

ONE-LINE DIAGRAM LEGEND

	FUSE		CONTROL POWER TRANSFORMER
	FUSED CUTOUT		RHEOSTAT
	POWER CIRCUIT BREAKER NUMERAL - INDICATES CIRCUIT		FAR - FREQUENCY ADJUSTING RHEOSTAT
	MOLDED CASE CIRCUIT BREAKER		VAR - VOLTAGE ADJUSTING RHEOSTAT
	MOTOR CIRCUIT PROTECTOR		GENERATOR
	MAGNETIC MOTOR STARTER		INDICATING LIGHT
	NON-FUSIBLE DISCONNECTING SWITCH		G - GREEN R - RED W - WHITE
	REDUCED VOLTAGE STARTER		AMMETER
	COMBINATION MOTOR CIRCUIT PROTECTOR AND REVERSING MOTOR STARTER		ETM - ELAPSED TIME METER
	3A - MCP RATING		F - FREQUENCY METER
	T - CONTROL POWER TRANSFORMER		LSM - LOAD SHARING MODULE
	100 - MOTOR. NUMERAL INDICATES HORSEPOWER		PM - PHASE METER
	PUSHBUTTON STATION		SY - SYNCHROSCOPE
	ST/SP - START/STOP		V - VOLTMETER
	J - JOG FOWARD		25 - SYNCHRONIZING RELAY, FINITE
	JR - JOG REVERSE		86 - FREQUENCY DIFFERENCE RELAY
	SP/L.O. - STOP LOCKOUT		SR/489 - LOCKOUT RELAY
	SELECTOR SWITCH STATION		DBR - DEAD BUS RELAY
	H/O/A - HAND/OFF/AUTO		GD - GROUND DETECTION RELAY
	CCT - CROSS CURRENT COMPENSATING TRANSFORMER		RESISTOR
	POTENTIAL TRANSFORMER		CAPACITOR
	TWO WINDING POWER TRANSFORMER		GROUND
	CONTROL POWER TRANSFORMER		PLUG-IN OR PULL-APART POWER OR CONTROL TERMINAL
	TS - TEST SWITCH		HIGH VOLTAGE TERMINATOR
			CONTACT, NORMALLY OPEN
			LA - LIGHTNING ARRESTOR
			SS - SURGE SUPPRESSOR
			SPMA - SPEED AND PHASE MATCHING AUXILIARY RELAY

LINES AND OUTLINES FOR DIAGRAMS

	NEW WORK UNLESS OTHERWISE INDICATED
	EXISTING INSTALLATION TO REMAIN UNLESS OTHERWISE INDICATED
	REMOVE UNDER THIS PROJECT AS NOTED
	EQUIPMENT OUTLINE

ELEMENTARY DIAGRAM LEGEND

	FUSE
	TERMINAL ON DEVICES
	INDICATING LIGHT G - GREEN R - RED
	MOTOR STARTER COIL H - HIGH SPEED L - LOW SPEED
	OVERLOAD
	GROUND
	CONTACT, NORMALLY CLOSED
	CONTROL POWER TRANSFORMER
	RECTIFIER
	PUSHBUTTON. NORMALLY OPEN, MOMENTARY CLOSE
	PUSHBUTTON. NORMALLY CLOSED, MOMENTARY OPEN
	LIMIT SWITCH. NORMALLY CLOSED
	PRESSURE SWITCH. CLOSE ON INCREASE
	SELECTOR SWITCH
	SELECTOR SWITCH

PLAN LEGEND

	MOTOR. NUMERAL INDICATES HORSEPOWER
	JUNCTION BOX
	CARBON MONOXIDE SENSOR
	MOTOR CIRCUIT PROTECTOR
	MAGNETIC MOTOR STARTER
	2 SPEED, 2 WINDING MOTOR STARTER
	MANUAL MOTOR STARTER
	INDICATING LIGHTS
	SELECTOR SWITCH STATION
	RECEPTACLE EM - EMERGENCY
	CCTV CAMERA
	NEW EXPOSED CONDUIT OR DUCT
	EXISTING EXPOSED CONDUIT OR DUCT
	REMOVAL WORK - EXISTING EXPOSED CONDUIT
	NEW UNDERGROUND CONDUIT OR DUCT
	EXISTING UNDERGROUND CONDUIT OR DUCT
	REMOVAL WORK - EXISTING UNDERGROUND CONDUIT OR DUCT
	FLEXIBLE METAL CONDUIT
	NEW EQUIPMENT
	EXISTING EQUIPMENT
	EXISTING EQUIPMENT LOCATED ABOVE FLOOR AS INDICATED

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	36	77

ABBREVIATIONS

A	AMPERE
A-C	ALTERNATING CURRENT
AIC	AMPERES INTERRUPTING CAPACITY
BCT	BUSHING CURRENT TRANSFORMER
BKR	BREAKER
BLDG	BUILDING
C	CONDUIT, CONDUCTOR
CKT	CIRCUIT
CLF	CHAIN LINK FENCE
CT	CURRENT TRANSFORMER
CU	COPPER
D-C	DIRECT CURRENT
DIA	DIAMETER
ELEC	ELECTRIC, ELECTRICAL
EMH	ELECTRIC MANHOLE
EXIST	EXISTING
FA	FIRE ALARM
FDR	FEEDER
GND	GROUND
GRC	GALVANIZED RIGID CONDUIT
HID	HIGH INTENSITY DISCHARGE
HT	HEIGHT
JB	JUNCTION BOX
KCM	THOUSAND CIRCULAR MILS
KV	KILOVOLTS
KVA	KILOVOLTS-AMPERES
LC	LEAD COVERED
LED	LIGHT EMITTING DIODE
MCB	MOLDED CASE CIRCUIT BREAKER
MIN	MINIMUM
MTG	MOUNTING
NEUT	NEUTRAL
OCB	OIL CIRCUIT BREAKER
OH	OVERHEAD
P	POLE
PCB	POLYCHLORINATED BIPHENYL
PH	PHASE
PNL	PANEL
PR	PAIR
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE
RM	ROOM
SDBC	SOFT DRAWN BARE COPPER
SUBSTA	SUBSTATION
TYP	TYPICAL
U.G.	UNDERGROUND
V	VOLTS
VA	VOLT-AMPERES
W	WIRE
XFMR	TRANSFORMER
&	AND



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

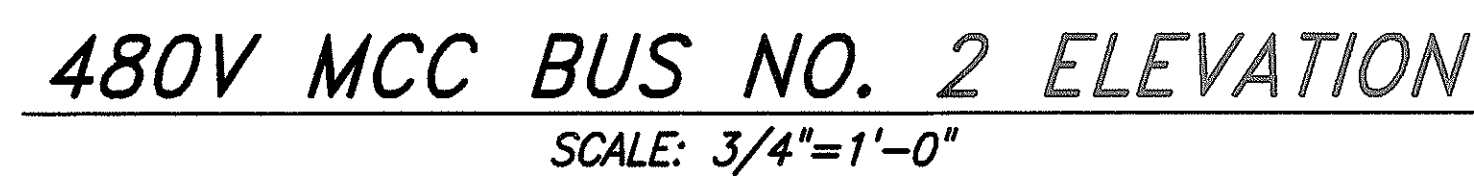
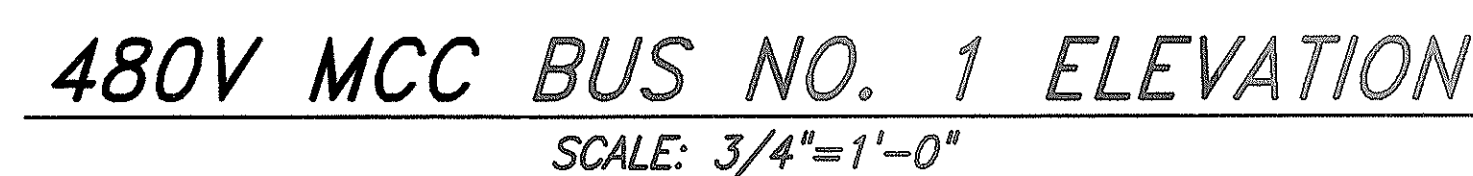
LEGEND AND
ABBREVIATIONS

WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE

PROJECT NO. HWY-0-21-98M

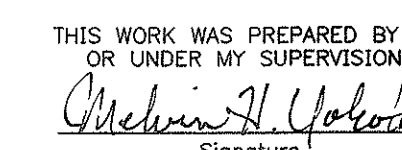
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SHEET No. E-1 OF E-27 SHEETS



1. DISCONNECT POWER AND CONTROL WIRING AT EXISTING DAMPER ACTUATORS. RECONNECT TO NEW DAMPER ACTUATORS.
2. REPLACE DAMPER MOTOR OVERLOAD HEATERS WITH NEW OVERLOAD HEATERS SIZED FOR FULL LOAD CURRENT AND SERVICE FACTOR OF MOTORS FOR NEW DAMPER ACTUATORS.

1 0 1 2FT
SCALE: 3/4"=1'-0"



STATE OF HAWAII
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VENTILATION BUILDING

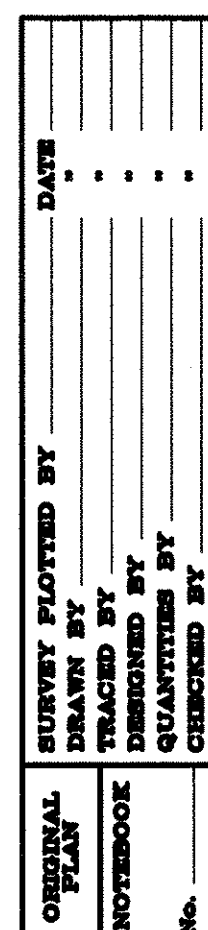
MCC ONE-LINE DIAGRAM

WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE
PROJECT NO. HWY-0-21-98M

Scale: As Noted Date: JULY 2000

SHEET No. E-2 OF E-27 SHEETS

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



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

KALIHI PORTAL OFFICE
& VAULT ONE-LINE DIAG

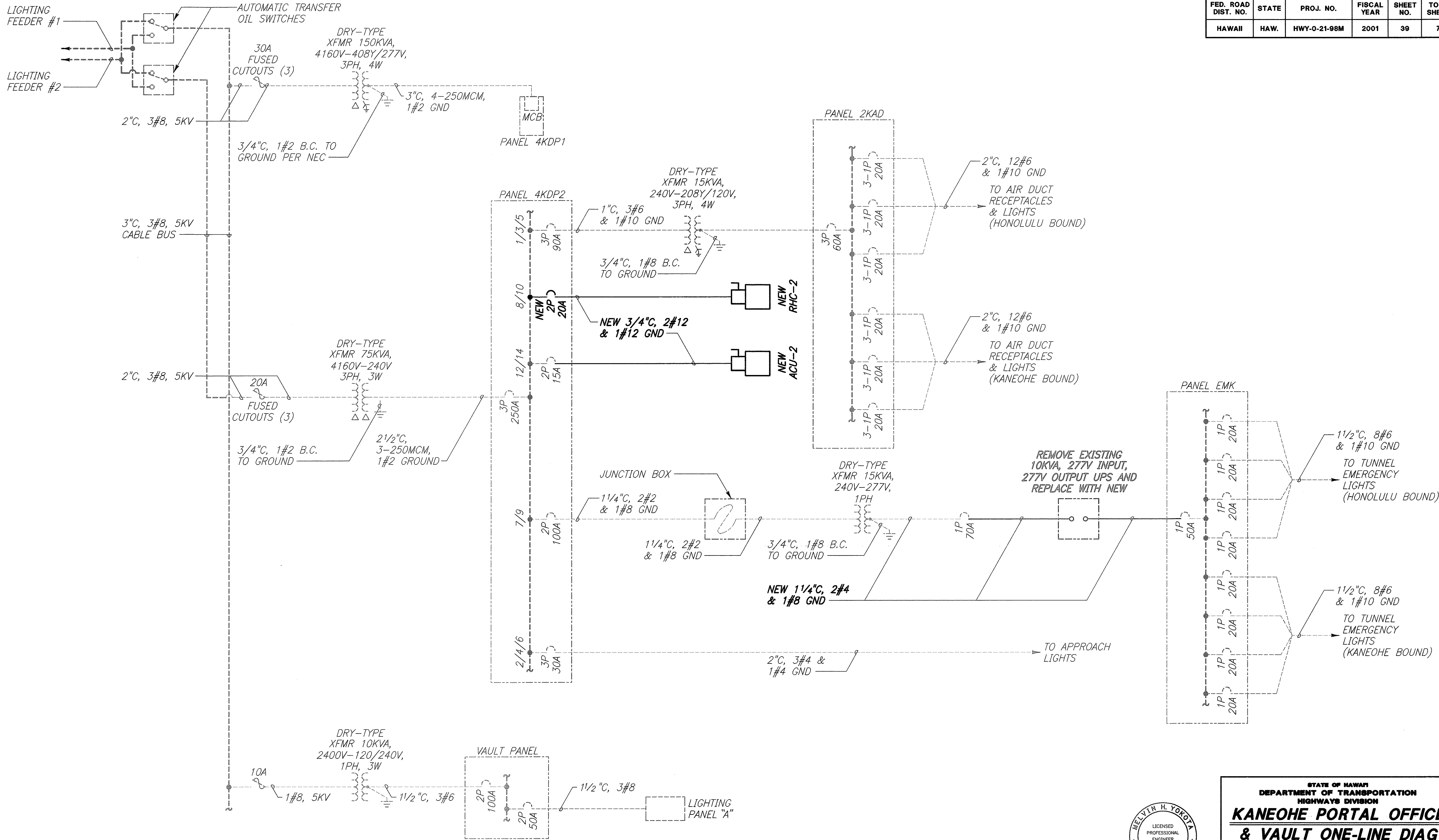
WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE
PROJECT NO. HWY-0-21-98M

Scale: None Date: JULY 2000

SHEET No. E-3 OF E-27 SHEETS

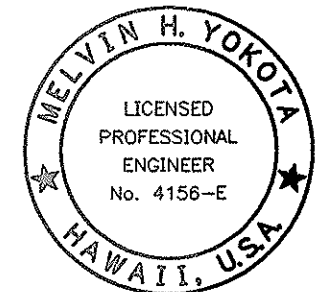
KALIHI PORTAL OFFICE AND VAULT ONE-LINE DIAGRAM

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	39	77



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

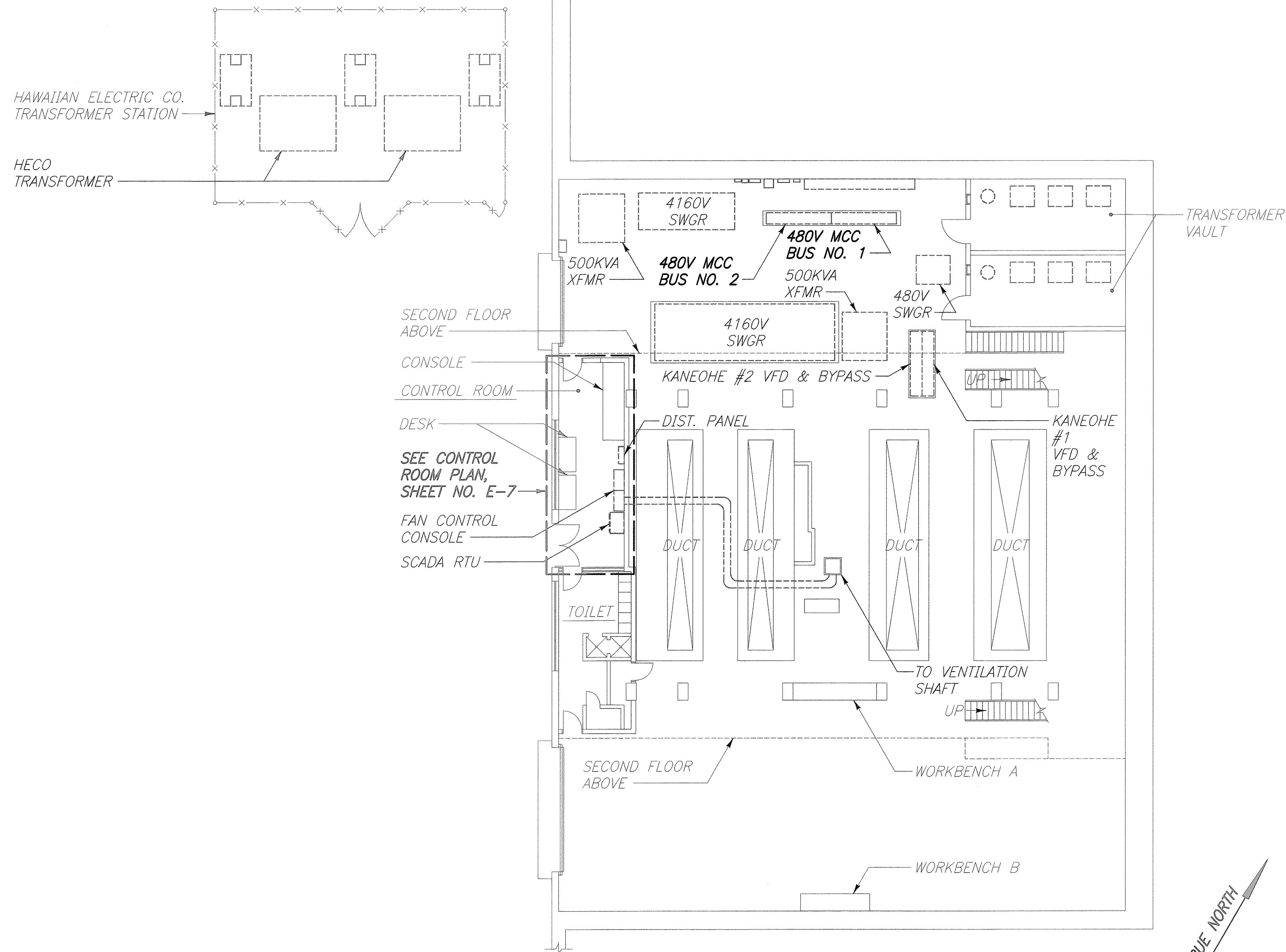
KANEOHE PORTAL OFFICE AND VAULT ONE-LINE DIAGRAM



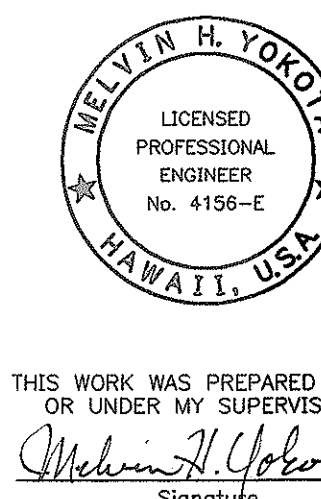
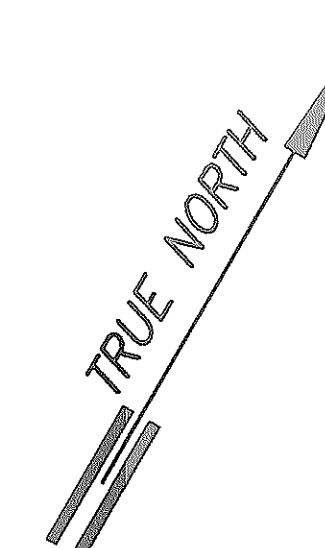
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**KANEOHE PORTAL OFFICE
& VAULT ONE-LINE DIAG**
WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE
PROJECT NO. HWY-0-21-98M
Scale: None Date: JULY 2000
SHEET No. E-4 OF E-27 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	40	77



VENTILATION BUILDING GROUND FLOOR POWER PLAN
SCALE: 1/8=1'-0"



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GRAPHIC SCALE

8 4 0 8 16FT
SCALE: 1/8=1'-0"

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**VENT BLDG GROUND
FLOOR POWER PLAN**

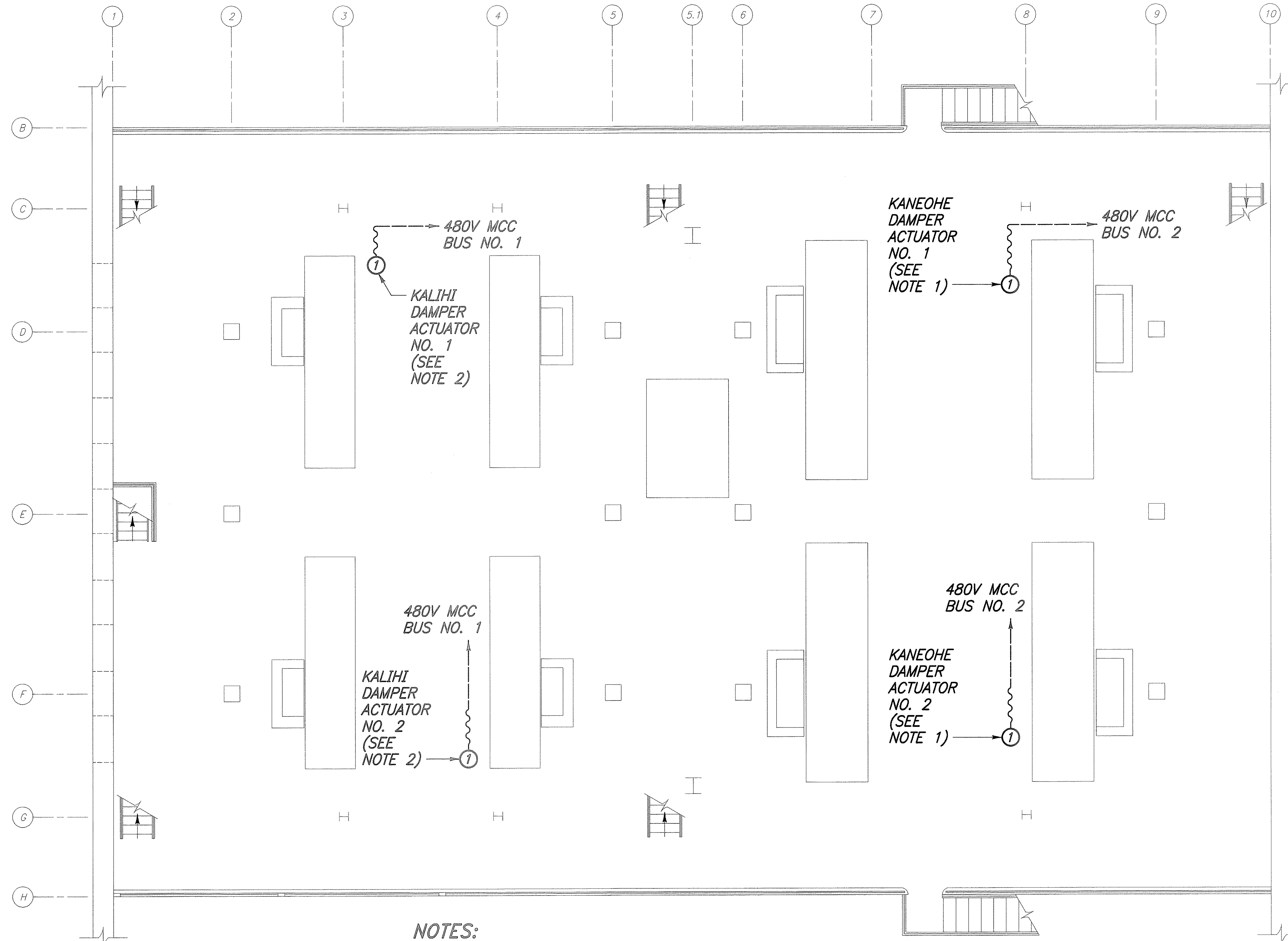
WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE

PROJECT NO. HWY-0-21-98M

Scale: As Noted Date: JULY 2000

SHEET No. E-5 OF E-27 SHEETS

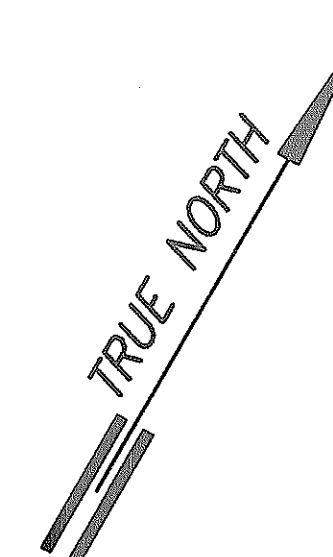
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	41	77

**NOTES:**

1. DISCONNECT POWER AND CONTROL WIRING FROM EXISTING 1/3 HP DAMPER ACTUATOR. RECONNECT POWER AND CONTROL WIRING TO NEW 1 HP DAMPER ACTUATOR.
2. DISCONNECT POWER AND CONTROL WIRING FROM EXISTING 1/2 HP DAMPER ACTUATOR. RECONNECT POWER AND CONTROL WIRING TO NEW 1 HP DAMPER ACTUATOR.

