HVAC REPLACEMENT

HUMBOLDT COUNTY REGIONAL FACILITY

EUREKA, CALIFORNIA

CONSTRUCTION DOCUMENTS

September 20, 2024

APPLICABLE CODES & STANDARDS

ALL WORK PERFORMED AND MATERIALS FURNISHED SHALL COMPLY WITH THE FOLLOWING CODES.

APPLICABLE CODES, REGULATIONS:
2022 CALIFORNIA ADMINISTRATIVE CODE (CAC)
PART 1, TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR)
2022 CALIFORNIA BUILDING CODE (CBC)
PART 2, TITLE 24, CCR, *BASED ON THE 2012 INTERNATIONAL BUILDING CODE (IBC)*
2022 CALIFORNIA ELECTRICAL CODE (CEC)
PART 3, TITLE 24, CCR, *BASED ON THE 2011 NATIONAL ELECTRIC CODE (NEC)*
2022 CALIFORNIA MECHANICAL CODE (CMC)
PART 4, TITLE 24, CCR, *BASED ON THE 2012 UNIFORM MECHANICAL CODE (UMC)*
2022 CALIFORNIA PLUMBING CODE (CPC)
PART 5, TITLE 24, CCR, *BASED ON THE 2012 UNIFORM PLUMBING CODE (UPC)*
2022 CALIFORNIA ENERGY CODE (VEV)
PART 6, TITLE 24, CCR
2022 CALIFORNIA FIRE CODE (CFC)
PART 9 TITLE 24, CCR, *BASED ON THE 2012 INTERNATIONAL FIRE CODE (IFC)*
2022 CALIFORNIA FIRE CODE (CFC)
PART 11, TITLE 24, CCR
2022 CALIFORNIA GREEN BUILDING STANDARDS CODE (CGC)
PART 12, TITLE 24, CCR
2022 CALIFORNIA REFERENCED STANDARDS

OTHER APPLICABLE CODES AND REGULATIONS
TITLE 19 - PUBLIC SAFETY, STATE FIRE MARSHAL, CALIFORNIA CODE OF REGULATIONS (CCR)
ADA REGULATION FOR TITLE III - 2010 - STANDARDS FOR PUBLIC ACCOMMODATIONS AND COMMERCIAL FACILITIES, U.S. DEPT. OF JUSTICE.

APPLICABLE NFPA STANDARDS ADOPTED BY 2019 CBC:
NFPA NO. 13 - 2016 INSTALLATION OF SPRINKLER SYSTEMS
NFPA NO. 14 - 2016 INSTALLATION OF STANDPIPE AND HOSE SYSTEM
NFPA NO. 20 - 2016 INSTALLATION OF STATIONARY PUMPS FOR FIRE PROTECTION
NFPA NO. 22 - 2013 WATER TANKS FOR PRIVATE FIRE PROTECTION
NFPA NO. 24 - 2016 PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES
NFPA NO. 45 - 2015 FIRE PROTECTION FOR LABORATORIES USING CHEMICALS
NFPA NO. 55 - 2019 COMPRESSED GASES AND CRYOGENIC FLUIDS.
NFPA NO. 70 - 2017 NATIONAL ELECTRICAL CODE
NFPA NO. 72 - 2016 NATIONAL FIRE ALARM & SIGNALING CODE
NFPA NO. 80 - 2016 FIRE DOORS AND OTHER OPENING PROTECTIVES
NFPA NO. 90A - 2009 INSTALLATION OF AIR-CONDITIONING VENTILATING SYSTEMS
NFPA NO. 99 - 2018 HEALTH CARE FACILITIES
NFPA NO. 101 - 2018 LIFE SAFETY CODE
NFPA NO. 220 - 2009 TYPES OF BUILDING CONSTRUCTION

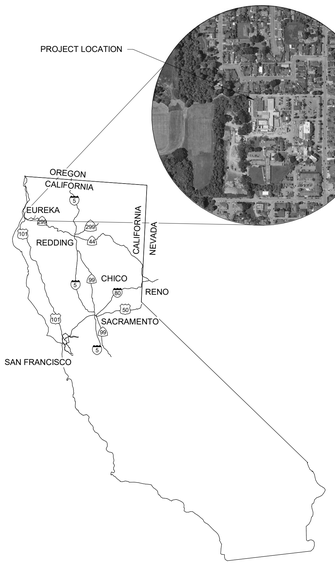
WHERE THERE IS A CONFLICT BETWEEN CALIFORNIA (ADAAG) AND FEDERAL (ADA) DISABLED ACCESS REQUIREMENTS, GENERALLY THE MOST STRINGENT WILL APPLY.

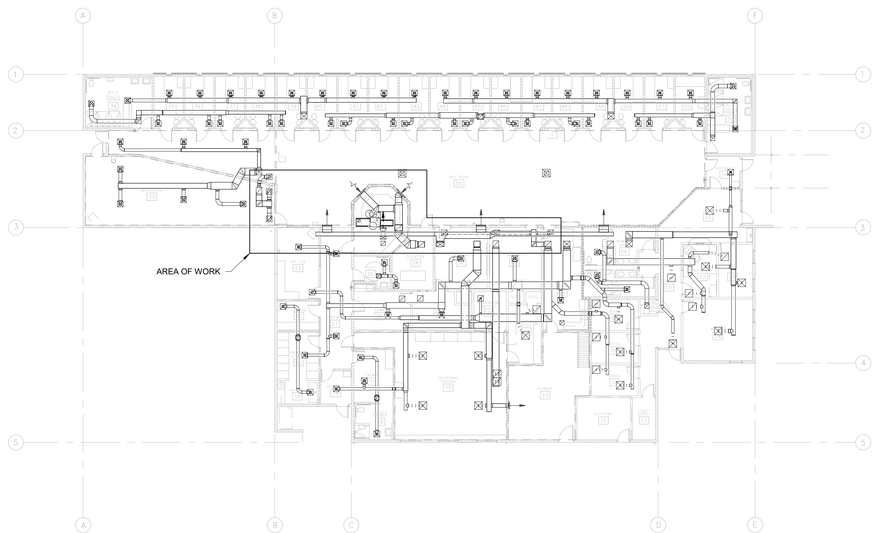
1. UNIFORM FEDERAL ACCESSIBILITY STANDARD (UFAS)
2. CALIFORNIA OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (CAL OSHA)
3. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA): HAZARD COMMUNICATIONS STANDARD

TITLE 24 C.C.R. ADMIN. REQUIREMENTS

1. ALL WORK SHALL CONFORM TO THE 2022 EDITION OF TITLE 24, CALIFORNIA CODE OF REGULATIONS (CCR).
2. A COPY OF PARTS 1 THRU 5 & 9, TITLE 24, CCR, SHALL BE KEPT ON THE JOB SITE AT ALL TIMES DURING CONSTRUCTION.
3. CHANGES TO THE APPROVED DRAWINGS AND SPECIFICATIONS SHALL BE MADE BY ADDENDA OR CONSTRUCTION CHANGE DOCUMENT (CCD) APPROVED BY DSA, AS REQUIRED BY SECTION 4-338, PART 1, TITLE 24, CCR.
4. TESTS BY MATERIALS AND TESTING LABORATORY SHALL BE IN ACCORDANCE WITH SECTION 4-335 OF PART 1, TITLE 24, AND THE DISTRICT SHALL EMPLOY AND PAY THE LABORATORY. COSTS OF RE-TEST MAY BE BACK-CHARGED TO THE CONTRACTOR. TESTING LABORATORY SHALL BE AN APPROVED MEMBER OF DSA'S LEA (LABORATORY EVALUATION AND ACCEPTANCE) PROGRAM.
5. CONTRACTOR, INSPECTOR, ARCHITECT & ENGINEERS SHALL SUBMIT VERIFIED REPORTS (FORM 6) IN ACCORDANCE WITH SECTION 4-336 AND 4-343, PART 1, TITLE 24.
6. THE ARCHITECT AND THE STRUCTURAL ENGINEER SHALL PERFORM THEIR DUTIES IN ACCORDANCE WITH SECTION 4-333 (a) AND 4-341, PART 1, TITLE 24.
7. CONTRACTOR SHALL PERFORM HIS DUTIES IN ACCORDANCE W/ SECTION 4-343, PART 1, TITLE 24.
8. THE INTENT OF THESE DRAWINGS AND SPEC'S. IS THAT THE WORK DESCRIBED HEREIN SHALL BE IN ACCORDANCE WITH THE TITLE 24, CCR. SHOULD ANY CONDITIONS DEVELOP NOT COVERED BY THE CONTRACT DOC'S. WHEREIN THE FINISHED WORK WILL NOT COMPLY WITH SAID TITLE 24, CCR, A CCD DETAILING & SPECIFYING THE REQ'D. WORK SHALL BE SUBMITTED TO & APPROVED BY THE DSA BEFORE PROCEEDING WITH THE WORK.

PROJECT LOCATION





PROJECT TEAM

OWNER REPRESENTATIVE:

JAKE JOHNSON
HUMBOLDT COUNTY DEPT. OF PUBLIC WORKS
1106 2ND STREET
EUREKA, CA 95501
PHONE: (707) 496-1769

OWNER:

BOARD OF SUPERVISORS
COUNTRY OF HUMBOLDT
825 5TH STREET
EUREKA, CA 95501

ELECTRICAL ENGINEER:

NATHANIEL WARNER, PE, E25042
FRONTIER CONSULTING ENGINEERS, INC.
2727 BECHELLI LANE
REDDING, CA 96002
PHONE: (530) 232-6160
FAX: (530) 232-2770

MECHANICAL ENGINEER:

NATHANIEL WARFIELD, PE, M41898
FRONTIER CONSULTING ENGINEERS, INC.
2727 BECHELLI LANE
REDDING, CA 96002
PHONE: (530) 232-6160
FAX: (530) 232-2770

SCOPE OF WORK

THE MECHANICAL SCOPE OF WORK FOR THE PROJECT CONSISTS OF THE REPLACEMENT OF ONE ROOFTOP AC UNIT WITH A NEW HIGH EFFICIENCY SPLIT SYSTEM WITH A ROOF MOUNTED CONDESING UNIT. ADDITIONALLY THREE ROOFTOP GAS-FIRED MAKE-UP AIR UNITS WILL BE REPLACED IN KIND WITH NEW GAS-FIRED MAKE-UP AIR UNITS.

THE ELECTRICAL SCOPE OF WORK INCLUDES THE CONNECTION OF THE NEW EQUIPMENT TO EXISTING ELECTRICAL INFRASTRUCTURE, ADDING A NEW CIRCUIT FOR THE NEW SPLIT SYSTEM AIR HANDLING UNIT, AND CONNECTION OF NEW EQUIPMENT INTO EXISTING FACILITY CONTROL AND FIRE ALARM SYSTEMS.

THE STRUCTURAL SCOPE OF WORK INCLUDES CURB MODIFICATIONS FOR NEW ROOFTOP EQUIPMENT AND SUPPORTS FOR NEW AIR HANDLING UNIT.

PROJECT NOTICE

THE FINAL DESIGN DOCUMENTS ARE INTENDED TO BE USED AS A COMPLETE PACKAGE. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO FURNISH ANY SUBCONTRACTORS, MATERIAL OR EQUIPMENT SUPPLIERS ACCESS TO THE TOTAL BID PACKAGE OF FINAL DESIGN DOCUMENTS. ALL OF THE DOCUMENTS APPLY TO ALL MEMBERS OF THE GENERAL CONTRACTOR CONSTRUCTION TEAM.

THE ARCHITECT AND ENGINEERS HAVE SHOWN VARIOUS PORTIONS OF THE WORK ON SEPARATE SHEETS OF DRAWINGS OR IN SEPARATE PROJECT SPECIFICATION SECTIONS FOR CLARITY. SUCH SEPARATION SHALL NOT BE CONSIDERED AS THE LIMITS OF THE WORK REQUIRED OF ANY SEPARATE TRADE. THE TERMS AND CONDITIONS OF SUCH LIMITATIONS ARE WHOLLY BETWEEN THE CONTRACTOR AND HIS SUB- CONTRACTORS.

THE FINAL PROJECT SHALL REFLECT ALL THE WORK SHOWN ON ALL DOCUMENTS WITHOUT REGARD TO WHO SHALL PROVIDE THE WORK. FOR PURPOSES OF THIS PROJECT THE ARCHITECT / ENGINEER / OWNER SHALL CONSIDER THE GENERAL CONTRACTOR AS THE SOLE PROVIDER OF ALL ITEMS NECESSARY TO COMPLETE THE PROJECT.

ITEMS SHOWN ON ONE DRAWING OR SPECIFICATION SECTION BUT NOT OTHERS SHALL BE FURNISHED IN THEIR ENTIRETY AS IF SHOWN ON ALL DOCUMENTS. - THE USE OF THESE DOCUMENTS WITHOUT THE BENEFIT OF REVIEWING THE ENTIRE PACKAGE WILL BE AT THE RISK OF THE USER.

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M102	TAB SPECIFICATIONS
M103	CONTROL SPECIFICATIONS
M200	MECHANICAL DEMOLITION PLAN
M210	MECHANICAL DEMOLITION ROOF PLAN
M220	MECHANICAL FLOOR PLAN
M240	MECHANICAL ROOF PLAN
M400	TITLE 24 COMPLIANCE
ELECTRICAL	
E100	ELECTRICAL LEGENDS AND SCHEDULES
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FRONTIER
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2727 Bechelli Lane - Redding, CA 96002
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LICENSE STAMP

KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

HUMBOLDT COUNTY REGIONAL FACILITY

2004 HARRISON AVENUE
EUREKA, CA 95501

NO.	REVISIONS	DATE

SHEET TITLE

TITLE SHEET

ISSUED FOR:

CONSTRUCTION DOCUMENTS

DATE:	9/20/2024
DRAWN BY:	WG
REVIEWED BY:	NW
SCALE:	As indicated
PROJECT NO:	22007

G100

MECHANICAL LEGEND

SYMBOLS	ABBREVIATIONS	
	ABC	ABOVE CEILING
	AFF	ABOVE FINISHED FLOOR
AD	AD	ACCESS DOOR
12/8	AL	ACOUSTIC LINED DUCT (DIM IS INTERNAL)
	AC	AIR CONDITIONING
	BHP	BRAKE HORSE POWER
	CFM	CUBIC FEET PER MINUTE
A/123		DIFFUSER TAG
	D	DEMO
	DB	DRY BULB
12/8		DUCT (RECTANGULAR DUCT, DIMENSIONS IN INCHES)
12Ø		DUCT (ROUND DUCT, DIAMETER IN INCHES)
D		DUCT DROP IN DIRECTION OF ARROW
R		DUCT RISE IN DIRECTION OF ARROW
	EER	ENERGY EFFICIENCY RATIO
	EAT	ENTERING AIR TEMPERATURE
EA	EA	EXHAUST AIR DUCT
	EF	EXHAUST FAN
		EXHAUST GRILLE
	(E), EX	EXISTING
	ESP	EXTERNAL STATIC PRESSURE
	FPM	FEET PER MINUTE
		FLEXIBLE DUCT
	FLA	FULL LOAD AMPS
	LAT	LEAVING AIR TEMPERATURE
L		LOUVERED DOOR
	MOCP	MAXIMUM OVER CURRENT PROTECTION
	MCA	MINIMUM CIRCUIT AMPACITY
M		MOTORIZED DAMPER
	(N)	NEW
		NEW CONNECTION TO EXISTING
	OA	OUTSIDE AIR
1/123		REGISTER/GRILLE TAG
	(R), R	RELOCATE
		REMOVE TO THIS POINT
RA	RA	RETURN AIR DUCT
		RETURN GRILLE
	RL/RS	REFRIGERANT LINE SET
	SEER	SEASONAL ENERGY EFFICIENCY RATIO
SD	SD	SMOKE DETECTOR
SA	SA	SUPPLY AIR DUCT
		SUPPLY DIFFUSER
T	T'STAT	THERMOSTAT (48" AFF TOP OF BOX)
	TSP	TOTAL STATIC PRESSURE
		TURNING VANES
	TYP	TYPICAL
UC		UNDERCUT DOOR
	UG	UNDERGROUND
	VIF	VERIFY IN FIELD
		VOLUME DAMPER - MANUAL OPERATION
	WB	WET BULB

MINI-SPLIT SCHEDULE

ID	Service	Manufacturer	Model	Nominal Tonnage	Cooling MBh	Cooling Rated Conditions	Heating MBh	Heating Rated Conditions	Electrical Data Service	Electrical Data MCA	Electrical Data MOCP	Dimensions	Weight (lbs)	Notes
HP-1	24 - CONTROL ROOM	DAIKIN	RX12WMVJU9	1	10.8	95°F DB / 75°F WB	13.6	47°F DB / 43°F WB	208/1/60	7.7	15	21-5/8"H x 26-9/16"W x 11-3/16"D	75	--
FC-1	24 - CONTROL ROOM	DAIKIN	FDMQ12WVJU9	1	10.8	80°F DB / 67°F WB	13.6	70°F DB / 60°F WB	208/1/60	--	--	9-5/8"H x 27-9/16"W x 31-1/2"D	75	1 - 5

NOTES:
1. INDOOR UNIT POWERED BY OUTDOOR UNIT.
2. PROVIDE WITH DACA-CP3-1 CONDENSATE PUMP.
3. DIVERSITECH CONDENSATE CS-2 SWITCH WIRED TO UNIT FOR OVERFLOW PROTECTION.
4. PROVIDE 7-DAY PROGRAMMABLE THERMOSTAT.
5. PROVIDE ALL NECESSARY REFRIGERATION PIPING AND APPURTENANCES.

HEATING VENTILATOR UNIT SCHEDULE

ID	Manufacturer	Model	Location Served	Supply Fan OA CFM	Supply Fan Supply CFM	Supply Fan Ext. S.P.	Supply Fan Motor HP	Gas Heating Section Input MBh	Gas Heating Section Output MBh	Gas Heating Section EAT/LAT	Gas Heating Section Fuel	Electrical Data Service	Electrical Data MCA	Electrical Data MOCP	Operating Weight (lbs)	Notes
HV-3	GREENHECK	IGX-P115-H12-MF-E	55 - DAY ROOM	510	2,600	1.843	2.06	150.0	121.5	34.0°F / 77.2°F	NATURAL GAS	208/3/60	15.2	25	1,420	1 - 9
HV-4	GREENHECK	IGX-P112-H12-MF-E	15 - VOCATIONAL TRAINING	280	2,000	1.841	1.34	150.0	121.5	34.0°F / 90.2°F	NATURAL GAS	208/3/60	10.2	15	1,400	1 - 8
HV-7	GREENHECK	IGX-P112-H12-MF-C	33 - RECEPTION	470	1,600	1.813	1.1	100.0	81.0	34.0°F / 80.8°F	NATURAL GAS	208/3/60	10.2	15	1,350	1 - 7, 9

NOTES:
1. PROVIDE WITH MANUFACTURER'S ROOF CURB.
2. PROVIDE WITH RETURN AIR UNIT SECTION AND MIXING BOX.
3. PROVIDE WITH NEW 7-DAY PROGRAMMABLE THERMOSTAT.
4. PROVIDE WITH SEA COAST COATING.
5. PROVIDE WITH FREEZE PROTECTION.
6. PROVIDE WITH 2" MERV 13 FILTERS.
7. PROVIDE WITH HINGED ACCESS DOORS.
8. PROVIDE WITH SUPPLY DUCT SMOKE DETECTOR WIRED TO UNIT FOR EMERGENCY SHUTDOWN.
9. PROVIDE WITH POWERED CONVIENCE OUTLET.

ROOF VENTILATOR SCHEDULE

ID	Manufacturer	Model	CFM	Throat Size	Velocity (fpm)	Pressure Drop	Notes
RV-1	GREENHECK	FGI-12x12	60	12"x12"	60	0.01"	1 - 2

NOTES:
1. PROVIDE WITH MANUFACTURER'S ROOF CURB.
2. PROVIDE WITH MOTORIZED TWO POSITION DAMPER POWERED BY FC-1 CONTROL BOARD.

AIR INLET SCHEDULE

ID	Manufacturer	Model	Mounting	Module Size	Face Size	Neck Size	Material	Finish	Notes
1	TITUS	50F	SURFACE	--	12" x 12"	--	ALUMINUM	BAKED ENAMEL	1

NOTES:
1. EGGCRATE RETURN GRILLE WITH OPPOSED BLADE DAMPER.

AIR OUTLET SCHEDULE

ID	Manufacturer	Model	Mounting	Module Size	Face Size	Neck Size	Material	Finish	Notes
A	TITUS	TDC	SURFACE	--	12" x 12"	10Ø	STEEL	BAKED ENAMEL	1

NOTES:
1. LOUVERED FACE DIFFUSER, 1-WAY THROW WITH OPPOSED BLADE DAMPER.

ACCEPTANCE TESTING

PER TAB SPECIFICATION 23 05 93 SECTION 1.2.B. THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR HIRING A QUALIFIED TESTING, ADJUSTING, AND BALANCING (TAB) AGENCY. THE TAB AGENCY MUST BE AN APPROVED ACCEPTANCE TEST EMPLOYER WITH ACCEPTANCE TEST TECHNICIANS (ATT) WHO WILL BE REQUIRED TO PERFORM ALL ACCEPTANCE TESTING AND ASSOCIATED FORMS.

AIR BALANCE PROCEDURES

THIS PROJECT INCLUDES BALANCING FOR SYSTEMS: FC-1, HV-3, HV-4, AND HV-7

PRIOR TO COMMENCING WORK, PERFORM THESE MEASUREMENTS:

1. MEASURE AIRFLOW AT ALL EXISTING CEILING SUPPLY DIFFUSERS, RETURN GRILLES, AND EXHAUST GRILLES.
2. MEASURE AND RECORD THE TOTAL AIRFLOW, OUTSIDE AIRFLOW, FAN RPM, MOTOR RPM, MOTOR AMPERAGE DRAW, MOTOR VOLTAGE, MOTOR BHP, SHEAVE SIZES, SHEAVE POSITION, VFD SPEED, STATIC PRESSURE PROFILE (INCLUDING ALL FILTERS, COILS, COMPONENTS), AND MOTOR NAMEPLATE DATA FOR THE AIR HANDLING UNIT, RETURN FAN, AND EXHAUST FAN.
3. ALL PREBALANCE MEASUREMENTS AND FAN DATA SHALL BE RECORDED IN A PREBALANCE REPORT AND SUBMITTED TO THE ARCHITECT/ENGINEER PRIOR TO ANY MODIFICATION WORK. THE REPORT SHALL INCLUDE A MAP OF RELEVANT GRILLES AND DIFFUSERS.

UPON COMPLETION OF INSTALLATION, PERFORM THE FOLLOWING WORK:

1. ADJUST FC-1 AS REQUIRED TO ACHIEVE SPECIFIED AIRFLOWS.
2. ADJUST HV-3, HV-4, AND HV-7 TO MEET AIRFLOWS RECORDED IN PRE-CONSTRUCTION REPORT AT ALL REGISTERS.
3. MEASURE AND RECORD THE TOTAL AIRFLOW, FAN RPM, MOTOR RPM, MOTOR AMPERAGE DRAW, MOTOR VOLTAGE, MOTOR BHP, VFD SPEED, STATIC PRESSURE PROFILE (INCLUDING ALL FILTERS, COILS, COMPONENTS), AND MOTOR NAMEPLATE DATA FOR THE AIR HANDLING UNIT, RETURN FAN AND EXHAUST FAN.
4. SUBMIT FINAL AIR BALANCE REPORT, INCLUDING ALL FINAL AIRFLOW TEST RESULTS AND PREVIOUSLY MEASURED PRE-CONSTRUCTION TEST RESULTS. THE REPORT SHALL INCLUDE A MAP OF RELEVANT GRILLES AND DIFFUSERS.

AIR BALANCE REQUIREMENTS

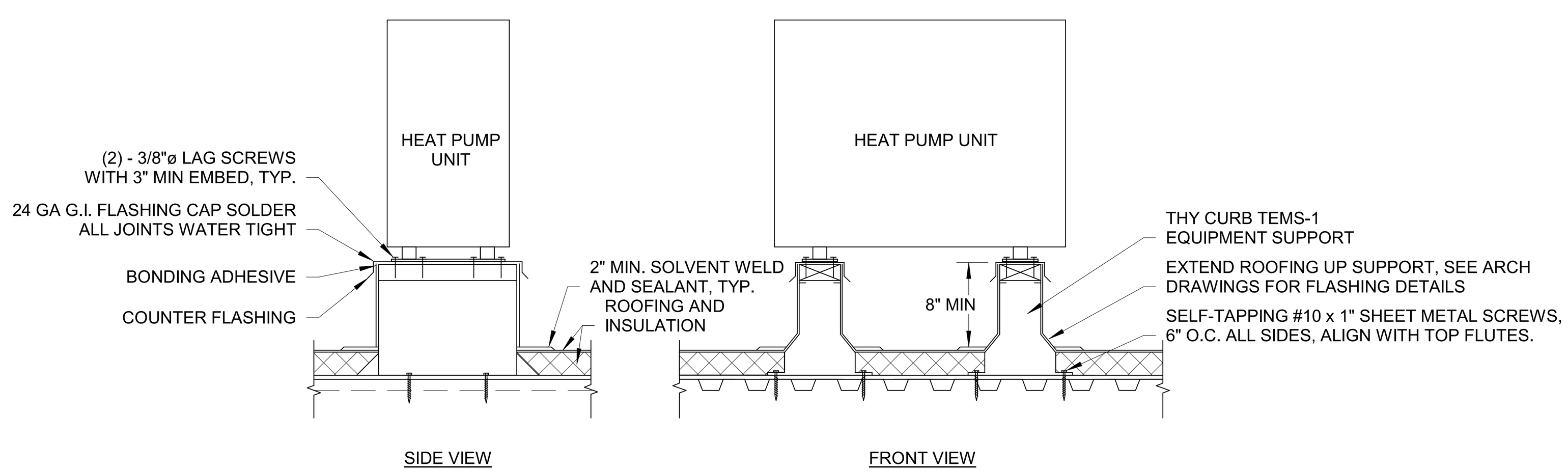
A. IN ACCORDANCE WITH 2022 CMC 407.3, THE VENTILATION SYSTEMS SHALL BE BALANCED IN ACCORDANCE WITH THE LATEST EDITIONS OF STANDARDS PUBLISHED BY THE ASSOCIATED AIR BALANCING COUNCIL (AABC), THE NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB), OR THE TESTING, ADJUSTING AND BALANCING BUREAU (TABB). THE TEST AND BALANCE AGENCY MUST BE CERTIFIED BY ONE OF THESE AGENCIES.

B. CONTRACTOR SHALL VERIFY THAT ALL SYSTEMS ARE COMPLETE AND OPERABLE BEFORE COMMENCING WORK. CONTRACTOR SHALL COORDINATE TESTING, ADJUSTING, AND BALANCING WORK WITH OTHER TRADES.

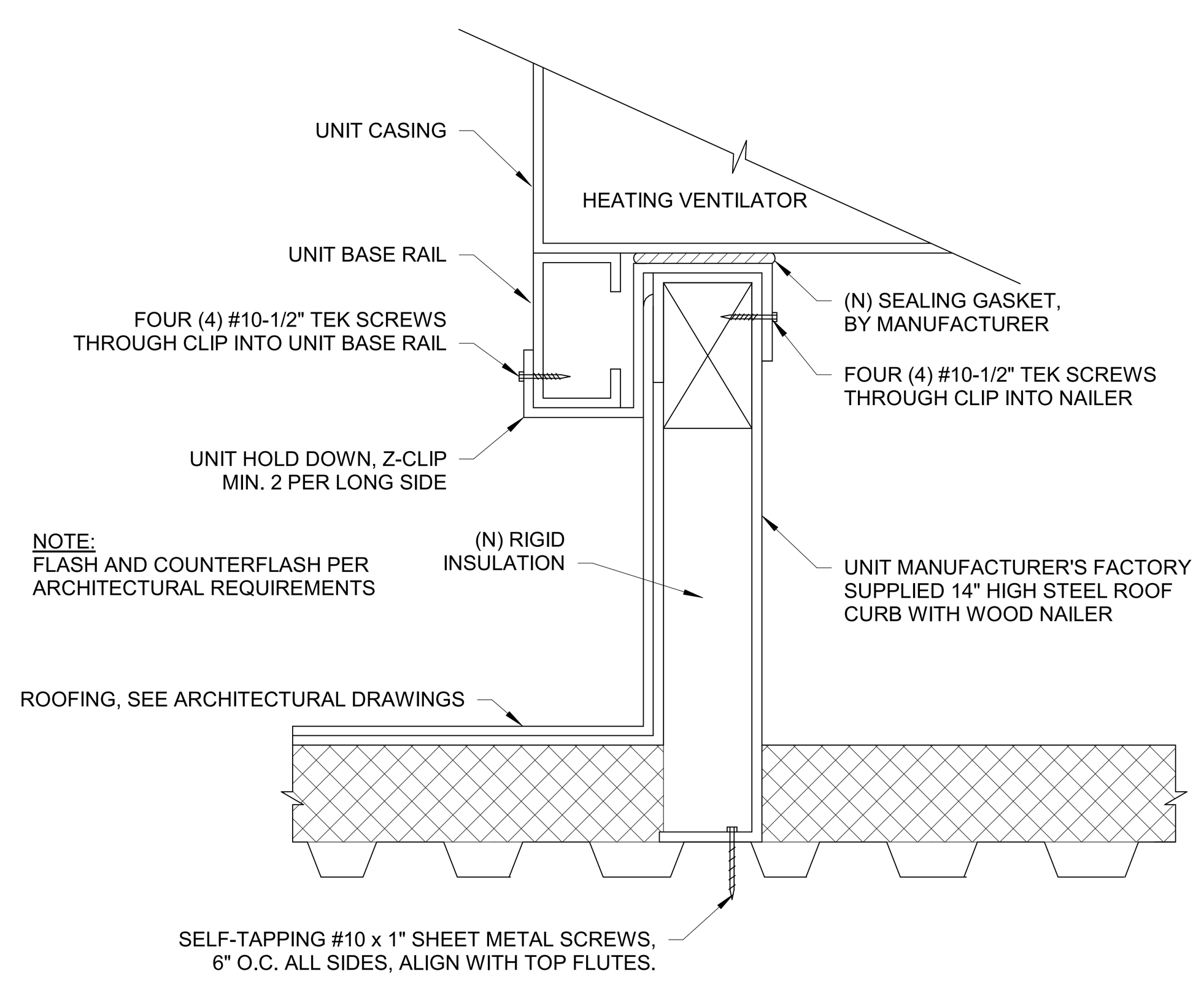
C. CONTRACTOR SHALL BE RESPONSIBLE FOR ADJUSTMENTS AND/OR MODIFICATIONS AND ADDITIONS TO FAN AND MOTOR SHEAVES, BELTS, DAMPER LINKAGES AND SIMILAR ITEMS REQUIRED TO ACHIEVE THE DESIGN AIR QUANTITIES SPECIFIED AT NO ADDITIONAL COST TO THE OWNER.

D. BALANCE ALL SUPPLY, RETURN, OUTSIDE AIR, AND EXHAUST AIR SYSTEMS TO ACHIEVE THE DESIGN QUANTITIES LISTED ON THE DRAWINGS. ADJUST ALL SYSTEMS TO WITHIN PLUS OR MINUS 5 PERCENT OF DESIGN AND ALL AIR INLETS AND OUTLETS TO WITHIN PLUS OR MINUS 10 PERCENT OF DESIGN. MEASURE AND RECORD TOTAL FAN AIRFLOWS, FAN SPEEDS, STATIC PRESSURE PROFILE ACROSS ALL MAJOR COMPONENTS, MOTOR ELECTRICAL CHARACTERISTICS, AND GENERAL OBSERVATIONS MADE DURING THE TEST AND BALANCE PROCESS.

