



FRONTIER
CONSULTING ENGINEERS, INC.

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LICENSE STAMP



PROJECT INFORMATION

**CCAT MINI SPLIT HVAC
SYSTEM UPGRADES
FOR
HUMBOLDT STATE
UNIVERSITY**

1 HARPST STREET
ARCATA, CA 95521

SHEET TITLE
**MECHANICAL LEGEND
AND SCHEDULE**

DATE: 4-13-20
DRAWN BY: JA
REVIEWED BY: BA
SCALE: AS NOTED
PROJECT NO: 19086

M100

MECHANICAL LEGENDS

SYMBOLS	ABBREVIATIONS	
	COP	COEFFICIENT OF PERFORMANCE
	CFM	CUBIC FEET PER MINUTE
		DIFFUSER TAG
	D	DEMO
		DUCT (RECTANGULAR DUCT, DIMENSIONS IN INCHES)
		DUCT (ROUND DUCT, DIAMETER IN INCHES)
	EER	ENERGY EFFICIENCY RATIO
	(E), EX	EXISTING
		FLEXIBLE DUCT
	MOCP	MAXIMUM OVER CURRENT PROTECTION
	MCA	MINIMUM CIRCUIT AMPACITY
	N	NEW
		NEW CONNECTION TO EXISTING REFRIGERANT LIQUID, SUCTION
		REGISTER/GRILLE TAG
		REMOVE TO THIS POINT
	RA	RETURN AIR DUCT
		RETURN GRILLE
	SEER	SEASONAL ENERGY EFFICIENCY RATIO
	SA	SUPPLY AIR DUCT
		SUPPLY DIFFUSER
	T'STAT	THERMOSTAT
	TYP	TYPICAL
		VOLUME DAMPER - MANUAL OPERATION

SPLIT SYSTEM SCHEDULE

ID	Service	Location	Manufacturer	Tonnage	Model	Cooling			Heating		Electric Data			Weight Lbs.	Notes
						Rated Capacity Btu/h	EER	SEER	Rated Capacity Btu/h	HSPF	Service	MCA	MOCP		
HP-1	CCAT	OUTDOOR	DAIKIN	4	RXTQ48TAVJU	48,000	10.3	18	54,000	10	208/1/60	29.1	35	225	1-2
FC-1	102	WALL	DAIKIN	0.5	FXAQ07PVJU	7,500	--	--	7,000	--	208/1/60	0.3	15	40	1-2
FC-2	103	WALL	DAIKIN	0.5	FXAQ07PVJU	7,500	--	--	7,000	--	208/1/60	0.3	15	40	1-2
FC-3	105	WALL	DAIKIN	0.5	FXAQ07PVJU	7,500	--	--	7,000	--	208/1/60	0.3	15	40	1-2
FC-4	LIVING	WALL	DAIKIN	1.0	FXAQ12PVJU	12,000	--	--	12,000	--	208/1/60	0.4	15	40	1-2
FC-5	WORK	CEILING	DAIKIN	1.0	FXZQ12TAVJU	12,000	--	--	12,000	--	208/1/60	0.4	15	40	1-2
FC-6	OFFICE	CEILING	DAIKIN	0.75	FXZQ09TAVJU	9,500	--	--	9,000	--	208/1/60	0.3	15	40	1-2

NOTES:

1. PROVIDE WITH ALL NECESSARY REFRIGERATION PIPING AND APPURTENANCES.
2. WIRED REMOTE CONTROL THERMOSTAT, MODEL BRC1E73.

PIPING MATERIALS SCHEDULE

SERVICE	LOCATION	SIZE	MATERIAL
CONDENSATE	INTERIOR	ALL	SCHEDULE 40 PVC-DWV
	EXTERIOR	ALL	SCHEDULE 40 PVC-DWV, PAINTED WITH SYNTHETIC LATEX PAINT TO MATCH EXTERIOR

MECHANICAL SPECIFICATIONS



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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 CODE 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 SYSTEM, AIR CONDITIONING SYSTEMS, HUMIDITY, AND THERMOSTATIC CONTROLS IN CONNECTION WITH THESE SYSTEMS, SHALL BE PERFORMED BY A C-20 - WARM-AIR HEATING, VENTILATING AND AIR-CONDITIONING CONTRACTOR.
- 1.4 SUBMITTALS
 - A. PRODUCT DATA
 - 1. SUBMIT MANUFACTURER'S PRODUCT DATA FOR ALL HVAC 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. 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. 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.
 - B. 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.
- C. 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 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.
- 1.10 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.
- 1.11 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.

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1.11 DELIVERY, STORAGE, AND HANDLING

- A. CONTRACTOR SHALL BE RESPONSIBLE FOR DELIVERY, STORAGE, PROTECTION, AND PLACING OF ALL EQUIPMENT AND MATERIALS. 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. ANY ITEMS DAMAGED SHALL BE REPAIRED OR REPLACED, AT NO ADDITIONAL COST TO THE OWNER.

1.12 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.

1.13 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.

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, ACTUAL ROOM TEMPERATURE, PROGRAMMED TEMPERATURE, PROGRAMMED TIME, DURATION OF TIMED OVERRIDE, DAY OF WEEK, SYSTEM MODE INDICATIONS INCLUDE "HEATING," "OFF," "FAN AUTO," AND "FAN ON."

- B. ACCURACY: PLUS OR MINUS 0.5 DEG. F AT CALIBRATION POINT.
- C. WIRE: TWISTED, SHIELDED-PAIR CABLE.

2.3 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 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.

PART 3 - EXECUTION

3.1 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.
- D. 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.

3.2 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.

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- 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.
- 3.3 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. IN ADDITION TO THE SUBMITTALS REQUIRED ABOVE, AND THOSE SET FORTH IN "SUBMITTALS," THE FOLLOWING ITEMS SHALL BE FURNISHED.
 - 1. IN AN EXISTING BUILDING, THIS CONTRACTOR SHALL FURNISH A DOCUMENT THAT DESCRIBES THE PROPOSED MATERIALS METHODS FOR INTEGRATION INTO THE EXISTING BUILDING MANAGEMENT SYSTEM, IF APPLICABLE.
 - 2. PRIOR TO FINAL INSPECTION, THE SYSTEM CONTRACTOR SHALL FURNISH A LETTER STATING THAT THE ENTIRE CONTROL SYSTEM AND ALL INTERLOCK WIRING IS INSTALLED AND OPERATING IN A SATISFACTORY MANNER.
- 3.4 THERMOSTAT
- A. 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.
 - B. LOW VOLTAGE CONTROL WIRING AND CONDUIT SHALL BE INSTALLED IN ACCORDANCE WITH REQUIREMENTS OF DIVISION 26.
- 3.5 INSULATION
- A. 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.
- 3.6 REFRIGERANT PIPING
- A. PIPING SHALL BE CONTINUOUSLY PURGED WITH DRY NITROGEN WHILE SOLDERING. CARE SHALL BE TAKEN WHEN SOLDERING NEAR VALVES OR OTHER EQUIPMENT THAT MAY BE DAMAGED BY EXTREME HEAT.

