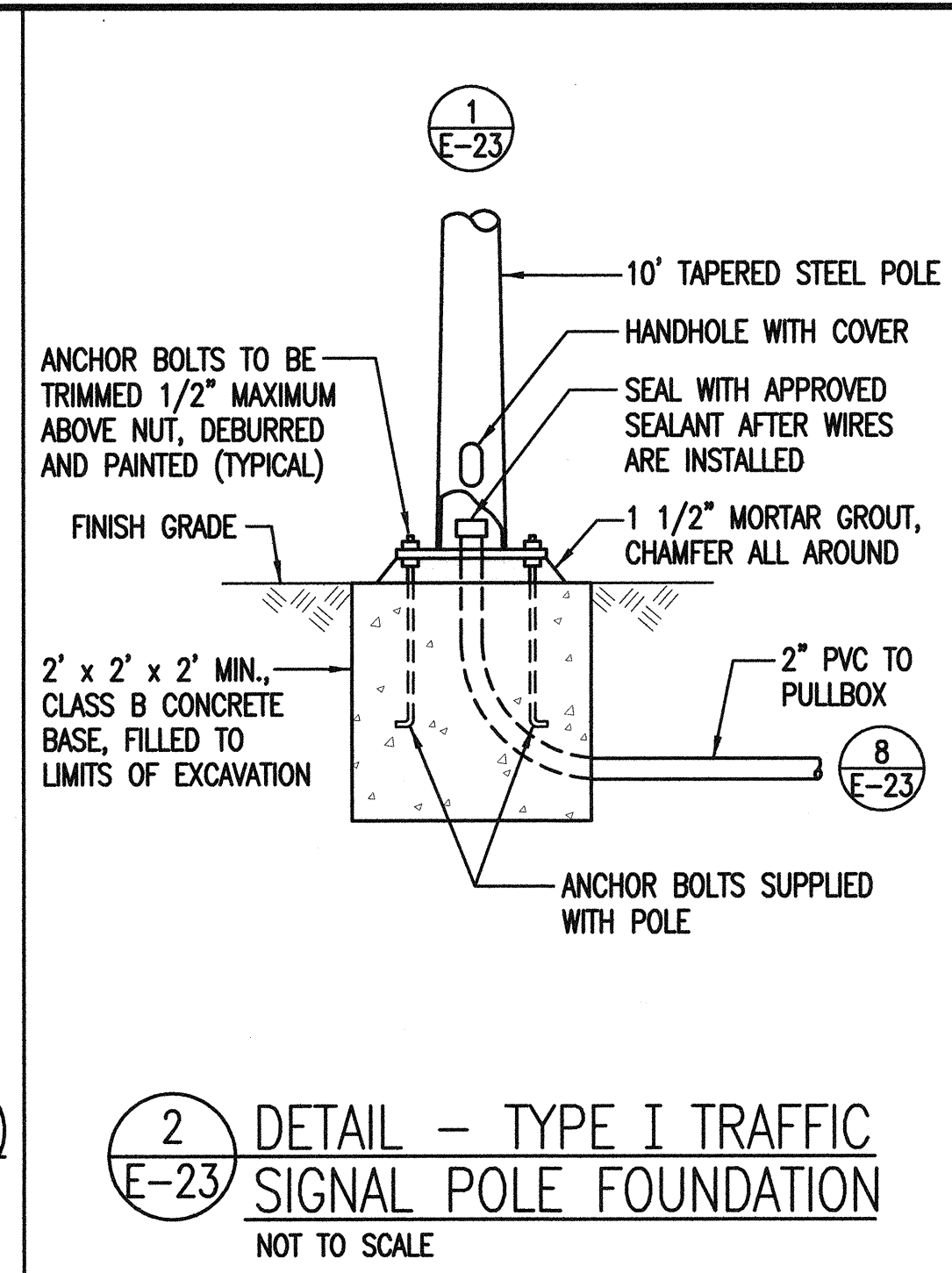
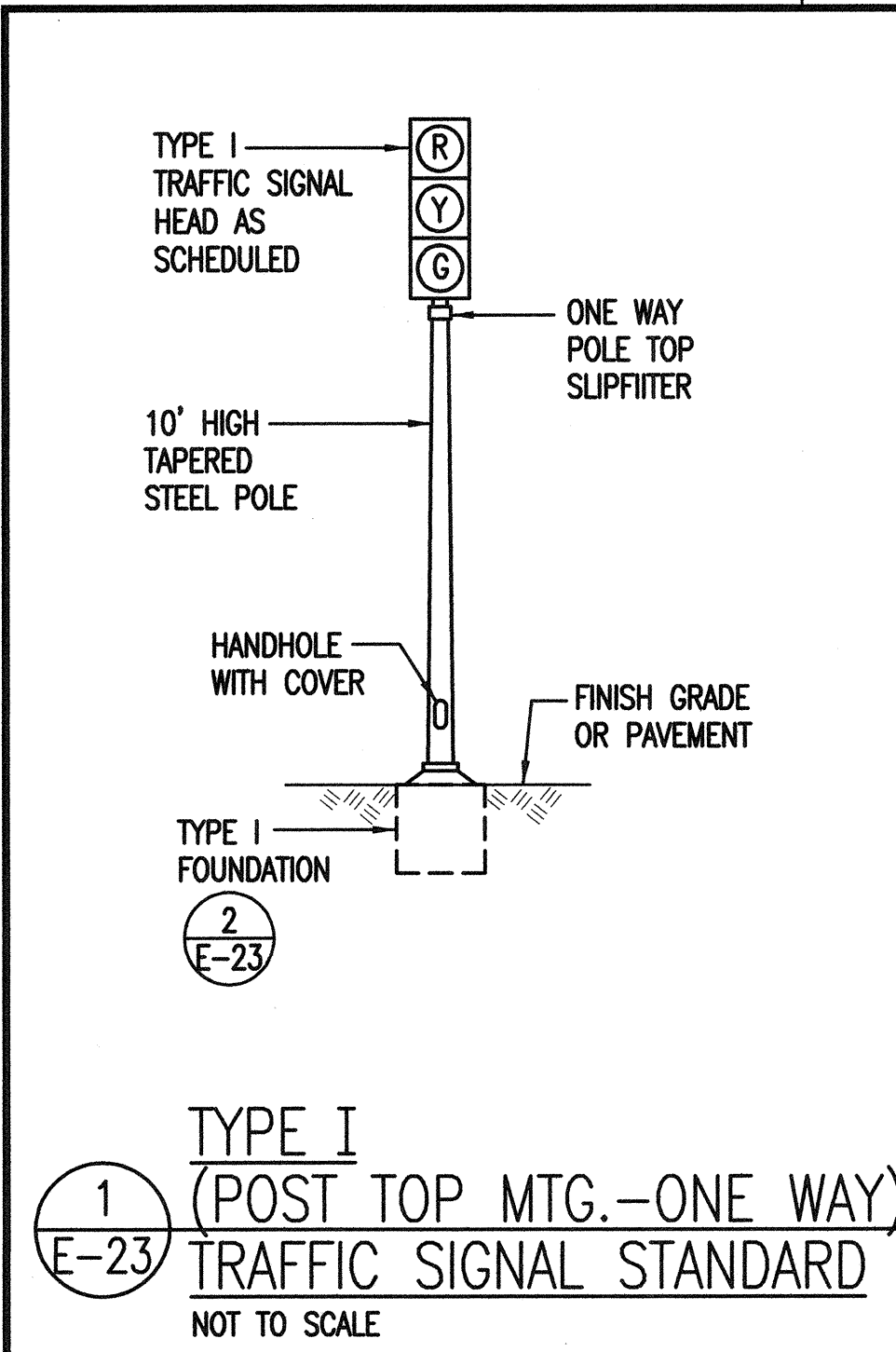
281

ORIGINAL PLAN
NOTE BOOK
No. _____

SURVEY PLOTTED BY _____ DATE _____
DRAWN BY _____
DESIGNED BY _____
QUANTITIES BY _____
CHECKED BY _____

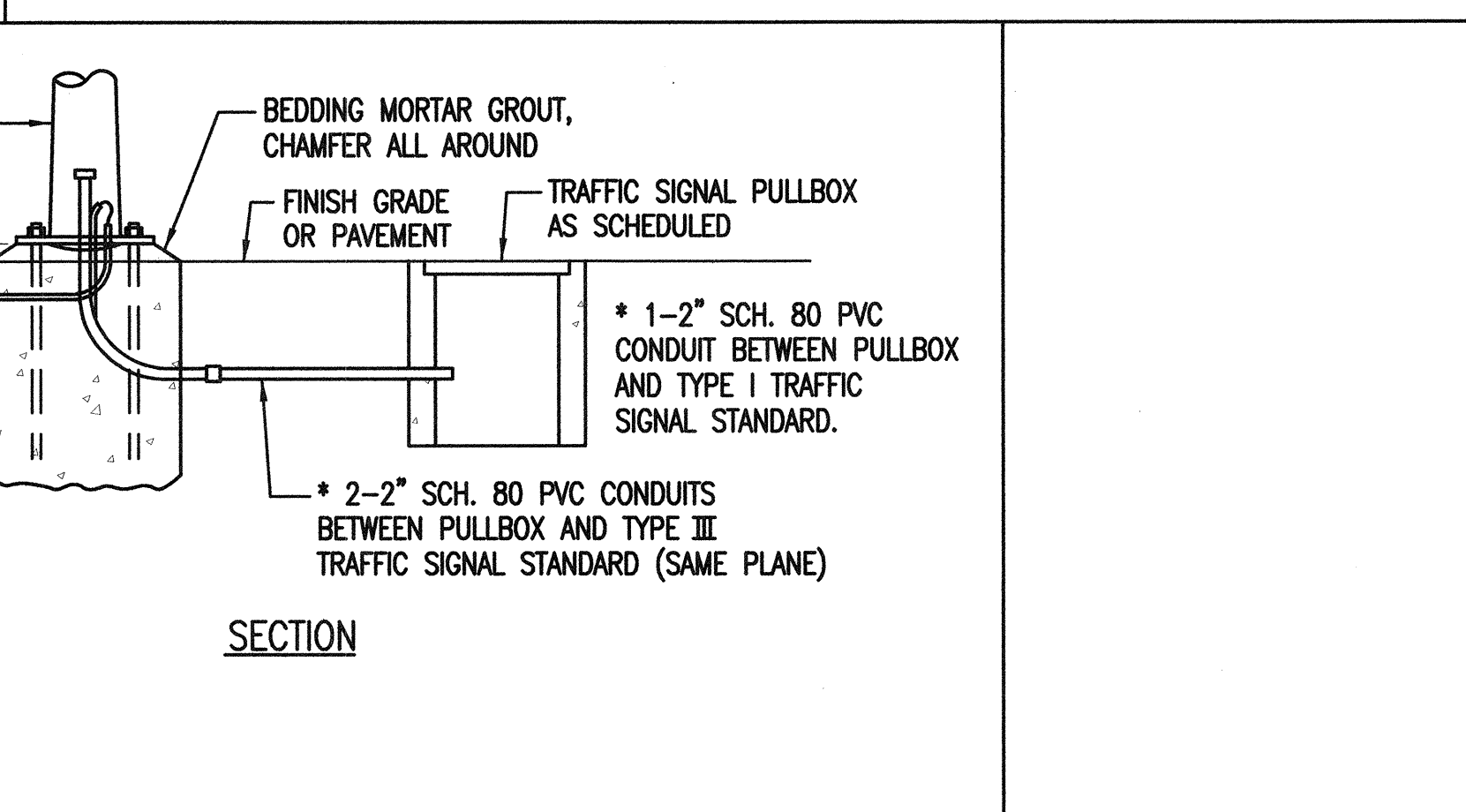
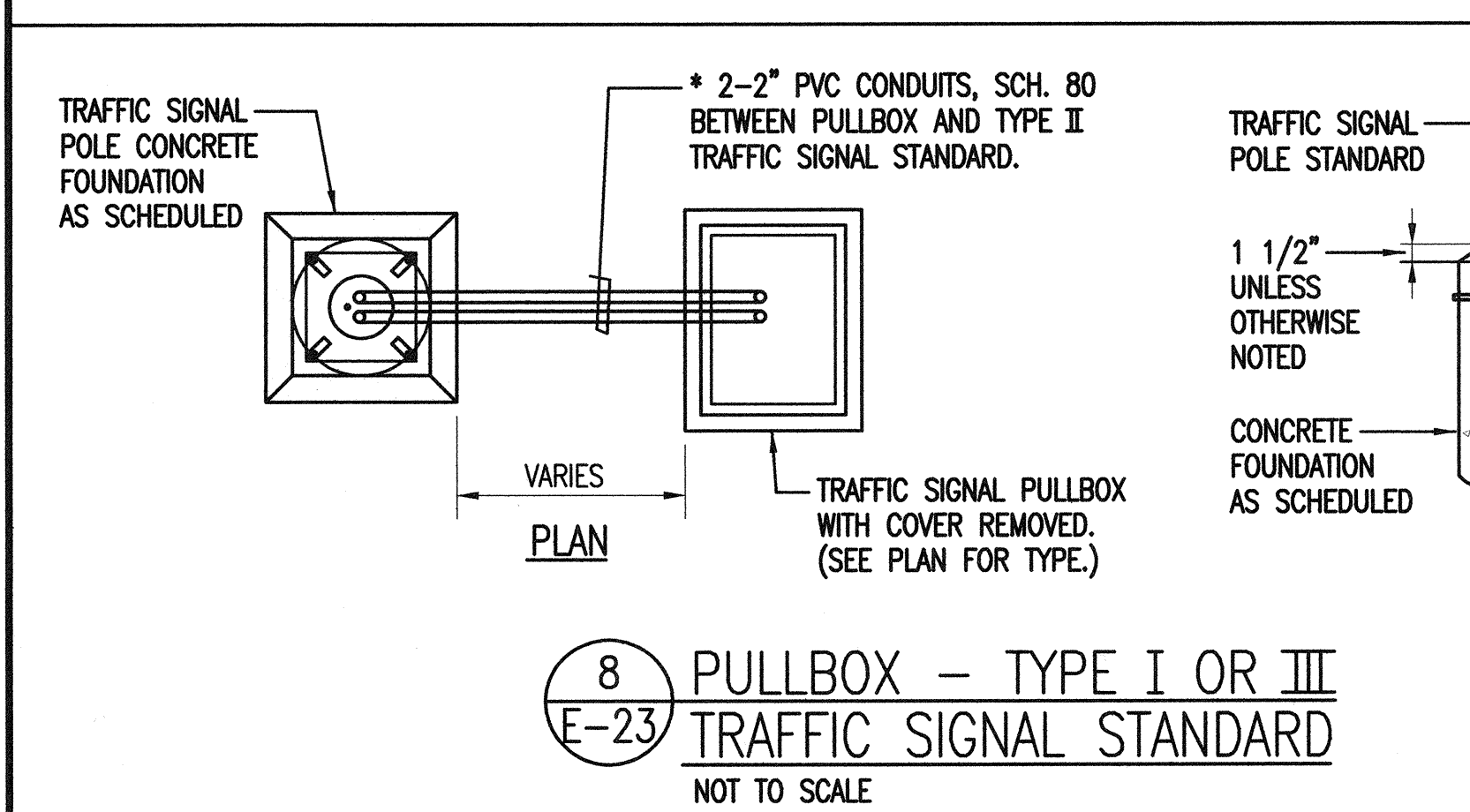
245.036

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	282	288



MAST ARM TABLE

MAST ARM LENGTH	"C"	"d" BARS
30'	6'-6"	12-#6
35'	6'-6"	12-#6
40'	6'-6"	12-#6



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

BRIAN T. ITOZAKI
 LICENSED PROFESSIONAL ENGINEER
 No. 9058-E
 HAWAII, U.S.A.
 THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
 SIGNATURE
 EXPIRATION DATE OF THE LICENSE: 04/30/06

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
NEW TRAFFIC SIGNAL STD. DETAILS (HALIIMAIL ROAD)
 HALEAKALA HIGHWAY WIDENING, PHASE 2
 HANA HIGHWAY TO PUKALANI BYPASS
 FED. AID PROJ. NO. NH-037-1(24)
 SCALE: AS NOTED DATE: MAY, 2005
 SHEET No. E-23 OF 29 SHEETS

E-23

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	283	288

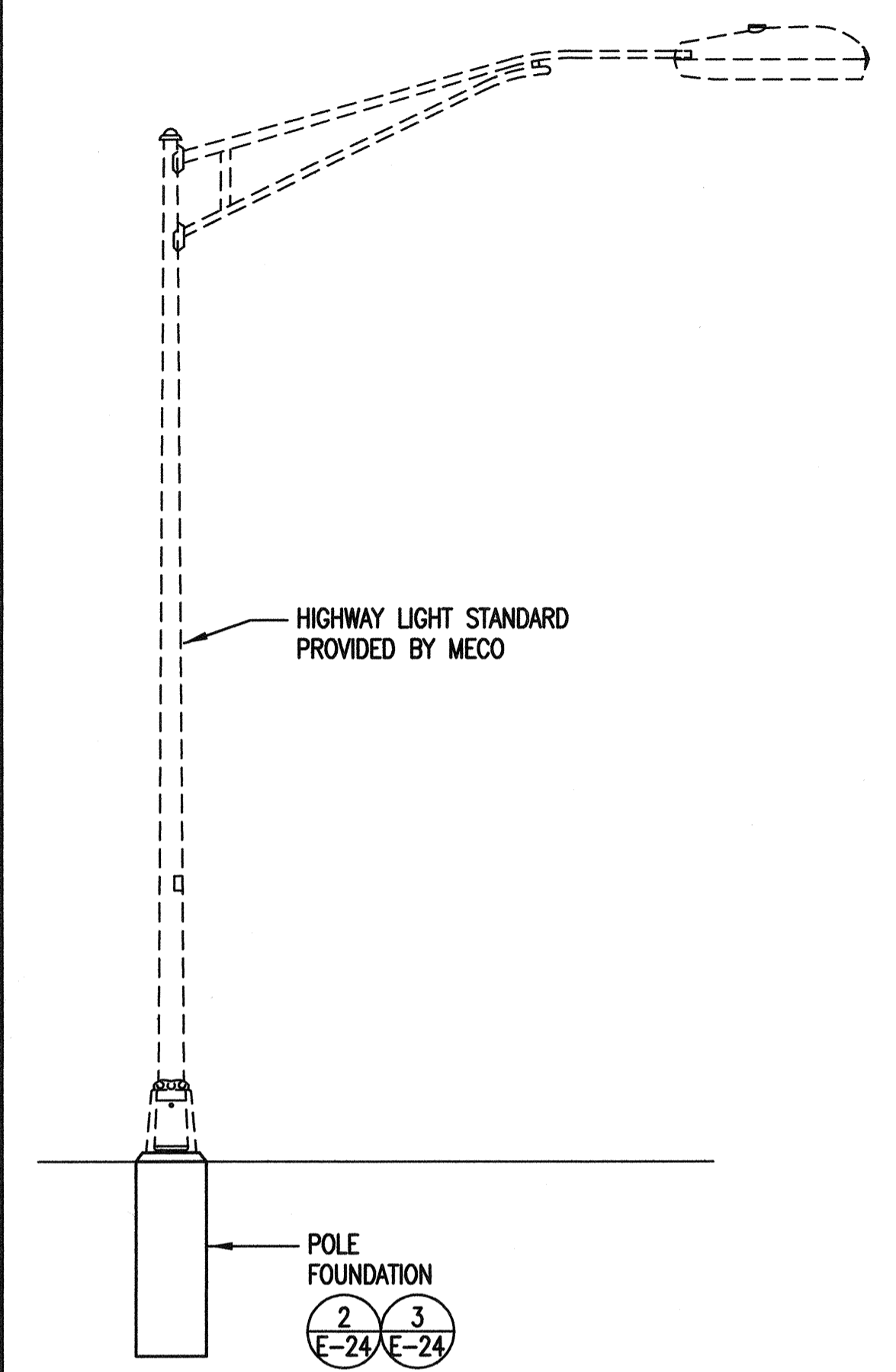
NOTES:

- ALL CONDUIT SHALL BE "PVC" SCHEDULE 80 FOR DIRECT BURIED AND SCHEDULE 40 WITH CONCRETE ENCASEMENT, UNLESS OTHERWISE NOTED.
- BACKFILL OVER CONCRETE DUCT SECTIONS SHALL BE TYPE "A".
- BACKFILL OVER DIRECT BURIED SECTIONS SHALL BE TYPE "B".
- IF THE NORMAL MATERIAL IN THE BOTTOM OF A TRENCH CONTAINING A DIRECT BURRIAL CONDUIT IS NOT TYPE "B" AN ADDITIONAL 3" SHALL BE EXCAVATED AND TYPE "B" BACKFILL PROVIDED.
- CONCRETE FOR DUCTS SHALL BE 3500 P.S.I. IN 28 DAYS.
- 8 MIL THICK RED COLORED PLASTIC WARNING TAPE 3" WIDE, ENTIRE LENGTH OF DUCT. TAPE TO HAVE CONTINUOUS METALLIC BACKING AND CORROSION RESISTANT FOIL CORE. WARNING AND IDENTIFICATION TO BE IMPRINTED ON TAPE AND SHALL READ "CAUTION BURIED ELECTRIC CABLE BELOW". MESSAGE SHALL BE REPEATED APPROXIMATELY EVERY TEN FEET.