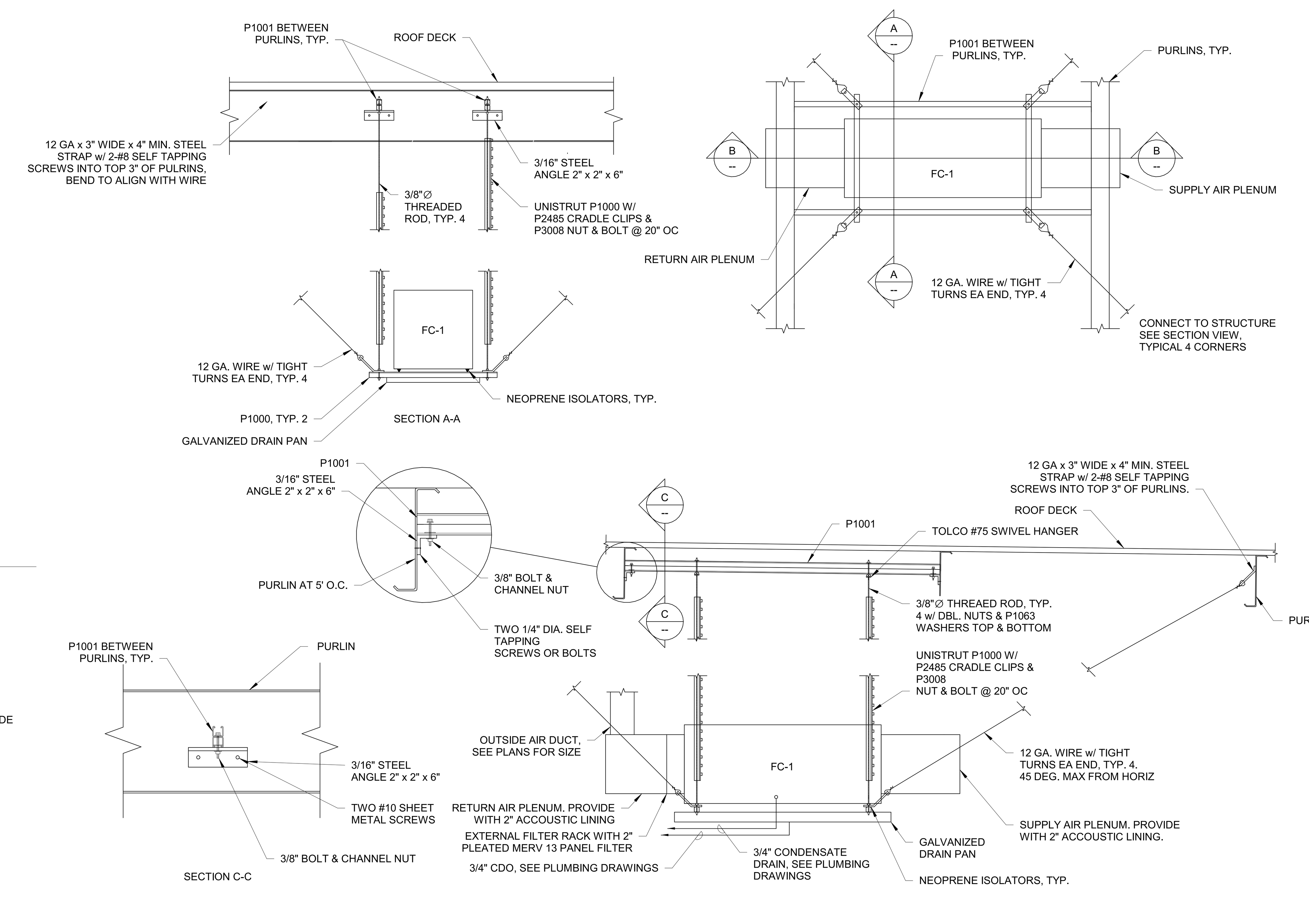
E. THE TAB AGENCY SHALL SUBMIT THREE (3) COPIES OF A COMPLETED AIR BALANCE REPORT. THE CONTRACTOR SHALL CERTIFY THAT ALL REPORTED DEFICIENCIES HAVE BEEN CORRECTED BY SIGNING THE FINAL BALANCE REPORT. ALL PRIOR TO FINAL ACCEPTANCE OF THE PROJECT.

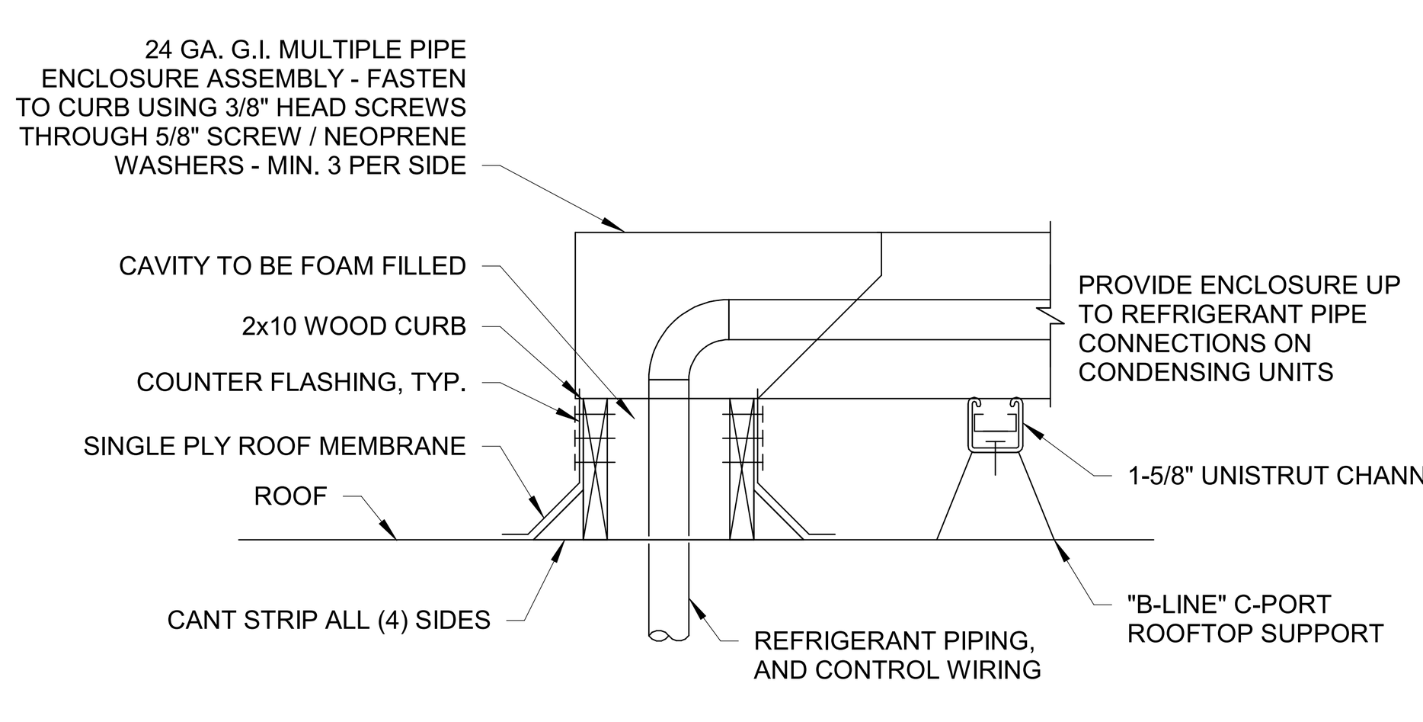


1 M100 HEAT PUMP ON ROOF DETAIL
NOT TO SCALE



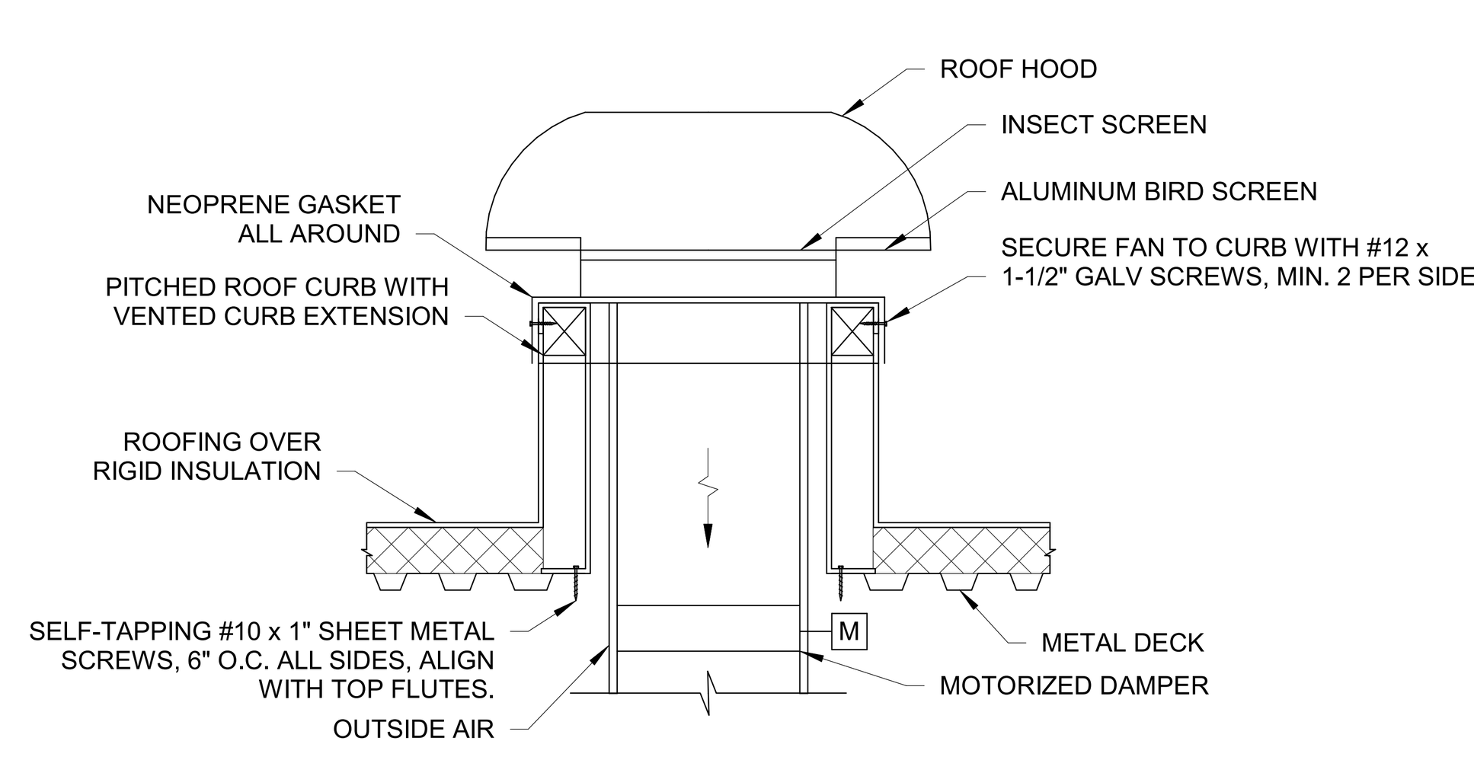
2 M100 HEATING VENTILATOR UNIT CURB DETAIL
NOT TO SCALE





NOTES:
1. ALL PIPES ENTERING THE PIPE ENCLOSURE ASSEMBLY SHALL BE SLOPED UPWARD AS THEY ENTER THE FLASHING SO THAT WATER WILL NOT BE ABLE TO RUN INTO THE BUILDING.
2. CLEAN AND PRIME THE ENTIRE TIE-IN AREA.

5 M100 REFRIGERANT PIPING THRU ROOF DETAIL
NOT TO SCALE



NOTE:
CURBS & FANS SHALL BE FROM THE SAME MANUFACTURER

4 M100 ROOF INTAKE DETAIL
NOT TO SCALE

3 M100 FAN COIL HANGING DETAIL
NOT TO SCALE

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Ph (530) 232-6160 · www.frontierce.com

LICENSE STAMP

KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

HUMBOLDT COUNTY REGIONAL FACILITY

2004 HARRISON AVENUE
EUREKA, CA 95501

NO.	REVISIONS	DATE

SHEET TITLE

MECHANICAL LEGEND, SCHEDULES, AND DETAILS

ISSUED FOR:

CONSTRUCTION DOCUMENTS

DATE:	9/20/2024
DRAWN BY:	EG
REVIEWED BY:	NW
SCALE:	1/8" = 1'-0"
PROJECT NO:	22007

M100

MECHANICAL SPECIFICATION

PART 1 – GENERAL

1.1 INCLUDED

A. THIS SECTION COVERS MECHANICAL WORK, COMPLETE. WORK INCLUDES FURNISHING, INSTALLING, CALIBRATING, ADJUSTING, TESTING, DOCUMENTING, AND STARTING UP EQUIPMENT IN ACCORDANCE WITH THESE SPECIFICATIONS, THE ACCOMPANYING PLANS, AND THE DIRECTIONS OF THE ENGINEER.

1.2 CODES AND STANDARDS

A. ALL WORK SHALL BE DONE IN COMPLIANCE WITH ALL APPLICABLE LOCAL, STATE, AND FEDERAL BUILDING SAFETY CODES, ORDINANCES, AND REGULATIONS. ADDITIONALLY, ALL WORK SHALL CONFORM TO THE LATEST EDITIONS OF THE FOLLOWING STANDARDS:

1. NATIONAL FIRE PROTECTION ASSOCIATION.
2. CALIFORNIA MECHANICAL CODE.
3. CALIFORNIA PLUMBING CODE.
4. UNDERWRITERS LABORATORIES.
5. TITLES 8, 17, 19, 21, 24 OF THE CALIFORNIA CODE OF REGULATIONS.
6. CALIFORNIA ELECTRIC CODE.
7. SMACNA STANDARDS.
8. ASHRAE STANDARDS 55 AND 62.1.

B. WHEN THE CONTRACT DOCUMENTS CALL FOR MATERIALS OR CONSTRUCTION OF A HIGHER STANDARD THAN IS REQUIRED BY THE ABOVE, THE CONTRACT DOCUMENT REQUIREMENTS SHALL TAKE PRECEDENCE OVER THE REQUIREMENTS OF THE APPLICABLE LAWS, ORDINANCES, RULES, OR REGULATIONS. NOTHING IN THE CONTRACT DOCUMENTS SHALL BE INTERPRETED AS PERMITTING WORK IN VIOLATION OF SAID LAWS, RULES, AND/OR REGULATIONS.

C. THE CONTRACTOR FOR THIS WORK SHALL FURNISH, WITHOUT EXTRA CHARGE, ANY ADDITIONAL MATERIALS AND/OR LABOR AS MAY BE REQUIRED FOR COMPLIANCE WITH THESE LAWS, RULES, AND/OR REGULATIONS THOUGH SUCH MATERIALS AND/OR LABOR ARE NOT SPECIALLY SET FORTH IN THE CONTRACT DOCUMENTS.

1.3 LICENSING REQUIREMENTS

A. ALL WORK OF DIVISION 22 AND 23 SHALL BE PERFORMED BY AN APPROPRIATELY LICENSED CONTRACTOR. THE LICENSES SHALL BE CURRENT, VALID THROUGH THE TERM OF THE CONTRACT AND IN THE NAME OF THE CONTRACTOR.

1. ALL HVAC WORK, WHICH INCLUDES WARM AIR HEATING SYSTEMS AND WATER HEATING PUMPS, VENTILATING SYSTEMS, AIR CONDITIONING SYSTEMS, AND DUCTWORK, REGISTERS, FLUES, HUMIDITY, AND THERMOSTATIC CONTROLS IN CONNECTION WITH THESE SYSTEMS, SHALL BE PERFORMED BY A C-20 – WARM-AIR HEATING, VENTILATING AND AIR-CONDITIONING CONTRACTOR.
2. ALL HYDRONIC PIPING SYSTEMS SHALL BE PERFORMED BY A C-4 – BOILER, HOT WATER HEATING AND STEAM FITTING CONTRACTOR.
3. ALL HYDRONIC PIPING INSULATION SHALL BE PERFORMED BY A C-2 – INSULATION AND ACOUSTICAL CONTRACTOR.

1.4 SUBMITTALS

A. SUBMITTAL LISTS AND DRAWINGS SHALL INCLUDE IDENTIFYING MARKS ASSIGNED BY THE DRAWINGS AND SPECIFICATIONS.

B. REVIEW OF DRAWINGS AND OTHER MATERIAL SUBMITTED SHALL NOT BE CONSTRUED AS COMPLETE CHECK OR CONSTITUTE A WAIVER OF THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS, BUT WILL INDICATE THAT THE MATERIAL SUBMITTED IS ACCEPTABLE IN QUALITY AND UTILITY. THIS REVIEW SHALL NOT RELIEVE THE CONTRACTOR OF THE RESPONSIBILITY TO FIT THE PROPOSED MATERIALS TO THE SPACES PROVIDED, AND TO EFFECT NECESSARY REARRANGEMENTS OR CONSTRUCTION OF OTHER WORK.

C. ALL FIXTURES, MATERIALS, AND EQUIPMENT EQUAL IN QUALITY AND UTILITY TO THESE HEREIN MENTIONED WILL BE ACCEPTED. WHEN SPECIFIC NAMES ARE USED IN DESCRIBING FIXTURES, MATERIALS, AND EQUIPMENT THEY ARE MENTIONED AS STANDARDS ONLY, BUT THIS IMPLIES NO RIGHT ON THE PART OF THE CONTRACTOR TO USE OTHER FIXTURES, MATERIAL, AND EQUIPMENT OR METHODS, UNLESS APPROVED AS EQUAL IN QUALITY AND UTILITY BY THE ARCHITECT.

D. BEFORE ANY FIXTURES, MATERIALS, OR EQUIPMENT ARE PURCHASED, THE CONTRACTOR SHALL SUBMIT TO THE ENGINEER FOR APPROVAL, A COMPLETE LIST OF MATERIALS, FIXTURES, AND EQUIPMENT, GIVING THE MANUFACTURER'S NAMES, CATALOG NUMBER, CAPACITY, SIZE, POWER REQUIREMENTS, ETC.

E. THE CONTRACTOR SHALL SUBMIT FOR THE APPROVAL OF THE ENGINEER, SHOP DRAWINGS OF PROPOSED MATERIAL AND EQUIPMENT THAT DIFFER FROM THE SPECIFIED MATERIALS AND EQUIPMENT, AND OF ANY SPECIFIED MATERIALS AND EQUIPMENT WITH SPECIAL CONDITIONS AND/OR ARRANGEMENTS. THESE DRAWINGS SHALL SHOW NECESSARY MODIFICATIONS OF OWNER, PLUMBING, ELECTRICAL, AND MECHANICAL WORK REQUIRED BY THE PROPOSED MATERIALS AND EQUIPMENT.

1.5 COOPERATION WITH OTHER TRADES

A. COOPERATE FULLY WITH OTHER TRADES DOING WORK ON THE PROJECT AS MAY BE NECESSARY FOR THE PROPER COMPLETION OF THE PROJECT. REFER TO THE STRUCTURAL, PLUMBING, AND ELECTRICAL DRAWINGS FOR DETAILS OF THE BUILDING STRUCTURE AND EQUIPMENT INSTALLATION THAT WILL TEND TO OVERLAP, CONFLICT WITH OR REQUIRE COORDINATION WITH THE WORK OF THIS SECTION, AND SCHEDULE THIS WORK ACCORDINGLY.

B. ANY WORK DONE WITHOUT REGARD FOR OTHER TRADES SHALL BE MOVED, REPLACED, OR REDONE AS REQUIRED, WITHOUT EXTRA CHARGES TO OWNER.

1.6 DIVISION OF WORK BETWEEN DIVISIONS 23 AND 26

A. CLOSE COORDINATION BETWEEN THE ELECTRICAL AND MECHANICAL TRADES IS A PART OF THE WORK THAT IS REQUIRED BY THIS CONTRACT. NO ALLOWANCE WILL BE MADE FOR OMISSIONS BASED ON INCORRECTLY ASSUMING ANOTHER TRADE WILL BE PERFORMING YOUR WORK. CONFIRM YOUR SCOPE OF WORK WITH THE GENERAL CONTRACTOR.

B. THE DIVISION OF RESPONSIBILITIES BETWEEN TRADES SUPPLYING EQUIPMENT IN OTHER DIVISIONS MAY BE DIFFERENT. FOR INSTANCE, DIVISION 26 CONTRACTOR MAY BE REQUIRED TO SUPPLY DISCONNECT SWITCHES AND STARTERS FOR NON-HVAC MECHANICAL EQUIPMENT SUPPLIED UNDER OTHER DIVISIONS.

C. DIVISION 23 RESPONSIBILITIES

1. ASSUME RESPONSIBILITY FOR THE PROPER FUNCTIONING OF THE HVAC SYSTEMS IN THEIR ENTIRETY.
2. FURNISH AND INSTALL ALL CONDUCTORS AND CONDUIT REQUIRED FOR CONTROL OF HVAC EQUIPMENT.
3. MAKE ALL TERMINATIONS WITH THE EXCEPTION OF POWER CONDUCTORS.
4. FURNISH AND INSTALL ALL CONTROL PANELS AND DEVICES TO PROVIDE A COMPLETE AND FUNCTIONAL CONTROLS SYSTEM, INCLUDING ALL CONTROLS TRANSFORMERS.
5. FURNISH AND INSTALL MOTOR STARTERS FOR ALL EQUIPMENT SPECIFIED IN DIVISION 23.
6. INSTALL DUCT SMOKE DETECTORS FURNISHED BY FIRE ALARM CONTRACTOR IN BUILDINGS WITH FIRE ALARM SYSTEMS.
7. FURNISH AND INSTALL DUCT SMOKE DETECTORS IN BUILDINGS WITHOUT FIRE ALARM SYSTEMS.
8. FURNISH AND INSTALL ALL CONTROL CONDUCTORS AND CONDUIT CONNECTING DUCT SMOKE DETECTORS TO SMOKE DAMPERS AND FAN START CONTROLS.
9. ALL ELECTRICAL WORK PERFORMED UNDER DIVISION 23 SHALL CONFORM TO THE REQUIREMENTS OF DIVISION 26.

D. DIVISION 26 RESPONSIBILITIES

1. FURNISH AND INSTALL ALL RACEWAYS, CONDUIT, DISCONNECT SWITCHES, AND CONDUCTORS NECESSARY FOR ELECTRICAL POWER SUPPLY.
2. MAKE ALL POWER SUPPLY TERMINATIONS TO MOTORS, STARTERS, DISCONNECT SWITCHES, CONTROL TRANSFORMERS, AND OTHER MECHANICAL DEVICES.
3. FIRE ALARM CONTRACTOR TO FURNISH DUCT SMOKE DETECTORS IN BUILDINGS WITH FIRE ALARM SYSTEMS.
4. PROVIDE POWER TO ALL DUCT SMOKE DETECTORS AND SMOKE DAMPERS.
5. COORDINATE ALL WORK WITH MECHANICAL CONTRACTORS.

1.7 AS-BUILT DRAWINGS

A. A COMPLETE SET OF CONTRACT DRAWINGS SHALL BE MAINTAINED AT THE WORK SITE, AND ALL CHANGES IN THE WORK SHALL BE RECORDED ON THIS SET, ON A DAILY BASIS. THE FINAL AS-BUILT DRAWINGS SHALL BE SUBMITTED TO THE ARCHITECT FOR APPROVAL.

1.8 DESIGN DRAWINGS

A. THE DRAWINGS INDICATE DIAGRAMMATICALLY THE GENERAL LAYOUT OF THE MECHANICAL SYSTEMS AND OTHER RELATED WORK. FIELD VERIFICATION OF SCALED DIMENSIONS TAKEN FROM THE DRAWINGS IS REQUIRED.

B. THE CONTRACTOR SHALL REVIEW AND COMPARE THE ARCHITECTURAL, STRUCTURAL, PLUMBING, MECHANICAL, AND ELECTRICAL DRAWINGS AND ALL OWNER SUPPLIED EQUIPMENT DRAWINGS, AND ADJUST THEIR WORK TO BE IN CONFORMITY WITH THE CONDITIONS INDICATED THEREON. DISCREPANCIES BETWEEN DRAWINGS, BETWEEN DRAWINGS AND ACTUAL FIELD CONDITIONS, OR BETWEEN DRAWINGS AND SPECIFICATIONS, SHALL PROMPTLY BE BROUGHT TO THE ATTENTION OF THE ARCHITECT FOR A DETERMINATION OF THE MODIFICATIONS TO BE EFFECTED. IN THE EVENT THAT A MAJOR MODIFICATION IS REQUIRED, A CHANGE ORDER WILL BE PREPARED.

1.9 VERIFICATION OF EXISTING CONDITIONS AND DEMOLITION

A. BEFORE INSTALLATION OF ANY NEW WORK, VERIFY THE LOCATION, SIZE, AND OTHER CONDITIONS AT ALL POINTS OF CONNECTION TO SERVICES OR OTHER EXISTING PIPING, AND AT ALL LOCATIONS WHERE NEW WORK WILL CROSS OR PASS NEAR EXISTING PIPING, ELECTRICAL, OR OTHER FACILITIES.

B. REMOVE DUCTWORK, PIPING, CONTROLS, FIXTURES, AND EQUIPMENT THAT IS NOT TO REMAIN IN SERVICE AS SHOWN ON THE DRAWINGS OR AS REQUIRED. THIS INCLUDED THE REMOVAL OF ASSOCIATED APPURTENANCES AND SUPPORTS.

C. PATCH, CAP, OR REPAIR EXISTING WORKS AFFECTED BY THIS DEMOLITION IN CONCEALED SPACES WITHIN SIX (6) INCHES OF A LIVE MAIN OR BRANCH.

D. DELIVER REMOVED MATERIAL TO THE OWNER AS DIRECTED BY THE ARCHITECT. DISPOSE OF ALL OTHER REMOVED MATERIAL OFFSITE.

E. INFORMATION SHOWN RELATIVE TO EXISTING SERVICES IS BASED UPON AVAILABLE RECORDS AND DATA DURING PREPARATION OF THE DRAWINGS, BUT SHALL BE VERIFIED. MAKE REASONABLE DEVIATIONS FOUND NECESSARY TO CONFORM TO ACTUAL LOCATIONS AND CONDITIONS, WITHOUT EXTRA CHARGE.

1.10 OPERATING AND MAINTENANCE INSTRUCTIONS

A. FURNISH THREE SETS OF TYPEWRITTEN INSTRUCTIONS COVERING MAINTENANCE, ADJUSTMENT, AND OPERATION OF EACH PIECE OF APPARATUS, BOUND IN A HARD COVER LOOSE-LEAF BINDER. NEATLY OBSCURE OR CROSS OUT INAPPLICABLE DATA FROM MANUFACTURER'S LITERATURE. SUBMIT DATA TO THE ARCHITECT.

B. OPERATING INSTRUCTIONS SHALL SHOW SEQUENCE OF OPERATIONS, LUBRICATION, CARE, AND MAINTENANCE REQUIREMENTS OF ALL EQUIPMENT. FINAL ACCEPTANCE OF THE WORK WILL NOT BE MADE UNTIL A SATISFACTORY SUBMISSION OF THIS MATERIAL IS RECEIVED AND APPROVED BY THE ARCHITECT.

C. THE OWNER'S AUTHORIZED REPRESENTATIVE SHALL BE INSTRUCTED IN THE OPERATION AND SERVICING OF ALL HVAC & PLUMBING SYSTEMS.

1.11 ACCURACY OF DATA

A. THE DATA GIVEN HEREIN AND ON THE DRAWINGS ARE AS EXACT AS COULD BE REASONABLY SECURED, BUT ABSOLUTE ACCURACY IS NOT GUARANTEED. EXACT LOCATIONS, DISTANCES, ELEVATIONS, ETC. WILL BE GOVERNED BY SHOP DRAWINGS, THE BUILDING ITSELF, AND ACTUAL FIELD CONDITIONS.

1.12 DAMAGE BY LEAKS

A. CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO WORK OF OTHER CONTRACTORS THAT IS CAUSED BY LEAKS IN ANY TEMPORARY OR PERMANENT PIPING SYSTEMS DUE TO PIPE RUPTURE, DISCONNECTED PIPES OR FITTINGS, OR BY OVERFLOW OF EQUIPMENT.

1.13 SEISMIC FORCE RESISTANCE: MECHANICAL, PLUMBING, FIRE PROTECTION SYSTEMS

A. ALL MECHANICAL SYSTEMS AND PLUMBING PIPING SYSTEMS SHALL ADHERE TO THE SMACNA "SEISMIC RESTRAINT MANUAL: GUIDELINES FOR MECHANICAL SYSTEMS," THIRD EDITION DATED MARCH 2008.

1.14 DELIVERY, STORAGE, AND HANDLING

A. CONTRACTOR SHALL BE RESPONSIBLE FOR DELIVERY, STORAGE, PROTECTION, AND PLACING OF ALL EQUIPMENT AND MATERIALS.

1. CONTRACTOR SHALL PROTECT THE WORK AND MATERIALS FROM DAMAGE DURING CONSTRUCTION. EQUIPMENT STORED AT THE JOB SITE SHALL BE PROTECTED FROM DUST, WATER, OR OTHER DAMAGE, AND BE COVERED IF EQUIPMENT IS EXPOSED TO WEATHER. PROTECT INTERIORS OF NEW EQUIPMENT AND PIPING SYSTEMS AGAINST ENTRY OF FOREIGN MATTER. CLEAN BOTH INSIDE AND OUTSIDE BEFORE PAINTING OR PLACING EQUIPMENT IN OPERATION.
2. ANY ITEMS DAMAGED SHALL BE REPAIRED OR REPLACED, AT NO ADDITIONAL COST TO THE OWNER.

B. CLEANLINESS OF PIPING AND EQUIPMENT SYSTEMS

1. EXERCISE CARE IN STORAGE AND HANDLING OF EQUIPMENT AND PIPING MATERIAL TO BE INCORPORATED IN THE WORK. REMOVE DEBRIS ARISING FROM CUTTING, THREADING, AND WELDING OF PIPING.
2. PIPING SYSTEMS SHALL BE FLUSHED, BLOWN, OR PIGGED AS NECESSARY TO DELIVER CLEAN SYSTEMS.
3. CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ALL COSTS, DAMAGE, AND DELAY ARISING FROM FAILURE TO PROVIDE CLEAN SYSTEMS.

1.15 WARRANTIES

A. EQUIPMENT WARRANTIES SHALL BE PROVIDED FOR ALL EQUIPMENT, WITH ALL NECESSARY INFORMATION FILLED IN, EXCEPT PURCHASE DATE, IN FAVOR OF THE OWNER.

B. THE CONTRACTOR SHALL GUARANTEE THAT ALL WORK UNDER THIS SECTION IS FREE FROM DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE YEAR FROM THE DATE OF FILING THE NOTICE OF COMPLETION. REPLACEMENT OF DEFECTIVE WORK AND DAMAGE CAUSED TO WORK OF OTHER TRADES AS A RESULT OF SUCH DEFECTIVE WORK SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, AND SHALL BE MADE AT NO COST TO THE OWNER.

1.16 ALTERNATIVE MATERIALS AND METHODS

A. THESE PLANS AND SPECIFICATIONS DESCRIBE THE GENERAL SCOPE OF THE MECHANICAL SYSTEMS. THESE PLANS AND SPECIFICATIONS DO NOT PRECLUDE THE SUBMITTAL OF ALTERNATIVE METHODS OR MATERIALS. MANUFACTURER'S NAMES AND CATALOG NUMBERS ARE STATED TO IDENTIFY THE TYPE AND QUALITY OF THE EQUIPMENT OR MATERIALS REQUIRED FOR THE PROJECT.

B. THE CONTRACTOR MAY SUBMIT SHOP DRAWINGS AND/OR TECHNICAL INFORMATION ON ALTERNATIVE EQUIPMENT, MATERIALS OR INSTALLATION DETAILS TO ACCOMPLISH THE INTENT OF THE PLANS AND SPECIFICATIONS. APPROVAL OF THE ALTERNATIVE EQUIPMENT, MATERIALS OR INSTALLATION DETAILS SHALL NOT RELIEVE THE CONTRACTOR OF ANY RESPONSIBILITY FOR COMPLYING WITH THE INTENT OF THE PLANS AND SPECIFICATIONS. SUBMIT THE MANUFACTURERS' TECHNICAL INFORMATION, SHOP DRAWINGS, AND/OR WRITTEN DESCRIPTION OF ALTERNATIVE METHODS FOR EACH ITEM DESCRIBED BY MANUFACTURER'S NAME AND CATALOG NUMBER AND FOR EACH COMPONENT, EQUIPMENT, MATERIAL, OR INSTALLATION DETAIL REQUIRED.

1.17 SITE EXAMINATION

A. THOROUGHLY EXAMINE THE SITE AND VERIFY THE ACTUAL WORK CONDITIONS. NO EXTRA COMPENSATION WILL BE ALLOWED FOR EXPENSES DUE TO FAILURE TO DISCOVER SITE CONDITIONS WHICH AFFECT THE WORK.

PART 2 – PRODUCTS

2.1 GENERAL

A. ALL MATERIALS, APPLIANCES, AND EQUIPMENT SHALL BE NEW AND BEST OF THEIR RESPECTIVE KINDS, FREE FROM DEFECTS, AND OF THE MAKE, BRAND, OR QUALITY SPECIFIED OR AS ACCEPTED BY THE ARCHITECT.

B. WHEN TWO OR MORE UNITS OF MATERIALS OR EQUIPMENT OF THE SAME TYPE OR CLASS ARE REQUIRED, THESE UNITS SHALL BE PRODUCTS OF ONE MANUFACTURER.

C. APPLY AND INSTALL ALL ITEMS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS. REFER CONFLICTS BETWEEN MANUFACTURER'S INSTRUCTIONS AND THE CONTRACT DRAWINGS AND SPECIFICATIONS TO THE ARCHITECT FOR RESOLUTION.

2.2 THERMOSTATS

A. ELECTRIC, SOLID-STATE, MICROCOMPUTER-BASED ROOM THERMOSTAT WITH THE FOLLOWING FEATURES.

1. AUTOMATIC SWITCHING FROM HEATING TO COOLING.
2. PREFERENTIAL RATE CONTROL TO MINIMIZE OVERSHOOT AND DEVIATION FROM SET POINT.
3. SET UP FOR FOUR SEPARATE TEMPERATURES PER DAY.
4. INSTANT OVERRIDE OF SET POINT FOR CONTINUOUS OR TIMED PERIOD FROM 1 HOUR TO 31 DAYS.
5. SHORT-CYCLE PROTECTION.
6. PROGRAMMING BASED ON EVERY DAY OF WEEK.
7. SELECTION FEATURES INCLUDE DEGREE F OR DEGREE C DISPLAY, 12- OR 24-HOUR CLOCK, KEYBOARD DISABLE, REMOTE SENSOR, AND FAN ON-AUTO.
8. BATTERY REPLACEMENT WITHOUT PROGRAM LOSS.
9. THERMOSTAT DISPLAY FEATURES INCLUDE THE FOLLOWING:
   a. TIME OF DAY.
   b. ACTUAL ROOM TEMPERATURE.
   c. PROGRAMMED TEMPERATURE.
   d. PROGRAMMED TIME.
   e. DURATION OF TIMED OVERRIDE.
   f. DAY OF WEEK.
   g. SYSTEM MODE INDICATIONS INCLUDE "HEATING," "OFF," "FAN AUTO," AND "FAN ON."

