HAWAIIAN TELEPHONE COMPANY GENERAL NOTES

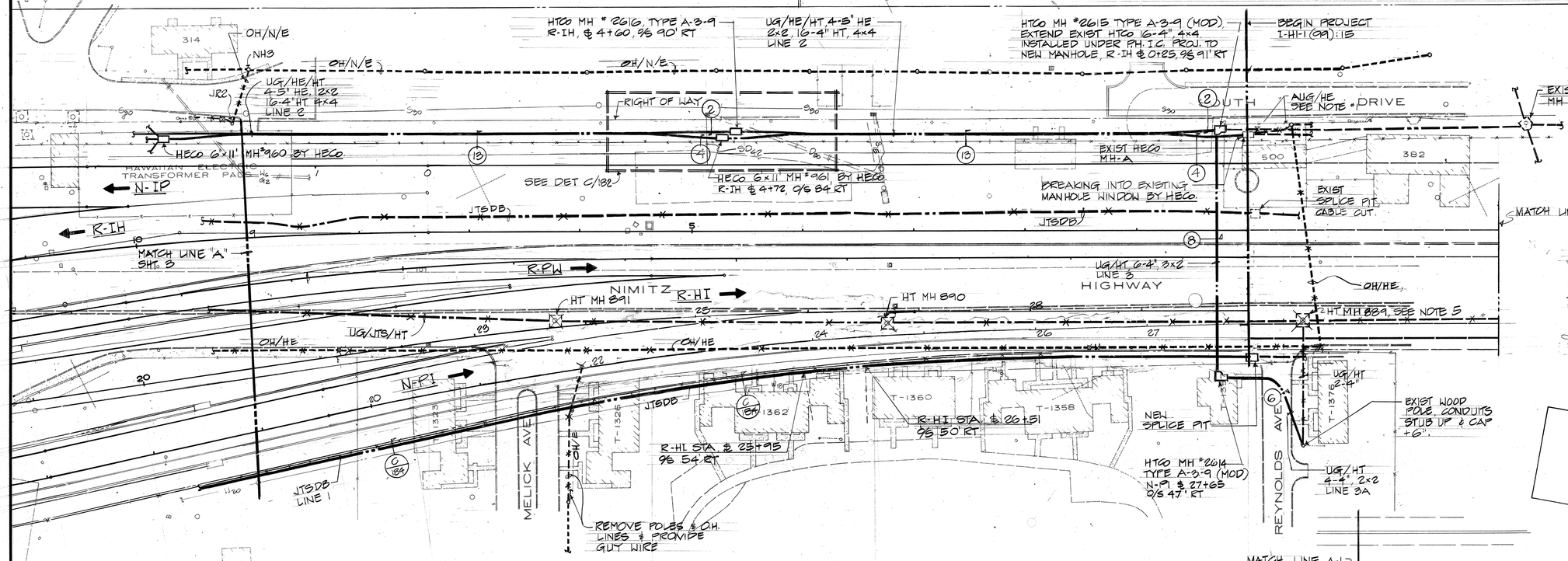
A. HTCO POLES & CABLES:
1. HTCO TO REMOVE ALL EXISTING TELEPHONE COMPANY POLES & CABLES EXCEPT AS NOTED ON PLANS. ALL AIR FORCE & NAVY OWNED POLES ARE TO BE REMOVED BY CONTRACTOR.
2. HTCO TO FURNISH & INSTALL ALL NEW HTCO POLES.
3. ALL NEW HTCO POLES & ANCHOR LOCATIONS TO BE STAKED OUT BY THE CONTRACTOR.
4. EXCAVATION OF HTCO POLES & ANCHOR & INSTALLATION OF ANCHORS BY HTCO.
5. HTCO TO FURNISH THE CONTRACTOR FOR PROPER INSTALLATION THE FOLLOWING MATERIALS;
   a. ALL MANHOLE FRAME & COVERS.
   b. ALL PULL BOXES & COVERS.
   c. ALL PULLING IRONS, CABLE RACKS, BOLTS, NUTS, WASHERS & GROUND RODS FOR INSTALLATION IN MANHOLES & HANDHOLES.
   d. ALL STYRENE DUCTS, FITTINGS & SPREADERS.
   e. ALL STEEL CONDUITS, BENDS & FITTINGS.
6. STAKE OUT OF HTCO MANHOLES, HANDHOLES, PULL BOXES & DUCTS BY THE CONTRACTOR VERIFIED BY HTCO.
7. ALL HTCO MANHOLES, HANDHOLES, PULL BOXES, STYRENE DUCTS, CONDUITS & CONDUIT BENDS TO BE INSTALLED BY THE CONTRACTOR. ALL WORKS TO BE DONE IN ACCORDANCE WITH HTCO STANDARD DRAWINGS.
8. LOCATION & DEPTH OF ALL HTCO MANHOLES, HANDHOLES, SERVICE & PULL BOXES, POLES, ANCHORS, DUCT & CONDUITS TO BE VERIFIED & APPROVED IN THE FIELD BY HTCO PRIOR TO CONSTRUCTION OR INSTALLATION.
9. MANHOLE DEPTH SHOWN ON PLANS REFER TO INSIDE DEPTH OF MANHOLES.

HAWAIIAN ELECTRIC COMPANY GENERAL NOTES

1. AT NO TIME SHALL THE MINIMUM COVER BETWEEN THE TOP OF THE DUCT LINE ENCASEMENT & TEMPORARY OR UNFINISHED GRADES BE LESS THAN 1 FT.
2. HECO WILL REMOVE ALL EXISTING HECO POLES & CABLES UNLESS OTHERWISE NOTED ON PLANS.
3. HECO WILL FURNISHED & INSTALL NEW POLES & ANCHORS AS NOTED ON PLANS.
4. ALL NEW HECO POLE & ANCHOR LOCATIONS TO BE STAKED OUT BY THE CONTRACTOR & VERIFIED BY HECO.
5. EXCAVATION OF HECO WOOD POLE HOLES & ANCHORS, INSTALLATION OF WOOD POLES & ANCHORS & BACKFILL OF POLE HOLES & ANCHORS TO BE DONE BY HECO AND/OR ITS CONTRACTOR.
6. STAKE OUT OF HECO'S MANHOLES, HANDHOLES, PULL & SERVICE BOXES, TRANSFORMER & SWITCH CABINET PADS & DUCT LINES ARE TO BE DONE BY CONTRACTOR & VERIFIED BY HECO BEFORE EXCAVATION OR CONSTRUCTION.
7. FURNISHING OF ALL NECESSARY MATERIALS & EQUIPMENT AS WELL AS INSTALLATION OF HECO'S DUCT LINES TO BE DONE BY CONTRACTOR IN CONFORMANCE WITH THIS DRAWINGS.
8. THE CONTRACTOR SHALL MANDREL TEST ALL DUCT LINES INSTALLED BY HIM IN THE PRESENCE OF HECO INSPECTOR.
9. CONTRACTOR SHALL MAINTAIN MINIMUM 3'-0" COVER FROM FINISHED GRADE TO TOP OF CONCRETE JACKET OF DUCT LINE ENCASEMENT UNLESS INDICATED OTHERWISE.
10. BREAKING INTO EXISTING HECO ENERGIZED UNDERGROUND FACILITIES SHALL BE DONE BY HECO. HOWEVER, THE CONTRACTOR IS TO EXPOSE THE UNDERGROUND FACILITY SUFFICIENTLY TO ENABLE HECO TO MAKE THE BREAK.
11. HECO SHALL COORDINATE ITS WORK WITH THE STATE CONTRACTOR & VICE VERSA IN SUCH A MANNER AS NOT TO IMPEDE CONSTRUCTION.
12. HECO SHALL REPAIR ALL TEMPORARY OPENINGS IN MANHOLES AND/OR HANDHOLES AFTER COMPLETION OF TEMPORARY CONSTRUCTION & CUT & PLUG CONDUIT BENDS & DUCTS AS INDICATED ON PLANS 2 FT. BELOW FIN. GR. AND/OR AS DIRECTED BY ENGINEER.
13. MANHOLE DEPTHS SHOWN ON PLANS REFER TO THE INSIDE DEPTH OF MANHOLES.
14. ALL HECO MANHOLE FRAMES & COVER SHALL SUPPLIED & INSTALLED BY HECO.
15. SECTION 630 OF SPECIAL PROVISIONS AS IT APPLIES.
16. HECO TO SUPPLY & INSTALL ALL DUCTS & RELATED DUCT LINE MATERIALS TO COMPLETE THE DUCTLINE INSTALLED BY HECO. MANDREL TESTING OF DUCTLINE INSTALLED BY HECO SHALL BE DONE BY HECO.

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(99):15	1977	177	350

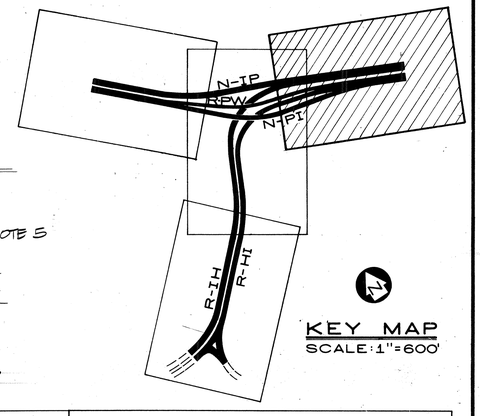
TRUE NORTH
SCALE: 1" = 50'



APPROVED:

J. Kamimoto — HAWAIIAN ELECTRIC CO. INC. — 7/26/76 DATE

J. Dean for Key — HAWAIIAN TELEPHONE CO. — 7/21/76 DATE



KEY MAP
SCALE: 1" = 600'

ABBREVIATION

UG	UNDERGROUND
OH	OVERHEAD
T	TELEPHONE
HE	HAWAIIAN ELECTRIC CO. FACILITY
E	ELECTRIC
e	SECOUNDARY CABLES
AFDB	AIR FORCE DIRECT BURIED CABLES
AF	AIR FORCE
JTS	JOINT TRUNKING SYSTEM
N	NAVY FACILITY
AUG	ABANDONED UNDERGROUND DUCT LINE
TS	TRAFFIC SIGNAL CONDUIT
HT	HAWAIIAN TELEPHONE CO. FACILITY
MH	MANHOLE
HH	HANDHOLE
PP	WOOD POLE
SL	STREET LIGHT

JTSDB JOINT TRUNKING SYSTEM DIRECT BURIED CABLES

LEGEND

- EXISTING O.H.
- EXISTING DUCTLINE TO BE ABANDONED OR REMOVED IF IN THE WAY OF CONSTRUCTION.
- NEW DUCTLINE
- MANHOLE OR HANDHOLE AS INDICATED.
- NEW PAD MOUNTED TRANSFORMER / EXISTING O.H. TRANSFORMER
- EXISTING MANHOLE OR HANDHOLE TO BE DEMOLISHED.
- EXISTING O.H. LINE & POLE TO BE REMOVED BY HECO.
- EXISTING POLE MTD TRANSFORMER TO BE REMOVED BY HECO.
- NEW HECO POLE & POLE NUMBER (HE 28)
- EXISTING POLE TO BE REMOVED
- EXISTING STREET LIGHT TO BE REMOVED
- TELEPHONE PULLBOX 434T
- EXISTING DUCTLINE
- HECO POLE MOUNTED TRANSFORMER
- ABANDONED UTILITY LINES

NOTES:

1. CUT & PLUG EXIST CONDUIT RISER 6" BELOW FINISH GRADE. PLUG CONDUIT INSIDE EXIST HECO MH-A.
2. STATION LINE & OFF-SET LINE SHALL BE TAKEN FROM THE CENTER OF MANHOLE COVERING TO THE ROADWAY BASELINE.
3. FOR MANHOLE WALL ELEVATIONS SEE SHT: 188, 189, 190, 191
4. FOR JTS & USAF MANHOLES, SEE HTCO MANHOLE DWG'S ON SHTS 192 TO 203.
5. EXIST HTCO MANHOLE CONC. CEIL SLAB SHALL BE DEMOLISHED & FILLED W/ BACKFILL MATERIALS IN ACCORDANCE W/ HIGHWAY REQUIREMENTS. TAMP COMPLETELY & RESTORE TO MATCH EXISTING GRADE.
6. HECO SHALL PROVIDE DUCT WINDOW OPENINGS ON ALL MANHOLES & HANDHOLES CONSTRUCTED BY HECO.

TAKETO KAWABATA — REGISTERED PROFESSIONAL ENGINEER — No. 750 — HAWAII

Taketo Kawabata
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NIMITZ SPUR
UTILITY PLAN - ELECTRICAL & TELEPHONE

INTERSTATE ROUTE H-1
PROJECT No. I-HI-1(99):15

SCALE: 1" = 50' DATE AUG 4 1976

SHEET No. 1 OF 43 SHEETS

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

PRINTED ON NO. 1000H CLEARPRINT

177

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-I(99)::15	1077	178	350

TRUE NORTH
SCALE: 1"=50'

EXIST HE.CO. POLE SCHEDULE (TEMPORARY 46KV)	
POLE	REMARKS
HE 26	TO REMAIN, ADJUST GUY WIRES TO CLEAR DUCTLINES
HE 27	TO BE REMOVED BY HECO
HE 28	TO BE REMOVED BY HECO
HE 28X	TO BE REMOVED BY HECO
HE 29	TO BE REMOVED BY HECO
HE 29X	TO BE REMOVED BY HECO
HE 30	TO BE REMOVED BY HECO
HE 31	TO REMAIN

SEE NOTE 4.

APPROVED:

J.K. Arimoto — HAWAIIAN ELECTRIC CO. INC. ITO M.9. — 7/26/76 DATE

L. Dei for K.Y. — HAWAIIAN TELEPHONE CO. — 8/2/76 DATE

VERIFY LOCATION
AF P811
AF P813
AF P814
OH
AF MH D-1
100
REMOVE EXIST. 3#2 600V CABLE FROM SEC. LINES ON POLE P813, RISER POLE P811 & AF MH D-1 TO BLDG 1308 FOR POWER TO HICKAM GATEHOUSE & ST. LTS.
REMOVE LUMINAIRE BRACKET & POLE, TYPICAL FOR NINE ST. LTS. SEE TEMP. LTG. PLAN.
UG/AF/E
SEE NOTE #1
OH/E
AF MH D-2
AFMH 11
AFMH 12
AFMH 13
AFMH 14
AF MH 222
AFHH
UG/AF
OH/HT
UG/AF/E
SEE NOTE #3
RIGHT OF WAY
AVE 10
KUNTZ
HE P78/5
HE P78/4
HE P78/3
OH/HE
P5
FIRST HAWAIIAN BANK
T-1413
1305
1304
MOKULELE ELEMENTARY SCHOOL
JTS MH771
JTS MH770
JTS/HT
UG/HT
NIMITZ
SOUTH
"A" AVE.
NMH 104 TO REMAIN
OH/HE, SEE SHT 180 FOR CONTINUATION
OH/N/E
OH/HE, 46 KV (TEMPORARY)
HE-28X
UG/N/T/E
NMH 105
HE28
RIGHT OF WAY
DRIVE
NMH 106
OH/HE, 46KV (TEMPORARY)
UG/N/T/E
HE-27
OH/N/E
NMH 107 & 107A TO REMAIN
NMH 110
UG/N/E
OH/HE
HUT 81C
PLANTATION DRIVE
AF MH 158
JTSDB
AFMH-B (225)
AFMH-A (224)
NEW JTS MH- TYPE V-1 TO INTERCEPT EXIST. DUCTS
OH/HE 46KV
HE-26
OH/HE SEE NOTE 3
UG/E
OH/HE HE 25
HAWAIIAN ELECTRIC TRANSFORMER PADS
HIGHWAY
UG/JTS/HT
JTSDB
OH/HE
JR-2
NH3
HT MH 892
SEE NOTE*
EXIST SERVICE TO PORTABLE CLASSROOM
EXIST. 3Ø 4W, 120/208 V SERVICE METER POLE TO BE RELOCATED SEE SHT 179.
T-1302
103
152
151
64
313
314

KEY MAP
SCALE: 1"=600'
N-IP
NPW
N-P1
R-IH

NOTES:

1. CABLES IN THESE DUCTS WERE REMOVED BY ANOTHER PROJECT. ABANDONED DUCTS IN THE WAY OF NEW CONSTRUCTION ARE TO BE REMOVED. ABANDONED MANHOLE SHALL BE DEMOLISHED.
2. SEE SHT 182 FOR PARTIAL PLAN OF UTILITY CORRIDOR. SCALE: 1"=10'
3. CONTACT H.T.Co. BEFORE REMOVING STUB POLE.
4. EXISTING HECo 46 KV TEMPORARY POLES ON THE WAY OF CONSTRUCTION SHALL BE REMOVED BEFORE COMMENCING EXCAVATION FOR UTILITY DUCTLINES.
5. REMOVE DUCTLINES & CABLES CONNECTING AFMH'S "I1" & "I2" & CONNECTING AFMH'S "E1" & "I1" IN THE WAY OF NEW CONSTRUCTION & PROVIDE NEW DUCTS & CABLES PER SHT. 179. ⚠1

NO.	REVISION	APPROVED BY	DATE
⚠1	REMOVAL OF DUCTLINE BETWEEN AFMH'S "I1" & "I2"		6/15/78

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

NIMITZ SPUR
UTILITY PLAN - ELECTRICAL & TELEPHONE
EXISTING DUCT ALIGNMENT

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(99)::15

SCALE: 1"=50' DATE AUG 4 1976

TOSHIO KAWABATA — REGISTERED PROFESSIONAL ENGINEER No. 750 — HAWAII, U.S.A.

Toshio Kawabata
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

SHEET No. 2 OF 43 SHEETS

C.O. (178)

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(99):15	1977	179	350

TRUE NORTH
SCALE: 1"=50'

NOTES:

1. SEE SHT 182+183 FOR PARTIAL PLAN OF UTILITY CORRIDOR, SCALE 1"=10'.
2. SEE SHT 183 FOR NAVY ELECTRIC & TELEPHONE SCHEMATIC DIAGRAM.
3. SEE DET B/183 FOR DETAILED PLAN OF HECO HANDHOLE "A" TYPE 5'x7', TRANSF. PAD & SVC. EQUIP. CABINET.
4. NEW 5'x7' NAVY HANDHOLE SIMILAR TO HECO HANDHOLE TYPE 5'7. SEE SHT 207 FOR DETAILS. PROVIDE REINF. BARS FOR CONCRETE JACKETED DUCTLINES 10 FEET FROM HANDHOLE WALL. SEE A/219 FOR DETAIL OF CONDUIT ENTRANCE.
5. CONTRACTOR TO BREAK DUCTLINE & EXPOSE CABLE.
3. 6. POWER OUTAGES DUE TO REROUTING OF HAFB 15KV CABLES SHALL BE SCHEDULED W/ BASE ENGINEERING AT LEAST 10 DAYS IN ADVANCE.

APPROVED:

J. Kamoto — 7/26/76
HAWAIIAN ELECTRIC CO. INC. "AS BUILT" — DATE

J. Dei for KY. — 8/2/76
HAWAIIAN TELEPHONE CO. — DATE

4	ADDED PROFILE REF. NOTE CONNECT NEW DUCT-LINE BETWEEN AFMH'S "I" & "12" DIRECTLY INTO MH.		8/2/78
3	REROUTING OF DUCTLINE BETWEEN AFMH'S "I" & "12"		6/15/78
2 2-9-78	RELOCATION OF ST. LT. TRANSF. CONTROL CABINET, & PULLBOX		
1	DELETED HECO SERVICE BOX AT END OF DUCT LINE 2H, REVISED NOTE AT HECO HAND HOLE A (DUCT LINE 2H)		
10-18-77	REVISED MH TYPE DESIGNATION,- JTS MH #771		
4-11-77 1	REVISED LINES 2A, 2C & 2D. DELETED LINE 2E.		
DATE	REVISION		

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

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NIMITZ SPUR

UTILITY PLAN - ELECTRICAL & TELEPHONE NEW DUCT ALIGNMENT

INTERSTAT ROUTE H-1
PROJECT No. I-HI-1(99):15

SCALE: 1" = 50' — DATE AUG & 1978

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Robert Kawabata

SHEET No. 3 OF 43 SHEETS

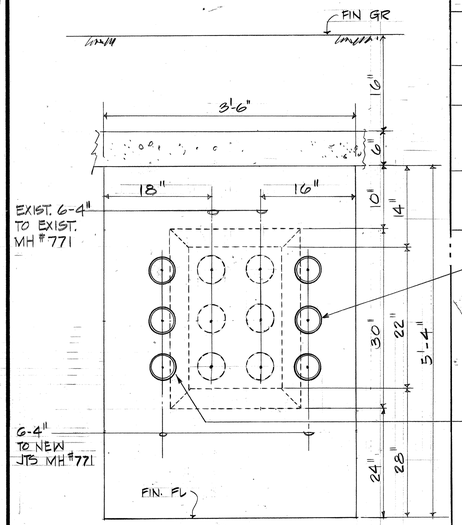
KEY MAP
SCALE: 1" = 600'

C.O. 179

PRINTED ON NO. 1000H CLEARPRINT

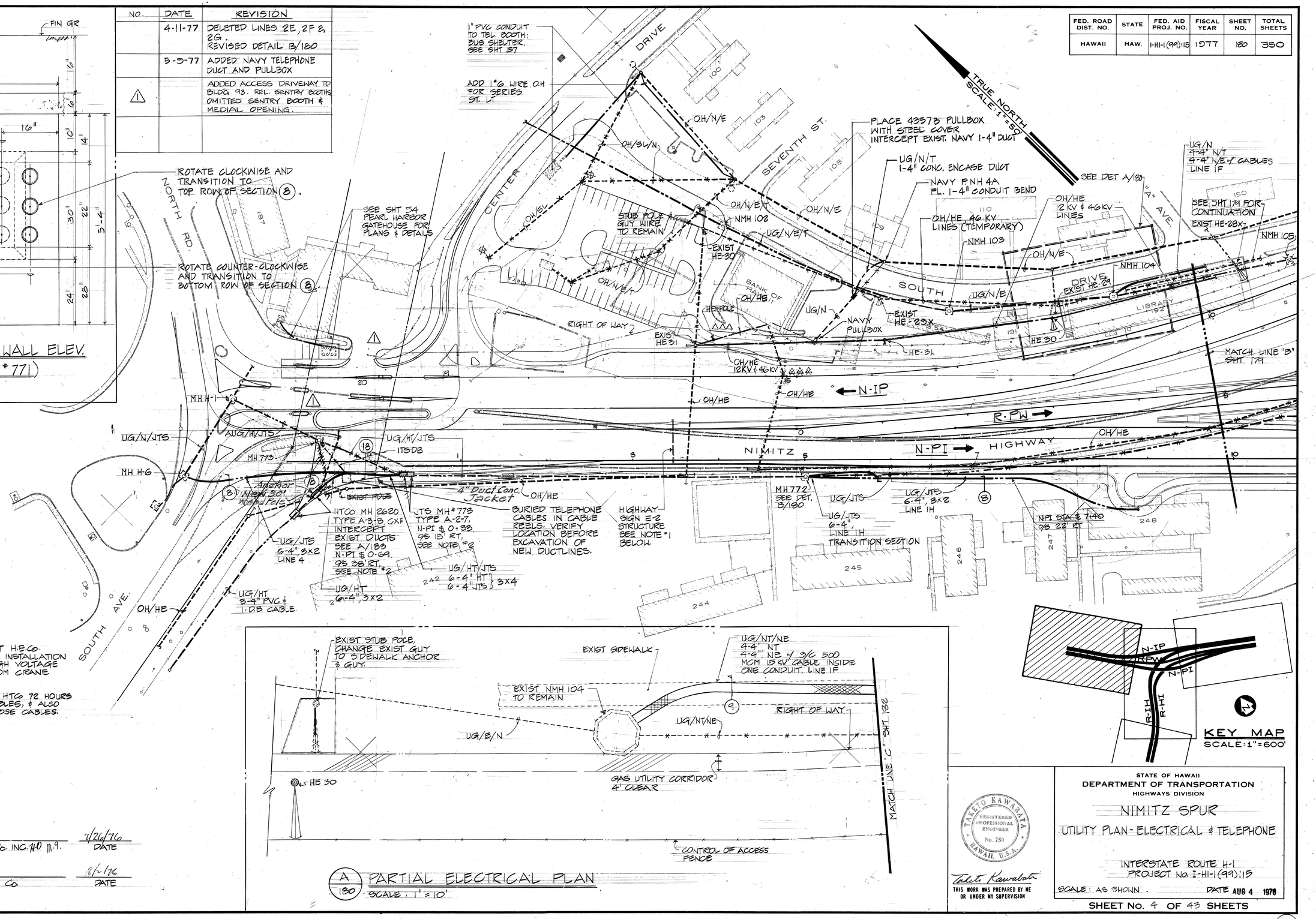
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(99)::15	1977	180	350

NO.	DATE	REVISION
	4-11-77	DELETED LINES 2E, 2F & 2G. REVISED DETAIL B/180
	5-3-77	ADDED NAVY TELEPHONE DUCT AND PULLBOX
1		ADDED ACCESS DRIVEWAY TO BLDG. 93. REL. SENTRY BOOTHS OMITTED SENTRY BOOTH & MEDIAL OPENING.



B/180 EXIST MH # 772 WALL ELEV. (FACING JTS MH # 771)

N.T.S.



NOTES:

1. CONTRACTOR TO REQUEST H.E.Co. TO STANDBY DURING THE INSTALLATION OF THE SIGN DUE TO HIGH VOLTAGE LINES & CLEARANCE FROM CRANE OR BOOM.
2. CONTRACTOR TO CONTACT HTC 72 HOURS BEFORE TONING EXIST CABLES, & ALSO TO BREAK DUCTLINE & EXPOSE CABLES.

A/180 PARTIAL ELECTRICAL PLAN

SCALE: 1"=10'

KEY MAP

SCALE: 1"=600'

APPROVED:

J Karamoto — HAWAIIAN ELECTRIC Co. INC. H.O. M.G. — 7/26/76 DATE

L. Dias for Kef. — HAWAIIAN TELEPHONE Co. — 8/2/76 DATE

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

REGISTERED PROFESSIONAL ENGINEER No. 750 TAKETO KAWABATA HAWAII, U.S.A.

Taketo Kawabata

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NIMITZ SPUR

UTILITY PLAN - ELECTRICAL & TELEPHONE

INTERSTATE ROUTE H-1
PROJECT No. I-HI-1(99)::15

SCALE: AS SHOWN DATE AUG 4 1976

SHEET No. 4 OF 43 SHEETS

C.O. (180)

C-T-7

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(99):15	1077	181	350

NOTE:

1. TEL. CONDUIT & PULLBOX UNDER TEL SYSTEM PAY ITEM.
   PWR CONDUIT & PULLBOX UNDER MILITARY ELEC. PAY ITEM.

TRUE NORTH
SCALE: 1" = 50'

VANDENBERG BLVD.

INSTALL 45' POLE & GUY TO INTERCEPT EXIST O/H A/F LINES. SEE DET B/185

OH/AF/E/T

NINETEENTH ST.

TEL. PULLBOX - 434T & PWR. PULLBOX - 18" x 36", PROVIDE TEL & PWR SERVICES TO TEMPORARY GATEHOUSE., SEE NOTE 1

END OF PROJECT I-HI-1(99):15

SLACK SPAN

OH/AF/E/T — NINETEENTH WAY — OH/AF/E/T

1-2"AF/E & 1-2" AF/T 36" DEPTH

TEMPORARY GATEHOUSE

AUG/AF/E — UG/AF/E — UG/AF/E

30 — 25 — 10

R-IH

KUNTZ AVE

R-HI

SEE SHT 52 HICKAM AIR FORCE BASE GATEHOUSE FOR PLANS & DETAILS

CHAPEL T-401

1601

1602

T-1404

T-1405 T-1406 T-1407 T-1408 T-1409 T-1410 T-1411 T-1412 T-1413

OH/AF/E — OH/AF/E

GARDNER AVE.

N-IP
R-PW
N-PI
R-IH
R-HI

KEY MAP
SCALE: 1" = 600'

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

APPROVED:

HAWAIIAN TELEPHONE CO LTD. — DATE 8/5/76

TAKETO KAWABATA REGISTERED PROFESSIONAL ENGINEER No. 750 HAWAII, U.S.A.

Taketo Kawabata

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NIMITZ SPUR

UTILITY PLAN - ELECTRICAL & TELEPHONE

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(99):15

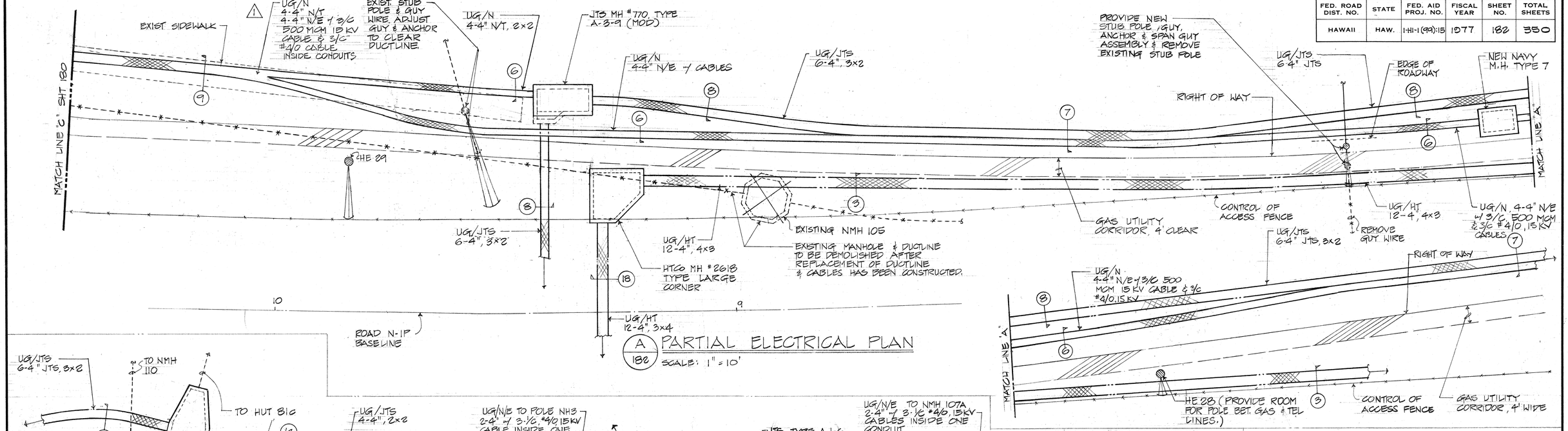
SCALE: 1" = 50' DATE AUG 4 1976

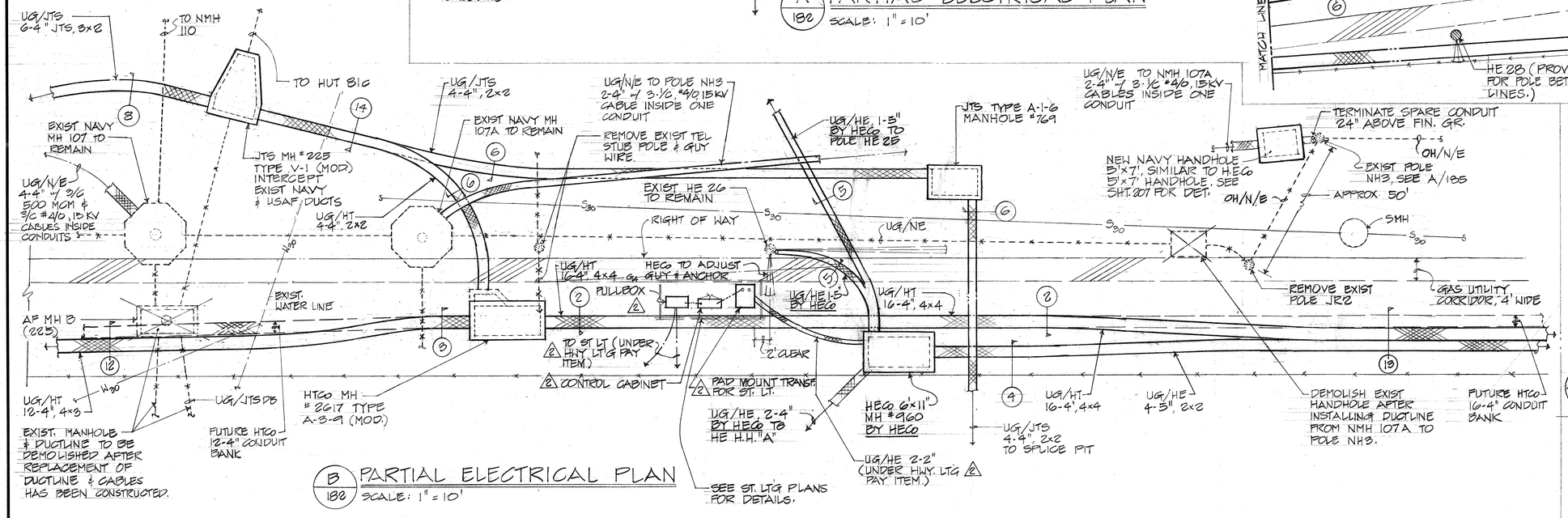
SHEET No. 5 OF 43 SHEETS

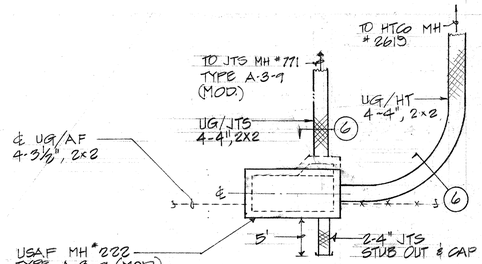
PRINTED ON NO. 1000H CLEARPRINT

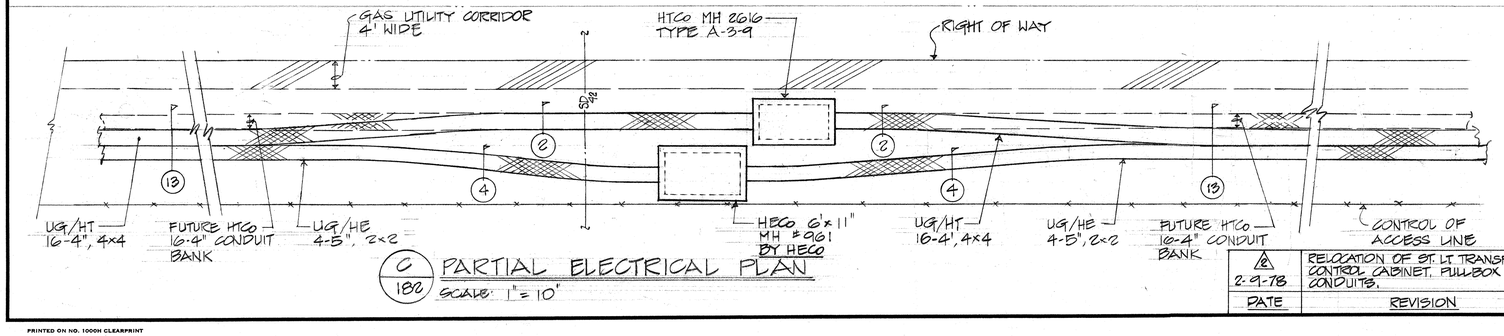
181

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(99):15	1977	182	350









APPROVED

HAWAIIAN ELECTRIC CO INC — 7/26/76 DATE

HAWAIIAN TELEPHONE CO — 8/3/76 DATE

NOTE

1. SEE CONDUIT PROFILE FOR CONDUIT ENTRANCE ELEVATION TO MANHOLE.

NO.	DATE	REVISION
1	6-22-77	REVISED NOTE, PARTIAL ELECTRICAL PLAN A.
2	2-9-78	RELOCATION OF ST. LT. TRANSF. CONTROL CABINET, PULLBOX & CONDUITS.
	4-11-77	REVISED DETAILS A/182, B/182 & D/182.

TAKETO KAWABATA — REGISTERED PROFESSIONAL ENGINEER — No. 750 — HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Taketo Kawabata

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NIMITZ SPUR

UTILITY PLAN-ELECTRICAL & TELEPHONE
PARTIAL ELECTRICAL PLANS

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(99):15

SCALE: 1"=10' DATE AUG 4 1976

SHEET NO. 6 OF 48 SHEETS

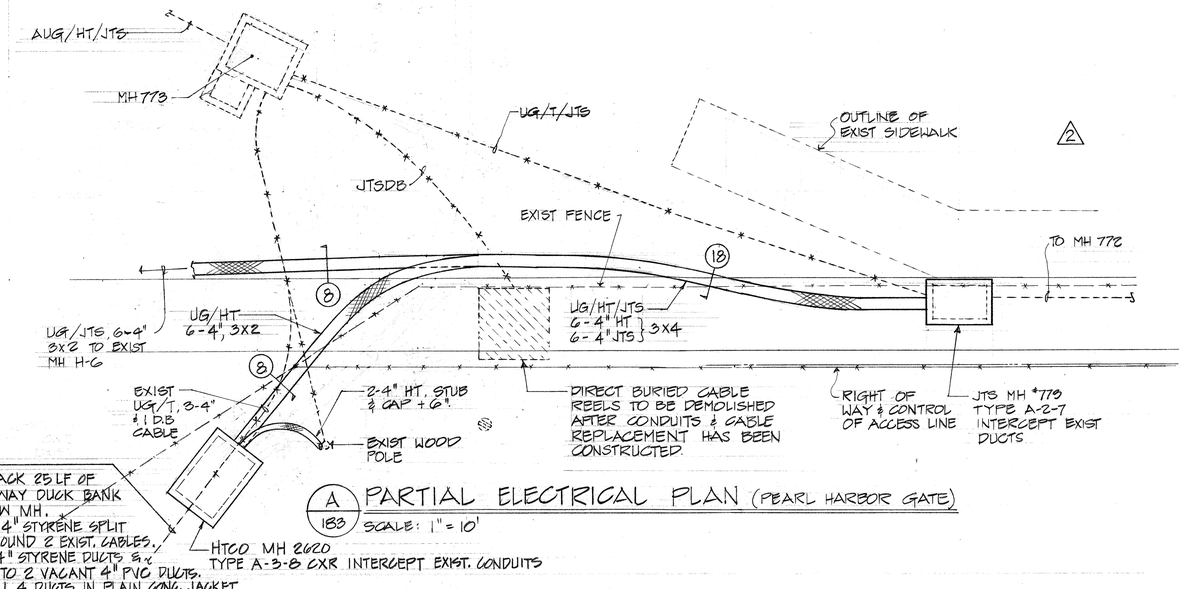
C.O. 182

ORIGINAL PLAN | SURVEY PLOTTED BY: | DRAWN BY: | TRACED BY: | DESIGN BY: | QUANTITIES BY: | CHECKED BY: | DATE

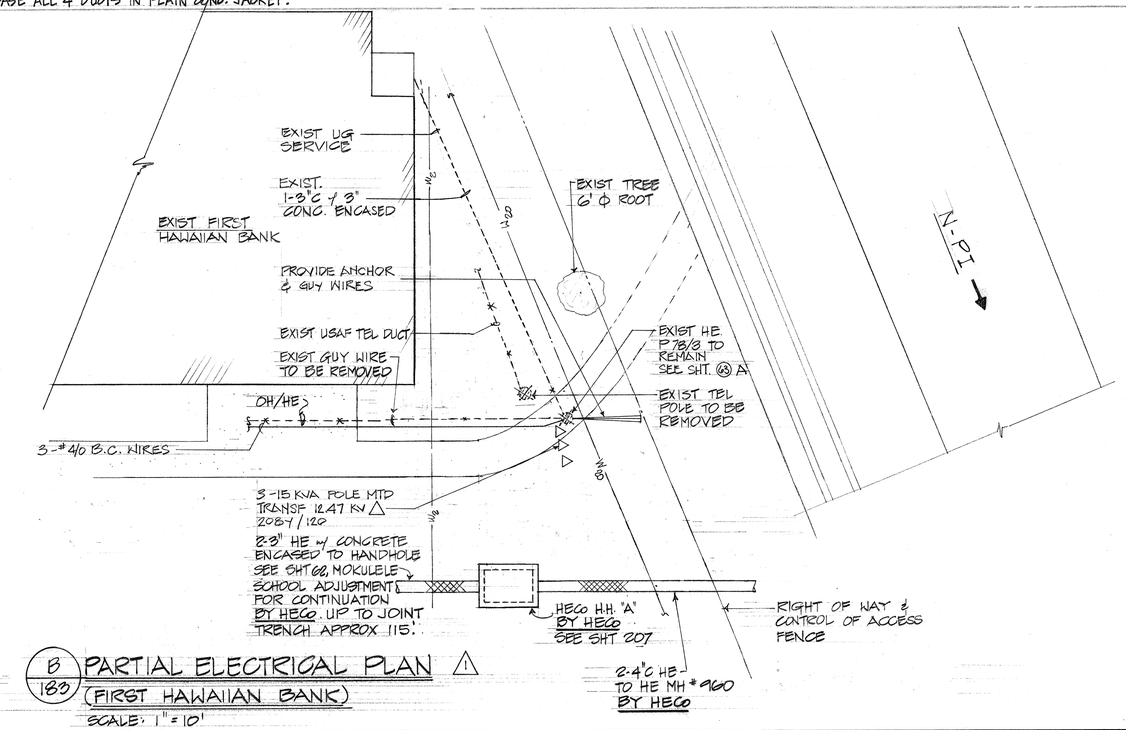
NOTE BOOK | No.