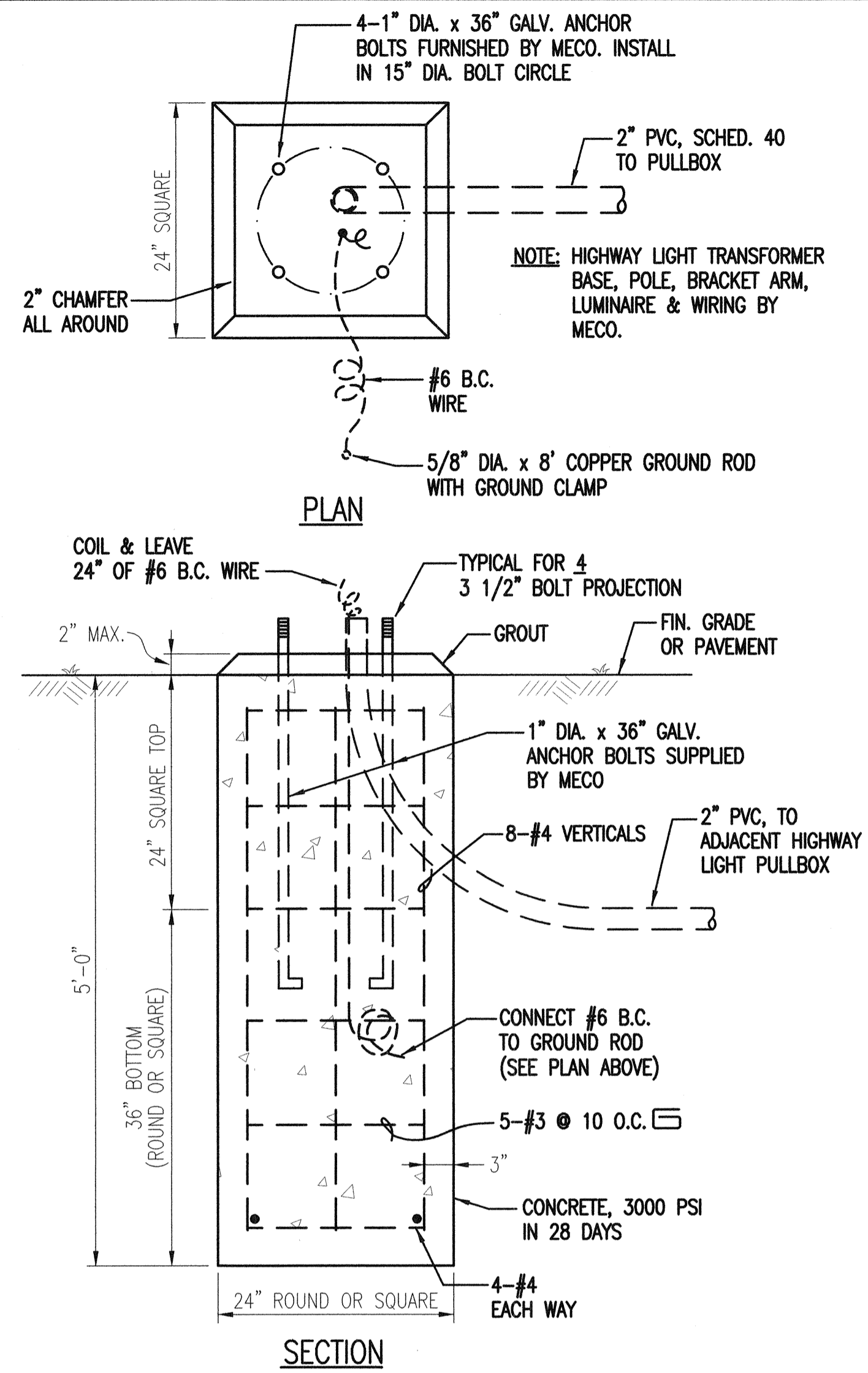
BACKFILL TYPES ARE:

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.

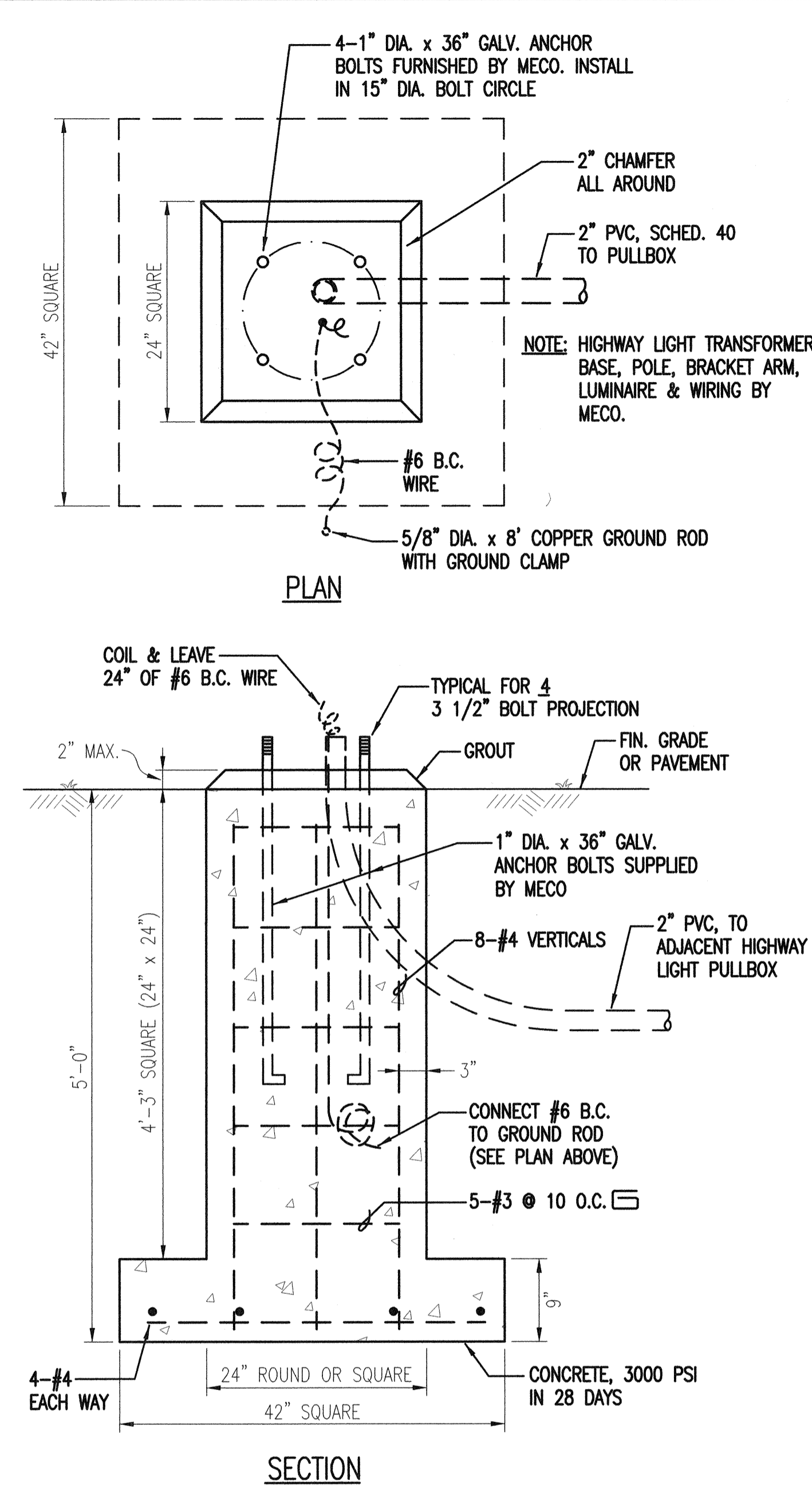
TYPE "B": BEACH SAND, EARTH OR EARTH AND GRAVEL IF EARTH AND GRAVEL USED, MIXTURE MUST PASS A 1/2" MESH SCREEN AND CONTAIN NOT MORE THAN 20% BY VOLUME OF ROCK PARTICLES.



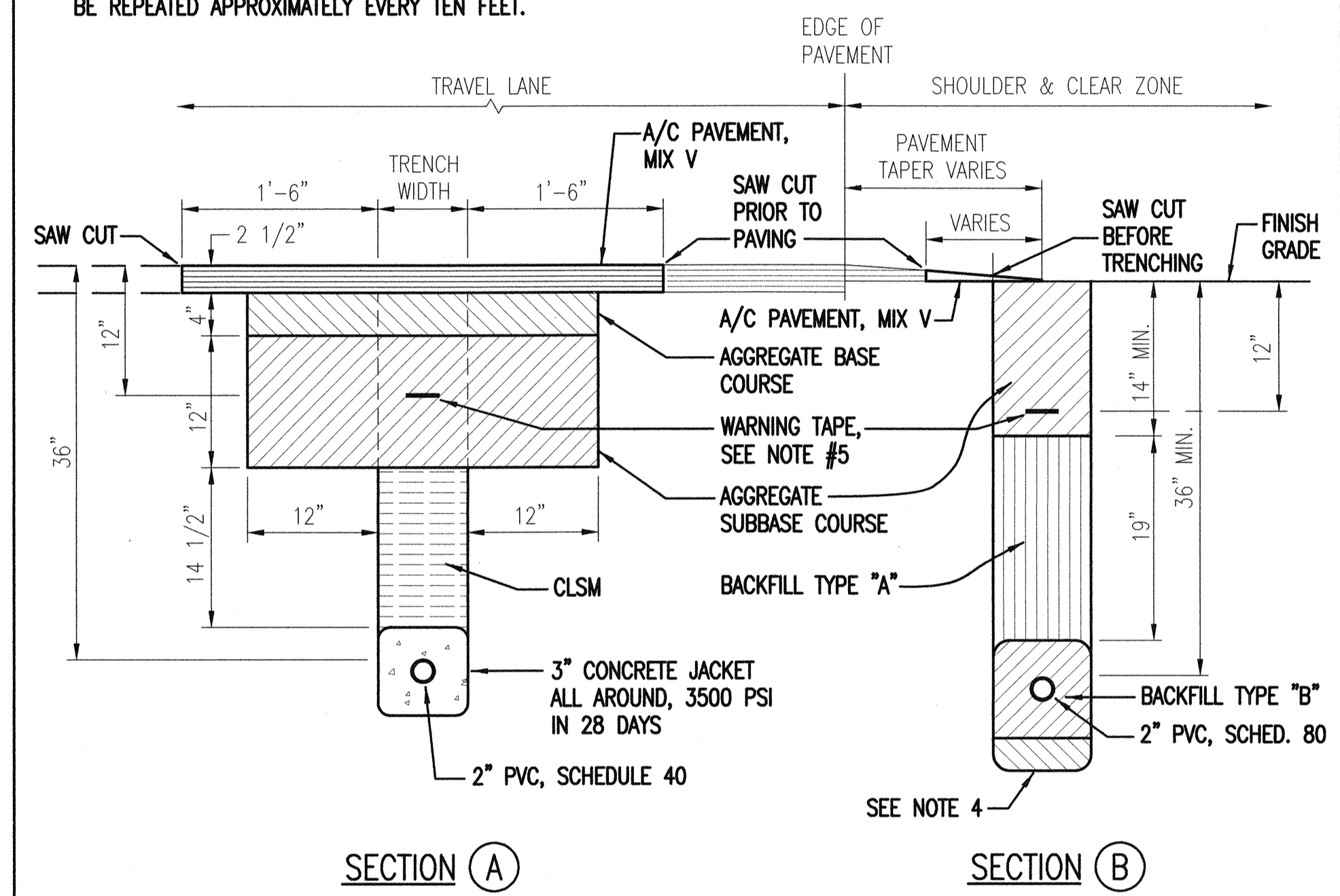
1 TYPICAL HIGHWAY LIGHT STANDARD
E-24 NOT TO SCALE



2 DETAIL - POURED IN PLACE CONCRETE FOUNDATION FOR MECO HIGHWAY LIGHT STANDARD
E-24

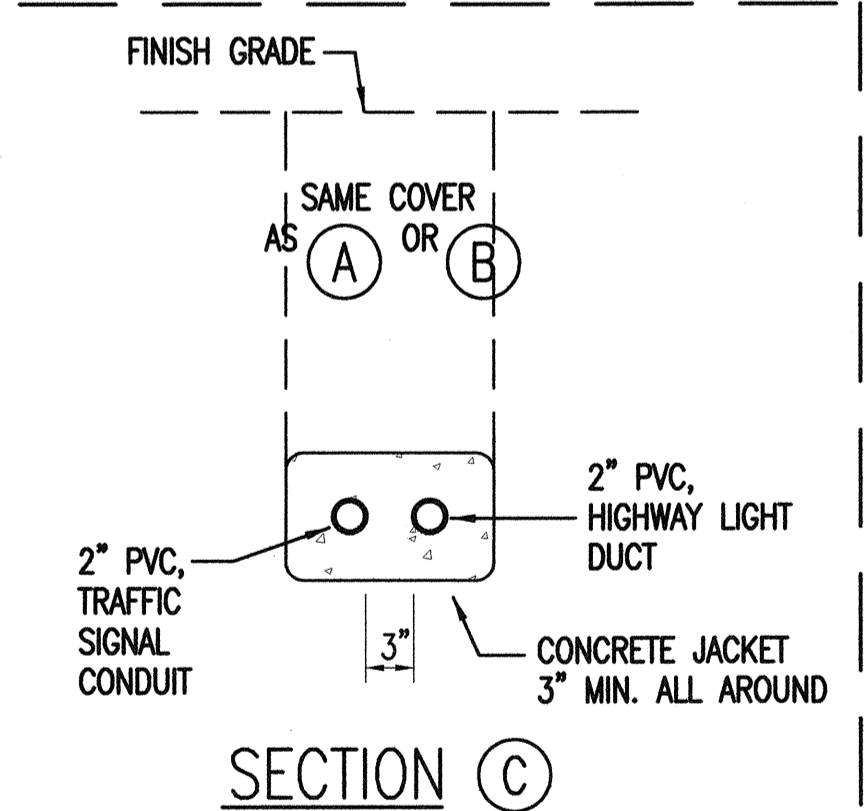


3 DETAIL - PRECAST CONCRETE FOUNDATION FOR MECO HIGHWAY LIGHT STANDARD (OPTIONAL)
E-24



SECTION (A)

SECTION (B)



SECTION (C)

4 TYPICAL DUCT SECTIONS
E-24

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

E-24

BRIAN T. ITOZAKI
LICENSED PROFESSIONAL ENGINEER
No. 9058-E
HAWAII, U.S.A.