B. THERMOSTAT COVER CONSTRUCTION: HEAVY-DUTY, LOCKING THERMOSTAT GUARD, OF SOLID METAL TAMPERPROOF CONSTRUCTION.

C. ACCURACY: PLUS OR MINUS 0.5 DEG. F AT CALIBRATION POINT.

D. WIRE: TWISTED, SHIELDED-PAIR CABLE.

E. CONTRACTOR SHALL FIELD VERIFY DIMENSIONS PRIOR TO ORDERING FAN AND CURB ADAPTOR.

2.3 DUCTWORK

A. SHEET METAL DUCTWORK - RECTANGULAR

1. DUCTS AND PLENUMS SHALL BE FABRICATED AND INSTALLED IN CONFORMANCE WITH THE LATEST EDITIONS OF: NFPA PAMPHLET NO. 90A; CALIFORNIA BUILDING CODE; CALIFORNIA MECHANICAL CODE AND THE SMACNA HVAC DUCT CONSTRUCTION STANDARDS (METAL AND FLEXIBLE). DUCTS AND PLENUMS SHALL BE CONSTRUCTED OF HOT DIPPED GALVANIZED MILD STEEL AND SHALL HAVE AIRTIGHT CLASS "B" SEALS AT ALL TRANSVERSE JOINTS AND LONGITUDINAL SEAMS. TABLES AND FIGURES HEREINAFTER REFERENCED ARE FROM THE 2005 EDITION OF THE SMACNA HVAC DUCT CONSTRUCTION STANDARDS (METAL AND FLEXIBLE).
2. RECTANGULAR DUCT CONSTRUCTION SHALL CONFORM TO TABLE 2-3. ALL TRANSVERSE JOINTS SHALL BE FLANGED PER TABLE 2-32, WITH CORNER CLOSURES OR "DUCT MATE" FLANGED CONNECTIONS WITH CORNER CLOSURES PER FIGURE 2-17. ELBOWS SHALL BE STANDARD RADIUS (TYPE RE 1) OR SQUARE THROAT WITH VANES (TYPE RE 2) PER FIGURE 4-2, WITH DOUBLE THICKNESS TURNING VANES PER FIGURES 4-3 AND 4-4. OFFSETS AND TRANSITIONS SHALL BE PER FIGURE 4-7. SUPPLY, RETURN, AND EXHAUST BRANCH CONNECTIONS SHALL BE PER FIGURE 4-5 OR 4-6. SPLITTERS SHALL NOT BE USED.
3. LINED DUCTS SHALL BE FABRICATED SUCH THAT THE NET INSIDE DIMENSIONS EQUALS THE DUCT SIZES SHOWN ON THE DRAWINGS.

B. SHEET METAL DUCTWORK – ROUND DUCTS SHALL BE SPIRAL, UNITED MCGILL OR EQUAL. ALL TRANSVERSE JOINTS AND LONGITUDINAL SEAMS SHALL HAVE CLASS "B" SEALS. ALL BRANCHES IN ROUND DUCT SYSTEMS SHALL BE MADE WITH FACTORY FABRICATED REDUCING WYE BRANCHES. DUCT TURNS SHALL BE MADE WITH STANDARD, FACTORY FABRICATED, THREE-PIECE ELBOWS.

C. FLEXIBLE DUCTWORK – FLEXIBLE DUCTS SHALL BE FLEXMASTER "8M" OR APPROVED EQUAL. FLEXIBLE DUCTS SHALL BE USED ONLY WHERE SHOWN ON THE DRAWINGS, AND MAXIMUM LENGTH OF ANY GIVEN FLEXIBLE DUCT SHALL NOT EXCEED 5 FT. GALVANIZED SHEET METAL ELBOWS SHALL BE USED FOR TURNS GREATER THE 45° ON FLEXIBLE DUCTS 10" AND LARGER. CONNECTIONS TO RECTANGULAR DUCTS SHALL BE MADE WITH "SPIN-IN" FITTINGS WITH AIR SCOOPS. THE INSTALLATION OF FLEXIBLE DUCTS SHALL CONFORM TO FIGURE 3-10, WITH THE EXCEPTIONS NOTED HEREIN.

D. SUPPORTS – SUPPORTS FOR HORIZONTAL DUCTS AND PLENUMS SHALL BE FABRICATED PER FIGURES 5-5 AND 5-6 AND TABLES 5-1, 5-2, AND 5-3. THE MAXIMUM DISTANCE BETWEEN HANGERS SHALL BE EIGHT FEET FOR RECTANGULAR DUCTS AND TWELVE FEET FOR ROUND DUCTS. ATTACHMENTS TO THE STRUCTURE SHALL BE MADE WITH ADEQUATELY SIZED LAG BOLTS FOR STRAPHANGERS AND ADEQUATELY SIZED MACHINE BOLTS AND SIDE BEAM BRACKETS FOR ROD HANGERS. SUPPORTS FOR VERTICAL DUCTS SHALL BE BAND IRON STRAP OR ANGLE BRACKET TYPE PER FIGURE 5-8 AND 5-9.

E. DUCT ACCESS DOORS: INCLUDING THOSE FOR REMOVING FILTERS, DUCT ACCESS DOORS SHALL BE AS DETAILED IN FIGURE 7-2 WITH SASH LOCKS, PIANO HINGES, AND GASKETS. ACCESS DOORS SHALL HAVE AN UNOBSTRUCTED FULL SWING.

2.4 IDENTIFICATION FOR MECHANICAL SYSTEMS

A. LABELS

1. VINYL WRAPAROUND LABELS: PREPRINTED, FLEXIBLE LABELS LAMINATED WITH A CLEAR, WEATHER- AND CHEMICAL-RESISTANT COATING AND MATCHING WRAPAROUND CLEAR ADHESIVE TAPE FOR SECURING LABEL ENDS.
2. SNAP-AROUND LABELS: SLIT, PRE-TENSIONED, FLEXIBLE, PREPRINTED, COLOR-CODED ACRYLIC SLEEVES, WITH DIAMETERS SIZED TO SUIT DIAMETERS AND THAT STAY IN PLACE BY GRIPPING ACTION.
3. SELF-ADHESIVE WRAPAROUND LABELS: 3-MIL-THICK, POLYESTER FLEXIBLE LABEL WITH ACRYLIC PRESSURE-SENSITIVE ADHESIVE.
   a. SELF-LAMINATION: CLEAR; UV-, WEATHER- AND CHEMICAL-RESISTANT; SELF-LAMINATING, PROTECTIVE SHIELD OVER THE LEGEND. LABELS SIZED SUCH THAT THE CLEAR SHIELD OVERLAPS THE ENTIRE PRINTED LEGEND.
   b. MARKER FOR LABELS: MACHINE-PRINTED, PERMANENT, WATERPROOF, BLACK INK RECOMMENDED BY PRINTER MANUFACTURER.
4. SELF-ADHESIVE LABELS: POLYESTER, THERMAL, TRANSFER-PRINTED, 3-MIL-THICK, MULTICOLOR, WEATHER- AND UV-RESISTANT, PRESSURE-SENSITIVE ADHESIVE LABELS, CONFIGURED FOR INTENDED USE AND LOCATION.
   a. MINIMUM NOMINAL SIZE:
      1. 3-1/2 BY 5 INCHES FOR EQUIPMENT.
      2. AS REQUIRED BY AUTHORITIES HAVING JURISDICTION.

2.5 DUCTWORK ACCESSORIES

A. FLEXIBLE DUCT CONNECTIONS

1. DURO-DYNE "METAL-FAB" WITH DUROION, VENTFABRICS "VENTGLASS," OR APPROVED EQUAL.
2. INSTALL AT EACH POINT WHERE A BLOWER UNIT IS CONNECTED TO A DUCT. A MINIMUM CLEARANCE OF THREE INCHES BETWEEN THE DUCT AND THE SOURCE OF VIBRATION SHALL BE MAINTAINED. INSTALL PER FIGURE 2-17.

B. SCREENS – INSTALL REMOVABLE BIRD SCREENS AT ALL OUTSIDE INTAKES AND EXHAUST AIR DISCHARGES. SCREENS SHALL BE FABRICATED FROM ½" X 14 GAUGE MESH SECURED IN FULL FRAMES. SCREENS AND FRAMES SHALL BE CONSTRUCTED OF THE SAME MATERIAL AS THE DUCT, HOOD, OR EQUIPMENT TO WHICH ATTACHED.

C. JOINTS – TAPE ALL JOINTS AIRTIGHT USING HARDCAST TYPE "DT" PRESSURELESS TAPE AND "HD-20" ADHESIVE, PER MANUFACTURER'S DIRECTIONS.

D. DAMPERS – PROVIDE BUTTERFLY OR MULTI-BLADE DAMPERS WHERE INDICATED ON THE DRAWINGS OR AS REQUIRED FOR BALANCING AIR QUANTITIES TO VALUES SHOWN WITHOUT GENERATING EXCESSIVE NOISE. PROVIDE DURO-DYNE "KS-385," OR APPROVED EQUAL, LOCKING QUADRANTS ON EACH MANUAL DAMPER. LOCATE DAMPERS IN FURRED CEILINGS NEAR ACCESS PANELS WHERE POSSIBLE.

1. BUTTERFLY DAMPERS SHALL BE CONSTRUCTED AS PER FIGURE 7-4, FIGURE A, B, AND C IN THE DUCT MANUAL.
2. MULTI-BLADE DAMPERS SHALL CONFORM TO FIGURE 7-5.
3. BACK-DRAFT DAMPERS SHALL BE AIR BALANCE "AIR DYNAMIC" MODEL DY-1002-V, OR EQUAL.

2.6 INSULATION

A. EXTERIOR OF DUCTWORK:

1. UNLESS SPECIFIED TO BE LINED, ALL SHEET METAL SUPPLY AND RETURN DUCTS IN INDIRECTLY CONDITIONED SPACES SHALL BE INSULATED ON THE OUTSIDE WITH JOHNS MANVILLE "MICROLITE XG" FLEXIBLE FIBERGLASS BLANKET-TYPE DUCT WRAP, WITH FACTORY APPLIED FSK ALUMINUM FOIL FACING, WITH A COMPOSITE UL RATING OF 25/50, MINIMUM R-6 INSTALLED.
2. UNLESS SPECIFIED TO BE LINED, ALL SHEET METAL SUPPLY AND RETURN DUCTS IN UNCONDITIONED SPACES SHALL BE INSULATED ON THE OUTSIDE WITH JOHNS MANVILLE "MICROLITE XG" FLEXIBLE FIBERGLASS BLANKET-TYPE DUCT WRAP, WITH FACTORY APPLIED FSK ALUMINUM FOIL FACING, WITH A COMPOSITE UL RATING OF 25/50, MINIMUM R-8 INSTALLED.
3. ALL OUTSIDE AIR DUCTWORK BETWEEN BUILDING OUTSIDE AIR INLET AND HVAC UNIT OR HEAT/ENERGY RECOVERY VENTILATOR SHALL BE INSULATED ON THE OUTSIDE WITH JOHNS MANVILLE "MICROLITE XG" FLEXIBLE FIBERGLASS BLANKET-TYPE DUCT WRAP, WITH FACTORY APPLIED FSK ALUMINUM FOIL FACING, WITH A COMPOSITE UL RATING OF 25/50, MINIMUM R-4 INSTALLED.
4. EXHAUST DUCTWORK WITHIN 10 FEET OF TERMINATION POINT AND BETWEEN ANY HEAT/ENERGY RECOVERY VENTILATOR AND EXHAUST TERMINATION SHALL BE INSULATED ON THE OUTSIDE WITH JOHNS MANVILLE "MICROLITE XG" FLEXIBLE FIBERGLASS BLANKET-TYPE DUCT WRAP, WITH FACTORY APPLIED FSK ALUMINUM FOIL FACING, WITH A COMPOSITE UL RATING OF 25/50, MINIMUM R-4 INSTALLED.

B. INTERIOR OF DUCTWORK:

1. DUCT LINING SHALL BE INSTALLED IN SUPPLY AND RETURN DUCTS AND PLENUMS WHERE NOTED ON THE DRAWINGS. LINING SHALL BE JOHNS MANVILLE "PERMACOTELINACOUSTIC R" RIGID FIBERGLASS BOARD FOR PLENUMS AND "PERMACOTELINACOUSTIC HP" FIBERGLASS DUCT LINER FOR DUCTS, 1" THICK, UNLESS OTHERWISE NOTED, WITH FIRE RESISTANT COATING. DUCT LINER SHALL MEET ASTM C 1071, WITH AIR SURFACE COATED WITH ACRYLIC COATING TREATED WITH EPA REGISTERED ANTI-MICROBIAL AGENT PROVE TO RESIST MICROBIAL GROWTH AS DETERMINED BY ASTM G 21 AND G 22. INSULATION WITH TORN OR BROKEN COATING SHALL BE REMOVED AND REPLACED. LOOSE CORNERS, EDGES, AND BUTT JOINTS WILL NOT BE ACCEPTED.
2. ALL EXPOSED EXTERIOR SUPPLY AND RETURN DUCTWORK SHALL HAVE MINIMUM 2" INTERIOR INSULATION, AS SPECIFIED IN THIS SECTION.
3. MAXIMUM VELOCITY: 5,000 FT/MIN.
4. FASTENERS: DUCT LINER GALVANIZED STEEL PINS, WELDED OR MECHANICALLY FASTENED.
5. DEVELOPED SMOKE DENSITY SHALL NOT EXCEED 50. FLAME SPREAD RATING SHALL NOT EXCEED 25.

2.7 REFRIGERATION PIPING AND APPURTENANCES

A. REFRIGERANT PIPING SHALL BE TYPE "ACR" DE-OXIDIZED HARD TEMPER COPPER TUBE, ASTM B280.

B. MECHANICAL JOINTS ON REFRIGERANT PIPING SYSTEMS ARE PROHIBITED. ALL REFRIGERANT PIPING JOINTS SHALL BE BRAZED. USE LEAD-FREE, SILVER SOLDER, MINIMUM 15% SILVER CONTENT.

C. PIPE FITTINGS SHALL BE WROUGHT-COPPER WITH SOLDERED JOINTS, ASME B16.22.

D. FLEXIBLE CONNECTIONS SHALL BE BRONZE, DOUBLE BRAIDED, SWEAT SOLDER ENDS.

E. MOISTURE/LIQUID INDICATORS (SIGHT GLASSES) SHALL BE COLOR CHANGE MOISTURE INDICATION TYPE, REPLACEABLE ELEMENT, FILTER SCREEN AND PAD, SWEAT SOLDER ENDS; SPORLAN "SEE-ALL", HENRY, OR EQUAL.

F. CHARGING AND PURGE VALVES SHALL BE FORGED BRASS, DIAPHRAGM PACKLESS, GLOBE TYPE, ANGLE OR STRAIGHT THROUGH, ONE END SOLDER, ONE END FLARE; HENRY 623 AND 643 SERIES, SPORLAN OR EQUAL.

G. SOLENOID VALVES SHALL BE FORGED BRASS, EXTENDED END CONNECTIONS, SOLDER ENDS, MOLDED COIL; SPORLAN "E" SERIES OR EQUAL. COMPLY WITH ARI 760 & UL 429.

H. FILTER DRIERS SHALL BE REPLACEABLE MEDIA, ANGLE TYPE; HENRY "DRI-COR" OR EQUAL; ARI 730.

I. THERMSOTATIC EXPANSION VALVES SHALL HAVE FORGED BRASS BODY, STAINLESS STEEL SEATS AND PINS, ODF SOLDER CONNECTIONS, EXTERNAL EQUALIZER,; ARI 750.

J. OUTDOOR CONDENSING UNITS SHALL HAVE A FLEXIBLE PIPING SECTION AT THE OUTDOOR UNIT.

K. REFRIGERANT PIPING BETWEEN THE OUTDOOR UNIT AND THE INDIVIDUAL FAN COIL (SPLIT SYSTEM) OR BRANCH SELECTOR BOX (VRF SYSTEM) SHALL BE TYPE "ACR" DE-OXIDIZED HARD TEMPER COPPER TUBE, ASTM B280.

L. REFRIGERANT PIPING (EXPOSED) BETWEEN THE INDOOR BRANCH SELECTOR BOXES AND THE INDIVIDUAL FAN COIL IN EXPOSED AREAS SHALL BE TYPE "ACR" DE-OXIDIZED HARD TEMPER COPPER TUBE, ASTM B280.

M. REFRIGERANT PIPING SHALL BE INSULATED WITH 1" WALL THICKNESS "ARMACELL AP ARMAFLEX" BLACK FLEXIBLE CLOSED-CELL ELASTOMERIC THERMAL INSULATION IN TUBULAR FORM WITH SELF-SEAL SYSTEM REINFORCED WITH LAP SEAL TAPE.

N. REFRIGERANT PIPING (CONCEALED) BETWEEN THE INDOOR BRANCH SELECTOR BOXES AND THE INDIVIDUAL AIR HANDLING UNITS MAY BE PRE-INSULATED LINE SETS, ISOCLIMA OR EQUAL. PRE-INSULATED WITH EXPANDED POLYETHYLENE SHEATH, CLOSED CELL WITH EXTERNAL LDPE FOIL. PIPING SHALL BE CRIMPED CLOSED FOR SAFETY. TESTED IN ACCORDANCE WITH UL94 FOR SURFACE BURNING CHARACTERISTICS, UL723A FOR FLAME/SMOKE INDEX AND UL746A FOR IGNITION RESISTANCE. COPPER SHALL BE ASTM B280 APPROVED.

2.8 ACCESS PANELS

A. WHERE CONSTRUCTION IS NOT INHERENTLY ACCESSIBLE, PROVIDE ADEQUATELY SIZED AND CONVENIENTLY LOCATED ACCESS DOORS IN CEILINGS, WALLS, AND FURRING FOR SERVICING VALVES, EQUIPMENT, ETC. DOORS SHALL BE DELIVERED TO THE GENERAL CONTRACTOR FOR INSTALLATION.

B. FIRE RATED: INRYCO/MILCOR, U.L. LISTED, "B" LABEL, 1 ½ HOUR RATING. MINIMUM SIZE SHALL BE 12" X 12". PROVIDE LARGER SIZES WHERE REQUIRED. LOCKS SHALL BE FLUSH SCREWDRIVER OPERATED.

C. DRYWALLED SURFACES: INRYCO/MILCOR, STYLE DW, PRIME COATED STEEL. MINIMUM SIZE SHALL BE 12" X 12". PROVIDE LARGER SIZES WHERE REQUIRED. LOCKS SHALL BE FLUSH SCREWDRIVER OPERATED.

D. CONCRETE AND TILED SURFACES: INRYCO/MILCOR, STYLE M, PRIME COATED STEEL, EXCEPT ACCESS PANELS INSTALLED IN TILED SURFACES SHALL BE STAIN FINISH STAINLESS STEEL. MINIMUM SIZE SHALL BE 12" X 12". PROVIDE LARGER SIZES WHERE REQUIRED. LOCKS SHALL BE FLUSH SCREWDRIVER OPERATED.

E. PLASTERED SURFACES: INRYCO/MILCOR, STYLE K, PRIME COATED STEEL. MINIMUM SIZE SHALL BE 12" X 12". PROVIDE LARGER SIZES WHERE REQUIRED. LOCKS SHALL BE FLUSH SCREWDRIVER OPERATED.

PART 3 – EXECUTION

3.1 INSTALLATION, GENERAL

A. PROVIDE ALL NECESSARY CUTTING IN CONNECTION WITH THE WORK OF THE SECTION. NO CUTTING SHALL BE DONE WITHOUT THE APPROVAL OF THE ARCHITECT. COMPLY WITH REQUIREMENTS SPECIFIED IN CUTTING AND PATCHING SECTION.

B. NO STRUCTURAL MEMBERS SHALL BE DRILLED, BORED, OR NOTCHED IN A MANNER THAT WILL IMPAIR THEIR STRUCTURAL CAPACITY.

C. ALL PENETRATIONS OF CONCRETE OR MASONRY SHALL BE MADE WITH CORE DRILLS.

3.2 EQUIPMENT STARTUP

A. NOTIFY THE OWNER'S REPRESENTATIVE A MINIMUM OF TWO WEEKS PRIOR TO EQUIPMENT STARTUP DATE TO ALLOW FOR OWNER'S PERSONNEL TO BE PRESENT DURING STARTUP.

B. MANUFACTURER MUST PROVIDE A SERVICE TECHNICIAN TO SUPERVISE RIGGING OF THE UNITS TO ENSURE PROPER FIT.

C. UNIT MUST BE CHECKED OUT, TESTED AND PLACED INTO OPERATION BY THE INSTALLING CONTRACTOR UNDER THE SUPERVISION OF AN AUTHORIZED REPRESENTATIVE OF THE FACTORY.

D. CONTROLS CONTRACTOR MUST BE PRESENT DURING STARTUP TO ENSURE THAT FACTORY-INSTALLED CONTROLS HAVE BEEN ADEQUATELY INSTALLED, WIRED, AND INTEGRATED INTO THE BUILDING MANAGEMENTS SYSTEM.

E. PROVIDE MINIMUM EIGHT (8) HOURS OF TRAINING TIME WITH OWNER'S MAINTENANCE PERSONNEL TO THOROUGHLY REVIEW NEW EQUIPMENT, MAINTENANCE REQUIREMENTS, AND EQUIPMENT CONTROLS.

F. DURING STARTUP, THE FULL FUNCTIONALITY OF THE EQUIPMENT SHALL BE DEMONSTRATED TO THE SATISFACTION OF THE OWNER'S REPRESENTATIVE, INCLUDING HEATING, MECHANICAL COOLING, ECONOMIZER COOLING, ZONE MODULATION, AND ALL EMERGENCY SHUTDOWN FEATURES.

3.3 EQUIPMENT, GENERAL REQUIREMENTS

A. EQUIPMENT SHALL OPERATE QUIETLY AND WITHOUT OBJECTIONABLE VIBRATION. SUCH PROBLEMS, OTHER THAN FROM EQUIPMENT OPERATING AT OPTIMUM CONDITIONS, SHALL BE THE CONTRACTOR'S RESPONSIBILITY AND SHALL BE ELIMINATED AT THE DIRECTION OF THE ARCHITECT.

B. INSTALL EQUIPMENT TO PROVIDE GOOD APPEARANCE, EASY ACCESS, AND ADEQUATE SPACE TO ALLOW REPLACEMENT AND MAINTENANCE. PROVIDE BASES, SUPPORTS, ANCHOR BOLTS, AND OTHER ITEMS REQUIRED TO ACHIEVE THIS. INSTALLATION SHALL BE LEVEL, ABOVE MOISTURE LEVEL, AND ADEQUATELY BRACED.

C. THOROUGHLY LUBRICATE EQUIPMENT BEFORE OPERATING. REPAIR OF DAMAGE RESULTING FROM FAILURE TO COMPLY WITH THIS REQUIREMENT SHALL BE THE CONTRACTOR'S RESPONSIBILITY.

D. CONNECTIONS TO PIPING SHALL BE SECURED AND PROPERLY ALIGNED AND ALL UTILITY AND CONTROL CONNECTIONS SHALL BE PROPERLY ISOLATED FROM THE BUILDING STRUCTURE BY MEANS OF VIBRATION ISOLATORS AND FLEXIBLE CONNECTIONS. ANY EQUIPMENT NOT MEETING THIS REQUIREMENT WILL BE MODIFIED AND REINSTALLED AT NO EXPENSE TO THE OWNER.

E. MOVE EQUIPMENT INTO BUILDING THROUGH AVAILABLE OPENINGS. DISMANTLE EQUIPMENT WHERE NECESSARY TO ACCOMPLISH THIS. AFTER REASSEMBLY, TEST EQUIPMENT TO VERIFY ITS SATISFACTORY OPERATING CONDITION.

3.4 DUCTWORK

A. ALL DUCTWORK SHALL BE INSTALLED WITHIN SPACES PROVIDED WHERE POSSIBLE. DUCTS SHALL BE INSTALLED TRUE TO LINE AND GRADE, FULLY SECURED TO STRUCTURAL FAMING WITH SPECIFIED HANGERS AND SUPPORTS, INSULATED, AND VIBRATION ISOLATED, WHERE REQUIRED.

B. EACH SECTION OF SUPPLY AIR DUCTWORK SHALL BE CLEANED AT THE SHOP, DUST AND OIL FREE, USING A DEGREASING AGENT AND DETERGENT AND SEALED AIRTIGHT AT BOTH ENDS WITH VISQUEEN AND TAPE. SUPPLY DUCTS SHALL BE ADDITIONALLY CLEANED WITH A DISINFECTING SOLUTION. ENDS OF ALL SUPPLY AND INTERNALLY INSULATED EXHAUST DUSTS SHALL BE KEPT SEALED UNTIL THE TIME THEY ARE JOINTED. WHEN DUCT SECTIONS ARE JOINED, WIPE DOWN ALL INTERIOR SURFACES WITH A CLEAN TACK CLOTH. IF TACK CLOTH SHOWS ANY DUST, THEN RE-CLEAN DUCT AS DESCRIBED ABOVE. THE INTENT IS THAT NO FOREIGN MATTER BE ALLOWED TO ENTER THE DUCTWORK AT ANY TIME AFTER FACTORY CLEANING AND DURING CONSTRUCTION.

3.5 CONTROLS

A. THIS CONTRACTOR SHALL PROVIDE ALL REQUIRED CONTROL COMPONENTS, INCLUDING BUT NOT LIMITED TO THERMOSTATS, TEMPERATURE SENSORS, STATIC PRESSURE SENSORS, HUMIDITY SENSORS, DAMPER ACTUATORS, VALVE ACTUATORS, UNITARY CONTROLLERS, RELAYS, AND LOW-VOLTAGE WIRING, SUCH THAT THE OWNER IS PROVIDED WITH A FULLY FUNCTIONAL CONTROL SYSTEM.

B. WHERE WORK IS PERFORMED IN AN EXISTING BUILDING, THIS CONTRACTOR SHALL INTEGRATE ALL CONTROL MODIFICATIONS INTO THE EXISTING BUILDING CONTROL SYSTEM, IF APPLICABLE. SPECIFIC REQUIREMENTS SHALL BE COORDINATED WITH OWNER AND APPROVED BY ARCHITECT PRIOR TO INSTALLATION.

C. INSTALLATION OF THE SYSTEM SHALL BE MADE UNDER THE SUPERVISION OF THE MANUFACTURER OF THE EQUIPMENT, OR HIS FACTORY AUTHORIZED REPRESENTATIVE.

D. ROOM THERMOSTATS SHALL BE INSTALLED IN THE LOCATIONS INDICATED ON THE CONTRACT DRAWINGS. FINAL LOCATIONS SHALL BE COORDINATED WITH OWNER'S MAINTENANCE PERSONNEL AND SHALL BE INSTALLED IN LOCATIONS WHICH SHALL PROVIDE REPRESENTATIVE TEMPERATURES FOR THE ADJACENT AREAS.

E. LOW VOLTAGE CONTROL WIRING AND CONDUIT SHALL BE INSTALLED IN ACCORDANCE WITH REQUIREMENTS OF DIVISION 26.

3.6 INSULATION

A. EXTERIOR DUCTWORK:

1. THE INSULATION SHALL BE CUT LONGER THAN THE PERIMETER OF THE DUCT TO PROVIDE 2" STAPLE LAP AND MINIMUM COMPRESSION AT THE CORNERS. ALL JOINTS SHALL BE LAPPED 2' AND STAPLED WITH OUTWARD CLINCHING STAPLES 2" ON CENTER. THE INSULATION SHALL BE MECHANICALLY FASTENED TO THE UNDERSIDE OF ALL DUCTS 24" WIDE OR MORE USING CUP-HEAD PINS, WELD PINS, OR STICK PINS WITH SPEED CLIPS 18" ON CENTER. ALL JOINTS AND PENETRATIONS OF THE VAPOR BARRIER JACKET SHALL BE SEALED WITH A MINIMUM 3" WIDE MATCHING PRESSURE SENSITIVE TAPE. PRESSURE-SENSITIVE TAPE SHALL BE FIRMLY RUBBED IN PLACE IMMEDIATELY AFTER APPLICATION USING A "SQUEEGEE" TYPE TOOL.
2. WHEN A VAPOR SEAL IS REQUIRED, TWO COATS OF VAPOR RETARDER MASTIC REINFORCED WITH ONE LAYER OF 4" WIDE, OPEN WEAVE GLASS FABRIC MAY BE USED IN LIEU OF PRESSURE-SENSITIVE TAPE. MASTIC SHALL BE BRUSHED ONTO JOINT AND GLASS FABRIC UNTIL THE FABRIC IS FILLED. MASTICS SHALL BE APPLIED IN ACCORDANCE WITH APPLICATION INSTRUCTIONS ON THE CONTAINER.

B. INTERIOR DUCT LINER

1. APPLY TO THE INSIDE FACE OF DUCTS, COATED SIDE FACING AIR STREAM, FASTEN USING FIRE RETARDANT ADHESIVE MEETING ASTM C 9169, AND SECURE WITH MECHANICAL LINER FASTENERS AT 24" MAXIMUM O.C., BOTH DIRECTIONS. PIN LENGTH SHOULD BE SUCH AS TO LIMIT COMPRESSION OF LINER.
2. EXPOSED EDGES MUST BE FACTORY OR FIELD COATED. FOR SYSTEMS OPERATING AT 4000 FPM OR HIGHER, A METAL NOSING MUST BE INSTALLED ON ALL LINER LEADING EDGES. INSULATION WITH TORN OR BROKEN COATINGS SHALL BE REMOVED OR REPLACED. LOOSE CORNERS, EDGES, AND BUTT JOINTS WILL NOT BE ACCEPTED.

C. REFRIGERANT PIPING

1. THE INSULATION SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. ALL JOINTS AND SEAMS SHALL BE SEALED WITH WATERPROOF VAPOR RETARDANT ADHESIVE. ALL PIPES EXPOSED TO THE WEATHER SHALL BE COATED WITH ALUMINUM JACKETING TO PROTECT THE INSULATION FROM ULTRA-VIOLET RADIATION IN ACCORDANCE WITH THE MANUFACTURER'S PUBLISHED INSTRUCTIONS.

3.7 TEST, INSPECTIONS

A. MAKE ALL NECESSARY CONTROL ADJUSTMENTS AND BALANCING OF AIR FLOWS. OPERATE THE ENTIRE SYSTEM FOR A PERIOD OF TIME NOT LESS THAN THREE (3) WORKING DAYS FOR THE PURPOSE OF PROVING SATISFACTORY PERFORMANCE. DURING THIS PERIOD, INSTRUCT SUCH PERSONS AS THE OWNER AND/OR ARCHITECT MAY DESIGNATE IN THE PROPER OPERATION OF THE SYSTEMS. SHOULD FURTHER ADJUSTMENT PROVE NECESSARY, OPERATING TESTS SHALL BE REPEATED UNTIL A SATISFACTORY TEST IS OBTAINED.

B. THIS CONTRACTOR SHALL NOT ALLOW OR CAUSE ANY WORK OF THIS SECTION TO BE COVERED OR ENCLOSED UNTIL IT HAS BEEN INSPECTED, TESTED, AND APPROVED BY THE ARCHITECT AND THE AUTHORITIES HAVING JURISDICTION OVER THE WORK. SHOULD ANY OF THIS WORK BE ENCLOSED OR COVERED UP BEFORE SUCH INSPECTION, TESTING, AND APPROVAL, THIS CONTRACTOR SHALL UNCOVER THE WORK, HAVE THE NECESSARY INSPECTIONS, TESTS, AND APPROVALS MADE AND, AT NO EXPENSE TO THE OWNER, MAKE ALL REPAIRS NECESSARY TO RESTORE BOTH HIS WORK AND THAT OF OTHER CONTRACTORS WHICH MAY HAVE BEEN DAMAGED TO BE IN CONFORMITY WITH THE CONTRACT DOCUMENTS.

3.8 CLEANUP

A. UPON COMPLETION OF THE WORK OF THIS SECTION, REMOVE ALL MATERIAL, DEBRIS, AND EQUIPMENT ASSOCIATED WITH OR USED IN THE PERFORMANCE OF THIS WORK.

END OF SECTION

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LICENSE STAMP

REGISTERED PROFESSIONAL ENGINEER
NATHANIEL E. WARFIELD
No. M41898
Exp. 03-31-2026
MECHANICAL
STATE OF CALIFORNIA

KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

HUMBOLDT COUNTY
REGIONAL FACILITY

2004 HARRISON AVENUE
EUREKA, CA 95501

NO.	REVISIONS	DATE

SHEET TITLE

MECHANICAL
SPECIFICATIONS

ISSUED FOR:

CONSTRUCTION
DOCUMENTS

DATE:	9/20/2024
DRAWN BY:	EG
REVIEWED BY:	NW
SCALE:	
PROJECT NO:	22007

M101

TAB SPECIFICATION

PART 1 GENERAL

1.1 SCOPE

A. PROVIDE ALL SUPERVISION, PERSONNEL, INSTRUMENTS, CALIBRATION, EQUIPMENT, AND ALL OTHER MATERIALS NECESSARY TO PERFORM BALANCING AND TESTING, AND COMPILE TEST DATA INCLUDING CALCULATIONS AND SERVICES NECESSARY FOR THE HEATING, VENTILATING, AND AIR CONDITIONING SYSTEMS FOR THIS PROJECT, ALL IN ACCORDANCE WITH THE PROJECT DRAWINGS AND SPECIFICATIONS AND AS SPECIFIED HEREIN.

