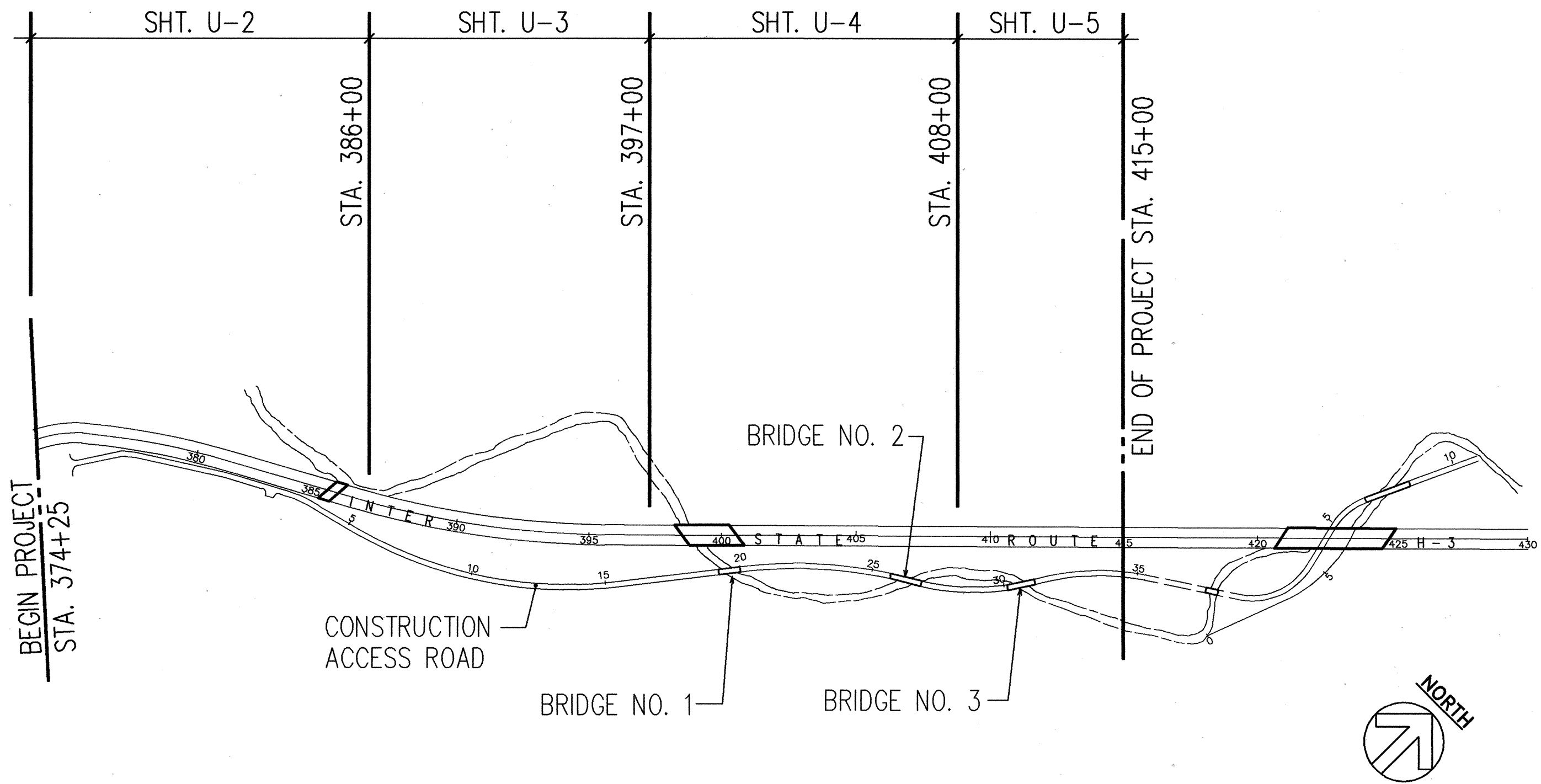


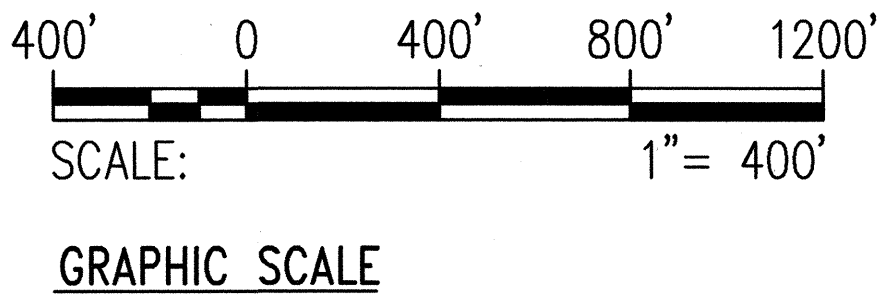
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	63	211

SYMBOLS AND LEGEND:

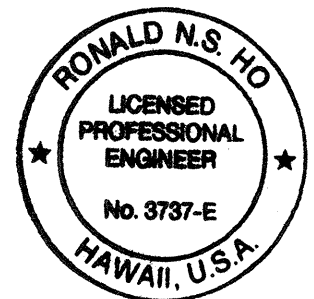
- e/t— EXISTING OVERHEAD POWER AND TELEPHONE LINES
- E/T— NEW OVERHEAD POWER AND TELEPHONE LINES
- P#1 ○ EXISTING POLE AND NUMBER
- NP#1 ● NEW POLE AND NUMBER
- EXISTING ANCHOR & GUY
- > NEW ANCHOR & GUY
- || NEW PUSH BRACE
- ⊗ EXISTING POLE TO BE REMOVED
- e/t-R— EXISTING OVERHEAD POWER AND TELEPHONE LINES TO BE REMOVED
- PRI PRIMARY
- ▲ POLE TOP TRANSFORMER



11.5KV POWER AND TELEPHONE LINE RELOCATION GENERAL LAYOUT PLAN
SCALE: 1"=400'



RONALD N. S. HO & ASSOC., INC.
Electrical Engineers



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OR UNDER MY SUPERVISION.
Ronald N. S. Ho 5/17/94

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

11.5KV POWER AND TELEPHONE LINE
RELOCATION GENERAL LAYOUT PLAN
STA. 374+25 TO STA. 415+00
INTERSTATE ROUTE H-3
F.A.I. PROJECT NO I-H3-1(59)
SCALE: AS NOTED DATE: JUNE 1993
SHEET No. U-1 OF 35 SHEETS

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

CONSTRUCTION PHASING NOTES STA. 375+75 TO 383+00 (SCOPE)

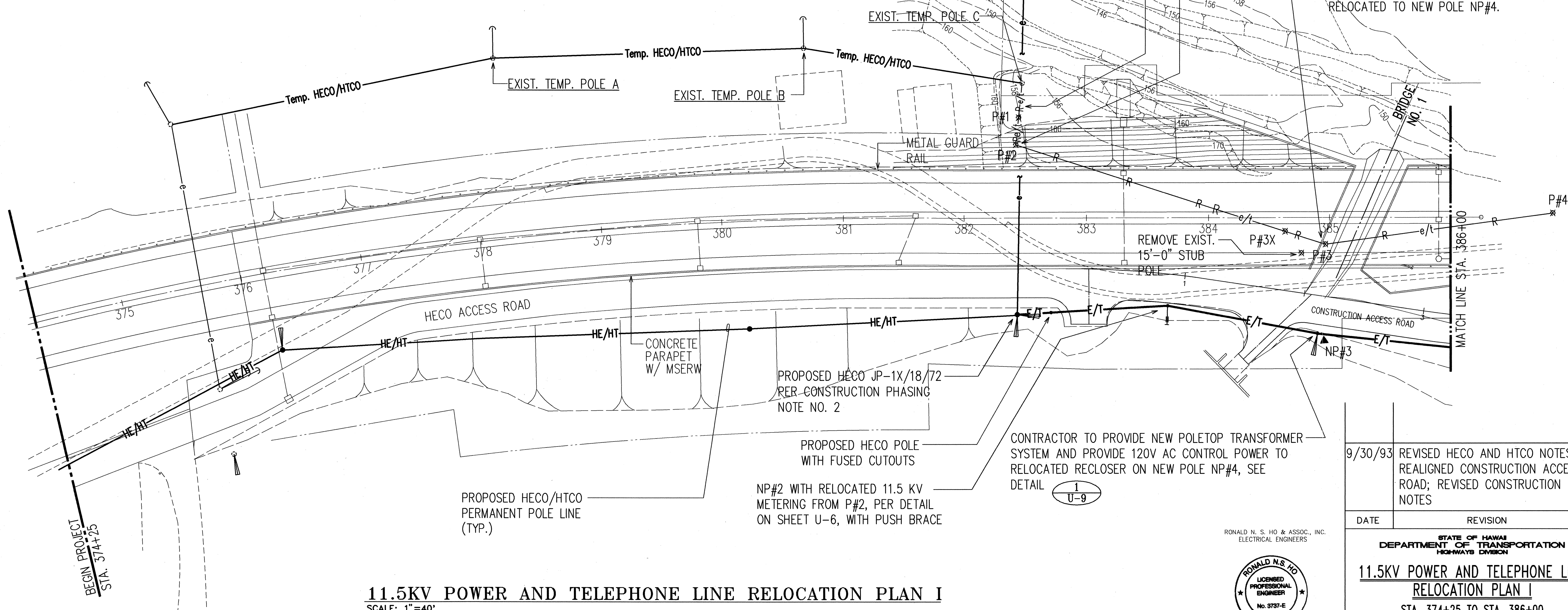
- CONTRACTOR SHALL EXCAVATE THE 1:1 CUT SLOPE FROM STATION 375+75 RT TO STATION 383+00 RT, CONSTRUCT THE HECO AND CONSTRUCTION ACCESS ROADS, AND INSTALL THE UNDERGROUND E AND T BOXES AND DUCTLINES (SEE SHT. U-11).
- THE CONTRACTOR SHALL THEN INFORM THE RESIDENT ENGINEER TO DIRECT HECO TO INSTALL THE PERMANENT OVERHEAD POLE LINE.

HECO AND HTCO NOTES:

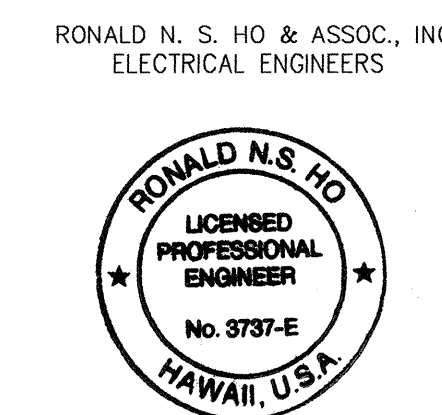
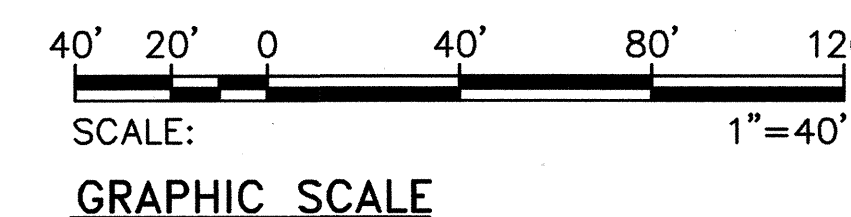
- THE JP ERECTING COMPANY SHALL COORDINATE ALL JP REQUIREMENTS.
- PARTICULARS OF HECO AND HTCO REQUIREMENTS ARE TO BE DETERMINED BY HECO AND HTCO. ITEMS SHOWN ARE FOR REFERENCE ONLY.

GENERAL CONSTRUCTION NOTES

- THE WORK ON THIS PLAN ASSUMES THE COMPLETION OF THE UTILITY CONSTRUCTION PHASING PLAN WHICH REQUIRES THE INSTALLATION OF TEMPORARY POLES A, B, C, P#1, P#2, & ANCHORS, RELATED APPURTENANCES & THE TEMPORARY 11.5KV TIE TO P#3 IN COORDINATION WITH THE HAWAIIAN ELECTRIC COMPANY AND THE HAWAIIAN TELEPHONE COMPANY TEMPORARY RELOCATION.
- THE CONTRACTOR SHALL PROVIDE ALL POLES, ANCHORS, METER RELOCATION, CONDUCTORS, INSULATORS, AND APPURTENANCES NECESSARY TO RELOCATE THE EXISTING 11.5KV POWER AND TELEPHONE LINES BETWEEN AND INCLUDING EXISTING POLE P#1 UP TO AND INCLUDING EXISTING POLE P#18. THE CONTRACTOR SHALL ALSO FURNISH AND INSTALL NEW TELEPHONE LINES, ALL AS SPECIFIED ON THESE PLANS AND AS REQUIRED BY THE SPECIAL PROVISIONS, CONTRACT AND BOND OF THE PROJECT.



11.5KV POWER AND TELEPHONE LINE RELOCATION PLAN I SCALE: 1"=40'



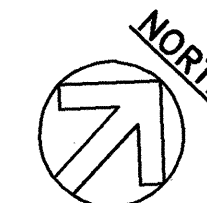
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Ronald N. S. Ho 5/17/96

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	ADD. 64	211

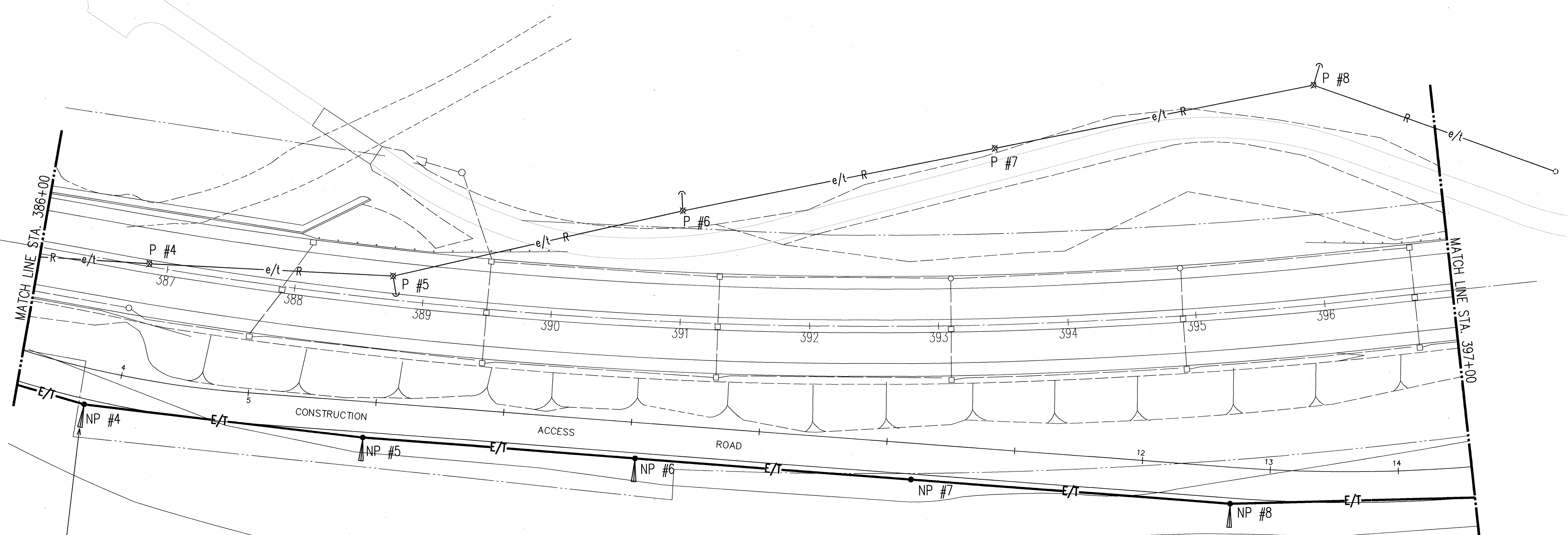
9/30/93	REVISED HECO AND HTCO NOTES; REALIGNED CONSTRUCTION ACCESS ROAD; REVISED CONSTRUCTION NOTES
---------	---

DATE	REVISION
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
	11.5KV POWER AND TELEPHONE LINE RELOCATION PLAN I
	STA. 374+25 TO STA. 386+00
	INTERSTATE ROUTE H-3 F.A.I. PROJECT NO I-H3-1(59)
SCALE: AS NOTED	DATE: JUNE 1993
SHEET No. U-2 OF 35 SHEETS	

ADD. 64



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	ADD. 65	211



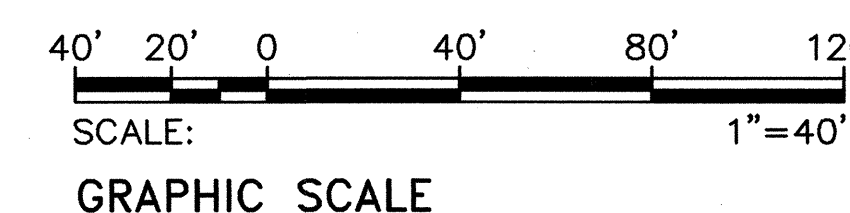
CONTRACTOR TO RELOCATE EXISTING RECLOSER AND ELECTRONIC RECLOSER CONTROL EQUIPMENT ONTO NEW POLE NP #4, TO MATCH EXISTING INSTALLATION. EXTEND NEW 120V AC CONTROL POWER CIRCUIT FROM NEW POLE TOP TRANSFORMER ON POLE NP #3. PROVIDE REQUIRED POLE TOP MOUNTING HARDWARE, TO MATCH EXISTING INSTALLATION. SEE DETAIL 3
U-9 FOR 120V

POWER TO RECLOSER CONTROL EQUIPMENT.

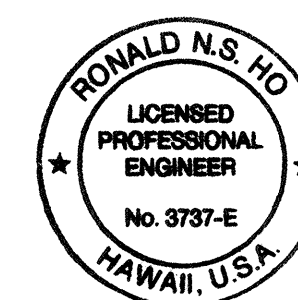
11.5KV POWER AND TELEPHONE LINE RELOCATION PLAN II

SCALE: 1"=40'

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
DRAWN BY		
TRACED BY		
NOTED BY		
CHECKED BY		
No.		



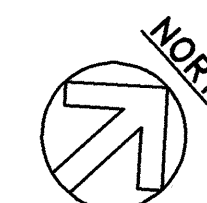
RONALD N. S. HO & ASSOC., INC.
ELECTRICAL ENGINEERS



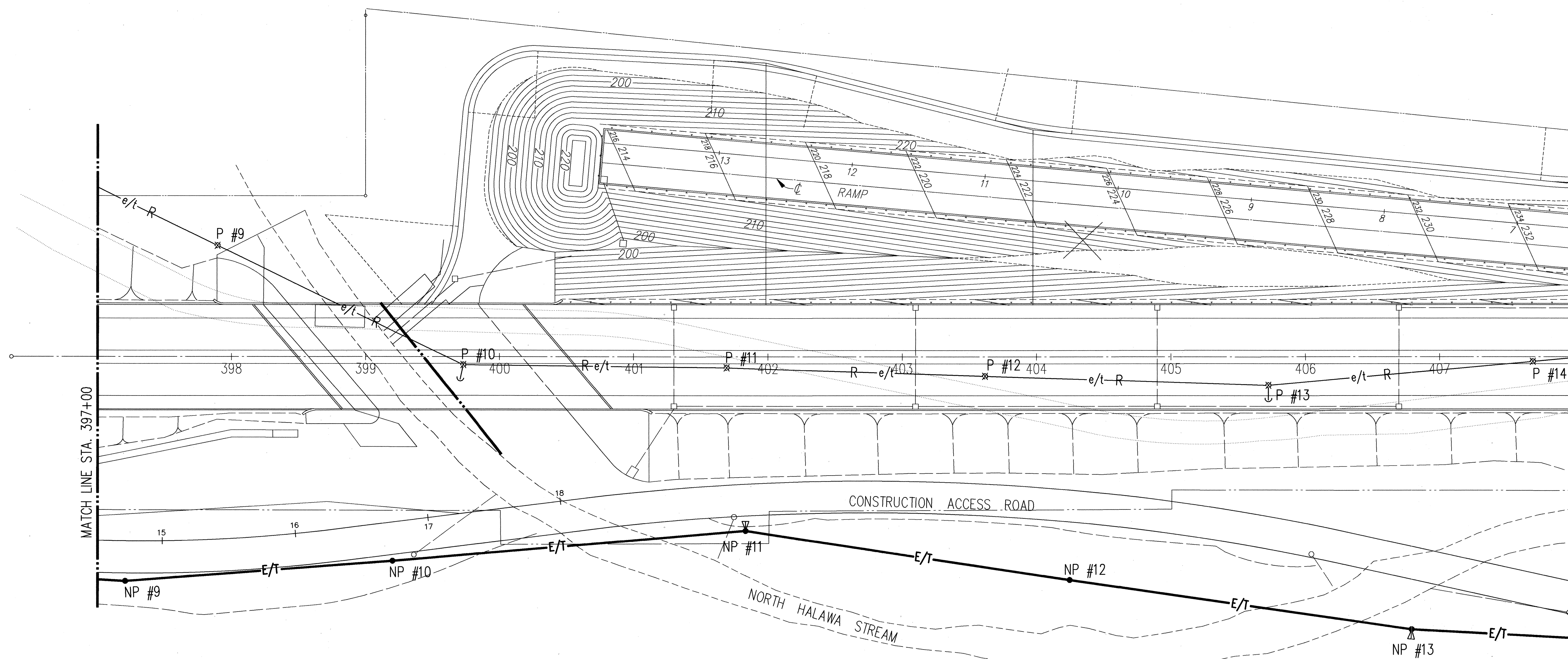
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9/30/93	REALIGNED CONSTRUCTION ACCESS ROAD
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
11.5KV POWER AND TELEPHONE LINE RELOCATION PLAN II	
STA. 386+00 TO STA. 397+00	
INTERSTATE ROUTE H-3 F.A.I. PROJECT NO I-H3-1(59)	
SCALE: AS NOTED	DATE: JUNE 1993
SHEET No. U-3 OF 35 SHEETS	

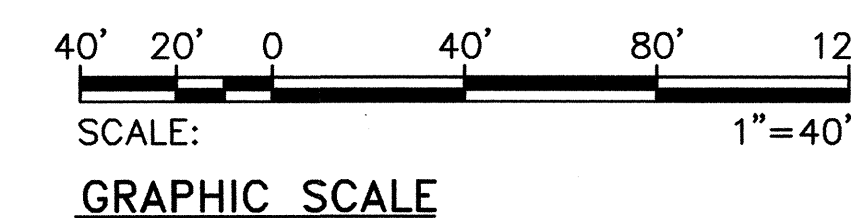
ADD. 65



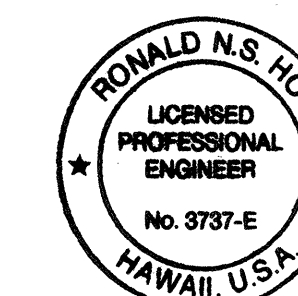
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	ADD. 66	211



11.5KV POWER AND TELEPHONE LINE RELOCATION PLAN III
SCALE: 1"=40'



RONALD N. S. HO & ASSOC., INC.
ELECTRICAL ENGINEERS

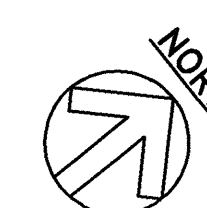


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Ronald N.S. Ho 5/17/96

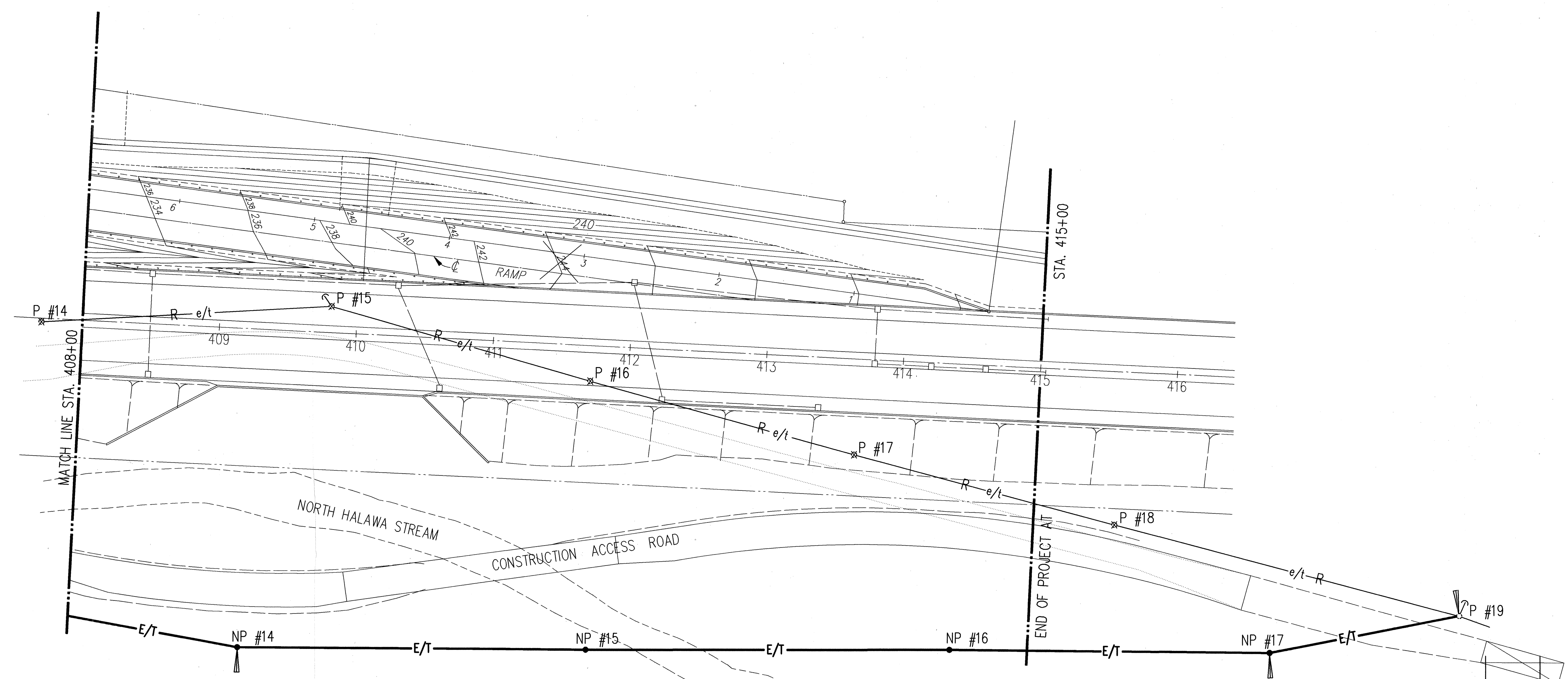
9/30/93	REALIGNED CONSTRUCTION ACCESS ROAD
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
11.5KV POWER AND TELEPHONE LINE RELOCATION PLAN III	
STA. 397+00 TO STA. 408+00	
INTERSTATE ROUTE H-3 F.A.I. PROJECT NO. I-H3-1(59)	
SCALE: AS NOTED	DATE: JUNE 1993
SHEET No. U-4 OF 35 SHEETS	

ADD. 66

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

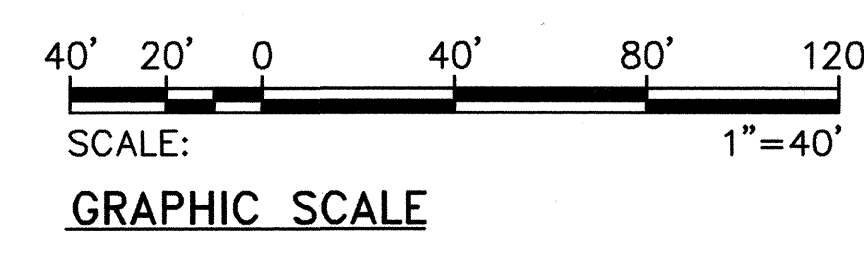


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	ADD. 67	211

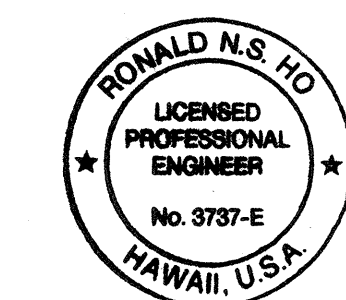


NOTE: CONTRACTOR SHALL REROUTE 11.5KV POWER AND TELEPHONE LINE UP TO EXISTING POLE P #19, AS INDICATED, BEYOND STATION 415+00

11.5KV POWER AND TELEPHONE LINE RELOCATION PLAN IV
SCALE: 1"=40'



RONALD N. S. HO & ASSOC., INC.
ELECTRICAL ENGINEERS



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9/30/93	REVISED DRAIN LINES
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
11.5KV POWER AND TELEPHONE LINE RELOCATION PLAN IV	
STA. 408+00 TO STA. 415+00	
INTERSTATE ROUTE H-3 F.A.I. PROJECT NO I-H3-1(59)	
SCALE: AS NOTED	DATE: JUNE 1993
SHEET No. U-5 OF 35 SHEETS	