PRINTED ON NO. 1000H CLEARPRINT

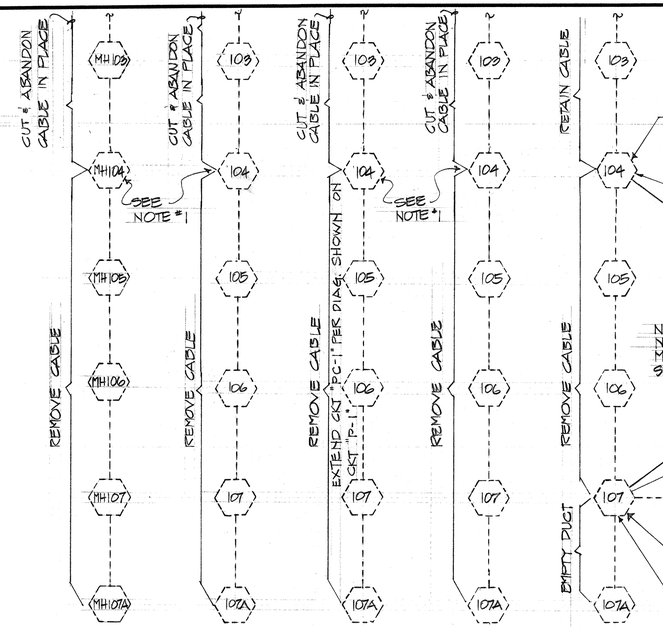
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(99)15	1977	183	350



A / 183 PARTIAL ELECTRICAL PLAN (PEARL HARBOR GATE)
SCALE: 1" = 10'

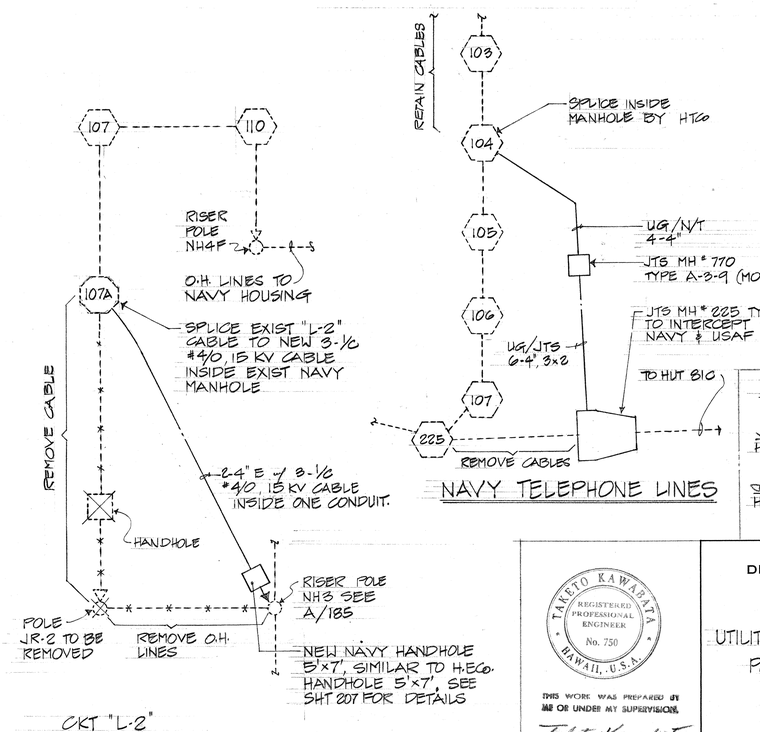


B / 183 PARTIAL ELECTRICAL PLAN (FIRST HAWAIIAN BANK) △1
SCALE: 1" = 10'



CKT "PK-1" CKT "PL-1" △1 CKT "PC-1" CKT "PL-26×28" △1 CKT "P-1"

NOTE:
1. CUT CABLE IN THIS MANHOLE. HOT CAP CABLE TO BE ABANDONED IN PLACE.



CKT "L-2"

NAVY TELEPHONE LINES

NO.	DATE	REVISION
△2		OMITTED TRAFFIC ISLAND.
△1	6-22-77	REVISED PARTIAL ELECTRICAL PLAN (FIRST HAWAIIAN BANK) REVISED NAVY TEL. CKT. PLANS PC-1 & P-1
	4-11-77	REVISED DETAIL A/183.

APPROVED:

J. Kawamoto — HAWAIIAN ELECTRIC CO., INC. — 7/26/76 DATE

A. Dear for Rep. — HAWAIIAN TELEPHONE CO. — 8/17/76 DATE

TAKETO KAWABATA — REGISTERED PROFESSIONAL ENGINEER — No. 750 — HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Taketo Kawabata

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NIMITZ SPUR
UTILITY PLAN - ELECTRICAL & TELEPHONE
PARTIAL ELECTRICAL PLANS

INTERSTATE ROUTE H-1
PROJECT No. I-HI-1(99)15

SCALE: 1"=10' DATE AUG 4 1976

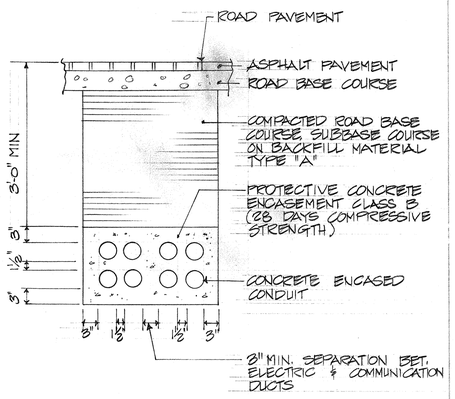
SHEET No. 7 OF 43 SHEETS

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

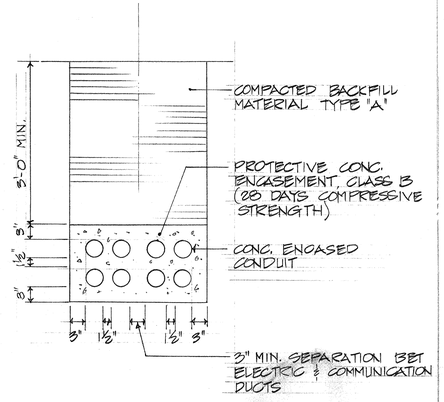
PRINTED ON NO. 1000H CLEARPRINT

C.O. 183

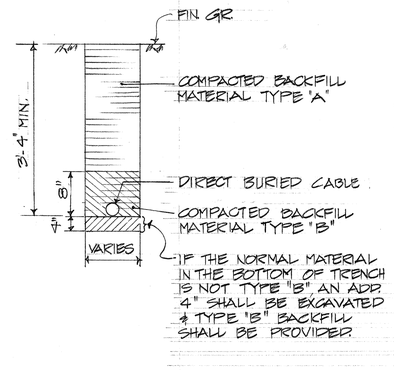
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(99):15	1977	184	350



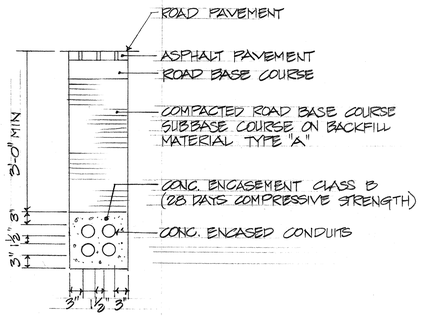
A 184 TYPICAL CONCRETE ENCASED RACEWAY SECTION UNDER ROAD PAVEMENT
NOT TO SCALE SEE NOTE #3



B 184 TYPICAL CONCRETE ENCASED RACEWAY SECTION IN OPEN AREAS
NOT TO SCALE SEE NOTE #3



C 184 TYPICAL DIRECT BURIED RACEWAY SECTION
NOT TO SCALE SEE NOTE #3

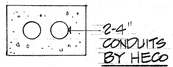


D 184 TYPICAL CONCRETE ENCASED RACEWAY SECTION
NOT TO SCALE, SEE NOTE #3

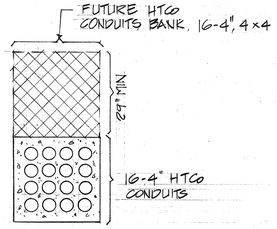
APPROVED:

J. Kawamoto — 7/26/76
HAWAIIAN ELECTRIC CO. INC. pp M. G. — DATE

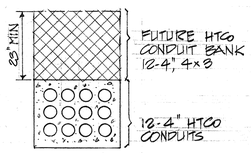
J. Dean for R.L. — 9/1/76
HAWAIIAN TELEPHONE CO LTD. — DATE



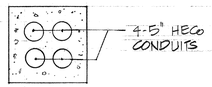
DUCT SECTION (1)



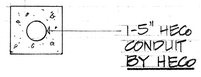
DUCT SECTION (2)



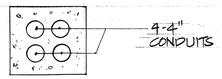
DUCT SECTION (3)



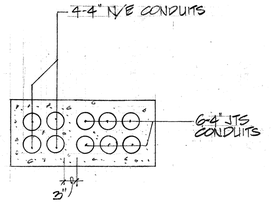
DUCT SECTION (4)



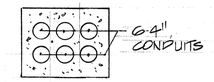
DUCT SECTION (5)



DUCT SECTION (6)



DUCT SECTION (7)



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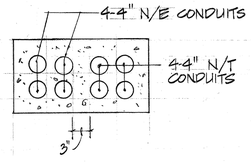
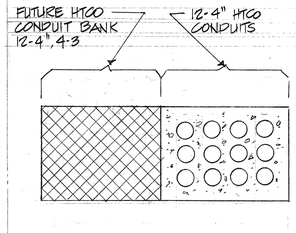
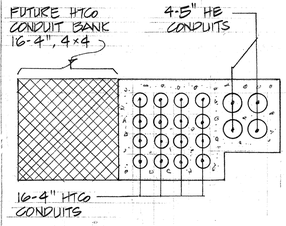


DUCT SECTION (9)



DUCT SECTION (12)



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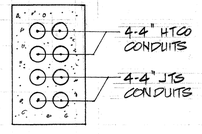
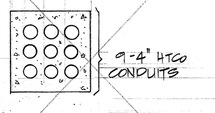
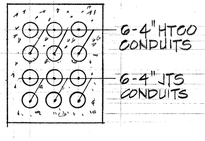


DUCT SECTION (14)

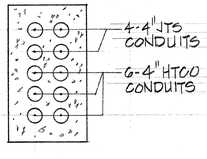
DELETE



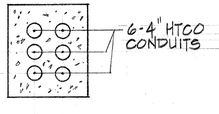
DUCT SECTION (17)



DUCT SECTION (18)



DUCT SECTION (19)



DUCT SECTION (20)

NOTES:

1. FOR DUCT SECTION 1, 4 TO 9, 12 TO 14 & 18 TO 20 MINIMUM DEPTH OF CONCRETE ENCASED CONDUIT TO BE 3 FEET FROM FINISH GRADE OR ROAD PAVEMENT.
2. FOR DUCT SECTION 2 AND 3, MINIMUM DEPTH OF TOP OF FUTURE HTCO DUCT BANK TO BE 3 FEET FROM FINISH GRADE.
3. BACKFILL MATERIALS:
   TYPE "A" - BEACH SAND, EARTH OR EARTH & GRAVEL, IF EARTH EARTH & GRAVEL USED MAX. ROCK SIZE SHALL BE 1" & MIXTURE SHALL CONTAIN NOT MORE THAN 50% BY VOLUME OF ROCK PARTICLES.
   TYPE "B" SAME AS "A" EXCEPT THAT IF EARTH & GRAVEL USED THE MIXTURE MUST PASS ½" MESH SCREEN & CONTAIN NOT MORE THAN 20% BY VOLUME OF ROCK PARTICLES.
4. CONDUIT SEPARATION: ELECTRIC - TELEPHONE = 3" ELECTRIC - ELECTRIC = 1½" TELEPHONE - TELEPHONE = 1½".

DATE	REVISION
4-11-77	REVISED DUCT SECTION 18. ADDED DUCT SECTIONS 19 & 20. DELETED DUCT SECTIONS 10, 11, 15, 16 & 17.

TAKETO KAWABATA
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No. 750
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
Taketo Kawabata

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NIMITZ SPUR
UTILITY PLAN - ELECTRICAL & TELEPHONE DUCT SECTIONS

INTERSTATE ROUTE H-1
PROJECT No. I-HI-1 (99)::15

SCALE: NONE DATE AUG 4 1976

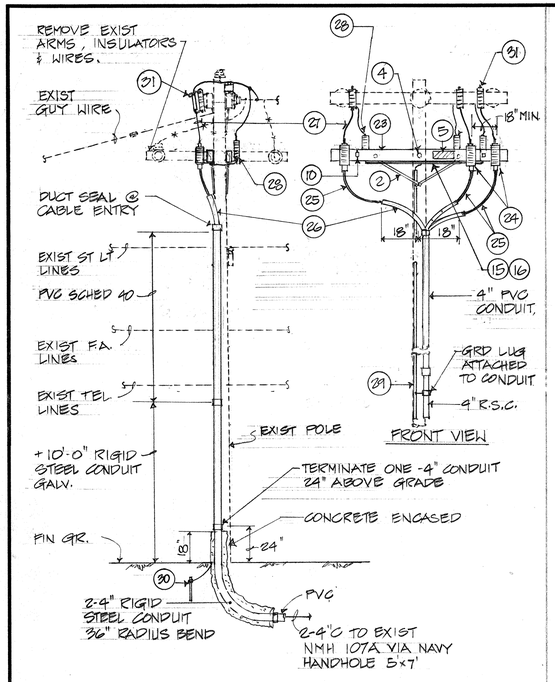
SHEET No. 8 OF 43 SHEETS

C.O. 184

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

PRINTED ON NO. 1000H CLEARPRINT

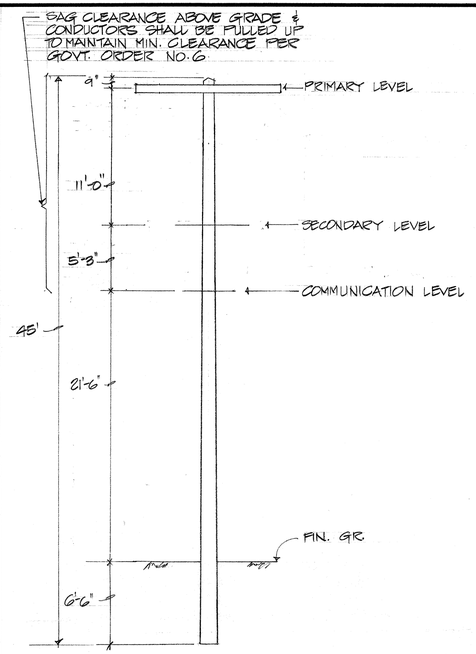
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(99):15	1977	185	350



A / 185 POLE (NH3) RISER DETAIL

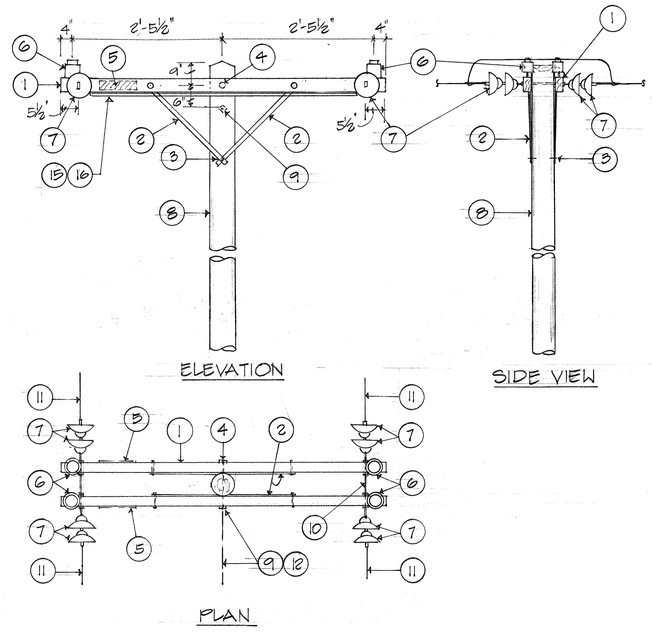
N.T.S.

SEE DETAIL C/185 FOR POLE GUYING DETAILS.



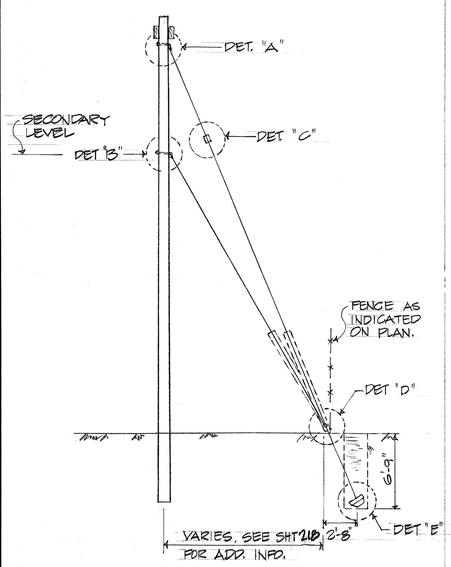
B / 185 POLE DETAIL (DOUBLE DEADEND FRAMING)

N.T.S



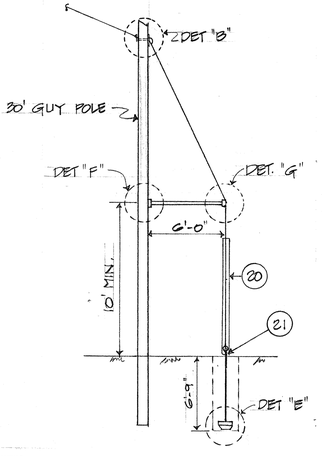
MATERIAL LIST - OVERHEAD SYSTEM

1	CROSSARM, 3¼" x 4½" x 5'-7" 1-PHASE CKT
2	CROSSARM BRACE, ¼" x 1¼" x 30" (5'-7" ARM)
3	LAG SCREW, ⅝" DIA.
4	CROSSARM BOLT, 5/8" DIA. WASHER & NUT
5	SIGN, HIGH VOLTAGE w/ FLATHEAD NAILS
6	INSULATOR,
7	INSULATOR, CLEVIS DEADEND w/ 5/8" MT'G BOLT, WASHER & NUT
8	POLE, PENTACHLOROPHENOL TREATED, CLASS 3, 45 FEET
9	GUY, ANGLE EYEBOLT 5/8" DIA w/ LIFT PLATE
10	DOUBLE ARMING BOLT, 5/8" DIA, WASHER & NUTS
11	PRIMARY CONDUCTOR, No 4
12	GUY STRAND, 3/8" DIA.,
13	GUY POLE PLATE, SIDEWALK TYPE, w/ SCREWS
14	GUY STRAND CLAMPS, SIDEWALK TYPE
15	BONDING WIRE #6 SDBC. & STAPLES
16	WOOD MOULDING, ½" WIRING w/ 2-HOLE STRAPS & NAILS
17	PREFORMED STRAND GRIP
18	GUY EYEBOLT, 5/8" DIAMETER w/ LIFT PLATE
19	STRAIN INSULATOR, #20,000
20	GUY GUARD, 8', GALV. STEEL
21	ANCHOR ROD, 1"x8'-0" TRIPLE EYE w/ WASHER & NUT
22	PIPE, 2" DIA., GALV. STEEL
23	CROSSARM, 3¼" x 4½" x 8'-0", 3-PHASE CKT
24	PORCELAIN CABLE TERMINATOR, 15 KV
25	CABLE, PRIMARY, 15 KV, ⅓ #4/0
26	2" PVC CONDUIT OVER CABLES IN CLIMBING SPACE
27	CONDUCTOR, #1, MHD BC
28	LIGHTNING ARRESTER, ENCASED VALVE TYPE, 12 KV
29	WOOD MOULD, HALF ROUND, STAPLE EVERY 12" w/ COPPER CLAD STAPPLE; #6 SD BC GROUND WIRE
30	5/8"Φ x 8' COPPER GRD ROD
31	PRIMARY DISCONNECT SWITCH



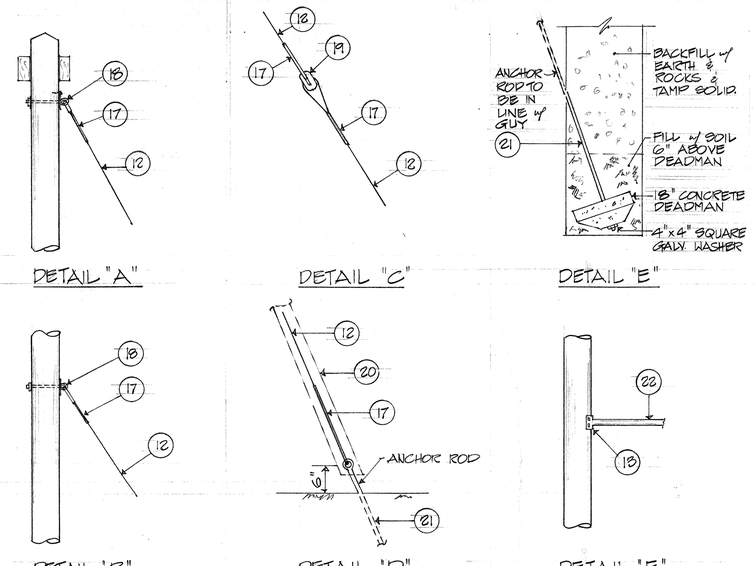
C / 185 POLE GUYING DETAILS

NOT TO SCALE



D / 185 SIDEWALK ANCHOR & GUY DETAILS

NOT TO SCALE



E / 185 GUY & ANCHOR DETAILS

NOT TO SCALE

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

TAKETO KAWABATA
REGISTERED PROFESSIONAL ENGINEER
No. 750
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Taketo Kawabata

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NIMITZ SPUR
UTILITY PLAN - ELECTRICAL & TELEPHONE
POLE, GUY & ANCHOR DETAILS

INTERSTATE ROUTE H-1
PROJECT No. I-HI-1(99):15

SCALE: NONE

DATE AUG 4 1976

SHEET No. 9 OF 43 SHEETS

PRINTED ON NO. 1000H CLEARPRINT

185

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-(02)-1S	1977	186	350

LINE - 1

EXIST. SPLICE PIT
SEE PROJ. I-HI-1(69)::15
EXIST. GROUND LINE @ ℄ DUCTS
FINISH GRADE LINE @ ℄ DUCTS
HTCO DUCTS
20.0± FLOOR
JTS CABLES (DIRECT BURIED) LINE 1
R-PW
N-PI
JTS MH #771 TYPE A-3-1 (MOD)
JTS MH #770 TYPE A-3-6
R/W
AF SECURITY FENCE
EXIST. DUCT
N-IP
21" SD
EXIST. TEL. 18" SD
20" WATER
4" WATER
4" GAS
N/E DUCTS
23.26 WINDOWS
21.20 FLOOR
6-4" JTS DUCTS LINE 1G
22.56 WINDOW
19.50 FLOOR
JTS SPLICE PIT N-PI @ 18+68.96 41' RT.
N-PI
R-HI
R-PW
R-IH
N-IP
4" WATER
4" WATER
JTS TYPE A-1-6 MH #769 N-IP @ 2+37.96 55' RT.
4" GAS
HECO DUCTS
HTCO DUCTS
30" SEWER
23.20 FLOOR
WINDOW 26.01
23.50 FLOOR
4-4" JTS DUCTS LINE 1A
4-4" JTS DUCTS LINE 1B
JTS MH #385 TYPE V-1 (MOD) INTERCEPT EXIST. NAVY & USAF DUCTS N-IP @ 3+51 95.69 RT.
EXIST. 30" SEWER
EXIST. DUCTS
WINDOW 20.06
SEWER 18.00 FLOOR
WINDOW 13.56
6-4" JTS DUCTS LINE 1C
HTCO MH #2617 TYPE A-3-5 (MOD) N-IP @ 3+30.29 25' RT.
MATCH LINE
4-4" HTCO DUCTS LINE 1J
EXIST. GROUND
4" GAS
30" SEWER
WINDOW 21.56
FLOOR 19.50
MATCH LINE "A"
6-4" JTS DUCTS 4-4" N/E DUCTS LINE 1D
6-4" JTS DUCTS LINE 1G
JTS MH #770 TYPE A-3-6 (MOD) R/W N-IP @ 9+51 46' RT.
N-IP
21" SD
EXIST. DUCT
R/W
AF SECURITY FENCE
EXIST. TEL. 18" SD
20" WATER
4" WATER
4" GAS
N/E DUCTS
23.26 WINDOWS
21.20 FLOOR
6 G-4" JTS DUCTS LINE 1G
22.56 WINDOW
19.50 FLOOR
MATCH LINE
MATCH LINE
MATCH LINE
MATCH LINE "A"
NEW NAVY 6'x8' MH TYPE 7 N-IP @ 7+16, 29' RT.
HTCO MH #2615 TYPE A-3-5 (MOD) EXTEND EXIST. HTCO 6"ø 4"x4" INSTALLED UNDER P.H.I.C. PROJECT TO NEW MH. R-IH @ 0+25.91' RT.
HTCO MH #2614 TYPE A-3-5 (MOD) N-IP @ 1+27.05 47' RT.
FENCE LINE CONTROL OF ACCESS
R/W
R-IH
R-HI
R/W
AF FENCE (SECURITY)
4" WATER
EXIST. REYNOLDS AVE TO EXIST. WOOD POLE
JTS CABLES
3.5'x3.5' BOX CULVERT
18" WATER
24" SD
16.06 WINDOW
14.00 FLOOR
6-4" HTCO DUCTS LINE 3
16.26 WINDOWS
12.20 FLOOR
4-4" HTCO DUCTS LINE 3A
4-4" N/E DUCTS LINE 1D
FLOOR 23.70
WINDOWS 21.26
6-4" N/E DUCTS LINE 1E
JTS MH 770
MATCH LINE
4-4" N/T DUCTS
25.76 WINDOW
21.20 FLOOR
4-4" N/E DUCTS 4-4" N/T DUCTS LINE 1F
WINDOW 26.01
FLOOR 24.01
EXIST. NAVY MH 104
EXIST. GROUND
JTS DUCTS
MATCH LINE
MATCH LINE C-1 SHT. 11
JTS MH 773 TYPE A-2-7
6-4" HTCO DUCTS 6-4" JTS DUCTS
18
EXIST. 30" SEWER
PROVIDE DUCT DRAIN
WINDOW 19.96
16.50 FLOOR
6-4" JTS DUCTS LINE 1G
22.56 WINDOW
19.50 FLOOR
AF SECURITY FENCE
20" WATER
EXIST. 20" WATER
6-4" JTS DUCTS LINE 1H
EXIST. SOUTH AVE.
EXIST. 6" SEWER
EXIST. MH H-6
EXIST. 18" WATER
4" GAS
EXIST. 30" WATER
18.2± FLOOR
12.2± WINDOW
EXIST. G-4" DUCTS
EXIST. JTS MH 772
FLOOR 23.0±
2-4" W/3-1/C W/4D 15 KV CABLE IN ONE CONDUIT LINE 1K
TO EXIST. POLE NH5
NEW NAVY H.H. 5'x7'
1-5" HECO DUCT
1-4" JTS DUCTS
24.2.0 FLOOR
EXIST. NAVY MH-107
EXIST. NAVY MH-107
EXIST. GROUND
4" GAS
EXIST. 30" WATER
30" SEWER
23.3± FLOOR
ELECTRICAL 4-4" W/3/C 500 MCM 15 KV CABLES LINE 1L
22.9± FLOOR
MATCH LINE
MATCH LINE

LINE - 3

LINE - 4

PROFILES

SCALES: HORIZ. 1"=50'
VERT. 1"=10'

APPROVED:

J. Lee for KY. 8/5/76
HAWAIIAN TELEPHONE CO. LTD
DATE

J. Kaminoto 7/26/76
HAWAIIAN ELECTRIC CO. INC. NO M-9
DATE

PAUL M. HIROTA REGISTERED PROFESSIONAL ENGINEER No. 1449 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

DATE	REVISION
10-18-77	REVISED PROFILES FOR LINES 1G & 1H. REVISED DEPTH JTS MH #771
4-11-77	REVISED PROFILES FOR LINES 1H & 4 - ADDED MANHOLE FLOOR & WINDOW ELEVATION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NIMITZ SPUR

UTILITY PROFILES
ELECTRICAL & TELEPHONE

INTERSTATE ROUTE H-1
PROJ. NO. I-H1-1(99)::15

SCALE: AS NOTED DATE: AUG 4 1976

SHEET No. 10 OF 43 SHEETS

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

C.O. 186

K&E CRYSTALENS TRACING PAPER

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(99)-15	1977	187	350

LINE - 2

EXIST. HECO MH TYPE 'A' SEG. PROJ. I-HI-1(99)15
HTCO MH #2615 TYPE A-3-9 (MOD) EXIST. HTCO EXIT AND EXIST. 16-4" HTCO PROJECT INSTALLED UNDER PROJ. I-HI-1(99)15 NEW MH, R-1H @ 1+25.20 % 2.50 RT.
4 4-5" HECO DUCTS
2 16-4" HTCO DUCTS W/16-4" FUTURE HTCO DUCTS LINE 2
EXIST. GROUND LINE @ ℄ DUCTS (TYPICAL)
EXIST. HECO DUCTS
EXIST. HTCO DUCT (UNDER PVC)
16.06 WINDOWS
14.00 FLOOR
17.0± FLOOR
13 16-4" HTCO DUCTS
24" SD
HTCO MH #2616 TYPE A-3-9 (MOD) N-1P @ 1+96 % 90 RT.
4-5" HECO DUCTS
HECO MH #2617 TYPE G 5'x11' BY HECO R-1H @ 4+72 % 84 RT.
42" SD
FLOOR 13.00
WINDOWS 14.56
15.40 FLOOR
R-FW
N-FI
4-5" HECO DUCTS
HECO DUCT TO HE 25
FINISH GROUND LINE @ ℄ DUCTS (TYPICAL)
JTS DUCTS
HECO MH #2620 TYPE G 5'x11' BY HECO N-1P @ 2+40 % 25 RT.
16-4" HTCO DUCTS LINE 2A
FLOOR 21.90
HTCO MH #2617 TYPE A-3-9 (MOD) N-1P @ 3+00 % 29 RT.
12 12-4" HTCO DUCTS LINE 2B
30" WATER W/ JACKET
WINDOWS 21.56
19.50 FLOOR
3 16-4" HTCO DUCTS W/ 16-4" FUTURE HTCO DUCTS LINE 2B
MATCH LINE "B"
MATCH LINE
HTCO MH #2618 TYPE LARGE CORNER N-1P @ 0+25 % 29 RT.
N-IP
AF SECURITY FENCE
R/W
HTCO MH #2619 TYPE LARGE CORNER N-1P
4-5" HECO DUCTS LINE 2
USAF MH #222 TYPE A-3-9 (MOD) N-1P @ 11+30 % 131 RT.
N/E DUCTS
24" SD
4" WATER
EXIST DUCT
20" WATER
18" SD
N-IH
R-HI
HECO HANDHOLE "A" BY HECO
4" WATER
EXIST DUCTS
20" WATER
21.90 FLOOR
1 2-4" HECO DUCTS BY HECO LINE 2H
24.60 FLOOR
12-4" HTCO DUCTS LINE 2C
18
WINDOWS 21.16
FLOOR 19.10
6 4-4" HTCO DUCTS LINE 2C
23.16 WINDOW
19.10 FLOOR
WINDOW 22.56
FLOOR 21.00
6 4-4" JTS DUCTS LINE 2D
4-4" JTS DUCTS
6-4" HTCO DUCTS
19
20" WATER
EXIST. 4-4" AF DUCTS
2-4" JTS STUB-OUT DUCTS
MATCH LINE 2D
WINDOWS 20.60
FLOOR 19.50
EXIST. GROUND
HTCO MH #2621 TYPE A-3-9 (MOD) N-1P @ 10+96 % 42 RT.
23.16 WINDOWS
19.10 FLOOR
USAF MH #222
1-3" HECO CONDUIT BY HECO W/3" CONC. ENCASE
TO HECO TRANSF. PAD BY HECO
HECO SVC PULLBOX BY HECO
EXIST UG SERVICE TO FIRST HAW. BANK
2-3" HECO CONDUIT BY HECO
FLOOR 25.00
APPROVED:
J. Kawamoto
HAWAIIAN ELECTRIC CO., INC
7/26/76 DATE
J Dan for RY
HAWAIIAN TELEPHONE CO. LTD
8/1/76 DATE
MATCH LINE "B"
5 12-4" HTCO DUCTS W/ 12-4" FUTURE HTCO DUCTS LINE 2B
JTS DUCTS
21.00 FLOOR
WINDOW 22.56
MATCH LINE 2D
HTCO MH #2619
G-4" HTCO DUCTS 20
21.16 WINDOW
19.10 FLOOR
MATCH LINE C-1
SHT. 10
HTCO MH #2620 TYPE A-3-9 CXR
12 DUCTS EXCEPT EXIST.
2-4" HTCO TO EXIST WOOD POLE
8 G-4" HTCO DUCTS
JTS DUCTS
FLOOR 17.00
WINDOWS 18.56
BREAK BACK 25 LF OF EXIST. 3 WAY DUCT BANK FROM NEW MH. PLACE 2-4" STYRENE SPLIT DUCTS OVER 2 EXIST. CABLES. PLACE 2-4" STYRENE DUCTS & CONNECT TO 2 VACANT 4" PVC DUCTS. ENCASE ALL 4 DUCTS IN PLAIN CONC. JACKET.
1-5" HECO DUCT BY HECO TO EXIST HECO 26
4" GAS
2-4" NAVY DUCTS TO HECO 25
5 1-5" HECO DUCT BY HECO LINE 2K
JTS DUCTS
30" SEWER HTCO DUCTS
FLOOR 21.90
19TH WAY
CONTROL OF ACCESS FENCE
HICKAM SENTRY HOUSE
AIR FORCE PWR PULLBOX R-1H
TO EXIST AF POLE
1-2" AF/E] CONC
1-2" AF/T] ENCASED
1-2" AF/E
1-2" AF/E] CONC
1-2" AF/T] ENCASED
AIR FORCE TEL. PULLBOX
1-2" AF/T

PROFILES

SCALES: HORIZ. 1" = 50'
VERT. 1" = 10'

REVISION NO.	DATE	REVISION
2	10-19-77	REVISED PROFILES FOR LINES 2C & 2D
	4-11-77	REVISED PROFILES FOR LINES 2A, 2C & 2D. DELETED LINES 2E, 2F & 2G. ADDED MH FLR. & WINDOW ELEV.

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

PAUL M. HIROTA REGISTERED PROFESSIONAL ENGINEER No. 1449 HAWAII, U.S.A.
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

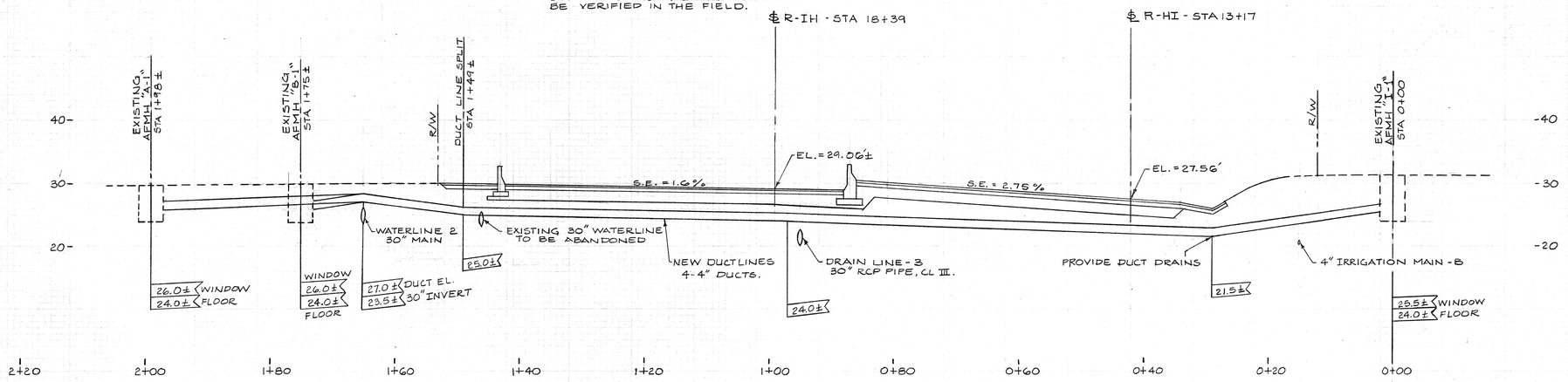
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
NIMITZ SFWR
UTILITY PROFILES
ELECTRICAL & TELEPHONE
INTERSTATE ROUTE H-1
PROJ. NO. I-HI-1(99)-15
SCALE: AS NOTED DATE: AUG 4 1976
SHEET No. 11 OF 13 SHEETS

K&E CRYSTALENE

C.O. (187)

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(39):15	1977	187A	350

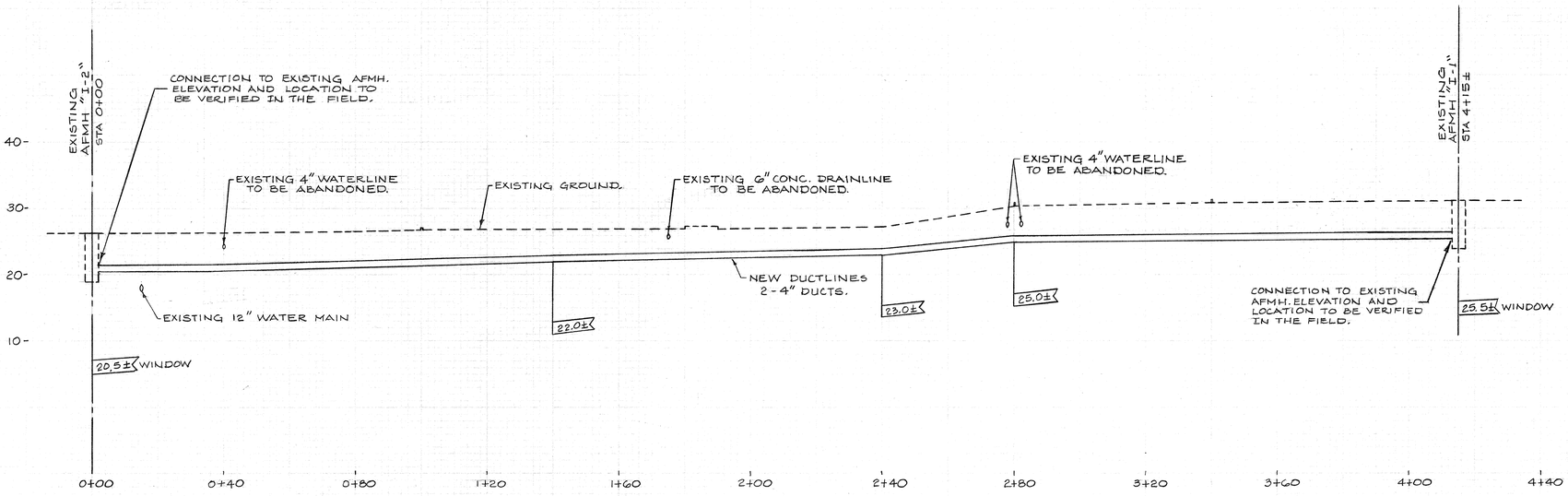
NOTE: LOCATION & ELEVATION OF ALL EXISTING MANHOLES, UTILITY LINES AND DRAIN LINES TO BE VERIFIED IN THE FIELD.