- B. REFRIGERANT PIPING SHALL BE TESTED FOR LEAKS UNDER 500 PSIG PRESSURE USING AN INERT GAS SUCH AS DRY NITROGEN. JOINTS SHALL BE TESTED FOR LEAKS USING SOAPSUDS. (WARNING! OXYGEN OR ACETYLENE SHALL NOT BE USED IN PLACE OF DRY NITROGEN. A VIOLENT EXPLOSION MAY RESULT!). BE SURE THAT ALL CONTROLS, RELIEF VALVES, OR RUPTURE DISCS THAT COULD BE DAMAGED BY TEST PRESSURE ARE REMOVED BEFORE BEGINNING PRESSURE TEST.
 - C. PRESSURE AND LEAK TESTS ON REFRIGERANT PIPING AND EQUIPMENT SHALL BE DONE IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS AND THE AMERICAN STANDARD SAFETY CODE FOR MECHANICAL REFRIGERATION (ASA B9.1).
 - D. PRESSURE TESTING REQUIREMENTS:
 - 1. A THREE-STEP PRESSURE TEST SHALL BE PERFORMED PER THE FOLLOWING:
 - a. STEP 1 - LEAK CHECK AT 149 PSI FOR A MINIMUM OF 3 MINUTES.
 - b. STEP 2- LEAK CHECK AT 312 PSI FOR A MINIMUM OF 5 MINUTES.
 - c. STEP 3 - LEAK CHECK AT 550 PSI FOR A MINIMUM OF 24 HOURS.
 - E. EVACUATION REQUIREMENTS:
 - 1. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT 48 HOURS PRIOR TO THE TIME AND DATE OF THE EVACUATION.
 - 2. A VACUUM PUMP SPECIFICALLY DESIGNED FOR USE WITH R-410A SHALL BE USED TO TRIPLE-EVACUATE THE SYSTEM PER THE FOLLOWING PROCEDURE:
 - a. STEP 1 - EVACUATE THE SYSTEM TO 29" MERCURY AND MAINTAIN FOR 20 MINUTES.
 - b. STEP 2 - BREAK VACUUM WITH DRY NITROGEN TO A PRESSURE OF 2-3 PSI AND MAINTAIN FOR 15 MINUTES.
 - c. STEP 3 - EVACUATE THE SYSTEM TO 29" MERCURY AND MAINTAIN FOR 20 MINUTES.
 - d. STEP 4 - BREAK VACUUM WITH DRY NITROGEN TO A PRESSURE OF 2-3 PSI AND MAINTAIN FOR 15 MINUTES.
 - e. STEP 5 - EVACUATE THE SYSTEM TO 29" MERCURY AND MAINTAIN FOR 20 MINUTES.
 - F. THE REFRIGERANT CHARGE SHALL BE CALCULATED AND WEIGHED INTO THE SYSTEM.
 - G. AFTER CHARGING WITH REFRIGERANT, ALL JOINTS SHALL BE TESTED WITH AN ELECTRIC HALIDE LEAK DETECTOR. PRECAUTIONS SHOULD BE TAKEN TO KEEP MOISTURE OUT OF THE SYSTEM, AND A DRIER SHALL BE USED.
 - H. SERVICE TECHNICIANS SHALL BE CERTIFIED IN THE USE OF CFC AND HCFC REFRIGERANT RECOVERY AND RECYCLING EQUIPMENT AND HE/SHE SHALL USE UL LISTED AND LABELED RECOVERY EQUIPMENT WHEN DISCHARGING REFRIGERANT.
- 3.7 TEST, INSPECTIONS
- A. MAKE ALL NECESSARY CONTROL ADJUSTMENTS AND BALANCING OF AIR AND WATER 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.

END OF SECTION

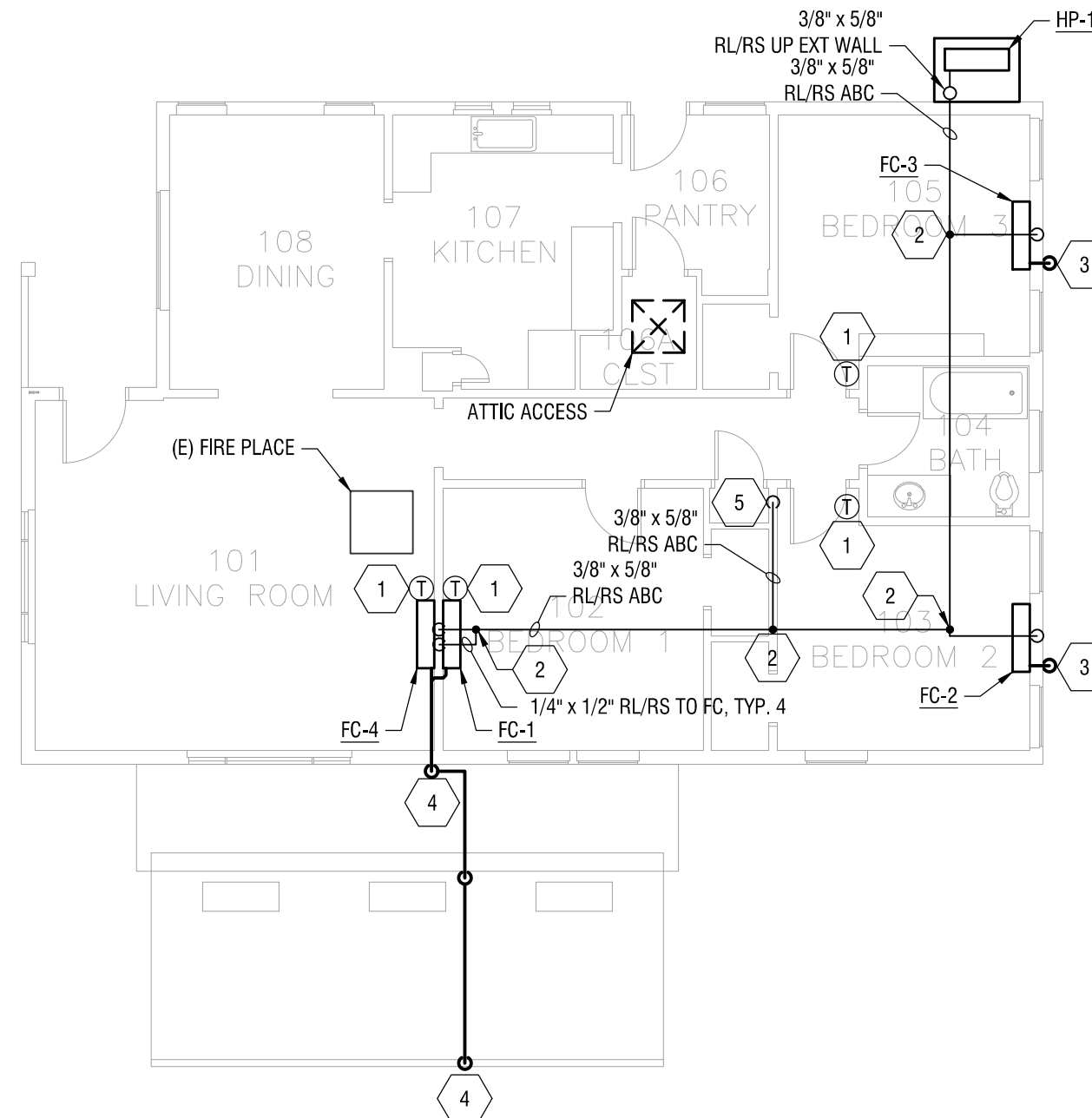


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KEYED NOTES

- 1 MOUNT WIRED THERMOSTAT 48" ABOVE FINISHED FLOOR.
- 2 PROVIDE WITH REFNET JOINT KHRP26A22T9 KIT FOR RL/RS LINES.
- 3 ROUTE 3/4" CONDENSATE DOWN WALL. DISCHARGE 6" ABOVE FINISHED GRADE. PAINT TO MATCH EXTERIOR WALL.
- 4 ROUTE 3/4" CONDENSATE DOWN WALL, ONTO GREENHOUSE ROOF AND DISCHARGE INTO GUTTER. PAINT PIPE TO MATCH EXTERIOR WALL AND ROOF.
- 5 RL/RS DOWN TO LOWER FLOOR.