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EXPIRATION DATE OF THE LICENSE: 04/30/06

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

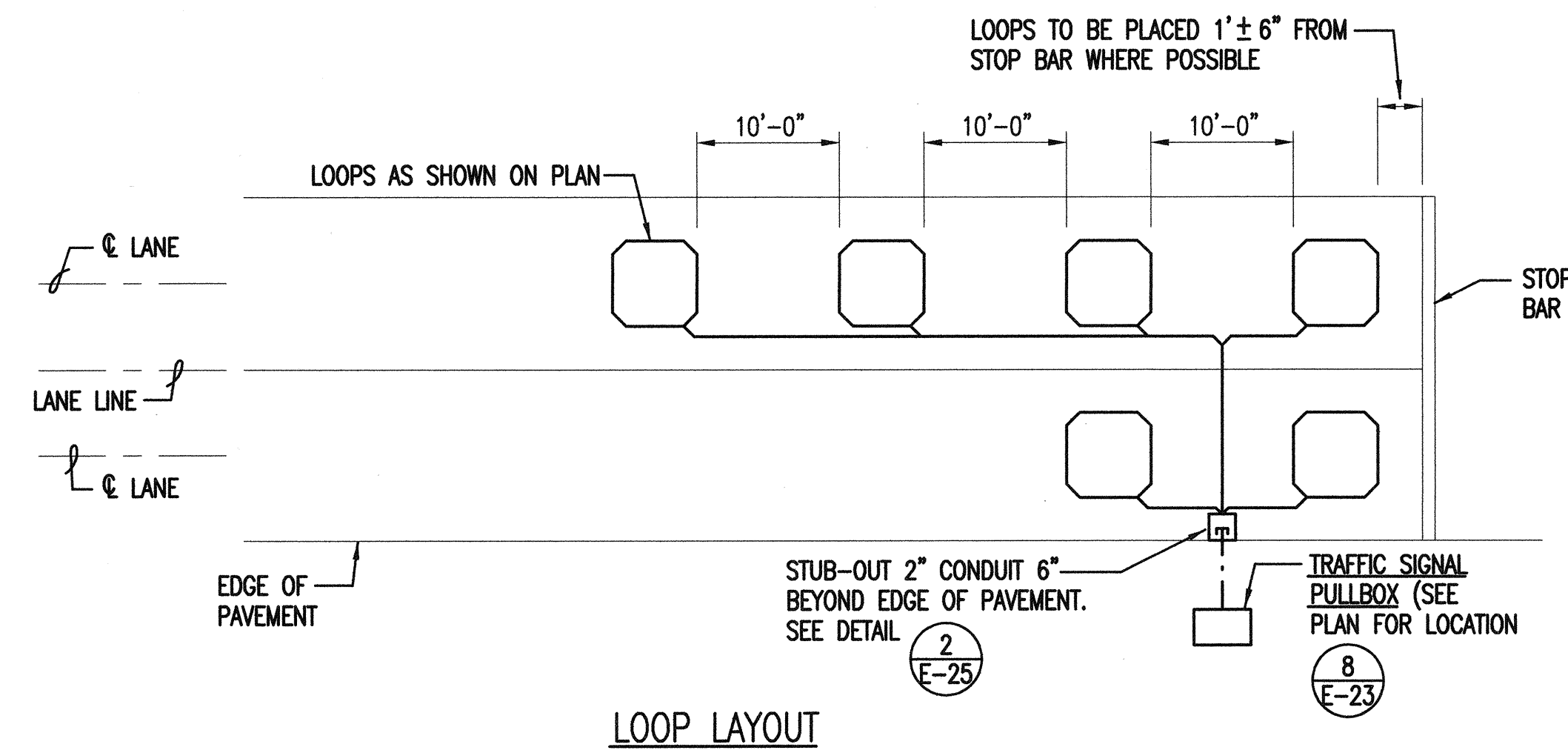
TYPICAL HIGHWAY LIGHT STANDARD DETAILS

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

SCALE: AS NOTED DATE: MAY, 2005

SHEET No. E-24 OF 29 SHEETS

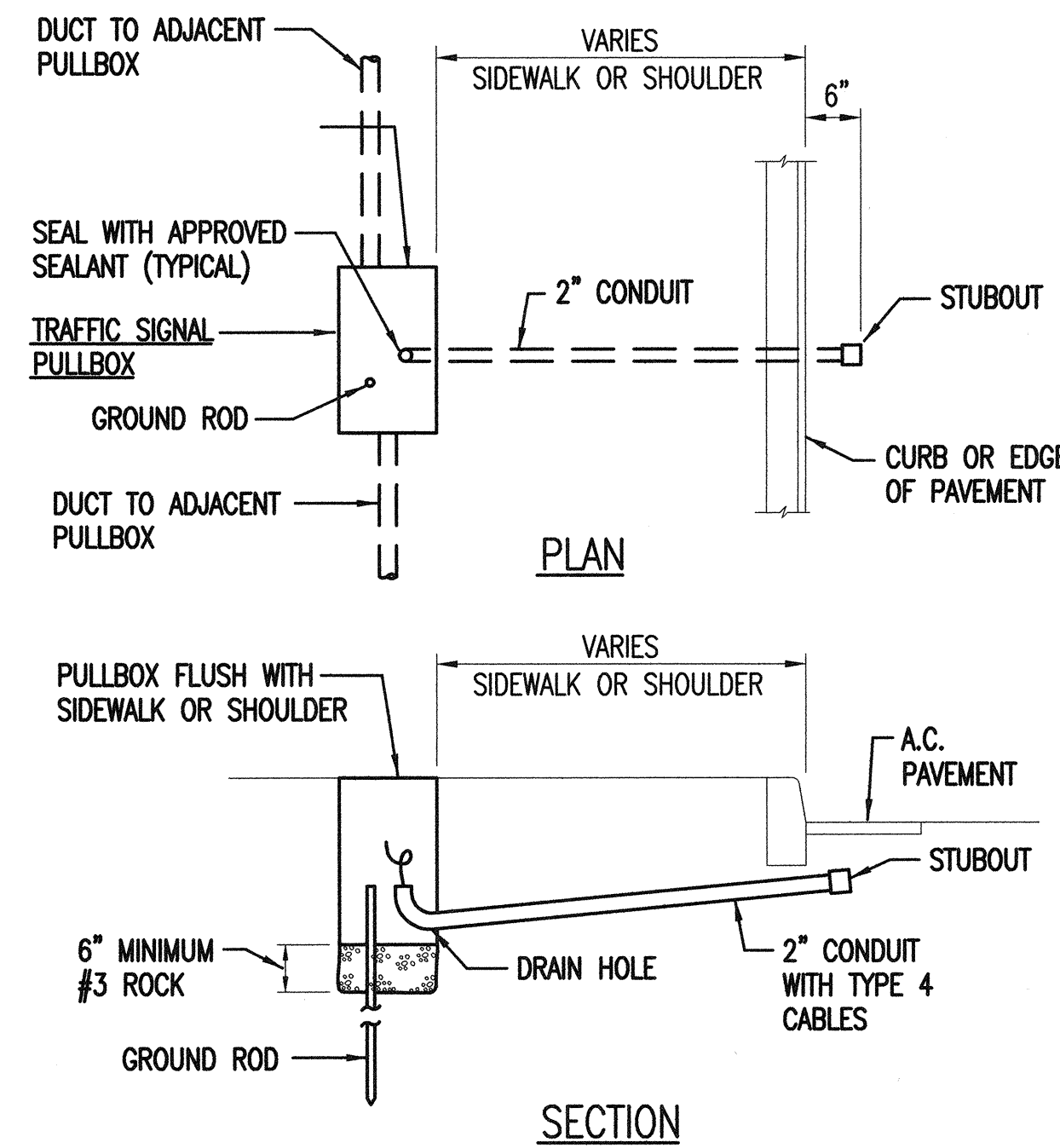
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	284	288



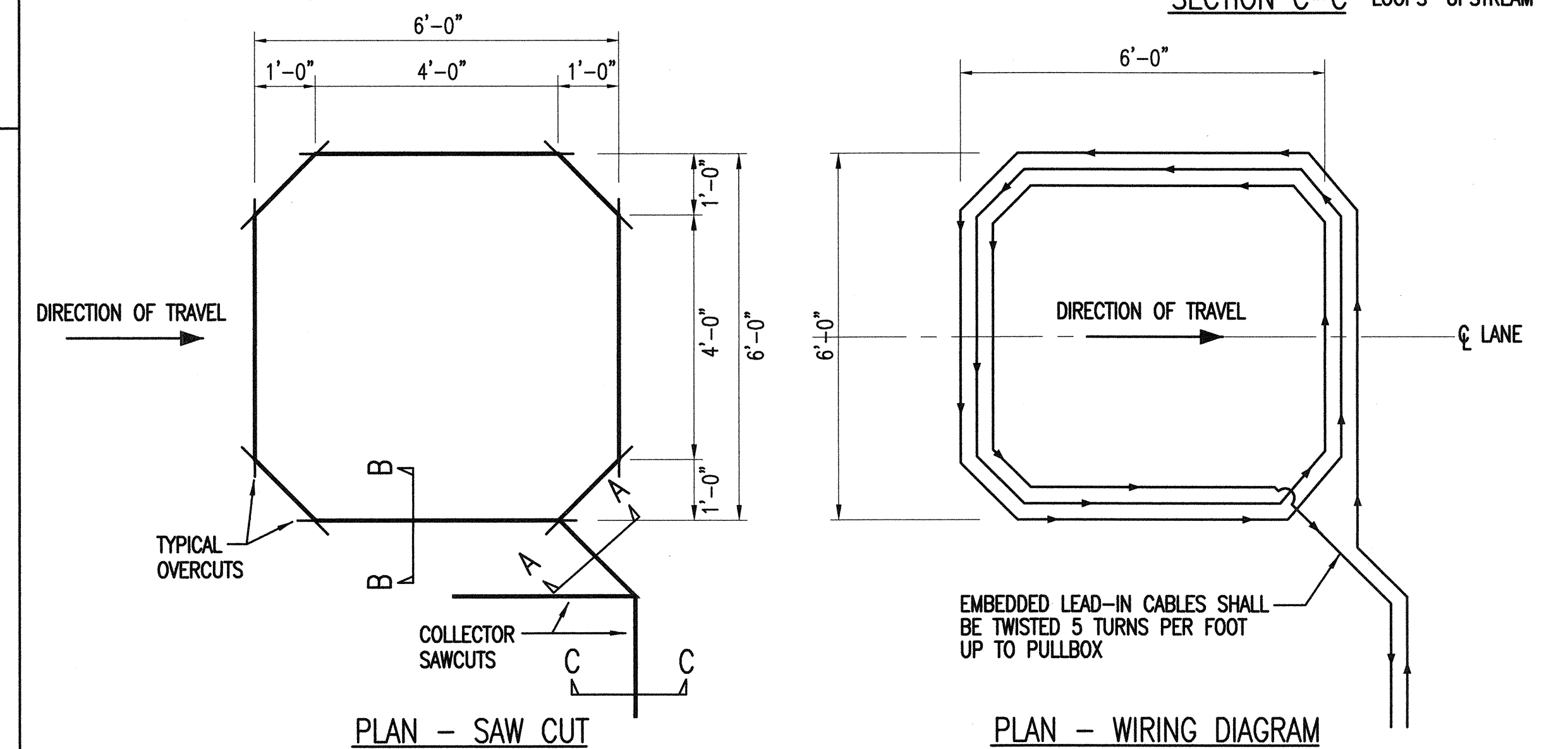
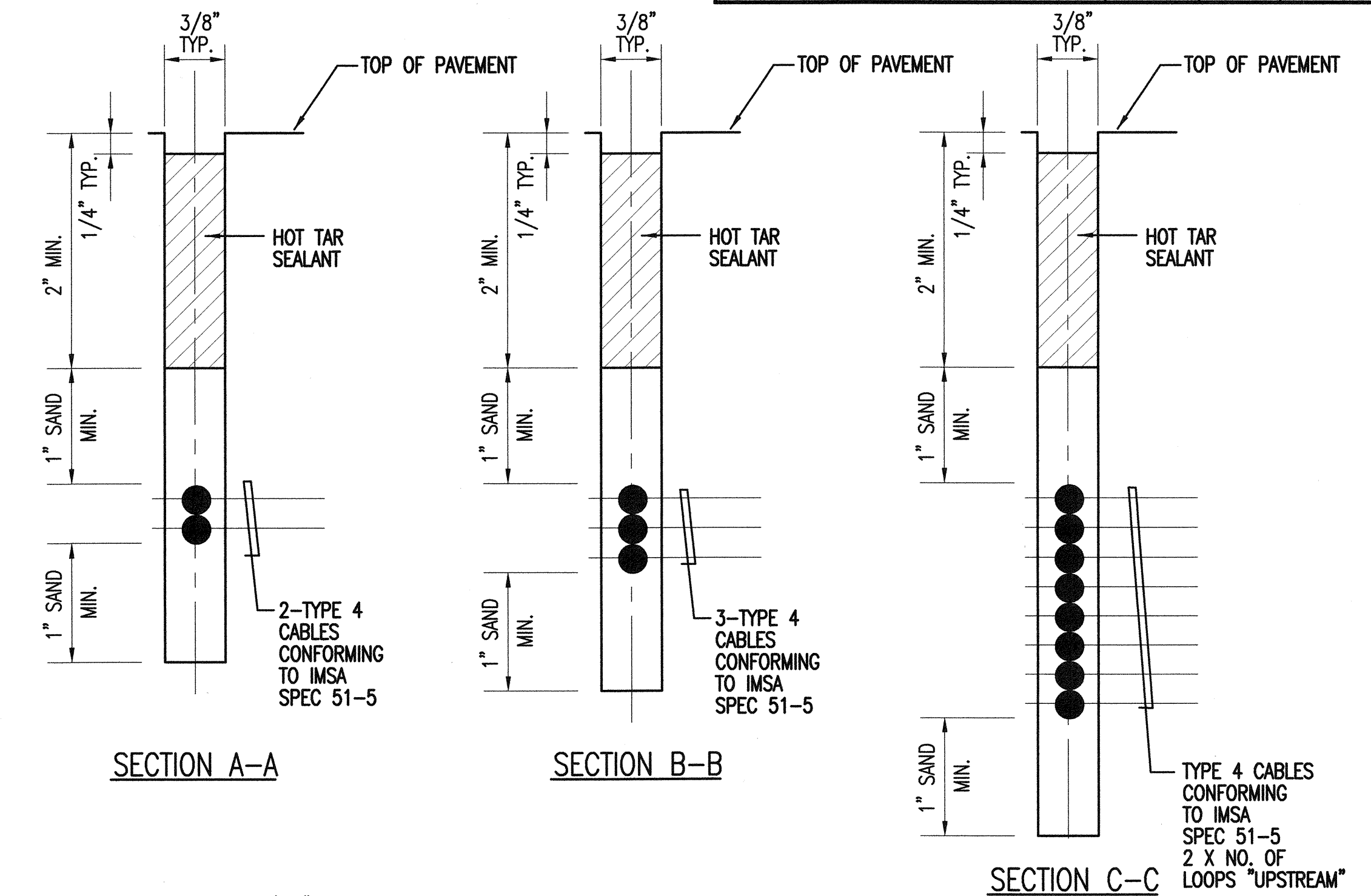
NOTES:

1. WHEN EXISTING BURIED LOOPS ARE ABANDONED IN PLACE, ALL EXISTING LOOP DETECTORS SHALL BE SAWCUT COMPLETELY THROUGH AT EVERY 15' TO PREVENT INDUCTIVE COUPLING.
2. EACH LOOP DETECTOR LEAD-IN CABLES SHALL BE IDENTIFIED IN THE CABINET WITH IT'S APPROPRIATE LOOP DETECTOR ASSIGNMENT NUMBER PER PLANS.
3. WHEN HOT SEALANTS ARE USED, ONLY POLYESTER INSULATION WITH A MINIMUM 400° MELTING POINT WILL BE PERMITTED.

1 PLAN - TYPICAL LOOP DETECTOR LAYOUT
E-25 NOT TO SCALE



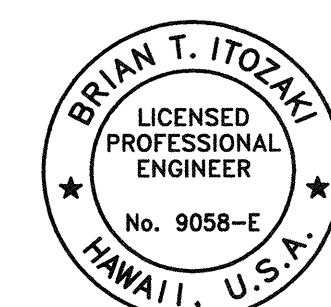
2 LOOP DETECTOR STUBOUT
E-25 NOT TO SCALE



NOTE!!
LENGTH OF OVERCUTS SHALL BE KEPT TO A MINIMUM. ALL OVERCUTS SHALL BE FILLED WITH HOT TAR SEALANT.

3 TYPICAL SENSOR LOOP SAWCUT DETAIL
E-25 NOT TO SCALE

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

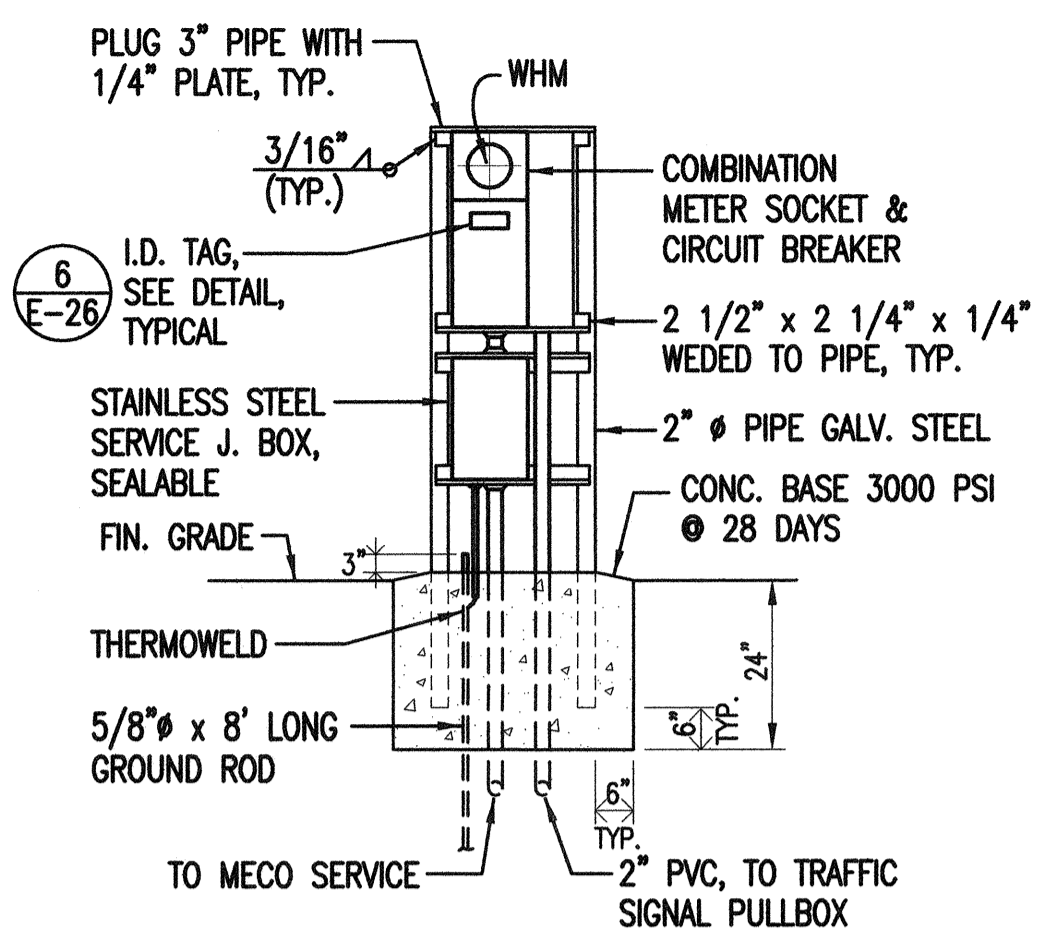


THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Brian T. Itozaki
SIGNATURE
EXPIRATION DATE OF THE LICENSE: 04/30/06