VENTILATION BUILDING SECOND FLOOR POWER PLAN

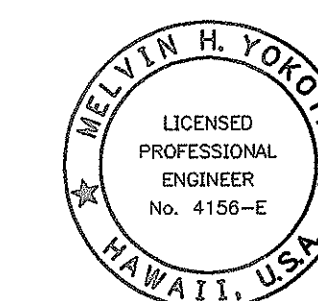
SCALE: 1/4"=1'-0"

**GRAPHIC SCALE**

4 2 0 4 8FT

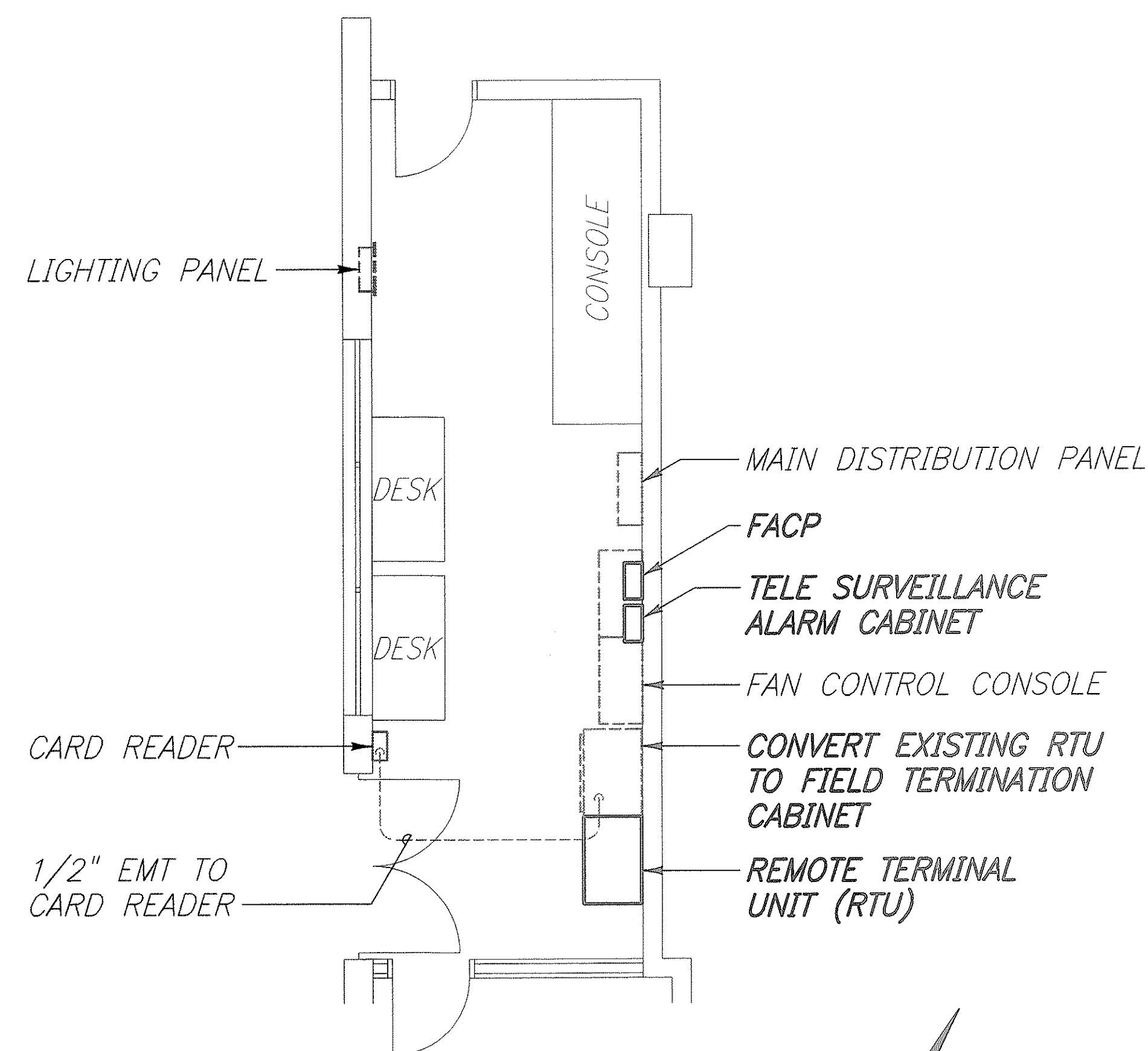
SCALE: 1/4"=1'-0"

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

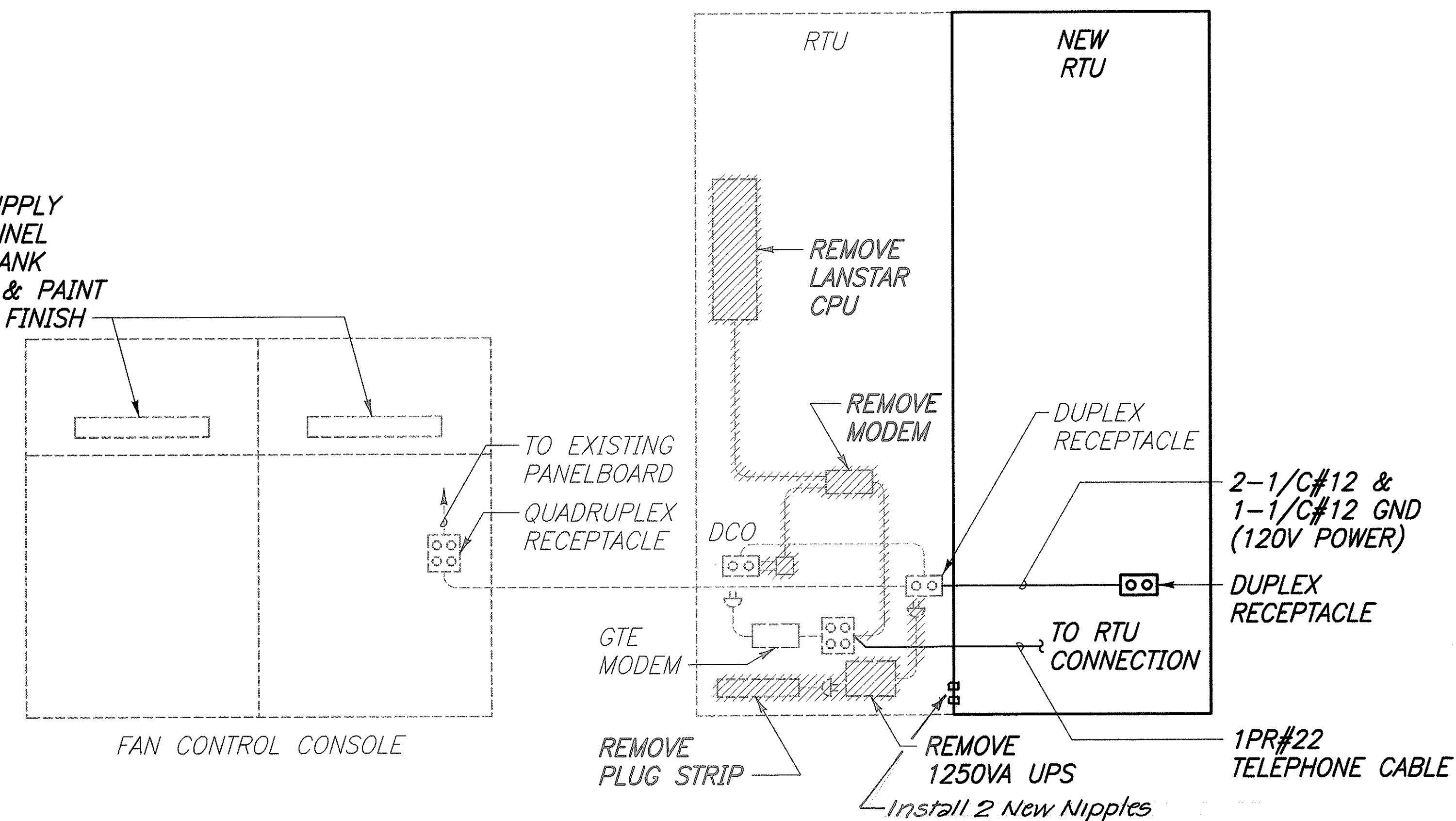
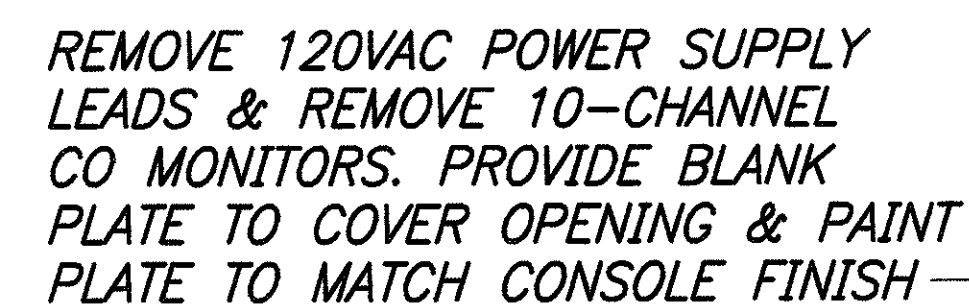
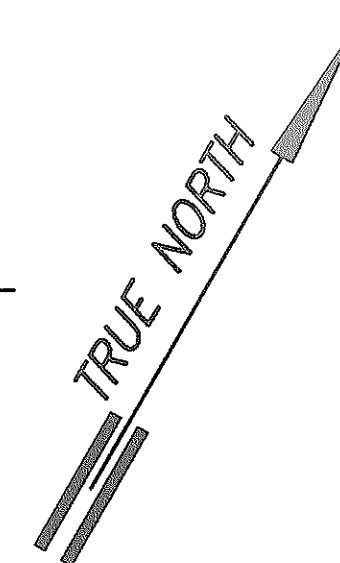


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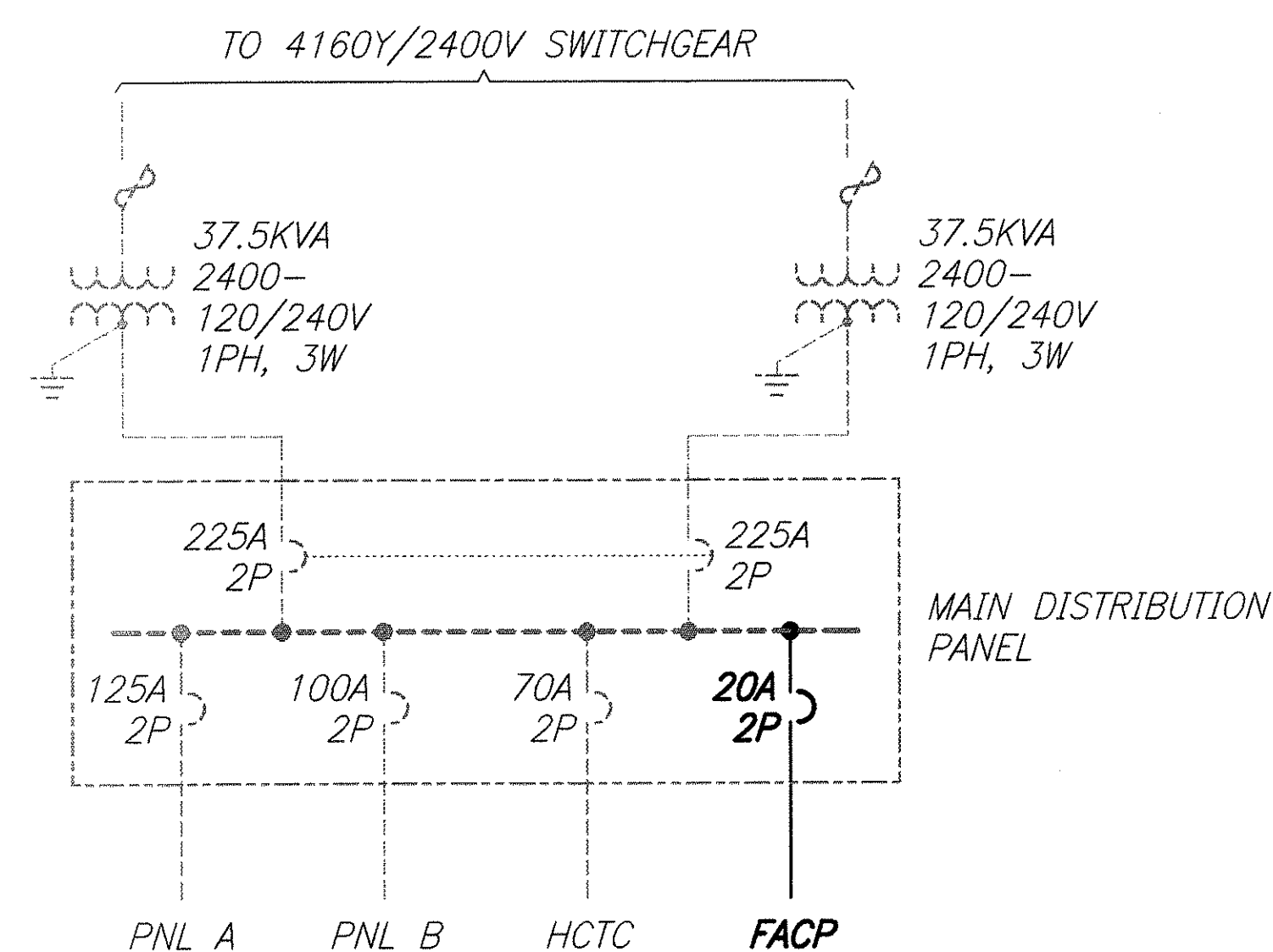
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
VENT BLDG SECOND FLOOR POWER PLAN
WILSON TUNNEL IMPROVEMENTS SCADA UPGRADE
PROJECT NO. HWY-0-21-98M
Scale: As Noted Date: JULY 2000
SHEET NO. E-6 OF E-27 SHEETS



CONTROL ROOM PLAN
SCALE: 1/4"=1'-0"

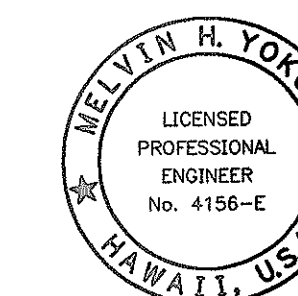
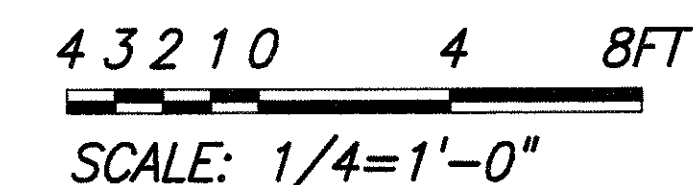


RTU RISER DIAGRAM



CONTROL ROOM PARTIAL ONE-LINE DIAGRAM

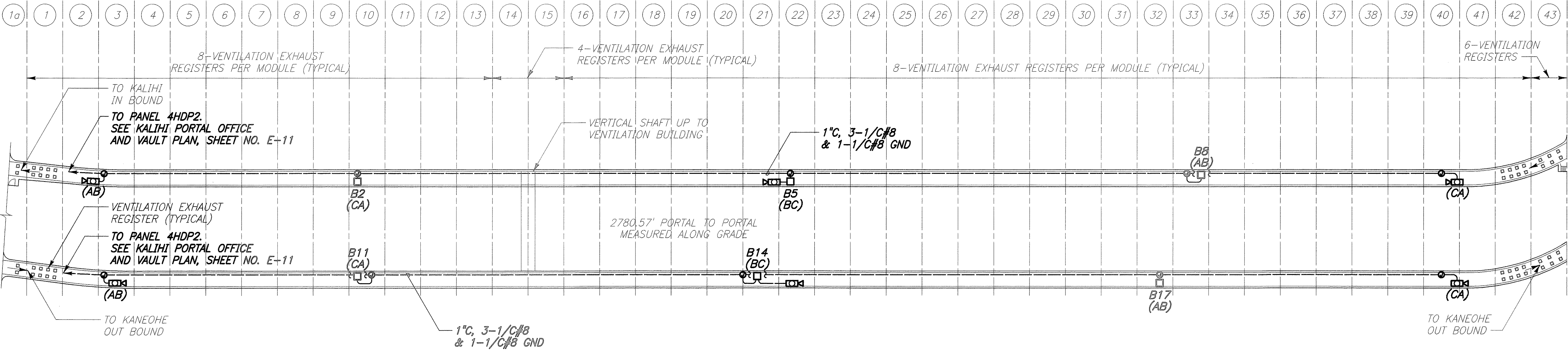
GRAPHIC SCALE



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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
VENT BLDG
CONTROL ROOM PLAN
WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE
PROJECT NO. HWY-0-21-98M
Scale: As Noted Date: JULY 2000
SHEET No. E-7 OF E-27 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	43	77

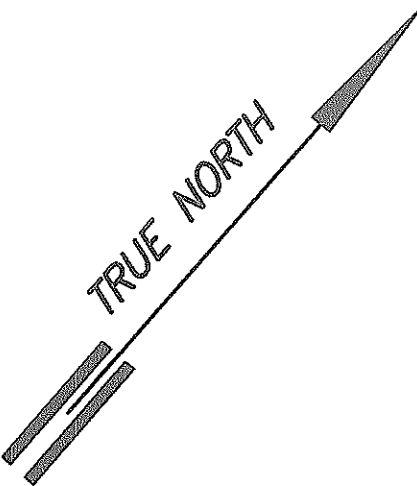


LEGEND

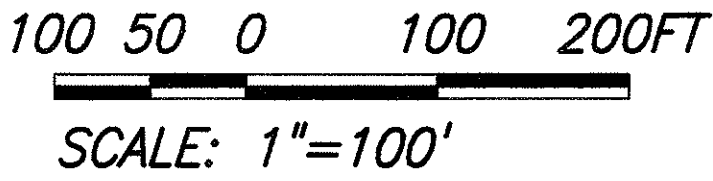
- 43 MODULE POINT NUMBER
- VENTILATION EXHAUST REGISTER

NOTE:
CONNECT TO PHASES INDICATED
IN PARENTHESIS ().

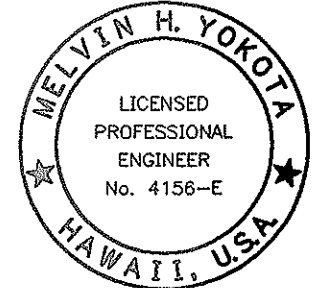
TUNNEL POWER PLAN
SCALE: 1"=100'



GRAPHIC SCALE



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



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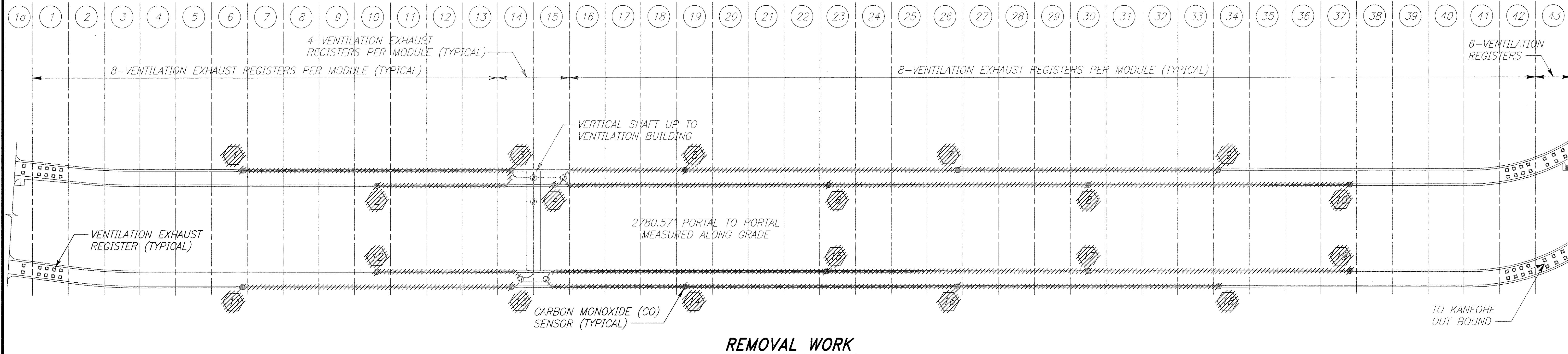
**TUNNEL POWER PLAN
AND FAN ELEM DIAG**

WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE

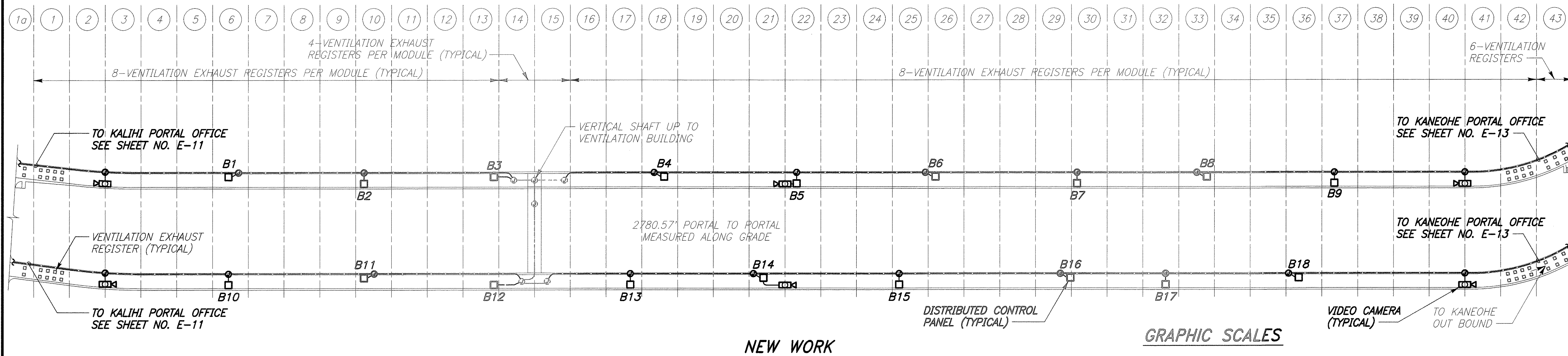
PROJECT NO. HWY-0-21-98M
Scale: As Noted Date: JULY 2000