DATE	_____
DESIGNED BY	_____
CHECKED BY	_____
QUANTITIES BY	_____
NO.	_____

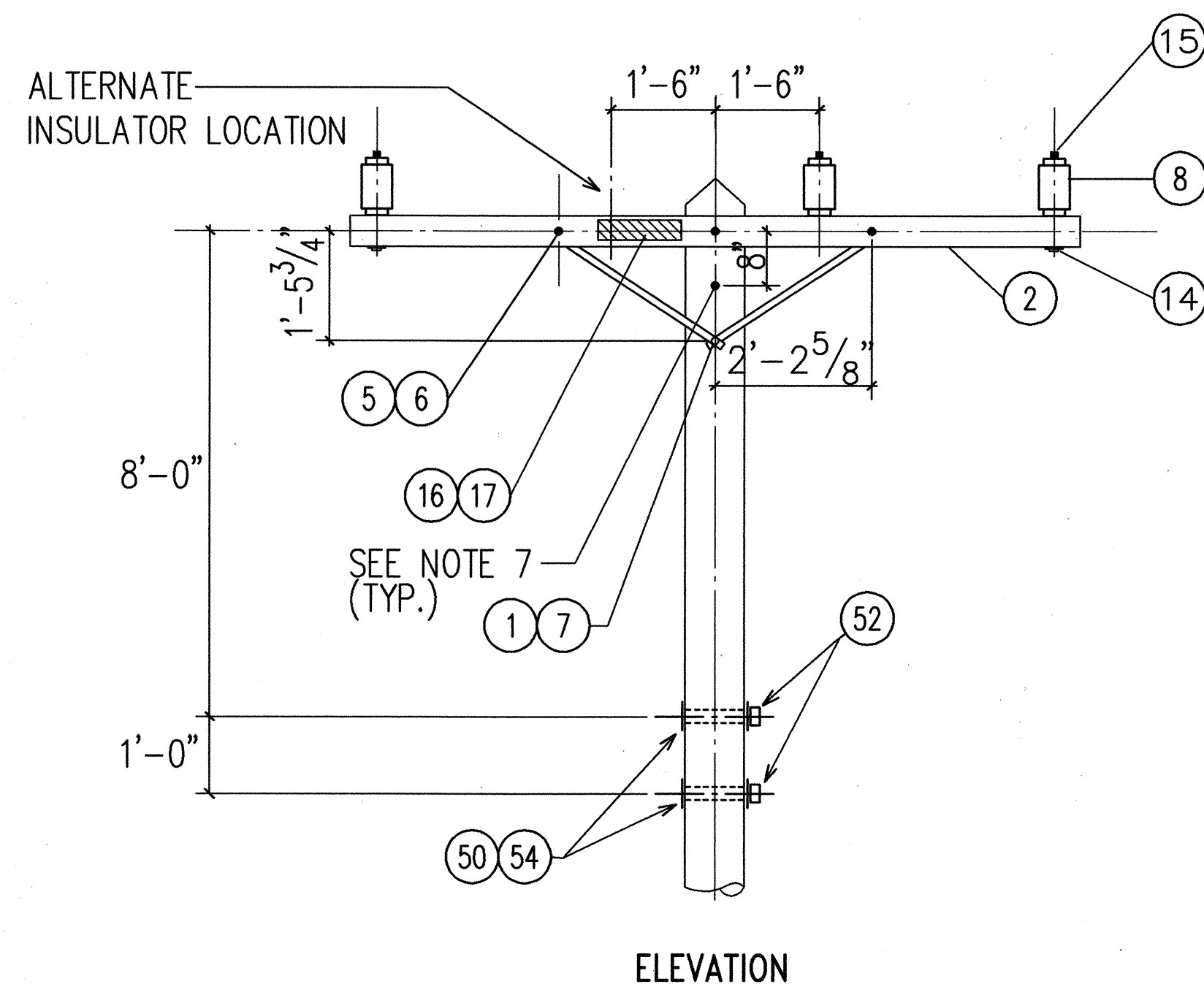
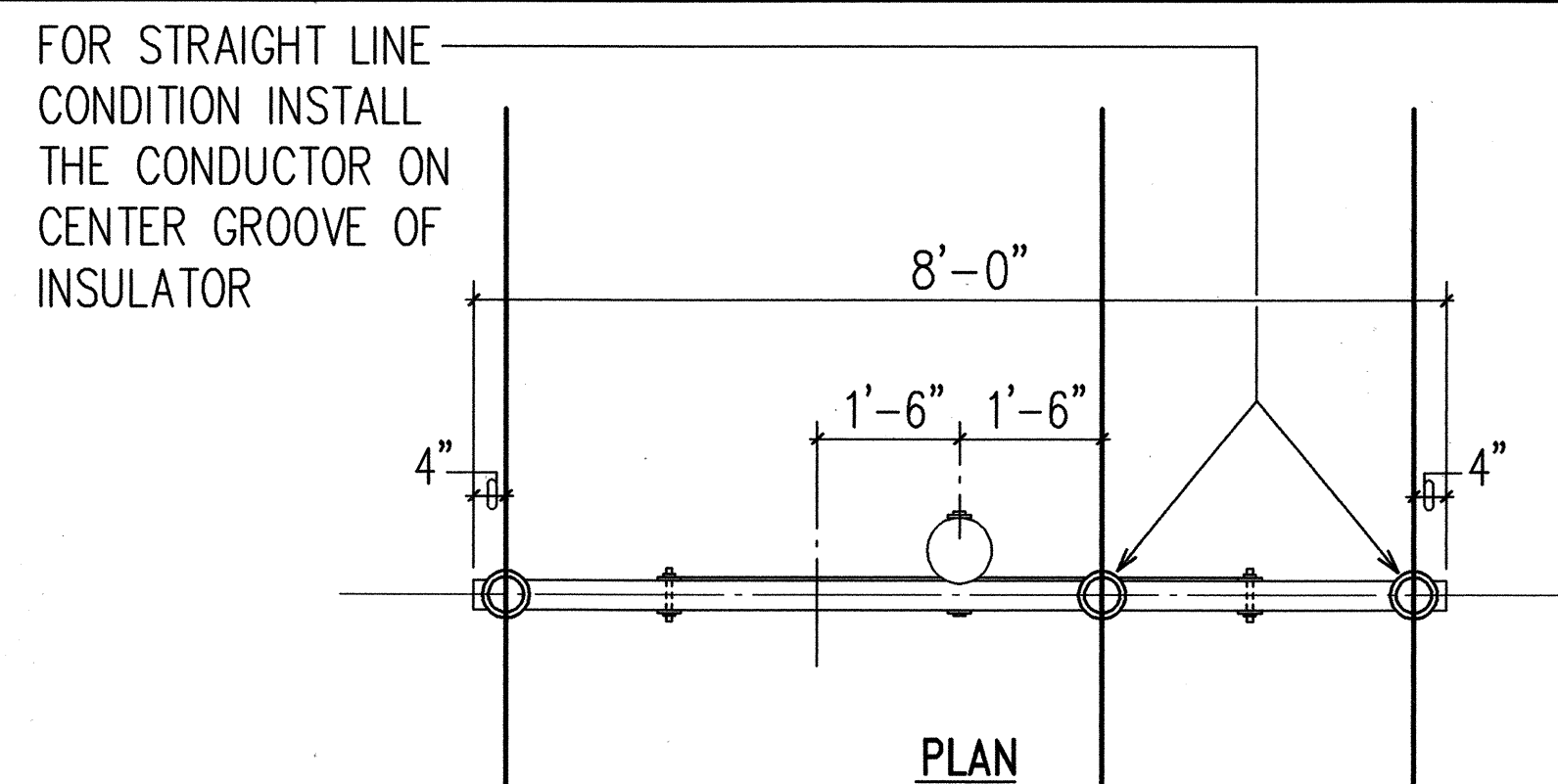
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	69	211

NOTES:

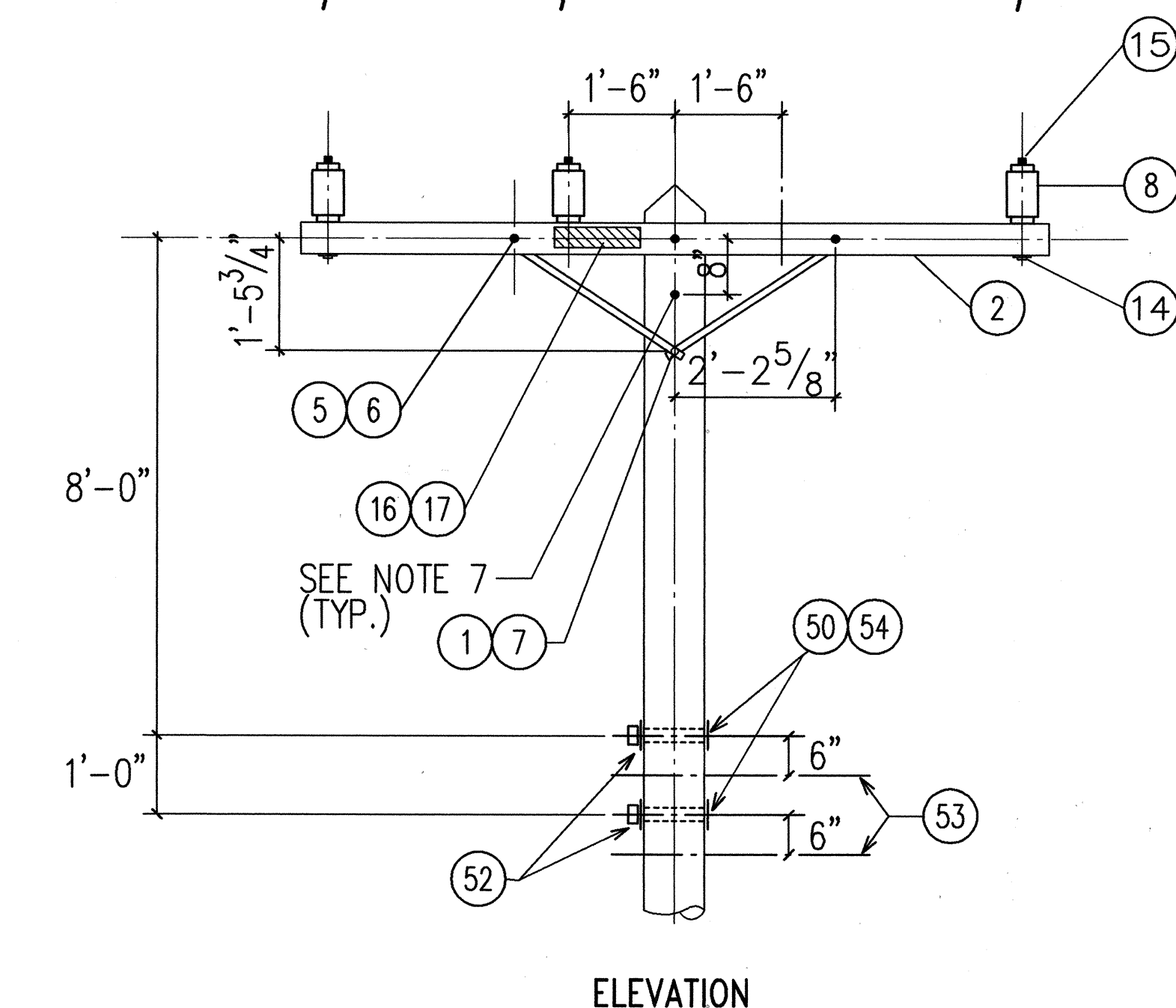
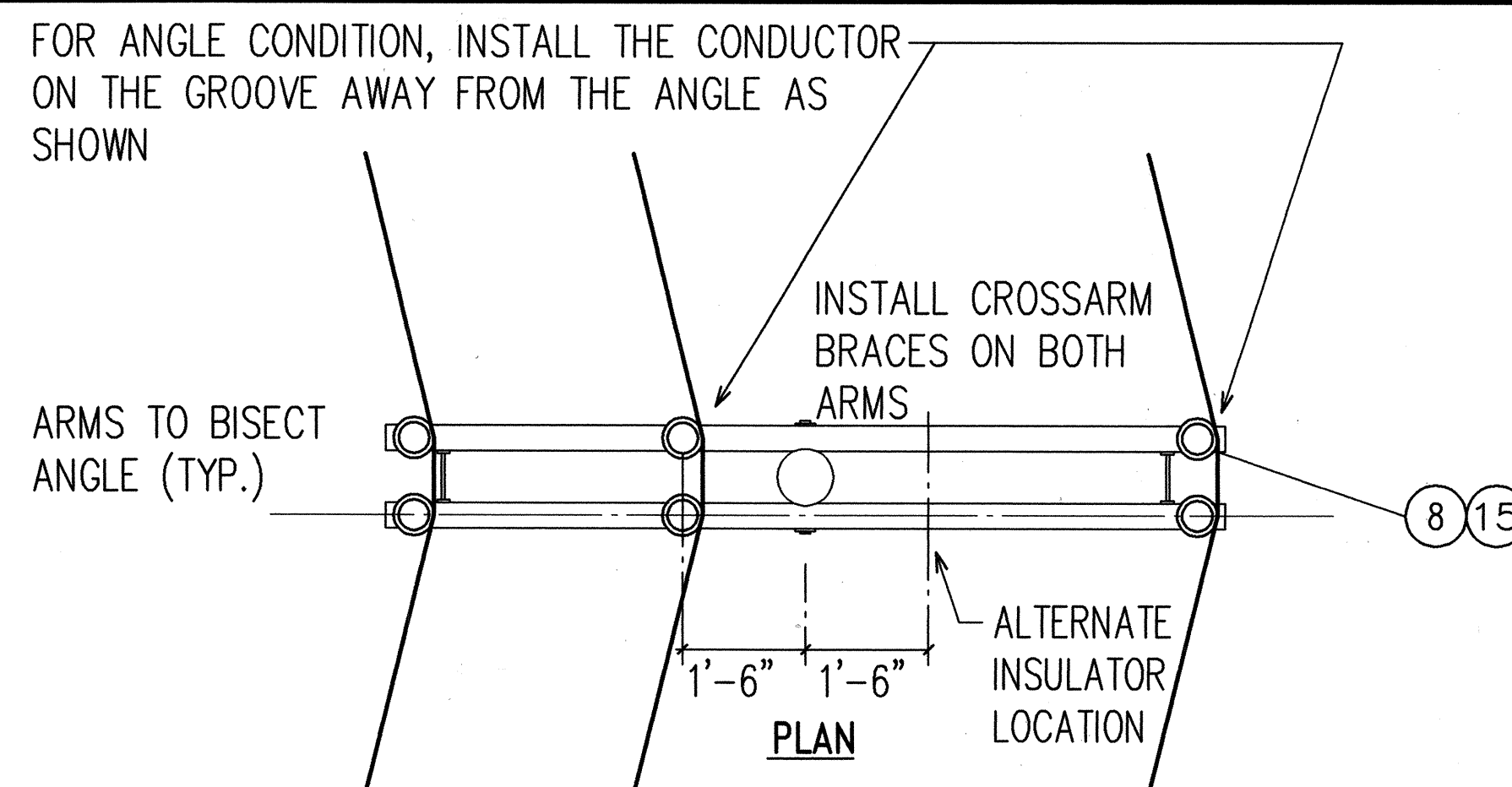
1. MAXIMUM POLE SPAN USING #3/0 ACC SHALL BE 270 FT.
2. RESULTANT TENSION SHALL NOT EXCEED 400LBS. FOR SINGLE INSULATOR PER DET. 1
U-7
3. RESULTANT TENSION SHALL NOT EXCEED 800LBS. FOR DOUBLE INSULATORS PER DET. 2
U-7
4. USE DOUBLE ARM DOUBLE DEADEND CROSSARM DETAIL 3
U-7 FOR DEVIATION ANGLE TO 60°, OR WHEN RESULTANT TENSION EXCEEDS 800# PER CONDUCTOR.
5. USE DEANDEND AND BUCK DET. 4
U-7 FOR DEVIATION ANGLES 60 TO 90°, OR WHEN RESULTANT TENSION EXCEEDS 800# PER CONDUCTOR.
6. INSTALL GALV. DROP FORGED CLEVIS BETWEEN EYELET AND INSULATOR WHERE THE DEVIATION ANGLE OF THE POLES IS LESS THAN 60°.
7. POINT OF GUY ATTACHMENT WHEN REQUIRED.
8. FOR TELEPHONE FRAMING DETAILS, REFER TO SHEET U-8.

MATERIAL LEGEND

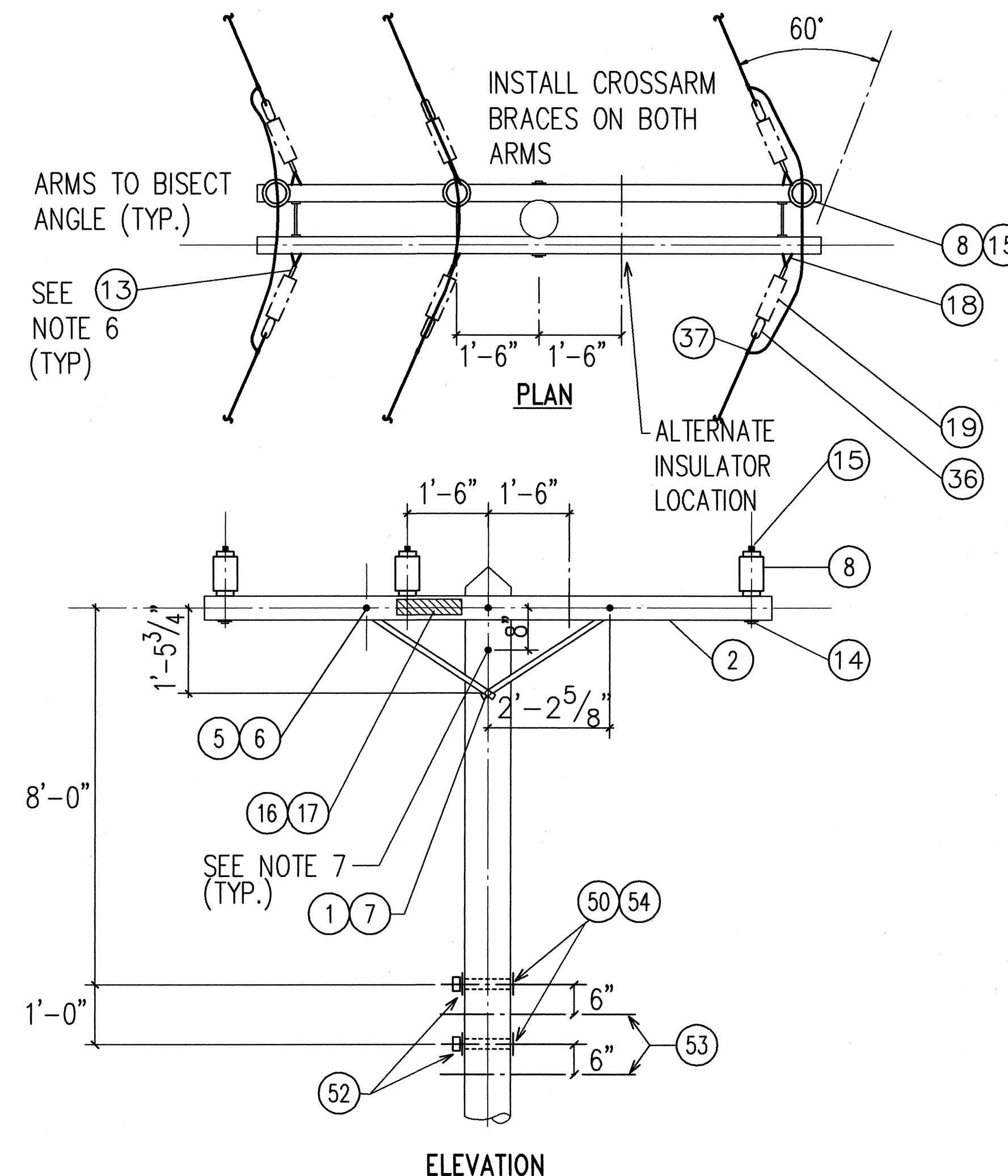
- ② CIRCLE WITH NUMBER WITHIN INDICATES THE POLE LINE MATERIAL LIST ITEM NO. SHOWN ON SHEET U-6.



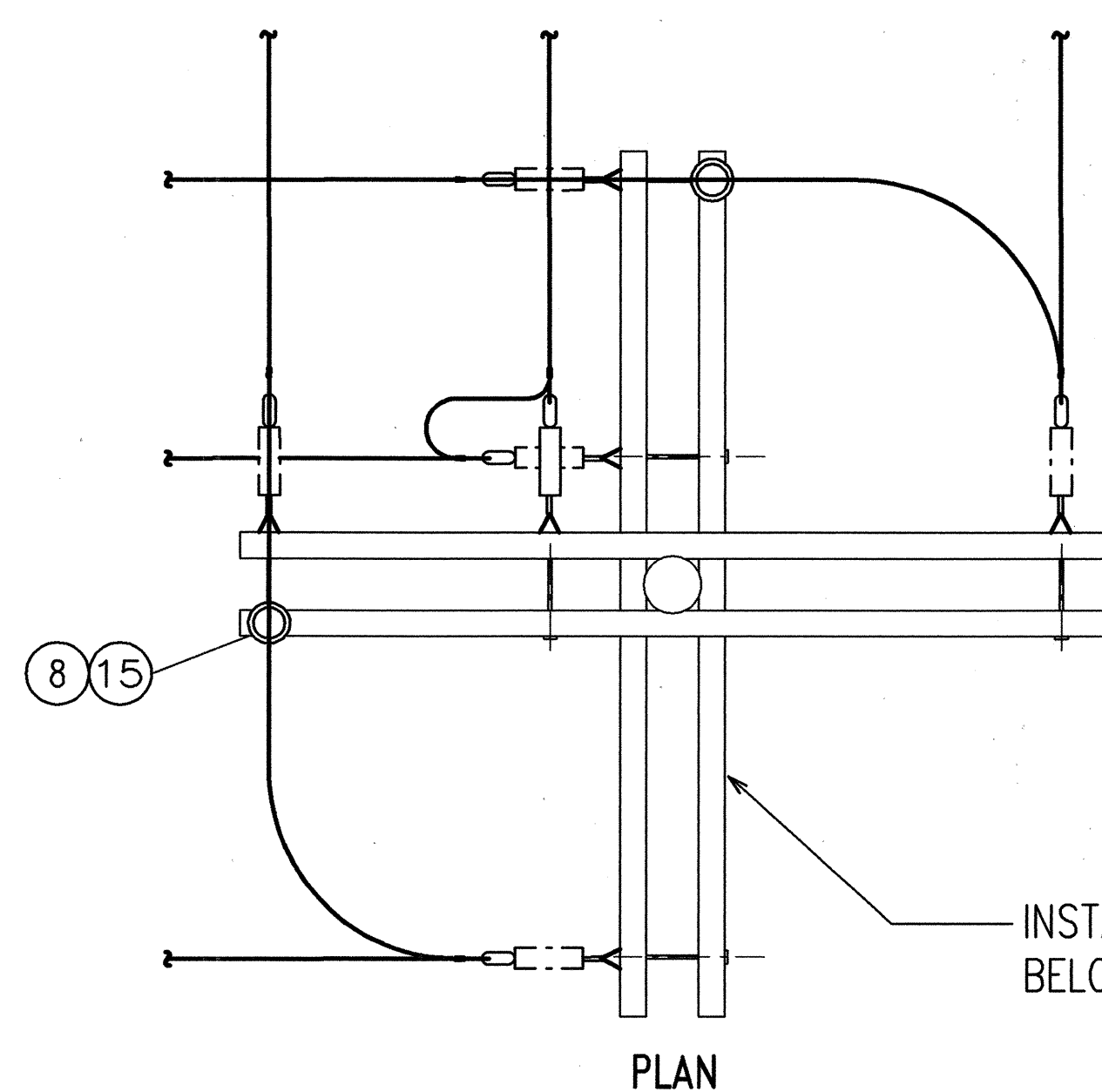
1
U-7 SINGLE ARM SINGLE INSULATOR CROSSARM DETAIL
SEE NOTE 2 N.T.S.



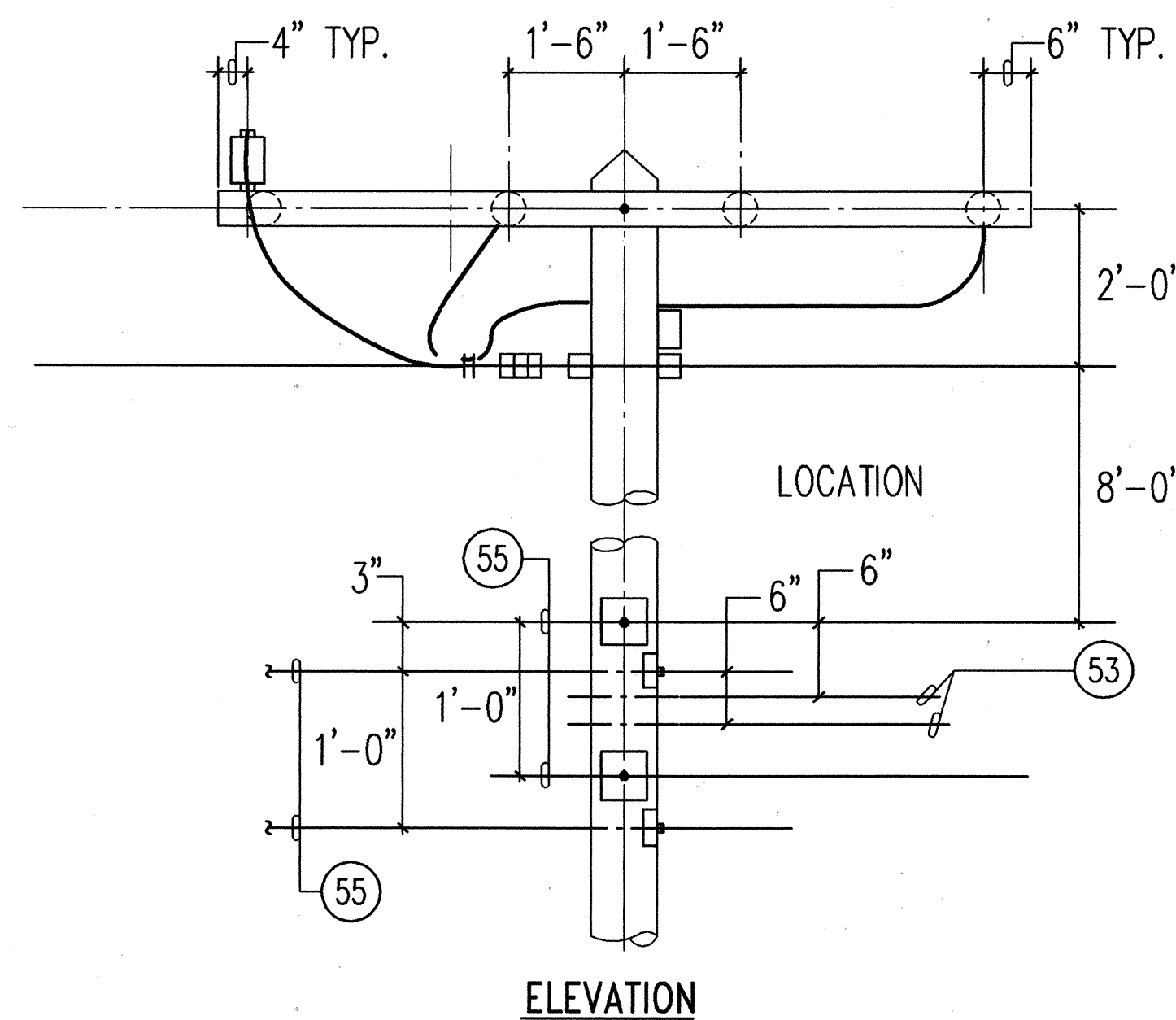
2
U-7 DOUBLE ARM DOUBLE INSULATOR CROSSARM DETAIL
SEE NOTE 3 N.T.S.



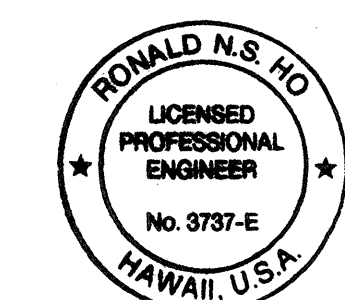
3
U-7 DOUBLE ARM DOUBLE DEADEND LESS THAN 60° DEVIATION ANGLE CROSSARM DETAIL
SEE NOTE 4 N.T.S.