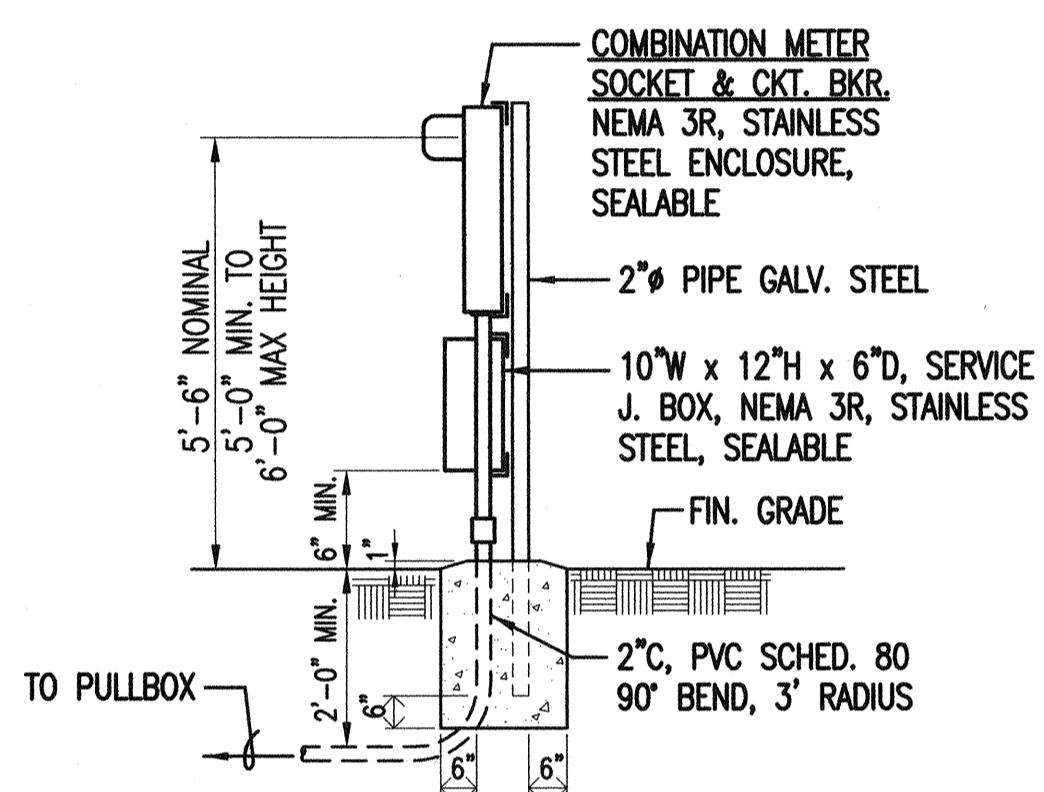
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
LOOP DETECTOR DETAILS
HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)
SCALE: AS NOTED DATE: MAY, 2005
SHEET No. E-25 OF 29 SHEETS

E-25

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	285	288



FRONT ELEVATION

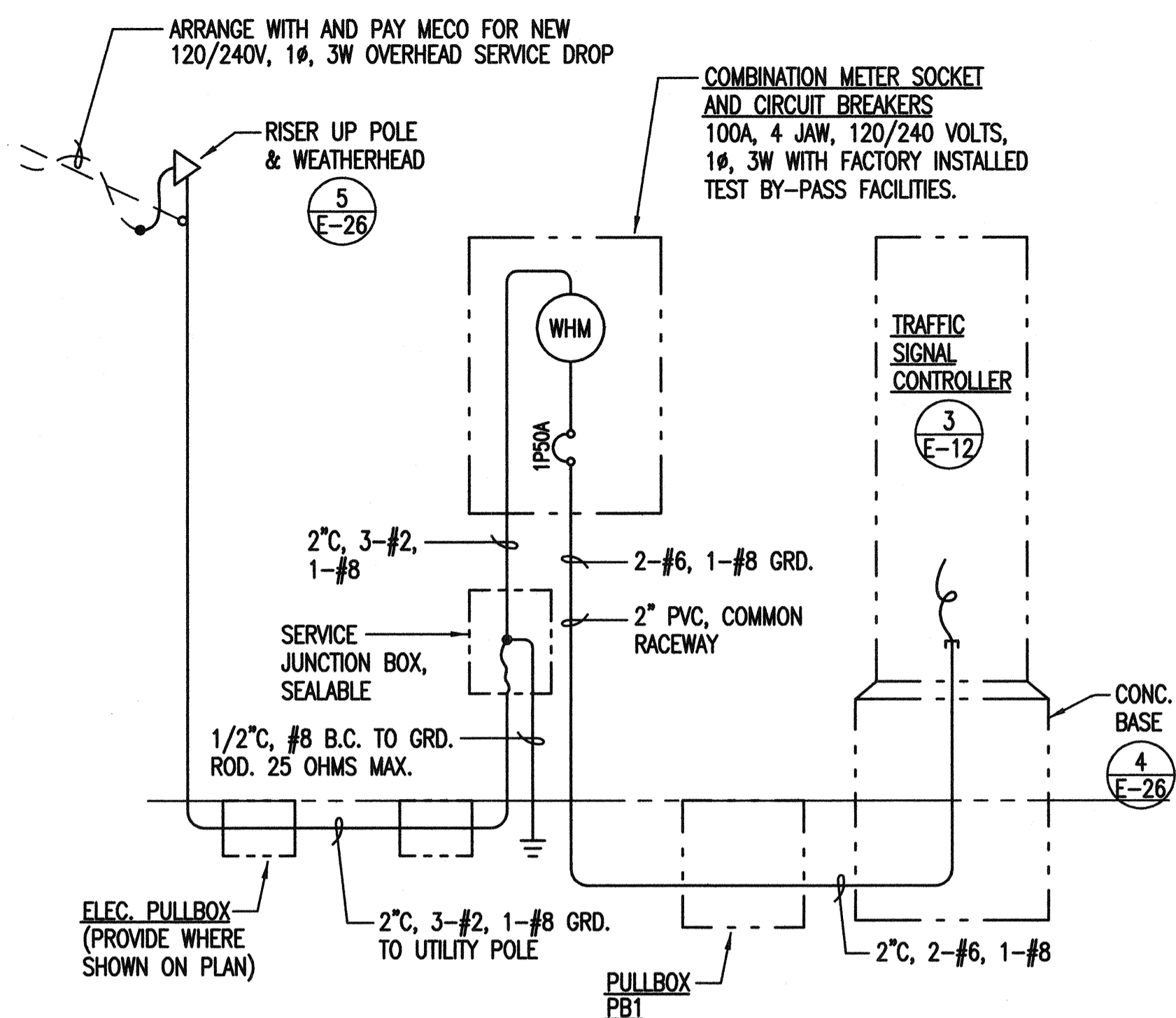


SIDE ELEVATION

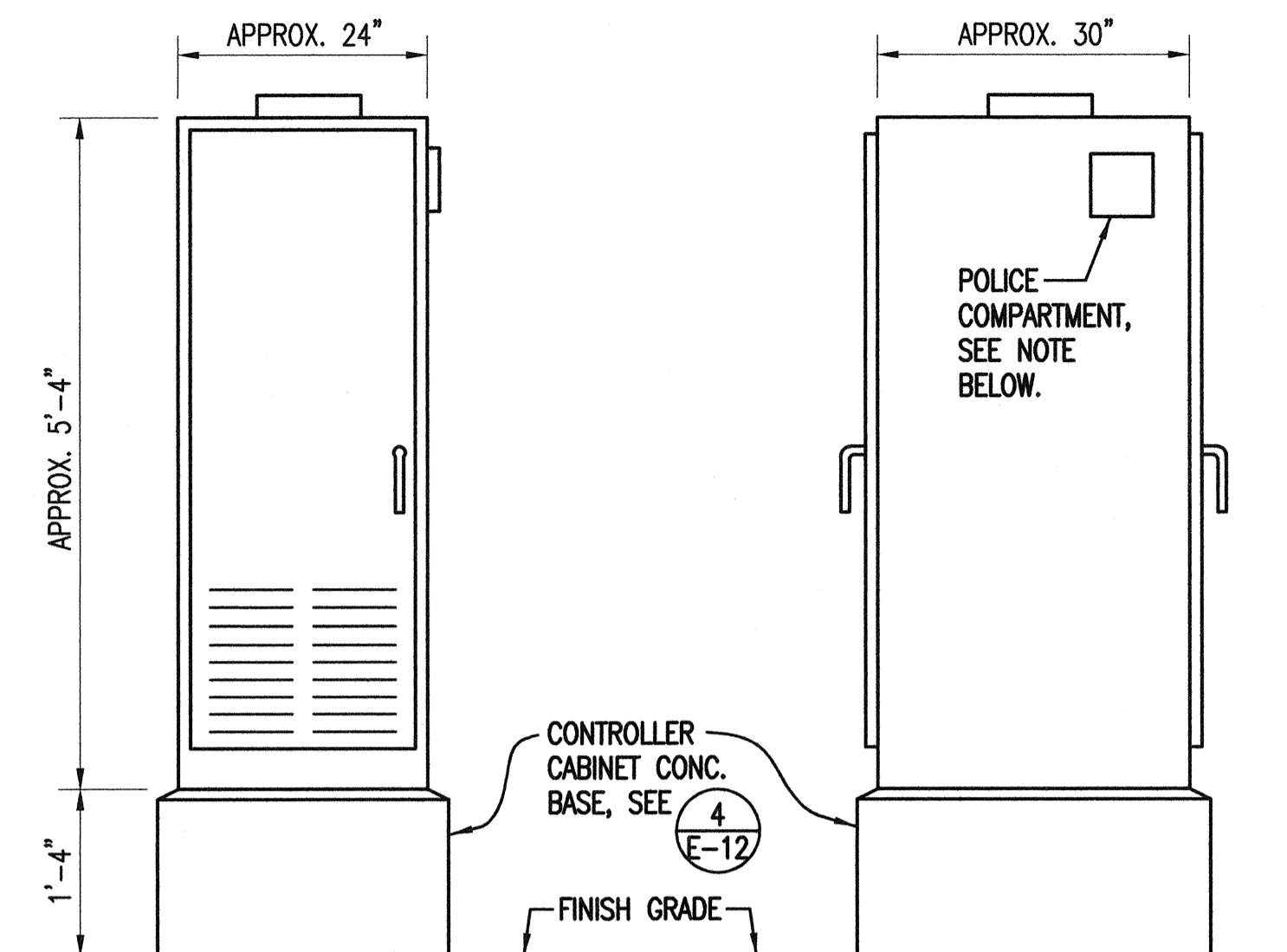
NOTES:

- CONTRACTOR SHALL MAKE ALL ELECTRICAL CONNECTION TO CONTROLLER, PROVIDE 2-1P50A BREAKER, GROUND 2" CONDUIT.
- ALL CONDUITS TO CONTAIN A POLYLEFIN PULL LINE. (JET LINE CAT #232 OR EQUIV.).
- PEDESTAL SHALL BE HOT-DIPPED GALVANIZED AFTER FABRICATION.
- ALL FASTENING BOLTS, NUTS AND WASHERS SHALL BE STAINLESS STEEL. PROVIDE ONE COAT SHOP PRIMER AND TWO COATS OF ACRYLIC ENAMEL FINISH, COLOR TO MATCH CONTROLLER CABINET.
- PROVIDE 4 FEET CLEARANCE IN FRONT OF METER.

1 DETAIL - ELECTRICAL SERVICE EQUIPMENT
E-26 NOT TO SCALE



2 DETAIL - ELECTRICAL SERVICE EQUIPMENT
E-26 NOT TO SCALE

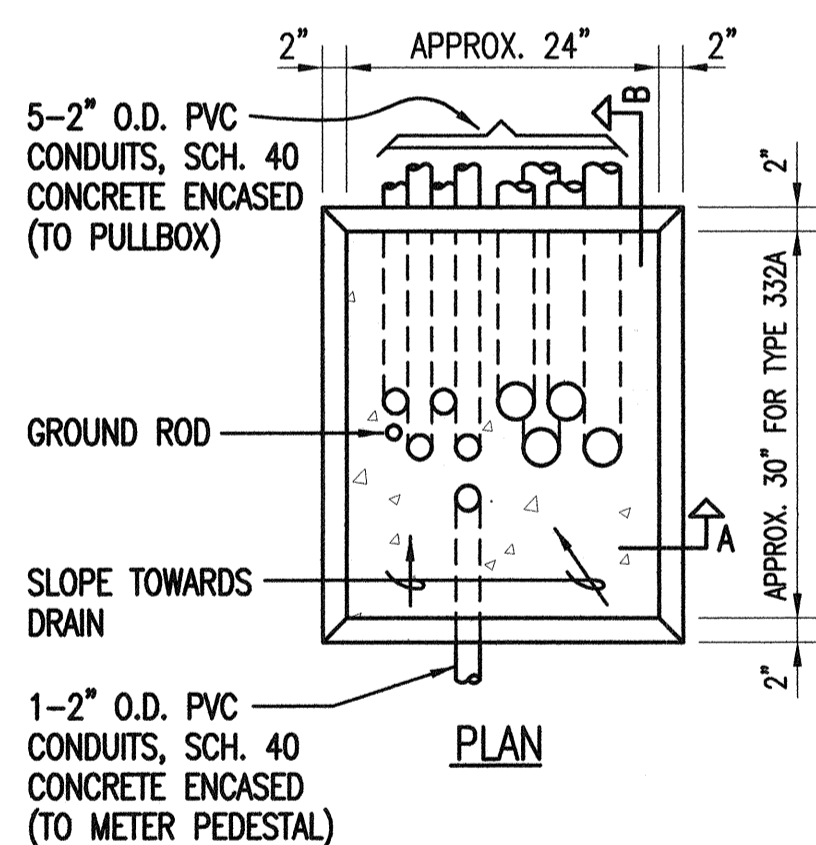


FRONT VIEW

SIDE VIEW

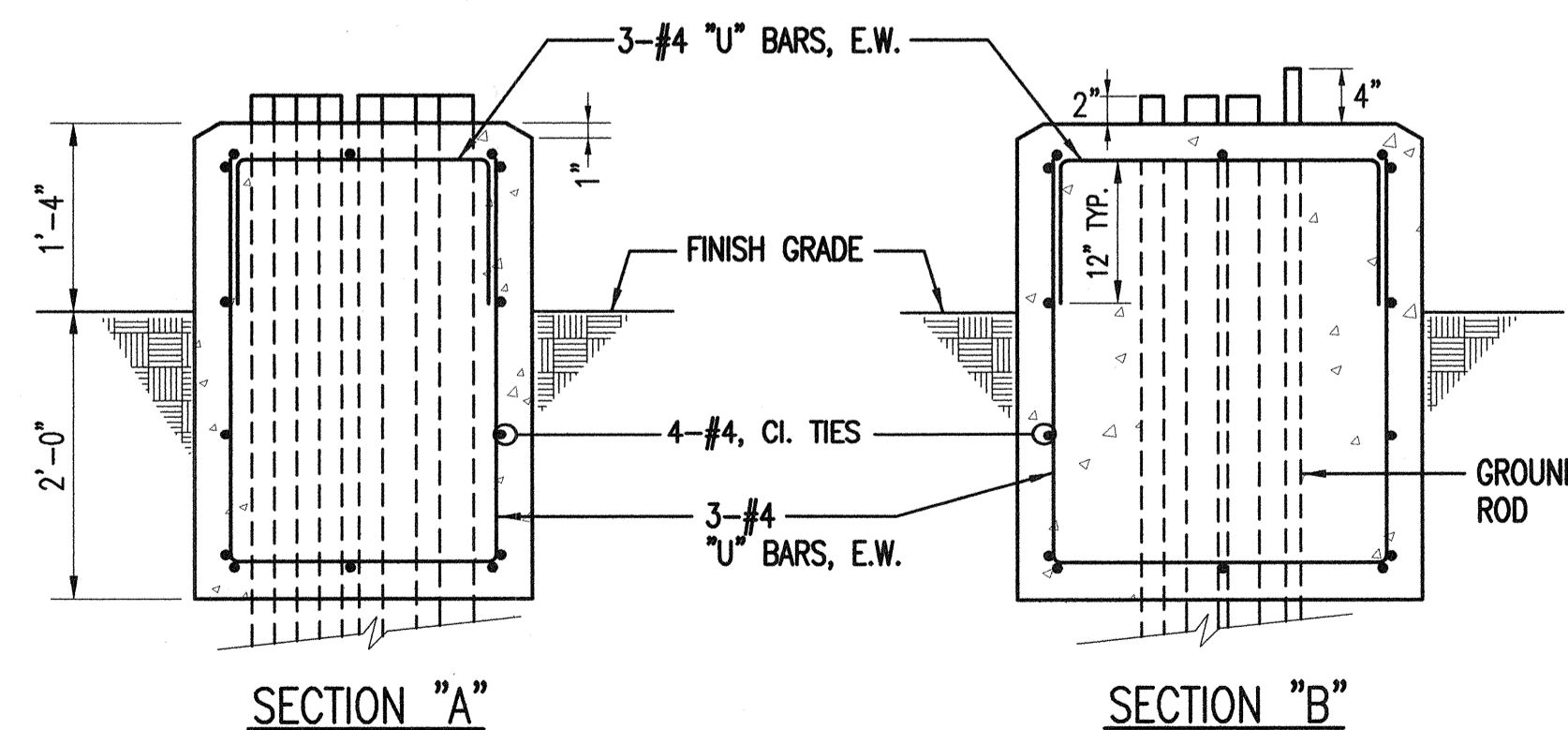
NOTE: PROVIDE A SWITCH/JACK AND 15 FOOT SWITCH CORD ASSEMBLY FOR POLICE COMPARTMENT. THE COST SHALL NOT BE PAID FOR SEPARATELY BUT SHALL BE CONSIDERED INCIDENTAL TO THE CONTROLLER CABINET.

3 DETAIL - TYPE 332A TRAFFIC SIGNAL CONTROLLER CABINET
E-26 NOT TO SCALE

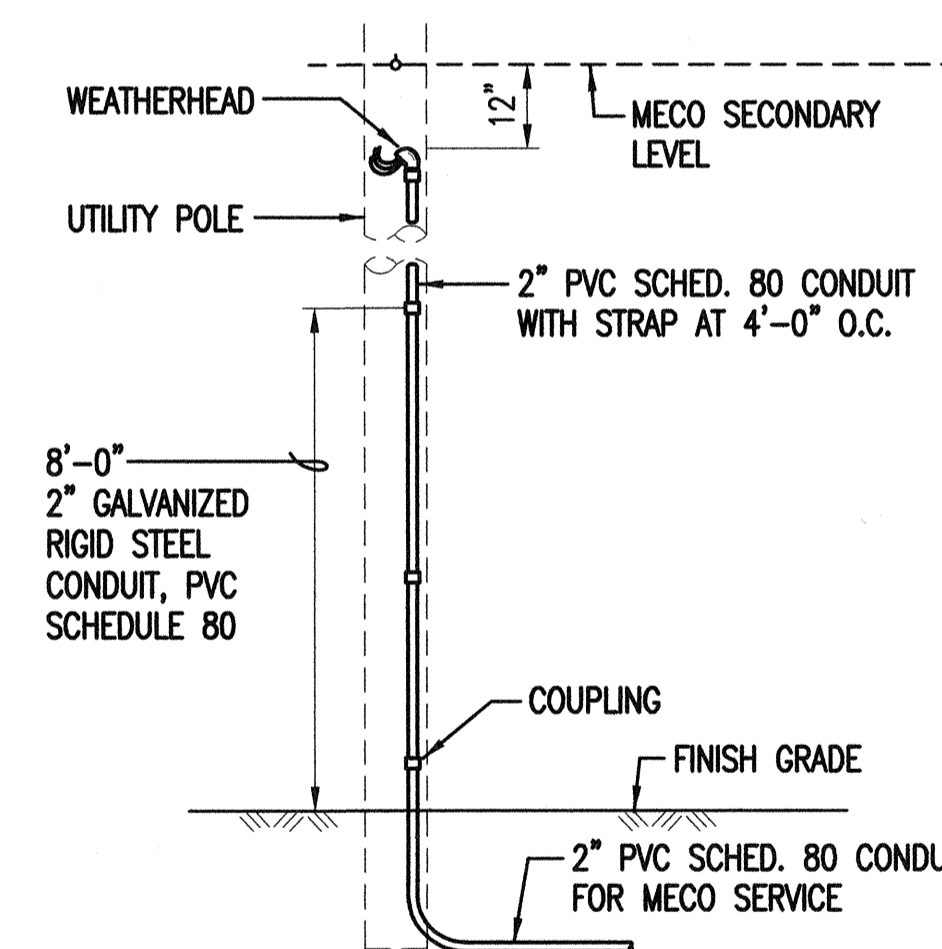


NOTES:

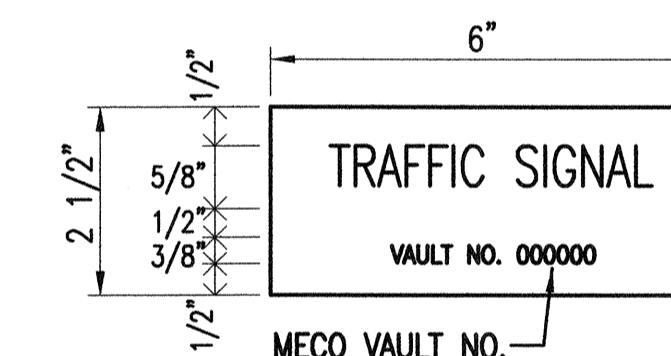
- CONCRETE SHALL BE CLASS "B".
- DIMENSION SHALL BE ALTERED TO SUIT CONTROLLER CABINET ACTUALLY FURNISHED.
- CONDUITS BENDS AND DRAIN ARE INCIDENTAL TO CONCRETE BASE.
- REFER TO CABINET MANUFACTURER'S SPECIFICATIONS FOR DETAILS OF ANCHOR BOLTS AND BASE SETTING.
- ALL EXPOSED SURFACES OF CONCRETE BASE SHALL BE GIVEN A CLASS 2, RUBBED FINISH.