SHEET No. E-8 OF E-27 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	44	77



REMOVAL WORK



NEW WORK

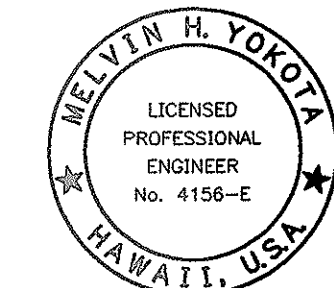
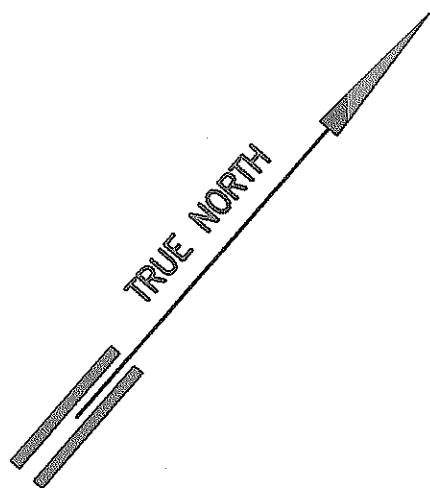
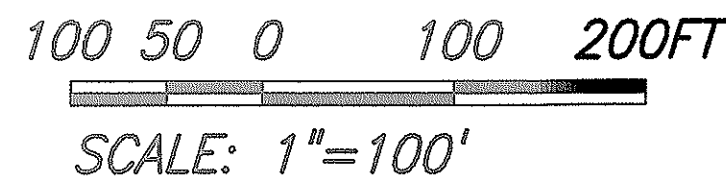
NOTES:

1. REFER TO SHEET NO. E-16 FOR REMOVAL WORK RISER DIAGRAM.
2. REFER TO SHEET NO. E-17 FOR NEW WORK RISER DIAGRAM.

TUNNEL INSTRUMENTATION SIGNAL PLAN

SCALE: 1"=100'

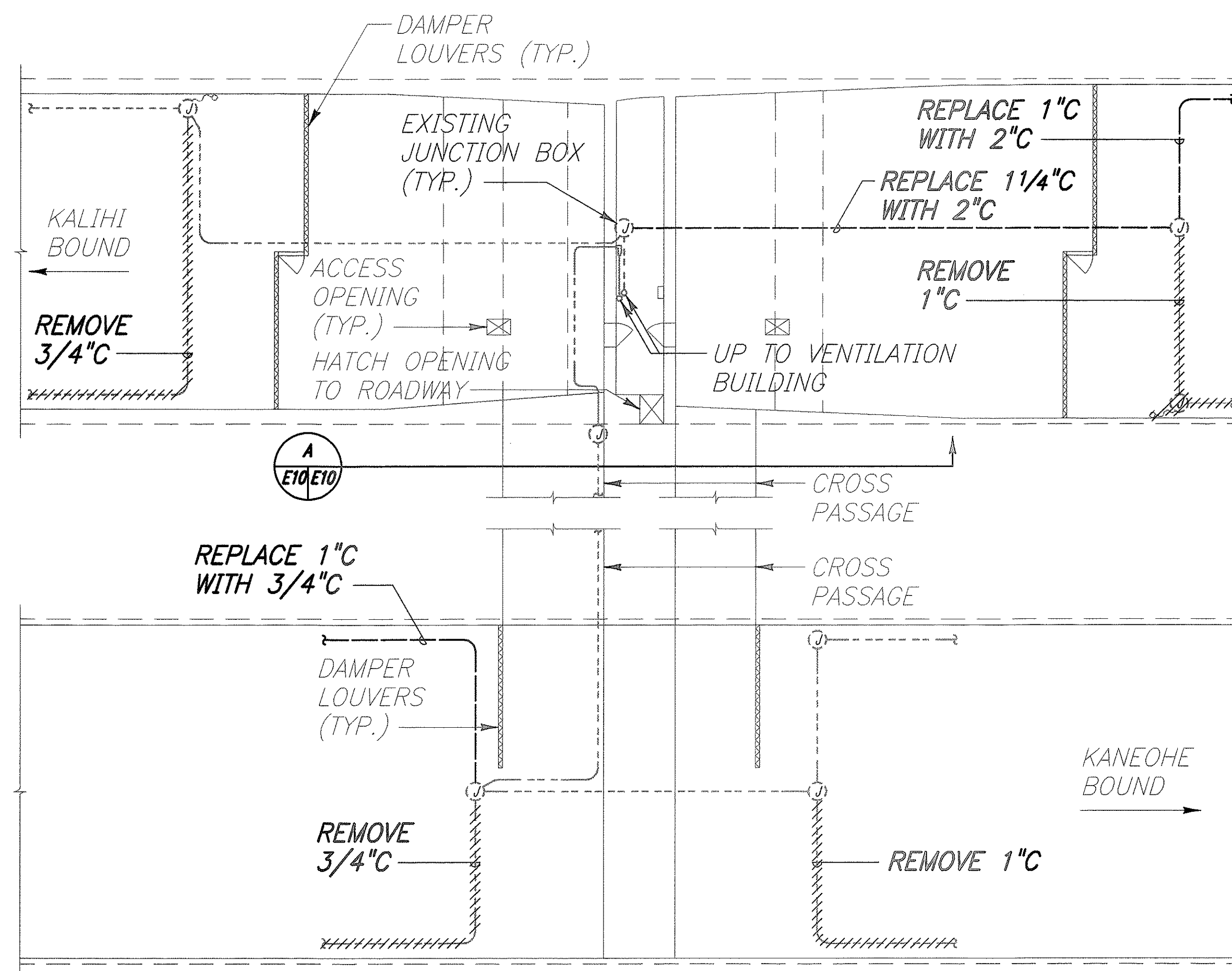
GRAPHIC SCALES



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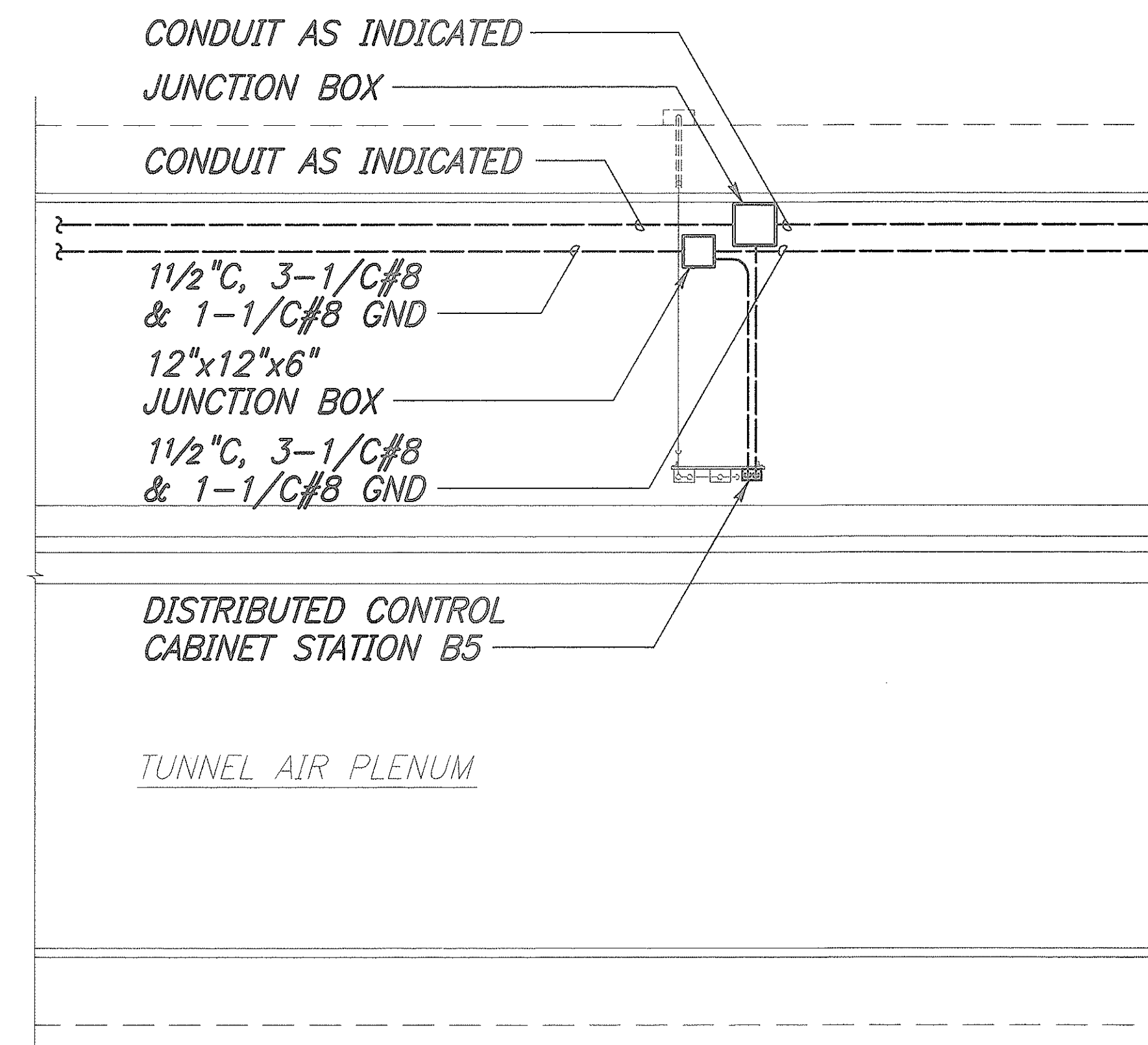
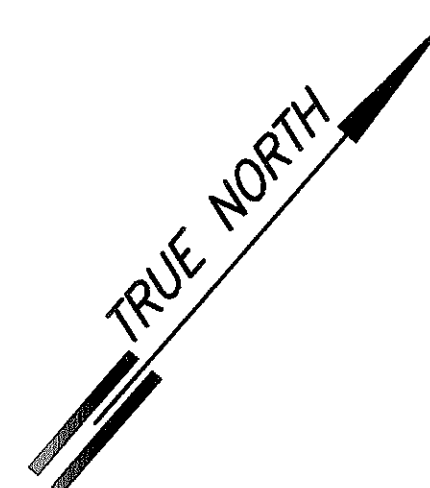
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
TUNNEL SIGNAL PLAN
WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE
PROJECT NO. HWY-0-21-98M
Scale: None Date: JULY 2000
SHEET No. E-9 OF E-27 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	45	77



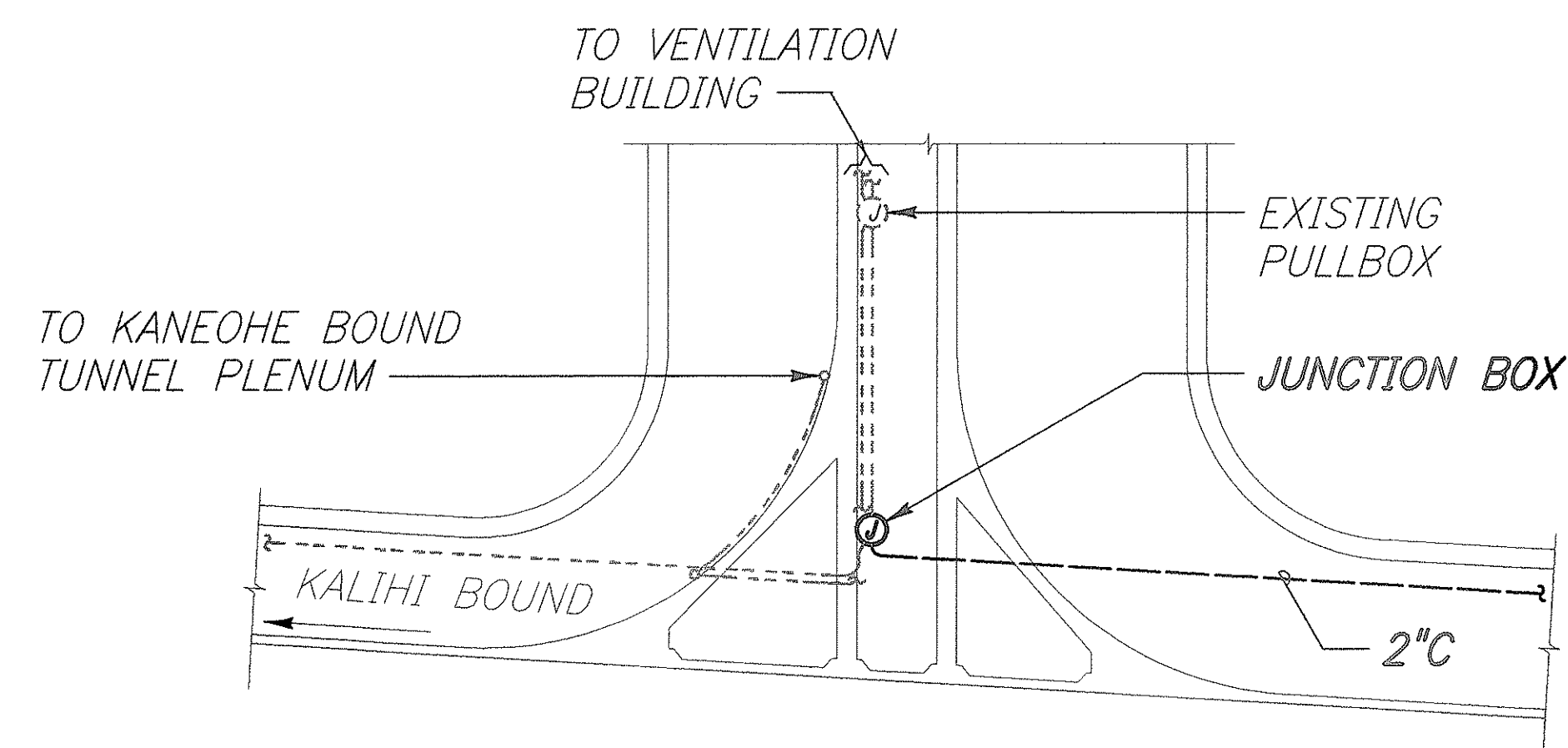
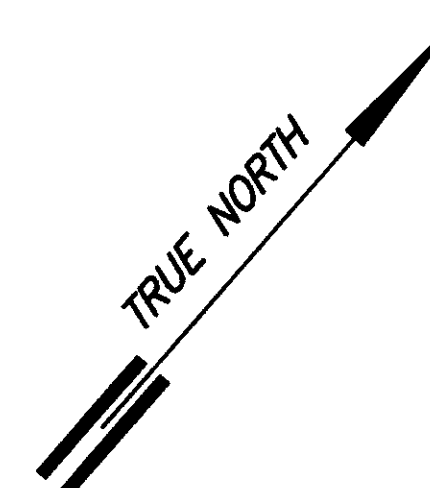
TUNNEL AIR PLENUM PARTIAL PLAN

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



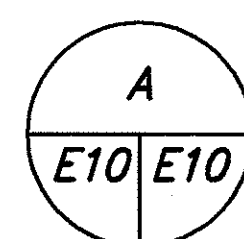
TYPICAL CARBON MONOXIDE SAMPLING STATION

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



KALIHI BOUND VENTILATION SHAFT/AIR PLENUM SECTION

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



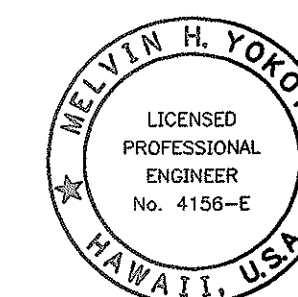
GRAPHIC SCALE

8 6 4 2 0 8 16FT

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

4 3 2 1 0 4 8FT

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



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DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**TUNNEL AIR PLENUM PARTIAL
PLAN AND SECTION**

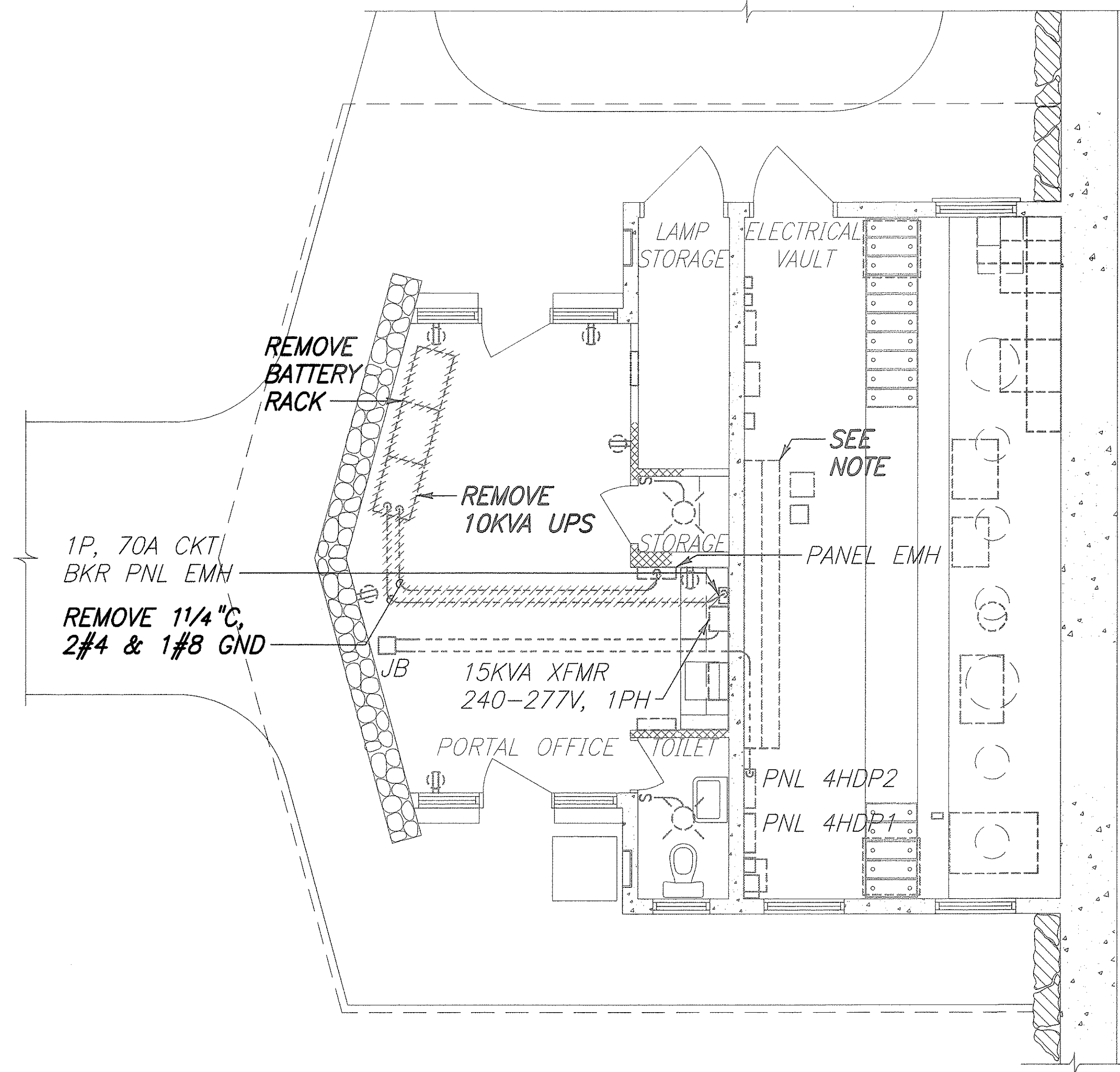
WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE

PROJECT NO. HWY-0-21-98M
Scale: As Noted Date: JULY 2000

SHEET NO. E-10 OF E-27 SHEETS

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
APPROVED BY	
ORIGINAL PLAN	
NOTED BY	
REVISIONS	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	46	77



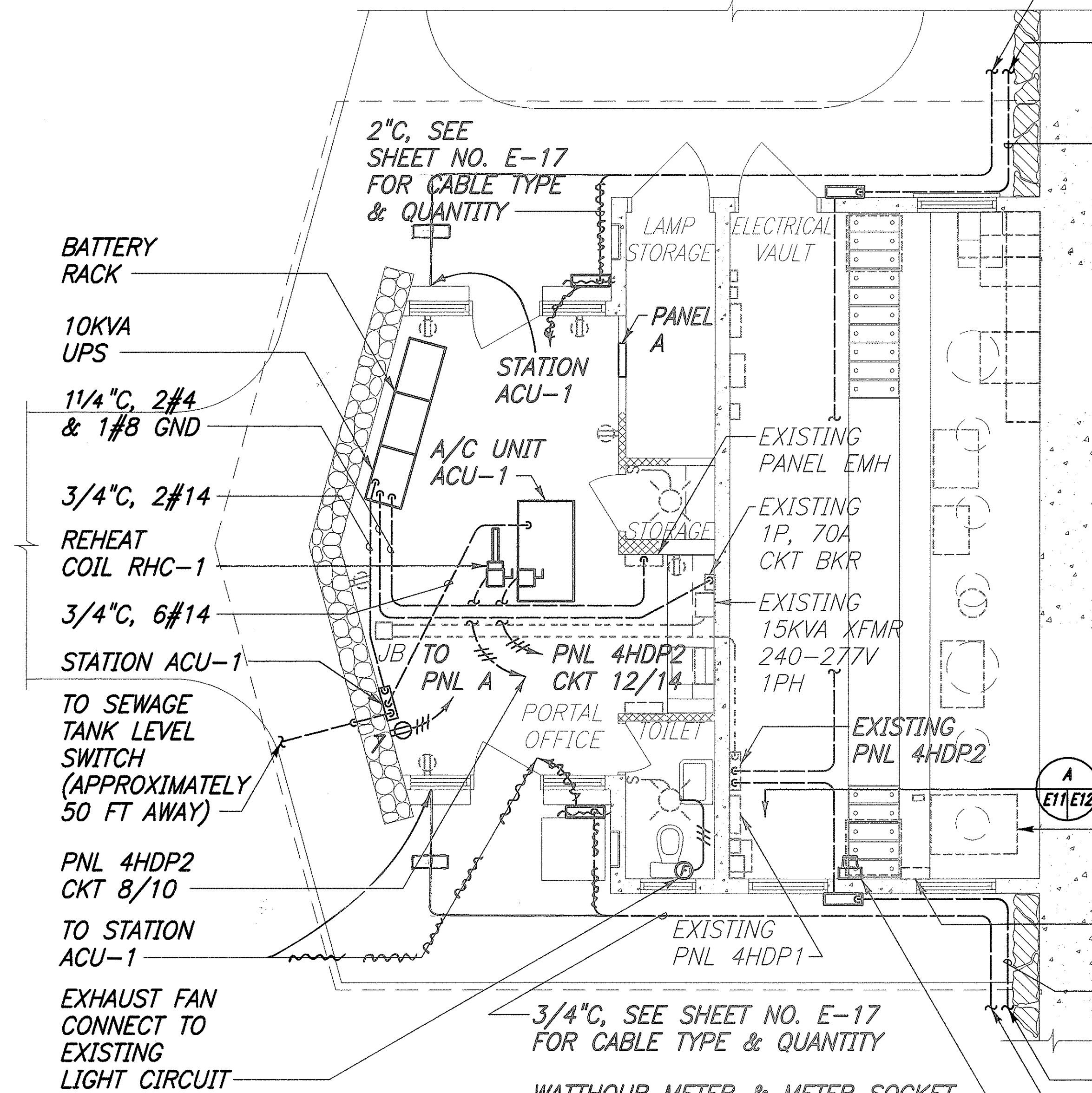
REMOVAL WORK

NOTE:

REMOVE BATTERY RACK WITH 60 EXIDE MANCHEX EMP-7 BATTERIES.