4
U-7 DEADEND AND BUCK CROSSARM DETAILS
SEE NOTE 5 N.T.S.



RONALD N. S. HO & ASSOC., INC.
Electrical Engineers

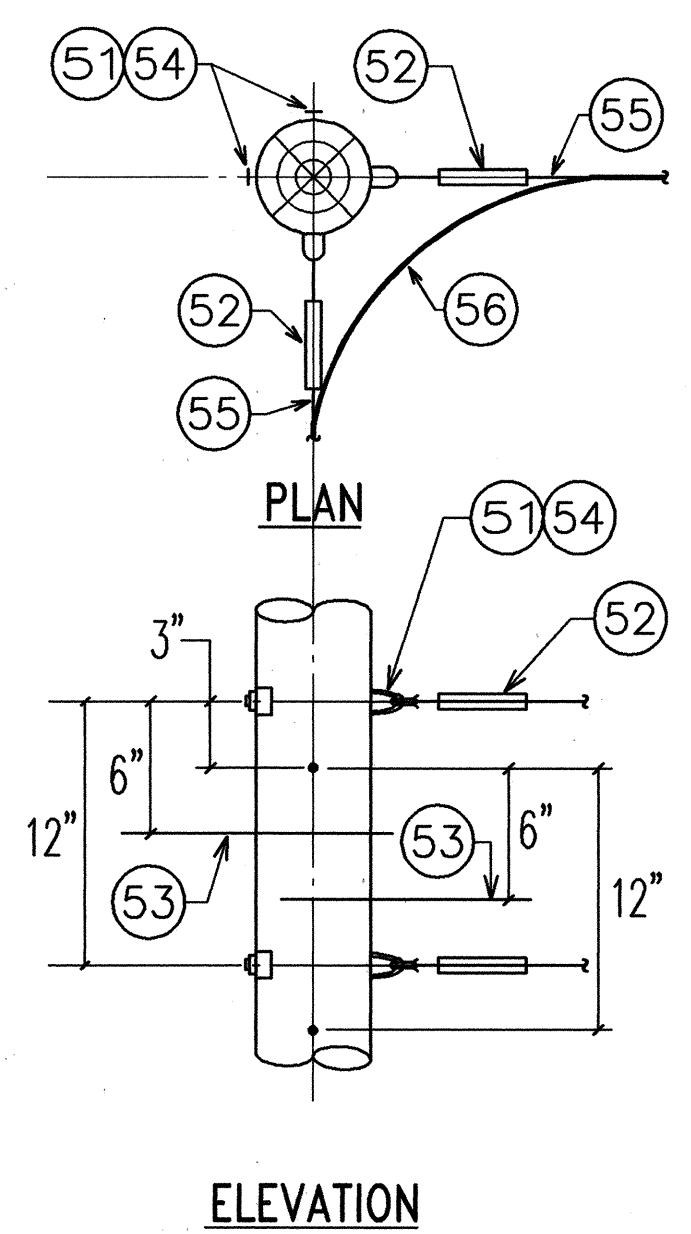
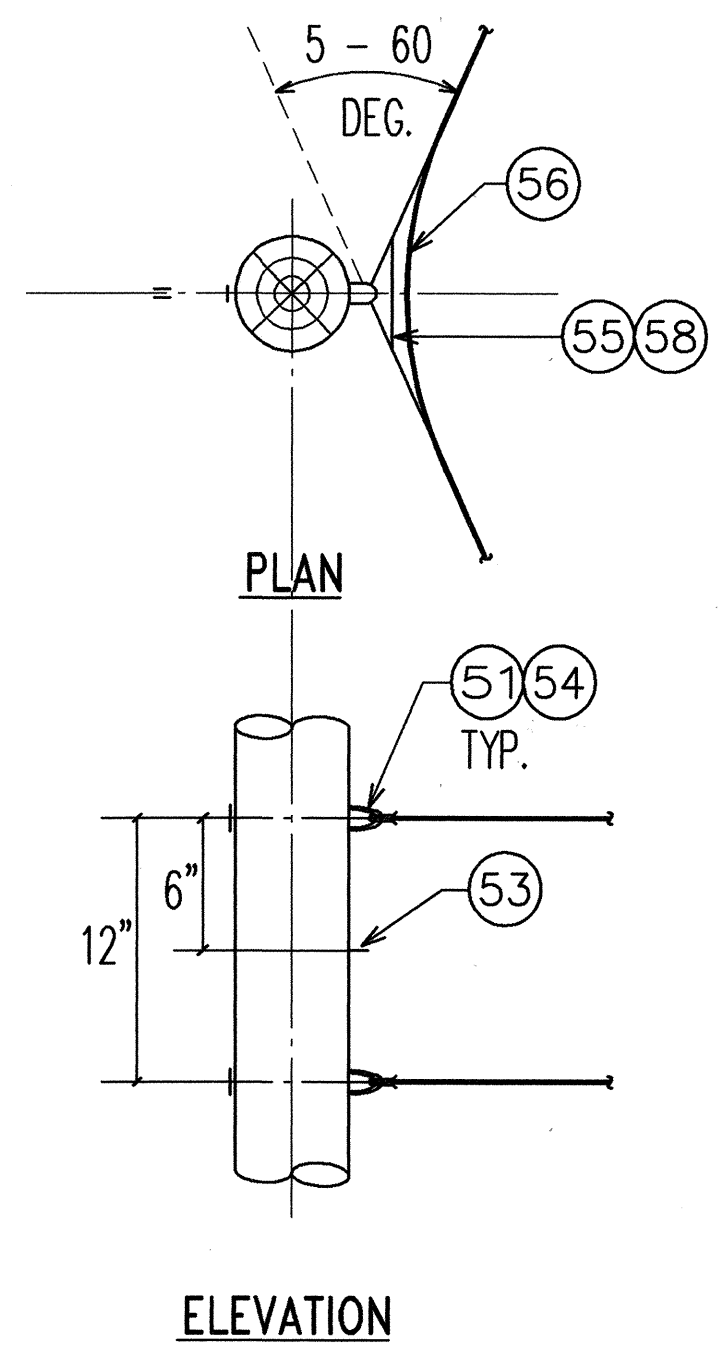
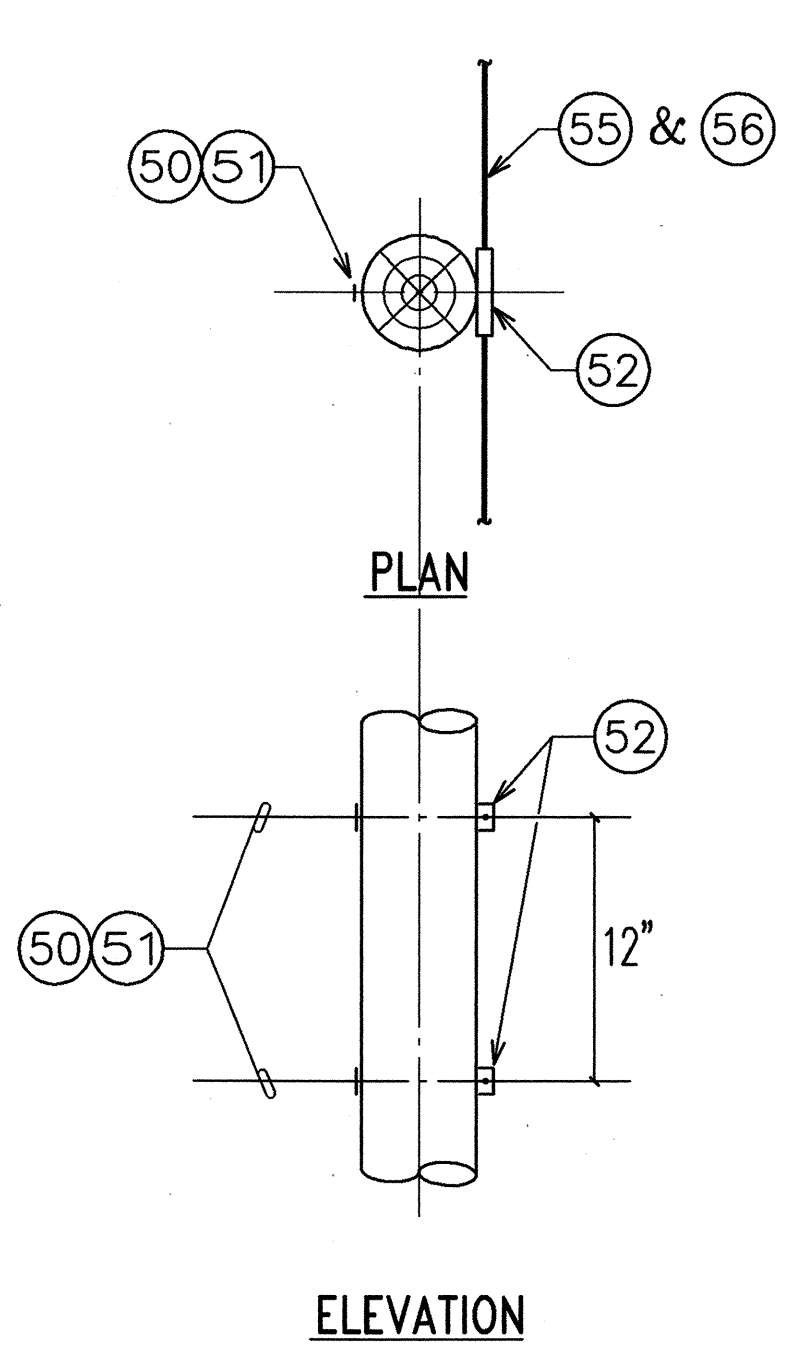


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STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
WOOD POLE FRAMING DETAILS I	
INTERSTATE ROUTE H-3 F.A.I. PROJECT NO I-H3-1(59)	
SCALE: AS NOTED	DATE: JUNE 1993
SHEET No. U-7 OF 35 SHEETS	

SURVEY PLOTTED BY	DATE
DRAWN BY	
TRACED BY	
CHECKED BY	
NOTED BY	
NO.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	ADD. 70	211



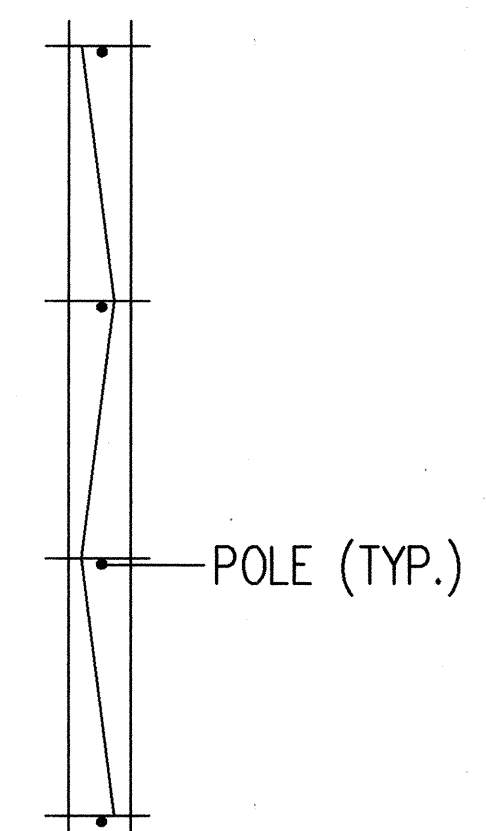
MATERIAL LEGEND

2 CIRCLE WITH NUMBER WITHIN INDICATES THE POLE LINE MATERIAL LIST ITEM NO. SHOWN ON SHEET U-6.

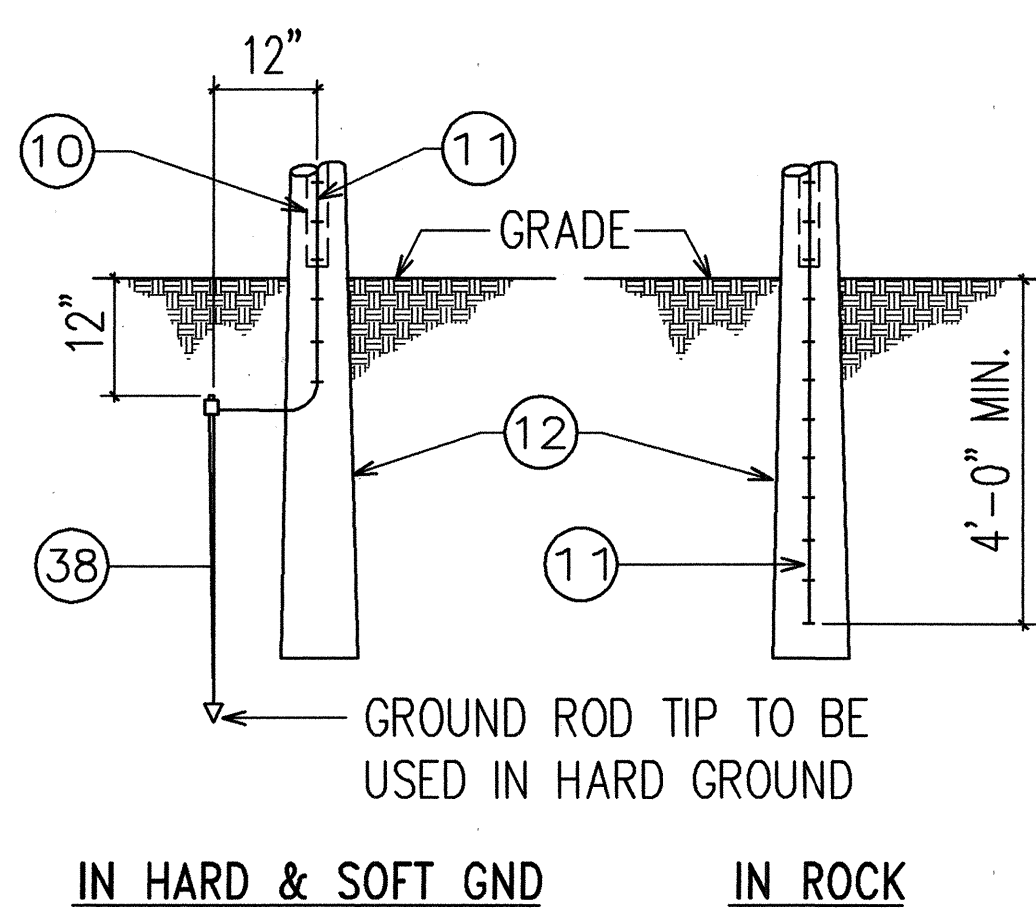
1 0 - 5° ANGLE
U-8 TELEPHONE FRAMING
N.T.S.

2 5 - 60° ANGLE
U-8 TELEPHONE FRAMING
N.T.S.

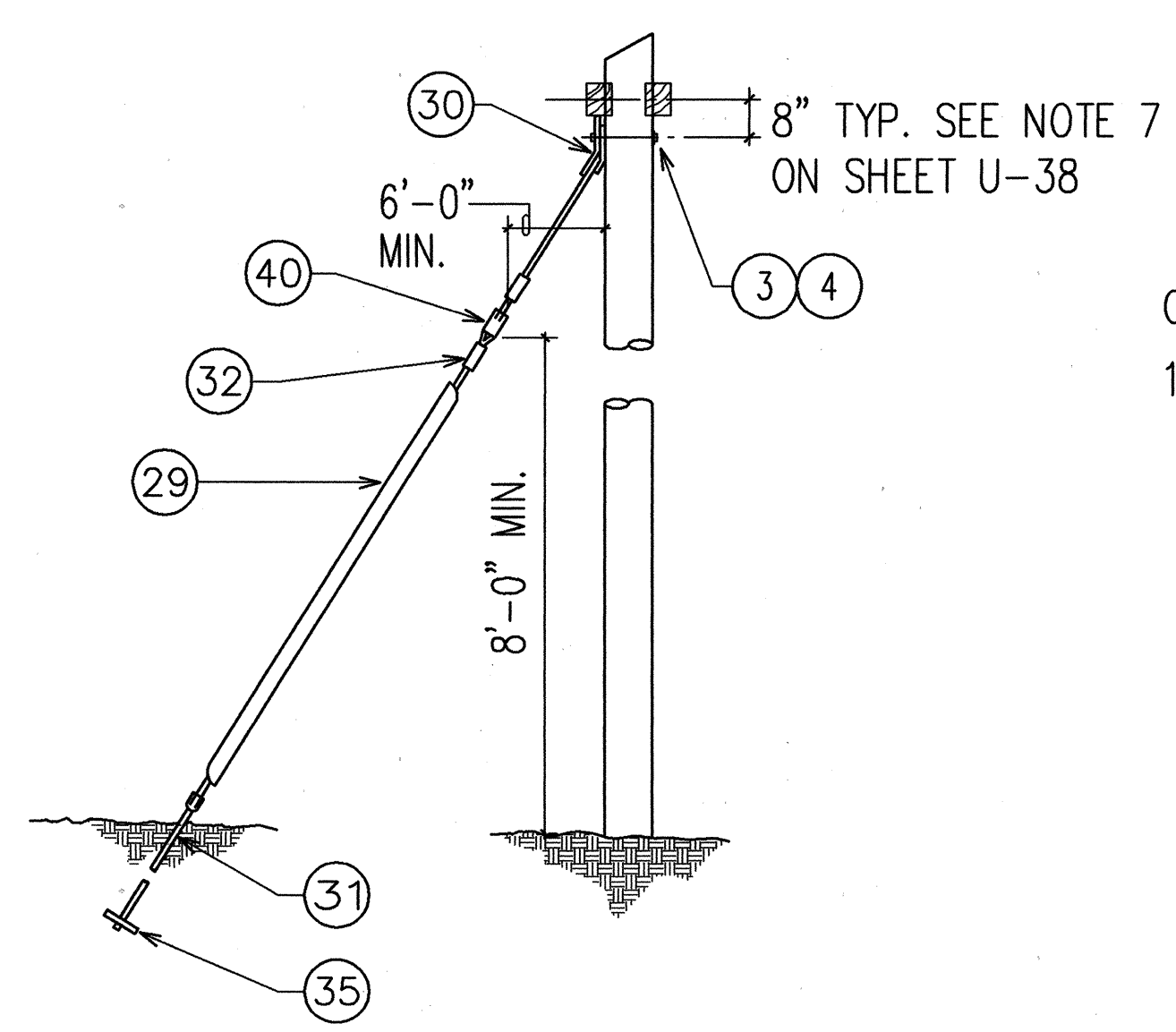
3 60 - 90° ANGLE
U-8 TELEPHONE FRAMING
N.T.S.



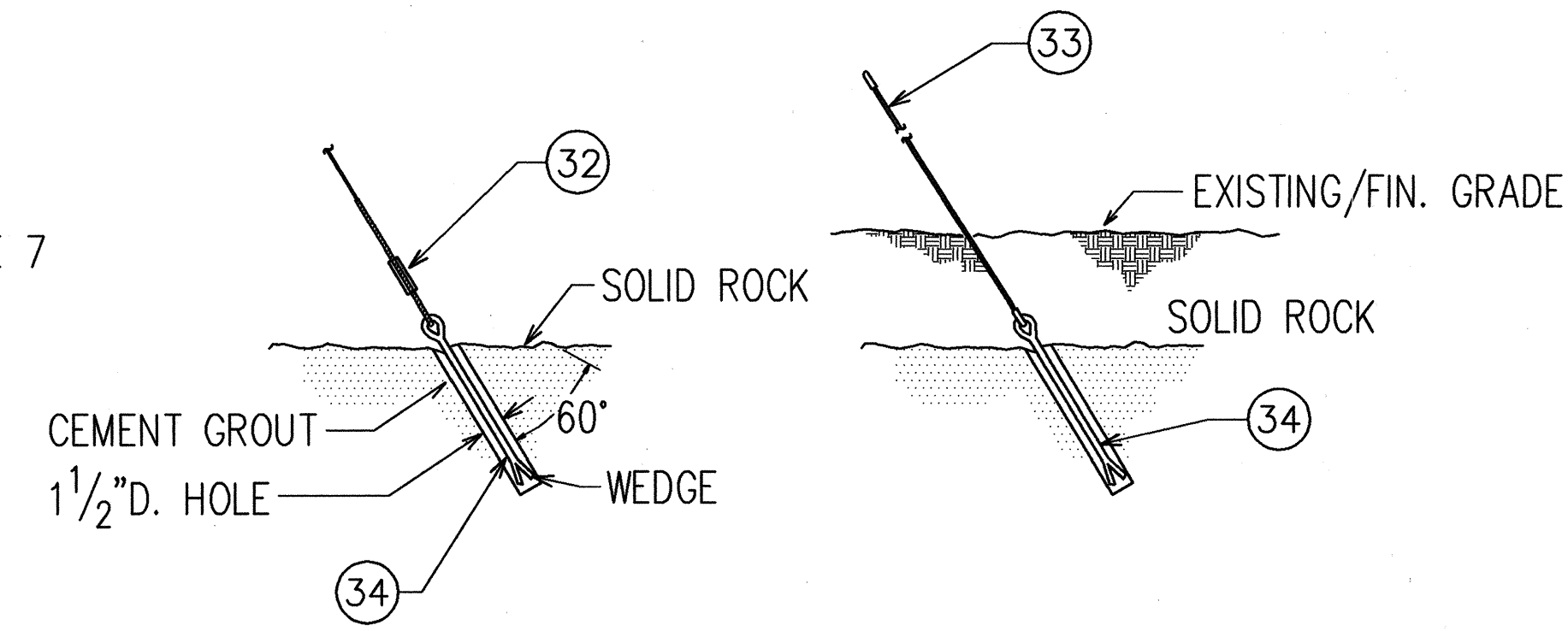
STAGGERING OF
CENTER CONDUCTOR
N.T.S.



GROUNDING DETAILS
N.T.S.

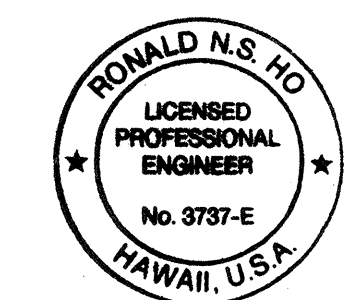


TYPICAL GUY & ANCHOR ASSY.
N.T.S.



ROCK ANCHOR DETAILS
N.T.S.

RONALD N. S. HO & ASSOC., INC.
ELECTRICAL ENGINEERS



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Ronald N. S. Ho 5/17/96

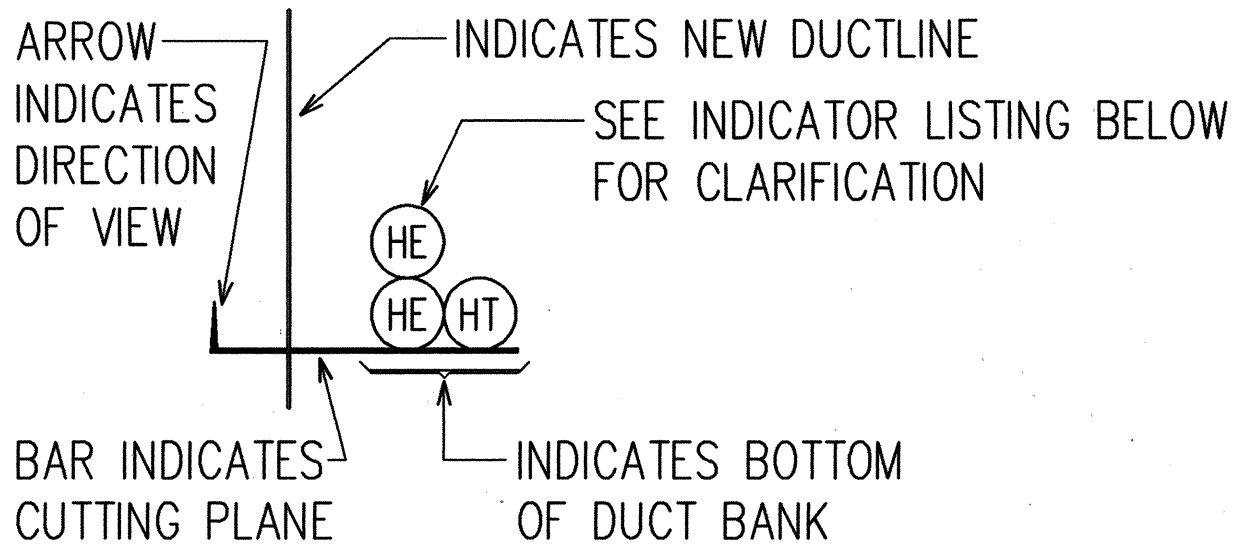
9/30/93	REVISED TELEPHONE CONDUCTOR MATERIAL
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION WOOD POLE FRAMING DETAILS II	
INTERSTATE ROUTE H-3 F.A.I. PROJECT NO I-H3-1(59)	
SCALE: AS NOTED	DATE: JUNE 1993
SHEET No. U-8 OF 35 SHEETS	

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	72	211

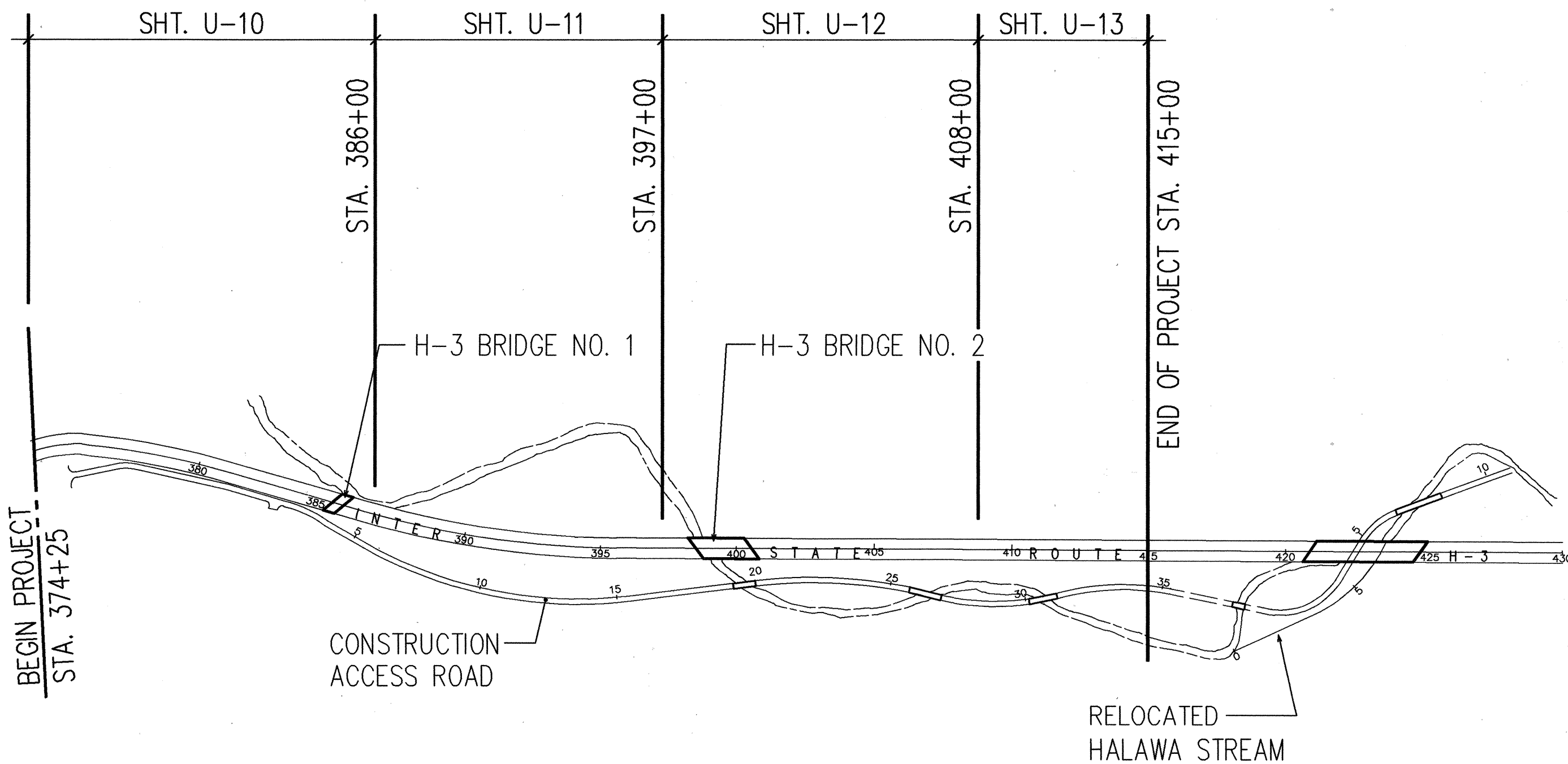
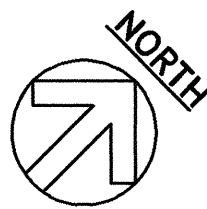
SYMBOLS AND LEGEND:

- NEW MANHOLE, OWNERSHIP & SIZE AS INDICATED ON PLAN
- NEW PULLBOX OR HANDHOLE, OWNERSHIP & SIZE AS INDICATED ON PLAN
- JP106 EXISTING POLE TO REMAIN
- ⊗ JP105 EXISTING POLE TO BE REMOVED
- JP108 NEW POLE
- EXISTING GUY AND ANCHOR
- NEW GUY AND ANCHOR
- he/ht— EXISTING HECO/HTCO OVERHEAD CONDUCTORS
- HE/HT— NEW HECO/HTCO OVERHEAD CONDUCTORS
- R he/ht— REMOVE EXISTING HECO/HTCO OVERHEAD CONDUCTORS
- OS OFFSET FROM BASELINE
- NEW UNDERGROUND DUCTLINE
- E— NEW 11.5KV PRI. METERED OVERHEAD CONDUCTORS