4 DETAIL - CONTROLLER CABINET CONCRETE BASE
E-26 NOT TO SCALE



5 DETAIL - SERVICE RISER AT POLE
E-26 NOT TO SCALE



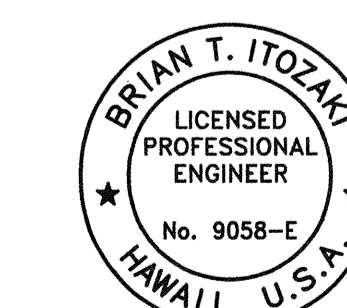
NOTES:

- USE 3-PLY LAMINATED FLEXIBLE PLASTIC, BLACK-WHITE-BLACK THICKNESS: BLACK CAP SHEET-0.010", WHITE BASE SHEET-0.052", BLACK BASE SHEET-0.010".
- ATTACH TO METER SOCKET USING SCOTCH 3M BRAND VERY HIGH BOND (VHB) DOUBLE COATED ACRYLIC FOAM TAPE OR EQUIVALENT.
- LETTERS/NUMBERS SHALL BE 1/16" STROKE, (WHITE IN COLOR).
- LETTERS/NUMBERS AREA INSCRIBED BY CUTTING THROUGH "BLACK CAP SHEET" TO EXPOSED WHITE LETTERS/NUMBERS.

6 DETAIL - STATE METER SOCKET ID. TAG
E-26 NOT TO SCALE

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

E-26



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Brian T. Itozaki

SIGNATURE

EXPIRATION DATE OF THE LICENSE: 04/30/06

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MISCELLANEOUS DETAILS

HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)

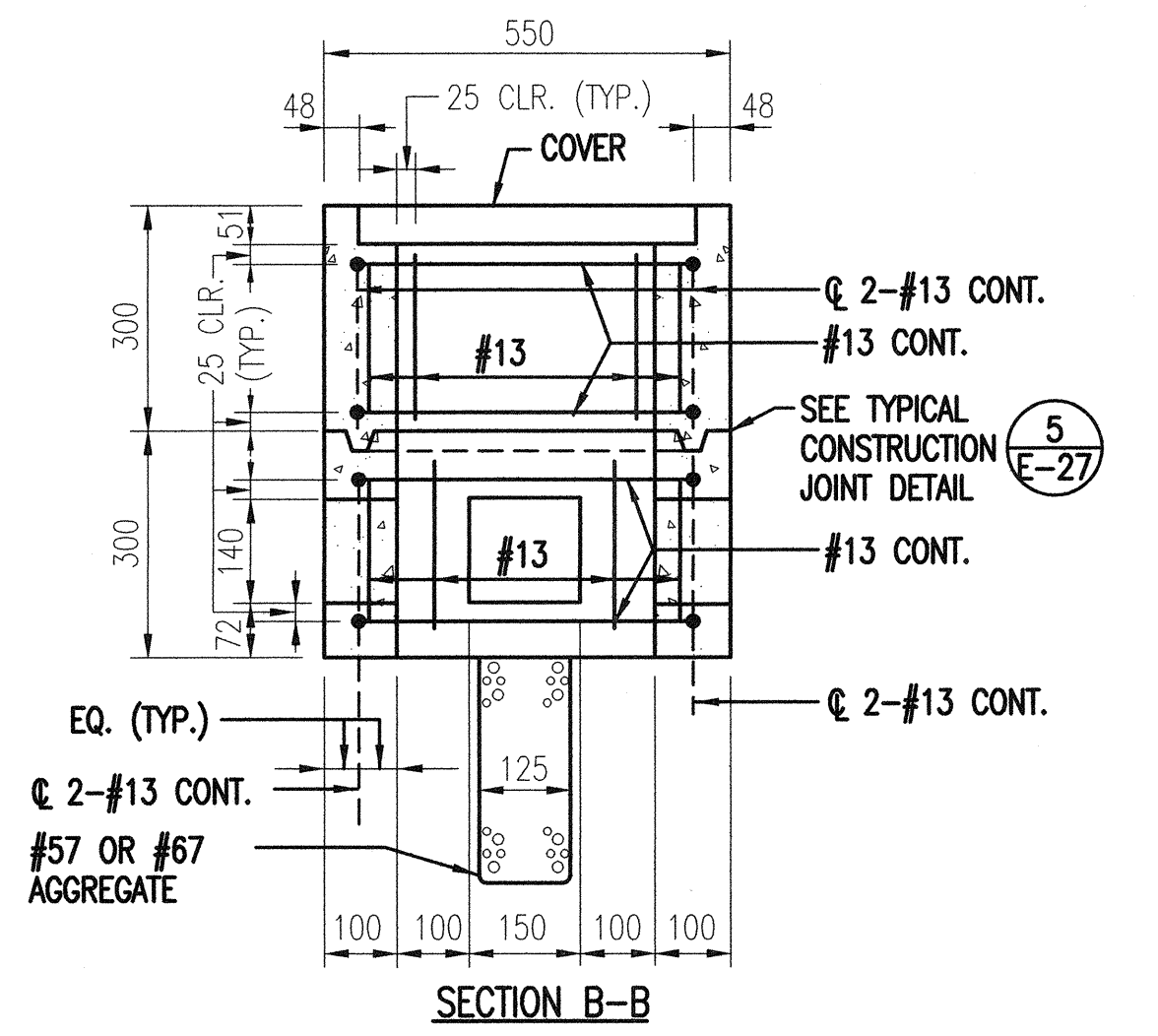
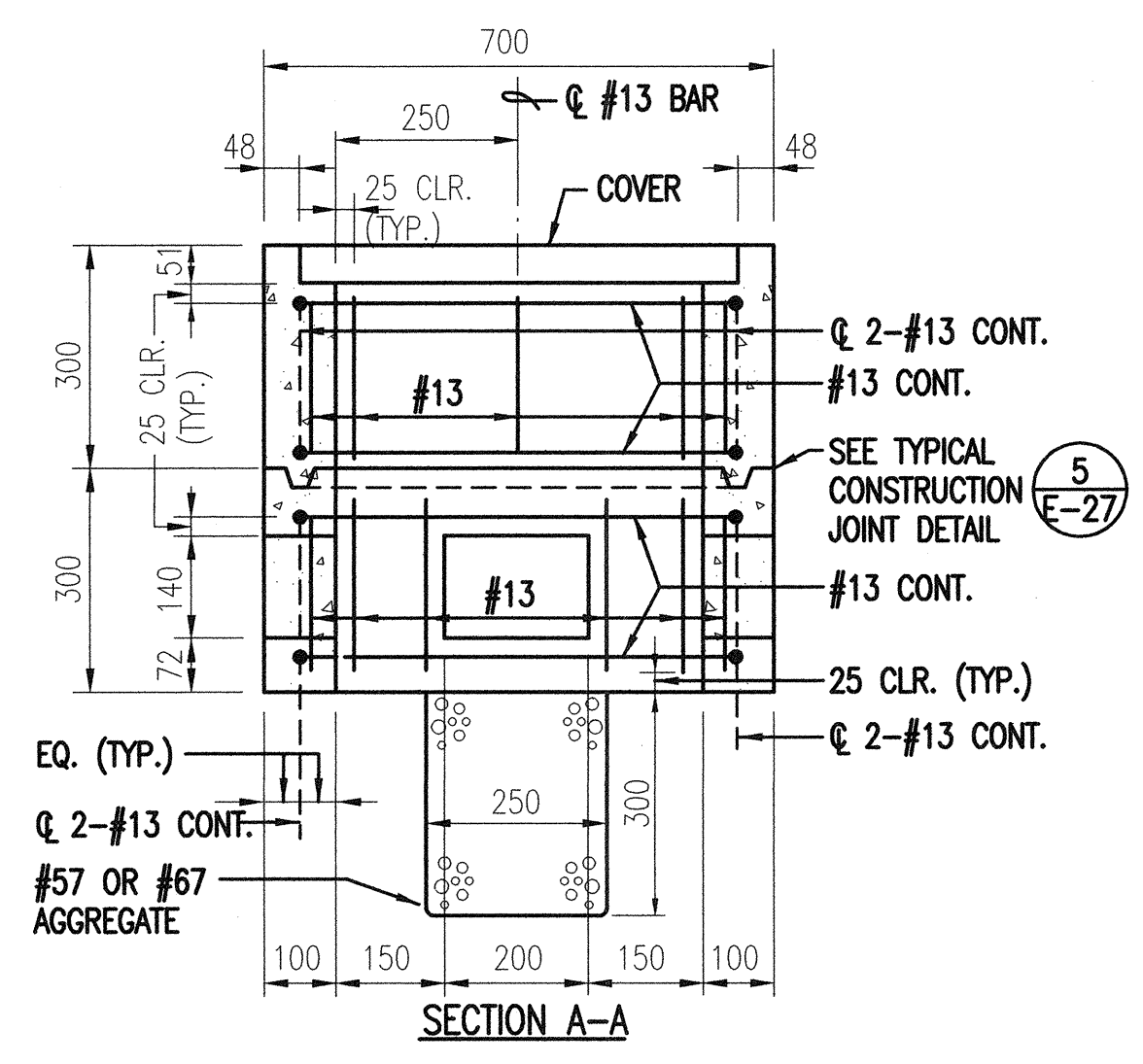
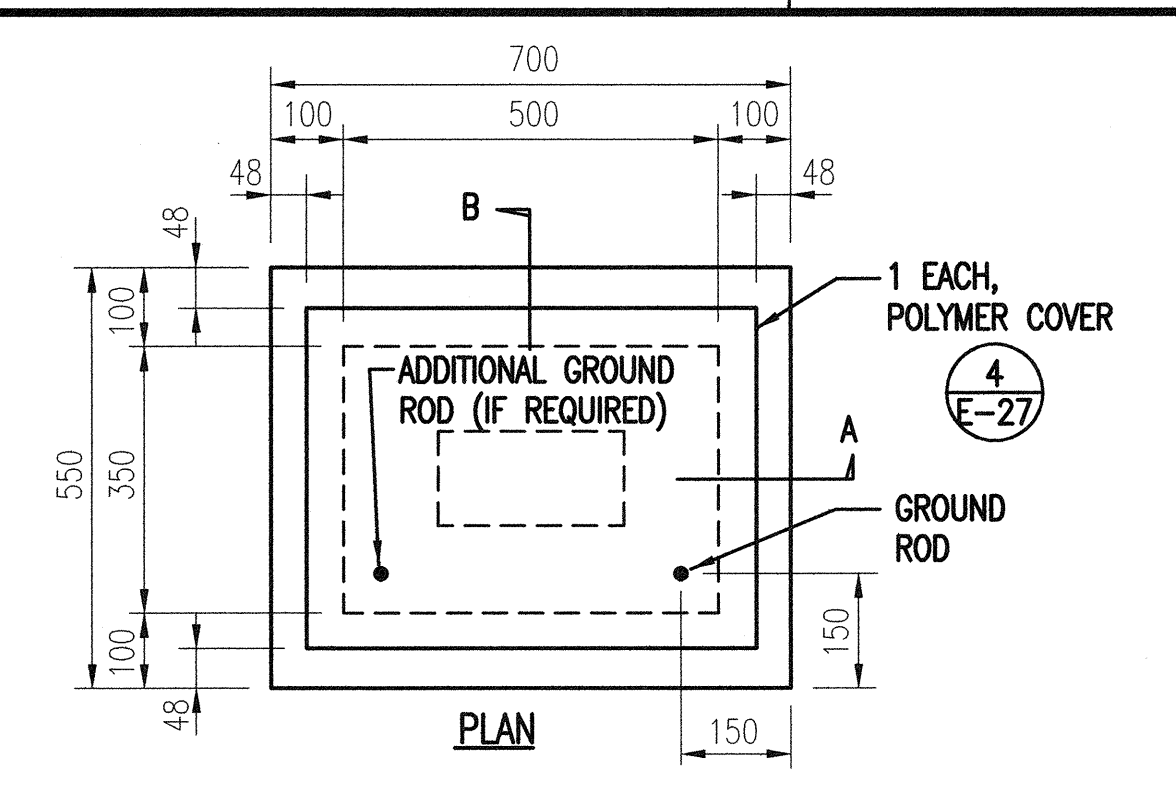
SCALE: AS NOTED DATE: MAY, 2005

