FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(77):13	1969	77	155

GENERAL STREET LIGHTING NOTES (CITY)

1. The Contractor shall notify the City and County Division of Street Lighting at least one week prior to doing any work on the C & C System.
2. Relocated C & C luminaires shall be mounted at the same height as the existing C & C luminaires.
3. All street lighting equipment removed and not reused shall be stockpiled. The C & C is to be notified when available for pickup. Existing cable removed shall become the Contractor's property.

GENERAL WATER NOTES (BOARD OF WATER SUPPLY)

1. The Contractor shall notify the Board of Water Supply in writing one week prior to commencing work on the water system.
2. The Contractor shall arrange with the Board of Water Supply to cut-off existing unused service lateral, remove meter boxes and appurtenances, prior to commencement of clearing and grading operations. Contractor shall provide all necessary excavation.
3. Asterisk (*) indicates work to be performed by BWS. Materials to be furnished by the Contractor unless specified as "relocate".
4. All excavation and backfill shall be done by the Contractor, including excavation for the relocation and lowering of existing mains, and excavation for meter to house service connection.
5. The locations of existing water mains and appurtenances shown on the plans are approximate only and the Contractor shall verify the exact locations. Any adjustment to the water mains and appurtenances whether shown on the construction plans or not shall be made a part of the project.
6. The Contractor shall plug the ends of abandoned water mains with class "C" concrete. Payment for class "C" concrete used as plugs shall be considered incidental to the various contract items for the water system.
7. Items indicated as "relocate" on the plans shall be removed, cleaned, painted and reinstalled at the new location by the Contractor unless otherwise specified.
8. The minimum clearance between fire hydrant and utility poles or light standards shall be 3.0 feet.
9. Any excavation work around existing water main shall be by hand only.
10. All gate valves, fire hydrants and other appurtenances, not shown as relocated, shall be removed, cleaned and stockpiled. The Board of Water Supply is to be notified when available for pickup.
11. Prior to final inspection, all fire hydrants shall be cleaned of all dirt, oil, grease or other loose material and given one coat of an approved red lead and one coat of an approved aluminum hydrant paint.
12. In field areas where the cover (from the existing ground) over the new main is less than three (3) feet, the Contractor shall first fill and compact the area (to provide a minimum of three (3) feet cover) prior to trenching for the new main.
13. B.W.S. shall make all taps to the existing mains for the connection of service laterals. The Contractor shall perform all excavation and backfill and furnish appropriate sizes of corporation stops.
14. Location of proposed lines, unless otherwise noted, are to be considered diagrammatic. Upon verification in the field of the location of the existing lines, the final location of the proposed lines shall be determined subject to the approval of the Engineer and the Board of Water Supply.

GENERAL SEWER NOTES (CITY)

1. The Engineer reserves the right to request the use of reinforced concrete cradle and jacket and or piling in the event that field conditions make such structural requirements necessary.
2. The Contractor shall notify the Division of Sewers 2 days prior to commencement of sewer work.
3. Top of sewer manholes in easements shall be four (4) inches above ground unless otherwise directed by the Engineer.
4. Existing laterals shown are from best sources available. The Contractor shall verify the exact locations as required. Any existing laterals exposed during construction shall be extended and reconnected to new mains if services are required or cut & plugged.
5. All frames and covers on existing sewer manholes to be demolished shall be cleaned and reused on new sewer manholes, or returned to the City and County as directed by the Engineer.
6. Location of proposed lines, unless otherwise noted, are to be considered diagrammatic. Upon verification in the field of the location of the existing lines, the final location of the proposed lines shall be determined subject to the approval of the Engineer and the City and County of Honolulu.
7. Cutting and plugging of existing sewers and sewer laterals, as well as connections to existing sewer manholes is to be considered incidental.
8. Restoration of existing streets and other improvements to be incidental.

GENERAL NOTES (NAVY-WATER & SEWER)

1. Unless otherwise noted, details of proposed water and sanitary sewer facilites for the U.S. Navy shall conform to the standard details of the Board of Water Supply and the City and County of Honolulu respectively.
2. Construction of the proposed 24" Water Main on Kaimakani Street in the vicinity of the existing Booster Pump house will necessitate the placement of this pipe under an existing wall. Construction of the proposed main in this area will also require the removal and replacement of a portion of an existing concrete slab. These are to be included in the cost of the 24" pipe.
3. Gate valves and manhole frames and covers for proposed Navy water and sewer lines which are noted as relocated, are to be obtained from existing Navy lines to be removed.
4. All connections (temporary or permanent), between existing and proposed fresh water mains and cutting and plugging of lines to be accomplished by Navy Public Works, Pearl Harbor, personnel. All excavation and backfilling materials, to be furnished by Contractor. Advance notice of at least one (1) week shall be given to the Navy for scheduling of the work.
5. Restoration of existing streets and other improvements due to new utilities to be incidental.
6. The Contractor shall notify the Navy in writing one week prior to commencing work on the water system.
7. The Contractor shall arrange with the Navy to cut-off existing unused service lateral, remove meter boxes and appurtenances, prior to commencement of clearing and grading operations. Contractor shall provide all necessary excavation.
8. All excavation and backfill shall be done by the Contractor, including excavation for the relocation and lowering of existing mains.
9. The locations of existing water mains and appurtenances shown on the plans are approximate only and the contractor shall verify the exact locations. Any adjustment to the water mains and appurtenances whether shown on the construction plans or not shall be made a part of the project.
10. The Contractor shall coordinate all work on Navy utilities with the Navy Public Works Center (phone extension 29102). All salvaged material is to be stockpiled, and the Navy Public Works Center is to be notified when available for pickup.

GENERAL ELECTRIC & TELEPHONE NOTES (H.E.Co. & H.T.Co.)

1. Existing electric and telephone systems shown on these plans are located from the best sources available. The Contractor shall check and verify the exact location and depth of same prior to start of construction operations.
2. Contractor to stake out H.E.Co. & H.T.Co. ductlines and H.T.Co. poles and anchors locations; H.E.Co. & H.T.Co. to check locations before Contractor undertakes excavation. H.E.Co. poles and anchors to be staked out, excavated, and installed by others.
3. Installation and backfill for H.T.Co. poles by H.T.Co. and installation for H.T.Co. anchors by the Contractor.
4. Poles and anchors are for H.E.Co. or H.T.Co. unless otherwise indicated.
5. Depth of poles and anchor holes are taken from finish grade.
6. For pole setting depth data, see Sht. No. 95.
7. All ducts and conduits called for installation in concrete jacket shall be inspected and approved by the respective Engineer of H.E.Co. or H.T.Co. or their representative before concrete placing. 72 hr. (min.) notice shall be given before placing concrete.
8. Minimum depth of ductlines from finish grade to top of concrete jacket where ducts are concrete encased = 2'-0" unless otherwise shown. Within Interstate Route H-1 R/W, minimum depth shall be 3'-0".
9. Ducts encased in concrete jackets:
   a. Normal distance from face of jacket to all ducts to be 3" minimum.
   b. Clear distance of 1½" minimum between ducts of same utility company.
   c. Clear distances of 3" minimum between H.E.Co. ducts and H.T.Co. ducts.
10. Location and depth of all pullboxes, service boxes, handholes and manholes to be verified and approved in the field by H.E.Co. and H.T.Co. prior to construction or installation.

~~GENERAL GAS NOTES (H.G.Co.)~~ NOT IN CONTRACT

1. ~~All work required for the installation of the relocated gas main & facilities shall be done by the Contractor. Honolulu Gas Co. & personnel shall furnish, fabricate, weld and test the relocated gas main and facilities.~~
2. ~~The Contractor shall notify the Honolulu Gas Co. Ltd. at least 10 calendar days in advance of relocation operations and shall coordinate his work with the Gas Co.~~

GENERAL NOTES (NAVY-ELECTRIC AND FIRE ALARM SYSTEM)

1. The Contractor shall coordinate all work on Navy utilities with the Navy Public Works Center (phone extension 29102). All salvaged material is to be stockpiled, and the Navy Public Works Center notified when available for pickup.
2. Existing electric and telephone systems shown on these plans are located from the best sources available. The Contractor shall check and verify the exact location and depth of same prior to start of construction operations.
3. Contractor to stake out Navy ductlines, pole and anchor locations; Navy to check locations before Contractor undertakes excavation, installation and backfill.
4. For pole setting depth data, see sheet No. 95.
5. All ducts and conduits called for installation in concrete jacket shall be inspected and approved by the Navy before concrete placing. 72 hours (minimum) notice shall be given before placing concrete.
6. Minimum depth of ductlines from finish grade to top of concrete jacket where ducts are concrete encased = 2'-0" unless otherwise shown.
7. Ducts encased in concrete jackets:
   a. Normal distance from face of jacket to all ducts to be 3" minimum.
   b. Clear distance of 1½" minimum between ducts of same utility owner.
   c. Clear distance of 3" minimum between Navy ducts and ducts of other utility owner.
8. Location and depth of all pullboxes, service boxes, handholes and manholes to be verified and approved in the field by the Navy prior to construction or installation.

APPROVED:

Chief, Engineering Division, BWS — 9/16/69 — Date

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schuchardt

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

GENERAL UTILITY NOTES

HALAWA INTERCHANGE
PROJECT NO. F-HI-1(77):13
DATE: NOV. 28, 1969

SHEET No. 10 OF 360 SHEETS

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

PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(77)13	1969	78	155

LEGEND

Denotes Utility Ownership

	Existing	New or Relocated	To Be Removed or To Be Abandoned	Not In Contract
Electric (H.E.Co)				(NIC)
Telephone (H.T.Co)				(NIC)

Hawaiian Telephone Company Transpac Land Cable Labelled (H.T.-T.P)

Street Lighting (City) — SL — SL REL — SL REM — SL(NIC)

Buildings

New 60' Pole 7' Deep (H.E.Co.)

Tone out Existing Buried T.P. Land Cable Prior to Excavation for Elec. Ducts.

Existing Buried T.P. Land Cable. (H.T.-T.P.)

TRUE NORTH
Scale: 1 in. = 50 ft.

New 30' Pole 5' Deep, 3/4" Anchor, 5' Lead (H.E.Co.)

1 1/4" Anchor, 25' Lead (H.E. Co.)

Existing Buried T.P. Land Cable. (H.T.-T.P.)

Close Circuit Loop Downstream of Light.

New 2-5" T.K. & 2-5" Conduit Bend Riser [LRB-R=8"] in Cond. Jacket 125 L.F. (H.E.Co.)

New 55' Pole 7' Deep - 1 1/4" Anchor, 25' Lead 1" Anchor, 5' Lead (H.E.Co.)

New Type I 6'x11' Elec. M.H. # 1 (H.E. Co.) Sta. 198+35, 155' o/s

Close Circuit Loop Downstream of Light.

Existing Pole P-11 New 1" Anchor 15' Lead (H.T.Co.)

New 2-5" T.K. in Concrete Jacket 340 L.F. (H.E.Co.) See Sht. 85 for Profile

1-4" T.K. in Cond. Jacket 36 L.F. Interface and connect to exist. 3" T.C. & Service Box (H.E.Co.)

Install One (1) H.T.Co. #24 Pullbox Over Existing 1" Conduit & Install One (1) Conduit & Conduler R.G.I.P. Bend Riser (2 New 45° Bends) Extend Riser 8'-0" Up Pole, Cap & Strap to Pole (H.T.Co.)

New 45' Pole, 6' Deep 2-1" Anchors, 15' Lead (H.E.Co.) (NIC)

Sta. 198+85.180 o/s New Type 6'11" V Elec. H.H. # 2 (H.E.Co.)

Exist. Pole P-8 New 36" Anchor 5' Lead (H.E.Co.) (NIC)

New 2-5" T.K. & 2-5" Conduit Bend Riser [LRB] and 1-4" T.K. & 1-4" Conduit Bend Riser [LRB] in Cond. Jacket. 24 L.F. (H.E.Co.)

New 35' Pole 5' Deep, 5/8" Anchor 15' Lead (City) (NIC)

New 45' Poles 6' Deep, 1" Anchors, 15' Lead (H.E.Co.) (NIC)

Existing Conduit (H.E.Co.) Existing Service Box & 3" Conduit (H.E.Co.) Existing Pole 30' o/s Adjust

New 30' Pole 5' Deep, 5' Lead (H.E.Co.)

New 45' Pole 7.5' Deep, 16" Anchor 20' Lead (H.E.Co.)

New 60' Pole 7' Deep 1" Anchor 15' Lead (H.E.Co.)

Existing Pole P-12 ~~New 1" Anchor 15' Lead (H.T.Co.)~~

~~New 40' Poles 5'-5" Deep, 1" Anchors 15' Lead (H.T.Co.) 20' Lead (H.T.Co.)~~

Deleted
See C.C.O. #11
Dated: 5/4/70

ULUNE ST. · EKE PL. · MATCH LINE · PUAKALA ST. · KULINA ST. · ANOUNOU STREET · ANOUNOU PLACE · KULINA STREET · LAKAPU PL. · KAMANI STREET · POOPAA PL. · EKE PL. · MATCH LINE · INTERSTATE ROUTE H-1 · RAMP · RAMP · DRIVE · HEIGHTS · AIEA · AIEA · PUAKALA · KULINA · STREAM

ABBREVIATIONS

T.K.	Transite Korduct.
T.C.	Transite Conduit.
P.V.C.	Polyvinyl Chloride Conduit.
LRB	Long Radius Bend.
SRB	Standard Radius Bend.
GSP	Galvanized Steel Pipe.

APPROVED

T. A. Judd — 8-12-69
Hawaiian Telephone Company — Date

Wm Loo. JK — 8/27/69
Hawaiian Electric Company, Inc. RN — Date

Kenneth R. Hong — ~~Aug~~ Sept 8 '69
for Traffic Engineer City & County of Honolulu — Date

J. ANDREW SCHLICHARDT — REGISTERED PROFESSIONAL ENGINEER — NO. 2229 — HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
J. Andrew Schlichardt

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRIC, TELEPHONE & STREET LIGHTS RELOCATIONS AT AIEA

HALAWA INTERCHANGE
PROJECT NO. I-HI-1(77):13
SCALE: 1"=50' DATE: NOV. 28, 1969

SHEET No. 20 OF 311 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(77):13	1969	79	154

LEGEND

Denotes Utility Ownership

	Existing	New	To Be Removed or To Be Abandoned	Not In Contract
San. Sewer (CITY)				NIC
Water (B.W.S.)				NIC
Buildings				

* For Alterations to City's Storm Drains on Puakala Street see sht. 36.

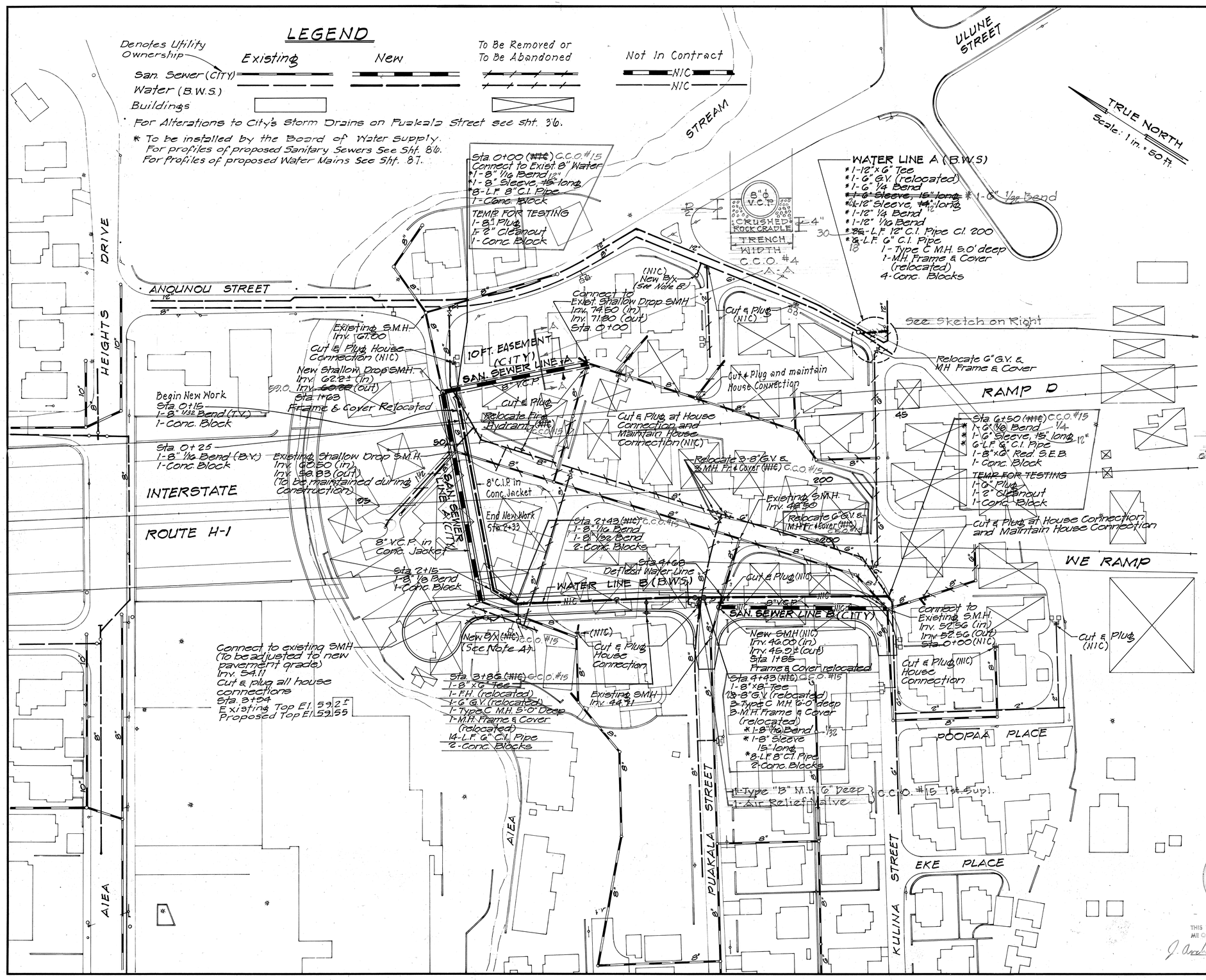
* To be installed by the Board of Water Supply. For profiles of proposed Sanitary Sewers See Sht. 86. For Profiles of proposed Water Mains See Sht. 87.

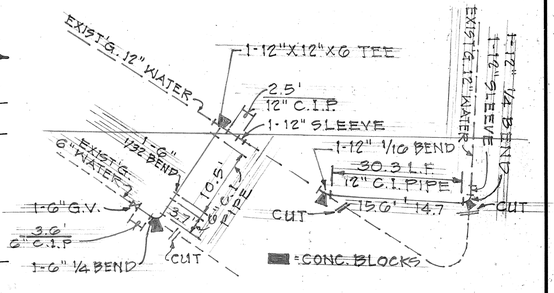
NOTE:

(NIC) A: New B/x includes Type X Meter Box (including cast iron cover) and 1 1/4 inch copper service connection and all appurtenances off new main.

(NIC) B: New B/x includes Type X Meter Box (including cast iron cover) and 1 1/4 inch copper service connection off existing main and all appurtenance with the Board of Water Supply to install corporation stop furnished by contractor.

C: Contractor shall furnish and install plugs for the incomplete water system to prevent water, mud, or other foreign matter from entering the pipe line. Incidental to various contract items.





PLAN
REVISED WATER LINE "A" B.W.S.
NOT TO SCALE

APPROVED:

Sewer System Director, Div. of Sewers — 9-5-69 Date

Chief, Engineering Division, B.W.S. — 9/16/69 Date

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SANITARY SEWER & WATER RELOCATIONS AT AIEA

HALAWA INTERCHANGE
PROJECT NO. I-HI-1(77):13

SCALE: 1"=50' DATE: NOV. 28, 1969

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2235 HAWAII, U.S.A.

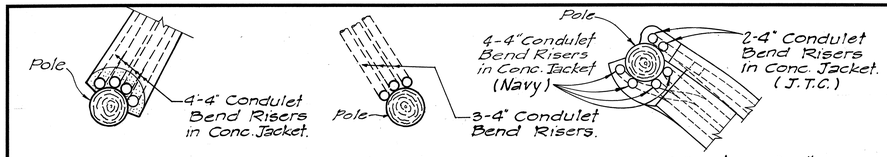
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schuchardt

SHEET No. 34 OF 361 SHEETS

79

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(77)13	1969	80	1554



PERMANENT

DETAIL "1"
EXISTING POLE P-5

TEMPORARY

DETAIL "2"
EXISTING POLE AHA-12

FOR UTILITY LINES THRU BRIDGE STRUCTURE
See Typical Section this sheet

Exist. F.H. (Navy)

Existing Pole AHA-12 (Navy) New 2-1¼" Anchors, 20' Lead. SEE DET. "2" (J.T.C.)

New 2-4" Styrene Duct in Conc. Jacket with 2-4" Conduiet Bend Risers at Pole AHA-12 & 60 L.F. (J.T.C.) See Sheet 87 for Profile

Sta. 17+48 New Type A-3-7 Telephone M.H. No.1 (⅔ H.T.Co., ⅓ J.T.C.)

6'-18" RCP

Sta. 17+56 (Inlet #61 Const. C.B. (Kaimakani St.) Inv. = 81.23 (City) Type D Frame & Cover (relocated)

Sta. 14+20 Inv. = 78.00
1-24" 1/32 Bend (V)
Sta. 14+15 Inv. 78.00
1-24" 1/32 Bend (V)
C.C.O. #20

Sta. 13+92
1-24" 1/8 Bend
2' conc. Blocks (Navy)
New 12"ø G.S.P. 350 L.F. (⅔ H.T.Co., ⅓ J.T.C.) See Sht. 84 for Profile

Sta. 14+09 Inv. = 81.70
1-24" 1/32 Bend (B.V.)
1-Conc. Block (Navy)

24" C.I.P.

℄ 24" Water Line C (Navy) See Sheet 87 for Profile

AHA-13 SW # 1318

℄ Telephone Ducts (⅔-H.T.Co., ⅓-J.T.C.)

8" San. Sewer

New 4-4" Asb. Cem. in Conc. Jacket with 4-4" Conduiet Bend Risers at Pole AHA-12. New 15KV, 3/c #4/0 VCLC Cable, New 4/C #10 Cable.

Cut & Plugged

6" Water (Navy)

Sta. 17+45 New 8'x6'x6' Deep Elec. M.H. No.1 (Navy)

New 8-4" G.S.C. 335 L.F. (Navy) New 15KV, 3/c #4/0 VCLC Cable, New 4/C Cable. See Sht. 87 for Profile.

℄ Structure See "Typical Structure Sect." 1/2

KAIMAKANI STREET

Approx. 2'-6" Cover

17

18

℄ Existing Roadway

℄ Underground Telephone 2 51 x 19 (H.T.Co.)

℄ Signal Corps Cable 26 x 22 (J.T.C.)

℄ Signal Corps Cable 101 x 19 (J.T.C.)

cut

cut

cut

New 24" C.I.P. (Navy)

Sta. 14+51 1-24" ½ Bend (B.V.) 1-Conc. Block (Navy)

WATER LINE C (Navy)

Sta. 12+38.33-7" Air Relief Valve

1-24" 1/8 Bend (B.V.) 1-Conc. Block (Navy)

℄ Electrical Ducts (Navy)

18" Storm Drain (City) See Sht. 41 for Profile.

18" C.I.P.

12" C.I.P.

SANITARY SEWER LINE "D" (Navy) See Sht. 86 for Profile.

18" Storm Drain (City)

24" Water (Navy)

Sta. 11+05 Tone out Existing Buried Cables (Typ.) & Excavate 10' x 10' Splice Pit, 4' Deep (⅔ H.T.Co., ⅓ J.T.C.)

Temporary 1-4" GSP Bend with 1-4" Conduiet Riser at Pole P-5 85 L.F. (1-H.T.Co., 2-J.T.C.)

5' Radius Bend Min. Typical

STREAM DUCT INTERLOCKET

New 1-4" GSP 105 L.F. (1-H.T.Co., 2-J.T.C.)

Relocated Existing Pole P-5 New 3-1¼" Anchors, 20' Lead (⅔ H.T.Co., ⅓ J.T.C.) DETAIL "1"

New 4-4" Styrene Ducts in Conc. Jacket with 4-4" Conduiet Bend Risers at Pole P-5. See Sheet 84 for Profile

Sta. 14+59 Connect to Water (relocated) 1-24" ⅛ Bend (H.T.Co.) 1-Type "A" M.H. 6'-0" Deep

Sta. 14+04 to 14+13 Connect to Exist. 24" Water Line C (Navy) 1-24" ⅛ Bend (H.T.Co.) 2-Conc. Blocks (Navy)

Inlet # 62 Sta. 14+04 = Sta. 17+56 (Kaimakani St.) Const. C.B. Type D (City) Inv. = 80.66 Out Inv. = 81.48 (In)

Existing Pipe to be adjusted as necessary to meet new C.B. Frame & Cover Relocated

For Continuation 12" San. Sewer (Navy) See Sheet 82.

Sta. 15+71 New S.M.H. (Navy) Inv. = 81.76 Frame & Cover (relocated)

TRUE NORTH
Scale: 1 in = 10 ft.

℄ Structure

24" Water Line (Navy) 22'-0" | 12" San. Sewer (Navy) 23'-11" | 18" Storm Drain (City) 21'-11" ℄

℄ Tele. Conduit 0'-0" (⅔ H.T.Co., ⅓ J.T.C.) | Electrical Conduit (Navy) 9'-9" | 20'-0" | 20'-0"

TYPICAL STRUCTURE SECTION
(LOOKING MAUKA)
Scale: ¼" = 1'-0"

LEGEND

Denotes Utility Ownership →	As Existing	As Reconstructed	As Removed or Abandoned
SAN. SEWER (Navy)	———	———	—/—/—
STORM DRAIN (City)	———	———	—/—/—
WATER (Navy)	———	———	—/—/—
TELEPHONE (H.T.Co.)	– – – – –	Permanent / Temporary	—/—/—
ELECTRIC (Navy)	—·—·—	———	—·—/—·—
FIRE ALARM (Navy)	+–+–+–+	———	+–+–+/+–+–+

ALL UTILITIES IN BRIDGE STRUCTURE AS LABELLED

HAWAIIAN TELEPHONE COMPANY JOINT TRUNKING CABLES LABELLED (J.T.C.)

APPROVED

T. H. Judd 8-12-69
Hawaiian Telephone Co., Ltd. Date

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

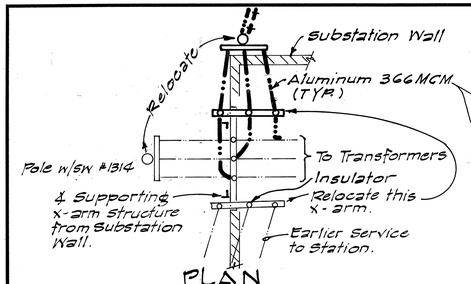
NAVY FACILITIES, TELEPHONE AND DRAINAGE RELOCATIONS AT LOWER KAIMAKANI ST.

HALAWA INTERCHANGE
PROJECT NO. I-HI-1(77)13
SCALE: 1"=10' DATE: NOV. 28, 1969

SHEET No. 40 OF 364 SHEETS

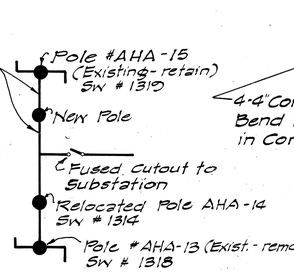
80

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(17):13	1969	81	154

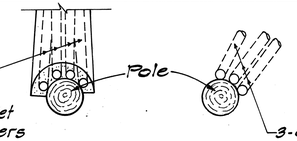


PLAN

DETAIL "4" RECONSTRUCTION AT SUBSTATION



SCHEMATIC DIAGRAM OF CONNECTION TO SUBSTATION



PERMANENT TEMPORARY

DETAIL "3" NEW 40' POLE (H.T.Co.)

(C.C.O. #20)
Sta. 10+98
1-Air Relief Valve
1-5.0' Type "B" M.H.
New 12-4" G.S.P. 350 L.F. (⅔-H.T.Co., ⅓ J.T.C.) See Sht. 84 for Profile
Sta. 10+89 1-24" 1/8 Bend (T.V.)
Sta. 10+73 1-24" 1/8 Bend, 2 Conc. Blocks (Navy)
Sta. 10+71 1-24" 1/8 Bend (T.V.) 1-24" 1/8 Bend Conc. Blocks (Navy)
Inlet #50 Sta. 10+00 = Sta. 21+14 (Kaimakani St.) Const. C.B. Type D Inv. = 90.00 (City) Frame & Cover (relocated)

ALL UTILITIES IN BRIDGE STRUCTURE AS LABELLED

HAWAIIAN TELEPHONE COMPANY JOINT TRUNKING CABLES LABELLED (J.T.C.)

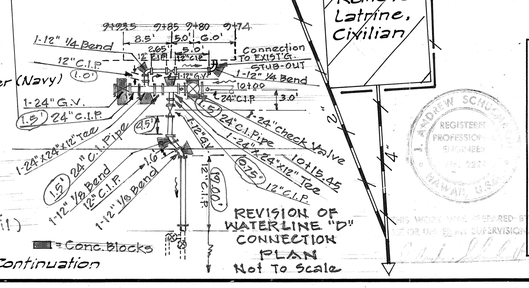
TRUE NORTH
Scale: 1 in. = 10 ft.

FOR UTILITY LINES THRU BRIDGE STRUCTURE See Sheet 80

KAIMAKANI STREET

24" C.I.P.
℄ 24" Water Line C (Navy) See Sheet 87 for Profile
New 8-4" G.S.C. 335 L.F. (Navy) See Sht. 84 for Profile
℄ Telephone Duct (⅔ H.T.Co., ⅓ - J.T.C.)
20
℄ Structure See "Typ. Struct. Sect." Sht. 80
4" Telephone Duct (H.T.Co.)
℄ Exist. Roadway
℄ Electrical Ducts (Navy)
18" C.I.P.
℄ 18" Storm Drain (City) See Sheet 41 for Profile
12"
SANITARY SEWER LINE D (Navy)
See Sht. 86 for Profile
New 4-4" Styrene Ducts in Conc. Jacket with 4-4" Conduit Bend Risers at Pole P.G. 40' L.F. (⅔ H.T.Co., ⅓ J.T.C.) See Sht. 84 for Profile.
New 8'X6'X6' Deep Elec. M.H. No. 2 (Navy)
12" V.C.P.
New Corner Small Type Tel. M.H. #8 6' Deep. (⅔-H.T.Co., ⅓-J.T.C.)
5' Radius Bend Min. Typ.
18" RCCP
New 24" CIP (Navy)
C.C.O. #6 Item 625.284
Inlet #50 Sta. 10+00 Const. C.B. Type D Inv. = 90.00 (City) Frame & Cover (relocated)
New 1-4" G.S.P. 45 L.F. (H.T.Co.)
(C.C.O. #25) Styrene Duct in P.C. Jacket
Temporary 1-4" G.S.P. each with 4" Conduit Bend Riser at Pole. Anchor (Bottom) 50 L.F. (1-H.T.Co., 1-J.T.C.)
Sta. 10+12 = Sta. 38+00 (Force Main)
New S.M.H. (Navy) Inv. 90.15 (8") Inv. 89.82 (12") Frame & Cover (relocated)
Sta. 10+00 Connect to and Adjust Exist. S.M.H. (Navy) to Grade. Inv. = 91.00
Sta. 21+38 Tone out Exist. Buried Cable & Excavate 5'x7' Splice Pit x 3.5' Deep. (H.T.Co.)
Adjust Exist. Pull Box to Grade (H.T.Co.) Incidental to Structure Excavation other than at Bridges.
Sta. 21+40 Tone out Exist. Buried Cables & Excavate 7'x7' Splice Pit x 3.5' Deep. (J.T.C.)
Underground Telephone 51x19 (H.T.Co.)
Signal Corps Cables 26x22 (J.T.C.) 101x19 (J.T.C.)
Exist. Conc. Driveway 12' wide (Navy) Approx. 2'-6" Cover.
From Camp H.M. Smith
To Camp H.M. Smith
12" San. Sewer (Navy)
12" Water (Navy)
Adjust Exist. W.M.H. to Grade (Navy)
Retaining Wall & Fence
Adjust Exist 12" Water (Navy) Crossing @ New 8" San. Sewer.
H.T.Co. to relocate
3 Cables 152 x 22 (J.T.C.) 202 x 19 (H.T.Co.) 400 x 22 (H.T.Co.)
Electrical (Navy) 3-366 MCM Aluminum 11.5 KV Primary
AHA-15 SW # 1319
12'
Kai. St. Sta. 21+05 New 40' Pole P-6 5.5' Deep (H.T.Co.) 2-1" Anchors 20' Lead (H.T.Co.) SEE DETAIL 3
New 1-4" G.S.P. 150 L.F. (J.T.C.)
8" V.C.P.
3 Ft. Gauge Track
Pumphouse, Booster
SANITARY SEWER LINE E (Navy)
Relocated 11.6 KV Primary (Navy)
Fire Alarm 4-1/C No. 10 (Navy) - Relocated
New 45' Pole (Navy)
Substation, Elec. & S.W. Equipment
Shop; Repair & Tunnel Entrance
24" Water (Navy)
New Location Chlorinator Building
11" Conc. Jacket C.C.O. #6 Item #625.281
1½"
359 - 10 KVA
360 - 10 KVA
772 - 20 KVA
1½" Force Main (Navy) (Pump Waste)
6" San. Sewer (Navy)
Sta. 37+66 New S.M.H. (Navy) Inv. = 90.50 (6" in.) Inv. = 90.33 (8" out) Frame & Cover (relocated)
Electrical M.H.
Remove Office and Locker Room
12' UTILITY ACCESS ROAD G
see Sheet 28
R = 20'
Remove Latrine, Civilian
Existing 24" Gate Valve to be relocated to Sta. 14+67
Existing 12" Gate Valve to be relocated to Navy Water Line D
Relocate Building & Facilities. See Shts. 110 to 112
Relocate Pole Structure Switch #1314 and Appurtenances
Existing 24" Gate Valve to be Relocated to Sta. 14+67
New 4-4" Asb. Cem. in conc. Jacket With 4-4" Conduit Bend Riser Relocated Pole. 30 L.F. (Navy). New 15 KV, 3/c #4/0 V.C.C. Cable New 4/c #0 cable.
Relocated Pole Structure Switch #1314 and Appurtenances See Detail 4 "Eaton Pole to Nail" C strap of 3/8" near top with 4" thick x 6" wide galvanized plate steel.
Electric Ducts to Remain
See Revision on Right of This Sheet
Lower Sump Inv. = 90.48
1-Check Valve (Relocated)
Sta. 10+00 1-12" ½ Bend 1-Conc. Block (Navy)
Sta. 9+97 1-24" Gate Valve (reloc.) TYPE A M.H. C.I.P. Frame & Cover (Navy)
Deleted C.C.O. #21
Install 2-1½" HD Fire Alarm Lines. See Sht. 83 for Continuation
New 12" Water Line (Navy). See Sht. 82 for Continuation.
Pole - See Sht. 83 for Continuation
SEE SHT. 82
WATER LINE D

Sta. 9+74 Connect to Exist. 24" Water (Navy)
Temp. For Testing
1-24" Plug
1-2" Cleanout
1-Conc. Block
82-Conc. Blocks
C.C.O. #21 12"x12"x24" Rectangular Channel
C.C.O. #21 Construct Valve Box as sketched. (See Sheet No. 111 for detail)
= Conc. Blocks



REVISION OF WATERLINE "D" CONNECTION
PLAN
Not To Scale

APPROVED

8-12-69
Hawaiian Telephone Co., Ltd. Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NAVY FACILITIES, TELEPHONE AND DRAINAGE RELOCATIONS AT UPPER KAIMAKANI ST.