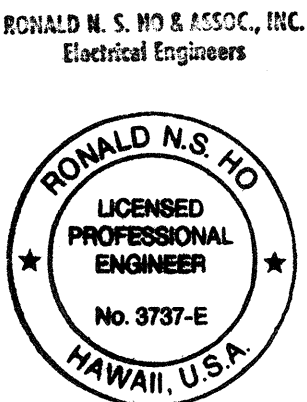
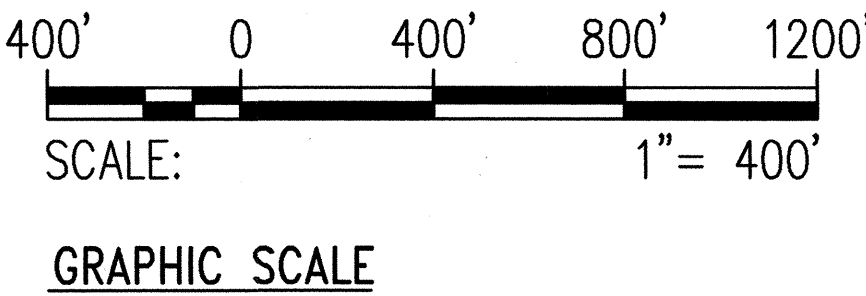


INDICATOR LISTING

- Ⓢ INDICATES: COMMUNICATION DUCT
- ⓗL INDICATES: HIGHWAY LIGHTING DUCT
- ⓔ INDICATES: DOT-STATE OF HAWAII, ELECTRIC DUCT
- Ⓣ INDICATES: DOT-STATE OF HAWAII, TELEPHONE DUCT
- ⓗE INDICATES: HAWAIIAN ELECTRIC CO. DUCT
- ⓗT INDICATES: HAWAIIAN TELEPHONE CO. DUCT



HECO/HTCO GENERAL LAYOUT PLAN
SCALE: 1"=400'



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Ronald N.S. Ho 5/17/96

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**HECO/HTCO GENERAL LAYOUT PLAN
AND LEGEND**

STA. 374+25 TO STA. 415+00

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO I-H3-1(59)

SCALE: AS NOTED DATE: JUNE 1993

SHEET No. U-10 OF 35 SHEETS

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

GENERAL NOTES FOR HAWAIIAN TELEPHONE CO., AND HAWAIIAN ELECTRIC CO. WORK

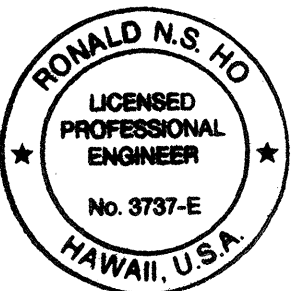
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	73	211

- ALL EXISTING HECO AND HECO FACILITIES SHALL REMAIN IN PLACE OR BE RELOCATED AS REQUIRED UNTIL THE PROPOSED PERMANENT FACILITIES ARE COMPLETED.
- ALL EXISTING FACILITIES SHOWN ARE APPROXIMATE ONLY. UTILITY COMPANIES TO VERIFY THEIR LOCATIONS AND SHALL MAKE ADJUSTMENTS TO ANY NEW OR EXISTING FACILITIES AS DIRECTED BY THE STATE'S RESIDENT ENGINEER.
- ALL PROPOSED MANHOLES, PULLBOXES, CONDUITS/DUCTLINES INCLUDING RISER BENDS, MANHOLE FRAMES AND COVERS, AND GROUND RODS REQUIRED BY HECO AND HECO AND WITHIN THE HIGHWAY RIGHT-OF-WAY SHALL BE FURNISHED AND INSTALLED BY THE CONTRACTOR.
- THE STATE'S SPECIAL PROVISIONS, PROPOSAL CONTRACT AND BOND - SECTIONS 630 AND 646 SHALL APPLY TO THE PROJECT.
- THE TERM ENGINEER FOR THE UTILITY COMPANIES SHALL ALSO MEAN HIS DELEGATED REPRESENTATIVE AND/OR THE UTILITIES' INSPECTOR OF RECORD.
- THE TERM PULLBOX SHALL MEAN SPLICE CAN, SPLICE OR SERVICE BOX, PULLBOX OR HANDHOLE.
- THE TERM MANHOLE SHALL MEAN ANY SUBSURFACE ENCLOSURE IN WHICH MEN MUST ENTER TO WORK.
- THE CONTRACTOR TO STAKEOUT ALL FACILITIES FOR VERIFICATION BY THE UTILITY INVOLVED AND/OR AFFECTED BEFORE PROCEEDING.
- THE LOCATION AND DEPTH OF ALL MANHOLES AND PULLBOXES AND THE ROUTING OF ALL DUCTLINES SHALL BE VERIFIED BY THE UTILITY COMPANY BEFORE EXCAVATION STARTS.
- THE CONTRACTOR SHALL FURNISH ALL MATERIALS REQUIRED TO COMPLETE THE CONSTRUCTION OF THE DUCTLINE SYSTEM. ALL HECO DUCTLINES SHALL BE PVC SCHEDULE 40. CONSTRUCTION SHALL CONFORM TO HECO STANDARD SPECIFICATIONS CS7001 AND CS7003.
- ALL MANHOLES, PULLBOXES AND DUCTLINES TO BE INSTALLED IN CONCRETE SHALL BE INSPECTED BY THE UTILITY COMPANY AND APPROVED BY THE RESIDENT ENGINEER BEFORE PLACING CONCRETE.
- MANHOLE DEPTHS SHOWN ON PLANS REFER TO INSIDE DEPTH OF MANHOLE.
- THE MINIMUM DEPTH OF DUCTLINES FROM FINISH GRADE TO TOP OF CONCRETE ENCASEMENT OR COVER IS AS FOLLOWS:
 - HAWAIIAN ELECTRIC CO. DUCTS _____ 1'-6" WHEN IN PRIVATE PROPERTY
 - HAWAIIAN TELEPHONE CO. DUCTS _____ 1'-6" WHEN IN PRIVATE PROPERTY
 - HAWAIIAN ELECTRIC CO. DUCTS _____ 3'-0" WHEN IN STATE HWY R-O-W
 - HAWAIIAN TELEPHONE CO. DUCTS _____ 3'-0" WHEN IN STATE HWY R-O-W
 - DOT-STATE OF HAWAII, ELECTRIC DUCTS _____ 3'-0" WHEN IN STATE HWY R-O-W
 - DOT-STATE OF HAWAII, TELEPHONE DUCTS _____ 3'-0" WHEN IN STATE HWY R-O-W
- ALL COMPLETED DUCTLINES SHALL BE MANDREL TESTED BY THE CONTRACTOR IN THE PRESENCE OF THE UTILITY COMPANY'S INSPECTOR USING THE UTILITY COMPANY'S STANDARD PRACTICE.
- THE CONTRACTOR SHALL INSTALL A 1/8"Ø POLYOLEFIN PULL LINE IN ALL COMPLETED DUCTLINES AFTER MANDREL TESTING IS COMPLETED AND APPROVED.
- THE CONTRACTOR SHALL FURNISH TO HECO HIS CONSTRUCTION SCHEDULE TWENTY (20) WORKING DAYS PRIOR TO STARTING ANY HECO WORK.
- THE CONTRACTOR SHALL NOTIFY HECO TEN (10) WORKING DAYS NOTICE TO PROCEED WITH IT'S PORTION OF THE WORK.
- HTCO SHALL COORDINATE IT'S WORK IN SUCH A MANNER AS NOT TO IMPEDE CONSTRUCTION OPERATIONS.
- HTCO SHALL REMOVE ALL EXISTING HTCO FACILITIES EXCEPT AS NOTED ON PLANS.

- THE CONTRACTOR SHALL FURNISH HIS CONSTRUCTION SCHEDULE TO HECO TWENTY (20) WORKING DAYS PRIOR TO STARTING ANY HECO WORK.
- THE CONTRACTOR SHALL NOTIFY HECO TEN (10) WORKING DAYS NOTICE TO PROCEED WITH IT'S PORTION OF THE WORK.
- HECO SHALL COORDINATE IT'S WORK IN SUCH A MANNER AS NOT TO IMPEDE CONSTRUCTION OPERATIONS.
- BARRICADING OF HECO'S FACILITIES, IF REQUIRED, SHALL BE DONE BY HECO. BREAKING INTO EXISTING HECO FACILITIES SHALL BE DONE BY HECO.
- HECO SHALL REMOVE ALL EXISTING JP AND HECO FACILITIES EXCEPT AS NOTED ON THE PLANS.
- HECO SHALL BE THE JP ERECTING COMPANY.
- SPECIAL NOTE
THE CONTRACTOR WILL NOT HANDLE OR DISTURB THE EXISTING HECO ELECTRICAL FACILITIES. THE EXISTING ELECTRICAL CIRCUITS WILL REMAIN ENERGIZED DURING CONSTRUCTION. THE CONTRACTOR WILL WORK CAUTIOUSLY AT ALL TIMES TO AVOID ACCIDENTS AND/OR DAMAGE TO THESE CIRCUITS, WHICH CAN RESULT IN ELECTROCUTION. THE CONTRACTOR SHALL NOT DISTURB BARRICADES ERECTED BY HECO. HE SHALL WORK CAUTIOUSLY TO AVOID ACCIDENTS AND DAMAGES TO EXISTING FACILITIES.
- THE CONTRACTOR WILL IMMEDIATELY REPORT DAMAGES DISCOVERED OR CAUSED BY HIS WORK TO:
 - HTCO @ PH. NO. 611
 - HECO @ PH. NO. 543-7874
- THE FOLLOWING TERMS WILL BE USED INTERCHANGEABLY THROUGHOUT THIS PROJECT:
 - HTCO OR HT FOR HAWAIIAN TELEPHONE CO.
 - HECO OR HE FOR HAWAIIAN ELECTRIC CO.
 - JP FOR JOINT POLE
- THE FOLLOWING HECO STANDARD DRAWINGS AND THEIR REFERENCES ARE APPLICABLE TO THIS PLAN:
MANHOLE TYPE NO. 1, 6'-0" X 11'-0" _____ HECO DRAWING 18775
PRECAST HANDHOLE, 3'-0" X 5'-0" _____ HECO DRAWING 15501
HANDHOLE AND MANHOLE, PRECAST COMPONENTS, 4'x6' MANHOLE _____ HECO DRAWING 26919
MISCELLANEOUS DETAILS, MANHOLES AND HANDHOLES _____ HECO DRAWING 16688
TYPICAL DUCT CONSTRUCTION INSTALLATION DETAILS _____ HECO DRAWING 30-1030
PLASTIC DUCTS INSTALLATION DETAILS _____ HECO DRAWING 30-1035
- THE FOLLOWING HTCO STANDARD DRAWINGS AND THEIR REFERENCES ARE APPLICABLE TO THIS PLAN:
LARGE PULLBOX NO. 435 T-B (2x4) _____ HTCO DRAWING 34056
3660 TB PULLBOX (3x5) _____ HTCO DRAWING 34082
STANDARD DUCT FORMATIONS, MANHOLE DETAILS _____ HTCO DRAWING 34028
MANHOLE FRAMES AND COVERS _____ HTCO DRAWING 34037
TYPE PRECAST MANHOLE, 4'-0" X 6'-6" X 6'-6" _____ GTS DRAWING 8395

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

RONALD N.S. HO & ASSOC., INC.
Electrical Engineers



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Ronald N.S. Ho 5/17/94

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

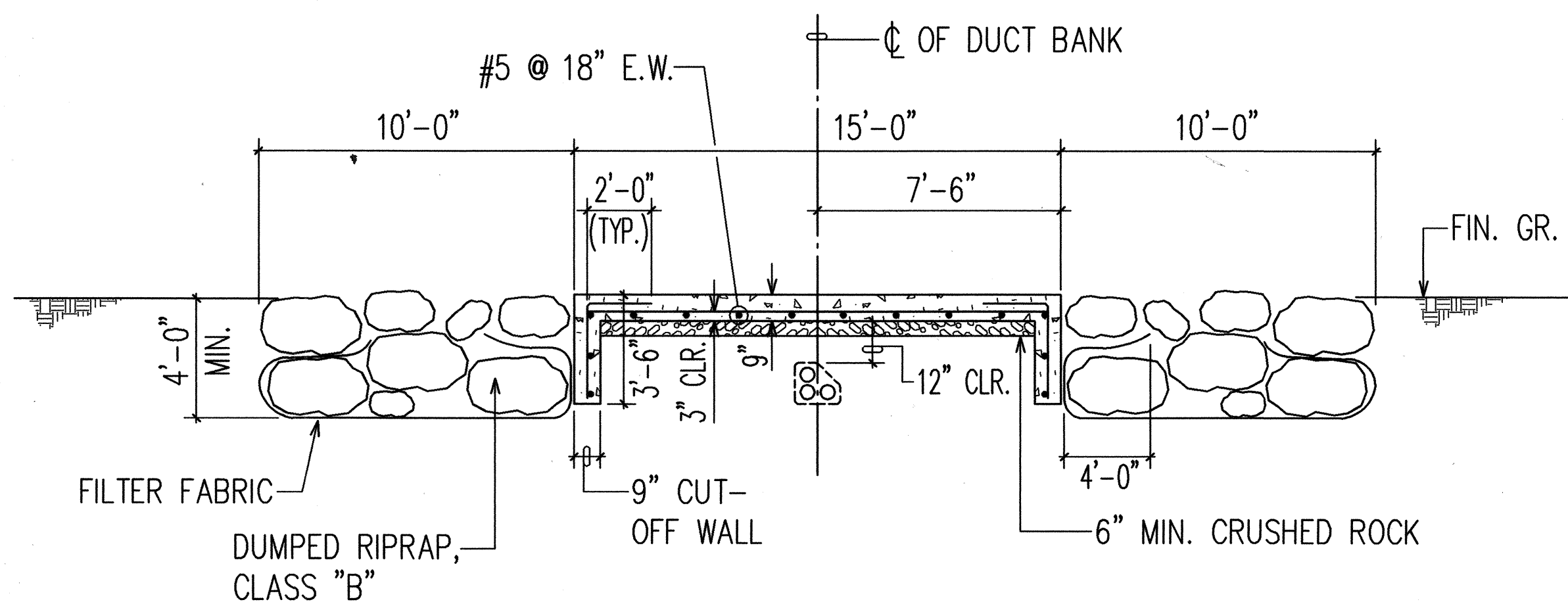
GENERAL NOTES FOR
HTCO AND HECO WORK

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO I-H3-1(59)

SCALE: NONE DATE: JUNE 1993

SHEET No. U-11 OF 35 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	ADD. 74	211



NOTES FOR CONSTRUCTION WITHIN BWS GARDEN

1. TREES AND GRASS WITHIN THE CONSTRUCTION AREA TO BE REMOVED AND TRANSPLANTED BY THE BWS.
2. CONTRACTOR SHALL LIMIT HIS WORK AREA TO WITHIN 20 FEET OUTSIDE OF THE RIPRAP AND/OR DUCT LINE.
3. CONTRACTOR SHALL RESTORE THE DISTURBED AREA TO PRE-CONSTRUCTION CONDITION.
4. THE CONTRACTOR SHALL NOTIFY MR. RODNEY NISHIHARA AT 527-5273 AT LEAST THREE (3) WEEKS PRIOR TO WORKING AT THIS SITE.
5. THE DUCTLINE ALIGNMENT SHALL BE COORDINATED WITH THE BWS INSPECTOR.

DUMPED RIPRAP GRADATION, CLASS "B"

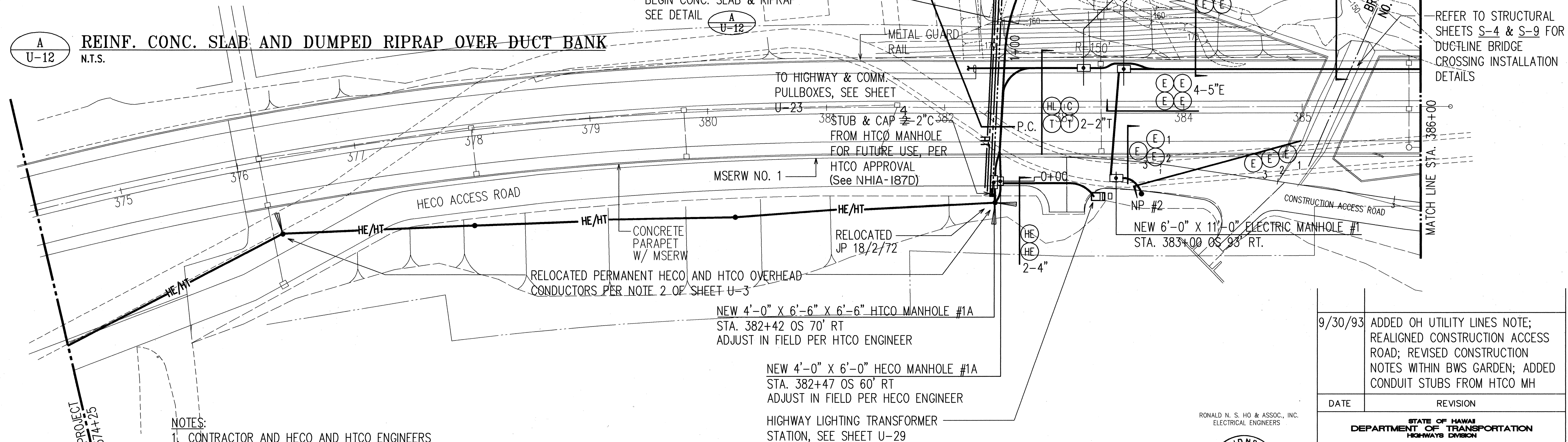
D100	=	3.3 FT. TO 3.7 FT.
D85	=	2.6 FT. TO 3.0 FT.
D50	=	2.2 FT. TO 2.5 FT.
D15	=	0.9 FT. TO 1.3 FT.

A U-12 REINF. CONC. SLAB AND DUMPED RIPRAP OVER DUCT BANK N.T.S.

EXISTING UTILITY CO. OVERHEAD LINES TO REMAIN OR BE REMOVED BY RESPECTIVE UTILITY COMPANY ONLY AFTER UNDERGROUND DUCTLINE AND HANDHOLE SYSTEM WITHIN THE BWS SITE IS COMPLETED AND ENERGIZED

2-4" (HE) (HT) 1-4" (HE) (T) 2-2"

H-3 @ STA. 382+58 (O/S 131' LT.) BEGIN CONC. SLAB & RIPRAP SEE DETAIL

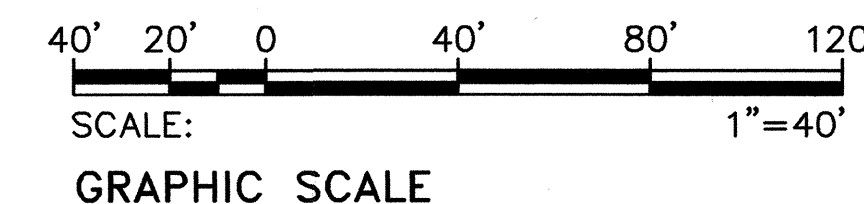


NOTES:

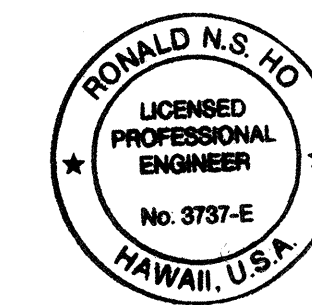
1. CONTRACTOR AND HECO AND HTCO ENGINEERS TO COORDINATE LOCATIONS OF HTCO HANDHOLE #1 AND HECO HANDHOLE #1 WITH MR. GLEN FUJIWARA OF THE BWS @ PHONE NO. 527-6173.
2. HIGHWAY LIGHTING AND COMMUNICATION PULLBOXES NOT SHOWN FOR CLARITY.

PARTIAL ELECTRIC AND TELEPHONE DUCTLINE UTILITY PLAN I

SCALE: 1"=40'-0"



RONALD N. S. HO & ASSOC., INC.
ELECTRICAL ENGINEERS



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5/17/94

9/30/93	ADDED OH UTILITY LINES NOTE; REALIGNED CONSTRUCTION ACCESS ROAD; REVISED CONSTRUCTION NOTES WITHIN BWS GARDEN; ADDED CONDUIT STUBS FROM HTCO MH
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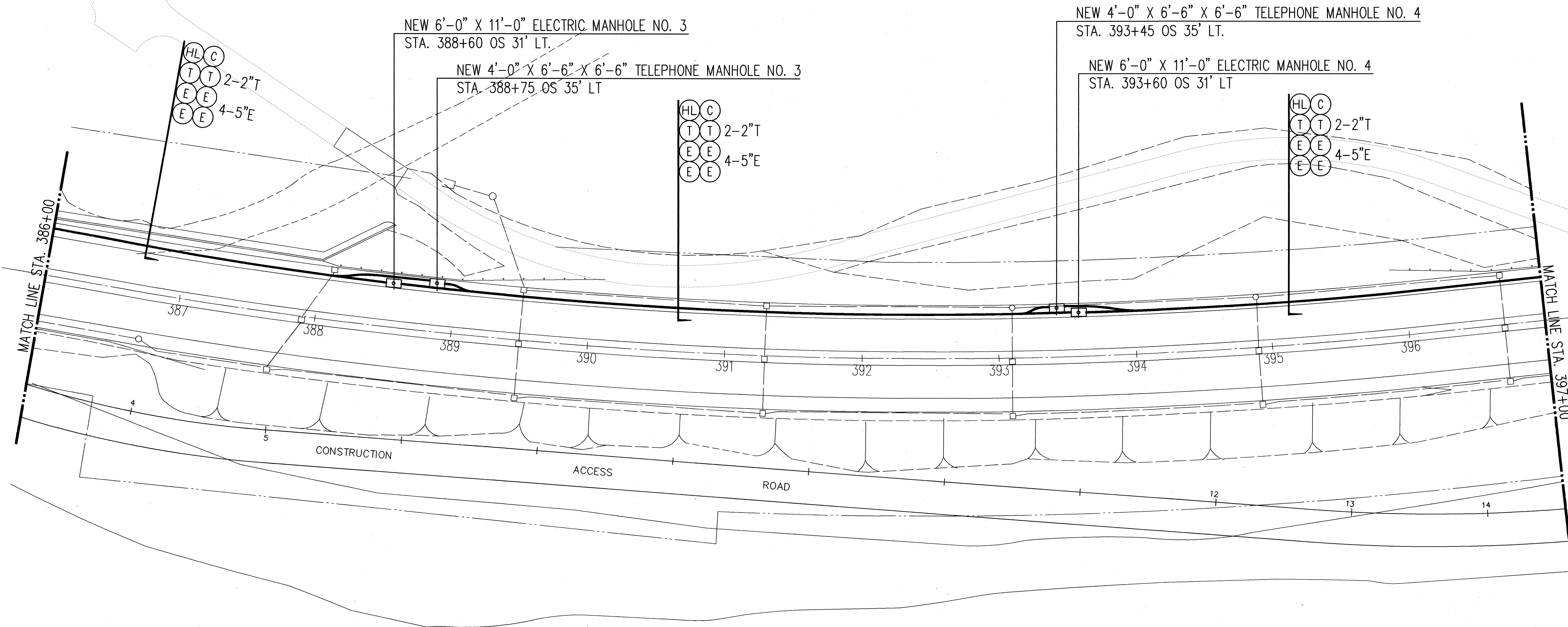
DATE	REVISION
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION PARTIAL ELECTRIC AND TELEPHONE DUCTLINE UTILITY PLAN I STA. 374+25 TO STA. 386+00 INTERSTATE ROUTE H-3 F.A.I. PROJECT NO I-H3-1(59) SCALE: AS NOTED DATE: JUNE 1993 SHEET No. U-12 OF 35 SHEETS

ADD. 74

DATE	_____
DESIGNED BY	_____
CHECKED BY	_____
NO.	_____

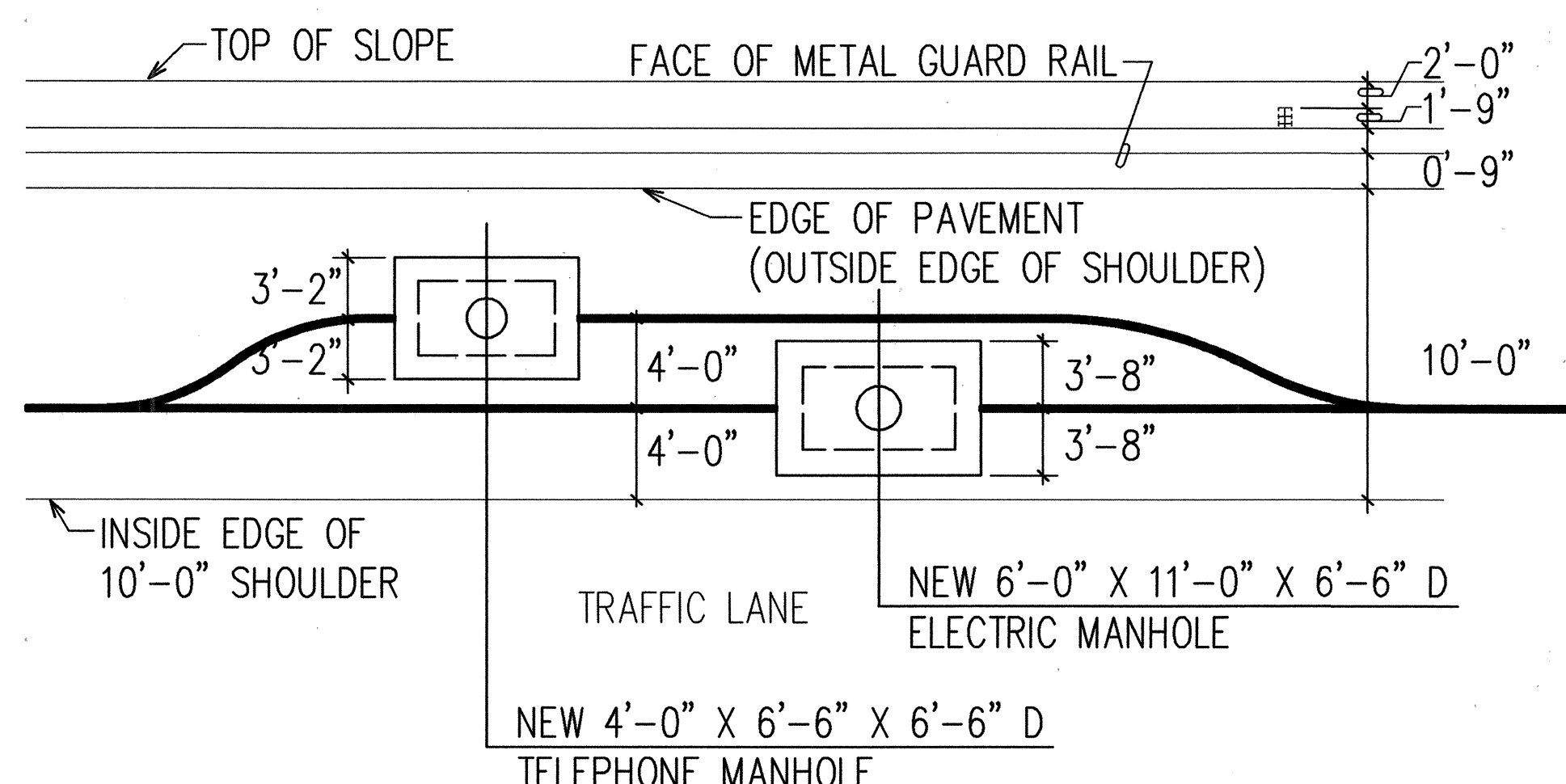


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	ADD. 75	211

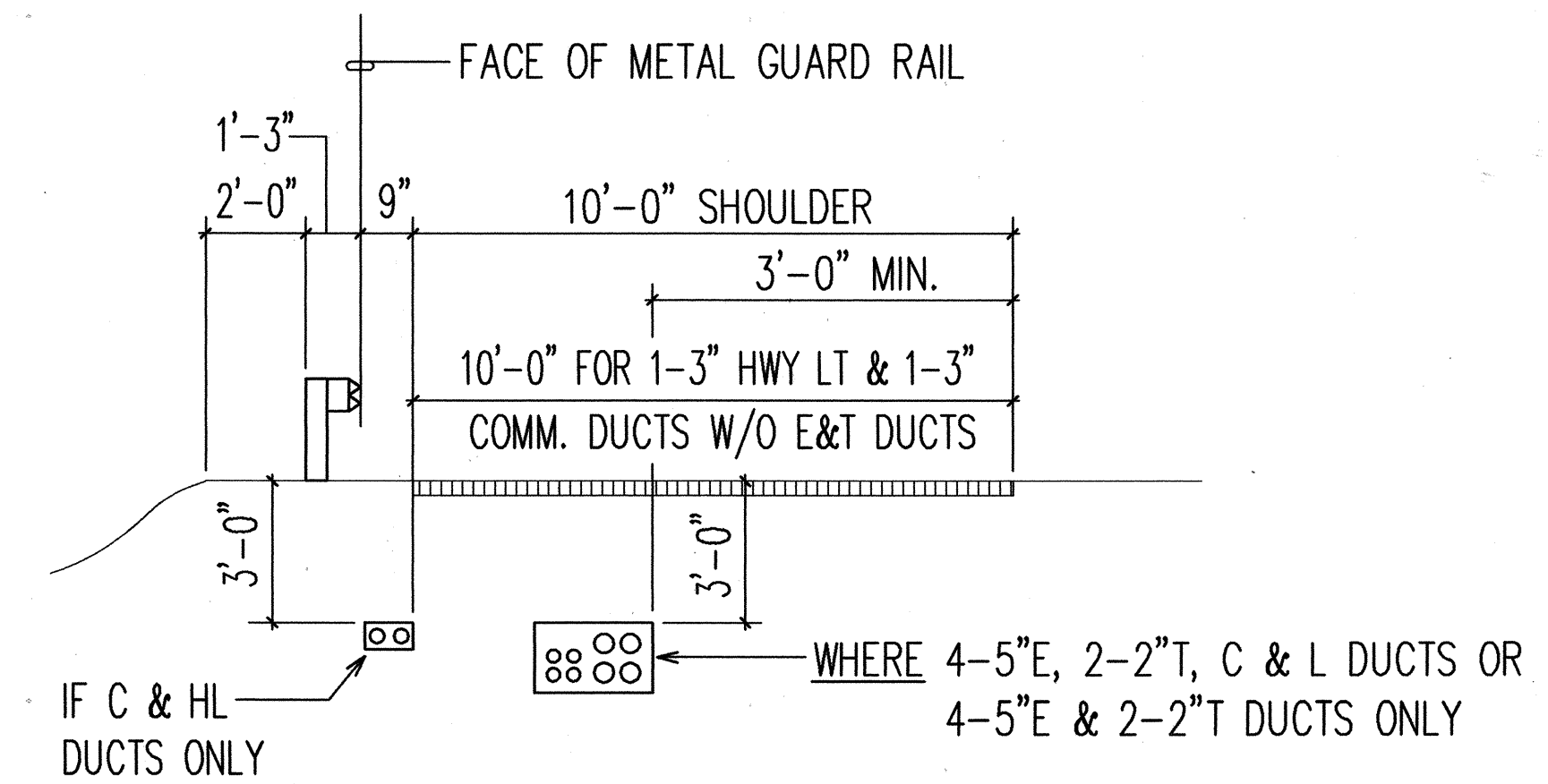


PARTIAL ELECTRIC AND TELEPHONE DUCTLINE UTILITY PLAN II
SCALE: 1"=40'

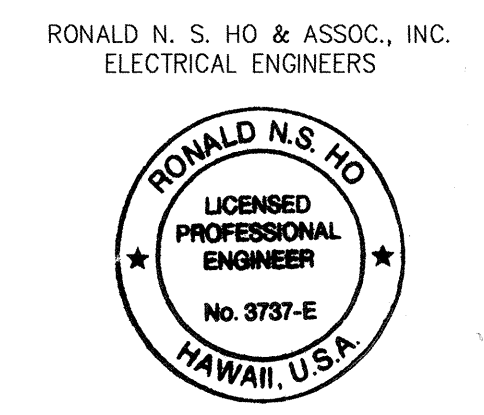
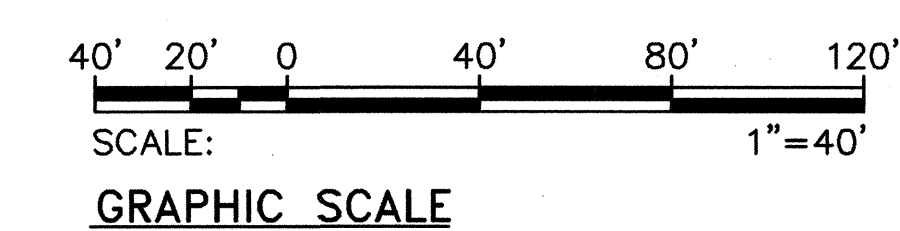
NOTE:
HIGHWAY LIGHTING AND COMMUNICATION
PULLBOXES NOT SHOWN FOR CLARITY



TYPICAL ELECTRIC MANHOLE AND TELEPHONE PULLBOX LOCATION PLAN DETAIL
N.T.S.