SHEET No. E-26 OF 29 SHEETS

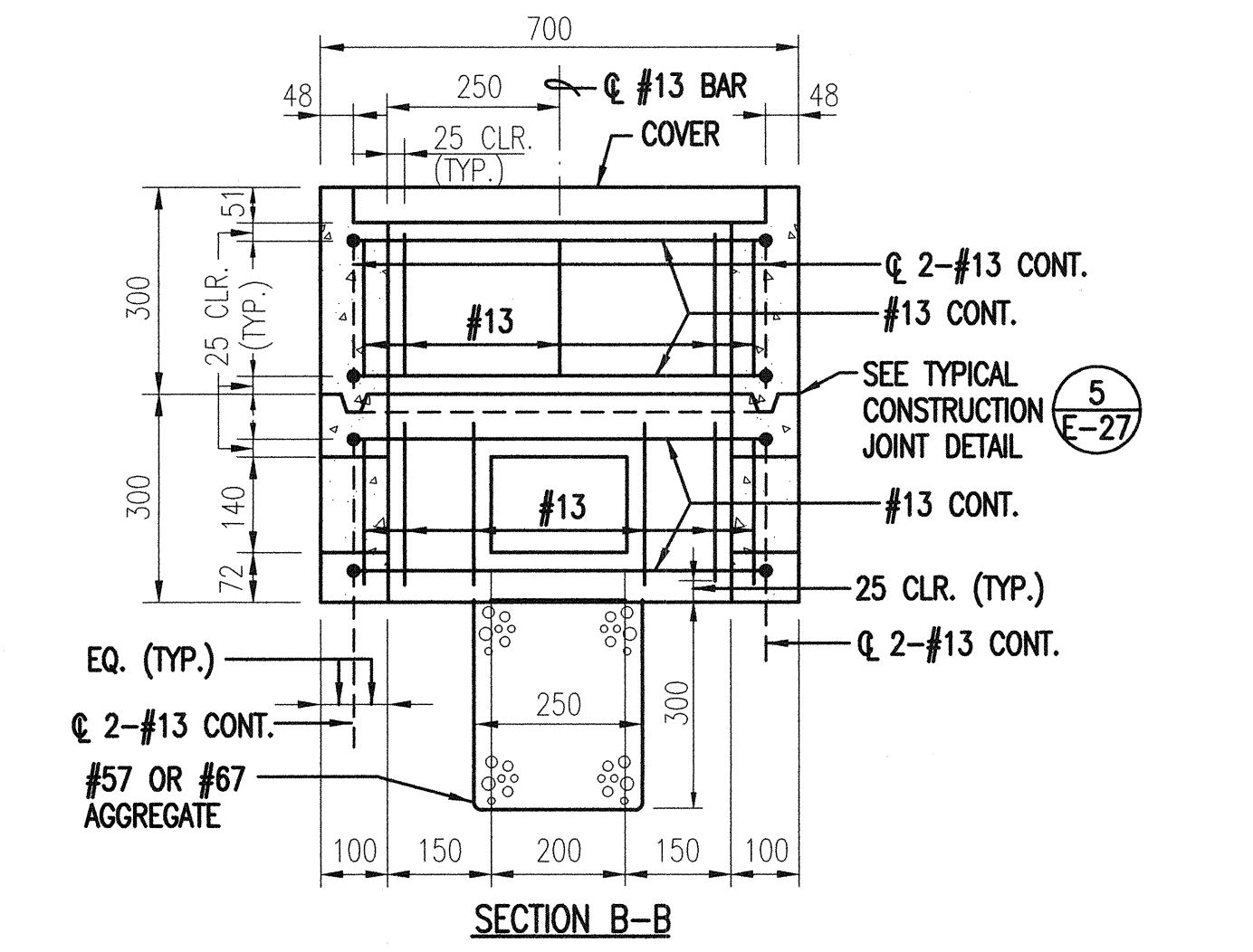
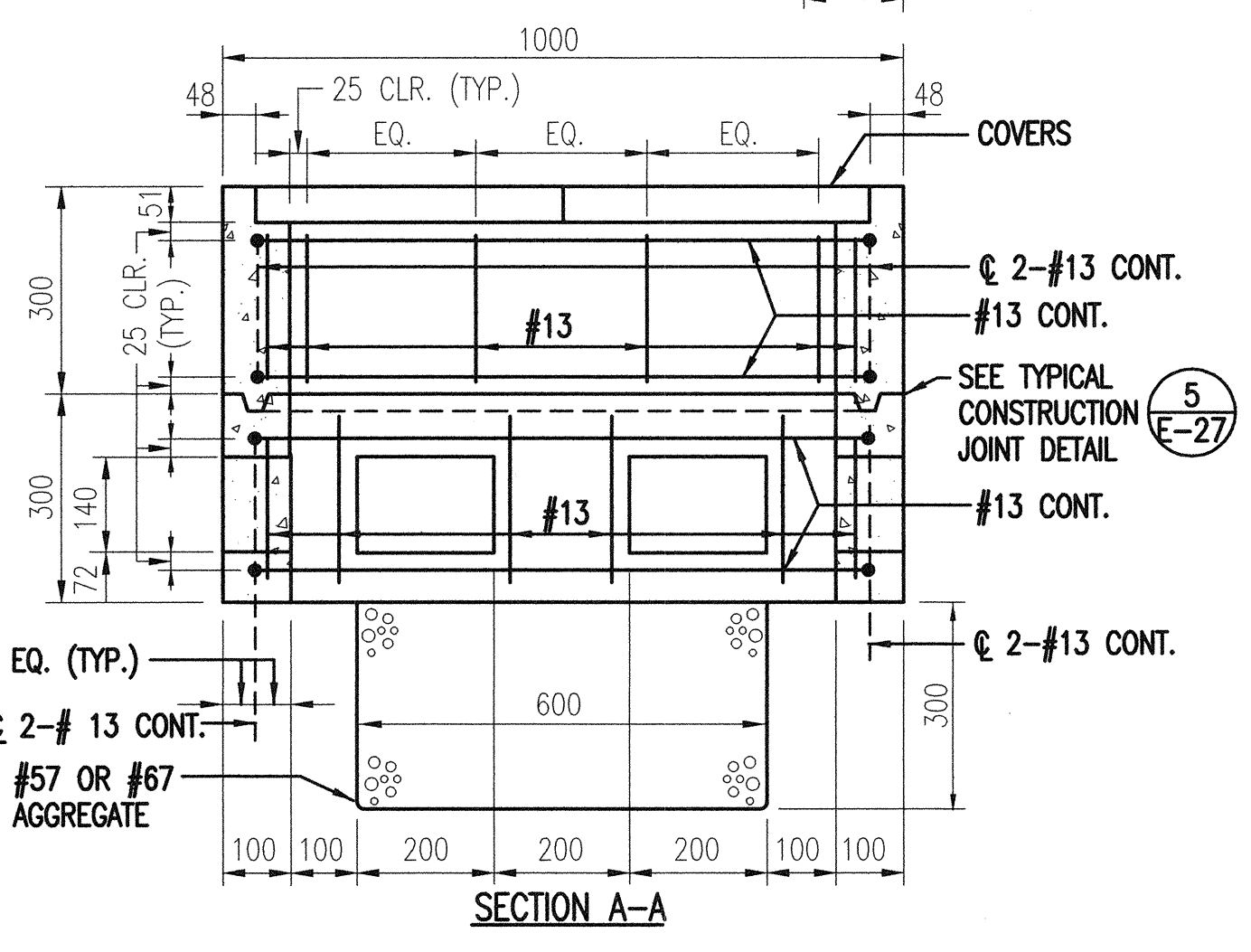
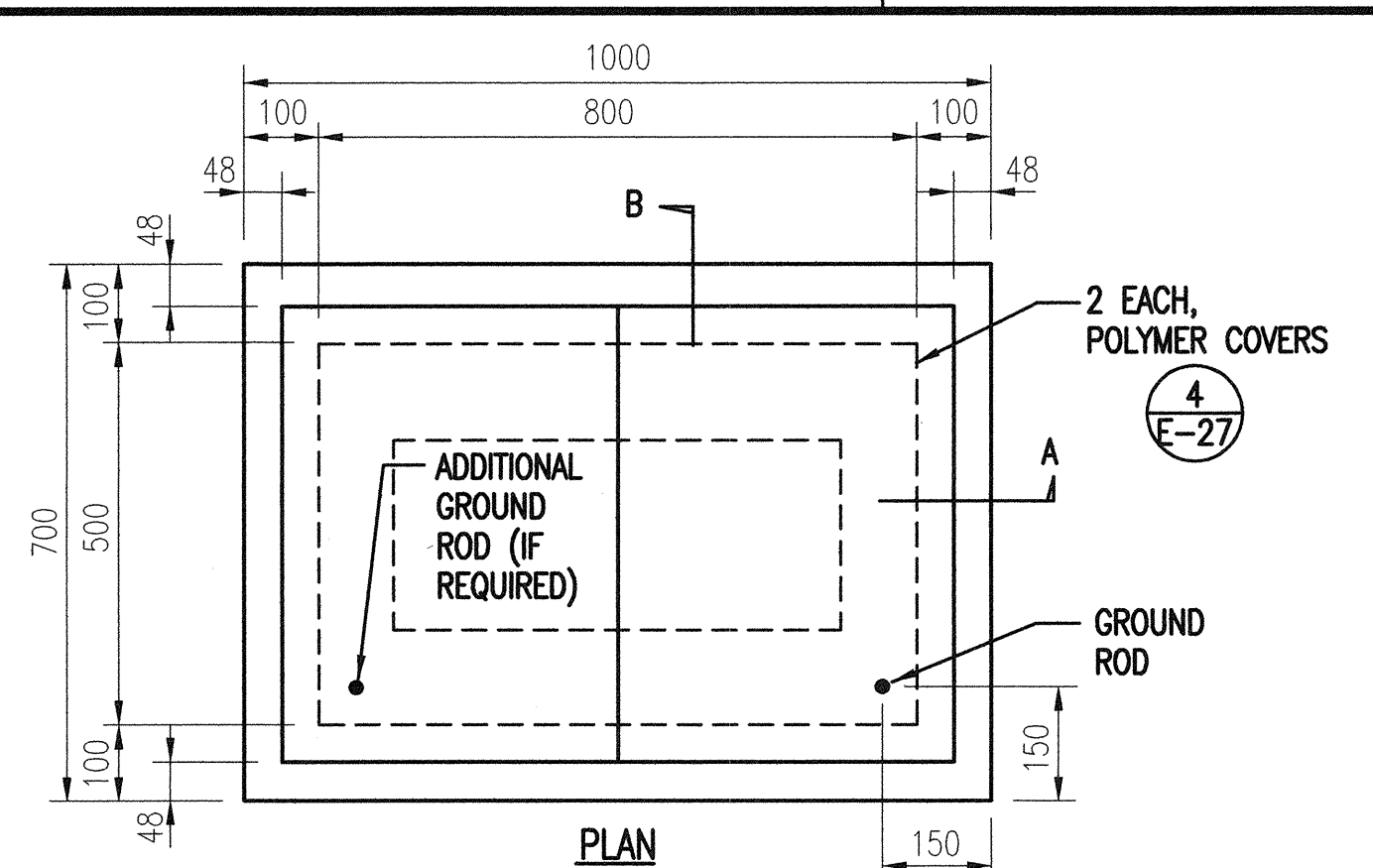
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	286	288

GENERAL NOTES:

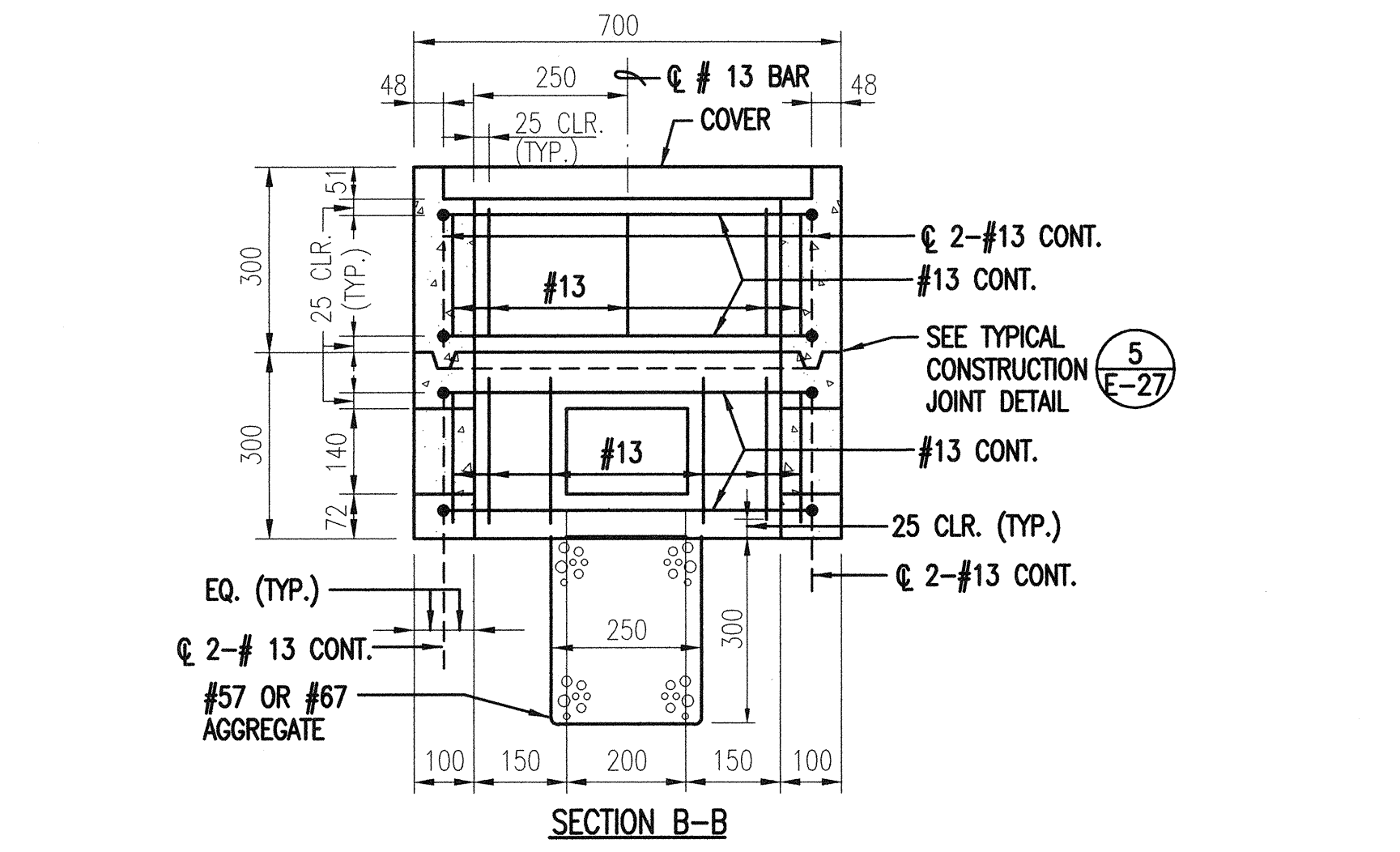
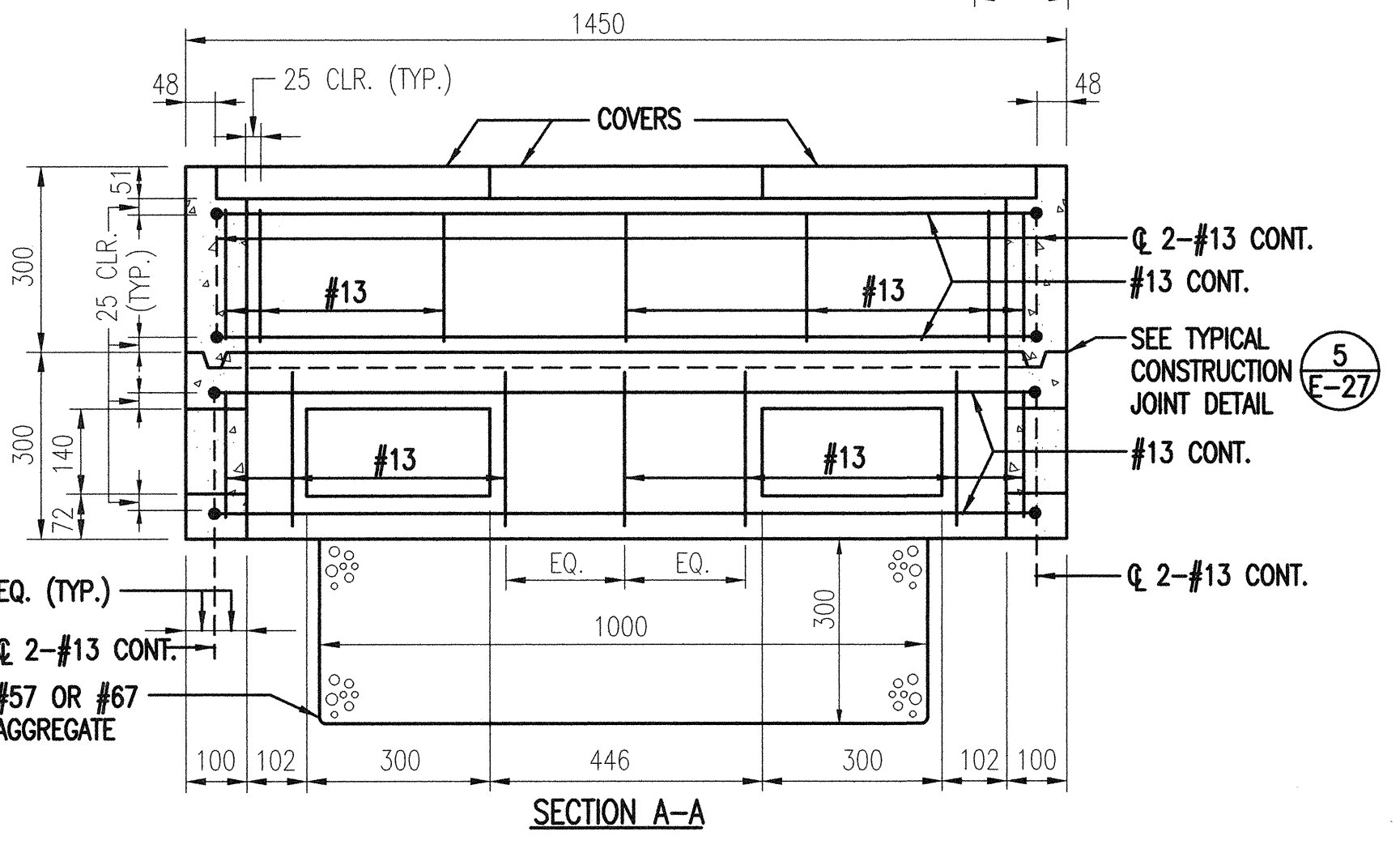
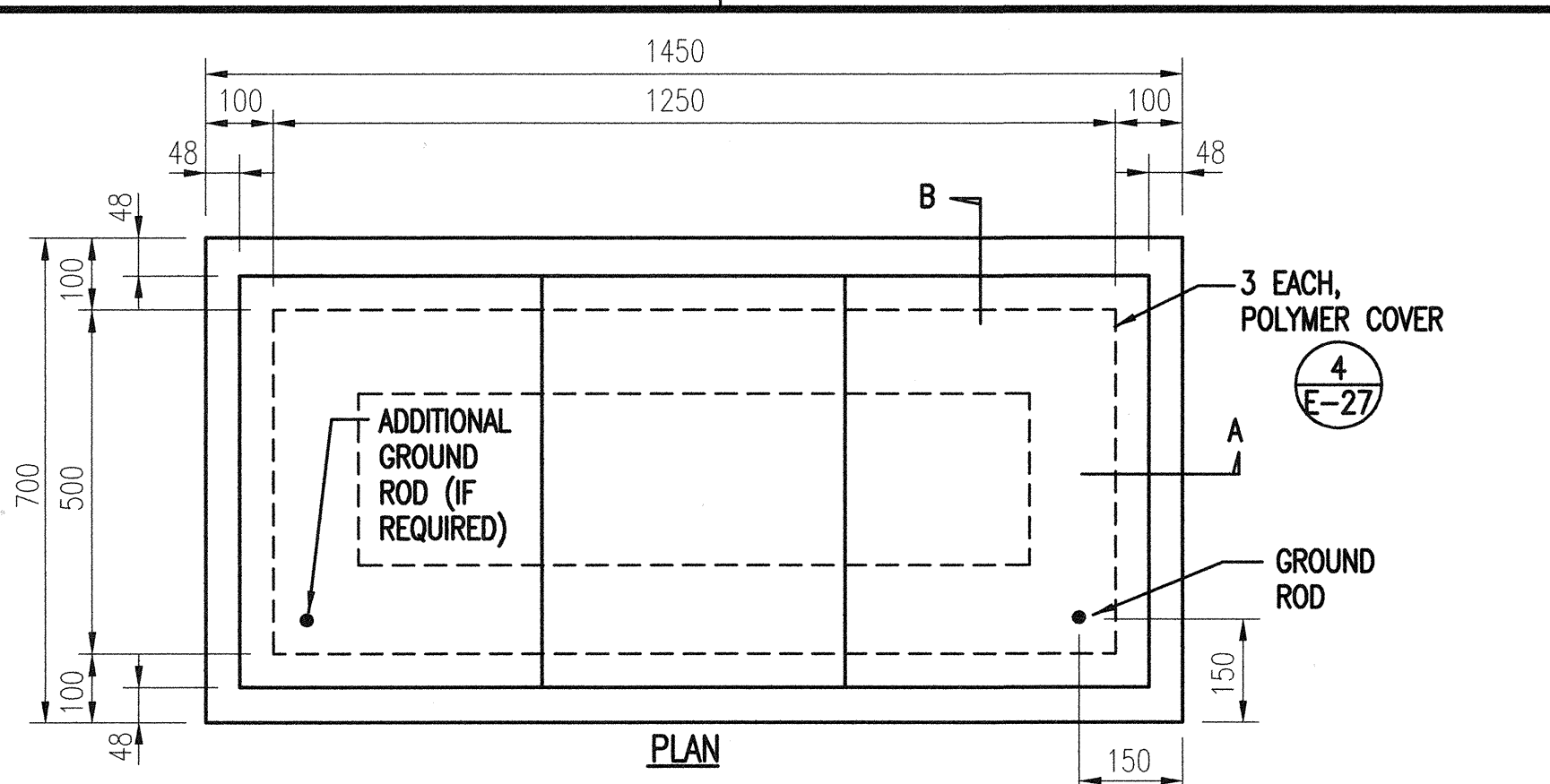
1. PROVIDE A MINIMUM OF ONE 16# x 2.5M COPPERWELD GROUND ROD IN EACH PULLBOX. WHEN DIRECTED BY THE TRAFFIC SIGNAL INSPECTOR/ENGINEER, INSTALL ADDITIONAL GROUND RODS. COST OF GROUND RODS SHALL BE INCIDENTAL TO THE PULLBOXES.
2. ALL PRE-CAST CONCRETE PULLBOXES SHALL BE MANUFACTURED IN TWO PIECES.
3. THE 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 CONDUIT 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.
7. 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).