PROFILE AFMH's "A-1" & "B-1" TO AFMH "I-1"

SCALES: HORIZONTAL - 1" = 10'
VERTICAL - 1" = 10'

NOTE:
1.) LOCATION & ELEVATION OF ALL EXISTING MANHOLES, UTILITY LINES AND DRAIN LINES TO BE VERIFIED IN THE FIELD.
2.) MINIMUM COVER FOR ENCASED DUCTS SHALL BE 3' UNLESS OTHERWISE NOTED.
3.) WHEN EXISTING MANHOLES ARE DEEPER THAN SHOWN, DUCTS SHALL BE LOWERED ACCORDINGLY TO PROVIDE MINIMUM COVER AS PRACTICALLY POSSIBLE.



PROFILE AFMH's "I-2" TO "I-1"

SCALES; HORIZONTAL - 1" = 20'
VERTICAL - 1" = 10'

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

NIMITZ SPUR

UTILITY PROFILES-RELOCATION OF EXISTING A.F. ELECTRICAL DUCTS

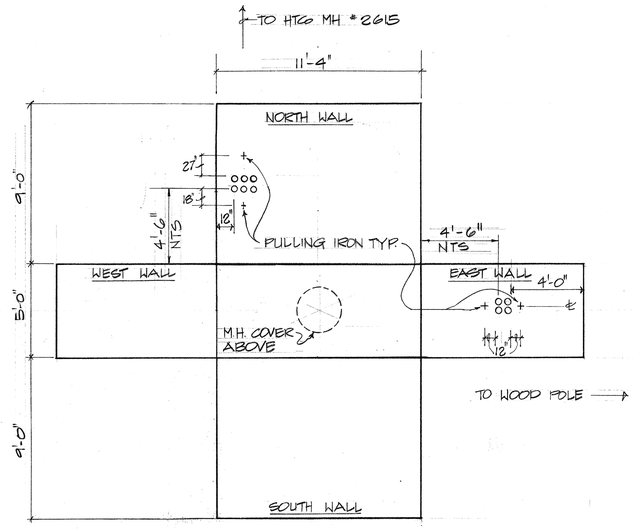
INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(39):15

SCALE: AS SHOWN DATE: 8-2-78

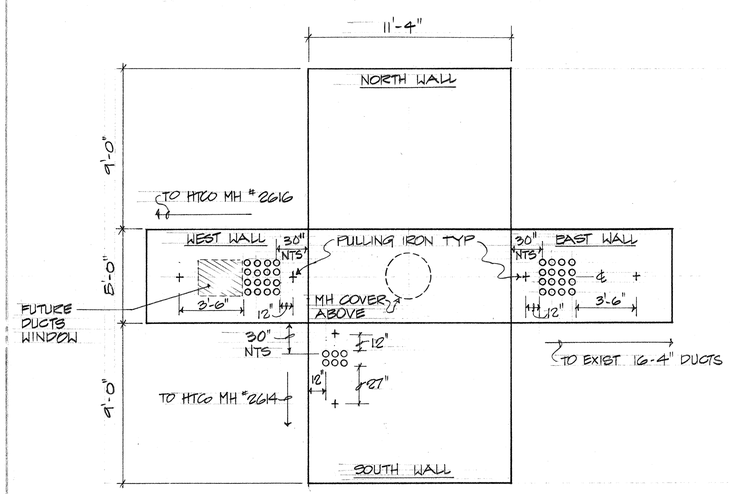
PRINTED ON NO. 1000H CLEARPRINT

C.O. 187A

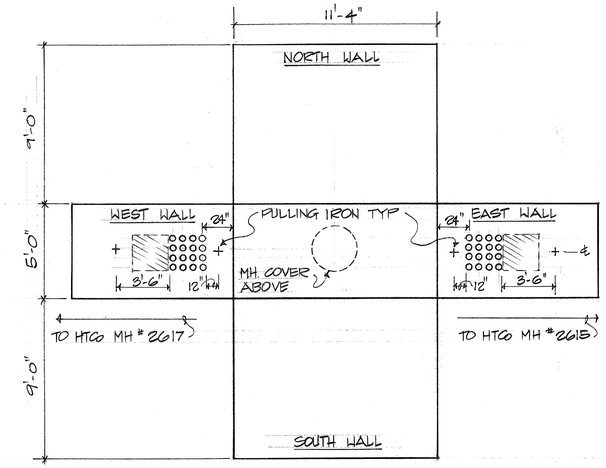
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(99):15	1077	188	350



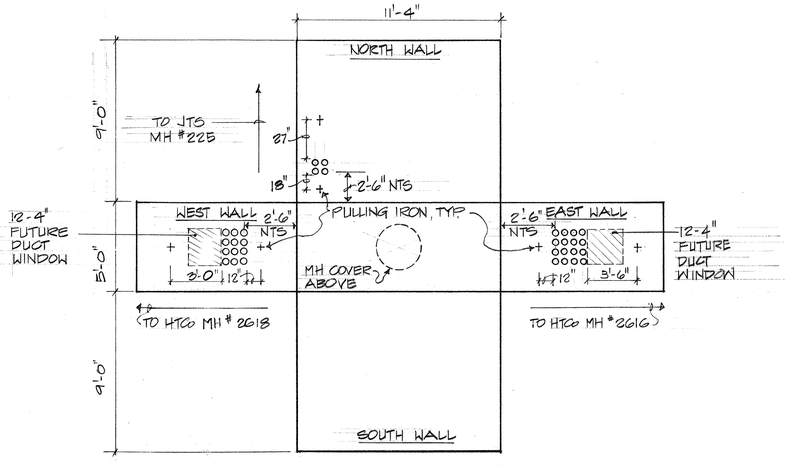
A 188 HTCO MH # 2614 (TYPE A-3-9 MOD.)
SCALE: 1/4" = 1'-0"



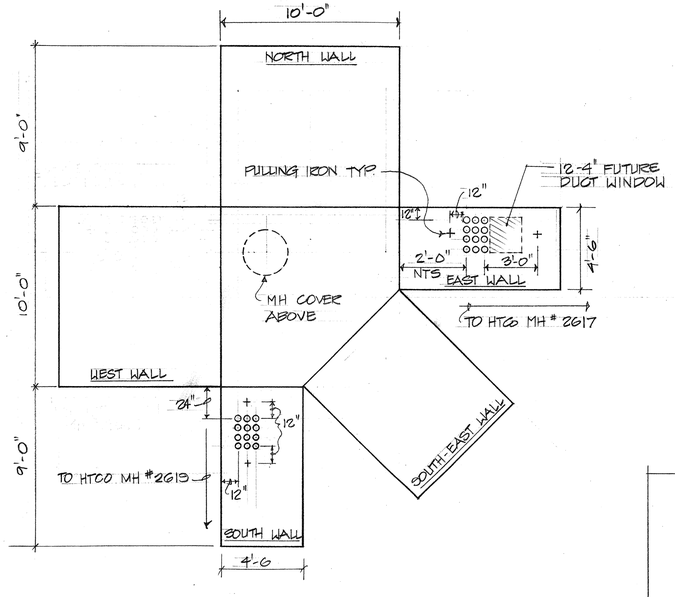
B 188 HTCO MH # 2615 (TYPE A-3-9 MOD)
SCALE: 1/4" = 1'-0"



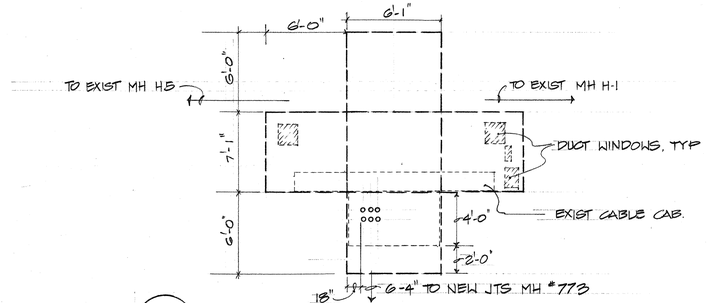
C 188 HTCO MH # 2616 (TYPE A-3-9)
SCALE: 1/4" = 1'-0"



D 188 HTCO MH # 2617 (TYPE A-3-9 MOD)
SCALE: 1/4" = 1'-0"



E 188 HTCO MH # 2618 (TYPE LARGE CORNER)
SCALE: 1/4" = 1'-0"



F 188 EXIST MH H-6
N.T.S.

APPROVED:

HAWAIIAN TELEPHONE Co — DATE 8/1/76

DATE	REVISION
4-11-77	REVISED DETAILS D/188 & E/188.

TAKETO KAWABATA — REGISTERED PROFESSIONAL ENGINEER No. 750 — HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
Taketo Kawabata

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NIMITZ SPUR
MANHOLE WALL ELEVATION

INTERSTATE ROUTE H-1
PROJECT NO I-HI-1(99):15

SCALE: NONE — DATE: AUG 4 1976

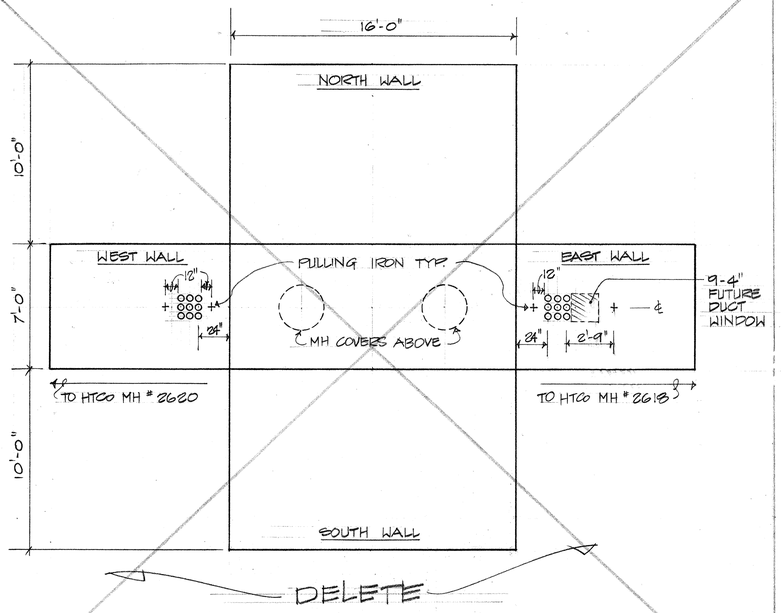
SHEET NO. 12 OF 43 SHEETS

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

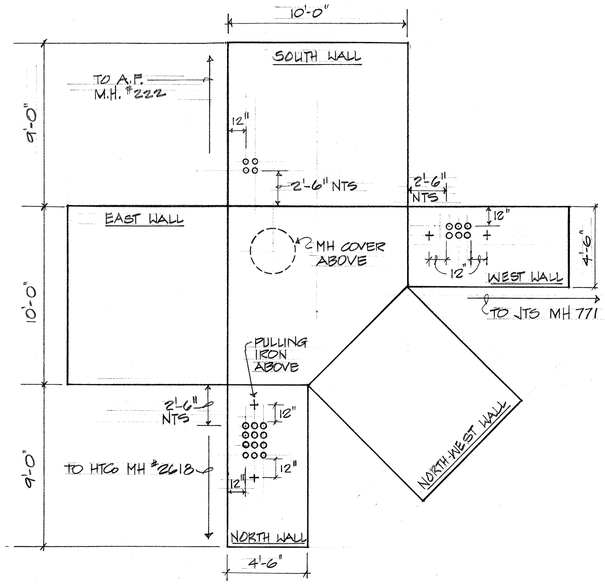
PRINTED ON NO. 1000H CLEARPRINT

C.O. 188

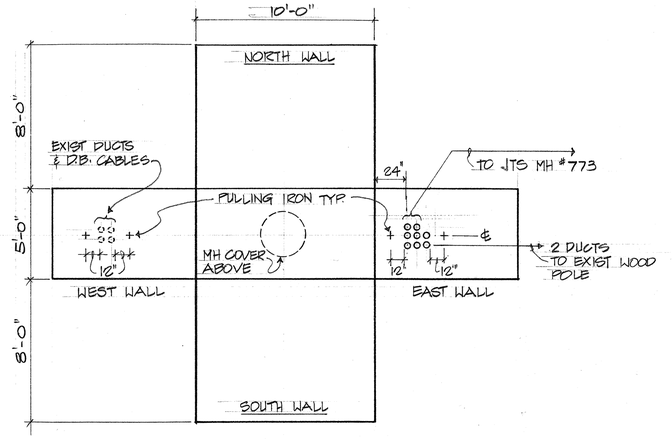
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(99):15	1977	189	350



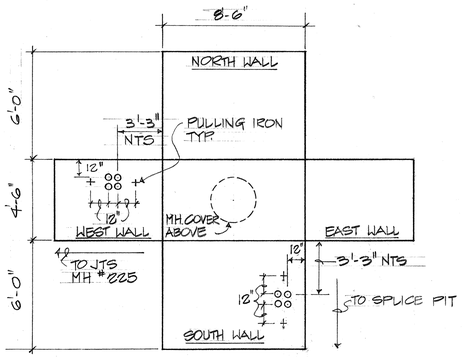
A / 189 HTCO MH # 2619 (TYPE LOAD COIL)
SCALE: 1/4"=1'-0"



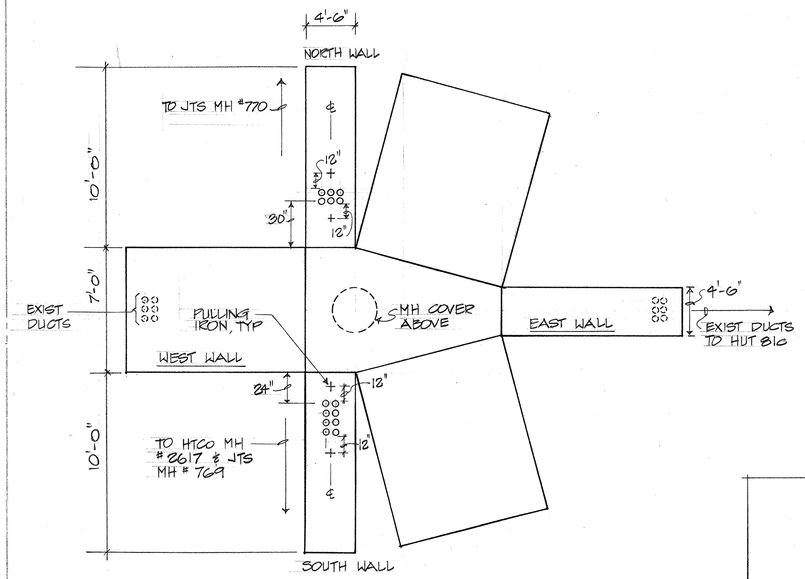
B / 189 HTCO MH # 2619 (TYPE LARGE CORNER)
SCALE: 1/4"=1'-0"



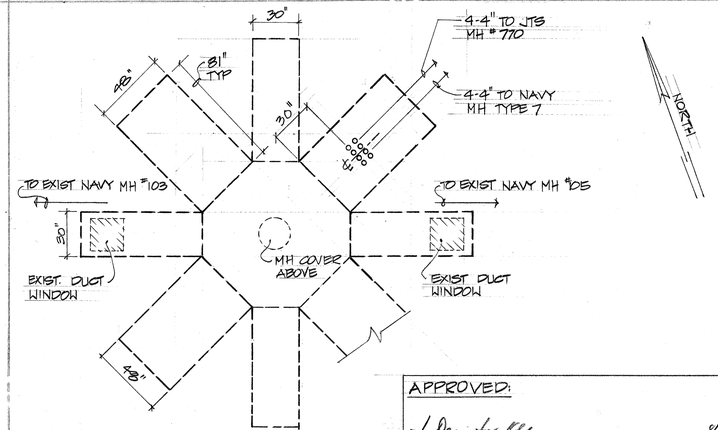
C / 189 HTCO MH # 2620 (TYPE A-3-8 CABLE CARRIER)
SCALE: 1/4"=1'-0"



D / 189 JTS MH # 769 (TYPE A-1-6)
SCALE: 1/4"=1'-6"



E / 189 JTS MH # 825 (TYPE V-1 MOD.)
SCALE: 1/4"=1'-0"



F / 189 EXIST NAVY MH # 104
N.T.S.

APPROVED:

L. Dean for RLY. 8/1/76

HAWAIIAN TELEPHONE CO DATE

DATE	REVISION
4-11-77	REVISED DETAIL C/189. REVISED DETAIL B/189 TO SUIT HTCO MH #2619. DELETED DETAIL A/189.

TAKETO KAWABATA
REGISTERED PROFESSIONAL ENGINEER
No. 750
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
Taketo Kawabata

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NIMITZ SPUR
MANHOLE WALL ELEVATION

INTERSTATE ROUTE H-1
PROJECT No. I-HI-1(99):15

SCALE: NONE DATE: AUG 4 1976

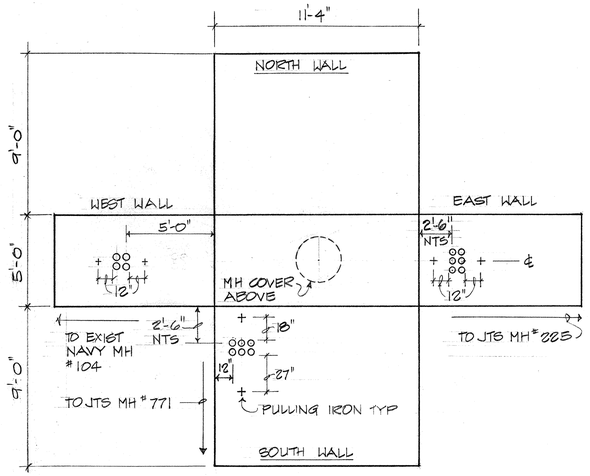
SHEET No. 13 OF 43 SHEETS

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

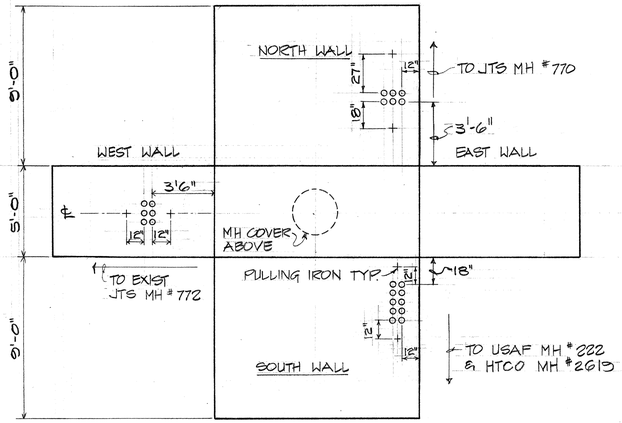
PRINTED ON NO. 1000H CLEARPRINT

C.O. (180)

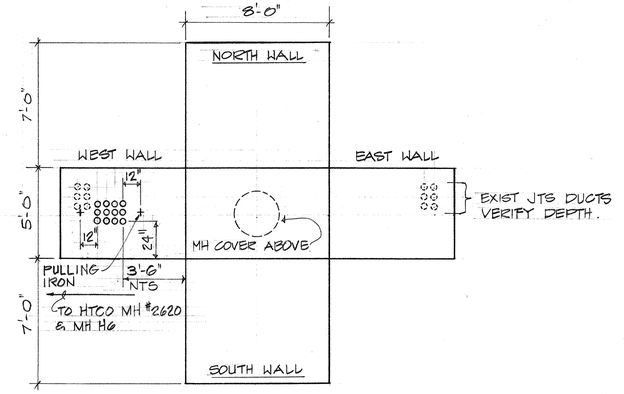
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(99):15	1977	190	350



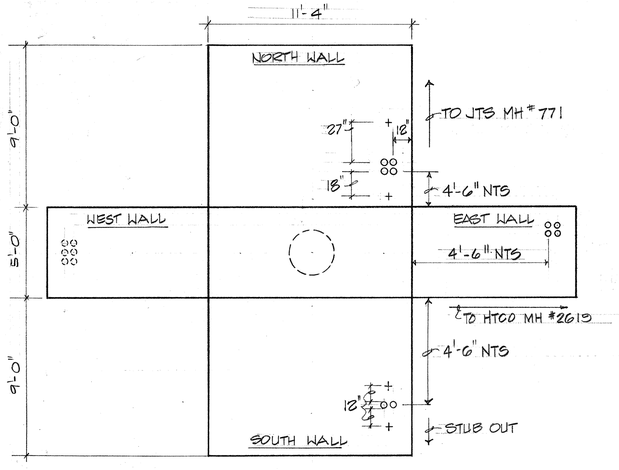
A 190 JTS MH # 770 (TYPE A-3-9 MOD)
SCALE: 1/4" = 1'-0"



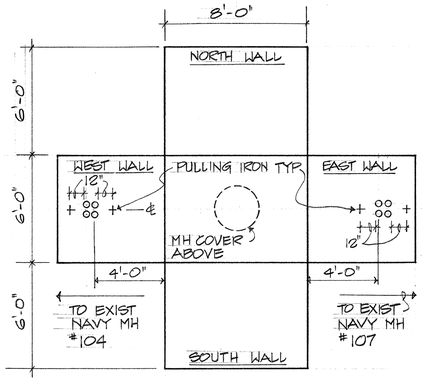
B 190 JTS MH # 771 (TYPE A-3-9 MOD.)
SCALE: 1/4" = 1'-0"



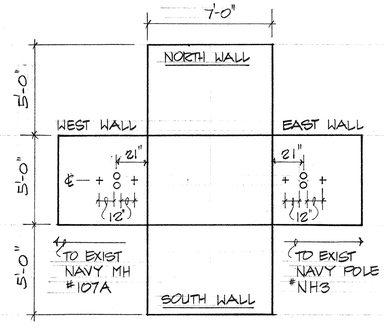
C 190 JTS MH # 773 (TYPE A-2-7)
SCALE: 1/4" = 1'-0"



D 190 USAF MH # 222 (TYPE A-3-9 MOD)
SCALE: 1/4" = 1'-0"



E 190 NAVY MH TYPE 7
SCALE: 1/4" = 1'-0"



F 190 NAVY H.H. TYPE 5x7
SCALE: 1/4" = 1'-0"

APPROVED:
L. Dean for Rep 11/1/76
HAWAIIAN TELEPHONE CO DATE

10-18-77	REVISED DETAIL B/190 REVISED DEPTH JTS MH #771	
4-11-77	REVISED DETAILS B/190, C/190 & D/190.	
DATE	REVISION	

TAKETO KAWABATA REGISTERED PROFESSIONAL ENGINEER No. 750 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Taketo Kawabata

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NIMITZ SPUR
MANHOLE WALL ELEVATION

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(99):15

SCALE: NONE DATE: AUG 4 1976

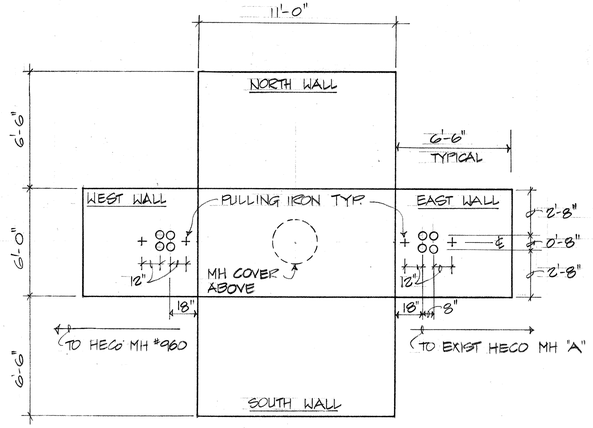
SHEET NO. 14 OF 43 SHEETS

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

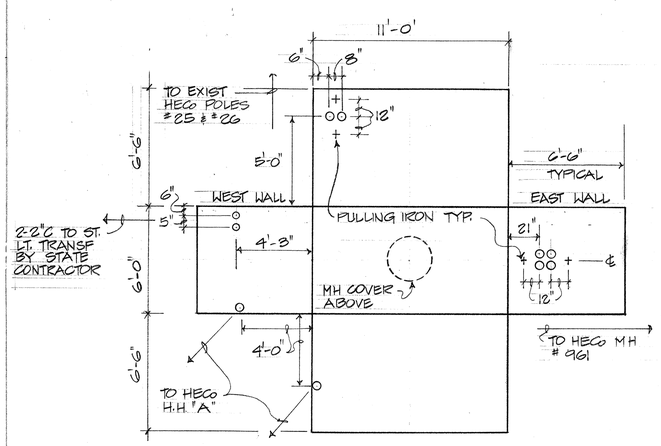
PRINTED ON NO. 1000H CLEARPRINT

C.O. 190

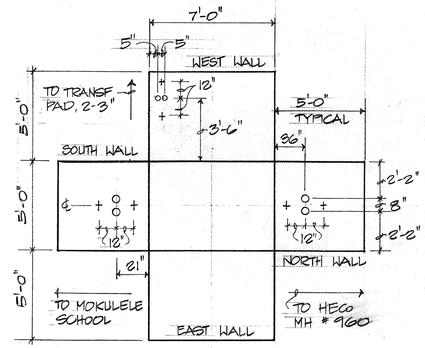
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(99):15	1977	191	350



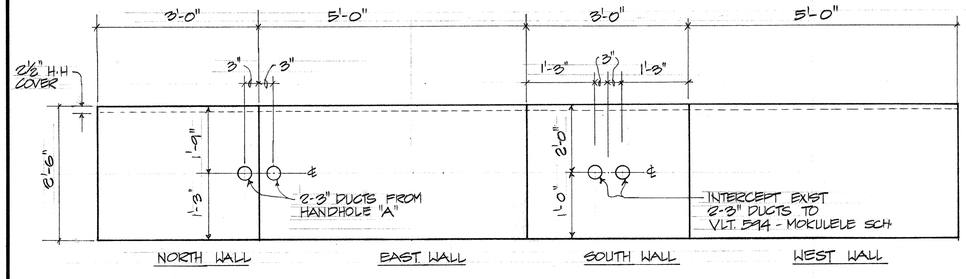
A 191 HECO MH #961 (TYPE 6×11)
SCALE: 1/4"=1'-0"



B 191 HECO MH #960 (TYPE 6×11)
SCALE: 1/4"=1'-0"



C 191 HECO HH "A" (TYPE 5×7)
SCALE: 1/4"=1'-0"



D 191 HECO H.H. "B" (TYPE 3'×5') NEAR EXISTING HE POLE P78/5
MOKULELE SCHOOL GROUNDS
SCALE: 3/4"=1'-0"

NOTE:

1. LOCATION OF DUCTS & PULLING IRONS ARE LOCATED AS YOU LOOK AT THE RESPECTIVE WALL FROM INSIDE THE MANHOLE OR HANDHOLE.

APPROVED:

J. Karimoto 7/26/76
HAWAIIAN ELECTRIC CO. INC. M.P. DATE

TAKETO KAWABATA REGISTERED PROFESSIONAL ENGINEER No. 750 HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Taketo Kawabata

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NIMITZ SPUR
MANHOLE WALL ELEVATION

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(99):15
SCALE: NONE DATE AUG 4 1976

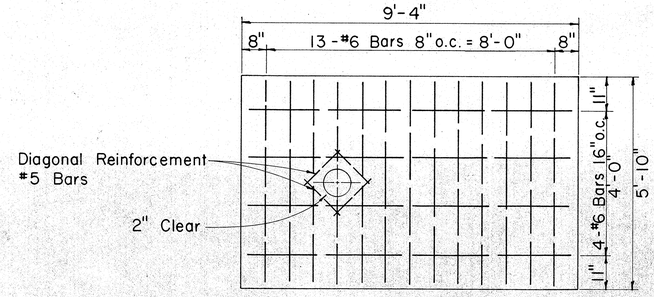
SHEET NO. 15 OF 43 SHEETS

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

PRINTED ON NO. 1000H CLEARPRINT

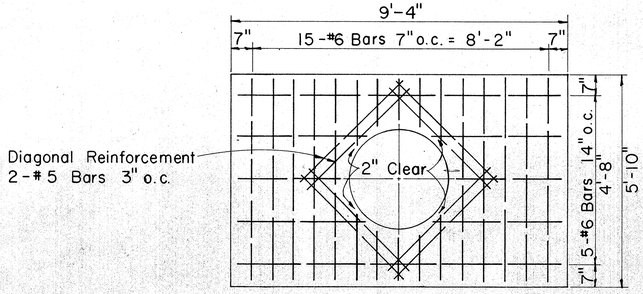
121

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	[illegible]	1977	192	350



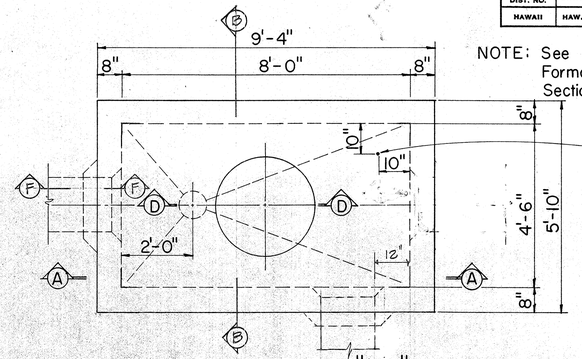
FLOOR SLAB REINF. PLAN

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



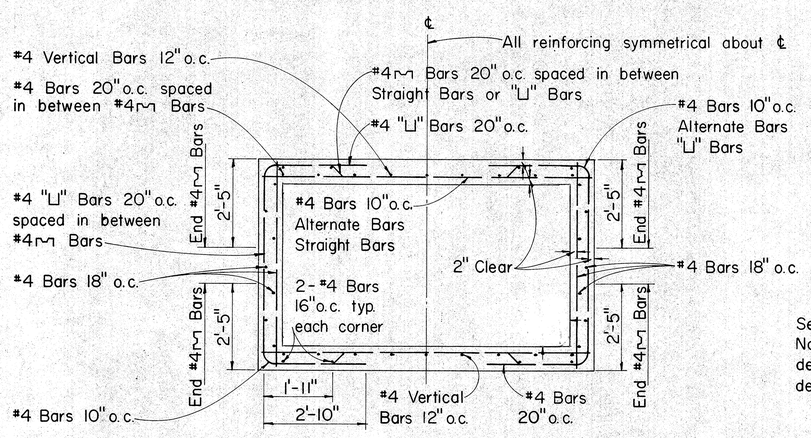
ROOF SLAB REINF. PLAN

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



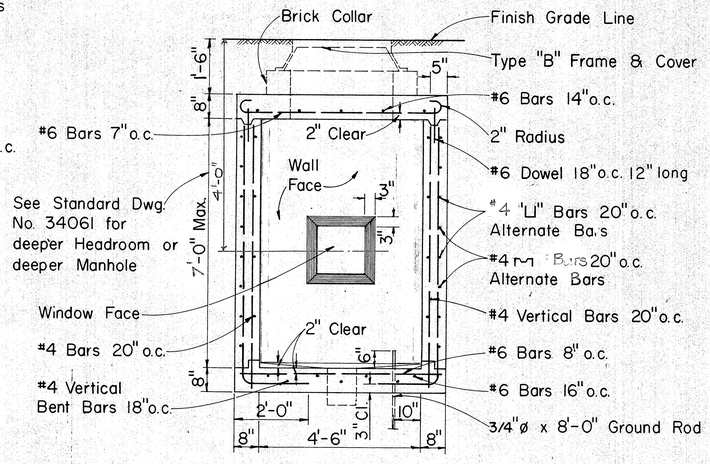
PLAN M.H. TYPE "A-1"
FOR ROADWAY & SIDEWALK AREAS

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



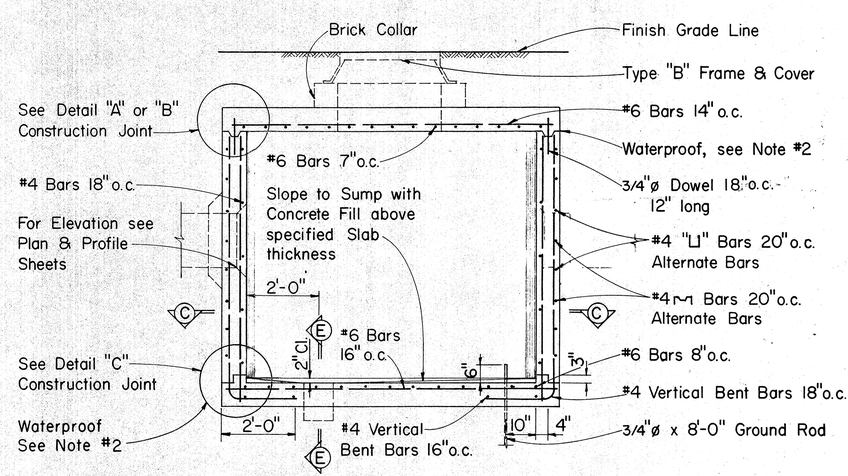
SECTION "C-C"

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



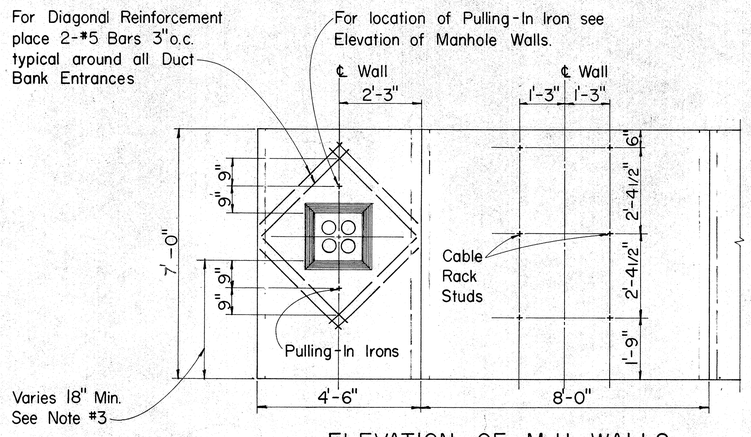
SECTION "B-B"

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



SECTION "A-A"

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



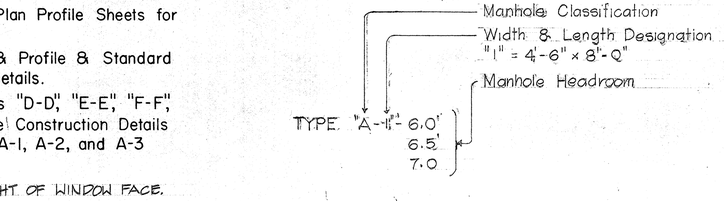
ELEVATION OF M.H. WALLS

(OPPOSITE FACES SIMILAR)

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

GENERAL NOTES

1. Design Data:
   f_s = 20,000 psi; f'_c = 3,000 psi; f_c = 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 "A", "B", "C", Sections "D-D", "E-E", "F-F", and other miscellaneous Manhole Construction Details see Supplement Sheet to Type A-1, A-2, and A-3 Telephone Manholes.
6. SEE UTILITY PROFILES FOR HEIGHT OF WINDOW FACE.



APPROVED:

L. Desi for Mgr. 8/4/76

Hawaiian Telephone Co., Ltd. Date

H. T. Co., Ltd. Drawing No. 34060

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPE A-1 MANHOLES FOR 6.0' TO 7.0' HEADROOM

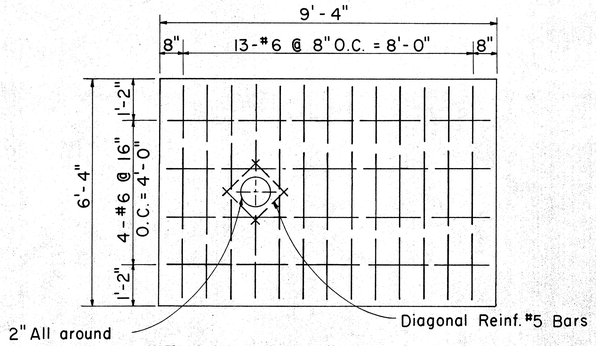
Scale: As Noted Date: AUG 4 1976

SHEET No. 16 OF 43 SHEETS

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

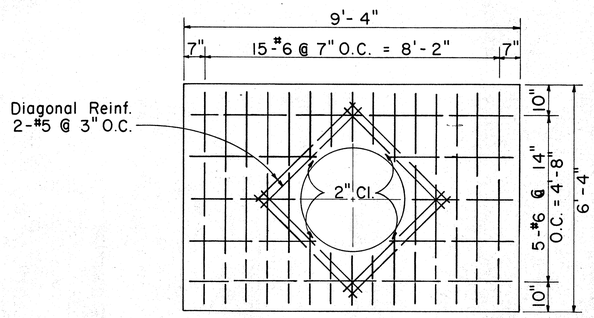
C-5-7

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(33)15	1977	193	350



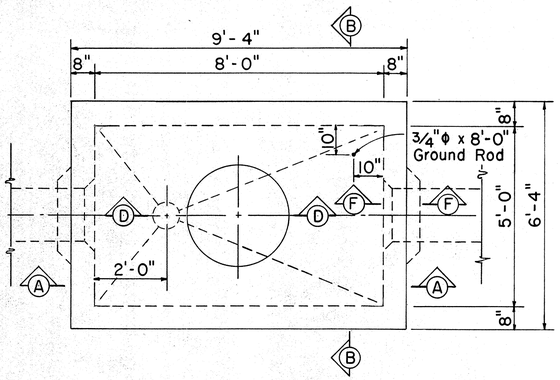
FLOOR SLAB REINF. PLAN

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



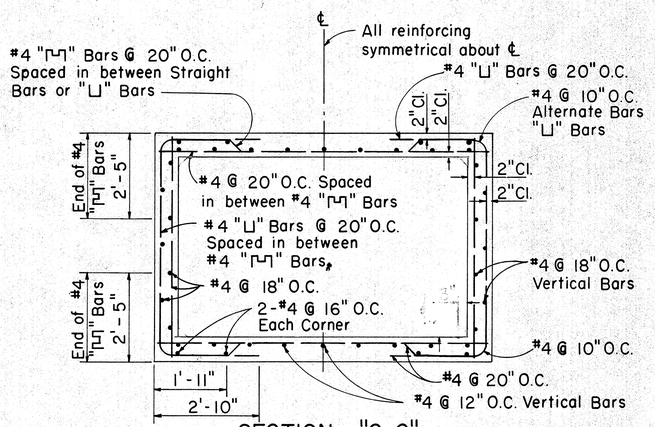
ROOF SLAB REINF. PLAN

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



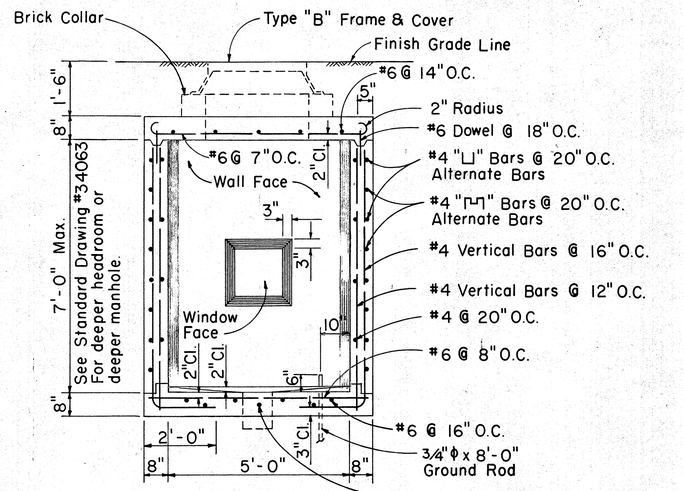
PLAN - M.H. TYPE "A-2" SERIES FOR ROADWAY & SIDEWALK AREAS

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



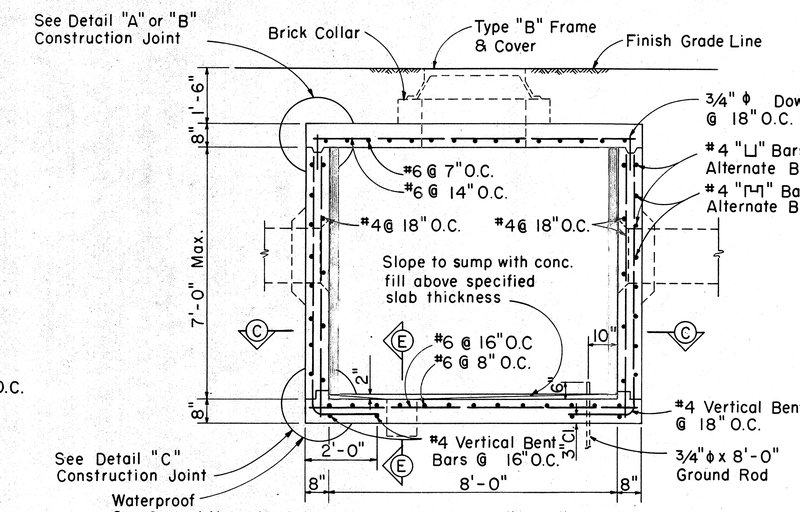
SECTION "C-C"

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



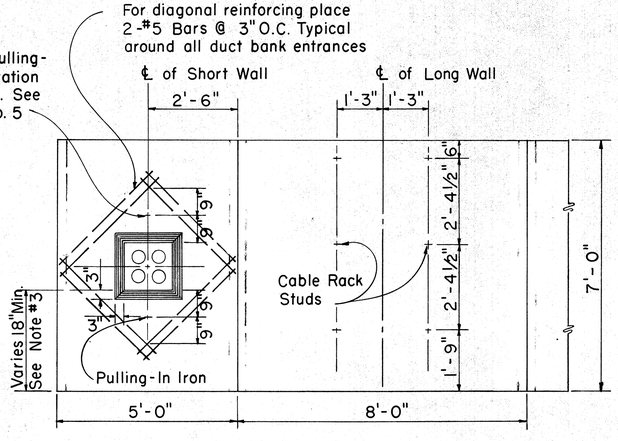
SECTION "B-B"

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



SECTION "A-A"

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



ELEVATION OF M.H. WALLS - TYPE "A-2" SERIES

(OPPOSITE FACES SIMILAR)

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

GENERAL NOTES:

1. Design Data:
   fs= 20,000 psi; f'c= 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 "A", "B", "C," Sections "D-D", "E-E", "F-F" and other miscellaneous Manhole Construction Details see Supplement Sheet to Type "A-1," "A-2" and "A-3" Telephone Manholes.
6. SEE UTILITY PROFILES FOR HEIGHT OF WINDOW FACE.