HALAWA INTERCHANGE
PROJECT NO. I-HI-1(77):13

SCALE: 1"=10' DATE: NOV. 28, 1969

SHEET No. 54 OF 361 SHEETS

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

S1

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(77)13	1969	82	154

LEGEND

	Existing	New	Removed or Abandoned
Force Main			
San. Sewer			
Storm Drain			
Water (Fresh)			
Water (Hot)			
Buildings			

For profiles of proposed Sanitary Sewers See Sht. 86
For profiles of proposed Water Mains See Sht. 87

PLAN VIEW Not to Scale

TRUE NORTH Scale: 1 in. = 50 ft.

KAIMAKANI STREET

ULUNE STREET

AIEA ELEMENTARY SCHOOL

MOANALUA ROAD

AVENUE

ARGONAUT AVENUE

LANGLEY STREET

RAMP A

RAMP B

RAMP C

RAMP D

H-1 INTERSTATE

Sta. 10+37± Incidental

See P-28

Unit (Meter G.V. & C.V.)

12" Meter

12" C.I.P.

12" Check Valve

6" G.V.

6" Meter

6" Check Valve

For Continuation of Sanitary Sewer Line D See Sheet 80

New SMH Inv. 81.76 Sta. 13+71 Frame & Cover (relocated)

New SMH Inv. 79.87 Sta. 14+46 Frame & Cover (relocated)

12" VCP SANITARY SEWER LINE D (Navy)

New SMH Inv. 77.90 Sta. 16+43 Frame & Cover (relocated)

New SMH Inv. 76.63 Sta. 17+70 Frame & Cover (relocated)

Existing SMH Inv. 75.33

Existing SMH Inv. 77.55

Cut & Plug

Cut & Plug 1 Conc. Block

Cut & Plug Laterals

Sta. 10+00 Connect To 24" Water (Navy) 1-24"x12" Tee 1-Conc. Block 1-12" G.V. (Relocated) 2-12" G.V. (Relocated) 2-Type B Manhole (6' Deep) 3-Manhole Frame & Cover (Relocated)

Delete 1-Type B Conc. #21

(Continued) Sta. 10+00 1-Meter Box (Relocated & Incidental) 1-Type "A" M.H. (4'-0" Deep)

Sta. 12+08 Connect To Exist. 12" Water Remove Existing Tee, 1-12" Hex Bend, 1-12"x12" Tee 1-12" Hex Bend 2-Conc. Block Temp. For Testing 1-12" Plug 1-12" Cleanout 1-Conc. Block

WATER LINE D (Navy) Sta. 11+90 Reconnect Service Lateral (Incidental to Cost of Pipe)

Sta. 11+90 1-12" G.V.

See Sketch

Elevated Pedestrian Crossing

Bldg. #301

Bldg. #302

Bldg. #307

Bldg. #308

Bldg. #309

Bldg. #401

Bldg. #402

ORIGINAL PLAN

SURVEY PLOTTED BY: DATE
DRAWN BY:
TRACED BY:
DESIGN BY:
NOTE BOOK QUANTITIES BY:
No. CHECKED BY:

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2257 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schuchardt

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NAVY WATER & SANITARY SEWER RELOCATIONS @ WEST HALAWA HOMES

HALAWA INTERCHANGE
PROJECT NO. I-HI-1(77)13
SCALE: 1"=50' DATE: NOV. 28, 1969

SHEET No. 61 OF 360 SHEETS

82

1-7-69

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(77)13	1969	83	154

Navy Facilities (Presently maintained by the Hawaii Housing Authority): Series Street Light, Fire Alarm &/or Electric Primary as Noted.

LEGEND

	Existing	New	Removed or Abandoned
Electric (H.E. Co.)			
Buildings			
Fire Alarm Manual Sta. (Navy)			
Street Light		REL	REM
Transformer			
Telephone (H.T.Co.) Denotes Utility Ownership			

TRUE NORTH
Scale: 1 in. = 50 ft

ULUNE STREET

KAIMAKANI STREET

4" Duct
Overhead
Buried Cables
Overhead

AIEA ELEMENTARY SCHOOL

Elevated Pedestrian Crossing

MOANALUA ROAD

INTERSTATE ROUTE H-1

RAMPS A & D

NE RAMP

SW RAMP

RAMP A

LANGLEY STREET

ARGONAUT AVENUE

Install New 2-1/c #10 Fire Alarm (Navy) Overhead Lines Connect into Existing Lines (For Continuation Sht. 81)

ORIGINAL PLAN	
NOTE BOOK	
No.	

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NAVY FACILITIES RELOCATION @ NORTH HALAWA HOMES

HALAWA INTERCHANGE
PROJECT NO. I-HI-1(77):13
SCALE: 1"=50' DATE: NOV. 28, 1969

J. ANDREW SCHUCHART
REGISTERED PROFESSIONAL ENGINEER
No. 3969
HAWAII, U.S.A.

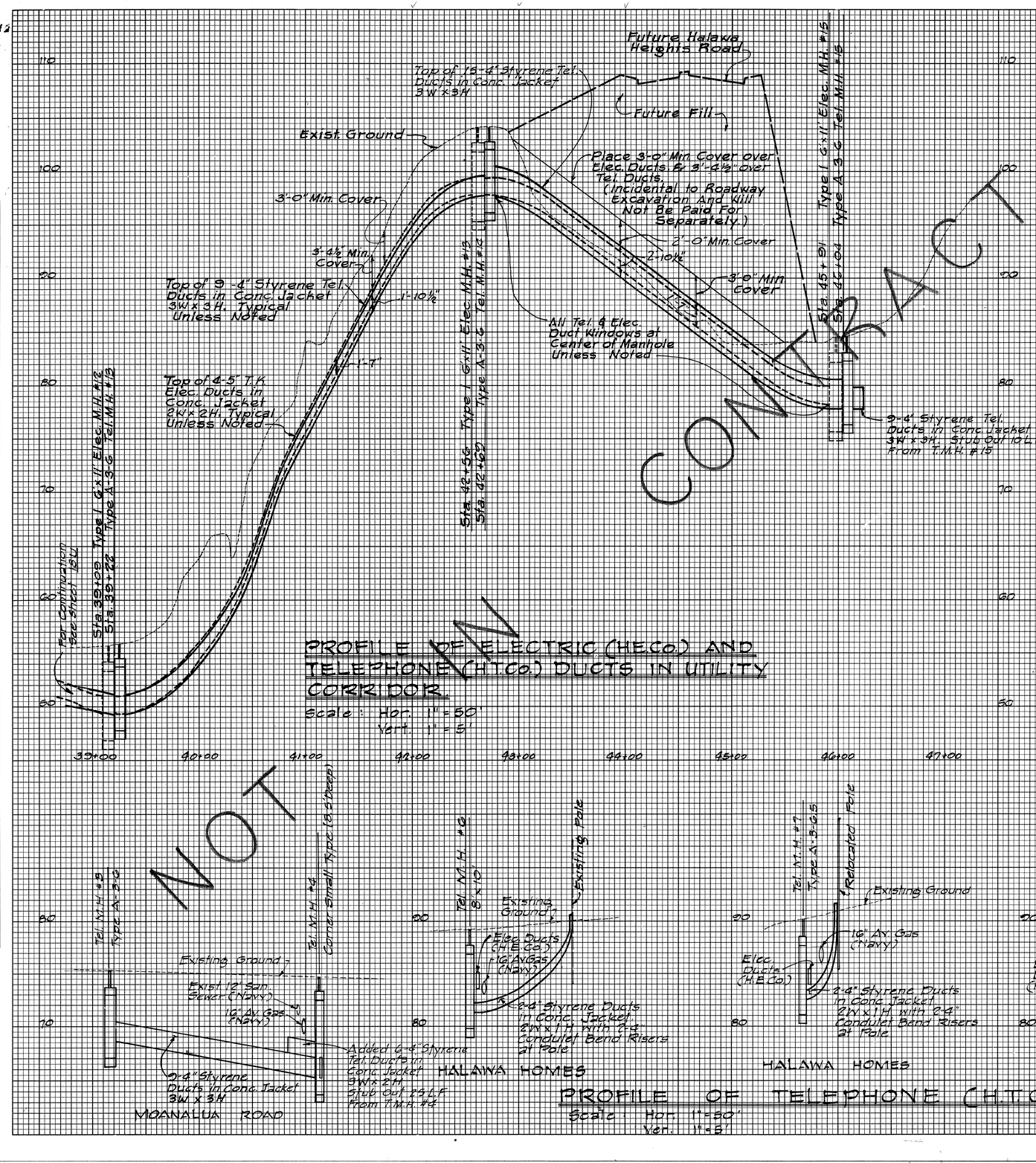
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
J. Andrew Schuchart

SHEET No. 74 OF 364 SHEETS

05-2-7

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-III-1(17)13	1969	84	1554

FINAL SURVEY	SURVEYED	BY	DATE
	PLOTTED		
	TRIANGULATE		
NOTE BOOK	AREAS		
NO.	AREAS CHECKED		



APPROVED

Hawaiian Telephone Co., Ltd. — 8-12-69 Date

Hawaiian Electric Co., Inc. — RN — 8-27-69 Date

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

SHEET NO. 84 OF 361 SHEETS

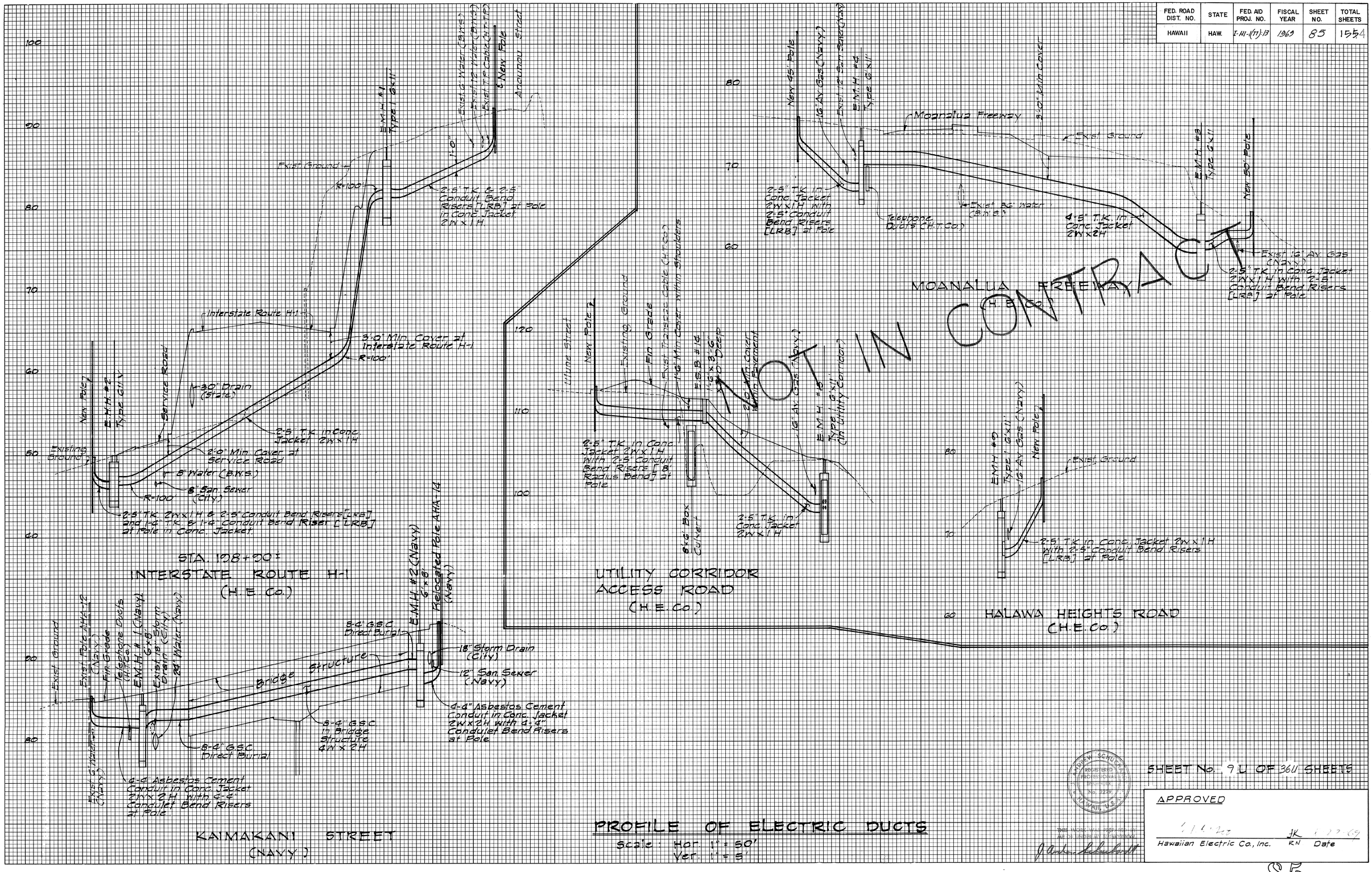
S4

PLATE 3 —CROSS SECTION G. F. R. & R. E. STANDARD
THE FREDERICK POST CO., CHICAGO

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-(17)-13	1969	85	1554

FINAL SURVEY — SURVEYED, PLOTTED, TRACED, CHECKED, NOTE BOOK, AREAS, AREAS CHECKED, NO., BY, DATE

ORIGINAL SURVEY — SURVEYED, PLOTTED, TRACED, CHECKED, NOTE BOOK, AREAS, AREAS CHECKED, NO., BY, DATE



PROFILE OF ELECTRIC DUCTS

Scale: Hor. 1" = 50'
Ver. 1" = 5'

SHEET No. 94 OF 361 SHEETS

APPROVED

1-11-69 — JK 1-22-69

Hawaiian Electric Co., Inc. — KN — Date

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

ANDREW SCHULZ — REGISTERED PROFESSIONAL ENGINEER — No. 2274 — HAWAII

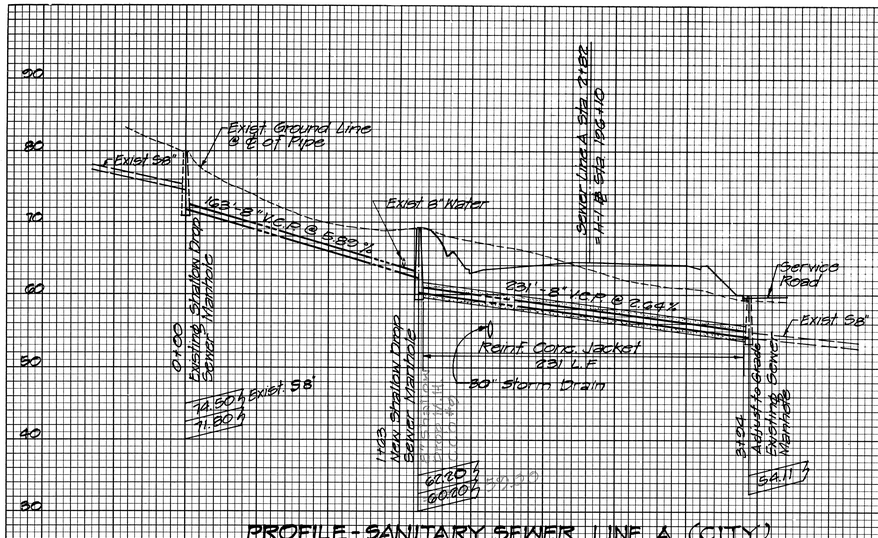
S5

PLATE 3 —CROSS SECTION O. P. R. & R. E. STANDARD
THE FREDERICK POST CO., CHICAGO

FED. ROAD DIST. NO.	STATE	FED AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEET
HAWAII	HAW.	I-H1-1(17)-13	1969	86	155

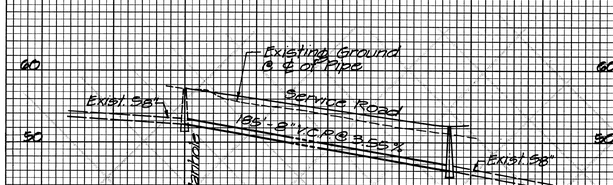
FINAL SURVEY — SURVEYED, PLOTTED, TEMPLATE, AREAS, AREAS CHECKED, NOTE BOOK, NO., BY, DATE

ORIGINAL SURVEY — SURVEYED, PLOTTED, TEMPLATE, AREAS, AREAS CHECKED, NOTE BOOK, NO., BY, DATE



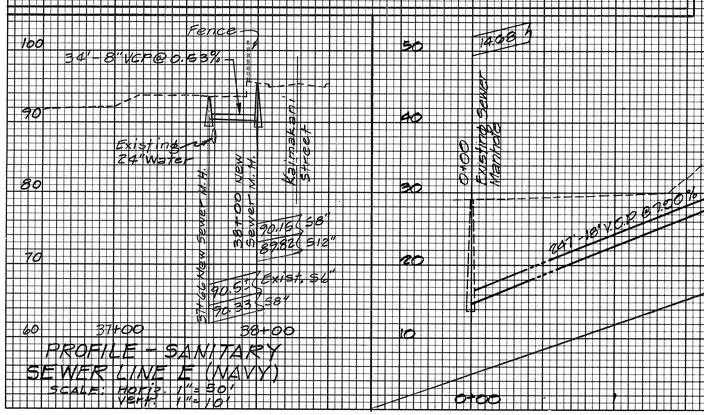
PROFILE - SANITARY SEWER LINE A (CITY)

Scales: Horiz. 1"=50'
Vert. 1"=10'



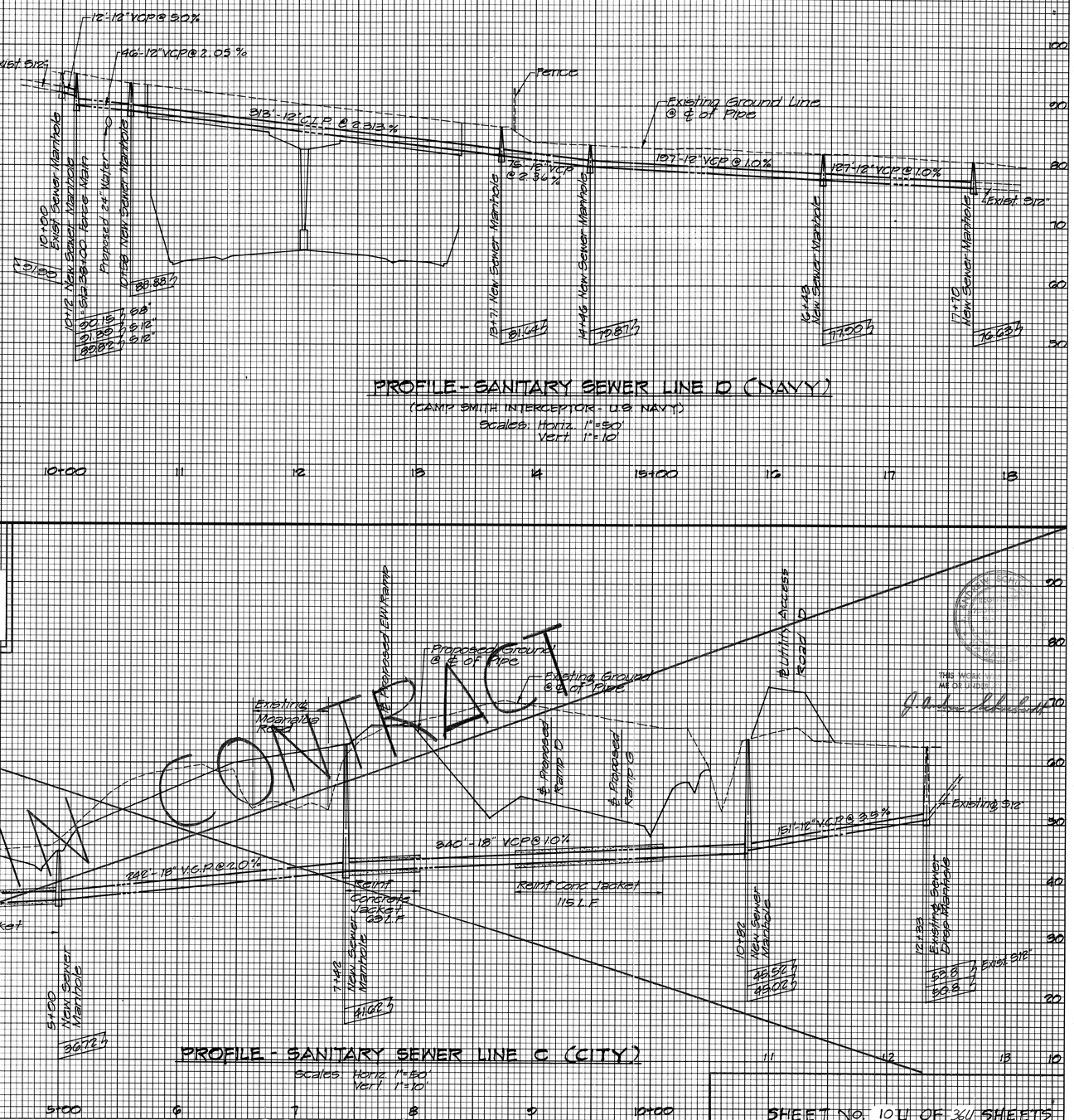
PROFILE - SANITARY SEWER LINE B (CITY)

Scales: Horiz. 1"=50'
Vert. 1"=10'



PROFILE - SANITARY SEWER LINE E (NAVY)

SCALE: Horiz. 1"=50'
Vert. 1"=10'



PROFILE - SANITARY SEWER LINE D (NAVY)

(CAMP SMITH INTERCEPTOR - U.S. NAVY)
Scales: Horiz. 1"=50'
Vert. 1"=10'

PROFILE - SANITARY SEWER LINE C (CITY)

Scales: Horiz. 1"=50'
Vert. 1"=10'

APPROVED

Sewer System Director, Div. of Sewers — 1-5-69 Date

THIS MAP WAS PREPARED BY ME OR UNDER MY SUPERVISION

SHEET NO. 101 OF 341 SHEETS

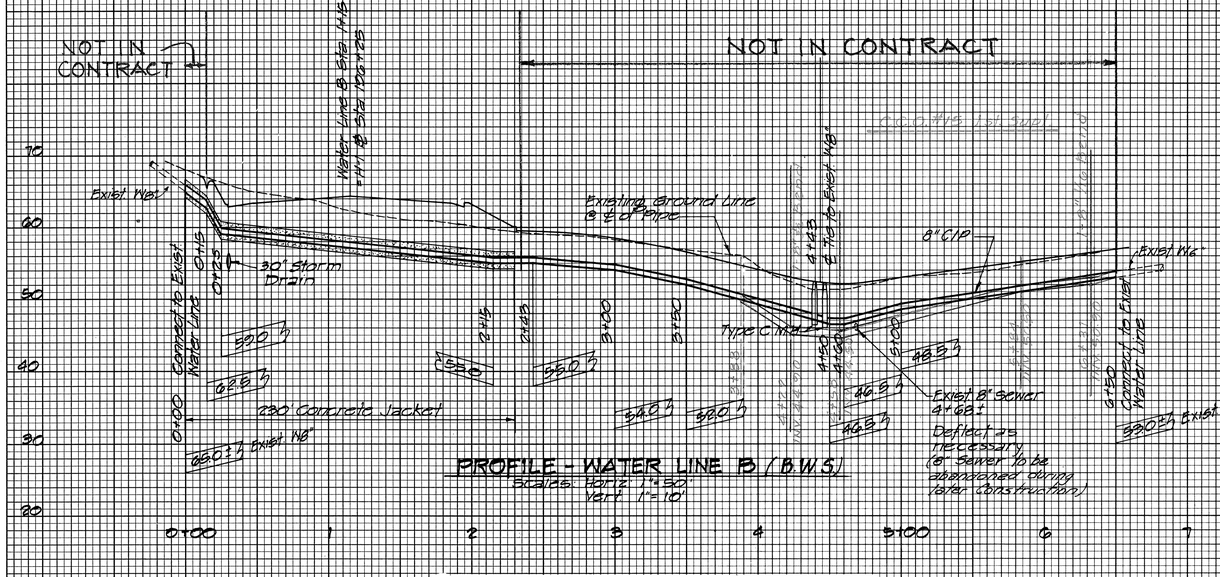
86

PLATE 3 —CROSS SECTION O. P. R. & R. E. STANDARD
THE FREDERICK POST CO., CHICAGO

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(17):13	1969	87	1554

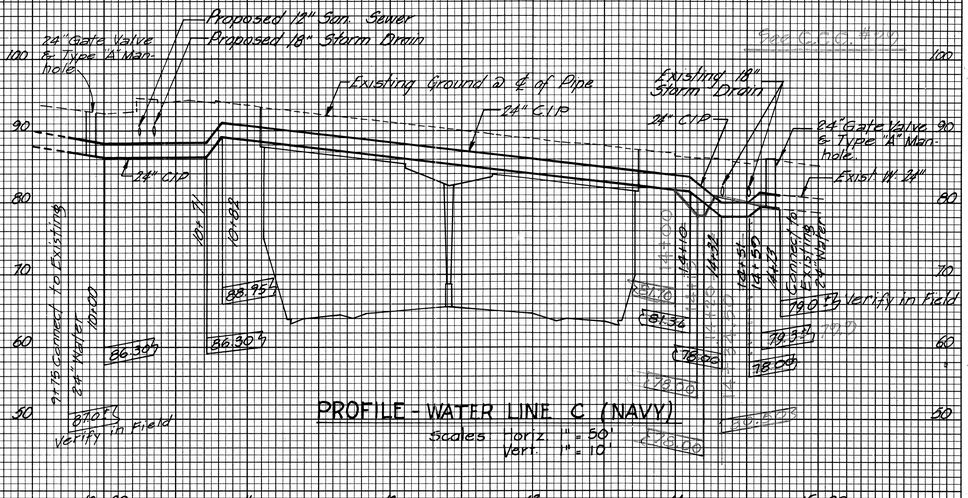
FINAL SURVEY — NOTE BOOK NO. — SURVEYED — PLOTTED — TEMPLATE — AREAS — AREAS CHECKED — BY — DATE

NOT IN CONTRACT



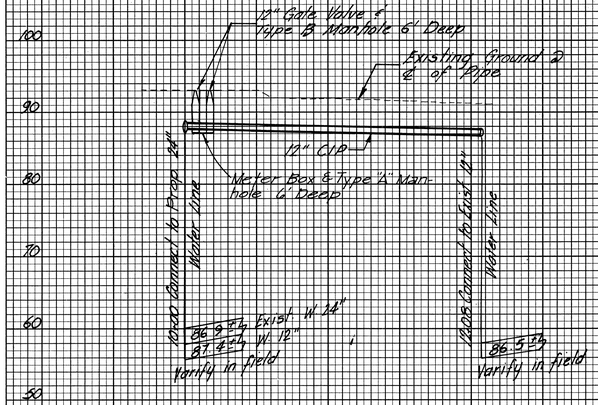
PROFILE - WATER LINE B (B.W.S.)
Scales: Horiz. 1"=50'
Vert. 1"=10'

APPROVED
L. Kawalea
Chief, Engineering Division, B.W.S.
9/16/69
Date

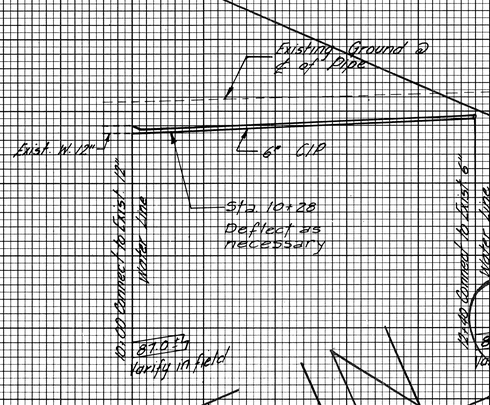


PROFILE - WATER LINE C (NAVY)
Scales: Horiz. 1"=50'
Vert. 1"=10'

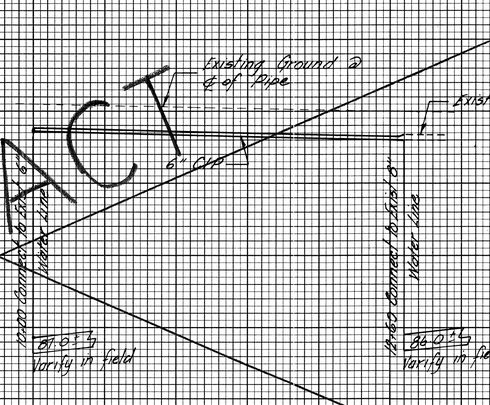
ORIGINAL SURVEY — NOTE BOOK NO. — SURVEYED — PLOTTED — TEMPLATE — AREAS — AREAS CHECKED — BY — DATE



PROFILE - WATER LINE D (NAVY)
Scales: Horiz. 1"=50'
Vert. 1"=10'



PROFILE - WATER LINE E (NAVY)
Scales: Horiz. 1"=50'
Vert. 1"=10'



PROFILE - WATER LINE F (NAVY)
Scales: Horiz. 1"=50'
Vert. 1"=10'

NOT IN CONTRACT

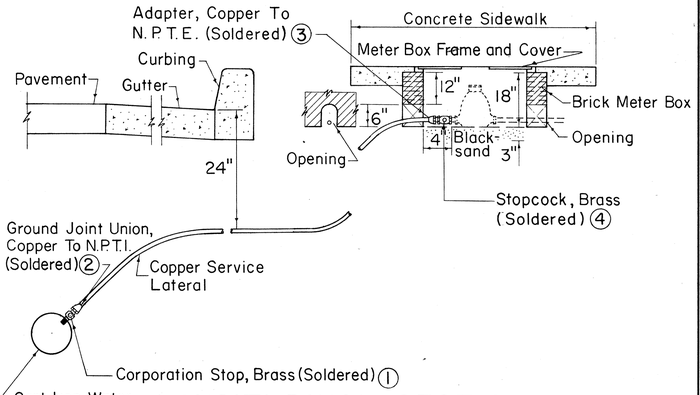
THIS PLAN IS NOT TO BE USED FOR CONSTRUCTION UNLESS SIGNED BY THE ENGINEER

SHEET No. 111 OF 361 SHEETS

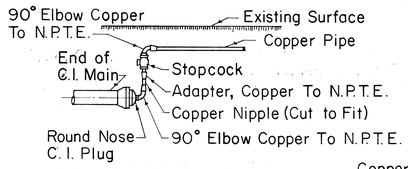
PLATE 3 —CROSS SECTION G. P. R. & R. E. STANDARD
THE FREDERICK POST CO. CHICAGO

57

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(17)13	1969	88	1554

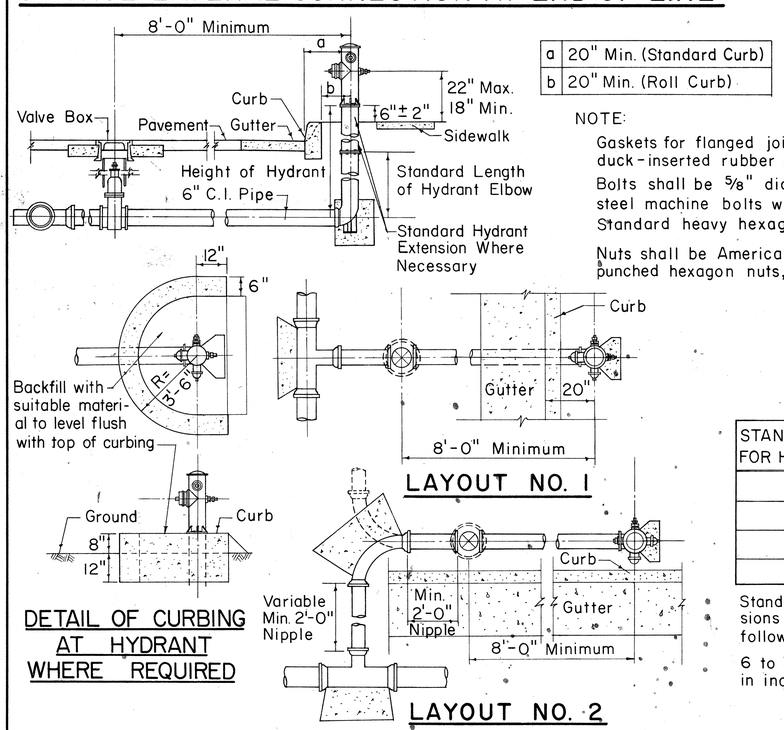


LONGITUDINAL SECTION



SOLDERED JOINT

SERVICE LATERAL CONNECTION AT END OF LINE



a	20" Min. (Standard Curb)
b	20" Min. (Roll Curb)

NOTE:

Gaskets for flanged joints shall be 1/16 inch duck-inserted rubber packing Garlock No. 19.

Bolts shall be 5/8" diameter x 2 3/4" long steel machine bolts with cut threads, American Standard heavy hexagon heads, galvanized.

Nuts shall be American Standard heavy cold punched hexagon nuts, galvanized.

LAYOUT NO. 1

LAYOUT NO. 2

DETAIL OF CURBING AT HYDRANT WHERE REQUIRED

STANDARD LENGTHS FOR HYDRANT ELBOWS
30"
36"
42"
48"

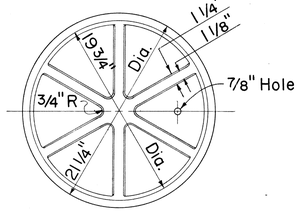
Standard Hydrant Extensions are available in the following Lengths:

6 to 30 inches long in in increments of 6 inches.

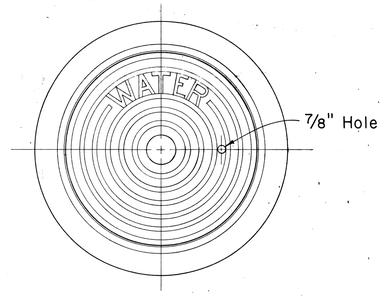
STANDARD FIRE HYDRANT LAYOUT

NOTE:

All castings shall be made accurately to the dimensions shown. Seat and cover shall be machined or ground where necessary to secure flat and true surfaces. The cover shall not rattle in any position.