KALIHI PORTAL OFFICE AND VAULT PLAN

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

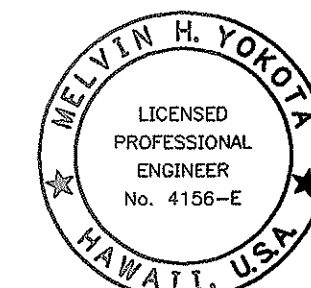
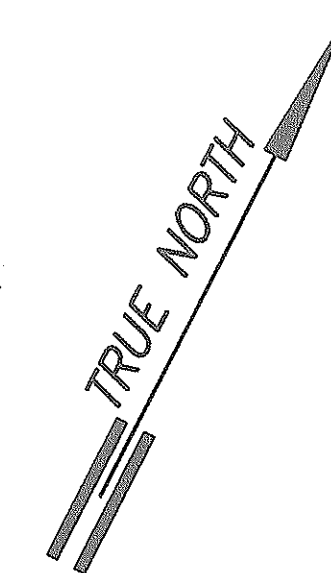


NEW WORK

GRAPHIC SCALE

4 2 0 4 8FT

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



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**KALIHI PORTAL OFFICE
AND VAULT PLANS**

WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE

PROJECT NO. HWY-0-21-98M
Scale: As Noted Date: JULY 2000

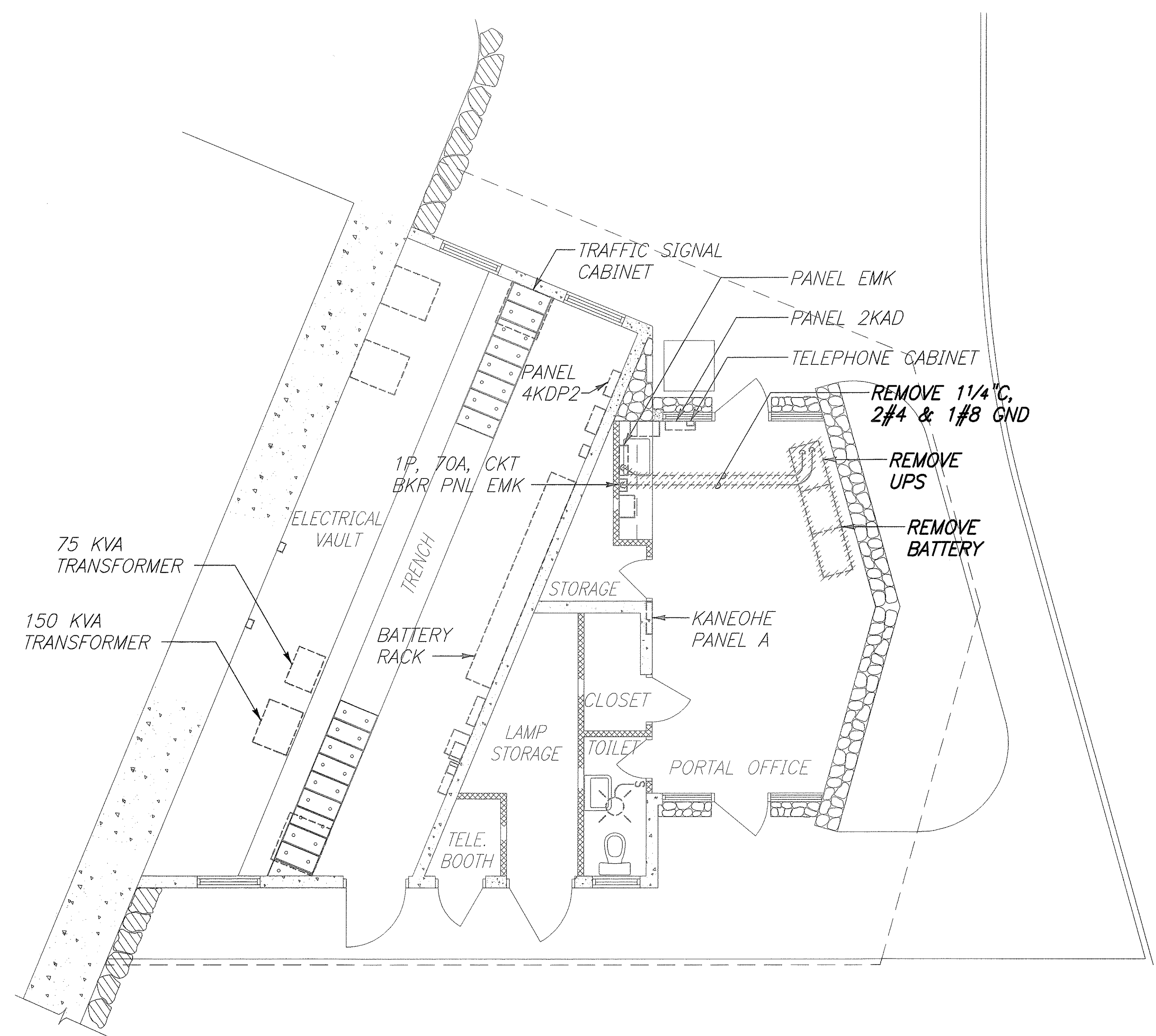
SHEET No. E-11 OF E-27 SHEETS

"AS-BUILT"

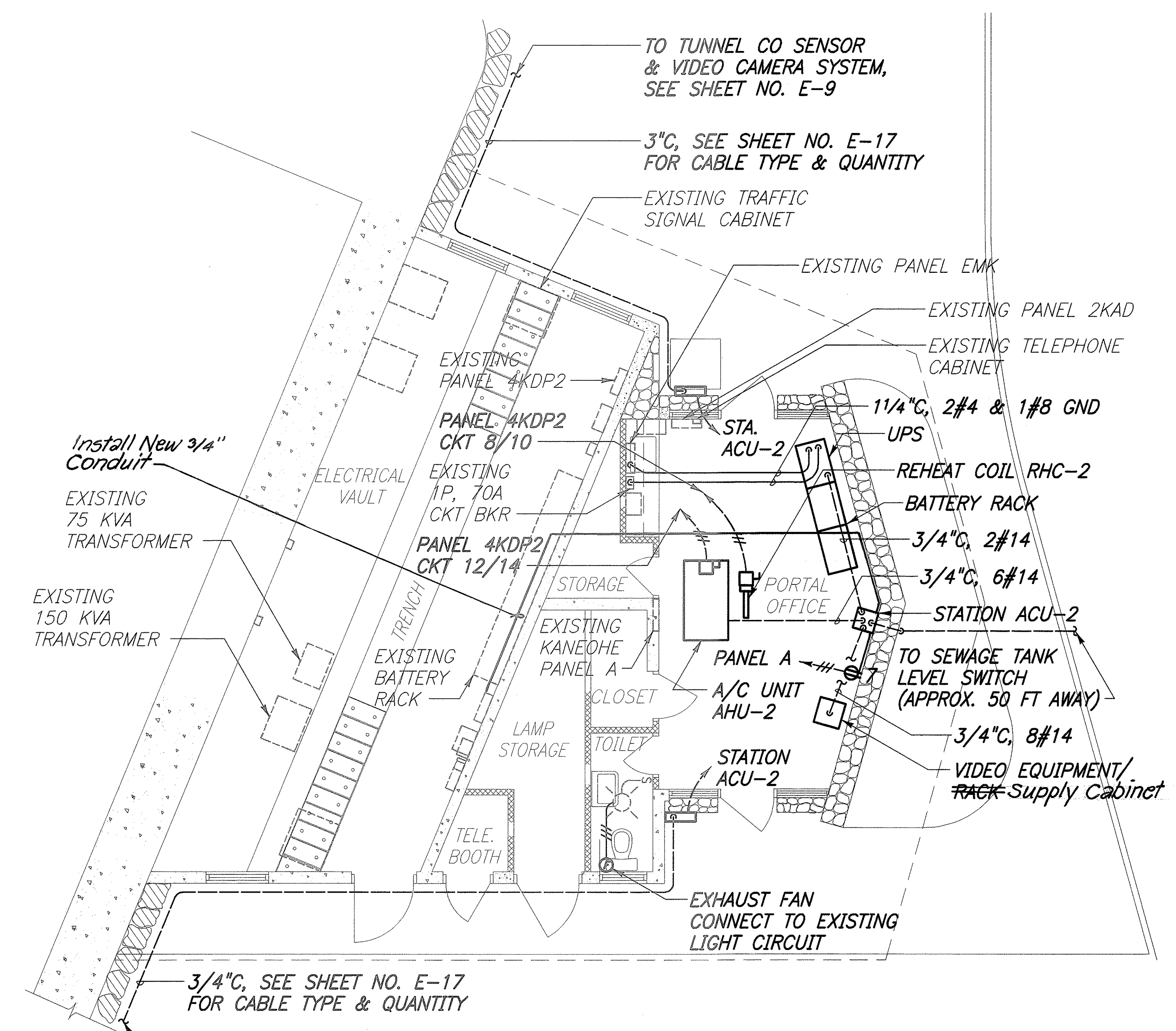
SURVEY PLOTTED BY	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
ORIGINAL PLAN	
NO.	



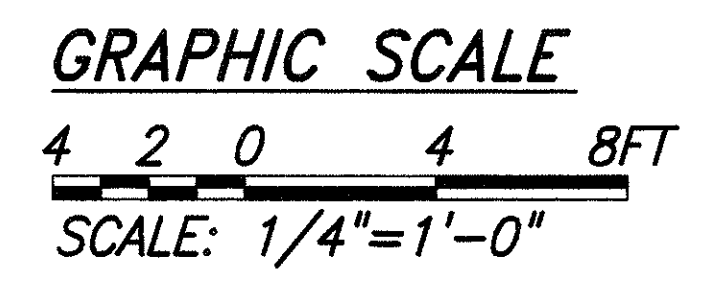
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	48	77



REMOVAL WORK

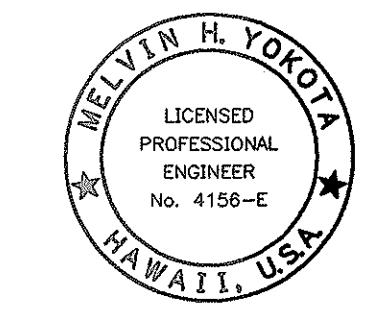
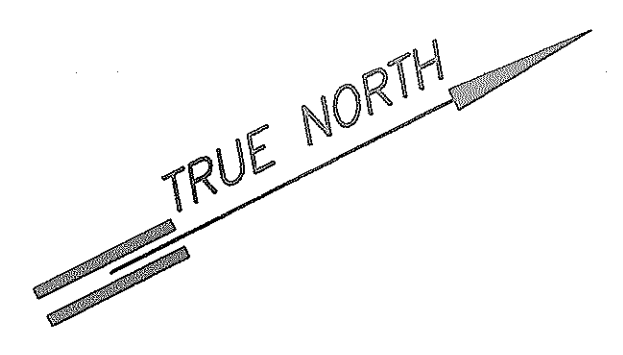


NEW WORK



KANEOHE PORTAL OFFICE AND VAULT PLAN

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



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Melvin H. Yokota
Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

KANEOHE PORTAL OFFICE AND VAULT PLANS

WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE
PROJECT NO. HWY-0-21-98M
Scale: As Noted Date: JULY 2000
SHEET No. E-13 OF E-27 SHEETS

"AS-BUILT"

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

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	49	77

EXISTING LIGHTING PANEL A										KALIHI PORTAL OFFICE	
PHASE				A		B		PANEL RATING			
CONNECTED LOAD/PHASE, VA				1100		1880		120/240V, 1PH, 3W, 50A			
CONNECTED LOAD/PANEL, VA				2980				WESTINGHOUSE TYPE NLAB 06-3L050			
ESTIMATED DEMAND FACTOR				1.0							
ESTIMATED DEMAND LOAD, VA				2980				SURFACE MOUNTING			
DESIGNATION		LOAD VA	CKT TRIP	BKR NO.	PHASE	CKT NO.	BKR TRIP	LOAD VA	DESIGNATION		
STOREROOM LIGHTS		400	20A	1	A	2	20A	600	MAIN OFFICE LIGHTS		
OUTSIDE LIGHTS		300	20A	3	B	4	20A	1080	OFFICE RECEPTACLES		
HLK ALARM		100	20A	5	A	6			PFB		
VIDEO EQUIPMENT RACK		500	20A	7	B	8					

EXISTING PANEL 4HDP2										KALIHI VAULT	
PHASE			A		B		C		PANEL RATING		
CONNECTED LOAD/PHASE, VA			21648		19900		12648		240V, 3PH, 3W, 250A, 3P MAIN CIRCUIT BREAKER. 10000 AIC AT 240V BOLT-ON CIRCUIT BREAKERS, GND BUS.		
CONNECTED LOAD/PANEL, VA					54196				WESTINGHOUSE TYPE PRL-1		
ESTIMATED DEMAND FACTOR					1.0				SURFACE MOUNTING		
ESTIMATED DEMAND LOAD, VA					54196						
DESIGNATION		LOAD VA	CKT TRIP	BKR NO.	PHASE	CKT NO.	BKR TRIP	LOAD VA	DESIGNATION		
TRANSFORMER 2HAD		5000	90A 3P	1	A	2	30A 3P	2400	APPROACH LIGHTS KALIHI SIDE		
		5000		3	B	4		2400			
		5000		5	C	6		2400			
TRANSFORMER EMH		7500	100A 2P	7	A	8	20A 2P	1500	REHEAT COIL RHC-1		
		7500		9	B	10		1500			
ATS-1		500	15A 2P	11	C	12	15A 2P	1248	AIR CONDITIONING UNIT ACU-1		
		500		13	A	14		1248			
VIDEO & CO MONITOR KALIHI BOUND LANE		350	30A 3P	15	B	16	30A 3P	2800	VENT BLD STREET LIGHTS		
		350		17	C	18		2800			
		350		19	A	20		2800			
VIDEO & CO MONITOR KANEOHE BOUND LANE		350	30A 3P	21	B	22			PFB		
		350		23	C	24			PFB		
		350		25	A	26			PFB		
PFB				27	B	28			PFB		
PFB				29	C	30			PFB		
PFB				31	A	32			PFB		
PFB				33	B	34			PFB		
PFB				35	C	36			PFB		

- * PROVIDE NEW 20A 2P MCB
- ** USE EXISTING SPARE MCB

SURVEY PLOTTED BY

DATE

DRAWN BY

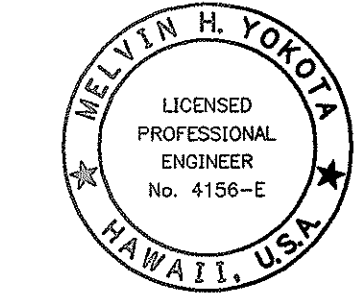
DESIGNED BY

CHECKED BY

ORIGINAL PLAN

NOTED BY

NO.



THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION.
Melvin H. Yokota
Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PORTAL OFFICE
PANEL SCHEDULES

WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE

PROJECT NO. HWY-0-21-98M

Scale: None Date: JULY 2000

SHEET No. E-14 OF E-27 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	50	77

EXISTING PANEL A

KANEOHE PORTAL OFFICE

PHASE		A		B		PANEL RATING			
CONNECTED LOAD/PHASE, VA		1300		1880		120/240V, 1PH, 3W, 50A			
CONNECTED LOAD/PANEL, VA		3180				WESTINGHOUSE TYPE NLAB 08-3L050			
ESTIMATED DEMAND FACTOR		1.0							
ESTIMATED DEMAND LOAD, VA		3180				SURFACE MOUNTING			
DESIGNATION		LOAD VA	CKT TRIP	BKR NO.	PHASE	CKT NO.	BKR TRIP	LOAD VA	DESIGNATION
STOREROOM & TEL BOOTH LIGHTS		600	20A	1	A	2	20A	600	OUTSIDE LIGHTS
MAIN OFFICE LIGHTS		300	20A	3	B	4	20A	1080	OFFICE RECEPTACLES
HLK ALARM		100	20A	5	A	6	20A		SPARE
VIDEO EQUIPMENT RACK		500	20A	7	B	8	20A		BLANK

EXISTING PANEL 4KDP2

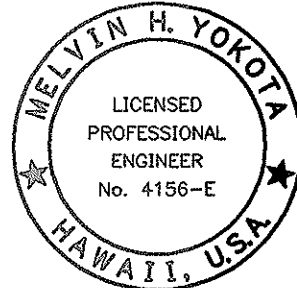
KANEOHE VAULT

PHASE		A		B		C		PANEL RATING	
CONNECTED LOAD/PHASE, VA		17948		16200		8948		240V, 3PH, 3W, 250A, 3P MAIN CIRCUIT BREAKER. 10000 AIC AT 240V BOLT-ON CIRCUIT BREAKERS, GND BUS.	
CONNECTED LOAD/PANEL, VA		43096						WESTINGHOUSE TYPE PRL-1	
ESTIMATED DEMAND FACTOR		1.0							
ESTIMATED DEMAND LOAD, VA		43096						SURFACE MOUNTING	
DESIGNATION	LOAD VA	CKT TRIP	BKR NO.	PHASE	CKT NO.	BKR TRIP	LOAD VA	DESIGNATION	
TRANSFORMER 2KAD	5000		1	A	2		2200	APPROACH LIGHTS KANEOHE SIDE	
	5000	90A 3P	3	B	4	30A 3P	2200		
	5000		5	C	6		2200		
TRANSFORMER EMK	7500	100A	7	A	8	20A	1500	REHEAT COIL RHC-2	*
	7500	2P	9	B	10	2P	1500		
OIL SWITCH CONTROL	500	15A	11	C	12	15A	1248	AIR CONDITIONING UNIT AHU-2	**
	500	2P	13	A	14	2P	1248		
PFB			15	B	16			PFB	
PFB			17	C	18			PFB	
PFB			19	A	20			PFB	
PFB			21	B	22			PFB	
PFB			23	C	24			PFB	
PFB			25	A	26			PFB	
PFB			27	B	28			PFB	
PFB			29	C	30			PFB	
PFB			31	A	32			PFB	
PFB			33	B	34			PFB	
PFB			35	C	36			PFB	

* PROVIDE NEW 20A 2P MCB

** USE EXISTING SPARE MCB

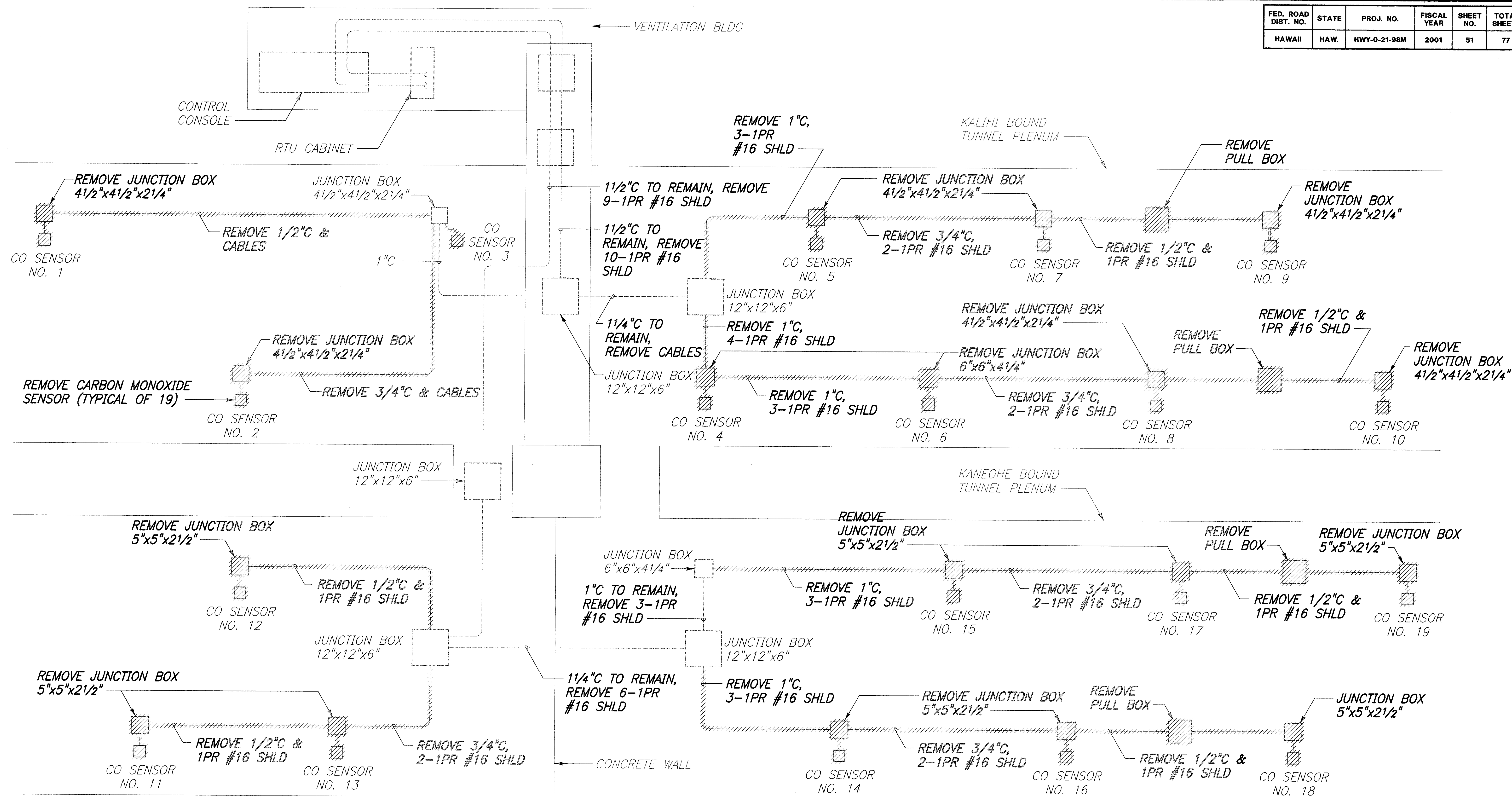
SURVEY PLOTTED BY	DATE
DRAWN BY	
TRACED BY	
CHECKED BY	
NOTED BY	
ORIGINAL PLAN	
NO.	