LICENSE STAMP



PROJECT INFORMATION

**CCAT MINI SPLIT HVAC
SYSTEM UPGRADES
FOR
HUMBOLDT STATE
UNIVERSITY**

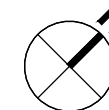
1 HARPST STREET
ARCATA, CA 95521

SHEET TITLE

**MECHANICAL UPPER
FLOOR PLAN**

DATE:	4-13-20
DRAWN BY:	JA
REVIEWED BY:	BA
SCALE:	AS NOTED
PROJECT NO:	19086

1 MECHANICAL UPPER FLOOR PLAN
M200 1/8" = 1'-0"



M200

KEYED NOTES

- 1 MOUNT WIRED THERMOSTAT 48" ABOVE FINISHED FLOOR.
- 2 PROVIDE WITH REFNET JOINT KHRP26A22T9 KIT FOR RL/RS LINES.
- 3 3/4" CONDENSATE FROM FAN COIL TO TAIL PIECE OF EXISTING SINK.
- 4 RL/RS FROM UPPER FLOOR ATTIC.



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PROJECT INFORMATION

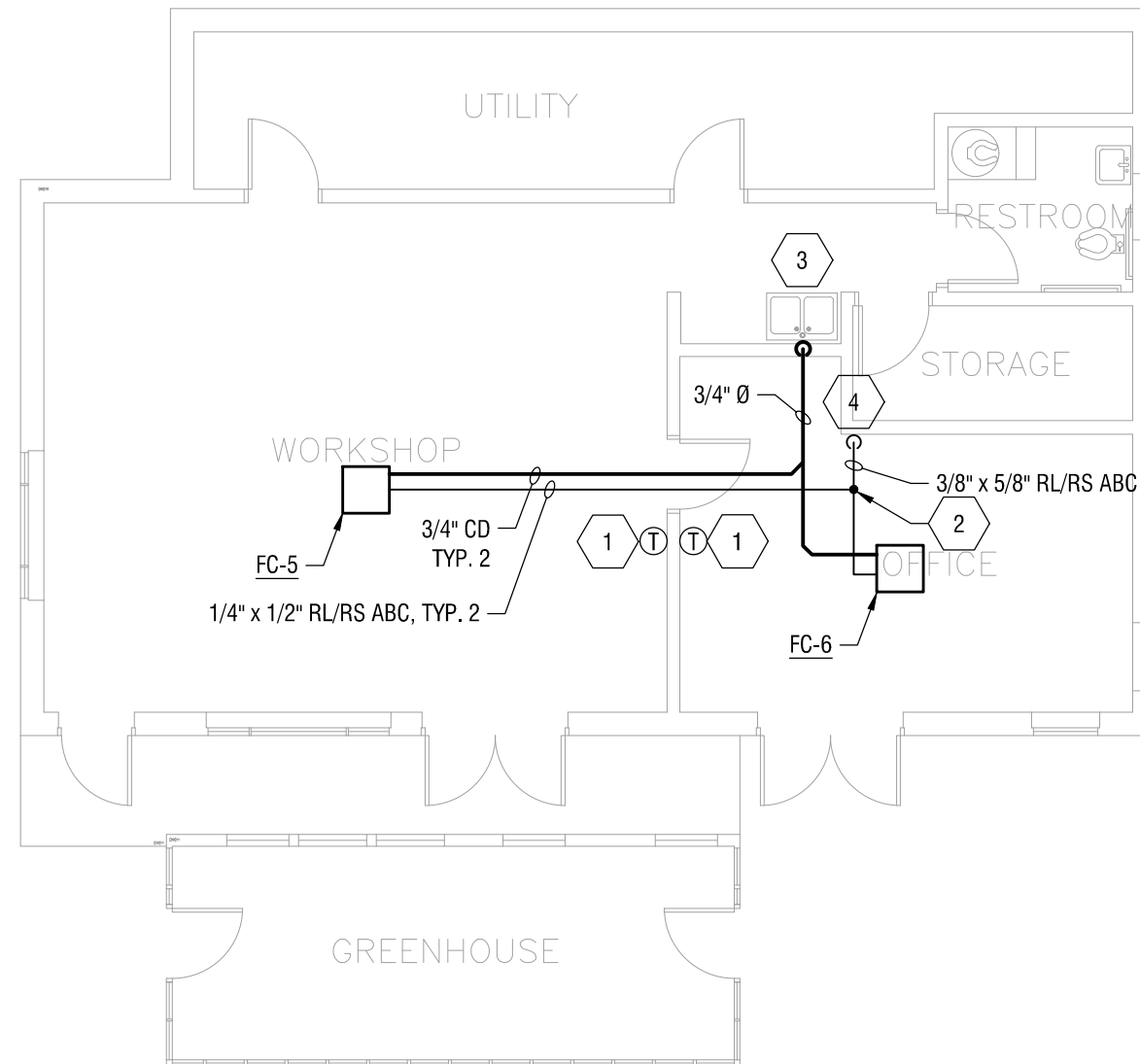
**CCAT MINI SPLIT HVAC
SYSTEM UPGRADES
FOR
HUMBOLDT STATE
UNIVERSITY**

1 HARPST STREET
ARCATA, CA 95521

SHEET TITLE

**MECHANICAL LOWER
FLOOR PLAN**

DATE:	4-13-20
DRAWN BY:	JA
REVIEWED BY:	BA
SCALE:	AS NOTED
PROJECT NO:	19086



1 MECHANICAL LOWER FLOOR PLAN
M201 1/8" = 1'-0"



M201