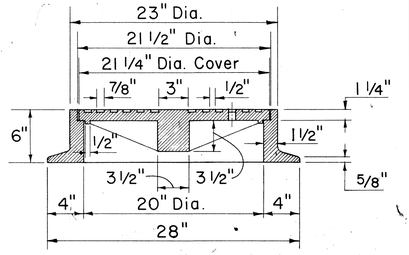
BOTTOM VIEW OF COVER



PLAN OF FRAME AND COVER

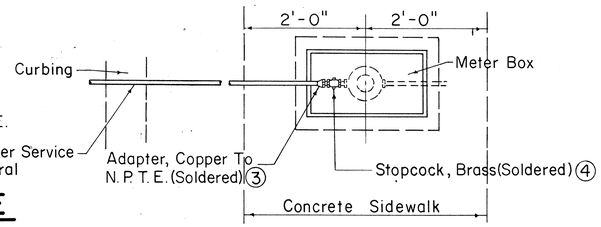
MANHOLE FRAME & COVER CAST IRON, 20" SIZE

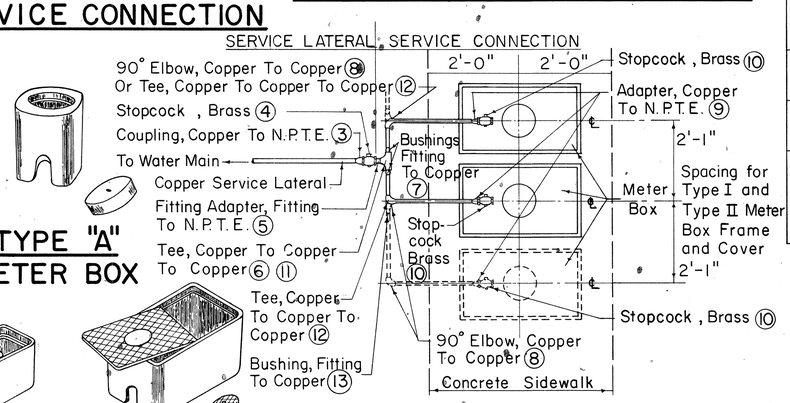
SCALE: 1-1/2" = 1'-0"



SECTION OF FRAME AND COVER

SINGLE SERVICE CONNECTION





TYPE "A" METER BOX

TYPE "B" METER BOX

TYPE "X" METER BOX

MULTIPLE SERVICE CONNECTION SOLDERED JOINTS

METER BOX DATA

TYPE METER BOX	METER SIZES	OVERALL DIMENSIONS AT BOTTOM	OVERALL DIMENSIONS AT TOP	COMPLETE WEIGHT	OVERALL DIMENSIONS OF LID
A	5/8" or 3/4" Without Valve	7 1/4" x 7 1/4"	10" x 10"	45 lbs.	7 3/8" Dia.
B	5/8" or 3/4"	9 1/2" x 16"	12 1/4" x 18 3/8"	82 lbs.	8 3/4" x 14 1/2"
X		14 1/2" x 23 1/2"	16" x 25"	143 lbs.	13 1/8" x 22 1/8"

SCHEDULE OF COPPER FITTINGS (SOLDERED JOINT)

ITEM NO.	DESCRIPTION	SINGLE SERVICE CONN.	MULTIPLE SERV. CONN. TWO SERVICES	MULTIPLE SERV. CONN. THREE SERVICES
1	Corporation Stop Brass (H-10003)	1	1	1
2	Ground Joint Union (Style Copper To N.P.T.E. No. C-109)	1	1	1
3	Adapter, Copper To N.P.T.E. (Style No. C-101)	2	1	1
4	Stopcock Brass (B.W.S Standard)	1	1	1
5	Fitting Adapter, (Style Fitting To N.P.T.E. No. C-104)	—	1	1
6	Tee, Copper To Copper To Copper (Style No. T-300)	—	1	1
7	Bushings, Fitting To Copper (Style No. C-103)	—	2	2
8	90° Elbow, Copper To Copper (Style No. C-200)	—	2	2
9	Adapter, Copper To N.P.T.E. (Style No. C-101)	1	2	3
10	Stopcock Brass (B.W.S. Standard)	1	2	3
11	Reducing Tee, Copper To Copper To Copper (Substitute For Items Number 6 and 7). (Style No. T-300)	—	1	1
12	Tee, Copper To Copper To Copper (Style No. T-300)	—	—	1
13	Bushing, Fitting To Copper (Style No. C-103)	—	—	1
14	Reducing Tee, Copper To Copper To Copper (Substitute For Items Number 12 and 13 (Style No. T-300)	—	—	1

NOTE:

Reference Numbers shown thus (H-10003) are from Mueller Co. Catalog "H" and (Style No. T-300) are from Mueller Brass Co. "Streamline" Catalog S-354. Approved Equal may be used.

APPROVED:

CHIEF, ENGINEERING DIVISION & DATE
BOARD OF WATER SUPPLY

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BOARD OF WATER SUPPLY
CITY & COUNTY OF HONOLULU

STANDARD DETAILS

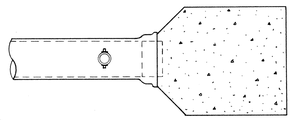
Not to Scale — Date: NOV. 28, 1969

SHEET NO. 124 OF 361 SHEETS

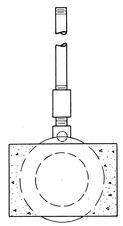
LIETZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(77):13	1969	89	154

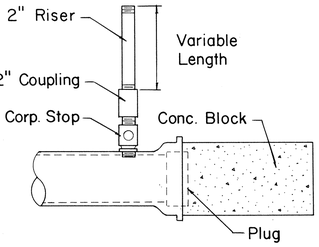
NOTE:
Contractor to furnish 1½" brass plug (Tapered thread) to replace corporation stop upon completion of chlorination.



TOP VIEW

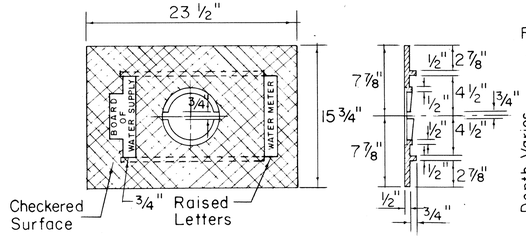


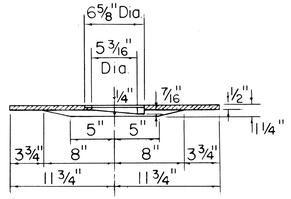
END VIEW



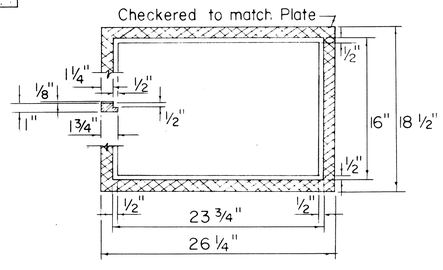
SIDE VIEW

DETAIL OF TEMPORARY 2" CLEANOUT
Not to Scale



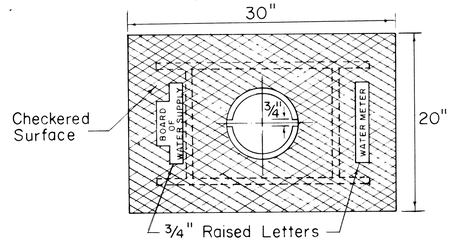


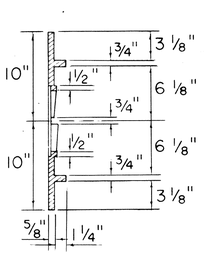
COVER PLATE

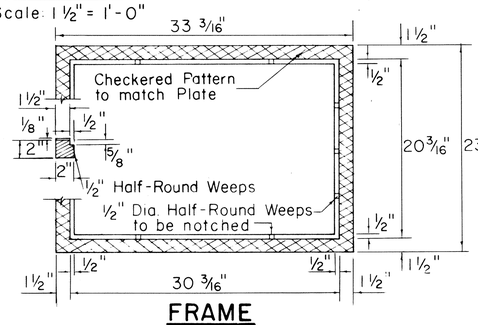


FRAME

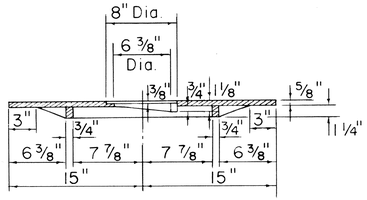
CAST IRON FRAME AND PLATE TYPE II
Scale: 1½" = 1'-0"



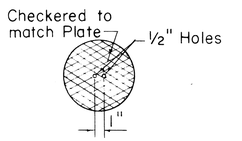


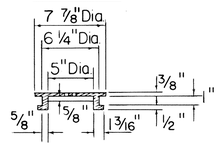


FRAME



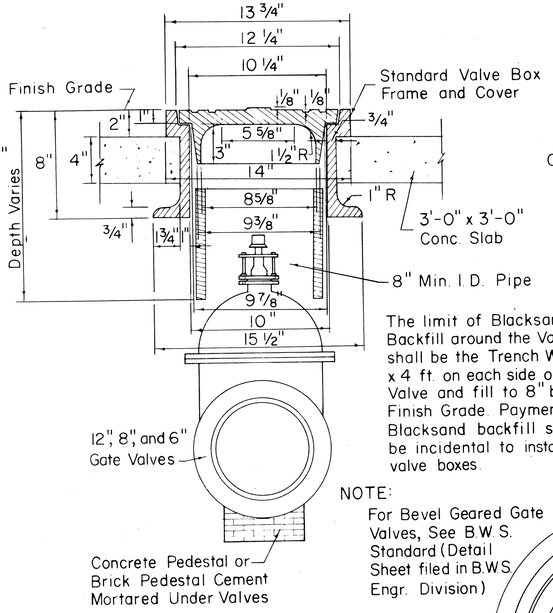
COVER PLATE





READING COVER

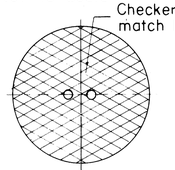
CAST IRON FRAME, PLATE AND COVER TYPE III
Scale: 1½" = 1'-0"

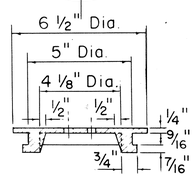


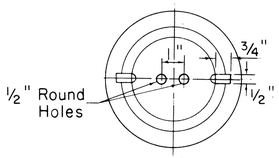
The limit of Blacksand Backfill around the Valve shall be the Trench Width x 4 ft. on each side of Valve and fill to 8" below Finish Grade. Payment for Blacksand backfill shall be incidental to installing valve boxes.

NOTE:
For Bevel Geared Gate Valves, See B.W.S. Standard (Detail Sheet filed in B.W.S. Engr. Division)

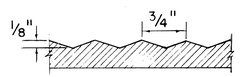
INSTALLATION OF VALVE BOX FOR GATE VALVES
Not to Scale





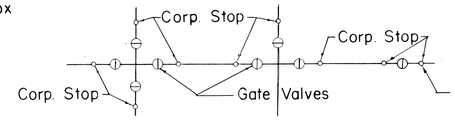


READING COVER



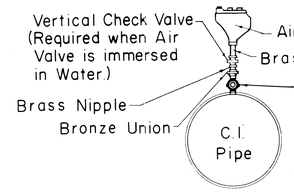
CHECKERED PATTERN

CAST IRON COVER FOR TYPE II FRAME
Not to Scale



Size of one Corp. Stop given in Table "A". Extra Corp. Stop required at valves located on the "run" shall be 1" x 1¼" for all sizes of pipes and shall be installed as directed by the Engineer.

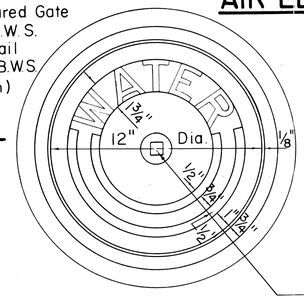
CORP. STOP LAYOUT
Not to Scale



For ¾" Air Valve - ¾" x 1" Corp. Stop w/Bushing
For 2" Air Valve - 1½" x 2" Corporation Stop

For Vertical Check Valve Fig. 490 from Kennedy Valve Mfg. Co., Cat. No. 78, or Fig. 24, from Crane Co., Cat. No. 53 or approved equal.

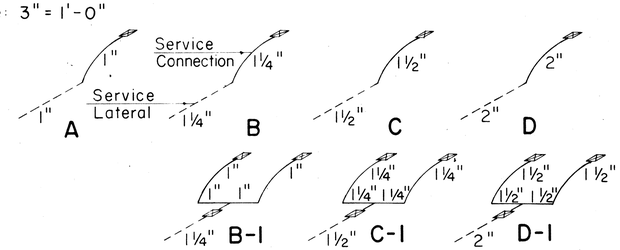
DETAIL OF CONNECTION FOR AIR ELIMINATING TRAP
Not to Scale



Offset word "WATER" 1¾" high, ⅛" deep

NOTE:
All castings shall be made accurately to the dimensions shown. Seat and Cover shall be ground where necessary to secure flat and true surfaces. The Cover shall not rattle in any position.
Minor changes in dimensions may be made to suit foundry conditions provided such changes are approved by the Board of Water Supply.

CAST IRON FRAME AND COVER
Scale: 3" = 1'-0"



TYPICAL LAYOUT OF SERVICE LATERALS AND CONNECTIONS
Not to Scale

APPROVED:
CHIEF, ENGINEERING DIVISION
BOARD OF WATER SUPPLY
9/16/69
DATE

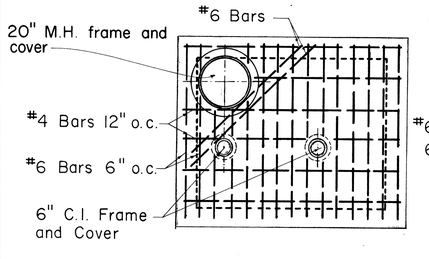
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BOARD OF WATER SUPPLY
CITY & COUNTY OF HONOLULU
STANDARD DETAILS

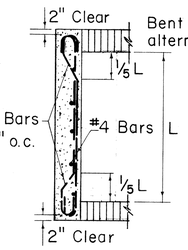
Scale As Noted
Date: NOV. 28, 1969

SHEET NO. 134 OF 364 SHEETS

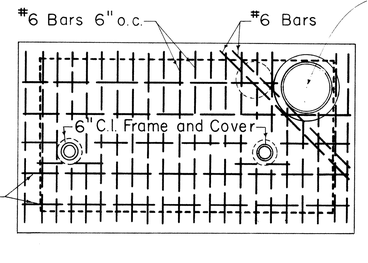
89

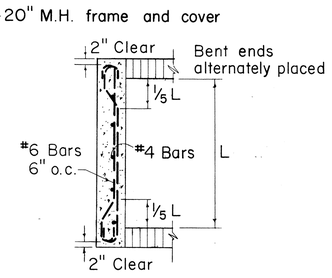
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(77):13	1969	90	155



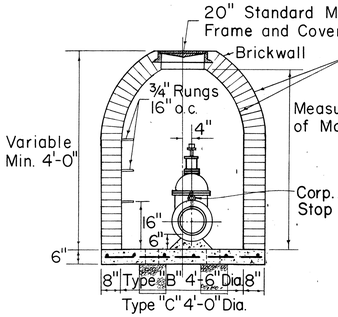


PLAN OF TOP SLAB

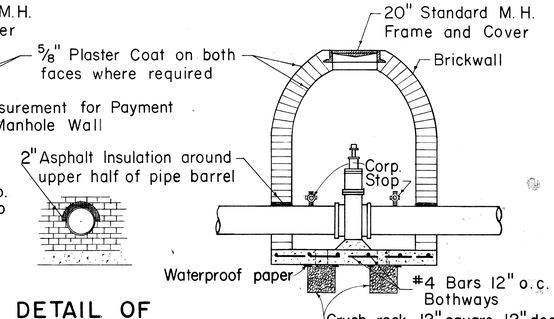




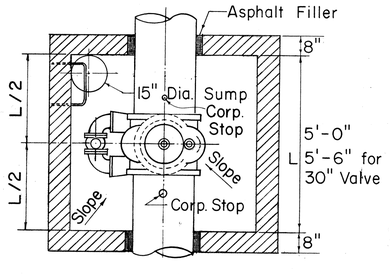
PLAN OF TOP SLAB

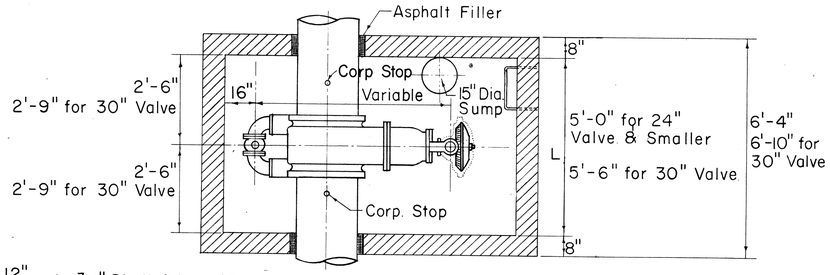


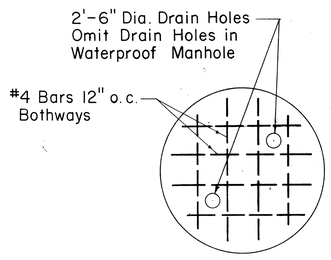
SECTION A-A



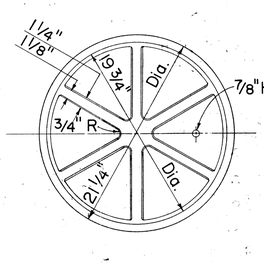
DETAIL OF ASPHALT FILLER





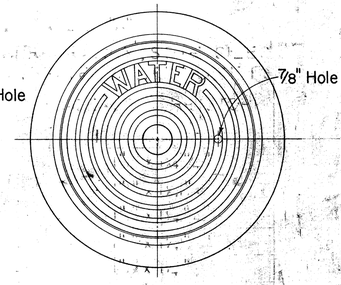


STEEL DETAIL IN BOTTOM SLAB

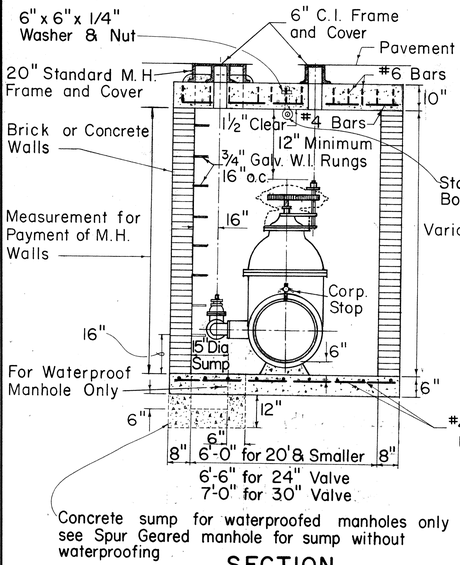


BOTTOM VIEW OF COVER

NOTE:
All castings shall be made accurately to the dimensions shown. Seat and cover shall be machined or ground where necessary to secure flat and and true surfaces. The cover shall not rattle in any position.

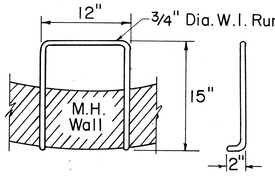


PLAN OF FRAME AND COVER

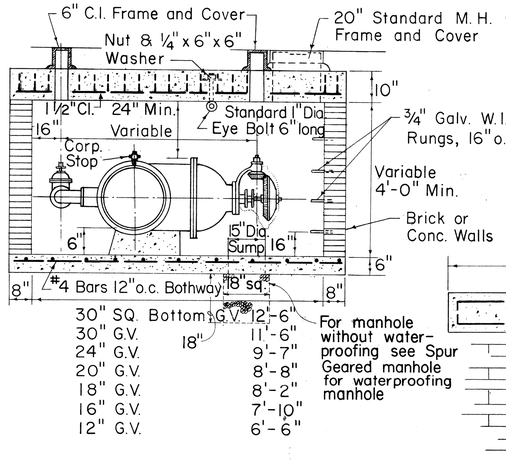


SECTION

TYPE "A" MANHOLE FOR SPUR GEARED GATE VALVES

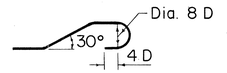


DETAIL OF RUNG

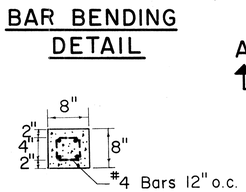


SECTION

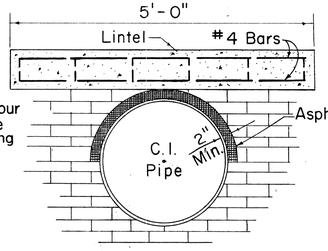
TYPE "A" MANHOLE FOR BEVEL GEARED GATE VALVES



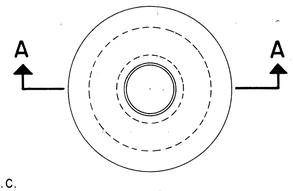
BAR BENDING DETAIL



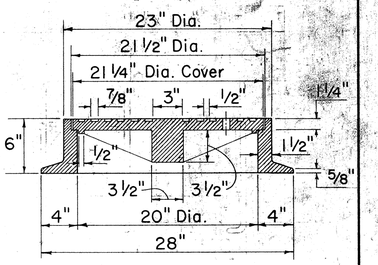
SECTION THRU LINTEL



DETAIL OF LINTEL AND ASPHALT FILLER



PLAN



SECTION OF FRAME AND COVER

MANHOLE FRAME & COVER CAST IRON, 20" SIZE

TYPE "B" M.H. 4'-6" DIA. (FOR 12" G.V.)
TYPE "C" M.H. 4'-0" DIA. (FOR 6" & 8" G.V.)

APPROVED:

A. Kawakami 9/16/69

CHIEF, ENGINEERING DIVISION BOARD OF WATER SUPPLY — DATE

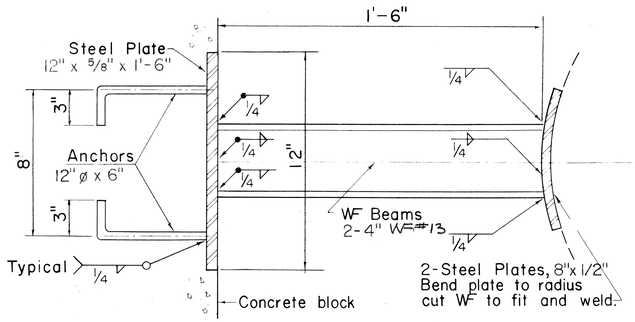
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
BOARD OF WATER SUPPLY
CITY & COUNTY OF HONOLULU
STANDARD DETAILS

Not to Scale — Date: NOV. 28, 1969

SHEET NO. 141 OF 364 SHEETS

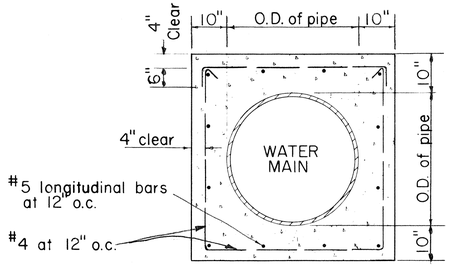
LIETZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW	I-HI-1(77)13	1969	91	154

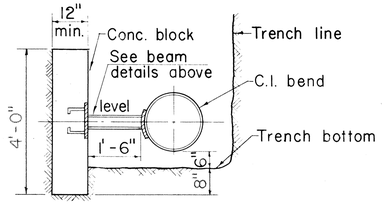


BEAM DETAIL

Scale: 3"= 1'-0"

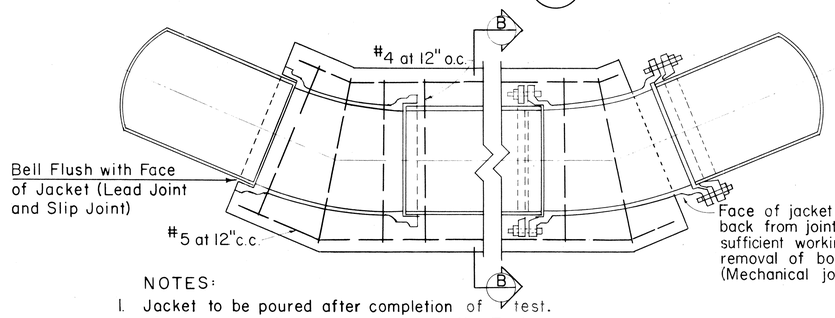


SECTION B



SECTION C

Scale: 1/2"= 1'-0"

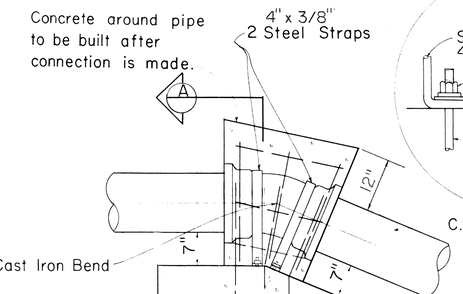


NOTES:

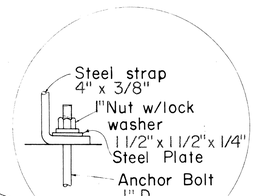
1. Jacket to be poured after completion of test. of test unless otherwise approved by the Engineer.
2. 2 1/2" depth of lead for lead joint pipe required at all embedded joints.
3. Wherever construction joints are required, 6" rubber or neoprene waterstops shall be installed. Waterstops shall be of the type specified and manufactured by the Servicized Products Corporation, Gate Rubber Company or approved equal.

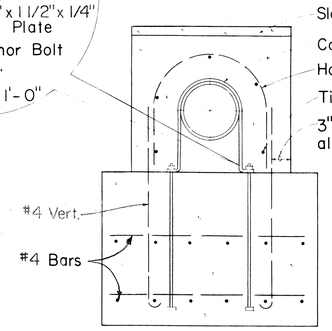
REINFORCED CONCRETE JACKET

Scale: Not to Scale



ELEVATION

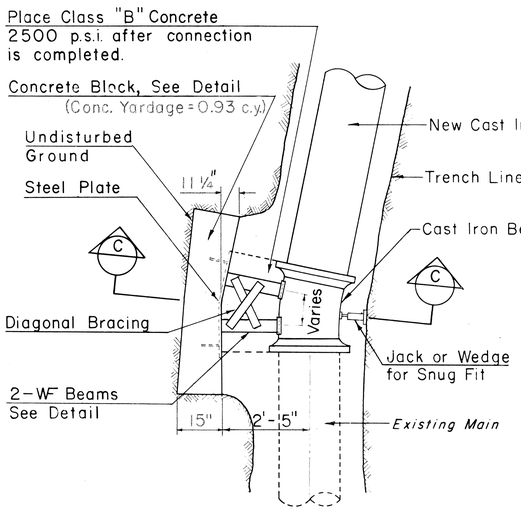




SECTION A

TYPICAL DETAIL OF CONCRETE REACTION BLOCK WITH STRAPS

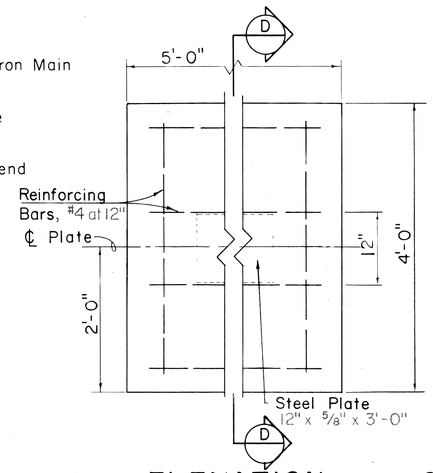
Scale: 3/4"= 1'-0"



PLAN

Scale: 1/2" = 1'-0"

N O T E:
Concrete Block with structural strut shall be used for bends at connections or for tee connections.



ELEVATION SECTION D

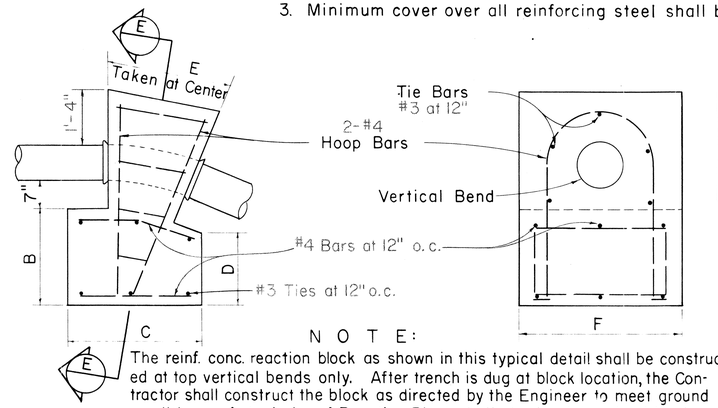
DETAILS OF CONCRETE BLOCK

Scale: 1" = 1'-0"

TYPICAL DETAIL OF CONCRETE BLOCK WITH STRUCTURAL STRUT

G E N E R A L N O T E S:

1. Detail drawings of actual blocks to be used, shall be furnished during construction by B.W.S. and or State.
2. Steel straps, anchor bolts, nuts, washers, etc., furnished and installed by the Contractor will not be paid for directly, but shall be considered incidental to the various contract items for the water system.
3. Minimum cover over all reinforcing steel shall be 3 inches.



ELEVATION SECTION E

N O T E:
The reinf. conc. reaction block as shown in this typical detail shall be constructed at top vertical bends only. After trench is dug at block location, the Contractor shall construct the block as directed by the Engineer to meet ground conditions. Actual size of Reaction Block shall also be determined by the Engineer.

TYPICAL DETAIL OF REINFORCED CONCRETE REACTION BLOCK FOR TOP VERTICAL BENDS

Scale: Not to Scale

1/16 VERTICAL BENDS, A.W.A.A. 250 p.s.i.							
PIPE SIZE	DIMENSIONS						CU YDS
	A	B	C	D	E	F	
8	1'-0"	2'-0"	3'-0"	1'-6"	1'-6"	4'-0"	1 1/4

APPROVED:

J. Kawakami 9/16/69

CHIEF, ENGINEERING DIVISION BOARD OF WATER SUPPLY — DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

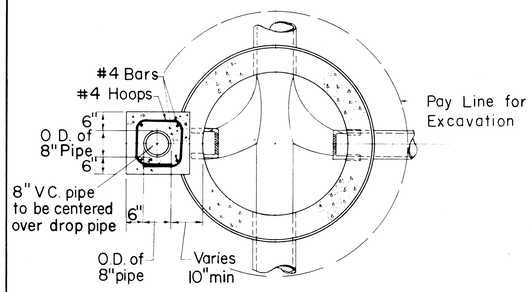
BOARD OF WATER SUPPLY
CITY & COUNTY OF HONOLULU
STANDARD DETAILS

Scale: As Shown DATE: NOV. 28, 1969

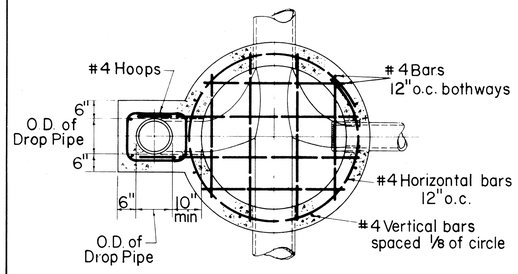
SHEET No. 154 OF 364 SHEETS

91

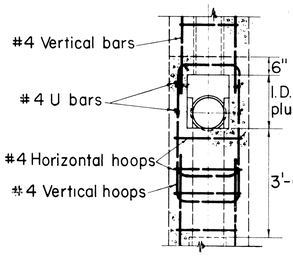
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(77):13	1969	92	154



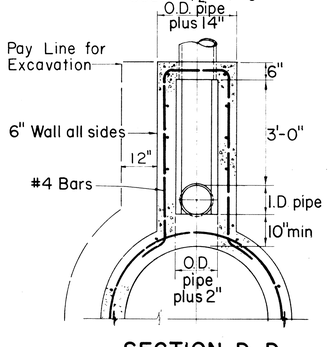
SECTION A-A
Scale: ½"=1'-0"



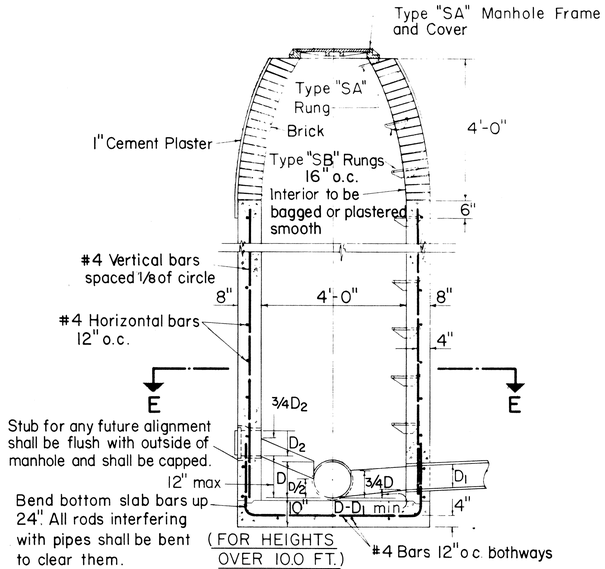
SECTION B-B
Scale: ½"=1'-0"



SECTION C-C
Scale: ½"=1'-0"



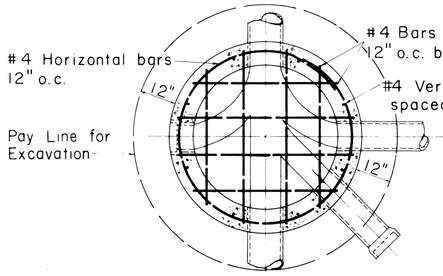
SECTION D-D
Scale: ½"=1'-0"



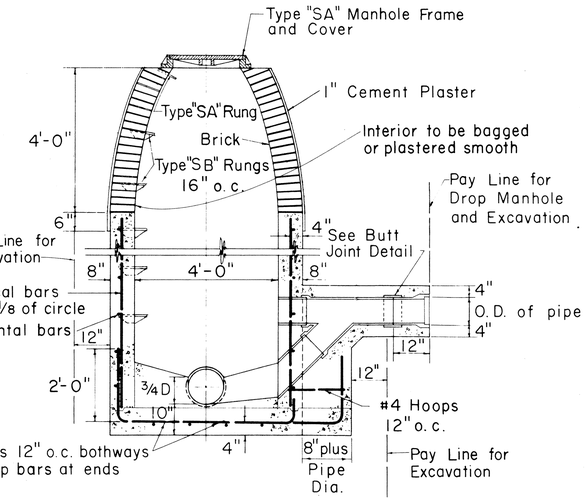
PLAIN MANHOLE
Scale: ½"=1'-0"

(FOR DROPS OVER 5.0 FEET)

DROP MANHOLE
Scale: ½"=1'-0"



SECTION E-E
Scale: ½"=1'-0"



(FOR DROPS UNDER 5.0 FEET)

SHALLOW DROP MANHOLE
Scale: ½"=1'-0"

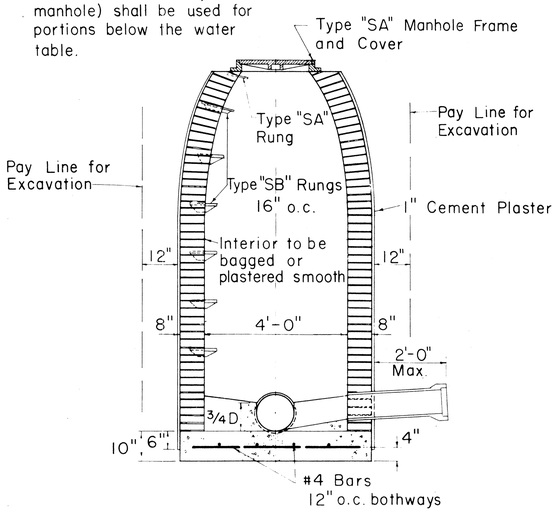
NOTE

1. Manhole rungs shall not be aligned above any flow line except in drop manhole.
2. No rungs shall be installed in manholes less than 3' high.
3. When not otherwise noted, manhole stubs shall be sloped as follows:

Pipe Size	Rise Per Foot
6"	⅛"
8"	3/32"
10"	1/16"
12"	1/16"

4. All reinforcing rods interfering with pipes shall be bent to clear them.
5. Bar lap to be 40 diameters in length.
6. Data for special manholes not shown shall be similar to that for plain manholes.
7. Size of drop pipe in all Drop Manholes shall be same as influent line.
8. Manhole wall to be of reinforced concrete to height 1' above normal ground water table.
9. All pipes entering or leaving manholes shall have a joint within 2'-0" of the manhole wall.