1.2 GENERAL

A. MECHANICAL CONTRACTOR WILL EMPLOY A TESTING, ADJUSTING, AND BALANCING (TAB) AGENCY THAT IS CERTIFIED BY ASSOCIATED AIR BALANCING COUNCIL (AABC), NATIONAL ENVIRONMENTAL BALANCING BUREAU (NEBB), OR TESTING, ADJUSTING, AND BALANCING BUREAU (TABB).

B. THE TAB AGENCY MUST ALSO BE AN APPROVED ACCEPTANCE TEST EMPLOYER WITH ACCEPTANCE TEST TECHNICIANS (ATT). THE ATT WILL BE RESPONSIBLE FOR PERFORMING ALL REQUIRED ACCEPTANCE TESTING AND ASSOCIATED FORMS.

C. THE TAB AGENCY SHALL BE RESPONSIBLE FOR INSPECTING, BALANCING, ADJUSTING, TESTING, AND LOGGING THE DATA OF THE PERFORMANCE OF FANS, ALL DAMPERS IN THE DUCT SYSTEMS, ALL AIR DISTRIBUTION DEVICES, AND THE FLOWS OF WATER THROUGH ALL COILS.

D. EXISTING EQUIPMENT, UNLESS SPECIFICALLY MENTIONED OTHERWISE, SHALL NOT IN THE SCOPE OF THE TAB WORK.

E. A COMPLETELY OPERABLE SYSTEM SHALL BE PLACED INTO OPERATION EACH DAY DURING TESTING AND BALANCING.

F. THE TAB AGENCY SHALL UTILIZE INSTRUMENTATION WHICH MEETS THE REQUIREMENTS OF ASHRAE 111, SECTION 5, “INSTRUMENTATION”.

G. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR CERTIFYING IN WRITING THAT THE SYSTEM, AS SCHEDULED FOR BALANCING, IS OPERATIONAL AND COMPLETE. COMPLETENESS SHALL INCLUDE NOT ONLY THE PHYSICAL INSTALLATION, BUT THE MECHANICAL CONTRACTOR’S CERTIFICATION THAT THE PRIME MOVERS ARE INSTALLED IN GOOD WORKING ORDER, AND THAT FULL LOAD PERFORMANCE HAS BEEN PRELIMINARY TESTED UNDER THE CERTIFICATION OF THE MECHANICAL CONTRACTOR. BEFORE ANY TESTING AND BALANCING IS STARTED, A COMPLETE REPORT SHALL BE SENT TO THE TAB AGENCY BY THE MECHANICAL CONTRACTOR.

H. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR MAKING ALL MODIFICATIONS TO RECERTIFY DISCREPANCIES REPORTED BY THE TAB CONTRACTOR AS INDICATING NON-COMPLIANCE WITH THE CONTRACT DOCUMENTS. BY COMPLETING THE WORK ON TIME, THE MECHANICAL CONTRACTOR SHALL PROVIDE SUFFICIENT TIME BEFORE THE COMPLETION DATE SO THAT BALANCING CAN BE ACCOMPLISHED.

I. IF CONSTRUCTION DEFICIENCIES ARE ENCOUNTERED WHICH PRECLUDE OBTAINING OPTIMUM CONDITIONS, THE DEFICIENCIES WILL BE RECORDED AND GIVEN TO THE OWNER’S REPRESENTATIVE. THE TAB AGENCY IS ADVISED THAT DEFICIENCIES IN THE HVAC CONSTRUCTION ARE OFTEN ENCOUNTERED DURING FINAL TAB SERVICES, AND SHOULD INCLUDE IN THE BID AN AMOUNT DEEMED ADVISABLE TO COMPENSATE FOR TIME IN IDENTIFYING THE DEFICIENCIES.

1.3 SERVICES

A. THE TAB AGENCY WILL BALANCE, TEST, AND ADJUST THE SYSTEMIC COMPONENTS TO OBTAIN OPTIMUM CONDITIONS IN EACH CONDITIONED SPACE IN THE BUILDING. IF CONSTRUCTION DEFICIENCIES ARE ENCOUNTERED WHICH PRECLUDE OBTAINING OPTIMUM CONDITIONS, THE DEFICIENCIES WILL BE RECORDED AND GIVEN TO THE OWNER’S REPRESENTATIVE. THE TAB AGENCY IS ADVISED THAT DEFICIENCIES IN THE HVAC CONSTRUCTION ARE OFTEN ENCOUNTERED DURING FINAL TAB SERVICES, AND SHOULD INCLUDE IN THE BID AN AMOUNT DEEMED ADVISABLE TO COMPENSATE FOR TIME IN IDENTIFYING THE DEFICIENCIES.

B. THE REPORT SHALL BE COMPLETE WITH LOGS, DATA, AND RECORDS AS REQUIRED HEREIN AND ALL LOGS, DATA, AND RECORDS SHALL BE TYPED, PRODUCED, ON WHITE BOND PAPER, AND BOUND. TRANSMIT FOUR COPIES DIRECTLY TO THE OWNER’S REPRESENTATIVE TO BE DISTRIBUTED TO THE MECHANICAL CONTRACTOR, CONTROLS CONTRACTOR, ENGINEER, AND RECORD FILE.

C. THE REPORT SHALL CONTAIN THE FOLLOWING GENERAL DATA IN A FORMAT SELECTED BY THE TAB AGENCY FOR CLARITY AND EASE OF REFERENCE.

1. PROJECT TITLE.
2. PROJECT LOCATION.
3. PROJECT ARCHITECT (FIRM NAME AND ADDRESS).
4. PROJECT MECHANICAL ENGINEER (NAME).
5. TAB FIELD TEST ENGINEER (NAME).
6. TAB AGENCY (FIRM NAME AND ADDRESS).
7. INCLUSIVE DATES TESTS WERE PERFORMED AND DATE OF REPORT.
8. CALIBRATION CERTIFICATES OF EACH INSTRUMENT USED ALONG WITH SPECIFIC ID NUMBERS (I.E., SERIAL NUMBERS).

1.4 SUBMITTALS

A. SUBMITTAL NO. 15950 (1) – TAB AGENDA

1. THE TAB CONTRACTOR SHALL SUBMIT A COMPLETE AGENDA, WHICH SHALL OUTLINE IN FULL THE TESTING METHODS AND LOCATIONS FOR EACH HVAC SYSTEM AND/OR DEVICE THAT IS WITHIN THE SCOPE OF THE TAB WORK. THE AGENDA SHALL REPRESENT THE TOTAL SYSTEM BALANCE REPORT, LESS FIELD TEST DATA. AREAS OF INTENDED FIELD TEST INPUTS SHALL BE REPRESENTED BY FULLY LABELED BLANK SPACES.
2. THE TAB AGENDA SHALL ALSO INDICATE THE PROPOSED TEST METHODS, INSTRUMENTATION DEVICES AND ALL APPLICABLE CALIBRATION CERTIFICATES.

B. SUBMITTAL NO 15950 (2) – TAB REPORT

1. PROVIDE TEST AND BALANCE REPORT AS INDICATED HEREIN.

1.5 AIR SYSTEMS REQUIREMENTS

A. IN ADDITION TO THE ABOVE DATA IN ITS APPROPRIATE FORMAT, THE TEST AND BALANCE REPORT SHALL INCLUDE THE FOLLOWING DATA:

1. HEATED VENTILATORS (EXISTING AND NEW)

a. MANUFACTURER AND MODEL.
b. SIZE.
c. MOTOR HP, VOLTAGE, PHASE, CYCLES, FULL LOAD AMPS.
d. LOCATION AND LOCAL IDENTIFICATION DATA.
e. IDENTIFICATION TAG LISTED IN SCHEDULES ON DRAWINGS AND SPECIFICATIONS.
f. SUPPLY AIRFLOW (CFM) AND RETURN AIRFLOW (CFM), WHERE APPLICABLE.
g. FAN RPM.
h. MOTOR CURRENT READINGS AT EACH FAN.
i. INLET AND OUTLET STATIC PRESSURE FROM SUPPLY FAN AND RETURN FAN (IF APPLICABLE). THESE READINGS SHALL BE RELATED TO THE FAN CURVE.
j. STATIC PRESSURE DIFFERENTIAL ACROSS EACH FILTER SECTION.
k. ENTERING AIR AND LEAVING AIR TEMPERATURES (DB) IN 100% HEATING MODE.
l. OUTDOOR AIR PERCENTAGE SETTING.
m. OUTDOOR AIRFLOW IN ECONOMIZER MODE (IF APPLICABLE).
n. OUTDOOR AIRFLOW IN DEMAND CONTROL VENTILATION MODE (IF APPLICABLE).

2. DUCTED FAN COILS

a. MANUFACTURER AND MODEL.
b. SIZE.
c. MOTOR HP, VOLTAGE, PHASE, CYCLES, FULL LOAD AMPS.
d. LOCATION AND LOCAL IDENTIFICATION DATA.
e. IDENTIFICATION TAG LISTED IN SCHEDULES ON DRAWINGS AND SPECIFICATIONS.
f. SUPPLY AIRFLOW (CFM) AND EXHAUST AIRFLOW (CFM), WHERE APPLICABLE.
g. FAN RPM.
h. MOTOR CURRENT READINGS AT EACH FAN.
i. INLET AND OUTLET STATIC PRESSURE FROM SUPPLY FAN (IF APPLICABLE). THESE READINGS SHALL BE RELATED TO THE FAN CURVE.
j. STATIC PRESSURE DIFFERENTIAL ACROSS EACH COIL AND FILTER SECTION.
k. ENTERING AIR AND LEAVING AIR TEMPERATURES (DB/WB) IN 100% COOLING MODE.
l. ENTERING AIR AND LEAVING AIR TEMPERATURES (DB) IN 100% HEATING MODE.
m. OUTDOOR AIR PERCENTAGE SETTING.
n. OUTDOOR AIRFLOW IN ECONOMIZER MODE (IF APPLICABLE).
o. OUTDOOR AIRFLOW IN DEMAND CONTROL VENTILATION MODE (IF APPLICABLE).

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 GENERAL PROCEDURES

A. DURING THE BALANCING, THE TEMPERATURE REGULATION SHALL BE ADJUSTED FOR PROPER RELATIONSHIP BETWEEN CONTROLLING INSTRUMENTS AND CALIBRATED. THE CORRECTNESS OF THE FINAL SETTING SHALL BE PROVED BY TAKING HOURLY READINGS FOR A PERIOD OF ONE SUCCESSIVE 8-HOUR DAY, IN A TYPICAL ROOM ON EACH SEPARATELY CONTROLLED ZONE, AFTER TENANT MOVES IN. THE TOTAL VARIATION SHALL NOT EXCEED 2 DEGREES FROM THE PRESET MEDIUM TEMPERATURE DURING THE TEMPERATURE SURVEY PERIOD. (THIS WILL BE DONE ONLY ON SYSTEMS THAT ARE TOTALLY OPERATIONAL).

3.2 AIR SYSTEMS PROCEDURES

A. THE TAB AGENCY SHALL PERFORM THE FOLLOWING TESTS AND BALANCE THE AIR SYSTEMS IN ACCORDANCE WITH THE FOLLOWING REQUIREMENTS:

1. TEST AND ADJUST BLOWER AND MOTOR RPM TO DESIGN REQUIREMENTS.
2. TEST AND RECORD MOTOR FULL LOAD AMPERES AND CORRESPONDING VOLTAGE.
3. MAKE PITOT TUBE TRAVERSE OF MAIN SUPPLY DUCTS AND OBTAIN DESIGN CFM AT FANS.
4. TEST AND RECORD SYSTEM STATIC PRESSURES, SUCTION AND DISCHARGE.
5. TEST AND ADJUST SYSTEM FOR DESIGN CFM OF OUTSIDE AIR.
6. TEST AND RECORD ENTERING AND LEAVING AIR DRY BULB TEMPERATURES OF ALL HEATING AND COOLING COILS.
7. TEST AND RECORD ENTERING AND LEAVING WET BULB TEMPERATURES OF ALL COOLING COILS.
8. ADJUST ALL MAIN SUPPLY AND RETURN AIR DUCTS TO PROPER DESIGN CFM. SYSTEM SUPPLY AIRFLOW, SYSTEM RETURN AIRFLOW, AND SYSTEM OUTDOOR AIRFLOW SHALL BE BALANCED TO WITHIN 5% OF THE DESIGN REQUIREMENT.
9. ADJUST ALL ZONES TO PROPER DESIGN CFM, SUPPLY AND RETURN.
10. TEST AND ADJUST EACH DIFFUSER, GRILLE, AND REGISTER TO WITHIN 10% OF DESIGN REQUIREMENT.
11. EACH GRILLE, DIFFUSER, AND REGISTER SHALL BE IDENTIFIED AS TO LOCATION AND AREA.
12. SIZE, TYPE, AND MANUFACTURER OF DIFFUSERS, GRILLES, REGISTERS, AND ALL TESTED EQUIPMENT SHALL BE IDENTIFIED AND LISTED. MANUFACTURER’S RATINGS ON ALL EQUIPMENT SHALL BE USED TO MAKE REQUIRED CALCULATIONS.
13. READINGS AND TEST OF DIFFUSERS, GRILLES, AND REGISTERS SHALL INCLUDE REQUIRED FPM VELOCITY AND TEST RESULTANT VELOCITY, REQUIRED CFM AND TEST RESULTANT CFM AFTER ADJUSTMENTS.
14. TAB AGENCY SHALL CHECK ALL CONTROLS TO ENSURE THEY ARE OPERATING AS SPECIFIED. PROVIDE THE CONTROL CONTRACTOR WITH SPECIFIC SET POINTS.

3.3 TEMPERATURE CONTROL SYSTEM

A. IN THE PROGRESS OF PERFORMING THE TAB WORK, THE TAB AGENCY SHALL:

1. WORK WITH THE CONTROLS CONTRACTOR TO ENSURE THE MOST EFFECTIVE TOTAL SYSTEM OPERATION WITHIN THE DESIGN LIMITATIONS, AND TO OBTAIN MUTUAL UNDERSTANDING OF INTENDED CONTROL PERFORMANCE.
2. VERIFY THAT ALL CONTROL DEVICES ARE PROPERLY CONNECTED.
3. VERIFY THAT ALL DAMPERS, VALVES, AND OTHER CONTROLLED DEVICES ARE OPERATED BY THE INTENDED CONTROLLER.
4. VERIFY THAT ALL DAMPERS AND VALVES ARE IN THE POSITION INDICATED BY THE CONTROLLER (OPEN, CLOSED, OR MODULATING).
5. VERIFY THAT THE INTEGRITY OF VALVES AND DAMPERS IN TERMS OF TIGHTNESS OF CLOSE-OFF AND FULL-OPEN POSITION. THIS INCLUDES DAMPERS IN MULTI-ZONE UNITS.
6. CHECK THAT ALL VALVES ARE PROPERLY INSTALLED IN THE PIPING SYSTEM IN RELATION TO DIRECTION OF FLOW AND LOCATION.
7. VERIFY THE CALIBRATION OF ALL CONTROLLERS.
8. VERIFY THE PROPER APPLICATION OF ALL NORMALLY OPEN AND NORMALLY CLOSED VALVES.
9. CHECK THE LOCATIONS OF ALL THERMOSTATS AND HUMIDISTATS FOR POTENTIAL ERRATIC OPERATION FROM OUTSIDE INFLUENCES SUCH AS SUNLIGHT, DRAFTS, OR COLD WALLS.
10. CHECK THE LOCATIONS OF ALL SENSORS TO DETERMINE WHETHER THEIR POSITION WILL ALLOW THEM TO SENSE ONLY THE INTENDED TEMPERATURES OR PRESSURES OF THE MEDIA. CONTROLS CONTRACTOR WILL RELOCATE AS DEEMED NECESSARY BY THE TAB AGENCY.
11. CHECK THE SEQUENCE OF OPERATION FOR ANY CONTROL MODE IS IN ACCORDANCE WITH APPROVED SHOP DRAWINGS. VERIFY THAT ONLY MINIMUM SIMULTANEOUS HEATING AND COOLING OCCURS. OBSERVE THAT HEATING CANNOT TAKE PLACE UNTIL THE COOLING ZONE OF VALVE IS COMPLETELY CLOSED.
12. VERIFY THAT ALL CONTROLLER SET POINTS MEET THE DESIGN INTENT.
13. CHECK ALL DAMPERS FOR FREE TRAVEL.
14. VERIFY THE OPERATION OF ALL INTERLOCK SYSTEMS.
15. PERFORM ALL SYSTEM VERIFICATION TO ASSURE THE SAFETY OF THE SYSTEM AND ITS COMPONENTS.

B. A SYSTEMATIC CHECK OF THE ABOVE REQUIREMENTS SHALL BE INCLUDED IN THE FINAL TAB REPORT.

3.4 DUCT LEAKAGE TEST

A. ALL SUPPLY, RETURN, EXHAUST, AND OUTSIDE AIR DUCTWORK SHALL BE TESTED FOR LEAKS, USING NECESSARY INSTRUMENTS BEFORE INSULATING ANY DUCTWORK.

B. DUCTWORK SHALL BE LEAK-TESTED IN ACCORDANCE WITH SMACNA HVAC AIR DUCT LEAKAGE TEST MANUAL. REPRESENTATIVE SECTIONS TOTALING NOT LESS THAN 10 PERCENT OF THE TOTAL INSTALLED DUCT AREA SHALL BE TESTED. WHERE THE TESTED 10 PERCENT FAILS TO COMPLY WITH THE REQUIREMENTS OF THIS SECTION, THEN 40 PERCENT OF THE TOTAL INSTALLED DUCT AREA SHALL BE TESTED. WHERE THE TESTED 40 PERCENT FAILS TO COMPLY WITH THE REQUIREMENTS OF THIS SECTION, THEN 100 PERCENT OF THE TOTAL INSTALLED DUCT AREA SHALL BE TESTED.

C. THE MAXIMUM PERMITTED LEAKAGE SHALL BE DETERMINED IN ACCORDANCE WITH CMC 603.9.2.

D. THE TEST AND BALANCE REPORT SHALL INCLUDE THE RESULTS OF THE DUCT LEAKAGE TEST FOR THE ENGINEER’S REVIEW.

3.5 TEST AND BALANCE REPORT

A. THE REPORT SHALL CONTAIN THE FOLLOWING DATA:

1. A LISTING OF THE MEASURED AIR QUANTITIES AT EACH OUTLET CORRESPONDING TO THE TEMPERATURE TABULATION SPECIFIED ABOVE.
2. AIR QUANTITIES AT EACH RETURN AND EXHAUST AIR HANDLING DEVICE (ONLY IF DUCTED RETURN SYSTEMS).
3. STATIC PRESSURE READINGS ENTERING AND LEAVING EACH SUPPLY, RETURN AND EXHAUST FAN, FILTER, AND COIL OF THE SYSTEM. THESE READINGS SHALL BE RELATED TO FAN CURVES IN TERMS OF CFM HANDLED.
4. MOTOR CURRENT READINGS AT EACH FAN. THE VOLTAGES AT THE TIME OF THE READINGS SHALL BE LISTED.

3.6 FINAL ACCEPTANCE

A. AT THE TIME OF FINAL INSPECTION, THE BALANCING AGENCY SHALL RECHECK, IN THE PRESENCE OF THE OWNER’S REPRESENTATIVE, SPECIFIC AND RANDOM SELECTIONS OF DATA, I.E., WATER AND AIR QUANTITIES, RECORDED IN THE CERTIFIED REPORT.

B. POINTS AND AREAS FOR RECHECK SHALL BE SELECTED BY THE OWNER’S REPRESENTATIVE.

C. MEASUREMENT AND TEST PROCEDURES SHALL BE THE SAME AS APPROVED FOR WORK FORMING BASIS OF CERTIFIED REPORT.

D. SELECTIONS FOR RECHECK, SPECIFIC PLUS RANDOM, WILL NOT NORMALLY EXCEED 25% OF THE TOTAL NUMBER TABULATED IN THE REPORT, EXCEPT THAT SPECIAL AIR SYSTEMS MAY REQUIRE A COMPLETE RECHECK FOR SAFETY REASONS.

E. IF RANDOM TESTS ELICIT A MEASURED FLOW DEVIATION OF 10% OR MORE FROM THAT RECORDED IN THE CERTIFIED REPORT ON 10% OR MORE OF THE SELECTED RECHECK STATIONS, THE REPORT SHALL BE AUTOMATICALLY REJECTED. IN THE EVENT THE REPORT IS REJECTED, ALL SYSTEMS SHALL BE READJUSTED AND TESTED, NEW DATA RECORDED, NEW CERTIFIED REPORT SUBMITTED, AND NEW INSPECTION TESTS MADE, ALL AT NO ADDITIONAL COST TO THE OWNER.

F. FOLLOWING FINAL ACCEPTANCE OF THE CERTIFIED REPORT BY THE OWNER’S REPRESENTATIVE, THE SETTINGS OF ALL VALVES, SPLITTER, DAMPERS, AND OTHER ADJUSTMENT DEVICES SHALL BE PERMANENTLY MARKED BY THE TAB AGENCY, SO THAT ADJUSTMENT CAN BE RESTORED IF DISTURBED AT ANY TIME. DEVICES SHALL NOT BE MARKED UNTIL AFTER FINAL ACCEPTANCE.

END OF SECTION

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LICENSE STAMP

REGISTERED PROFESSIONAL ENGINEER
NATHANIEL E. WARFIELD
No. M41898
EXP. 03-31-2026
MECHANICAL
STATE OF CALIFORNIA

KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

HUMBOLDT COUNTY REGIONAL FACILITY

2004 HARRISON AVENUE
EUREKA, CA 95501

NO.	REVISIONS	DATE

SHEET TITLE

TAB SPECIFICATIONS

ISSUED FOR:

CONSTRUCTION DOCUMENTS

DATE:	9/20/2024
DRAWN BY:	EG
REVIEWED BY:	NW
SCALE:	
PROJECT NO:	22007

M102

CONTROLS SPECIFICATION

PART 1 – GENERAL

1.1 WORK INCLUDED

A. FURNISH ALL LABOR, MATERIALS, EQUIPMENT, AND SERVICE NECESSARY TO MODIFY THE EXISTING ENERGY MANAGEMENT SYSTEM (EMS) FOR A COMPLETE AND OPERATIVE NEW EMS SYSTEM, UTILIZING DIRECT DIGITAL ELECTRONIC CONTROLS AS SHOWN ON THE DRAWINGS AND AS SPECIFIED HEREIN.

B. ALL LABOR, MATERIAL, EQUIPMENT, AND SOFTWARE NECESSARY TO MEET THE LISTED FUNCTIONS OF THE EMS AS SPECIFIED HEREIN AND AS SHOWN ON THE DRAWINGS SHALL BE INCLUDED.

C. CONTROL WIRING, EXCEPT FOR POWER WIRING, NECESSARY FOR TEMPERATURE CONTROL SYSTEMS IS COVERED IN THIS SECTION.

1.2 STARTUP, OPERATING, AND MAINTENANCE SERVICE

A. THE MANUFACTURER'S FIELD SERVICES REPRESENTATIVE SHALL FURNISH TECHNICAL DIRECTION AS REQUIRED TO ENSURE PROPER STARTUP, OPERATION, AND MAINTENANCE OF THE EQUIPMENT.

B. OPERATION AND MAINTENANCE TRAINING OF THE OWNER'S STAFF SHALL BE PROVIDED. NOT LESS THAN 4 HOURS OF TRAINING SHALL BE PROVIDED AT TIMES CONVENIENT TO THE OWNER.

1.3 OPERATION AND MAINTENANCE MANUALS

A. PROVIDE FIVE COPIES OF OPERATION AND MAINTENANCE MANUALS.

B. MATERIAL SHALL BE CLEAN AND FILED UNDER DIVIDERS WITH HEADINGS IN ACCORDANCE WITH THE SPECIFICATION ITEM TITLE.

1.4 WARRANTY

A. THE WORK AND MATERIALS COVERED IN THIS SECTION SHALL BE GUARANTEED FOR A PERIOD OF 1 YEAR FROM THE DATE OF ACCEPTANCE THEREOF AGAINST DEFECTIVE MATERIAL, DESIGN, AND WORKMANSHIP.

PART 2 – PRODUCTS

2.1 SYSTEM, GENERAL

A. ALL COMPONENTS USED SHALL BE SERVICEABLE, REPAIRABLE, AND REPLACEABLE BY QUALIFIED TEMPERATURE CONTROL TECHNICIANS USING NONPROPRIETARY PARTS, TOOLS, AND INSTRUMENTS.

2.2 TEMPERATURE CONTROL MATERIAL

A. ELECTRIC DAMPER ACTUATORS

1. ELECTRIC DAMPER ACTUATORS SHALL BE GEAR OR HYDRAULIC TYPE AS SCHEDULED.
2. ACTUATORS SHALL BE PROPERLY SIZED TO PROVIDE SUFFICIENT TORQUE TO POSITION THE DAMPER THROUGHOUT ITS OPERATING RANGE.
3. SPRING RETURN ACTUATORS SHALL BE USED WITH OUTSIDE AIR AND RELIEF AIR DAMPERS.

B. MOTORIZED CONTROL DAMPERS

1. MOTORIZED CONTROL DAMPERS SHALL BE PARALLEL BLADE FOR TWO-POSITION CONTROL AND OPPOSED BLADE FOR PROPORTIONAL CONTROL APPLICATIONS.
2. DAMPERS SHALL BE BLACK ENAMEL FINISH, GALVANIZED, WITH NYLON BEARINGS.
3. BLADE EDGE AND TIP SEALS SHALL BE INCLUDED FOR ALL DAMPERS.
4. BLADES SHALL BE 16 GAUGE, MINIMUM, AND 10 INCHES WIDE, MAXIMUM THE FRAME SHALL BE WELDED CHANNEL IRON.
5. DAMPERS WITH BOTH DIMENSIONS UNDER 18 INCHES MAY HAVE STRAP IRON FRAMES.

C. CONTROL VALVES

1. SHALL BE TWO-WAY OR THREE-WAY PATTERN AS SHOWN.
2. CONSTRUCTED FOR TIGHT SHUTOFF.
3. SHALL OPERATE SATISFACTORILY AGAINST SYSTEM PRESSURES AND DIFFERENTIALS.
4. VALVES WITH SIZES UP TO AND INCLUDING 2 INCHES SHALL BE SCREWED.
5. 2 ½ INCH, AND LARGER VALVES SHALL BE FLANGED CONFIGURATION.
6. CONTROL VALVES SHALL BE SIZED FOR A MAXIMUM PRESSURE DROP OF 4.0 PSIG AT RATED FLOW (EXCEPT AS NOTED).

D. TEMPERATURE CONTROL PANELS (TCP)

1. FURNISH NEMA 1 (INTERIOR) OR NEMA 4 (EXTERIOR) TEMPERATURE CONTROL PANEL OF CODE GAUGE STEEL, WITH LOCKING DOORS, FOR MOUNTING AND DEVICES AS SHOWN.
2. THEY SHALL MEET ALL APPLICABLE REQUIREMENTS OF TITLE 24, CALIFORNIA ADMINISTRATIVE CODE.
3. ALL CONTROLLERS, RELAYS, SWITCHES, ETC., FOR EQUIPMENT LOCATED IN MECHANICAL EQUIPMENT ROOMS SHALL BE MOUNTED IN A TCP, AS SHOWN ON THE DRAWINGS.
4. TEMPERATURE SETTINGS, ADJUSTMENTS, AND CALIBRATION SHALL BE DONE AT THE TCP.
5. ALL ELECTRIC DEVICES WITHIN A CONTROL PANEL SHALL BE FACTORY WIRED.
6. PROVIDE ENGRAVED, LAMINATED PLASTIC NAMEPLATES IDENTIFYING ALL DEVICES MOUNTED ON THE FACE OF THE CONTROL PANEL.
7. A COMPLETE SET OF RELATED "AS-BUILT" CONTROL DRAWINGS SHALL BE FURNISHED IN EACH CONTROL PANEL.

E. ELECTRONIC THERMOMETERS

1. SHALL HAVE 2 PERCENT ACCURACY AND 1 ⅓ DEGREES REPEATABILITY.
2. SHALL BE MOUNTED ON THE TEMPERATURE CONTROL PANELS AS SHOWN ON THE TEMPERATURE CONTROL DIAGRAMS.

2.3 GENERAL PRODUCT DESCRIPTION

A. THE ENERGY MANAGEMENT SYSTEM SHALL BE CAPABLE OF INTEGRATING MULTIPLE BUILDING FUNCTIONS, INCLUDING EQUIPMENT SUPERVISION AND CONTROL, ALARM MANAGEMENT, ENERGY MANAGEMENT, AND HISTORICAL DATA COLLECTION AND ARCHIVING.

B. THE ENERGY MANAGEMENT SYSTEM SHALL CONSIST OF THE FOLLOWING:

1. STAND-ALONG DDC PANELS.
2. STAND-ALONE APPLICATION-SPECIFIC CONTROLLERS (ASCS).
3. PORTABLE OPERATOR'S TERMINALS.

C. THE SYSTEM SHALL BE MODULAR IN NATURE AND SHALL PERMIT EXPANSION OF BOTH CAPACITY AND FUNCTIONALITY THROUGH THE ADDITION OF SENSORS, ACTUATORS, STAND-ALONG DDC PANELS, AND OPERATOR DEVICES.

D. SYSTEM ARCHITECTURAL DESIGN ELIMINATES DEPENDENCE UPON ANY SINGLE DEVICE FOR ALARM REPORTING AND CONTROL EXECUTION.

E. EACH DDC PANEL SHALL OPERATE INDEPENDENTLY BY PERFORMING ITS OWN SPECIFIED CONTROL, ALARM MANAGEMENT, OPERATOR I/O, AND HISTORICAL DATA COLLECTION.

F. THE FAILURE OF ANY SINGLE COMPONENT OR NETWORK CONNECTION SHALL NOT INTERRUPT THE EXECUTION OF CONTROL STRATEGIES AT OTHER OPERATIONAL DEVICES.

G. STAND-ALONE DDC PANELS SHALL BE ABLE TO ACCESS ANY DATA FROM OR SEND CONTROL COMMANDS AND ALARM REPORTS DIRECTLY TO ANY OTHER DDC PANEL OR COMBINATION OF PANELS ON THE NETWORK WITHOUT DEPENDENCE UPON A CENTRAL PROCESSING DEVICE.

H. STAND-ALONE DDC PANELS SHALL *ALSO* BE ABLE TO SEND ALARM REPORTS TO MULTIPLE-OPERATOR WORKSTATIONS WITHOUT DEPENDENCE UPON A CENTRAL PROCESSING DEVICE.

2.4 NETWORKING/COMMUNICATIONS

A. THE DESIGN OF THE EMS NETWORK OPERATOR WORKSTATIONS AND STAND-ALONE DDC PANELS, AS SHOWN ON THE DRAWINGS.

B. INHERENT IN THE SYSTEM'S DESIGN SHALL BE THE ABILITY TO EXPAND OR MODIFY THE NETWORK.

C. LOCAL AREA NETWORK:

1. WORKSTATION.DDC PANEL SUPPORT

a. DDC PANELS SHALL DIRECTLY RESIDE ON A LOCAL AREA NETWORK SUCH THAT COMMUNICATIONS MAY BE EXECUTED DIRECTLY BETWEEN CONTROLLERS, DIRECTLY BETWEEN WORKSTATIONS, AND BETWEEN CONTROLLERS AND WORKSTATIONS ON A PEER-TO-PEER BASIS.

2. DYNAMIC DATA ACCESS

a. ALL OPERATOR DEVICES, EITHER NETWORK RESIDENT OR CONNECTED VIA DIAL-UP MODEMS, SHALL HAVE THE ABILITY TO ACCESS ALL POINT STATUS AND APPLICATION REPORT DATA OR EXECUTE CONTROL FUNCTIONS FOR ANY AND ALL OTHER DEVICES VIA THE LOCAL AREA NETWORK.
b. ACCESS TO DATA SHALL BE BASED UPON LOGICAL IDENTIFICATION OF BUILDING EQUIPMENT.
c. ACCESS TO SYSTEM DATA SHALL NOT BE RESTRICTED BY THE HARDWARE CONFIGURATION OF THE ENERGY MANAGEMENT SYSTEM.
d. THE HARDWARE CONFIGURATION OF THE EMS NETWORK SHALL BE TOTALLY TRANSPARENT TO THE USER WHEN ACCESSING DATA OR DEVELOPING CONTROL PROGRAMS.