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Melvin H. Yokota
Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
PORTAL OFFICE
PANEL SCHEDULES
WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE
PROJECT NO. HWY-0-21-98M
Scale: None Date: JULY 2000
SHEET No. E-15 OF E-27 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	51	77



SIGNAL REMOVAL WORK RISER DIAGRAM

A circular professional engineer seal for Melvin H. Yokoyama. The outer ring contains the text "MELVIN H. YOKOYAMA" at the top and "HAWAII, U.S.A." at the bottom, separated by a small star on the left. The center of the seal contains the text "LICENSED PROFESSIONAL ENGINEER" and "No. 4156-E".

THIS WORK WAS PREPARED BY M
OR UNDER MY SUPERVISION.
Melvin H. Golok
Signature

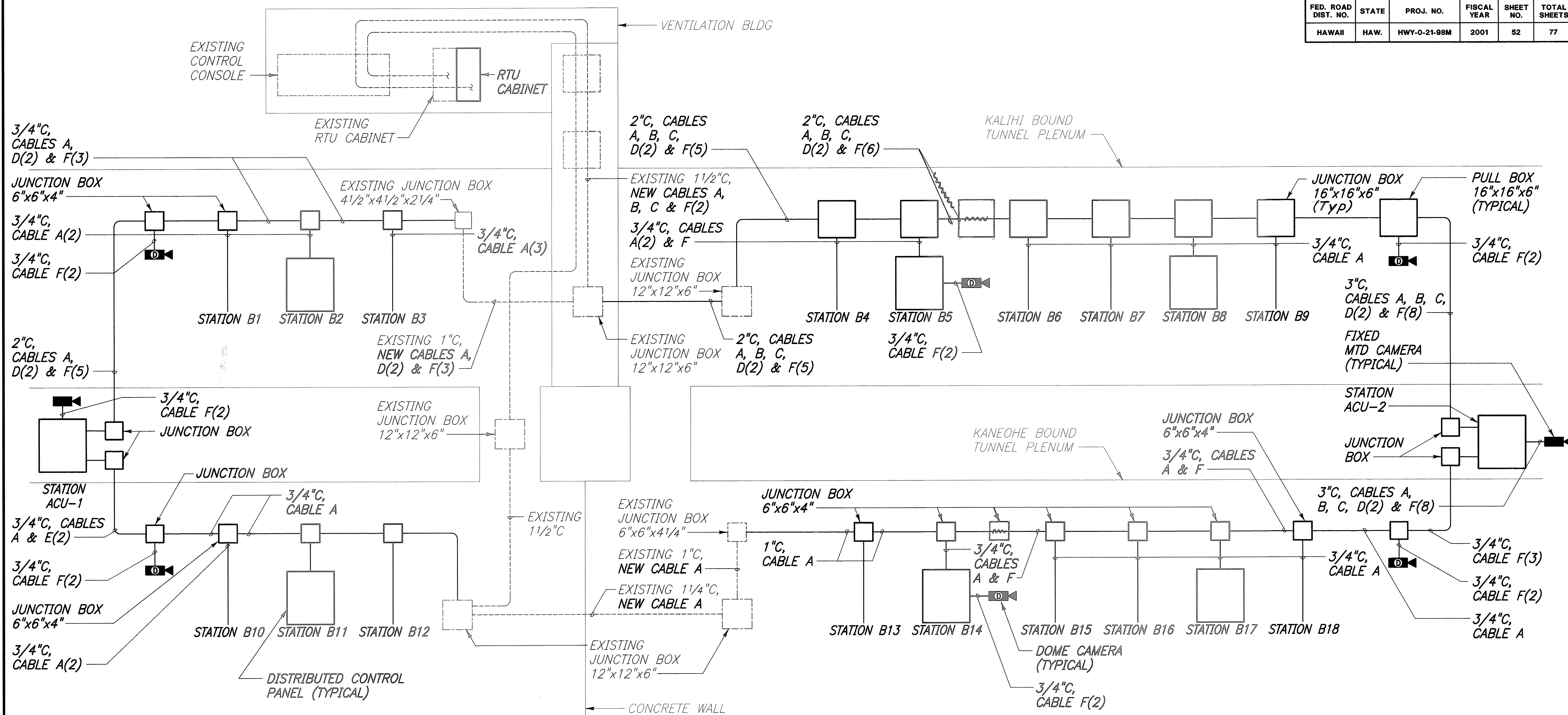
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
SIGNAL REMOVAL WORK
RISER DIAGRAM

WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE

PROJECT NO. HWY-0-21-98M
Scale: None Date: JULY 2000

SHEET No. E-16 OF E-27 SHEETS

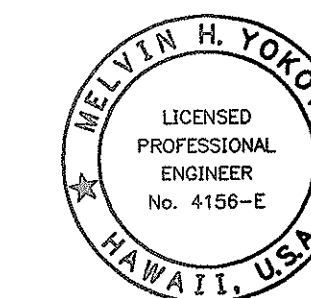
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	52	77



NOTES:

- LETTER INDICATES CABLE TYPE. NUMERAL CONTAINED WITHIN THE PARENTHESIS INDICATES CABLE QUANTITY. IF QUANTITY IS NOT INDICATED, PROVIDE ONE CABLE OF TYPE INDICATED.
- CABLE TYPES AS FOLLOWS:
 - A - 4PR #22 CAT 4
 - B - 4 STRAND SM FIBER OPTIC
 - C - MULTI-PAIR #18
 - D - 2PR#18
 - E - 2PR#24
 - F - 4PR#24

SIGNAL NEW WORK RISER DIAGRAM



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OR UNDER MY SUPERVISION.
Melvin H. Yokota
Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SIGNAL NEW WORK RISER DIAGRAM

WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE

PROJECT NO. HWY-0-21-98M

Scale: None

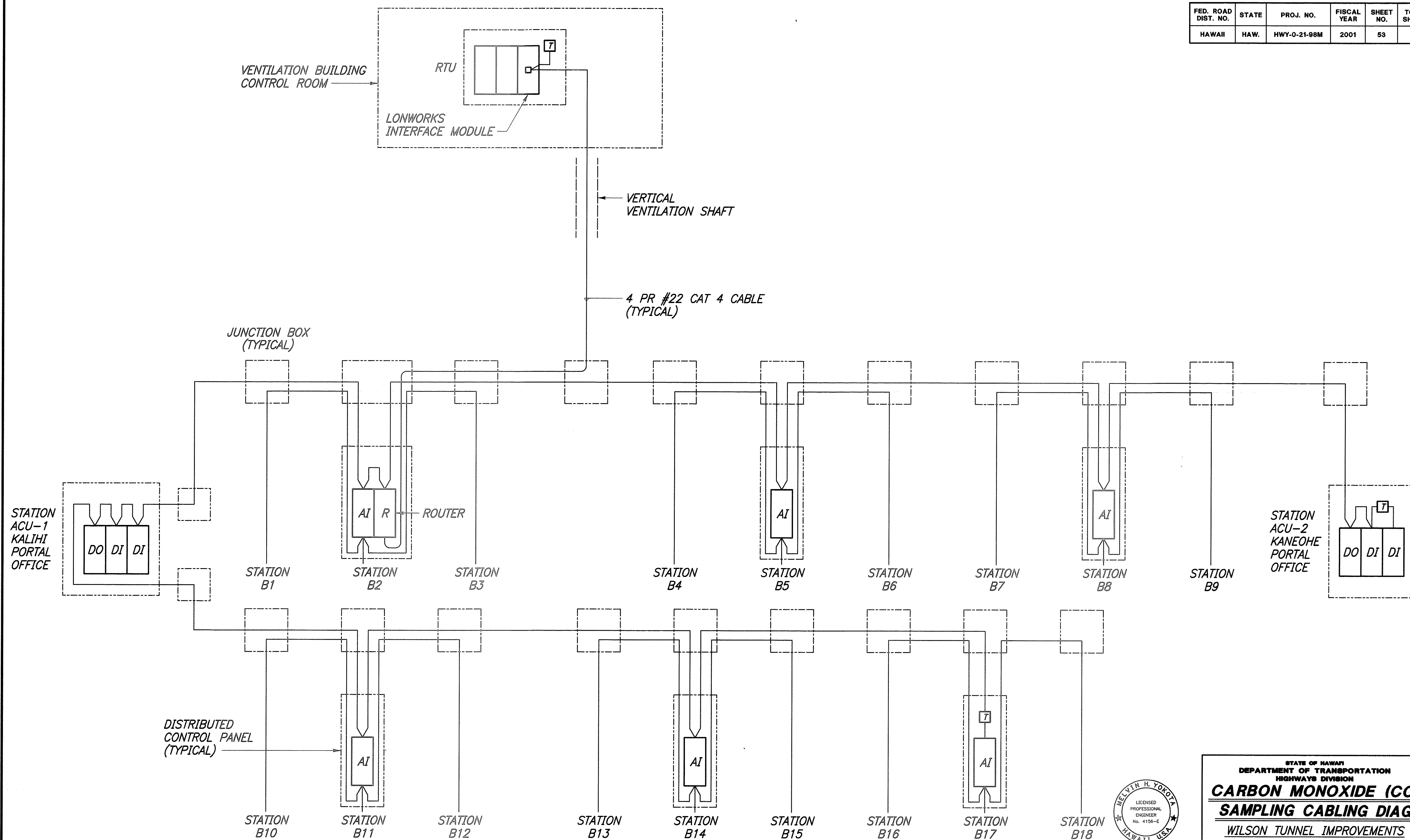
Date: JULY 2000

SHEET No. E-17 OF E-27 SHEETS

"AS-BUILT"

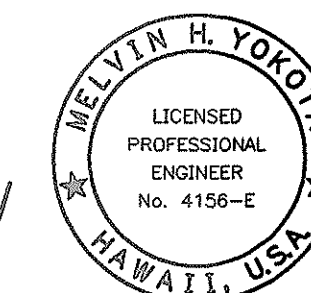
DESIGNED BY	DATE
CHECKED BY	
NOTED BY	
REVISIONS	
1.	
2.	
3.	
4.	
5.	
6.	
7.	
8.	
9.	
10.	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	53	77



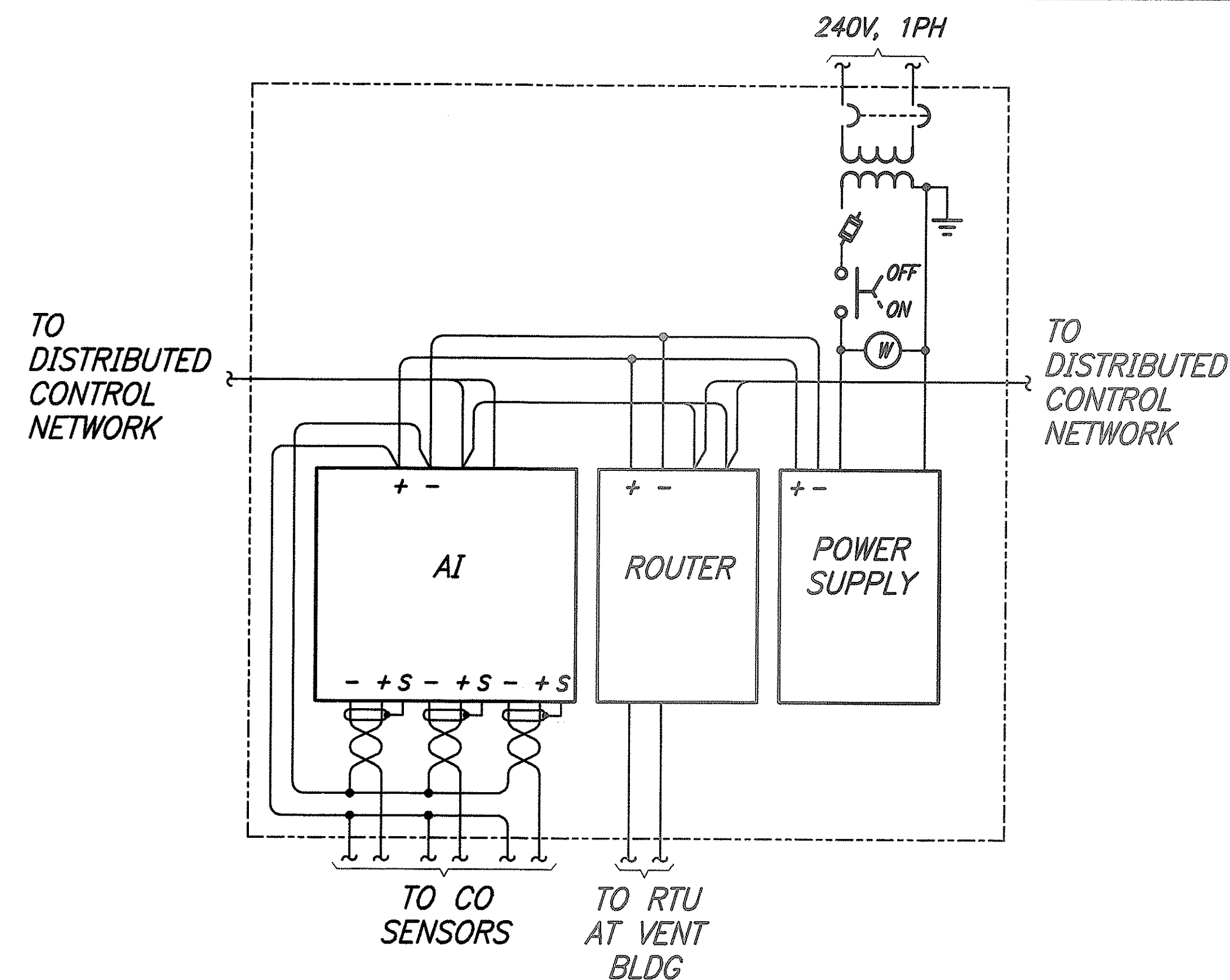
CARBON MONOXIDE (CO) SAMPLING CABLING DIAGRAM

THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION.
Melvin H. Yokota
Signature

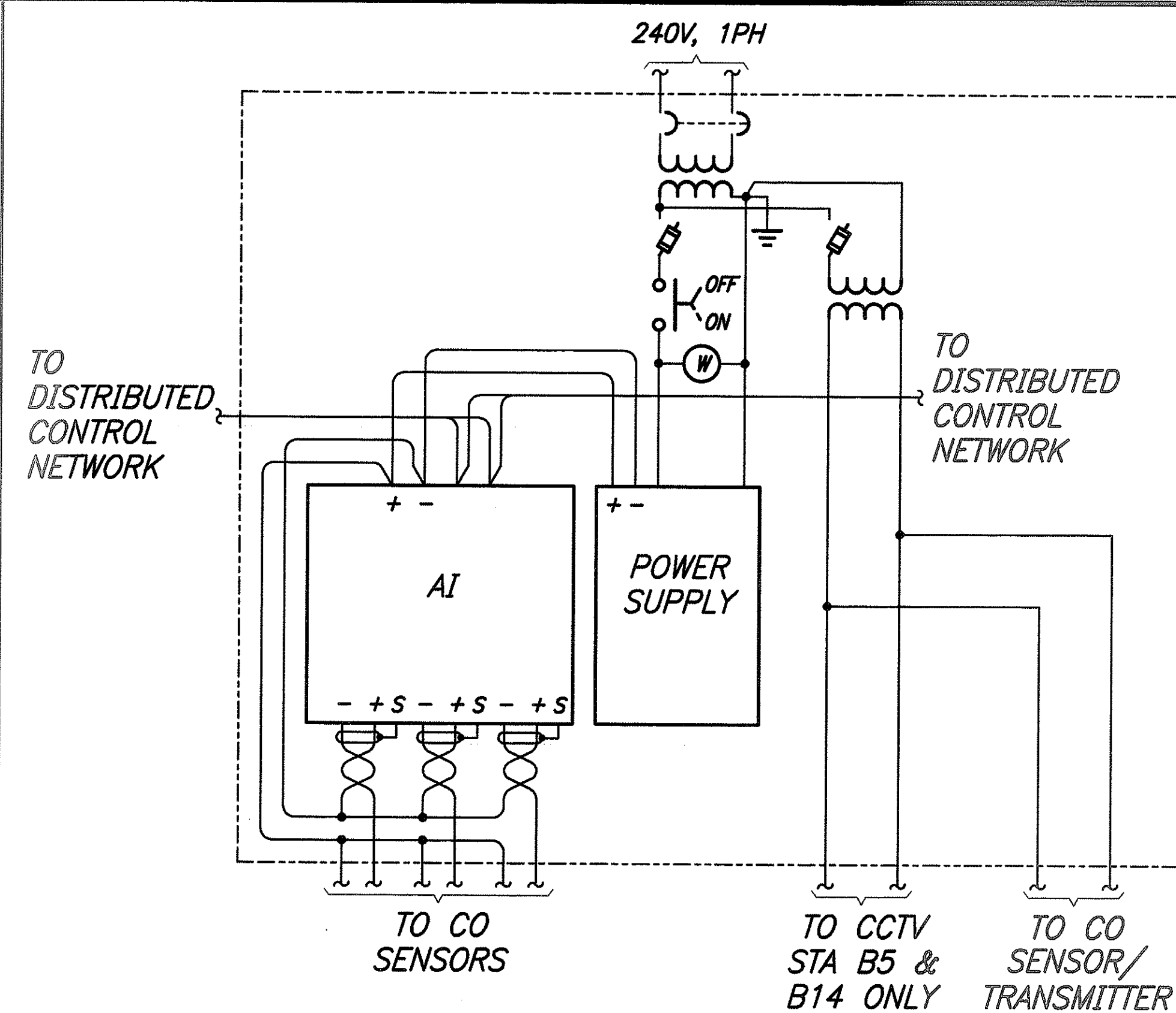


STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**CARBON MONOXIDE (CO)
SAMPLING CABLING DIAG**
WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE
PROJECT NO. HWY-0-21-98M
Scale: None Date: JULY 2000
SHEET No. E-18 OF E-27 SHEETS

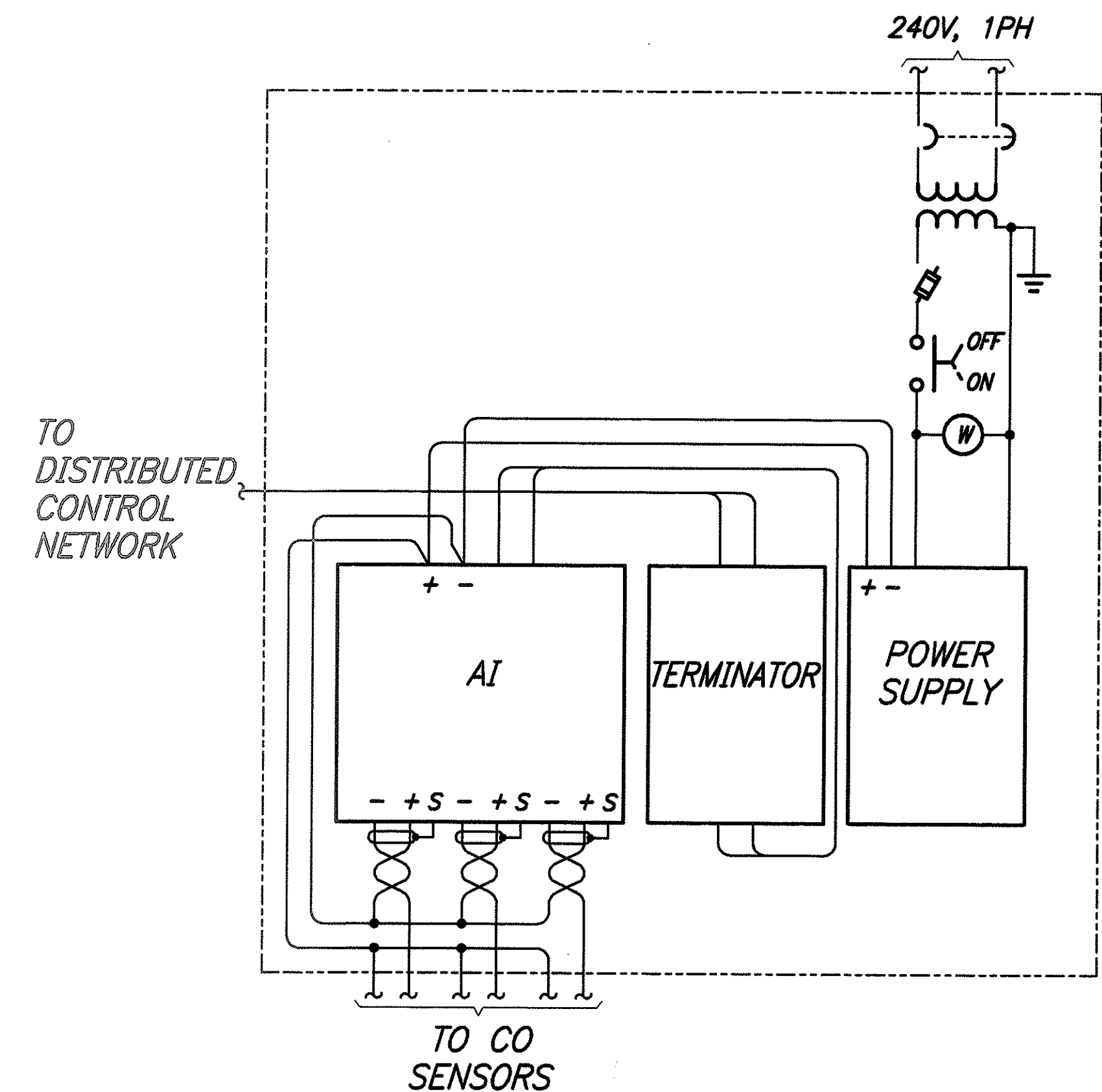
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	54	77