NOTE:
Reinforced concrete manhole walls (See detail of plain manhole) shall be used for portions below the water table.



(MAXIMUM HEIGHT - 10.0 FEET)

BRICK MANHOLE
Scale: ½"=1'-0"

Payment for excavation for manholes shall be made under unit price for trench excavation and shall be measured to one foot outside of walls from original ground elevation to authorized bottom elevation.

Payment for manhole walls (brick, or cast-in-place concrete) shall include brick, mortar, concrete, reinforcing steel, cast-iron steps, galvanized wrought iron rungs, and plastering.

APPROVED:

Zdona for 9-5-69
SEWER SYSTEM DIRECTOR, DIVISION OF SEWERS — DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DIVISION OF SEWERS
CITY & COUNTY OF HONOLULU

STANDARD DETAILS

SEWERS - DROP MANHOLE AND BRICK MANHOLE DETAILS

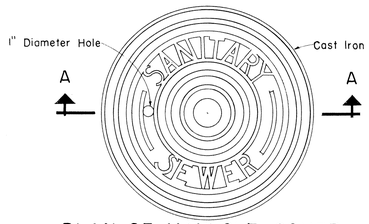
Scales: As Noted — Date: NOV. 28, 1969

SHEET NO. 164 OF 361 SHEETS

IMPERIAL TM K & E CO., N.Y. TRADE MARK

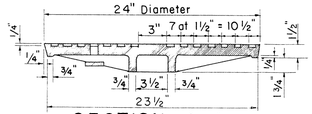
92

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(17);13	1969	93	155



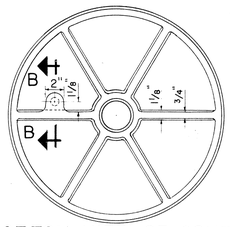
PLAN OF MANHOLE COVER

Scale: 1 1/2" = 1'-0"



SECTION A-A

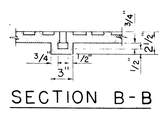
Scale: 1 1/2" = 1'-0"



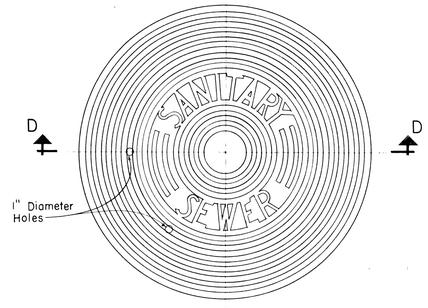
BOTTOM VIEW OF COVER

Scale: 1 1/2" = 1'-0"

NOTE:
This cover is used with the "SA" or "SD" frame



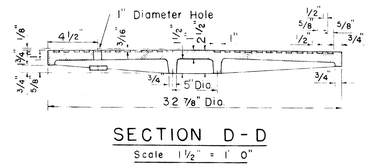
SECTION B-B



PLAN

SPECIAL MANHOLE COVER

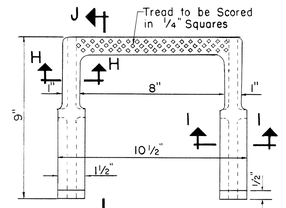
Scale: 1 1/2" = 1'-0"



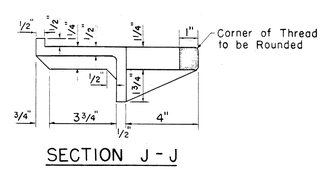
SECTION D-D

Scale 1 1/2" = 1' 0"

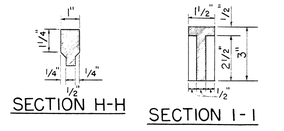
Approx Weight 260 Pounds



PLAN

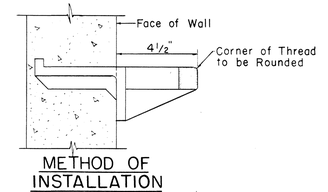


SECTION J - J



SECTION H-H

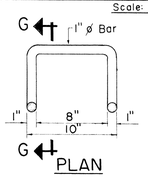
SECTION I-I



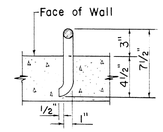
METHOD OF INSTALLATION

TYPE "SB" MANHOLE RUNGS (CAST IRON)

Scale: 3" = 1'-0"



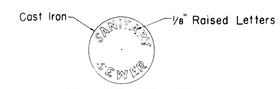
PLAN



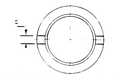
SECTION G-G

TYPE "SA" MANHOLE RUNGS (WROUGHT IRON)

Scale: 1 1/2" = 1'-0"

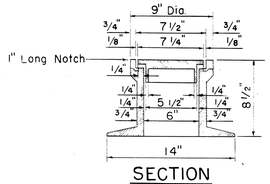


PLAN OF COVER



BOTTOM OF COVER

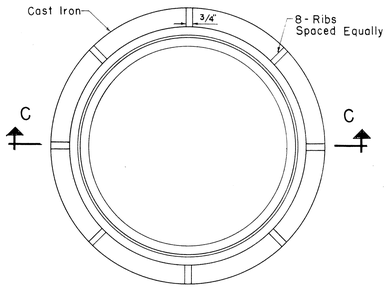
ELEVATION



SECTION

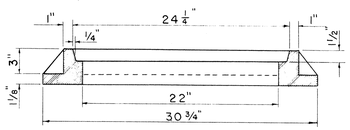
DROP MANHOLE CHIMNEY CASTINGS

Scale: 1 1/2" = 1'-0"



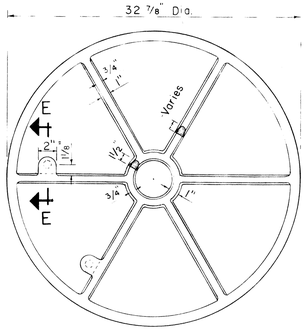
PLAN OF MANHOLE FRAME

Scale: 1 1/2" = 1'-0"



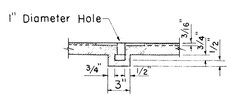
SECTION C-C

Scale: 1 1/2" = 1'-0"



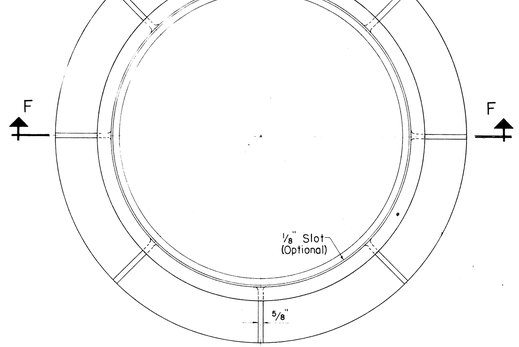
BOTTOM VIEW OF COVER

Scale: 1 1/2" = 1'-0"



SECTION E-E

Scale: 1 1/2" = 1'-0"

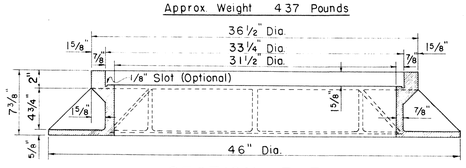


PLAN

SPECIAL MANHOLE FRAME

Scale: 1 1/2" = 1'-0"

Approx Weight 437 Pounds



SECTION F-F

Scale: 1 1/2" = 1'-0"

TYPE "SA" SEWER MANHOLE FRAME AND COVER

Scale: 1 1/2" = 1'-0"

TYPE "SB" SEWER MANHOLE FRAME AND COVER

Scale: 1 1/2" = 1'-0"

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE 11-5-68
	DRAWN BY	11-5-68
	TRACED BY	
NOTE BOOK	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

APPROVED:

Edona #44 9-5-69

SEWER SYSTEM DIRECTOR, DIVISION OF SEWERS — DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DIVISION OF SEWERS
CITY & COUNTY OF HONOLULU

STANDARD DETAILS

SEWERS - MANHOLE RUNGS, CHIMNEY CASTINGS AND FRAME AND COVER DETAILS

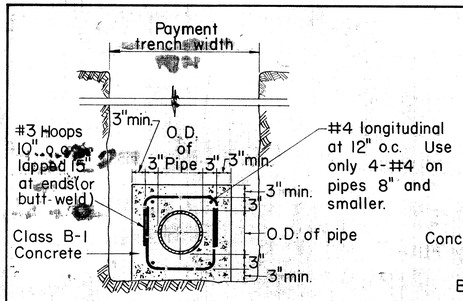
Scales: As Noted — Date: NOV. 28, 1969

SHEET NO. 174 OF 360 SHEETS

93

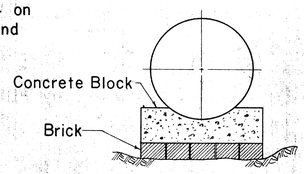
EPD 125 IMPERIAL TRACING CLOTH 10-62

FED. ROAD DIST. NO	STATE	FED. AID PROJ. NO	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(77):13	1969	94	155



DETAIL OF CONCRETE JACKET

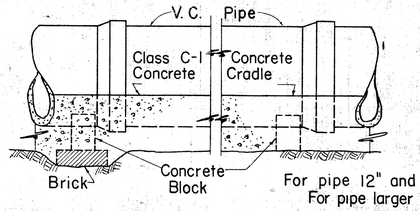
Scale: 3/4" = 1'-0"



METHOD OF USING BRICKS UNDER CONCRETE BLOCKS

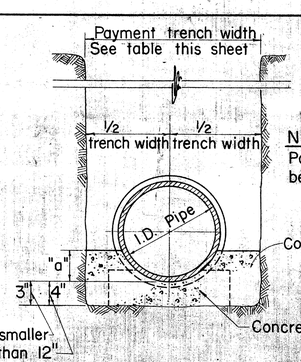
Not To Scale

Contractor shall set Concrete Blocks on undisturbed ground. Where ground is too low, the contractor shall not heap up dirt under the Concrete Block but use Concrete Bricks to take up the deficiency, scraping away beneath Concrete Block to give sufficient room for Brick.



ELEVATION SHOWING METHOD OF LAYING PIPE

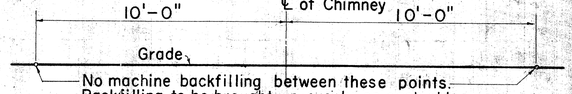
Not To Scale

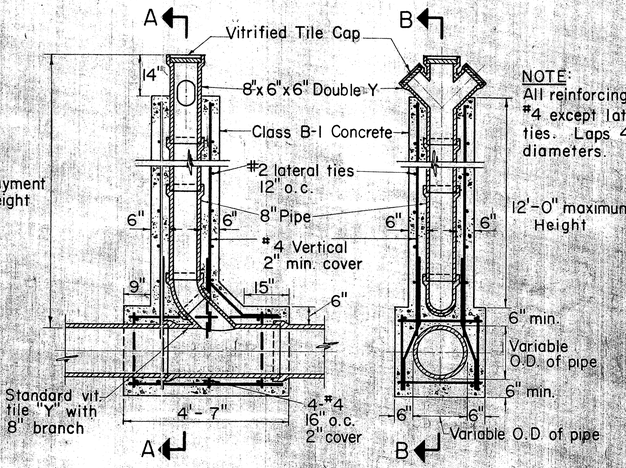


NOTE:
Payment width of cradle shall be payment trench width.

CONCRETE CRADLE FOR VITRIFIED CLAY PIPE

Not To Scale



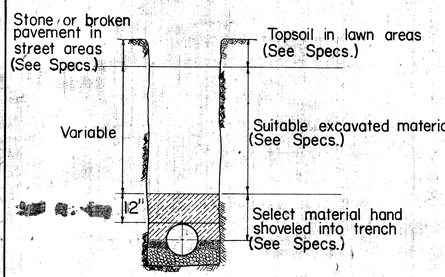


NOTE:
All reinforcing rods #4 except lateral ties. Laps 40 diameters.

DETAILS OF CHIMNEY

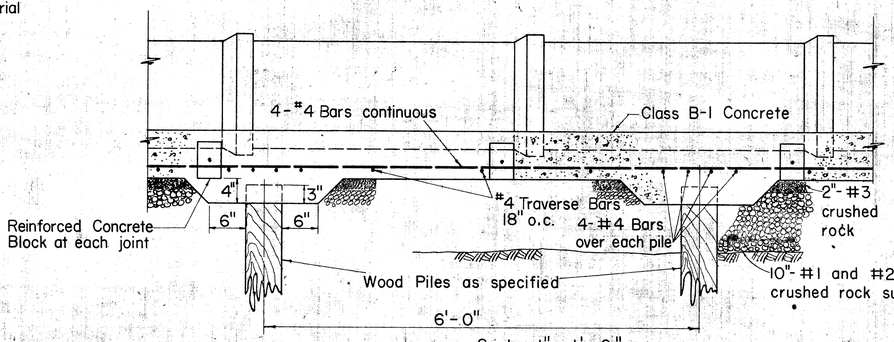
Scale: 1/2" = 1'-0"

Payment quantities for trench excavation, crushed rock fill, crushed rock cradle, and crushed rock sub-base shall be computed using payment trench widths as shown in the table of "Trench Widths". No payment shall be made for excess quantities resulting from trench widths greater than the payment trench widths shown.

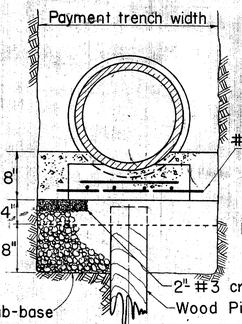


METHOD OF BACKFILL

Not To Scale



Scale: 1" = 1'-0"



SECTION

NOTE:
Reinforcing bars of laterals shall be lapped 40 dia. to reinf. bars of mains.

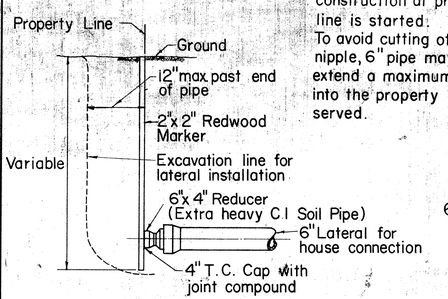
DETAIL OF REINFORCED CONCRETE CRADLE ON WOOD PILES (FOR 6, 8, 10 & 12 IN. V.C. PIPE)

DETAIL OF REINFORCED CONCRETE CRADLE WITHOUT PILES SIMILAR EXCEPT FOR WOOD PILES AND PILE CAPS

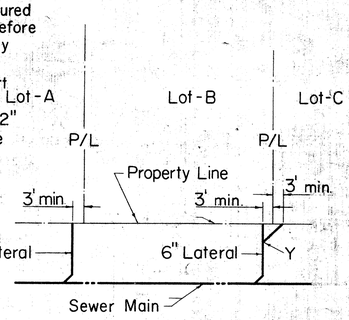
BUTT JOINT DETAIL

Scale: 1" = 1'-0"

NOTE: Permission is to be secured from property owner before construction at property line is started. To avoid cutting of short nipple, 6" pipe may extend a maximum of 12" into the property to be served.



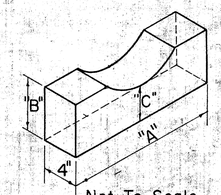
DETAIL AT PROPERTY LINE



LAYOUT

CONSTRUCTION OF LATERALS

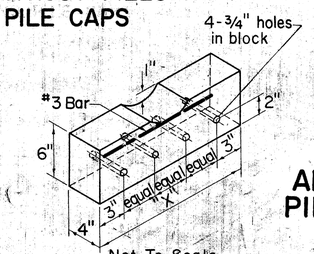
Not To Scale



Not To Scale

DETAIL OF PRECAST CONC. PIPE BLOCK

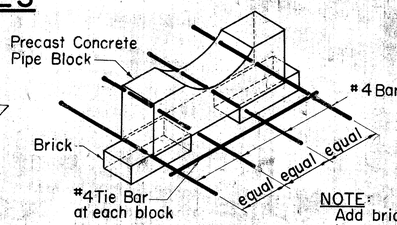
CONCRETE BLOCK DIMENSIONS			
PIPE SIZE	"A"	"B"	"C"
6"	1'-2"	6"	3"
8"	1'-5"	6"	3"
10"	1'-7"	6"	3"
12"	1'-7"	6"	3"
15"	1'-8"	6"	4"
18"	1'-9"	6"	4"
21"	1'-10"	6"	4"
24"	1'-11"	6"	4"
27"	2'-0"	6"	4"
30"	2'-3"	6"	4"



Not To Scale

DETAIL OF CONC. PIPE BLOCK FOR REINF. CRADLE

DIM. OF REINF. CONC. BLOCK	
PIPE SIZE	"X"
6"	1'-6"
8"	1'-6"
10"	1'-8"
12"	1'-8"
15"	1'-10"
18"	1'-10"
21"	1'-10"
24"	2'-0"
27"	2'-0"
30"	2'-0"



Not To Scale

NOTE:
Add brick for larger size pipe

ALTERNATE DETAIL OF CONC. PIPE BLOCK FOR REINF. CRADLE

VITRIFIED CLAY PIPE TABLE				
TRENCH WIDTHS		DIM. OF CONC. CRADLE		
PIPE SIZE	PAY. WIDTH	PIPE SIZE	"a"	WIDTH
6"	24"	6"	3"	24"
8"	24"	8"	3"	24"
10"	24"	10"	3"	24"
12"	30"	12"	3"	30"
15"	38"	15"	4"	38"
18"	41"	18"	5"	41"
21"	45"	21"	5"	45"
24"	50"	24"	6"	50"
27"	53"	27"	7"	53"
30"	57"	30"	7"	57"

APPROVED:

SEWER SYSTEM DIRECTOR, DIVISION OF SEWERS

9-5-69
DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
DIVISION OF SEWERS
CITY & COUNTY OF HONOLULU

STANDARD DETAILS

SEWERS - CONCRETE JACKET & MISCELLANEOUS DETAILS

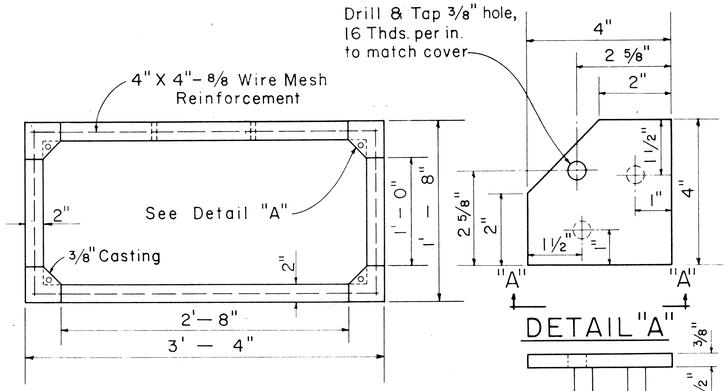
Scales: As Noted
Date: NOV. 28, 1969

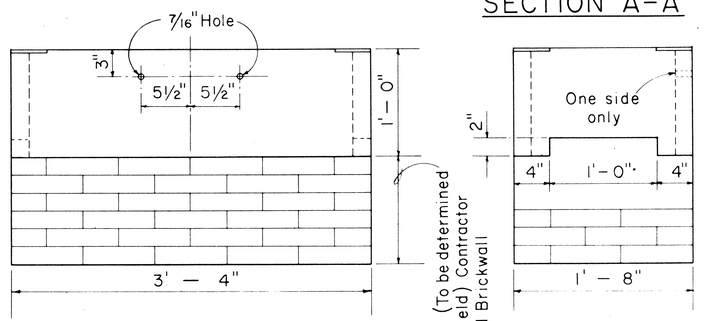
SHEET NO. 184 OF 361 SHEETS

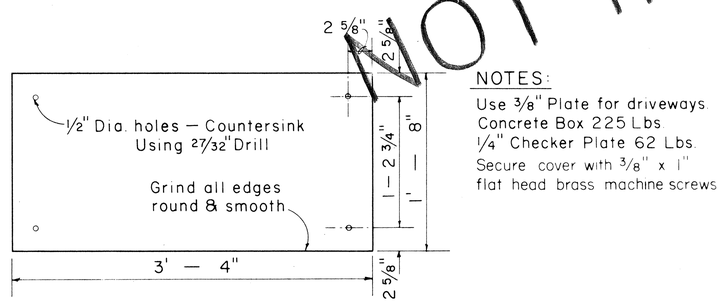
94

IMPERIAL 139 K & E CO., N.Y. TRADE MARK

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(77)13	1969	25	155







NOTES:
Use 3/8" Plate for driveways
Concrete Box 225 Lbs
1/4" Checker Plate 62 Lbs.
Secure cover with 3/8" x 1" flat head brass machine screws

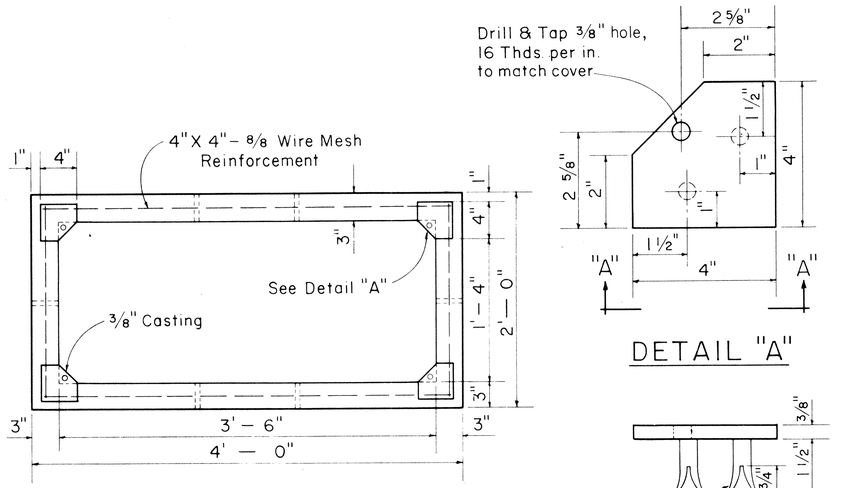
1/4" CHECKER PLATE COVER

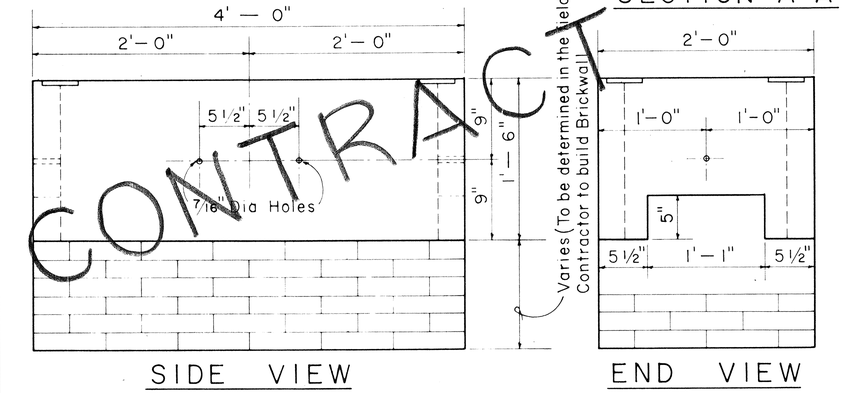
(Hot dip galvanize checkered plate after drilling, countersinking, and grinding edge)

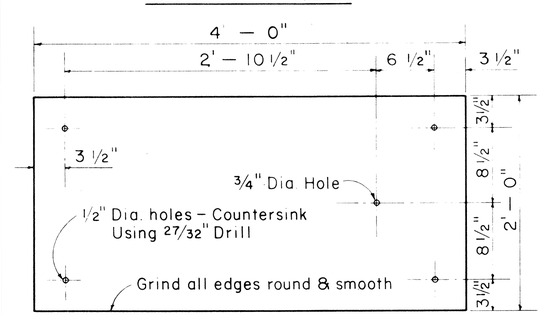
1'-4" X 3'-0" CONCRETE SERVICE BOX

Scale: 1 1/2" = 1'-0"

011250







NOTES:
Use 3/8" Plate for driveway.
Concrete Box 575 Lbs.
1/4" Checker Plate 130 Lbs.
Secure cover with 3/8" x 1" flat head brass machine screws.

1/4" CHECKER PLATE COVER

(Hot dip galvanize checkered plate after drilling, countersinking, and grinding edge)

1'-6" X 3'-6" CONCRETE SERVICE BOX

Scale: 1 1/2" = 1'-0"

011255

CONTRACT NOT IN

CREOSOTED DOUGLAS FIR & YELLOW PINE POLE DATA

LENGTH IN FEET	CLASS	APPROX. MINIMUM DIMENSIONS (INCHES) AT TOP DIA.	AT TOP CIR.	6' FROM BUTT DIA.	6' FROM BUTT CIR.	AVERAGE WEIGHT (LBS.) DOUGLAS FIR	POLE SETTING DEPTH (FT.) IN SOIL	IN ROCK	BREAKING LOAD 2'-0" BELOW TOP OF POLE (LBS.)
25	5	6.04	19	8.26	26	525	4.5	3	1900
30	3	7.32	23	10.32	32.5	810	5	3.5	3000
	5	6.04	19	8.90	28	600	5	3.5	1900
35	2	7.96	25	12.23	37.5	1260	5	3.5	3700
	5	6.04	19	9.55	30	770	5	3.5	1900
40	3	7.32	23	11.77	37	1320	5.5	3.5	3000
45	2	7.96	25	13.20	41.5	1845	6	4.	3700
	3	7.32	23	12.25	38.5	1575	6	4	3000
50	2	7.96	25	13.70	43.	2150	6.5	4	3700
	3	7.32	23	12.70	40	1850	6.5	4	3000
55	1	8.59	27	15.11	47.5	2860	7	4.5	4500
	2	7.96	25	14.15	44.5	2475	7	4.5	3700
	3	7.32	23	13.20	41.5	2145	7	4.5	3000
60	1	8.59	27	15.75	49.5	3360	7	4.5	4500
	2	7.96	25	14.62	46	2820	7	4.5	3700
65	1	8.59	27	16.20	51	3835	7.5	5	4500
	2	7.96	25	15.11	47.5	3250	7.5	5	3700
70	1	8.59	27	16.70	52.5	4340	7.5	5	4500
	2	7.96	25	15.60	49	3640	7.5	5	3700
75	1	8.59	27	17.20	54	4800	8	5.5	4500
	2	7.96	25	16.05	50.5	4050	8	5.5	3700
80	1	8.59	27	17.50	55	5240	8	6	4500
	2	7.96	25	16.40	51.5	4400	8	6	3700
85	1	8.59	27	18.00	56.5	5780	8.5	6.5	4500
	2	7.96	25	16.88	53	4930	8.5	6.5	3700
90	1	8.59	27	18.30	57.5	6300	8.5	6.5	4500
	2	7.96	25	17.20	54	5400	8.5	6.5	3700

NOTE:
The ultimate fiber stress for creosoted Southern Yellow Pine & Douglas Fir is 7,400 Lbs. per square inch.

Weights are for untreated poles. Add 5% as estimate of added weight of creosote treatment.

REFERENCES:
American Standards Association 05.4-1941, 05.6-1945.
Standard Handbook for Electrical Engineers, Eighth Edition
H. E. Co. Specification for Poles.

WOOD POLE DATA

APPROVED:

HAWAIIAN ELECTRIC Co., Inc. — JK RN — 8/27/69 DATE

HAWAIIAN TELEPHONE Co. — 8-12-69 DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
H.E. Co. AND H.T. Co.
SERVICE BOX DETAILS
AND WOOD POLE DATA

Scales: As Noted — Date Nov. 28, 1969

SHEET NO. 10 OF 36 SHEETS

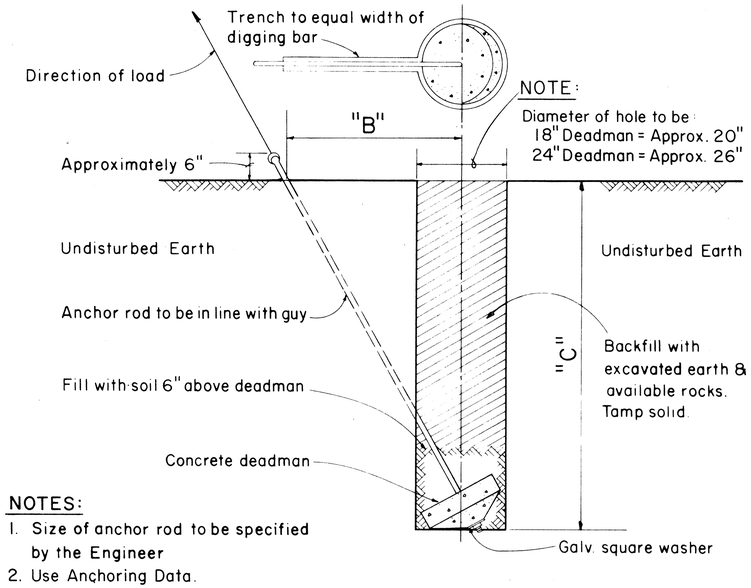
25

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

34

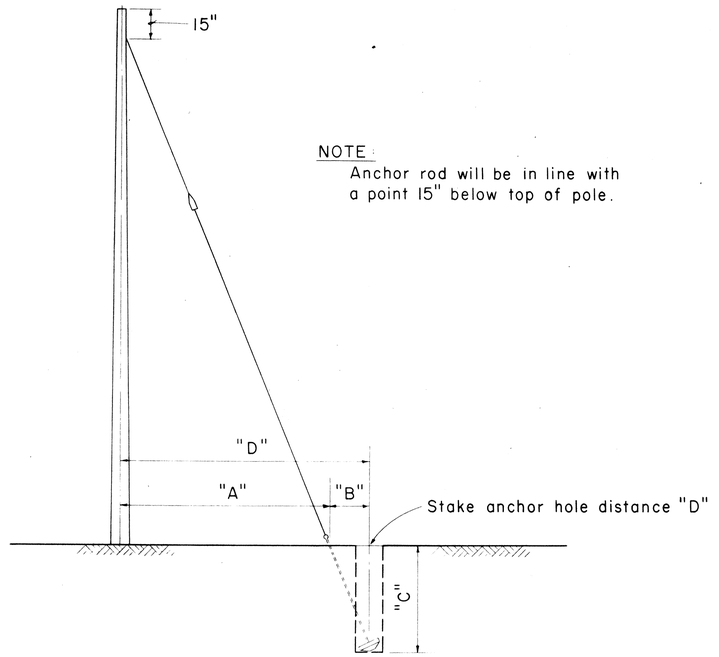
LIETZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(77)13	1969	96	154



NOTES:
1. Size of anchor rod to be specified by the Engineer
2. Use Anchoring Data.

