

THE CITY OF WALTHAM
MASSACHUSETTS
PURCHASING DEPARTMENT

HVAC Renovations for Waltham Public Library, 2024

ADDENDUM NO. 1

February 19, 2024

CHANGES, CORRECTIONS AND CLARIFICATIONS

The attention of bidders submitting proposals for the above subject project is called to the following addendum to the specifications. The items set forth herein, whether of omission, addition, substitution, or clarification are all to be included in and form a part of the proposal submitted.

THE NUMBER OF THIS ADDENDUM (NO. 1) MUST BE ACKNOWLEDGED IN THE BID FORM - SECTION 000600 AND/OR SECTION 000601.

ITEM 1: ANSWERS TO POSED QUESTIONS

Q1. Please provide the manufacturer and model for the existing fire alarm panel at the Waltham Public Library, and please provide name and contact for the current holder of the fire alarm maintenance contract.

A1. Fire alarm panel is manufactured by FireLite /Honeywell MS-9200UDLS. Attached is a photo of the Fire Alarm Panel @ the Library. Our Wires Dept handle the resets etc. The City has a sub-contractor, Fire Equipment Inc, 20 Hall St Medford, MA 02155 handles preventative maintenance and testing. We also use Safe & Secure Protection for Fire Alarm Repairs.

Q2. The Sub-sub-bidders Classes of Work listed in the specs at 26 00 00-1 appear to be left over from a different project.

A2. Paragraph 1.1E shall be eliminated.

Q3. The electrical riser and panel schedules appear to be missing from the documents.

A3. See Addendum 1 drawings E7.0 and E9.1

Q4. For the electrical work, I cannot locate a one-line power riser or panel schedules for new and existing electrical panels. Can these be provided?

A4. See Addendum 1 drawings E7.0 and E9.1

Q5. Drawing E2.4 shows "ACCU-1" & "ACCU-2". I cannot locate these tags on the mechanical equipment schedule on drawing E-9.0. Are they miss labeled? Please confirm what sized circuit is needed for the ACCU's and where the circuit is being fed from.

A5. See Addendum 1

Q6. Specification section 260000-1.1F does not list any drawings. Please provide list.

A6. E-0.0, ED-2.1, ED-2.2, ED-2.3, ED-2.4, E-2.1, E-2.2, E-2.3, E-2.4, E-7.0, E-8.0, E-9.0, E-9.1, FA-0.00, FA-2.3 and FA-2.4

Q7. Panel specification was not included in Division 26 00 00.

A7. Add the following sections to Division 26 00 00 specification:

2.12 PANELBOARDS

A. General

1. Provide dead-front lighting and power panelboards where shown on drawings and as scheduled.
2. Panelboards shall meet or exceed requirements of NEMA Standard Publication PB-1, and UL-50 and 67. Panelboards shall be UL-listed.
3. Where panelboards are used as service entrance equipment, they shall comply with all NEC and UL requirements for service. The panelboard shall include a UL service entrance label, incoming line isolation barriers and a removable neutral bond to ground for solidly grounded wye systems.
4. Enclosures shall be at least twenty (20) inches wide made of galvanized steel. Gutter space shall be in accordance with NEC requirements for the specified combination of devices and accessories. Fronts shall be reinforced steel with concealed hinges and concealed trim adjusting screws. Trim clamps are unacceptable. Where two (2) section panels are required, bolt boxes together to form one (1) unit. Trim shall be two-piece construction with doors of equal size over each section. Trims shall be cleaned, primed and painted gray ANSI 61.
5. For panelboards up to 400 amps, provide cabinets with flush hinges and combination catch and lock to cover circuit breaker handles. Provide a directory card with a clear plastic cover mounted inside the door. Power and lighting panels shall have heavy-duty, continuous, section vertical-hinged to box section for access to wiring gutters in addition to trim door. All locks shall be keyed alike. Panelboards greater than 400 amps shall be provided with a four-piece front to cover wiring gutter and wiring access areas.
6. Nameplates shall be in accordance with other sections of this specification.
7. The manufacturer shall warrant equipment to be free from defects in materials and workmanship for one (1) year from date of installation or eighteen (18) months from date of purchase, whichever occurs first.
8. Panels shall be equal to Eaton- Pow-R-Line 2a for 400 A and below unless more than one (1) 125 A or larger branch breaker and/or space is specified. Eaton Pow-R-Line 4 or 5P (or equal) panelboards shall be provided for all applications greater than 400 amps and to accommodate multiple branch breakers greater than 125 amps. Approved equal panelboards by GE, Siemens or Square D will be considered.
9. Where specifically indicated on the drawings for Selective Coordination, provide fused panelboards equal to Eaton Pow-R-Line 2aF. All fuses in the system where selective coordination is required shall be manufactured by the same manufacturer.

