FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(1)	2005	111	144

ELECTRICAL SITE PLAN

SCALE: 1"=400'

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

22 DEC 2004

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL SITE PLAN

North–South Road
Phase 1A
F.A.I. Proj. No. STP–8930(1)

Scale: AS NOTED — Date: DEC. 22, 2004

SHEET No. E0.1 OF 15 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(1)	2005	112	144

ELECTRICAL SYMBOLS

SYMBOL	DESCRIPTION
	Street Light Standard Transformer Base & Concrete Foundation. See Detail A/E2.4
	Street Light Standard Transformer Base & Modified Concrete Foundation. See Detail A/E2.5
	Future Street Light Standard
	Existing Street Light
	HECo 2' X 4' Pullbox
	HECo 4' X 6' Handhole
	HECo 6' X 11' Manhole
	HECo 6' X 14' Manhole
	HECo Transformer Pad Lot
	HECo Switch Equipment Pad Lot
	HECo PMH3 Switch Pad Lot
	HTCo 2' X 4' Handhole or Pullbox
	HTCo 5' X 10' Manhole
	HTCo 6' X 12' Manhole
	Traffic Signal Pullbox, Type "A", See Sheet E2.3
	Traffic Signal Pullbox, Type "B", See Sheet E2.3
	Traffic Signal Pullbox, Type "C", See Sheet E2.3
	Street Light Pullbox, Type "C", See Sheet E2.3
	Street Light Pullbox, Type "A", See Sheet E2.3
	Existing HECo Manhole, Handhole or Pullbox
	Existing Telephone Handhole, Pullbox, or Manhole
	Utility Pole Provided By Utility Co.
	Exst Utility Pole
	Exst Utility Pole to be Removed By Utility Co.
	Guying and Guy Anchor Provided By Respective Utility Co.
	Exst Guying and Anchor
	Exst Guying and Anchor to be Removed By Respective Utility Co.

SYMBOL	DESCRIPTION
2-2L	Electric/Signal Ductline with Designators; Indicates Duct Section "A" with "2-2L" Ducts. See Sheets E2.1 & E2.2 for Duct Sections and Sheet E2.2 for Conduit Schedules.
	Stub, Cap, & Mark Conduits; Provide Pullwire
—E—	Electric Ductline
—SL—	Street Light Ductline & Wiring
—T—	Signal Ductline
—TS—	Traffic Signal Ductline & Wiring
—e—	Exst Elec/Signal Ductline & Wiring
—x—e—x—	Exst Elec/Signal Ductline to be Abandoned In Place
—sl—	Exst Street Light Ductline & Wiring
—x—sl—x—	Exst Street Light Ductline to be Abandoned In Place
—ts—	Exst Traffic Signal Ductline
—x—ts—x—	Exst Traffic Signal Ductline to be Abandoned In Place
—E/OH—	Elec Overhead Lines
—T/OH—	Signal Overhead Lines
—SL/OH—	Overhead Street Light Wiring, Provide Conn to Sec Elec
—e/oh—	Exst Elec Overhead Lines
—x—e/oh—	Exst Elec Overhead Lines to be Removed By HECo
—t/oh—x—	Exst Signal Overhead Lines
—x— t/oh —x—	Exst Signal Overhead Lines to be Removed By HTCo and Catv
— et/oh —	Exst Elec/Signal Overhead Lines
—x— et/oh —x—	Exst Elec/Signal Overhead Lines to be Removed By HECo, HTCo and Catv
[D]	Exst HTCo. Air Dryer and Air Pressure Assessories
[E]	Exst Electrical Equipment
[S]	Concrete Stub-Out Marker, See Detail F/E2.4
[5]	Note Symbol; See Sheet
	Exst Metering Equipment

HECO REFERENCE SPECIFICATIONS

SPEC. NO.	DESCRIPTION
CS7001	Construction of Underground Facilities
CS7003	Construction of Electrical Facilities
CS7202	General Conditions for Construction of Projects
CS7401	Concrete Work
CS9401	Design and Construction of Precast Manholes and Handholes

HECO REFERENCE DRAWINGS

DWG NO.	DESCRIPTION
16688 Sht. 1&2	Details Handholes & Manholes, UG Standards
18844	Handhole Type 611 UG Standard
71467	Manhole Type 614 Structural Details UG Standards
11249	Material Drawing for Concrete Pad System
22-2005	Type. 3 Phase Padmounted TSF Requirements, Commercial Distribution System
30-5000	Location, Clearances and Protection Details, Pad-Mounted Equipment
30-5001	1 Phase Pad Mounted TSF Concrete Pad URD Installation
30-5011	3 Phase Deadfront Padmount TSF - Conc. Pads, UG Ducts & Structures 75 to 300 KVA
30-5512	Concrete Pad Installation 25KV PMH-3 Switch Enclosure
30-5515	Concrete Pad Installation PMH-9 Auto. Trans. Swgr. 25KV
Note:	Reference Drawings Referred to in Description of Equipment Schedule.

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22-DEC-2004

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL SYMBOLS

North-South Road
Phase 1A
F.A.I. Proj. No. STP-8930(1)

Scale: AS NOTED
Date: DEC. 22, 2004

SHEET No. E0.2 OF 15 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.	STP-8930(1)	2005	113	144

NOTES FOR CONSTRUCTION WITHIN STATE RIGHT-OF-WAY

1. The Contractor shall obtain a permit to perform work upon State Highways from the State Highways' District Engineer, at 727 Kakoi Street, prior to commencement of work within the State's Highway Right-of-Way.
2. Construction and restoration of all existing Highway facilities within the State's Right-of-Way shall be done in accordance with all applicable Sections of the current Standard Specifications For Road, Bridge and Public Works Construction, and the Specifications for Installation of Miscellaneous Improvements Within State Highway, of the State Highways Division.
3. See Contract Documents for Work Hours.
4. The Contractor shall provide, install, and maintain all necessary signs, lights, flares, barricades, markers, cones and other protective facilities, and shall take all necessary precautions for the protection, convenience, and safety of public traffic. All such protective facilities and precautions to be taken shall conform with the "Administrative Rules of Hawaii Governing the Use of Traffic Control Devices at Work Sites on or Adjacent to Public Streets and Highways", adopted by the Director of Transportation, and the current U.S. Federal Highways Administration "Manual on Uniform Traffic Control Devices for Streets and Highways, Part VI - Standards and Guides for Traffic Control for Street and Highway Construction, Maintenance, Utility and Incident Management Operations". If lane closures are required during construction, a Traffic Control Plan shall be incorporated into the construction plans and must be approved by the Division prior to issuance of the permit.
5. The minimum pavement structure shall consist of:
   a. Residential Driveways
      1) 2" Asphalt Concrete (Mix IV) and 6" Aggregate Base Course, or 2" Asphalt Concrete and 2 1/2" Asphalt Concrete Base Course or Asphalt Concrete.
      2) 4" Class "A" Concrete Reinforced with 6" x 6" W2.9 x W2.9 Wire Mesh on 12" Aggregate Subbase, if deemed necessary by the Engineer.
   b. Commercial Driveways, Sideroads, and Utility Installations on Minor Highways
      1) 2 1/2" Asphalt Concrete (Mix IV), 8" Aggregate Base Course and 12" Subbase, or 2 1/2" Asphalt Concrete and 8" Asphalt Concrete Base Course or Asphalt Concrete.
      2) 6" of Class "A" Concrete Reinforced with 6" x 6" W2.9 x W2.9 Wire Mesh on 12" Aggregate Subbase, if deemed necessary by the Engineer.
6. No material and/or equipment shall be stockpiled or otherwise stored within the Highway right-of-way, except at locations designated in writing and approved by the District Engineer.
7. Compaction tests shall be taken in accordance with the Specifications for installation of miscellaneous improvements within State Highways, as follows:
   a. Subbase: One (1) Compaction Test per lift per 100 lineal feet of roadway.
   b. Base Course: One (1) Compaction Test per lift per 100 lineal feet of roadway.
   c. One (1) Compaction Test per lift per 300 lineal feet of trench.
8. Prior to commencing trench excavation work, the Contractor shall take a profile along the centerline of the proposed utility trench. This information shall be used in the verification of restoring the roadway to its original condition. A copy of the profile shall be submitted to the District Engineer.
9. The Contractor shall provide an adequate and safe non-skid bridging material, including shoring, over trenches in pavement areas. The bridging shall be able to support all types of vehicular traffic.
10. Unless otherwise noted, no trench shall be opened more than 300 feet in advance of installed and tested pipeline and/or ductline.
11. Existing drainage systems shall be functional at all times.
12. The Contractor shall exercise care to minimize damages to existing Highway improvements. All damages shall be repaired by the Contractor, at his expense, to the satisfaction of the District Engineer.
13. All regulatory, guide, and construction signs and barricades shall have a high-intensity reflective background.
14. Driveways shall be kept open unless the Owners of the properties using these rights-of-way are otherwise provided for satisfactorily.
15. Where pedestrian walkways exist, they shall be maintained in a safe and passable condition, or other facilities for pedestrians shall be provided. Passages between walkways at intersections shall likewise be provided.
16. The Contractor shall reference to the satisfaction of the District Engineer, all existing traffic signs, posts, and pavement markings prior to the commencement of construction. The Contractor shall replace or repair all traffic signs, posts, and pavement markings disturbed by his activities, at his expense, unless directed otherwise by the District Engineer or his representative.
17. The Contractor shall exercise care when performing work in or adjacent to the State Highway Right-of-Way. Damages to existing facilities shall be immediately reported to the respective Utility Companies, and/or City or State Agencies. The repair work shall be done at the Contractor's expense.
18. The Contractor shall notify the State Highways' Highway Lighting and Traffic Signal Supervisor (834-4581), three (3) working days prior to commencing work.
19. Traffic signals shall be kept operational during construction, and if deemed necessary by the District Engineer or his representative, a temporary vehicle detection device shall be installed. All work shall be done in accordance to the requirements of the Department of Transportation Services, City and County of Honolulu, and paid for by the Contractor.
20. The Contractor shall notify Oahu Transit Services, Inc. (OTS), Ed Sniffen at 848-4571, or Lowell Tom at 848-4578, two weeks prior to commencing any work. The Contractor shall inform OTS of the location and scope of work, proposed closure of any street or traffic lane, and the need to relocate any bus stop.
21. The Permit to perform work upon State Highways may be revoked because of default in any of the following, but not limited to, conditions:
   a. Work performed before or after permitted hours.
   b. Failure to maintain roadway surfaces in a smooth and safe condition.
   c. Failure to clean up construction debris generated from Project work.
   d. Failure to provide proper traffic control.
   e. Failure to replace damaged pavement markings and signs.

TRAFFIC SIGNALS & TECHNOLOGY NOTES:

1. All work shall be done in accordance with the "Standard Specifications for Public Works Construction", September, 1986, of the Department of Public Works, City and County of Honolulu, except as modified herein or in the Special Provisions.
2. The Contractor shall verify with the respective Utility Companies and Government Agencies, the locations of all electric, telephone, traffic signal, street light, fire alarm, gas, water, sewer, drain, and other lines crossing the excavation path or in excavation areas.
3. Locations of traffic signal conduits shall be staked out by the Contractor and approved by the Engineer prior to any excavation.
4. All structures, pavements, utilities, landscaping, and other topographical features shown on the Intersection Drawings are existing and are to remain unless noted or indicated otherwise.
5. The Contractor shall notify all affected Utility Companies and Government Agencies of their intent to begin construction on any intersection or street at least two (2) weeks prior to the start of such construction.
6. The Contractor may close only one lane of traffic at a time for any reason. during the peak traffic periods from 6:00 to 9:00 a.m. and from 3:00 to 6:00 p.m., Monday through Friday, all lanes shall be kept open and maintained at all times.
7. The Contractor shall notify the Traffic Control Branch, Department of Transportation Services, three (3) working days prior to commencing work on the traffic signal system (phone: 523-4589).
8. The Contractor shall be responsible for any damages to the existing traffic signal facilities, including the Traffic Signal Interconnecting System. Any and all damages to these facilities shall be repaired by the Contractor at his cost in accordance with the requirements of the City and County of Honolulu.

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22 DEC 2004

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STATE NOTES AND MISCELLANEOUS DETAILS
North-South Road
Phase 1A
F.A.I. Proj. No. STP-8930(1)

Scale: AS NOTED   Date: DEC. 22, 2004

SHEET No. E0.3 OF 15 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.	STP-8930(1)	2005	114	144

HAWAIIAN ELECTRIC COMPANY (HECO) NOTES

1. LOCATION OF HECO FACILITIES

The location of HECO's overhead and underground facilities shown on the plans are from existing records with varying degrees of accuracy and are not guaranteed as shown. The Contractor shall verify in the field the locations of the facilities and shall exercise proper care in excavating and working in the area. wherever connections of new utilities to existing utilities and utility crossings are shown, the Contractor shall expose the existing lines at the proposed connections and crossings to verify the depths prior to excavation for the new lines. The Contractor shall be responsible for any damages to HECO's facilities whether shown or not shown on the plans.

2. COMPLIANCE WITH HAWAII OCCUPATIONAL SAFETY AND HEALTH LAWS

The Contractor shall comply with the state of Hawaii's Occupational Safety and Health Laws and Regulations, including without limitation, those related to working on or near exposed or energized electrical lines and equipment.

3. EXCAVATION PERMIT

The Contractor shall obtain an excavation permit from HECO's Techinical Division (543-5654) located at 820 Ward Avenue, 4th floor, two weeks prior to starting construction. Please refer to our request number at that time.

4. CAUTION!!! ELECTRICAL HAZARD!!!

Existing HECO overhead and underground lines are energized and will remain energized during construction unless prior special arrangements have been made with HECO. Only HECO personnel are to handle these energized lines and erect temporary guards to protect these lines from damage. The Contractor shall work cautiously at all times to avoid accidents and damage to existing HECO facilities, which can result in electrocution.

5. OVERHEAD LINES

State law requires that a worker and the longest object he or she may contact cannot come closer than a minimum radial clearance of 10 feet when working close to or under any overhead lines rated 50kV and below. For each additional 1kV above 50kV, an additional 0.4 inch shall be added to the 10-foot clearance requirement. The preceding information on line clearance requirements is provided as a convenience and it is the Contractor's responsibility to be informed of and comply with any revisions or amendments to the law.

Should the Contractor anticipate that his work will result in the need to encroach within the minimum required clearance at any time, the Contractor shall notify HECO at least four (4) weeks prior to the planned encroachment so that, if feasible, the necessary protections (e.g. relocate, de-energize, or blanket HECO lines) can be put in place. HECO's cost of safeguarding its lines will be charged to the Contractor.

Contact HECO's Customer Installations Department at 543-7846 for assistance in identifying and safeguarding overhead power lines.

Refer to Section X of HECO's Electric Service Installation Manual for additional guidelines when working around HECO's facilities. A copy may be obtained from HECO's Customer Installations Department.

6. POLE BRACING

A minimum clearance of 10 feet must be maintained when excavating around utility poles and/or their anchor system to prevent weakening or pole support failure. Should work require excavating within 10 feet of a pole and/or its anchor system, the Contractor shall protect, support, secure, and take all other precautions to prevent damage to or leaning of these poles. The Contractor is responsible for all associated costs to brace, repair, or straighten poles. All means of structural support for the pole proposed by the Contractor shall first be reviewed by HECO before implementation. For pole bracing instructions, the Contractor shall call the HECO Construction and Maintenance Dept., Customer & System Superintendent at 543-4223 a minimum of two (2) weeks in advance.

7. UNDERGROUND LINES

The Contractor shall exercise extreme caution whenever construction crosses or is in close proximity of underground lines. HECO's existing electrical cables are energized and will remain energized during construction. Only HECO personnel are to break into existing HECO facilities, handle these cables, and erect temporary guards to protect these cables from damage. The cost of HECO's assistance in providing proper support and protection of its underground lines will be charged to the Contractor. Special precautions are required when excavating near HECO's 138kV underground lines (see HECO Instructions to Consultants/Contractors on "excavation near HECO's underground 138kV lines" for detailed requirements).

For verification of underground lines, the Contractor shall call HECO's Underground Division at 543-7049 a minimum of 72 hours in advance.

For assistance in providing proper support and protection of these lines, the Contractor shall call HECO's Construction & Maintenance Dept., Customer & System Superintendent, at 543-4223, a minimum of two (2) weeks in advance.

8. UNDERGROUND FUEL PIPELINES

The Contractor shall exercise extreme caution whenever construction crosses or is in close proximity of HECO's underground fuel oil pipelines. Special precautions are required when excavating near HECO's underground fuel oil pipelines (see HECO Instructions to Consultants/Contractors on "excavation near HECO's underground fuel pipelines" for detailed requirements).

9. EXCAVATIONS

When trench excavation is adjacent to or beneath HECO's existing structures or facilities, the Contractor is responsible for:

a) sheeting and bracing the excavation and stabilizing the existing ground to render it safe and secure and to prevent possible slides, cave-ins, and settlements.
b) properly supporting existing structures or facilities with beams, struts, or under-pinnings to fully protect it from damage.
c) backfilling with proper backfill material including special thermal backfill where existing (refer to Engineering Department for thermal backfill specifications).

10. RELOCATION OF HECO FACILITIES

Any work required to relocate or modify HECO facilities shall be done by HECO, or by the Contractor under HECO's supervision. The Contractor shall be responsible for all coordination, and shall provide necessary support for HECO's work, which may include, but not be limited to, excavation and backfill, permits and traffic control, barricading, and restoration of pavement, sidewalks, and other facilities.

All costs associated with any relocation or modification (either temporary or permanent) for the convenience of the Contractor, or to enable the Contractor to perform his work in a safe and expeditious manner in fulfilling his contract obligations shall be borne by the Contractor.

11. CONFLICTS

Any redesign or relocation of HECO's facilities not shown on the plans may be cause for lengthy delays. The Contractor acknowledges that HECO is not responsible for any delay or damage that may arise as a result of any conflicts discovered or identified with respect to the location or construction of HECO's electrical facilities in the field, regardless of whether the Contractor has met the requested minimum advance notices. In order to minimize any delay or impact arising from such conflicts, HECO should be notified immediately upon discovery or identification of such conflict.

12. DAMAGE TO HECO FACILITIES

The Contractor shall be responsible for the protection of all HECO surface and subsurface utilities and shall be responsible for any damages to HECO's facilities as a result of his operations. The Contractor shall immediately report such damages to HECO's Trouble Dispatcher at 548-7961. Repair work shall be done by HECO or by the Contractor under HECO's supervision costs for damages to HECO's facilities shall be borne by the Contractor.

In case of damage or suspected damage to HECO's fuel pipeline, the Contractor shall immediately notify HECO's Honolulu Power Plant Shift Supervisor at 533-2102 (a 24-hour number) so HECO personnel can secure the damaged section and report any oil spills to the proper authorities. all costs associated with the damage, repair, and oil spill cleanup shall be borne by the Contractor.

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

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22 DEC 2004

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HECO NOTES 1

North-South Road
Phase 1A
F.A.I. Proj. No. STP-8930(1)

Scale: AS NOTED
Date: DEC. 22, 2004

SHEET No. E0.4 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(1)	2005	115	144

HAWAIIAN ELECTRIC COMPANY (HECO) NOTES CONT.

13. *HECO STAND-BY PERSONNEL*

The Contractor may request HECO to provide an inspector to stand-by during construction near HECO's facilities. The cost of such inspection will be charged to the Contractor.

The Contractor shall call the HECO Construction and Maintenance Dept., Customer & System Superintendent at 543-4223 a minimum of 5 working days in advance to arrange for HECO stand-by personnel.

14. *CLEARANCES*

The following clearances shall be maintained between HECO's ductline and all adjacent structures (charted and uncharted) in the trench:

Structure Type	Minimum Clearance(inches)
Water Lines, Parallel	36 (a)
Water Lines, Crossing	12 (b)
Sewer Lines, Parallel	36 (c)
Sewer Lines, Crossing	24 (d)
Drain Lines, Parallel	12
Drain Lines, Crossing	6 (e)
Electrical and Gas Lines, Parallel	12
Electrical and Gas Lines, Crossing	12
Telephone Lines, Parallel	6 (e)
Telephone Lines, Crossing	6 (e)
Chevron Oil Lines, Parallel	36
Chevron Oil Lines, Crossing	48 below oil line (f)

(a) *The minimum horizontal clearances to water lines parallel to electrical ductlines must be increased to 60 inches if the water line is greater than 16 inches in diameter*
(b) *The minimum vertical clearances to water lines crossing electrical ductlines can be reduced to 6 inches if the electrical ductline structure is concrete encased and is below the water line and the water line is less than 16 inches in diameter.*
(c) *A minimum horizontal clerance of 36 inches is required between new handholes and existing sewer laterals.*
(d) *The minimum vertical clearances to sewer pipes crossing electrical ductlines can be reduced to 12 inches if the sewer pipe is jacketed in concrete.*
(e) *The minimum clearances shall be increased to 12 inches if the electrical ductline is direct buried.*
(f) *The minimum vertical clearances to oil lines crossing electrical ductlines can be reduced to 24 inches below oil lines if the crossings are encased in 6 inches of concrete.*
(g) *The Contractor shall notify the Construction Manager & HECO of any heat sources (power cable duct bank, steamline, etc.) encountered that are not properly identified on the drawing.*

The following clearance shall be maintained between HECO's fuel oil pipelines and all adjacent structures: 24-inches, parallel or crossing. The minimum clearance can be reduced to 12 inchel (parallel and below only) if the structure is jacketed in concrete.