GUY ANCHOR DEADMAN
Scale: 3/4" = 1' – 0"



Not to Scale

FOR 25', & 30' POLES WITH 8'-0" ANCHOR RODS				
"A"	"B"	"C"		"D" = ("A" + "B")
LEAD-ANCHOR ROD TO ℄ OF POLE	ANCHOR ROD TO ℄ OF HOLE	VERTICAL DEPTH 18" D.M.	VERTICAL DEPTH 24" D.M.	TOTAL DISTANCE POLE TO HOLE
5'-0"	1'-8"	7'-1"	7'-4"	6'-8"
10'-0"	3'-0"	6'-7"	7'-0"	13'-0"
15'-0"	4'-0"	6'-1"	6'-6"	19'-0"
20'-0"	4'-8"	5'-6"	5'-10"	24'-8"
25'-0"	5'-2"	4'-11"	5'-4"	30'-2"
FOR 35' THRU 70' POLES WITH 8'-0" ANCHOR RODS				
5'-0"	1'-0"	7'-3"	7'-4"	6'-0"
10'-0"	1'-11"	7'-1"	7'-3"	11'-11"
15'-0"	2'-8"	6'-9"	7'-1"	17'-8"
20'-0"	3'-3"	6'-6"	6'-10"	23'-3"
25'-0	3'-10"	6'-2"	6'-7"	28'-10"
FOR 40' THRU 70' POLES WITH 1 1/4" x 10'-0" ANCHOR RODS				
5'-0"	1'-7"		9'-4"	6'-7"
10'-0"	3'-0"		9'-0"	13'-0"
15'-0"	4'-2"		8'-6"	19'-2"
20'-0"	5'-3"		7'-11"	25'-3"
25'-0"	6'-2"		7'-3"	31'-2"

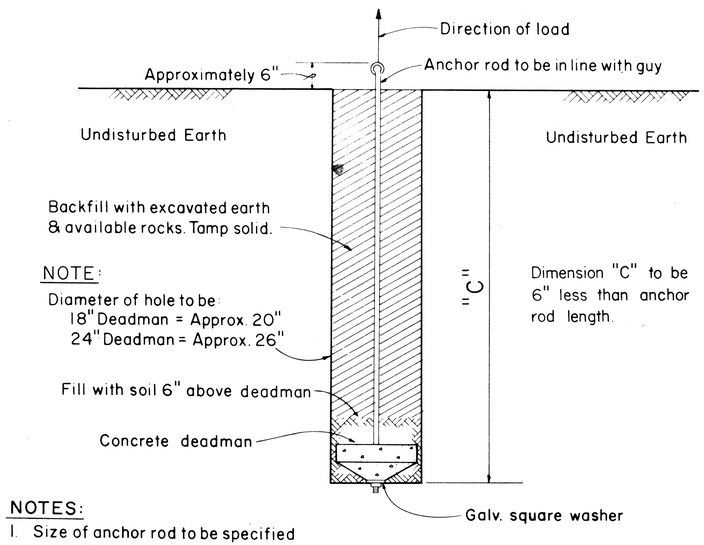
D. M. = Deadman

TABLE 2 ANCHOR ROD - ANCHOR SLUG - SQUARE WASHER COMBINATION

H.E. CODE NO.	ANCHOR ROD	WORKING TENSION 1/2 ULT (LBS.)	H.E. CODE NO.	CONC. ANC. (IN.)	H.E. CODE NO.	WASHER SIZE	QTY.
617	5/8" x 8'-0" Steel	8,000	518	18	2320	4" x 4" x 3/16"	2
615	5/8" x 8'-0" Cu Cov Stl	9,250	518	18	**	3" x 3" x 1/8"	2
618	3/4" x 8'-0" Steel	11,500	518	18	2330	6" x 6" x 3/8"	1
619	1" x 8'-0" Steel	18,000	524	24	2331	6" x 6" x 1/2"	1
616	1" x 8'-0" Cu Cov Stl	22,500	524	24	**	4" x 4" x 3/16"	2
613	1 1/4" x 10'-0" Steel	29,000	524	24	2330	6" x 6" x 3/8"	2

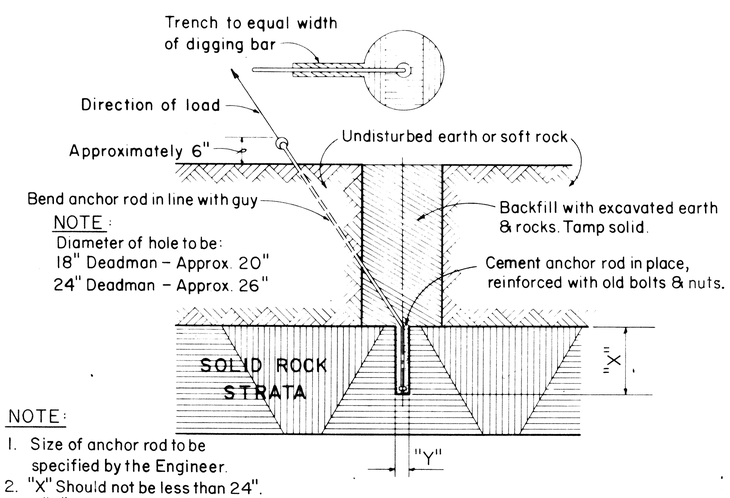
** Use bronze square washers included in anchor rod assembly on copper covered steel (Cu Cov Stl) anchor rods.

ANCHORING DATA



NOTES:
1. Size of anchor rod to be specified by the Engineer.
2. Use Anchoring Data.

SIDE – WALK ANCHOR
Scale: 3/4" = 1' – 0"



NOTE:
1. Size of anchor rod to be specified by the Engineer.
2. "X" Should not be less than 24". If "X" is less than 24" complete hole & install anchor.
3. "Y" 5/8" Anchor rod drill 2" hole
   3/4" Anchor rod drill 2" hole
   1" Anchor rod drill 2 1/2" hole
   1 1/4" Anchor rod drill 3" hole
4. Use Anchoring Data.

ROCK ANCHOR
Not to Scale

APPROVED:

HAWAIIAN ELECTRIC Co., Inc. — DATE 8/27/69

HAWAIIAN TELEPHONE Co. — DATE 8-12-69

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
H.E.Co. AND H.T. Co.
ANCHOR DETAILS AND ANCHORING DATA

Scales: As Noted — Date Nov. 28, 1969

SHEET No. 20U OF 36U SHEETS

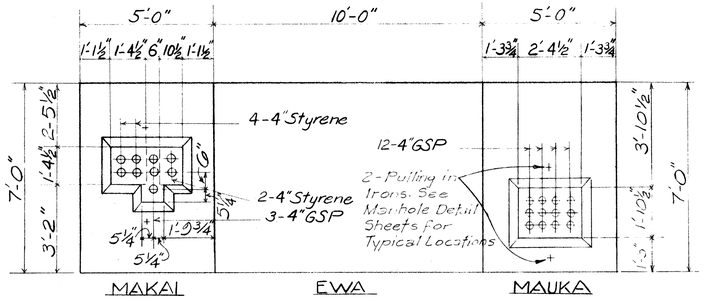
96

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HH-(17)-13	1969	97	154

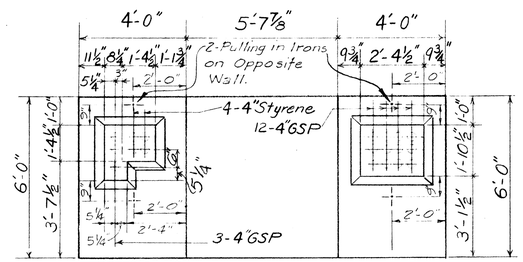
PULLING IN IRON SYMBOLS

+ Pulling-in Iron to be Installed on Wall as Shown. See Manhole Detail Sheets for Typical Locations.

-|- Pulling-in Iron to be Installed on Opposite Wall From Wall on Which Shown at Locations Shown.



TMH NO.1
TYPE A-3-6.5 AT KAIMAKANI STREET



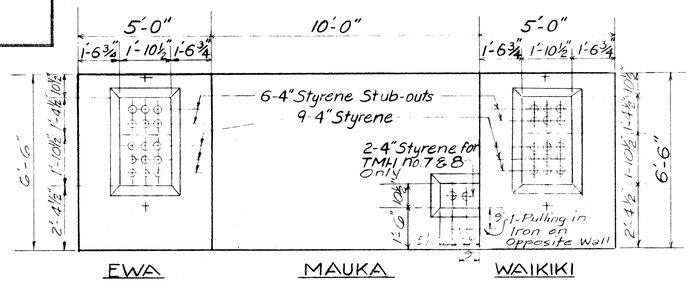
TMH NO.2
CORNER SMALL TYPE AT KAIMAKANI STREET

SEE SHEET NO. U

TMH NO.5
SPECIAL EXTRA DEEP 6'X11' IN UTILITY CORRIDOR

SEE SHEET NO. U

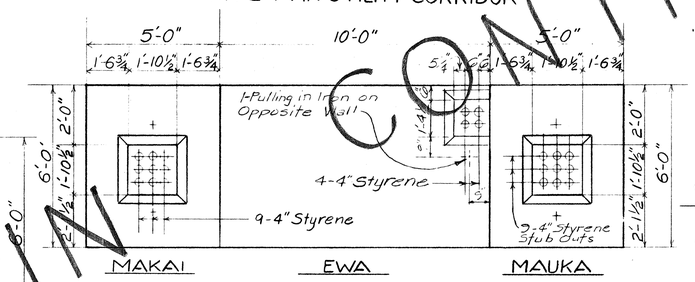
TMH NO.6
8'X10' MANHOLE IN UTILITY CORRIDOR



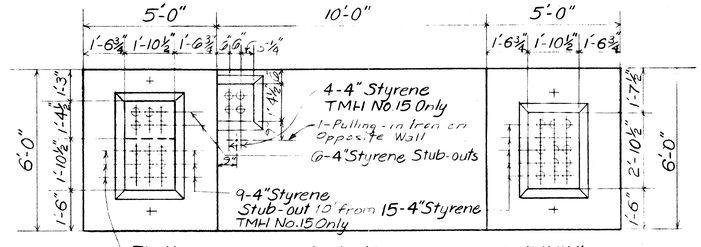
TMH NO.7, TMH NO.8, TMH NO.12
TYPE A-3-6.5 IN UTILITY CORRIDOR

SEE SHEET NO. U

TMH NO.9
TYPE V-1 IN UTILITY CORRIDOR



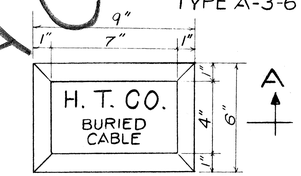
TMH NO.10
TYPE A-3-6 AT HALAWA HEIGHTS ROAD



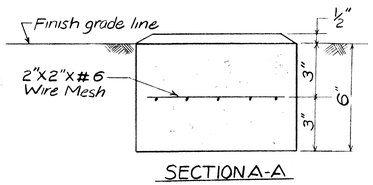
TMH NO.14
TYPE A-3-6 IN UTILITY CORRIDOR

WAIKIKI MAKAI EWA

TMH NO.15
TYPE A-3-6 IN UTILITY CORRIDOR

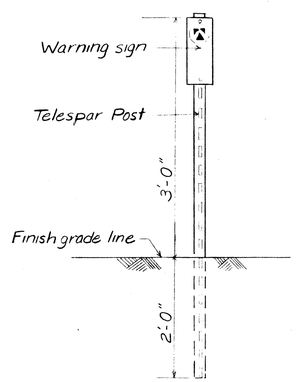


PLAN VIEW



SECTION A-A

DETAIL "1"
BURIED CONCRETE CABLE MARKER
SCALE: 3"=1'-0"



DETAIL "2"
TELESPAR CABLE MARKER
NO SCALE

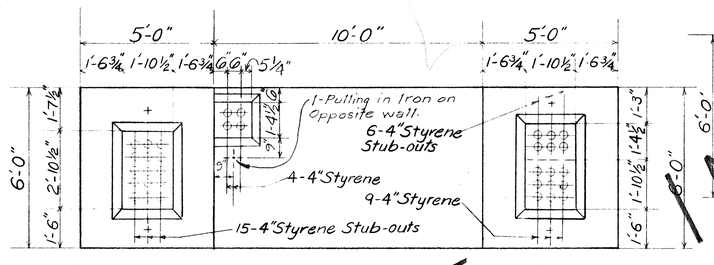
NOTE:
Buried Concrete Cable Marker & Telespar Cable Marker Shall be furnished by Hawaiian Telephone Company and installed by the Contractor. See Sheet U for Locations.

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

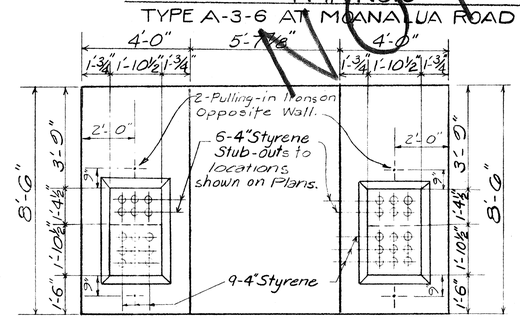
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schuchardt

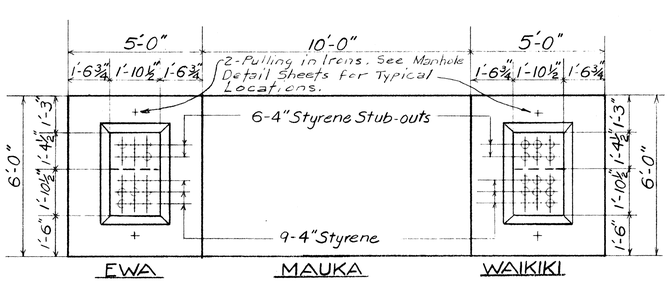
TMH NO.3
TYPE A-3-6 AT MOANALUA ROAD



TMH NO.4
CORNER SMALL TYPE AT MOANALUA ROAD



TMH NO.11, TMH NO.13
TYPE A-3-6 IN UTILITY CORRIDOR



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

APPROVED:

F. H. Judd 8-12-69

HAWAIIAN TELEPHONE COMPANY DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

H.T.Co. MANHOLE WALL ELEVATIONS & CABLE MARKER DETAILS

SCALE: AS SHOWN DATE: Nov. 28, 1969

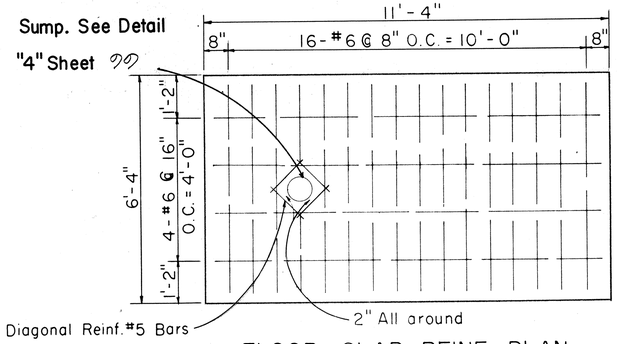
SHEET No. 21U OF 36U SHEETS

97

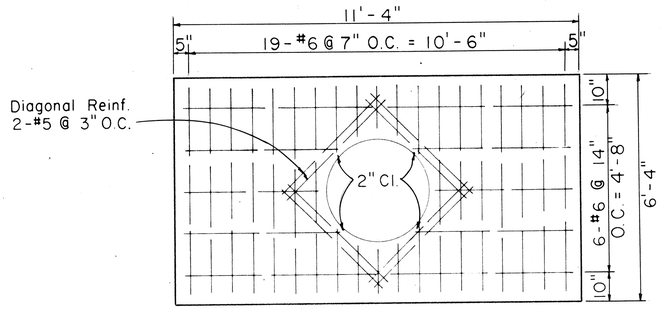
CONTRACT
NOT
IN

PRINTED ON NO. 1001R CLEARPRINT

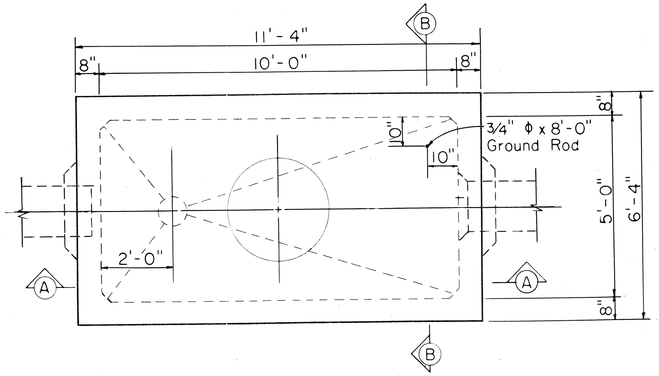
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IHI-1(77)13	1969	98	154



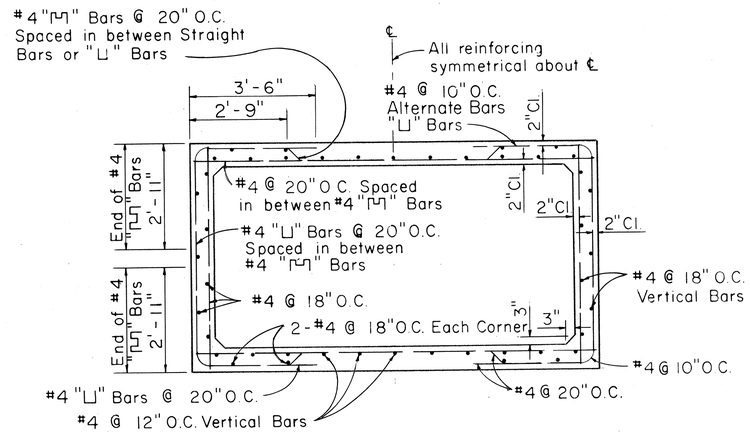
FLOOR SLAB REINF. PLAN
Scale: 1/2"=1'-0"



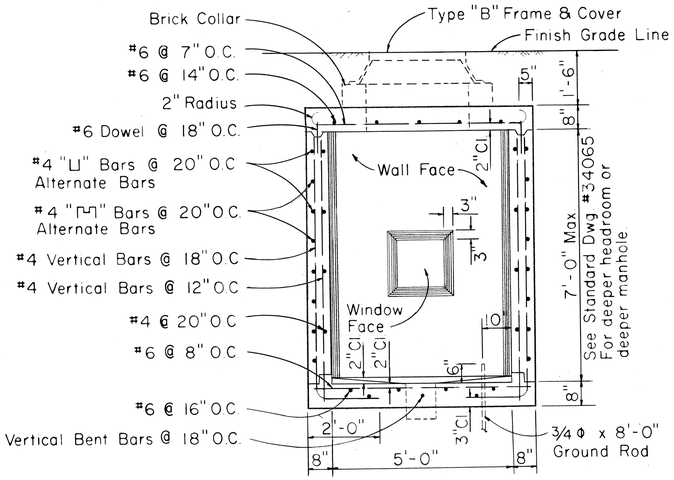
ROOF SLAB REINF. PLAN
Scale: 1/2"=1'-0"



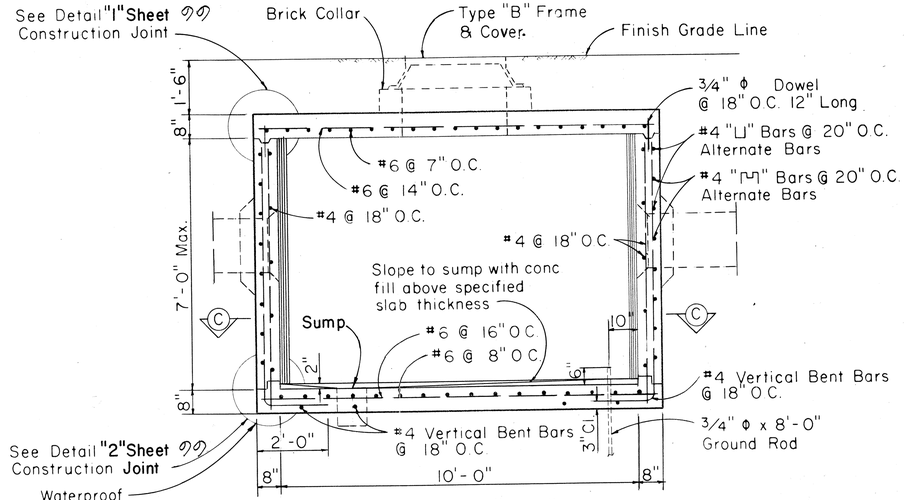
PLAN - M.H. TYPE "A-3" SERIES
FOR ROADWAY & SIDEWALK AREAS
Scale: 1/2"=1'-0"



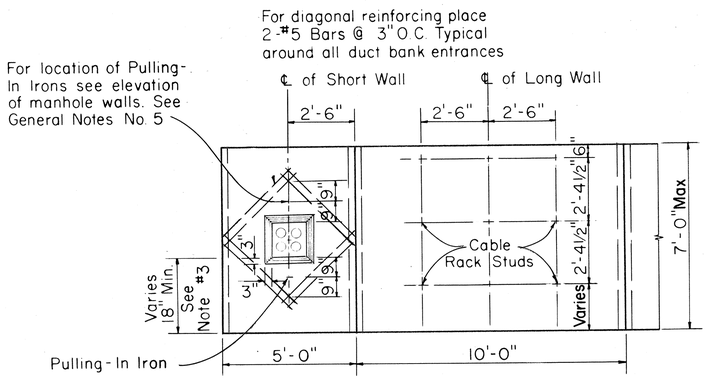
SECTION "C-C"
Scale: 1/2"=1'-0"



SECTION "B-B"
Scale: 1/2"=1'-0"



SECTION "A-A"
Scale: 1/2"=1'-0"



ELEVATION OF M.H. WALLS - TYPE "A-3" SERIES
(OPPOSITE FACES SIMILAR)
Scale: 3/8"=1'-0"

GENERAL NOTES:

1. Design Data:
   fs= 20,000 psi; fc'= 3,000 psi; fc= 1,350 psi; n=10
   w= Equivalent Fluid Pressure: 30#/ft²
2. All Construction Joints shall be waterproofed with two applications of Thoro Seal or equal.
3. For Duct Window location see Plan Profile Sheets for Elevations.
4. Duct Window to suit - See Plan & Profile & Standard Detail Sheets for Location & Details.
5. For Details **"1" thru "4" See Sheet** 99 **and for** other miscellaneous Manhole Construction Details see **Sheet** 101.

Manhole Classification
Width & Length Designation "3" = 5.0' x 10.0'
Manhole Headroom

TYPE "A-3"-6.0'
6.5'
7.0'

THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION.
J. Andrew Schuchart

APPROVED:
F. H. Judd 8-12-69
Hawaiian Telephone Co., Ltd Date
H.T. Co., Ltd. Drawing No. 34064

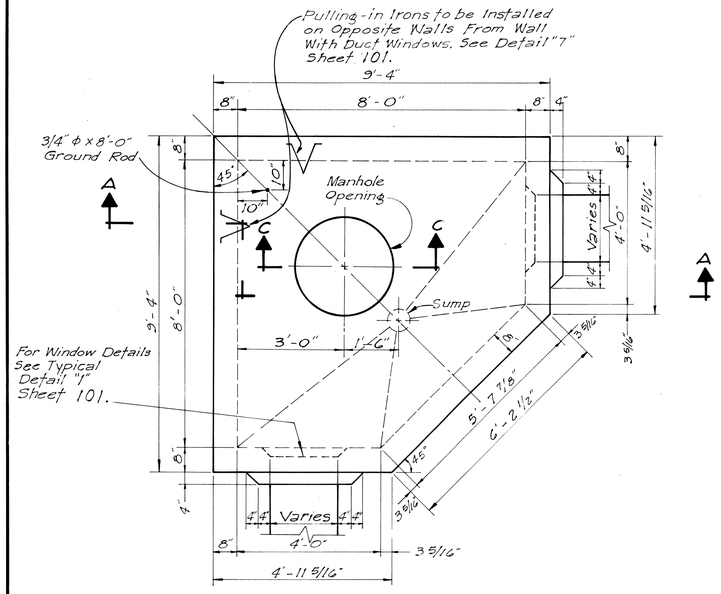
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPE "A-3" MANHOLES
FOR 6.0' TO 7.0' HEADROOM

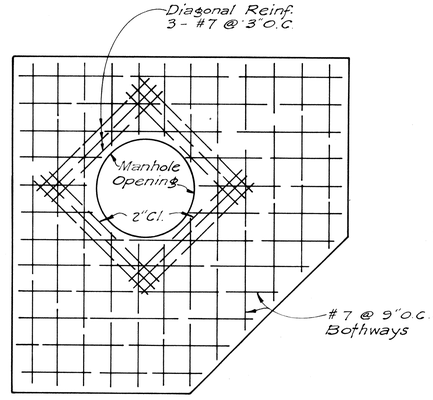
Scale: As Noted Date: Nov. 28, 1969
SHEET No. 122 OF 364 SHEETS

99

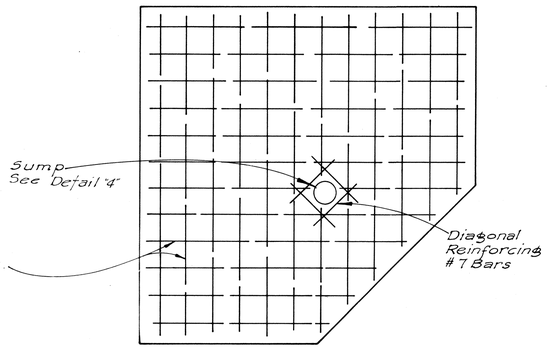
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(17)13	1969	99	154



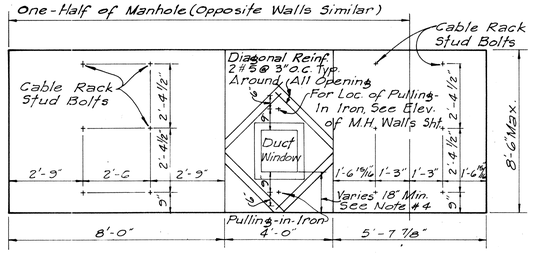
PLAN VIEW
SCALE 1/2" = 1'-0"



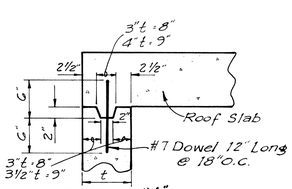
REINFORCING PLAN
ROOF SLAB
SCALE 1/2" = 1'-0"



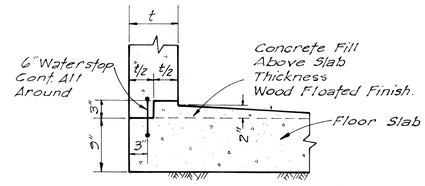
REINFORCING PLAN
FLOOR SLAB
SCALE 1/2" = 1'-0"



ELEVATION OF INSIDE WALLS
SCALE 3/8" = 1'-0"



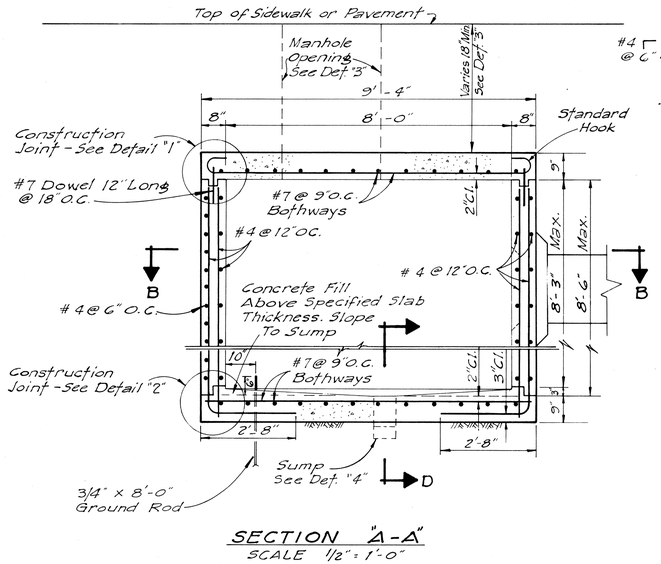
DETAIL "1"
TOP CONSTRUCTION JOINT
SCALE 1" = 1'-0"



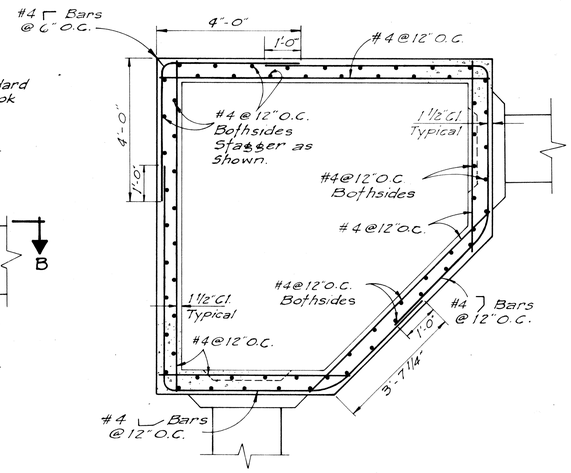
DETAIL "2"
BOTTOM CONSTRUCTION JOINT
SCALE 1" = 1'-0"

GENERAL NOTES:

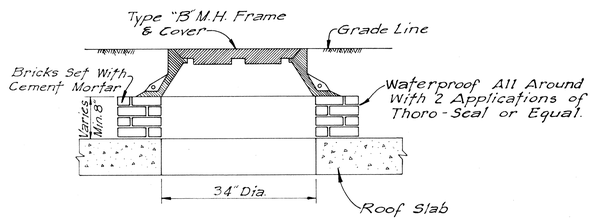
1. Design Data
   - fs = 20,000 psi
   - f'c = 3,000 psi
   - fc = 1,200 psi
   - n = 10
   - w = Equiv. Fluid Pressure 30 #/Ft²
2. Concrete Shall Be Class A-1 & Shall Have A Compressive Strength of 3,000psi In 28 Days. Slump Shall Be 3".
3. Reinforcing - Intermediate Grade Deformed Bars.
4. Unless Otherwise Indicated, For Vertical Location Of Duct Windows See Profile Sheet.
5. Manhole Walls Shall Be Doubled Formed.
6. All Concrete Shall Be Cured By An Impervious Liquid Membrane Compound.
7. Concrete Shall Not Be Loaded, Except By Its Own Weight, Until 28 Days After Placement.
8. All Construction Joints Shall Be Waterproofed.
9. Plug All Ducts In Manhole.
10. Concrete Admixture Shall Be 2 1/2 Lbs "Tricosol Normal" Per Cubic Feet
11. Apply Dampproofing To The Surfaces Of Reinf. Concrete That Are In Contact With The Earth Excluding The Underside Of The Floor Slab. Material And Application Shall Be According To The 1963 Edition Of The "State" Highway Department's Standard Specifications For Road And Bridge Construction.



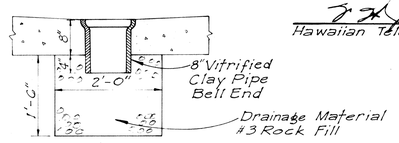
SECTION "A-A"
SCALE 1/2" = 1'-0"



SECTION "B-B"
SCALE 1/2" = 1'-0"



SECTION "C-C"
M.H. COVER-DETAIL "3"
SCALE 3/4" = 1'-0"



SECTION "D-D"
M.H. SUMP-DETAIL "4"
SCALE 3/4" = 1'-0"

APPROVED

F. H. Judd 8-12-69
Hawaiian Telephone Co., Ltd Date

J. ANDREW SCHUCHARDT
REGISTERED PROFESSIONAL ENGINEER
No. 2229
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
J. Andrew Schuchardt

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

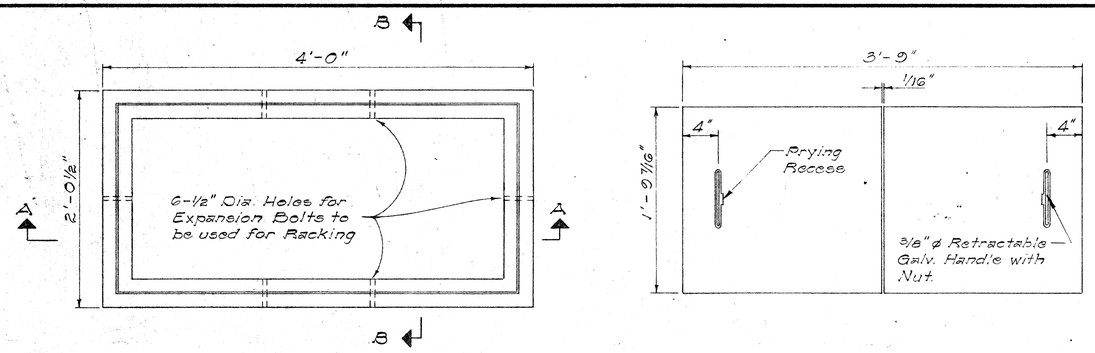
TELEPHONE MANHOLE CORNER SMALL TYPE

SCALE: AS SHOWN DATE Nov. 28, 1967

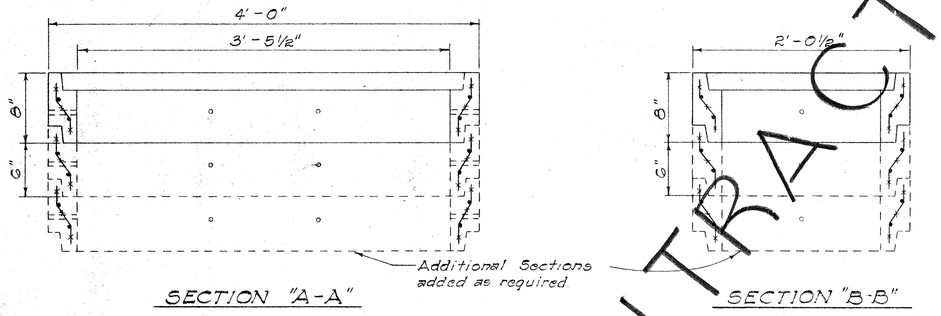
SHEET No. 93 U OF 96 U SHEETS

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.	I-HI-1(77)13	1969	100	154



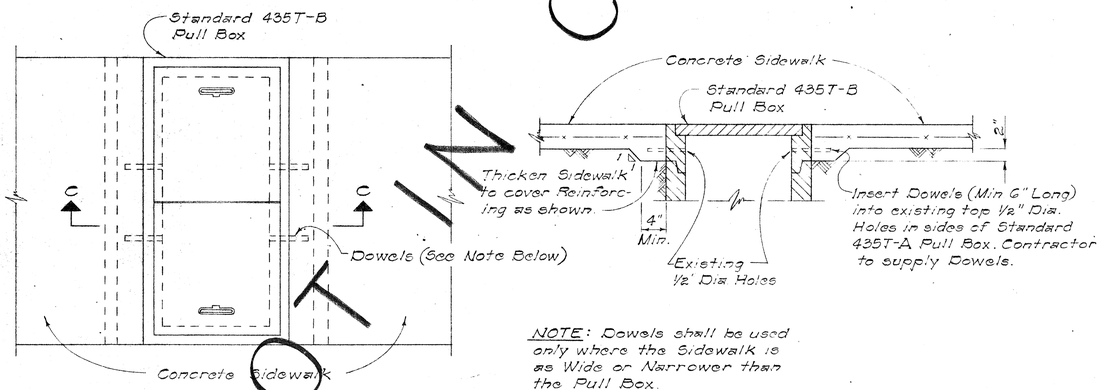
PLAN — PLAN OF COVER



SECTION "A-A" — SECTION "B-B"

DETAIL OF LARGE PULL BOX No. 435T-B

Scale: 1½" = 1'-0"

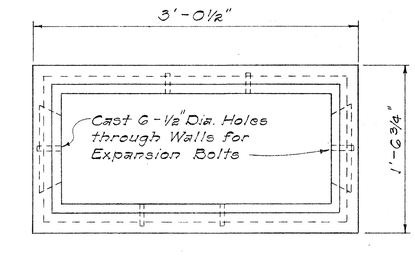


NOTE: Dowels shall be used only where the Sidewalk is as Wide or Narrower than the Pull Box.