3. GENERAL NETWORK DESIGN SHALL INCLUDE THE FOLLOWING PROVISIONS:

a. HIGH-SPEED DATA TRANSFER RATES FOR ALARM REPORTING, QUICK REPORT GENERATION FROM MULTIPLE CONTROLLERS, AND UPLOAD/DOWNLOAD EFFICIENCY BETWEEN NETWORK DEVICES. THE MINIMUM BAUD RATE SHALL BE 2.5 MEGABAUD.
b. SUPPORT OF ANY COMBINATION OF CONTROLLERS AND OPERATOR WORKSTATIONS DIRECTLY CONNECTED TO THE LOCAL AREA NETWORK. A MINIMUM OF 50 DEVICES SHALL BE SUPPORTED ON A SINGLE LOCAL AREA NETWORK.
c. DETECTION AND ACCOMMODATION OF SINGLE OR MULTIPLE FAILURES OF EITHER WORKSTATIONS, DDC PANELS, OR THE NETWORK MEDIA. THE NETWORK SHALL INCLUDE PROVISIONS FOR AUTOMATICALLY RECONFIGURING ITSELF TO ALLOW ALL OPERATIONAL EQUIPMENT TO PERFORM THEIR DESIGNATED FUNCTIONS AS EFFECTIVELY AS POSSIBLE IN THE EVENT OF SINGLE OR MULTIPLE FAILURES.
d. MESSAGE AND ALARM BUFFERING TO PREVENT INFORMATION FROM BEING LOST.
e. ERROR DETECTION, CORRECTION, AND RETRANSMISSION TO GUARANTEE DATA INTEGRITY.
f. DEFAULT DEVICE DEFINITION TO PREVENT LOSS OF ALARMS OR DATA, AND ENSURE ALARMS ARE REPORTED AS QUICKLY AS POSSIBLE IN THE EVENT AN OPERATOR DEVICE DOES NOT RESPOND.
g. COMMONLY AVAILABLE, MULTIPLE-SOURCED NETWORKING COMPONENTS AND PROTOCOLS SHALL BE USED TO ALLOW THE EMS TO COEXIST WITH OTHER NETWORKING APPLICATIONS, SUCH AS OFFICE AUTOMATION. MAP, ETHERNET, IBM TOKEN RING, AND ARCNET ARE ACCEPTABLE TECHNOLOGIES.
h. USE OF AN INDUSTRY STANDARD IEEE 802.X PROTOCOL. COMMUNICATIONS MUST BE OF A DETERMINISTIC NATURE TO ENSURE CALCULABLE PERFORMANCE UNDER WORST-CASE NETWORK LOADING.
i. SYNCHRONIZATION OF THE REAL-TIME CLOCKS IN ALL DDC PANELS SHALL BE PROVIDED.

2.5 STAND-ALONE DDC PANELS

A. GENERAL

1. STAND-ALONE DDC PANELS SHALL BE MICROPROCESSOR-BASED, MULTITASKING, MULTIUSER, REAL-TIME, DIGITAL CONTROL PROCESSORS.
2. EACH STAND-ALONE DDC PANEL SHALL CONSIST OF MODULAR HARDWARE, WITH PLUG0IN ENCLOSED PROCESSORS, COMMUNICATION CONTROLLERS, POWER SUPPLIES, AND INPUT/OUTPUT MODULES.
3. A SUFFICIENT NUMBER OF CONTROLLERS SHALL BE SUPPLIED TO FULLY MEET THE REQUIREMENTS OF THIS SPECIFICATION AND THE ATTACHED POINT LIST.

2.6 SYSTEM SOFTWARE FEATURES

A. GENERAL

1. ALL NECESSARY SOFTWARE TO FORM A COMPLETE OPERATING SYSTEM AS DESCRIBED IN THIS SPECIFICATION SHALL BE PROVIDED.
2. THE SOFTWARE PROGRAMS SPECIFIED IN THIS SECTION SHALL BE PROVIDED AS AN INTEGRAL PART OF THE DDC PANEL AND SHALL NOT BE DEPENDENT UPON ANY HIGHER-LEVEL COMPUTER FOR EXECUTION.

2.7 APPLICATIONS-SPECIFIC CONTROLLERS, HVAC APPLCIATIONS

A. EACH STAND-ALONE DDC CONTROLLER SHALL BE ABLE TO EXTEND ITS PERFORMANCE AND CAPACITY THROUGH THE USE OF REMOTE APPLICATION-SPECIFIC CONTROLLERS (ASCS).

B. THE OPERATOR INTERFACE TO ANY ASC POINT DATA OR PROGRAMS SHALL BE THROUGH ANY NETWORK-RESIDENT PC WORKSTATION OR ANY PC OR PORTABLE OPERATOR'S TERMINAL THAT IS CONNECTED TO ANY DDC PANEL IN THE NETWORK.

C. POWER FAIL PROTECTION

1. ALL SYSTEM SET POINTS, PROPORTIONAL BANDS, CONTROL ALGORITHMS, AND ANY OTHER PROGRAMMABLE PARAMETERS SHALL BE STORED SUCH THAT A POWER FAILURE OF ANY DURATION DOES NOT NECESSITATE REPROGRAMMING THE CONTROLLER.

D. APPLICATION DESCRIPTION

1. VAV TERMINAL UNIT CONTROLLERS

a. VAV TERMINAL UNIT CONTROLLER SHALL SUPPORT, BUT NOT BE LIMITED TO, THE CONTROL OF THE FOLLOWING CONFIGURATIONS OF VAV BOXES TO ADDRESS CURRENT REQUIREMENTS, AS DESCRIBED IN THE EXECUTION PORTION OF THIS SPECIFICATION, AND FOR FUTURE EXPANSION:

1. SINGLE DUCT ONLY (COOLING ONLY OR COOLING WITH REHEAT)
2. FAN POWERED (PARALLEL/SIDE POCKET, SERIES/ON-OFF LOGIC)
3. DUAL DUCT (CONSTANT VOLUME, VARIABLE VOLUME)
4. SUPPLY/EXHAUST

b. VAV TERMINAL UNIT CONTROLLERS SHALL SUPPORT THE FOLLOWING TYPES OF POINT INPUTS AND OUTPUTS:

1. PROPORTIONAL COOLING OUTPUTS
2. BOX AND BASEBOARD HEATING OUTPUTS (PROPORTIONAL, OR ONE TO THREE STAGES)
3. FAN CONTROL OUTPUT (ON/OFF LOGIC, OR PROPORTIONAL SERIES FAN LOGIC)

c. THE MODES OF OPERATION SUPPORTED BY THE VAV TERMINAL UNIT CONTROLLERS SHALL MINIMALLY INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:

1. DAY/WEEK SCHEDULE
2. COMFORT/OCCUPANCY MODE
3. ECONOMY MODE (STANDBY MODE, UNOCCUPIED, ETC.)
4. TEMPORARY OVERRIDE MODE

d. OCCUPANCY-BASED STANDBY/COMFORT MODE CONTROL

1. EACH VAV TERMINAL UNIT CONTROLLER SHALL HAVE A PROVISION FOR OCCUPANCY-SENSING OVERRIDES.
2. BASED UPON THE CONTACT STATUS OF EITHER A MANUAL WALL SWITCH OR AN OCCUPANCY-SENSING DEVICE, THE VAV TERMINAL UNIT CONTROLLER SHALL AUTOMATICALLY SELECT EITHER STANDBY OR COMFORT MODE TO MINIMIZE THE HEATING AND COOLING REQUIREMENTS, WHILE SATISFYING COMFORT CONDITIONS.

e. CONTINUOUS ZONE TEMPERATURE HISTORIES

1. EACH VAV TERMINAL UNIT CONTROLLER SHALL AUTOMATICALLY AND CONTINUOUSLY MAINTAIN A HISTORY OF THE ASSOCIATED ZONE TEMPERATURE TO ALLOW USERS TO QUICKLY ANALYZE SPACE COMFORT AND EQUIPMENT PERFORMANCE FOR THE PAST 24 HOURS.
2. A MINIMUM OF TWO SAMPLES PER HOUR SHALL BE STORED.

f. ALARM MANAGEMENT

1. EACH VAV TERMINAL UNIT CONTROLLER SHALL PERFORM ITS OWN LIMIT AND STATUS MONITORING AND ANALYSIS TO MAXIMIZE NETWORK PERFORMANCE BY REDUCING UNNECESSARY COMMUNICATIONS.

2. UNITARY CONTROLLERS

a. UNITARY CONTROLLERS SHALL SUPPORT, BUT NOT BE LIMITED TO, THE FOLLOWING TYPES OF SYSTEMS TO ADDRESS SPECIFIC APPLICATIONS DESCRIBED IN THE EXECUTION PORTION OF THIS SPECIFICATION, AND FOR FUTURE EXPANSION:

1. UNIT VENTS (ASHRAE CYCLE I, II, III, OR W)
2. HEAT PUMPS (AIR-TO-AIR, WATER-TO-AIR)
3. PACKAGE ROOFTOPS
4. FAN COILS (TWO-PIPE, FOUR-PIPE)

b. UNITARY CONTROLLERS SHALL SUPPORT THE FOLLOWING TYPES OF POINT INPUTS AND OUTPUTS:

1. ECONOMIZER SWITCHOVER INPUTS

a. DRY BULB
b. OUTDOOR AIR ENTHALPY
c. DIFFERENTIAL TEMPERATURE
d. BINARY INPUT FROM A SEPARATE CONTROLLER

2. ECONOMIZER OUTPUTS

a. INTEGRATED ANALOG, WITH MINIMUM POSITION
b. BINARY OUTPUT TO ENABLE SELF-CONTAINED ECONOMIZER ACTUATOR
c. HEATING AND COOLING OUTPUTS
d. ONE TO THREE STAGES
e. ANALOG OUTPUT, WITH TWO-PIPE LOGIC
f. REVERSING VALVE LOGIC FOR HEAT PUMPS

3. FAN OUTPUT

a. ON/OFF LOGIC CONTROL

c. UNITARY CONTROLLERS SHALL SUPPORT THE FOLLOWING LIBRARY OF CONTROL STRATEGIES TO ADDRESS THE REQUIREMENTS OF THE SEQUENCES DESCRIBED IN THE EXECUTION PORTION OF THIS SPECIFICATION, AND FOR FUTURE EXPANSION:

1. DAILY/WEEKLY SCHEDULES
2. COMFORT/OCCUPANCY MODE
3. ECONOMY MODE

a. STANDBY MODE/ECONOMIZER AVAILABLE
b. UNOCCUPIED/ECONOMIZER NOT AVAILABLE
c. SHUTDOWN
d. LIGHTING LOGIC INTERLOCK TO ECONOMY MODE

4. TEMPORARY OVERRIDE MODE

a. TEMPORARY COMFORT MODE (OCCUPANCY-BASED CONTROL)
b. BOOST (OCCUPANT WARMER/COOLER CONTROL)

d. OCCUPANCY-BASE STANDBY/COMFORT MODE CONTROL

1. EACH UNITARY CONTROLLER SHALL HAVE A PROVISION FOR OCCUPANCY-SENSING OVERRIDES.
2. BASED UPON THE CONTACT STATUS OF EITHER A MANUAL WALL SWITCH OR AN OCCUPANCY-SENSING DEVICE, THE UNITARY CONTROLLER SHALL AUTOMATICALLY SELECT EITHER STANDBY OR COMFORT MODE TO MINIMIZE THE HEATING AND COOLING REQUIREMENTS, WHILE SATISFYING COMFORT CONDITIONS.

e. CONTINUOUS ZONE TEMPERATURE HISTORIES

1. EACH UNITARY CONTROLLER SHALL AUTOMATICALLY AND CONTINUOUSLY MAINTAIN A HISTORY OF THE ASSOCIATED ZONE TEMPERATURE TO ALLOW USERS TO QUICKLY ANALYZE SPACE COMFORT AND EQUIPMENT PERFORMANCE FOR THE PAST 24 HOURS. A MINIMUM OF TWO SAMPLES PER HOUR SHALL BE STORED.

f. ALARM MANAGEMENT

1. EACH UNITARY CONTROLLER SHALL PERFORM ITS OWN LIMIT AND STATUS MONITORING AND ANALYSIS TO MAXIMIZE NETWORK PERFORMANCE BY REDUCING UNNECESSARY COMMUNICATIONS.

3. AHU CONTROLLERS

a. AHU CONTROLLERS SHALL SUPPORT, BUT NOT BE LIMITED TO, THE FOLLOWING CONFIGURATIONS OF SYSTEMS TO ADDRESS CURRENT REQUIREMENTS, AS DESCRIBED IN THE EXECUTION PORTION OF THIS SPECIFICATION, AND FOR FUTURE EXPANSION:

1. LARGE AIR HANDLING UNITS

a. MIXED AIR – SINGLE PATH
b. MIXED AIR – DUAL PATH
c. 100-PERCENT SINGLE PATH
d. 100-PERCENT DUAL PATH

b. AHU CONTROLLERS SHALL SUPPORT ALL OF THE NECESSARY POINT INPUTS AND OUTPUTS TO PERFORM THE SPECIFIED CONTROL SEQUENCES IN A TOTALLY STAND-ALONE FASHION.
c. AHU CONTROLLERS SHALL HAVE A LIBRARY OF CONTROL ROUTINES AND PROGRAM LOGIC TO PERFORM THE SEQUENCES OF OPERATION, AS SPECIFIED IN THE EXECUTION PORTION OF THIS SPECIFICATION.
d. OCCUPANCY-BASED STANDBY/COMFORT MODE CONTROL

1. EACH AHU CONTROLLER SHALL HAVE A PROVISION FOR OCCUPANCY-SENSING OVERRIDES.
2. BASED UPON THE CONTACT STATUS OF EITHER A MANUAL WALL SWITCH OR AN OCCUPANCY-SENSING DEVICE, THE AHU CONTROLLER SHALL AUTOMATICALLY SELECT EITHER STANDBY OR COMFORT MODE TO MINIMIZE THE HEATING AND COOLING REQUIREMENTS, WHILE SATISFYING COMFORT CONDITIONS.

e. CONTINUOUS ZONE TEMPERATURE HISTORIES

1. EACH AHU CONTROLLER SHALL AUTOMATICALLY AND CONTINUOUSLY MAINTAIN A HISTORY OF THE ASSOCIATED ZONE TEMPERATURE TO ALLOW USERS TO QUICKLY ANALYZE SPACE COMFORT AND EQUIPMENT PERFORMANCE FOR THE PAST 24 HOURS.
2. A MINIMUM OF TWO SAMPLES PER HOUR SHALL BE STORE.

f. ALARM MANAGEMENT

1. EACH AHU CONTROLLER SHALL PERFORM ITS OWN LIMIT AND STATUS MONITORING AND ANALYSIS TO MAXIMIZE NETWORK PERFORMANCE BY REDUCING UNNECESSARY COMMUNICATIONS.

PART 3 – EXECUTION

3.1 GENERAL

A. WORK SHALL BE PERFORMED IN A WORKMANLIKE MANNER BY CRAFTSMAN SKILLED IN THE PARTICULAR TRADE. WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE PLANS, SPECIFICATIONS, MANUFACTURER'S RECOMMENDATIONS, AND THE BEST PRACTICE IN THE TRADE. COMPLETED WORK SHALL PRESENT A NEAT AND FINISHED APPEARANCE.

B. COORDINATE WORK WITH THE OWNER AND THE WORK OF OTHER TRADES TO AVOID CONFLICTS, ERRORS, DELAYS, AND UNNECESSARY INTERFERENCE DURING CONSTRUCTION.

C. ALL THERMOSTATS OR TEMPERATURE SENSORS IN THE CONDITIONED SPACE SHALL HAVE BLANK LOCKING COVERS. FURNISH CAST ALUMINUM GUARDS WHERE SHOWN ON THE PLANS.

D. IDENTIFY EACH ITEM MOUNTED ON THE FACE OF A CONTROL PANEL WITH AN ENGRAVED, PHENOLIC LABEL (1/4 –INCH HIGH ENGRAVED LETTERS, MINIMUM). IDENTIFY EACH ITEM OF CONTROL EQUIPMENT (EXCEPT ROOM SENSORS AND THERMOSTATS) WITH STAMPED TAPE FIRMLY ATTACHED TO EQUIPMENT.

E. ALL CONTROL ADJUSTMENTS SHALL BE ACCESSIBLE WITHOUT USE OF A LADDER.

F. THERMOSTATS OR SENSORS MOUNTED ON OUTSIDE WALLS SHALL BE MOUNTED ON 1-INCH MINIMUM THICKNESS RIGID FIBERGLASS INSULATING BASE (OR EQUAL).

G. ALL THERMAL SENSORS IN WATER LINES HALL BE THE DIRECT-IMMERSION TYPE, INSTALLED THROUGH A "DIRECT-IMMERSION FITTING" CONSISTING OF AN ISOLATION VALVE AND TEFLON PACKING.

3.2 PROTECTION DURING CONSTRUCTION

A. THROUGHOUT THE CONTRACT, PROVIDE PROTECTION FOR MATERIALS AND EQUIPMENT AGAINST LOSS OR DAMAGE AND FROM THE EFFECTS OF WEATHER.

B. PRIOR TO INSTALLATION, STORE ITEMS TO BE INSTALLED IN INDOOR LOCATIONS.

C. ITEMS SUBJECT TO CORROSION UNDER DAMP CONDITIONS AND ITEMS CONTAINING INSULATION, SUCH AS TRANSFORMERS, MOTORS, AND CONTROLS, SHALL BE STORED IN INDOOR, HEATED, DRY LOCATIONS.

D. FOLLOWING INSTALLATION, PROTECT MATERIALS, EQUIPMENT, AND INSULATION FROM CORROSION, PHYSICAL DAMAGE, AND MOISTURE.

E. CAP CONDUIT RUNS DURING CONSTRUCTION WITH MANUFACTURED SEALS.

F. KEEP OPENINGS IN BOXES OR EQUIPMENT CLOSED DURING CONSTRUCTION.

G. PROVIDE TEMPORARY HEATING SOURCE FOR ELECTRICAL EQUIPMENT IN DAMP LOCATIONS OR LOCATIONS SUBJECT TO CONDENSATION, INCLUDING TRANSFORMERS, MOTORS, AND CONTROLS, UNTIL CONSTRUCTION IS COMPLETE AND EQUIPMENT IS ENERGIZED.

3.3 MATERIAL AND EQUIPMENT INSTALLATION

A. FOLLOW THE MANUFACTURER'S INSTALLATION RECOMMENDATIONS UNLESS OTHERWISE INDICATED.

B. FOLLOW THE ENGINEER'S DECISION, AT NO ADDITIONAL COST TO THE OWNER, WHEREVER ANY CONFLICT ARISES BETWEEN THE MANUFACTURER'S INSTRUCTION, STATE, OR OTHER CODES AND REGULATIONS, AND THESE CONTRACT DOCUMENTS.

C. KEEP COPY OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AVAILABLE ON THE JOBSITE FOR REVIEW AT ALL TIMES.

D. INSTALL FREESTANDING EQUIPMENT IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS. UNLESS NOTED OTHERWISE, MOUNT FREESTANDING EQUIPMENT ON A 3 ½ INCH CONCRETE PAD.

E. SECURE MOTOR CONTROL CENTERS (MCCS) AND OTHER FREESTANDING EQUIPMENT RIGIDLY TO FLOORS TO MOUNTING PADS WITH ANCHOR BOLTS, EXPANSION SHIELDS, OR OTHER APPROVED MEANS.

F. GROUT MOUNTING CHANNELS PROVIDED WITH MCCS INTO THE FLOOR OR MOUNTING PADS, UNLESS THE MCCS ARE FIRMLY ANCHORED WITH THE SPECIFIED CONCRETE ANCHORS, IN WHICH CASE THE CHANNELS ARE NOT REQUIRED.

3.4 CUTTING AND PATCHING

A. DO NOT CUT OR NOTCH ANY STRUCTURAL MEMBER OR BUILDING SURFACE WITHOUT SPECIFIC APPROVAL OF THE ENGINEER.

B. WHERE POSSIBLE, AVOID ANY CUTTING, CHANNELING, CHASING, OR DRILLING OF FLOORS, WALLS, PARTITIONS, CEILINGS, PAVING, OR OTHER SURFACES.

C. USE CLAMPS AND CHANNEL WHERE REQUIRED FOR THE INSTALLATION, SUPPORT, OR ANCHORAGE OF CONDUIT, RACEWAYS, OR OTHER ELECTRICAL MATERIALS AND EQUIPMENT.

D. FOLLOWING SUCH WORK, RESTORE SURFACES NEATLY TO NEW CONDITION USING SKILLED CRAFTSMEN OF THE TRADES INVOLVED, AT NO ADDITIONAL COST TO THE OWNER.

3.5 CLEANING AND TOUCHUP PAINTING

A. KEEP THE PREMISES FREE FROM ACCUMULATION OF WASTE MATERIAL OR RUBBISH.

B. UPON COMPLETION OF WORK, REMOVE MATERIALS, SCRAPS, AND DEBRIS FROM THE PREMISES AND FROM THE INTERIOR AND EXTERIOR OF ALL DEVICES AND EQUIPMENT.

C. REFINISH DAMAGED SURFACES TO NEW CONDITION USING SKILLED CRAFTSMEN OF THE TRADES INVOLVED, AT NO ADDITIONAL COST TO THE OWNER.

3.6 INSTALLATION

A. ELECTRICAL WORK

1. ALL TEMPERATURE CONTROL AND INTERLOCK WIRING SHALL BE PLENUM-RATED CABLE.
2. POWER OR INTERLOCK WIRING SHALL BE RUN IN SEPARATE CONDUIT FORM SENSOR WIRING.
3. WIRING SHALL CONFORM TO THE NATIONAL ELECTRICAL CODE.
4. ALL WIRING OF ANY NATURE IN CONNECTION WITH TEMPERATURE CONTROL SYSTEM, REGARDLESS OF VOLTAGE, INCLUDING TEMPERATURE CONTROL WIRING, INTERLOCKING, AND THE LIKE, SHALL BE INCLUDED IN THE AIR CONDITIONING WORK.

END OF SECTION

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LICENSE STAMP

KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

HUMBOLDT COUNTY
REGIONAL FACILITY

2004 HARRISON AVENUE
EUREKA, CA 95501

NO.	REVISIONS	DATE

SHEET TITLE

CONTROL
SPECIFICATIONS

ISSUED FOR:

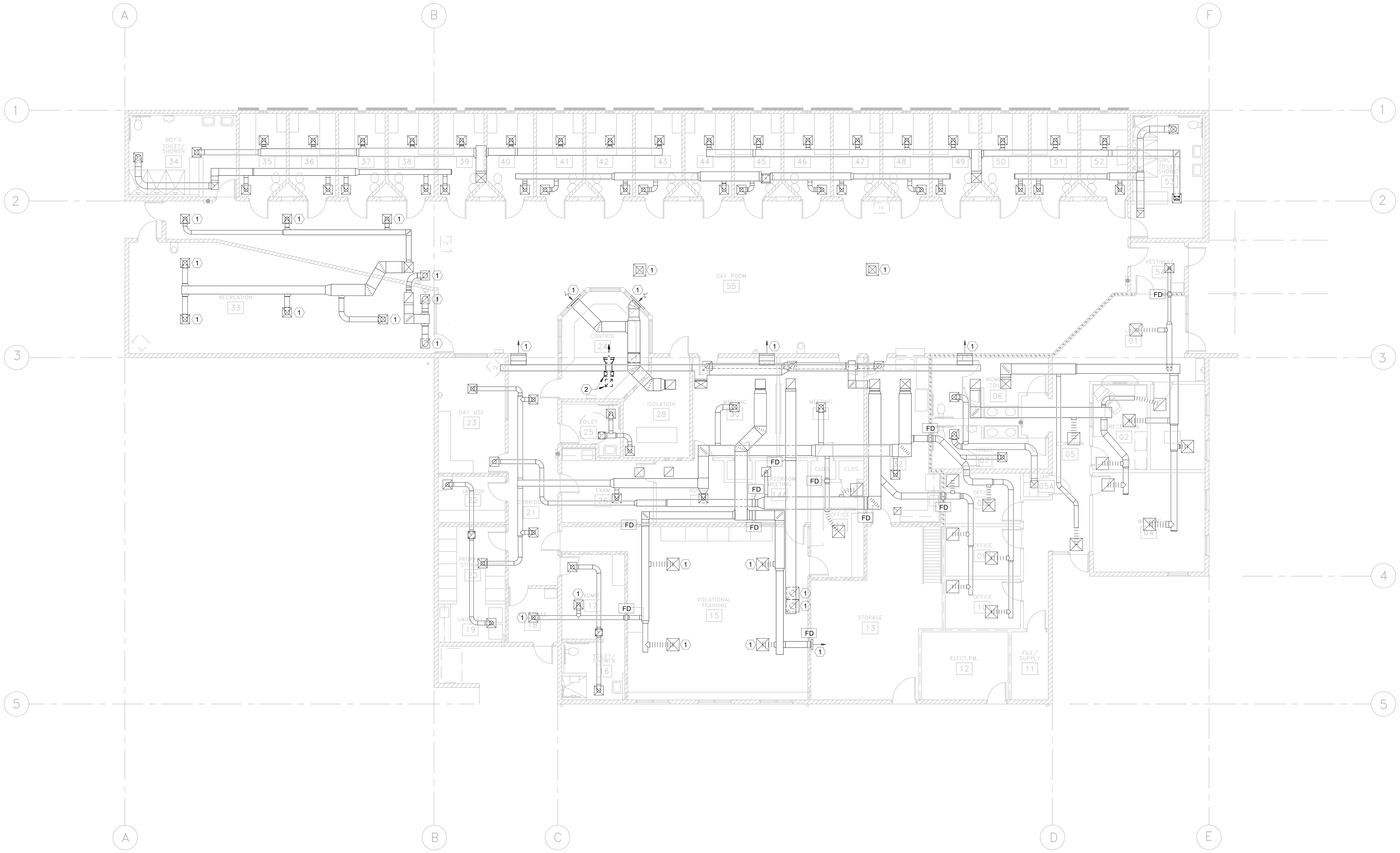
CONSTRUCTION
DOCUMENTS

DATE:	9/20/2024
DRAWN BY:	EG
REVIEWED BY:	NW
SCALE:	
PROJECT NO:	22007

M103

KEYED NOTES:

1. CONDUCT PRE-CONSTRUCTION AIR BALANCE TESTING FOR EXISTING AIR INLET OR OUTLET. SEE AIR BALANCE PROCEDURES ON M100 FOR ADDITIONAL INFORMATION.
2. REMOVE EXISTING DUCT DROPS, DUCTING, AND REGISTERS. PATCH WALL AND CEILING TO MATCH.



1 M200 MECHANICAL DEMOLITION PLAN
1/8" = 1'-0"

N

FRONTIER
CONSULTING ENGINEERS
2727 Bechelli Lane - Redding, CA 96002
Ph: (530) 232-6160 - www.frontierce.com

LICENSE STAMP

REGISTERED PROFESSIONAL ENGINEER
NATHANIEL E. WARFIELD
No. M41898
MECHANICAL
STATE OF CALIFORNIA

KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

HUMBOLDT COUNTY
REGIONAL FACILITY

2004 HARRISON AVENUE
EUREKA, CA 95501

NO.	REVISIONS	DATE

SHEET TITLE

MECHANICAL
DEMOLITION PLAN

ISSUED FOR:

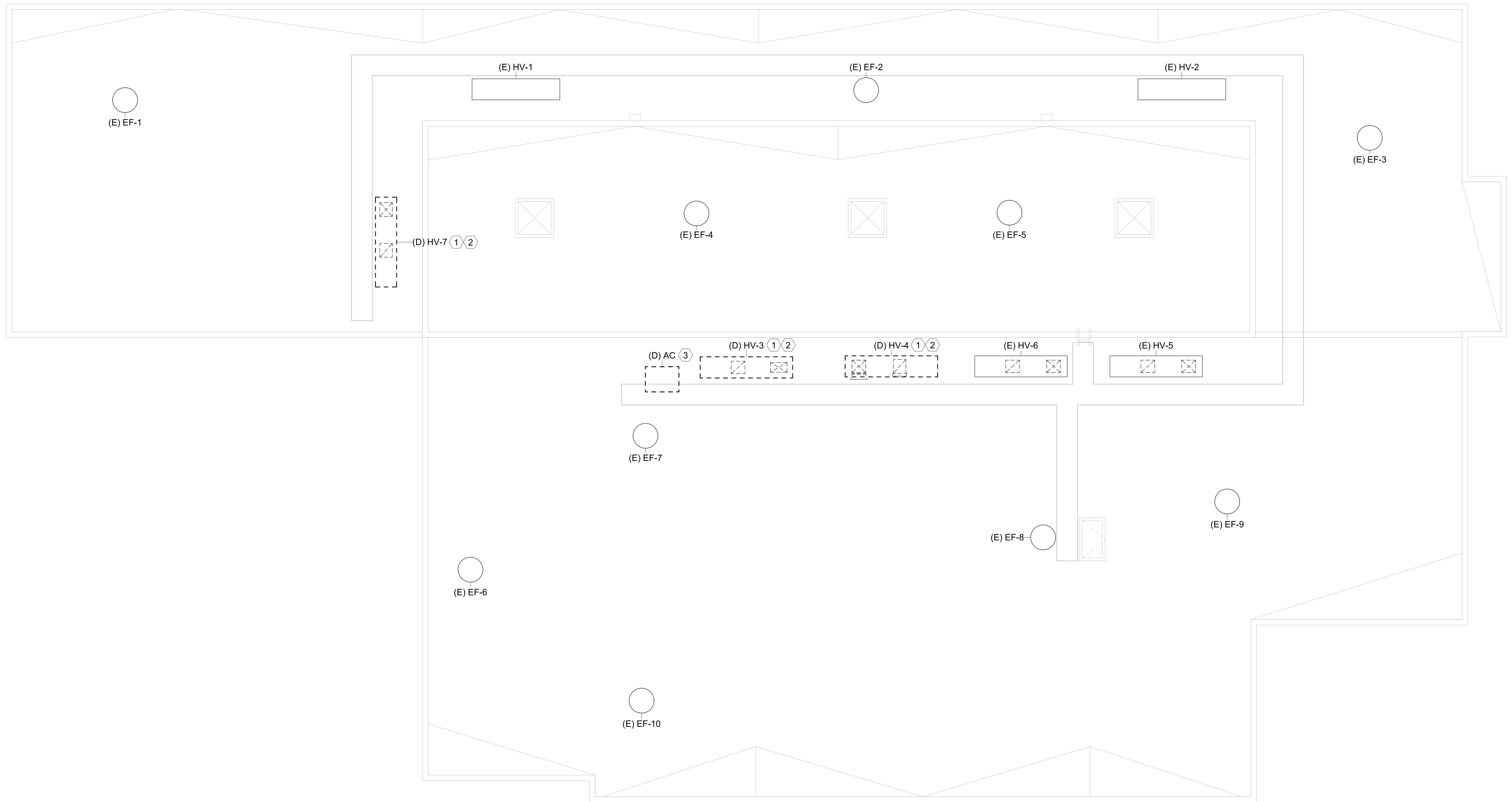
CONSTRUCTION
DOCUMENTS

DATE:	9/20/2024
DRAWN BY:	EG
REVIEWED BY:	NW
SCALE:	1/8" = 1'-0"
PROJECT NO:	22007

M200

KEYED NOTES:

1. REMOVE EXISTING ROOFTOP UNIT AND ASSOCIATED CURB. PREPARE LOCATION FOR INSTALLATION ON NEW CURB.
2. CONDUCT PRE-CONSTRUCTION AIR BALANCE TESTING FOR EXISTING HEATING VENTILATOR. SEE AIR BALANCE PROCEDURES ON M100 FOR ADDITIONAL INFORMATION.
3. REMOVE EXISTING ROOFTOP UNIT AND ASSOCIATED CURB. PATCH ROOF TO MATCH EXISTING.



1
M210
MECHANICAL DEMOLITION ROOF PLAN
1/8" = 1'-0"

N

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KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

HUMBOLDT COUNTY REGIONAL FACILITY

2004 HARRISON AVENUE
EUREKA, CA 95501

NO.	REVISIONS	DATE

SHEET TITLE

MECHANICAL DEMOLITION ROOF PLAN

ISSUED FOR:

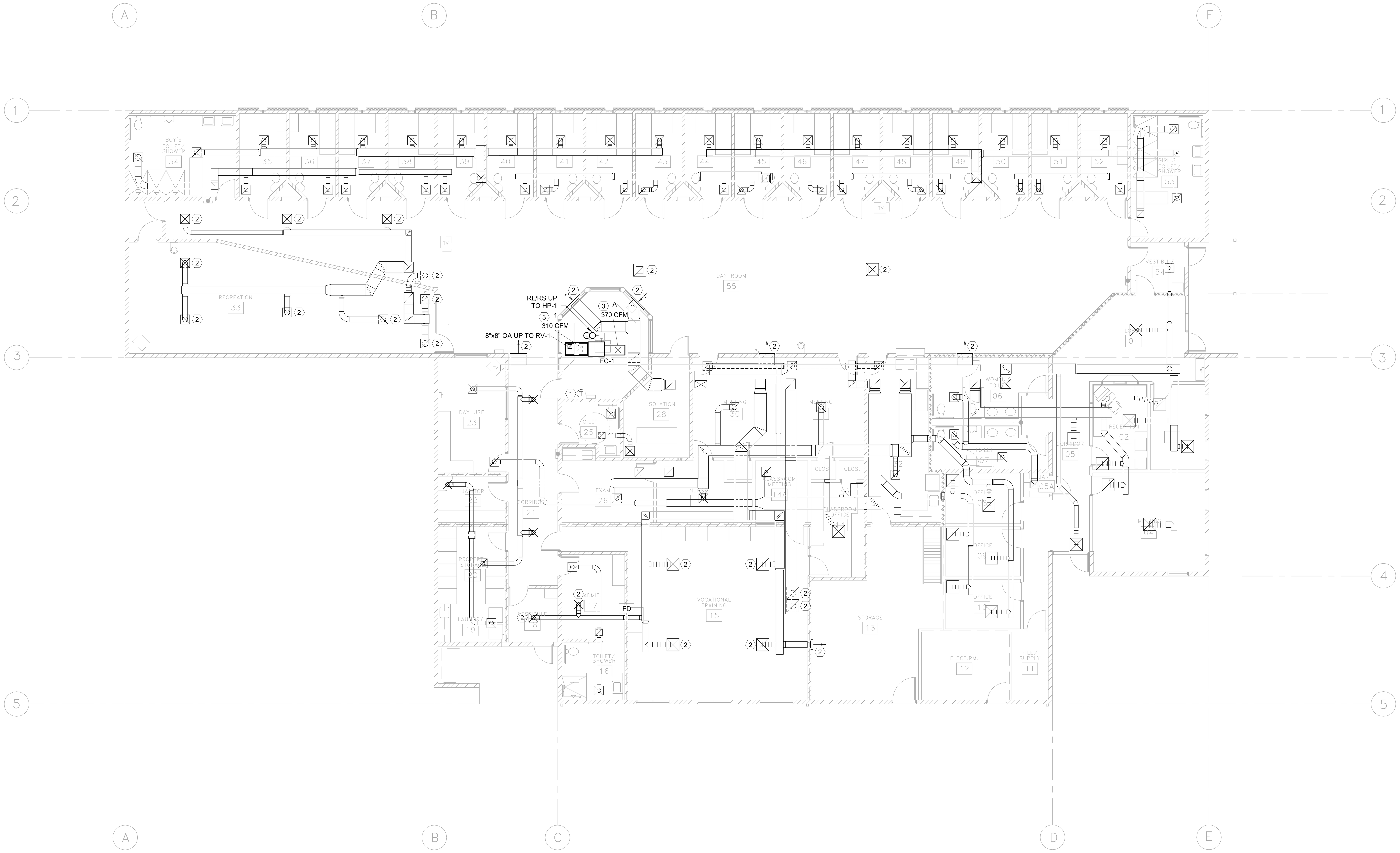
CONSTRUCTION DOCUMENTS

DATE:	9/20/2024
DRAWN BY:	EG
REVIEWED BY:	NW
SCALE:	1/8" = 1'-0"
PROJECT NO:	22007

M210

KEYED NOTES:

1. MOUNT THERMOSTAT 48" ABOVE FINISHED FLOOR. COORDINATE FINAL LOCATION WITH OWNER.
2. CONDUCT POST-CONSTRUCTION AIR BALANCE TESTING FOR EXISTING AIR INLET OR OUTLET TO VERIFY PRE-CONSTRUCTION AIRFLOWS HAVE BEEN MAINTAINED. SEE AIR BALANCE PROCEDURES ON M100 FOR ADDITIONAL INFORMATION.
3. BALANCE AIR TERMINAL TO ACHIEVE SPECIFIED AIRFLOW.