15. *INDEMNITY*

The Contractor shall indemnify, defend and hold harmless HECO from and against all losses, damages, claims, and actions, including but not limited to reasonable attorney's fees and costs based upon or arising out of damage to property or injuries to persons, or other tortious acts caused or contributed to by Contractor or anyone acting under its direction or control or on its behalf; provided Contractor's indemnity shall not be applicable to any liability based upon the sole negligence of HECO.

16. *SCHEDULE*

Contractor shall furnish his construction schedule 14 working days prior to starting work on HECO facilities. Contractor shall give HECO, in writing 5 working days notice to proceed with HECO's portion of work.

17. *AUTHORITY*

All construction, restoration work, and inspection shall be subject to whichever governmental agency has authority over the work.

18. *SPECIFICATIONS*

Construction of HECO's underground facilities shall be constructed in accordance with the latest revisions of HECO Specifications CS7001, CS7003, CS7202, CS9301, and CS9401 and applicable HECO Standards.

19. *CONSTRUCTION*

Contractor shall furnish all labor, materials, equipment, and services to properly perform and fully complete all work shown on the contract, drawings, and specifications. All materials shall be new and manufactured in the united states of america. All manhole, handhole, and ductline installations shall be inspected and approved by HECO prior to excavation and prior to placing concrete. Contractor shall notify HECO's Inspection Division at 543-4356 at least 48 hours prior to placing concrete.

Contractor to coordinate work to break into HECO's existing electrical facilities with HECO's Underground Division at 543-7871 at least 10 working days in advance.

20. *STAKEOUT*

The Contractor shall arrange for toneouts of all underground facilities and shall stakeout all proposed HECO facilities within the project area so as to not conflict with any utility (existing or proposed) and any proposed construction or improvement work for verification by HECO before proceeding with HECO work.

21. *DUCTLINES*

All ductline installations shall be PVC Schedule 40 encased in concrete, unless otherwise noted. all completed ductlines shall be mandrel tested by the Contractor in the presence of HECO's inspector using HECO's standard practice. The Contractor shall install a 1/8" polyolefin pull line in all completed ductlines after mandrel testing is complete.

22. *JOINT POLE REMOVAL*

The last joint pole occupant off the poles shall remove the poles.

23. *AS-BUILT PLANS*

The Contractor shall provide HECO with two sets of as-built reproducible tracings showing the offsets, stationing, and vertical elevation of the duct line(s) constructed.

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22 Dec 2004

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HECO NOTES II

North-South Road
Phase 1A
F.A.I. Proj. No. STP-8930(1)

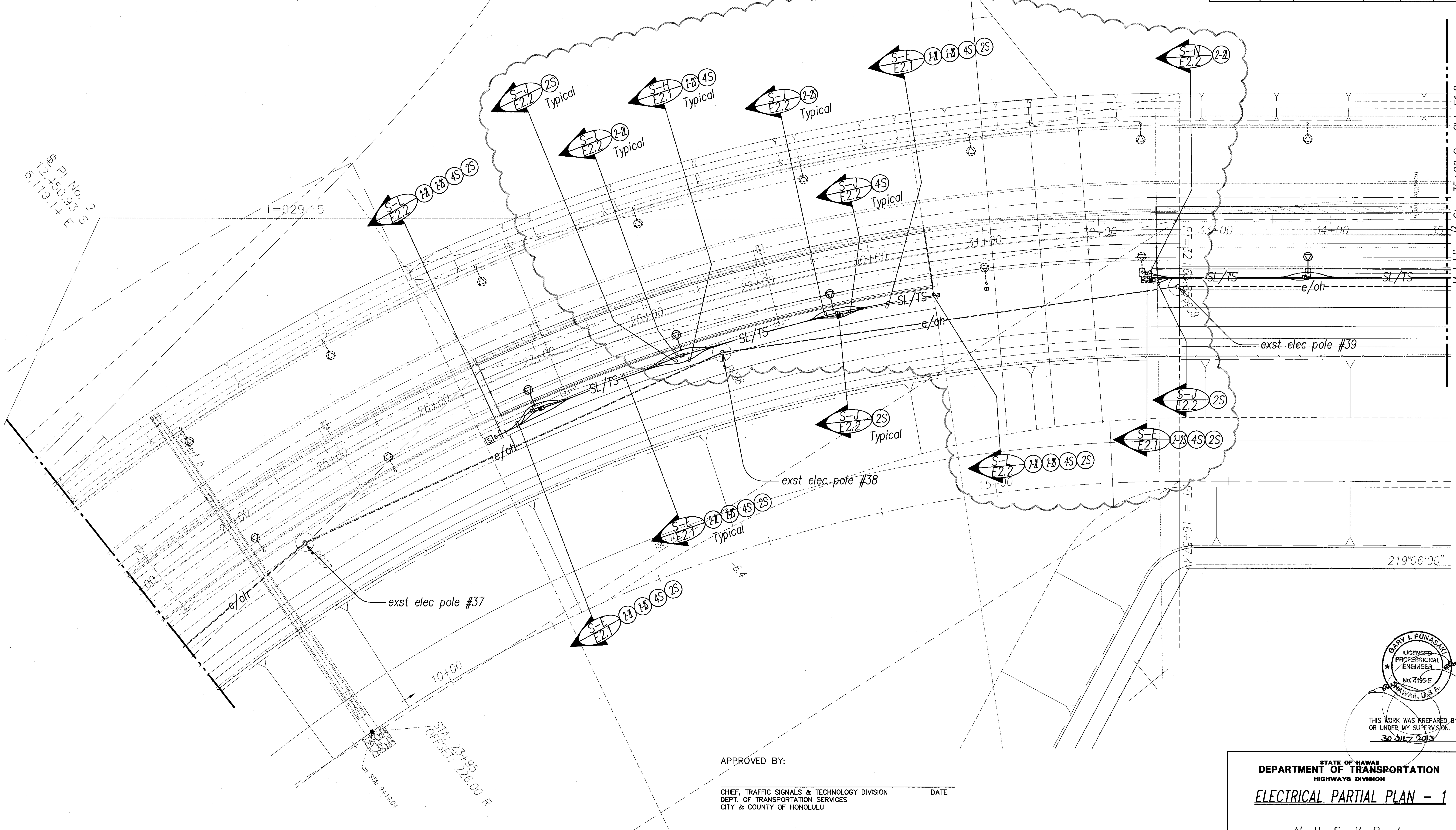
Scale: AS NOTED Date: DEC. 22, 2004

SHEET No. E0.5 OF 15 SHEETS

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

LAST SAVE: 12/21/04 @ 13:26:33 BY: KMT PLOT SC 1"=1'

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(1)	2004	C0116	144



APPROVED BY:

CHIEF, TRAFFIC SIGNALS & TECHNOLOGY DIVISION DATE
DEPT. OF TRANSPORTATION SERVICES
CITY & COUNTY OF HONOLULU

NORTH

ELECTRICAL PARTIAL PLAN – 1
SCALE: 1"=40'

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.
30 JULY 2013

DATE	REVISION
6/21/06	DELETED ELEC BETWEEN STA. NO. 30+50 AND 31+50 PER SDOT

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL PARTIAL PLAN – 1

North–South Road
Phase 1A
F.A.I. Proj. No. STP–8930(1)

Scale: AS NOTED Date: DEC. 22, 2004

SHEET No. E1.1 OF 15 SHEETS

"AS–BUILT" C0116

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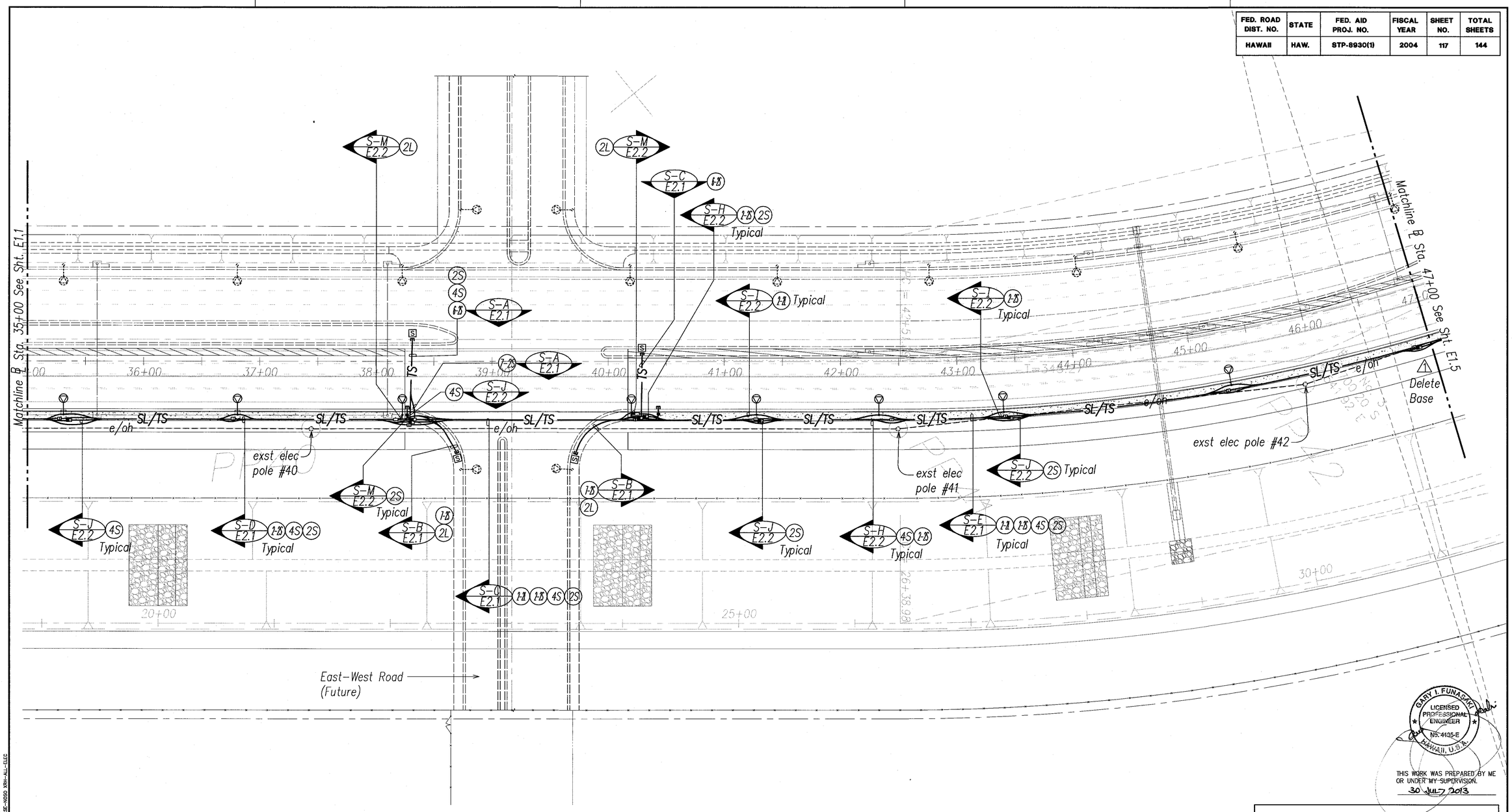
NOTE BOOK
No.
LAST SAVE: 06/16/06 @ 08:43:09 BY: TE PLOT SC 1=40

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(1)	2004	117	144



APPROVED BY:

CHIEF, TRAFFIC SIGNALS & TECHNOLOGY DIVISION DATE
DEPT. OF TRANSPORTATION SERVICES
CITY & COUNTY OF HONOLULU

NORTH

ELECTRICAL PARTIAL PLAN – 2

SCALE: 1"=40'

40' 20' 0 40' 80' 120'

SCALE: GRAPHIC SCALE 1"=40'

DATE	REVISION
	⚠ FO #2

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL PARTIAL PLAN – 2

North–South Road
Phase 1A
F.A.I. Proj. No. STP-8930(1)

Scale: AS NOTED Date: DEC. 22, 2004

SHEET No. E1.2 OF 15 SHEETS

"AS-BUILT"

117

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

LAST SAVE: 07/30/13 @ 11:02:47 BY: TE PLOT SC: 1=40
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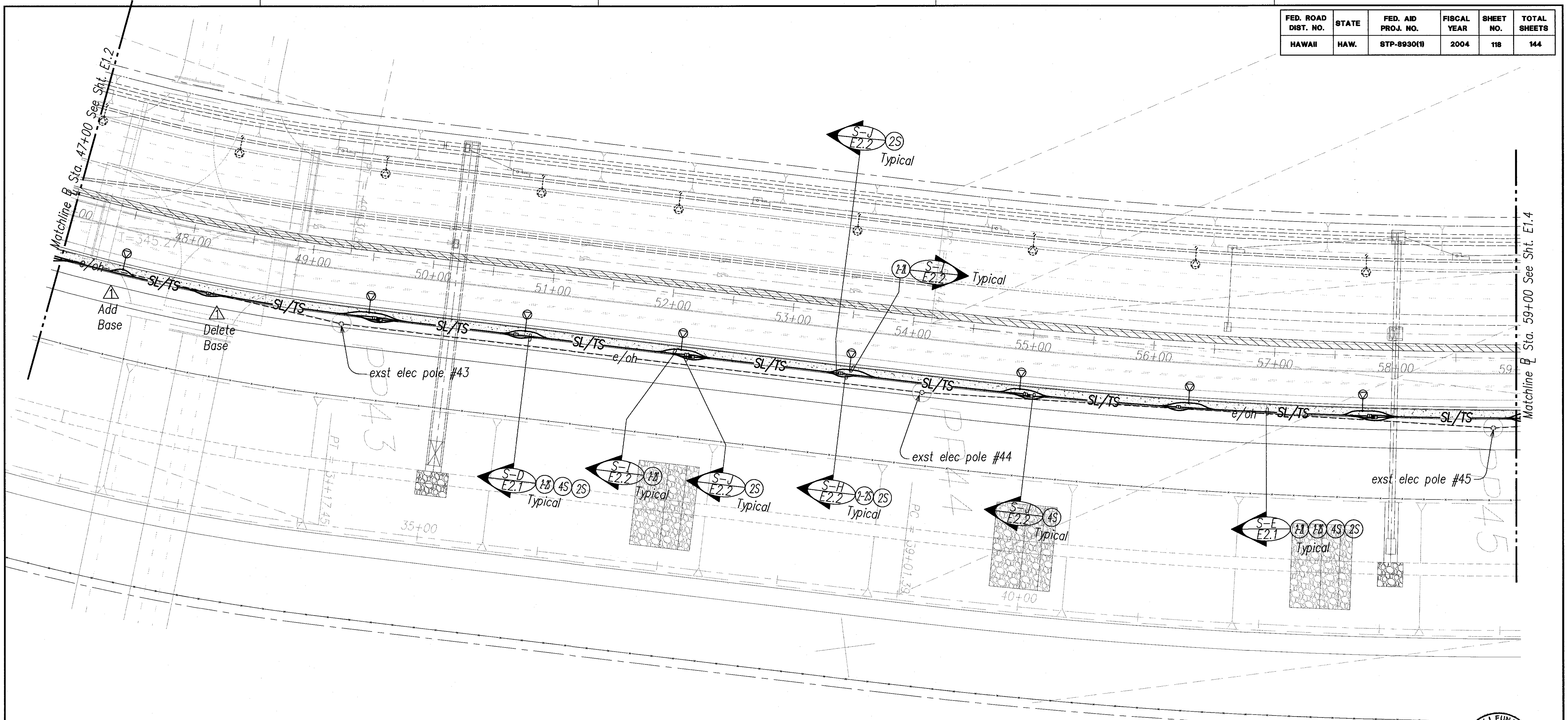
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(1)	2004	118	144



APPROVED BY:

CHIEF, TRAFFIC SIGNALS & TECHNOLOGY DIVISION DATE
DEPT. OF TRANSPORTATION SERVICES
CITY & COUNTY OF HONOLULU

NORTH

ELECTRICAL PARTIAL PLAN – 3

SCALE: 1"=40'

40' 20' 0 40' 80' 120'

SCALE: 1"=40'

GRAPHIC SCALE

DATE	REVISION
⚠	FO #2

GARY I. FUNASAKI
LICENSED PROFESSIONAL ENGINEER
No. 6185-E
HAWAII, U.S.A.

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30 JULY 2013

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL PARTIAL PLAN – 3

North–South Road
Phase 1A
F.A.I. Proj. No. STP–8930(1)

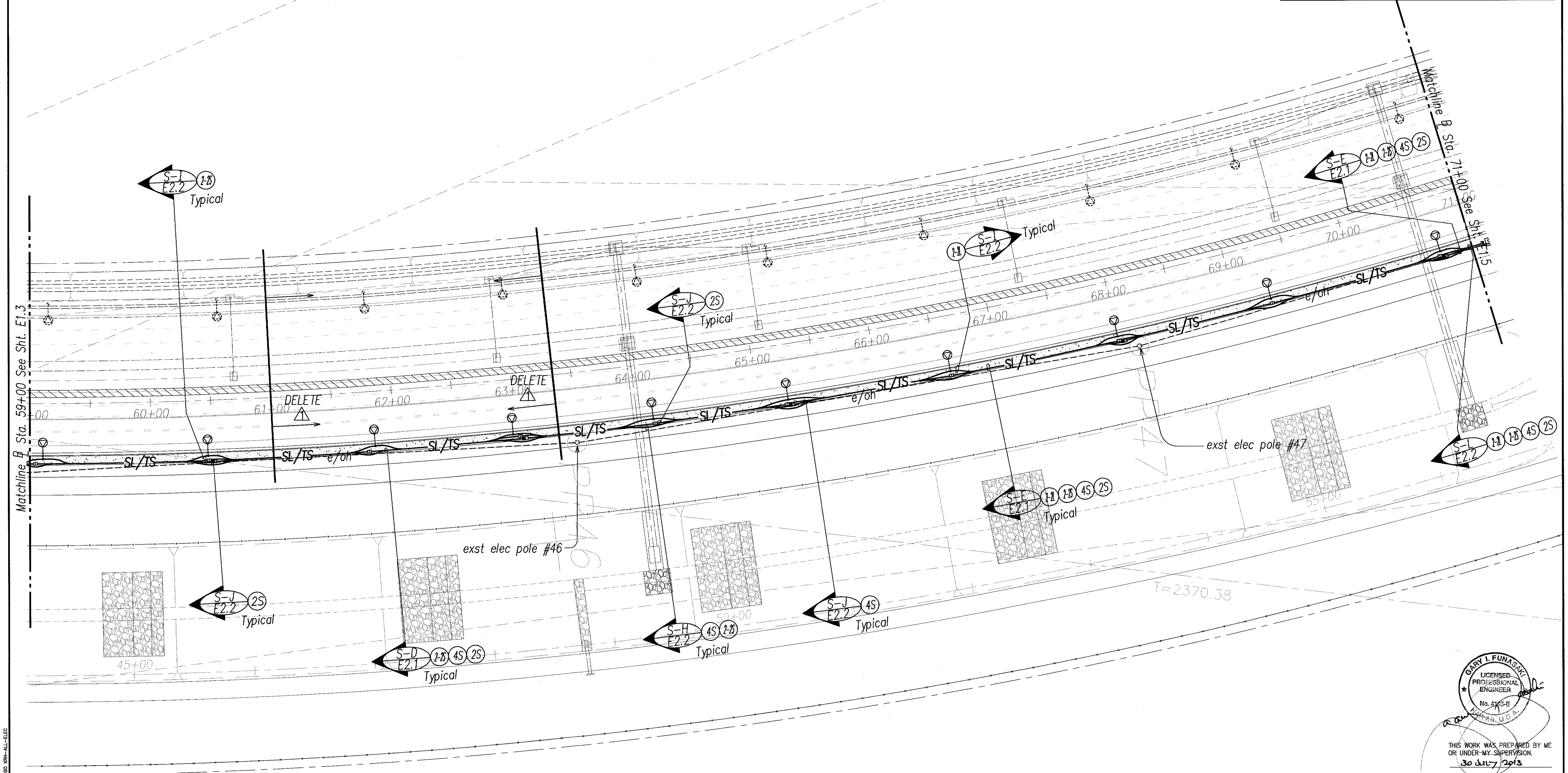
Scale: AS NOTED Date: DEC. 22, 2004

SHEET No. E1.3 OF 15 SHEETS

"AS–BUILT"

ORIGINAL PLAN
NOTE BOOK
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.	STP-8930(1)	2004	119	144



APPROVED BY:

CHIEF, TRAFFIC SIGNALS & TECHNOLOGY DIVISION DATE
DEPT. OF TRANSPORTATION SERVICES
CITY & COUNTY OF HONOLULU

ELECTRICAL PARTIAL PLAN - 4

NORTH
SCALE: 1"=40'