TYPE "A-2"-6.0'
6.5'
7.0'

Manhole Classification
Width & Length Designation "2" = 5.0' x 8.0'
Manhole Headroom

APPROVED
L. Dean for RLY 8/11/76
HAWAIIAN TELEPHONE CO. DATE

H.T. Co., Ltd. Drawing No. 34062

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPE "A-2" MANHOLES FOR 6.0' TO 7.0' HEADROOM

Scale: As Noted Date: AUG 4 1976

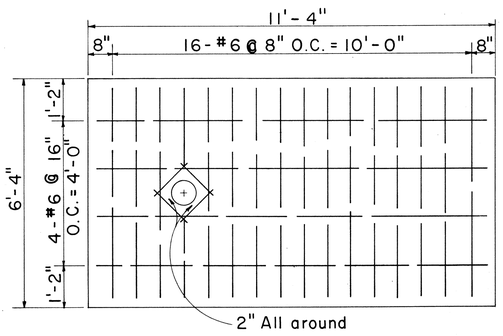
SHEET No. 17 OF 43 SHEETS

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

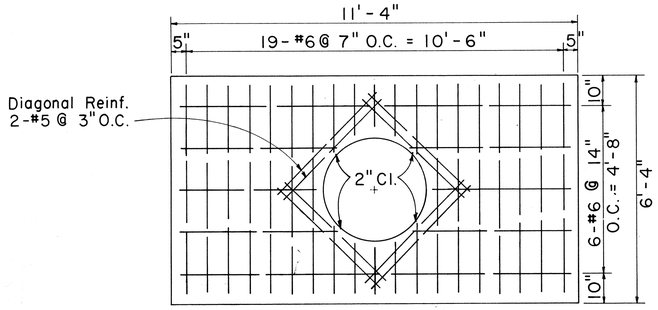
C-8-7

193

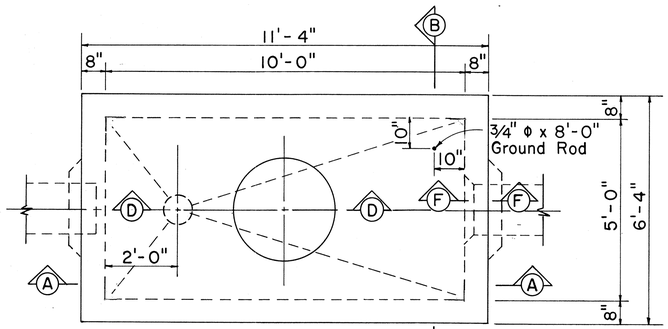
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(99):15	1977	194	350



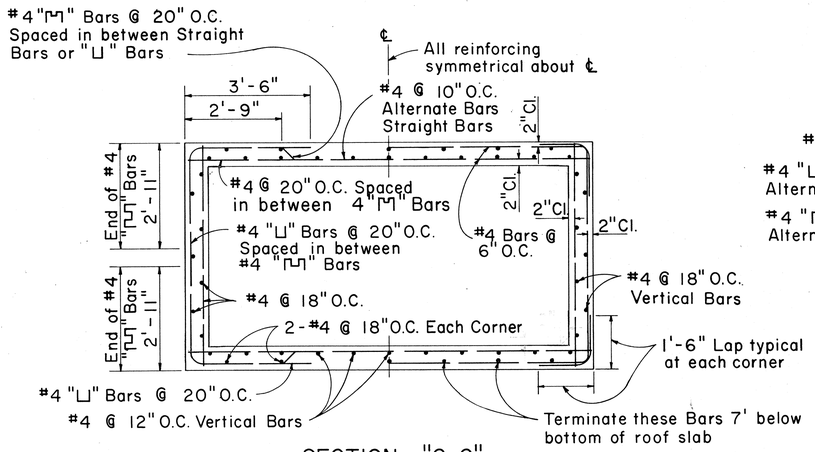
FLOOR SLAB REINF. PLAN
Scale: 1/2"=1'-0"



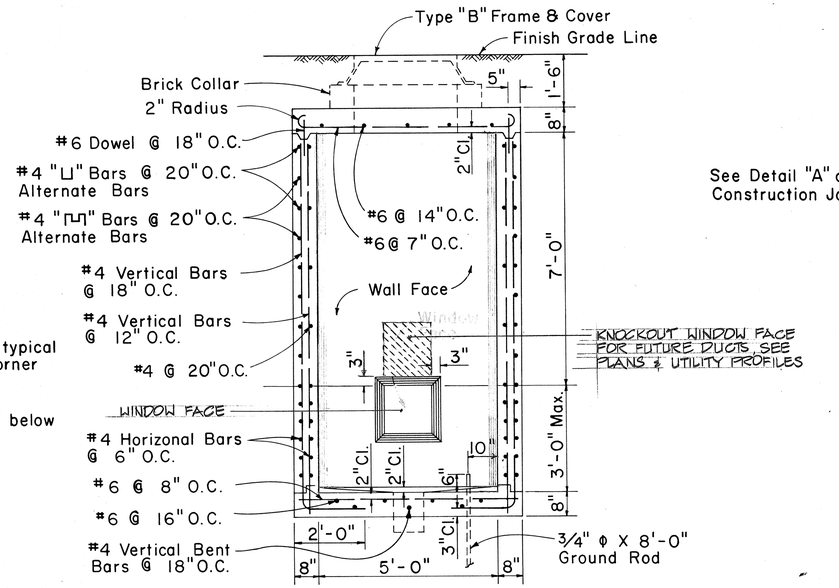
ROOF SLAB REINF. PLAN
Scale: 1/2"=1'-0"



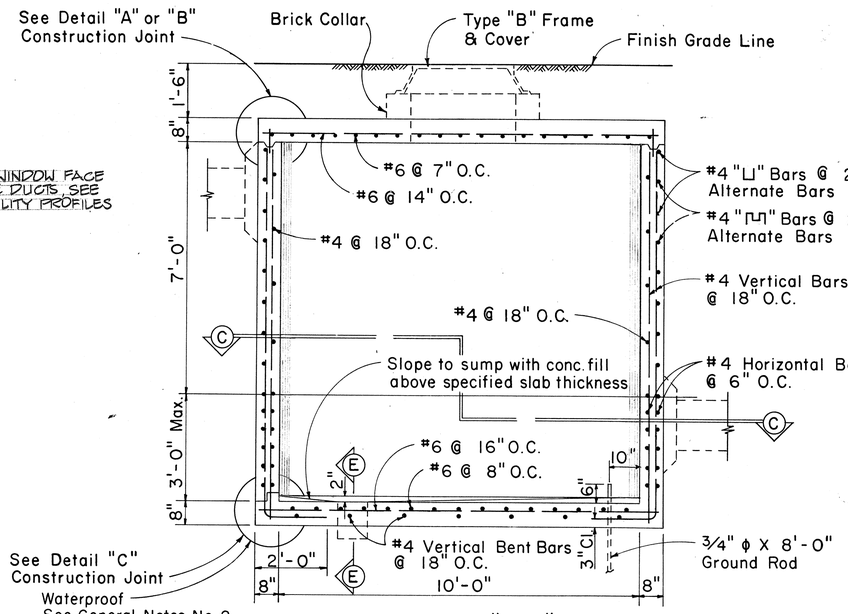
PLAN - M.H. TYPE "A-3" SERIES
FOR ROADWAY & SIDEWALK AREAS
Scale: 1/2"=1'-0"



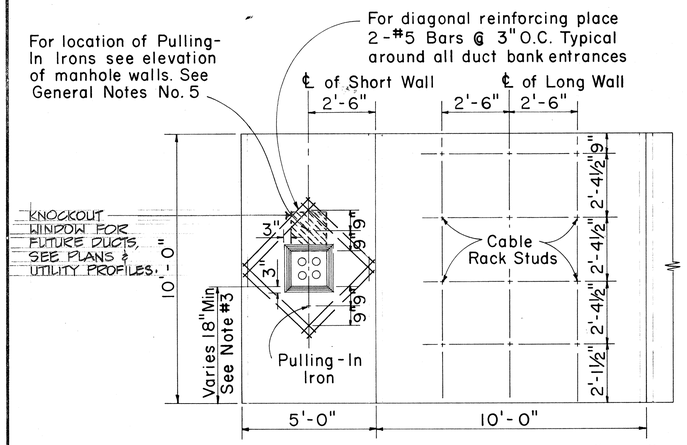
SECTION "C-C"
Scale: 1/2"=1'-0"



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; f'c= 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 "A", "B", "C", Sections "D-D", "E-E", "F-F" and other miscellaneous Manhole Construction Details see Supplement Sheet to Type "A-1", "A-2" and "A-3" Telephone Manholes.
6. Step and Ladder required only in Manholes with Headroom of 9.0' or more. Step and Ladder to be furnished by H.T.CO.
7. SEE SHT 203 FOR CABLE RACK DIMENSION FOR A-3-B CXR ONLY.
8. SEE UTILITY PROFILES FOR HEIGHT OF WINDOW FACE.

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

TYPE "A-3"-7.5'
8.0
8.5
9.0
9.5
10.0

APPROVED:

Hawaiian Telephone Co., Ltd. — Date 8/1/76

H.T. Co., Ltd. Drawing No. 34065

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPE "A-3" MANHOLES FOR 7.5' TO 10.0' HEADROOM

Scale: As Noted Date: AUG 4 1976

SHEET No. 18 OF 43 SHEETS

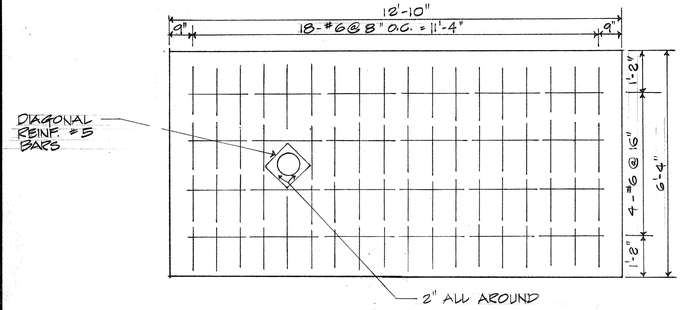
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	"
NOTE BOOK	TRACED BY	"
	DESIGNED BY	"
No.	QUANTITIES BY	"
	CHECKED BY	"

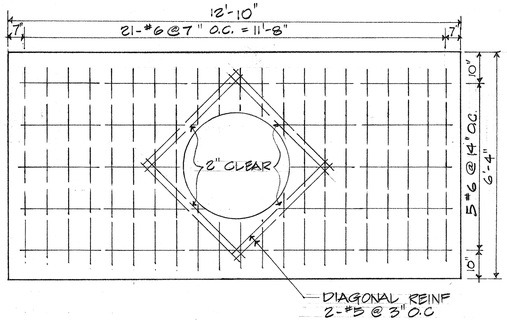
C-5-7

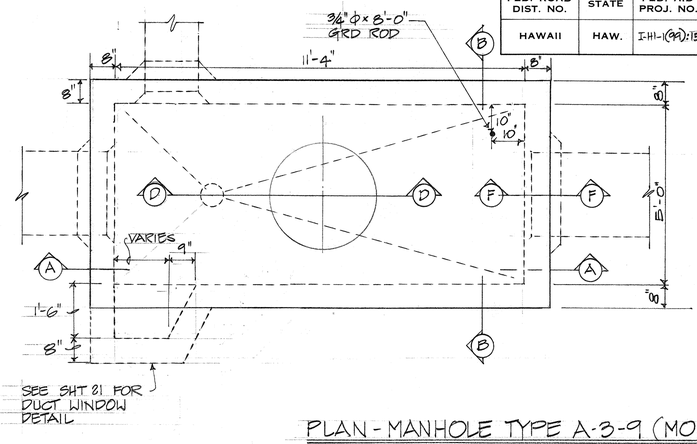
194

HT-12

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(69):15	1977	195	350

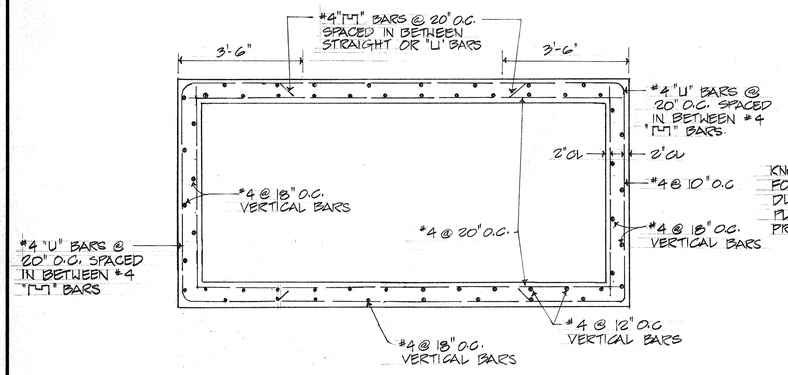






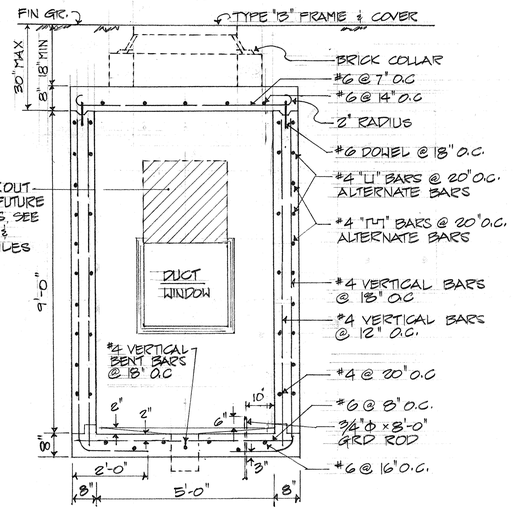
FLOOR SLAB REINF. PLAN

SCALE: ½"= 1'-0"



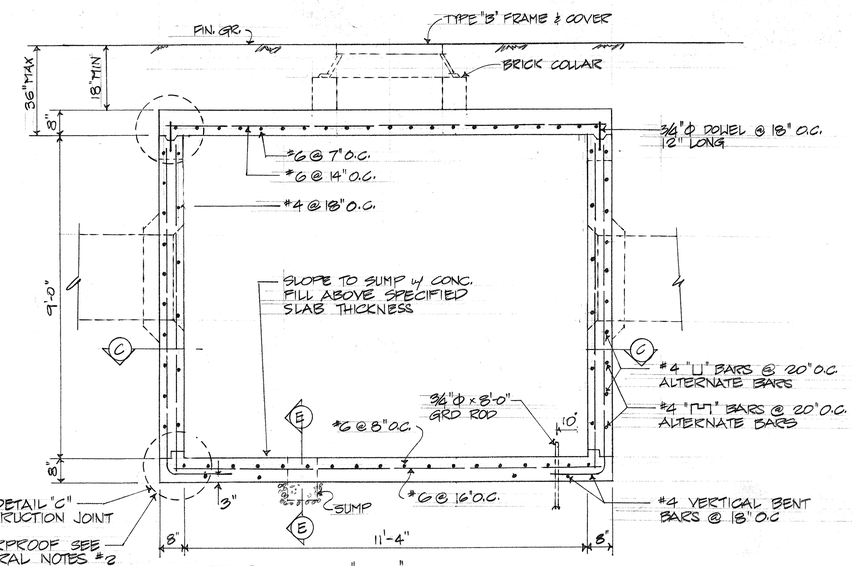
ROOF SLAB REINF PLAN

SCALE: ½"= 1'-0"



PLAN - MANHOLE TYPE A-3-9 (MODIFIED) FOR ROADWAY & SIDEWALK AREAS

SCALE: ½"= 1'-0"



SECTION "C-C"

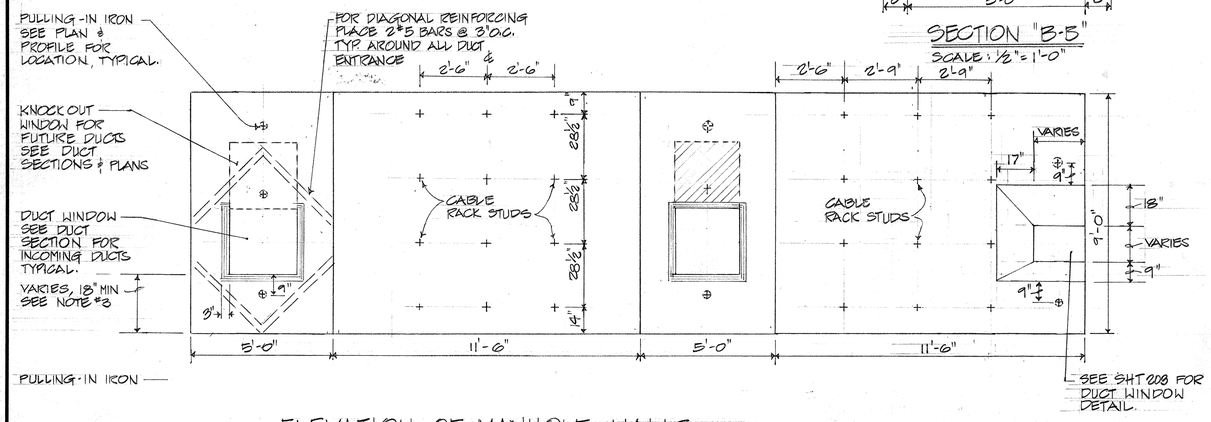
SCALE: ½"= 1'-0"

SECTION "B-B"

SCALE: ½"= 1'-0"

SECTION "A-A"

SCALE: ½"= 1'-0"



ELEVATION OF MANHOLE WALLS

SCALE: ⅜"= 1'-0"

GENERAL NOTES:

1. DESIGN DATA:
   f_s= 20,000 PSI; f'_c= 3,000 PSI; f_c=1,350 PSI; n=10
   w = EQUIVALENT FLUID PRESSURE : 30 #/ft²
2. ALL CONSTRUCTION JOINTS SHALL BE WATERPROOFED W/ TWO APPLICATION 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 "A", "B", "C", SECTIONS "D-D", "E-E" "F-F" & OTHER MISCELLANEOUS MANHOLE CONSTRUCTION DETAILS SEE SUPPLEMENT SHEET TO TYPE, "A-2" & "A-3" TELEPHONE MANHOLES.
6. SEE UTILITY PROFILES FOR HEIGHT OF WINDOW FACE.

APPROVED:

L. Quai for Mgr. 8/6/76

HAWAIIAN TELEPHONE CO. LTD. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPE "A-3" (MODIFIED) MANHOLE FOR 7.0' TO 9.0' HEADROOM

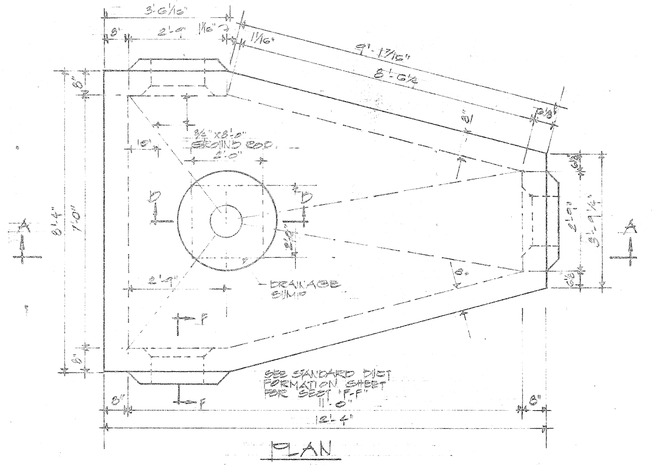
SCALE: AS NOTED DATE AUG 4 1976

SHEET No. 19 OF 43 SHEETS

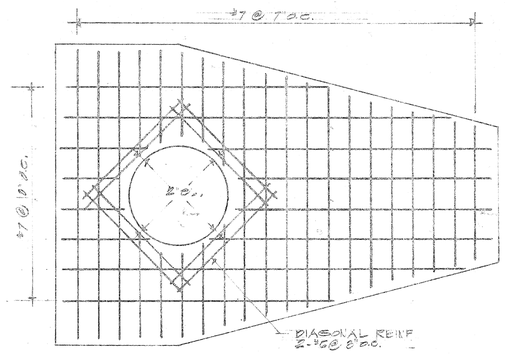
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	
	TRACED BY	
NOTE BOOK	DESIGNED BY	
	QUANTITIES BY	
No.	CHECKED BY	

PRINTED ON NO. 1000H CLEARPRINT

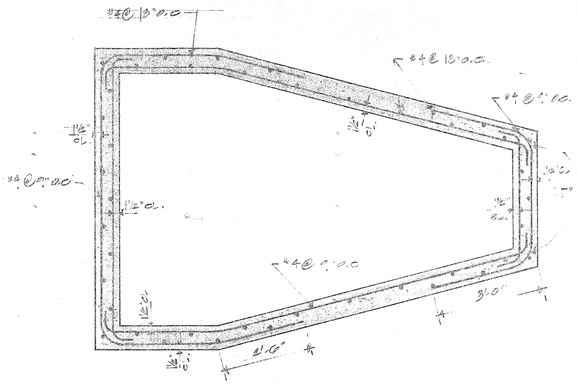
FED ROAD DIST NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEET
HAWAII	HAW	I-HI-1(99):15	1977	196	350



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



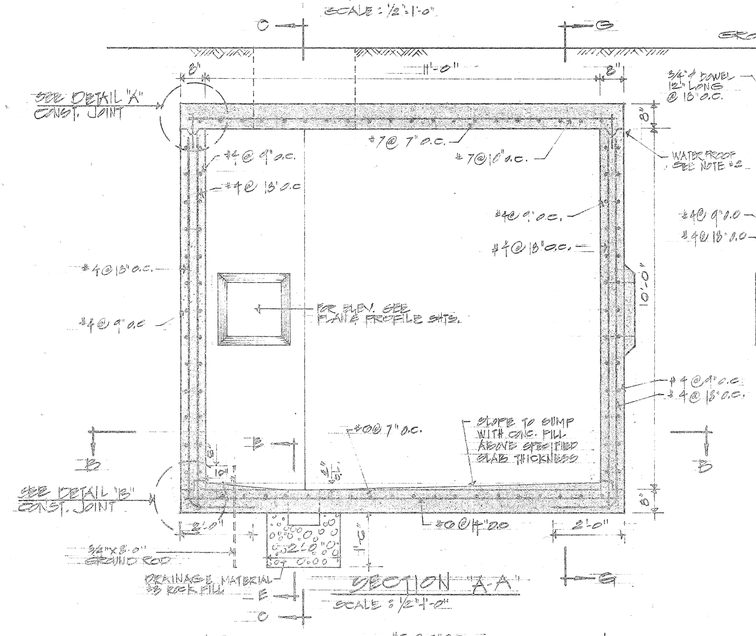
ROOF SLAB REINF PLAN
SCALE 1/2"=1'-0"



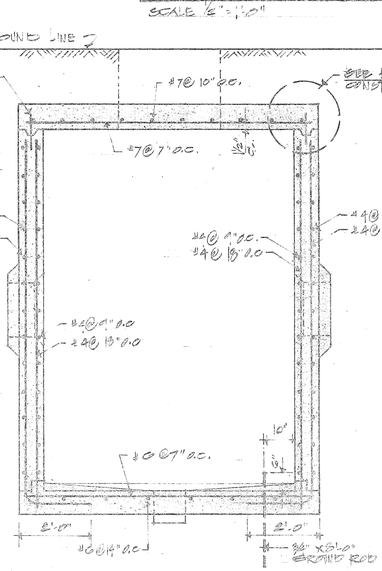
SECTION "B-B"
SCALE : 1/2"=1'-0"

GENERAL NOTES

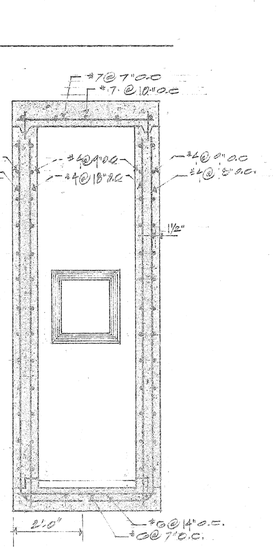
1. DESIGN DATA
   f'_c = 2,000 PSI.
   f_c = 1,200 PSI, f_s = 20,000 PSI
   n = 10
   W = REIN. CONC. UNIT WEIGHT = 150 PCF
2. ALL CONSTRUCTION JOINTS SHALL BE WATERPROOFED WITH THE APPLICATION OF THORO-SEAL OR EQUAL.
3. FIRST WINDOW TO BE 8'0" SEE PLAN & PROFILE STANDARD DETAIL SHEETS FOR LOCATION & DETAILS.



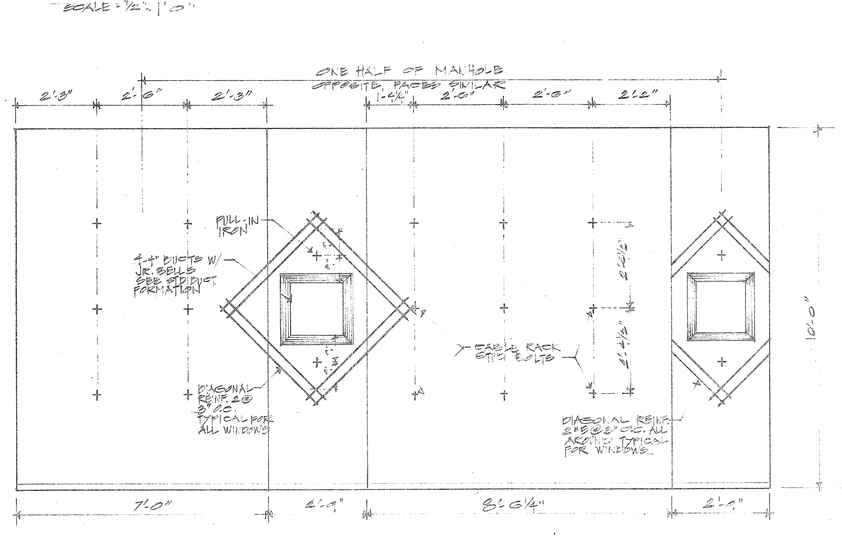
SECTION "A-A"
SCALE : 1/2"=1'-0"



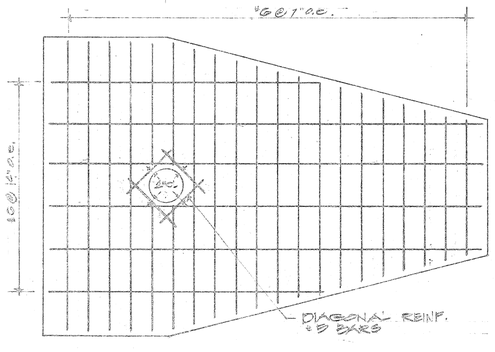
SECTION "C-C"
SCALE : 1/2"=1'-0"



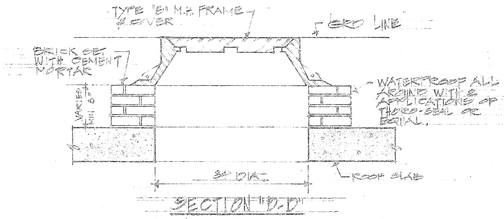
SECTION "E-E"
SCALE 1/2"=1'-0"



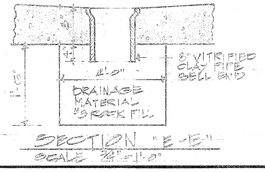
TYPICAL ELEVATION OF INSIDE WALLS
SCALE : 1/2"=1'-0"



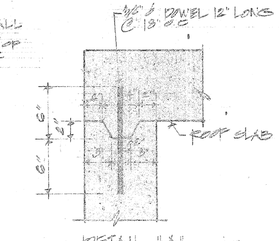
FLOOR SLAB REINF. PLAN
SCALE : 1/2"=1'-0"



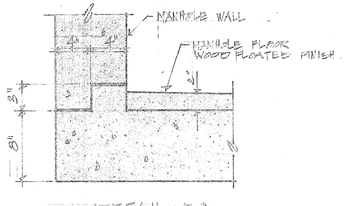
SECTION "D-D"
M.H. COVER DETAIL
SCALE : 3/4"=1'-0"



SECTION "E-E"
SCALE 3/4"=1'-0"



DETAIL "A"
TOP CONST JOINT
SCALE : 1/2"=1'-0"



DETAIL "B"
BOTTOM CONST JOINT
SCALE 1/2"=1'-0"

APPROVED
L. Nani for LY. 8/2/76
HAWAIIAN TELEPHONE Co LTD DATE
H. T. Co., Ltd Drawing No. 587-0002-1

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPE "V-1" (MODIFIED) MANHOLE FOR 10.0' HEADROOM

MANHOLE FOR ROADWAY AND SIDEWALK AREAS

SCALE : AS NOTED DATE AUG 4 1976

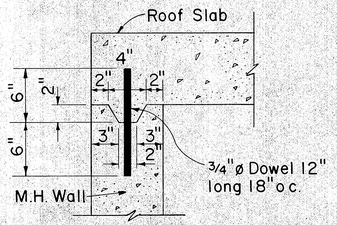
SHEET No. 20 OF 43 SHEETS

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

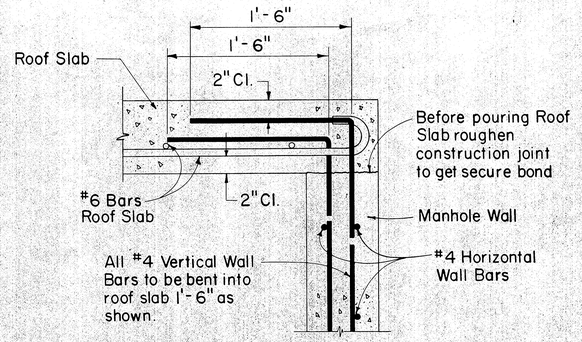
V-1-1

STK NO. 80-5108

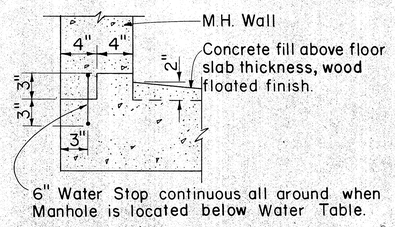
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	[illegible]	1977	197	350



DETAIL "A"
TOP CONSTRUCTION JOINT
Scale: 1 1/2" = 1'-0"
(Optional for cast-in-place construction
Required for precast construction)

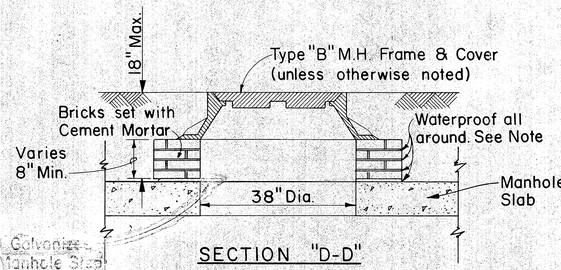


DETAIL "B"
(USED FOR CAST-IN-PLACE CONSTRUCTION)
Scale: 1 1/2" = 1'-0"

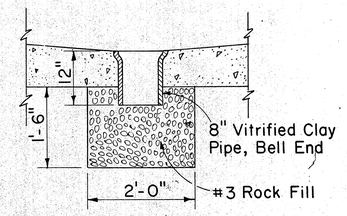


DETAIL "C"
BOTTOM CONSTRUCTION JOINT
Scale: 1 1/2" = 1'-0"

NOTE:
Corbel Bricks to suit Type A Frame & Cover.

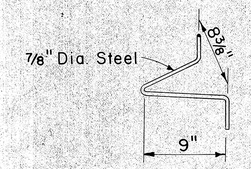


SECTION "D-D"
M.H. COVER DETAIL
Scale: 3/4" = 1'-0"

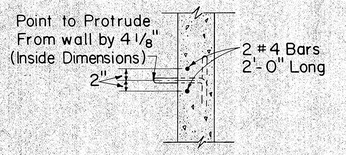


SECTION "E-E"
M.H. SUMP DETAIL
Scale: 3/4" = 1'-0"

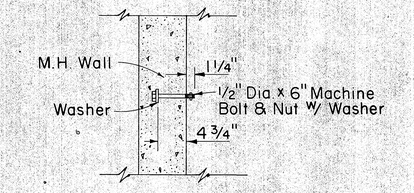
Note:
See Section "E1-E1" Below



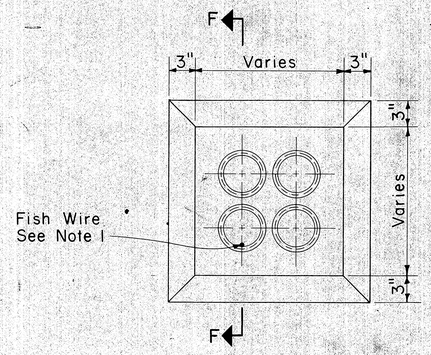
PULLING-IN IRON



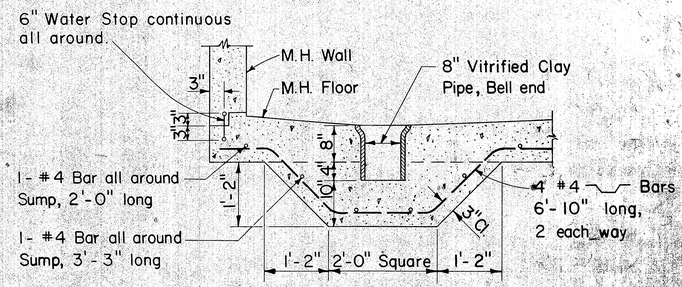
SECTIONAL VIEW OF PULLING-IN IRON
Scale: 3/4" = 1'-0"



CABLE RACK STUD BOLT DETAIL
Scale: 1" = 1'-0"

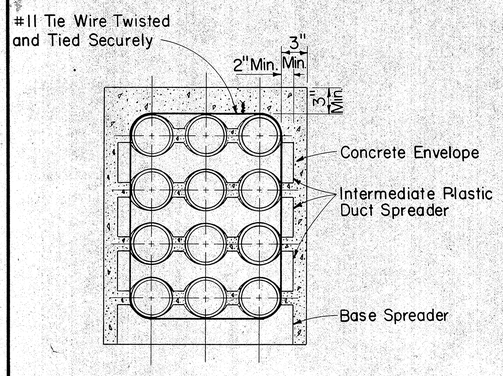


TYPICAL MANHOLE DUCT WINDOW
Scale: 1 1/2" = 1'-0"

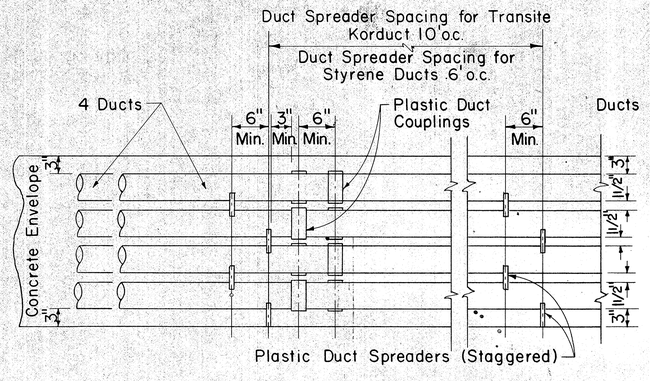


Note: Only for manholes located below water table

SECTION "E1-E1"
MANHOLE SUMP DETAIL
Scale: 3/4" = 1'-0"

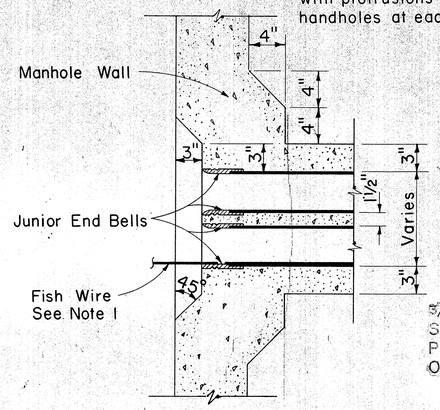


SECTION SHOWING SPACERS

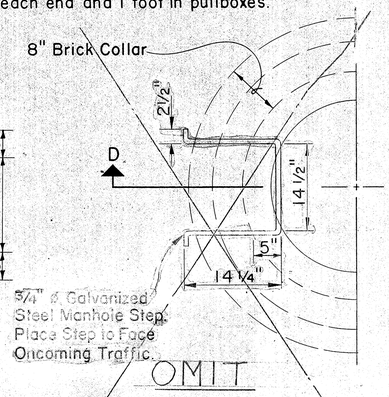


TYPICAL DUCT ENVELOPE ELEVATION
ARRANGEMENT OF COUPLING & PLASTIC SPACERS
Scale: 1" = 1'-0"

NOTE
1. The Contractor shall place #12 Fish Wire in designated duct throughout its entire length with protrusions of 2 feet in manholes & handholes at each end and 1 foot in pullboxes.



SECTION "F-F"
TYPICAL WINDOW DETAIL & JUNIOR END BELL
Scale: 1 1/2" = 1'-0"



PART-PLAN MANHOLE STEP
Scale: 1"=1'-0"

Supplement Sheet to Type "A-1" (Drawing Nos. 34060 & 34061) Type "A-2" (Drwg. Nos. 34062 & 34063) and Type "A-3" (Drwg. Nos. 34064 & 34065) Telephone M.H.

APPROVED:

L. Dean for KJ. 8/4/76

Hawaiian Telephone Co., Ltd. Date

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

TYPE "A" MANHOLE AND MISCELLANEOUS TELEPHONE DETAILS

Scale: As Noted Date: AUG 4 1976

SHEET No. 21 OF 43 SHEETS

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-(33)15	1977	198	350

GENERAL NOTES:

1 Design Data
- fs = 20,000 psi
- f'c = 3,000 psi
- fc = 12,000 psi
- n = 10
- w = Equiv. Fluid Pressure 30 #/Ft²

2 Minimum overlap for a Lapped Splice shall be 24 Bar Dia. but not less than 12". Lap of Adjacent Bars shall not be in same location.