1 M220 MECHANICAL FLOOR PLAN
1/8" = 1'-0"

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LICENSE STAMP

REGISTERED PROFESSIONAL ENGINEER
NATHANIEL E. WARFIELD
No. M41898
MECHANICAL
STATE OF CALIFORNIA

KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

HUMBOLDT COUNTY REGIONAL FACILITY

2004 HARRISON AVENUE
EUREKA, CA 95501

NO.	REVISIONS	DATE

SHEET TITLE

MECHANICAL FLOOR PLAN

ISSUED FOR:

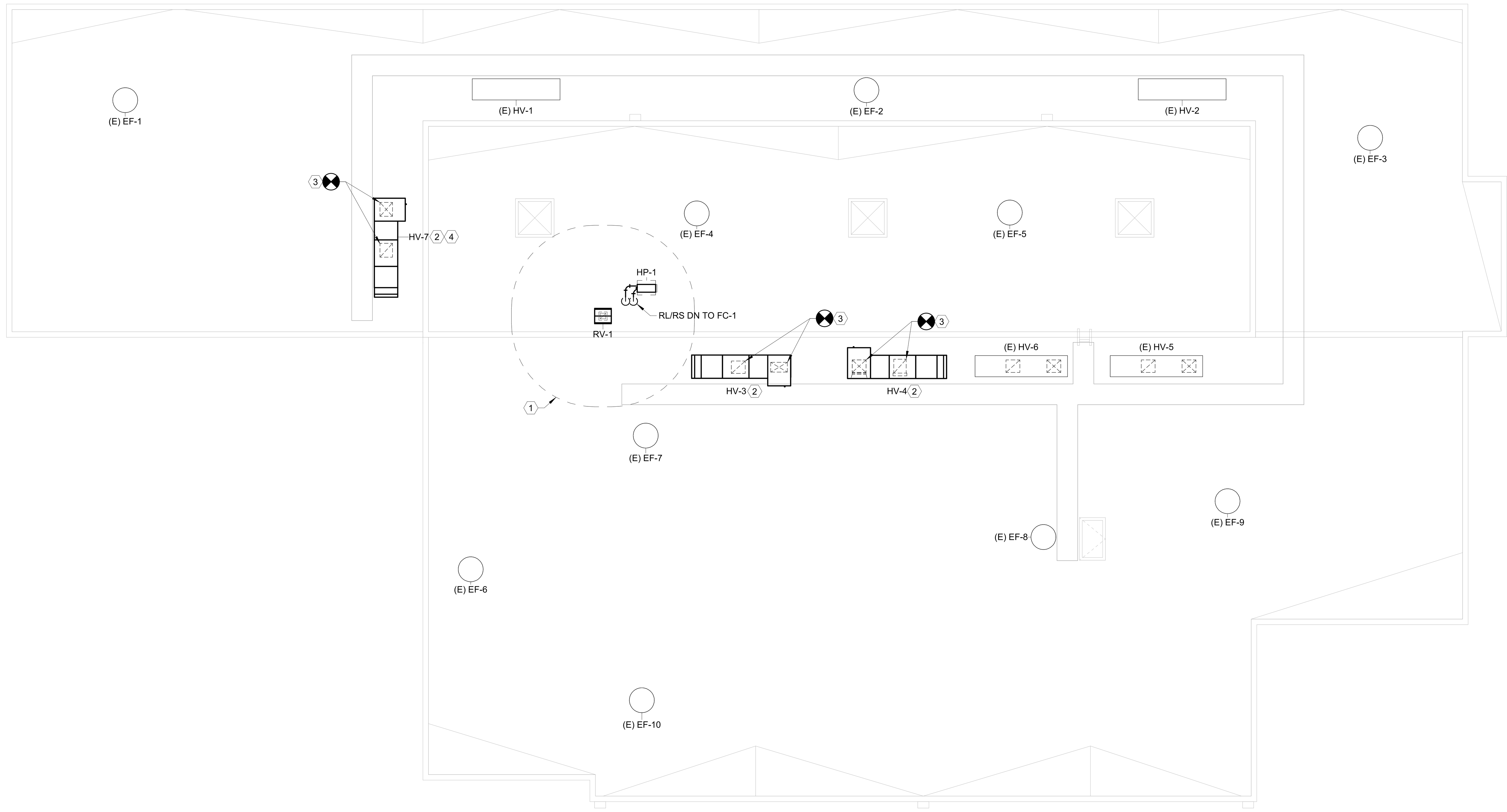
CONSTRUCTION DOCUMENTS

DATE:	9/20/2024
DRAWN BY:	EG
REVIEWED BY:	NW
SCALE:	1/8" = 1'-0"
PROJECT NO:	22007

M220

<u>KEYED NOTES:</u>

1. MAINTAIN 10'-0" MIN CLEARANCE FROM ROOF VENTILATOR TO ANY EXHAUST DISCHARGE, VENT, OR FLUE.
2. CONDUCT POST-CONSTRUCTION AIR BALANCE TESTING FOR EXISTING FURNACE. SEE AIR BALANCE PROCEDURES ON M100 FOR ADDITIONAL INFORMATION.
3. CONNECT NEW UNIT TO EXISTING DROPS ABOVE CEILING. MODIFY DUCTWORK AS NECESSARY TO CONNECT.
4. MAINTAIN MINIMUM 18" CLEARANCE FROM PARAPET FOR FUTURE SECURITY FENCING.



1
M240
MECHANICAL ROOF PLAN
1/8" = 1'-0"

N

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LICENSE STAMP

KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

HUMBOLDT COUNTY
REGIONAL FACILITY

2004 HARRISON AVENUE
EUREKA, CA 95501

NO.	REVISIONS	DATE

SHEET TITLE

MECHANICAL ROOF PLAN

ISSUED FOR:

CONSTRUCTION DOCUMENTS

DATE:	9/20/2024
DRAWN BY:	EG
REVIEWED BY:	NW
SCALE:	1/8" = 1'-0"
PROJECT NO:	22007

M240

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
This document is used to demonstrate compliance for mechanical systems that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.4, or 141.0(b)2 for alterations.			
Project Name: HUMBOLDT COUNTY REGIONAL FACILITY		Report Page:	(Page 1 of 17)
Project Address:	2004 HARRISON STREET	Date Prepared:	9/20/2024

A. GENERAL INFORMATION

01	Project Location (city)	EUREKA	04	Total Conditioned Floor Area	5871
02	Climate Zone	1	05	Total Unconditioned Floor Area	0
03	Occupancy Types Within Project:		06	# of Stories (Habitable Above Grade)	1

• Classroom • Office

B. PROJECT SCOPE

This table Includes mechanical systems or components that are within the scope of the permit application and are demonstrating compliance using the prescriptive path outlined in 140.4, 170.2(b) or 141.0(b)2 and 180.2(b)2 for alterations.

01	02	03
Air System(s)	Wet System Components	Dry System Components
☒ Heating Air System	☐ Water Economizer	☐ Air Economizer
☒ Cooling Air System	☐ Pumps	☐ Electric Resistance Heat
Mechanical Controls	☐ System Piping	☒ Fan Systems
☒ Mechanical Controls (existing to remain, altered or new)	☐ Cooling Towers	☒ Ductwork (existing to remain, altered or new)
	☐ Chillers	☒ Ventilation
	☐ Boilers	☐ Zonal Systems/ Terminal Boxes

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: HUMBOLDT COUNTY REGIONAL FACILITY	Report Page:	(Page 2 of 17)
	Date Prepared:	9/20/2024

C. COMPLIANCE RESULTS

Table C will indicate if the project data input into the compliance document is compliant with mechanical requirements. This table is not editable by the user. If this table says "DOES NOT COMPLY" or "COMPLIES with Exceptional Conditions" refer to Table D., or the table indicated as not compliant for guidance.

01		02		03		04		05		06		07		08	09
System Summary 110.1, 110.2, 140.4, 170.2(c)	AND	Pumps 140.4(k), 170.2(c)4I	AND	Fans/ Economizers 140.4(c), 140.4(e), 170.2(c)	AND	System Controls 110.2, 120.2, 140.4(f), 170.2(c)	AND	Ventilation 120.1, 160.2	AND	Terminal Box Controls 140.4(d), 170.2(c)4B	AND	Distribution 120.3, 140.4(l), 160.2, 160.3	AND	Cooling Towers 110.2(e)2	Compliance Results
(See Table F)		(See Table G)		(See Table H)		(See Table I)		(See Table J)		(See Table K)		(See Table L)		(See Table M)	
Yes	AND		AND	Yes	AND	Yes	AND	Yes	AND		AND	Yes	AND		COMPLIES
Mandatory Measures Compliance (See Table Q for Details)															COMPLIES

D. EXCEPTIONAL CONDITIONS

This table is auto-filled with uneditable comments because of selections made or data entered in tables throughout the form.

E. ADDITIONAL REMARKS

This table includes remarks made by the permit applicant to the Authority Having Jurisdiction.

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Space Conditioning System Information

01	02	03	04	05	06
System Name	Quantity	System Serving	System Status	Space Type	Utilizing Recovered Heat
ZONE AC 1	1	Single zone	New/ Addition		☐
ZONE HV 3	1	Single zone	Alteration		☐
ZONE HV 4	1	Single zone	Alteration		☐
ZONE HV 7	1	Single zone	Alteration		☐

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: HUMBOLDT COUNTY REGIONAL FACILITY	Report Page:	(Page 3 of 17)
	Date Prepared:	9/20/2024

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Dry System Equipment Sizing (includes air conditioners, condensers, heat pumps, VRF, furnaces and unit heaters and DOAS systems)

01	02	03	04	05	06	07	08	09	10	11
				Equipment Sizing per Mechanical Schedule (kBtu/h) 140.4(a&b), 170.2(c)1 & 170.2(c)2						
				Heating Output[2,3]			Cooling Output[2,3]		Load Calculations[3,4]	
Name or Item Tag	Equipment Category per Tables 110.2, 140.4(a)2 and 170.2(c)3aii	Equipment Type per Tables 110.2 and Title 20	Smallest Size Available[1] 140.4(a) and 170.2(c)1	Per Design (kBtu/h)	Rated (kBtu/h)	Supp. Heating Output (kBtu/h)	Sensible Per Design (kBtu/h)	Rated (kBtu/h)	Total Heating Load (kBtu/h)	Total Sensible Cooling Load (kBtu/h)
ZONE AC 1	Unitary Heat Pumps	Air-cooled, split (1phase)	Yes	9.44	13.6	0	9.1	8	0.35	1.98
ZONE HV 3	Furnace + AC	AC, air cooled, single pkg + warm-air central furnace, gas-fired	NA: Altered per 141.0(b)2E and 180.2(b)2	121.5	121.5	0	0	0	6.11	19.8
ZONE HV 4	Furnace + AC	AC, air cooled, single pkg + warm-air central furnace, gas-fired	NA: Altered per 141.0(b)2E and 180.2(b)2	121.5	121.5	0	0	0	11.55	20.72
ZONE HV 7	Furnace + AC	AC, air cooled, single pkg + warm-air central furnace, gas-fired	NA: Altered per 141.0(b)2E and 180.2(b)2	81	81	0	0	0	6.76	9.81

[1]FOOTNOTES: Equipment shall be the smallest size, within the available options of the desired equipment line, necessary to meet the design heating and cooling loads of the building per 140.4(a) and 170.2(c)1. Healthcare facilities are excepted.
[2]It is common practice to show rated output capacity on the equipment schedule. Sensible cooling output comes from specification sheet tables.
[3] If equipment is heating only, leave cooling output and load blank. If equipment is cooling only, leave heating output and load blank.
[4] Authority Having Jurisdiction may ask for load calculations used for compliance per 140.4(b) and 170.2(c).

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: HUMBOLDT COUNTY REGIONAL FACILITY	Report Page:	(Page 4 of 17)
	Date Prepared:	9/20/2024

F. HVAC SYSTEM SUMMARY (DRY & WET SYSTEMS)

Dry System Equipment Efficiency (other than Package Terminal Air Conditioners (PTAC) and Package Terminal Heat Pumps (PTHP), DX-DOAS and Dual Fuel Heat Pumps)

01	02	03	04	05	06	07	08	09
		Heating Mode				Cooling Mode		
Name or Item Tag	Size Category (Btu/h)	Rating Condition (°F)	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency	Efficiency Unit	Minimum Efficiency Required per Tables 110.2 / Title 20	Design Efficiency
ZONE AC 1	<65,000		HSPF2	7.5	8.1	SEER2	14.3	14.6
ZONE HV 3	<65,000		AFUE	0.8	0.81	SEER2	13.4	14
ZONE HV 4	<65,000		AFUE	0.8	0.81	SEER2	13.4	14
ZONE HV 7	<65,000		AFUE	0.8	0.81	SEER2	13.4	14

G. PUMPS

This section does not apply to this project.

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: HUMBOLDT COUNTY REGIONAL FACILITY	Report Page:	(Page 5 of 17)
	Date Prepared:	9/20/2024

H. FAN SYSTEMS & AIR ECONOMIZERS

This table is used to demonstrate compliance with prescriptive requirements found in 140.4(c), 140.4(e), 140.4(m), 170.2(c)3, and 170.2(c)4A for fan systems. Fan systems serving only process loads are exempt from these requirements and do not need to be included in Table H.

System Name	ZONE AC 1	Quantity	1	Fan System Status	New	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	371	Site Elevation	43	Economizer	NA: <=33 kBtu/h cooling

01	02	03	04	05	06	07	08	09	10	11
						Allowance		Design		
Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Component Allowance	Fan Allowance (watt/cfm)[3]	Design Electrical Input Power Method	Motor Nameplate Horsepower	Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	100		86		Manufacturer provided		0.04
			MERV 13-16 Filter upstream of thermal conditioning equipment	100		52				
			Hydronic/DX cooling coil or heat pump coil	100		52				
Supply Fan Base Allowance (kW)			Exhuast/Return/Relief/Transfer Fan Base Allowance(kW)			Fan System Allowance (kW)[3]		1	Fan System Electrical Output (kW)	0.04

STATE OF CALIFORNIA
Mechanical Systems
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CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: HUMBOLDT COUNTY REGIONAL FACILITY	Report Page:	(Page 6 of 17)
	Date Prepared:	9/20/2024

H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	ZONE HV 3	Quantity	1	Fan System Status	Alteration	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	2,600	Site Elevation	43	Economizer	NA: Altered packaged AC or HP <54 kBtu/h

01	02	03	04	05	06	07	08	09	10	11
						Allowance		Design		
Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Component Allowance	Fan Allowance (watt/cfm)[3]	Design Electrical Input Power Method	Motor Nameplate Horsepower	Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	100		603		Manufacturer provided		1.65
			MERV 13-16 Filter upstream of thermal conditioning equipment	100		361				
			Gas heat	100		151				
			Hydronic/DX cooling coil or heat pump coil	100		361				
			Supply Fan System	100		361				
Supply Fan Base Allowance (kW)			Exhuast/Return/Relief/Transfer Fan Base Allowance(kW)			Fan System Allowance (kW)[3]		1.84	Fan System Electrical Output (kW)	1.65

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CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: HUMBOLDT COUNTY REGIONAL FACILITY	Report Page:	(Page 7 of 17)
	Date Prepared:	9/20/2024

H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	ZONE HV 4	Quantity	1	Fan System Status	Alteration	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	2,000	Site Elevation	43	Economizer	NA: Altered packaged AC or HP <54 kBtu/h

01	02	03	04	05	06	07	08	09	10	11
						Allowance		Design		
Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Component Allowance	Fan Allowance (watt/cfm)[3]	Design Electrical Input Power Method	Motor Nameplate Horsepower	Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	100		464		Manufacturer provided		1.11
			MERV 13-16 Filter upstream of thermal conditioning equipment	100		278				
			Gas heat	100		116				
			Hydronic/DX cooling coil or heat pump coil	100		278				
			Supply Fan System	100		278				
Supply Fan Base Allowance (kW)			Exhuast/Return/Relief/Transfer Fan Base Allowance(kW)			Fan System Allowance (kW)[3]		1.41	Fan System Electrical Output (kW)	1.11

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: HUMBOLDT COUNTY REGIONAL FACILITY	Report Page:	(Page 8 of 17)
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H. FAN SYSTEMS & AIR ECONOMIZERS

System Name	ZONE HV 7	Quantity	1	Fan System Status	Alteration	System Zoning	all other systems	Serving Dwelling Units	Not Serving Dwelling Units	Fan System Airflow (cfm)	1,600	Site Elevation	43	Economizer	NA: Altered packaged AC or HP <54 kBtu/h

01	02	03	04	05	06	07	08	09	10	11
						Allowance		Design		
Fan Name or Item Tag	Fan Type	Qty	Component	Airflow through Component (%)	Water Gauge (w.g)	Component Allowance	Fan Allowance (watt/cfm)[3]	Design Electrical Input Power Method	Motor Nameplate Horsepower	Design Electrical Input Power (kW)
SF	Supply	1	Base Allowance for system serving spaces <=6 floors away	100		371		Manufacturer provided		0.93
			MERV 13-16 Filter upstream of thermal conditioning equipment	100		222				
			Gas heat	100		93				
			Hydronic/DX cooling coil or heat pump coil	100		222				
			Supply Fan System	100		222				
Supply Fan Base Allowance (kW)			Exhuast/Return/Relief/Transfer Fan Base Allowance(kW)			Fan System Allowance (kW)[3]		1.13	Fan System Electrical Output (kW)	0.93

[1] FOOTNOTES: Fans serving spaces with design background noise goals below NC35
[2] Low-turndown single-zone VAV fan system must be capable of and configured to reduce airflow to 50 percent of design airflow and use no more than 30 percent of the design wattage at that airflow. No more than 10 percent of the design load served by the equipment shall have fixed loads.
[3] Fan system allowance includes fan system base allowance.
[4] Filter pressure loss can only be counted once per fan system.
[5] Complex Fan System means a fan system that combines a single cabinet fan system with other supply fans, exhaust fans, or both.
[6] Computer room economizers must meet requirements of 140.9(a) and will be documented on the NRCC-PRC-E document..

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: HUMBOLDT COUNTY REGIONAL FACILITY	Report Page:	(Page 9 of 17)
	Date Prepared:	9/20/2024

H. EXHAUST AIR HEAT RECOVERY 140.4(q), 170.2(c)4O

01	02	03	04	05	06	07	08	09	10	11
Fan System Name	Qty	Hours of Operation per Year	Design Supply Airflow Rate	Outdoor Airflow	% Outdoor Air at Full Design Airflow	Exemptions to Exhaust Air Heat Recovery Requirement per 140.4(q) & 170.2(c)4O	Exhaust Air Heat Recovery 140.4(q) & 170.2(c)4O	Type Of Heat Recovery Rating	Required Recovery Ratio	Energy Recovery Bypass

Fan Energy Index (FEI)

01	02	03
Name or Item Tag	FEI Exception	FEI
ZONE AC 1	Embedded Fan <5HP or <4.1kW	
ZONE HV 3	Altered Fan System	
ZONE HV 4	Altered Fan System	
ZONE HV 7	Altered Fan System	

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: HUMBOLDT COUNTY REGIONAL FACILITY	Report Page:	(Page 10 of 17)
	Date Prepared:	9/20/2024

I. SYSTEM CONTROLS

This table is used to demonstrate compliance with mandatory controls in 110.2 and 120.2 and prescriptive controls in 140.4(f) and (n), 170.2(c)4D 170.2(c)4L or requirements in 141.0(b)2E 180.2(b)2 for altered space conditioning systems.

01	02	03	04	05	06	07	08	09
System Name	System Zoning	Conditioned Floor Area Being Served (ft^2)	Thermostats 110.2(b) & (c)[1], 120.2(a) 160.3(a)2A or 141.0(b)2E & 180.2(b)2	Shut-Off Controls 120.2(e) & 160.3(a)2D	Isolation Zone Controls 120.2(g) & 160.3(a)2F	Demand Response 110.12 120.2(b) & 160.3(a)2B	Supply Air Temp. Reset 140.4(f) & 170.2(c)4D	Window Interlocks per 140.4(n) & 170.2(c)4D
ZONE AC 1	Single zone	<= 25,000 ft^2	Setback	4 Hour Timer	NA: Single Zone	EMCS	Included	NA: No operable windows
ZONE HV 3	Single zone	<= 25,000 ft^2	Setback	NA: Altered per 141.0(b)2E	NA: Altered per §141.0(b)2E	EMCS	NA: Alteration	NA: Alteration Project
ZONE HV 4	Single zone	<= 25,000 ft^2	Setback	NA: Altered per 141.0(b)2E	NA: Altered per §141.0(b)2E	EMCS	NA: Alteration	NA: Alteration Project
ZONE HV 7	Single zone	<= 25,000 ft^2	Setback	NA: Altered per 141.0(b)2E	NA: Altered per §141.0(b)2E	EMCS	NA: Alteration	NA: Alteration Project

[1]FOOTNOTES: Gravity gas wall heaters, gravity floor heaters, gravity room heaters, non-central electric heaters, fireplaces or decorative gas appliances, wood stoves are not required to have setback thermostats.

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: HUMBOLDT COUNTY REGIONAL FACILITY	Report Page:	(Page 11 of 17)
	Date Prepared:	9/20/2024

J. VENTILATION AND INDOOR AIR QUALITY

This table is used to demonstrate compliance with mandatory ventilation requirements in 120.1 120.2(e)3B 140.4(p) and 140.4(q) for all nonresidential and hotel/motel and d:t24refnolink/]160.2, 160.3(a)3D, 170.2(a)4N, 170.2(a)4O for high-rise residential occupancies. For alterations, only ventilation systems being altered within the scope of the permit application need to be documented in this table. In lieu of this table, the required outdoor ventilation rates and airflows may be shown on the plans or the calculations can be presented in a spreadsheet.

01	☐	Check the box if the project is showing ventilation calculations on the plans, or attaching the calculations instead of completing this table.
02	☒	Check this box if the project included Nonresidential, Hotel/Motel Spaces or Multifamily Common Use Spaces
	☐	
03	☐	Check the box if the project is using natural ventilation in any nonresidential or hotel/motel spaces to meet required ventilation rates per 120.1(c)2.

Nonresidential and Hotel/ Motel Multifamily Common Use Ventilation Systems

04		05		06		07
System Name	ZONE AC 1	System Design OA CFM Airflow[1]	0	System Design Transfer Air CFM	0	Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]: Provided

08	09	10	11	12	13	14	15	16	
	Mechanical Ventilation Required per 120.1(c)3[3] & 160.2(c)3					Exh. Vent per 120.1(c)4 & 160.2(c)4		DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D	
Space Name or Item Tag	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM		
24 - CONTROL	Office space	233			34.9	0	0	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
17	Total System Required Min OA CFM				35	18	Ventilation for this System Complies?	Yes	

04		05		06		07
System Name	ZONE HV 3	System Design OA CFM Airflow[1]	0	System Design Transfer Air CFM	0	Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]: Provided
08	09	10, 11	12	13, 14	15	16

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: HUMBOLDT COUNTY REGIONAL FACILITY	Report Page:	(Page 12 of 17)
	Date Prepared:	9/20/2024

J. VENTILATION AND INDOOR AIR QUALITY

Space Name or Item Tag	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D	
	Mechanical Ventilation Required per 120.1(c)3[3] & 160.2(c)3					Exh. Vent per 120.1(c)4 & 160.2(c)4			
55 - DAY ROOM A	Media Center	2624			393.6	0	0	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
17	Total System Required Min OA CFM				394	18	Ventilation for this System Complies?	Yes	

04		05		06		07
System Name	ZONE HV 4	System Design OA CFM Airflow[1]	52	System Design Transfer Air CFM	0	Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]: Provided

08	09	10	11	12	13	14	15	16	
	Mechanical Ventilation Required per 120.1(c)3[3] & 160.2(c)3					Exh. Vent per 120.1(c)4 & 160.2(c)4		DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D	
Space Name or Item Tag	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM		
15 - VOCATIONAL TRAINING	Media Center	1760			264	0	0	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
17	Total System Required Min OA CFM				264	18	Ventilation for this System Complies?	Yes	

04		05		06		07
System Name	ZONE HV 7	System Design OA CFM Airflow[1]	0	System Design Transfer Air CFM	0	Air Filtration per 120.1(c) 141.0(b)2 and 160.2(c)21[2]: Provided
08	09	10, 11	12	13, 14	15	16

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: HUMBOLDT COUNTY REGIONAL FACILITY	Report Page:	(Page 13 of 17)
	Date Prepared:	9/20/2024

J. VENTILATION AND INDOOR AIR QUALITY

Space Name or Item Tag	Occupancy Type[4]	Conditioned Floor Area (ft^2)	# of Shower heads/ toilets	# of people[5]	Required Min OA CFM	Required Min CFM	Provided per Design CFM	DCV or Sensor Controls per 120.1(d)3, 120.1(d)5, and 120.1(e)3[6] 160.2(c)5D 160.2(c)5E 160.2(c)5D	
	Mechanical Ventilation Required per 120.1(c)3[3] & 160.2(c)3					Exh. Vent per 120.1(c)4 & 160.2(c)4			
33 - RECREATION	Media Center	1254			188.1	0	0	DCV	NA: Not required per §120.1(d)3
								Occ Sensor	NA: Not required space type
17	Total System Required Min OA CFM				188	18	Ventilation for this System Complies?	Yes	

[1] FOOTNOTES: System CFM should include both mechanical and natural ventilation for the zone/system
[2] Air filtration requirements apply to the following three system types per 120.1(c)1A: space conditioning systems utilizing ducts to supply air to occupiable space; supply-only ventilation systems providing outside air to occupiable space; supply side of balanced ventilation systems including heat recovery and energy recovery ventilation systems providing outside air to occupiable space.
[3] Uniform Mechanical Code may have more stringent ventilation requirements; the most stringent code requirement takes precedence.
[4] See Standards Tables 120.1-A and 120.1-B.
[5] For lecture halls with fixed seating, the expected number of occupants shall be determined in accordance with the California Building Code.
[6] 120.2(e)3 requires systems serving rooms that are required by 130.1(c) to have lighting occupancy sensing controls to also have occupancy sensing zone controls for ventilation. Examples of spaces which require lighting occupancy sensors include offices 250ft^2 or smaller, multipurpose rooms less than 1,000 ft^2, classrooms, conference rooms, restrooms, aisles and open areas in warehouses, library book stack aisles, corridors, stairwells, parking garages, and loading and unloading zones, unless excepted by 130.1(c).

K. TERMINAL BOX CONTROLS

This section does not apply to this project.

L. DISTRIBUTION (DUCTWORK and PIPING)

This table is used to show compliance with mandatory pipe insulation requirements found in 120.3 and mandatory requirements found in 120.4(g) for duct sealing.

01	☐	Insulation shall be protected from damage, including that due to sunlight, moisture, equipment maintenance, and wind. Insulation exposed to weather shall be installed with a cover suitable for outdoor service. Insulation covering chilled water piping and refrigerant suction piping located outside the conditioned space shall have a Class I or Class II vapor retarder. All penetrations and joints of which shall be sealed.

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: HUMBOLDT COUNTY REGIONAL FACILITY	Report Page:	(Page 14 of 17)
	Date Prepared:	9/20/2024

L. DISTRIBUTION (DUCTWORK and PIPING)

Duct Leakage Testing

The answers to the questions below apply to the following duct systems:	ZONE AC 1	**NR/ Common Use:** Duct leakage testing shall not exceed 6% per NA7.5.3 required for these systems?	No
		Dwelling Units: Total duct leakage of duct system shall not exceed 12% or duct system to outside shall not exceed 6% per RA3.1.4 required for systems?	No
		Duct leakage testing per CMC Section 603.10.1 required for these systems?	Yes

11	No	The scope of the project includes only duct systems serving healthcare facilities
12	Yes	Duct system provides conditioned air to an occupiable space for a constant volume, single zone, space-conditioning system.
13	Yes	The space conditioning system serves less than 5,000 ft^2 of conditioned floor area.
14	No	The combined surface area of the ducts is more than 25% of the total surface area of the entire duct system:
15		The scope of the project includes extending an existing duct system, which is constructed, insulated or sealed with asbestos.
16	No	The scope of the project includes an existing duct system that is documented to have been previously sealed as confirmed through field verification and diagnostic testing in accordance with procedures in the Reference Nonresidential Appendix NA2.
17		All Ductwork and plenums with pressure class ratings shall be constructed to Seal Class A
18		All ductwork is an extension of an existing duct system
19		Ductwork serving individual dwelling unit
20		< 25 ft of new or replacement space conditioning ducts installed
21	R-8	Duct Insulation R-value
22		
23		

M. COOLING TOWERS

This section does not apply to this project.

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: HUMBOLDT COUNTY REGIONAL FACILITY	Report Page:	(Page 15 of 17)
	Date Prepared:	9/20/2024

N. DECLARATION OF REQUIRED CERTIFICATES OF INSTALLATION

Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E Additional Remarks. These documents must be provided to the building inspector during construction and can be found online at https://www.energy.ca.gov/title24/2019standards/2019_compliance_documents/Nonresidential_Documents/NRCI/

Form/Title
NRCI-MCH-01-E - Must be submitted for all buildings

O. DECLARATION OF REQUIRED CERTIFICATES OF ACCEPTANCE

Selections have been made based on information provided in previous tables of this document. If any selection needs to be changed, please explain why in Table E Additional Remarks. These documents must be provided to the building inspector during construction and can be found online at https://www.energy.ca.gov/title24/2019standards/2019_compliance_documents/Nonresidential_Documents/NRCA/

Form/Title	Systems/Spaces To Be Field Verified
NRCA-MCH-02-A - Outdoor Air must be submitted for all newly installed HVAC units. Note: MCH-02-A can be performed in conjunction with MCH-07-A Supply Fan VFD Acceptance (if applicable) since testing activities overlap.	RX12WMVJU9; GH 2600CFM; GH 2000CFM; GH 1600CFM;
NRCA-MCH-03-A - Constant Volume Single Zone HVAC NOTE: This form does not automatically move to "Yes'. If Constant Volume Single Zone HVAC Systems are included in the scope, permit applicant should move this form to "Yes".	RX12WMVJU9; GH 2600CFM; GH 2000CFM; GH 1600CFM;
NRCA-MCH-11-A Automatic Demand Shed Controls	RX12WMVJU9; GH 2600CFM; GH 2000CFM; GH 1600CFM;
NRCA-MCH-18-A Energy Management Control Systems	RX12WMVJU9; GH 2600CFM; GH 2000CFM; GH 1600CFM;

P. DECLARATION OF REQUIRED CERTIFICATES OF VERIFICATION

There are no NRCV forms required for this project.

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE		NRCC-MCH-E
Project Name: HUMBOLDT COUNTY REGIONAL FACILITY	Report Page:	(Page 16 of 17)
	Date Prepared:	9/20/2024

Q. MANDATORY MEASURES DOCUMENTATION LOCATION

This table is used to indicate where mandatory measures are documented in the plan set or construction documentation.

01		02
Compliance with Mandatory Measures documented through MCH Mandatory Measures Note Block	Yes	Plan sheet or construction document location: M-Sheets

STATE OF CALIFORNIA
Mechanical Systems
CALIFORNIA ENERGY COMMISSION

CERTIFICATE OF COMPLIANCE			NRCC-MCH-E
Project Name: HUMBOLDT COUNTY REGIONAL FACILITY		Report Page:	(Page 17 of 17)
Project Address:	2004 HARRISON STREET	Date Prepared:	9/20/2024

DOCUMENTATION AUTHOR'S DECLARATION STATEMENT

I certify that this Certificate of Compliance documentation is accurate and complete.