40' 20' 0 40' 80' 120'
SCALE: 1"=40'
GRAPHIC SCALE

DATE	REVISION
	⚠ FO #13

GARY I. FUNASAKI
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No. 4103-E
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30 July 2013

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL PARTIAL PLAN - 4

North-South Road
Phase 1A
F.A.I. Proj. No. STP-8930(1)

Scale: AS NOTED Date: DEC. 22, 2004

SHEET No. E1.4 OF 15 SHEETS

"AS-BUILT"

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

LAST SAVE: 02/03/05 @ 15:03:03 BY: RN PLOT SC 1=40

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(1)	2005	120	144

NORTH

ELECTRICAL PARTIAL PLAN – 5

SCALE: 1"=40'

40' 20' 0 40' 80' 120'

SCALE: 1"=40'

GRAPHIC SCALE

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

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22-DEC 2004

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL PARTIAL PLAN – 5

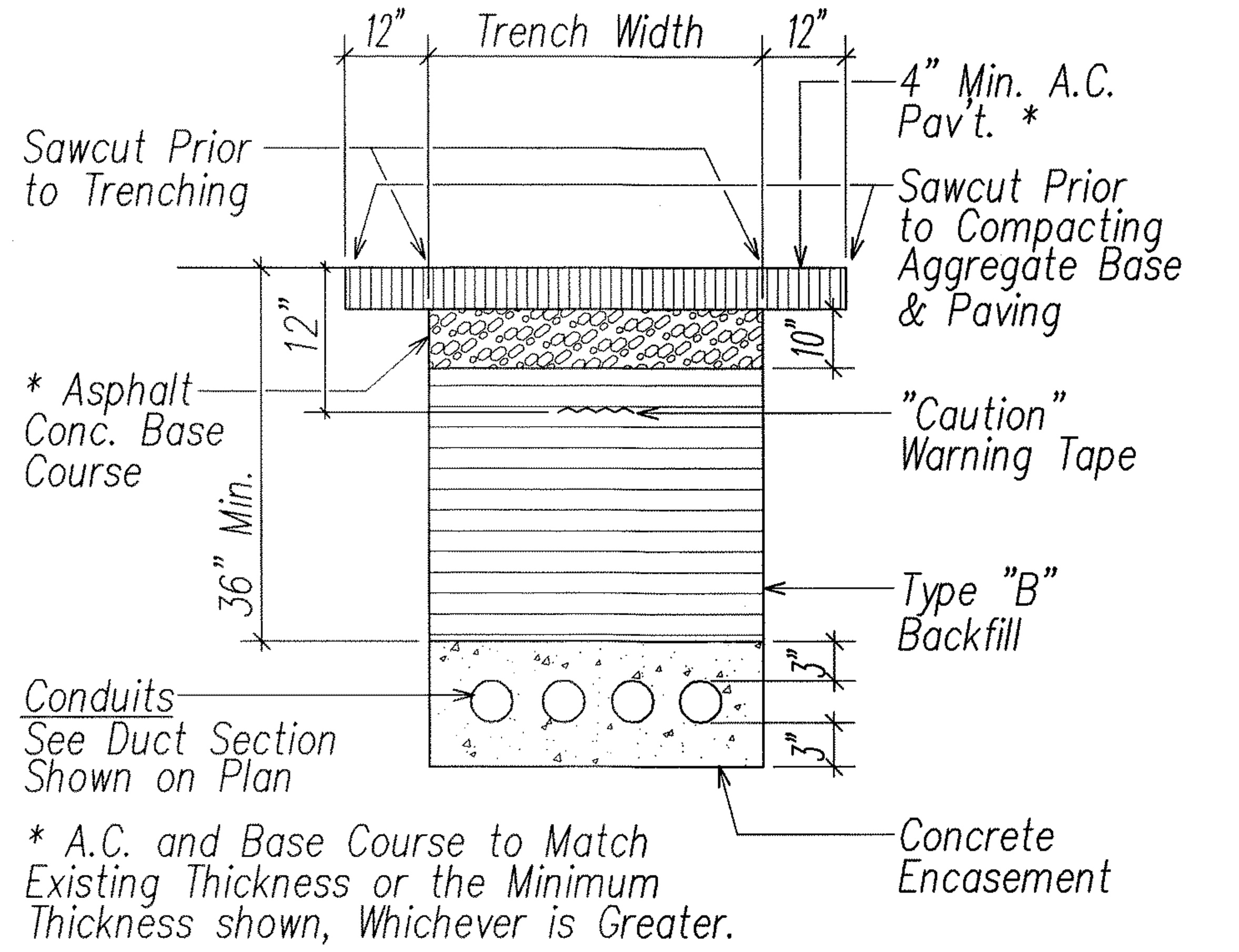
North–South Road
Phase 1A
F.A.I. Proj. No. STP-8930(1)

Scale: AS NOTED Date: DEC. 22, 2004

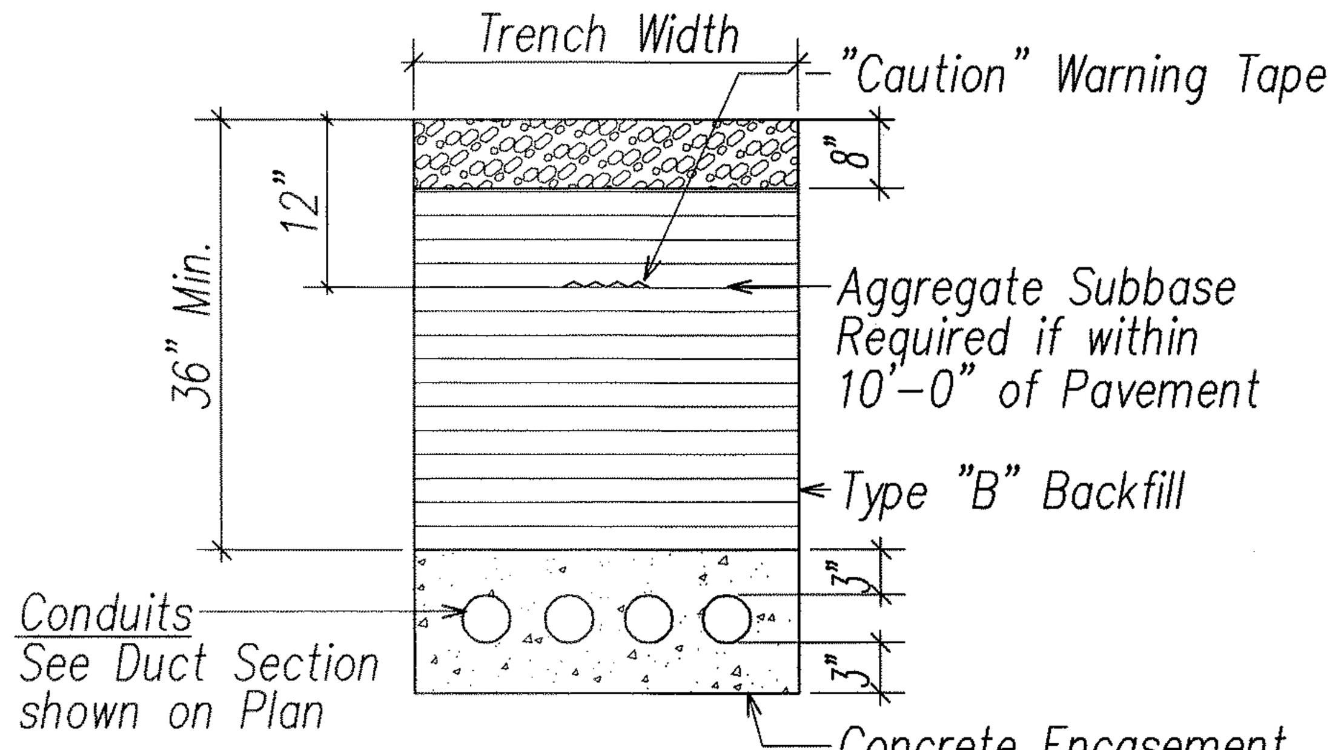
SHEET No. E1.5 OF 15 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(1)	2005	121	144



(1) Backfill Section
Within State Right-of-Way
Under Existing Roadway & Paved Shoulder



(2) Backfill Section
Within State Right-of-Way
Under Unpaved Shoulder

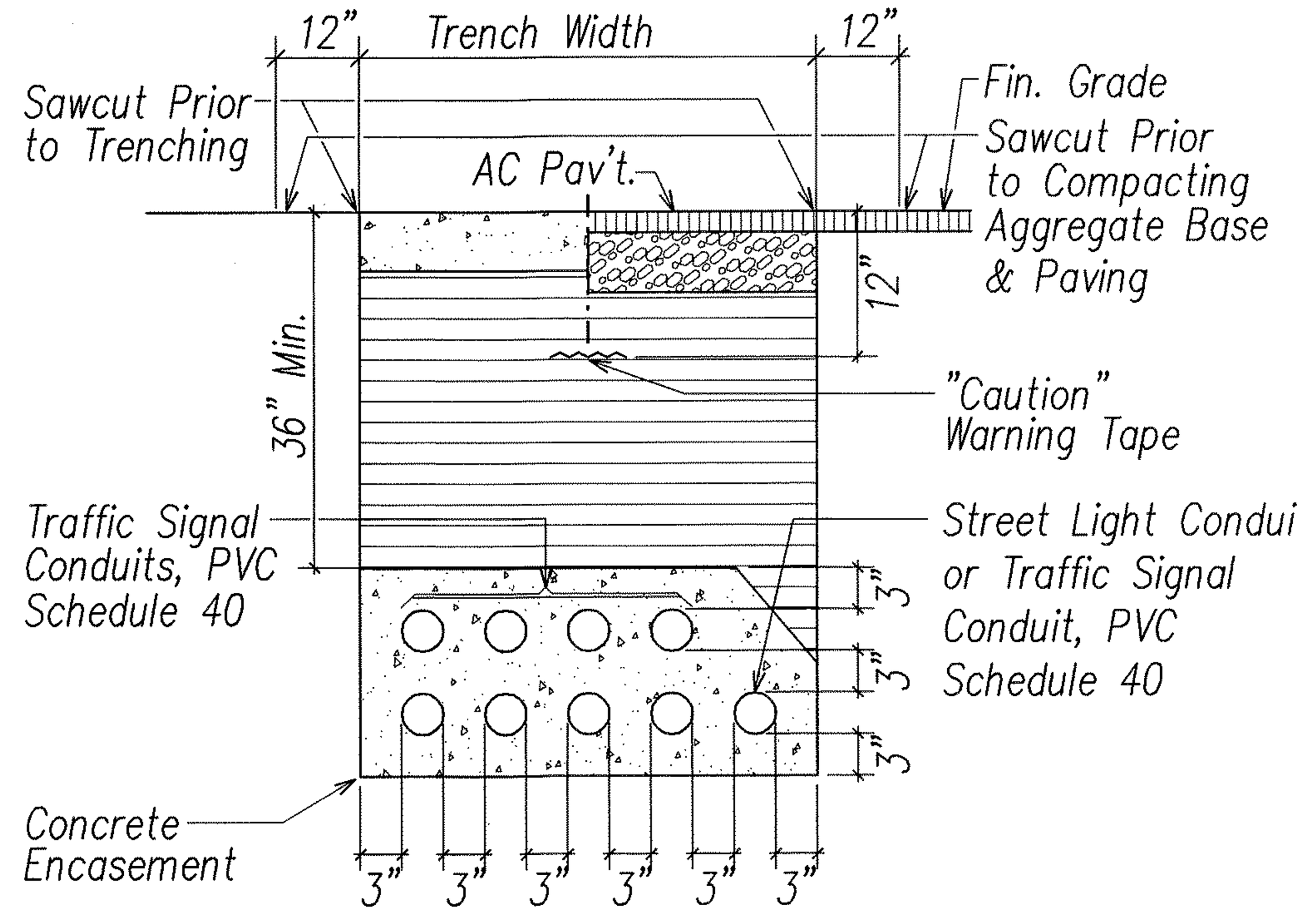
STATE RIGHT-OF-WAY BACKFILL NOTES

- 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 "A", Excavate Material & Provide 3" Backfill Material "A". See Above.
- Concrete – 3" Encasement, Class B.

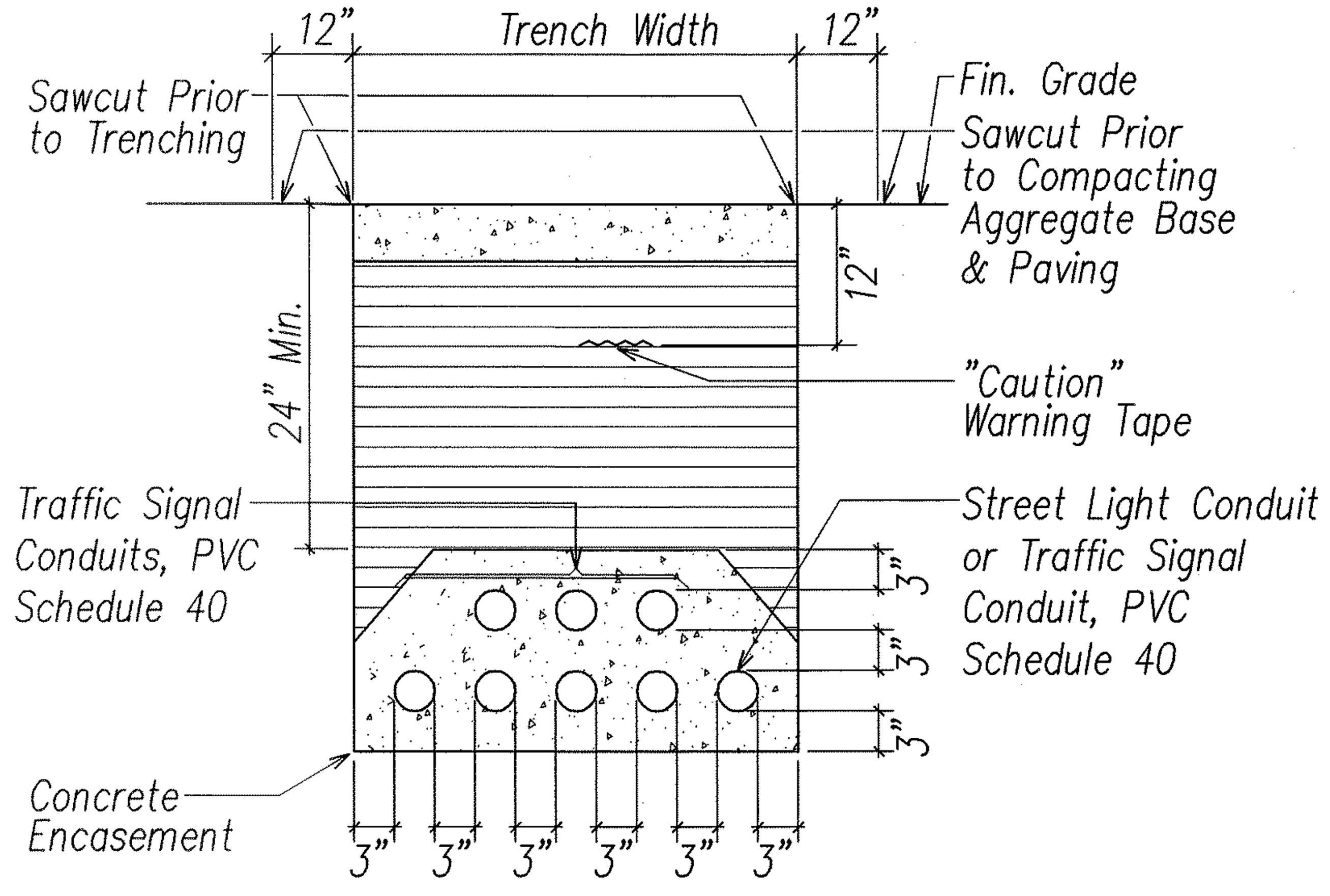
Note: Base Course & Sub-Base Course per 1985 State Standard Specifications for Highway Construction.

A/E2.1 STATE RIGHT-OF-WAY TYPICAL BACKFILL SECTIONS & NOTES

Not to Scale



Section (S-A)



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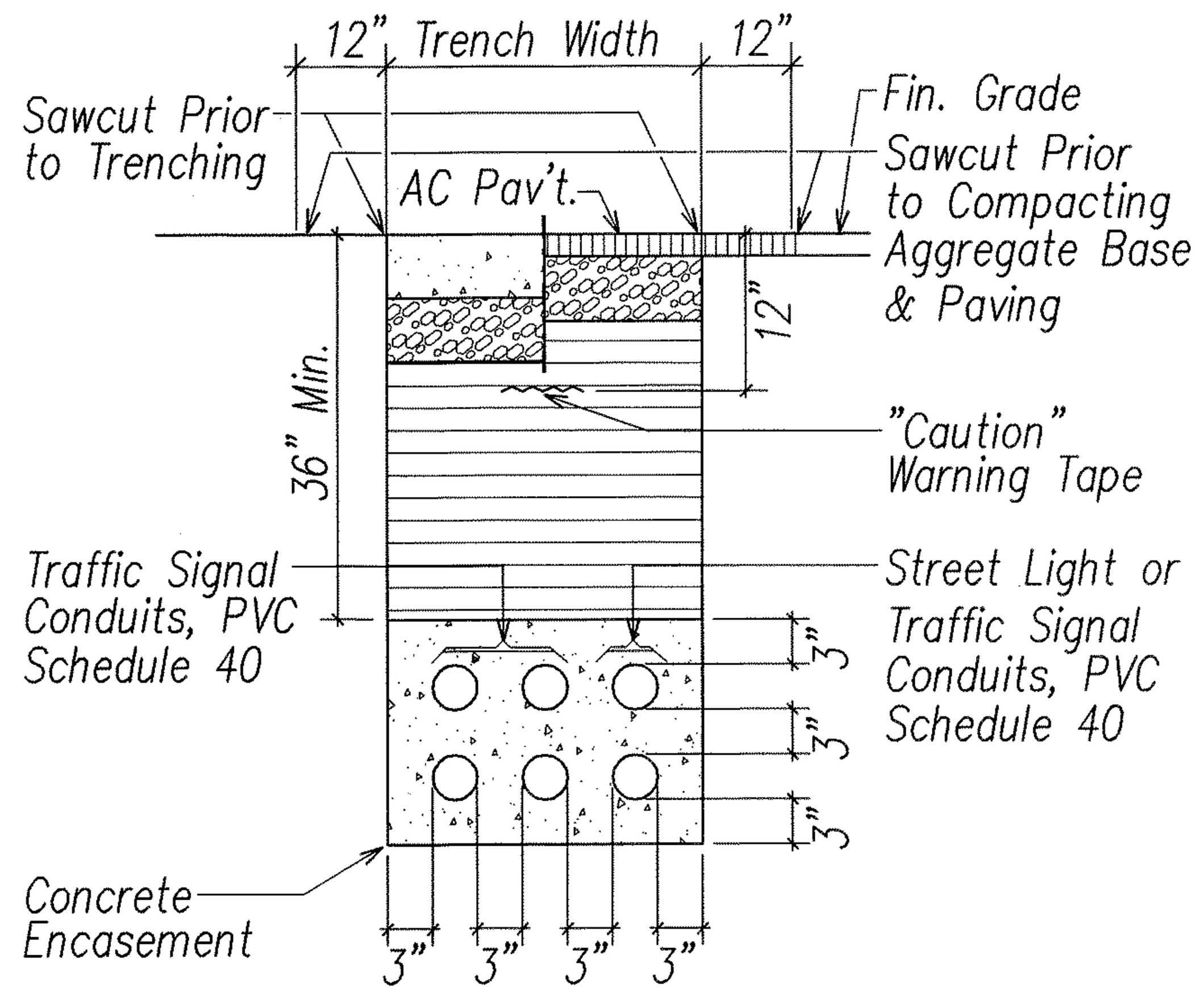