3 Unless otherwise indicated, for Vertical Location of Duct Windows see Profile Sheet.

4 Manhole Walls shall be Doubled Formed.

5 All Concrete shall be cured by an Impervious Liquid Membrane Compound.

6 Concrete shall not be loaded, except by its own weight, until 28 Days have passed since placement

7 All Construction Joints shall be Waterproofed with Two Applications of Thoro-Seal or equal.

8 Cap all Ducts and Stubouts.

9 Concrete shall be Class A and shall have a Compressive Strength of 3000 psi in 28 Days with a Slump of 3".

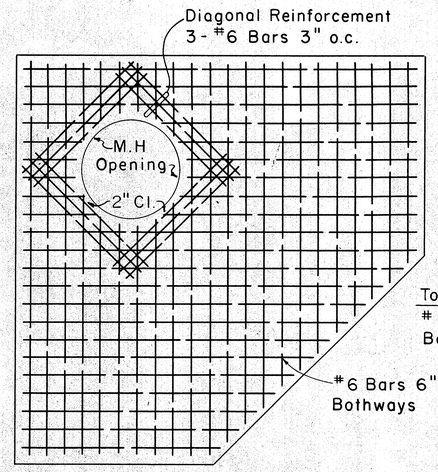
10 Concrete Admixture shall be 2½ Lbs. "Tricosol Normal" per Cubic Yard.

11 For Details "A", "B", "C", Sections "D-D", "E-E", "F-F" and other Miscellaneous Manhole Construction Details see Supplement Sheet to A-1, A-2, and A-3 Telephone Manholes.

12 APPLY DAMPPROOFING TO THE SURFACES OF REINF. CONCRETE THAT ARE IN CONTACT W/ THE EARTH EXCLUDING THE UNDERSIDE OF THE FLOOR SLAB. MATERIAL & APPLICATION SHALL BE ACCORDING TO THE 1961 EDITION OF THE "STATE" HIGHWAY DEPT. STANDARD SPEC. FOR ROAD & BRIDGE CONSTRUCTION.

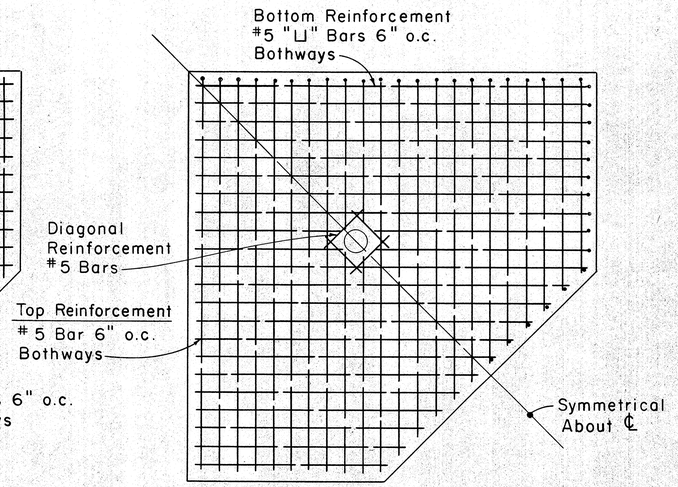
13 WHERE MANHOLE IS LOCATED BELOW THE WATER TABLE ALL CONSTRUCTION JOINTS SHALL BE WATERPROOFED W/ A CONTINUOUS STRIP OF RUBBER WATERSTOP.

14 SEE UTILITY PROFILES FOR HEIGHT OF DUCT WINDOW FACE.



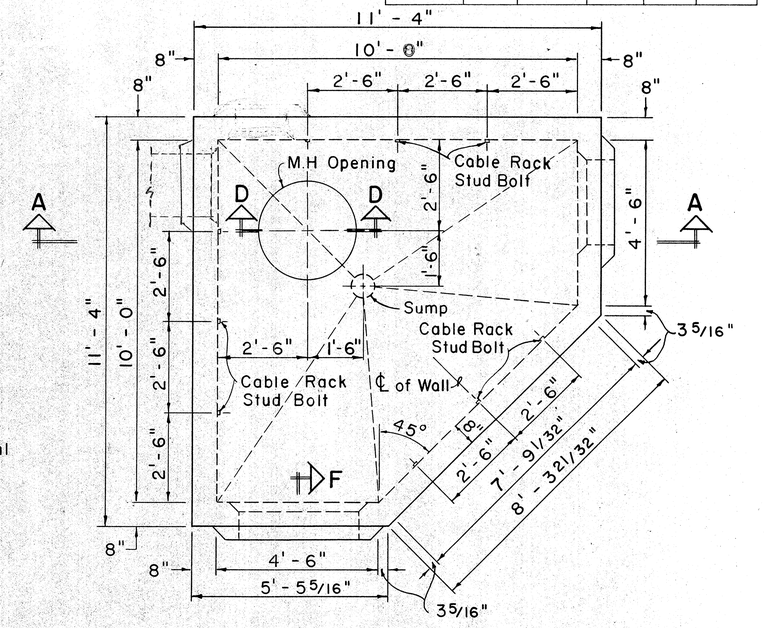
ROOF SLAB REINF. PLAN

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



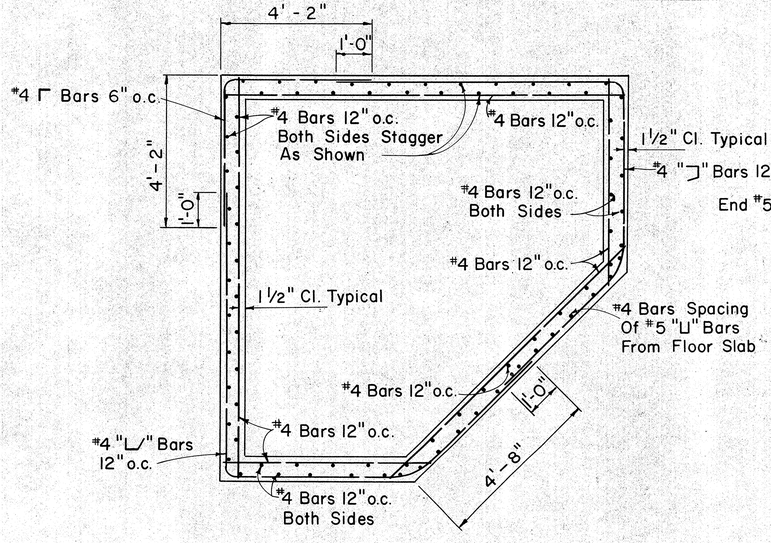
FLOOR SLAB REINF. PLAN

(Showing Top & Bottom Reinf.)
Scale: 1/2" = 1'-0"



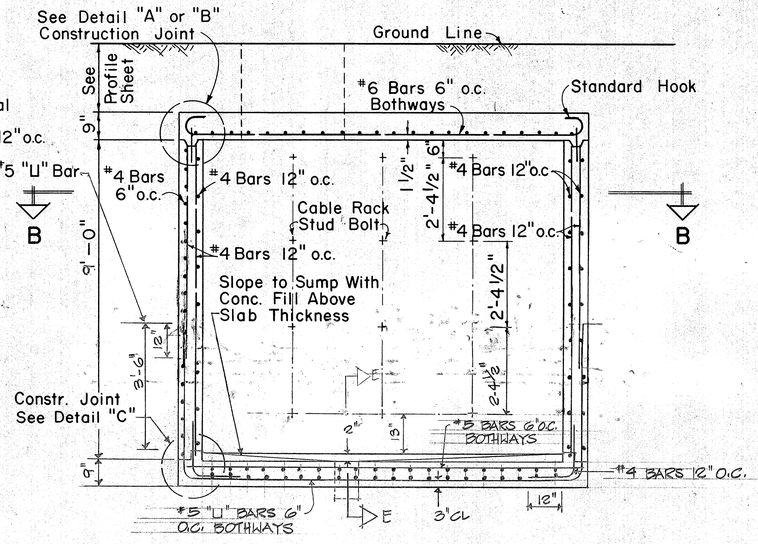
PLAN

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



SECTION "B-B"

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



SECTION "A-A"

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

APPROVED:

L. Dean for Kg. 8/1/76

Hawaiian Telephone Co., Ltd. Date

H. T. Co., Ltd. Drawing No. 34034

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD CORNER
LARGE TYPE MANHOLE

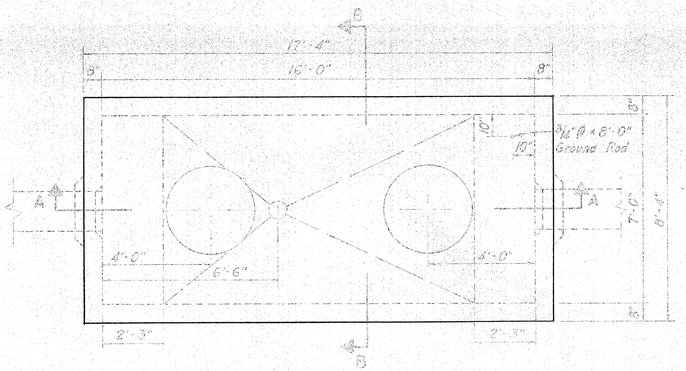
Scale: As Noted Date: AUG 4 1976

SHEET No. 22 OF 43 SHEETS

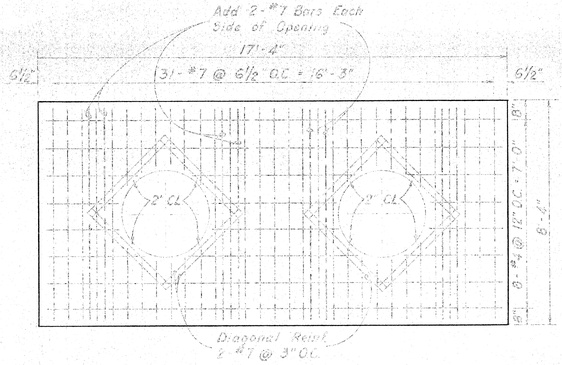
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	"
	TRACED BY	"
NOTE BOOK	DESIGNED BY	"
	QUANTITIES BY	"
No.	CHECKED BY	"

198

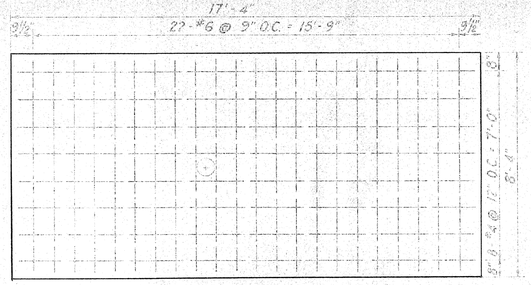
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HH(89)15	1977	199	350



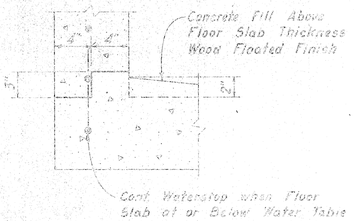
PLAN
SCALE: 3/16" = 1'-0"



ROOF SLAB REINFORCING PLAN
SCALE: 3/16" = 1'-0"

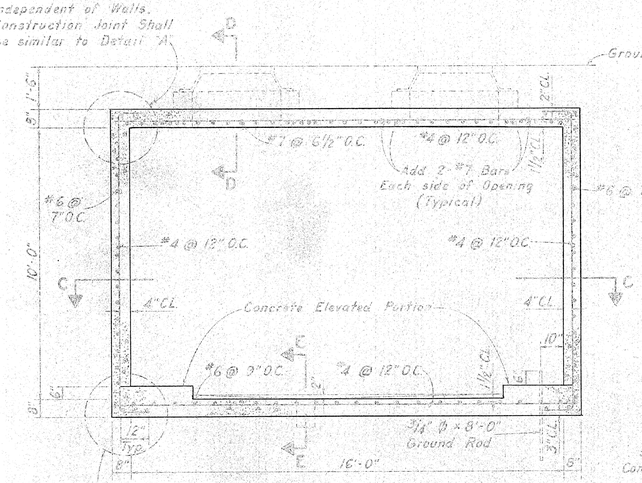


FLOOR SLAB REINFORCING PLAN
SCALE: 3/16" = 1'-0"

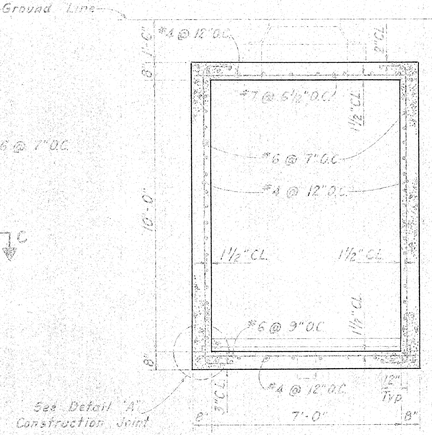


DETAIL "A"
SCALE: 1½" = 1'-0"

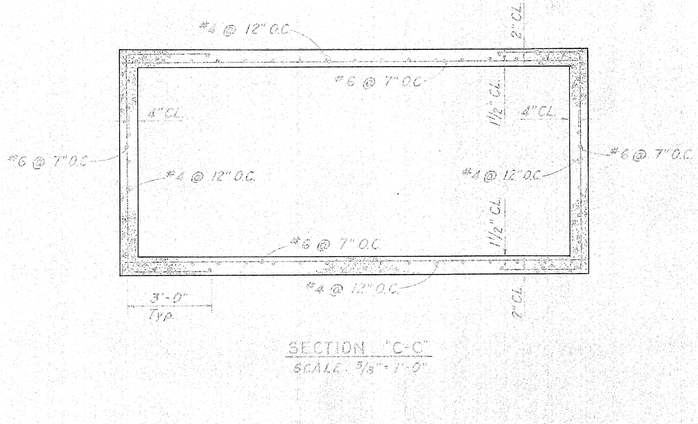
If Roof Slab is Poured Independent of Walls, Construction Joint Shall be similar to Detail "A"



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



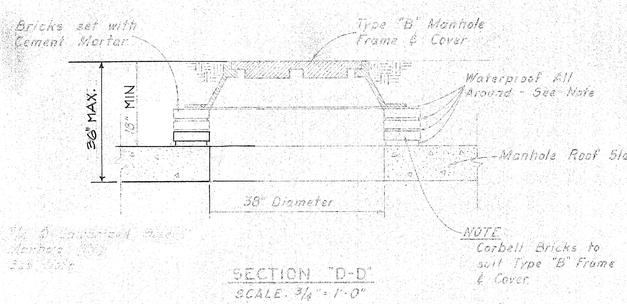
SECTION "B-B"
SCALE: 3/8" = 1'-0"



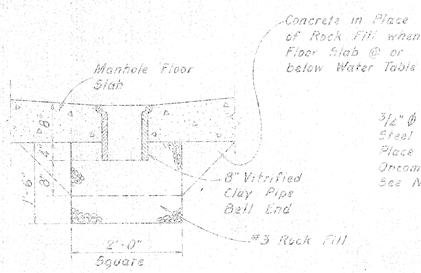
SECTION "C-C"
SCALE: 3/8" = 1'-0"

GENERAL NOTES:

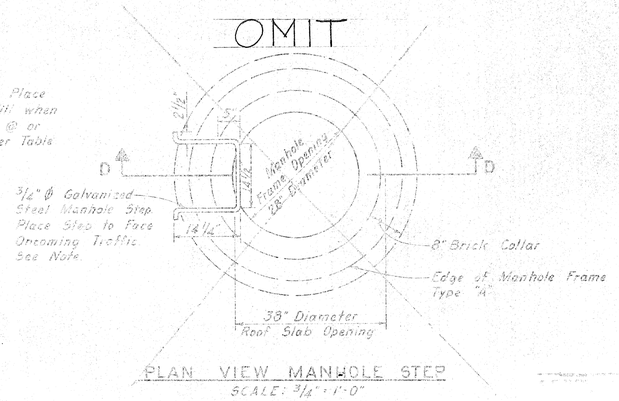
1. DESIGN DATA
   - f_s = 20,000 P.S.I.
   - f_c = 3,000 P.S.I., f_c = 1,350 P.S.I.
   - N = 10
   - W = Equiv. Fluid Press: 30 #/ft²
2. All Construction Joints Shall Be Waterproofed With Two Applications Of Thoro Seal Or Equal
3. For Duct Window Location See Plan Profile Sheets For Elevations.
4. Duct Window To Suit - See Plan & Profile & Standard Detail Sheets For Location & Details.
5. For Duct Window Details See Section "F-F" Standard Duct Formations & Manhole Details Sheet



SECTION "D-D"
SCALE: 3/4" = 1'-0"



SECTION "E-E"
SCALE: 3/4" = 1'-0"



PLAN VIEW MANHOLE STEP
SCALE: 3/4" = 1'-0"

SHT 1 OF 2

APPROVED

J. Davis for Mgr. 8/4/76
HAWAIIAN TELEPHONE CO. LTD. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPE 7'x16'x10' LOAD COIL MANHOLE

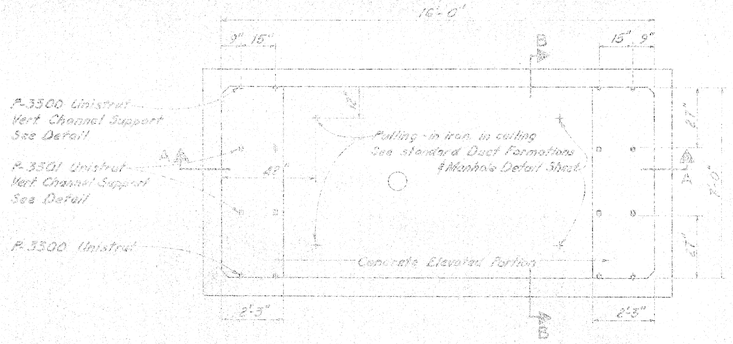
SCALE: AS NOTED DATE AUG 4 1976

SHEET No. 23 OF 43 SHEETS

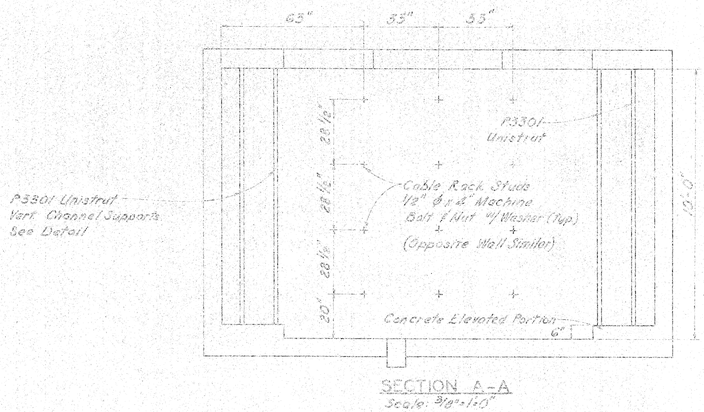
133

C-1-7

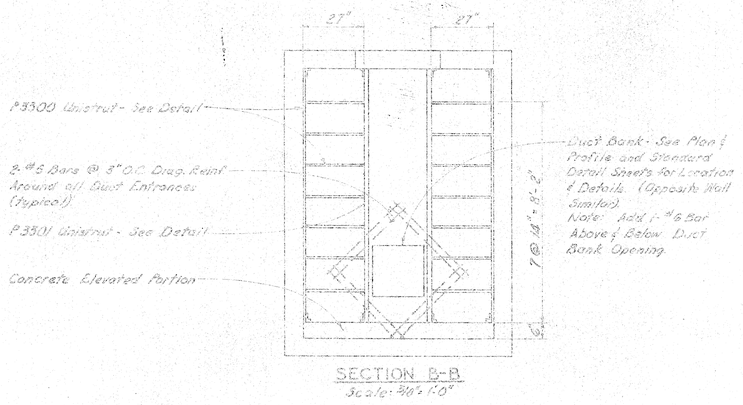
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H1-1(99)15	1977	200	350



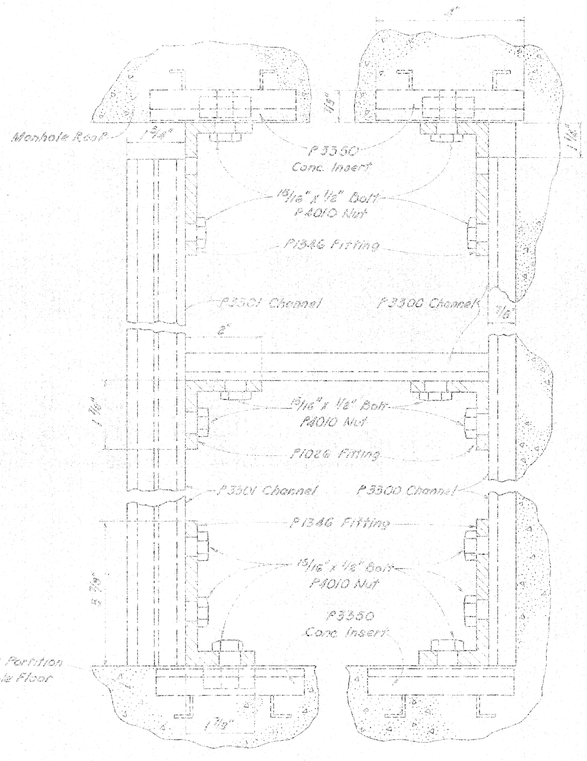
PLAN
Scale: 3/8"=1'-0"



SECTION A-A
Scale: 3/8"=1'-0"



SECTION B-B
Scale: 3/8"=1'-0"



TYP VERTICAL CHANNEL SUPPORTS DETAIL
Not To Scale

SHT 2 OF 2

APPROVED

S. Desai for Mgr. 8/1/76

HAWAIIAN TELEPHONE CO. LTD DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPE 7'x16'x10' LOAD COIL MANHOLE

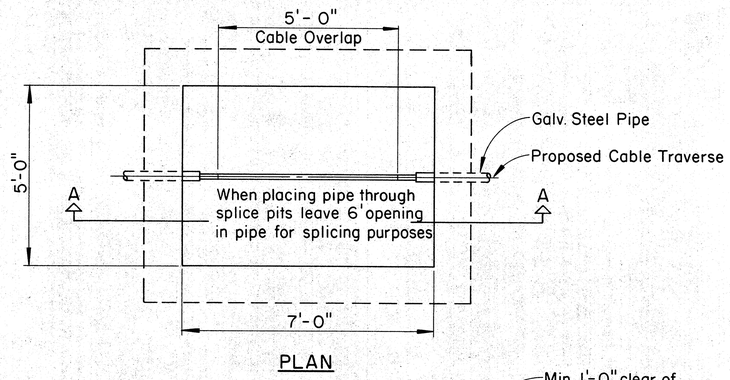
SCALE: AS NOTED DATE AUG 4 1976

SHEET NO. 24 OF 43 SHEETS

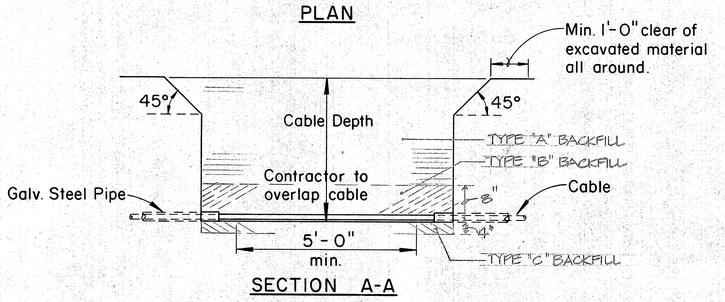
300

E-V-1

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	CMI-1(23)115	1977	201	350



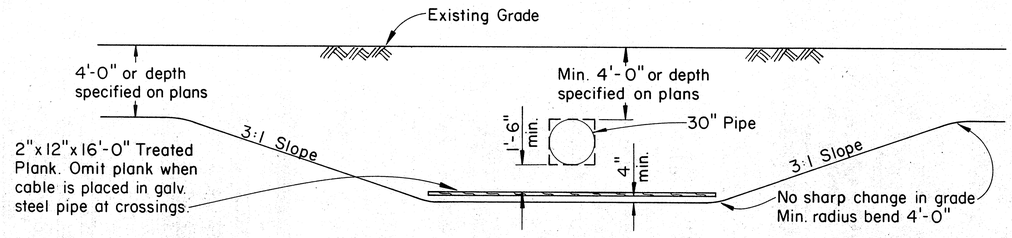
PLAN



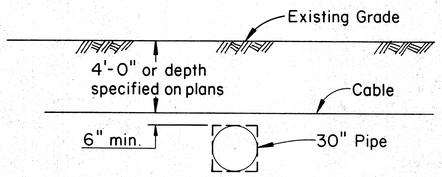
SECTION A-A

TYPICAL SPLICING PITS FOR BURIED CABLE

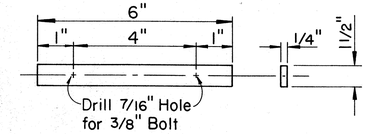
NOTES:
1. The Contractor shall dig pits at specified locations.
2. One face of pit shall be kept free of excavated material.
3. Where pits are located on sloping or irregular ground, the excavated material shall be placed in such a manner as to prevent surface water from draining into the pit.
4. Provide a fence around the pit at any location where stock have access to the route, and pits near farm homes to keep out small animals and pets.
5. SEE SHT 8 FOR BACKFILL MATERIALS DATA.



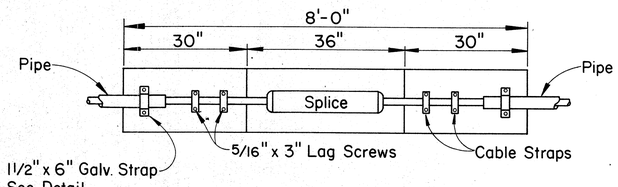
DETAIL OF CABLE CROSSING UNDER STORM CULVERTS-IRRIGATION PIPES, OTHER UTILITIES, OR FOREIGN PIPES



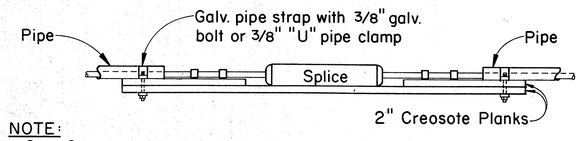
DETAIL OF CABLE CROSSING OVER STORM CULVERTS-IRRIGATION PIPES, OTHER UTILITIES, OR FOREIGN PIPES



GALVANIZED STRAP DETAIL



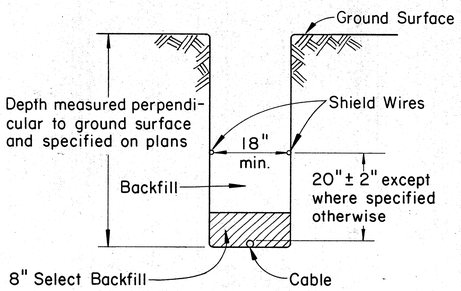
PLAN



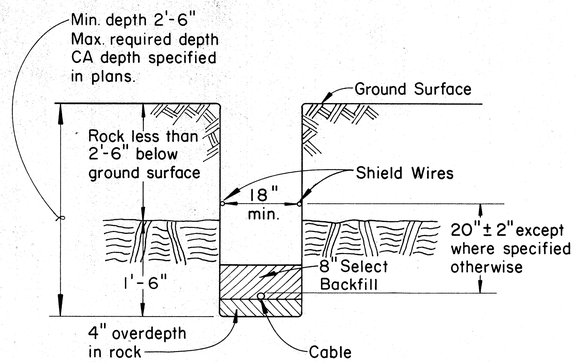
NOTE:
Galv. Strap may be substituted with pipe clamp.

ELEVATION

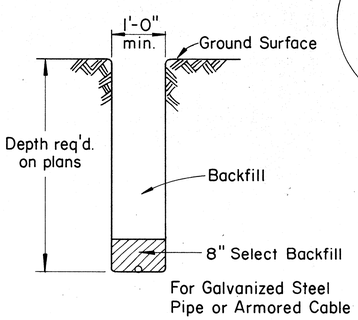
DETAIL OF SPLICE SUPPORT BETWEEN PIPE SECTIONS



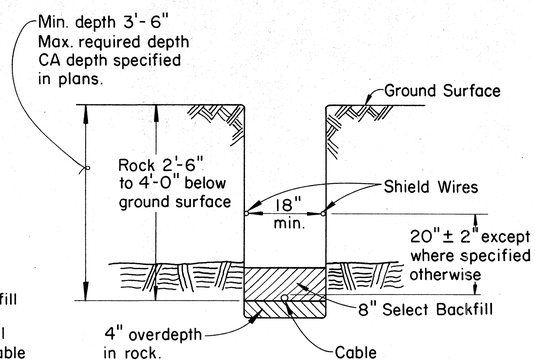
TYPICAL SECTION THROUGH NORMAL TRENCH



TYPICAL SECTION THROUGH TRENCH WITH ROCK LESS THAN 2'-6" BELOW SURFACE



TYPICAL SECTION FOR TRENCH WHERE NO SHIELD WIRE IS REQUIRED



TYPICAL SECTION THROUGH TRENCH WITH ROCK 2'-6" TO 4'-0" BELOW SURFACE

APPROVED:
J. Dees for RP
Hawaiian Telephone Co., Ltd. 8/1/76
Date

H.T. Co., Ltd. Drawing Nos. 34047 34048

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS SPLICING PITS AND STANDARD TRENCHING DETAILS FOR BURIED COAXIAL CABLE

Scale: Not to Scale DATE: AUG 4 1976

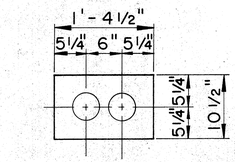
SHEET No. 25 OF 43 SHEETS

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

K&E IMPERIAL™ LA 3207

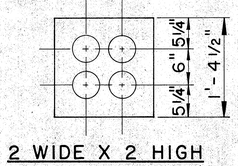
201

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(99)1E	1979	200	350



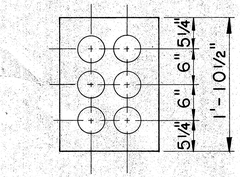
2 DUCTS

$\left(\frac{T}{2F-2}\right)$



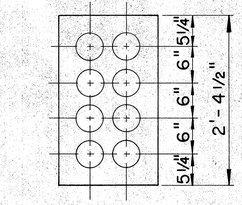
2 WIDE X 2 HIGH

$\left(\frac{T}{4F-2}\right)$



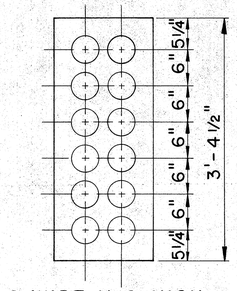
2 WIDE X 3 HIGH

$\left(\frac{T}{6F-2}\right)$



2 WIDE X 4 HIGH

$\left(\frac{T}{8F-2}\right)$



2 WIDE X 6 HIGH

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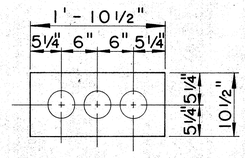

3 DUCTS

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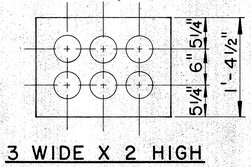
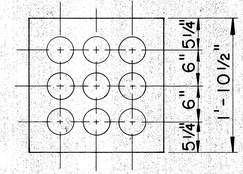


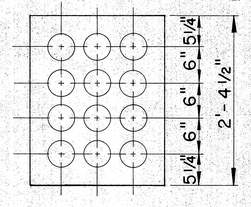
3 WIDE X 2 HIGH

$\left(\frac{T}{6F-3}\right)$



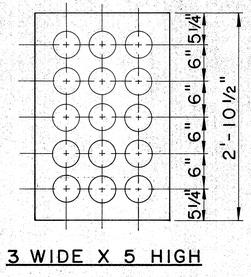
3 WIDE X 3 HIGH

$\left(\frac{T}{9F-3}\right)$



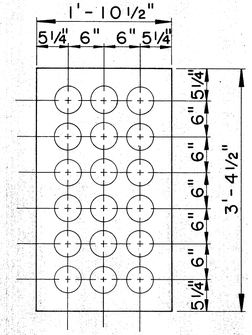
3 WIDE X 4 HIGH

$\left(\frac{T}{12F-3}\right)$



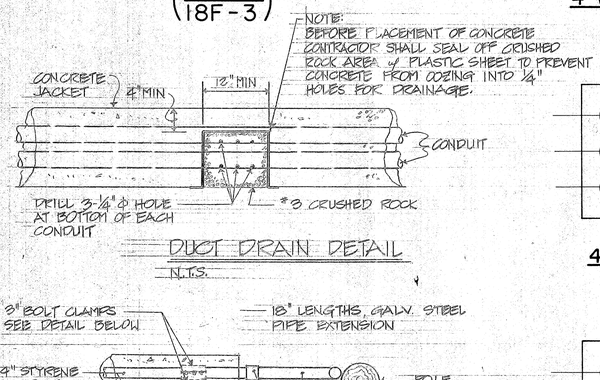
3 WIDE X 5 HIGH

$\left(\frac{T}{15F-3}\right)$



3 WIDE X 6 HIGH

$\left(\frac{T}{18F-3}\right)$



DUCT DRAIN DETAIL

N.T.S.

ELEVATION

TYPICAL INSTALLATION DETAILS

NOT TO SCALE

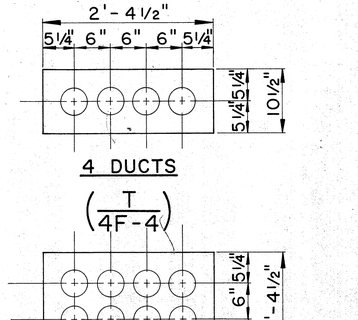
SECTION

3-BOLT CLAMP ADAPTOR DETAIL

N.T.S.

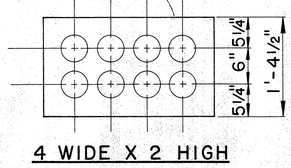
STANDARD DUCT FORMATIONS

Scale: 1"= 1'-0"



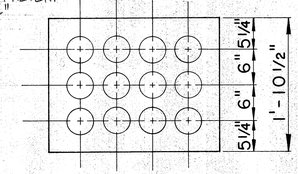
4 DUCTS

$\left(\frac{T}{4F-4}\right)$



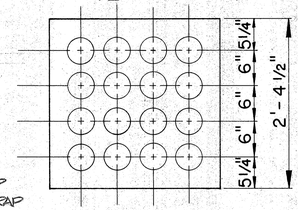
4 WIDE X 2 HIGH

$\left(\frac{T}{8F-4}\right)$



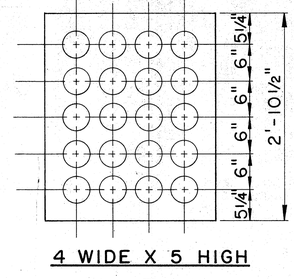
4 WIDE X 3 HIGH

$\left(\frac{T}{12F-4}\right)$



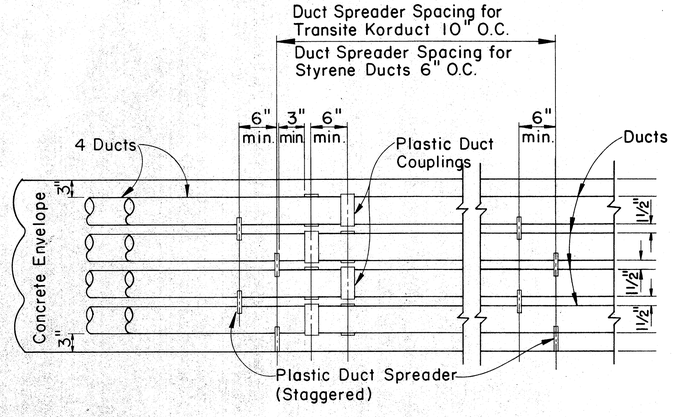
4 WIDE X 4 HIGH

$\left(\frac{T}{16F-4}\right)$



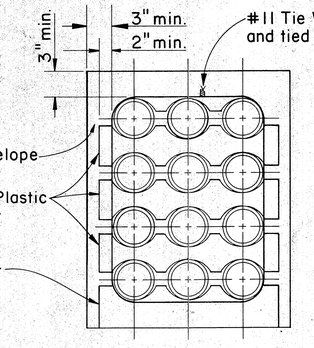
4 WIDE X 5 HIGH

$\left(\frac{T}{20F-4}\right)$



TYPICAL DUCT ENVELOPE ELEVATION ARRANGEMENT OF COUPLING & PLASTIC SPACERS

Scale: 1"= 1'-0"



NOTE:

1. The Contractor shall place #12 Fish Wire in designated duct throughout its entire length with protrusions of 2 feet in manholes & handholes at each end and 1 foot in pullboxes.

SECTION SHOWING SPACERS

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

$\left(\frac{T}{20F-4}\right)$

- Denotes H.T. Co.
- Denotes Number of ducts bottom layer
- Denotes 4 inch ducts
- Denotes Total Number Of Ducts

SYMBOL IDENTIFICATION

APPROVED:

L. Dean Loo Kee — 8/17/76

Hawaiian Telephone Co., Ltd. — Date

H.T. Co., Ltd. — Drawing No. 34028

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

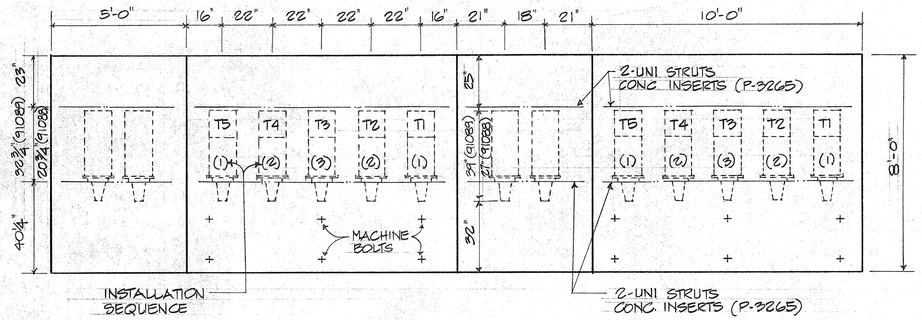
STANDARD DUCT FORMATIONS

Scale: As Shown — Date: AUG 4 1976

SHEET No. 26 OF 48 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(99)15	1977	203	350



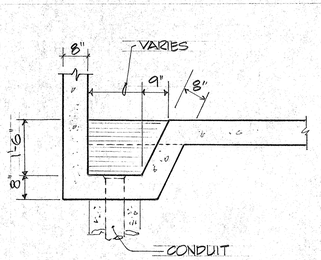
MANHOLE MOUNTING DETAILS (FOR M.H. TYPE A-3-B CXR ONLY)

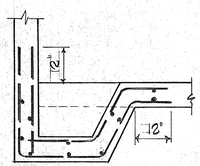
91088 OR 91089 REPEATER HOUSINGS

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

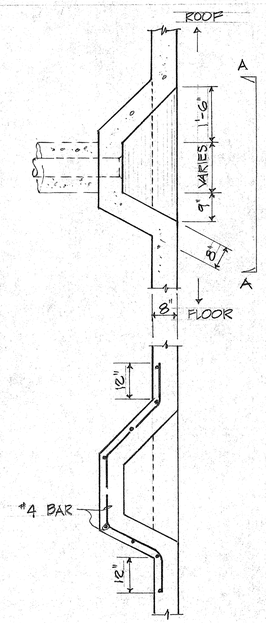
GENERAL NOTES:

1. EQUIPPED WEIGHT 91089 REPEATER HOUSING = 146 LBS.
   EQUIPPED WEIGHT 91088 REPEATER HOUSING = 75 LBS.
2. THE RECOMMENDED GROUND CLEARANCE FOR POLE MOUNTED PCM CARRIER HOUSINGS IS 8'-0"
3. REFER TO GSP'S 631-862-200 & 342-910-103 FOR ADD. INFORMATION.

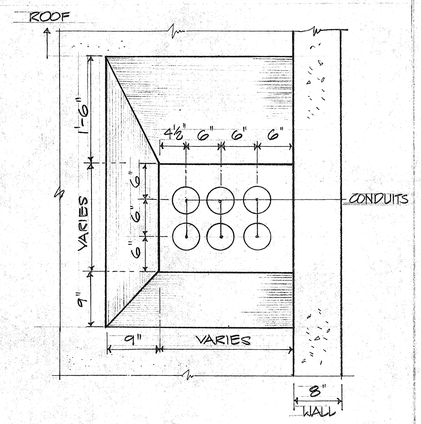




PLAN



ELEVATION



SECTION "A-A" (FOR SIX DUCTS)

RECESSED DUCT WINDOW DETAIL

(FOR MODIFIED MANHOLE TYPE A-3)

NOT TO SCALE

NOTES:

1. SEE UTILITY PROFILES FOR HEIGHT OF DUCT WINDOW FACE & FUTURE DUCT WINDOW REQUIREMENTS.
2. SEE PLANS FOR NUMBER OF INCOMING DUCTS.