Documentation Author Name: Nathaniel Warfield	Documentation Author Signature: Nathaniel Warfield
Company: Frontier Consulting Engineering, Inc.	Signature Date: 2024-09-20
Address: 2727 Bechelli Lane	CEA/ HERS Certification Identification (if applicable):
City/State/Zip: Redding California 96002	Phone: (530) 232-6160

RESPONSIBLE PERSON'S DECLARATION STATEMENT

I certify the following under penalty of perjury, under the laws of the State of California:

1. The information provided on this Certificate of Compliance is true and correct.
2. I am eligible under Division 3 of the Business and Professions Code to accept responsibility for the building design or system design identified on this Certificate of Compliance (responsible designer)
3. The energy features and performance specifications, materials, components, and manufactured devices for the building design or system design identified on this Certificate of Compliance conform to the requirements of Title 24, Part 1 and Part 6 of the California Code of Regulations.
4. The building design features or system design features identified on this Certificate of Compliance are consistent with the information provided on other applicable compliance documents, worksheets, calculations, plans and specifications submitted to the enforcement agency for approval with this building permit application.
5. I will ensure that a completed signed copy of this Certificate of Compliance shall be made available with the building permit(s) issued for the building, and made available to the enforcement agency for all applicable inspections. I understand that a completed signed copy of this Certificate of Compliance is required to be included with the documentation the builder provides to the building owner at occupancy.

Responsible Designer Name: Nathaniel Warfield	Responsible Designer Signature: Nathaniel Warfield
Company: Frontier Consulting Engineers, Inc.	Date Signed: 2024-09-20
Address: 2727 Bechelli Lane	License: M41898
City/State/Zip: Redding California 96002	Phone: (530) 232-6160

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CONSULTING ENGINEERS
2727 Bechelli Lane - Redding, CA 96002
Ph: (530) 232-6160 - www.frontierce.com

LICENSE STAMP

REGISTERED PROFESSIONAL ENGINEER NATHANIEL E. WARFIELD No. M41898 EXP. 03-31-2026 MECHANICAL STATE OF CALIFORNIA

KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

HUMBOLDT COUNTY REGIONAL FACILITY

2004 HARRISON AVENUE
EUREKA, CA 95501

NO.	REVISIONS	DATE

SHEET TITLE

TITLE 24 COMPLIANCE

ISSUED FOR:

CONSTRUCTION DOCUMENTS

DATE:	9/20/2024
DRAWN BY:	EG
REVIEWED BY:	NW
SCALE:	
PROJECT NO:	22007

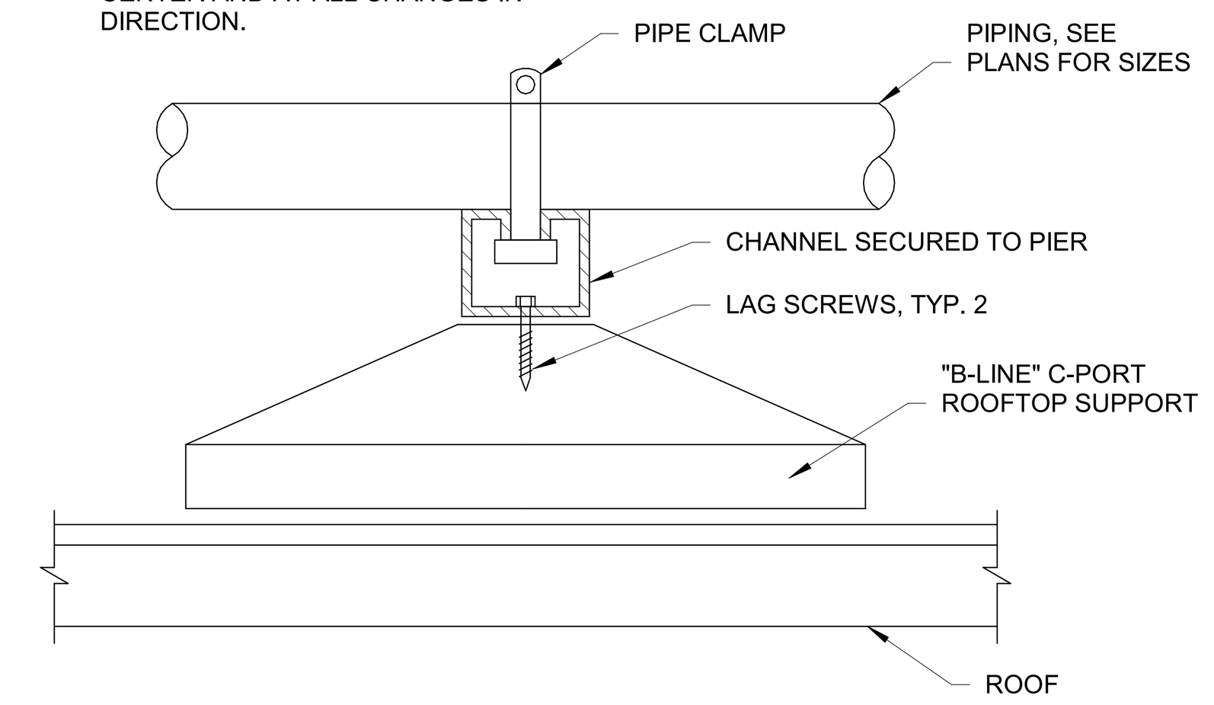
M400

PIPING MATERIALS SCHEDULE

Service	Location	Size	Material	Notes
GAS	EXTERIOR, ABOVE GRADE	ALL	BLACK STEEL THREADED	2" AND SMALLER - THREADED CONNECTIONS, LARGER THAN 2" - WELDED CONNECTIONS
COND. DRAIN	ALL	ALL	TYPE M - HARD TEMPER COPPER SCHEDULE 40 PVC DWV IS TO BE USED ON FUEL BURNING APPLIANCES ONLY	SLOPED AT 1/4" PER FOOT

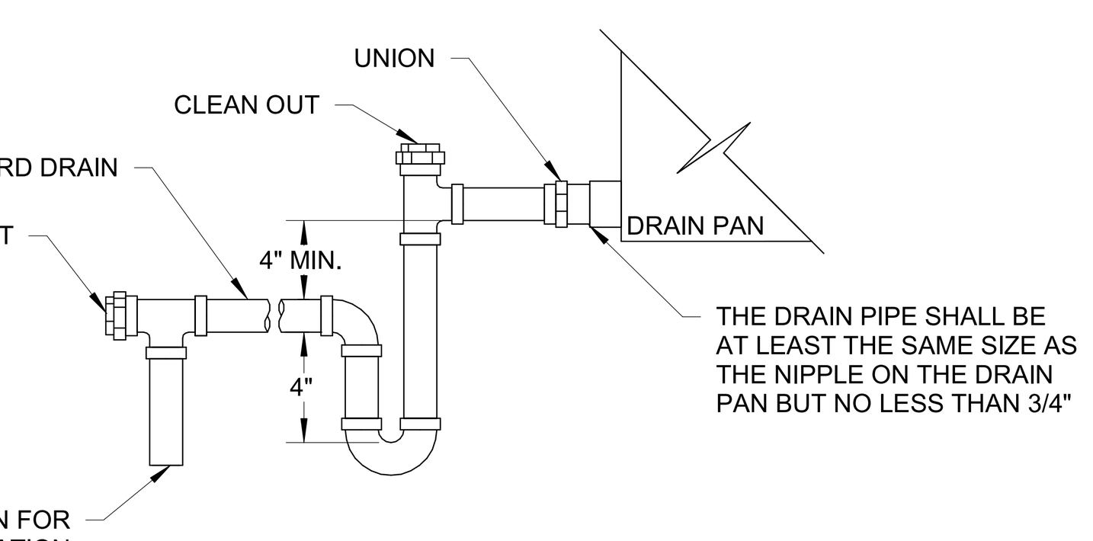
NOTES:

1. PLACE SUPPORTS AT 8'-0" ON CENTER AND AT ALL CHANGES IN DIRECTION.

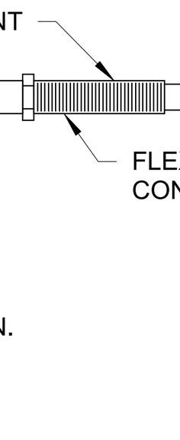


ELEVATION

1 P100 PIPE SUPPORT ON ROOF DETAIL
NOT TO SCALE



2 P100 HVAC CONDENSATE DRAIN DETAIL
NOT TO SCALE



3 P100 GAS CONNECTION DETAIL
NOT TO SCALE

PLUMBING LEGEND

SYMBOLS	ABBREVIATIONS	
	ABC	ABOVE CEILING
	BFP	BACKFLOW PREVENTER
		BALL VALVE
	BG	BELOW GRADE
	BS	BELOW SLAB
		CHECK VALVE
	CW	COLD WATER SUPPLY
	CD	CONDENSATE DRAIN
	CDO	CONDENSATE DRAIN OVERFLOW
		CONNECTION TO BOTTOM OF PIPE
		CONNECTION TO TOP OF PIPE
	D	DEMO
		DOMESTIC COLD WATER
		DOMESTIC HOT WATER
	DN	DOWN
	DIW	DOWN IN WALL
	E, EX	EXISTING
		FLANGE
	FCO	FLOOR CLEAN OUT
	FD	FLOOR DRAIN
	FS	FLOOR SINK
	GSM	GALVANIZED SHEET METAL
	GCO	GRADE CLEAN OUT
	GW	GREASE WASTE
	HB	HOSE BIB
	HW	HOT WATER SUPPLY
	HWR	HOT WATER RECIRC
	N	NEW
		NEW CONNECTION TO EXISTING
	OH	OVERHEAD
		PIPE CAP
		PIPE TURNED DOWN
		PIPE TURNED UP
		PRESSURE GAUGE
		PRESSURE REGULATOR
		P-TRAP
		RELIEF VALVE
		REMOVE TO THIS POINT
	SS	SANITARY SEWAGE (BELOW GRADE)
	SOV	SHUT-OFF VALVE
	SK	SINK
		STRAINER
		THERMOMETER
	TMV	THERMOSTATIC VALVE
	TP	TRAP PRIMER
		TRIPLE DUTY VALVE
	UG	UNDERGROUND
		UNION
	UIW	UP IN WALL
	UR	URINAL
	V	VENT
	VTR	VENT TO ROOF
	WC	WATER CLOSET
	WHA	WATER HAMMER ARRESTER
	WCO	WALL CLEANOUT

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KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

HUMBOLDT COUNTY REGIONAL FACILITY

2004 HARRISON AVENUE
EUREKA, CA 95501

NO.	REVISIONS	DATE

SHEET TITLE

PLUMBING LEGENDS AND DETAILS

ISSUED FOR:

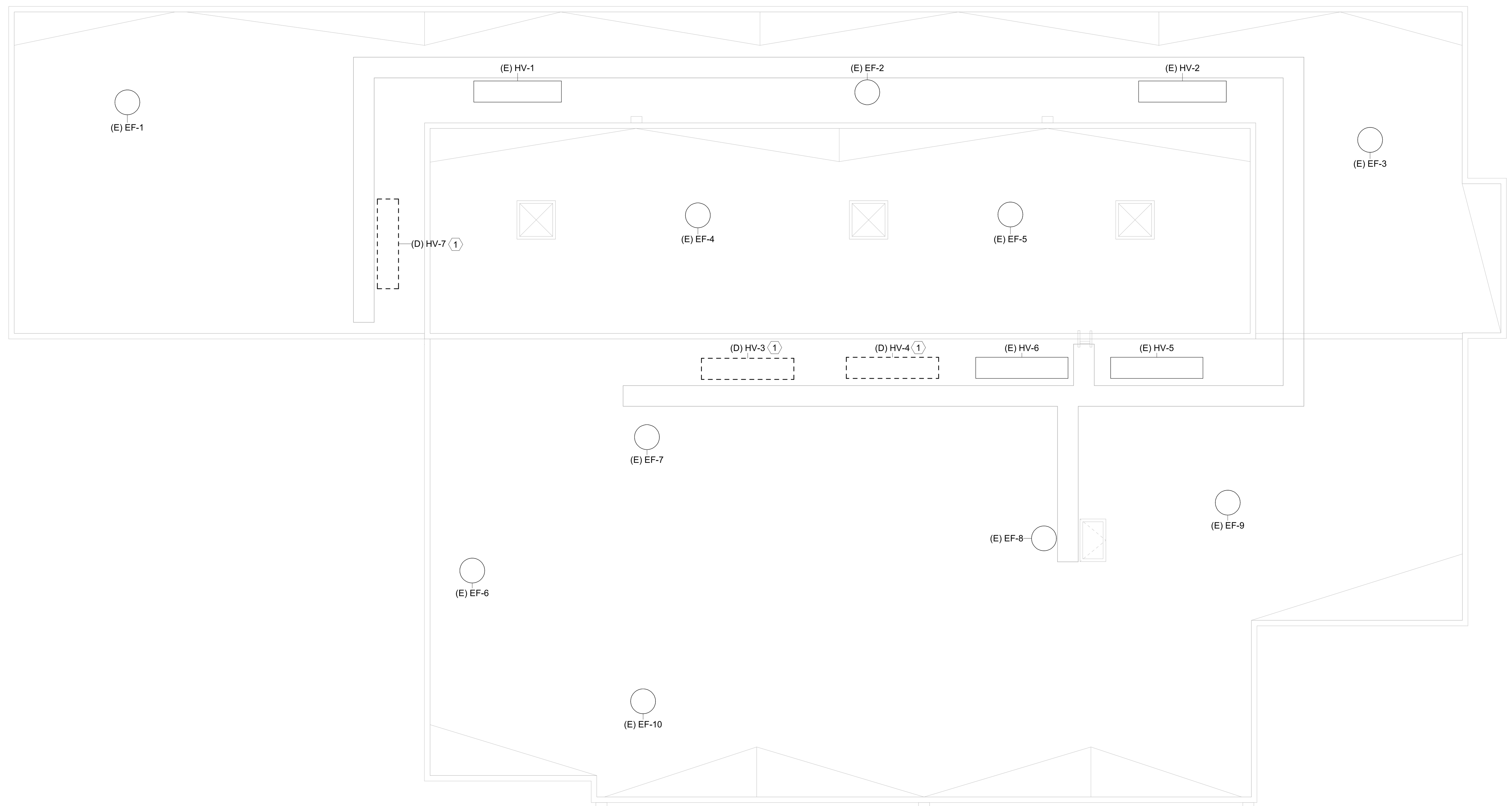
CONSTRUCTION DOCUMENTS

DATE:	9/20/2024
DRAWN BY:	EG
REVIEWED BY:	NW
SCALE:	1/8" = 1'-0"
PROJECT NO:	22007

P100

KEYED NOTES:

1. DISCONNECT EXISTING GAS PIPING FROM UNIT. PREPARE FOR CONNECTION TO NEW UNIT



1 P210 PLUMBING DEMOLITION ROOF PLAN
1/8" = 1'-0"

N

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KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

HUMBOLDT COUNTY REGIONAL FACILITY

2004 HARRISON AVENUE
EUREKA, CA 95501

NO.	REVISIONS	DATE

SHEET TITLE

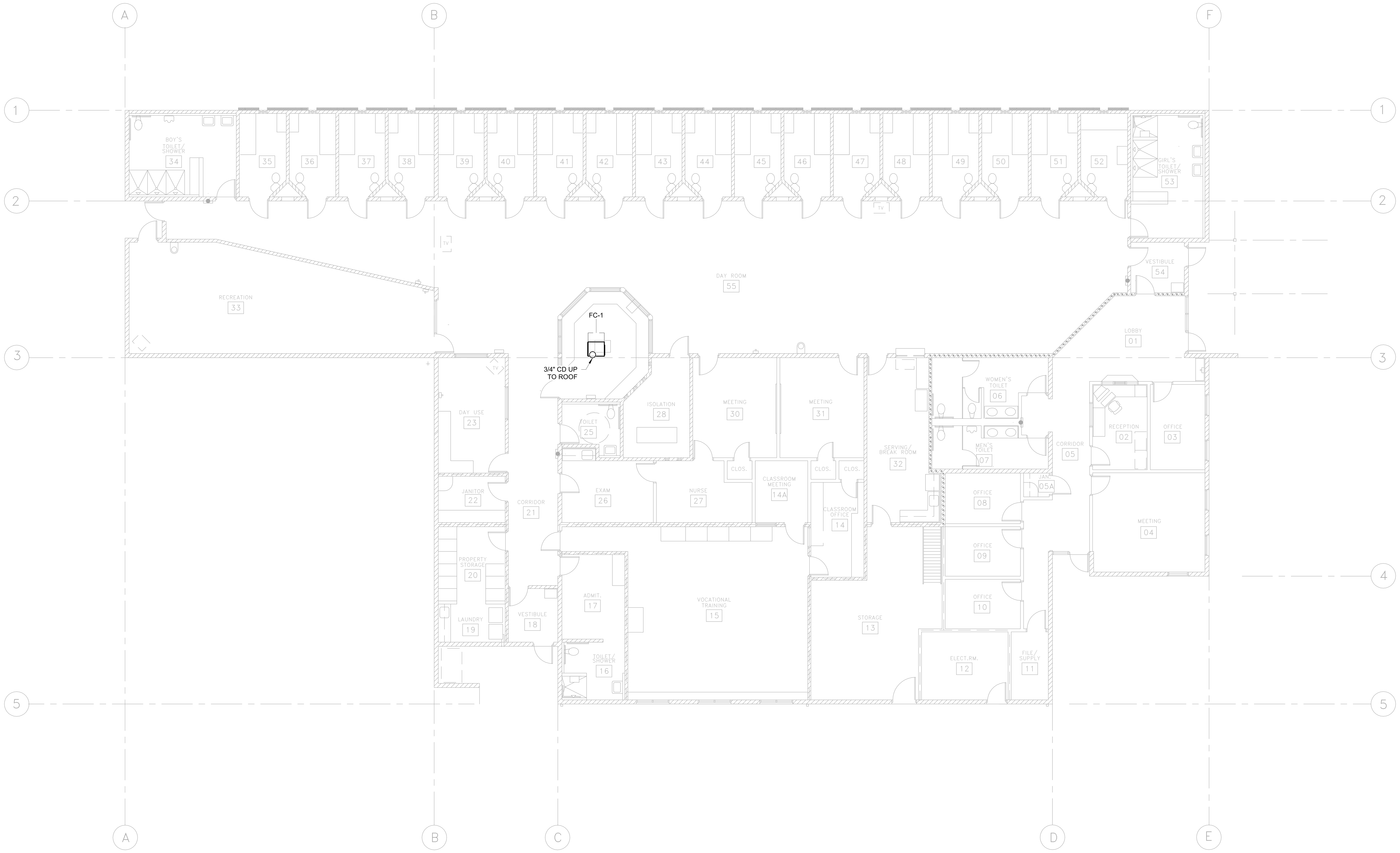
PLUMBING DEMOLITION ROOF PLAN

ISSUED FOR:

CONSTRUCTION DOCUMENTS

DATE:	9/20/2024
DRAWN BY:	EG
REVIEWED BY:	NW
SCALE:	1/8" = 1'-0"
PROJECT NO:	22007

P210



1 P220 **PLUMBING FLOOR PLAN**
1/8" = 1'-0"

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Ph: (530) 232-6160 - www.frontierce.com

LICENSE STAMP

KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

HUMBOLDT COUNTY REGIONAL FACILITY

2004 HARRISON AVENUE
EUREKA, CA 95501

NO.	REVISIONS	DATE

SHEET TITLE

PLUMBING FLOOR PLAN

ISSUED FOR:

CONSTRUCTION DOCUMENTS

DATE:	9/20/2024
DRAWN BY:	EG
REVIEWED BY:	NW
SCALE:	1/8" = 1'-0"
PROJECT NO:	22007

P220

ELECTRICAL ABBREVIATIONS

A	-AMMETER, AMPERE
AC	-ALTERNATING CURRENT
ACH	-ABOVE COUNTER HEIGHT
AFCI	-ARC FAULT CIRCUIT INTERRUPT
AFF	-ABOVE FINISHED FLOOR
AIC	-AMPS INTERRUPTING CAPACITY
ATS	-AUTOMATIC TRANSFER SWITCH
BRKR	-BREAKER
BOE	-BOTTOM OF EQUIPMENT
CEC	-CALIFORNIA ELECTRICAL CODE
C/COND	-CONDUIT
CKT	-CIRCUIT
COD	-CENTER OF DEVICE
CT	-CURRENT TRANSFORMER
DC	-DIRECT CURRENT
(E)	-EXISTING
G	-GROUND
GFCI	-GROUND FAULT CIRCUIT INTERRUPT
J	-JUNCTION BOX
LCP	-LIGHTING CONTROL PANEL
LTR	-LIGHTING
MFR	-MANUFACTURER
MSB	-MAIN SWITCH BOARD
MTS	-MANUAL TRANSFER SWITCH
NEC	-NATIONAL ELECTRIC CODE
NEMA	-NATIONAL ELECTRIC MANUFACTURER'S ASSOCIATION
N	-NEUTRAL
PB	-PULLBOX
PC	-PHOTOCELL
PNL	-PANELBOARD
RECEPT	-RECEPTACLE
SWBD	-SWITCHBOARD
T	-THERMOSTAT OR TELE CONDUIT
TOD	-TOP OF DEVICE
TYP	-TYPICAL
V	-VOLTMETER, VOLT
W	-WATT
WP	-WEATHERPROOF (NEMA 3R)
XFMR	-TRANSFORMER

ELECTRICAL LEGEND

SYMBOLS	
	CONDUIT EXPOSED
	CONDUIT CONCEALED OR BURIED
	CROSS HATCHES W/ BARS INDICATES NUMBER OF #10 CONDUCTORS
	1/2" C - 2# 12.1 #12G / CAT 5e LIGHTING CABLE
LA-2	HOME RUN-DESTINATION SHOWN
	CONDUIT DOWN
	CONDUIT UP
	CONNECTION POINT
	TELEPHONE CONNECTION POINT; 18" TO COD AFF UNLESS OTHERWISE NOTED. 3/4" C - STUB UP TO CEILING PLENUM
	DATA CONNECTION POINT; 18" TO COD AFF UNLESS OTHERWISE NOTED. 3/4" C - STUB UP TO CEILING PLENUM
	TELE/DATA CONNECTION POINT; 18" TO COD AFF UNLESS OTHERWISE NOTED. 3/4" C - STUB UP TO CEILING PLENUM
$	WALL SWITCH, 46" TO COD AFF UNLESS OTHERWISE NOTED
$3	INDICATES THREE-POLE WALL SWITCH
$D	INDICATES WALL SWITCH WITH INTEGRAL DIMMER
$OC	INDICATES WALL SWITCH WITH INTEGRAL OCCUPANCY SENSOR
$a $b $c $d	INDICATES WALL SWITCHES FOR MULTIPLE LIGHTING GROUPS
$LV	INDICATES LOW VOLTAGE WALL SWITCH
$K	INDICATES KEY-OPERATED WALL SWITCH
$T	INDICATES WALL SWITCH WITH INTEGRAL TIMER
OC	OCCUPANCY SENSOR
J	JUNCTION BOX
CR	CONTACT RELAY
	20A SPECIFICATION GRADE RECEPTACLE, COORDINATE CONFIGURATION W/ SUPPLIED EQUIPMENT
	20A SPECIFICATION GRADE QUADRUPLEX RECEPTACLE
	208/240V RECEPTACLE 18" COD UNLESS OTHERWISE NOTED ON PLANS
	SPLITWIRED RECEPTACLES
60/40 F XXA/XXF XX	FUSED DISCONNECT
30 XX XX	NON-FUSED DISCONNECT
XXAS XXAF	FUSED SWITCH
	LAY-IN 2 FT x 2 FT.
	SURFACE MOUNTED 2 FT x 4 FT FLUORESCENT LIGHT FIXTURE.
	SURFACE MOUNTED 1 FT x 4 FT FLUORESCENT LIGHT FIXTURE.
	HATCHING INDICATES EMERGENCY LIGHTING.
	RECESSED LIGHT FIXTURE.
	PENDANT MOUNTED LIGHT FIXTURE
	SINGLE FACE ILLUMINATED EXIT SIGN
	DOUBLE FACED ILLUMINATED DIRECTIONAL EXIT SIGN.
	SINGLE FACED ILLUMINATED DIRECTIONAL EXIT SIGN.
	LED STANDARD EMERGENCY LIGHT

BRANCH PANEL E2

LOCATION:
SUPPLY FROM:
MOUNTING: SURFACE
ENCLOSURE: NEMA 1
VOLTS: 120/208 Wye
PHASES: 3
WIRES: 4
CIRCUITS: 42
A.I.C. RATING: 10 KAIC
BUS RATING: 225 A
MAIN: 225 A

CKT	Circuit Description	Rating	Poles	A	B	C	A	B	C	Poles	Rating	Circuit Description	CKT
1	(E) EM LIGHTING - CELLS 35-43	20 A	1	640			700			1	15 A	(E) EF-1	2
3	(E) EM LIGHTING - CELLS 44-52	20 A	1		640			700		1	15 A	(E) EF-4	4
5	(E) EM LIGHTING - 24	20 A	1			180			400	3	15 A	(E) HV-1	6
7	(E) EM LIGHTING - CELLS 33, 34, 55	20 A	1	810			400						8
9	(E) EM LIGHTING - 28	20 A	1		60			400					10
11	(E) EM LIGHTING - CELLS 15-18, 21 26, 27	20 A	1			1020			641	2	15 A	(N) HVAC - HP-1 ⟨2⟩	12
13	(E) CCTV CAMERAS - 7-9	20 A	1	300			641						14
15	(E) CCTV CAMERAS - 6, 10	20 A	1		200			--		1	--	(N) SPACE ⟨2⟩	16
17	(E) RECEPTS - CONTROL ROOM	20 A	1			400			200	1	15 A	(E) EF-7	18
19	(E) RECEPTS - CONTROL ROOM	20 A	1	400			200			1	15 A	(E) EF-6	20
21	(E) RECEPTS - CONTROL ROOM	20 A	1		400			200		1	15 A	(E) EF-10	22
23	(E) RECEPTS - FIRE ALARM PANEL	20 A	1			200			980	3	15 A	(E) HVAC - HV-7 ⟨3⟩	24
25	(E) RECEPTS - 26	20 A	1	400			980						26
27	(E) RECEPTS - 27	20 A	1		400			980					28
29	(E) CCTV CAMERA - 1	20 A	1			100			1500	1	20 A	(E) INTERCOM CONTROLLER	30
31	(E) SEWER ALARM - E2-31	20 A	1	320			1500			1	20 A	(E) SWITCHER POWER	32
33	(E) LOAD	20 A	1		70			1500		1	20 A	(E) DOOR AND CONTROLLER	34
35	(E) LOAD	20 A	1			70			1500	1	20 A	(E) LOAD	36
37	(E) A/C CLASSROOM	40 A	2	2900			1000			1	20 A	(E) EF-5	38
39					2900			900		1	20 A	(E) LOAD	40
41	SPACE	--	1			--			900	1	20 A	(E) POWER SUPPLY TO LVLC	42

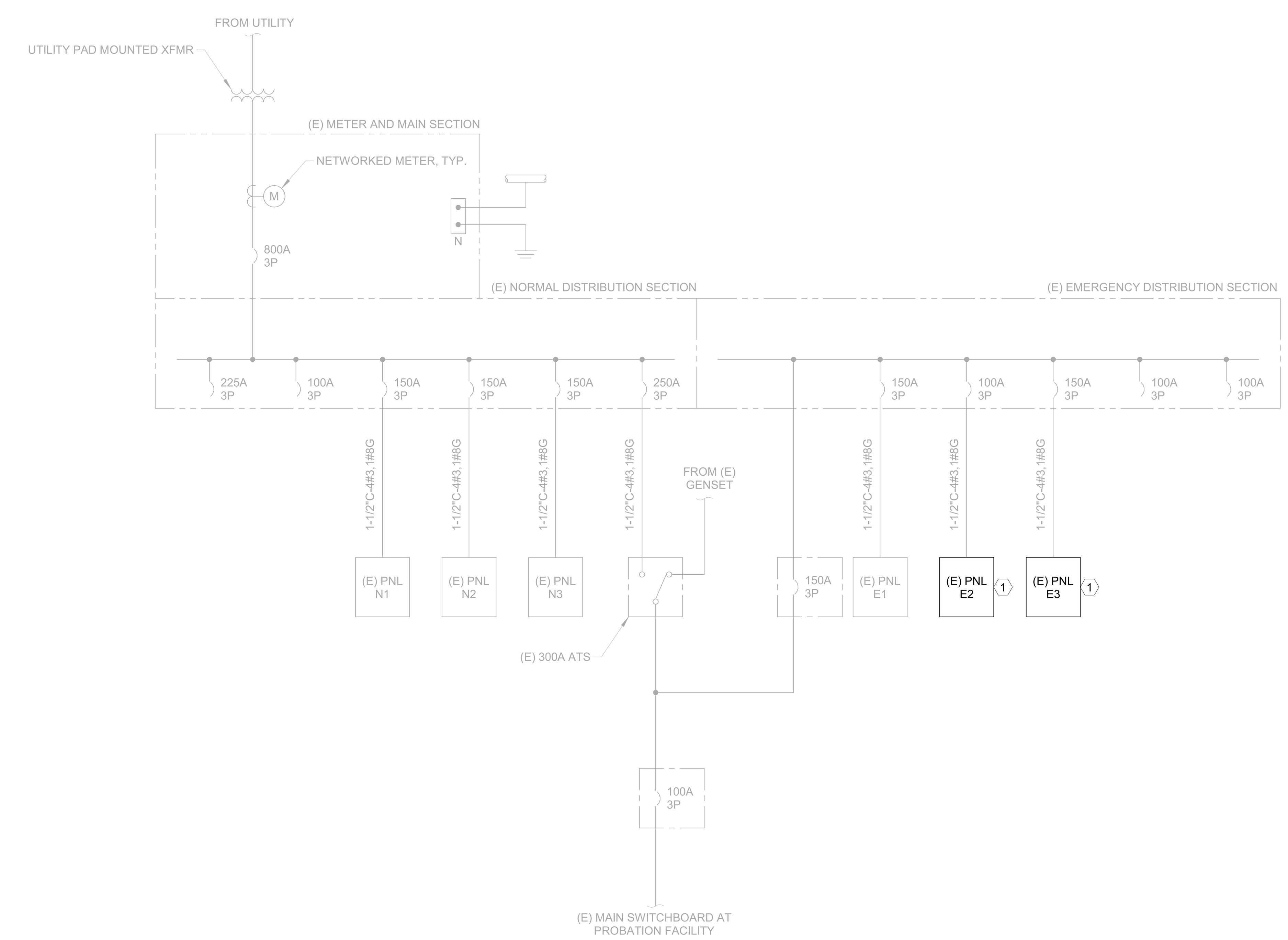
	PHASE A	PHASE B	PHASE C
TOTAL LOAD (VOLT-AMPS):	11191 VA	9350 VA	8091 VA
TOTAL LOAD (AMPS):	95 A	80 A	67 A

BRANCH PANEL E3

LOCATION:
SUPPLY FROM:
MOUNTING: SURFACE
ENCLOSURE: NEMA 1
VOLTS: 120/208 Wye
PHASES: 3
WIRES: 4
CIRCUITS: 30
A.I.C. RATING: 10 KAIC
BUS RATING: 225 A
MAIN: 225 A

CKT	Circuit Description	Rating	Poles	A	B	C	A	B	C	Poles	Rating	Circuit Description	CKT
1	(E) HVAC - EF-2	15 A	1	700			700			1	15 A	(E) HVAC - EF-8	2
3	(E) HVAC - EF-11	15 A	1		75			500		1	15 A	(E) HVAC - EF-9	4
5	(E) HVAC - EF-3	15 A	1			700			0	1	15 A	(E) SPARE	6
7	(E) HVAC - HV-2	15 A	3	400			0			3	15 A	(E) SPARE	8
9					400			0					10
11						400			0				12
13	⟨4⟩ HVAC - HV-3	25 A	3	1460			400			3	15 A	(E) HVAC - HV-5	14
15					1460			400					16
17						1460			400				18
19	⟨3⟩ HVAC - HV-4	15 A	3	980			0			1	20 A	SPARE	20
21					980			0		1	20 A	SPARE	22
23						980			200	1	15 A	(E) SOLENOID VALVES	24
25	(E) SPACE	--	1	--			4200			3	50 A	(E) HVAC - HV-6	26
27	(E) SPACE	--	1		--			4200					28
29	(E) SPACE	--	1			--			4200				30

	PHASE A	PHASE B	PHASE C
TOTAL LOAD (VOLT-AMPS):	8840 VA	8015 VA	8340 VA
TOTAL LOAD (AMPS):	74 A	67 A	70 A



1 E100 ONE-LINE DIAGRAM
NOT TO SCALE

KEYED NOTES

1. REFER TO PANEL SCHEDULE FOR SCOPE OF MODIFICATIONS.
2. REPLACE EXISTING BREAKER(S) WITH NEW BREAKER(S) TO SERVE NEW EQUIPMENT AS SHOWN. MODIFY PANEL AS REQUIRED.
3. REUSE EXISTING BREAKER TO SERVE NEW EQUIPMENT.
4. REPLACE EXISTING BREAKER(S) WITH NEW BREAKER(S) TO SERVE NEW EQUIPMENT AS SHOWN. MODIFY PANEL AS REQUIRED.