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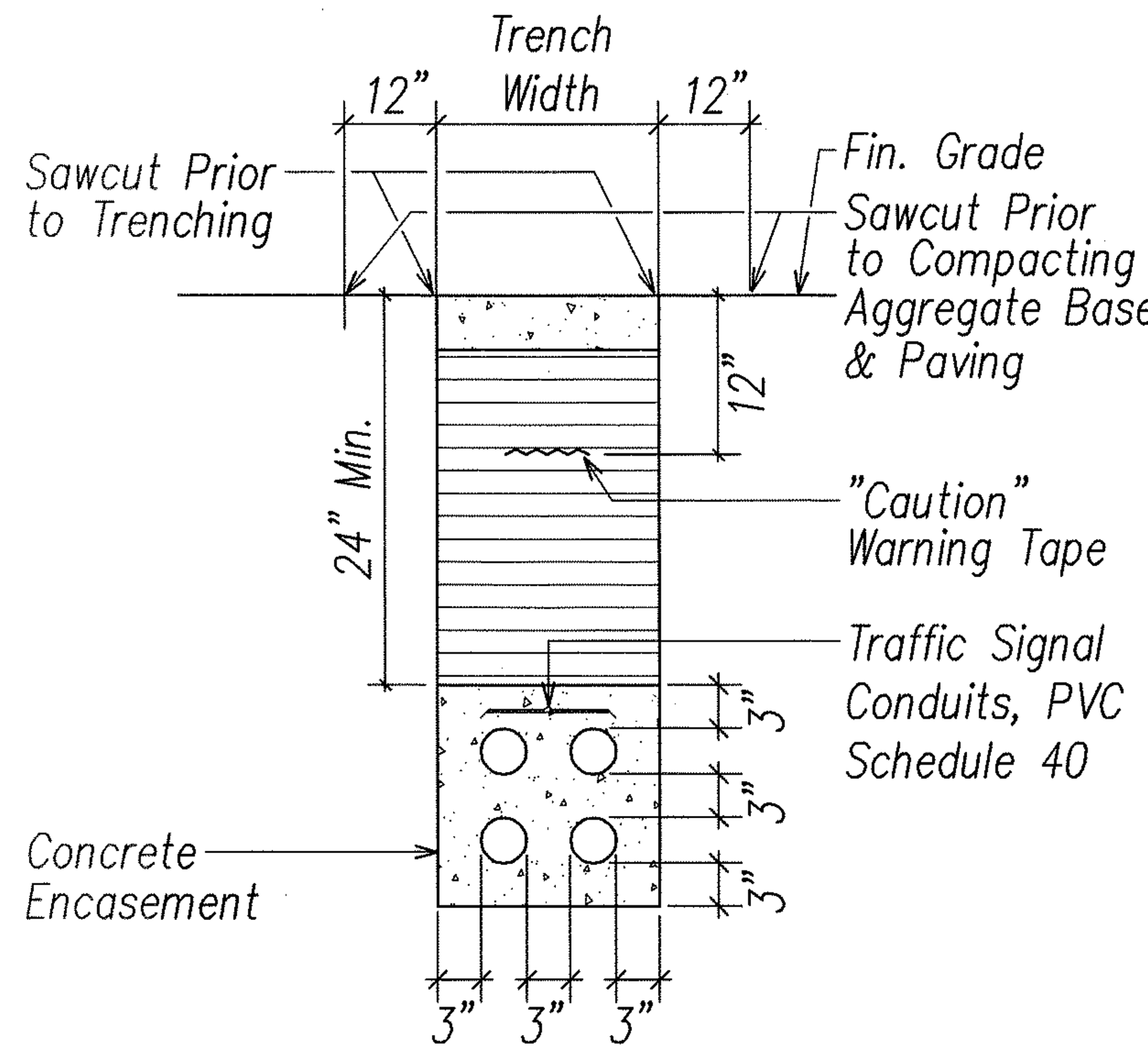

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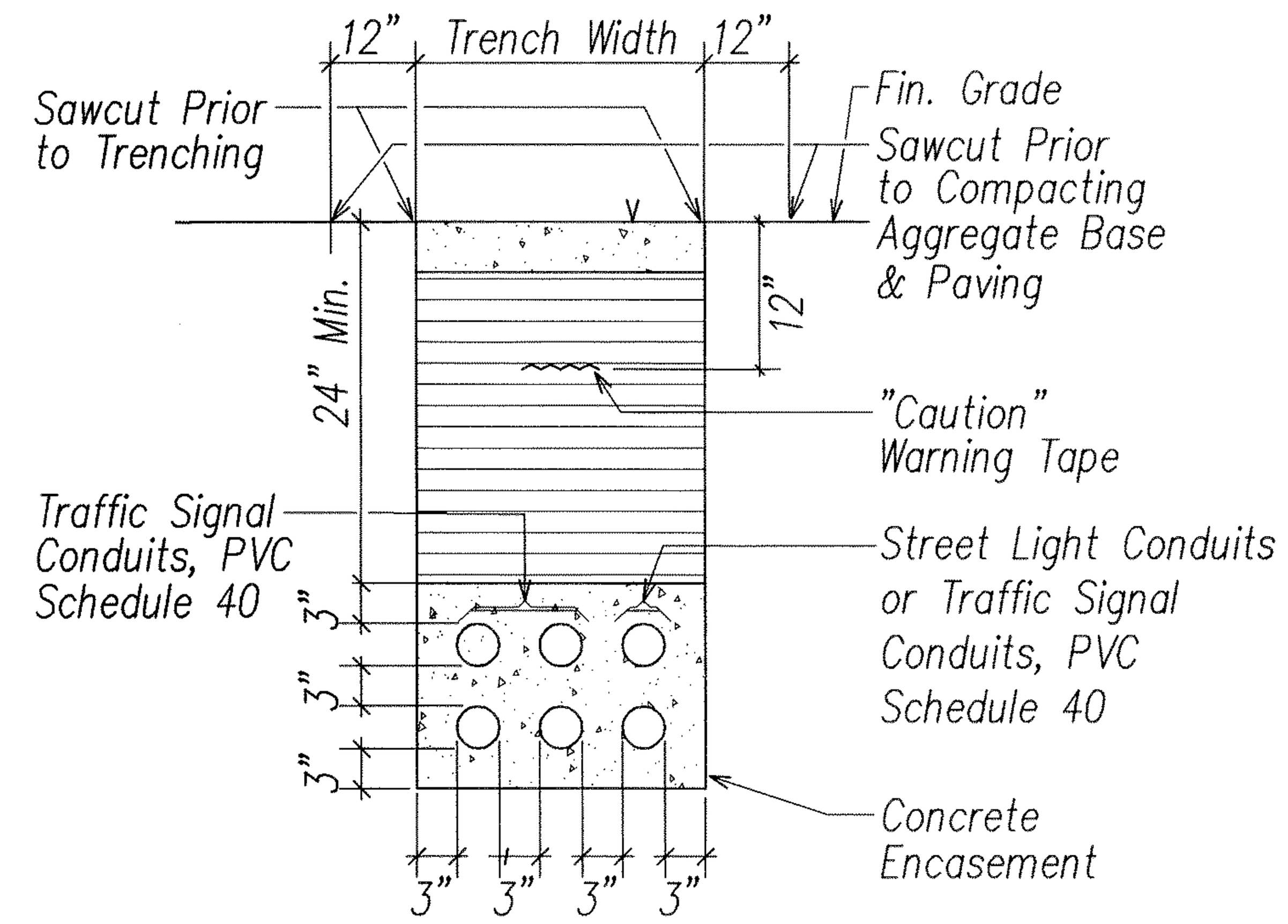

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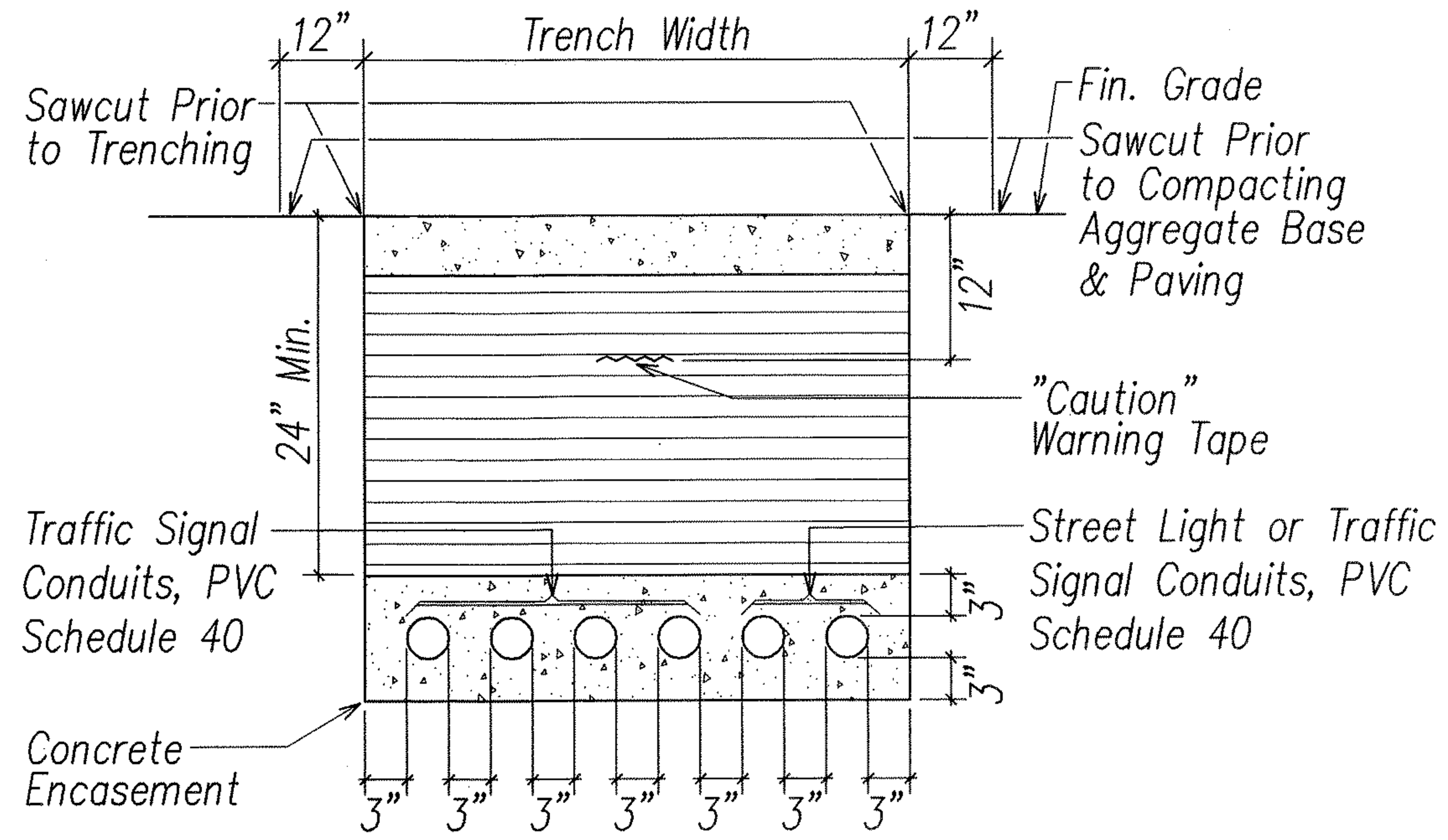

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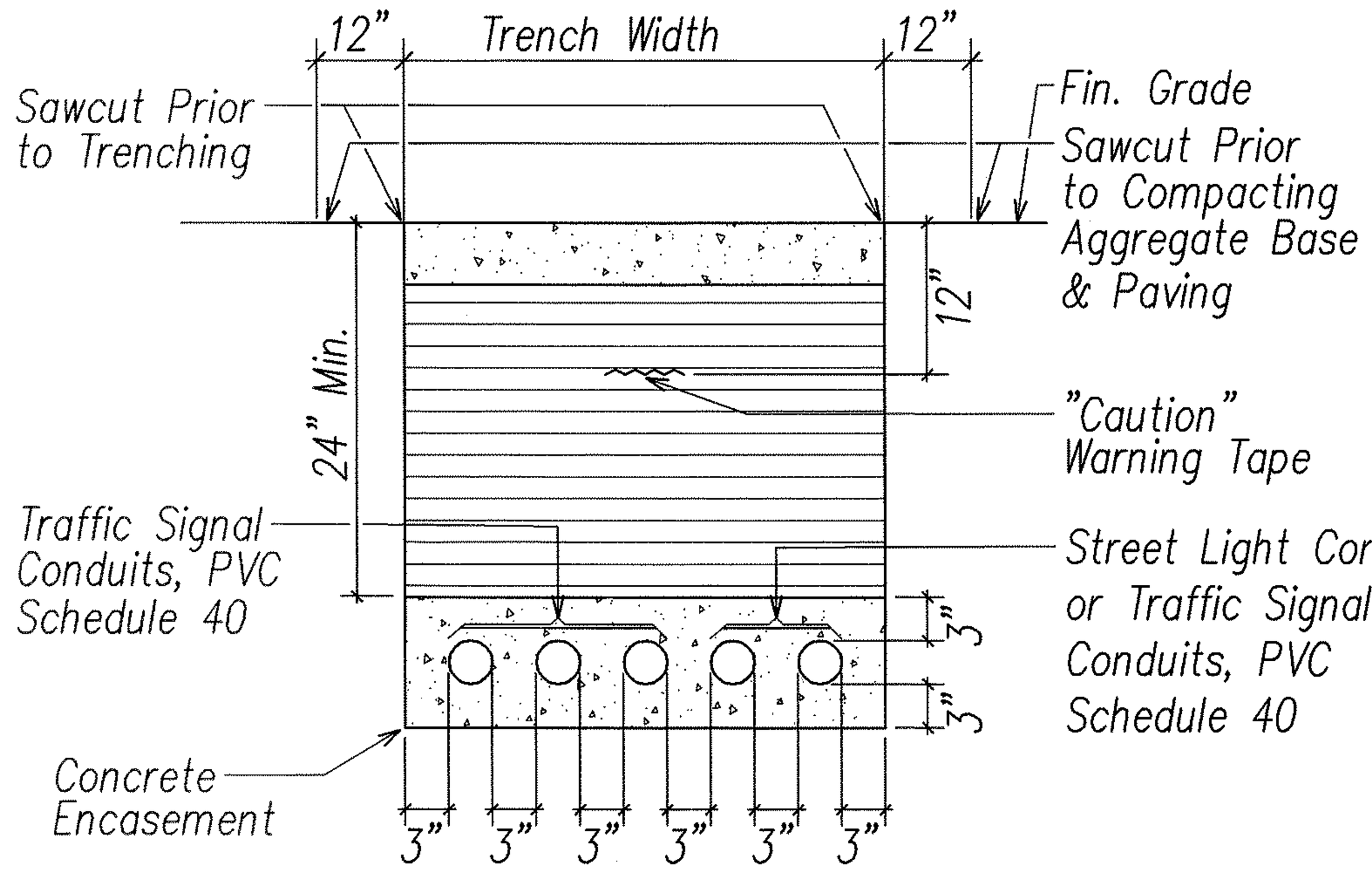
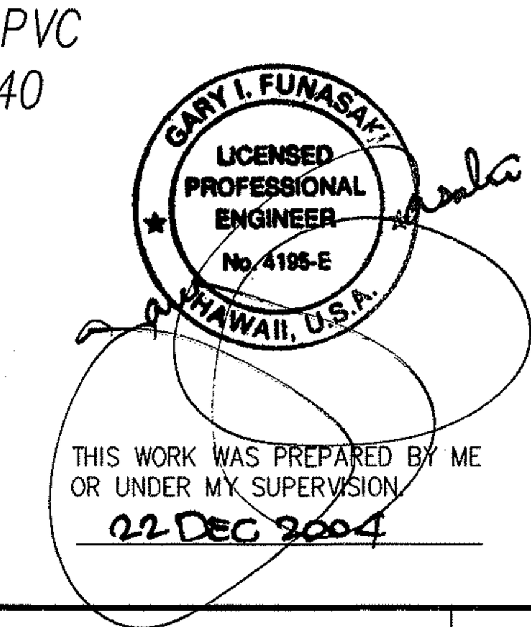


Section (S-G)

B/E2.1 TYPICAL DUCT SECTIONS I (STATE)

Not to Scale



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22 DEC 2004

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL DUCT SECTIONS I

North–South Road
Phase 1A
F.A.I. Proj. No. STP-8930(1)

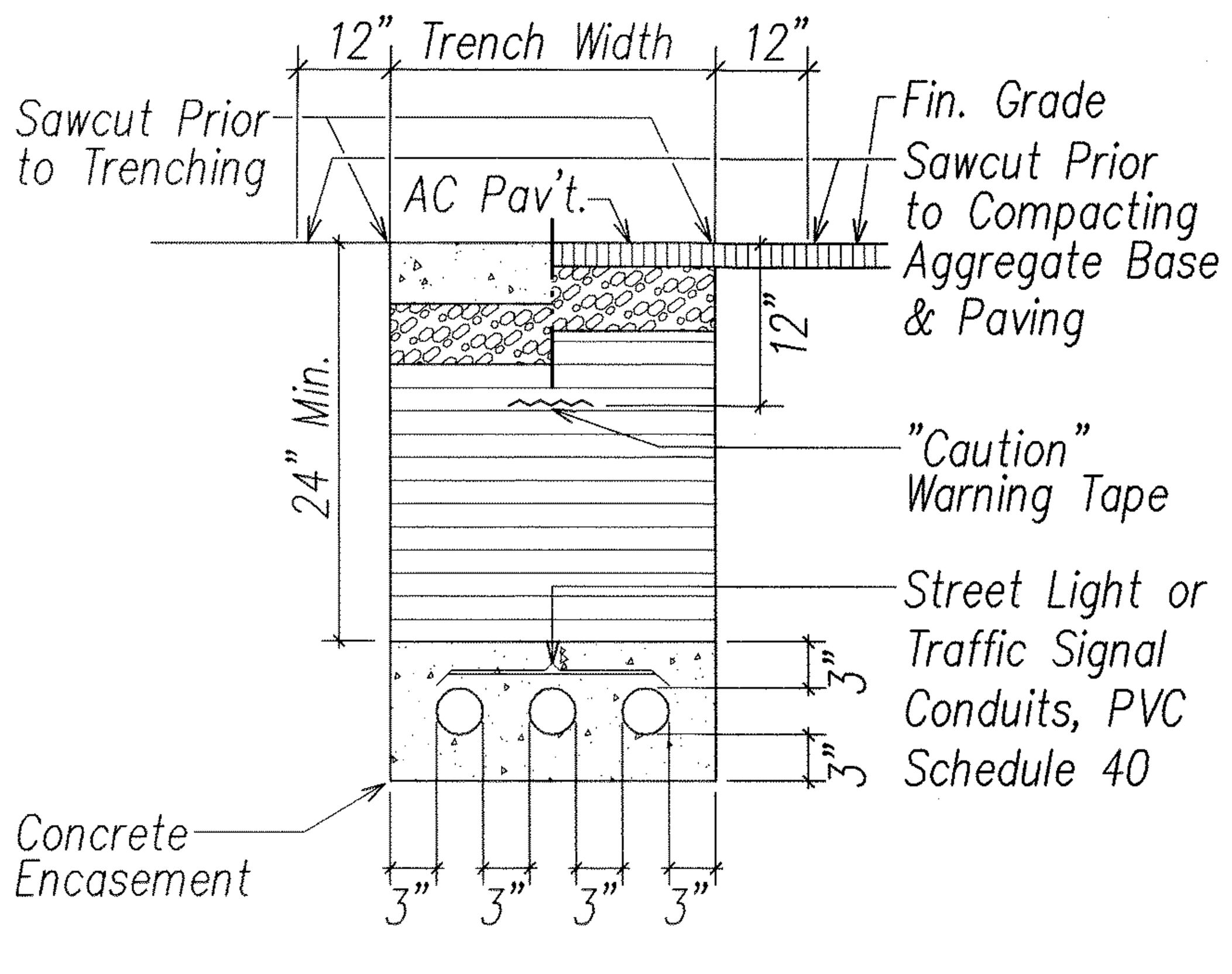
Scale: AS NOTED
Date: DEC. 22, 2004

SHEET No. E2.1 OF 15 SHEETS

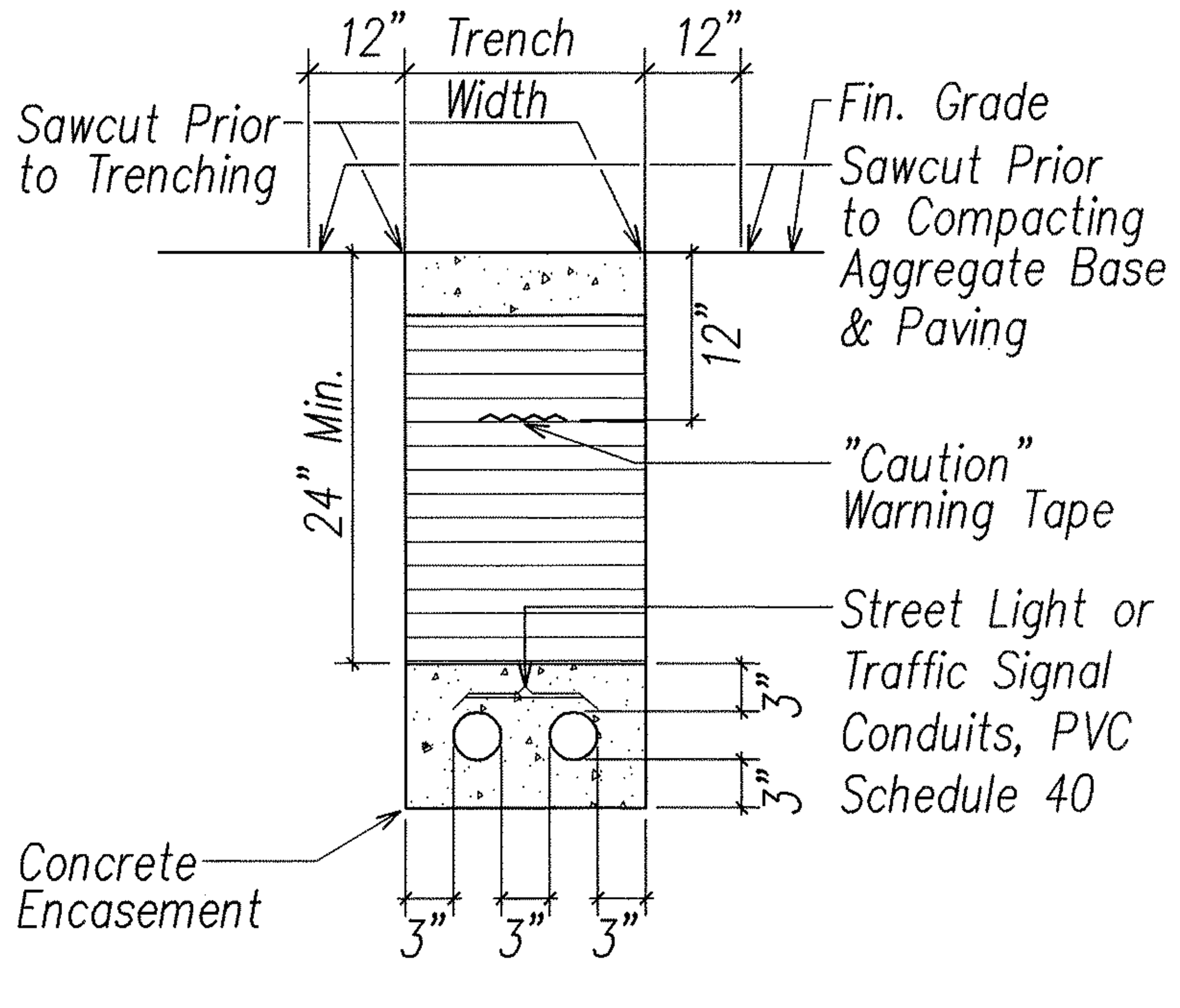
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	TRACED BY	
	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