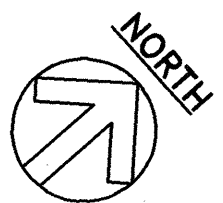
TYPICAL IN-GRADE CROSS SECTION
N.T.S.



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5/17/94

9/30/93	REALIGNED CONSTRUCTION ACCESS ROAD
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
PARTIAL ELECTRIC AND TELEPHONE DUCTLINE UTILITY PLAN II	
STA. 386+00 TO STA. 397+00	
INTERSTATE ROUTE H-3 F.A.I. PROJECT NO I-H3-1(59)	
SCALE: AS NOTED	DATE: JUNE 1993
SHEET No. U-13 OF 35 SHEETS	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	ADD. 76	211



HL C
T T 2-2" T
E E 4-5" E
E E

NEW 6'-0" X 11'-0" ELECTRIC MANHOLE NO. 5
STA. 397+50 OS 31' LT.

NEW 4'-0" X 6'-6" X 6'-6" TELEPHONE MANHOLE NO. 5
STA. 397+75 OS 35' LT.

THRU BRIDGE ONLY

HL C
T T 2-2" T
E E 4-5" E
E E

REFER TO SHEETS S-9,
S-13 & S-35 FOR DUCTLINE
BRIDGE CROSSING
INSTALLATION DETAILS.

NEW 4'-0" X 6'-6" X 6'-6" TELEPHONE MANHOLE NO. 6
STA. 402+75 OS 35' LT.

NEW 6'-0" X 11'-0" ELECTRIC MANHOLE NO. 6
STA. 402+90 OS 31' LT.

NEW 6'-0" X 11'-0" ELECTRIC MANHOLE NO. 7
STA. 408+00 OS 31' LT.

HL C
T T 2-2" T
E E 4-5" E
E E

MATCH LINE STA. 397+00

MATCH LINE STA. 408+00

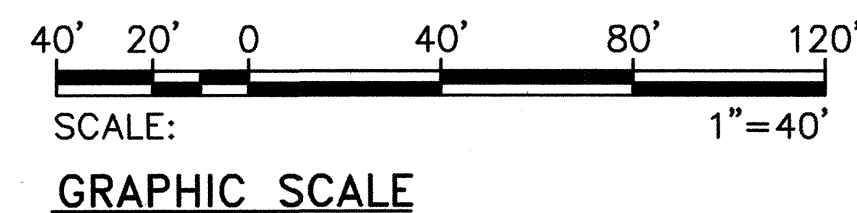
CONSTRUCTION ACCESS ROAD

NORTH HALAWA STREAM

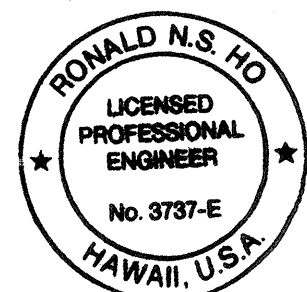
NOTE:
HIGHWAY LIGHTING AND COMMUNICATION
PULLBOXES NOT SHOWN FOR CLARITY

PARTIAL ELECTRIC AND TELEPHONE DUCTLINE UTILITY PLAN III

SCALE: 1"=40'



RONALD N. S. HO & ASSOC., INC.
ELECTRICAL ENGINEERS



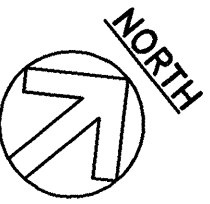
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Ronald N.S. Ho 5/17/96

9/30/93	REALIGNED CONSTRUCTION ACCESS ROAD; REVISED HECO AND HTCO MH NO. 5 LOCATIONS
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION PARTIAL ELECTRIC AND TELEPHONE DUCTLINE UTILITY PLAN III STA. 397+00 TO STA. 408+00 INTERSTATE ROUTE H-3 F.A.I. PROJECT NO. I-H3-1(59)	
SCALE: AS NOTED	DATE: JUNE 1993
SHEET No. U-14 OF 35 SHEETS	

ADD. 76

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

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	ADD. 77	211

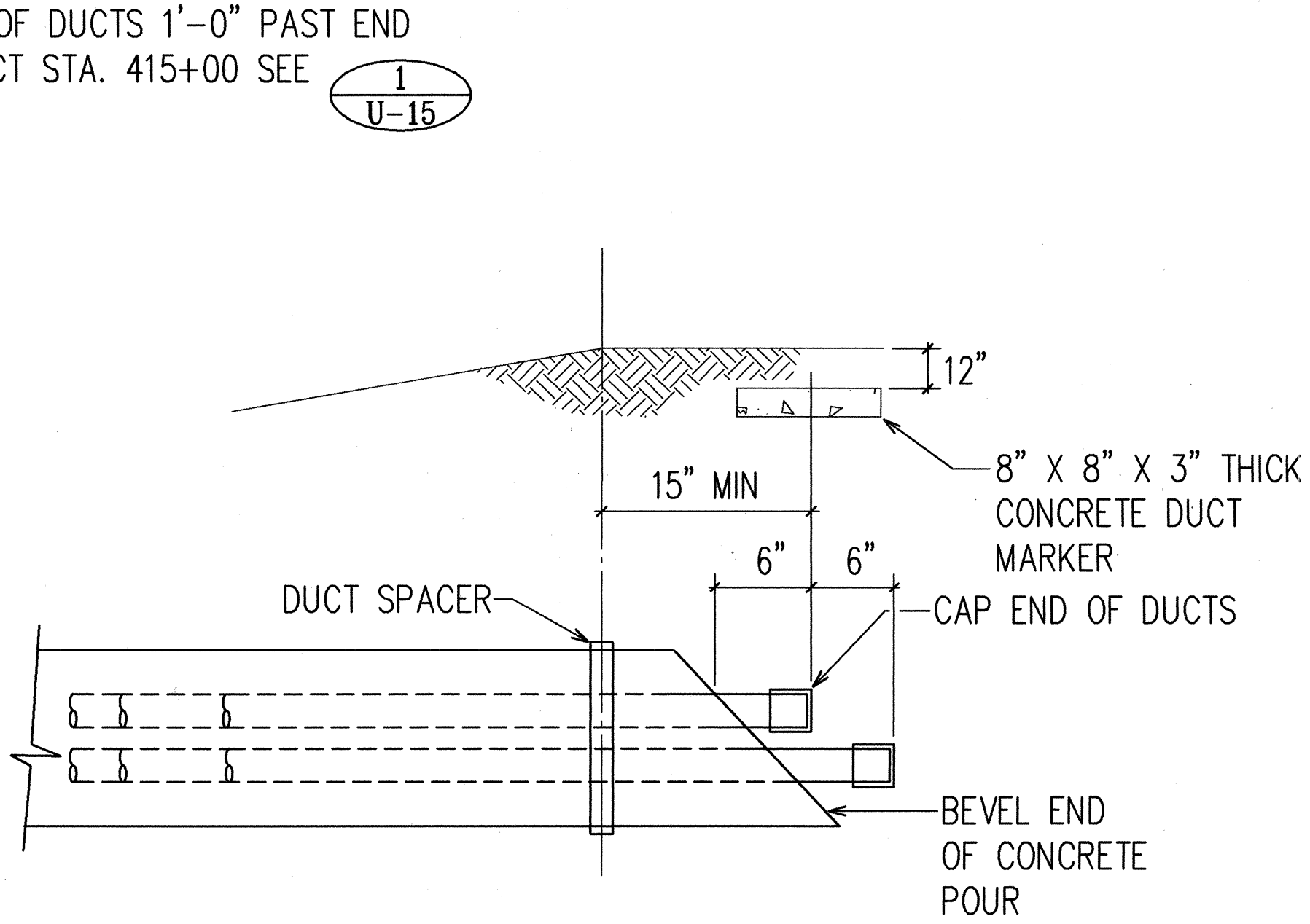
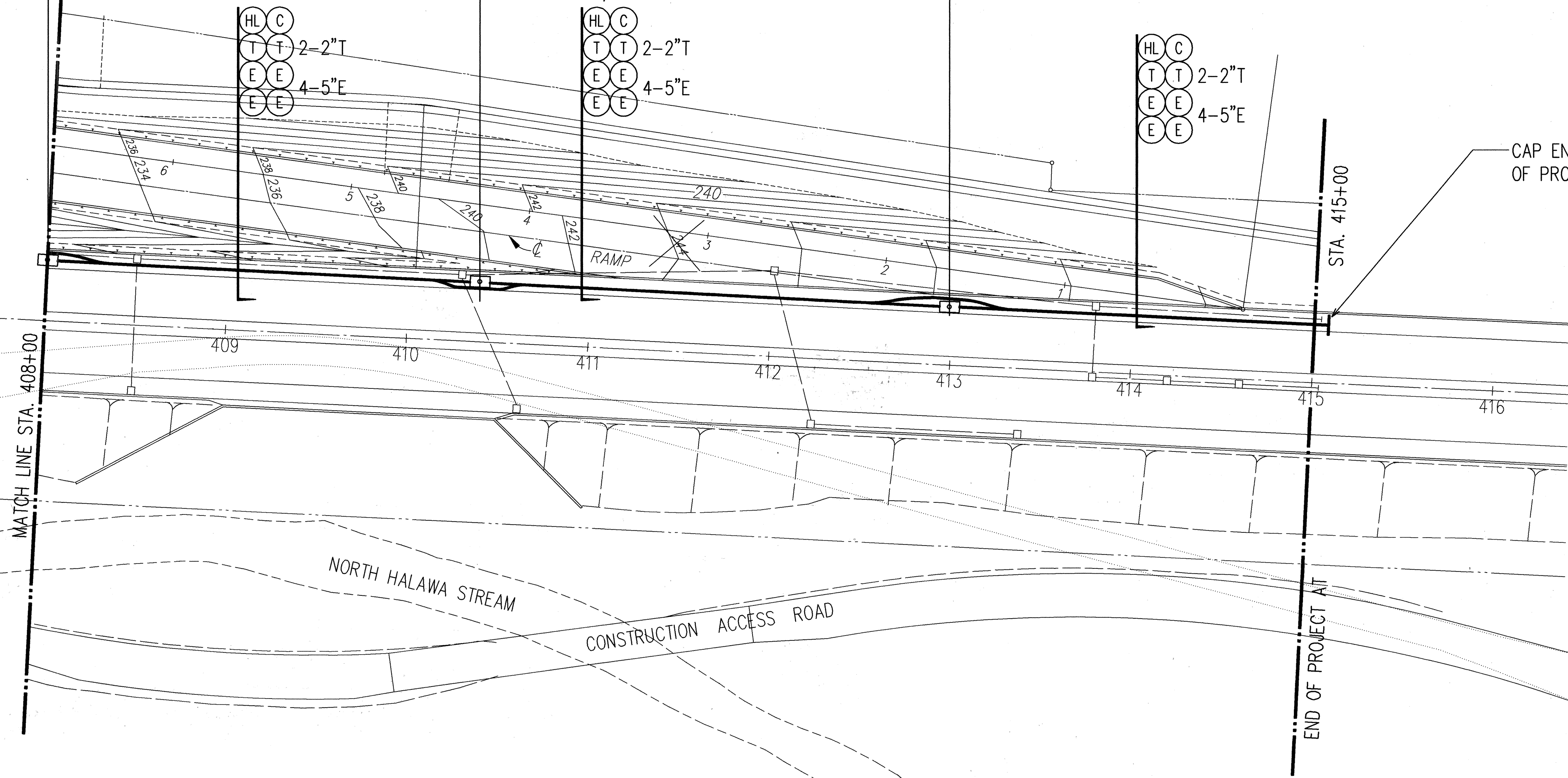


NEW 6'-0" X 11'-0" ELECTRIC MANHOLE NO. 7
STA. 408+00 OS 31' LT.

NEW 4'-0" X 6'-6" X 6'-6" TELEPHONE MANHOLE NO. 7
STA. 410+45 OS 35' LT.
32.9' (RFI No. 122)*

*Project Files are Located at 727 Kakoi St.
Honolulu, Hi. 96819

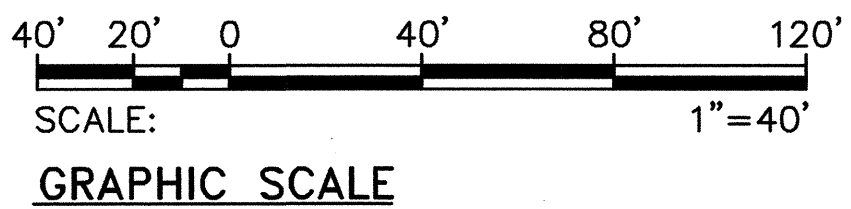
NEW 6'-0" X 11'-0" ELECTRIC MANHOLE NO. 8
STA. 413+00 OS 31' LT.



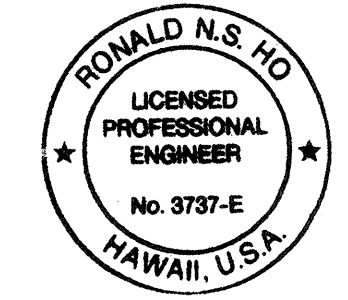
DUCT END CAP DETAIL
N.T.S.
NOTE:
HIGHWAY LIGHTING AND COMMUNICATION
MANHOLES NOT SHOWN FOR CLARITY

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

PARTIAL ELECTRIC AND TELEPHONE DUCTLINE UTILITY PLAN IV
SCALE: 1"=40'



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ELECTRICAL ENGINEERS



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Ronald N.S. Ho 5/17/94

9/30/93	REVISED DRAIN LINES
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
PARTIAL ELECTRICAL AND TELEPHONE DUCTLINE UTILITY PLAN IV	
STA. 408+00 TO STA. 415+00	
INTERSTATE ROUTE H-3 F.A.I. PROJECT NO. I-H3-1(59)	
SCALE: AS NOTED	DATE: JUNE 1993
SHEET No. U-15 OF 35 SHEETS	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I - H3 - I(59)	1993	ADD. 77S-1	211

GENERAL NOTES:

1. CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND PROTECTING ALL EXISTING UTILITY LINES.
2. FOR DESIGN STANDARDS OF ELECTRICAL/TELEPHONE LINES, REFER TO LATEST EDITION OF TITLE VI, PUBLIC UTILITIES COMMISSION RULES FOR CONSTRUCTION OF UNDERGROUND ELECTRIC AND COMMUNICATION SYSTEMS, GENERAL ORDER NO.10.
3. THE CONTRACTOR SHALL RESTORE TO THEIR ORIGINAL CONDITION ALL IMPROVEMENTS DAMAGED AS A RESULT OF THE CONSTRUCTION, INCLUDING PAVEMENTS, EMBANKMENTS, CURBS, SIGNS, LANDSCAPING, STRUCTURES, UTILITIES, WALLS, FENCES, ETC. UNLESS PROVIDED FOR SPECIFICALLY IN THE PROPOSAL. DEMOLITION AND RESTORATION OF EXISTING ITEMS SHALL BE INCIDENTAL AND INCLUDED WITHIN THE AMOUNT PAID FOR UNDERCLASSIFIED TRENCH EXCAVATION.
4. EXCESS EXCAVATED MATERIAL SHALL BE DISPOSED OF BY CONTRACTOR.
5. SEE ADDITIONAL NOTES ON PAGE C-20.

NOTES FOR CONSTRUCTION WITHIN BWS GARDEN:

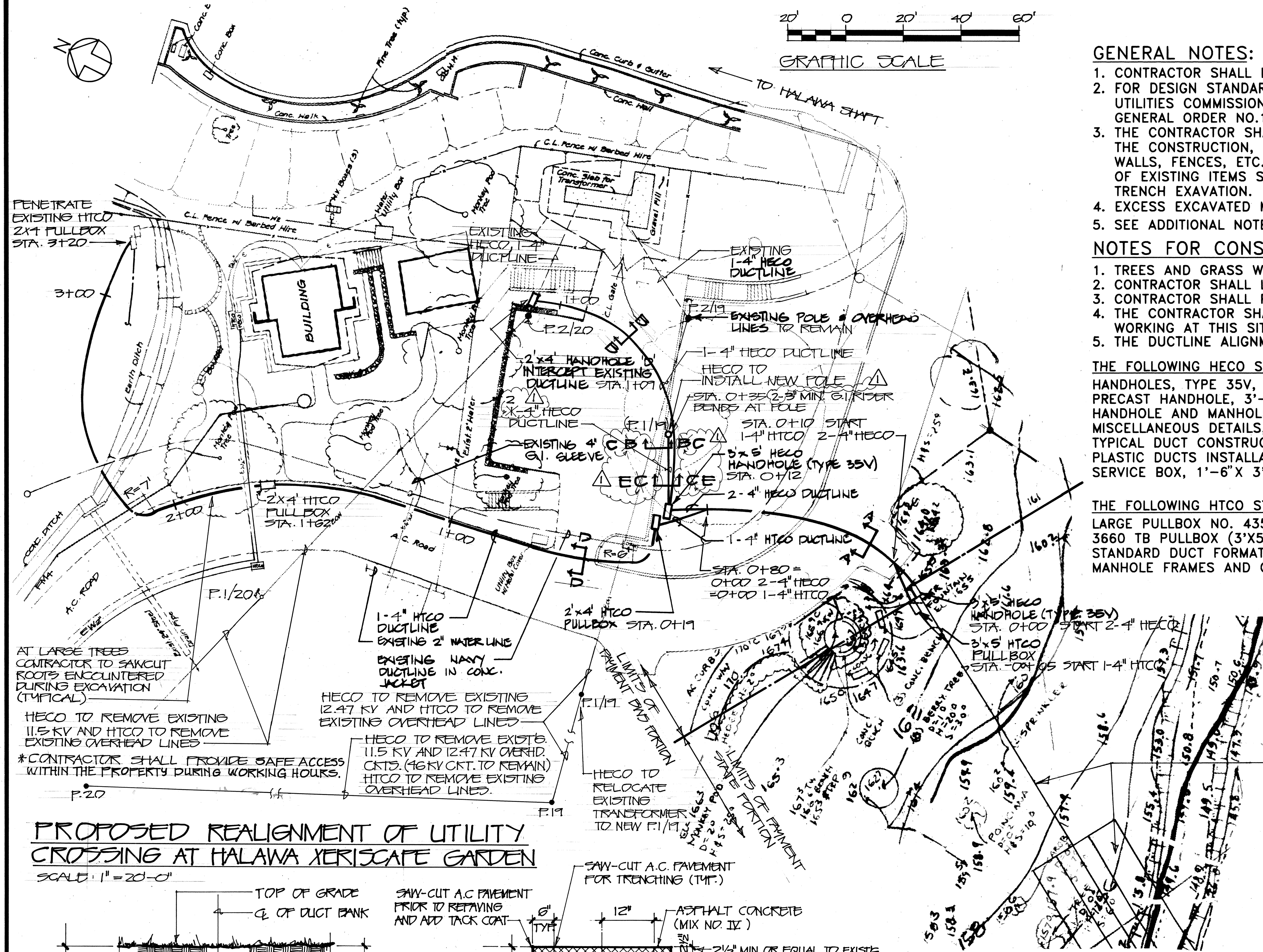
1. TREES AND GRASS WITHIN THE CONSTRUCTION AREA TO BE REMOVED AND TRANSPLANTED BY THE CONTRACTOR.
2. CONTRACTOR SHALL LIMIT HIS WORK AREA TO WITHIN 20 FEET OUTSIDE OF THE DUCT LINE.
3. CONTRACTOR SHALL RESTORE THE DISTURBED AREA TO PRE-CONSTRUCTION CONDITION.
4. THE CONTRACTOR SHALL NOTIFY MR. RODNEY NISHIHARA AT 527-5273 AT LEAST (3) WEEKS PRIOR TO WORKING AT THIS SITE.
5. THE DUCTLINE ALIGNMENT SHALL BE COORDINATED WITH THE BWS INSPECTOR.

THE FOLLOWING HECO STANDARD DRAWINGS AND THEIR REFERENCES ARE APPLICABLE TO THIS PLAN:

HANDHOLES, TYPE 35V, 3'-0" X 5'-0" (FOR LIGHT VEHICULAR TRAFFIC)	HECO DRAWING 18841
PRECAST HANDHOLE, 3'-0" X 5'-0"	HECO DRAWING 15501
HANDHOLE AND MANHOLE, PRECAST COMPONENTS, 4'X6' MANHOLE	HECO DRAWING 26919
MISCELLANEOUS DETAILS, MANHOLES AND HANDHOLES	HECO DRAWING 16688
TYPICAL DUCT CONSTRUCTION INSTALLATION DETAIL	HECO DRAWING 30-1030
PLASTIC DUCTS INSTALLATION DETAILS	HECO DRAWING 30-1035
SERVICE BOX, 1'-6" X 3'-6" INSTALLATION DETAILS (2'X4' PULL BOX)	HECO DRAWING 30-2005

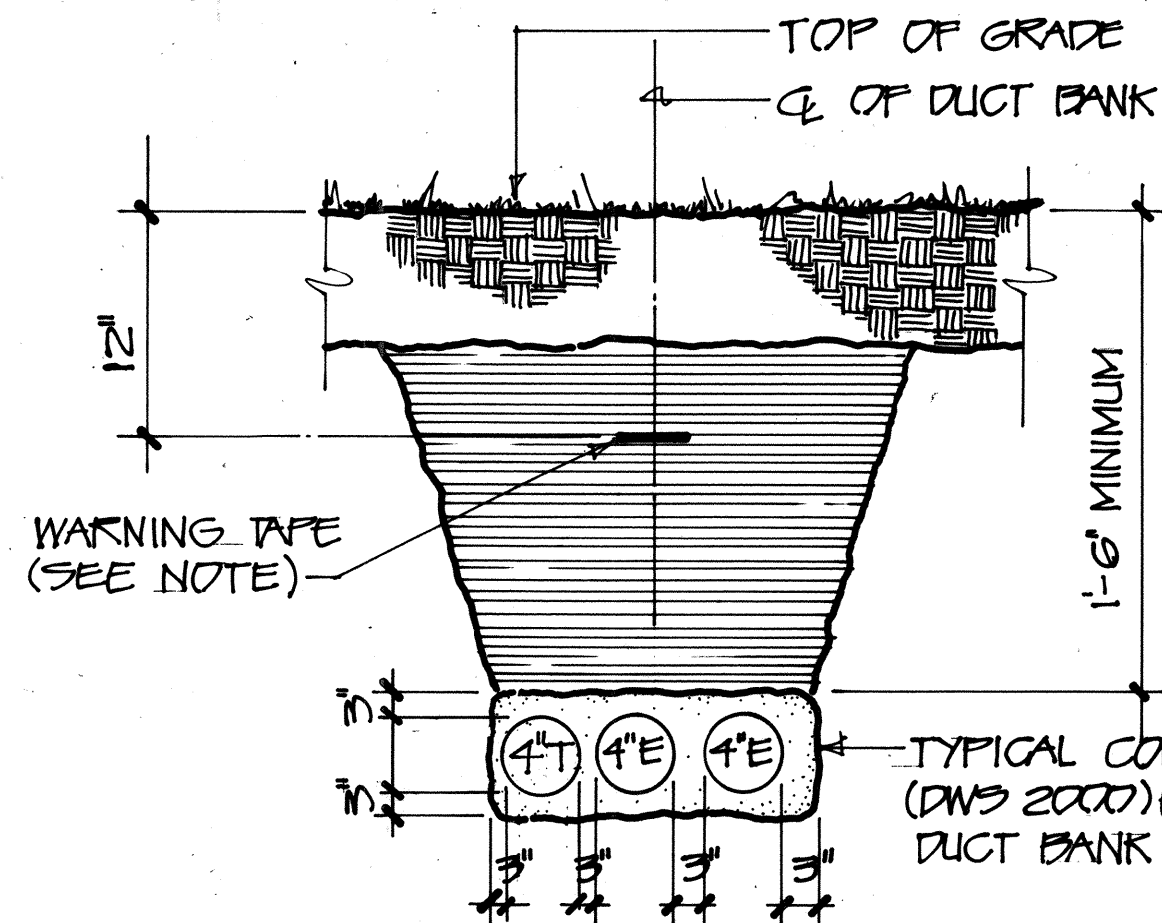
THE FOLLOWING HTCO STANDARD DRAWINGS AND THEIR REFERENCES ARE APPLICABLE TO THIS PLAN:

LARGE PULLBOX NO. 435 T-B (2'X4')	HTCO DRAWING 34056
3660 TB PULLBOX (3'X5')	HTCO DRAWING 34082
STANDARD DUCT FORMATIONS, MANHOLE DETAILS	HTCO DRAWING 34028
MANHOLE FRAMES AND COVERS	HTCO DRAWING 34037