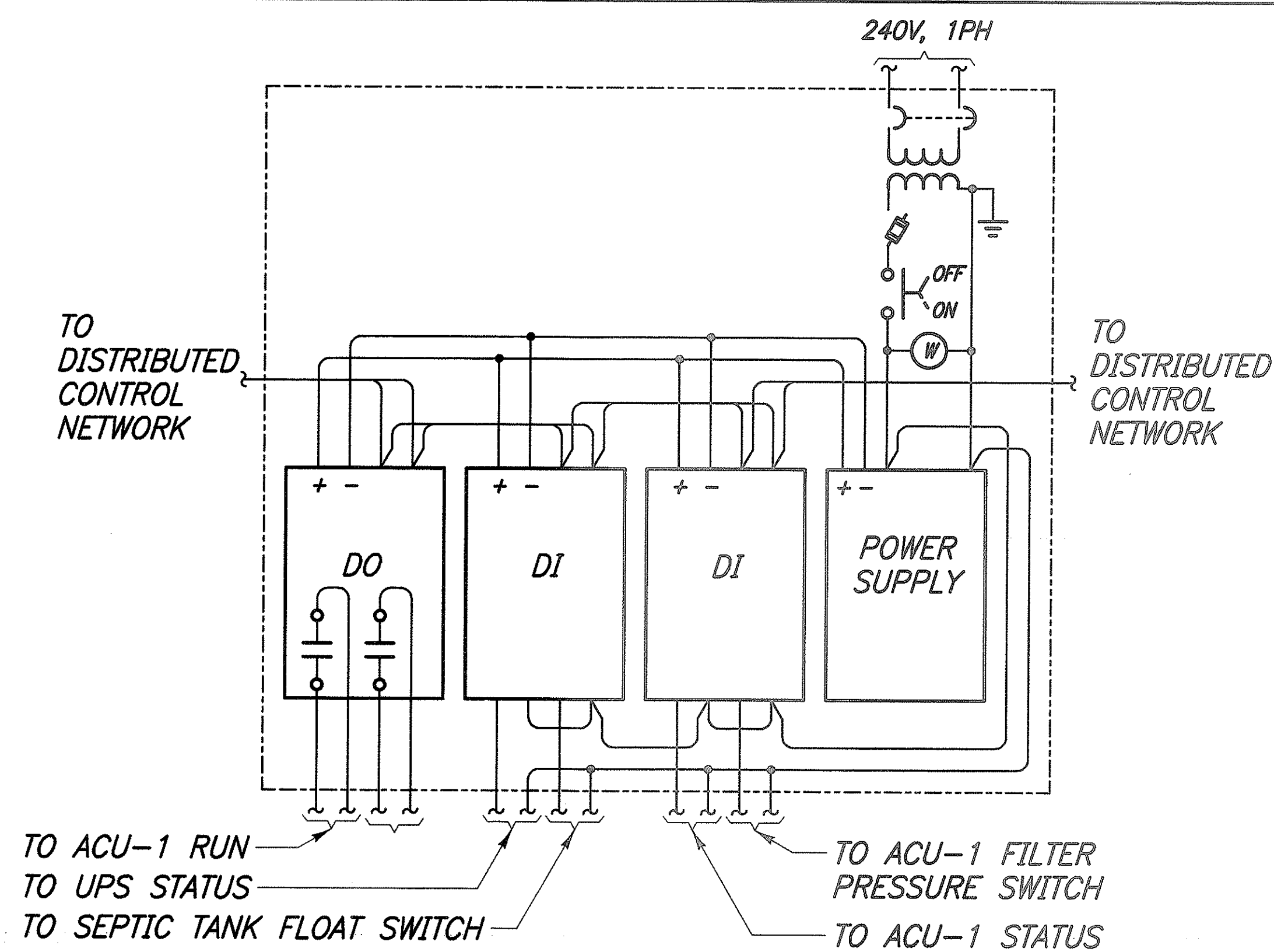
STATION B2 CONTROL DIAGRAM



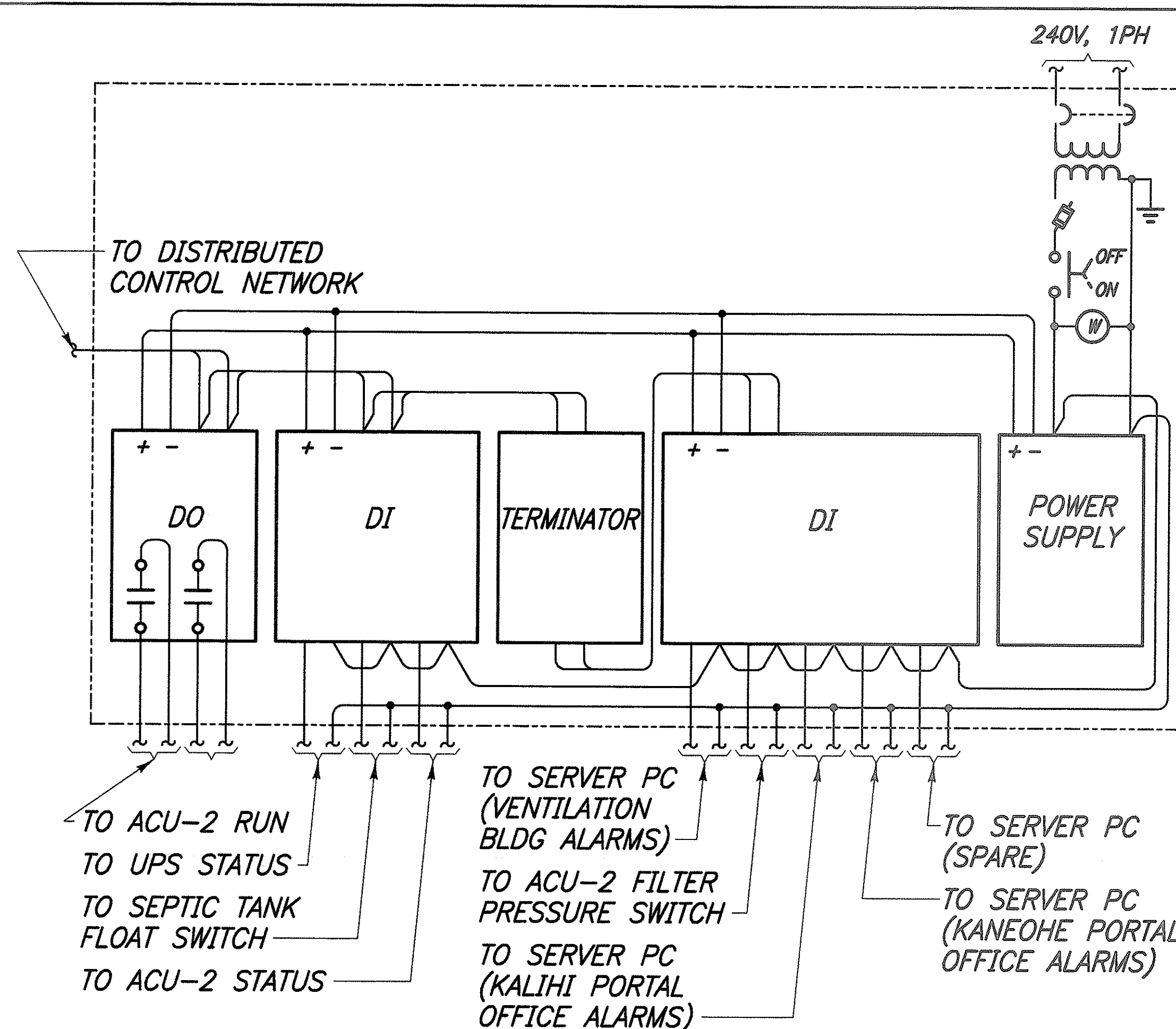
STATION B5 CONTROL DIAGRAM
STATIONS B8, B11 & B14 SIMILAR



STATION B17 CONTROL DIAGRAM



STATION ACU-1 CONTROL DIAGRAM



STATION ACU-2 CONTROL DIAGRAM

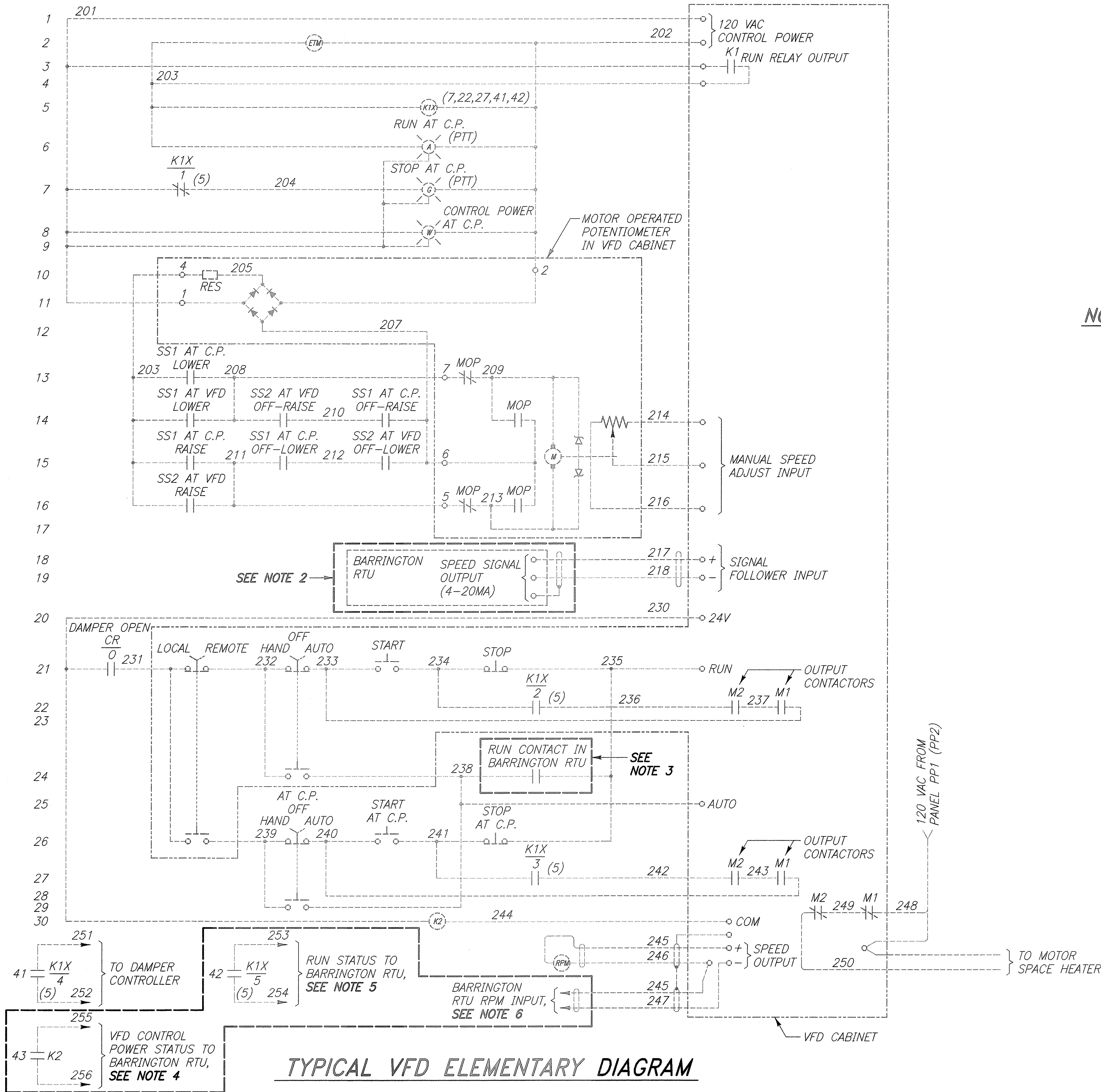
DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
QUANTITIES BY	
CHECKED BY	
NO.	

MELVIN H. YOKOTA
LICENSED PROFESSIONAL ENGINEER
No. 4156-E
HAWAII, USA

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Melvin H. Yokota
Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STATION
CONTROL DIAGRAMS
WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE
PROJECT NO. HWY-0-21-98M
Scale: None Date: JULY 2000
SHEET No. E-19 OF E-27 SHEETS

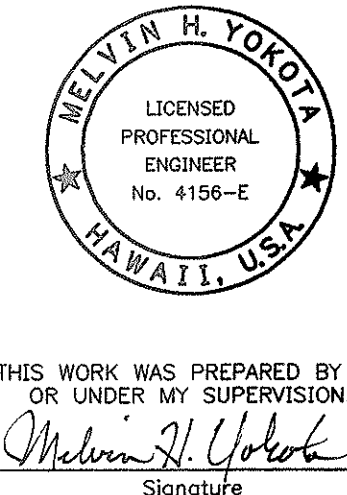
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	55	77



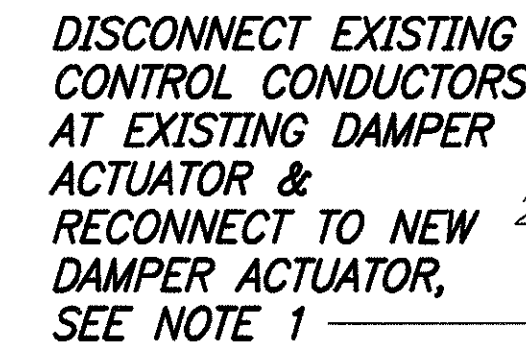
NOTES:

1. EQUIPMENT, DEVICES AND WIRING SHOWN ARE EXISTING UNLESS OTHERWISE NOTED.
2. INTERCEPT SIGNAL FOLLOWER INPUT WIRES IN EXISTING RTU CABINET. REMOVE WIRES FROM TERMINAL BLOCK TO EXISTING ANALOG OUTPUT TERMINAL ON EXISTING BARRINGTON MICROSTAR CARD. EXTEND WIRES FROM TERMINAL BLOCK TO VFD SPEED SETPOINT ANALOG OUTPUT TERMINALS IN NEW RTU.
3. INTERCEPT RUN CONTACT WIRES IN EXISTING RTU CABINET. REMOVE WIRES FROM TERMINAL BLOCK TO EXISTING DIGITAL OUTPUT TERMINALS ON EXISTING BARRINGTON MICROSTAR CARD. EXTEND WIRES FROM TERMINAL BLOCK TO RUN DIGITAL OUTPUT TERMINALS IN NEW RTU.
4. INTERCEPT VFD CONTROL POWER STATUS WIRES IN EXISTING RTU CABINET. REMOVE WIRES FROM TERMINAL BLOCK TO EXISTING DIGITAL INPUT TERMINALS ON EXISTING BARRINGTON MICROSTAR CARD. EXTEND WIRES FROM TERMINAL BLOCK TO VFD CONTROL POWER STATUS DIGITAL INPUT TERMINALS IN NEW RTU.
5. INTERCEPT RUN STATUS WIRES IN EXISTING RTU CABINET. REMOVE WIRES FROM TERMINAL BLOCK TO EXISTING DIGITAL INPUT TERMINALS ON EXISTING BARRINGTON MICROSTAR CARD. EXTEND WIRES FROM TERMINAL BLOCK TO RUN STATUS DIGITAL INPUT TERMINALS IN NEW RTU.
6. INTERCEPT VFD SPEED OUTPUT SIGNAL WIRES IN EXISTING RTU CABINET. REMOVE WIRES FROM TERMINAL BLOCK TO EXISTING ANALOG INPUT TERMINALS ON EXISTING BARRINGTON MICROSTAR CARD. EXTEND WIRES FROM TERMINAL BLOCK TO VFD SPEED OUTPUT ANALOG INPUT TERMINALS IN NEW RTU.

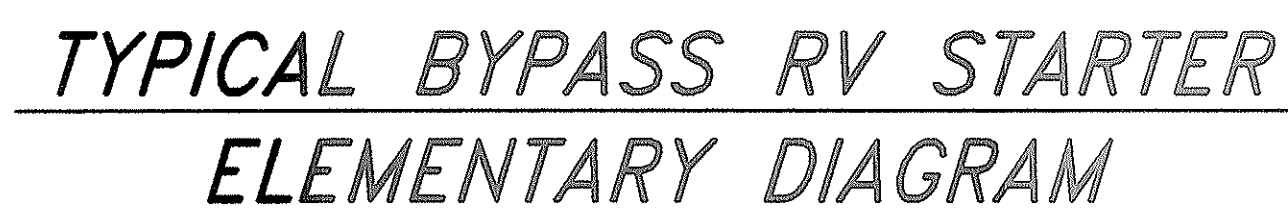
DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
QUANTITIES BY	
REVISIONS	



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
480 V MCC
ELEMENTARY DIAGRAM
WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE
PROJECT NO. HWY-0-21-98M
Scale: None Date: JULY 2000
SHEET No. E-20 OF E-27 SHEETS



ORIGINAL PLAN	SURVEY PLOTTED BY _____	DATE _____
NOTEBOOK	DRAWN BY _____	" _____
	TRACED BY _____	" _____
	DESIGNED BY _____	" _____
	QUANTITIES BY _____	" _____
No. _____	CHECKED BY _____	" _____

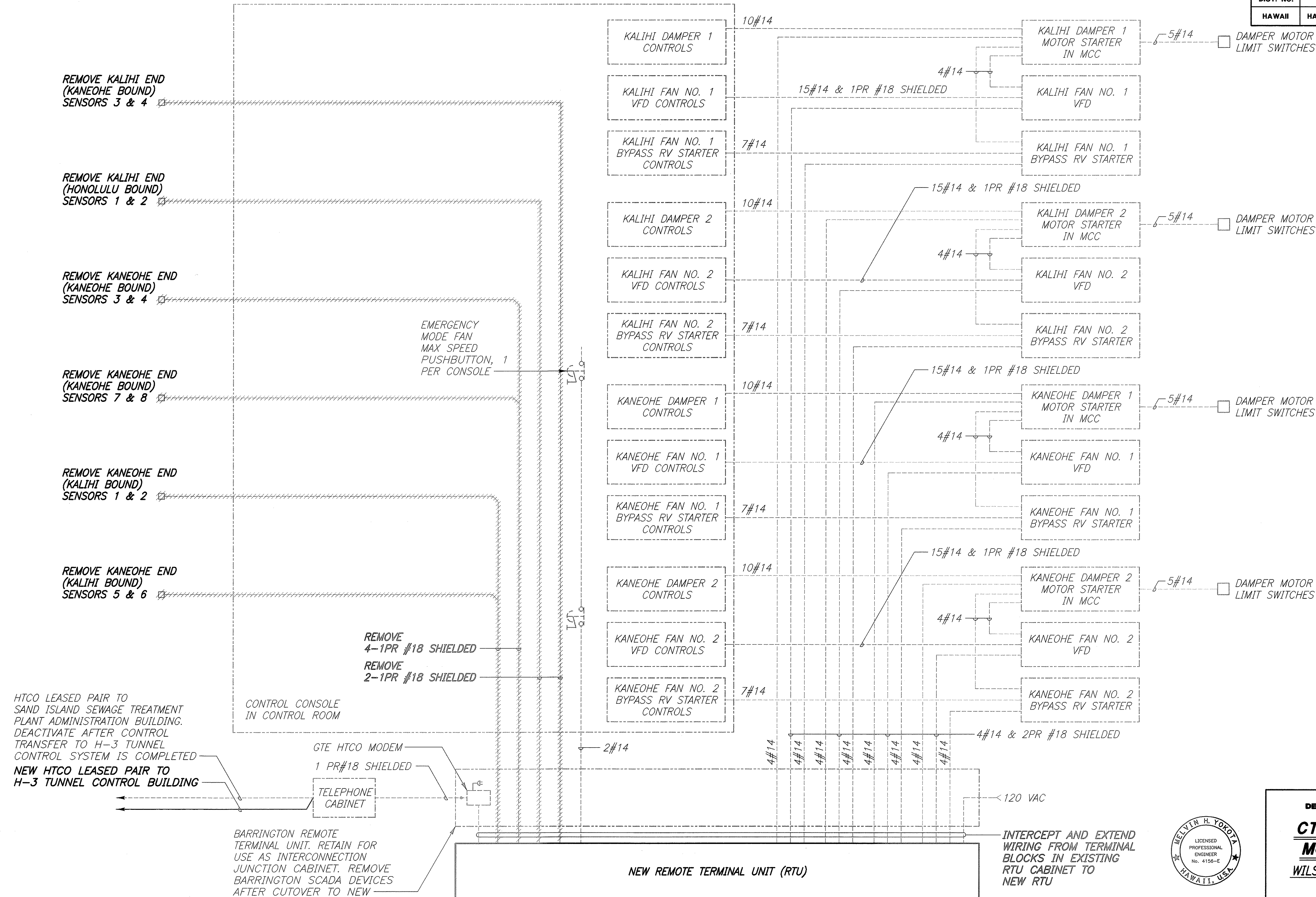


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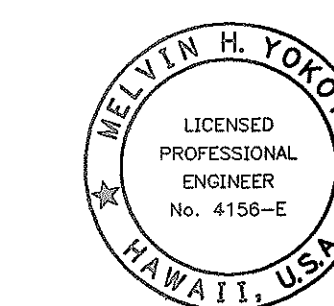
Melvin H. Golob
Signature

56

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	57	77



CONTROL AND SCADA SYSTEM MODIFICATION INTERCONNECTION DIAGRAM

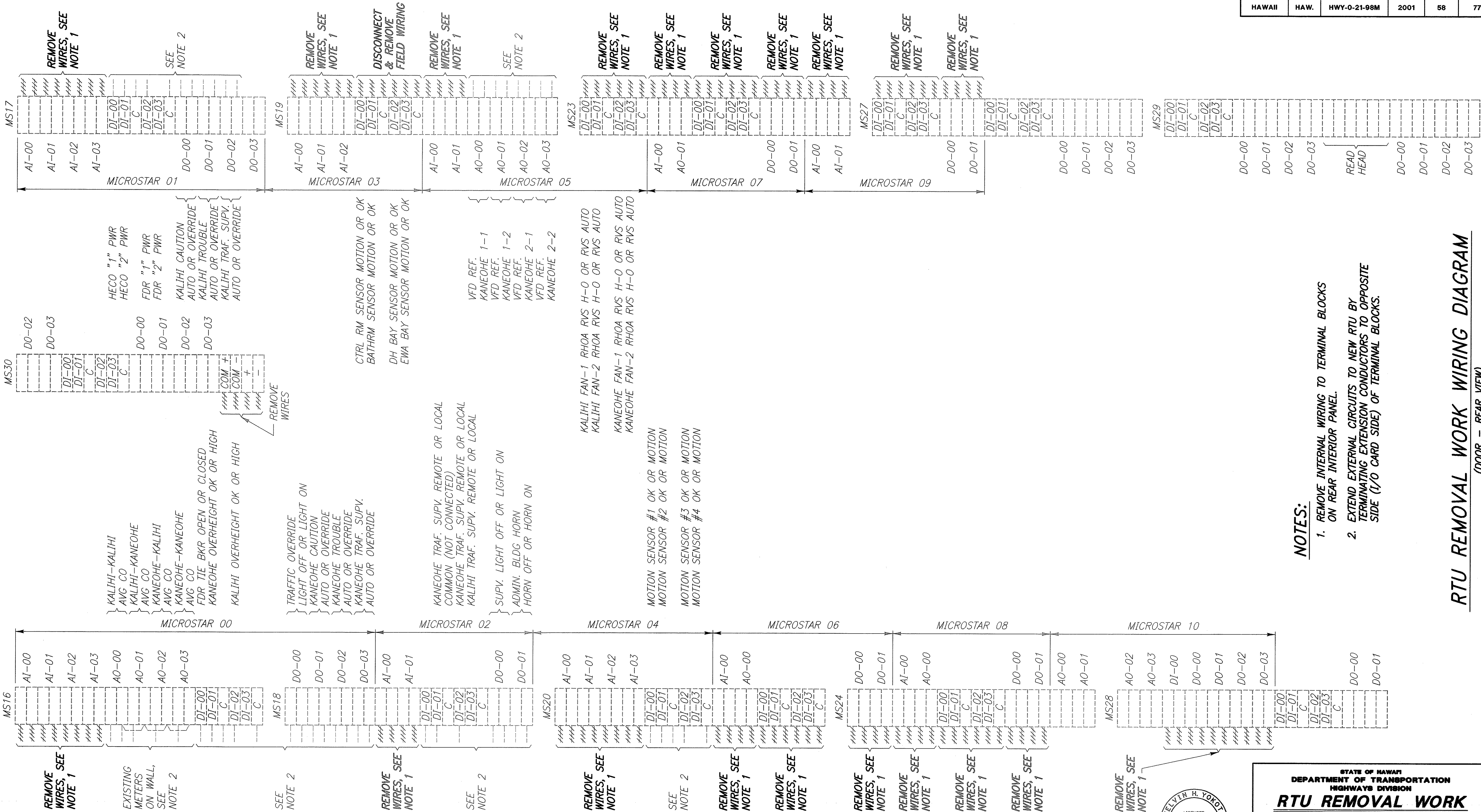


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OR UNDER MY SUPERVISION.
Melvin H. Yokota
Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**CTRL AND SCADA SYS
MOD INTERCON DIAG**
WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE
PROJECT NO. HWY-0-21-98M
Scale: None Date: JULY 2000
SHEET No. E-22 OF E-27 SHEETS

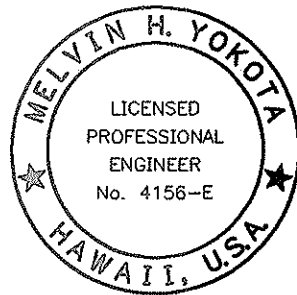
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	58	77

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTED BY	DRAWN BY	
NOTED BY	DESIGNED BY	
NOTED BY	CHECKED BY	



NOTES:

1. REMOVE INTERNAL WIRING TO TERMINAL BLOCKS ON REAR INTERIOR PANEL.
2. EXTEND EXTERNAL CIRCUITS TO NEW RTU BY TERMINATING EXTENSION CONDUCTORS TO OPPOSITE SIDE (I/O CARD SIDE) OF TERMINAL BLOCKS.