B. Bussing

1. Main bus bars of panels shall be copper, rated to carry at least full rating of the panel as identified on the schedules.
2. Split solid neutral bus, with rated capacity equal to the phase bus, shall be plated and located in main compartment for all incoming neutral cables to be same length. Neutral bus shall be 200% rated where double sized neutrals are indicated and/or where the panel is supplied via a K-rated transformer.
3. Provide separate equipment ground bus for each panelboard. Where an isolated ground is specified, provide an additional isolated ground bus, which shall be insulated from the panel enclosure and equipment ground.
4. Panelboards shall have a short circuit current rating equal to or greater than circuit breaker AIC ratings schedule on the drawings. Where series ratings are allowed, as per the schedule on the drawings, a label shall be affixed to the panel stating the conditions of the UL Series rating including:
 5. Size and type of upstream device
 6. Branch devices that are acceptable
 7. UL Series short-circuit rating
8. All lugs shall be UL listed tin-plated aluminum suitable for copper or aluminum cable for sizes indicated on the drawings. Provide oversized lugs to accommodate designed cable sizes or increase gutter space to allow use of solid stud compression lugs where necessary. All terminations shall be suitable for 75°C cable.
9. Provide bus connections for future overcurrent devices with suitable insulation and bracing to maintain proper short circuit rating and voltage clearances. All required hardware shall be installed and be in place for ready insertion of future breaker without the need to relocate adjacent units. Future spaces shall accommodate frame sizes up to 50% of the main bus ampacity.

C. Overcurrent Devices

1. Molded case circuit breakers shall be bolt-on devices. Multi-pole breakers shall have internal common trip crossbars for simultaneous tripping of each pole.
2. Trip units shall be:
3. Thermal magnetic below 400A frame unless solid state sensing specifically indicated on the drawings.
4. Solid state trip units shall be provided on all molded case breakers at 400A frame and above. Trip units shall be equal to Eaton Digitrip 310.
5. All breakers shall have handle trip indication and a trip indicator in the window of the circuit breaker housing.
6. Internal accessories shall be UL Listed for field installation without removing the circuit breaker cover. Internal accessories shall be common to all frame sizes. Shunt trips, auxiliary contacts, and other accessories shall be factory installed.

D. Submittals

1. The manufacturer shall provide copies of the following documents for review and evaluation in accordance with general requirements of Division 1 and Division 16:
 - a. Product Data on specified product
 - b. Shop Drawings on specified product
 - c. Certified trip curves for each specified product
 - d. Nameplate list
 - e. Short circuit and coordination study shall be submitted with the equipment shop drawings to ensure rating conformity to study conclusions. Submittals made without the study shall be rejected.

3.13 PANELBOARDS**A. Storage**

1. Contractor shall store, protect, and handle products in accordance with recommended practices listed in manufacturer's Installation and Maintenance Manuals. Contractor shall store in a clean, dry space. Cover with heavy canvas or plastic to keep out dirt, water, construction debris, and traffic. Heat enclosures to prevent condensation.
2. Low voltage panelboards shall be located in well-ventilated areas, free from excess humidity, dust and
3. dirt and away from hazardous materials. Ambient temperature of area will be between -30 °C and +25 °C. Indoor locations shall be protected to prevent moisture from entering enclosure.