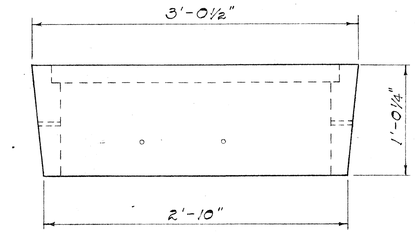
PLAN — SECTION "C-C"

INSTALLATION DETAIL OF PULL BOX No. 435T-B IN SIDEWALK AREAS

Scale: 1" = 1'-0"



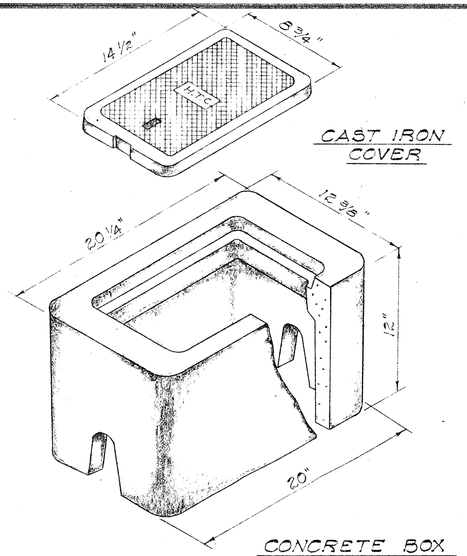
PLAN — PLAN OF COVER



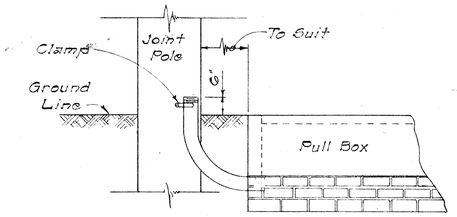
SIDE ELEVATION — END ELEVATION

DETAIL OF SMALL PULL BOX No. 434T

Scale: 1½" = 1'-0"



TYPE "B" METER BOX TYPE 436T



TYPICAL 90° CONDUIT BEND TO POLE

Not To Scale

APPROVED:
F. A. Judd
HAWAIIAN TELEPHONE CO.
8-12-69
DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS TELEPHONE PULL BOXES Nos. 435T-B, 434T AND 436T

Scale: As Shown — Date: Nov. 28, 1969

J. ANDREW SCHUCHART REGISTERED PROFESSIONAL ENGINEER No. 4239 HAWAII, U.S.A.

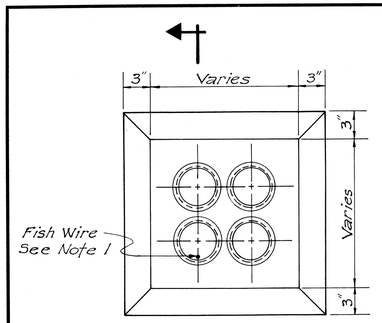
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
J. Andrew Schuchart

SHEET No. 240 OF 364 SHEETS

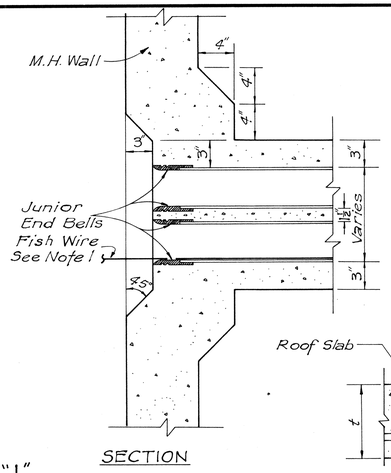
ORIGINAL PLAN | NOTE BOOK No. | SURVEY PLOTTED BY | DRAWN BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE

CONTRACT NOT IN

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	EHI-1(77):13	1969	101	154

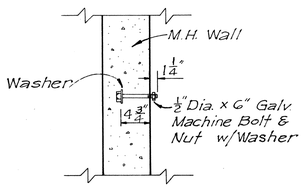


ELEVATION

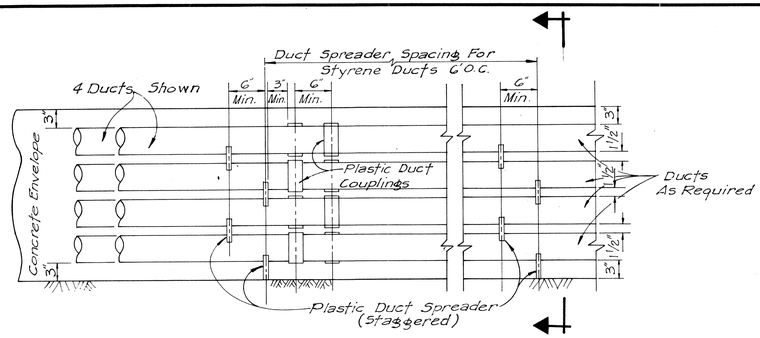


SECTION

DETAIL "1"
TYPICAL MANHOLE DUCT WINDOW
SCALE 1 1/2" = 1'-0"

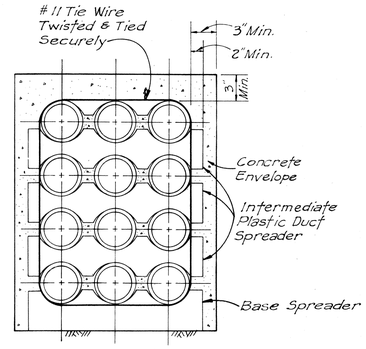


CABLE RACK STUD BOLT-DETAIL "2"
SCALE 1"=1'-0"

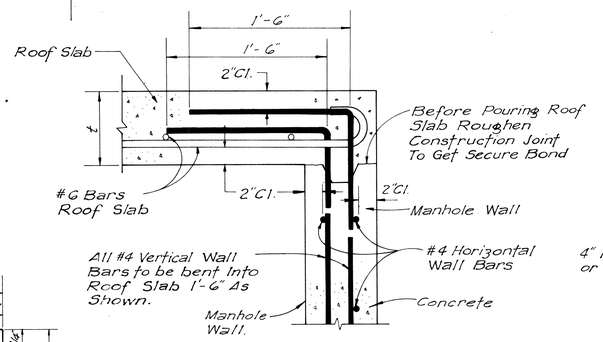


TYPICAL DUCT ENVELOPE ELEVATION
ARRANGEMENT OF COUPLING & PLASTIC SPACERS

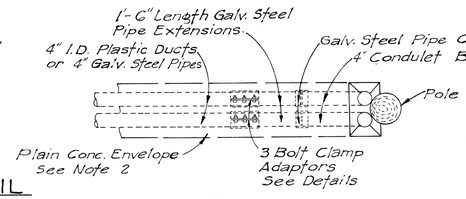
DETAIL "4"
TYPICAL H.T.Co. DUCTS
SCALE 1" = 1'-0"



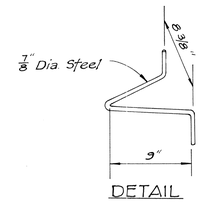
DUCT SECTION SHOWING SPACERS
NO SCALE



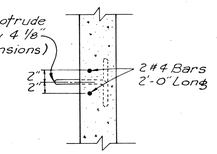
DETAIL "3"
CAST-IN-PLACE ROOF SLAB DETAIL
SCALE 1 1/2" = 1'-0"



PLAN

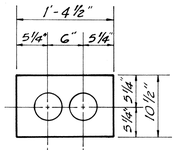


DETAIL

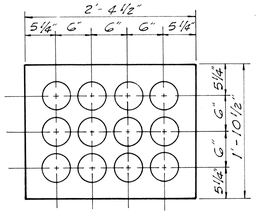


SECTIONAL VIEW

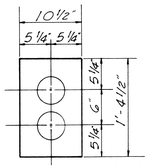
PULLING-IN-IRON- DETAIL "7"
SCALE 3/4" = 1'-0"



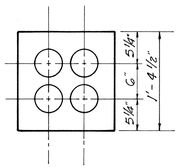
2 DUCTS



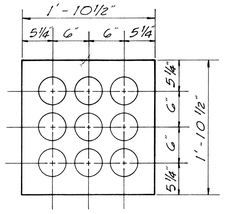
4 WIDE x 3 HIGH
12 DUCTS



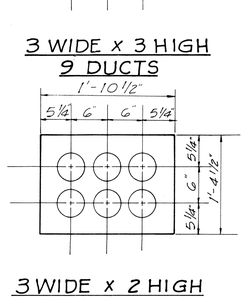
2 DUCTS



2 WIDE x 2 HIGH
4 DUCTS

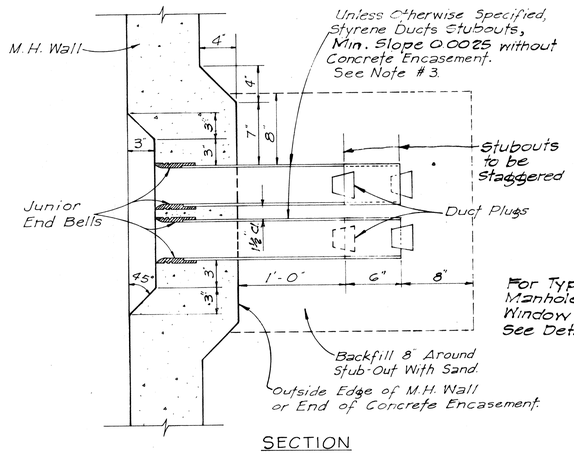


3 WIDE x 3 HIGH
9 DUCTS



3 WIDE x 5 HIGH
15 DUCTS

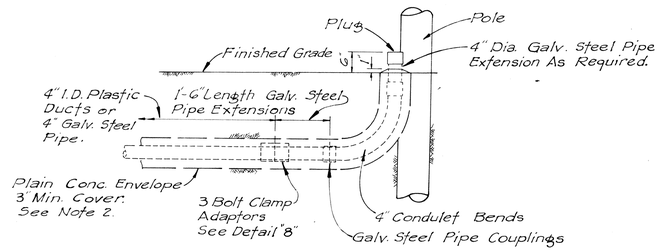
3 WIDE x 2 HIGH
6 DUCTS



SECTION

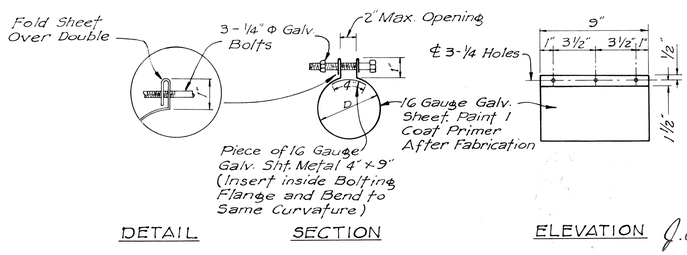
For Typical
Manhole Duct
Window Elevation
See Detail "1".

TYPICAL STUB-OUTS - DETAIL "5"



ELEVATION

TYPICAL RISER - DETAIL "6"
SCALE 1/2" = 1'-0"



DETAIL SECTION ELEVATION

3 BOLT CLAMP ADAPTER DETAIL "8"

TYPICAL MANHOLE DETAILS
NO SCALE

NOTES:

1. The Contractor Shall Place #12 Fish Wire In Designated Duct Throughout It's Entire Length With Protrusions of 2 Feet In Manholes & Handholes At Each End And 1 Foot In Pullboxes.
2. Plain Concrete Envelope Is Not Required For Temporary Galv. Steel Pipe Ducts Called For On The Plans.
3. Stub-Outs For Future Duct Lines Shall Be Installed So That 3" Minimum Concrete Envelope Can Be Provided For The Future Duct Lines. See Plans For Lengths of Stub Outs, 1' min. Unless Otherwise Specified.

APPROVED

J. F. Judd — 8-12-69
Hawaiian Telephone Co. Ltd. — Date

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

REGISTERED PROFESSIONAL ENGINEER No. 2229 ANDREW SCHSCHARDT HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
J. Andrew Schschardt

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

H.T.Co. STANDARD DUCT FORMATIONS & TYPICAL MANHOLE DETAILS

SCALE: AS SHOWN DATE: Nov. 28, 1969

SHEET No. 25 U OF 36 U SHEETS

STANDARD DUCT FORMATIONS

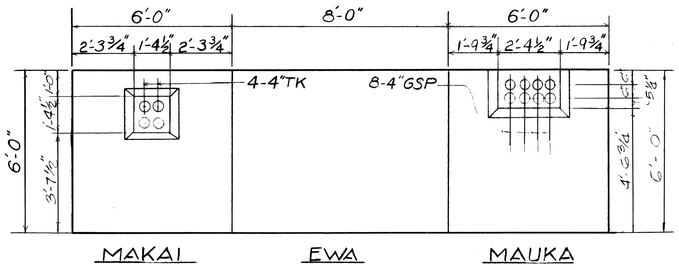
101

APPROVED

JK KH

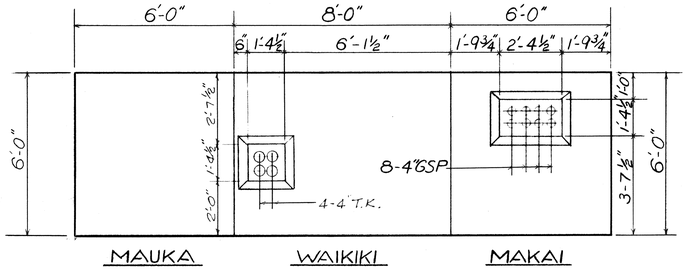
Hawaiian Electric Company, Inc. Date

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-I(77)13	1969	102	154



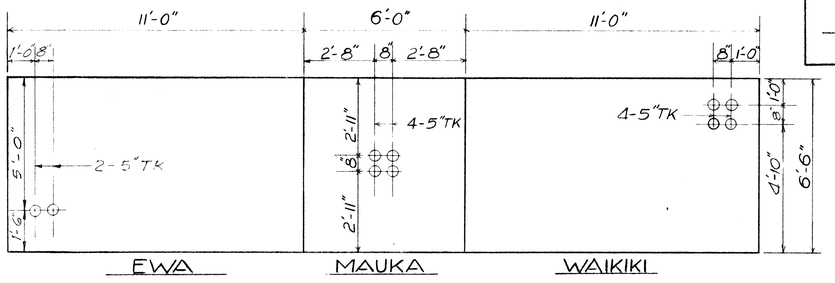
EMH NO.1 (NAVY)

6'X8' AT KAIMAKANI STREET



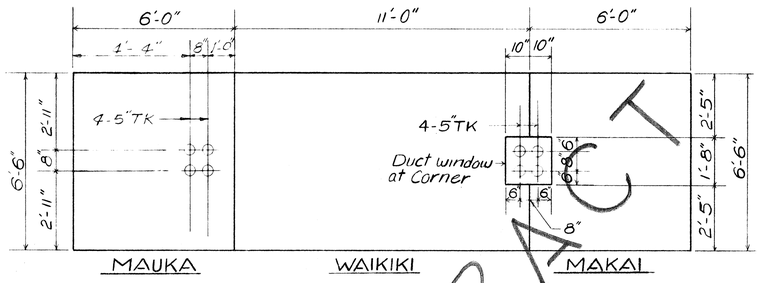
EMH NO.2 (NAVY)

6X8' AT KAIMAKANI STREET



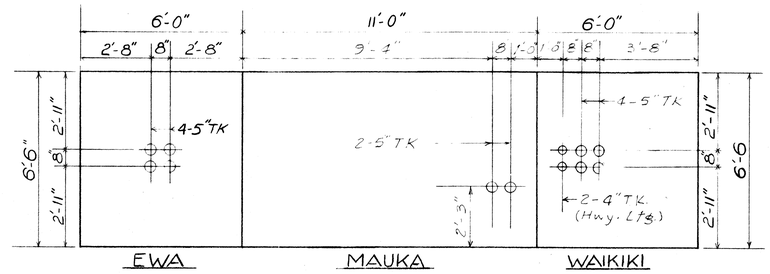
EMH NO.4 (HECo)

TYPE1 6'X11' IN UTILITY CORRIDOR



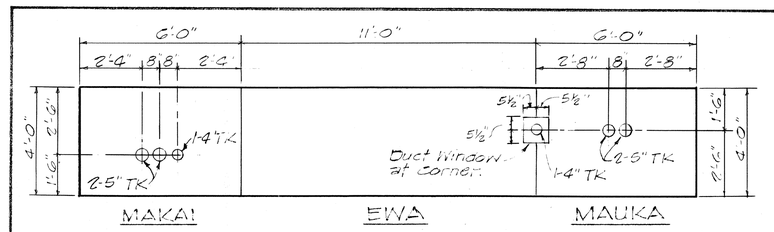
EMH NO.5 (HECo)

TYPE 1 6'X11' IN UTILITY CORRIDOR



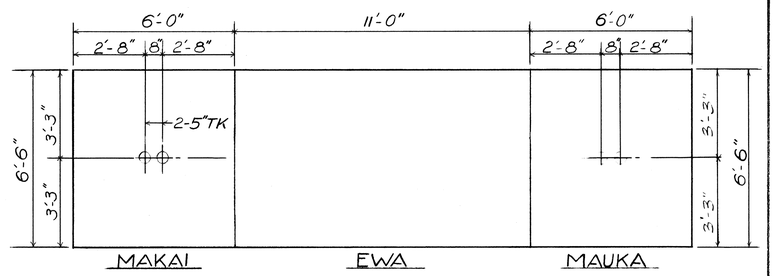
EMH NO.9 (HECo)

TYPE 1 6'X11' IN UTILITY CORRIDOR AT HALAWA HEIGHT ROAD



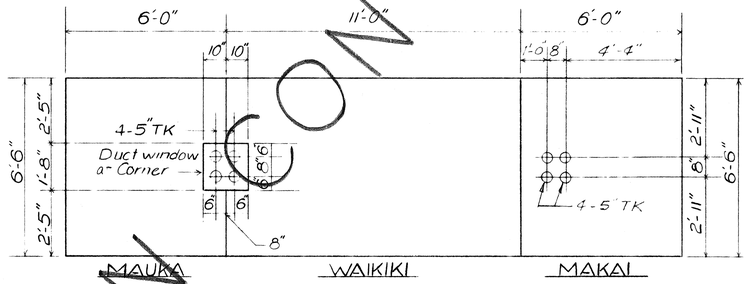
EHH NO. 2 (H.E.Co.)

TYPE 611 V AT PUAKALA STREET



EMH NO.1 (HECo)

TYPE 1 6'X11' : EMH NO.1 AT ANOUNOU STREET



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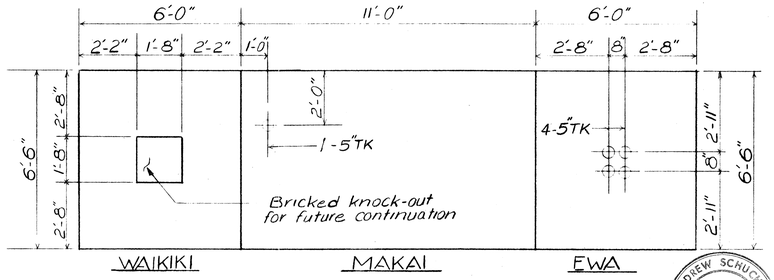
TYPE 1 6'X11' IN UTILITY CORRIDOR



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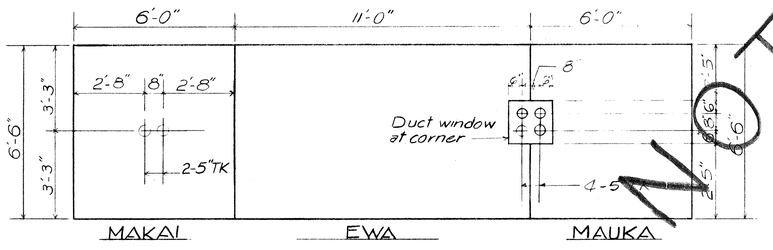
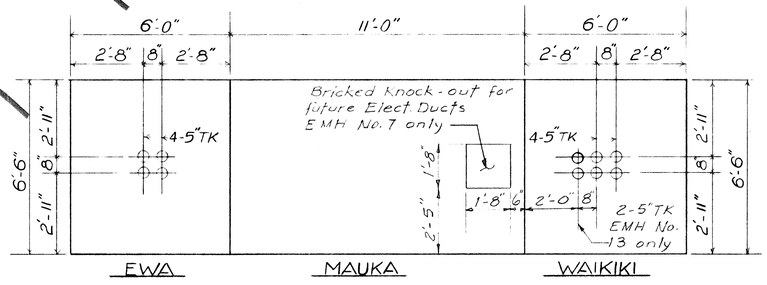
TYPE 1 6'X11' IN UTILITY CORRIDOR



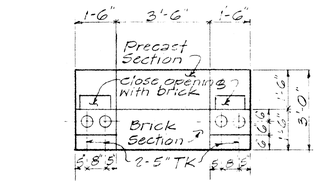
EMH NO.3 (HECo)

TYPE 1 6'X11' AT HALE STREET



EMH NOS.7,8,10,11,12&13 (HECo)

TYPE 1 6'X11' IN UTILITY CORRIDOR



ESB NO.14 (H.E.Co.)

1'-6" x 3'-6" AT UTILITY CORRIDOR ACCESS RD. "D"

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

J. Andrew Schuchardt

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

H.E.Co. & NAVY MANHOLE WALL ELEVATIONS

SCALE: 3/8"=1'-0" DATE: Nov. 28, 1969

SHEET No. 264 OF 364 SHEETS

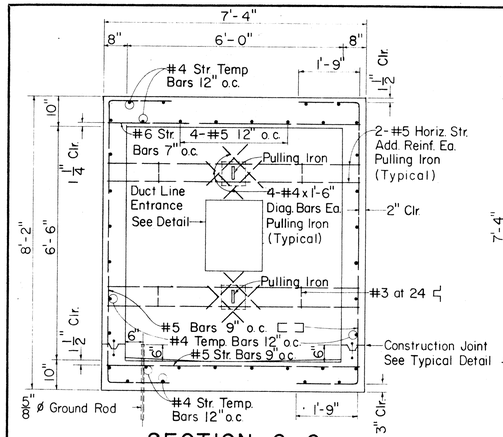
102

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

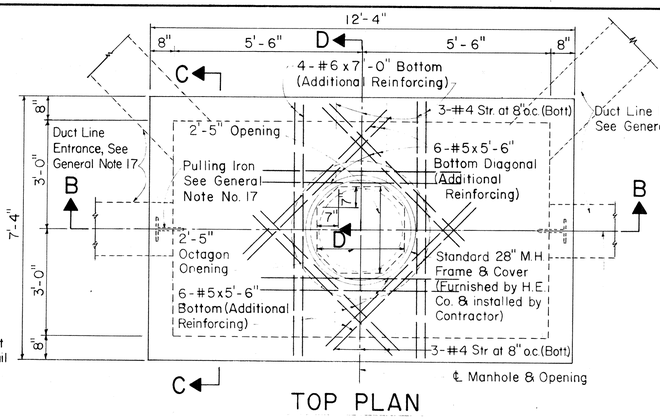
NOT IN CONTRACT

PRINTED ON NO. 1000H CLEARPRINT

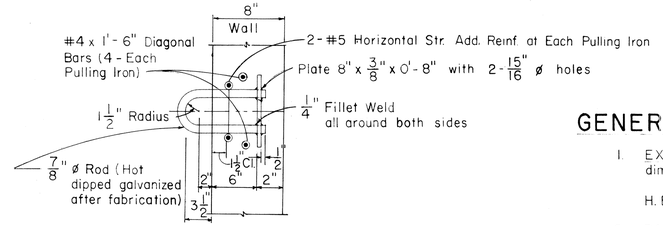
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-I(17)13	1969	103	154



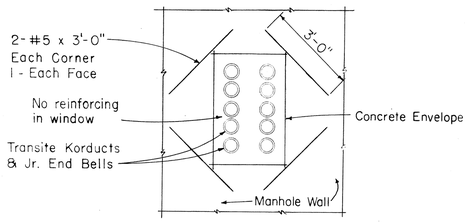
SECTION C-C



TOP PLAN



PULLING IRON DETAIL

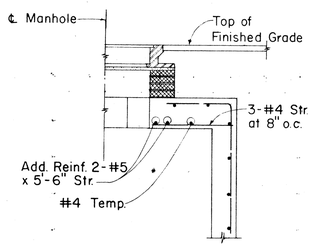


ELEVATION

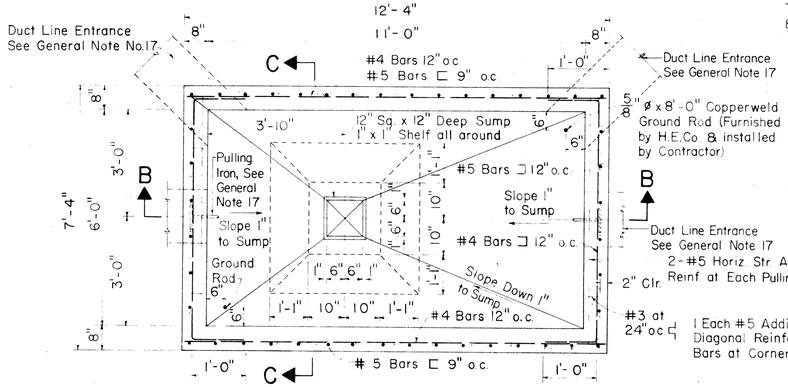
REINFORCING AT DUCT WINDOW

GENERAL NOTES

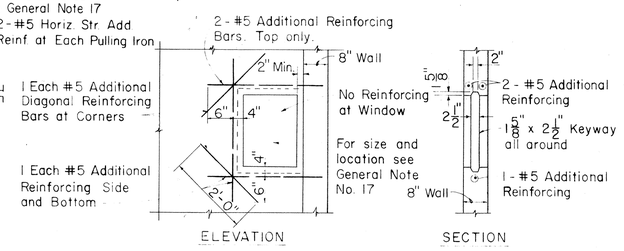
1. EXCAVATION : Excavate for manhole to accurate alignment, grades and dimensions as shown on drawings.
   All excavation must be approved by Engineering Dept. H.E.Co. before any concrete is poured.
   All excess cut shall be backfilled with concrete or rocks.
2. BACKFILL : Remove all debris before backfilling. Backfill in accordance with latest specifications of Division of Highways, State of Hawaii.
3. All work to be done in dry.
4. Concrete shall be Class A conforming to the requirements of Section 601 of the **Standard Specifications.**
5. MIXING : Ready-Mixed A.S.T.M. C-94 **(Latest edition).**
6. REINFORCING : Round deformed bars (clean and new).
7. SPLICE : Lap 30 bar diameters unless otherwise shown.
8. CURING : Keep concrete moist at least 7 days after pouring. (By approved method)
9. FINISH : All surfaces smooth and free from defects.
   Top of manhole - wood floated. Manhole floor - steel troweled.
   Inside walls and ceiling - cement washed.
10. Install all inserts, including pulling irons, ground rods, etc, before pouring concrete.
11. POURING : Notify the H.E.Co. Contracting and Inspection Division, 24 hours before pouring any concrete. All concrete pouring shall be done in the presence of an H.E.Co. Engineer or Inspector.
12. FORMS : Make of good sound lumber, of sufficient strength, water tight and conforming to shape and dimensions indicated on drawings.
13. The Hawaiian Electric Co. Inc. to furnish and Contractor to install, for each manhole:
    A - 2-5/8" ø x 8'-0" copperweld ground rods.
    B - Standard 28" manhole frame and cover. (H.E. Standard)
14. Slope manhole floor down 1" toward sump.
15. All work shall be subject to inspection by the Hawaiian Electric Co. Inc.; and/or Division of Highways, State of Hawaii; and/or Division of Engineering, City & County of Honolulu.
16. All materials shall be new and shall be manufactured in the United States.
17. For number, size, and exact location of ducts entrances and pulling irons, refer to project drawings.

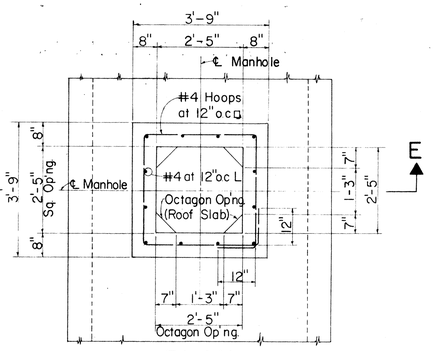


SECTION D-D

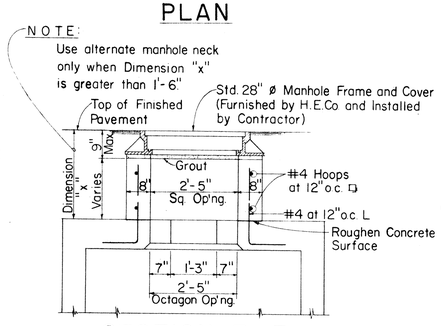


SECTIONAL PLAN A-A



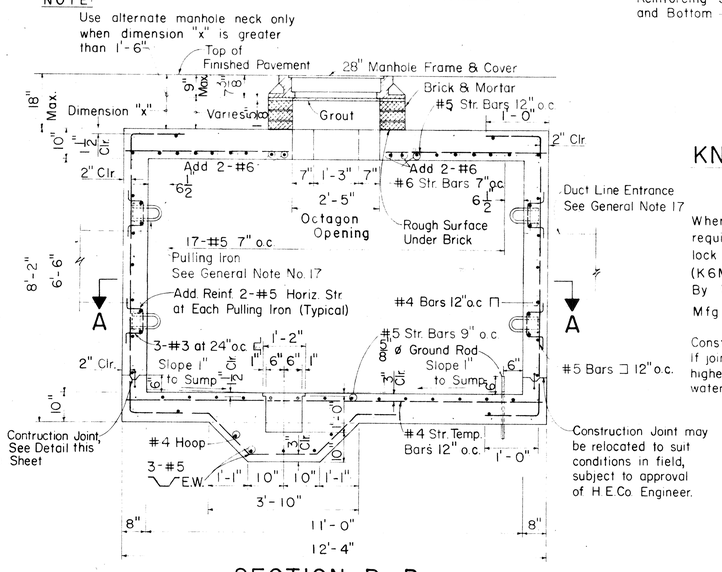


PLAN

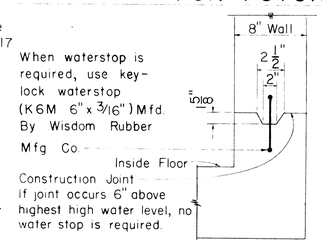


SECTION E-E

ALTERNATE MANHOLE NECK



SECTION B-B



TYPICAL DETAIL OF CONSTRUCTION JOINT AND KEYWAY

NOTE:
Provide opening for future duct line. Fill opening with bricks with mortar joints as required. (See project drawing).

KNOCKOUT FOR FUTURE DUCT LINE

Construction Joint may be relocated to suit conditions in field, subject to approval of H.E.Co. Engineer.

REFERENCE DRAWINGS

U-10082 - Standard H.E.Co. 28" Manhole Frame and Cover.
18585 - Underground Ductline Construction Standards - Details.
18585A - Underground Ductline Construction Standards - Specifications.

REINFORCED CONCRETE QUANTITIES

QUANTITY OF MATERIALS FOR DEPTH "D"=5'-0"
Total Concrete = 11.8 Cu. Yds.
Total Reinf. Steel = 1,363 Lbs.
QUANTITY OF MATERIALS FOR ALTERNATE NECK "D"=1'-0"
Concrete = 0.29 Cu. Yds.
Reinf. Steel = 39 Lbs.
MATERIALS FOR 6" DEPTH OF 8" THICK WALL
Concrete = 0.45 Cu. Yds.
Reinf. Steel = 37 Lbs.

FOR USE IN AREAS SUBJECT TO PRESENT AND FUTURE VEHICULAR TRAFFIC

APPROVED:
HAWAIIAN ELECTRIC Co., Inc. — DATE 8/27/69

HECo., Inc. Drawing Number
18775

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
MANHOLE TYPE No. 1 (6'-0" x 11'-0")
UNDERGROUND STANDARDS

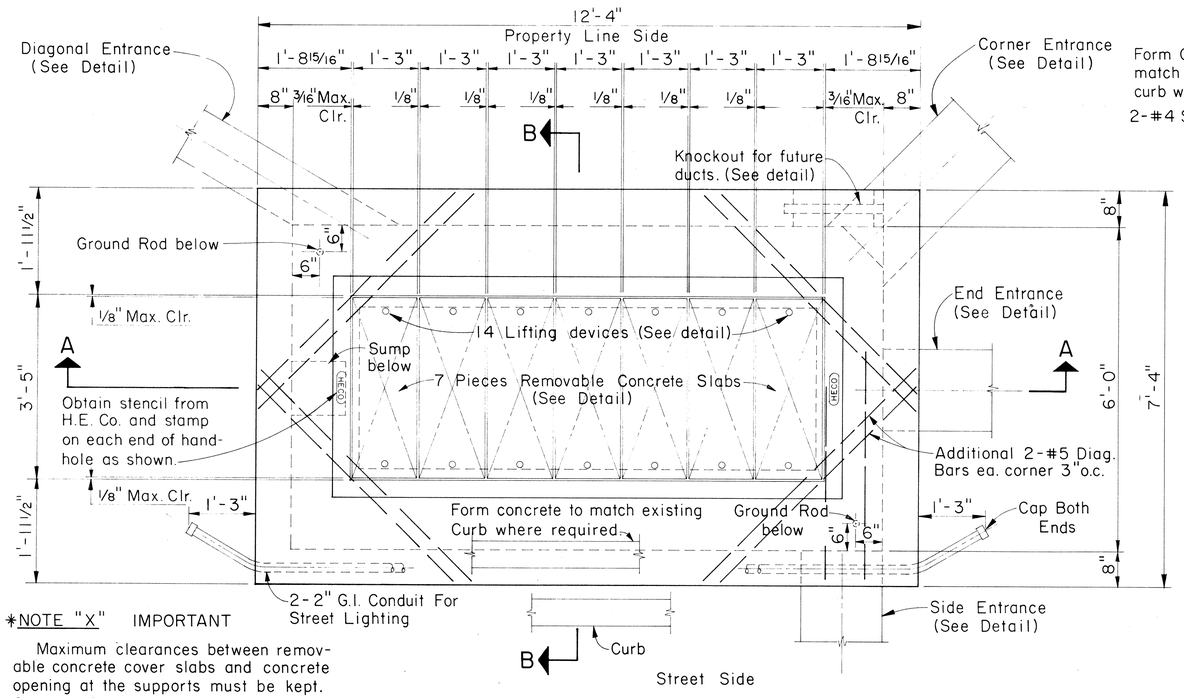
Scales: Not to Scale Date: Nov. 28, 1969

SHEET NO 87U OF 361U SHEETS

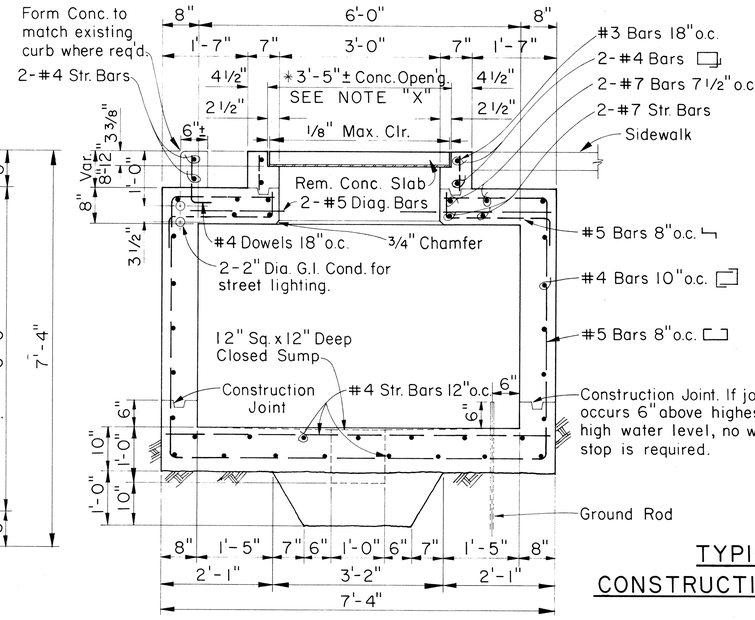
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	"
	TRACED BY	"
NOTE BOOK	DESIGNED BY	"
	QUANTITIES BY	"
No.	CHECKED BY	"

103

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(17)13	1969	104	154



PLAN
Scale: 3/4" = 1'-0"



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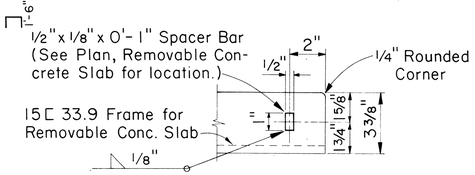
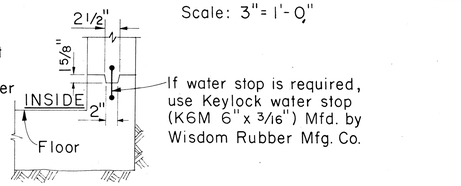


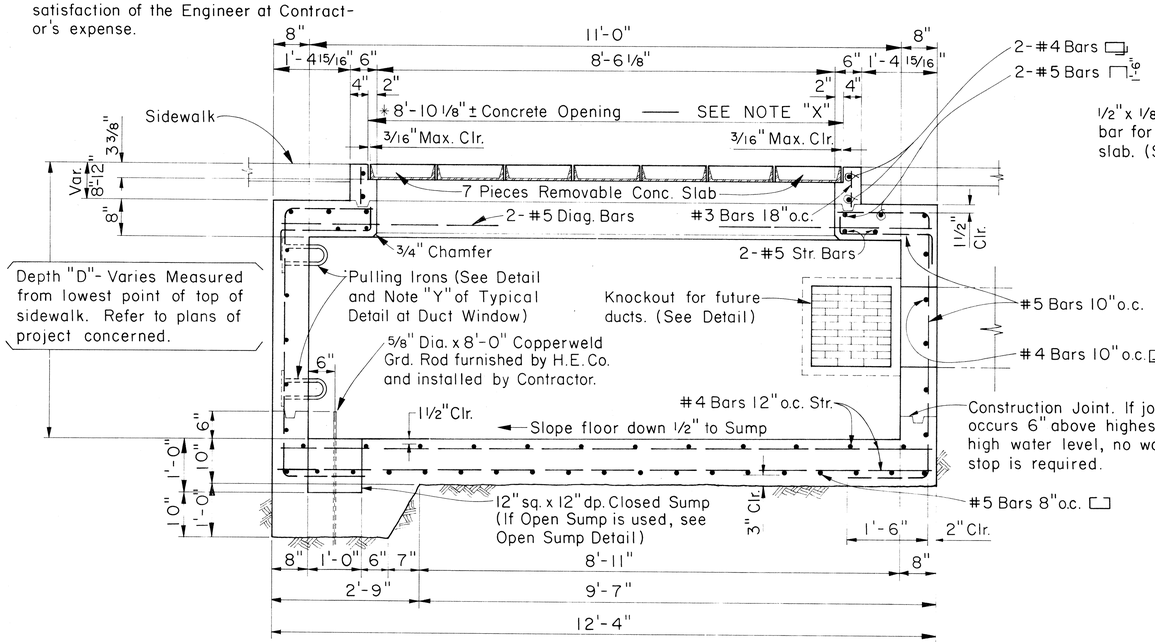
PARTIAL ELEVATION
SPACER BAR FOR REMOVABLE CONCRETE SLAB
Scale: 3" = 1'-0"



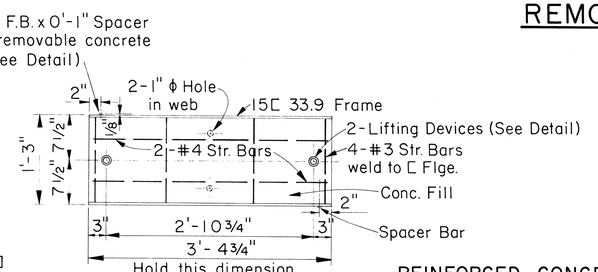
TYPICAL DETAIL OF CONSTRUCTION JOINT AND KEYWAY
Scale: 1" = 1'-0"

*NOTE "X" IMPORTANT

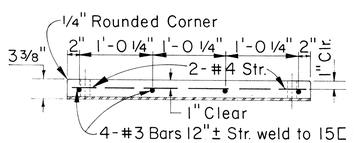
Maximum clearances between removable concrete cover slabs and concrete opening at the supports must be kept. Concrete Contractor shall measure cover slab steel frame after fabrication to obtain proper clearances. Any variation in clearances shall be corrected to the satisfaction of the Engineer at Contractor's expense.