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**CCAT MINI SPLIT HVAC
SYSTEM UPGRADES
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1 HARPST STREET
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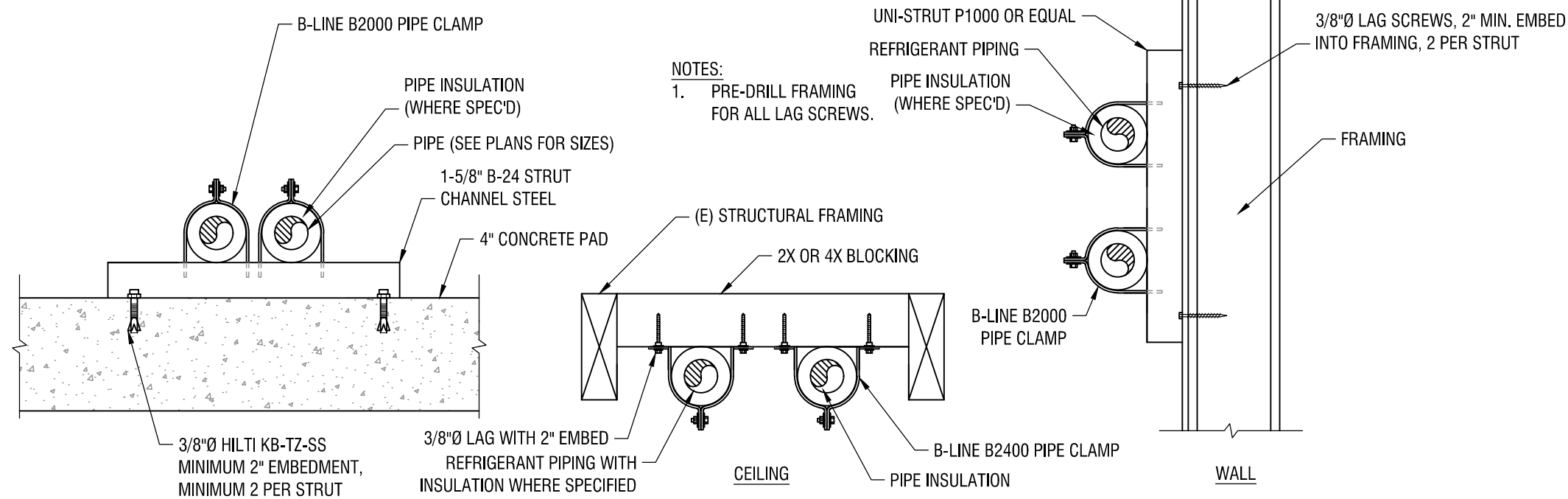
SHEET TITLE

MECHANICAL DETAILS

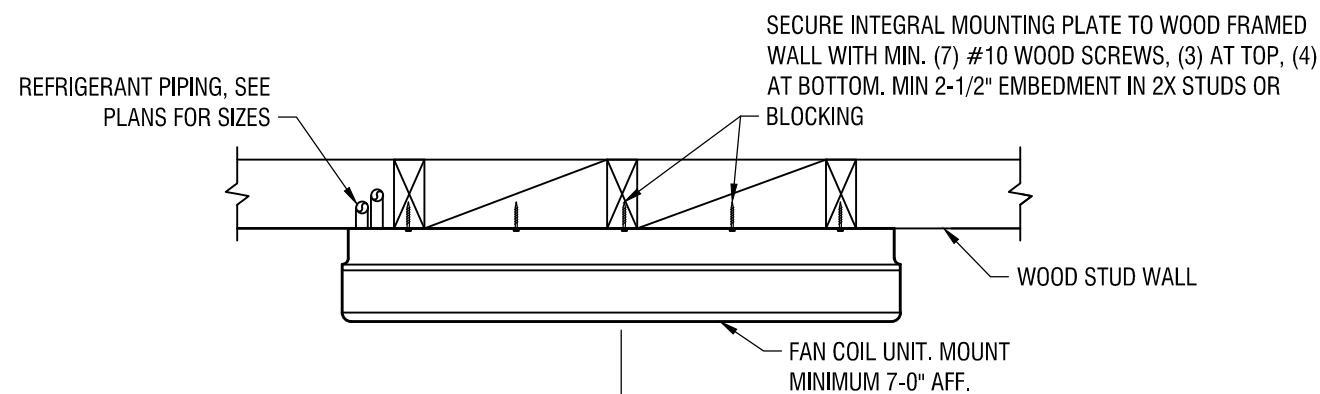
DATE:	4-13-20
DRAWN BY:	JA
REVIEWED BY:	BA
SCALE:	AS NOTED
PROJECT NO:	19086

NOTES:

1. PRE-DRILL FRAMING FOR ALL LAG SCREWS.
2. PROVIDE SHEET METAL ENCLOSURE AT EXTERIOR LOCATIONS. PAINT SHEET METAL ENCLOSURE TO MATCH EXISTING.
3. HORIZONTAL PIPING TO BE SUPPORTED EVERY 6 FEET. VERTICAL PIPING TO BE SUPPORTED EVERY 10 FEET.



1 REFRIGERANT PIPING DETAIL
M300 NO SCALE

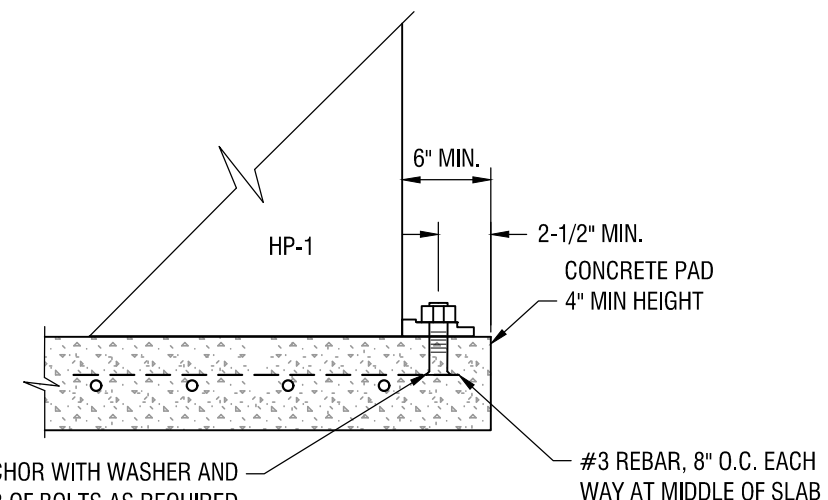


NOTES:

1. INSTALL 4x4 BLOCKING w/ A34 T.&B. EACH END BETWEEN 2x STUDS AS REQUIRED.

PLAN VIEW

3 WALL-MOUNTED FAN COIL DETAIL
M300 NO SCALE



3/8\"/>

2 HEAT PUMP ANCHORAGE DETAIL
M300 NO SCALE

M300



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**CCAT MINI SPLIT HVAC
SYSTEM UPGRADES
FOR
HUMBOLDT STATE
UNIVERSITY**