LAST SAVE: 12/21/04 @ 13:30:47 BY: KMT PLOT SC 1"=0'=1"

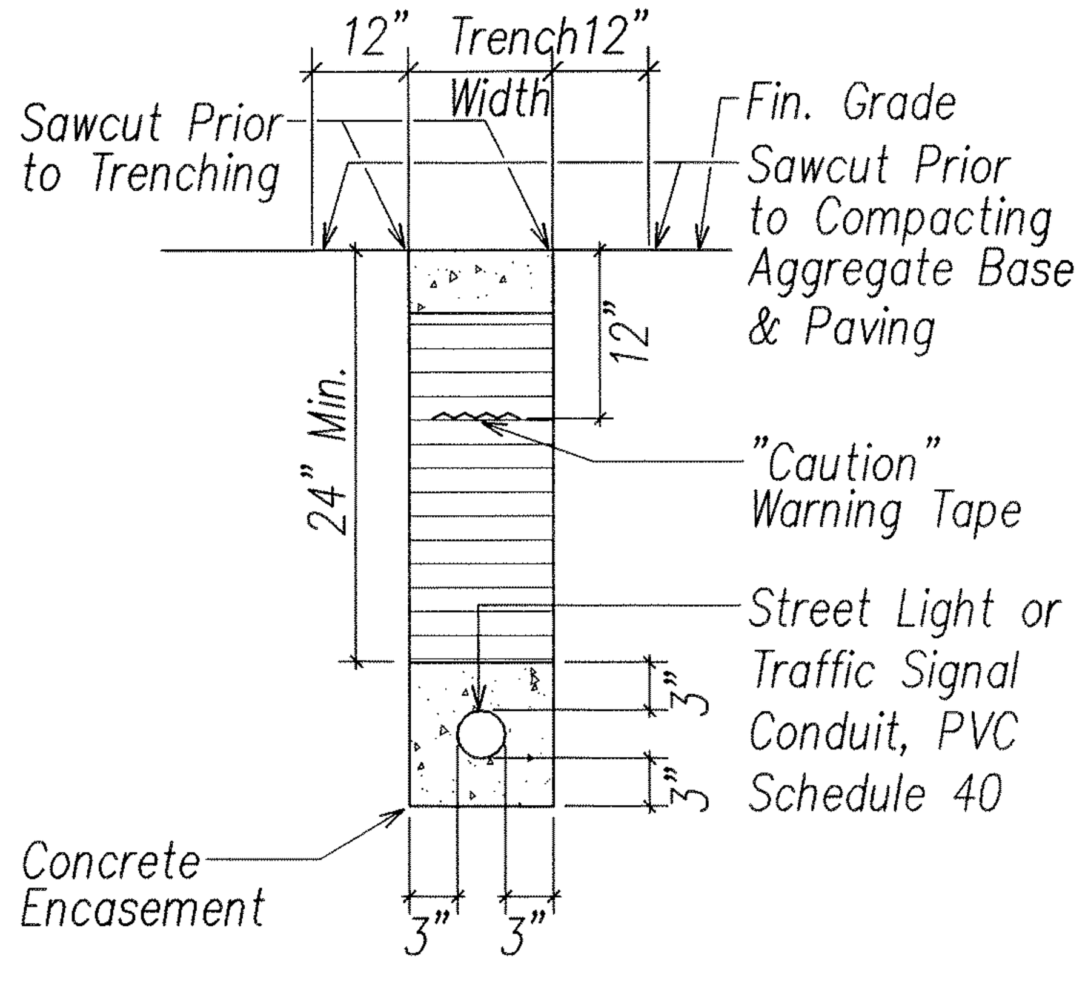
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(1)	2005	122	144



Section (S-H)



Section (S-I)



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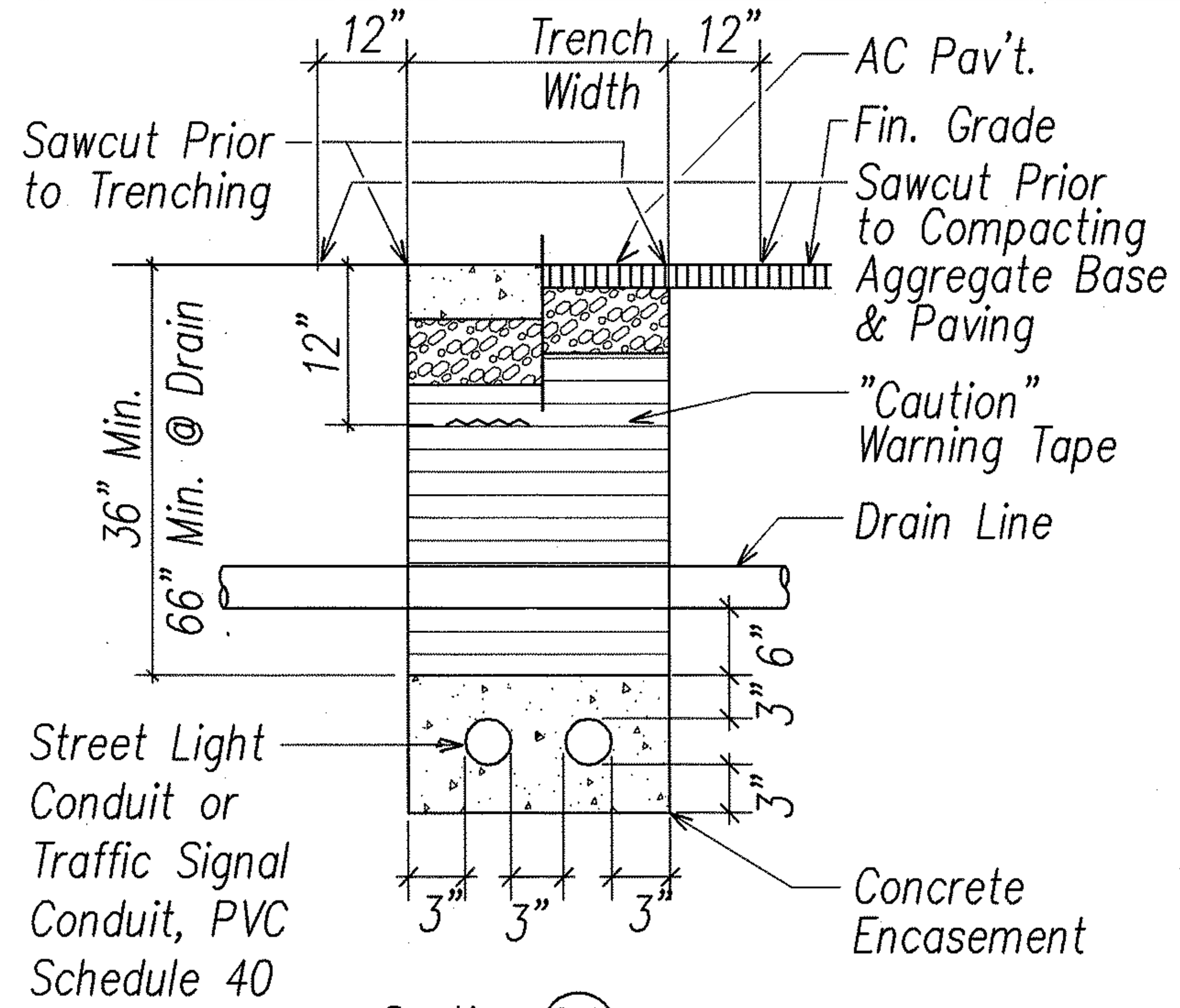
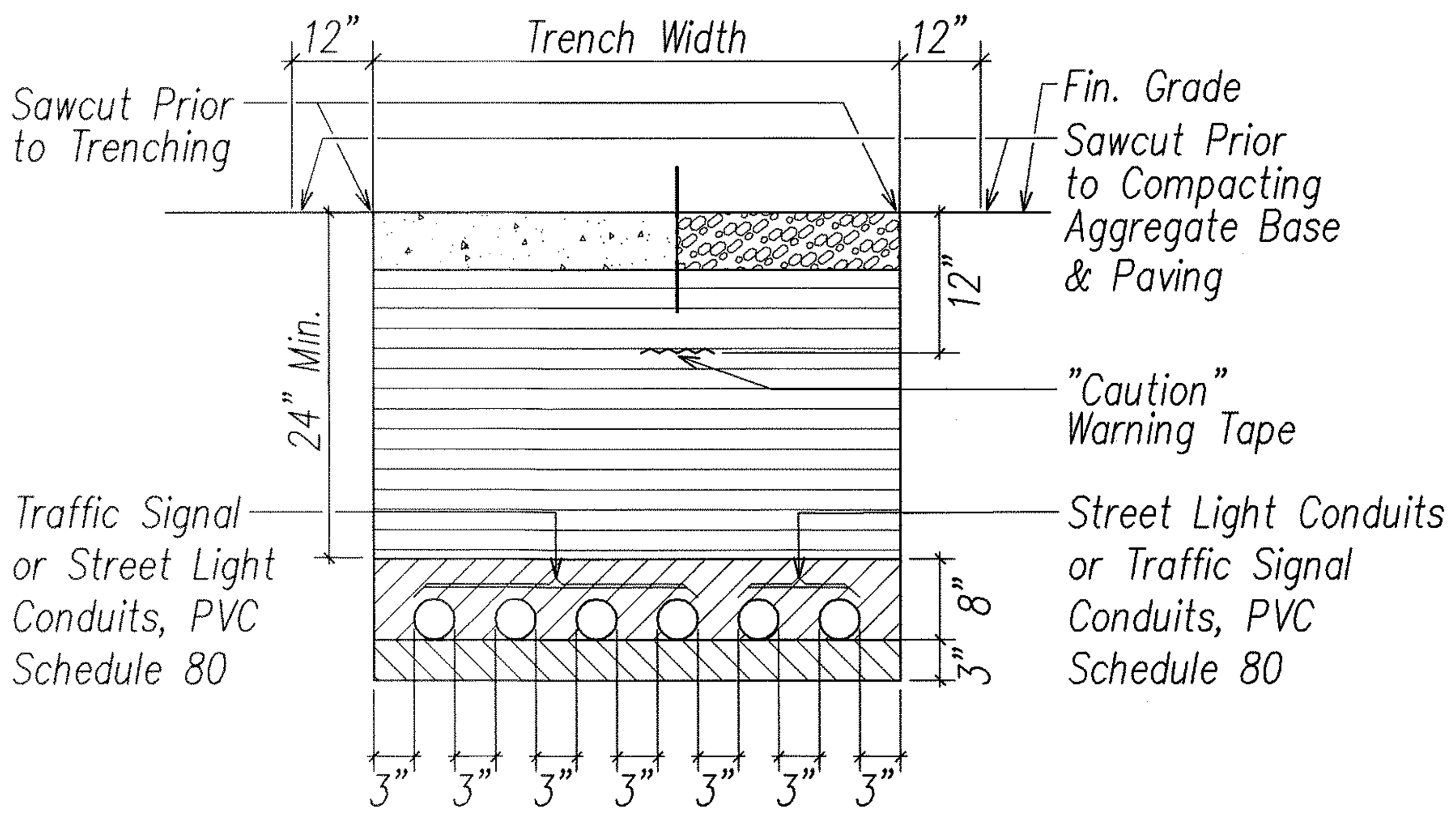


Section (S-K)



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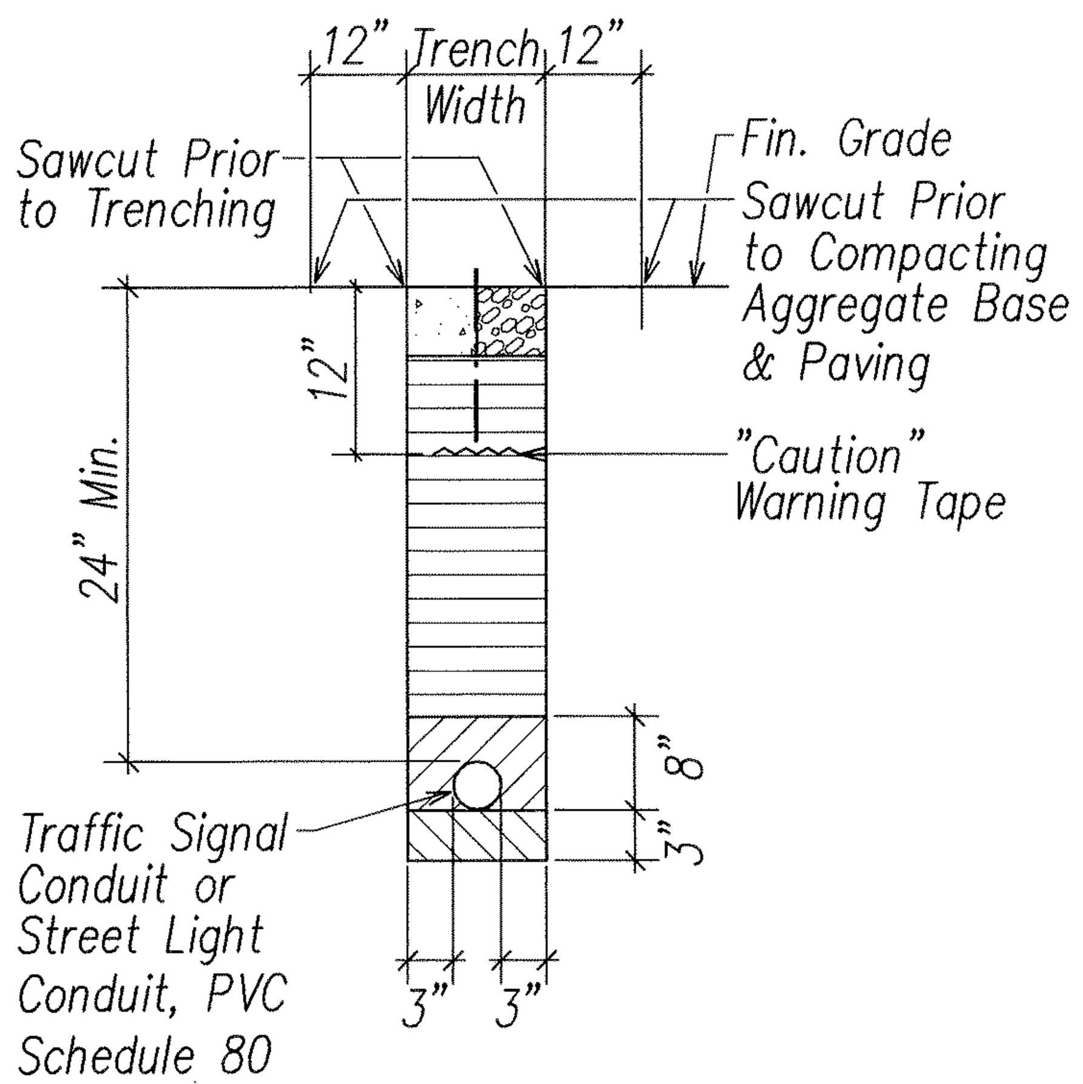

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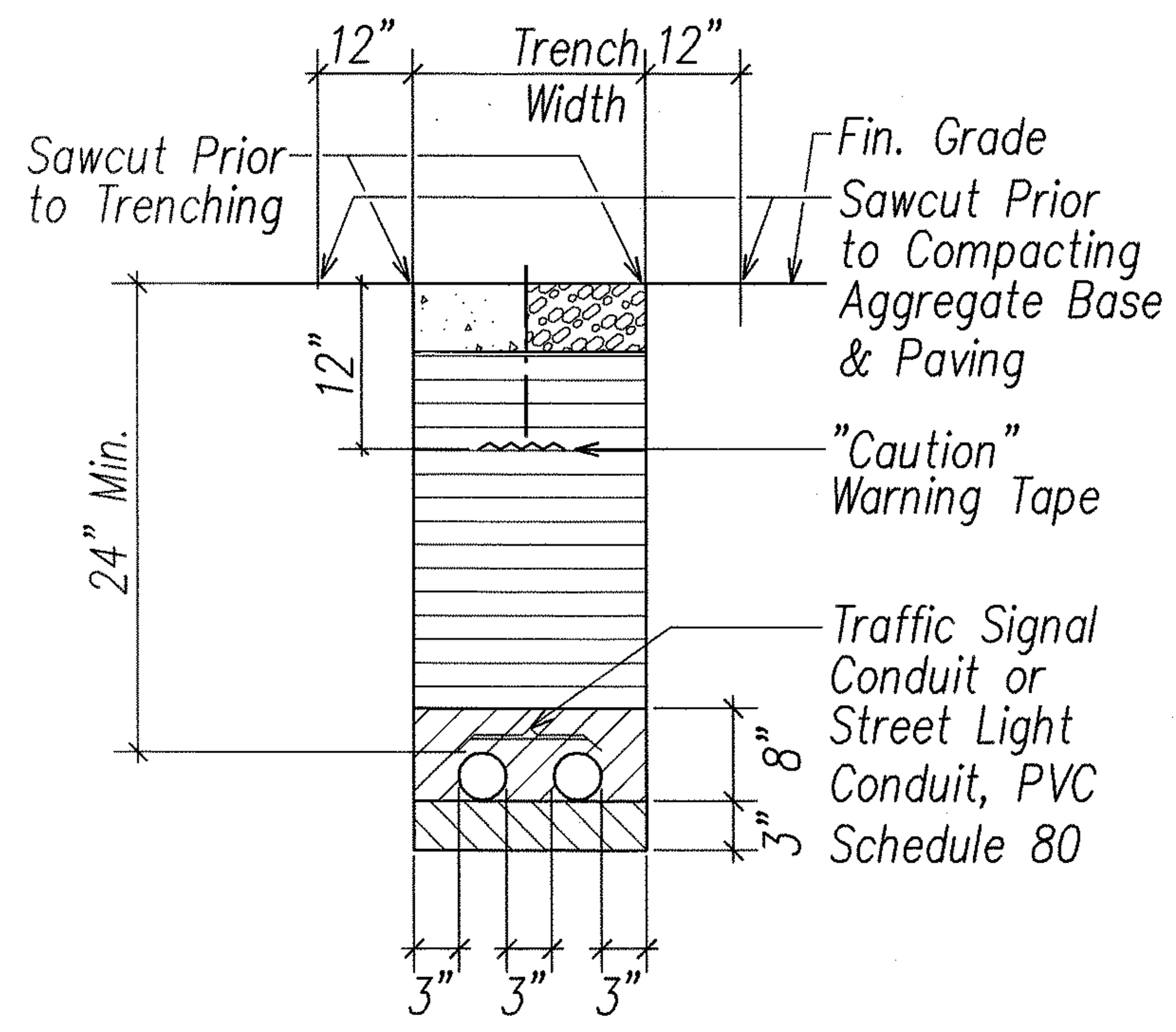

Section (S-N)