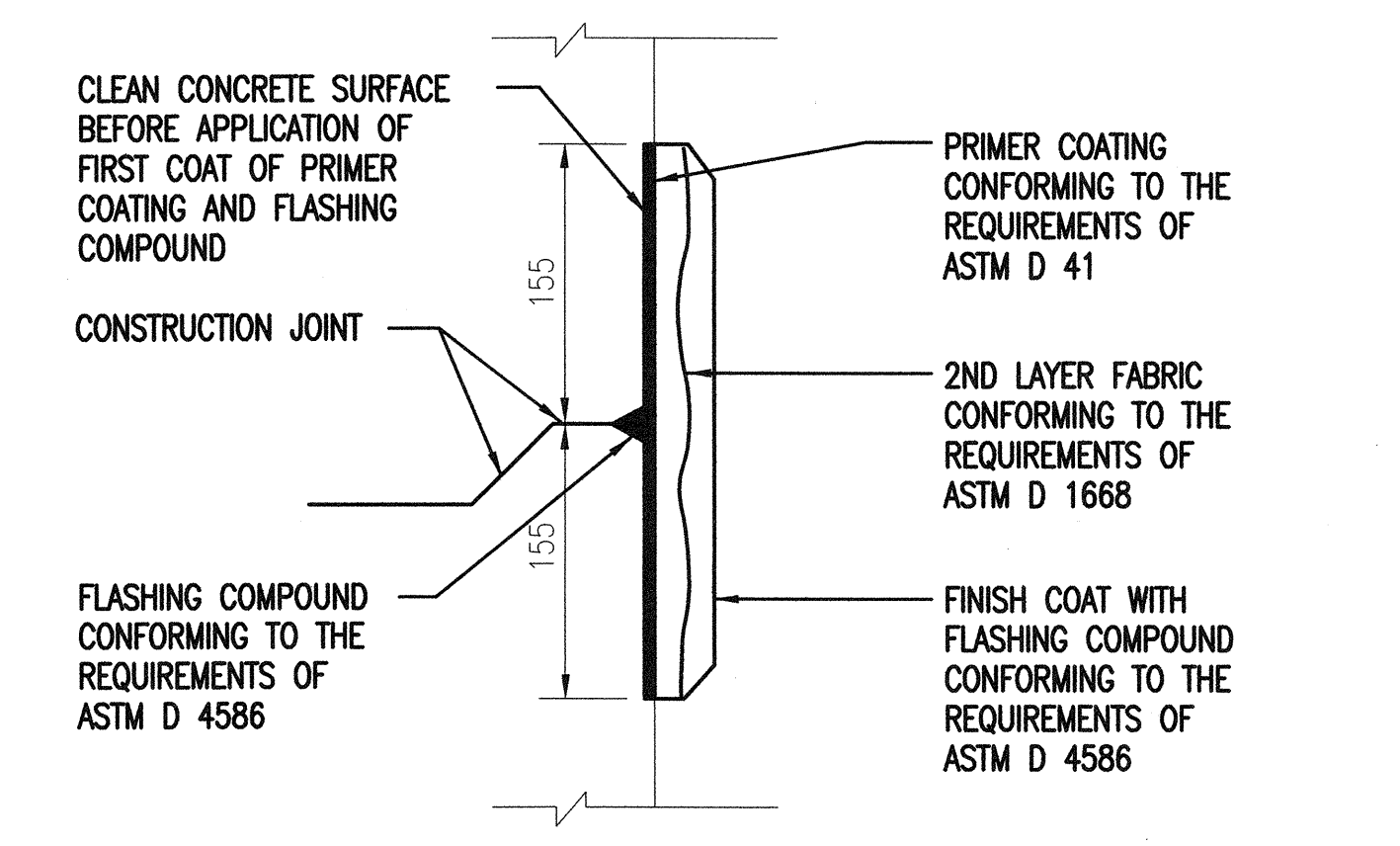
1 TYPE "A" PULLBOX
E-27 (OLD TYPE "B")
SCALE: 1:100



2 TYPE "B" PULLBOX
E-27 (OLD TYPE "C")
SCALE: 1:100



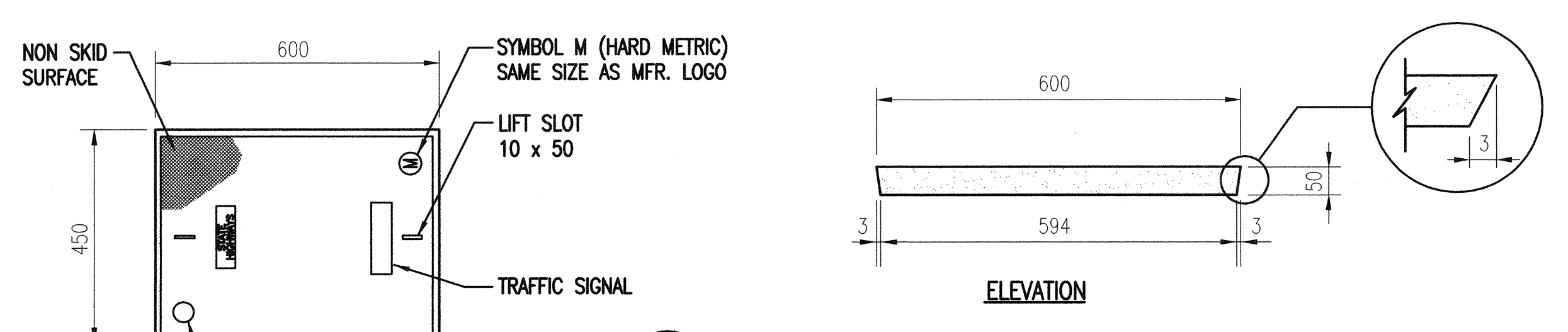
3 TYPE "C" PULLBOX
E-27 (OLD TYPE "D")
SCALE: 1:100



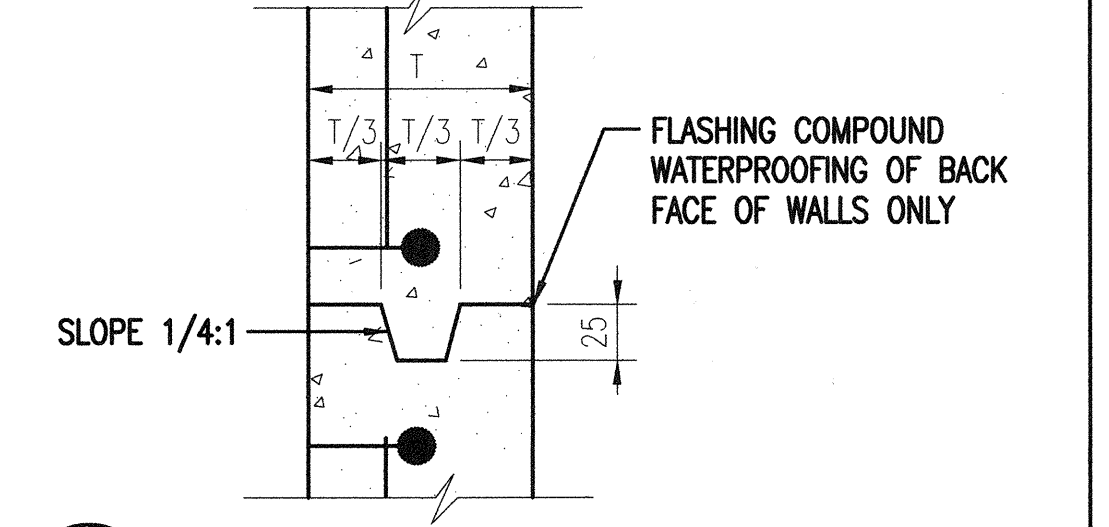
6 DETAIL - TYPICAL FLASHING COMPOUND WATERPROOFING
E-27 NOT TO SCALE

NOTE:
ALL DIMENSIONS ARE IN MILLIMETERS
UNLESS OTHERWISE SHOWN.

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



4 DETAIL - POLYMER CONCRETE COVER
E-27 NOT TO SCALE



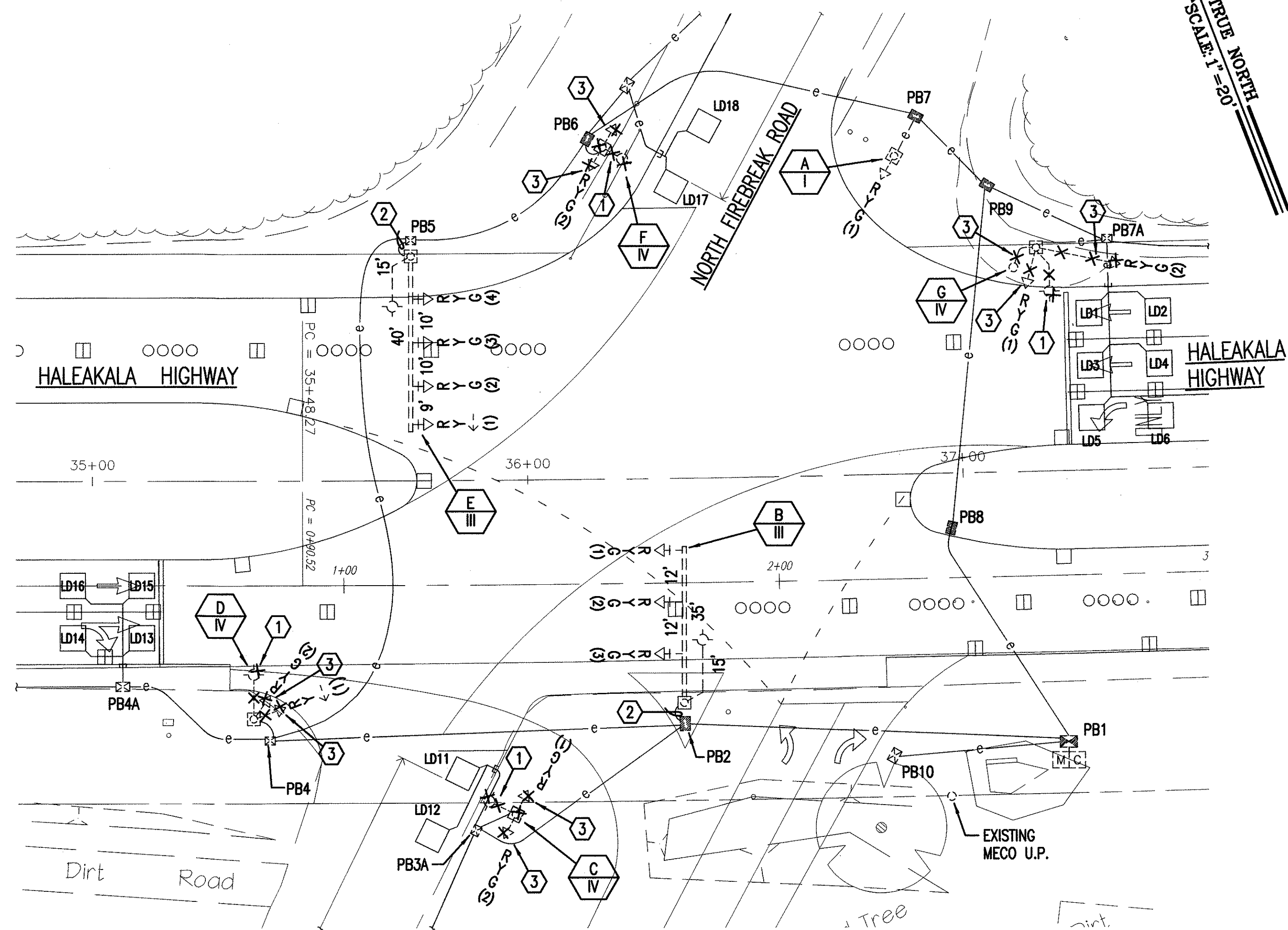
5 DETAIL - TYPICAL CONSTRUCTION JOINT
E-27 NOT TO SCALE

E-27

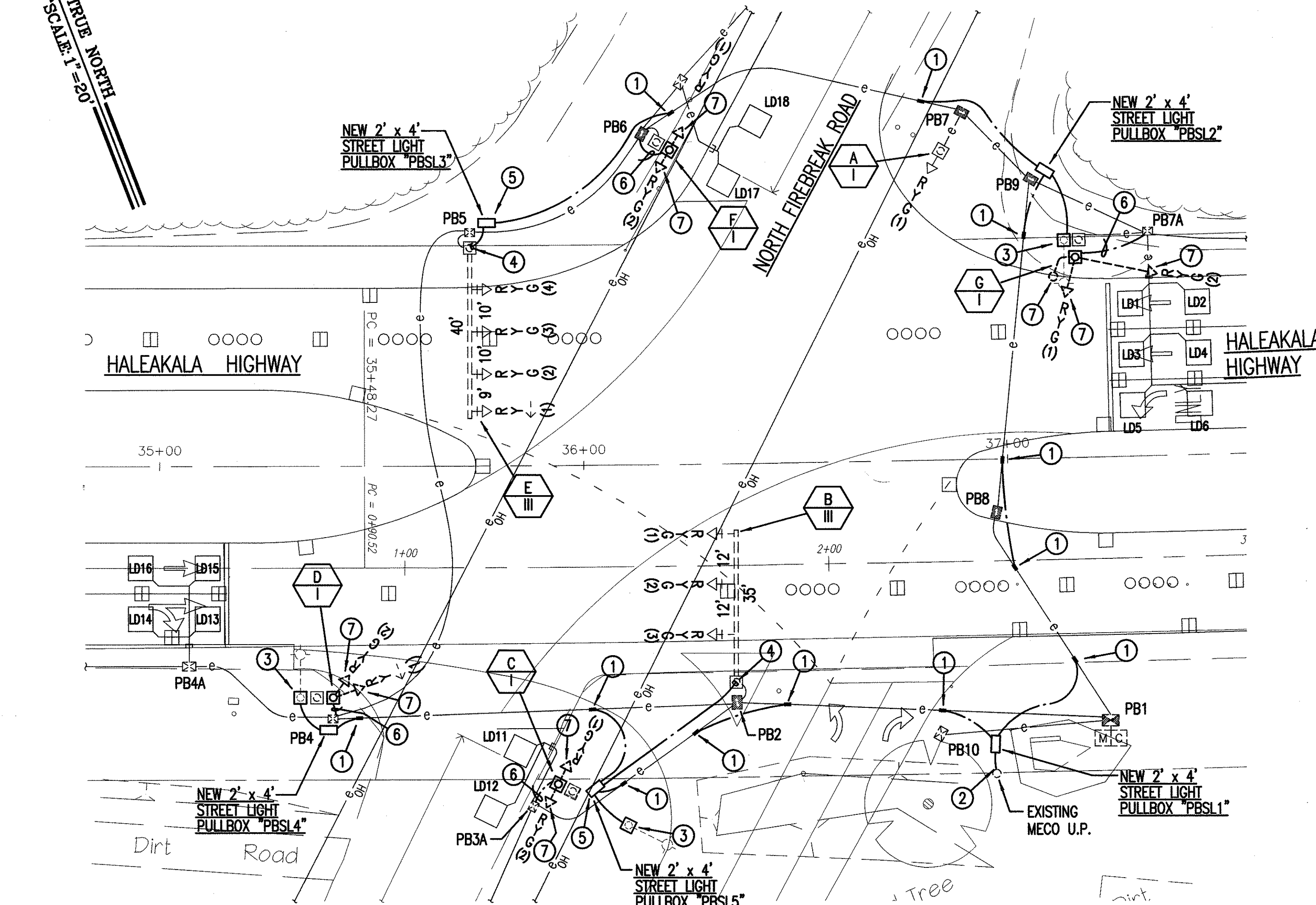
BRIAN T. ITOZAKI
LICENSED PROFESSIONAL ENGINEER
No. 9058-E
HAWAII, U.S.A.
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
SIGNATURE
EXPIRATION DATE
OF THE LICENSE: 04/30/06

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
PULLBOX AND COVER DETAILS
HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)
SCALE: AS NOTED DATE: MAY, 2005
SHEET No. E-27 OF 29 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	287	288



1 INTERSECTION ELECTRICAL PLAN (EXISTING/REMOVAL WORK)
E-28 SCALE: 1" = 20'



NOTES:
 1. MECO SHALL PROVIDE NEW LIGHT POLES ON CONTRACTOR PROVIDED FOUNDATIONS.
 2. 2' x 4' PULLBOXES SHALL BE MECO TYPE 30-2005. REFER TO HECO DWG. NO. 11313 FOR CONCRETE COVER.

2 INTERSECTION ELECTRICAL PLAN (NEW WORK)
E-28 SCALE: 1" = 20'

ELECTRICAL NOTES: EXISTING/REMOVAL WORK

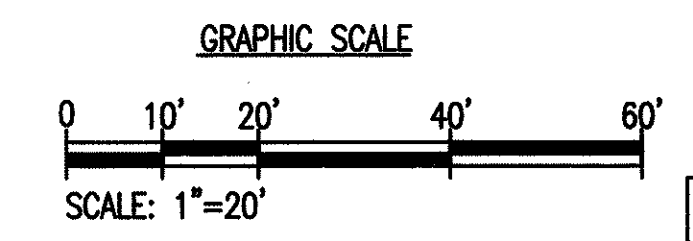
- ① DISCONNECT AND REMOVE EXISTING LUMINAIRE, ARM, POLE AND WIRES.
- ② REMOVE EXISTING STREET LIGHT CONDUCTORS UP TO EXISTING WATERPROOF CONNECTORS.
- ③ DISCONNECT, REMOVE AND REINSTALL EXISTING TRAFFIC SIGNALS AND WIRES.

ELECTRICAL NOTES: NEW WORK

- ① CHIP EXISTING CONCRETE JACKET AND INTERCEPT EXISTING 2" STREET LIGHTING DUCT WITH NEW 2" DUCT. ROUTE TO NEW STREET LIGHT PULLBOX. TAKE CAUTION TO NOT DAMAGE ADJACENT DUCTS.
- ② STUB NEW STREET LIGHT RACEWAY 3'-0" UP UTILITY POLE AND CAP.
- ③ PROVIDE NEW CONCRETE FOUNDATION FOR MECO HIGHWAY LIGHT STANDARD. SEE 2/E-24.
- ④ CHIP EXISTING POLE CONCRETE BASE TO INSTALL NEW 2" STREET LIGHTING DUCT. STUB DUCT UP 4" (ABOVE TOP OF BASE) IN CENTER OF BASE. PULL IN NEW 3/c #6 CABLE AND CONNECT TO EXISTING WATERPROOF CONNECTORS.
- ⑤ COIL 3' OF NEW STREET LIGHT CABLE (FROM EXISTING LUMINAIRE) IN NEW STREET LIGHT BOX.
- ⑥ PROVIDE NEW 2" SIGNAL DUCT AND WIRES. SEE CONDUIT/CABLE SCHEDULE ON SHEET E-29.
- ⑦ REINSTALL EXISTING TRAFFIC SIGNAL EQUIPMENT ON NEW POLE. CONNECT TO EXISTING/NEW WIRES.