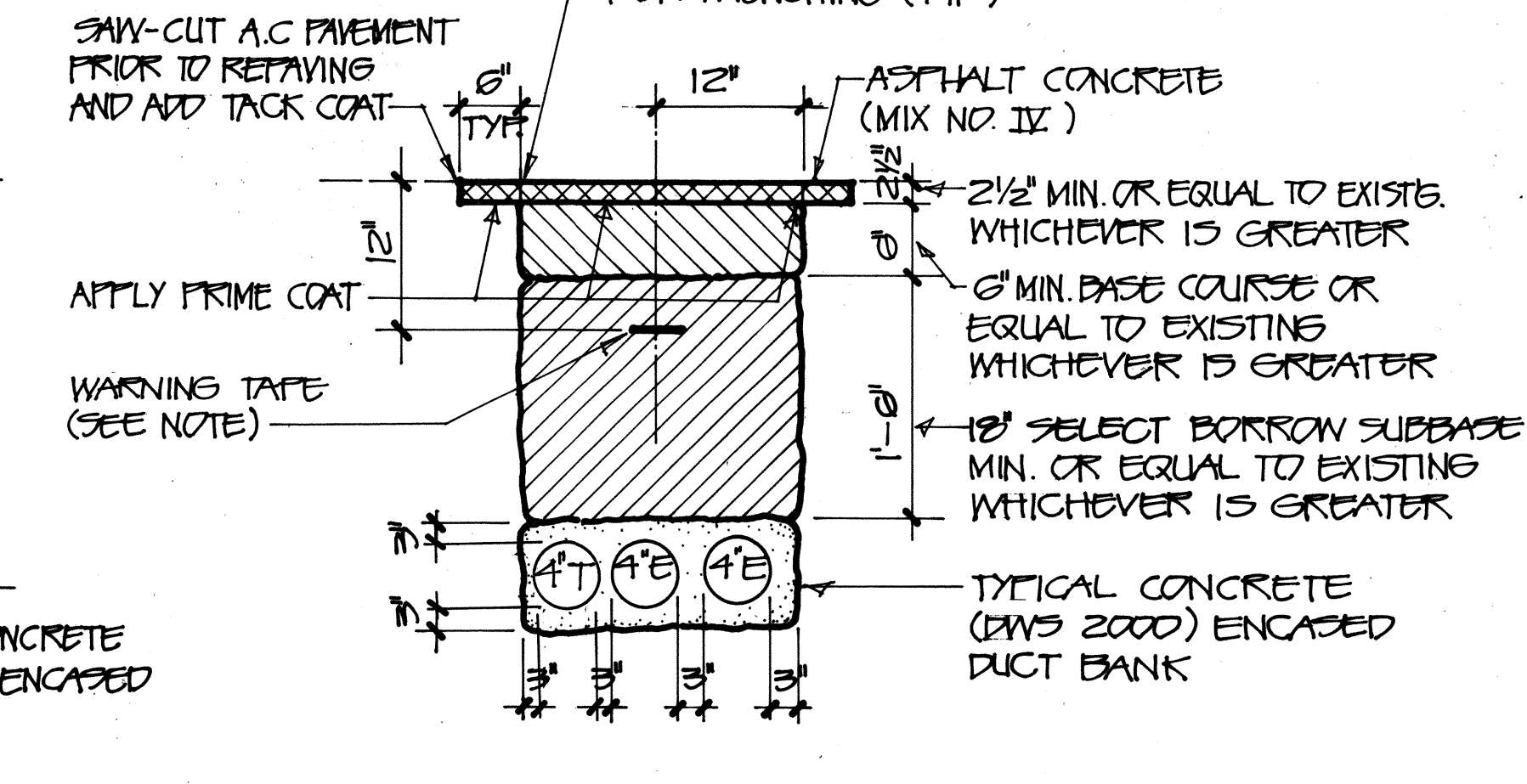


PROPOSED REALIGNMENT OF UTILITY CROSSING AT HALAWA XERISCAPE GARDEN

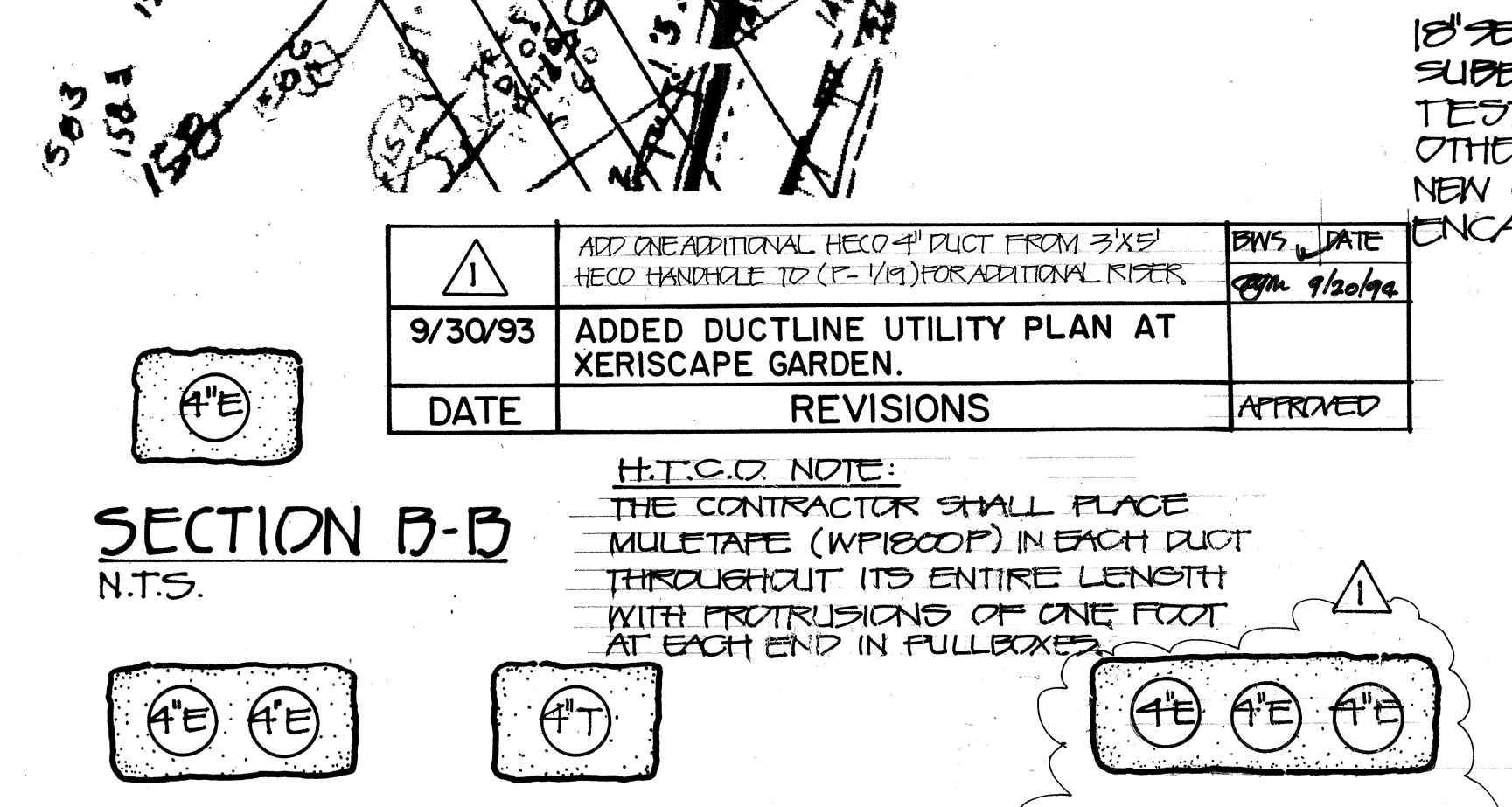
SCALE: 1" = 20'-0"



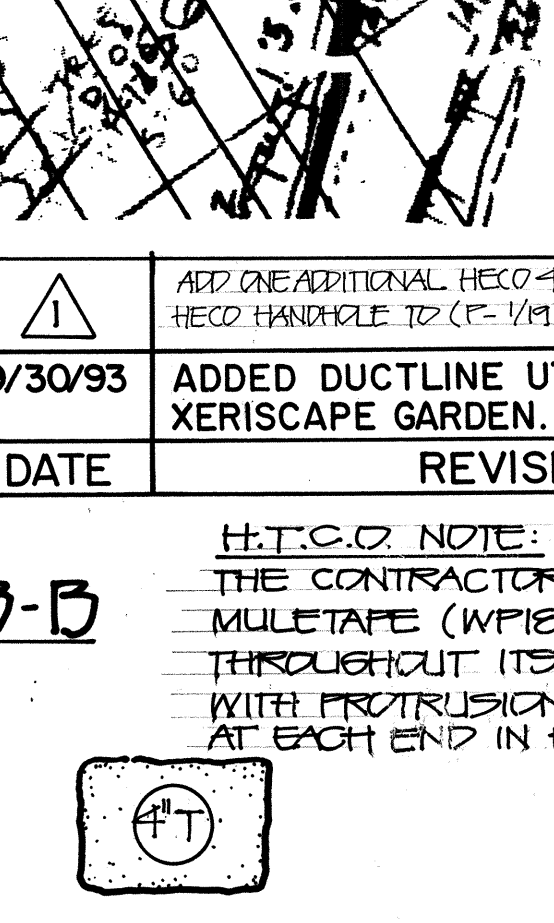
SECTION A-A
N.T.S.



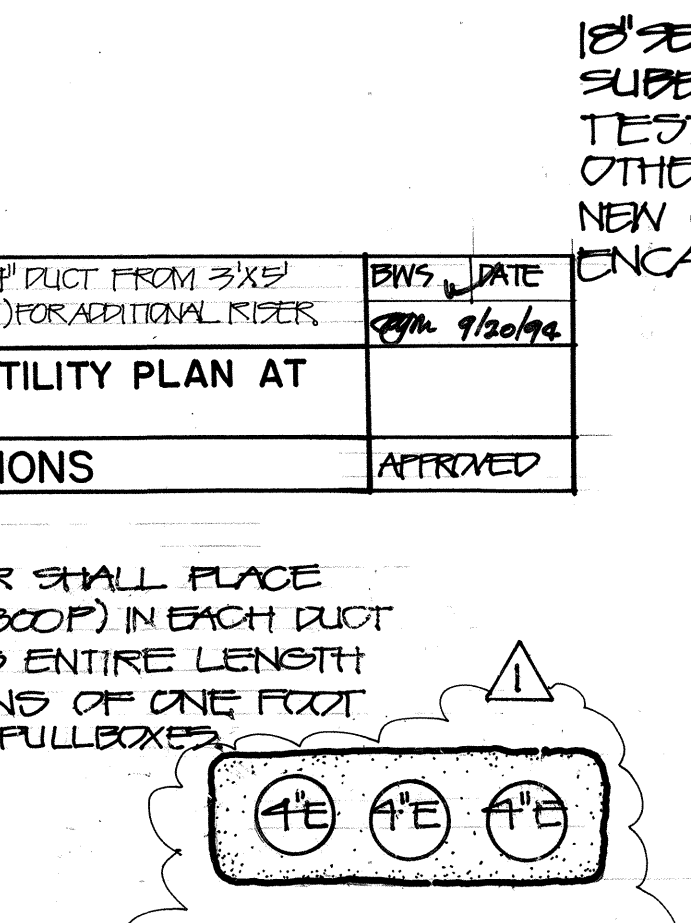
SECTION A-A
N.T.S.



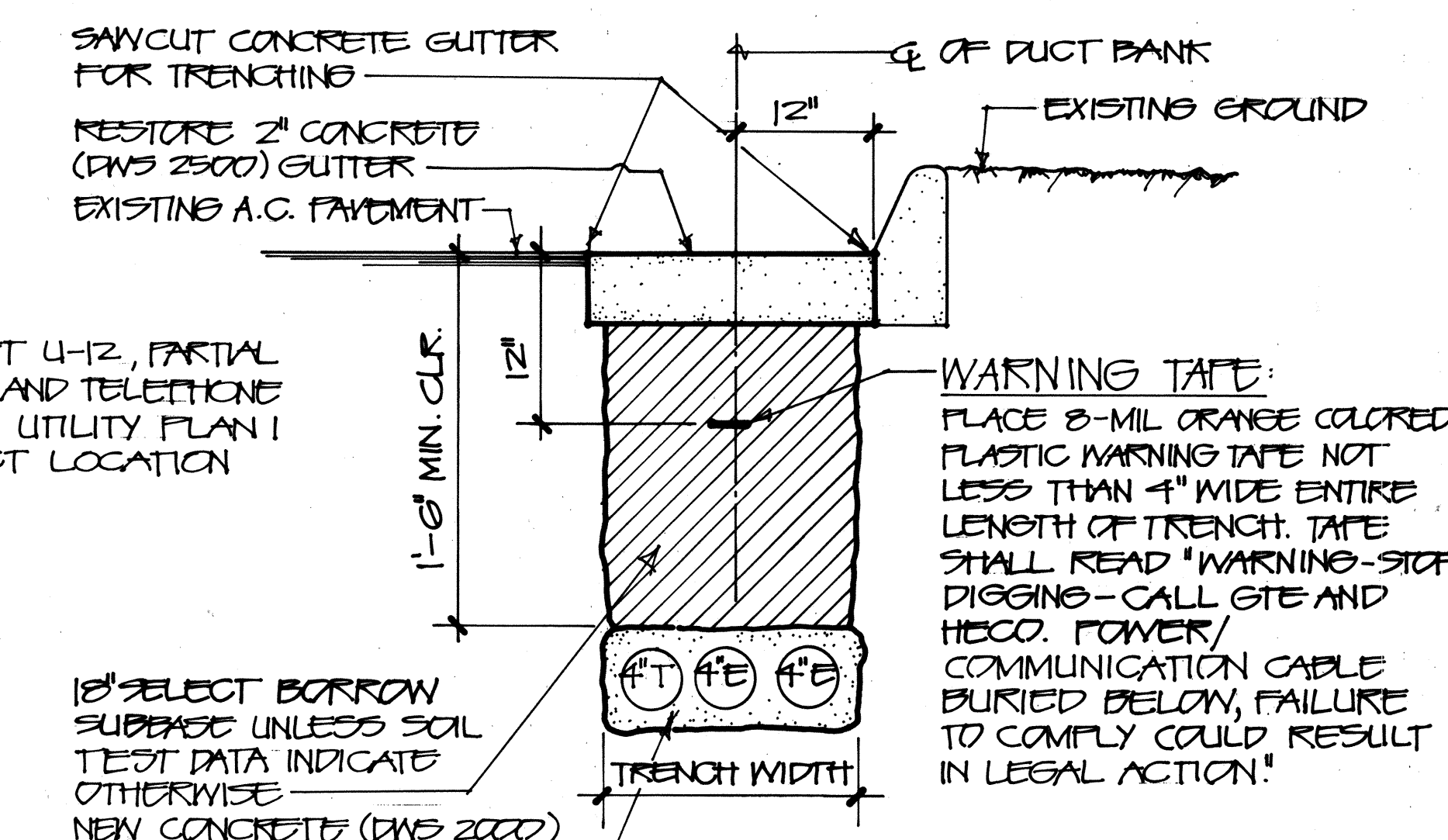
SECTION C-C
N.T.S.



SECTION D-D
N.T.S.



SECTION E-E
N.T.S.



TYPICAL TRENCH DETAIL
NOT TO SCALE

DATE	REVISIONS	APPROVED
9/30/93	ADD ONE ADDITIONAL HECO 4" DUCT FROM 3/4" HECO HANDHOLE TO (E-1/4) FOR ADDITIONAL RISER	DWS DATE 9/30/93
	ADDED DUCTLINE UTILITY PLAN AT XERISCAPE GARDEN.	

HECO NOTE:
THE CONTRACTOR SHALL PLACE MULETAPE (WPI800P) IN EACH DUCT THROUGHOUT ITS ENTIRE LENGTH WITH PROTRUSIONS OF ONE FOOT AT EACH END IN PULLBOXES.

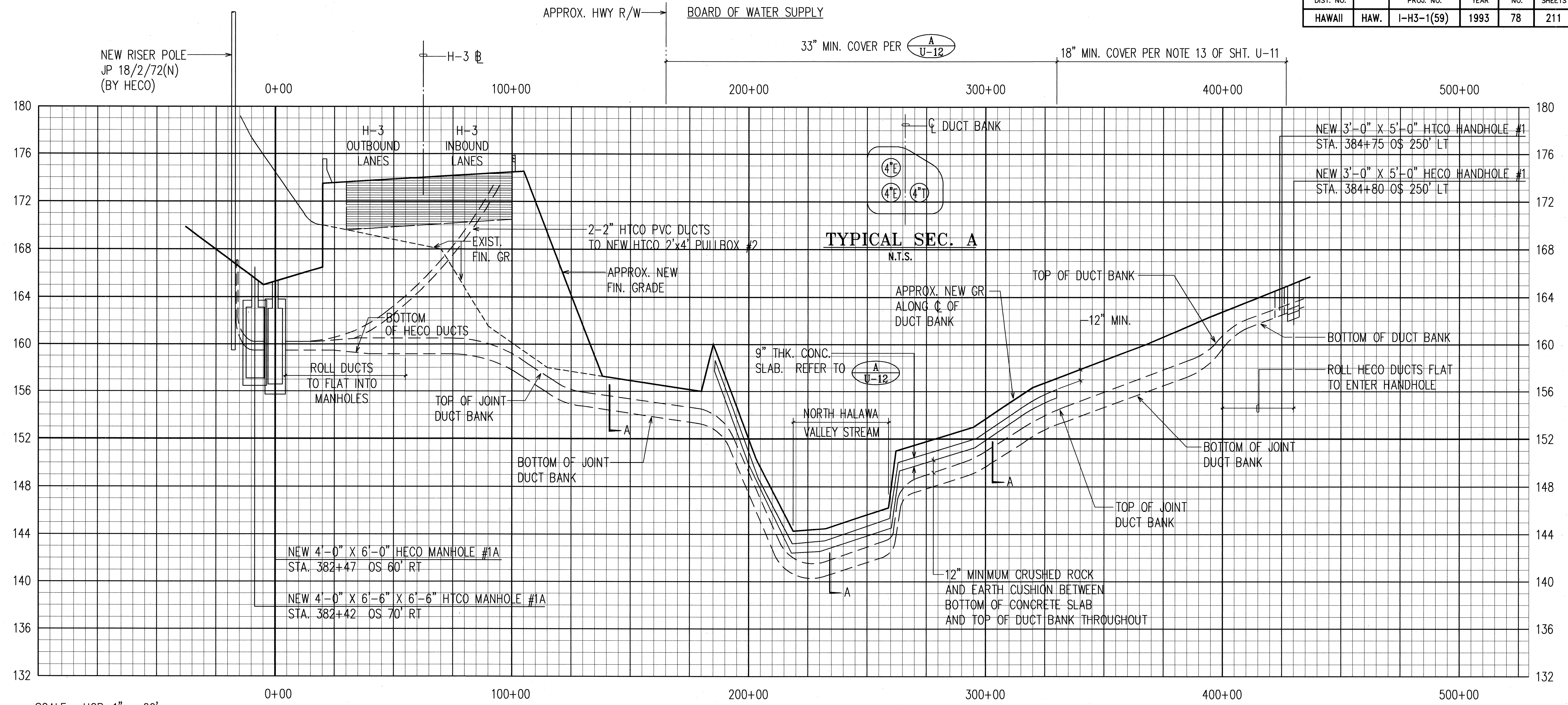
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**ELECTRIC & TELEPHONE
DUCTLINE UTILITY PLAN
AT BWS XERISCAPE GARDEN**

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO. I - H3 - I(59)

SCALE: AS NOTED DATE: SEPT. 1993
SHEET No. U35A OF 35 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	78	211

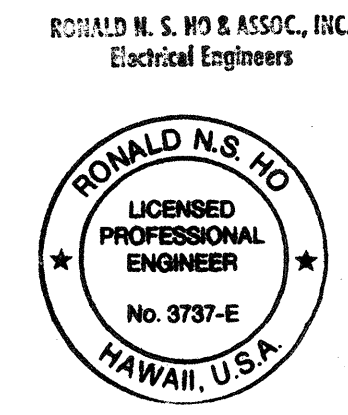


SCALE: HOR. 1" = 20'
VERT. 1" = 4'

NOTES:

1. THE LOCATIONS OF HANDHOLE AND MANHOLES TO BE ADJUSTED IN THE FIELD. REFER TO SHEET U-12.

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



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Ronald N.S. Ho 5/17/96

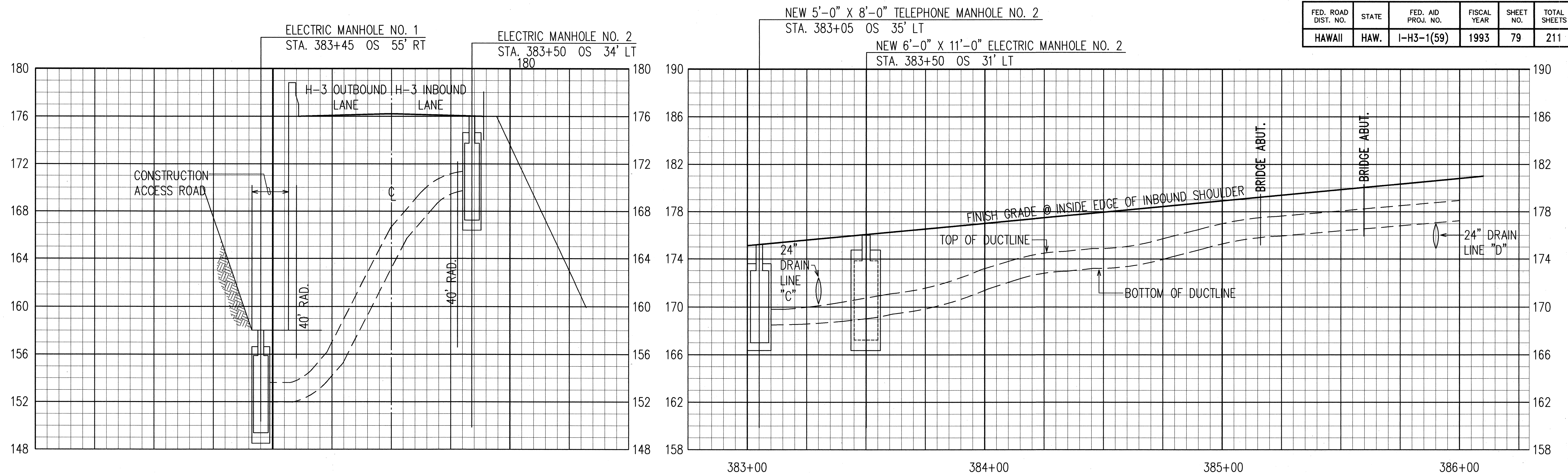
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

HECO AND HECO
DUCTLINE PROFILE
JP 18/2/72 TO BWS SITE
INTERSTATE ROUTE H-3
F.A.I. PROJECT NO I-H3-1(59)

SCALE: AS NOTED DATE: JUNE 1993

SHEET No. U-16 OF 35 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	79	211

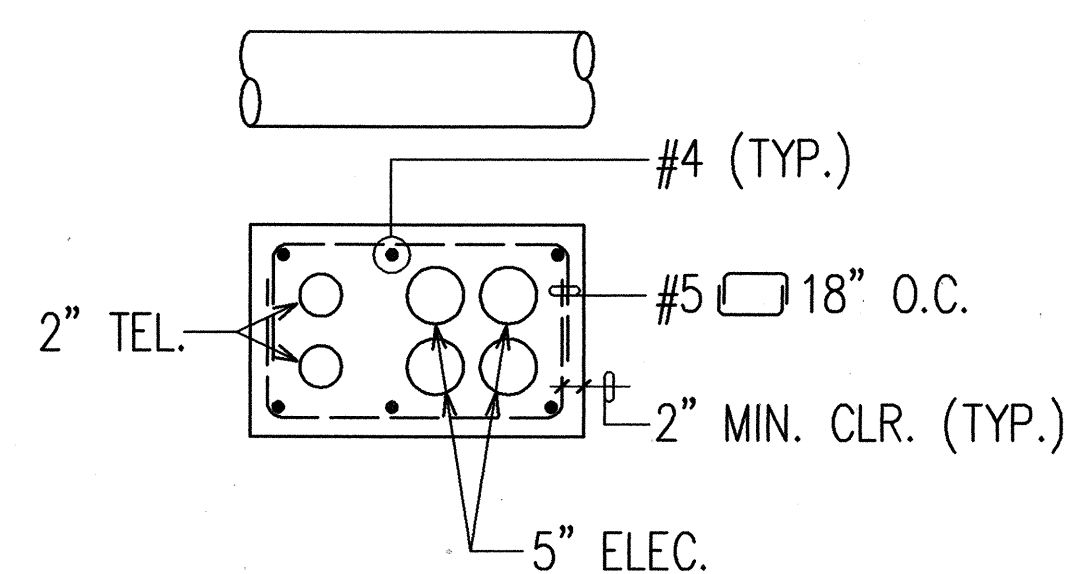


ELECTRIC MANHOLE NO. 1 TO ELECTRIC MANHOLE NO. 2

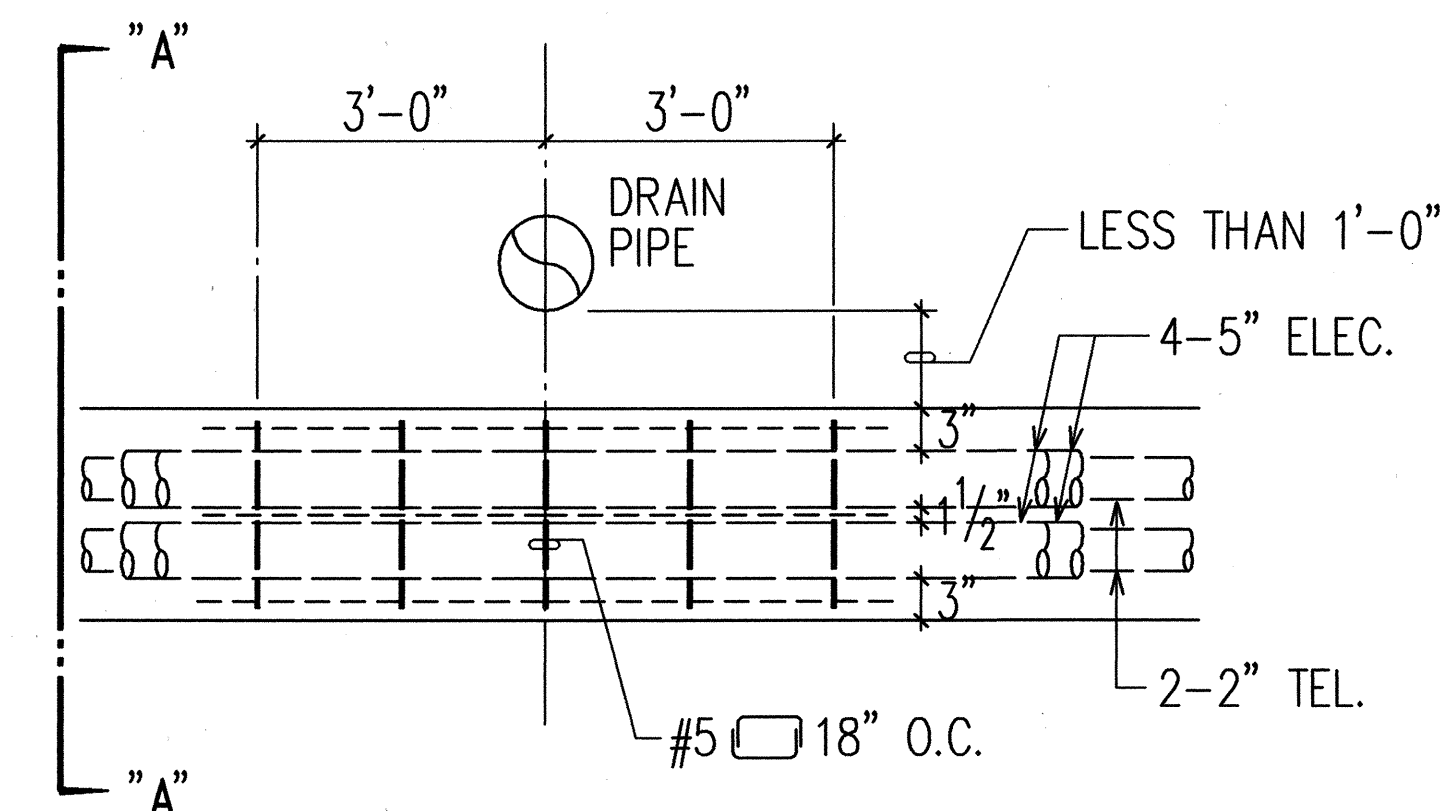
SCALE: HOR. 1" = 20'
VERT. 1" = 4'

PROFILE GENERAL NOTES:

- LONGITUDINAL FIN. GRADE SHOWN IS ALONG THE INSIDE EDGE OF THE INBOUND SHOULDER.
- FOR TYPICAL DUCT SECTION, BOX ENTRANCE DETAILS, AND EXPANSION JOINT DETAILS REFER TO SHEET U-20.
- UNLESS OTHERWISE NOTED, DUCTLINE TO CONSIST OF 4-5" ELECTRIC DUCTS AND 2-2" TELEPHONE DUCTS WITH THE ELECTRIC DUCTS ENTERING THE ELECTRIC MANHOLE AND THE TELEPHONE DUCTS ENTERING THE TELEPHONE HANDHOLE.
- ALL ELECTRICAL MANHOLES = 6'-0" X 11'-0" X 6'-6" DEEP PER HECO STANDARDS.
ALL TELEPHONE MANHOLES = 4'-0" X 6'-6" X 6'-6" PER HECO STANDARDS.
- WHERE CLEARANCE BETWEEN DRAIN PIPE AND E & T DUCTLINE IS LESS THAN 1'-0", REINFORCE PER DETAIL TO 3'-0" BOTH SIDES OF DRAIN PIPE.