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ARCATA, CA 95521

SHEET TITLE

MECHANICAL DETAILS

DATE: 4-13-20

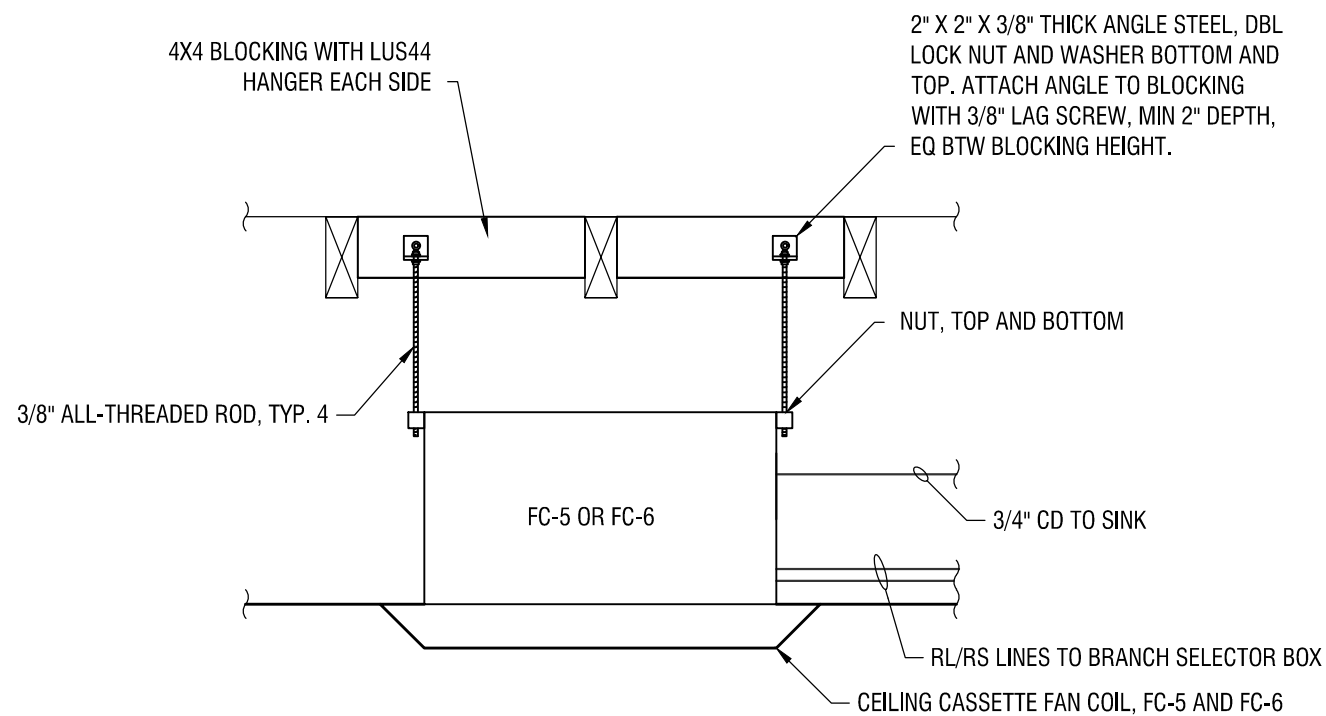
DRAWN BY: JA

REVIEWED BY: BA

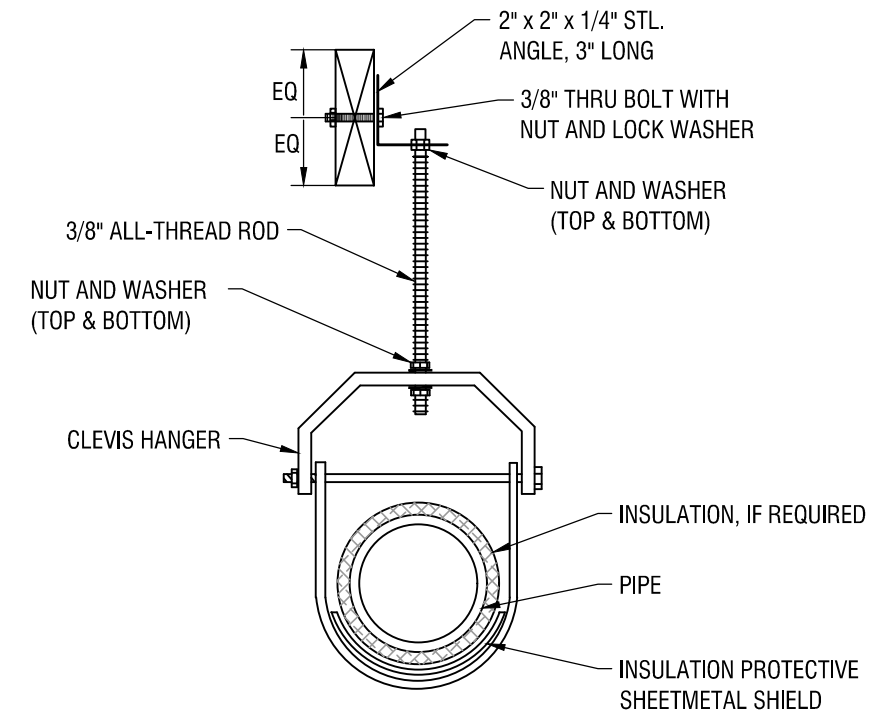
SCALE: AS NOTED

PROJECT NO: 19086

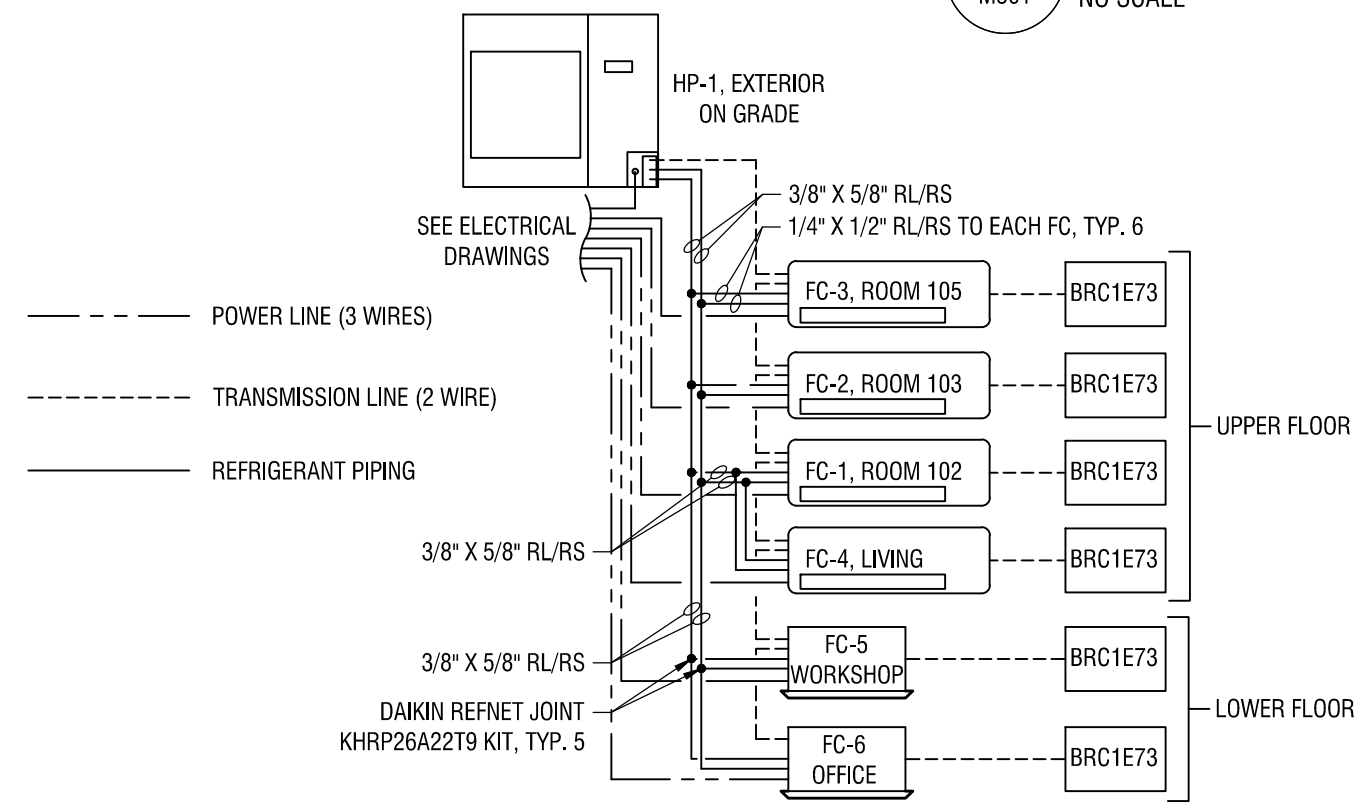
M301



2 CEILING CASSETTE DETAIL
M301 NOT TO SCALE



1 PIPE HANGING DETAIL
M301 NO SCALE



3 EQUIPMENT SCHEMATIC
M301 NO SCALE

KEYED NOTES

- 1 PROVIDE AND INSTALL A NEW CIRCUIT BREAKER IN PANEL EXISTING SPARE SPACE. CONNECT NEW CIRCUIT AS INDICATED. MODIFY PANEL AS REQUIRED.
- 2 USE EXISTING SPARE CIRCUIT BREAKER AND CONNECT TO NEW CIRCUIT INDICATED. MODIFY PANEL AS REQUIRED.