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LICENSE STAMP

REGISTERED PROFESSIONAL ENGINEER
No. E25042
EXP. 06-30-2026
ELECTRICAL
STATE OF CALIFORNIA

KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

HUMBOLDT COUNTY REGIONAL FACILITY

2004 HARRISON AVENUE
EUREKA, CA 95501

NO.	REVISIONS	DATE

SHEET TITLE

ELECTRICAL LEGENDS AND SCHEDULES

ISSUED FOR:

CONSTRUCTION DOCUMENTS

DATE:	9/20/2024
DRAWN BY:	NM
REVIEWED BY:	NW
SCALE:	1/8" = 1'-0"
PROJECT NO:	22007

E100

ELECTRICAL SPECIFICATIONS

PART 1 - GENERAL

1.1 GENERAL

A. ELECTRICAL PLAN DRAWINGS SHOW ONLY GENERAL LOCATIONS OF EQUIPMENT, DEVICES, AND RACEWAY UNLESS SPECIFICALLY DIMENSIONED. THE CONTRACTOR IS RESPONSIBLE FOR THE PROPER ROUTING OF RACEWAY, SUBJECT TO THE APPROVAL OF THE ENGINEER. MAKE ADJUSTMENTS AS NECESSARY TO WIRING, CONDUIT, DISCONNECTS, BRANCH CIRCUIT PROTECTION, AND OTHER AFFECTED MATERIAL OR EQUIPMENT TO ACCOMMODATE ACTUAL EQUIPMENT SUPPLIED FOR THIS PROJECT.

1.2 CODES, PERMITS, AND REGULATIONS

A. DO ALL WORK AND INSTALL ALL MATERIALS AND EQUIPMENT IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL ELECTRICAL CODE (NEC), APPLICABLE STATE AND LOCAL LAWS AND ORDINANCES, AND THE POWER COMPANY. CONFLICTS, IF ANY, WILL BE RESOLVED AT THE DISCRETION OF THE ENGINEER.

1.3 COORDINATION

A. CLOSE COORDINATION BETWEEN THE ELECTRICAL AND MECHANICAL TRADES IS A PART OF THE WORK THAT IS REQUIRED BY THIS CONTRACT. NO ALLOWANCE WILL BE MADE FOR OMISSIONS BASED ON INCORRECTLY ASSUMING ANOTHER TRADE WILL BE PERFORMING YOUR WORK. CONFIRM YOUR SCOPE OF WORK WITH THE GENERAL CONTRACTOR.

PART 2 - PRODUCTS

2.1 GENERAL

A. UNLESS OTHERWISE INDICATED, PROVIDE ALL FIRST-QUALITY NEW MATERIALS, FREE FROM ANY DEFECTS, AND SUITABLE FOR THE INTENDED USE AND THE SPACE PROVIDED. PROVIDE MATERIALS APPROVED BY UL WHEREVER STANDARDS HAVE ITEMS NOT SPECIFICALLY SHOWN OR SPECIFIED WHICH ARE REQUIRED TO PROVIDE THE COMPLETE SYSTEMS SPECIFIED HEREIN. WHERE TWO OR MORE UNITS OF THE SAME CLASS OF MATERIAL OR EQUIPMENT ARE REQUIRED, PROVIDE PRODUCTS OF A SINGLE MANUFACTURER. COMPONENT PARTS OF MATERIALS OR EQUIPMENT NEED NOT BE PRODUCTS OF THE SAME MANUFACTURER.

2.2 EQUIPMENT FINISH

A. UNLESS OTHERWISE INDICATED, FINISH FOR ELECTRICAL EQUIPMENT AND ENCLOSURES SHALL BE MANUFACTURER'S STANDARD GRAY OR ANSI 61 GRAY OVER A PRIMER AND RUST INHIBITOR.

2.3 JUNCTION AND PULLBOXES

A. LARGE SHEET STEEL BOX: NEMA 1.
   1. BOX: CODE-GAUGE, GALVANIZED STEEL.
   2. COVER: FULL ACCESS, SCREW TYPE.
   3. MACHINE SCREWS: CORROSION-RESISTANT.

B. LARGE WEATHERPROOF: NEMA 3R.
   1. BOX: GALVANIZED STEEL.
   2. COVER: SCREW WITH PROVISIONS FOR PAD LOCKING.
   3. EMBOSSED MOUNTING HOLES ON BACK OF ENCLOSURE.
   4. NO GASKETING.

2.4 CONDUIT AND TUBING

A. ELECTRIC METALLIC TUBING (EMT):
   1. MEET REQUIREMENTS OF ANSI C80.3 AND UL 797.
   2. MATERIAL: HOT-DIP GALVANIZED, WITH CHROMATED AND LACQUERED PROTECTIVE LAYER.

B. FLEXIBLE METAL, LIQUID-TIGHT CONDUIT:
   1. UL 360 LISTED FOR 105°C INSULATED CONDUCTORS.
   2. MATERIAL: GALVANIZED STEEL, WITH AN EXTRUDED PVC JACKET.

2.5 FITTINGS

A. ELECTRIC METALLIC TUBING:
   1. MEET REQUIREMENTS OF UL 514B.
   2. TYPE: STEEL BODY AND LOCK NUTS WITH STEEL OR MALLEABLE IRON COMPRESSION NUTS.
   3. TYPE: STEEL BODY WITH SET SCREWS AND INSULATED THROAT.
      c. FLEXIBLE METAL, LIQUID-TIGHT CONDUIT: INSULATED THROAT AND SEALING O-RINGS.

2.6 CONDUCTORS

A. ALL CONDUCTORS SHOWN SHALL BE NEW UNLESS OTHERWISE INDICATED.

B. CONDUCTOR TYPE:
   1. SOLID COPPER.

C. INSULATION: TYPE THHN/THWN, 90°C DRY OR 75°C WET.

2.7 CONDUCTOR ACCESSORIES

A. TAPE:
   1. GENERAL PURPOSE, FLAME RETARDANT: 7 MIL, VINYL PLASTIC, RATED FOR 90°C MINIMUM MEETING REQUIREMENTS OF UL 510.
   2. FLAME RETARDANT, COLD AND WEATHER RESISTANT: 8.5 MIL, VINYL PLASTIC.

B. CABLE TIES:
   1. NYLON, ADJUSTABLE, AND SELF-LOCKING.

2.8 DISCONNECT SWITCH, INDIVIDUAL, 0 TO 600 VOLTS:

A. NEMA KS 1.

B. QUICK-MAKE, QUICK-BREAK, MOTOR RATED, LOAD-BREAK, HEAVY-DUTY (HD) TYPE WITH EXTERNAL MARKINGS CLEARLY INDICATING ON/OFF POSITIONS.

C. ENCLOSURE: NEMA 12, INDUSTRIAL USE, NEMA 3R, DENOTED BY WP, UNLESS OTHERWISE SHOWN.

D. INTERLOCK: ENCLOSURE AND SWITCH TO PREVENT OPENING COVER WITH SWITCH IN THE ON POSITION.

E. LOCKABLE TO THE OPEN POSITION. PROVIDE TAG READING "DO NOT OPEN UNDER LOAD."

PART 3 - EXECUTION

3.1 GENERAL PROCEDURES

A. COORDINATE ELECTRICAL WORK WITH THE OWNER AND WORK OF OTHER TRADES TO AVOID CONFLICTS, ERRORS, DELAYS, AND UNNECESSARY INTERFERENCE DURING CONSTRUCTION.

3.2 PROTECTION DURING CONSTRUCTION

A. FOLLOWING INSTALLATION, PROTECT MATERIALS, EQUIPMENT, AND INSULATION FROM CORROSION, PHYSICAL DAMAGE, AND MOISTURE. CAP CONDUIT RUNS DURING CONSTRUCTION WITH MANUFACTURED SEALS. KEEP OPENINGS IN BOXES OR EQUIPMENT CLOSED DURING CONSTRUCTION.

3.3 MATERIAL AND EQUIPMENT INSTALLATION

A. FOLLOW THE MANUFACTURER'S INSTALLATION RECOMMENDATIONS UNLESS OTHERWISE INDICATED. FOLLOW THE ENGINEER'S DECISION, WHEREVER ANY CONFLICT ARISES. KEEP COPY OF THE MANUFACTURER'S INSTALLATION INSTRUCTIONS AVAILABLE ON THE JOBSITE FOR REVIEW AT ALL TIMES.

3.4 CUTTING AND PATCHING

A. DO NOT CUT OR NOTCH ANY STRUCTURAL MEMBER OR BUILDING SURFACE WITHOUT SPECIFIC APPROVAL OF THE ENGINEER. FOLLOWING SUCH WORK, RESTORE SURFACES NEATLY TO NEW CONDITION USING SKILLED CRAFTSMEN OF THE TRADES INVOLVED.

3.5 CLEANING AND TOUCH-UP PAINTING

A. KEEP THE PREMISES FREE FROM ACCUMULATION OF WASTE MATERIAL OR RUBBISH. UPON COMPLETION OF WORK, REMOVE MATERIALS, SCRAPS, AND DEBRIS FROM THE PREMISES AND FROM THE INTERIOR AND EXTERIOR OF ALL DEVICES AND EQUIPMENT. REFINISH DAMAGED SURFACES TO NEW CONDITION USING SKILLED CRAFTSMEN OF THE TRADES INVOLVED.

3.6 RACEWAY SYSTEM

A. INTERIOR, EXPOSED:
   1. ELECTRIC METALLIC TUBING.

B. INTERIOR, CONCEALED (NOT EMBEDDED IN CONCRETE):
   1. GALVANIZED RIGID STEEL: WHEN ENTERING THE BUILDING FROM AN OUTSIDE SOURCE WHERE THE CONDUIT RUN MUST BE WATERTIGHT.
   2. GALVANIZED STEEL FLEX; USE ONLY IN INDOOR, DRY LOCATIONS FOR FINAL CONNECTION TO FIXTURES IN LAY IN APPLICATIONS OR OTHER EQUIPMENT SUBJECT TO VIBRATION OR MOVEMENT.
   3. ELECTRIC METALLIC TUBING: ALL OTHER LOCATIONS.

C. FOR EQUIPMENT WHERE FLEXIBLE CONNECTION IS REQUIRED TO MINIMIZE VIBRATION:
   1. FLEXIBLE METAL, LIQUID-TIGHT CONDUIT.
   2. LENGTH: 18-INCH MINIMUM, 60-INCH MAXIMUM OF SUFFICIENT LENGTH TO ALLOW MOVEMENT OR ADJUSTMENT OF EQUIPMENT.

D. BOX TYPE (ALL RACEWAY SYSTEMS)
   1. EXTERIOR LOCATIONS: WEATHERPROOF TYPE 3R.
      INSTALL PULL BOXES WHERE SHOWN AND WHERE NECESSARY TO TERMINATE, TAP-OFF, OR REDIRECT MULTIPLE CONDUIT RUNS. INSTALL PULL BOXES WHERE NECESSARY IN RACEWAY SYSTEM TO FACILITATE CONDUCTOR INSTALLATION. INSTALL PULL BOXES IN CONDUIT RUNS AT LEAST EVERY 150 FEET OR AFTER THE EQUIVALENT OF THREE RIGHT-ANGLE BENDS. USE OUTLET BOXES AS JUNCTION AND PULL BOXES WHEREVER POSSIBLE AND ALLOWED BY APPLICABLE CODES.

F. SUPPORT BOXES INDEPENDENTLY OF CONDUIT BY ATTACHMENT TO BUILDING STRUCTURE OR STRUCTURAL MEMBER. INSTALL BAR HANGERS IN FRAME CONSTRUCTION, OR FASTEN BOXES DIRECTLY WITH WOOD SCREWS ON WOOD, BOLTS AND EXPANSION SHIELDS ON CONCRETE OR BRICK, TOGGLE BOLTS ON HOLLOW MASONRY UNITS, AND MACHINE SCREWS OR WELDED THREADED STUDS ON STEELWORK.

3.7 RACEWAY INSTALLATION

A. CONDUIT AND TUBING SIZES SHOWN ARE BASED ON THE USE OF COPPER CONDUCTORS.

B. MAINTAIN RACEWAY ENTIRELY FREE OF OBSTRUCTIONS AND MOISTURE.

C. GROUP RACEWAYS INSTALLED IN SAME AREA.

D. FOLLOW STRUCTURAL SURFACE CONTOURS WHEN INSTALLING EXPOSED RACEWAYS. AVOID OBSTRUCTION OF PASSAGEWAYS. RUN EXPOSED RACEWAYS PARALLEL OR PERPENDICULAR TO WALLS, STRUCTURAL MEMBERS, OR INTERSECTIONS OF VERTICAL PLANES.

E. INSTALL WATERTIGHT CONDUIT SEALING IN OUTDOOR, UNDERGROUND, OR WET LOCATIONS.

F. ALL METAL CONDUIT TO BE REAMED, BURRS REMOVED, AND CLEANED BEFORE INSTALLATION OF CONDUCTORS, WIRES, OR CABLES.

G. FOR EMPTY CONDUIT INSTALL A NYLON PULL CORD TO BE USED FOR FUTURE INSTALLATION.

3.8 RACEWAY SUPPORT

A. SUPPORT FROM STRUCTURAL MEMBERS ONLY, AT INTERVALS NOT EXCEEDING NEC REQUIREMENTS, AND IN ANY CASE NOT EXCEEDING 10 FEET. DO NOT SUPPORT FROM PIPING, PIPE SUPPORTS, OR OTHER RACEWAYS.

B. WALL BRACKETS AND ASSOCIATED HARDWARE IN CONTACT WITH CONCRETE OR MASONRY SHALL BE STAINLESS STEEL. PROVIDE GALVANIZED STEEL AT ALL OTHER LOCATIONS. STRAP HANGERS, AND CEILING TRAPEZE INCLUDING HARDWARE, SHALL BE GALVANIZED STEEL.

C. PROVIDE AND ATTACH WALL BRACKETS, STRAP HANGERS, OR CEILING TRAPEZE AS FOLLOWS:
   1. WOOD: WOOD SCREWS.
   2. HOLLOW MASONRY UNITS: TOGGLE BOLTS.
   3. CONCRETE OR BRICK: EXPANSION SHIELDS, OR THREADED STUDS DRIVEN IN BY POWDER CHARGE, WITH LOCK WASHERS AND NUTS.
   4. STEELWORK: MACHINE SCREWS.

D. NAILS OR WOODEN PLUGS INSERTED IN CONCRETE OR MASONRY FOR ATTACHING RACEWAY NOT PERMITTED. DO NOT WELD RACEWAYS OR PIPE STRAPS TO STEEL STRUCTURES. DO NOT USE WIRE IN LIEU OF STRAPS OR HANGERS.

3.9 RACEWAY BENDS

A. INSTALL CONCEALED RACEWAYS WITH A MINIMUM OF BENDS IN THE SHORTEST PRACTICAL DISTANCE.

B. AVOID FIELD-MADE BENDS AND OFFSETS, BUT WHERE NECESSARY, MAKE WITH ACCEPTABLE HICKEY OR BENDING MACHINE. DO NOT HEAT METAL RACEWAYS TO FACILITATE BENDING.

C. FLEXIBLE CONDUIT: DO NOT MAKE BENDS THAT EXCEED ALLOWABLE CONDUCTOR BENDING RADIUS OF CABLE TO BE INSTALLED OR THAT SIGNIFICANTLY RESTRICTS CONDUIT FLEXIBILITY.

3.10 EXPANSION/DEFLECTION FITTINGS

A. PROVIDE ON ALL RACEWAYS AT STRUCTURAL EXPANSION JOINTS.

3.11 TERMINATION AT ENCLOSURES

A. SHEET METAL BOXES, CABINETS, AND ENCLOSURES:
   1. ELECTRIC METALLIC TUBING: PROVIDE GLAND COMPRESSION, INSULATED CONNECTORS.
   2. FLEXIBLE METAL CONDUIT: PROVIDE TWO SCREW TYPE, INSULATED, MALLEABLE IRON CONNECTORS.

3.12 CONDUCTORS

A. DO NOT SPLICE INCOMING SERVICE CONDUCTORS AND BRANCH POWER DISTRIBUTION CONDUCTORS NO. 6 AWG AND LARGER UNLESS SPECIFICALLY INDICATED OR APPROVED BY THE ENGINEER.

B. CONNECTIONS AND TERMINATIONS:
   1. INSTALL WIRE NUTS ONLY ON SOLID CONDUCTORS.
   2. INSTALL NYLON SELF-INSULATED CRIMP CONNECTORS AND TERMINATORS FOR CIRCUIT CONDUCTORS NO. 6 AWG AND SMALLER.
   3. INSTALL UNINSULATED CRIMP CONNECTORS AND TERMINATORS FOR CIRCUIT CONDUCTORS NO. 4 AWG THROUGH NO. 2/0 AWG.
   4. INSTALL UNINSULATED, BOLTED, TWO-WAY CONNECTORS AND TERMINATORS FOR CIRCUIT CONDUCTORS NO. 4/0 AWG AND LARGER.
   5. TAPE INSULATE ALL UNINSULATED CONNECTIONS.
   6. PLACE NO MORE THAN ONE CONDUCTOR IN ANY SINGLE-BARREL PRESSURE CONNECTION.
   7. INSTALL CRIMP CONNECTORS WITH TOOLS APPROVED BY CONNECTOR MANUFACTURER.
   8. COMPRESSION LUGS:
      a. ATTACHED WITH A TOOL SPECIFICALLY DESIGNED FOR PURPOSE.
      b. DO NOT USE PLIERS TYPE CRIMPERS.

C. DO NOT USE SOLDERED MECHANICAL JOINTS.

D. SPLICES AND TERMINATIONS:
   1. INDOORS: USE GENERAL PURPOSE, FLAME RETARDANT TAPE.
   2. OUTDOORS: USE FLAME RETARDANT, COLD- AND WEATHER-RESISTANT TAPE.

E. CAP SPARE CONDUIT WITH UL LISTED END CAPS.

F. CABINETS AND PANELS:
   1. REMOVE SURPLUS WIRE, BRIDLE AND SECURE.
   2. WHERE CONDUCTORS PASS THROUGH OPENINGS OR OVER EDGES IN SHEET METAL, REMOVE BURRS CHAMFER EDGES, AND INSTALL BUSHINGS AND PROTECTIVE STRIPS OF INSULATING MATERIAL TO PROTECT THE CONDUCTORS.

3.13 GROUNDING

A. UNLESS OTHERWISE INDICATED, GROUND ALL EXPOSED NONCURRENT-CARRYING METALLIC PARTS OF ELECTRICAL EQUIPMENT, RACEWAY SYSTEMS, AND THE NEUTRAL OF ALL WIRING SYSTEMS IN ACCORDANCE WITH THE CEC, STATE, AND OTHER APPLICABLE LAWS AND REGULATIONS.

3.14 TESTING, INSPECTION, AND OBSERVATION

A. INSULATION TESTING PER CEC 110.7 AND 2018 NFPA 99 6.74.1.2.2.

END OF SECTION

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LICENSE STAMP

REGISTERED PROFESSIONAL ENGINEER
NATHANIEL J. WARNER
No. E25042
EXP. 06-30-2026
ELECTRICAL
STATE OF CALIFORNIA

KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

HUMBOLDT COUNTY REGIONAL FACILITY

2004 HARRISON AVENUE
EUREKA, CA 95501

NO.	REVISIONS	DATE

SHEET TITLE

ELECTRICAL SPECIFICATIONS

ISSUED FOR:

CONSTRUCTION DOCUMENTS

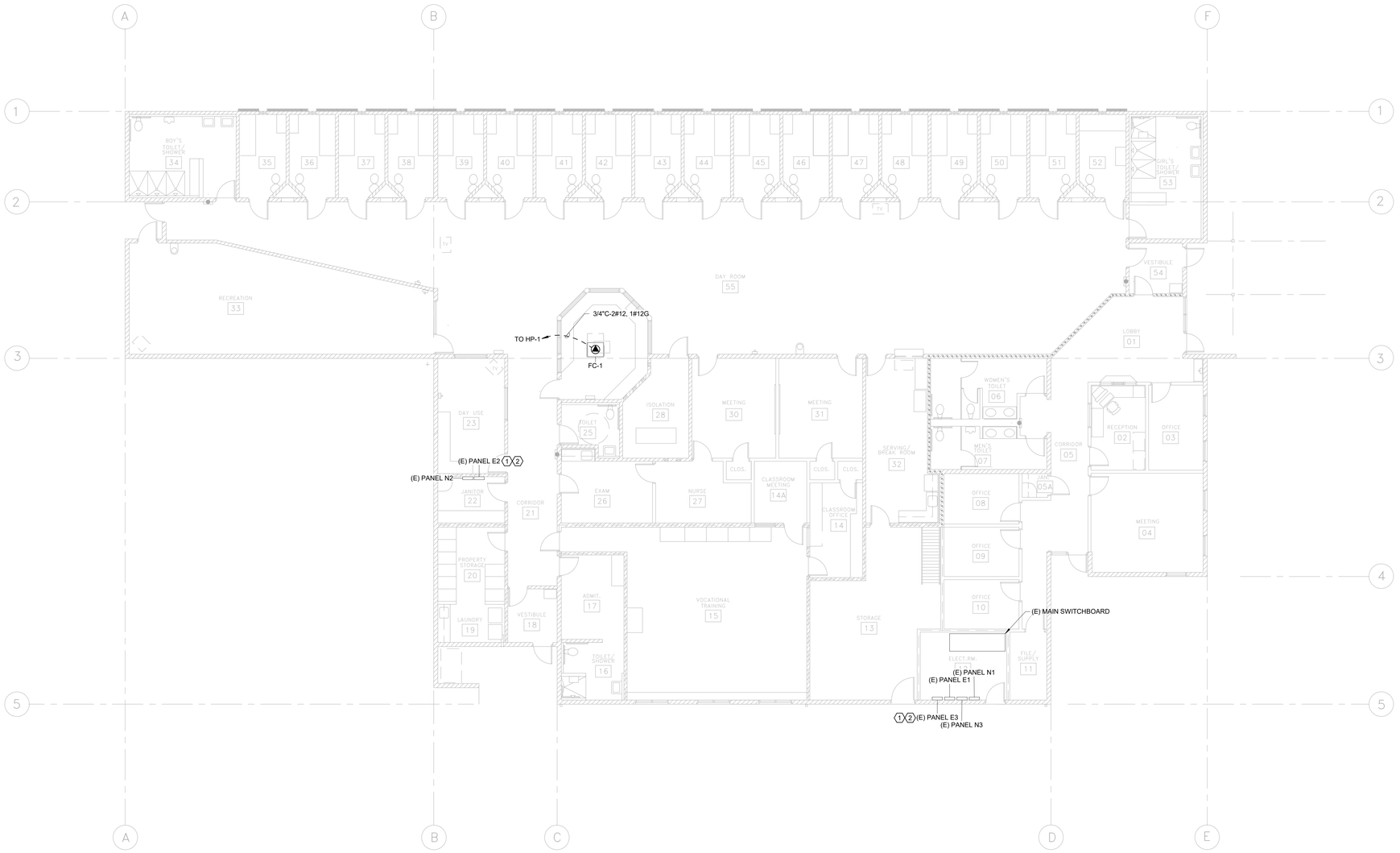
DATE:	9/20/2024
DRAWN BY:	NM
REVIEWED BY:	NW
SCALE:	1/8" = 1'-0"
PROJECT NO:	22007

E101

KEYED NOTES

(1) REFER TO ELECTRICAL ONE-LINE DIAGRAM FOR FEEDER AND OVERCURRENT PROTECTION INFORMATION.

(2) REFER TO PANEL SCHEDULE FOR LOAD AND OVERCURRENT PROTECTION INFORMATION.



1 E210 ELECTRICAL FLOOR PLAN

1/8" = 1'-0"

N

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LICENSE STAMP

REGISTERED PROFESSIONAL ENGINEER DARRELL T. WARNER No. E25042 EXP. 06-30-2026 ELECTRICAL STATE OF CALIFORNIA

KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

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2004 HARRISON AVENUE
EUREKA, CA 95501

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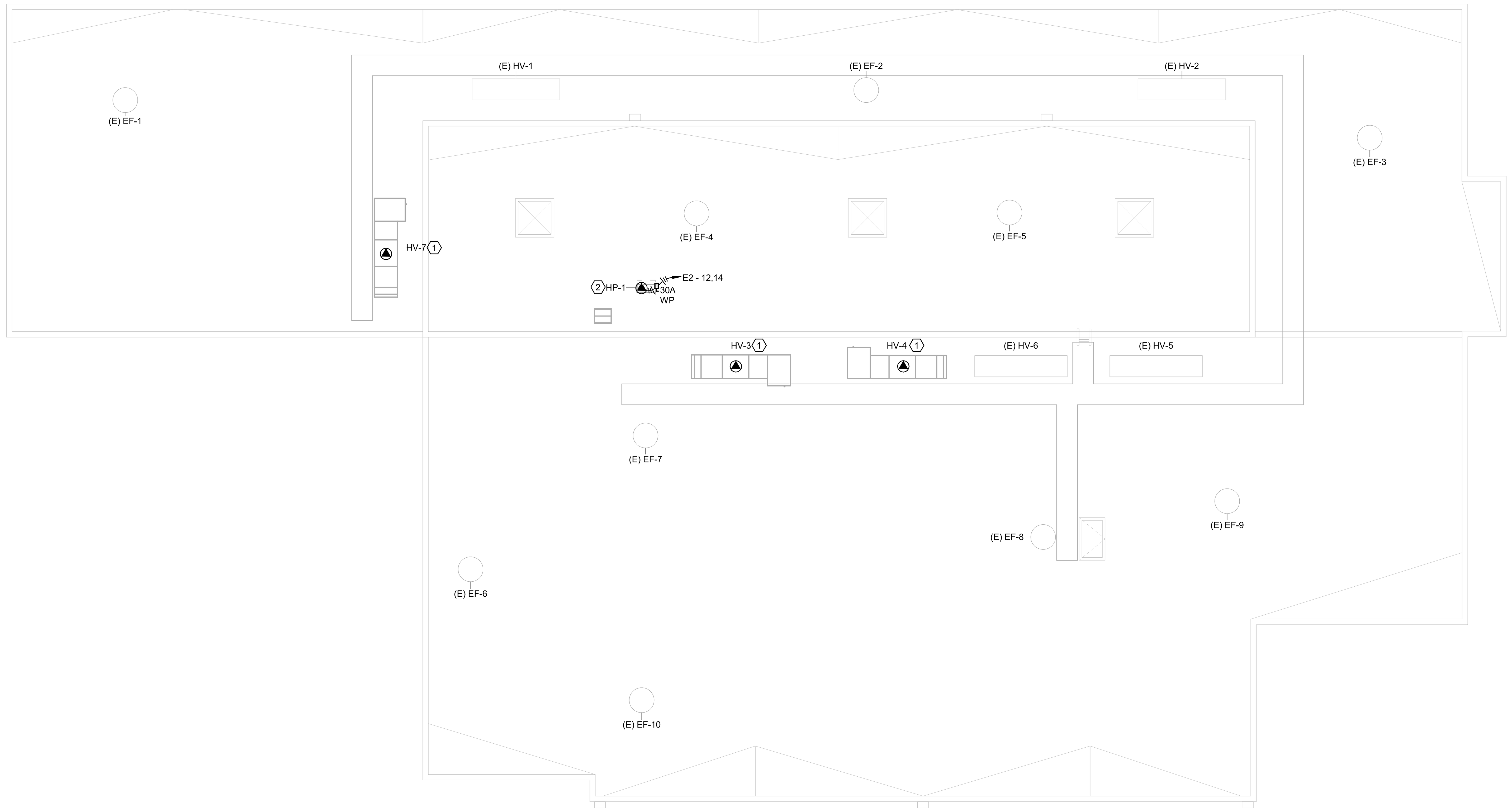
REVIEWED BY:	NW
SCALE:	1/8" = 1'-0"
PROJECT NO:	22007

E210

KEYED NOTES

1. EXISTING ROOFTOP HEATING VENTILATOR TO BE REPLACED IN KIND. REFER TO PANEL SCHEDULES FOR NEW ELECTRICAL LOADS. DISCONNECT EXISTING CONDUIT AND CONDUCTORS FROM EXISTING EQUIPMENT. REUSE EXISTING CONDUIT, CONDUCTORS, AND DISCONNECT SWITCH FOR CONNECTIONS TO NEW EQUIPMENT.
2. REUSE EXISTING CONDUIT AND CONDUCTORS. REMOVE EXTRA CONDUCTOR PREVIOUSLY USED TO POWER (D) AC-1.



1
E240
ELECTRICAL ROOF PLAN
1/8" = 1'-0"

N

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PROJECT NAME

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FOR

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REGIONAL FACILITY

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EUREKA, CA 95501

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SHEET TITLE

ELECTRICAL ROOF PLAN

ISSUED FOR:

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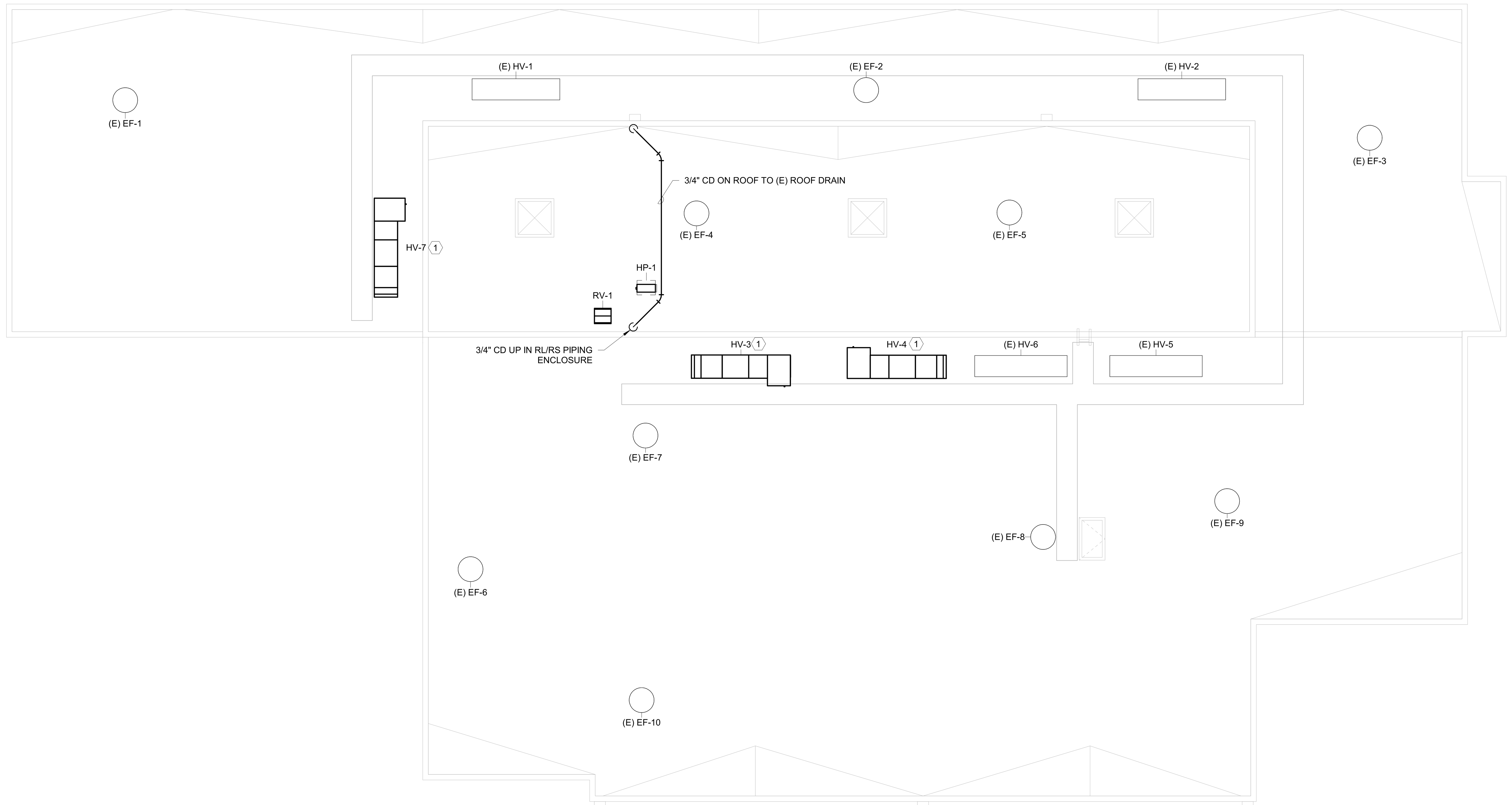
DATE:	9/20/2024
DRAWN BY:	NM
REVIEWED BY:	NW
SCALE:	1/8" = 1'-0"
PROJECT NO:	22007

E240

KEYED NOTES:

1. CONNECT NEW HEATING UNIT TO EXISTING GAS PIPING PER 3/P100.



1 P240 PLUMBING ROOF PLAN
1/8" = 1'-0"

N

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NATHANIEL E. WARFIELD
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STATE OF CALIFORNIA

KEY PLAN

PROJECT NAME

HVAC REPLACEMENT

FOR

HUMBOLDT COUNTY REGIONAL FACILITY

2004 HARRISON AVENUE
EUREKA, CA 95501

NO.	REVISIONS	DATE

SHEET TITLE

PLUMBING ROOF PLAN

ISSUED FOR:

CONSTRUCTION DOCUMENTS

DATE:	9/20/2024
DRAWN BY:	EG
REVIEWED BY:	NW
SCALE:	1/8" = 1'-0"
PROJECT NO:	22007

P240