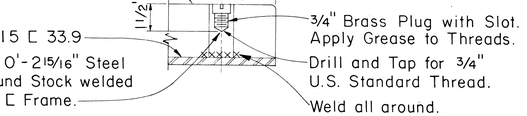
SECTION A-A
Scale: 3/4" = 1'-0"



PLAN



SECTION
REMOVABLE CONCRETE SLAB
Scale: 1" = 1'-0"



REMOVABLE CONCRETE COVER SLAB LIFTING DEVICE
Scale: 3" = 1'-0"

REINFORCED CONCRETE QUANTITIES

QUANTITY OF MATERIALS FOR DEPTH "D" = 5'-0"

Total Concrete	=	8.5 Cu. Yds.
Total Rein. Steel	=	1,634 Lbs.
Total Misc. Steel	=	845 Lbs.

WEIGHT PER REMOVABLE CONCRETE SLAB

Concrete	=	149 Lbs.
Reinf. Steel	=	6 Lbs.
Misc. Steel	=	118 Lbs.
Total	=	273 Lbs.

MATERIALS FOR 6" DEPTH OF 8" THICK WALL

Concrete	=	0.45 Cu. Yds.
Reinf. Steel	=	56 Lbs.

APPROVED:

HAWAIIAN ELECTRIC Co., Inc. — JK 12N — DATE 8/27/69

FOR USE IN AREAS SUBJECT TO PRESENT & FUTURE VEHICULAR TRAFFIC.

HECo., Inc. Drawing Number

18849

SHEET No. 1 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

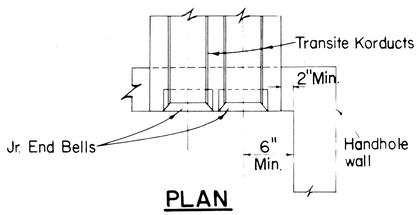
HANDHOLE TYPE 611V (6'-0" x 11'-0") UNDERGROUND STANDARDS

Scales: As Noted — Date: Nov. 28, 1969

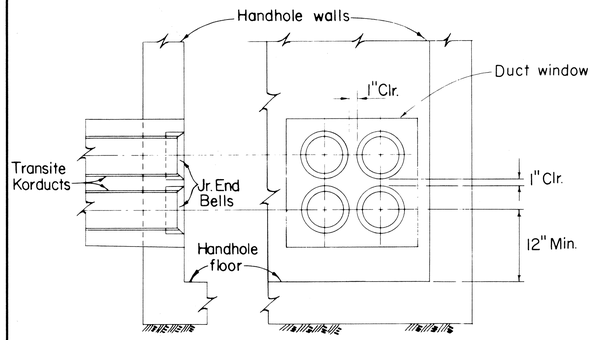
SHEET No. 28 OF 36 SHEETS

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

FED. AID DIST. NO.	STATE	FED. AID. PROJECT	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-I(17):13	1969	105	154



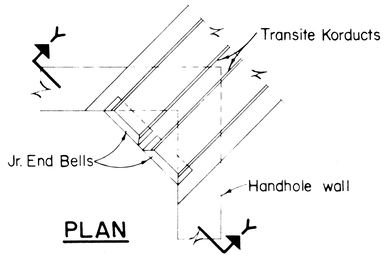
PLAN



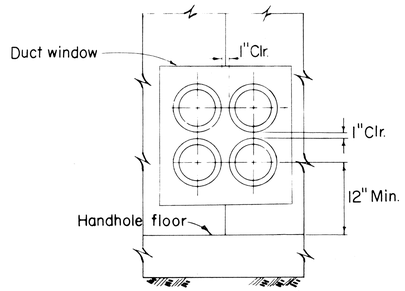
SIDE ELEV. FRONT ELEV.

END & SIDE ENTRANCES

(FOUR WAY DUCT)



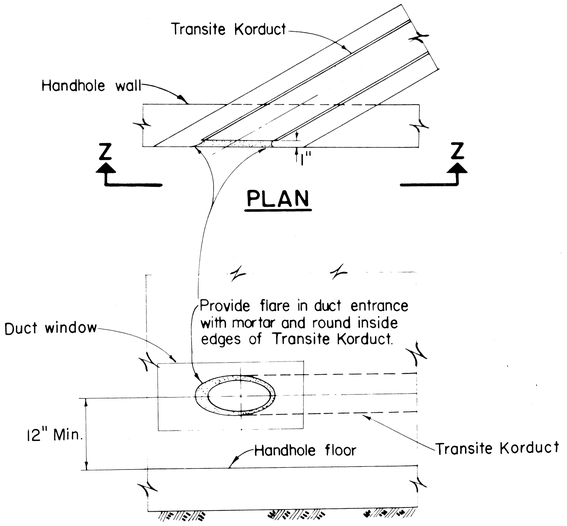
PLAN



ELEV. Y-Y

CORNER ENTRANCE

(FOUR WAY DUCT)



PLAN

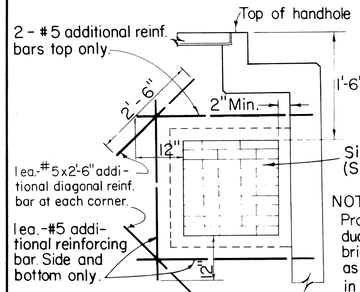
ELEV. Z-Z

DIAGONAL ENTRANCE

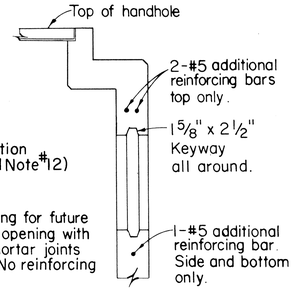
(ONE WAY DUCT)

TYPICAL DUCT LINE ENTRANCE DETAILS

NOT TO SCALE



ELEVATION

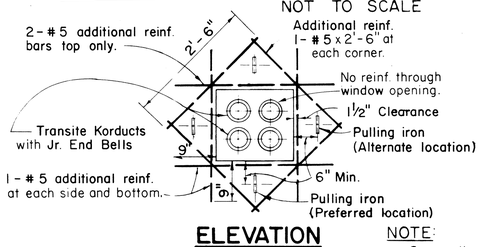


SECTION

NOTE:
Provide opening for future duct line. Fill opening with bricks and mortar joints as required. No reinforcing in window.

KNOCKOUT FOR FUTURE DUCT LINE

NOT TO SCALE

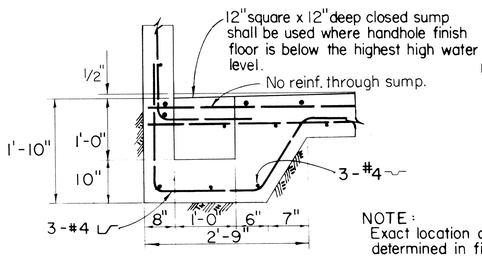


ELEVATION

TYPICAL DETAIL AT DUCT WINDOW

NOT TO SCALE

NOTE:
Generally 2 Pulling Irons are required and located on opposite wall of each duct window unless otherwise shown or noted. H.E. Co. Engineer shall determine number required.

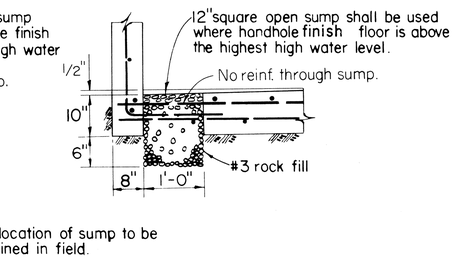


NOTE:
Exact location of sump to be determined in field.

SECTION ELEV.

CLOSED SUMP

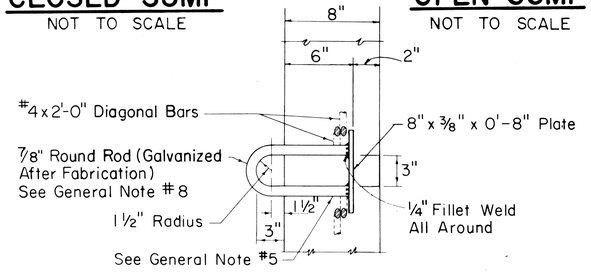
NOT TO SCALE



SECTION ELEV.

OPEN SUMP

NOT TO SCALE



SECTION ELEV.

PULLING IRON

NOT TO SCALE

GENERAL NOTES

1. Concrete to develop compressive cylinder strength of 3000 PSI in 28 days.
2. CONCRETE FINISH:
   Top of Handhole - Woodfloated (sidewalk finish) according to State Department of Transportation or City and County of Honolulu specifications whichever Agency has authority over the work.
   Floor - Smooth metal trowelled.
   Exposed Wall Surfaces, and Edges - Smooth and free from defects.
   CONCRETE POURING:
   Notify the Hawaiian Electric Co. Contracting & Inspection Div. 24 hours before pouring any concrete. All concrete pouring shall be done in the presence of an H.E. CO. Engineer or Inspector.
3. REINFORCING: round deformed bars, new billet stock intermediate grade ASTM A15. All hooked bars shall have ACI std. hook unless otherwise shown.
4. FORMS: form handhole to size and shape as shown. Exterior face of handhole wall shall be formed except:
   A) Excavation in solid material such as coral or rock, neat cut, no forms required.
   B) Excavation in solid material other than coral or rock, lining such as salvaged corrugated iron, canec etc. may be used.
5. PULLING IRONS:
   For location and number required, see duct entrance plan of project concerned.
6. DRAINAGE: Slope floor down 1/2" to sump.
7. For slope of top of handhole, see plan of project concerned.
8. FINISH STEEL WORK:
   ⊏ iron frames, lifting devices for removable concrete slabs and pulling irons shall be HOT DIP GALVANIZED AFTER FABRICATION.
9. EXCAVATION:
   Excavate for handhole to accurate alignment, grades and dimensions as shown on drawing. All excavation must be approved by the Engineering Department, the Hawaiian Electric Co., Inc., before any concrete is poured. All excess cut shall be backfilled with concrete or rock.
10. BACKFILL:
    Remove all debris before backfilling. Backfill in accordance with latest specifications of and subject to approval of State Department of Transportation or City and County of Honolulu whichever Agency has authority over the work.
11. For duct line construction standards see H.E.CO. Dwg. 18585, and specs. sheet 18585A.
12. DUCTS: For number, size, and exact location of duct entrances, refer to project drawings.
13. ALL MATERIALS SHALL BE NEW AND SHALL BE MANUFACTURED IN THE UNITED STATES OF AMERICA.

FOR USE IN AREAS SUBJECT TO PRESENT AND FUTURE VEHICULAR TRAFFIC.

APPROVED:

HAWAIIAN ELECTRIC Co., Inc. — DATE 8/27/69

HECo., Inc. Drawing Number	
18849	SHEET No. 2 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

HANDHOLE TYPE 611V (6'-0 x 11'-0)
UNDERGROUND STANDARDS

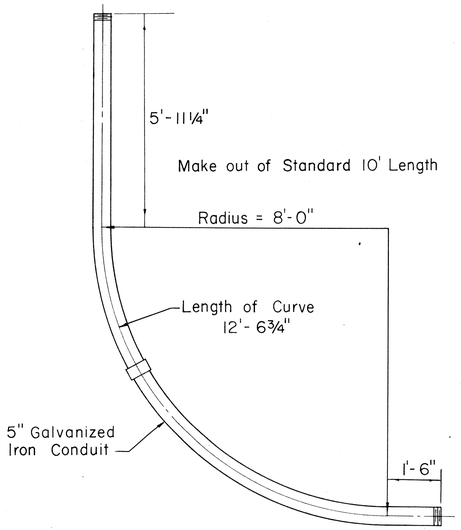
Scales: As Noted — Date Nov. 28, 1969

SHEET NO. 29U OF 36U SHEETS

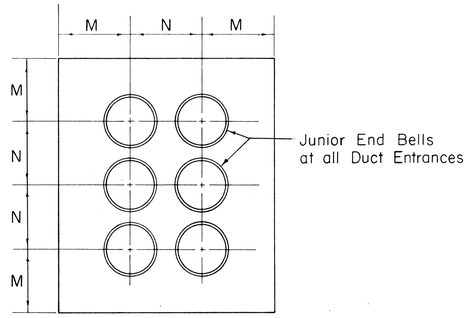
105

LIETZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	EHI-1(17):13	1969	106	154

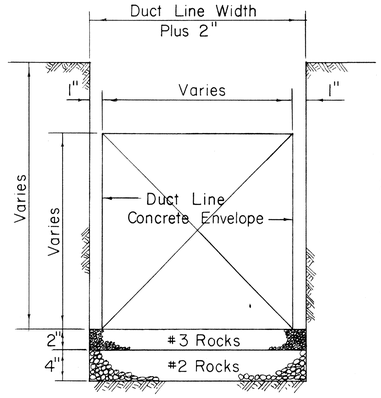


46 KV COMBINATION RISER AND BEND
(8'-0" RADIUS)
Not to Scale



TYPICAL DUCT DETAIL AT MANHOLE WALL
Not to Scale

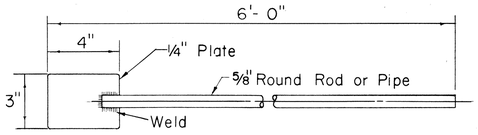
SIZE	M	N
3"	5"	6"
4"	5½"	7"
4½"	5½"	7½"
5"	6"	8"



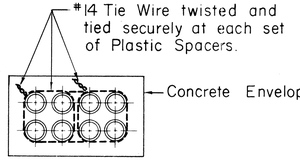
TYPICAL EXCAVATION DETAIL
Not to Scale

NOTES

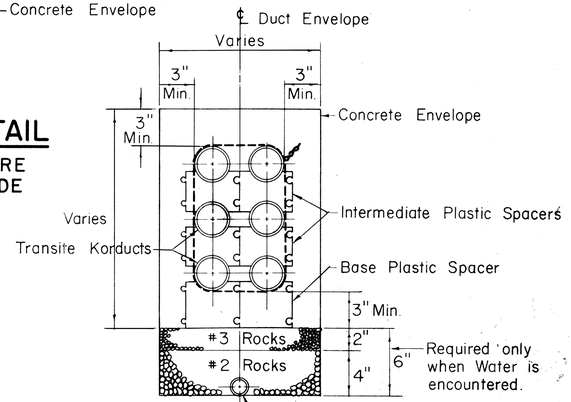
1. Size of Concrete Envelope and Depth of Excavation to be determined by Project concerned.
2. Widen Trench Excavation when Forms are used.
3. Rock Foundation required only when Water is encountered.



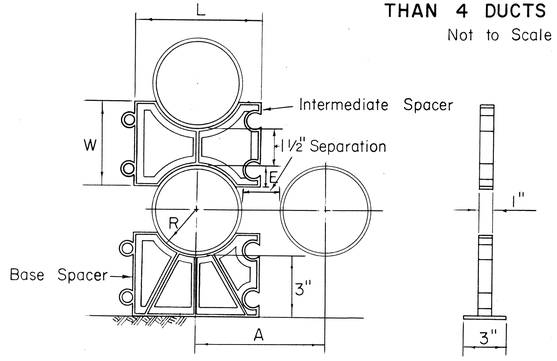
CONCRETE DUCT ENVELOPE TAMPING ROD
Scale: 3" = 1'-0"



TIE WIRE DETAIL
FOR DUCT LINE MORE THAN 4 DUCTS WIDE
Not to Scale



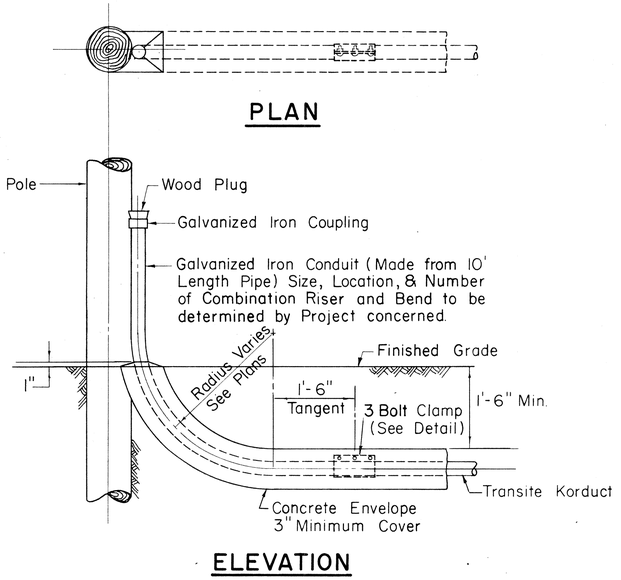
TYPICAL DUCT PLASTIC SPACERS & DRAINAGE SECTION
(6 WAY DUCT SHOWN - 3 HIGH - 2 WIDE)
Not to Scale



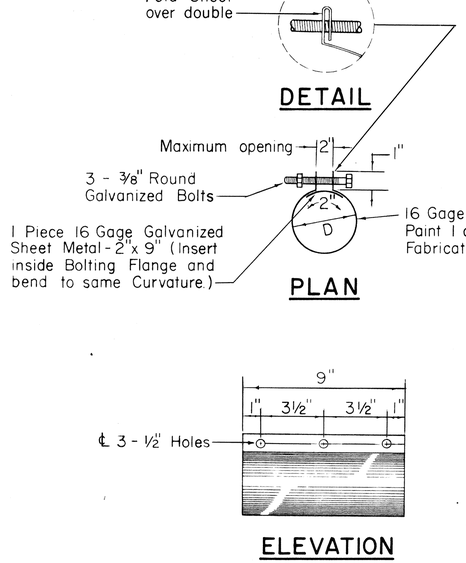
TYPICAL PLASTIC SPACERS
Not to Scale

SIZE	R	E	W	A	L
3"	1 27/32"	7/8"	3 1/4"	5 1/8"	5"
4"	2 13/32"	1 1/8"	3 3/4"	6 1/4"	6 1/8"
4 1/2"	2 23/32"	1 1/4"	4"	6 7/8"	6 3/4"
5"	3 1/16"	1 3/8"	4 1/4"	7 5/8"	7 1/2"

For 1½" Separation



TYPICAL DETAIL COMBINATION RISER AND BEND
Scale: ¾" = 1'-0"



3 BOLT CLAMP DETAIL
Scale: 3" = 1'-0"

APPROVED:

HAWAIIAN ELECTRIC CO., INC. — RN — DATE 5/27/69

HECo., Inc. Drawing Number	
18585	SHEET No. 1 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

CONSTRUCTION STANDARDS
TRANSITE KORDUCTS
UNDERGROUND DUCT LINES

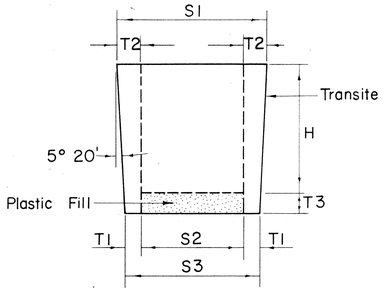
Scales: As Noted — Date Nov. 28, 1969

SHEET NO. 300 OF 364 SHEETS

106

LIETZ 103 ARKWRIGHT TRACING CLOTH 10-60 200P

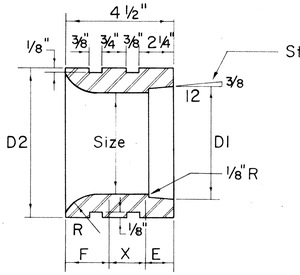
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(77):13	1969	107	154



PLUGS FOR TRANSITE KORDUCTS

Not to Scale

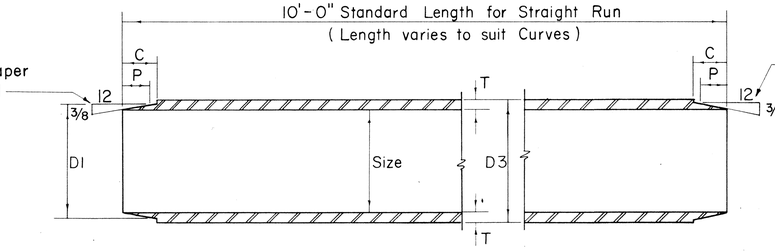
SIZE	H	S1	S2	S3	T1	T2	T3
3"	4"	3 3/8"	2"	2 5/8"	5/16"	11/16"	3/4"
4"	4 1/2"	4 27/64"	2 3/4"	3 37/64"	13/32"	27/32"	3/4"
4 1/2"	4 1/2"	4 59/64"	3"	4 5/64"	35/64"	31/32"	3/4"
5"	4 1/2"	5 27/64"	3 1/2"	4 37/64"	35/64"	31/32"	3/4"



JUNIOR END BELLS

Not to Scale

SIZE	DI	D2	F	X	E	R
3"	3 25/64"	4 1/2"	1 11/32"	1 29/32"	1 1/4"	1 3/4"
4"	4 25/64"	5 3/4"	1 9/16"	1 9/16"	1 3/8"	2"
4 1/2"	4 57/64"	6 1/4"	1 9/16"	1 9/16"	1 3/8"	2"
5"	5 29/64"	7"	1 9/16"	1 7/16"	1 1/2"	2"



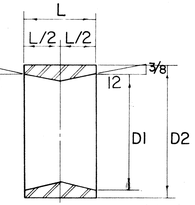
TRANSITE KORDUCTS

Not to Scale

SIZE	DI	D3	C	P	T
3"	3 25/64"	3 35/64"	1 1/8"	7/8"	17/64"
4"	4 25/64"	4 35/64"	1 1/4"	1"	17/64"
4 1/2"	4 57/64"	5 3/64"	1 1/4"	1"	17/64"
5"	5 29/64"	5 39/64"	1 25/64"	1 1/8"	19/64"

Note "X"

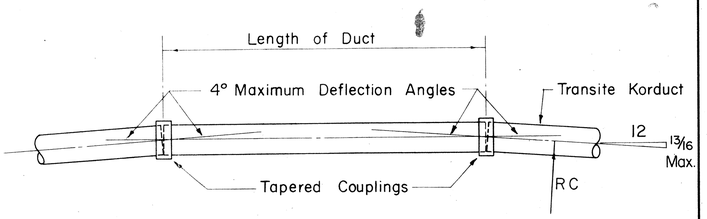
Provide one set of Spacers
(a) 10 Ft. straight run for 4 Ducts high or less.
(b) 5 Ft. straight run for 5 Ducts high or more.



SIZE	DI	D2	L
3"	3 25/32"	4 11/64"	2 1/4"
4"	4 25/64"	5 3/16"	2 1/2"
4 1/2"	4 57/64"	5 49/64"	2 1/2"
5"	5 29/64"	6 21/64"	2 3/4"

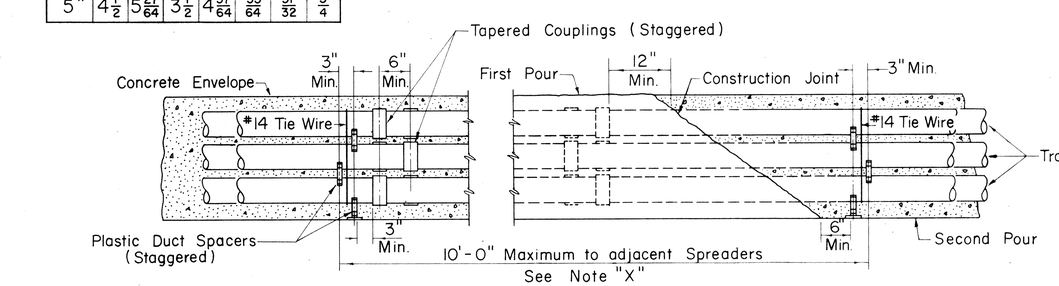
TAPERED COUPLINGS

Not to Scale



METHOD OF FORMING CURVES

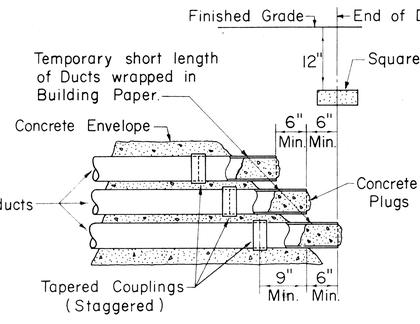
Not to Scale



TYPICAL DUCT ENVELOPE ELEVATION

(6 WAY DUCT LINE SHOWN)

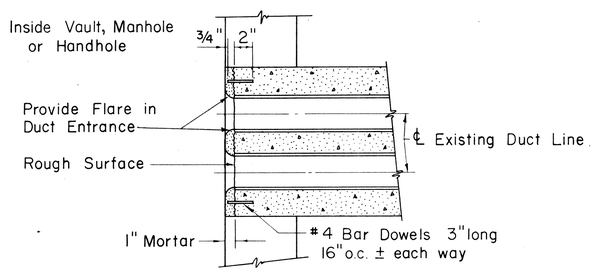
Not to Scale



TYPICAL STUB OUT DETAIL

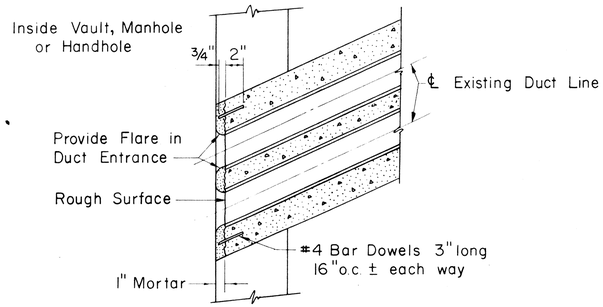
Not to Scale

MINIMUM RADIUS TO FORM CURVES										
LENGTH OF DUCT	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"
MIN. RAD. RC	14'-4"	21'-6"	28'-8"	35'-10"	42'-11"	50'-1"	57'-3"	64'-5"	71'-7"	78'-9"
LENGTH OF DUCT	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"	
MIN. RAD. RC	85'-11"	93'-1"	100'-3"	107'-5"	114'-7"	121'-8"	128'-10"	136'-0"	143'-2"	



DUCT LINE ENTRANCE AT EXISTING DUCT LINE

Scale: 1 1/2" = 1'-0"



DUCT LINE DIAGONAL ENTRANCE

Scale: 1 1/2" = 1'-0".

APPROVED:

HAWAIIAN ELECTRIC CO., INC. — JK 6/27/69 — ENGINEER — DATE

HECo., Inc. Drawing Number	
18585	SHEET No. 2 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

CONSTRUCTION STANDARDS
TRANSITE KORDUCTS
UNDERGROUND DUCT LINES

Scales: As Noted — Date Nov. 28, 1967

SHEET NO. 31 OF 364 SHEETS

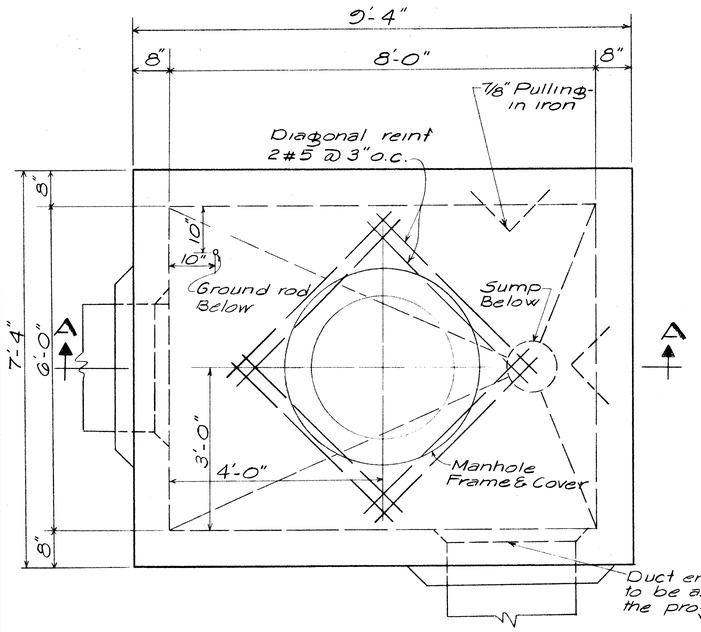
107

LIETZ 103 ARKWRIGHT TRACING CLOTH 10-60 200P

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	[HI-1(77)-13	1969	108	1554

APPROVED

Hawaiian Electric Co., Inc. RH Date

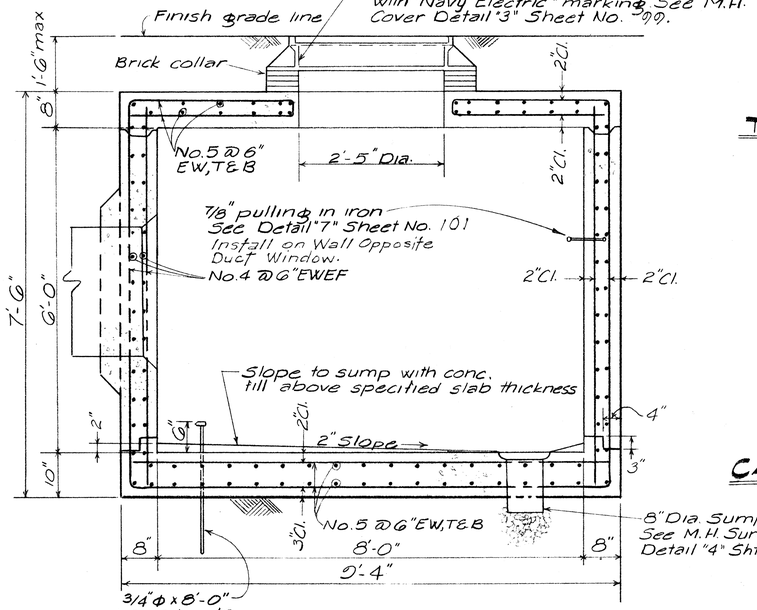


GENERAL NOTES

1. Design Data
   fs = 20,000 psi
   fc = 3,000 psi, fc = 1200 psi
   n = 10
   W = Equiv. fluid press = 30 #/ft²
2. All construction joints shall be waterproofed with two applications of Thoro-Seal or equal.
3. For Duct window location see Plan & Profile Sheet. Duct window details similar HTCo. Duct windows. See Sheet 101.
4. Duct window to suit. See Plan, Profile & Standard Detail Sheets for Location & Details.
5. All materials for manhole misc. items shall be hotdip galvanized after fabrication.