B. Installation

1. Provide ½ inch spacers for panelboards mounted at exterior walls below grade to establish ½ inch air space behind panel. Inspect installed panelboard(s) for anchoring, alignment, grounding and physical damage. Clean interiors to remove construction debris, dirt and shipping materials. Check tightness of all electrical connections with calibrated torque wrench. Minimum acceptable values are specified in manufacturer's instructions.
2. Adjust all circuit breakers and doors for free mechanical operation as described in manufacturer's instructions.
3. Adjust circuit breaker trip and time delay settings to values determined by the short circuit and coordination study.
4. Directories shall be typed to indicate loads served by each circuit and mounted in a holder behind a clear protective covering.

- C. Circuit breakers used as a motor disconnecting means, and not in sight of the motor and the driven machinery location, shall be capable of being locked in the open position.

- D. Circuit breakers supplying fire alarm equipment and any others loads noted on the schedules shall be capable of being locked in the ON position. The locking means shall not inhibit the ability of the circuit breaker from performing its protective function.**

Q8. Power system study was not included in Division 26 00 00 specification.

A8. See Addendum 1 specification section 26 05 74

Q9. The one-line riser diagram seems to be missing for information regarding the new panels and feeder sizes?

A9. See Addendum 1 drawing E7.0 .

Q10. New panels H2G, H22, H24 do not have panel schedules.

A10. See Addendum 1 drawing E9.1

Q11. Is there glycol in the existing heating system?

A11. No, the site does not use glycol in the heating hydronic system.

Q12. Are we doing preliminary balancing due to the fact that we are connecting to existing fan power boxes under the base bid?

A12. Yes, Under both the base bid and the add-alternate 1, the contractor shall record the existing airflows at each air terminal and a summation of supply air flow at each air handler. Air terminal data shall include primary air only at minimum and maximum air valve position as well as primary air minimum plus fan airflow. Tabulated data should be provided to the engineer for review prior to submitting the replacement AHU's. For new work, The contractor shall rebalance the existing air terminals to the CFM's indicated on plans in parentheses, where possible. For the single FPVAV with hot water reheat (FPVAV3.1), provide waterside balancing to the gpm shown for both the base bid and add-alternates. The ATC contractor shall set the minimum/maximum FPVAV airflows through the BAS.

ITEM 2: CHANGES TO SPECIFICATIONS

1. 05 12 00 Structural Steel Framing 1.6C.1.b and 1.6C.2.b:
 - a. Delete reference to AISC designations.
2. 05 12 00 Structural Steel Framing 1.6A
 - a. Revise building code to Ninth Edition of 780 CMR.
3. 07 92 00 Joint Sealants.
 - a. Delete reference to Roofing and Flashing Filed Sub-bid. See section 075323 EPDM Roofing for joint sealant information for the Roofing and Flashing Filed Sub-bid.
4. Add attached specification section 26 05 74 Short Circuit, Coordination and Arc Flash Study

ITEM 3: CHANGES TO DRAWINGS

1. Sheet T-1:
 - a. Add E-7.0, E-9.1, and FA-2.4 to the drawing list.
2. Sheet A-2, detail 6:
 - a. Steel post penetration to be per General Contractor. Flashing the penetrations to be per 07 00 01.
3. Sheet A-2, detail 7:
 - a. New adapter curbs per General Contractor. Flashing the curbs to be per 07 00 01.
4. Sheet A-2, detail 11:
 - a. New mechanical equipment per Division 23. New curbs and flashing per 07 00 01.

ITEM 4: Attachments

- Photo of existing Fire Alarm Panel
- M-2.4
- M-8.0
- M-8.1
- E-2.4
- E-7.0
- E-9.0
- E-9.1
- FA-2.4
- 26 05 74 Short Circuit, Coordination and Arc Flash Study

End of Addendum 1

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SECTION 26 05 74

SHORT CIRCUIT, COORDINATION AND ARC FLASH STUDY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this section.
- B. All criteria establish within Specification 26 00 00 shall apply to this section unless specifically noted otherwise.