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PANELBOARD:

VOLTAGE: **A** PHASE: 120 LINE-LINE: 240
CURRENT: 225
AIC RATING: 10K

DESCRIPTION	LOAD(VA)		RATING	POLES	CIRCUIT	NUMBER	POLES	RATING	LOAD(VA)		DESCRIPTION
	PHASE A	PHASE B							PHASE A	PHASE B	
WATER HTR RM RECEP	360		20	1	1	2	1	20	360		RESTROOM RECEP
S/W WALL LOBBY RECEP		360	20	1	3	4	1	20		360	N WALL FRONT RECEP
HALL RECEP	180		20	1	5	6	1	20	180		STOR ROOM RECEP
SE ROOM RECEP		540	20	1	7	8	1	20		360	SW WALL RECEP
EXT/SOUTH RECEP	180		20	1	9	10	1	20	480		STOR/RESTROOM LTG
SE ROOM LTG		600	20	1	11	12	1	20		600	EXT/LOBBY LTG
FIRE ALARM	180		20	1	13	14	1	20	180		EXT RECEP W WALL
SPARE			20	1	15	16	1	20		360	ENERGY DETECTIVE
SPARE			20	1	17	18	2	50	4200		RANGE
1 FAN COILS	200		15	2	19	20	2	50		4200	RANGE
2 FAN COILS		200	15	2	21	22	1	20	180		ENERGY DETECTIVE
2 HP-1 RECEP		180	20	1	23	24	1	20		180	ENERGY DETECTIVE
1 HP-1	2800		35	2	25	26	2	30	2400		WATER HTR
HP-1		2800	35	2	27	28	2	30		2400	WATER HTR
SPACE					29	30					SPACE
SPACE					31	32					SPACE
SPACE					33	34					SPACE
SPACE					35	36					SPACE
SPACE					37	38					SPACE
SPACE					39	40					SPACE
SPACE					41	42					SPACE
TOTALS	3900	4680							7980	8460	

PHASE A LOAD (A): 99
PHASE B LOAD(A): 110

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PROJECT INFORMATION

**CCAT MINI SPLIT HVAC
SYSTEM UPGRADES
FOR
HUMBOLDT STATE
UNIVERSITY**

1 HARPST STREET
ARCATA, CA 95521

SHEET TITLE
**ELECTRICAL PANEL
SCHEDULE**

DATE: 4-13-20
DRAWN BY: JA
REVIEWED BY: BA
SCALE: AS NOTED
PROJECT NO: 19086

E100



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PROJECT INFORMATION

**CCAT MINI SPLIT HVAC
SYSTEM UPGRADES**
FOR
**HUMBOLDT STATE
UNIVERSITY**

1 HARPST STREET
ARCATA, CA 95521

SHEET TITLE

ELECTRICAL LEGEND

DATE: 4-13-20
DRAWN BY: JA
REVIEWED BY: BA
SCALE: AS NOTED
PROJECT NO: 19086

E101

ELECTRICAL SYMBOLS

	CONDUIT EXPOSED		
	CONDUIT CONCEALED OR BURIED		
	CROSS HATCHES W/ BARS INDICATES NUMBER OF #10 CONDUCTORS		
	1/2" C - 2# 12.1 #12G		
	HOME RUN-DESTINATION SHOWN		
	CONDUIT DOWN		
	CONDUIT UP		
	CONNECTION POINT		
	TELE/DATA CONNECTION POINT; 18" TO COD AFF UNLESS OTHERWISE NOTED. 3/4" C - STUB UP TO CEILING PLENUM		
S	WALL SWITCH, 46" TO COD AFF UNLESS OTHERWISE NOTED		
	JUNCTION BOX		
	20A SPECIFICATION GRADE RECEPTACLE, COORDINATE CONFIGURATION W/ SUPPLIED EQUIPMENT	GFCI	GROUND FAULT CIRCUIT INTERRUPT DUPLEX RECEPTACLE; CIRCUITS DOWNSTREAM FROM ANY GFCI SHALL NOT BE PROTECTED UNLESS OTHERWISE NOTED ON PLANS.
	20A SPECIFICATION GRADE QUADRUPLEX RECEPTACLE	WP GFCI	WEATHER RESISTANT GROUND FAULT CIRCUIT INTERRUPT DUPLEX RECEPTACLE W/ GALVANIZED WEATHER PROOF. WHILE IN USE. LOCKABLE COVER.
	18" TO COD AFF UNLESS OTHERWISE NOTED	(XX)	EQUIPMENT SCHEDULE LABEL. SEE SUPPLEMENTARY DESIGN SHEETS.
	208/240V RECEPTACLE 18" COD UNLESS OTHERWISE NOTED ON PLANS	COORDINATE WITH SUPPLIED EQUIPMENT	
	FUSED DISCONNECT	60A/20F WP	60A DISCONNECT / 20A FUSE NEMA-3R
	NON-FUSED DISCONNECT	60A WP	60A DISCONNECT NEMA-3A
	RECESS MOUNT PANELBOARD		
	SURFACE MOUNT PANELBOARD		
	GROUND		
	KEYNOTE		

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 OR COND	-CONDUIT
CKT	-CIRCUIT
COD	-CENTER OF DEVICE
CT	-CURRENT TRANSFORMER
DC	-DIRECT CURRENT
(E) OR EXIST	-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
RM	-ROOM
SWBD	-SWITCHBOARD
T	-THERMOSTAT OR TELE CONDUIT
TOD	-TOP OF DEVICE
TYP	-TYPICAL
V	-VOLTMETER, VOLT
W	-WATT
WP	-WEATHERPROOF (NEMA 3R)
XFMR	-TRANSFORMER

NOTE: THIS IS A SUPPLEMENTAL STANDARD LEGEND. SOME SYMBOLS OR ABBREVIATIONS MAY APPEAR ON THIS LEGEND AND NOT ON THE PLANS

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 OUTLET AND DEVICE BOXES
 - A. SHEET STEEL: ONE-PIECE DRAWN TYPE, ZINC- OR CADMIUM-PLATED.
- 2.4 JUNCTION AND PULLBOXES
 - A. OUTLET BOXES USED AS JUNCTION OR PULL BOX: AS SPECIFIED UNDER OUTLET AND DEVICE BOXES.
 - B. LARGE SHEET STEEL BOX: NEMA 1.
 - 1. BOX: CODE-GAUGE, GALVANIZED STEEL.
 - 2. COVER: FULL ACCESS, SCREW TYPE.
 - 3. MACHINE SCREWS: CORROSION-RESISTANT.
 - C. 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.
- 2.5 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.
- 2.6 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.
- 2.7 CONDUCTORS
 - B. ALL CONDUCTORS SHOWN SHALL BE NEW UNLESS OTHERWISE INDICATED.
 - C. CONDUCTOR TYPE:
 - 1. 120VAC AND 277VAC LIGHTING: SOLID COPPER.
 - 2. 120 AC RECEPTACLE CIRCUITS: SOLID COPPER.
 - 3. ALL OTHER CIRCUITS: STRANDED COPPER.
 - C. INSULATION: TYPE THHN/THWN, 90°C DRY OR 75°C WET.