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

APPROVED:

L Dean for Mgr. 8/5/76

HAWAIIAN TELEPHONE CO. LTD. DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

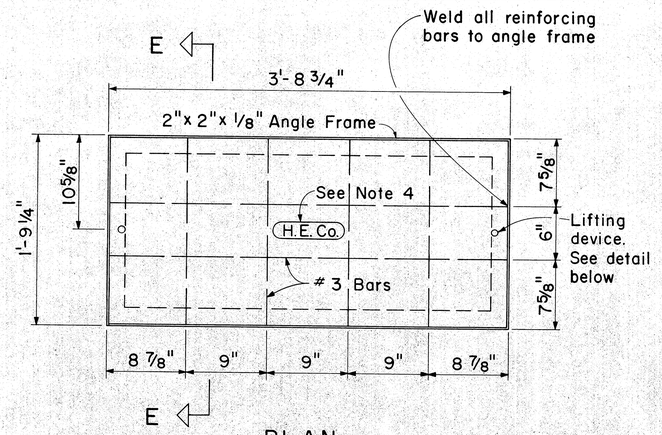
TYPE "A" MANHOLE MISCELLANEOUS DETAILS

SCALE: AS SHOWN DATE: AUG 4 1976

SHEET No. 27 OF 48 SHEETS

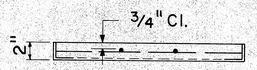
PRINTED ON NO. 1000H CLEARPRINT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	R-III-1(39)15	1977	204	350



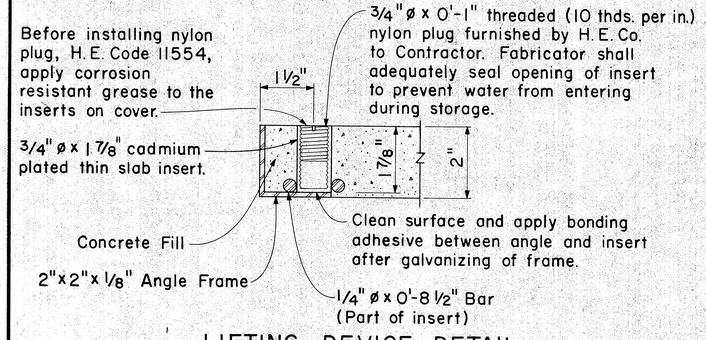
PLAN

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



SECTION E-E

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



LIFTING DEVICE DETAIL

Scale: 1/2 Actual Size

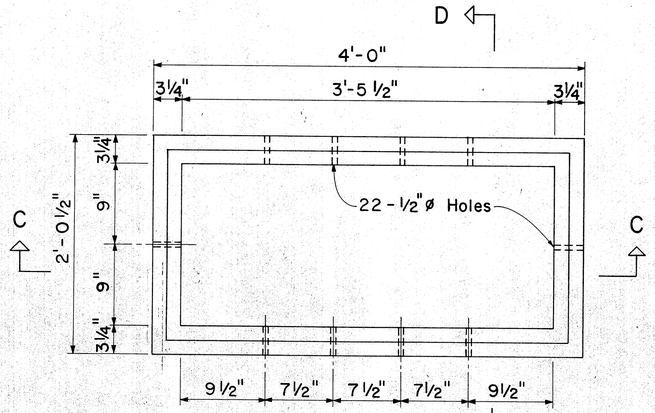
CONCRETE COVER FOR 1'-6" x 3'-5 1/2" SERVICE BOX

NOTES:

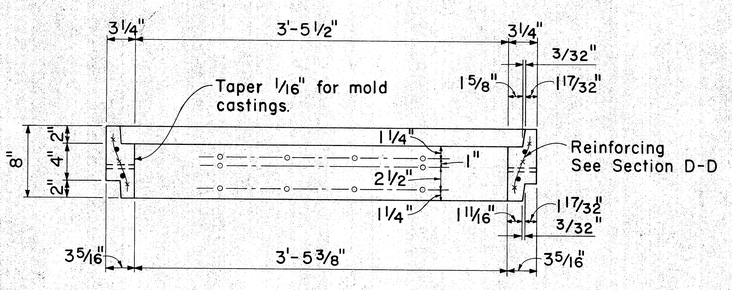
1. Galvanize Angle Frame per ASTM 153 (as amended to date) after fabrication.
2. Concrete compressive strength = 3,000 psi in 28 days.
3. Finished surface shall be broomed or roughened per City & County or State Standards for sidewalks.
4. Company identification marking stamped on Cover.
5. "Contractor Furnished" item.

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

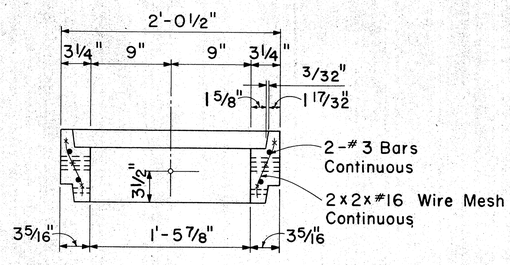
H.E. Co. DWG. NO. 011312



PLAN



SECTION C-C



SECTION D-D

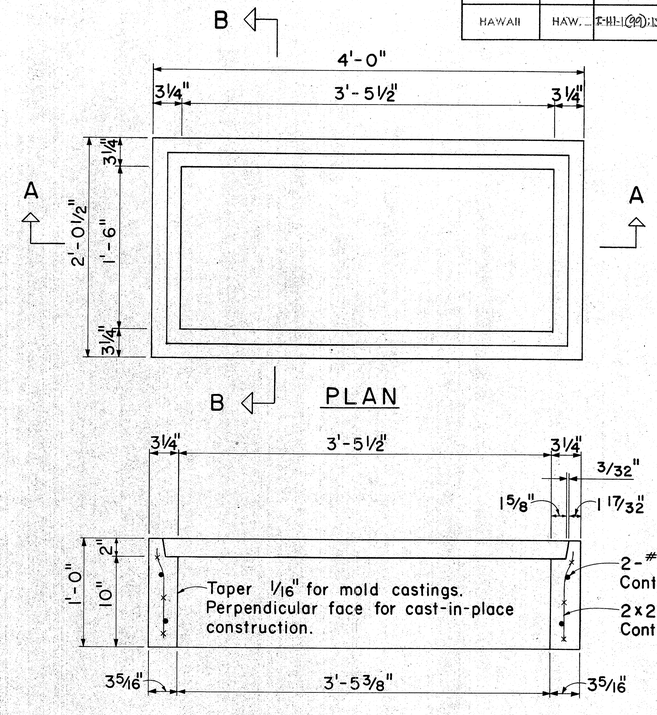
CONCRETE SERVICE BOX EXTENSION 1'-6" x 3'-5 1/2" x 0'-8" DEPTH

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

NOTES:

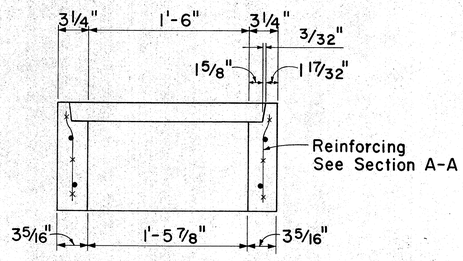
1. Concrete compressive strength = 3,000 psi in 28 days.
2. Weight per section = 200 lbs. ±.
3. See Drawing 011312 for Concrete Cover.
4. "Contractor Furnished" item.

H.E. Co. DWG. NO. 011311



PLAN

SECTION A-A



SECTION B-B

CONCRETE SERVICE BOX BODY 1'-6" x 3'-5 1/2" x 1'-0" DEPTH

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

NOTES:

1. Concrete compressive strength = 3,000 psi in 28 days.
2. Weight of box = 412 lbs. ±
3. See Drawing 011312 for Concrete Cover.
4. "Contractor Furnished" item.

H.E. Co. DWG. NO. 011310

APPROVED:

J. Kaumots — HAWAIIAN ELECTRIC Co., Inc. — 7/26/76 DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

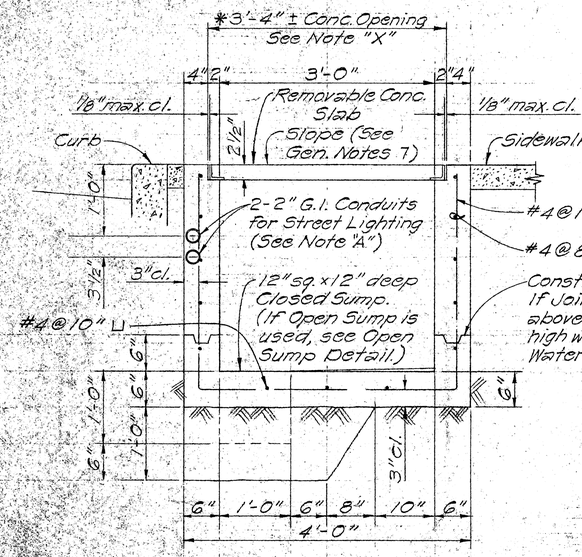
STANDARD DETAILS
CONCRETE SERVICE BOX
BODY, EXTENSION AND COVER

Scale: As Noted Date: AUG 4 1976

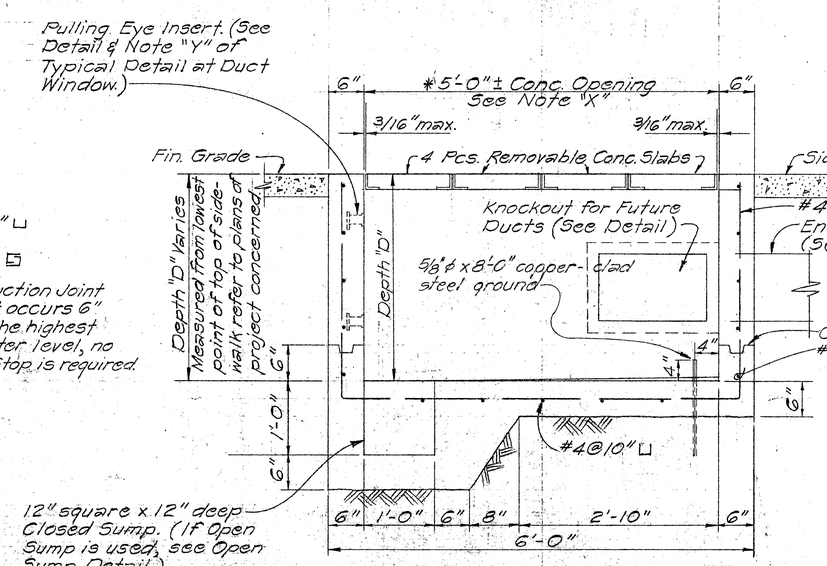
SHEET No. 28 OF 43 SHEETS

204

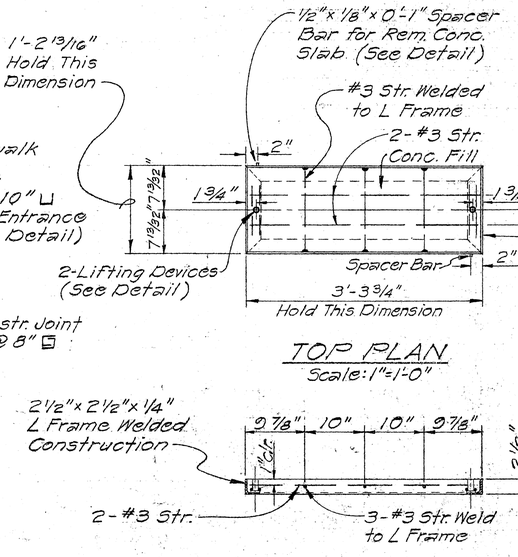
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-(22)15	1977	205	350



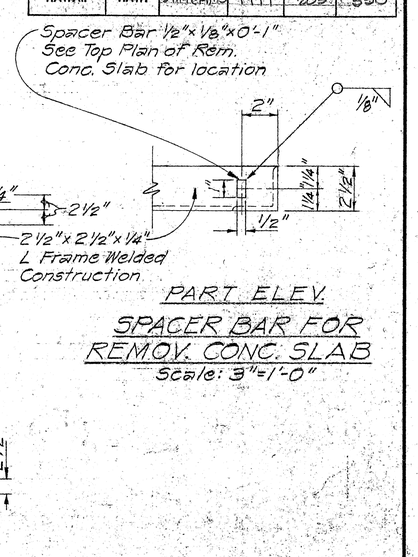
SECTION "B-B"
Scale: 1"=1'-0"



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



TOP PLAN
Scale: 1"=1'-0"



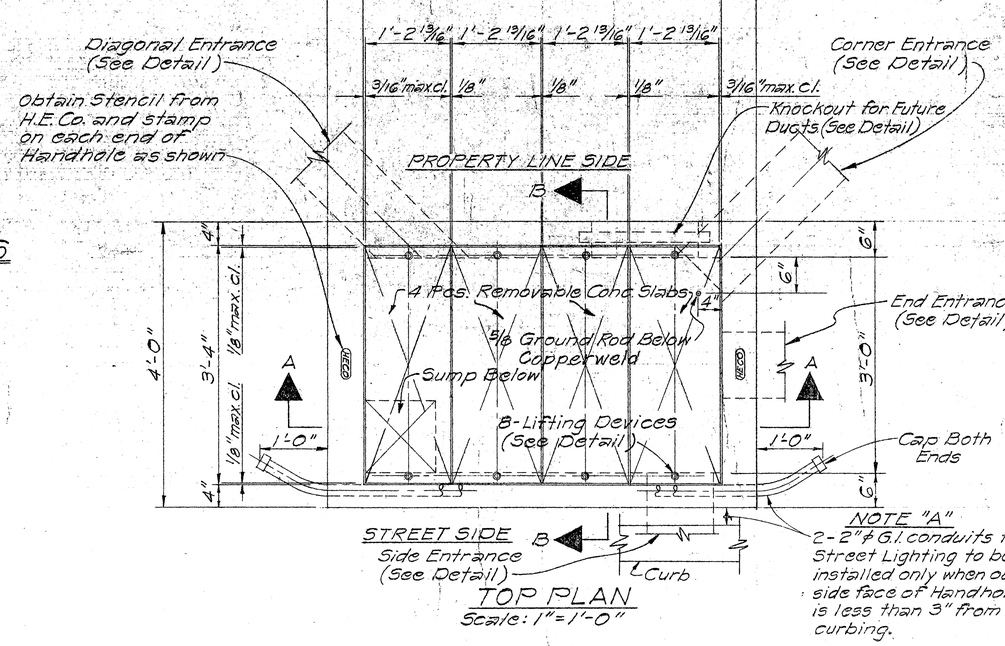
PART ELEV.
SPACER BAR FOR REMOV. CONC. SLAB
Scale: 3"=1'-0"

SECTION
Scale: 1"=1'-0"

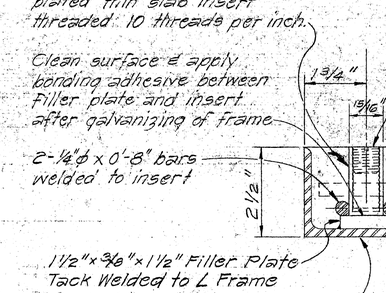
REMOVABLE CONC. SLAB DETAIL
Scale: As Shown

*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.



TOP PLAN
Scale: 1"=1'-0"



PART SECTION
LIFTING DEVICE DETAIL
Scale: 1/2 Full Size

REINFORCED CONCRETE QUANTITIES

QUANTITY OF MATERIALS FOR DEPTH "D"=4'-0"

Total concrete	=	2.05 cu. yds.
Total reinf. steel	=	300 lbs.
Total misc. steel	=	157 lbs.

WEIGHT PER REMOVABLE CONCRETE SLAB,

Concrete	=	119 lbs.
Reinf. steel	=	7 lbs.
Misc. steel	=	39 lbs.
Total		165 lbs.

MATERIALS FOR 6" DEPTH OF 6" THICK WALL,

Concrete	=	0.17 cu. yds.
Reinf. steel		19 lbs.

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

FOR USE IN AREAS NOT SUBJECT TO VEHICULAR TRAFFIC.

APPROVED:
J. Karamoto 7/26/76
HAWAIIAN ELECTRIC Co., Inc. M.E. DATE

HECo., Inc. Drawing Number	
18841	SHEET No. 1 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

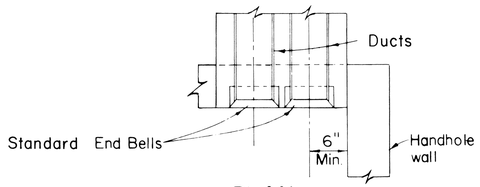
HANDHOLE TYPE 35 (3'-0" x 5'-0") UNDERGROUND STANDARDS

SCALE: AS NOTED DATE AUG 4 1976

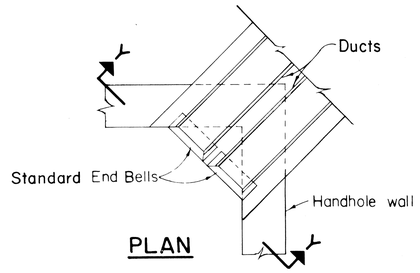
SHEET No. 29 OF 43 SHEETS

K&E CRYSTALENE "LA" 2920

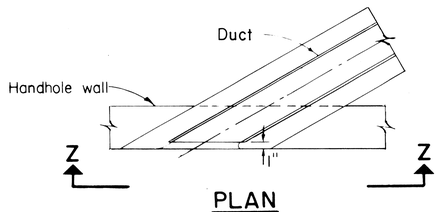
FED. AID DIST. NO.	STATE	FED. AID. PROJECT	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-H-1(69)-15	1977	206	350



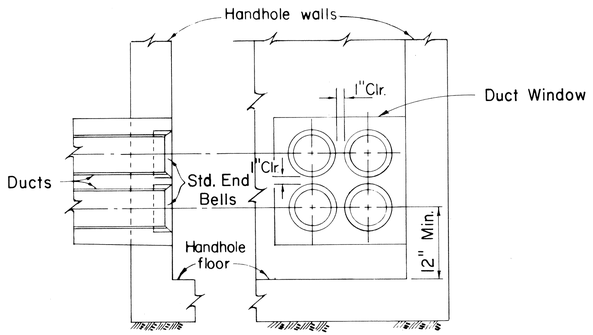
PLAN



PLAN



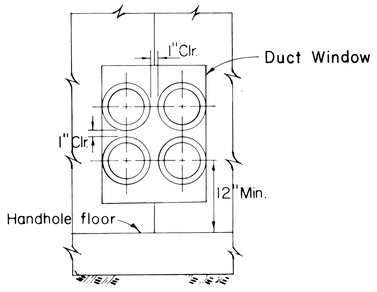
PLAN



SIDE ELEV. FRONT ELEV.

END & SIDE ENTRANCES

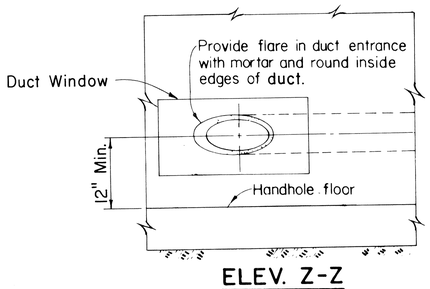
(FOUR WAY DUCT)



ELEV. Y-Y

CORNER ENTRANCE

(FOUR WAY DUCT)



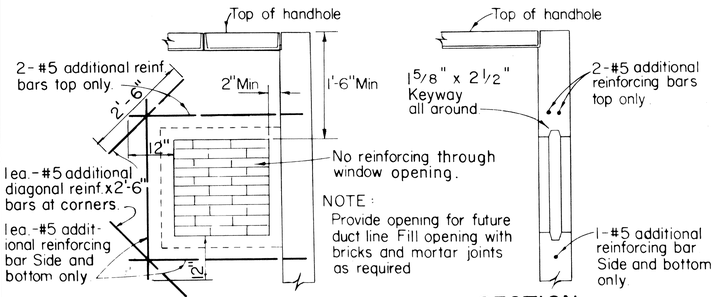
ELEV. Z-Z

DIAGONAL ENTRANCE

(ONE WAY DUCT)

TYPICAL DUCT LINE ENTRANCE DETAIL

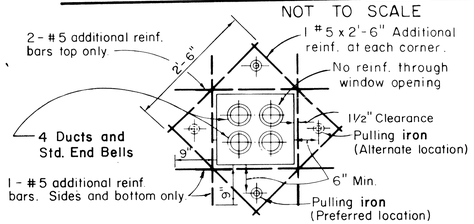
NOT TO SCALE



ELEVATION SECTION

KNOCKOUT FOR FUTURE DUCT LINE

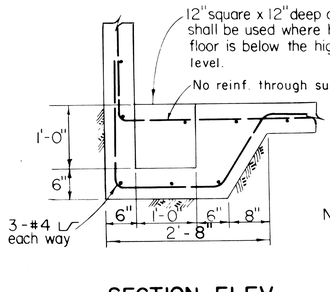
NOT TO SCALE



ELEVATION

TYPICAL DETAIL AT DUCT WINDOW

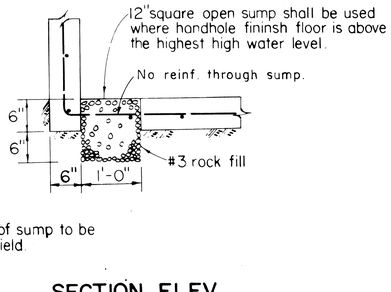
NOT TO SCALE



SECTION ELEV.

CLOSED SUMP

NOT TO SCALE

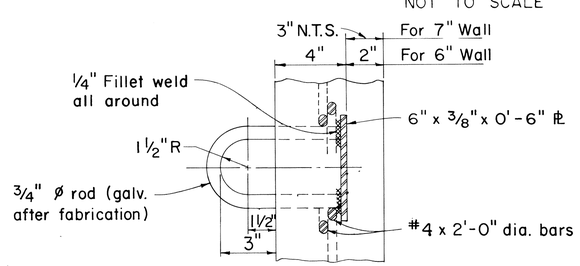


NOTE:
Exact location of sump to be determined in field.

SECTION ELEV.

OPEN SUMP

NOT TO SCALE



SECTION ELEV.

PULLING IRON

NOT TO SCALE

NOTE "Y":
Generally 2 pulling irons are required and located on opposite wall of each duct entrance unless otherwise shown or noted. H.E. Co. engineer shall determine number required.

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 Highways Division, State of Hawaii or Division of Engineering, City & County of Honolulu specification 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 grade 40, ASTM A615. 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 ½" to sump.
7. Slope top of handhole. See plan of project concerned.
8. FINISH STEEL WORK:
   Angle Iron frames for remov. conc. 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 approved aggregate.
10. BACKFILL:
    Remove all debris before backfilling. Backfill in accordance with latest specifications of and subject to approval of Highways Division, State of Hawaii or Division of Engineering, City & County of Honolulu whichever Agency has authority over the work.
11. For duct line construction standards see H.E.CO. Dwgs.30-1033, 20191, and specs sheet CS 7001-0.
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 NOT SUBJECT TO VEHICULAR TRAFFIC.

APPROVED:

J. Karimoto 7/26/76

HAWAIIAN ELECTRIC Co., Inc. BY DATE

HECo., Inc. Drawing Number	
18841	SHEET No. 2 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

HANDHOLE TYPE 35 (3'-0" x 5'-0")

UNDERGROUND STANDARDS

Scales As Noted Date AUG 4 1976

SHEET NO. 30 OF 43 SHEETS

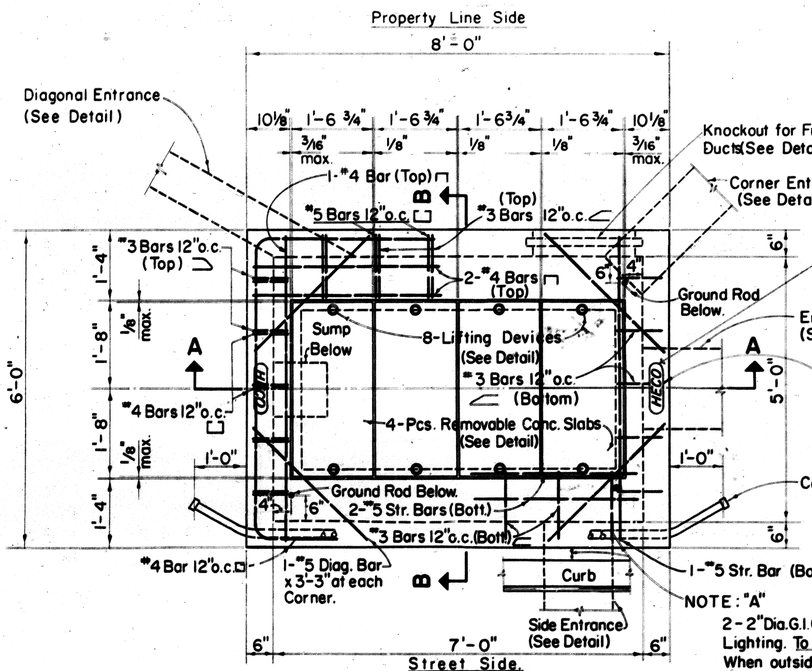
206

HE-13

C-V-7

KEUFFEL & ESSER CO. MADE IN U.S.A. DIETZGEN 1103 ANKAWRIGHT TRACING CLOTH 10 60 2HP

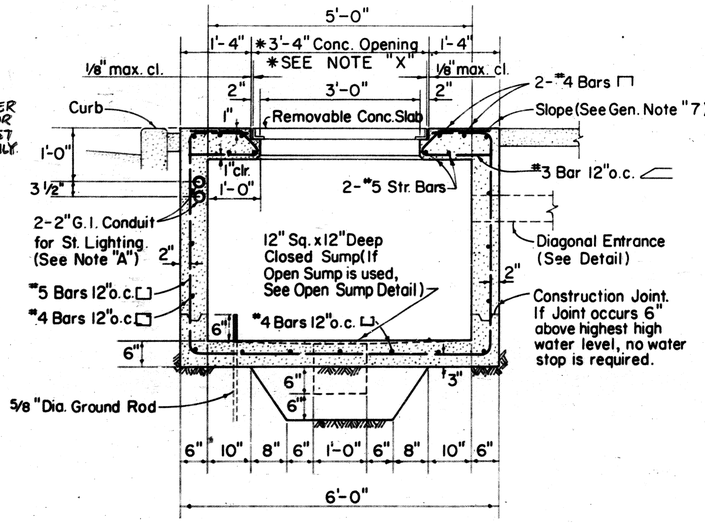
FED. AID DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(99) 15	1977	207	350



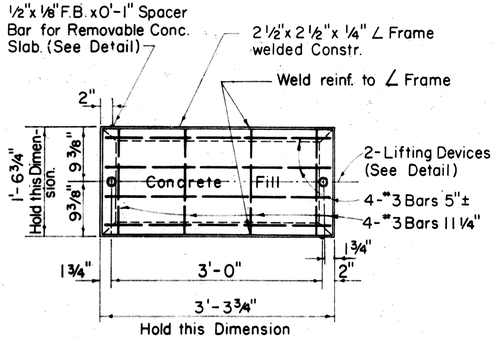
TOP PLAN
Scale: ¾" = 1'-0"

CHANGE LETTER TO "ELEC" FOR NEW NAVY ST HANDHOLE ONLY.

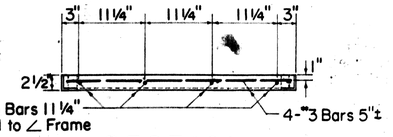
NOTE: "A"
2-2"Dia.G.I.Cond. For Street Lighting. To be installed only When outside face of H.H.Wall is less than 3" from Curbing.



SECTION "B-B"
Scale: ¾" = 1'-0"



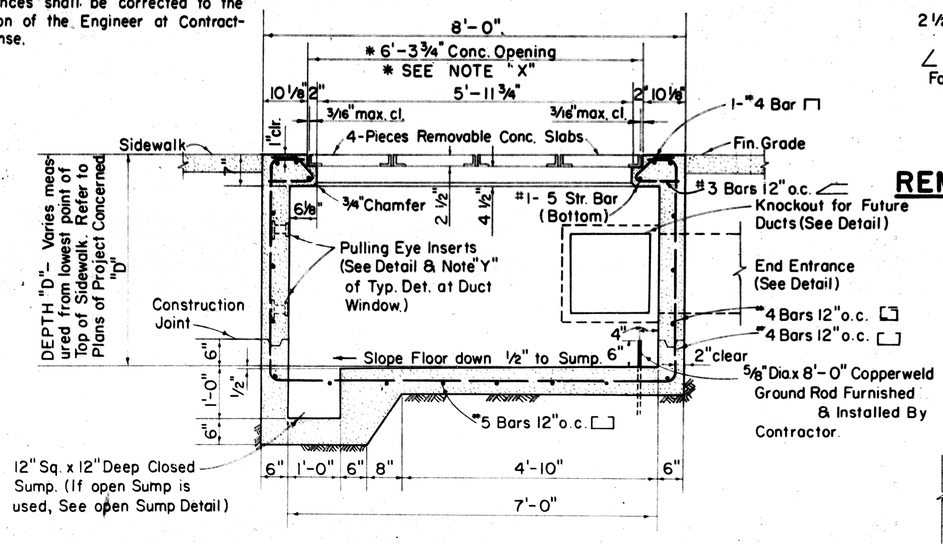
PLAN
Scale: 1"=1'-0"



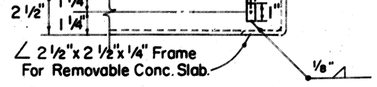
SECTION REMOVABLE CONCRETE SLAB
Scale: 1" = 1'-0"

* NOTE: "X"

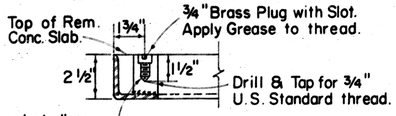
Maximum clearances between removable concrete cover slabs and concrete opening at the supports must be kept. Concrete Contractor shall measure cover slab steel frame after fabrication to obtain proper clearances. Any variation in clearances shall be corrected to the satisfaction of the Engineer at Contractor's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



SECTION "A-A"
Scale: ¾" = 1'-0"

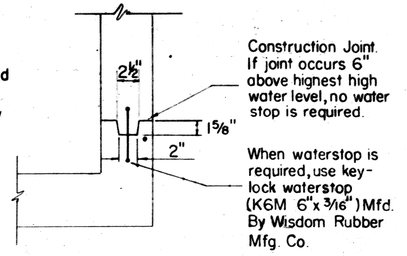


PART ELEVATION
SPACER BAR FOR REMOVABLE CONC. SLAB
Scale: 3" = 1'-0"



NOTE: Galvanize ∠ Frame after fabrication.

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



TYPICAL DETAIL OF CONSTRUCTION JOINT AND KEYWAY
Scale: 1½" = 1'-0"

REINFORCED CONCRETE QUANTITIES

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

Total Concrete	= 3.97 Cu. Yds.
Total Reinf. Steel	= 594 Lbs.
Total Misc. Steel	= 168 Lbs.

WEIGHT PER REMOVABLE CONCRETE SLAB

Concrete	= 150 Lbs.
Reinf. Steel	= 7 Lbs.
Misc. Steel	= 42 Lbs.
	TOTAL = 199 Lbs.

MATERIALS FOR 6" DEPTH OF 6" THICK WALL

Concrete	=0.24 Cu. Yds.
Reinf. Steel	= 31 Lbs.

APPROVED:

HAWAIIAN ELECTRIC Co., Inc. DATE

FOR USE IN AREAS NOT SUBJECT TO VEHICULAR TRAFFIC

HECo., Inc. Drawing Number	
18843	SHEET No. 1 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
HANDHOLE TYPE 57
(5'-0 x 7'-0)
UNDERGROUND STANDARDS

Scales: As Noted Date AUG 4 1975

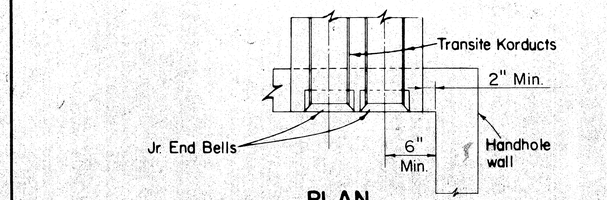
SHEET NO. 31 OF 43 SHEETS

(207)

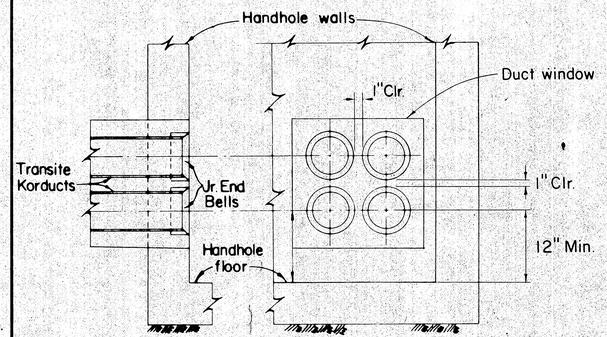
C-5-7

LIETZ 3103 ARKWRIGHT TRACING CLOTH 1040

FED. AID DIST. NO.	STATE	FED. AID PROJECT	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(99)15	1977	208	350



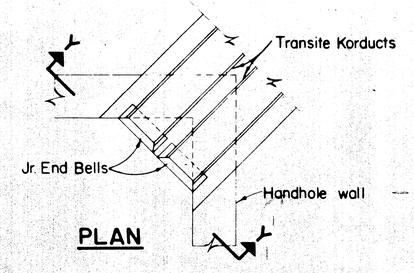
PLAN



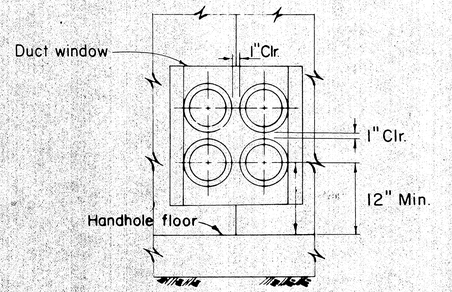
SIDE ELEV. FRONT ELEV.

END & SIDE ENTRANCES

(FOUR WAY DUCT)



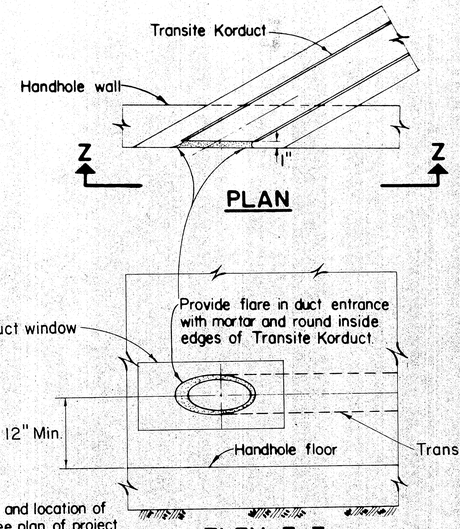
PLAN



ELEV. Y-Y

CORNER ENTRANCE

(FOUR WAY DUCT)



PLAN

ELEV. Z-Z

DIAGONAL ENTRANCE

(ONE WAY DUCT)

NOTE:
For size and location of ducts, see plan of project concerned.

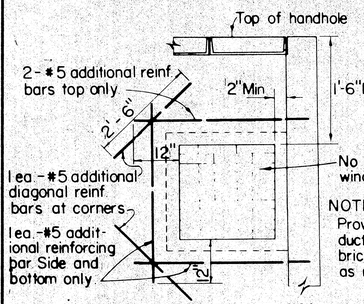
TYPICAL DUCT LINE ENTRANCE DETAIL

NOT TO SCALE

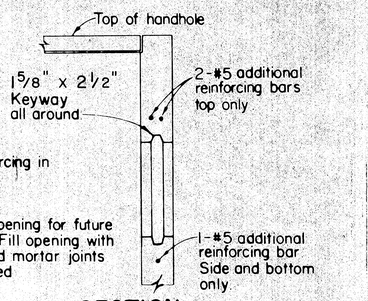
GENERAL NOTES

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 Highway 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 Dept 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 EYE INSERTS:
   For location and number required, see duct entrance plan of project concerned.
6. DRAINAGE: Slope floor down ½" to sump.
7. Slope of top of manhole. See plan of project concerned.
8. FINISH STEEL WORK:
   ℄ iron frames, lifting devices for removable concrete slabs 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 Highway 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

OMIT



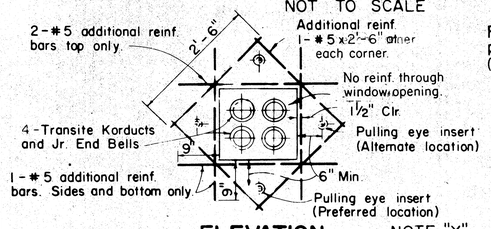
ELEVATION



SECTION

KNOCKOUT FOR FUTURE DUCT LINE

NOT TO SCALE

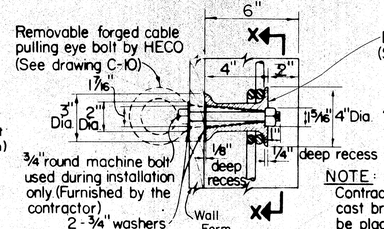


ELEVATION

TYPICAL DETAIL AT DUCT WINDOW

NOT TO SCALE

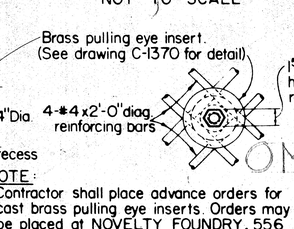
NOTE "Y":
Generally 2 pulling eye inserts are required and located on opposite wall of each duct entrance unless otherwise shown or noted. HECO engineer shall determine number required.



SECTION ELEV.

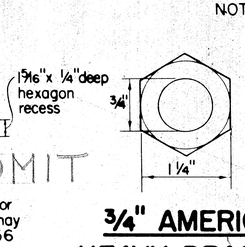
BRASS PULLING EYE INSERT

NOT TO SCALE



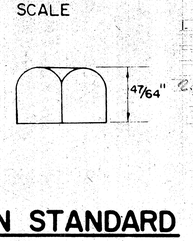
NOTE:
Contractor shall place advance orders for cast brass pulling eye inserts. Orders may be placed at NOVELTY FOUNDRY, 556 Kamani Street phone 502314.

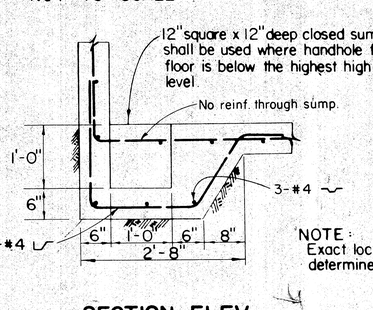
OMIT



¾" AMERICAN STANDARD HEAVY BRASS HEXAGON NUT

NOT TO SCALE



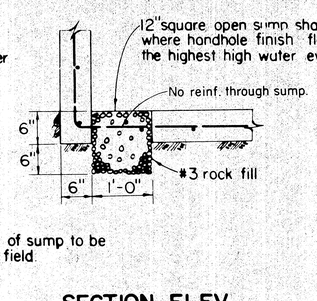


SECTION ELEV.

CLOSED SUMP

NOT TO SCALE

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



SECTION ELEV.

OPEN SUMP

NOT TO SCALE

GENERAL NOTES

1. SEE GENERAL NOTES FROM 1 THRU 19 ON DWG No. 18775. DELETE NOTE 15b & CHANGE "MANHOLE" TO "HANDHOLE".
2. REFER TO PULLING EYE DETAIL ON DWG. NO. 18775 & APPLY TO HANDHOLE CONSTRUCTION. CHANGE DIMENSIONS FROM 8" TO 6" & 6" TO 4".

FOR USE IN AREAS NOT SUBJECT TO VEHICULAR TRAFFIC.