1.2 SCOPE OF SERVICES

- A. Section includes a computer-based fault-current study to determine the minimum interrupting capacity of circuit protective devices, overcurrent protective device coordination study to determine overcurrent protective device settings and an arc-flash study to determine the arc-flash hazard distance and the incident energy to which personnel could be exposed during work on or near electrical equipment.
- B. The studies shall include all portions of the electrical distribution system from the normal and alternate sources of power throughout the low-voltage distribution system. Normal system operating methods, alternate operation, and operations which could result in maximum-fault conditions shall be thoroughly covered in the study.

1.3 DEFINITIONS

- A. One-Line Diagram: A diagram which shows, by means of single lines and graphic symbols, the course of an electric circuit or system of circuits and the component devices or parts used therein.
- B. Protective Device: A device that senses when an abnormal current flow exists and then removes the affected portion from the system.
- C. SCCR: Short-circuit current rating.
- D. Service: The conductors and equipment for delivering electric energy from the serving utility to the wiring system of the premises served.

1.4 ACTION SUBMITTALS

- A. The results of the power system studies shall be summarized in a final report.
- B. Submit the following submittals prior to or concurrently with the submittal of system protective devices included with panelboards, switchboards/switchgear, starters, VFDs, etc.

- C. The report shall include the following sections:
1. Description, purposes, basis, and scope of the study and a single-line diagram of the portion of the power system which is included within the scope of study.
 2. Tabulations of circuit breaker, fuse, and other equipment ratings versus calculated short-circuit duties and commentary regarding same.
 3. Protective device time versus current coordination curves, tabulations of relay and circuit breaker trip settings, fuse selection, and commentary regarding same.
 4. Fault-current tabulations including a definition of terms and a guide for interpretation.
 5. Study report; signed, dated, and sealed by a qualified professional engineer.
 6. Submit study report for action prior to receiving final approval of the distribution equipment submittals. If formal completion of studies will cause delay in equipment manufacturing, obtain approval from Engineer for preliminary submittal of sufficient study data to ensure that the selection of devices and associated characteristics is satisfactory. Failure to submit the study prior to release of associated equipment shall be at the sole risk of the Contractor, who will bear all costs associated with changes necessary to comply with the requirements of the Electrical Construction documents.

1.5 QUALITY ASSURANCE

- A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are unacceptable.
- B. Study Software Developer Qualifications: An entity that owns and markets computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.
1. The computer program shall be developed under the charge of a licensed professional engineer who holds IEEE Computer Society's Certified Software Development Professional certification.
- C. Study Specialist Qualifications: Professional engineer in charge of performing the study, analyzing the arc flash, and documenting recommendations, licensed in the state where Project is located. All elements of the study shall be performed under the direct supervision and control of this professional engineer.

1.6 COORDINATION

- A. An independent testing firm shall be engaged for the purpose of inspecting, setting, testing, and calibrating the protective relays, circuit breakers and other applicable devices as recommended in the power-system study report.

PART 2 - PRODUCTS

2.1 NOT USED

PART 3 - EXECUTION

3.1 SHORT-CIRCUIT STUDY

- A. The study shall be in accordance with applicable ANSI and IEEE standards.
- B. The study input data shall include the utility company's short-circuit single and three phase contribution with the X/R ratio, the resistance and reactance components of each branch impedance, motor and generator contributions, base quantities selected, and all other applicable circuit parameters.
- C. Short-momentary duties and interrupting duties shall be calculated on the basis of maximum available fault current at each switchgear bus, switchboard, motor control center, distribution panelboard, pertinent branch circuit panelboards, and other significant locations through the system.
- D. An equipment evaluation study shall be performed to determine the adequacy of circuit breakers, controllers, surge arresters, busways, switches, and fuses by tabulating and comparing the short-circuit ratings of these devices with the maximum short-circuit momentary and interrupting duties. Evaluation study should be submitted prior to final approval of equipment submittals.