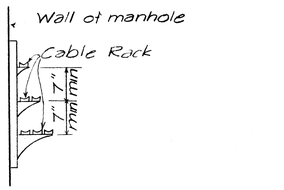
M.H. PLAN

Scale: 3/4" = 1'-0"



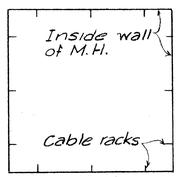
M.H. SECTION A-A

Scale: 3/4" = 1'-0"



TYPICAL CABLE RACK

No Scale



Arrangement of cable racks for full capacity of manhole

CABLE RACK PLAN

No Scale

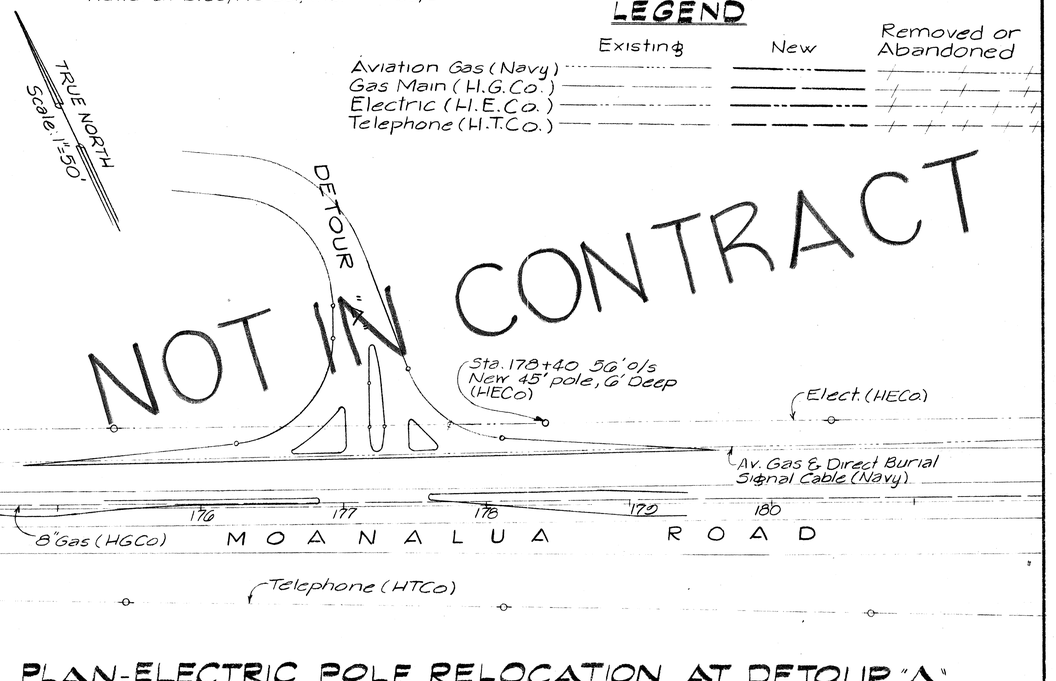
STANDARD MANHOLE DETAILS ELECTRIC (NAVY)

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

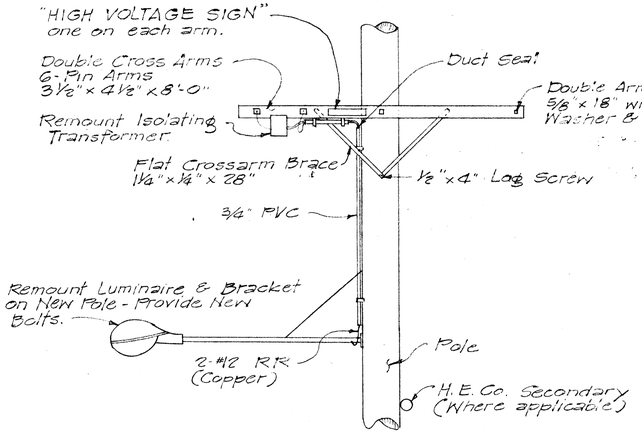
PRINTED ON NO. 1000H CLEARPRINT

LEGEND

	Existing	New	Removed or Abandoned
Aviation Gas (Navy)			
Gas Main (H.G.Co.)			
Electric (H.E.Co.)			
Telephone (H.T.Co.)			

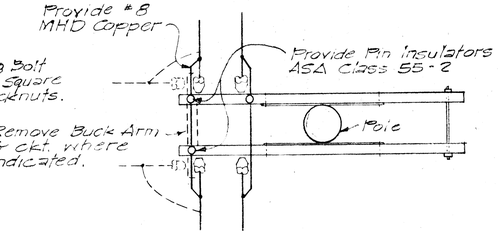


PLAN-ELECTRIC POLE RELOCATION AT DETOUR "A" AND MOANALUA ROAD (H.E. Co.)



RELOCATING STREETLIGHT

Scale: ½" = 1'-0"



CLOSING SERIES CKT. LOOP

Scale: ½" = 1'-0"

J. ANDREW SCHUCHARDT REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

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J. Andrew Schuchardt

APPROVED: Kenneth K. Hong Jr. 6-29-69

Asst Traffic Engineer, City & County of Honolulu — Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

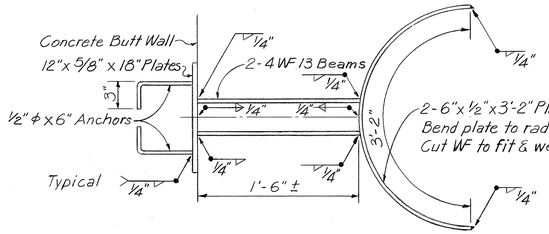
NAVY ELECT. M.H., H.E.Co. POLE RELOCATION AT DETOUR "A" & MOANALUA RD. & ST. LIGHT DETAILS

SCALE: AS SHOWN DATE: Nov. 28, 1969

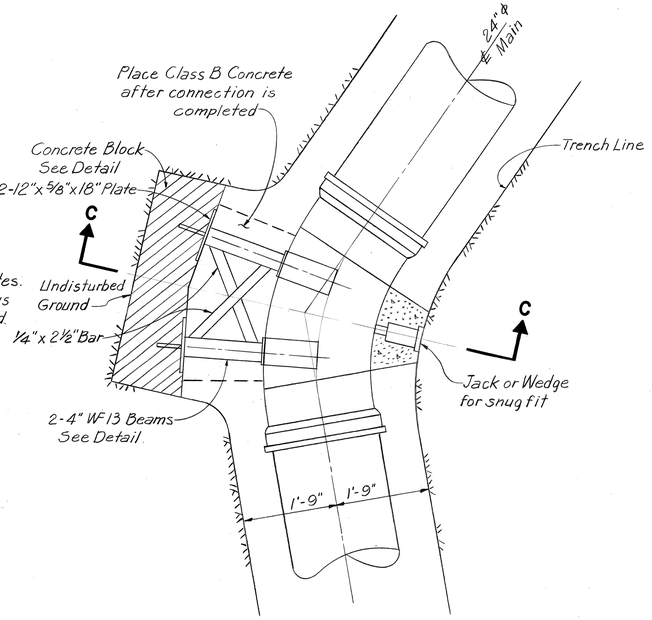
SHEET No. 320 OF 360 SHEETS

108

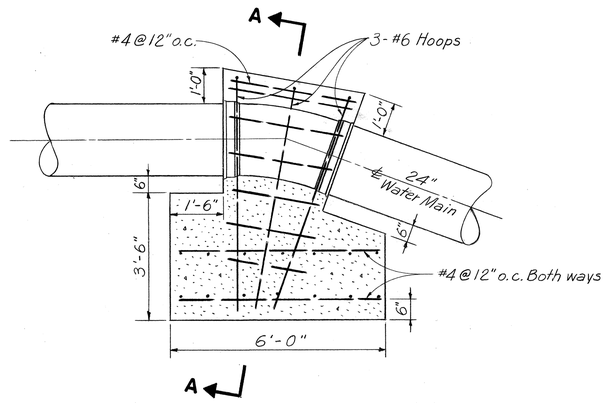
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(77):13	1969	109	1554



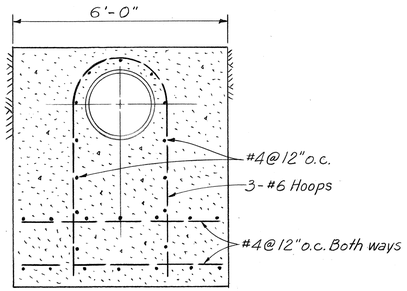
BEAM DETAIL
Scale: 1½"=1'-0"



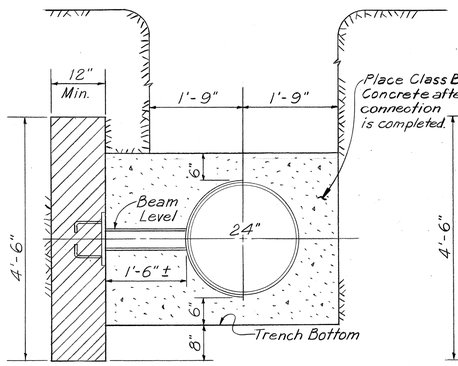
PLAN



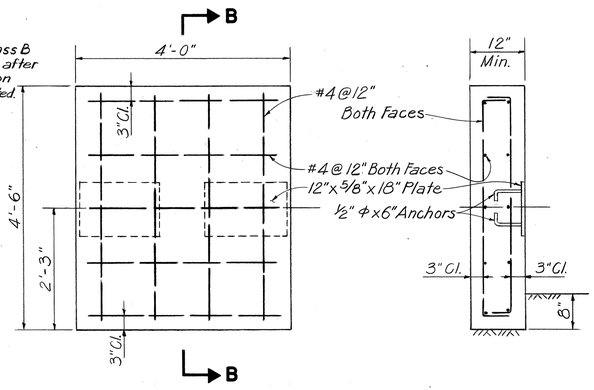
ELEVATION
Scale: ½"=1'-0"



SECTION A-A
Scale: ½"=1'-0"



SECTION C-C



ELEVATION

SECTION B-B

DETAIL OF CONCRETE BLOCK

GENERAL NOTES

1. Design Pressure in 24" ϕ Main @ 150 psi.
2. Minimum Cover over Reinforcement shall be 3".
3. Concrete shall be Class B.
4. Special Concrete Block to be installed only where directed by the Engineer.
5. Payment for Structural Steel, Jack or Wedge shall be incidental to Class B Concrete.

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

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J. A. Schuckhardt

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

WATER DETAILS (NAVY)

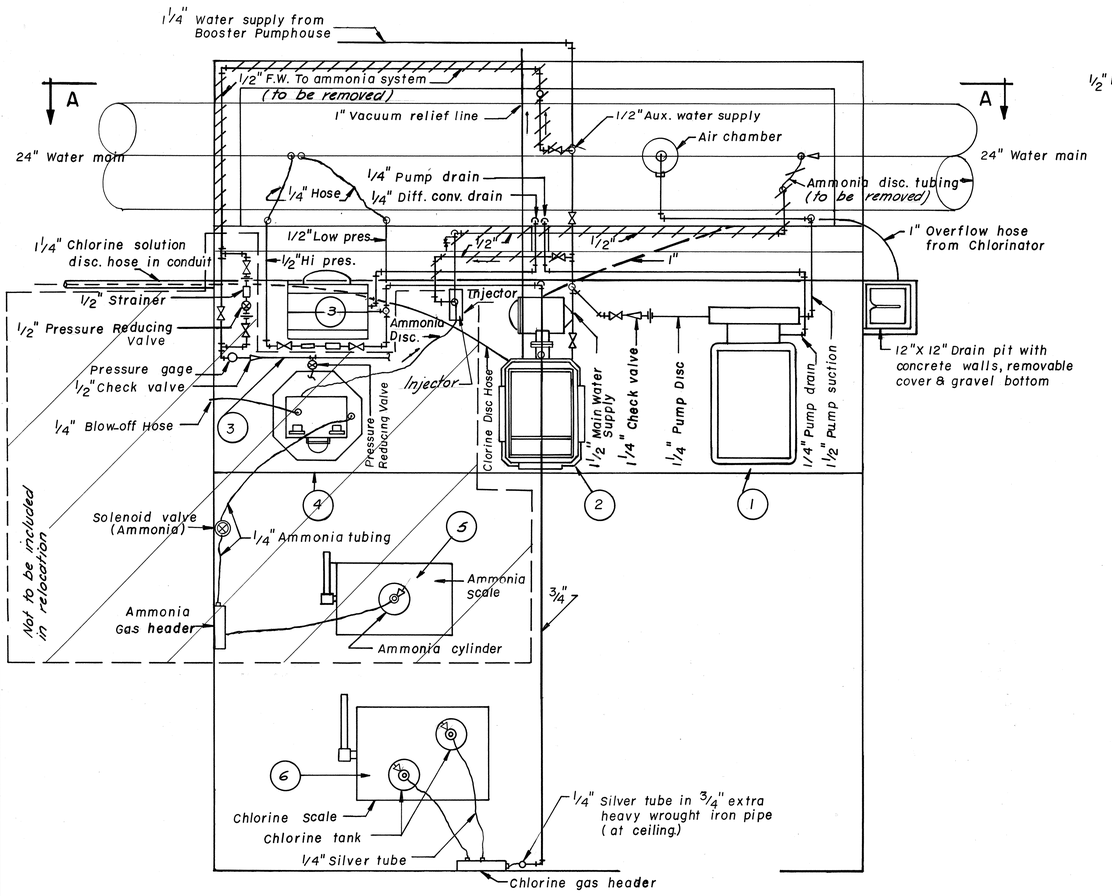
HALAWA INTERCHANGE
PROJECT NO. I-HI-1(77):13

SCALE: 3/4"=1'-0" Unless Noted DATE: NOV. 28, 1969

SHEET No. 331 OF 361 SHEETS

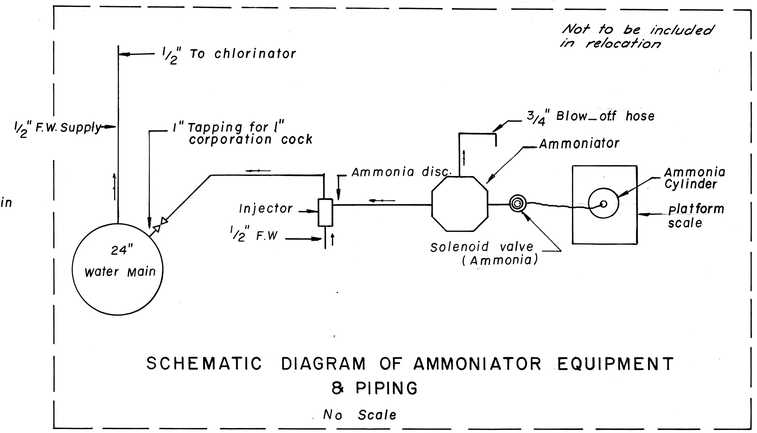
109

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(77):13	1969	110	1554



PLAN VIEW
AMMONIATOR & CHLORINATOR HOUSING
Scale: 3/4"= 1'-0"

(Ammoniator not to be included in relocation)



SCHEMATIC DIAGRAM OF AMMONIATOR EQUIPMENT & PIPING
No Scale

EQUIPMENT NOTES:

1. Chlorine stand-by pump-Allis-Chalmers 2 stage electrifugal pump 15 hp motor
2. Wallace & Tiernan visible vacuum automatic chlorinator, type Masv-M cap, from 4,000,000 to 16,000,000 gals. per day.
3. Wallace & Tiernan differential converter.
4. Wallace & Tiernan direct feed, type Mdpa-M manual control ammoniator — *Not to be included in relocation*
5. Ammonia scale, type "A" (min. size) portable platform scale 500# Navy specs. 18S13C & 18S13D — *Not to be included in relocation*
6. Chlorine scale: Fairbanks Platform Scale

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

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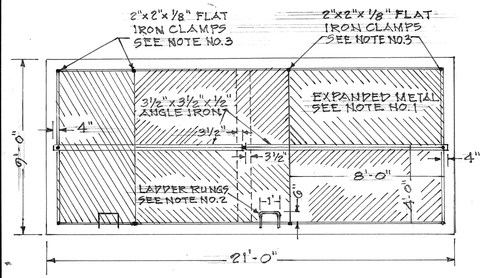
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RELOCATION OF CHLORINATOR FACILITY (U.S. NAVY)
HALAWA INTERCHANGE
PROJECT NO. I-HI-1(77):13
SCALE: AS SHOWN DATE: NOV. 28, 1969

SHEET No. 341 OF 361 SHEETS

110

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(77):13	1969	///	154



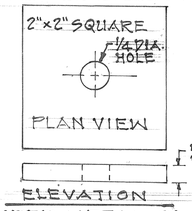
EXPANDED METAL AND SUPPORTING ANGLE IRON

PLAN

SCALE: 3/8" = 1'-0"

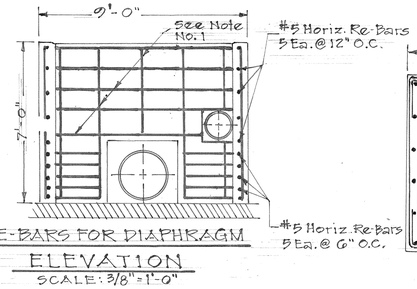
NOTES:

1. Require 5 Pieces of 4'x8' Expanded Metal Sheets with 3/4" Eyes of No.9 Gage.
2. Require 5 Pieces of Ladder Rungs. Ladder Rungs should be spaced 16" o.c. with First Rung 1 Foot above the Valve Box Bottom.
3. Total of Eleven 2"x2"x1/8" Flat Iron Clamps are required for securing the Expanded Metal as shown. Also Eleven 1/4" NC Nuts and Flat Washers are needed.



EXPANDED METAL CLAMP

SCALE: NONE



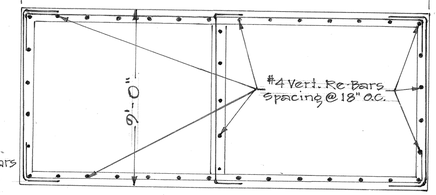
RE-BARS FOR DIAPHRAGM

ELEVATION

SCALE: 3/8" = 1'-0"

NOTE

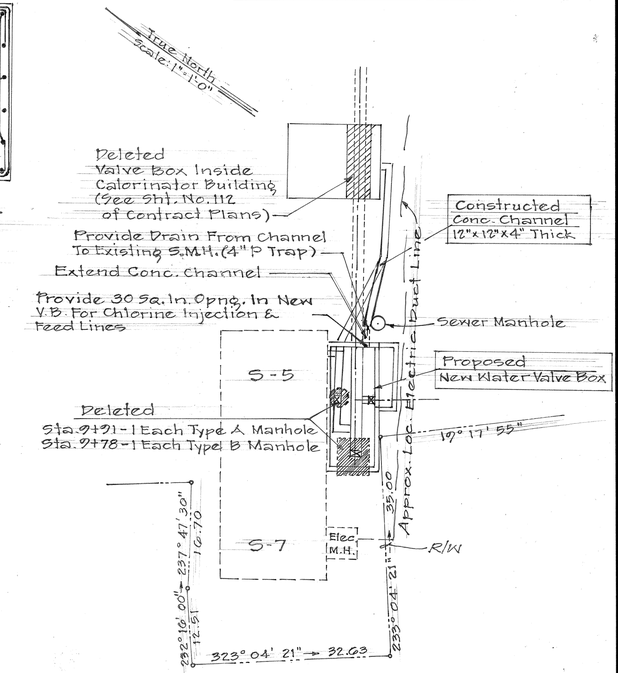
1. Spacing of the Horiz. and Vert. Re-Bars Should Follow Closely To Those Shown For The Side Walls.



RE-BARS ARRANGEMENT FOR NEW WATER VALVE BOX

PLAN

SCALE: 3/8" = 1'-0"

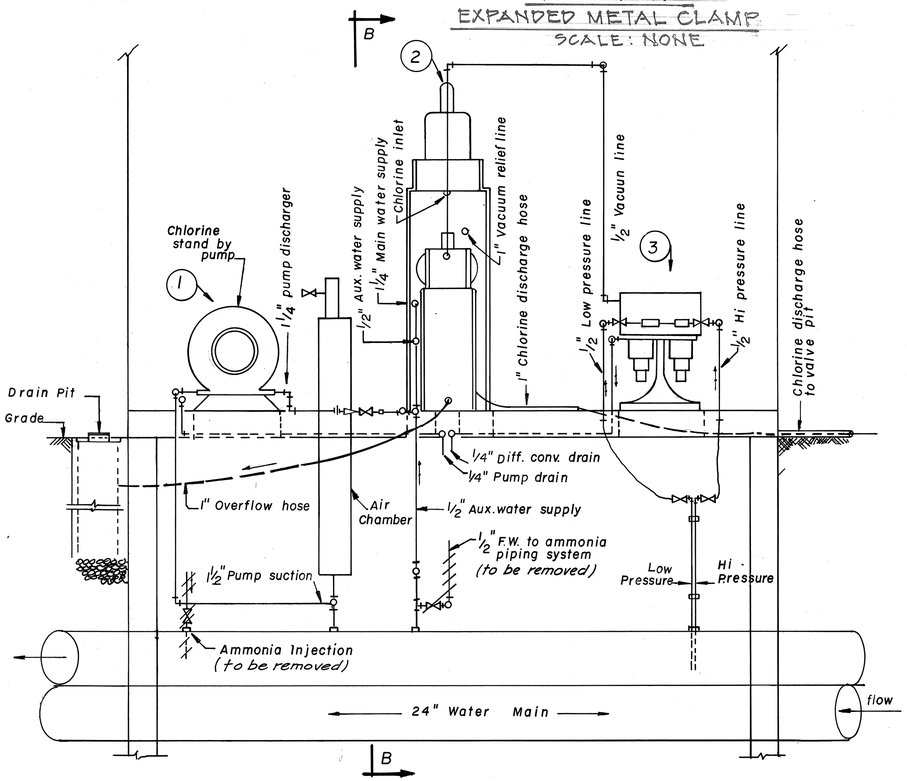


LOCATION OF 24" & 12" WATER LINE AT NAVY CHLORINE STATION

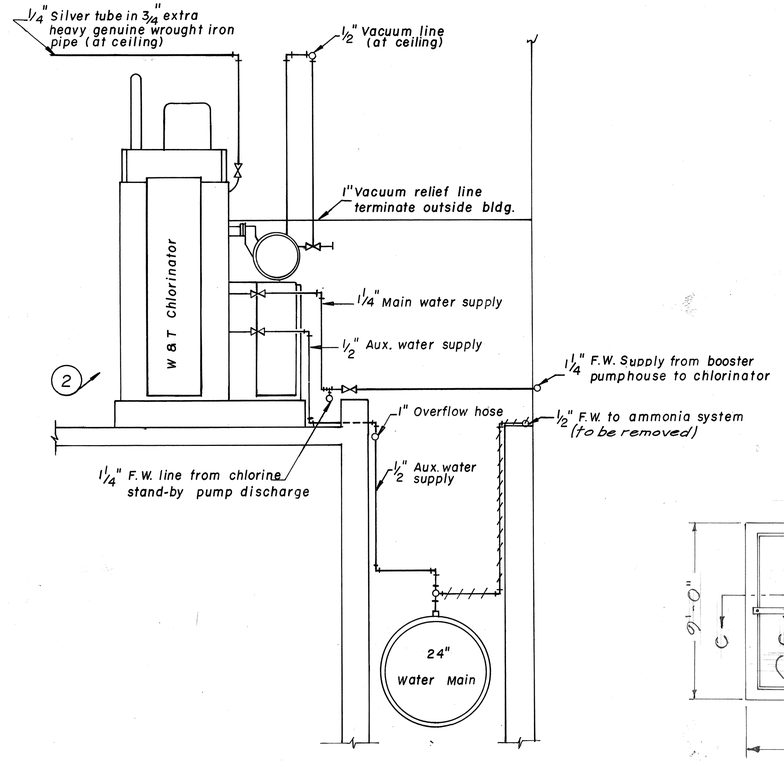
GENERAL PLAN

SCALE: 1" = 10'

(C.C.O. NO. 21)



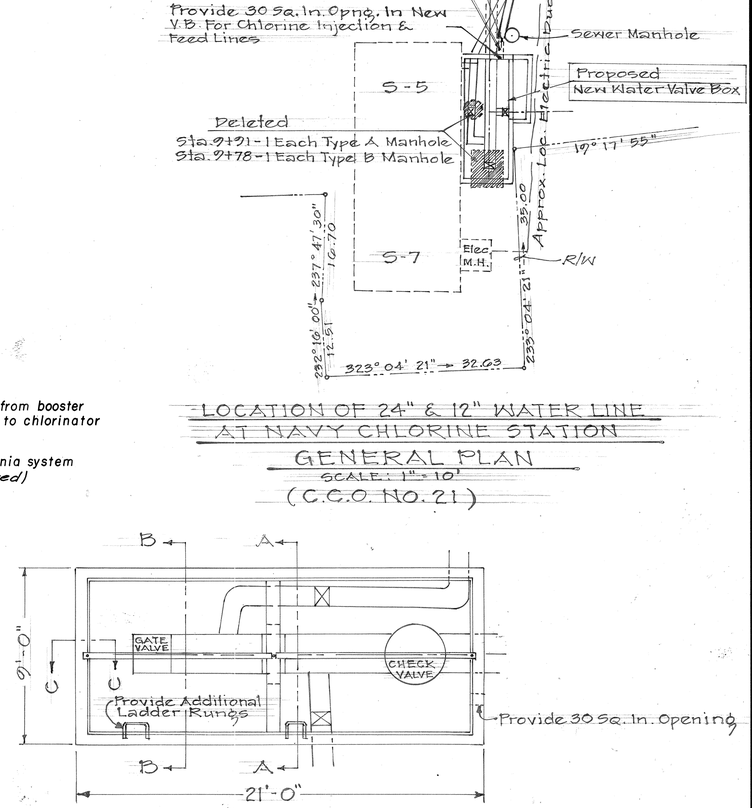
SECTION A-A



SECTION B-B

CHLORINATOR EQUIPMENT & PIPING

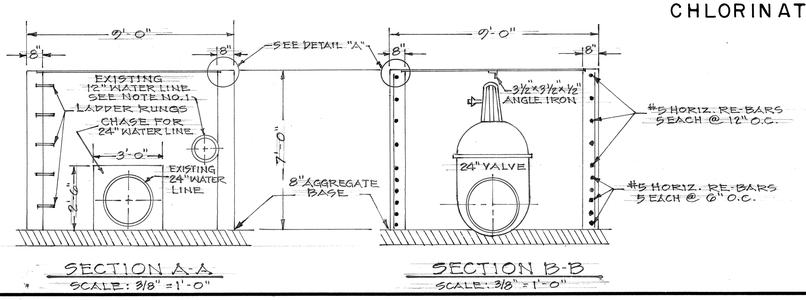
Scale: 3/4" = 1'-0"



NEW WATER VALVE BOX

PLAN

SCALE: 3/8" = 1'-0"

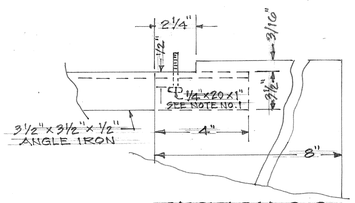


SECTION A-A

SCALE: 3/8" = 1'-0"

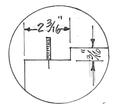
SECTION B-B

SCALE: 3/8" = 1'-0"



SECTION C-C

SCALE: NONE



DETAIL "A"

SCALE: NONE

C.C.O. #21

NOTE:

1. Location of the ¼"x20x1½" machine screws use for clamping the expanded metal sheets are shown in sheet No. of . Detail drawing of the clamps are shown in sheet No. 4 of 5. Equivalent standard clamps for expanded metal may be used as substitute.

ANDREW SCHUCHART REGISTERED PROFESSIONAL ENGINEER No. 2229 HAWAII, U.S.A.

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RELOCATION OF CHLORINATOR FACILITY (U.S. NAVY) HALAWA INTERCHANGE

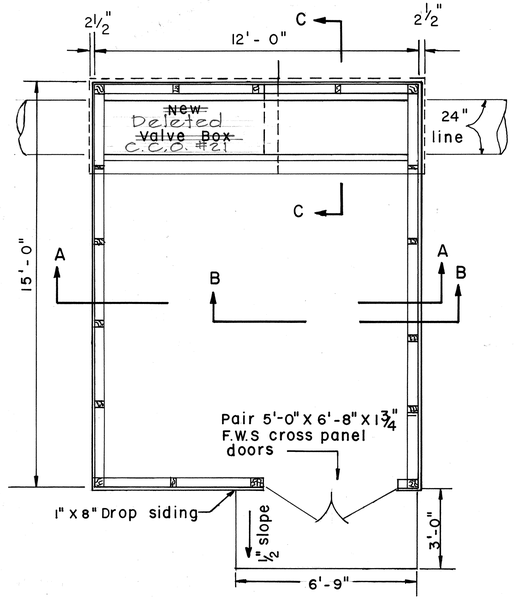
PROJECT NO. I-HI-1(77):13

SCALE: AS SHOWN DATE: NOV. 28, 1969

SHEET No. 351 OF 361 SHEETS

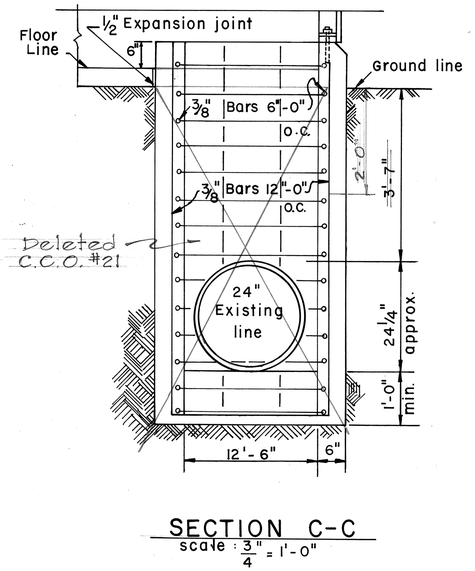
111

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(77):13	1969	112	1584



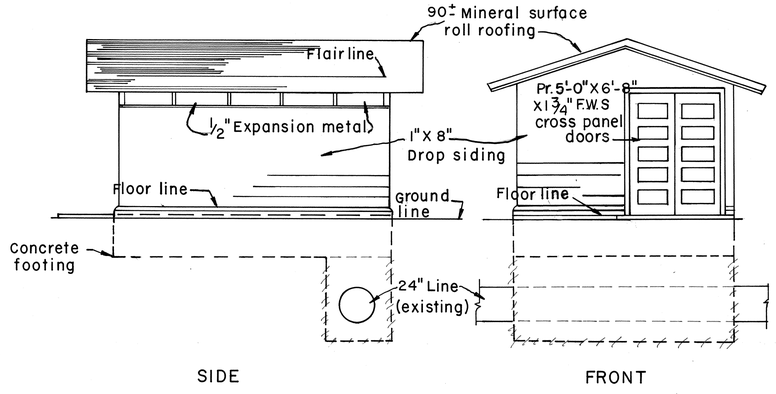
FLOOR PLAN

scale $\frac{3}{8}$" = 1'-0"



SECTION C-C

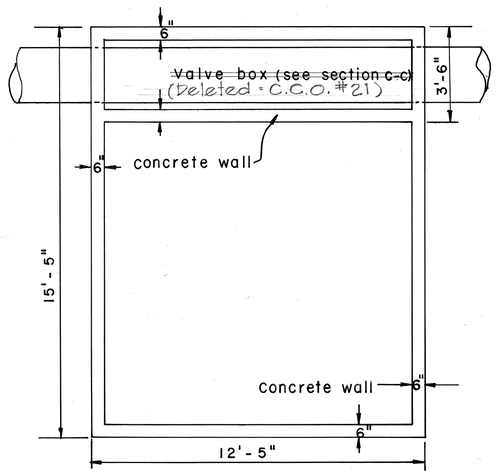
scale: $\frac{3}{4}$" = 1'-0"



SIDE FRONT

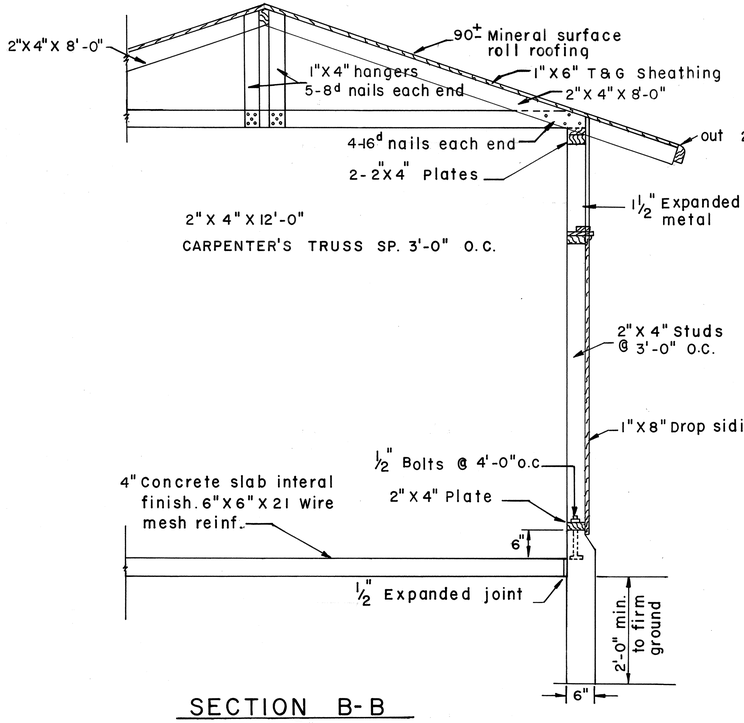
ELEVATIONS

scale: $\frac{1}{4}$" = 1'-0"



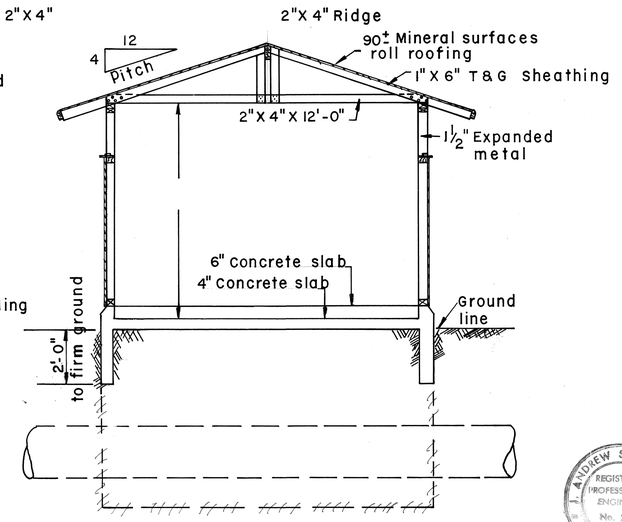
FOUNDATION PLAN

scale: $\frac{3}{8}$" = 1'-0"



SECTION B-B

scale: $\frac{3}{4}$" = 1'-0"



SECTION A-A

scale: $\frac{3}{8}$" = 1'-0"

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RELOCATION OF CHLORINATOR FACILITY (U. S. NAVY)
HALAWA INTERCHANGE
PROJECT NO. I-HI-1(77):13
SCALE: AS SHOWN DATE: NOV. 28, 1969

SHEET No. 361 OF 364 SHEETS

112