APPROVED:

J. Karimoto 7/26/76

HAWAIIAN ELECTRIC Co., Inc. DATE

HECo., Inc. Drawing Number	
18843	SHEET No. 2 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

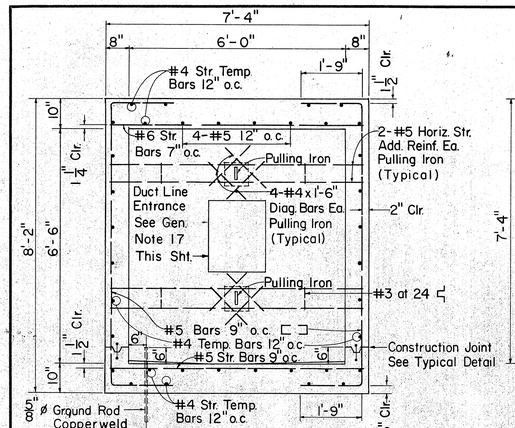
HANDHOLE TYPE 57
(5'-0 x 7'-0)
UNDERGROUND STANDARDS

Scales As Noted Date AUG 4 1976

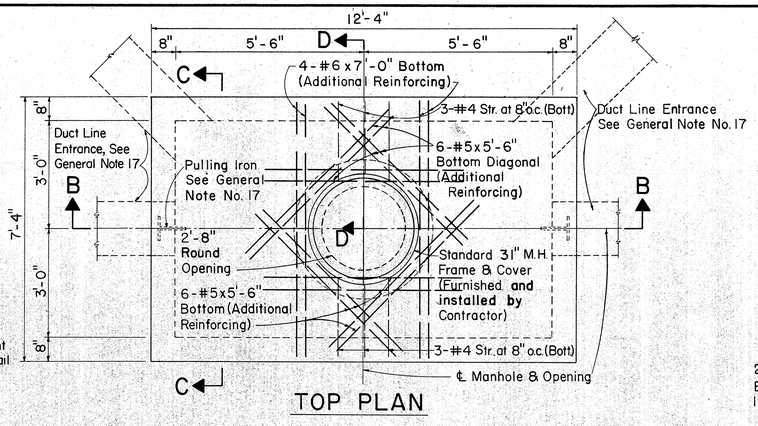
SHEET NO. 22 OF 40 SHEETS

LIETZ 1183 ARKWRIGHT TRACING CLOTH 18-60 20BP

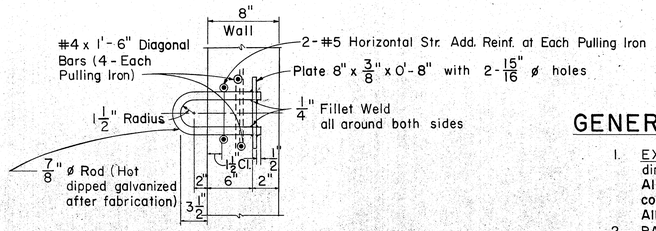
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-1(99)8	1977	224	350



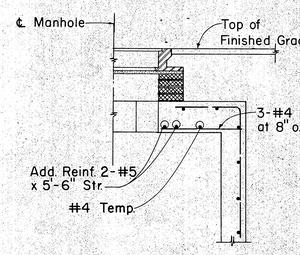
SECTION C-C



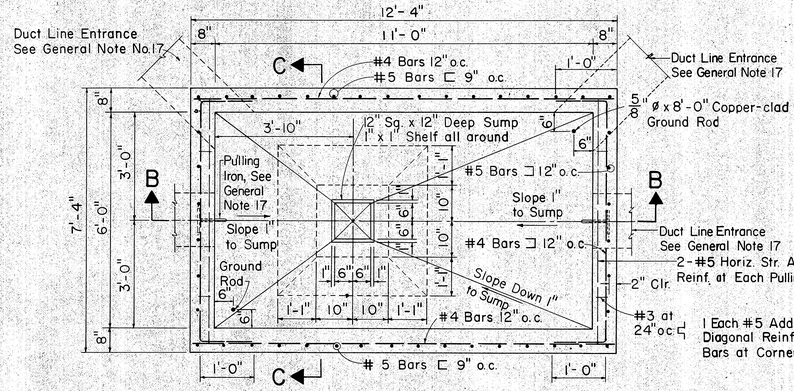
TOP PLAN



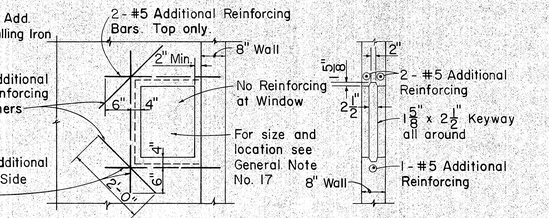
PULLING IRON DETAIL



SECTION D-D

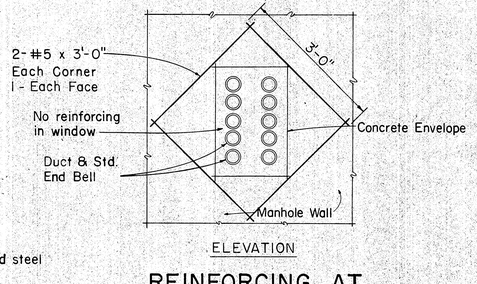


SECTIONAL PLAN A-A



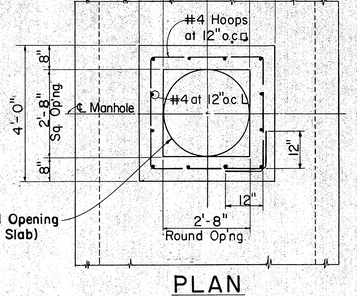
ELEVATION

SECTION

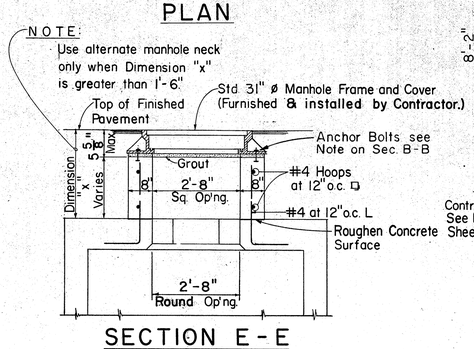


ELEVATION

REINFORCING AT DUCT WINDOW

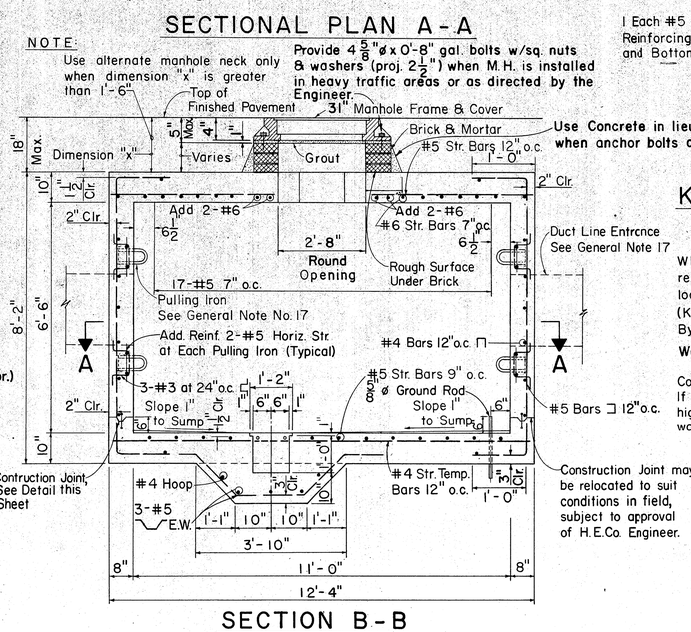


PLAN



SECTION E-E

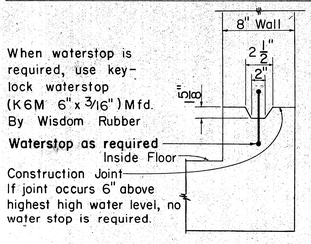
ALTERNATE MANHOLE NECK



SECTION B-B

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

KNOCKOUT FOR FUTURE DUCT LINE



TYPICAL DETAIL OF CONSTRUCTION JOINT AND KEYWAY

QUANTITY OF MATERIALS, (M.H. ONLY)

* Concrete	= 11.52 Cu. Yds.
Reinf. Steel	= 1444.61 lbs.
Misc. Steel (Pulling Irons, ea.	= 10.90 lbs.

ADDITIONAL QUANTITY OF MATERIALS FOR ALTERNATE NECK (Dim. "X" = 2'-0")

Concrete	= 0.50 Cu. Yds.
Reinf. Steel	= 40.0 lbs.

* NOTE: Conc. for M.H. necks when used in lieu of bricks (for dim "X" < 1'-6") for anchor bolt installation is not included in above totals.

APPROVED:

J. Kormos 7/26/76

HAWAIIAN ELECTRIC Co., Inc. DATE

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 approved aggregate.**
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 State Standard Specification.**
5. MIXING: Ready-Mixed A.S.T.M. C-94-47.
6. REINFORCING: Round deformed bars (clean and new). **Grade 40 Billet Steel per ASTM A615.**
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 Contractor to furnish and install for each manhole:
    a. 2-5/8" ø x 8'-0" copper-clad steel ground rods.
    b. Standard **31"** 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 of America
17. For number, size, and exact location of ducts entrances and pulling irons, refer to project drawings.
18. **Waterstop shall conform to the requirements of Section 705.07 of the State Standard Specifications for Road & Bridge Construction.**
19. The Contractor is to furnish all materials to complete the construction.

REFERENCE DRAWINGS AND SPECIF.

011327 & 011328 - Standard - H. E. Co. 31" Manhole Frame and Cover.
20191 & 30-1033 - Underground Ductline Construction Standards - Details.
CS 7001-0 - Construction of Underground Facilities - Specification

FOR USE IN AREAS SUBJECT TO VEHICULAR TRAFFIC

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

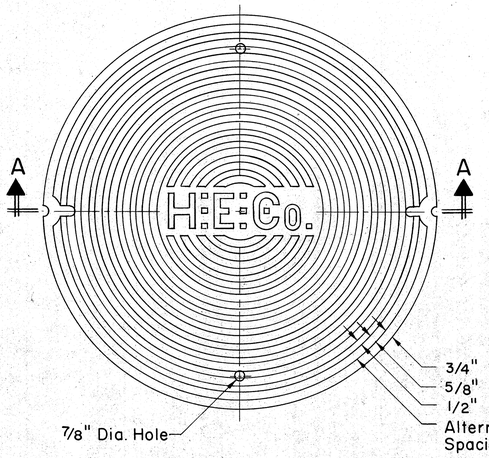
Scales: Not to Scale DATE AUG 4 1976

SHEET NO. 33 OF 43 SHEETS

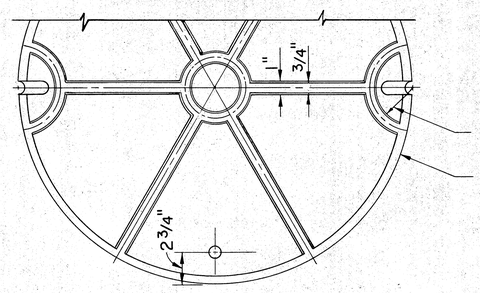
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
	DRAWN BY	"
	TRACED BY	"
NOTE BOOK	DESIGNED BY	"
No.	QUANTITIES BY	"
	CHECKED BY	"

C-5-7

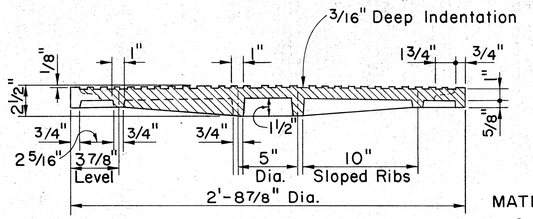
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IRH-1(90)15	1977	210	250



TOP VIEW



BOTTOM VIEW



SECTION A-A

MATERIAL:
Cast Iron per ASTM A48, Class 30.

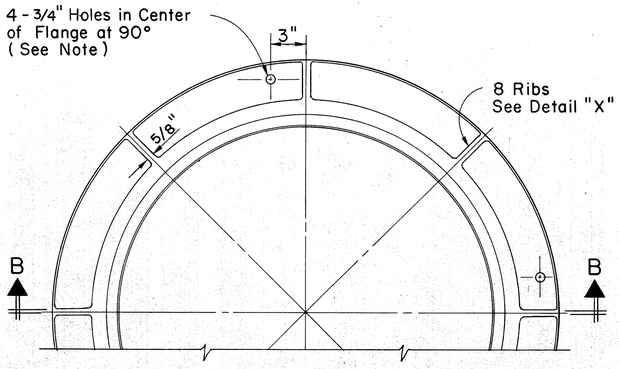
WEIGHT:
Approx. 262 lbs.

REFERENCE:
31" Manhole Frame - Dwg. 011328.

31" MANHOLE COVER

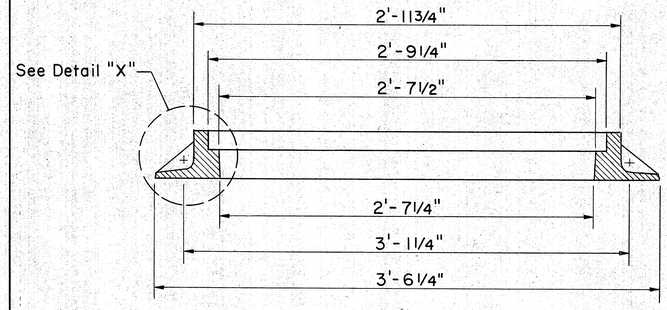
Scale: 2"= 1'-0"

011327



PARTIAL PLAN

Scale: 2"= 1'-0"



SECTION B-B

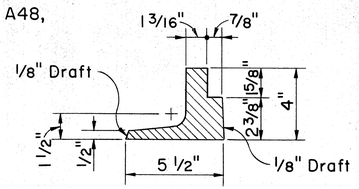
Scale: 2"= 1'-0"

INSTALLATION NOTE:
If frame is to be installed where heavy traffic will be on frame, insert 5/8" ϕ bolts thru holes in flange into concrete.

MATERIAL:
Cast Iron per ASTM A48, Class 30.

WEIGHT:
Approx. 300 lbs.

REFERENCE:
31" Manhole Cover - Dwg. 011327.



DETAIL "X"

Scale: 3"= 1'-0"

31" MANHOLE FRAME

Scale: As Shown

011328

APPROVED:

J. Yamada
HAWAIIAN ELECTRIC CO. INC.
7/23/76
DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

31" DIA MANHOLE COVER & FRAME STANDARDS

SCALE: AS NOTED
DATE: AUG 4 1976

SHEET No. 54 OF 43 SHEETS

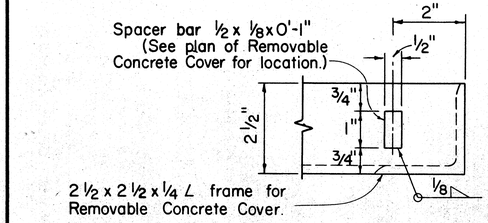
ORIGINAL PLAN
NOTE BOOK
No.
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE

C-1-7

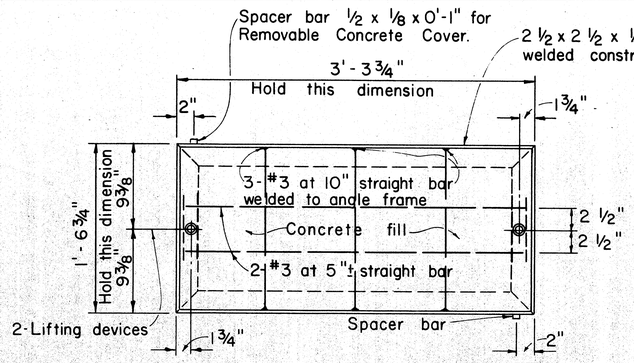
K&E IMPERIAL™ LA 3207

210

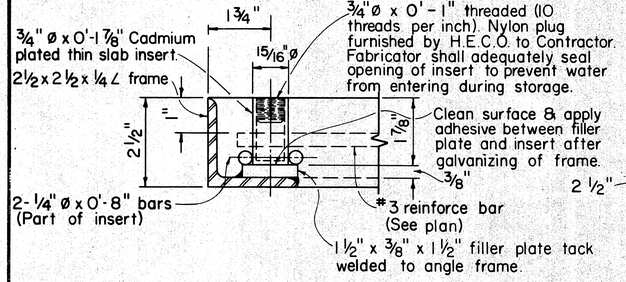
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	FH-1(22):15	1977	211	250



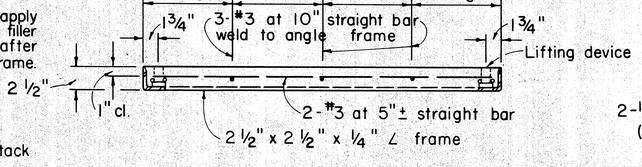
PART ELEVATION
SPACER BAR
Scale: ½ full size



PLAN
Scale: 1½" = 1'-0"



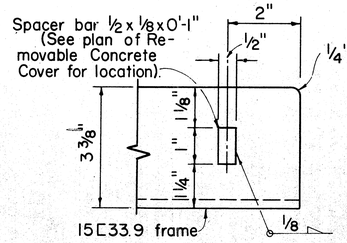
PART SECTION
LIFTING DEVICE
Scale: ½ full size



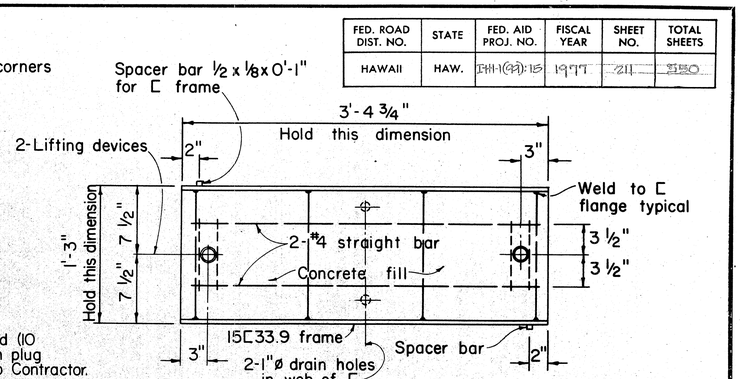
SECTION
Scale: 1½" = 1'-0"

NOTE: Galvanize ∟ frame or ⊏ frame, steel rods, and spacer bars after fabrication.

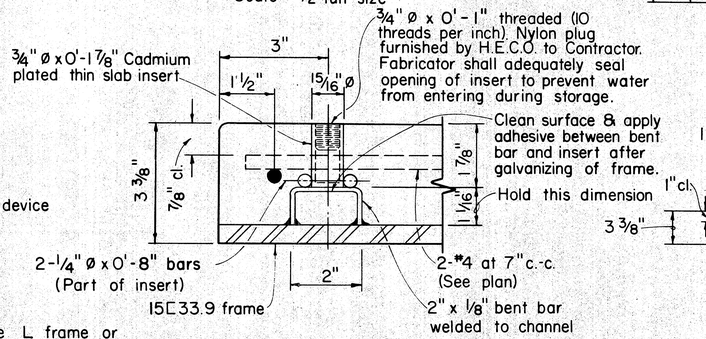
TYPE "SW" REMOVABLE CONCRETE COVER



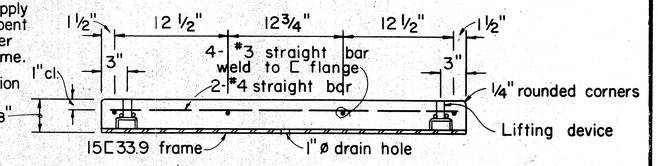
PART ELEVATION
SPACER BAR
Scale: ½ full size



PLAN
Scale: 1½" = 1'-0"



PART SECTION
LIFTING DEVICE
Scale: ½ full size

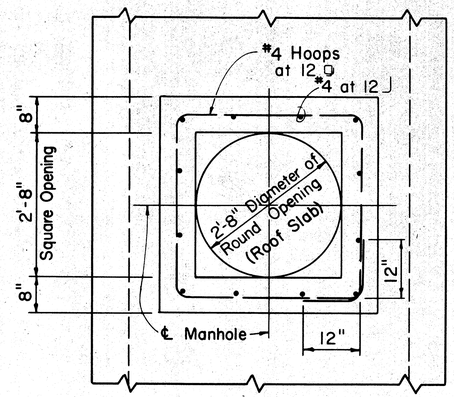


SECTION
Scale: 1½" = 1'-0"

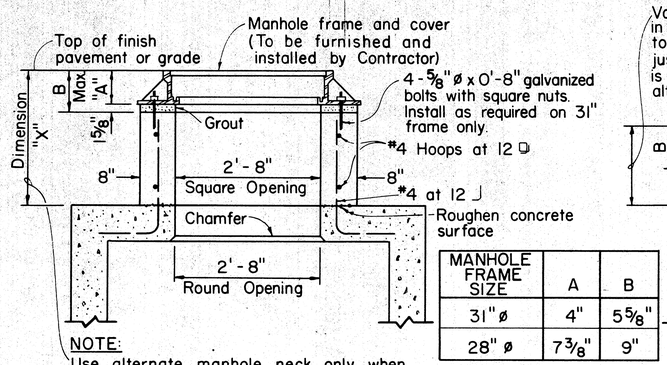
TYPE "TR" REMOVABLE CONCRETE COVER

GENERAL NOTES

1. On handhole covers, maximum clearances must be kept between removable concrete cover slabs and concrete openings at the supports. Contractor shall measure cover slabs steel frame after fabrication to obtain proper clearances. All covers after being installed shall be seated firmly and evenly and be free from rocking. Any variation in clearances and unevenness shall be corrected to the satisfaction of the Engineer at the Contractor's expense.
2. Concrete Pouring: Notify the Hawaiian Electric Co., Inc. Contracting & Inspection Division, 24 hours before pouring concrete. All concrete pouring shall be done in the presence of a Hawaiian Electric Co., Inc. Engineer or Inspector.
3. All materials shall be new and manufactured in the United States of America.



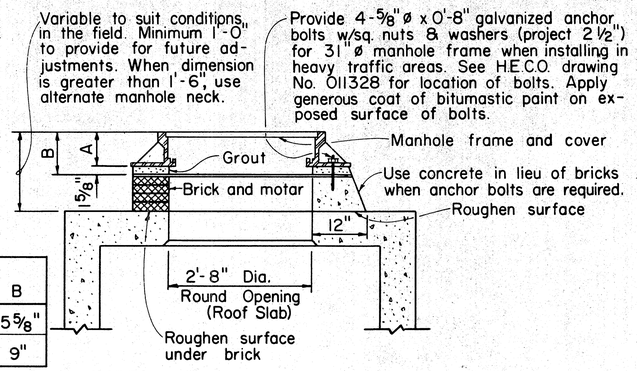
PLAN



NOTE:
Use alternate manhole neck only when dimension "X" is greater than 1'-6".

SECTION

MANHOLE FRAME SIZE	A	B
31" ø	4"	5⅝"
28" ø	7⅜"	9"



NOTE:
See table alternate manhole neck detail for dimension A and B.

ALTERNATE MANHOLE NECK
Scale: ¾" = 1'-0"

31" ø & 28" ø MANHOLE FRAME NECK DETAIL
Scale: ¾" = 1'-0"

APPROVED:
F. Kawamoto 7/26/76
Hawaiian Electric Co., Inc. Date

HECo., Inc. Drawing Number
16688
SHEET NO. 1 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MISCELLANEOUS DETAILS
HANDHOLES & MANHOLES
UNDERGROUND STANDARDS

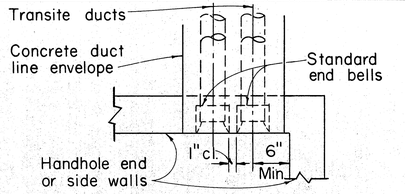
Scale as noted
DATE: AUG 4 1976

SHEET No. 35 OF 49 SHEETS

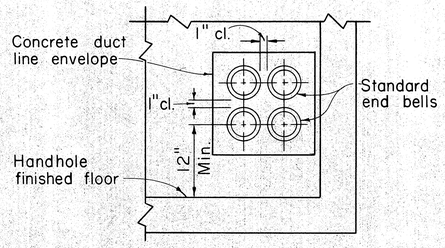
SURVEY PLOTTED BY
DRAWN BY
TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY
DATE
ORIGINAL PLAN
NOTE BOOK
No.

E11

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-I(99):15	1977	342	350



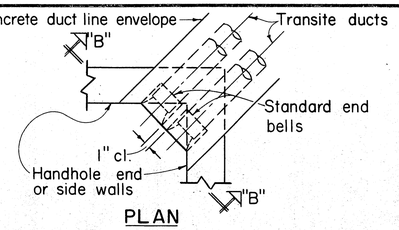
PLAN



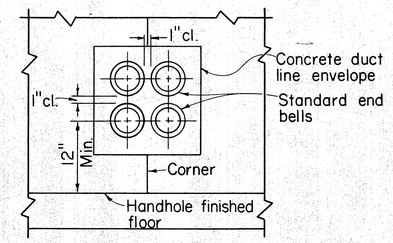
ELEVATION

END OR SIDE ENTRANCE

Scale: 1" = 1'-0"



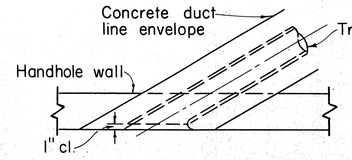
PLAN



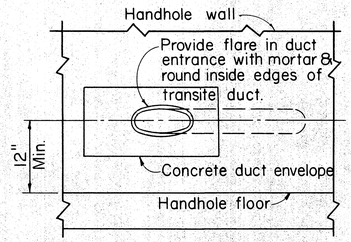
ELEVATION "B-B"

CORNER ENTRANCE

Scale: 1" = 1'-0"



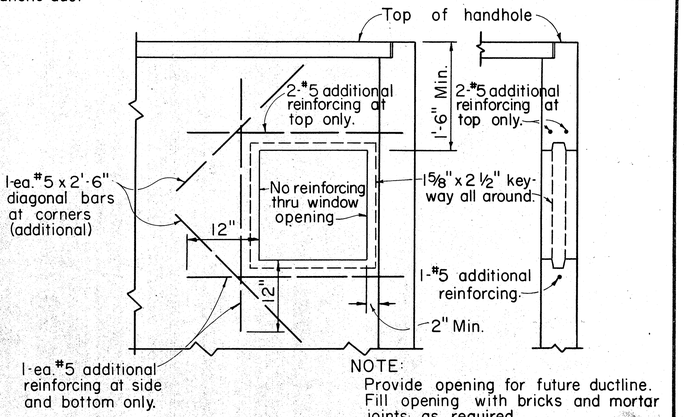
PLAN



ELEVATION

DIAGONAL ENTRANCE

Scale: 1" = 1'-0"

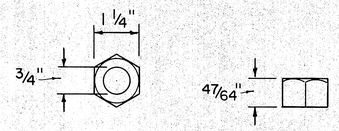


NOTE:
Provide opening for future ductline. Fill opening with bricks and mortar joints as required.

ELEVATION SECTION

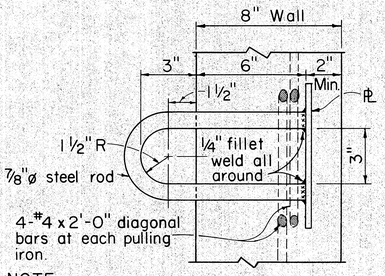
KNOCKOUT FOR FUTURE DUCT LINE

Scale: 1" = 1'-0"



3/4" ø AMERICAN STANDARD HEAVY BRASS HEXAGON NUT

Scale: 1/2 full size

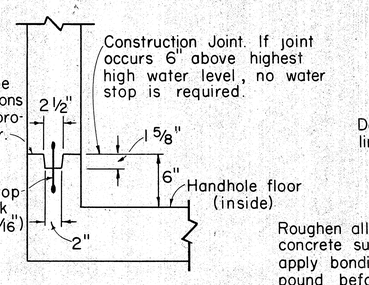


NOTE:
Hot-dip galvanized after fabrication.

SECTION

PULLING IRON

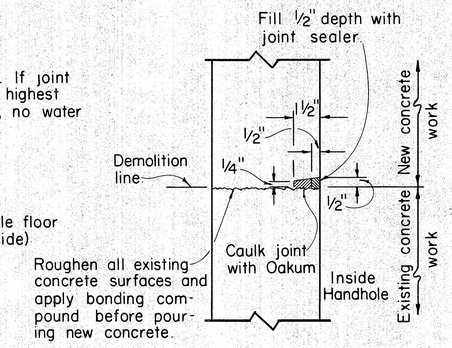
Scale: 3" = 1'-0"



SECTION

TYPICAL CONSTRUCTION JOINT

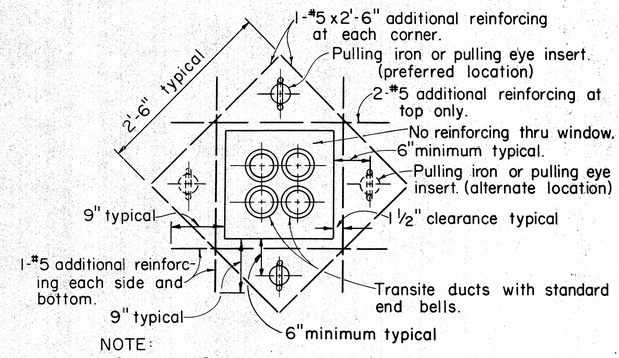
Scale: 1 1/2" = 1'-0"



SECTION

TYPICAL COLD JOINT

Scale: 3" = 1'-0"

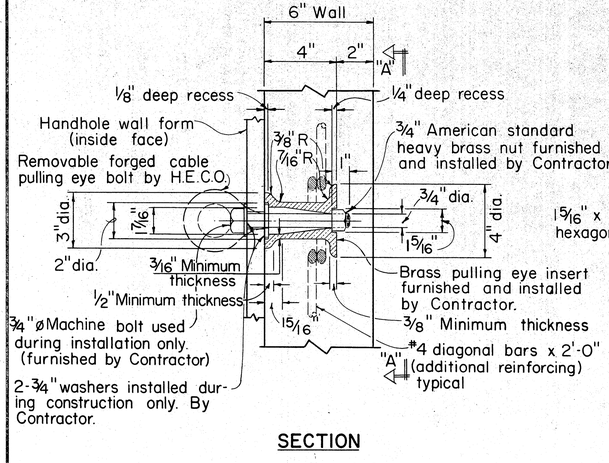


NOTE:
Generally 2 pulling irons or pulling eye inserts are required and located on opposite wall of each duct window unless otherwise shown or noted. H.E.Co. Engineer shall determine number required.

ELEVATION

TYPICAL DUCT WINDOW

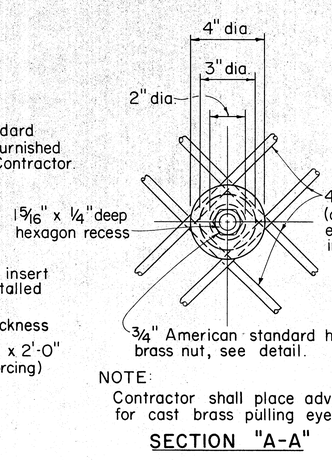
Scale: 1" = 1'-0"



SECTION

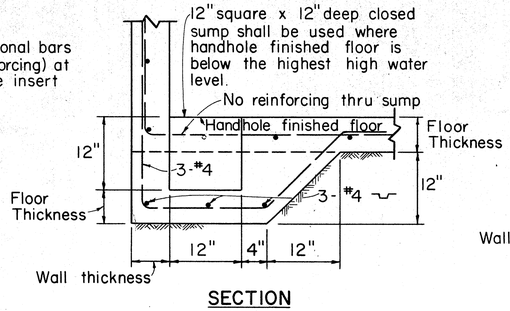
BRASS PULLING EYE INSERT

Scale: 3" = 1'-0"



NOTE:
Contractor shall place advance orders for cast brass pulling eye inserts.

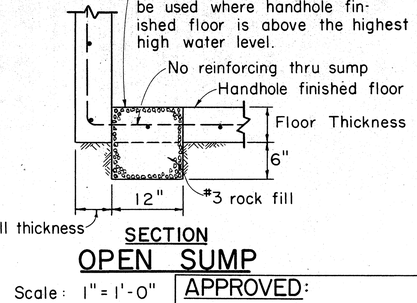
SECTION "A-A"



SECTION

CLOSED SUMP

Scale: 1" = 1'-0"



SECTION

OPEN SUMP

Scale: 1" = 1'-0"

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

APPROVED:
S. Kawamoto 7/26/76
Hawaiian Electric Co., Inc. Date

HECo., Inc. Drawing Number
16688
SHEET NO. 2 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

MISCELLANEOUS DETAILS HANDHOLES & MANHOLES UNDERGROUND STANDARDS

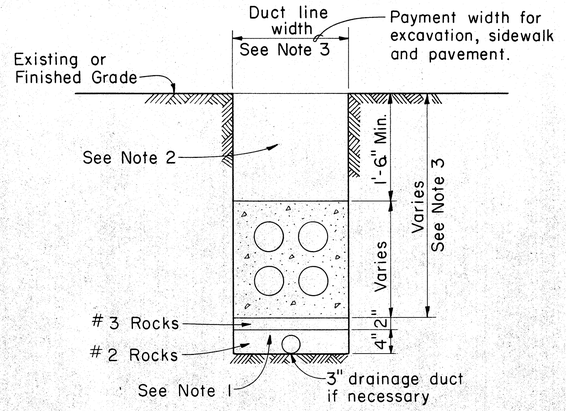
Scale as noted DATE: AUG 4 1976

SHEET No. 36 OF 42 SHEETS

2-V-1

342

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	[illegible]	1977	212	350



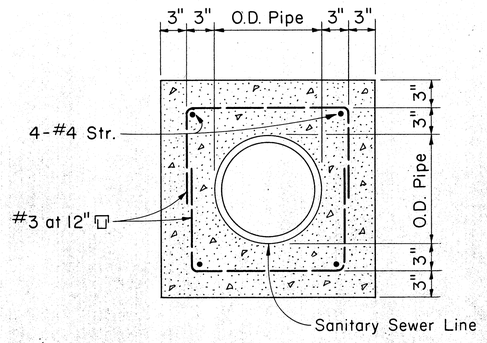
NOTES:

1. If drainage is necessary, install 6" rockfill as shown. In extremely watery areas, install 3" drainage duct.
2. Refer to H.E.Co. Specification CS7001-0 (or equivalent) for backfill material requirements.
3. Size of concrete envelope and depth of excavation to be determined by specific project.

EB EXCAVATION AND BACKFILL DETAILS

(TYPICAL)

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



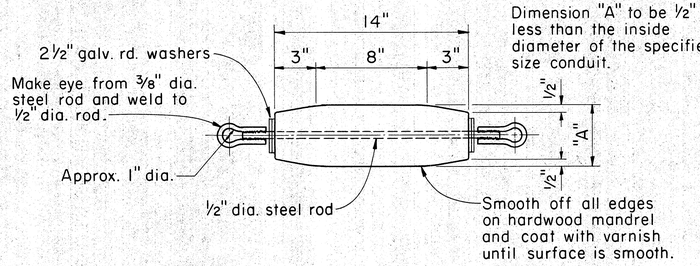
CROSS-SECTION OF SEWER LINE

NOTE:
Where duct line crosses sewer line, cover sewer line with concrete jacket as indicated in specification.

DUCT LINE WIDTH	LENGTH OF SEWER LINE TO BE COVERED
24" or less	5'
Greater than 24"	(Width of duct line) + (5')

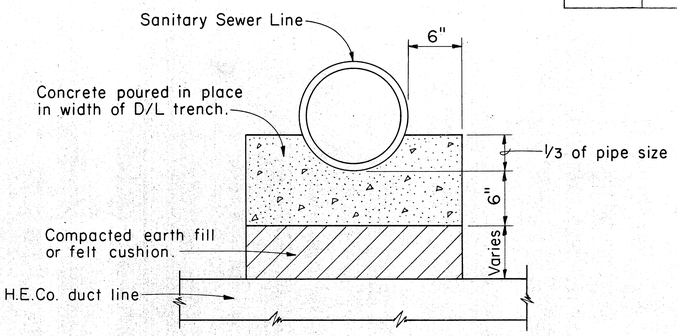
SANITARY SEWER LINE CROSSING DETAIL

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



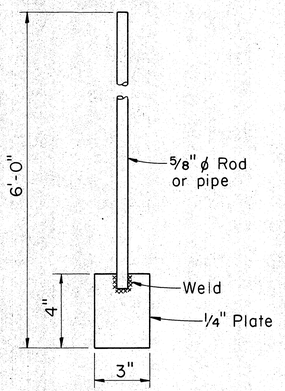
MANDREL DETAIL

Not To Scale



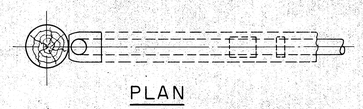
CONCRETE CRADLE FOR SANITARY SEWER LINE CROSSING

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

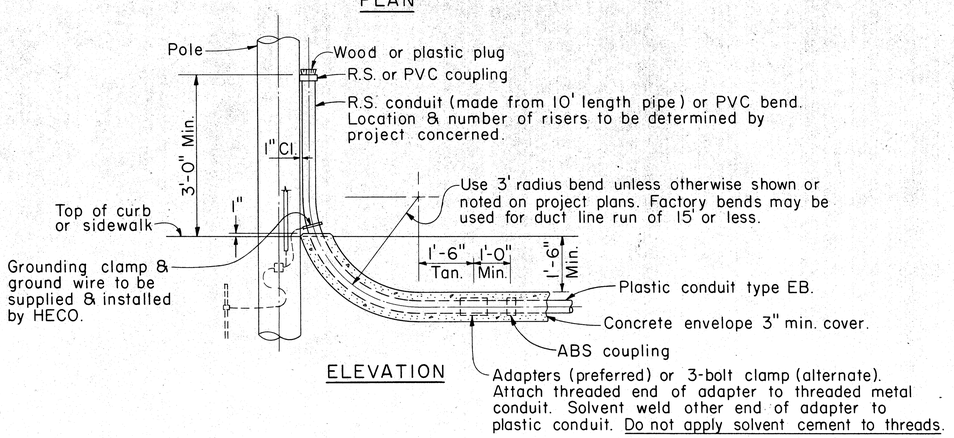


HAND SPADE

Scale: 3" = 1'-0"



PLAN

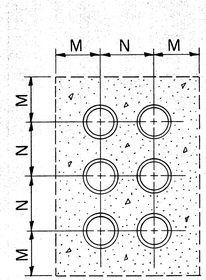


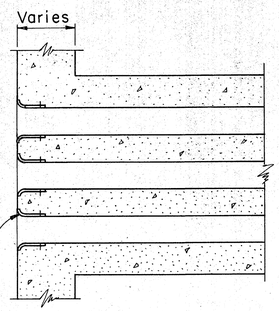
ELEVATION

TYPICAL RISER DETAIL

(POLE RISER SHOWN)

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





TYPICAL CONDUIT ENTRANCE INTO HANDHOLE, MANHOLE OR VAULT WALLS

(6 WAY DUCT LINE SHOWN)

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

DUCT SIZE	DIMENSIONS (INCHES)	
	M	N
2	4	5
3	5	6
4	5 1/2	7
5	6	8
6	6 5/16	9

APPROVED:

[signature] 7/26/76

Hawaiian Electric Co., Inc. Date

HECo., Inc. Drawing Number

30-1030

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TYPICAL DUCT CONSTRUCTION INSTALLATION DETAILS UNDERGROUND DETAILS

Scale as noted DATE: AUG 4 1976

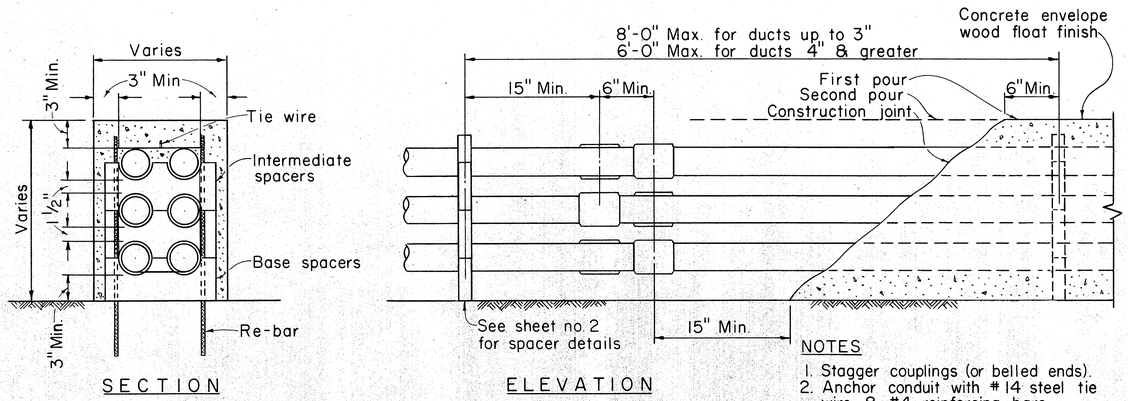
SHEET No. 37 OF 43 SHEETS

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

K&E IMPERIAL™ LA 3207

213

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(42)15	1977	278	350



SECTION ELEVATION

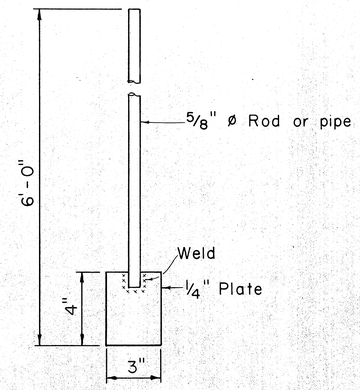
TYPICAL DUCT LINE

(6-WAY DUCT SHOWN)

Scale: 1½" = 1'-0"

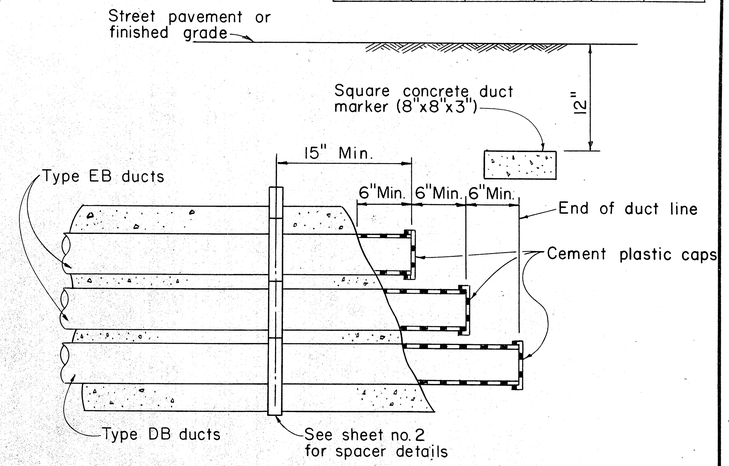
NOTES

1. Stagger couplings (or belled ends).
2. Anchor conduit with #14 steel tie wire & #4 reinforcing bars.
3. Cement all joints.
4. Avoid standing on conduit.