- 2.8 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.
- 2.9 WIRING DEVICES
 - A. GROUND FAULT INTERRUPTER (GFCI) RECEPTACLE:
 - 1. NEMA WD 1.
 - 2. RATING: 120VAC, 20A.
 - 3. CONFIGURATION: 5-20 R.
 - 4. PROTECTIONS: TRIPS AT 5 MA AND CAPABLE OF INTERRUPTING 1,000A WITHOUT DAMAGE.
 - 5. COLOR: TO BE DETERMINED.
 - 6. PROVISION FOR TESTING.
 - 7. ALL RECEPTACLE TYPES SHALL BE FROM A SINGLE MANUFACTURER.
- 2.10 DEVICE PLATES
 - A. PLASTIC
 - 1. MATERIAL: NYLON HIGH IMPACT MATERIAL NONCOMBUSTIBLE.
 - 2. COLOR: TO MATCH ASSOCIATED WIRING DEVICE.
 - 3. MOUNTING SCREW: OVAL-HEAD METAL, COLOR MATCHED TO PLATE.
 - B. WEATHER RESISTANT RECEPTACLES
 - 3. PROVIDE RAINPROOF PROTECTION WHILE OUTLET IS IN USE.
 - 4. DIE-CAST ZINC HOUSING WITH POLYESTER POWDER COAT PAINT FOR CORROSION RESISTANCE.
 - 5. STAINLESS STEEL SCREWS AND SPRINGS.
 - 6. FULLY GASKETED.
 - 7. UL LISTED TAMPER RESISTANT AND CAPABLE OF ACCEPTING A PADLOCK.
 - 8. NEMA 3R RATED WHILE IN USE.
- 2.11 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.



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LICENSE STAMP



PROJECT INFORMATION

**CCAT MINI SPLIT HVAC
SYSTEM UPGRADES
FOR
HUMBOLDT STATE
UNIVERSITY**

1 HARPST STREET
ARCATA, CA 95521

SHEET TITLE
**ELECTRICAL
SPECIFICATIONS**

DATE:	4-13-20
DRAWN BY:	JA
REVIEWED BY:	BA
SCALE:	AS NOTED
PROJECT NO:	19086

E102

ELECTRICAL SPECIFICATIONS



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PROJECT INFORMATION

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- 3.6 RACEWAY SYSTEM
- A. UNLESS OTHERWISE INDICATED, RECEPTACLES AND JUNCTION BOXES SHALL BE CONNECTED TO THE CIRCUIT INDICATED USING 1/2" C-2#12, 1#12G. RECEPTACLE CIRCUITS SHALL BE CONCEALED IN WALLS OR ABOVE CEILINGS.
 - B. PROVIDE AND INSTALL 3/4" CONDUIT STUB CONCEALED IN WALL FROM ALL LOW-VOLTAGE DEVICE BOXES (DATA, TELEPHONE, LIGHTING CONTROLS, ETC.) TO THE SPACE ABOVE THE CEILING. PROVIDE A CONDUIT BUSING AT CONDUIT END TO PROTECT CONDUCTOR INSTALLATION.
 - C. UNLESS OTHERWISE SPECIFIED OR INDICATED, WIRING SHALL CONSIST OF INSULATED CONDUCTORS INSTALLED IN RACEWAYS OF THE TYPES INDICATED.
 - D. INTERIOR, EXPOSED:
 - 1. ELECTRIC METALLIC TUBING.
 - E. 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.
 - F. 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.
 - G. BOX TYPE (ALL RACEWAY SYSTEMS)
 - 1. EXTERIOR LOCATIONS: WEATHERPROOF TYPE 3R.
 - H. 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.
 - I. 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. HORIZONTAL RACEWAYS INSTALLED UNDER FLOOR SLABS SHALL LIE COMPLETELY UNDER THE SLAB, WITH NO PART EMBEDDED WITHIN SLAB.
 - H. INSTALL, CONCEALED, EMBEDDED, AND BURIED RACEWAYS SO THAT THEY EMERGE AT RIGHT ANGLES TO SURFACE AND HAVE NO CURVED PORTION EXPOSED.
 - I. FOR EMPTY CONDUIT INSTALL A NYLON PULL CORD TO BE USED FOR FUTURE INSTALLATION.

- 3.8 RACEWAY PENETRATIONS
- A. MAKE AT RIGHT ANGLES, UNLESS OTHERWISE SHOWN.
 - B. NOTCHING OR PENETRATION OF STRUCTURAL MEMBERS, INCLUDING FOOTING AND BEAMS, NOT PERMITTED.
 - C. FIRE-RATED WALLS, FLOORS, OR CEILINGS: FIRE-STOP OPENINGS AROUND PENETRATIONS TO MAINTAIN FIRE-RESISTANCE RATING.

- 3.9 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.

- 3.10 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.
- 3.11 EXPANSION/DEFLECTION FITTINGS
- A. PROVIDE ON ALL RACEWAYS AT STRUCTURAL EXPANSION JOINTS.
- 3.12 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.
- 3.13 CONDUCTORS
- A. 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 PLIER TYPE CRIMPERS.
 - B. DO NOT USE SOLDERED MECHANICAL JOINTS.
 - C. SPLICES AND TERMINATIONS:
 - 1. INDOORS: USE GENERAL PURPOSE, FLAME RETARDANT TAPE.
 - 2. OUTDOORS: USE FLAME RETARDANT, COLD- AND WEATHER-RESISTANT TAPE.
 - D. CAP SPARE CONDUIT WITH UL LISTED END CAPS.
 - E. 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.

- 3.14 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.