DATE	REVISION
9/25/06	REVISIONS
11/4/05	REVISED PER MECO COMMENTS

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

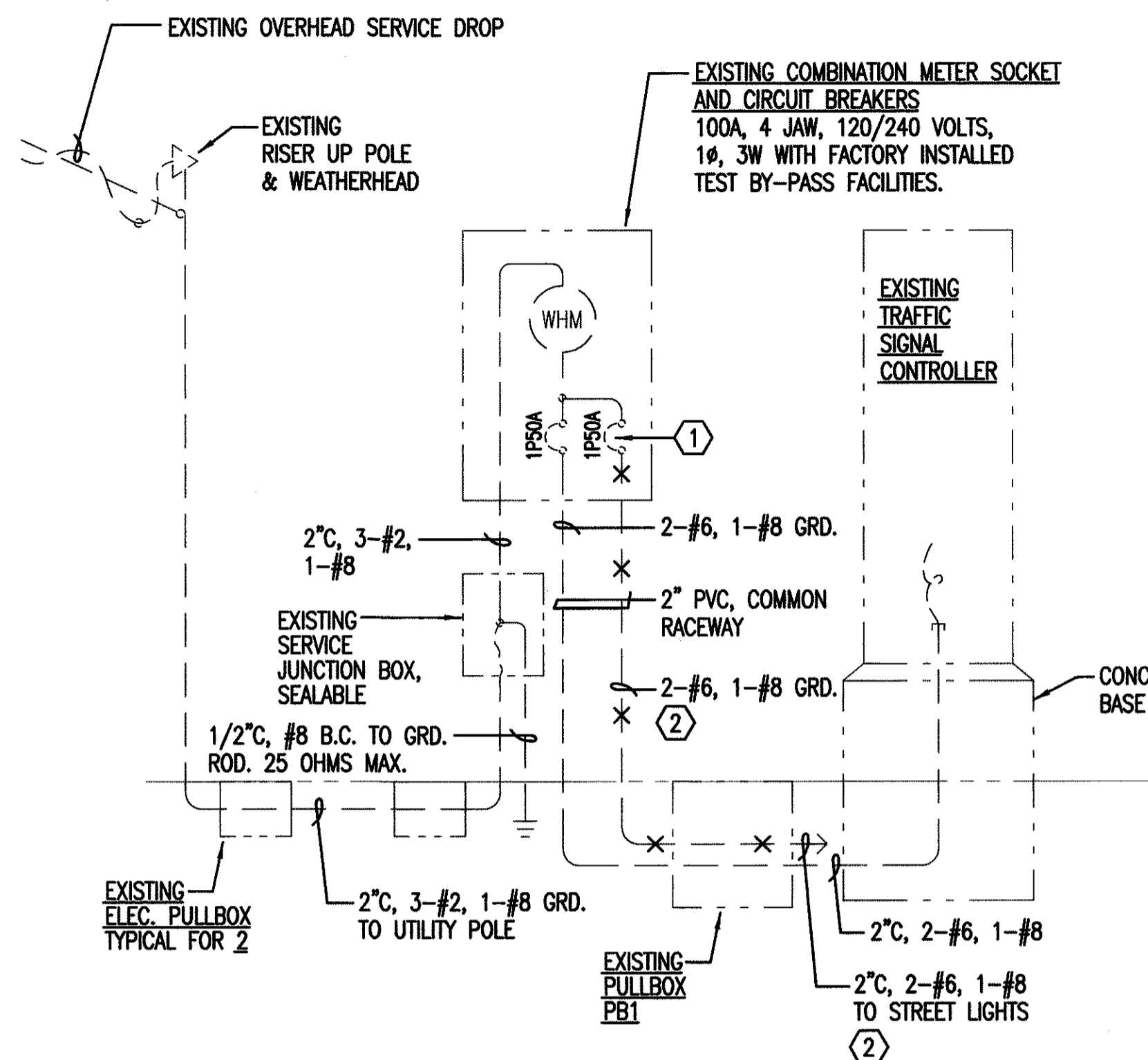


E-28

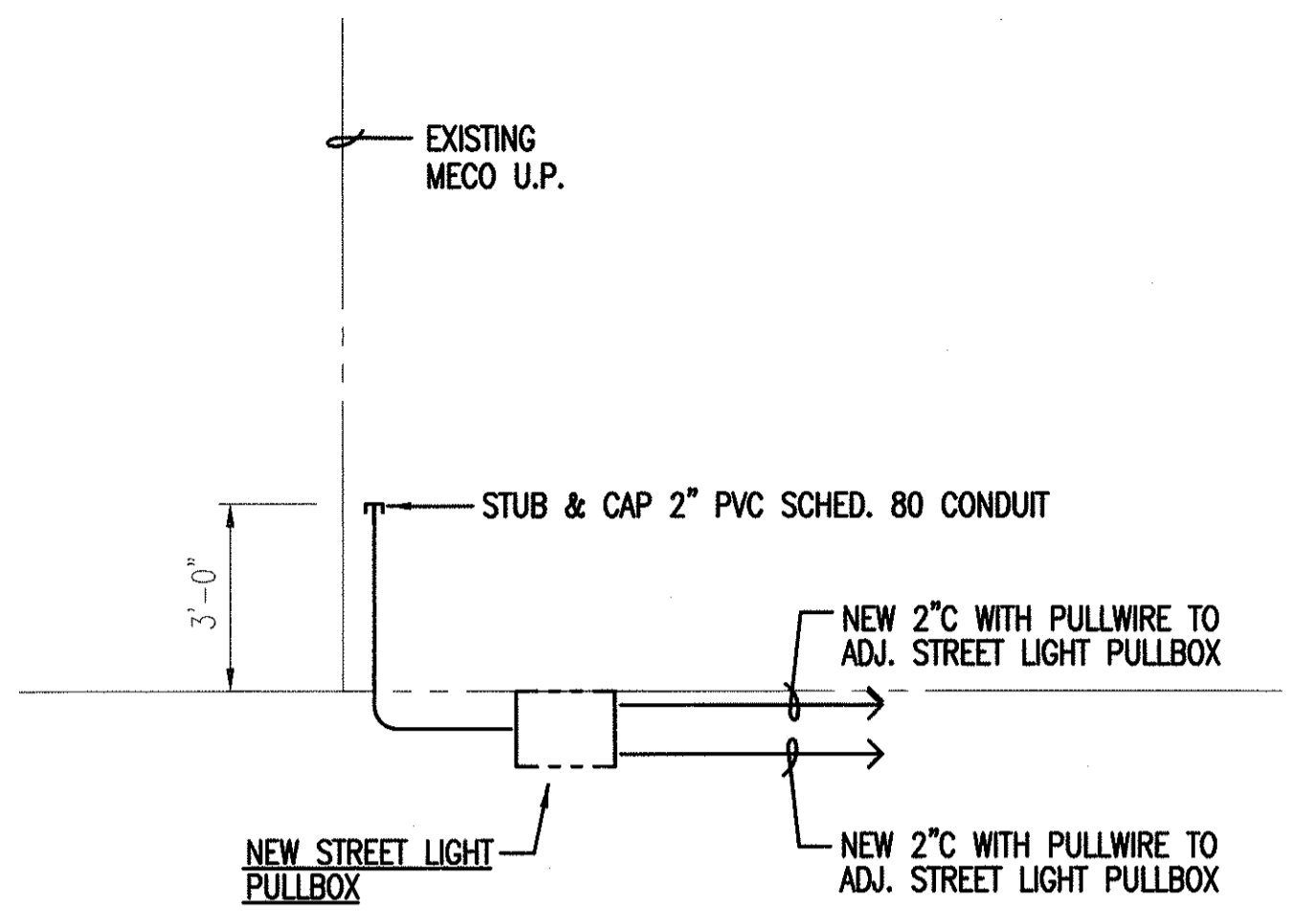
BRIAN T. ITOZAKI
 LICENSED PROFESSIONAL ENGINEER
 No. 9058-E
 HAWAII, U.S.A.
 THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
 SIGNATURE
 EXPIRATION DATE OF THE LICENSE: 04/30/06

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
**ELECTRICAL PLAN - NEW TRAFFIC SIGNAL
 POLES AT NORTH FIREBREAK ROAD INTERSECTION**
 HALEAKALA HIGHWAY WIDENING, PHASE 2
 HANA HIGHWAY TO PUKALANI BYPASS
 FED. AID PROJ. NO. NH-037-1(24)
 SCALE: AS NOTED DATE: MAY, 2005
 SHEET No. E-28 OF 29 SHEETS

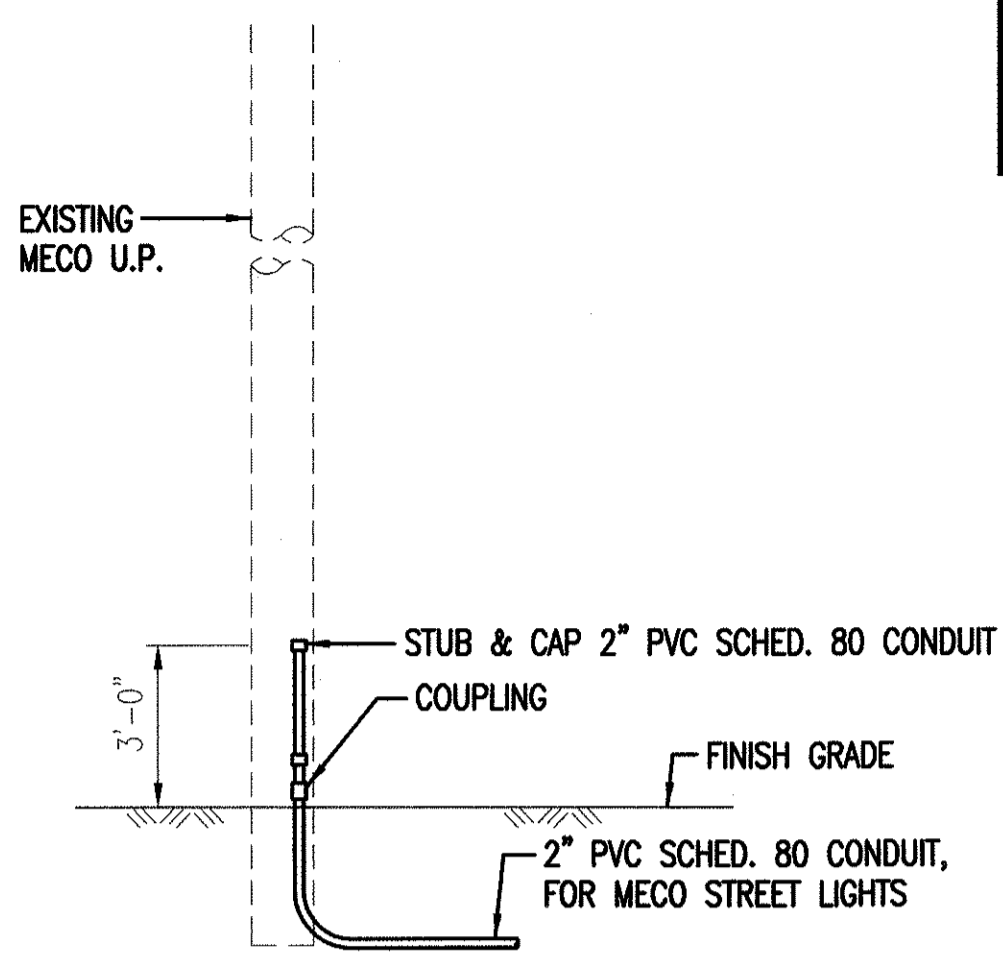
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-037-1(24)	2005	288	288



1 DETAIL - EXISTING ELECTRICAL SERVICE DIAGRAM
E-29 NOT TO SCALE



2 DETAIL - NEW STREET LIGHT SERVICE DIAGRAM
E-29 NOT TO SCALE



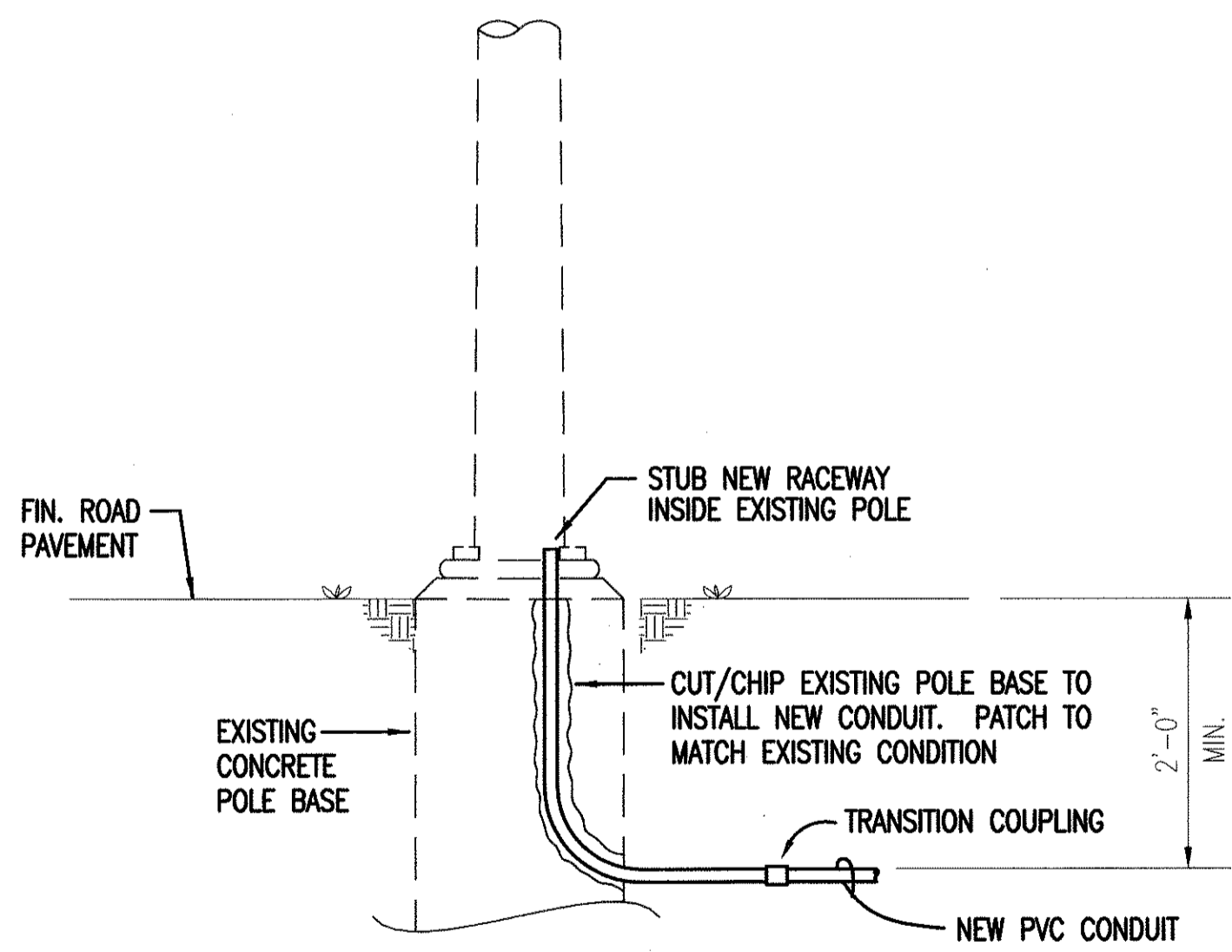
3 DETAIL - STREET LIGHT SERVICE RISER AT POLE
E-29 NOT TO SCALE

PARTIAL EXISTING CONDUIT/CABLE SCHEDULE

FROM	TO	MAIN CONTROL		SIGNAL CONTROL		DETECTORS (VEH)		SIGNAL FLASHER		STREET LIGHTS		SPARE	REMARKS
		CONDUIT 2"	CABLE 26/C #14	CONDUIT 2"	CABLE 4/C #14	CONDUIT 2"	CABLE 2/C #16	CONDUIT 2"	CABLE 2/C #12	CONDUIT 2"	CABLE 3/C #6		
METER	PB1	--	--	--	--	--	--	--	--	1	*	--	* REMOVE EXISTING WIRES
PB1	PB2	1	1	--	--	1	10	1	2	1	*	1	* REMOVE EXISTING WIRES
PB2	PB3A	1	1	--	--	1	2	--	--	1	*	--	* REMOVE EXISTING WIRES
PB3A	C	--	--	*	*	--	--	--	--	1	*	--	* REMOVE EXISTING WIRES
PB2	PB4	1	1	--	--	1	3	1	1	1	*	--	* REMOVE EXISTING WIRES
PB4	D	--	--	*	*	--	--	--	--	1	*	--	* REMOVE EXISTING WIRES
PB2	B	--	--	1	4	--	--	--	--	1	*	--	* REMOVE EXISTING WIRES
PB1	PB8	1	1	--	--	1	5	1	1	1	*	1	* REMOVE EXISTING WIRES
PB8	PB9	1	1	--	--	1	5	1	1	1	*	1	* REMOVE EXISTING WIRES
PB7	PB6	1	1	--	--	1	4	--	--	1	*	1	* REMOVE EXISTING WIRES
PB6	F	--	--	*	*	--	--	--	--	1	*	--	* REMOVE EXISTING WIRES
PB6	PB5	1	1	--	--	--	--	--	--	1	*	--	* REMOVE EXISTING WIRES
PB5	E	--	--	1	4	--	--	--	--	1	*	--	* REMOVE EXISTING WIRES
PB9	PB7A	--	--	--	--	1	3	1	1	1	*	--	* REMOVE EXISTING WIRES
PB7A	G	--	--	*	*	--	--	--	--	1	*	--	* REMOVE EXISTING WIRES

ELECTRICAL NOTES: EXISTING/REMOVAL WORK

- ① SWITCH OFF EXISTING CIRCUIT BREAKER. PROVIDE LABEL INDICATING "SPARE".
- ② REMOVE EXISTING WIRES. PULL IN NEW PULLWIRE.



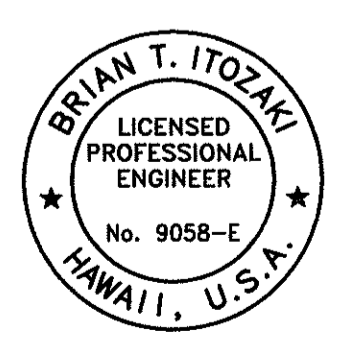
4 DETAIL - NEW STREET LIGHT RACEWAY AT EXISTING POLE BASE
E-29 NOT TO SCALE

NEW CONDUIT SCHEDULE

FROM	TO	STREET LIGHTS		SIGNAL CONTROL		REMARKS
		CONDUIT 2"	CABLE 3/C #6	CONDUIT 2"	CABLE 4/C #14	
PBSL1	MECO POLE	1				CE - CONCRETE ENCASED
PBSL1	PBSL2	1				CE (NEW)
PBSL2	G	1				CE (INTERCEPT EXISTING)
PBSL2	PBSL3	1				CE (NEW)
PBSL3	E	1	1			CE (INTERCEPT EXISTING)
PBSL1	PBSL5	1				CE (NEW)
PBSL5	B	1	1			CE (NEW)
PBSL5	C	1				CE (NEW)
PBSL5	PBSL4	1				CE (INTERCEPT EXISTING)
PBSL4	D	1				CE (NEW)
PB3A	C			1	2	CE (NEW)
PB4	D			1	2	CE (NEW)
PB6	F			1	2	CE (NEW)
PB7A	G			1	2	CE (NEW)

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

9/25/06	REVISIONS
11/4/05	REVISED PER MECO COMMENTS
DATE	REVISION



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
SIGNATURE
EXPIRATION DATE OF THE LICENSE: 04/30/06

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
ELECTRICAL DETAILS AND DIAGRAMS
FOR NORTH FIREBREAK ROAD INTERSECTION
HALEAKALA HIGHWAY WIDENING, PHASE 2
HANA HIGHWAY TO PUKALANI BYPASS
FED. AID PROJ. NO. NH-037-1(24)
SCALE: AS NOTED DATE: MAY, 2005
SHEET No. E-29 OF 29 SHEETS

E-29