CONDUIT SCHEDULE

Item	Description
(2-2E)	HECo 2–2" Conduits (PVC Schd. 40)
(6-2E)	HECo 6–2" Conduits (PVC Schd. 40)
(3E)	HECo 3" Conduit (PVC Schd. 40)
(2-4E)	HECo 2–4" Conduits (PVC Schd. 40)
(4-4E)	HECo 4–4" Conduits (PVC Schd. 40)
(2-5E)	HECo 2–5" Conduits (PVC Schd. 40)
(2-6E)	HECo 2–6" Conduits (PVC Schd. 40)
(4-6E)	HECo 4–6" Conduits (PVC Schd. 40)
(6-6E)	HECo 6–6" Conduits (PVC Schd. 40)
( )	
(4T)	HTCo 4" Conduit
(2-4T)	HTCo 2–4" Conduits
(4-4T)	HTCo 4–4" Conduits
(6-4T)	HTCo 6–4" Conduits
(8-4T)	HTCo 8–4" Conduits
( )	
( )	
(1¼L)	Street Light 1¼" Conduit
(1½L)	Street Light 1½" Conduit
(2L)	Street Light 2" Conduit
(2-2L)	Street Light 2–2" Conduits
(3-2L)	Street Light 3–2" Conduits
(4-2L)	Street Light 4–2" Conduits
( )	
(4V)	Catv 4" Conduit
(2VS)	Catv 2" Secondary Power Conduit
( )	
( )	
(1S)	Traffic Signal 1" Conduit
(2S)	Traffic Signal 2" Conduit
(2-2S)	Traffic Signal 2–2" Conduits
(3-2S)	Traffic Signal 3–2" Conduits
(4-2S)	Traffic Signal 4–2" Conduits
(5-2S)	Traffic Signal 5–2" Conduits
(6-2S)	Traffic Signal 6–2" Conduits
(7-2S)	Traffic Signal 7–2" Conduits
(4S)	Traffic Signal 4" Conduit

A / E2.2 **TYPICAL DUCT SECTIONS II (STATE)**
Not to Scale

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

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22 DEC 2004

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL DUCT SECTIONS II

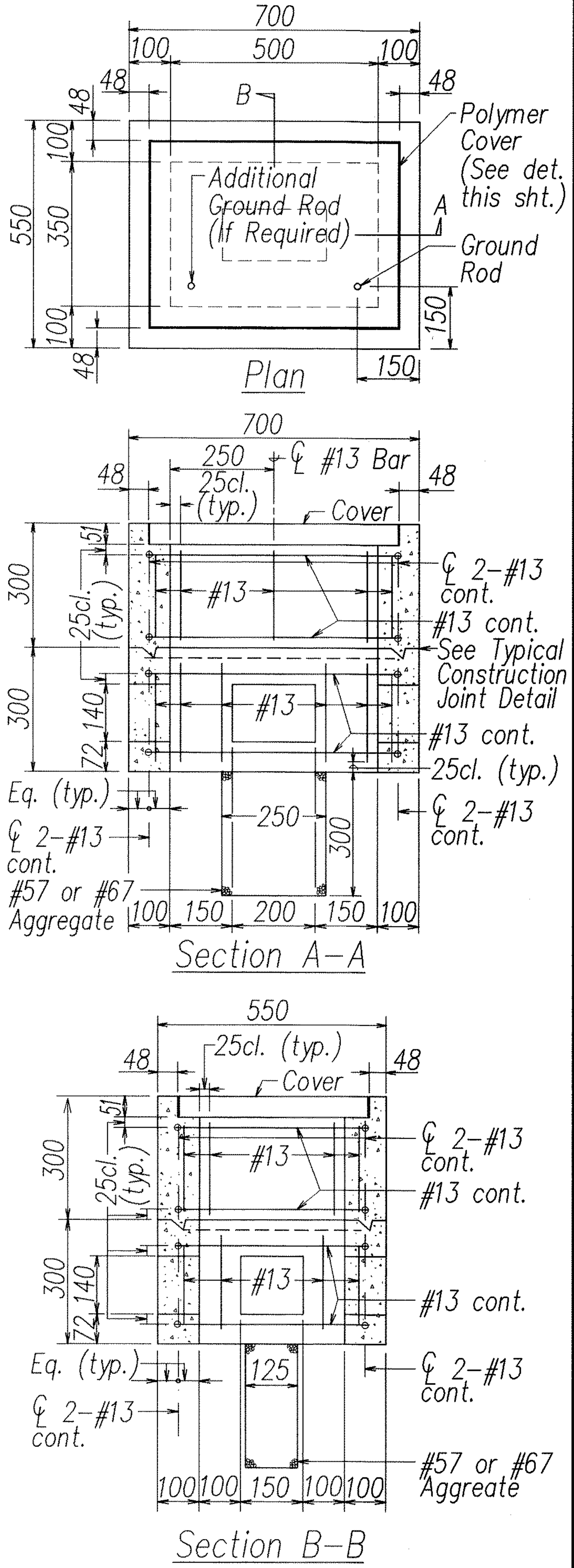
North–South Road
Phase 1A
F.A.I. Proj. No. STP-8930(1)

Scale: AS NOTED — Date: DEC. 22, 2004

SHEET No. E2.2 OF 15 SHEETS

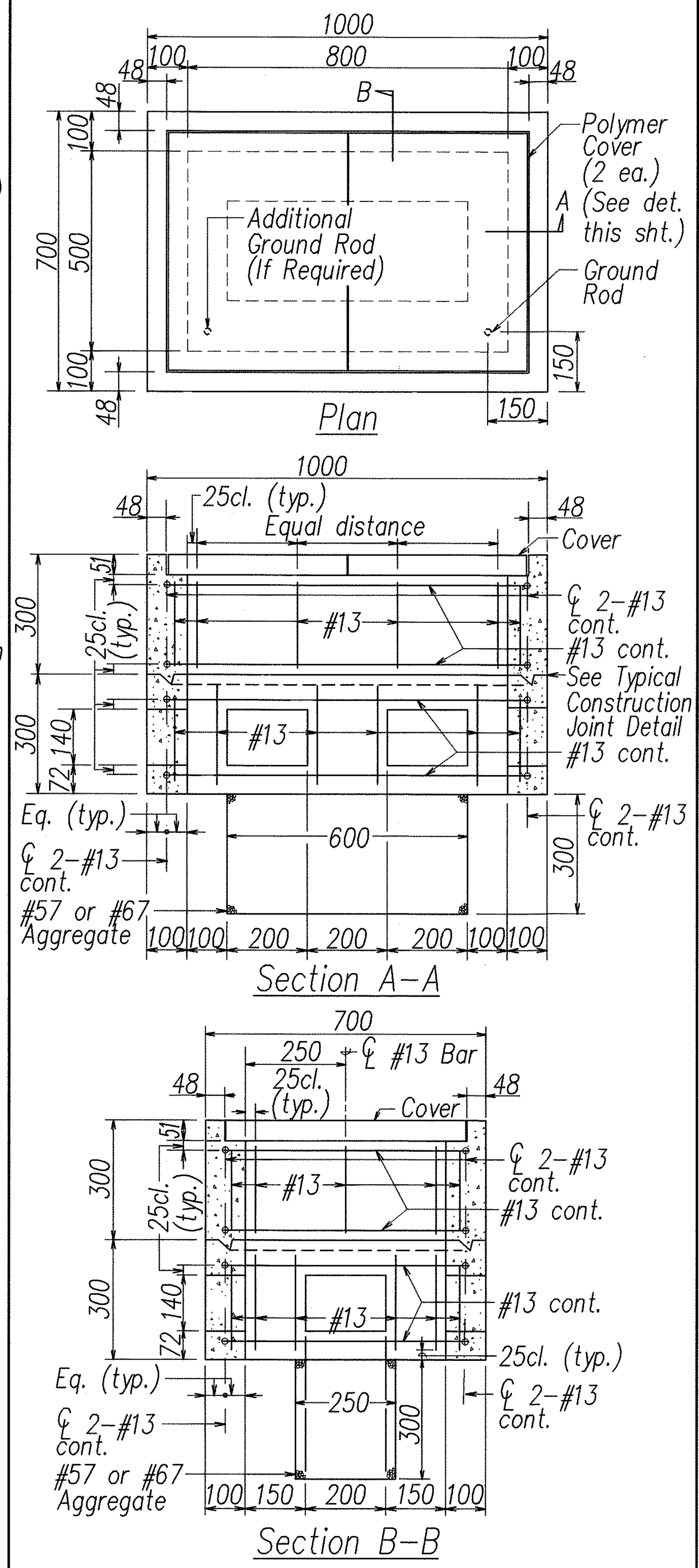
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(1)	2005	123	144



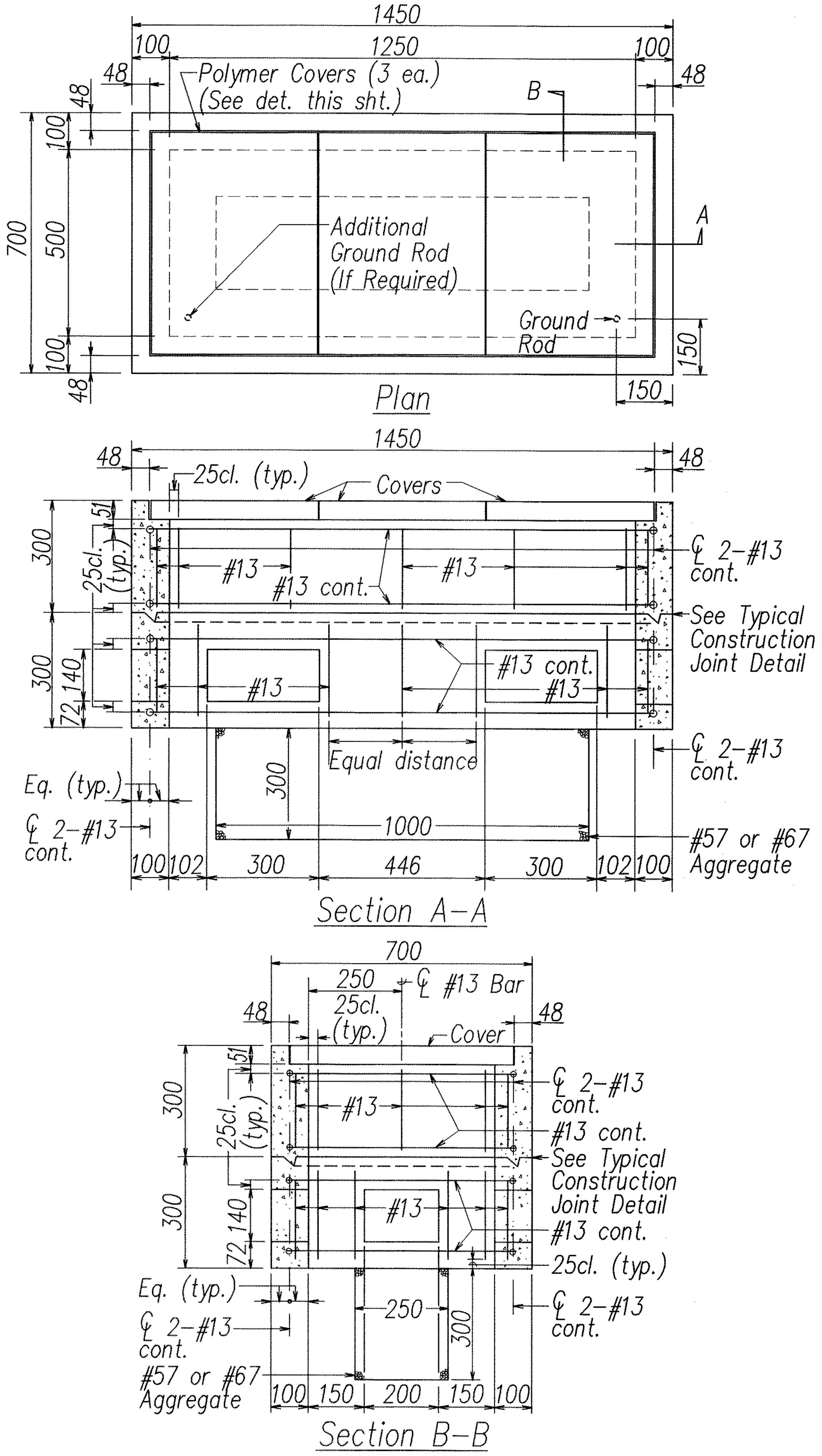
TYPE "A" PULLBOX (Old Type "B")

Scale: 1 : 100



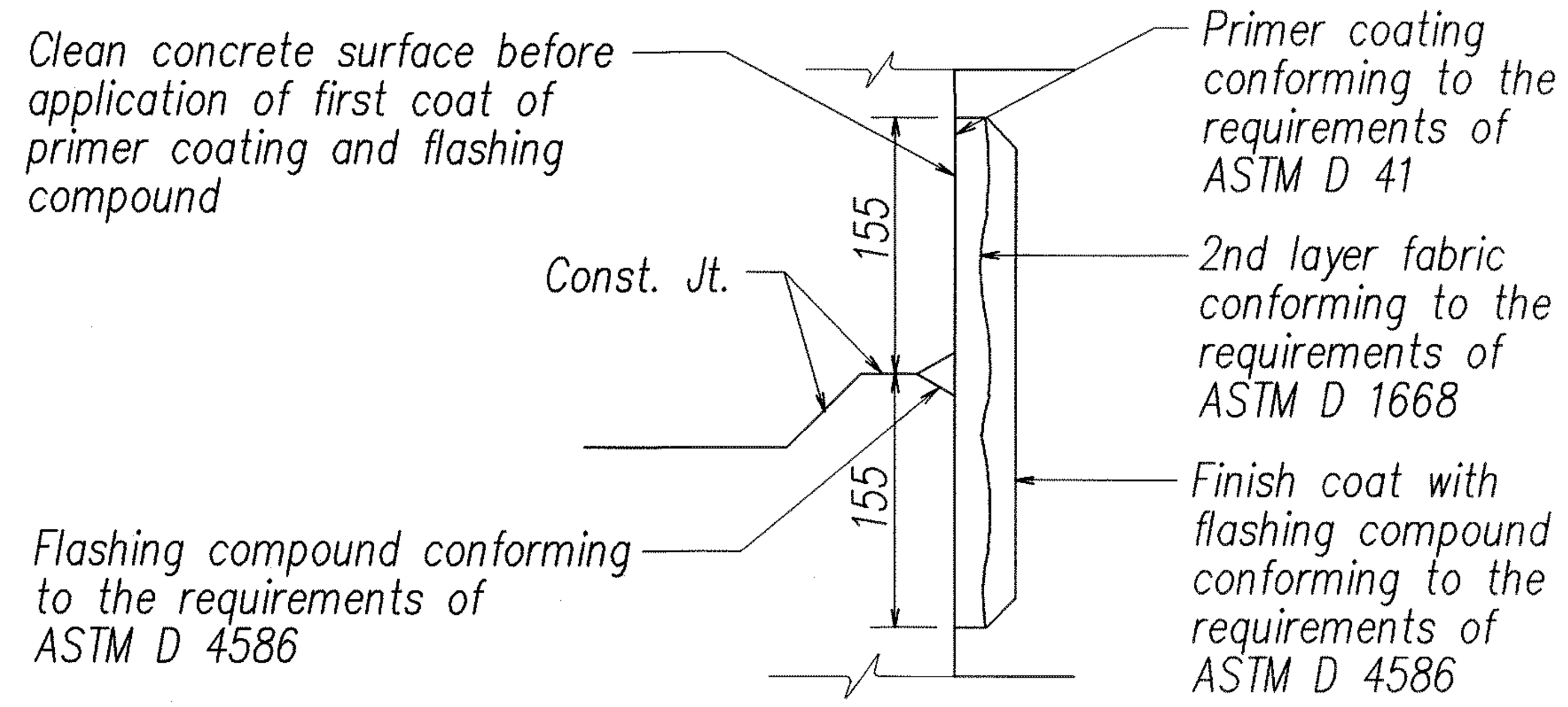
TYPE "B" PULLBOX (Old Type "C")

Scale: 1 : 100



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

Scale: 1 : 100

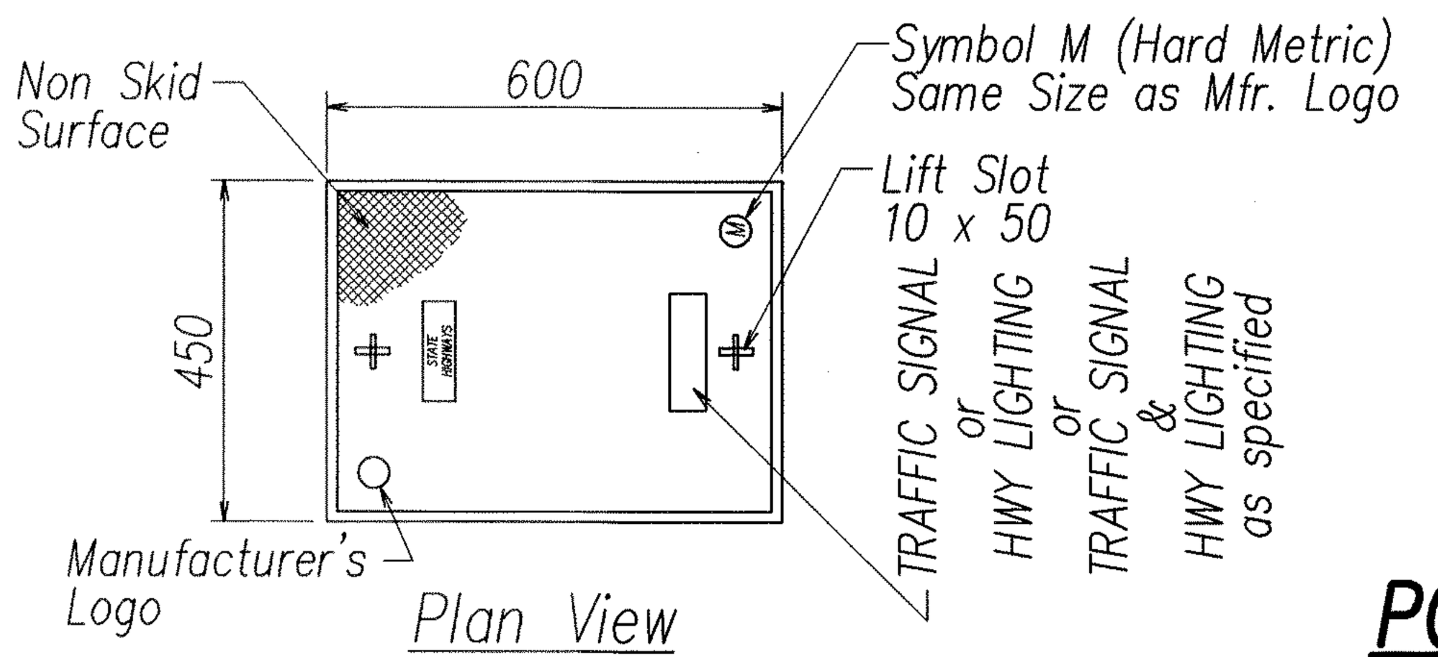


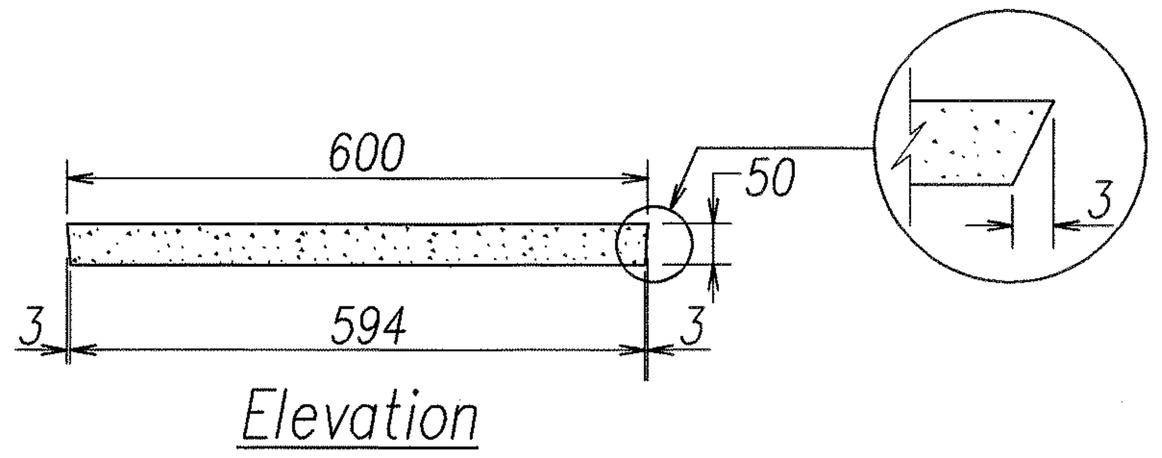
TYPICAL FLASHING COMPOUND WATERPROOFING DETAILS

Not to Scale

General Notes:

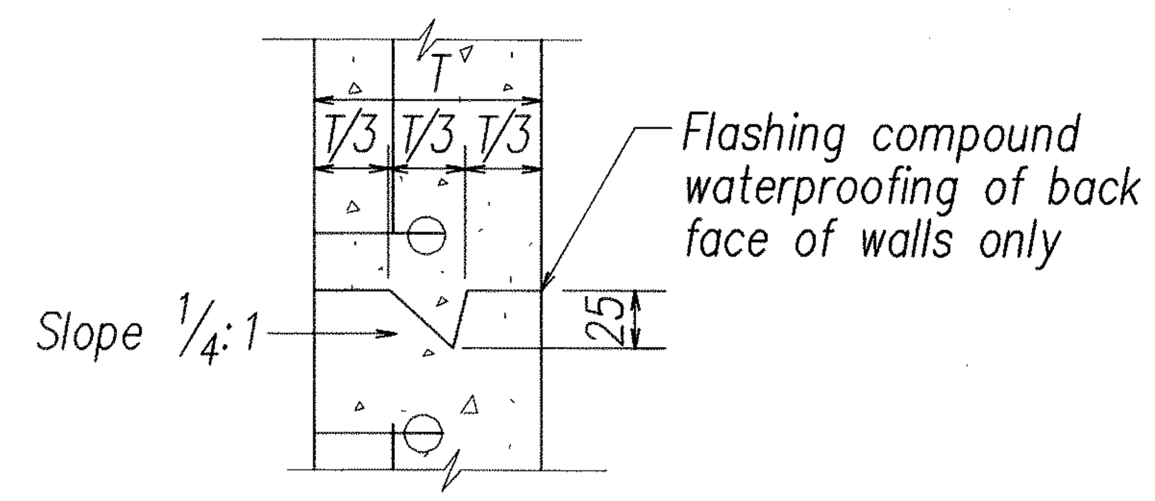
1. Provide a minimum of one 16 ø x 2.5m Copperweld Ground Rod in each pullbox. When directed by the Traffic Signal Inspector/Engineer, install additional Ground Rods. Cost of Ground Rods shall be incidental to the pullboxes.
2. All pre-cast concrete pullboxes shall be manufactured in two pieces.
3. The pullbox with cover shall be capable of supporting an MS 18 Loading.
4. The maximum weight of the pullbox cover shall not exceed 27 kilograms.
5. The openings for the conduits on all pullboxes shall be pre-cast concrete knockouts.
6. After installing the conduits in the openings of the pullboxes, the Contractor shall fill the excess opening in the pre-cast knockouts with concrete mortar.
7. Prior to installing the pullboxes, the Contractor shall level the bottom of the trench and achieve a minimum of 95% relative compaction of the bottom of the trench.
8. All concrete shall be Class A (25MPa, min.)
9. Rebars shall be Grade 300 and all lapped splices shall be 360mm minimum.
10. The #57 or #67 size aggregate shall conform to latest version of AASHTO M43 (ASTM D 448).
11. Type "C" Pullbox shall be installed in a location protected from vehicular traffic (i.e. raised sidewalk, behind A.C. curbs, traffic signal standard or pipe guards).