SECTION "A-A"

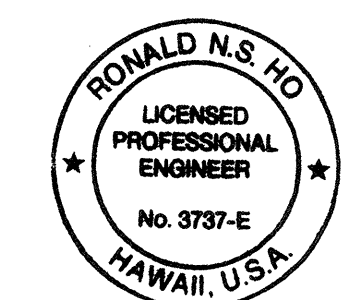


NOTE: HIGHWAY LIGHTING AND COMMUNICATION DUCTS NOT SHOWN FOR CLARITY.

1
U-17

TYPICAL DUCTLINE REINF. DETAILS
N.T.S. (SEE PROFILE GENERAL NOTE NO. 5)

RONALD N. S. HO & ASSOC., INC.
Electrical Engineers



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5/1/92

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL AND TELEPHONE
DUCTLINE PROFILE 1

STA. 383+00 TO STA. 386+00

INTERSTATE ROUTE H-3

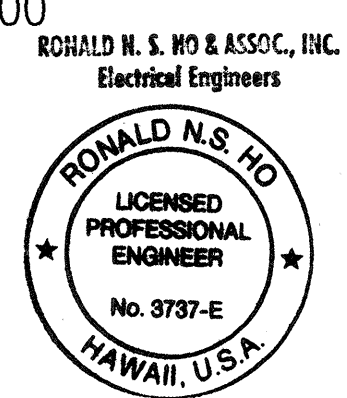
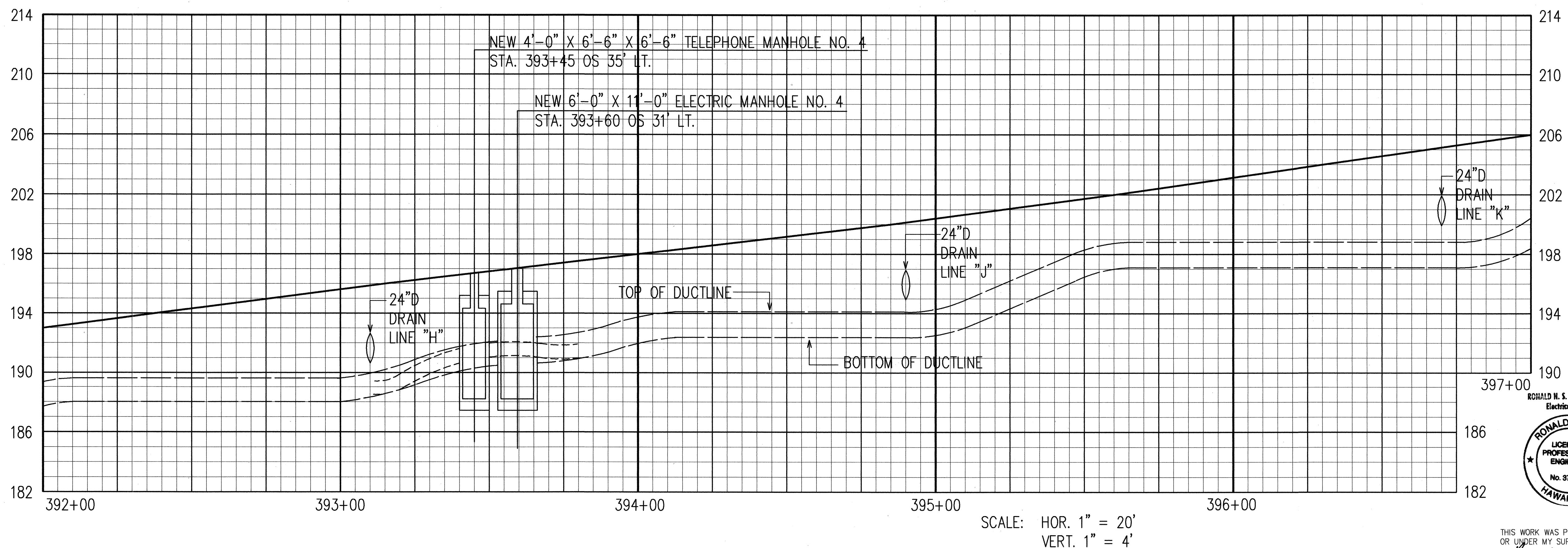
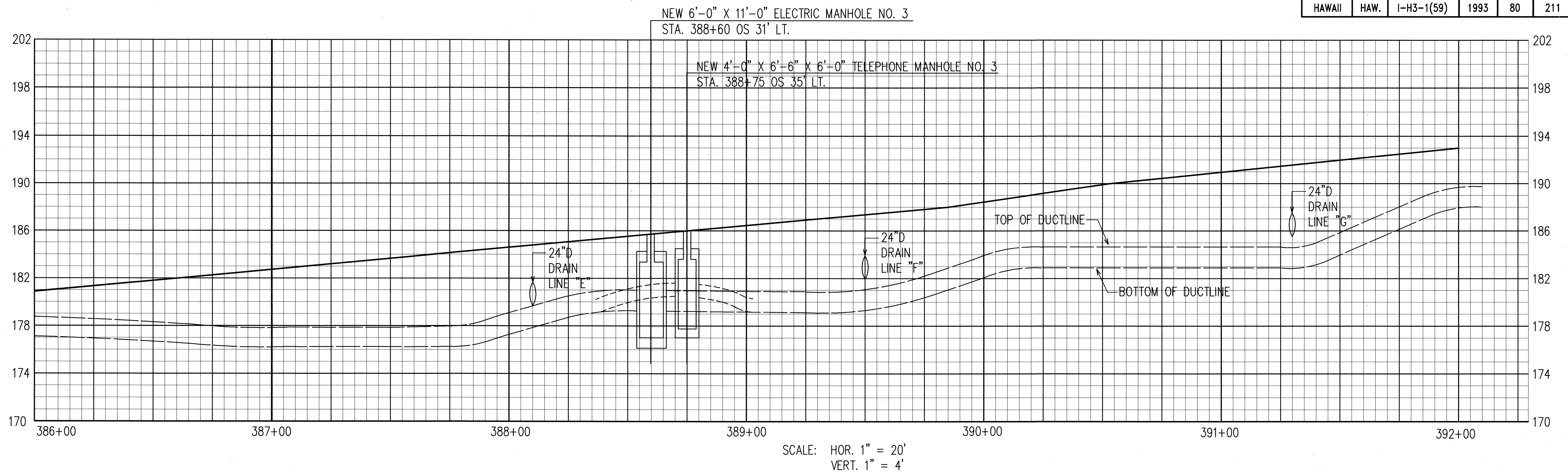
F.A.I. PROJECT NO I-H3-1(59)

SCALE: AS NOTED

DATE: JUNE 1993

SHEET No. U-17 OF 35 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	80	211



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**ELECTRICAL AND TELEPHONE
DUCTLINE PROFILE II**

STA. 386+00 TO 397+00

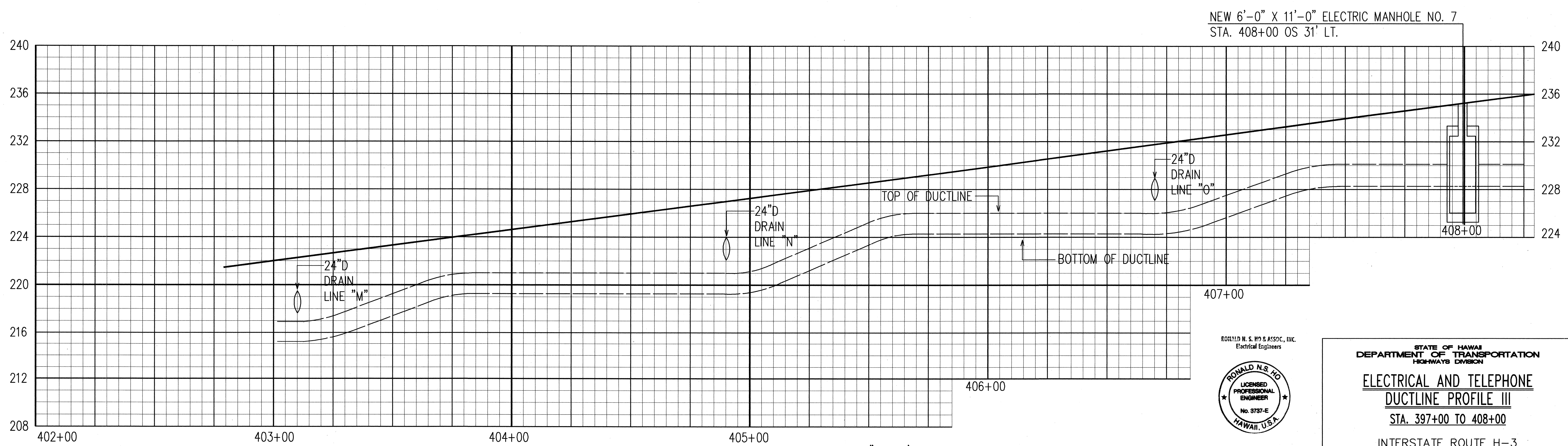
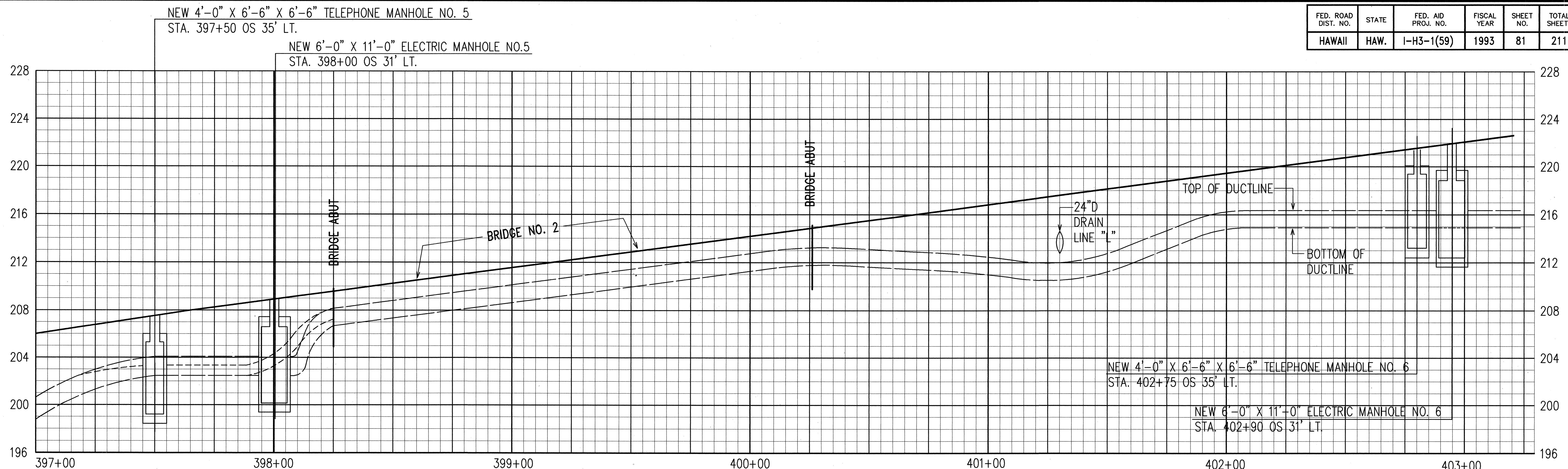
INTERSTATE ROUTE H-3
F.A.I. PROJECT NO I-H3-1(59)

SCALE: AS NOTED DATE: JUNE 1993

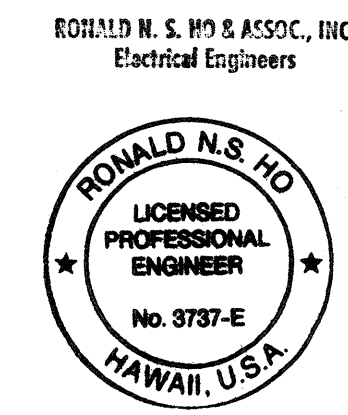
SHEET No. U-18 OF 35 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
DRAWN BY		
DESIGNED BY		
CHECKED BY		
NO.		

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	81	211



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



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Ronald N.S. Ho 5/17/96

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**ELECTRICAL AND TELEPHONE
DUCTLINE PROFILE III**

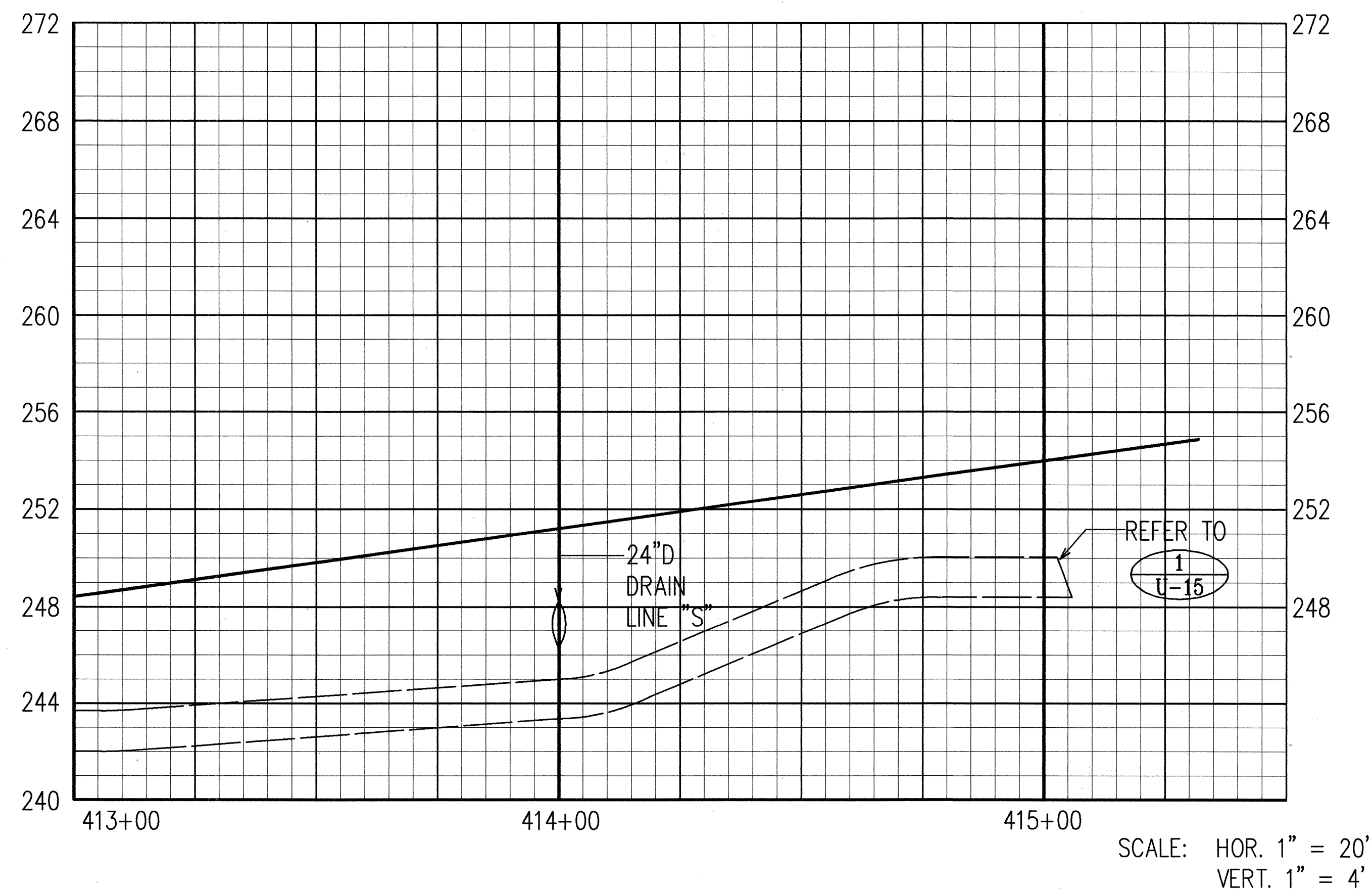
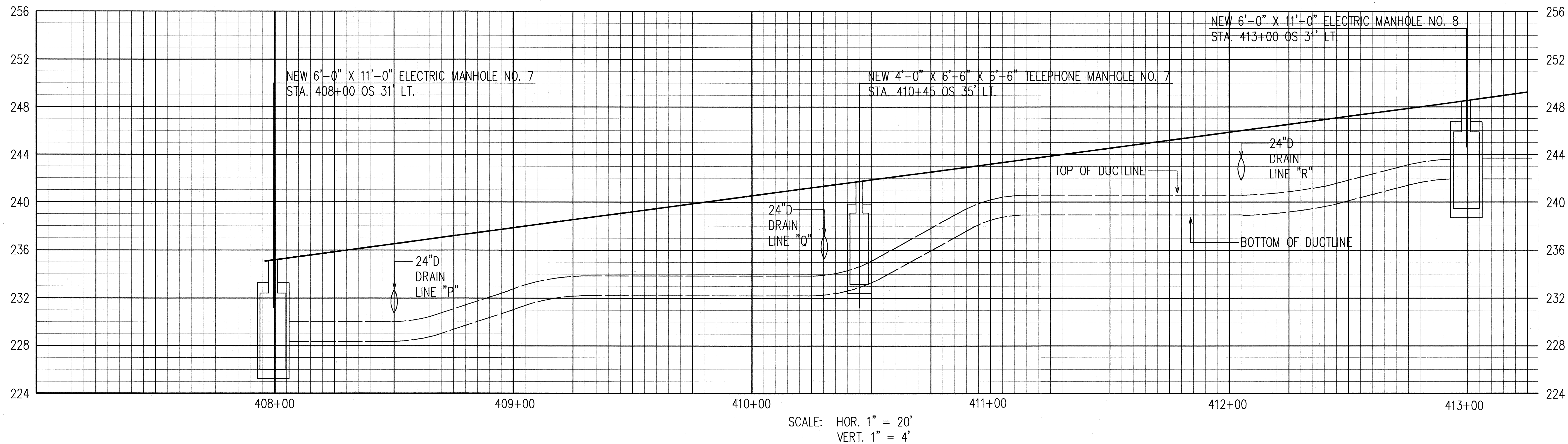
STA. 397+00 TO 408+00

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO I-H3-1(59)

SCALE: AS NOTED DATE: JUNE 1993

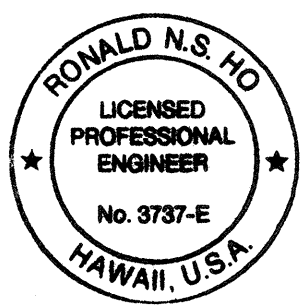
SHEET No. U-19 OF 35 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	ADD. 82	211



ORIGINAL PLAN
DATE
DRAWN BY
DESIGNED BY
NOTED BY
QUANTITIES BY
CHECKED BY

RONALD N. S. HO & ASSOC., INC.
ELECTRICAL ENGINEERS

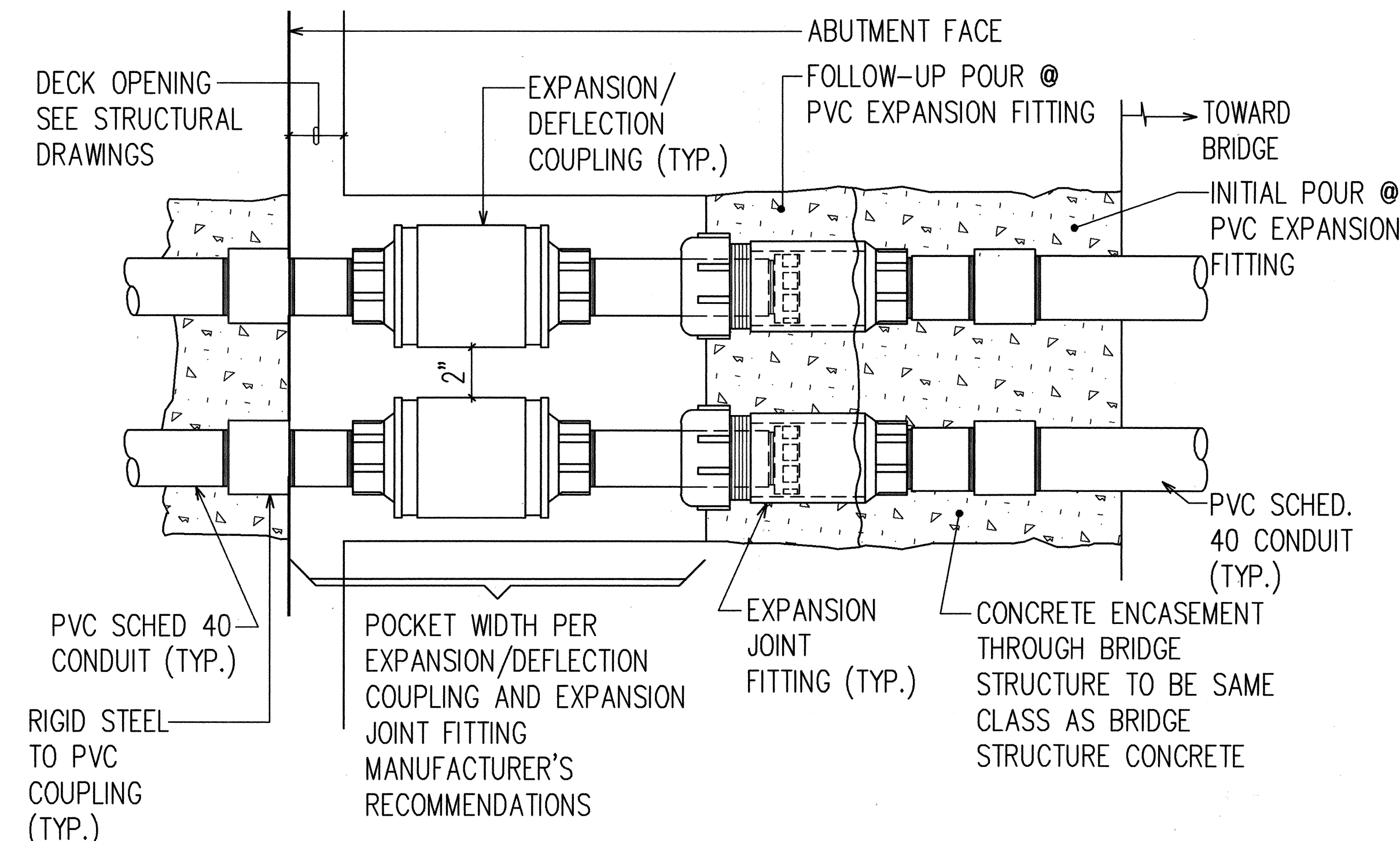


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9/30/93	REVISED DRAIN LINE LOCATION OVER DUCTLINE
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION ELECTRICAL AND TELEPHONE DUCTLINE PROFILE IV STA. 408+00 TO 415+00 INTERSTATE ROUTE H-3 F.A.I. PROJECT NO I-H3-1(59)	
SCALE: AS NOTED	DATE: JUNE 1993
SHEET No. U-20 OF 35 SHEETS	

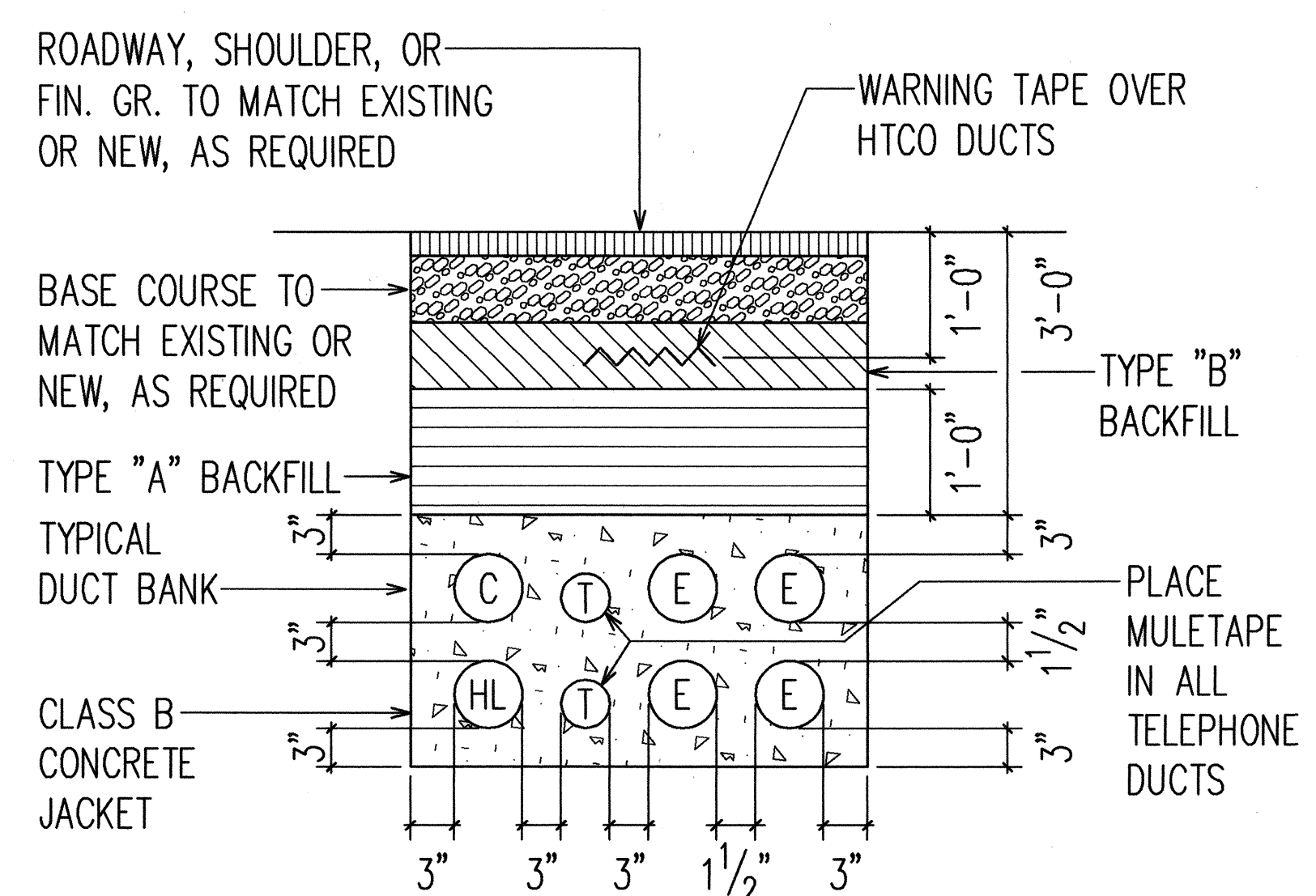
ADD. 82

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	83	211

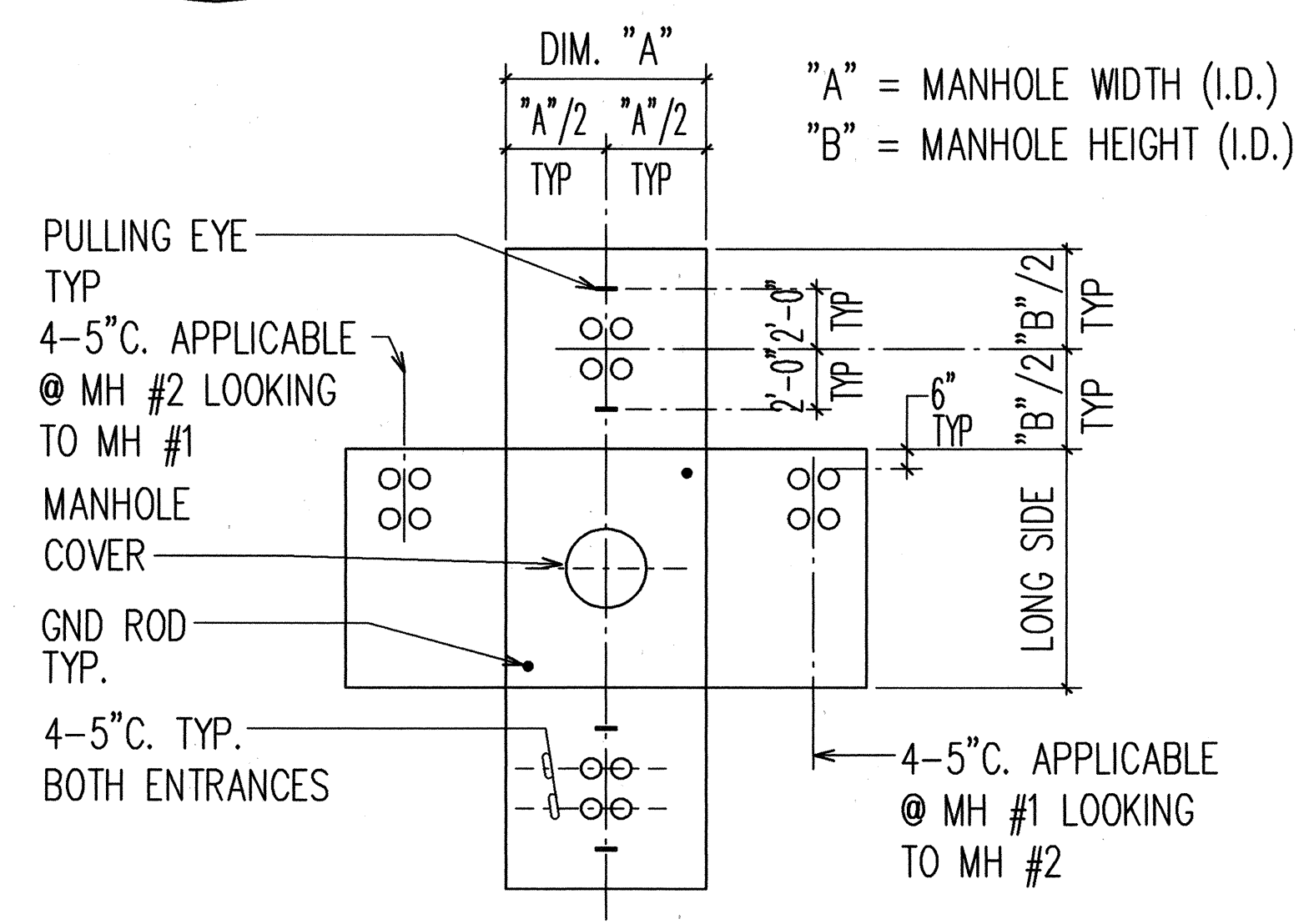


NOTE:
SUBMIT SHOP DRAWINGS FOR EXPANSION JOINT AND EXPANSION/DEFLECTION COUPLINGS FOR APPROVAL

1
U-21
TYPICAL DUCTLINE EXPANSION/DEFLECTION FITTING DETAIL
N.T.S.



2
U-21
TYPICAL DUCT SECTION
N.T.S.



3
U-21
ELECTRIC MANHOLE TYP DUCT ENTRANCE DETAIL
N.T.S.

LEGEND:

- 5E REFER TO PROJECT PLAN DUCT SECTION INDICATOR FOR DUCT SIZES AND CONFIGURATION.
- TYPE "A" BACKFILL SHALL CONSIST OF: BEACH SAND, EARTH OR EARTH AND GRAVEL. IF EARTH AND GRAVEL, THE MAXIMUM ROCK SIZE SHALL BE 1" AND THE MIXTURE SHALL CONTAIN NOT MORE THAN 50% BY VOLUME OF ROCK PARTICLES.
- TYPE "B" BACKFILL SHALL CONSIST OF: BEACH SAND, EARTH OR EARTH AND GRAVEL. IF EARTH AND GRAVEL, THE MIXTURE MUST PASS A 1/2" MESH SCREEN AND CONTAIN NOT MORE THAN 20% BY VOLUME OF ROCK PARTICLES.
- IF THE NORMAL MATERIAL IN THE BOTTOM OF THE TRENCH IS NOT TYPE "B", AN ADDITIONAL 3" SHALL BE EXCAVATED AND TYPE "B" BACKFILL SHALL BE PROVIDED.