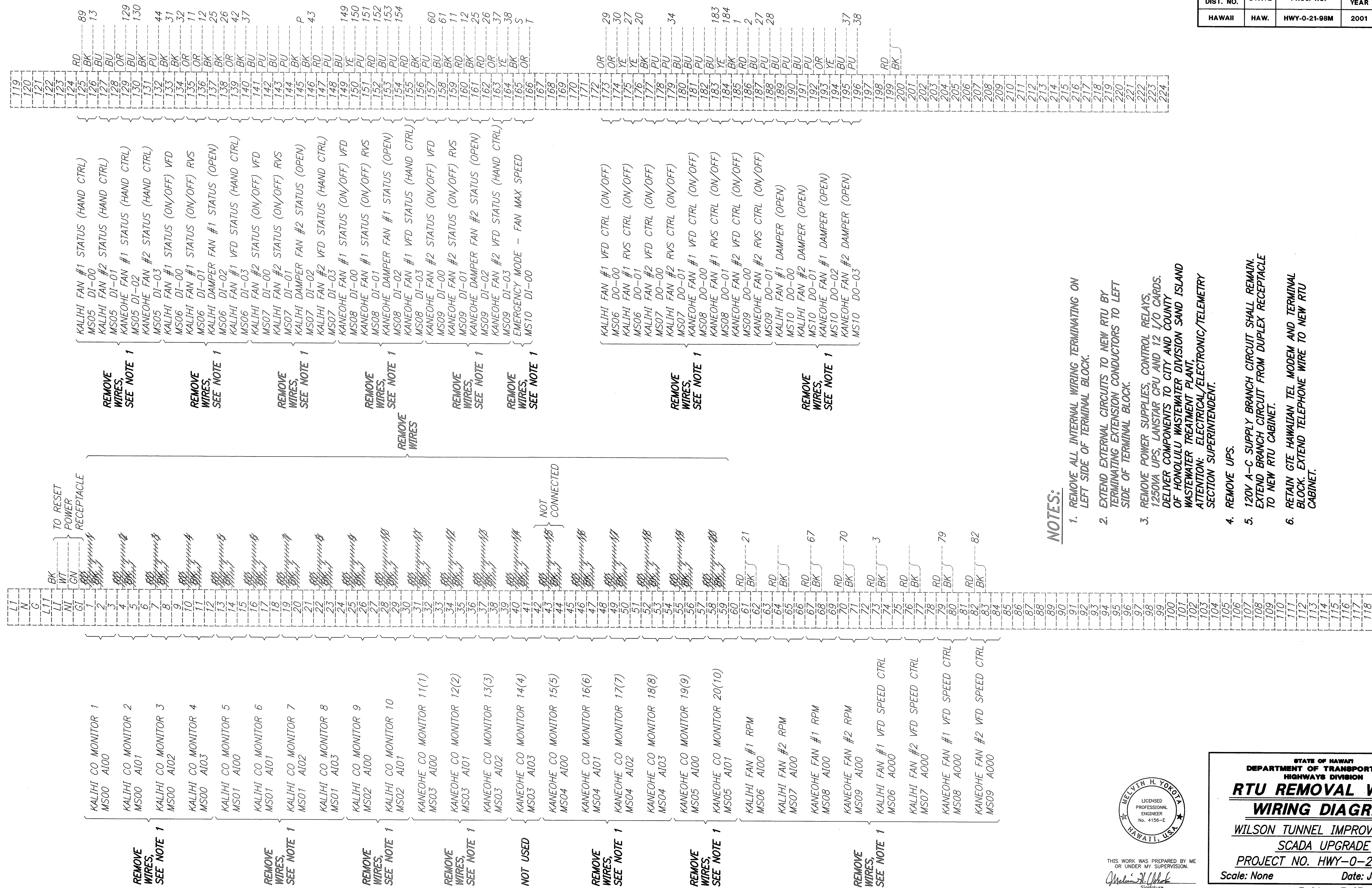
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.
Melvin H. Yokota
Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
RTU REMOVAL WORK
WIRING DIAGRAM
WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE
PROJECT NO. HWY-0-21-98M
Scale: None Date: JULY 2000
SHEET No. E-23 OF E-27 SHEETS

RTU REMOVAL WORK WIRING DIAGRAM

(DOOR - REAR VIEW)

ORIGINAL PLAN	SURVEY PLOTTED BY _____	DATE _____
NOTEBOOK	DRAWN BY _____	" _____
	TRACED BY _____	" _____
	DESIGNED BY _____	" _____
	QUANTITIES BY _____	" _____
No. _____	CHECKED BY _____	" _____



1. REMOVE ALL INTERNAL WIRING TERMINATING ON LEFT SIDE OF TERMINAL BLOCK.
2. EXTEND EXTERNAL CIRCUITS TO NEW RTU BY TERMINATING EXTENSION CONDUCTORS TO LEFT SIDE OF TERMINAL BLOCK.
3. REMOVE POWER SUPPLIES, CONTROL RELAYS, 1250VA UPS, LANSTAR CPU AND 12 I/O CARDS. DELIVER COMPONENTS TO CITY AND COUNTY OF HONOLULU WASTEWATER DIVISION SAND ISLAND WASTEWATER TREATMENT PLANT.
ATTENTION: ELECTRICAL/ELECTRONIC/TELEMETRY SECTION SUPERINTENDENT.

4. REMOVE UPS.
5. 120V A-C SUPPLY BRANCH CIRCUIT SHALL REMAIN. EXTEND BRANCH CIRCUIT FROM DUPLEX RECEPTACLE TO NEW RTU CABINET.
6. RETAIN GTE HAWAIIAN TEL MODEM AND TERMINAL BLOCK. EXTEND TELEPHONE WIRE TO NEW RTU CABINET.

THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION.

William H. Gholak
Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RTU REMOVAL WORK

WIRING DIAGRAM

WILSON TUNNEL IMPROVEMENTS

SCADA UPGRADE

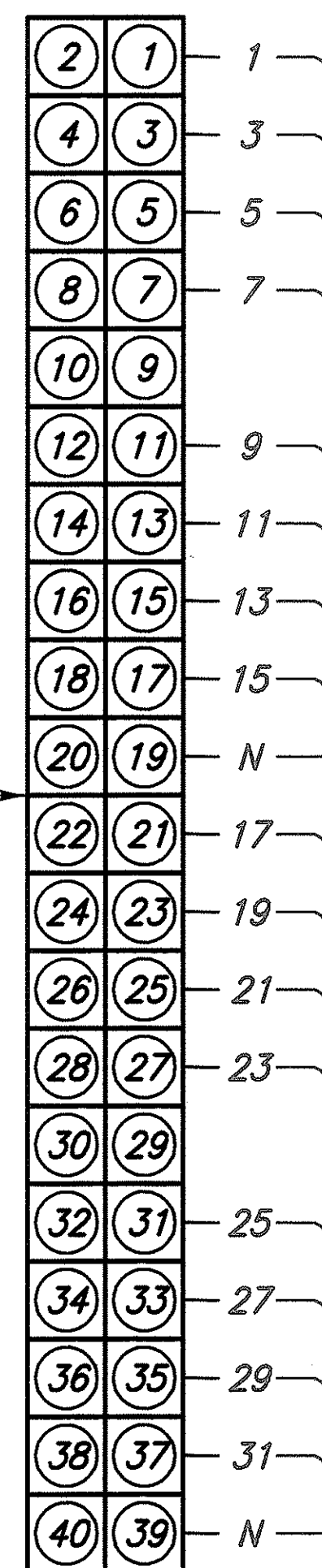
PROJECT NO. HWY-0-21-98M

Scale: None Date: JULY 2000

SHEET No. E-24 OF E-27 SHEETS

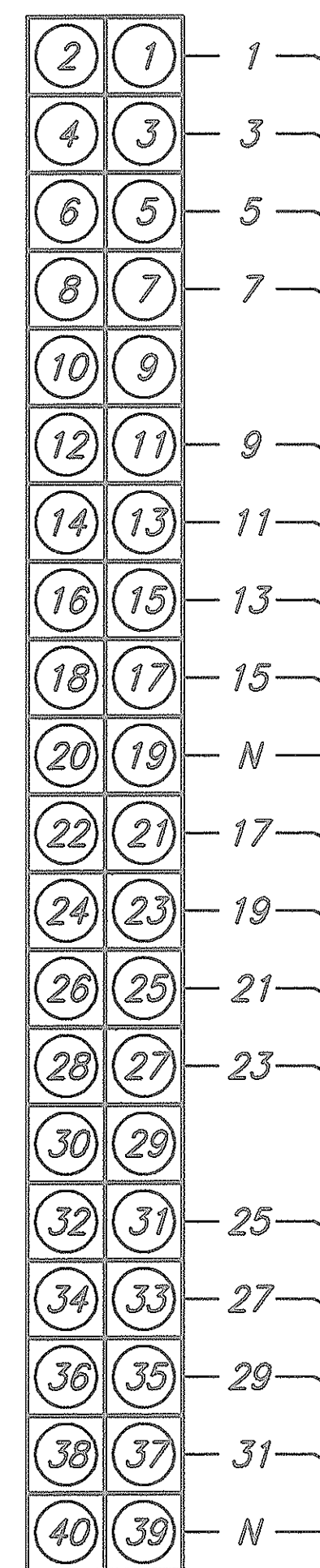
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	60	77

DI MODULE 1

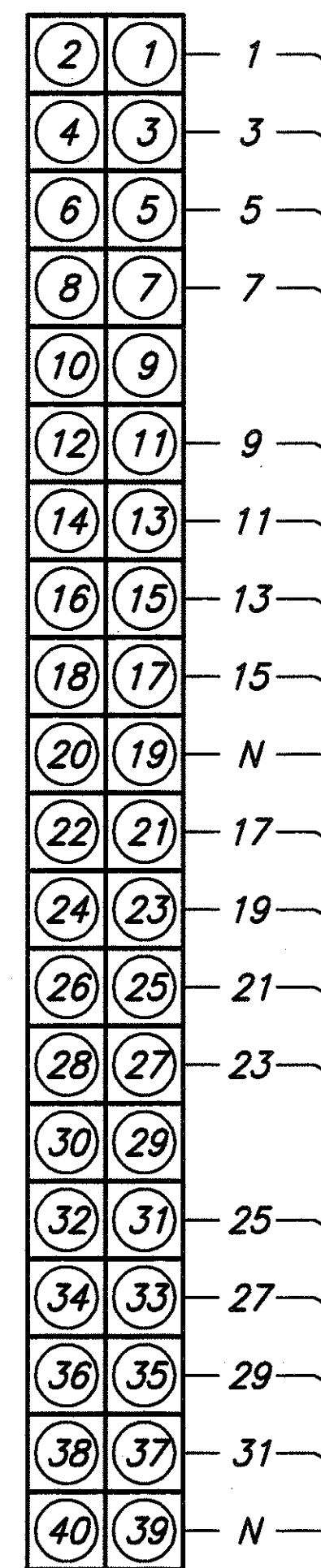


115VAC 16 INPUT
DISCRETE INPUT
MODULE (TYPICAL)

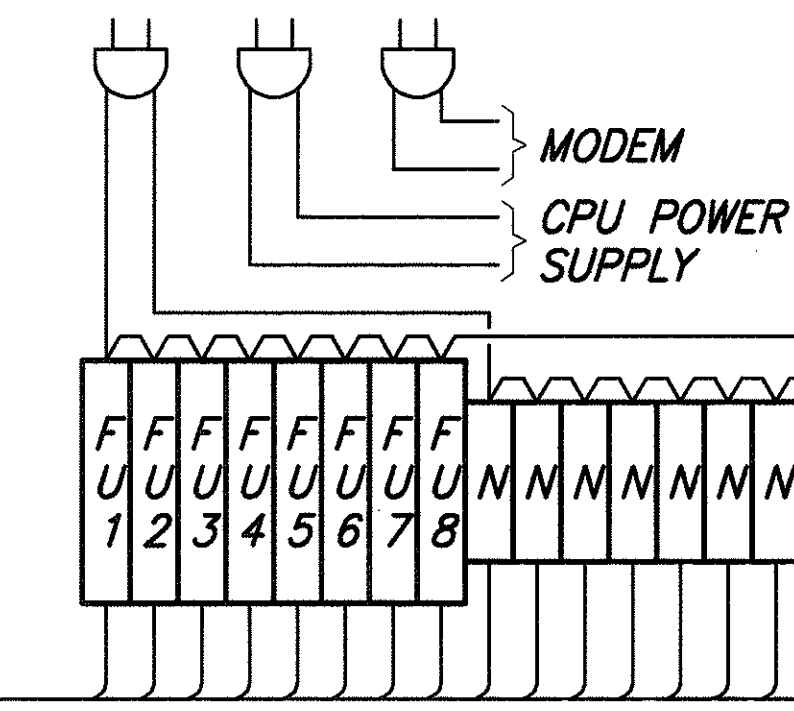
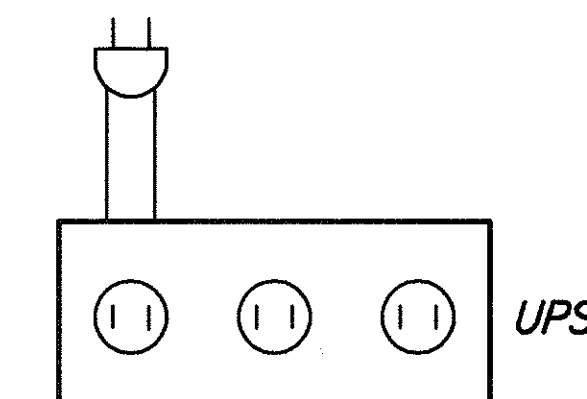
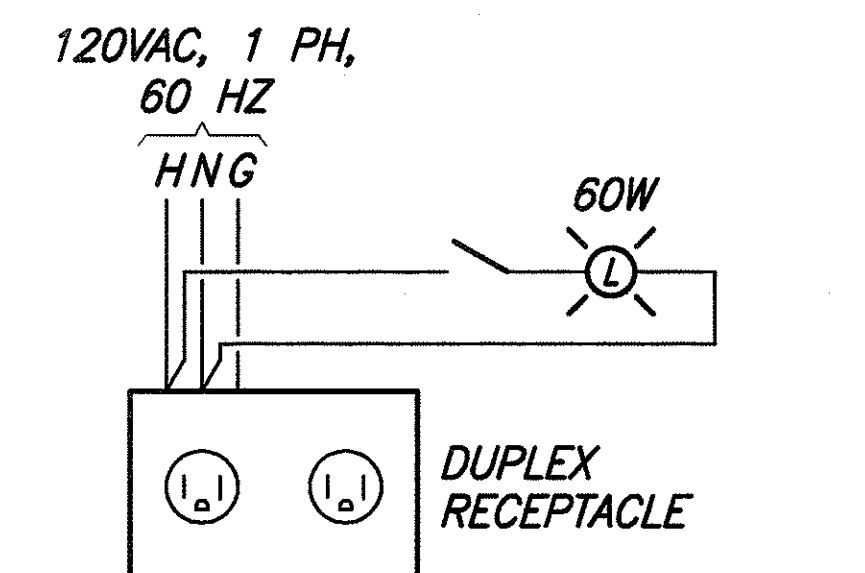
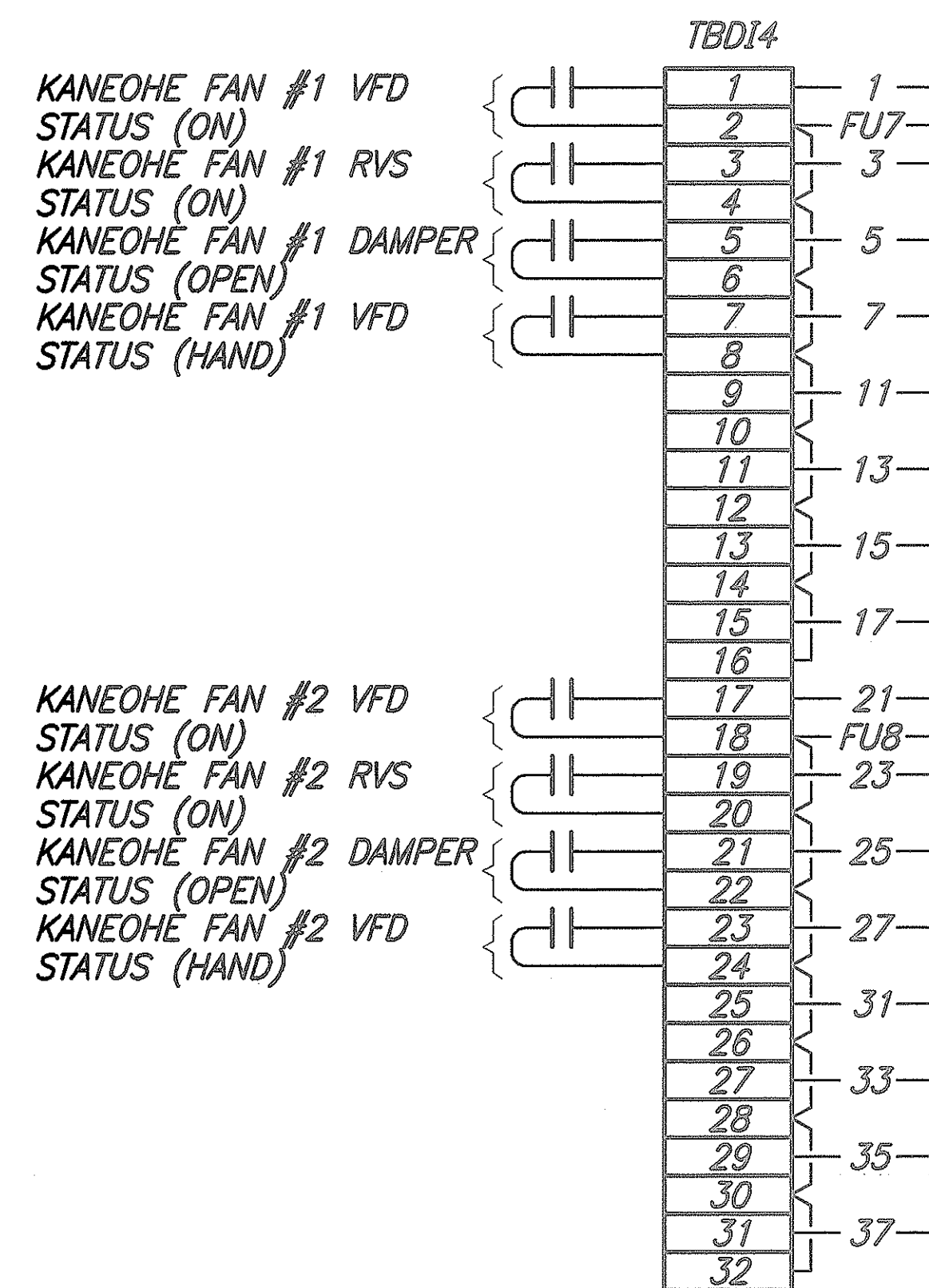
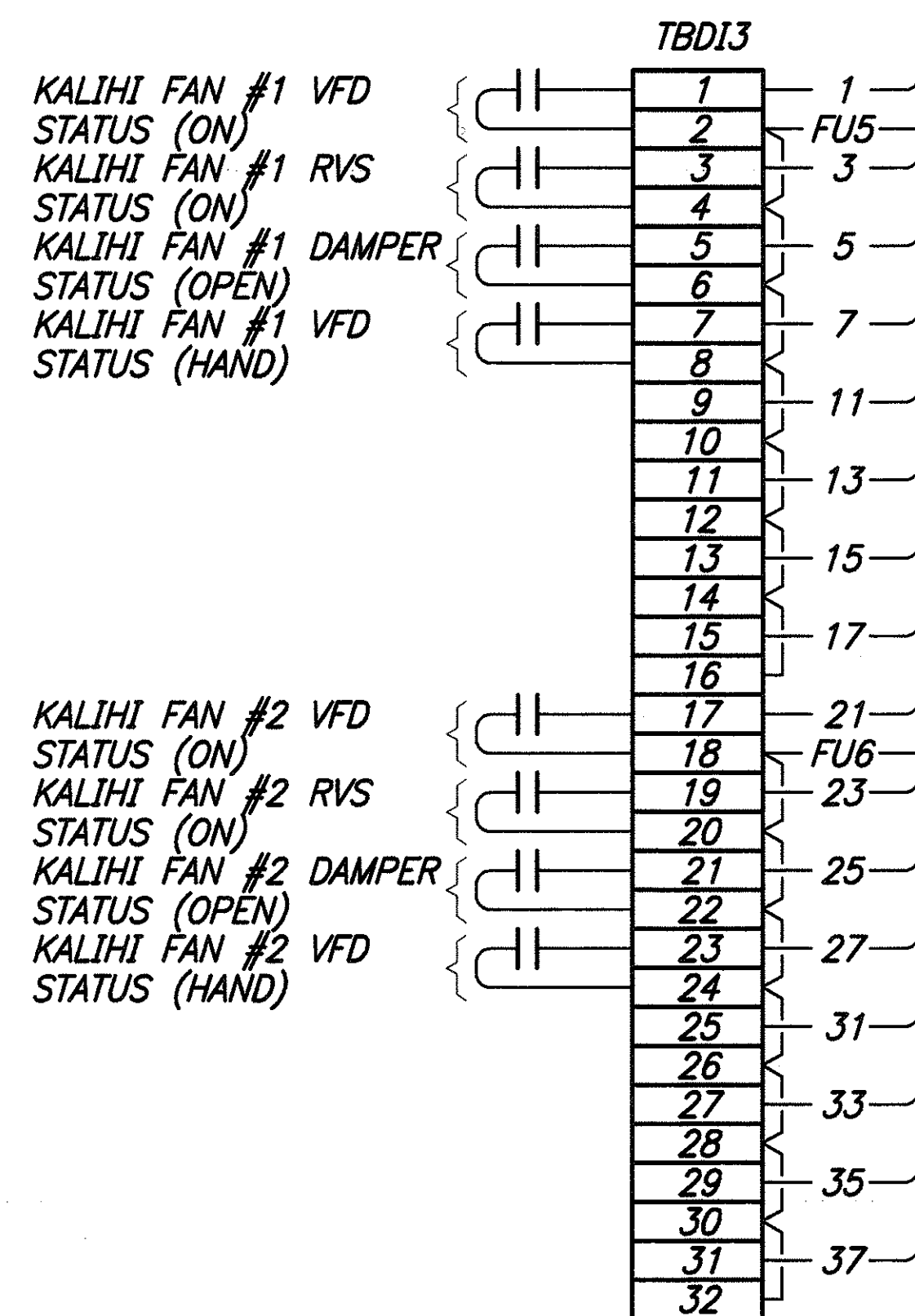
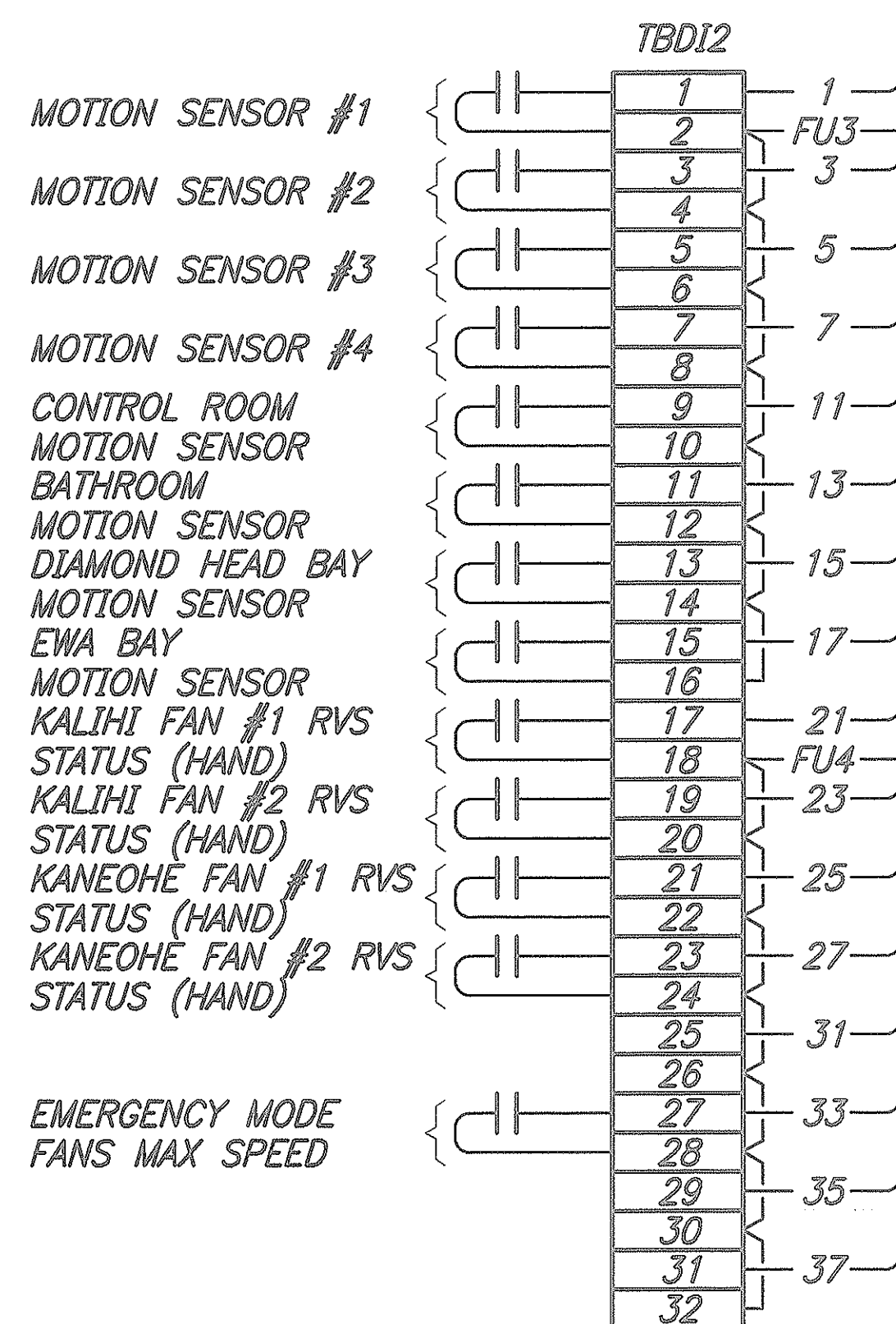
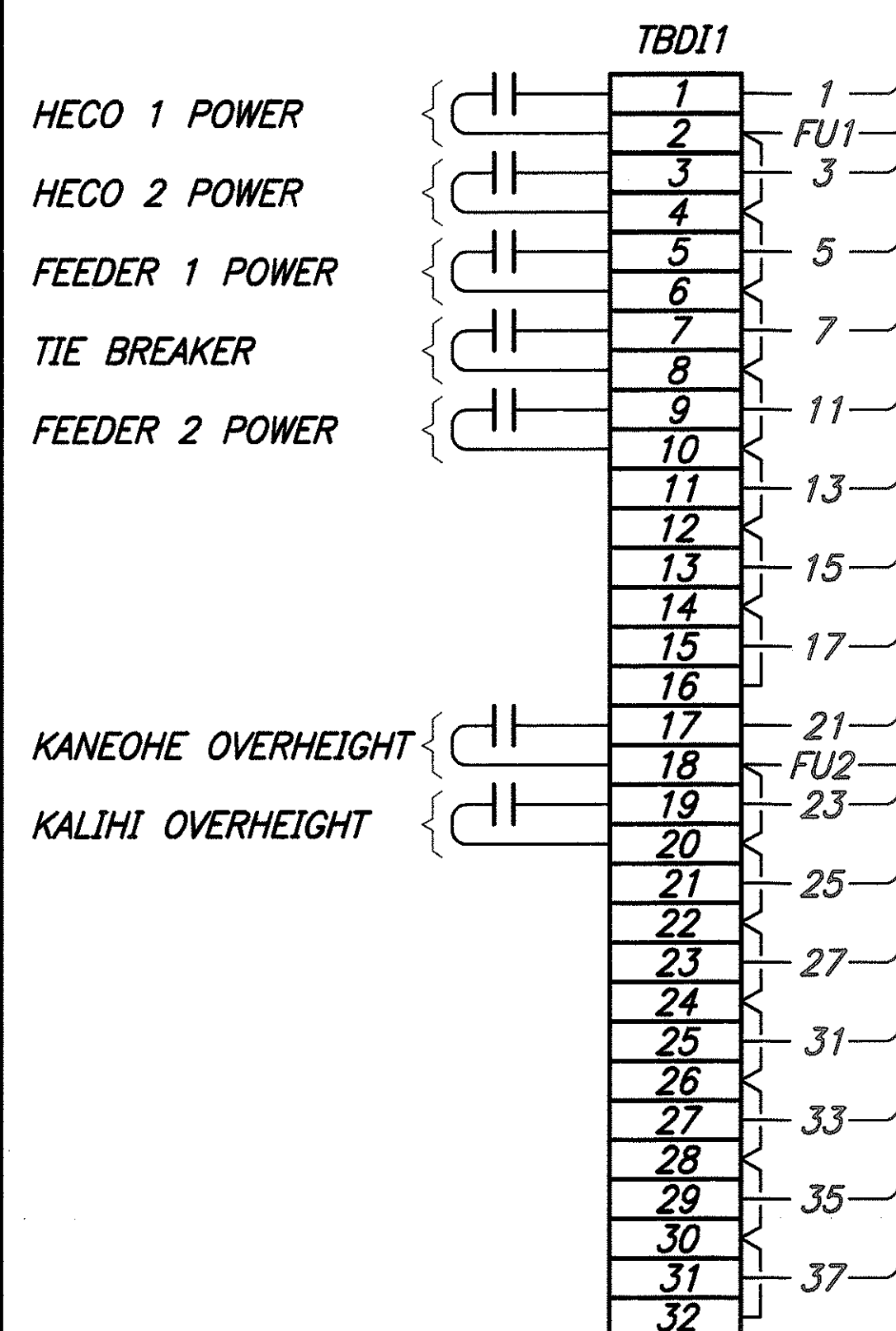
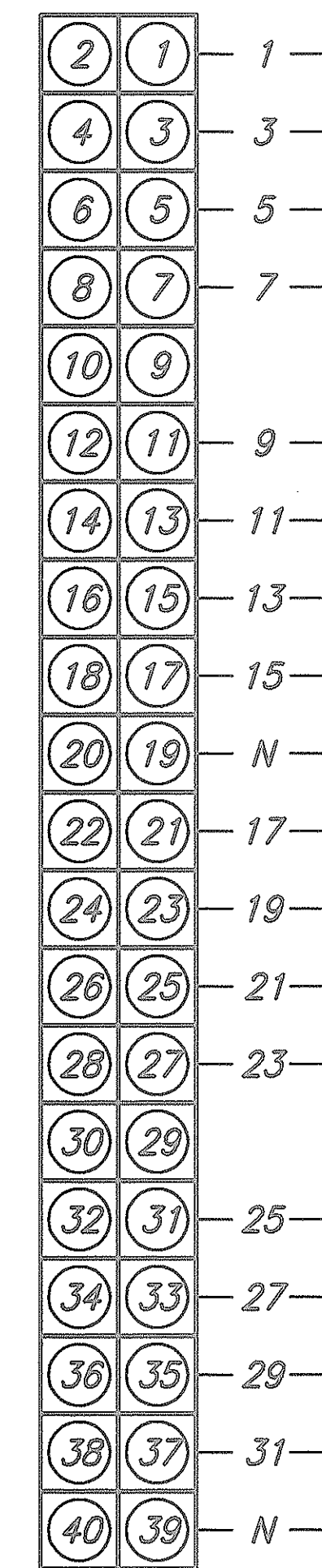
DI MODULE 2