POLYMER CONCRETE COVER

Not to Scale



TYPICAL CONSTRUCTION JOINT DETAIL

Not to Scale

All Dimensions are in Millimeters unless Otherwise shown.

GARY I. FUNASAKI
LICENSED PROFESSIONAL ENGINEER
No. 4105-E
HAWAII, U.S.A.

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22 DEC 2004

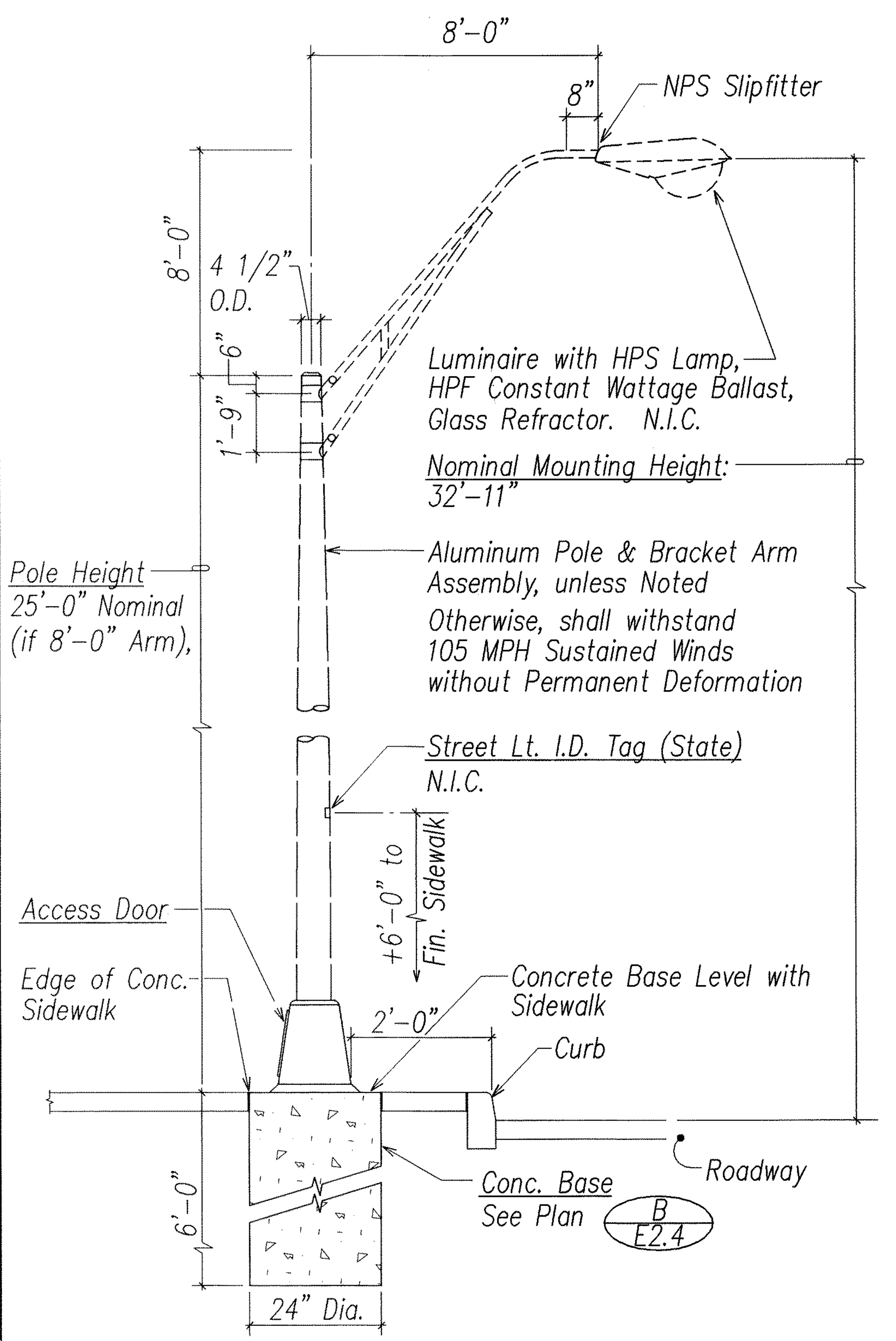
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PULLBOX & COVER (STATE) DETAILS
North-South Road
Phase 1A
F.A.I. Proj. No. STP-8930(1)

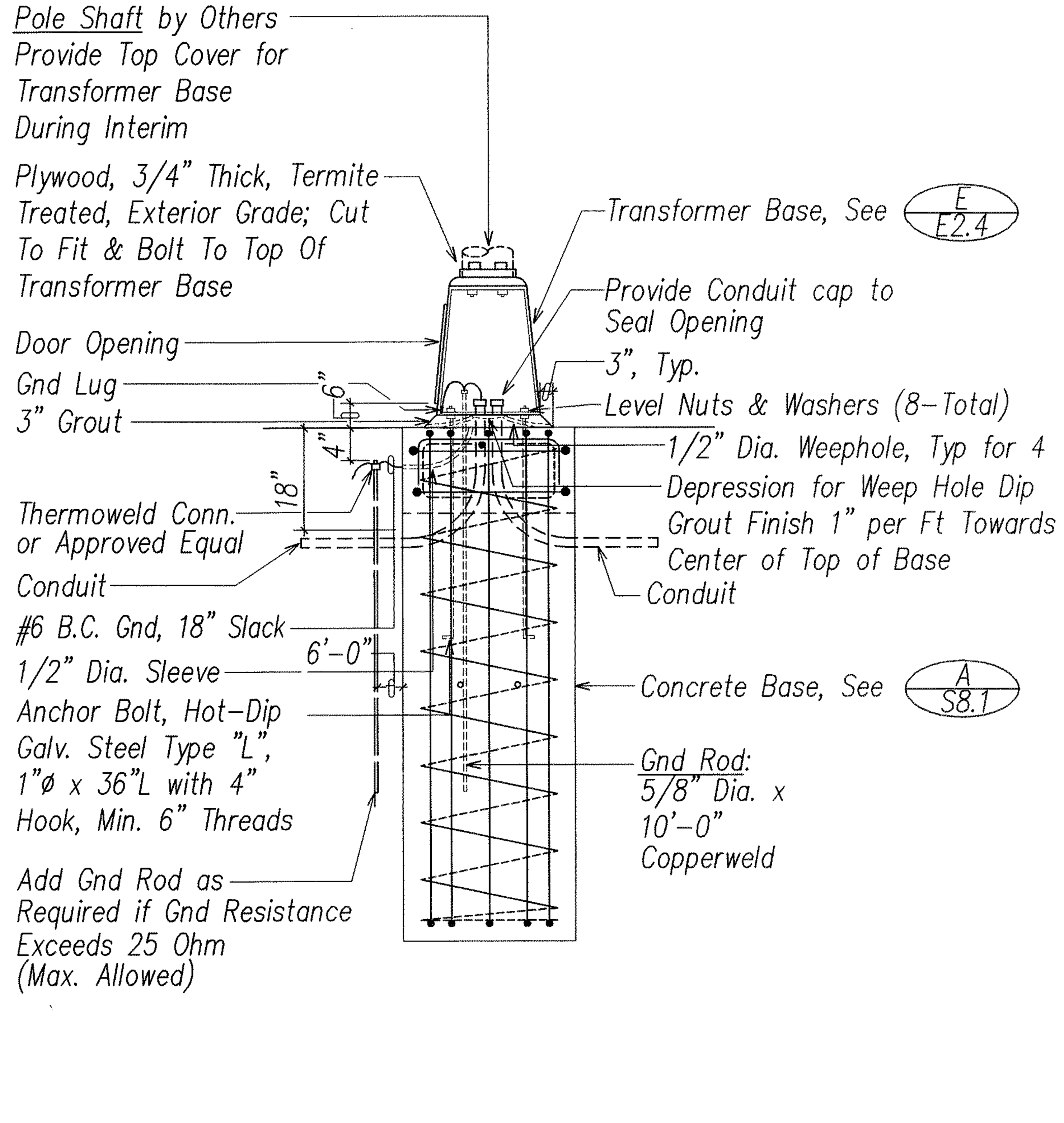
Scale: AS NOTED
Date: DEC. 22, 2004

SHEET No. E2.3 OF 15 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-8930(1)	2005	124	144

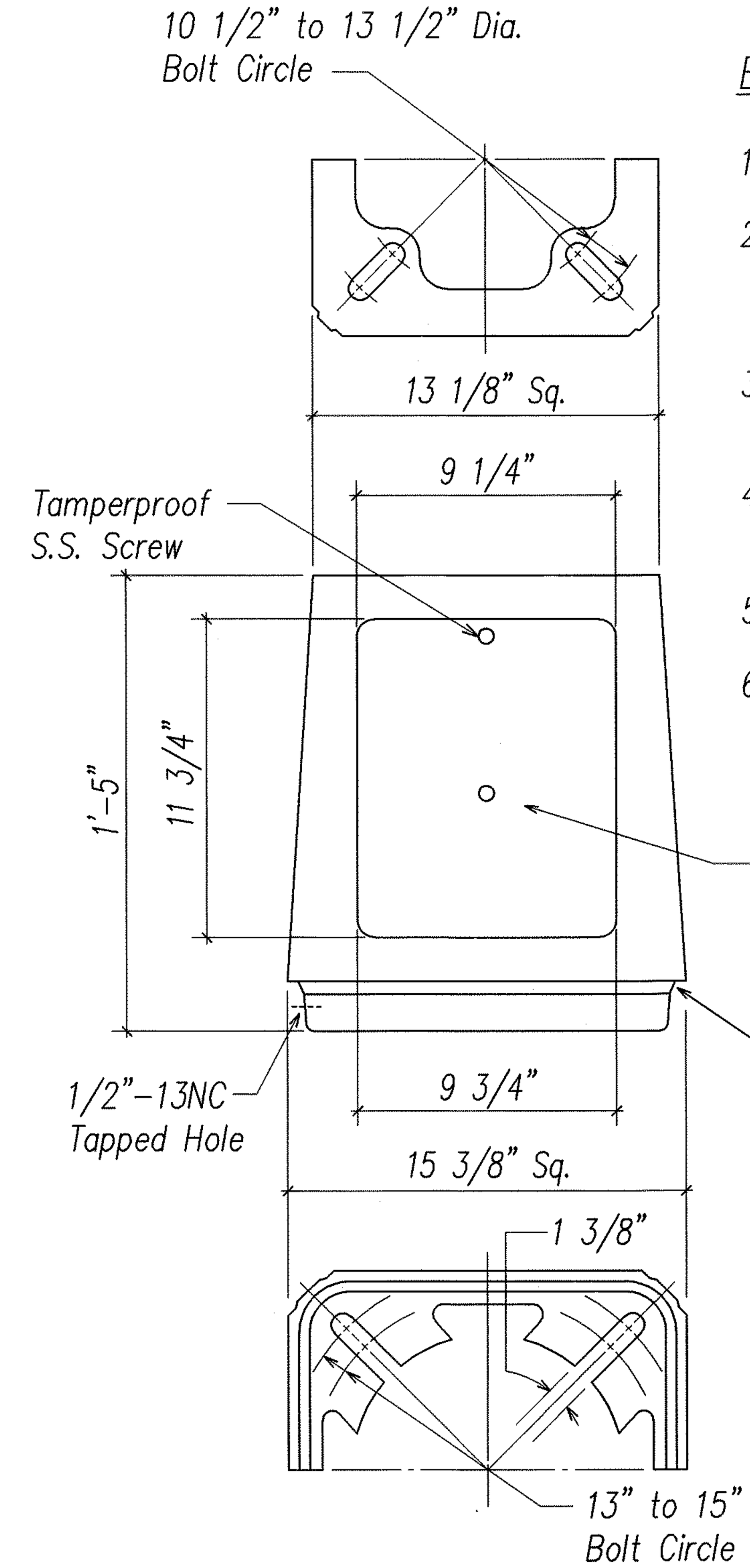


A/E2.4 **STREET LIGHT STANDARD**
Not to Scale



Note: See Concrete Base Plan B/E2.4 & Structural Drawings

C/E2.4 **CONCRETE BASE ELEVATION**
Not to Scale



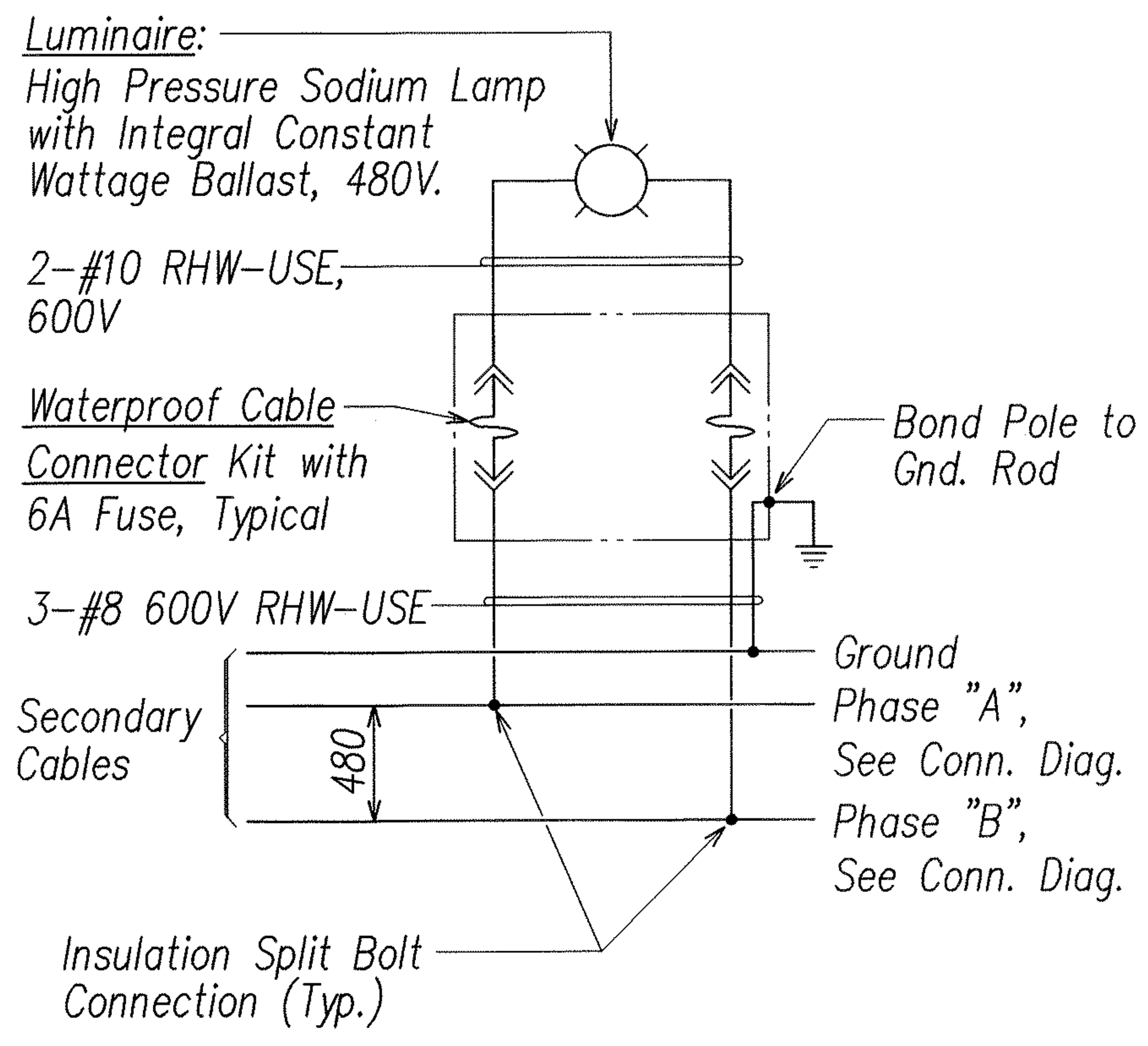
Base Shall Be Supplied With:

1. Door and 1/4"-20NC S.S. screw
2. Eight 1" washers 1/2" thick x 2 3/4" O.D. (Washers mechanical galvanized per ASTM B454)
3. Four 1"-8NC x 3 3/4" long galvanized steel hex. hd. bolts
4. Four 1"-8NC galvanized steel hex. nuts
5. Four 1" galvanized stl. lock washers
6. Four 1" x 2" O.D. galvanized stl. flatwashers

Akron Foundry
TB1-AF 1315-17 I.W. OR Equal
(Plus Hardware)