HAND SPADE

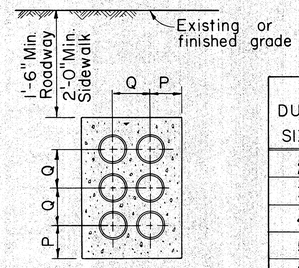
Scale: 3" = 1'-0"



TYPICAL STUB OUT DETAIL

(6-WAY DUCT SHOWN)

Scale: 1½" = 1'-0"



DUCT SIZE	DIMENSIONS (INCHES) P	Q
2	4 1/4	4 1/8
3	4 3/4	5 1/8
4	5 1/4	6 1/4
5	5 7/8	7 5/8
6	6 5/16	8 5/8

EB TYPICAL DUCT SECTION

(6-WAY DUCT SHOWN)

Scale: 1" = 1'-0"

NOTE:

1. Maintain 1½" minimum spacing between conduit; 3" minimum concrete envelope around top, bottom & sides.
2. Dimensions are minimum dimensions.
3. The bottom row in an encased duct bank of three or more layers shall be Type DB ducts. The remaining ducts shall be Type EB.

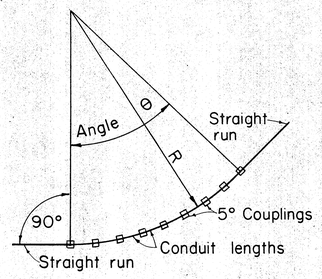


TABLE "A"	
APPROX. RADIUS OF BEND, R	LENGTH OF EA. CONDUIT-FT USING 5° BEND AT COUPL.
11'-6"	1
17'-3"	1.5
23'-0"	2
28'-9"	2.5
34'-6"	3
40'-3"	3.5
46'-0"	4
51'-9"	4.5
57'-6"	5
69'-0"	6
80'-6"	7
92'-0"	8

TABLE "B"		
ANGLE OF BEND θ	NO. OF COUPLINGS	LENGTH OF CONDUIT
15°	3	2
30°	6	5
45°	9	8
60°	12	11
75°	15	14
90°	18	17

EXAMPLE:

Radius of bend (R) = 60'
Angle of bend (θ) = 45°

From Table A, the nearest value to 60' radius is 57'-6". Length of conduit = 5'.

From Table B, for 45° angle.
Number of couplings required = 9
Number of conduit lengths required = 8

METHOD OF FORMING CURVES:

There are 4 methods of forming curves with plastic conduit.

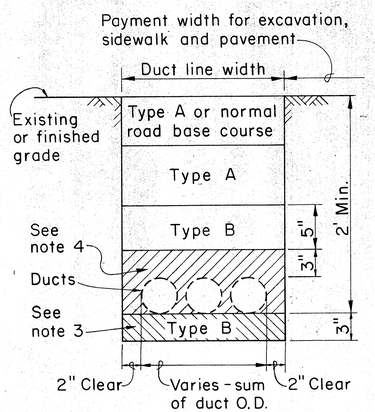
1. "Cold" bending: Limit trench formed radius sweeps to 25' minimum radius.
2. "Heat" bending: Do not heat bend conduit.
3. 5° angle couplings may be used as shown.
4. Factory made elbows and sweeps may be used only when specified by Engineer.

GENERAL NOTES

A. APPROVED CONDUIT MATERIALS — HECO PURCHASE SPECIFICATION NO.

1. Encased Burial (EB) Conduit
   a) Asbetos Cement, Type I ---------- M7005
   b) ABS (Acrylonitrile-Butadiene-Styrene) Plastic Conduit, Type EB ---------- M7001
   c) PVC (Polyvinyl Chloride) Plastic Conduit, Type EB ---- M7001
   d) PVC Plastic Conduit, Schedule 40 ---------- 116
   See note 3 EB Typical Duct Section
2. Direct Burial (DB) Conduit
   a) ABS Plastic Conduit, Type DB ---------- M7001
   b) PVC Plastic Conduit ---------- M7001
   c) PVC Plastic Conduit, Schedule 40 ---------- 116

B. This drawing provides details for installing Plastic Ducts (ABS & PVC) only. Refer to drawing 30-1030 & 30-1033 for installing Asbestos Cement Ducts Encased Burial.



NOTES:

1. Type A: Beach sand, earth or earth and gravel. If earth and gravel, the max. rock size shall be 1" and the mixture shall contain not more than 50%, by volume, of rock particles.
2. Type B: Beach sand, earth or earth and gravel. If earth and gravel, the mixture must pass a ½" mesh screen and contain not more than 20%, by volume, of rock particles.
3. When trench bottom is coarser than Type B material, provide 3" duct cushion.
4. Soil poison details: Use an aqueous solution of 2% chlordane, 1% dieldrin or 1% adlrin, when specified by engineer. Apply soil poison (1 gal. per 3 square feet) to trench floor and to layer of backfill from trench floor to 3" above conduit.

D.B. EXCAVATION & BACKFILL DETAILS (TYPICAL)

Scale 1½" = 1'-0"

APPLICATION OF 5° COUPLING FOR LONG RADIUS BENDS

REFERENCE SPECIFICATION

CS 7202	General Conditions
CS 7001	Construction of U.G. Facilities
CS 7003	Construction of Electrical Facilities

APPROVED:

J. Karamatsu 7/26/78
Hawaiian Electric Co., Inc. Date

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

HECo., Inc. Drawing Number

30-1035 SHEET No. 1 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

PLASTIC DUCTS
INSTALLATION DETAILS
UNDERGROUND STRUCTURES

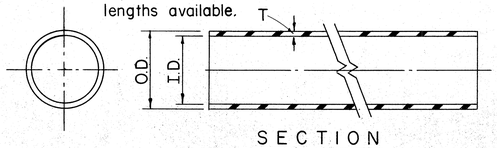
Scale as noted DATE: AUG 4 1978

SHEET No. 38 OF 43 SHEETS

C-11

314

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(40)215	1977	215	350

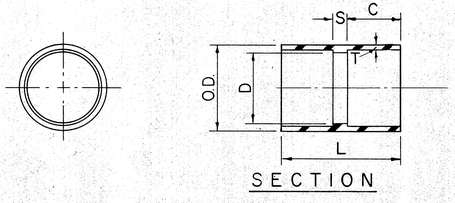


SECTION

CONDUIT

CONDUIT SIZE	EB (ENCASED BURIAL) HECO CODE	EB O.D.	EB I.D.	EB T (MIN.)	EB WEIGHT #/10² FT.	DB (DIRECT BURIAL) HECO CODE	DB O.D.	DB I.D.	DB T (MIN.)	DB WEIGHT #/10² FT.
2		2.375	*2.25	.060	21	29010	2.375	2.15	.110	38
3		3.500	3.35	.075	39	29012	3.500	3.25	.125	64
4		4.500	4.31	.095	63	29014	4.500	4.18	.160	104
5		5.563	5.36	.100	82	29016	5.563	5.20	.180	146
6		6.625	6.375	.125	121		6.625	6.25	.190	182

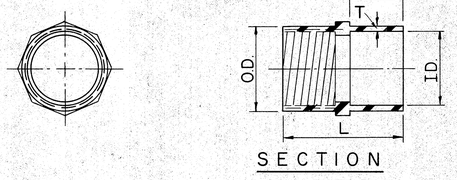
NOTE: Type EB & DB Conduits have same O.D. for a given size. All fittings which go over Conduits are DB type & fit both types of Conduits.



SECTION

COUPLING (ASTM D-2750)

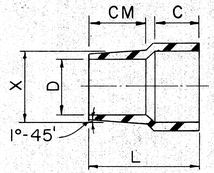
SIZE	HECO CODE	O.D.	D	L	C	S	T
2		2.620	2.255	2 7/16	1.16	.110	.110
3		3.780	3.350	3 3/8	1.63	.120	.125
4		4.855	4.310	3 11/16	1.78	.120	.160
5		5.965	5.363	4 3/32	1.97	.160	.180
6		7.050	6.375	4 15/32	2.16	.160	.190



SECTION

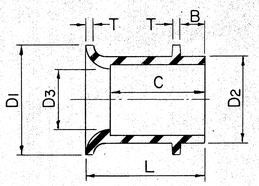
ADAPTER - PLASTIC TO STEEL

SIZE	HECO CODE	O.D.	I.D.	L	T	C
2				2 15/16	1 1/16	1.16
3				3 7/16	1 5/8	1.63
4				3 11/16	1 23/32	1.78
5				4 1/16	1 27/32	1.97
6				15 5/8	1 11/16	3.44



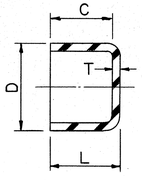
ADAPTER - PLASTIC TO ASBESTOS CEMENT

SIZE	HECO CODE	CM	C	X	D	L
2		3 1/16	2.580	1 3/4	2.18	1.16
3		3 19/32	3.620	1 3/4	3.09	1.63
4		4 1/32	4.620	2	4.03	1.78
5						



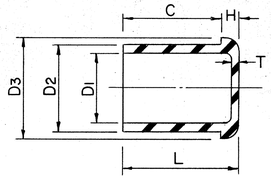
END BELL (ASTM D-2750)

SIZE	HECO CODE	D1	D2	D3	B	C	L	T
2		3.01	2.520	2.255	.50	1.16	1.54	.060
3		4.10	3.680	3.350	.75	1.63	2.00	.075
4		5.31	4.725	4.310	.75	1.78	2.28	.095
5		6.36	5.805	5.363	1.00	1.97	2.47	.100
6		7.38	6.920	6.375	1.00	2.16	2.66	.125



CAP (RIGID) - FOR SEMI-PERMANENT USE (ASTM D-2750)

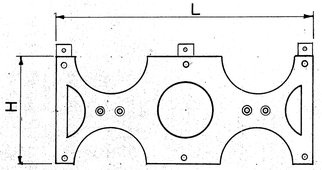
SIZE	HECO CODE	D	C	L	T
2		2.52	.59	.65	.060
3		3.68	.81	.89	.075
4		4.725	.91	1.01	.095
5		5.805	1.00	1.10	.100
6		6.920	1.13	1.25	.125



CAP (TEMPORARY) (ASTM D-2750)

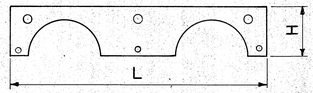
SIZE	HECO CODE	D1	D2	D3	C	H	L	T
2		2.260	2.375	2.500	.593	.125	.718	.060
3		3.360	3.500	3.656	.812	.156	.968	.075
4		4.320	4.500	4.687	.906	.187	1.092	.095
5		5.375	5.638	5.760	1.000	.218	1.218	.100
6		6.390	6.625	6.875	1.093	.250	1.343	.125

NOTE: Cap will go over conduit or "plug" the coupling.



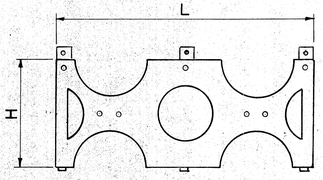
INTERMEDIATE SPACER

SIZE	HECO CODE	L	H	W
2		9.50	3.94	
3		11.25	5.06	
4		13.75	6.06	
5		15.97	7.06	
6		18.0	8.19	



CAP SPACER

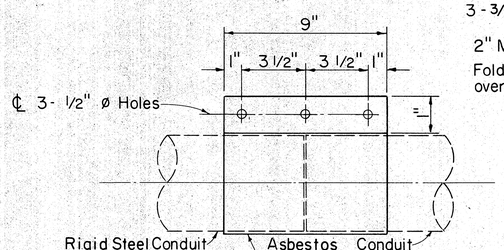
SIZE	HECO CODE	L	H
2		9.50	1.75
3		11.25	2.25
4		13.75	3.13
5		15.87	3.63
6		18.0	4.25

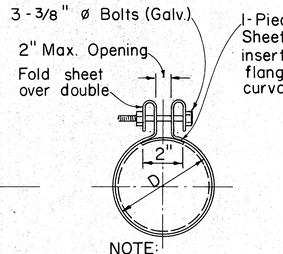


BASE SPACER

SIZE	HECO CODE	L	H
2		9.50	4.25
3		11.25	4.75
4		13.75	5.25
5		15.87	5.87
6		18.0	6.375

DUCT SPACER COMPONENTS (FORMEX SPACER OR EQUIVALENT)





SIZE	HECO CODE
2	13126
3	13128
4	13130
5	13132
6	

3 - BOLT CLAMP

GENERAL NOTES:

1. All dimensions in inches.
2. Spacers shown are different than that used for Asbestos Cement Type.
3. These accessories are to be used with ABS (Acrylonitrile-Butadiene-Styrene), or PVC (Poly-Vinyl Chloride) Plastic Conduit, per HECO purchase specification M7001-O.

APPROVED:
J. Kaumeheiwa 1/26/76
Hawaiian Electric Co., Inc. Date

HECo., Inc. Drawing Number
30-1035
SHEET NO. 2 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

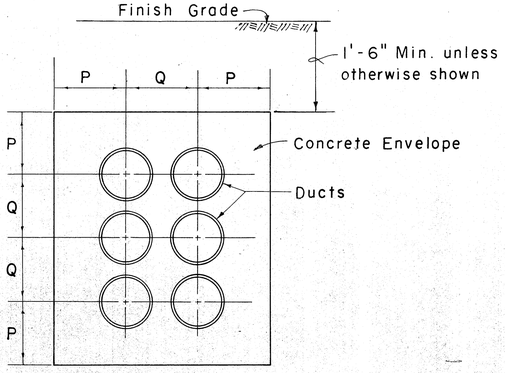
STANDARD DETAILS
PLASTIC DUCTS
INSTALLATION DETAILS
UNDERGROUND STRUCTURES

Scales: Not to Scale DATE: AUG 4 1976

SHEET No. 39 OF 48 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	HAWAII	F-RI-I(93):15	1977	216	256



TYPICAL DUCT LINE SECTION

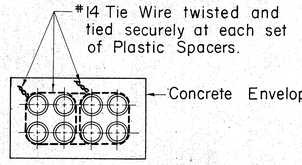
(6 WAY DUCT LINE SHOWN)

Not to Scale

SIZE	P	Q
3"	5"	5 1/8"
4"	5 1/2"	6 1/4"
5"	6"	7 5/8"

GENERAL NOTE

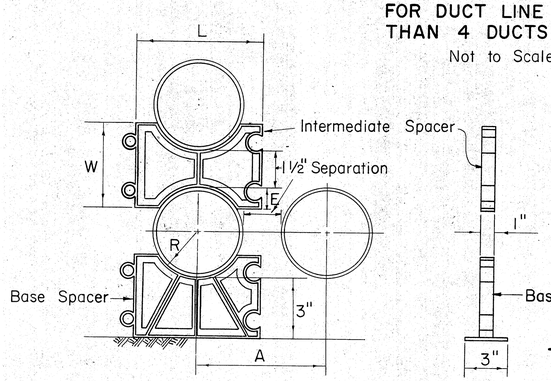
1. Provide one set of Spacers:
   a. 10 feet straight run for 2 ducts high or less.
   b. 5 feet straight run for 3 ducts high or more.
2. All ducts shall terminate with Standard End Bells at vault, handhole or manhole unless otherwise shown or noted.
3. All materials shall be new and shall be manufactured in the United States of America.



TIE WIRE DETAIL

FOR DUCT LINE MORE THAN 4 DUCTS WIDE

Not to Scale

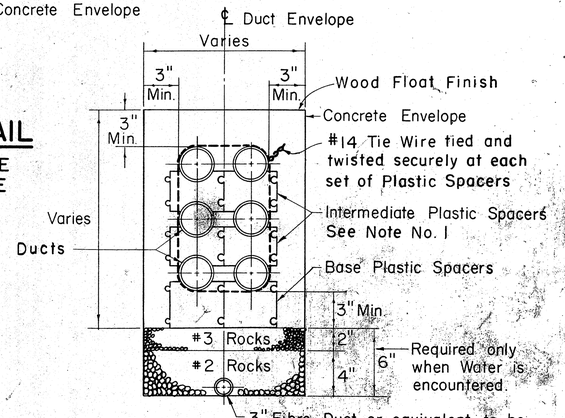


TYPICAL PLASTIC SPACERS

Not to Scale

SIZE	R	E	W	A	L
3"	1.83	.87	3.25	5.12	5.00
4"	2.40	1.12	3.75	6.25	6.12
5"	3.06	1.37	4.25	7.62	7.50

For 1 1/2" Separation



TYPICAL DUCT LINE SECTIONS SHOWING PLASTIC SPACERS & TRENCH DRAINAGE

(6 WAY DUCT SHOWN - 3 HIGH - 2 WIDE)

Not to Scale

REFERENCE SPECIFICATION SHEETS

CS 7202	General Conditions
CS 7001	Construction of U.G. Facilities
CS 7003	Construction of Electrical Facilities

APPROVED:

HAWAIIAN ELECTRIC CO., INC. DATE 7/30/76

HECo., Inc. Drawing Number

30-1033 SHEET No. 1 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

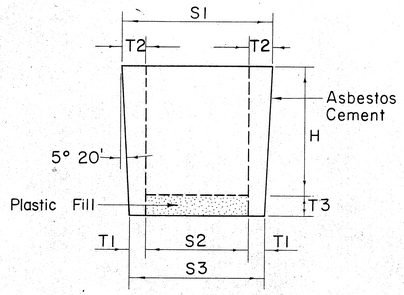
STANDARD DETAILS
CONSTRUCTION STANDARDS
ASBESTOS CEMENT DUCTS
INSTALLATION DETAILS
UNDERGROUND STRUCTURES

Scales: As Noted DATE AUG 4 1976

SHEET NO. 40 OF 40 SHEETS

LIETZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

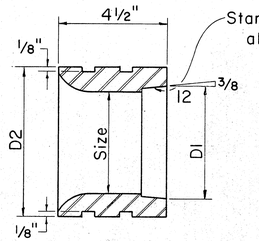
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	TH-1(22)15	1977	21	350



SIZE	H	S1	S2	S3	T1	T2	T3
3"	4.00	3.37	2.00	2.63	.32	.69	.75
4"	4.50	4.42	2.75	3.58	.42	.84	.75
5"	4.50	5.42	3.50	4.58	.54	.96	.75

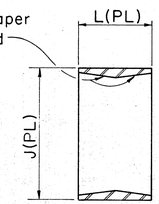
ASBESTOS CEMENT PLUG

Not to Scale



SIZE	D1	D2
3"	3.45	4.50
4"	4.46	5.75
5"	5.46	7.00

STANDARD END BELL

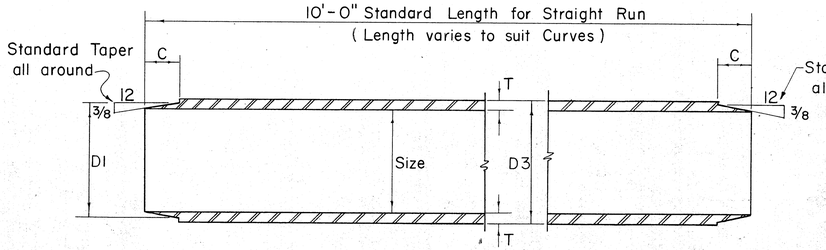


SIZE	J(PL)	L(PL)
3"	3.60	2.25
4"	4.61	2.50
5"	5.61	2.50

TAPERED COUPLING

PLASTIC COUPLING

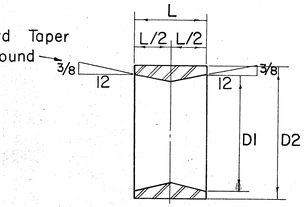
Not to Scale



SIZE	D1	D3	C	T
3"	3.45	3.54	1.13	.27
4"	4.46	4.54	1.25	.27
5"	5.46	5.60	1.25	.30

ASBESTOS CEMENT TYPE I

Not to Scale

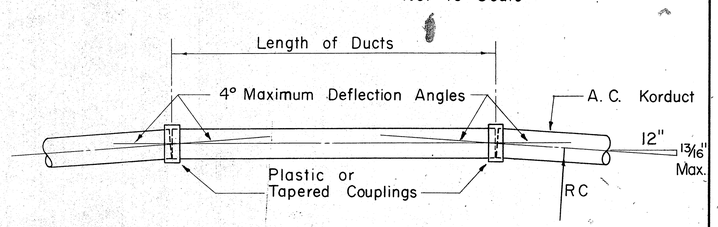


SIZE	D1	D2	L
3"	3.45	4.23	2.25
4"	4.46	5.26	2.50
5"	5.46	6.34	2.50

TAPERED COUPLING

PLASTIC COUPLING

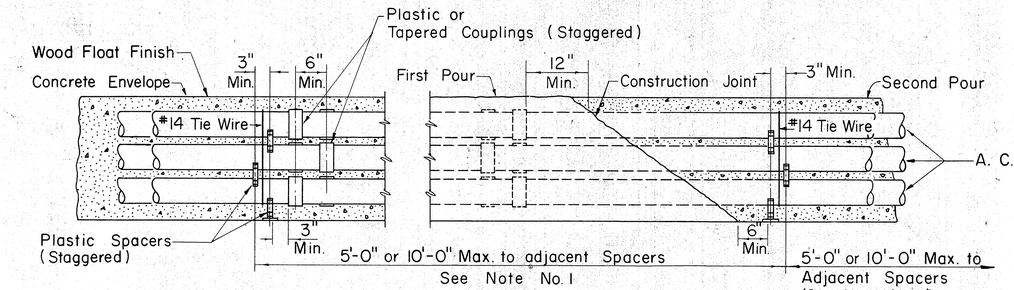
Not to Scale



METHOD OF FORMING CURVES

Not to Scale

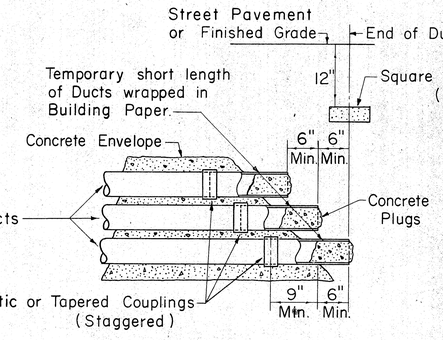
MINIMUM RADIUS TO FORM CURVES										
LENGTH OF DUCT	1'-0"	1'-6"	2'-0"	2'-6"	3'-0"	3'-6"	4'-0"	4'-6"	5'-0"	5'-6"
MIN. RAD. RC	14'-4"	21'-6"	28'-8"	35'-10"	42'-1"	50'-1"	57'-3"	64'-5"	71'-7"	78'-9"
LENGTH OF DUCT	6'-0"	6'-6"	7'-0"	7'-6"	8'-0"	8'-6"	9'-0"	9'-6"	10'-0"	
MIN. RAD. RC	85'-11"	93'-1"	100'-3"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



TYPICAL DUCT ENVELOPE ELEVATION

(6 WAY DUCT LINE SHOWN)

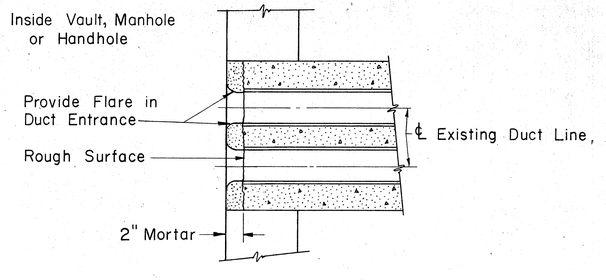
Not to Scale



TYPICAL STUB OUT DETAIL

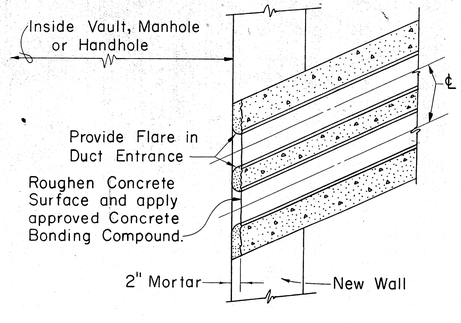
Not to Scale

NOTE: Asbestos Cement or Plastic Plugs may be used if approved by H.E.Co. Engineer.



DUCT LINE ENTRANCE AT EXISTING DUCT LINE

Scale: 1½" = 1'-0"



RIGHT ANGLE OR DIAGONAL ENTRANCE

METHOD OF TERMINATING EXISTING DUCT LINE

Not to Scale

NOTE:
In lieu of this method, existing Concrete Envelope may be cut back and End Bells used same as in new construction.

APPROVED:

J. Harwood 1/26/76
HAWAIIAN ELECTRIC CO., INC. DATE

HECo., Inc. Drawing Number	
30-1033	SHEET No. 2 OF 2 SHEETS

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS

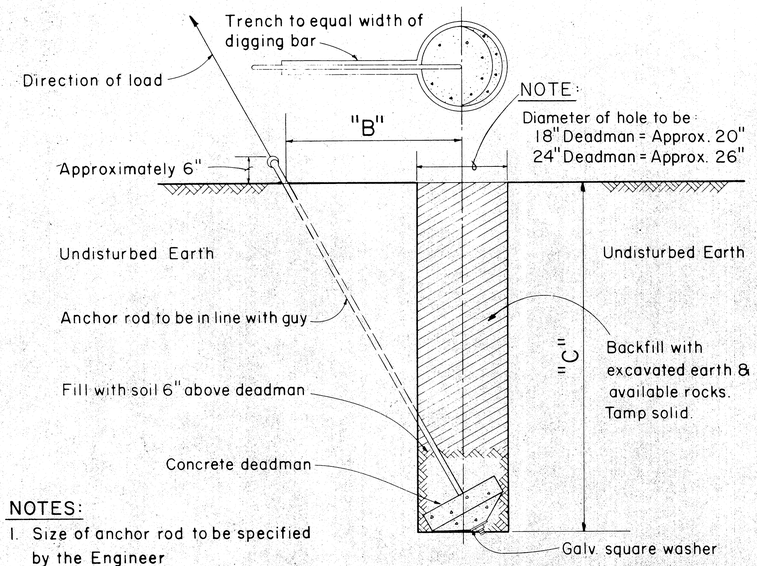
CONSTRUCTION STANDARDS
ASBESTOS CEMENT DUCTS
INSTALLATION DETAILS
UNDERGROUND STRUCTURES

Scales: As Noted DATE: AUG 4 1976

SHEET NO. 41 OF 43 SHEETS

LIETZ 1103 ARKWRIGHT TRACING CLOTH 10-60 200P

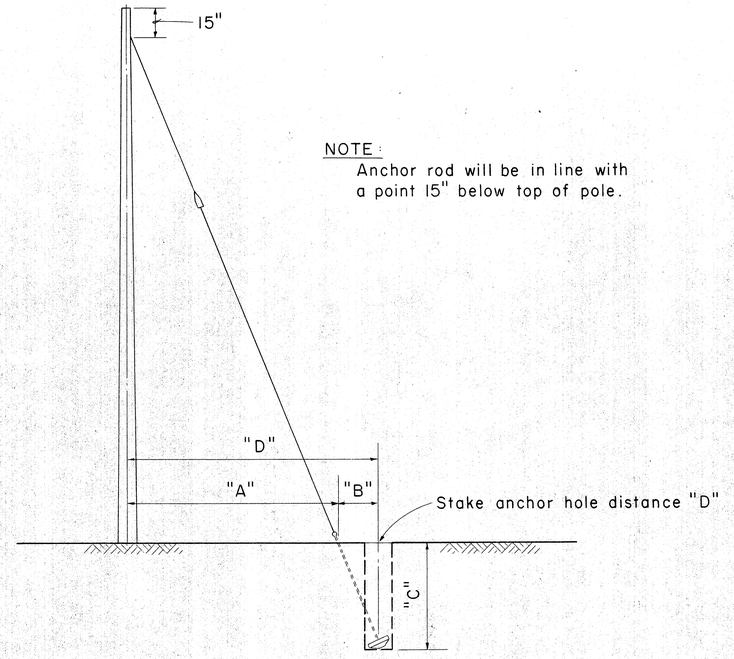
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII	I-HI-(22)15	1977	213	350



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

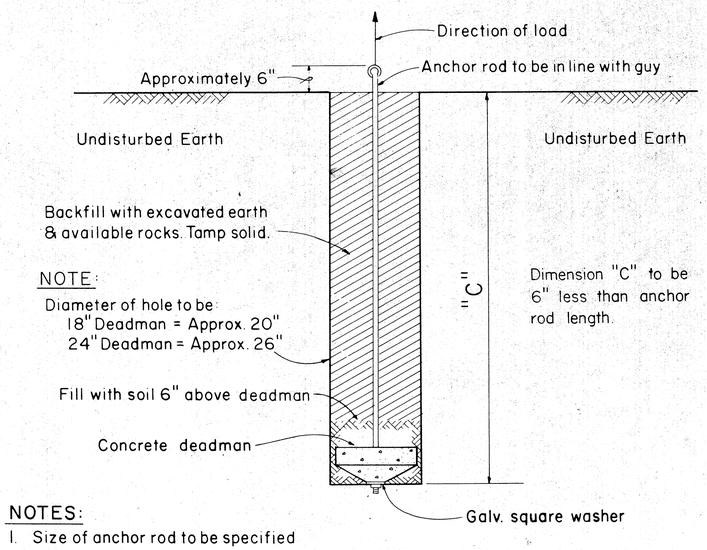
FOR 25', & 30' POLES WITH 8'-0" ANCHOR RODS				
"A"	"B"	"C"		"D" = ("A" + "B")
LEAD-ANCHOR ROD TO ℄ OF POLE	ANCHOR ROD TO ℄ OF HOLE	VERTICAL DEPTH 18" D.M.	VERTICAL DEPTH 24" D.M.	TOTAL DISTANCE POLE TO HOLE
5'-0"	1'-8"	7'-1"	7'-4"	6'-8"
10'-0"	3'-0"	6'-7"	7'-0"	13'-0"
15'-0"	4'-0"	6'-1"	6'-6"	19'-0"
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.

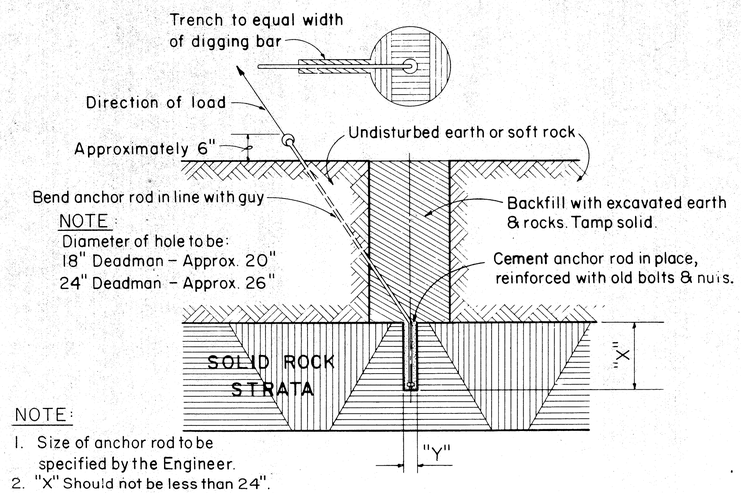
ANCHORING DATA



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:

J. Kawamoto 7/26/76
HAWAIIAN ELECTRIC Co., Inc. DATE

J. Desi for Kaj. 8/1/76
HAWAIIAN TELEPHONE Co. DATE

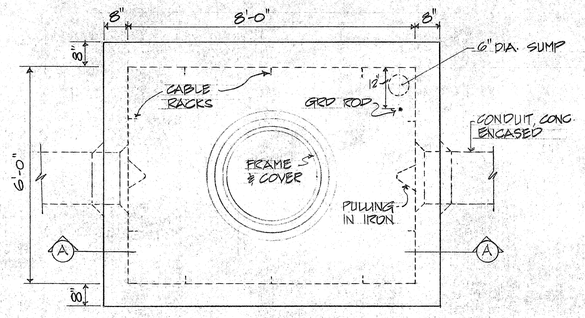
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

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

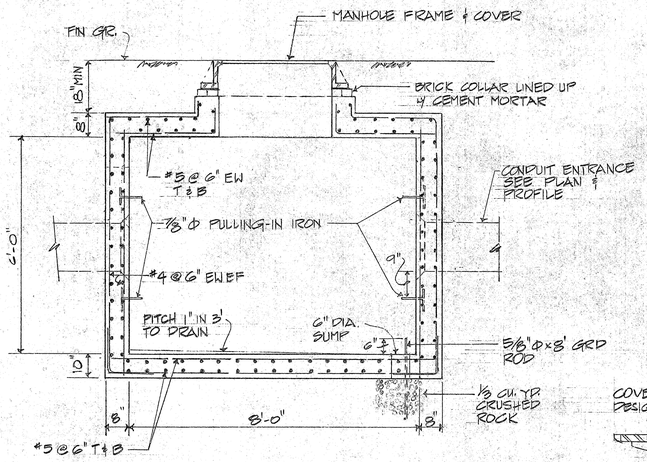
Scales: As Noted Date AUG 4 1976

SHEET No. 42 OF 42 SHEETS

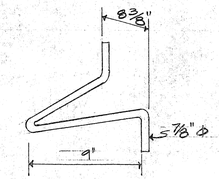
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-HI-1(99)15	1977	219	350



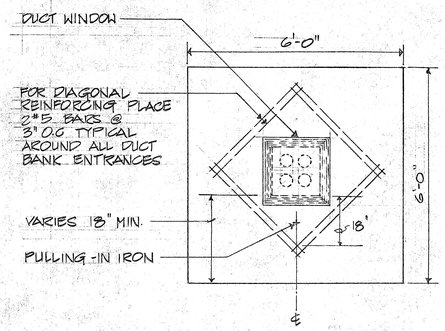
PLAN



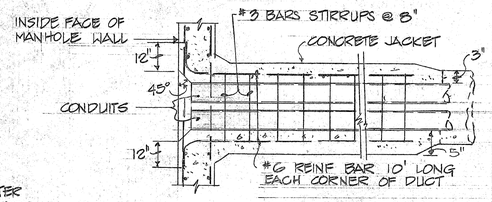
SECTION "A-A"



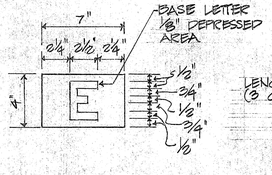
PULLING-IN IRON DETAIL



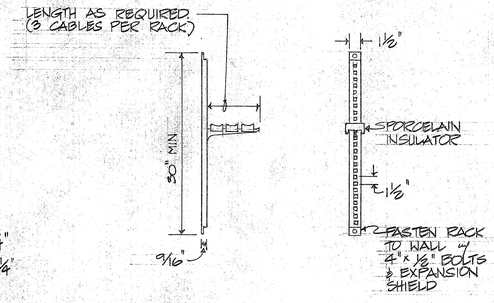
ELEVATION OF MANHOLE WALL



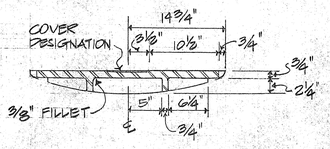
CONDUIT ENTRANCE



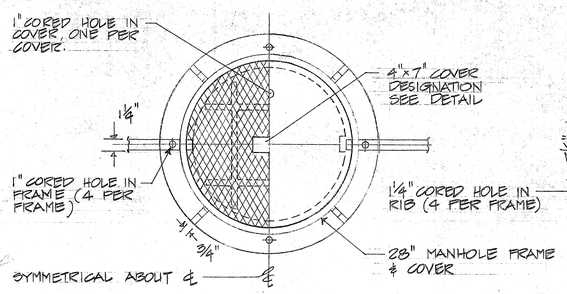
COVER DESIGNATION



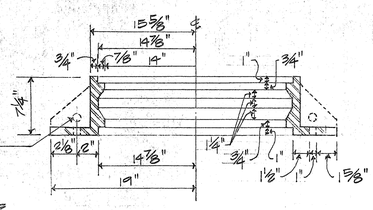
CABLE RACK DETAIL



COVER SECTION



PLAN

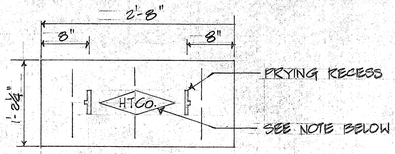


FRAME SECTION

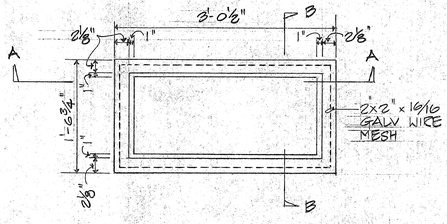
A 219 NAVY TYPE 7 MANHOLE

NOT TO SCALE

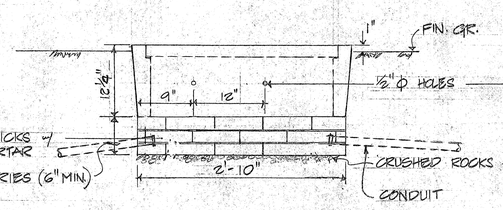
NOTE: FOR USE IN AREAS SUBJECT TO VEHICULAR TRAFFIC.



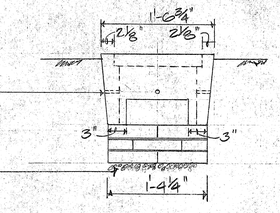
PLAN OF COVER



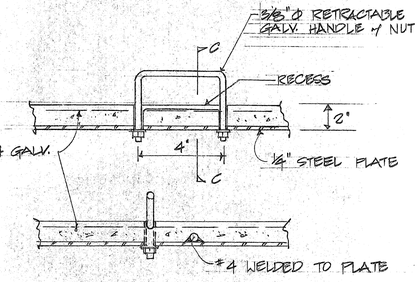
PLAN.



SECTION "A-A"



SECTION "B-B"



SECTION "C-C"

RETRACTABLE HANDLE DETAIL

B 219 TELEPHONE PULLBOX-4341 DET. (POWER PULLBOX SIMILAR)

NOT TO SCALE

NOTE: FOR POWER PULLBOX CHANGE INSCRIPTION TO "ELEC".

APPROVED:

S. Dean for Mgr. 8/3/76

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. 750 TAKETO KUWABARA HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

Taketo Kuwabara

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

NIMITZ SPUR
UTILITY PLAN - ELECTRICAL & TELEPHONE
NAVY TYPE 7 MANHOLE

INTERSTATE ROUTE H-1
PROJECT NO. I-HI-1(99)15

SCALE: AS NOTED DATE AUG 4 1976

SHEET NO. 43 OF 43 SHEETS

219

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