DI MODULE 3



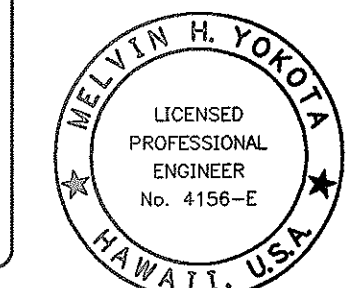
DI MODULE 4



TO 115VAC-24V
D-C POWER
SUPPLY, SEE
SHEET NO. E-26

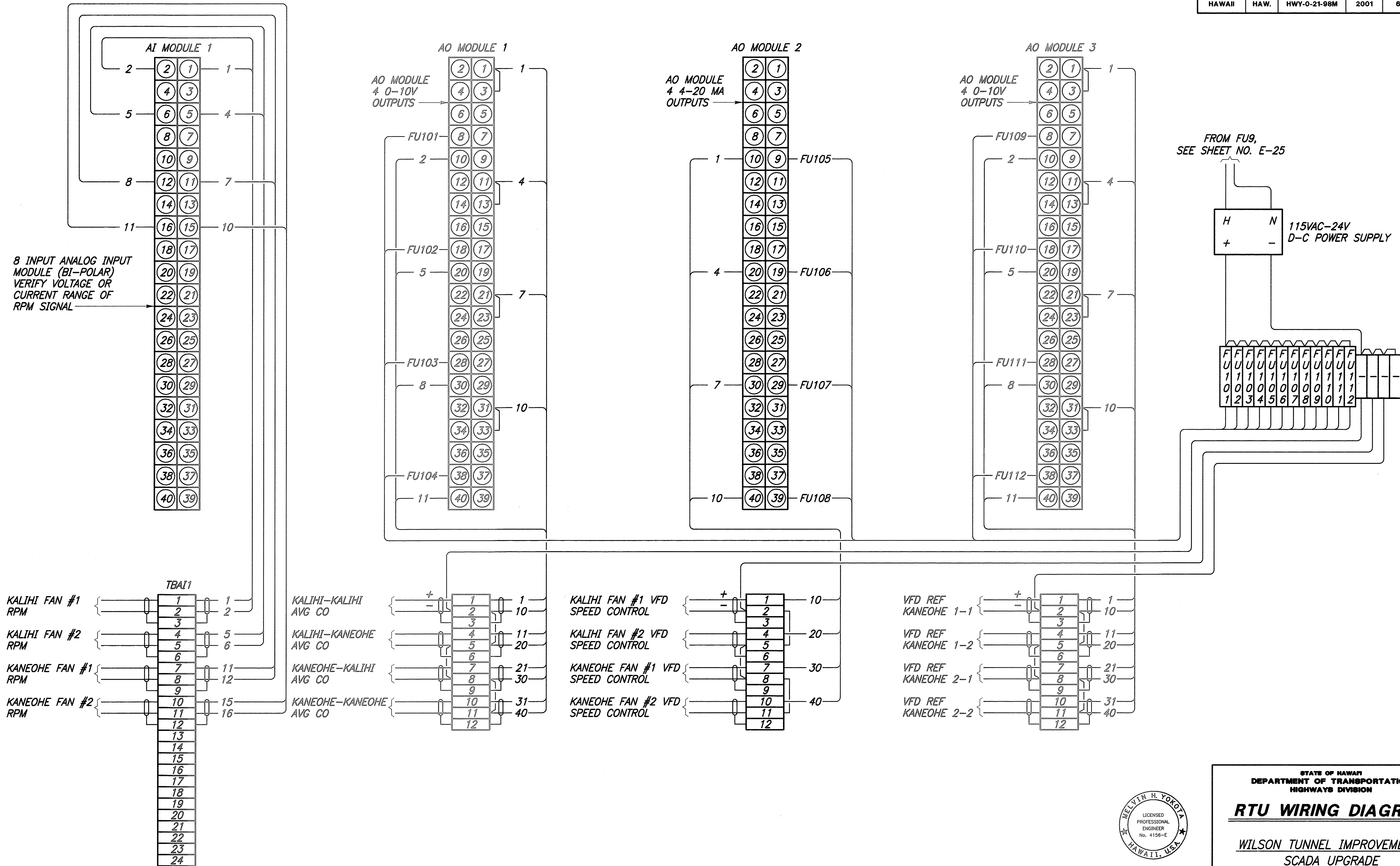
RTU WIRING DIAGRAM

THIS WORK WAS PREPARED BY ME
OR UNDER MY SUPERVISION.
Melvin H. Yokota
Signature



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
RTU WIRING DIAGRAM
WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE
PROJECT NO. HWY-0-21-98M
Scale: None Date: JULY 2000
SHEET No. E-25 OF E-27 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	61	77



RTU WIRING DIAGRAM



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Melvin H. Yokota
Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RTU WIRING DIAGRAM

WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE

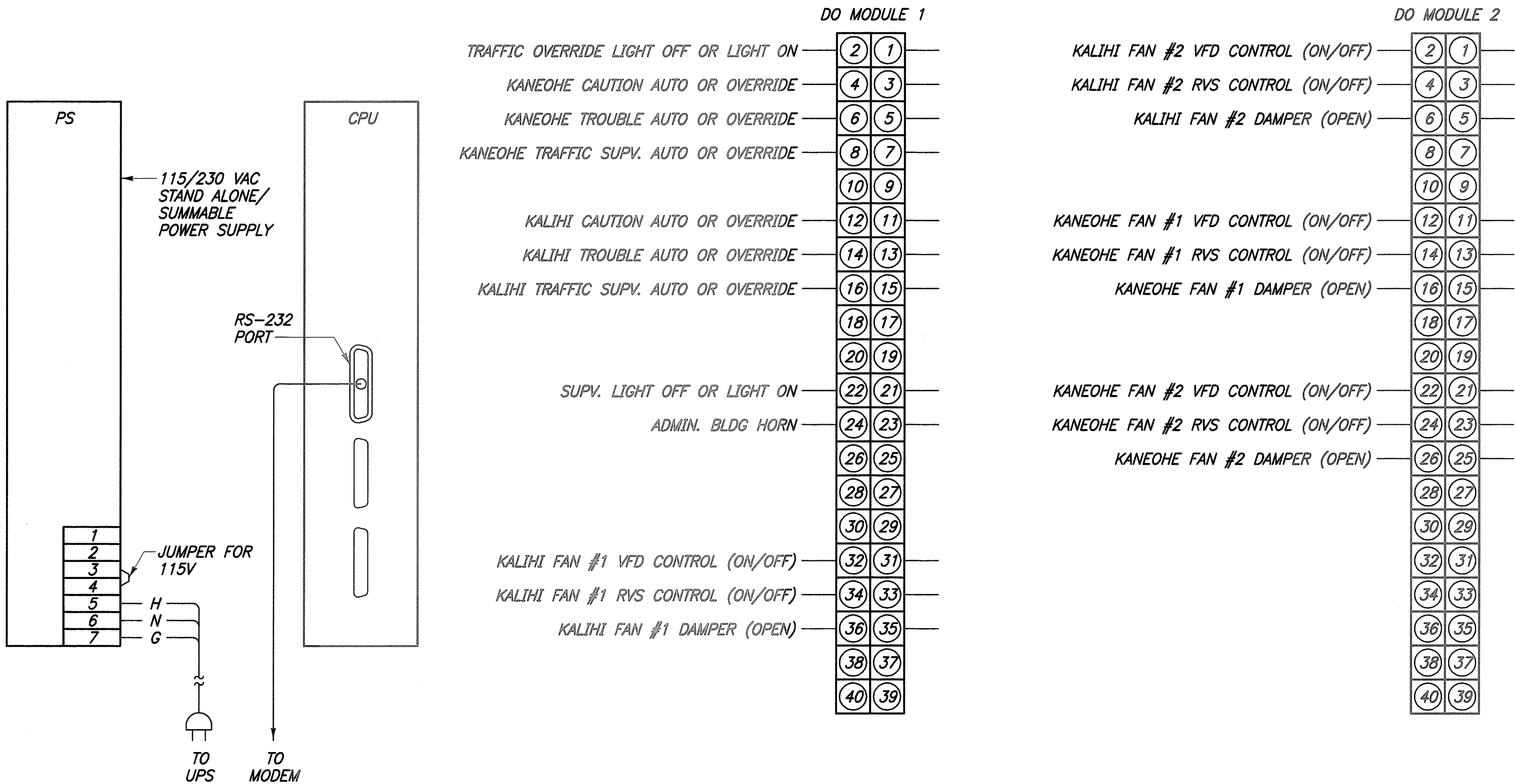
PROJECT NO. HWY-0-21-98M

Scale: None Date: JULY 2000

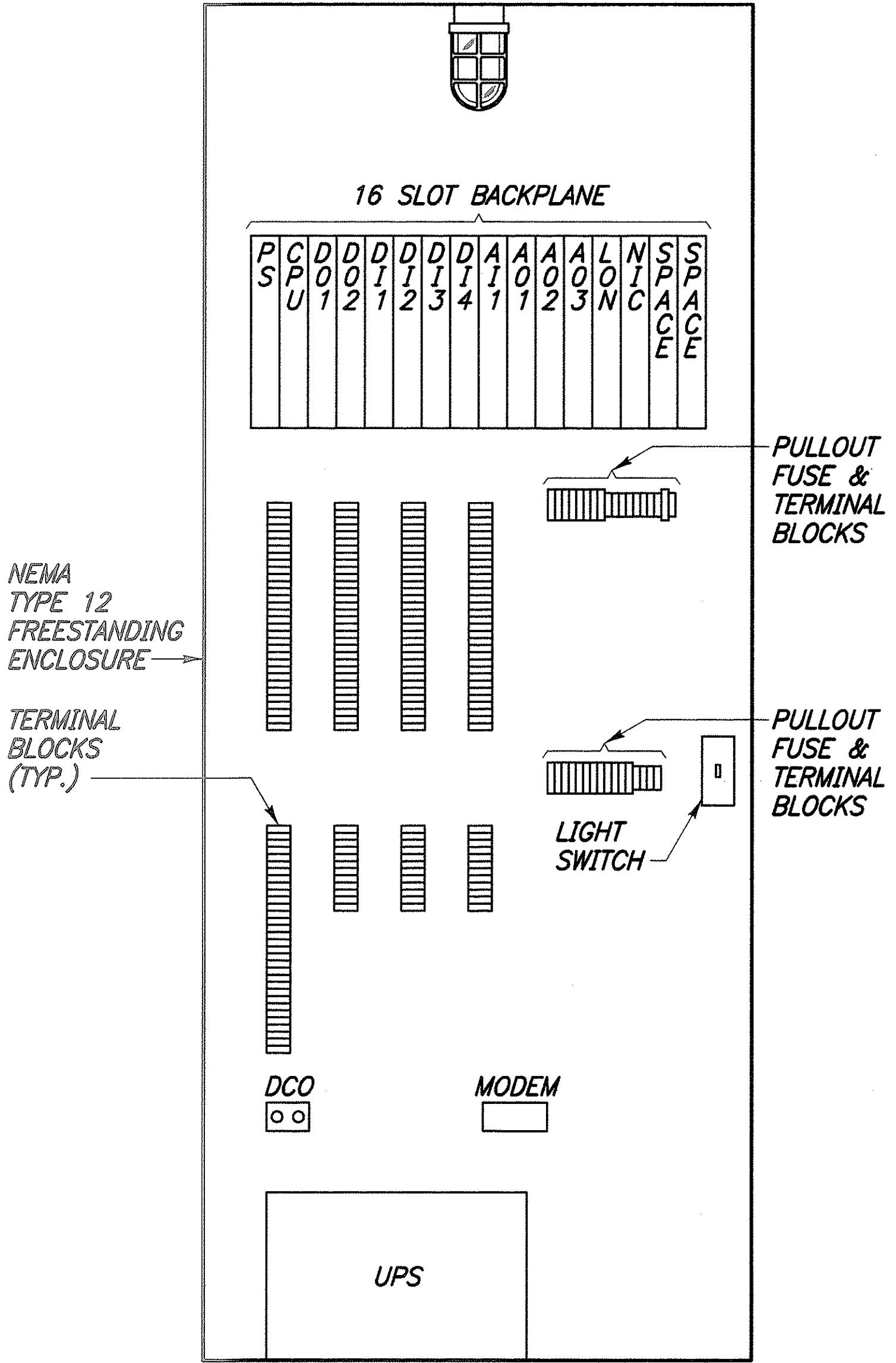
SHEET No. E-26 OF E-27 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-0-21-98M	2001	62	77

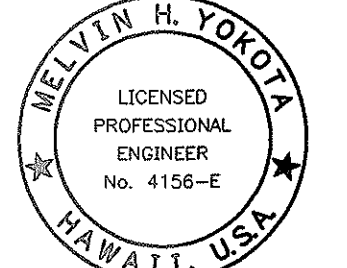
DESIGNED BY	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NO.	



RTU WIRING DIAGRAM



RTU INTERIOR ARRANGEMENT
NOT TO SCALE



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Melvin H. Yokota
Signature

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RTU ARRANGEMENT & WIRING

WILSON TUNNEL IMPROVEMENTS
SCADA UPGRADE

PROJECT NO. HWY-0-21-98M

Scale: None Date: JULY 2000

SHEET No. E-27 OF E-27 SHEETS