3.2 PROTECTIVE-DEVICE COORDINATION STUDY

- A. A protective-device coordination study shall be performed to select or to verify the selection of power fuse ratings, protective-relay characteristics and settings, ratios, and characteristics of associated voltage and current transformers, and low-voltage breaker trip characteristics and settings.
- B. The coordination study shall include all voltage classes of equipment from the utility's incoming line protective device down to and including each motor control center and/or panelboard. The phase and ground overcurrent protection shall be included as well as settings for all other adjustable protective devices.
- C. Coordination shall be in accordance with requirements of the NEC and the recommendations of the IEEE Standard 399. TC curves shall be provided for each typical branch scenario from source to largest branch circuit device.
- D. The selection and settings of the protective devices shall be provided separately in a tabulated form listing circuit identification, IEEE device number, current transformer ratios, manufacturer, type range of adjustment, and recommended settings. A tabulation of the recommended power fuse selection shall be provided for all fuses in the system. Discrepancies, problem areas, or inadequacies shall be promptly brought to the Owner's attention.

3.3 ARC FLASH STUDY

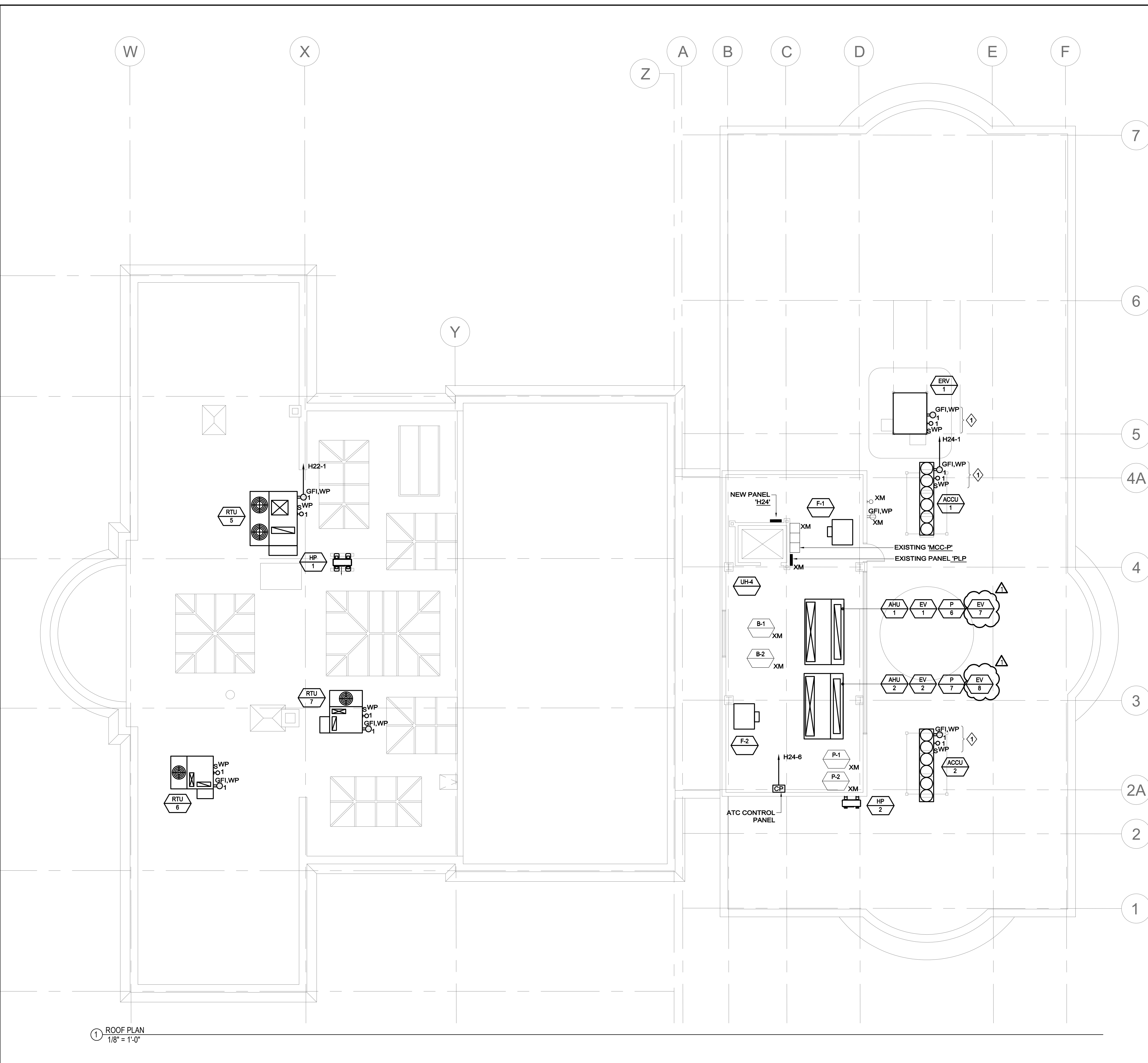
- A. Determine arc flash levels based upon minimum and maximum available utility fault and protective device settings as determined in the Protective Device Coordination Study.