DUCT DIMENSIONS

ID	OD
2"	2.375(3/8)"
3"	3.500(1/2)"
4"	4.500(1/2)"
5"	5.563(9/16)"

DUCT SEPARATION REQUIREMENTS IN RUNS:

E - E = 1 1/2"	E = ELECTRIC
E - T = 3"	T = TELEPHONE
T - T = 1 1/2"	C = COMM
T - C = 3"	HL = HWY LT
T - HL = 3"	
C - HL = 3"	

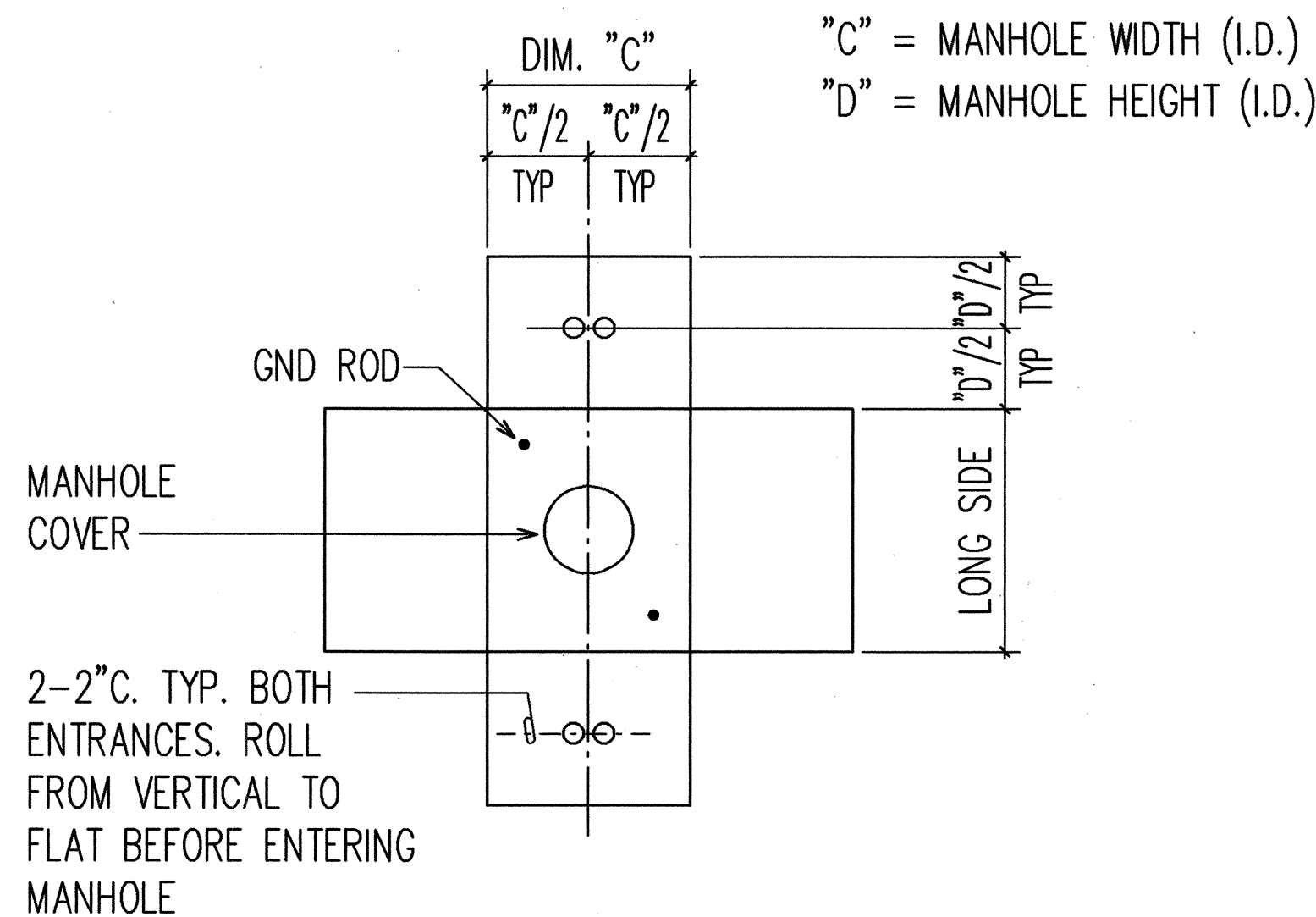
DUCT SEPARATION REQUIREMENTS @ MH FACE:

E - E = 8"	
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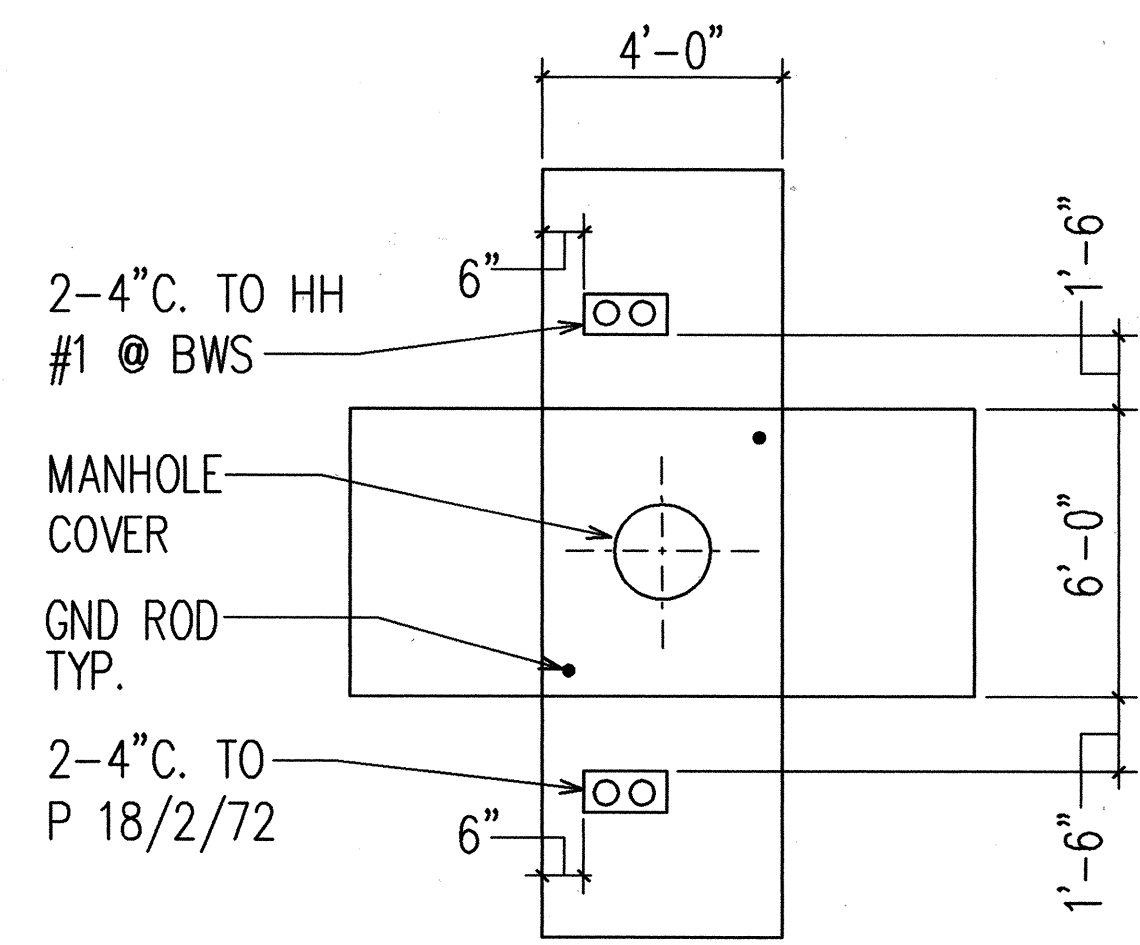
NOTES:

- MINIMUM CLEARANCES: FINISH GRADE TO TOP OF CONCRETE ENVELOPE
 - HAWAIIAN ELECTRIC CO. DUCTS _____ 1'-6" WITHIN PRIVATE PROPERTY
 - HAWAIIAN TELEPHONE CO. DUCTS _____ 1'-6" WITHIN PRIVATE PROPERTY
 - HAWAIIAN ELECTRIC CO. DUCTS _____ 3'-0" WITHIN STATE HWY R-O-W
 - HAWAIIAN TELEPHONE CO. DUCTS _____ 3'-0" WITHIN STATE HWY R-O-W
 - DOT-STATE OF HAWAII, ELECTRIC DUCTS _____ 3'-0" WITHIN STATE HWY R-O-W
 - DOT-STATE OF HAWAII, TELEPHONE DUCTS _____ 3'-0" WITHIN STATE HWY R-O-W
- ALL DIMENSIONS SHOWN ARE MINIMUM.
- PLACE WARNING TAPE ABOVE HTCO DUCTS AS SHOWN.
PLACE MULETAPES IN ALL HTCO DUCTS.

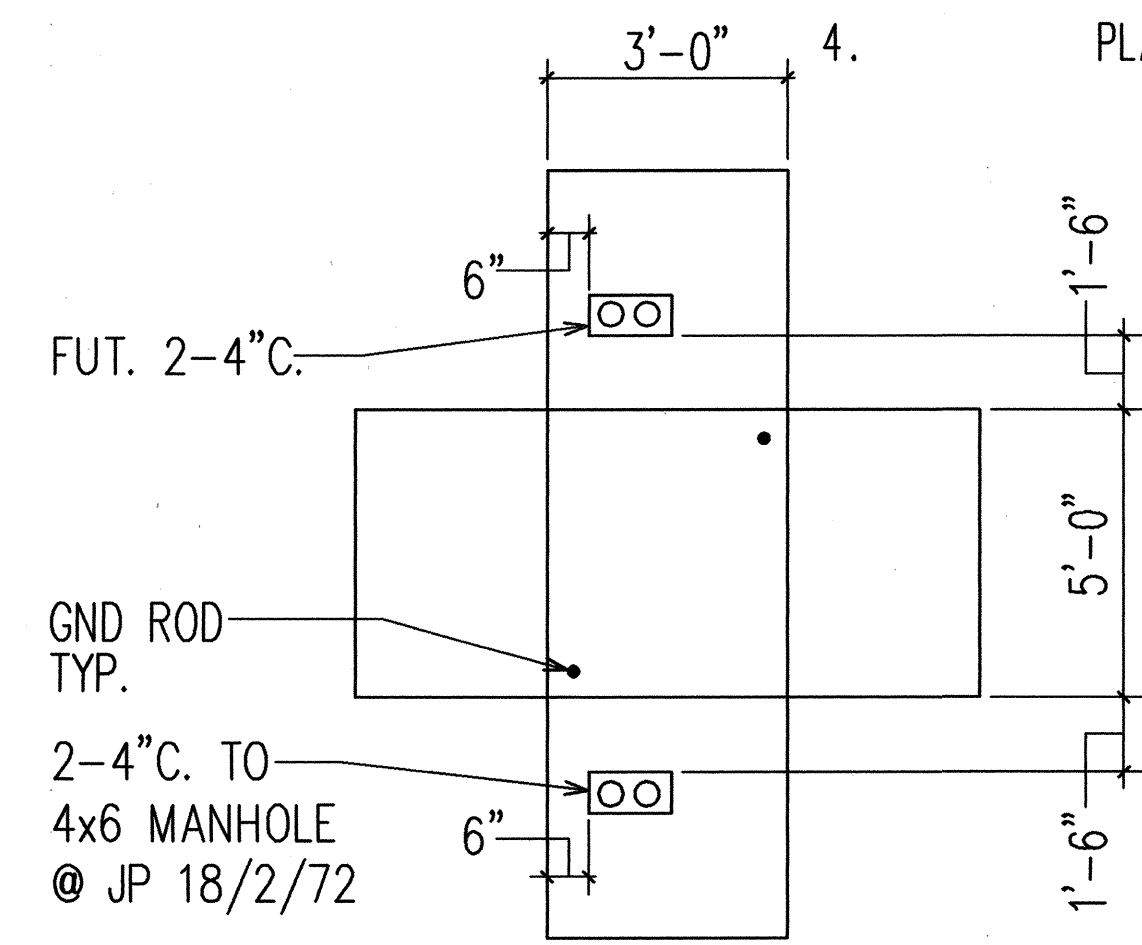
ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
	DESIGNED BY	
	CHECKED BY	
	NO.	



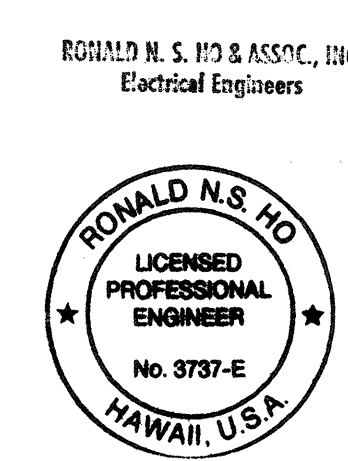
4
U-21
TELEPHONE MANHOLE TYP DUCT ENTRANCE DETAIL
N.T.S.



5
U-21
HECO 4'-0"x6'-0" MANHOLE DUCT ENTRANCE DETAIL



6
U-21
HECO 3'-0"x5'-0" HANDHOLE DUCT ENTRANCE DETAIL



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

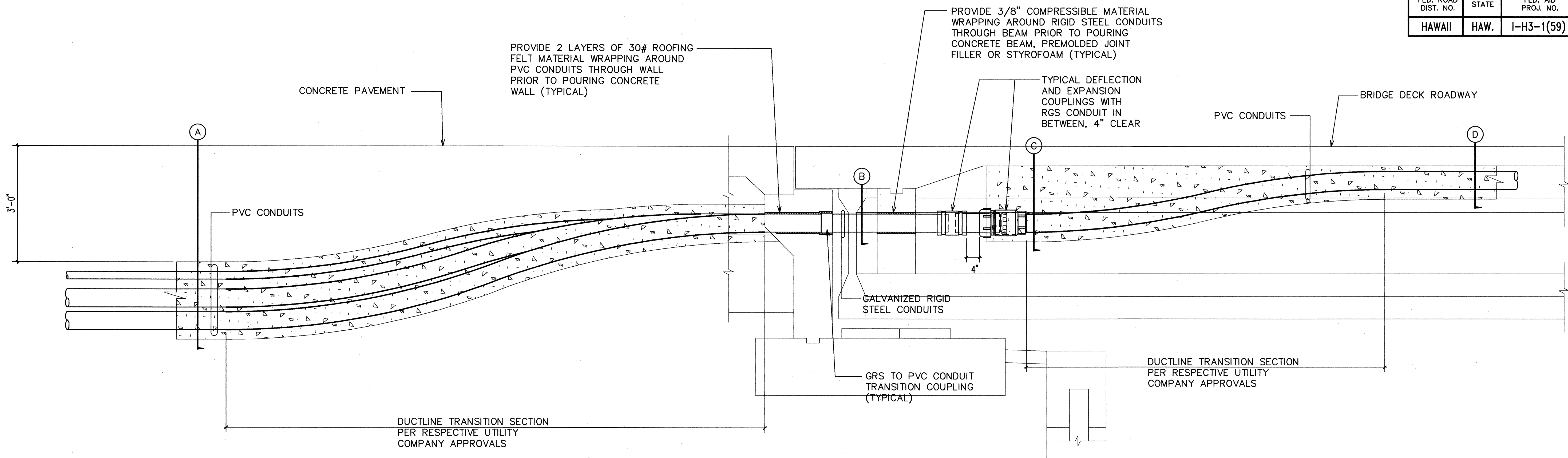
DUCT SECTION DETAILS, TYPICAL SECTIONS AND GENERAL NOTES

INTERSTATE ROUTE H-3
F.A.I. PROJECT NO I-H3-1(59)

SCALE: AS NOTED
DATE: JUNE 1993

SHEET No. U-21 OF 35 SHEETS

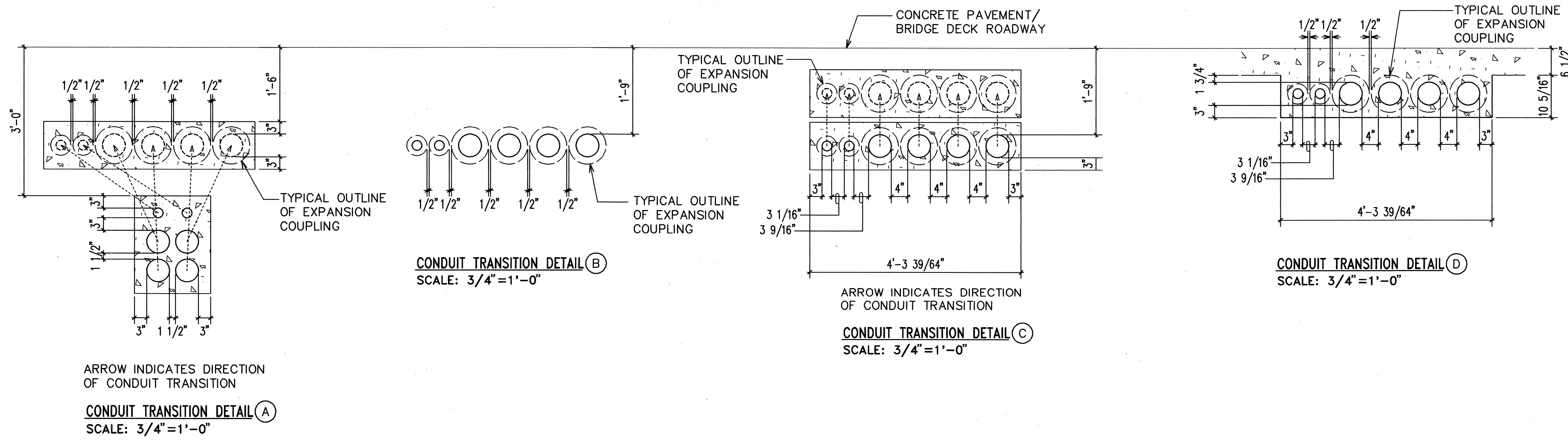
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	C.O. 83S-1	211



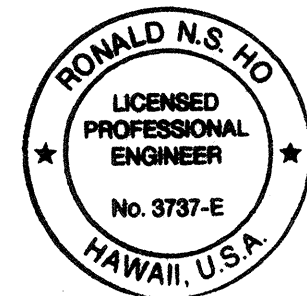
1
U-21A

TYPICAL DUCTLINE EXPANSION AND DEFLECTION COUPLING INSTALLATION DETAIL AT BRIDGE NO. 1

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



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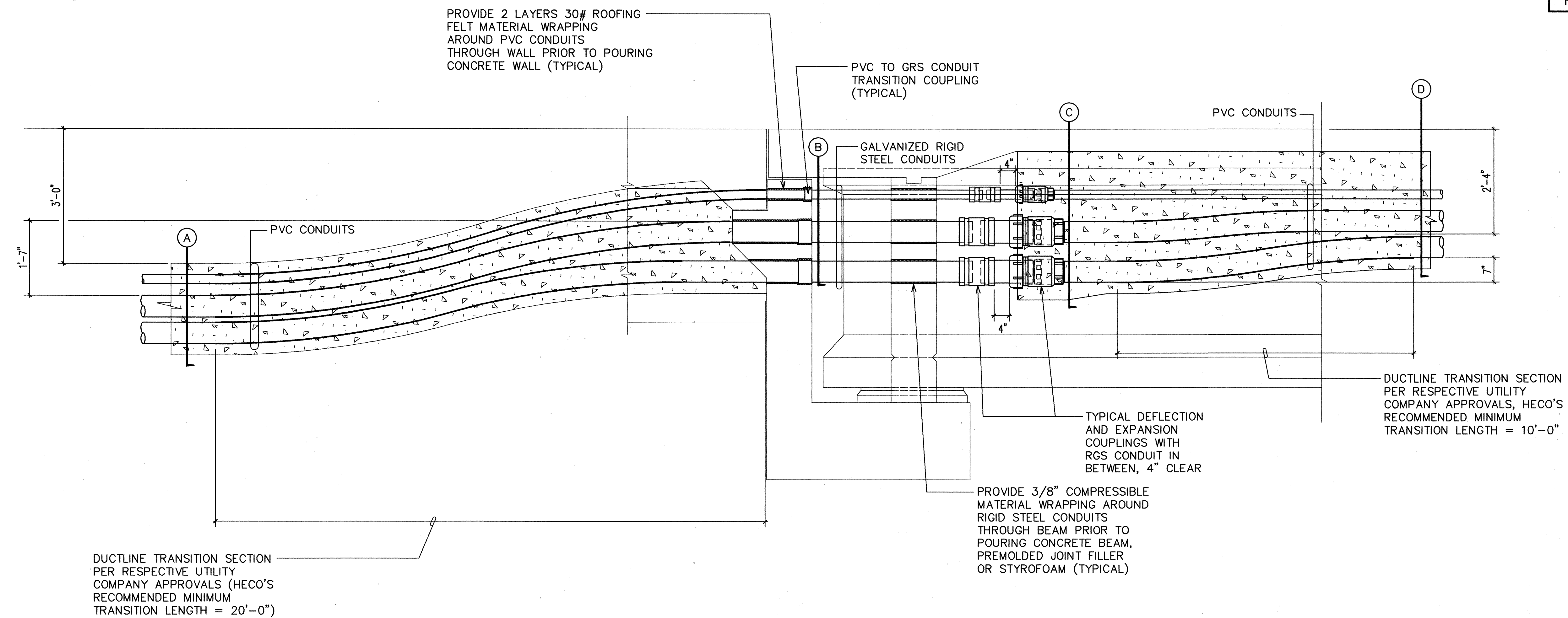


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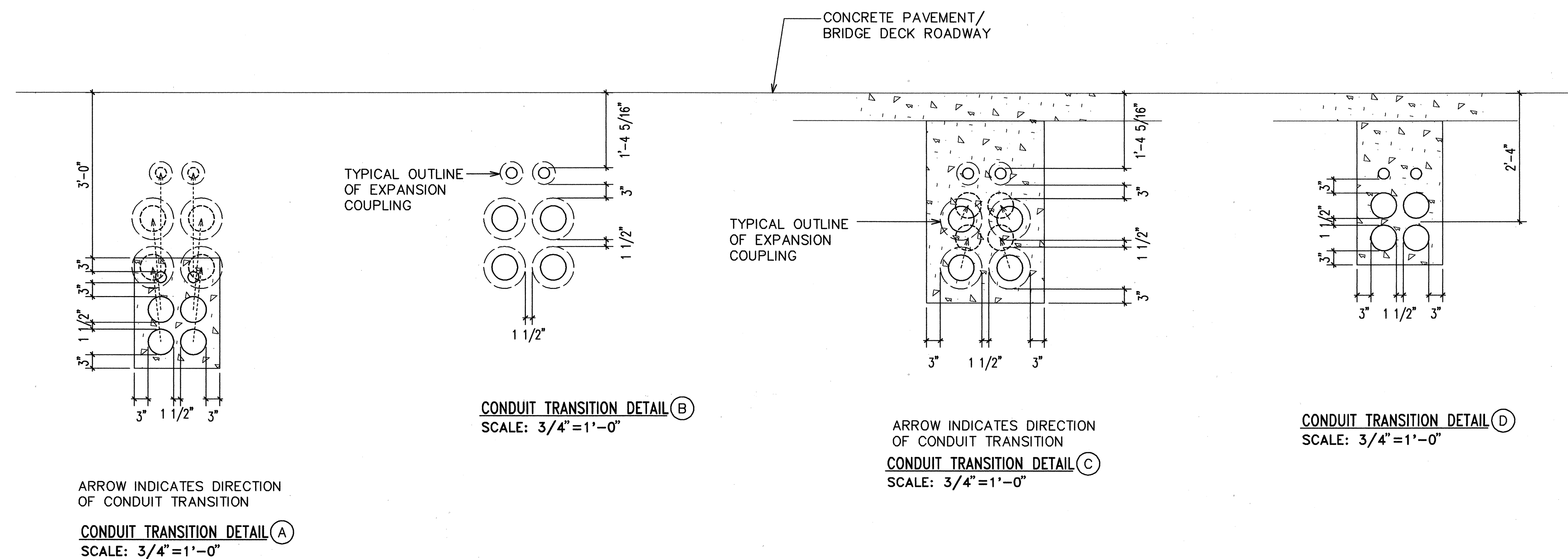
1/5/95	NEW SHEET ADDED
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION EXPANSION/DEFLECTION COUPLING DETAILS, BRIDGE NO. 1 INTERSTATE ROUTE H-3 F.A.I. PROJECT NO I-H3-1(59)	
SCALE: AS NOTED	DATE: JAN 5, 1995
SHEET No. U-21A OF 35 SHEETS	

C.O. 83S-1

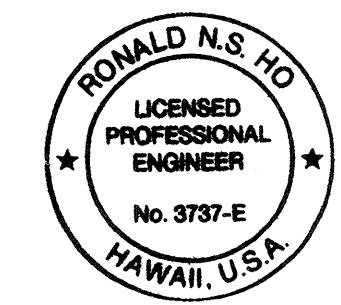
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	I-H3-1(59)	1993	C.O. 83S-2	211



1
U-21B
**TYPICAL DUCTLINE EXPANSION AND DEFLECTION
COUPLING INSTALLATION DETAIL AT BRIDGE NO. 2**
SCALE: 3/4"=1'-0"



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5/17/96

1/5/95	NEW SHEET ADDED
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION EXPANSION/DEFLECTION COUPLING DETAILS, BRIDGE NO. 2 INTERSTATE ROUTE H-3 F.A.I. PROJECT NO I-H3-1(59) SCALE: AS NOTED DATE: JAN 5, 1995 SHEET No. U-21B OF 35 SHEETS	

C.O. 83S-2