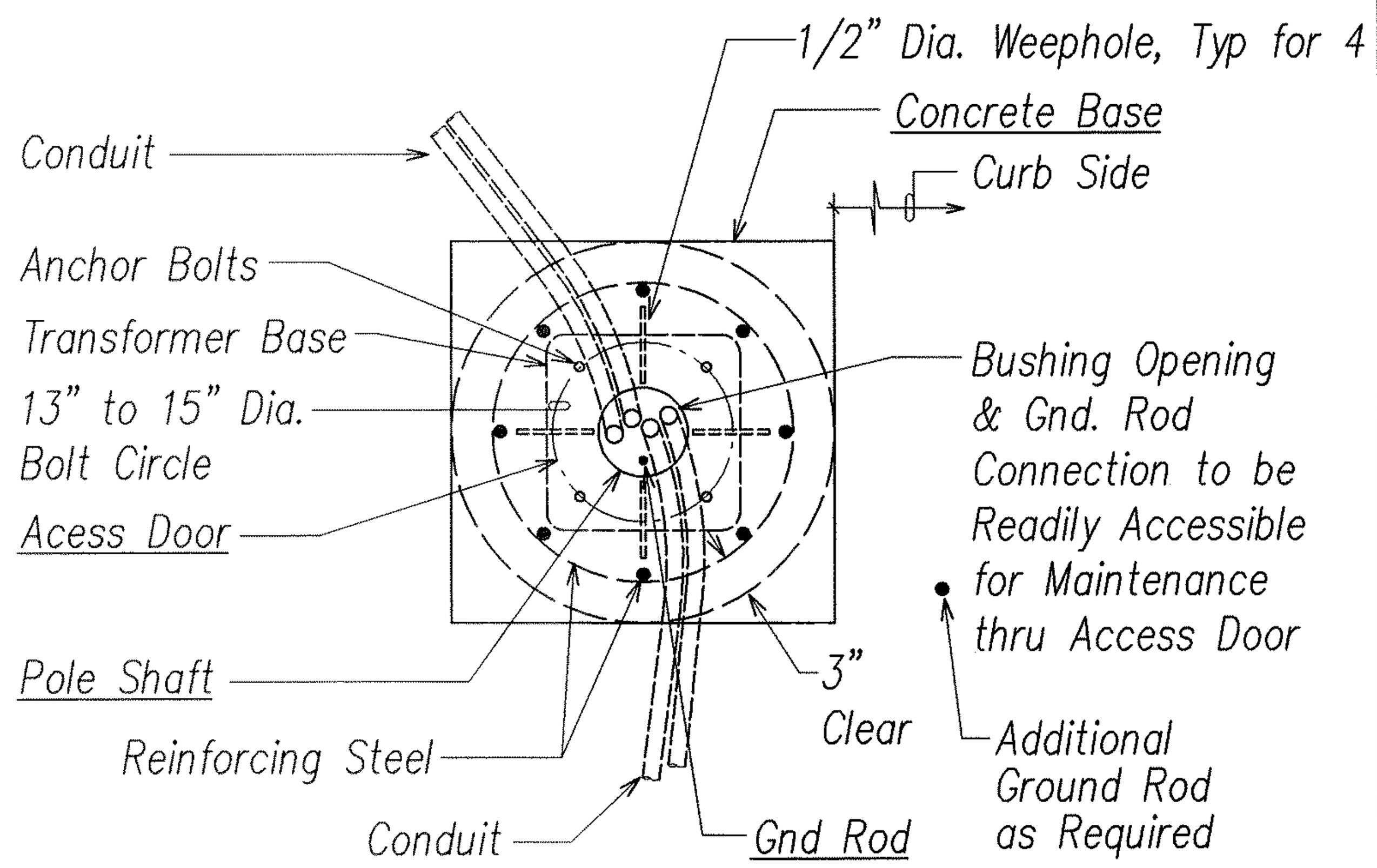
Material: Alum. Alloy 356-T6

E/E2.4 **BREAKAWAY TRANSFORMER BASE (ALUMINUM) DETAIL**
NOT TO SCALE

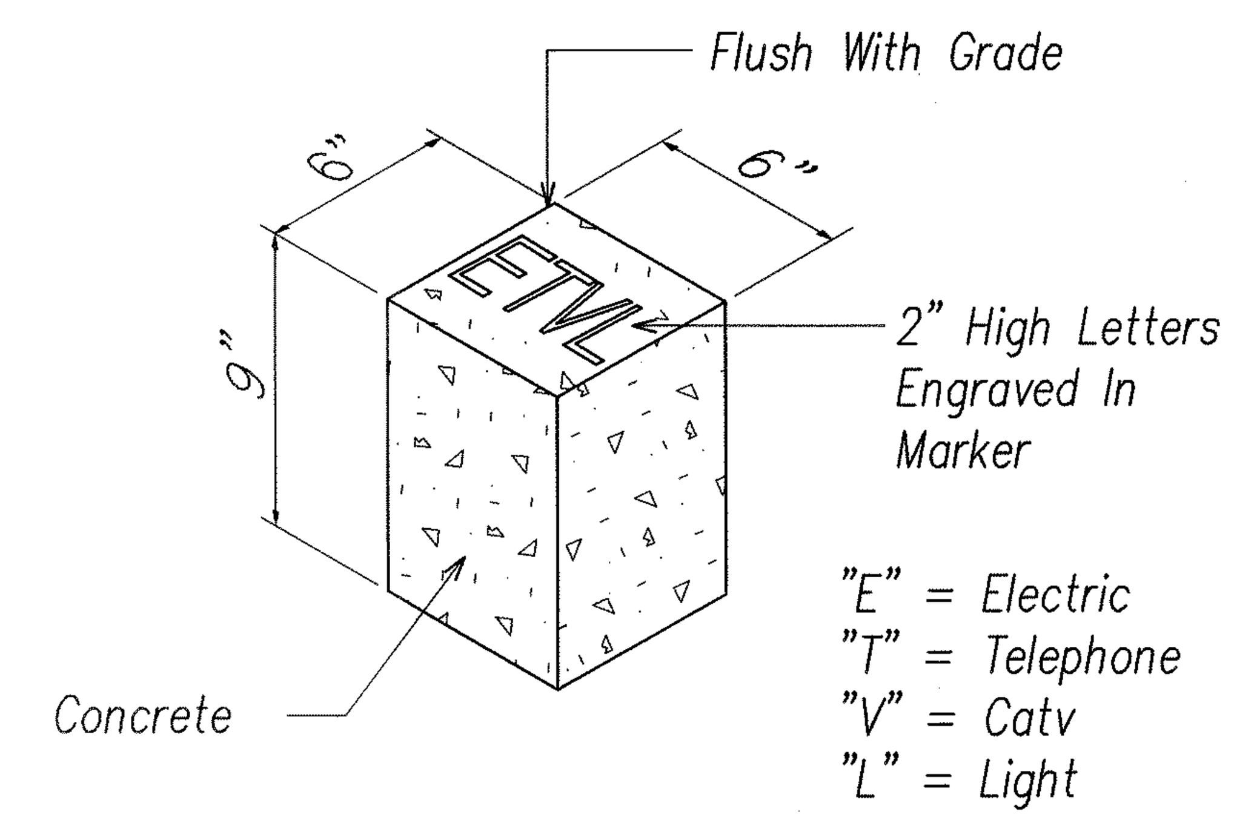


Note: All Neutral Conductors shall be identified with white insulation. Other means of identification is not acceptable.

D/E2.4 **STREET LIGHT CONNECTION DIAGRAM** (480V Metered System)



B/E2.4 **CONCRETE BASE PLAN**
Not to Scale



F/E2.4 **CONCRETE CONDUIT STUB-OUT MARKER**
Not to Scale

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

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29 DEC 2004

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

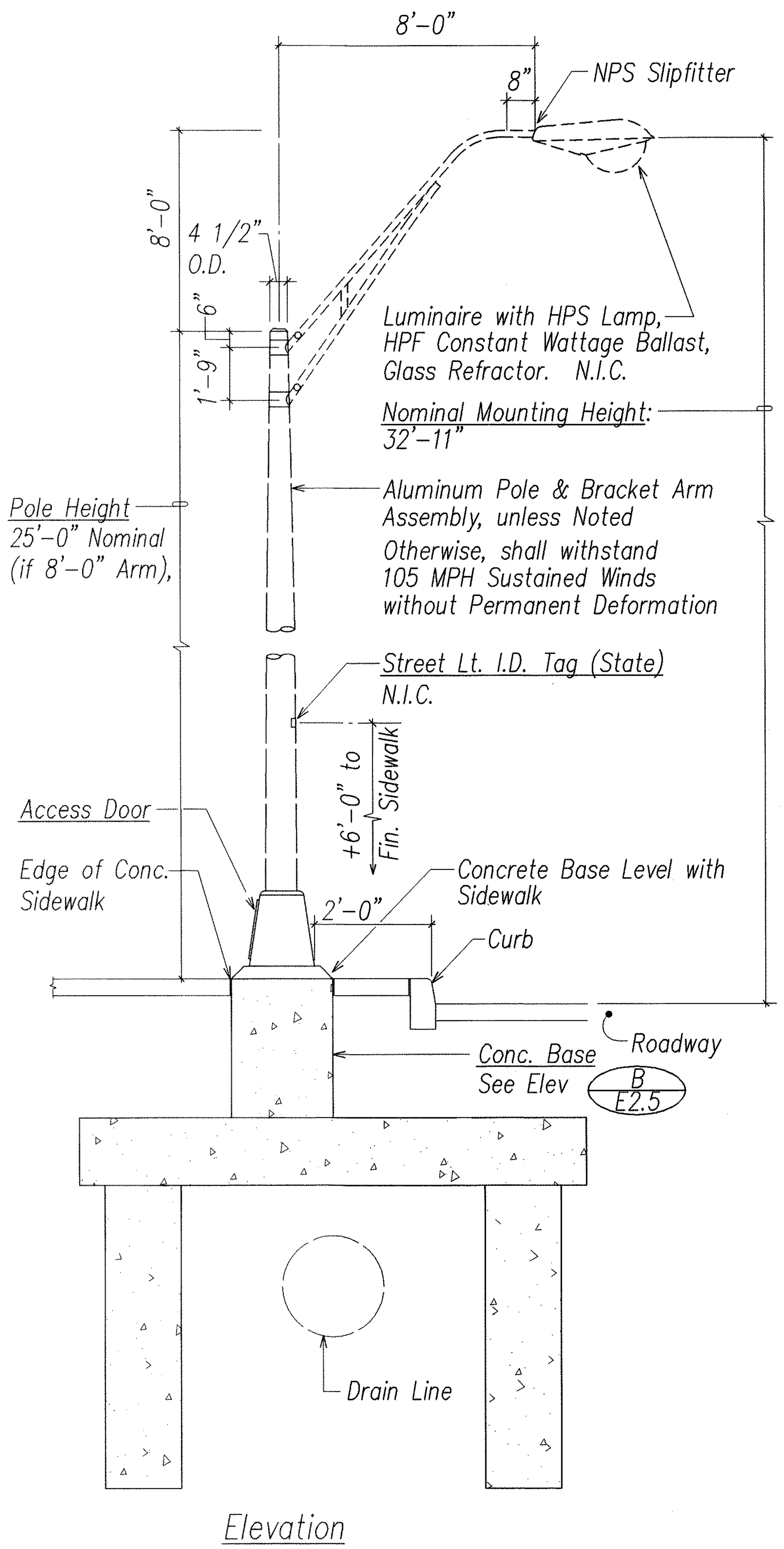
STREET LIGHT (STATE)
DETAILS I
North-South Road
Phase 1A
F.A.I. Proj. No. STP-8930(1)

Scale: AS NOTED Date: DEC. 22, 2004

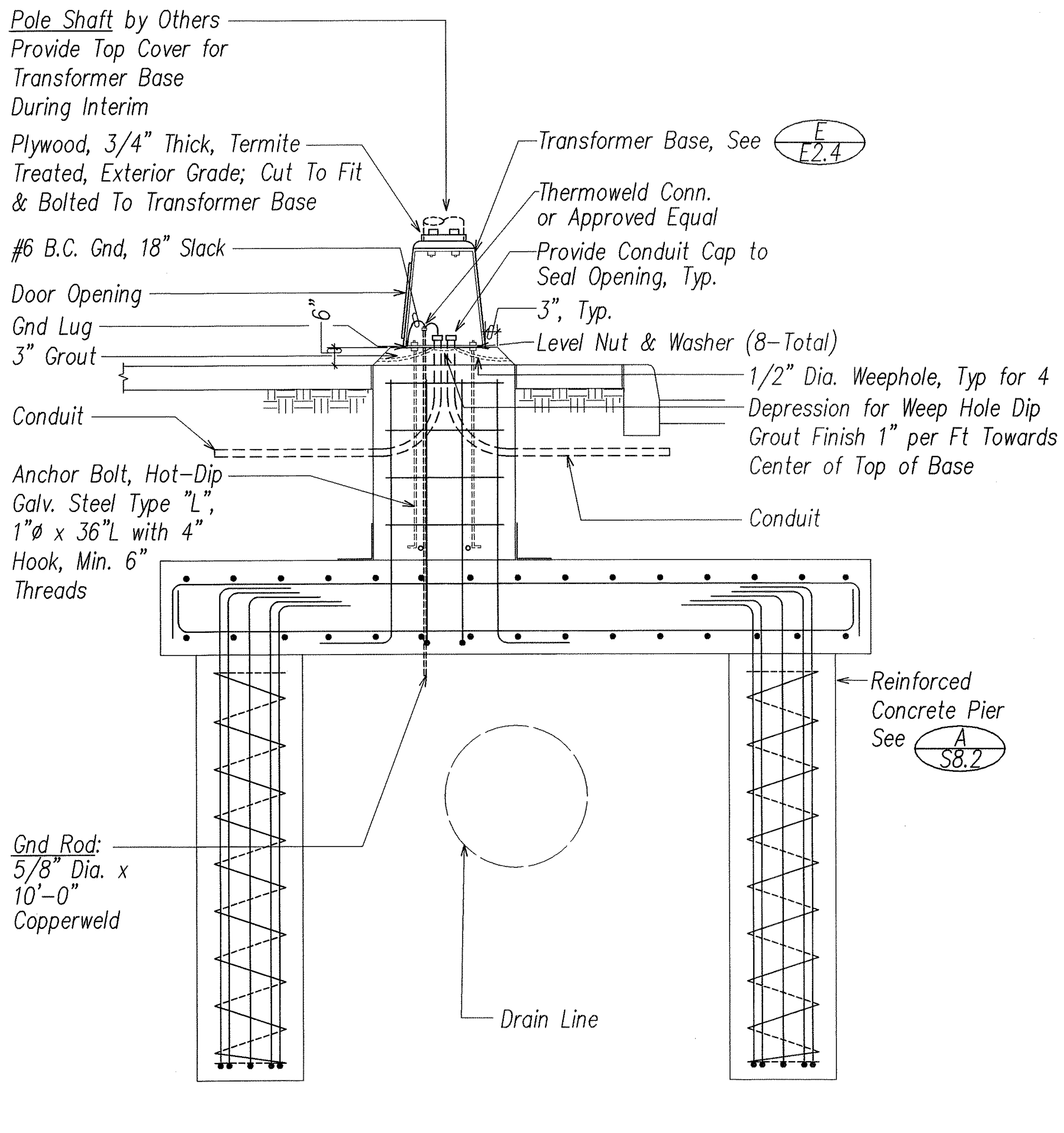
SHEET No. E2.4 OF 15 SHEETS

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.	STP-8930(1)	2005	125	144

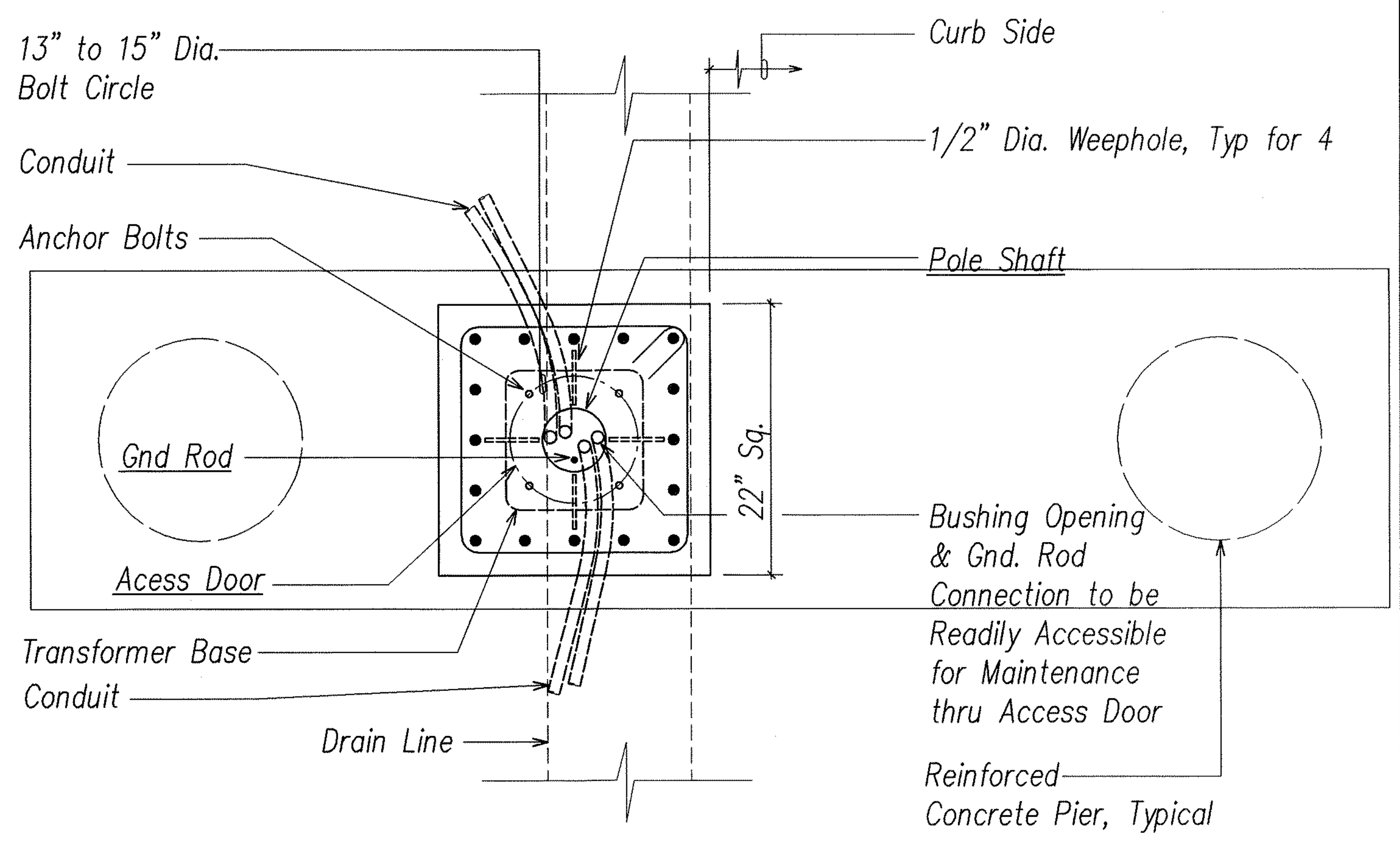


A E2.5 **STREET LIGHT STANDARD**
Not to Scale

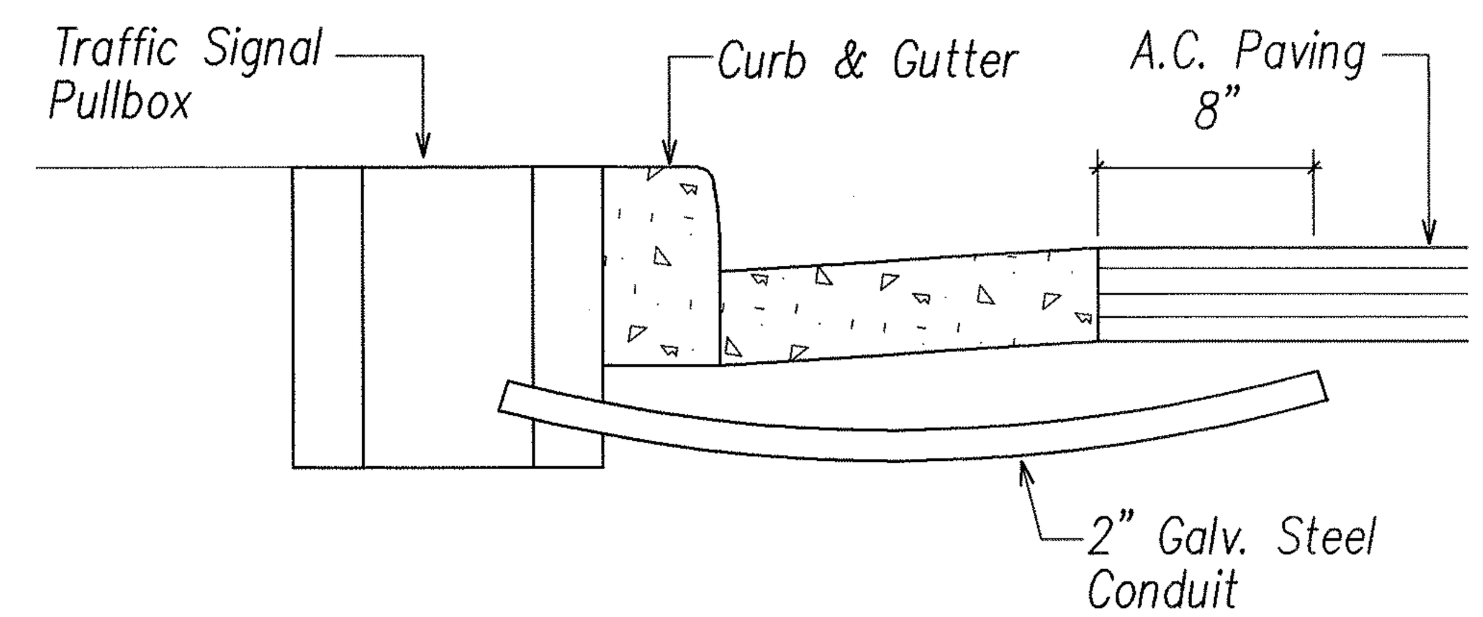


Note: See Concrete Base Plan C/E2.5 & Structural Drawings

B E2.5 **CONCRETE BASE ELEVATION**
Not to Scale



C E2.5 **CONCRETE BASE PLAN**
Not to Scale



Note: Seal Roadway End of Conduit after Installation.

D E2.5 **LOOP DETECTOR CONDUIT STUB OUT**
NOT TO SCALE

APPROVED BY:

CHIEF, TRAFFIC SIGNALS & TECHNOLOGY DIVISION DATE
DEPT. OF TRANSPORTATION SERVICES
CITY & COUNTY OF HONOLULU

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
29 DEC 2004

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STREET LIGHT (STATE)
DETAILS II
North-South Road
Phase 1A
F.A.I. Proj. No. STP-8930(1)

Scale: AS NOTED Date: DEC. 22, 2004

SHEET No. E2.5 OF 15 SHEETS

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