HVAC REPLACEMENT AT
WALTHAM PUBLIC LIBRARY
Waltham, MA

- B. Label all switchboards, panelboards, disconnects, starters, VFD's and any other electrical equipment likely to require maintenance or adjustment while energized.
- C. Identify the current appropriate ratings of personal protective equipment (PPE).
- D. Establish the Flash Protection Boundary (approach limit distance) as required by NFPA 70E.
- E. Provide equipment specific environment and chemical arc-flash hazard warning labels per NEC® Section 110.16 requirements.
- F. Label shall identify the level of arc flash hazard and the required PPE level.
- G. Identify the risk of personal injury as a result of exposure to incident energy released during an arc flash event for each electrical distribution component (switchboard, switchgear, MCC, starter, panelboard, disconnect).

END OF SECTION 26 05 74

W:\BLD\Projects\2023\0220164 - Waltham Public Library HVAC System\300 Drawings\305 Electrical\0220164 E-2.4 ELECTRICAL POWER ROOF NEW WORK PLAN.dwg [PAPER] February 14, 2024 - 10:48am MariaMcDonnell



- POWER NOTES:**
1. REFER TO DRAWING E-0.0 FOR LEGEND, SYMBOLS AND GENERAL NOTES.
 2. REFER TO ARCHITECTURAL DRAWINGS FOR ASSOCIATED NOTES, MOUNTING DETAILS, HEIGHTS AND EXACT LOCATIONS OF ALL DEVICES.
 3. CIRCUIT NUMBERS DENOTE CIRCUITING INTENT. EXACT NUMBER DESIGNATIONS SHALL BE DETERMINED IN THE FIELD AND REFLECTED ON THE AS BUILT DRAWINGS. INTERCONNECTING BRANCH WIRING SHALL BE SIZED EQUAL TO THE HOMERUN UNLESS NOTED OTHERWISE.
 4. VOLTAGE DROP HAS BEEN CONSIDERED IN THE DESIGN OF ALL BRANCH CIRCUITRY AND FEEDER SIZES BASED ON EQUIPMENT LAYOUTS AND SHORTEST CONDUCTOR/RACEWAY ROUTING. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR DEVIATIONS TAKEN THAT WILL INCREASE CONDUCTOR/RACEWAY LENGTHS. BRANCH CIRCUITS LONGER THAN 75' FOR 120V FROM PANEL TO LAST OUTLET SHALL BE INCREASED A MINIMUM OF ONE SIZE ABOVE THAT SPECIFIED TO LIMIT VOLTAGE DROP TO LESS THAN 3%. FEEDERS SHALL FOLLOW SIMILAR GUIDELINES AND BE LIMITED TO A 2% DROP.
 5. POWER BRANCH CIRCUITRY SHALL BE INSTALLED IN CONDUIT FROM THE PANEL TO THE FIRST DEVICE AND/OR WHERE EXPOSED. POWER BRANCH CIRCUITRY MAY BE TYPE MC CABLE WHERE CONCEALED ABOVE SUSPENDED CEILINGS AND IN METAL STUD WALLS.
 6. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL EXISTING POWER DEVICES TO REMAIN.
 7. SWITCHBOARDS, PANELBOARDS, METER SOCKET ENCLOSURES AND MOTOR CONTROL CENTERS SHALL BE FIELD MARKED TO WARN QUALIFIED PERSONS OF POTENTIAL ELECTRIC ARC FLASH HAZARDS. THE MARKING SHALL BE LOCATED SO AS TO BE CLEARLY VISIBLE TO QUALIFIED PERSONS BEFORE EXAMINATION, ADJUSTMENT, SERVICING, OR MAINTENANCE OF THE EQUIPMENT.