END OF SECTION

E103

KEYED NOTES

1 SEE MECHANICAL SHEETS FOR EQUIPMENT SPECIFICATION.



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PROJECT INFORMATION

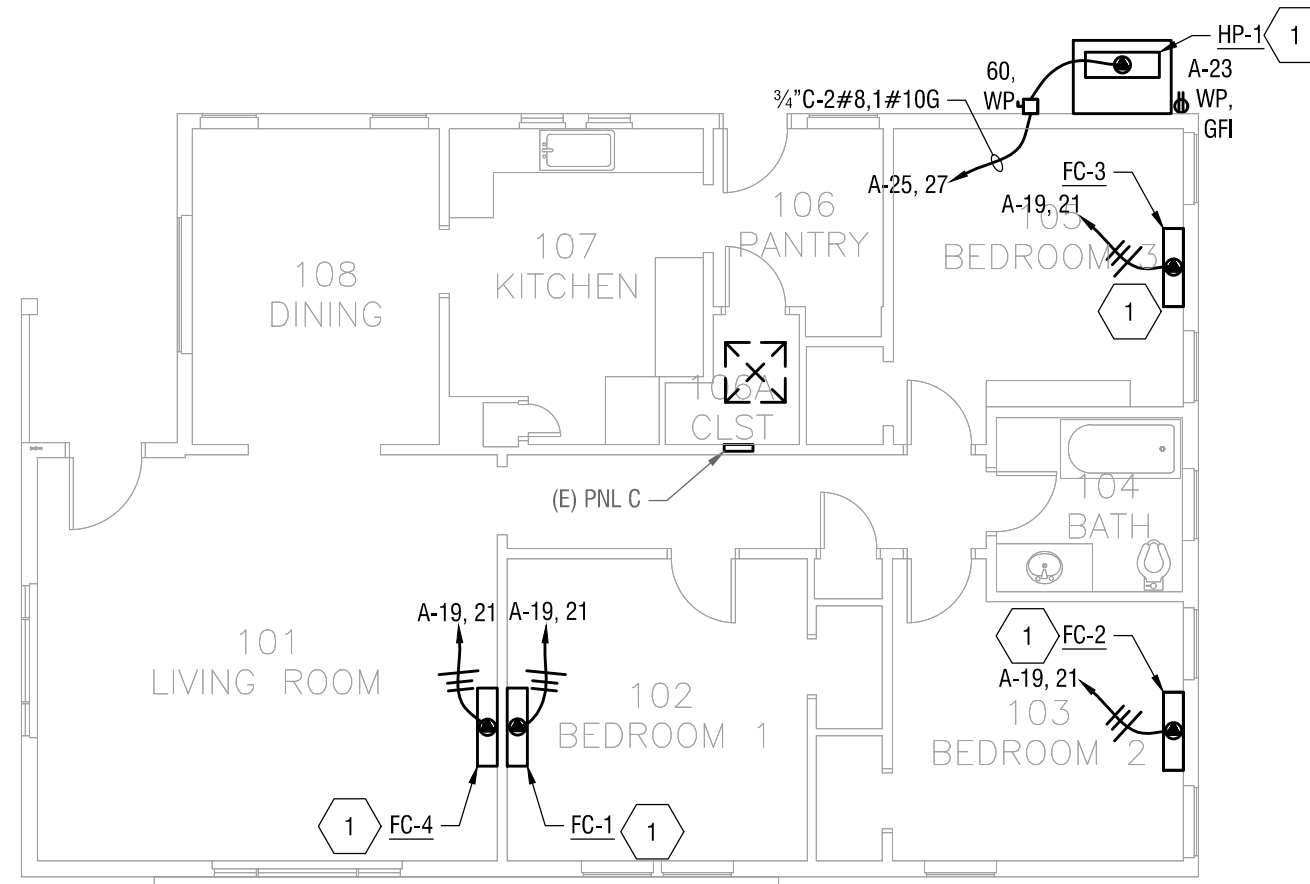
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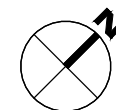
SHEET TITLE

**ELECTRICAL UPPER
FLOOR PLAN**

DATE:	4-13-20
DRAWN BY:	JA
REVIEWED BY:	BA
SCALE:	AS NOTED
PROJECT NO:	19086



1 ELECTRICAL UPPER FLOOR PLAN
E200 1/8" = 1'-0"



E200

KEYED NOTES

1 SEE MECHANICAL SHEETS FOR EQUIPMENT SPECIFICATION.



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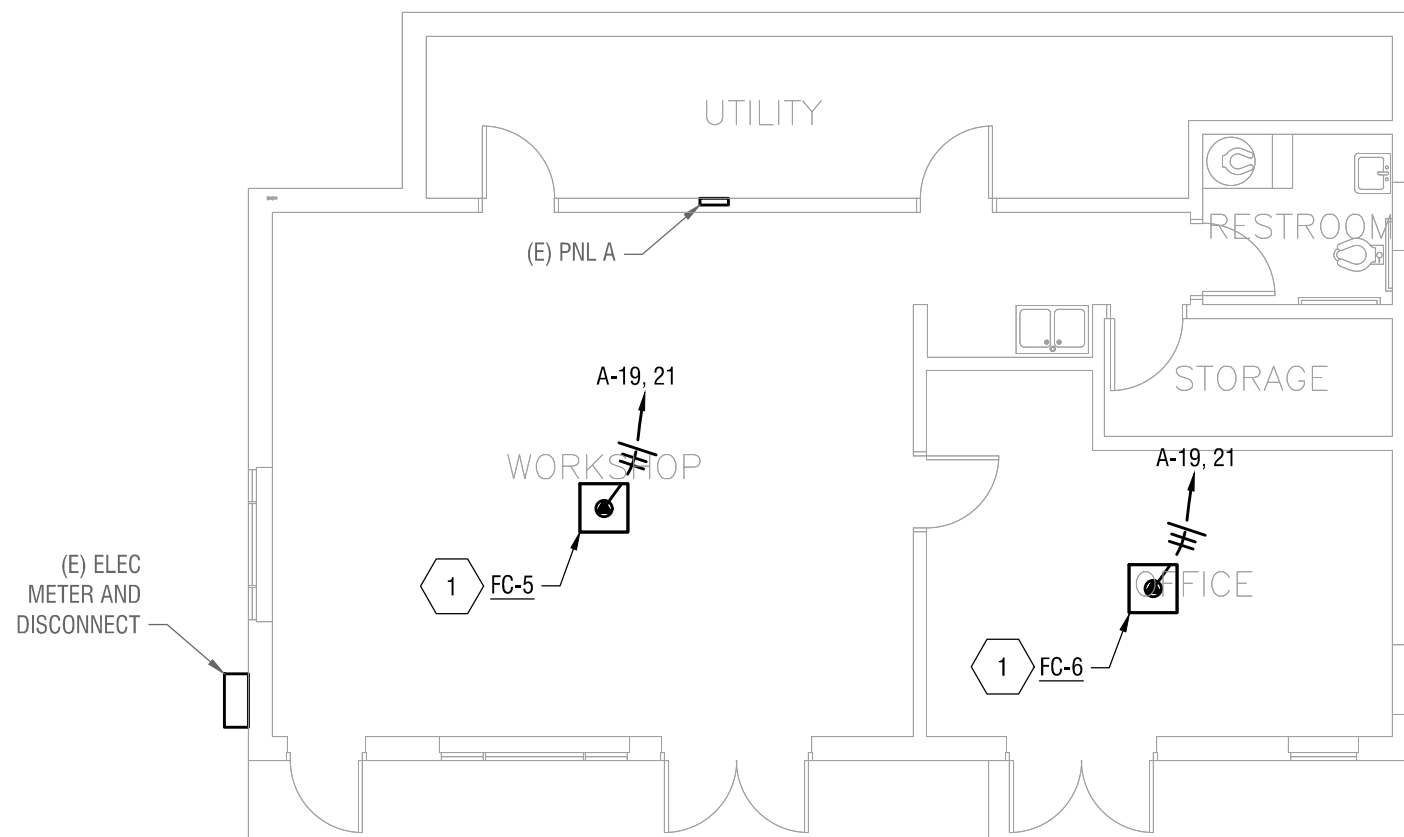
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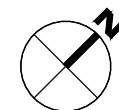
SHEET TITLE

**ELECTRICAL LOWER
FLOOR PLAN**

DATE:	4-13-20
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REVIEWED BY:	BA
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PROJECT NO:	19086



1 **ELECTRICAL LOWER FLOOR PLAN**
E201 1/8" = 1'-0"



E201