KEYNOTES	
1	SEE DETAIL E203 ON DRAWING E-8.0 FOR ADDITIONAL INFORMATION.
NOTES:	
1	REFER TO SPECIFICATIONS AND DETAILS FOR ADDITIONAL INFORMATION.

N|V|5
 200 Brickstone Square
 Andover, MA 01810-1488
 T. 978-296-6200
 F. 978-296-6201
 W. www.nv5.com

CGKV Architects, Inc.
 204A Hampshire Street
 Cambridge, MA 02139
 Tel. 617-504-8196
 Fax. 617-812-6364
 cgkvarchitects.com

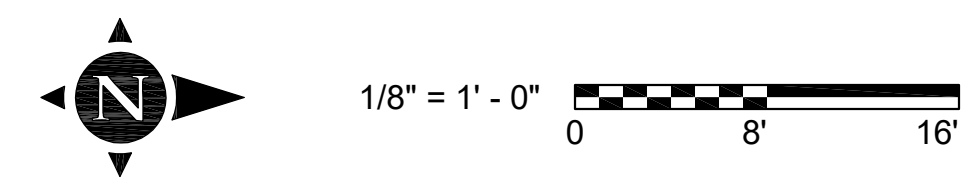
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 610 Main Street
 Waltham, MA 02452

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 735 Main Street
 Waltham, MA 02451

SCALE: 1/8" = 1'-0"
 DATE: 2024-01-31
 REVISIONS:
 2024-02-16: ADDENDUM 1

DRAWN BY: MVM
**ELECTRICAL
 POWER
 ROOF NEW
 WORK PLAN**

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



EXISTING MOTOR CONTROL CENTER SCHEDULE															
TAG: MCC-P VOLT: 208V 3 PHASE 3 WIRE AIC: 25,000 AMPS SYM MAIN: 600 MLO AMPS MAIN BUS: 600 AMPS VERT BUS: 600AMPS															
CIRCUIT	DESCRIPTION/TAG	LOAD		STARTER		OVERCURRENT DEVICE			ACCESSORIES				REMARKS		
		HP	KVA	NEMA SIZE	TYPE	CB	FUSE	MCP	PB	HOA	R	G		A	CPT
1A	INCOMING														
1B	EXIST PUMP P-1	3	4.0	0	FVNR			15	X	X	X	X	X	X	
1C	EXIST PUMP P-2	3	4.0	0	FVNR			15	X	X	X	X	X	X	
1D	SPACE														
1E	SPACE														
1F	SPACE														
2A	EXISTING FAN F-1	7.5	9.1	1	FVNR			50	X	X	X	X	X	X	
2B	EXISTING FAN F-2	7.5	9.1	1	FVNR			50	X	X	X	X	X	X	
2C	SPACE														
2D	EXISTING AHU-1	20	22.4	3	FVNR			100	X	X	X	X	X	X	
2E	SPACE														
3A	SPACE														
3B	SPACE														
3C	SPACE														
3D	EXISTING AHU-2	20	22.4	3	FVNR			100	X	X	X	X	X	X	
3E	SPACE														
3F	SPACE														
TOTAL CONNECTED KVA =		71.0													

EXISTING MOTOR CONTROL CENTER SCHEDULE - NEW WORK															
TAG: MCC-P VOLT: 208V 3 PHASE 3 WIRE AIC: 25,000 AMPS SYM MAIN: 600 MLO AMPS MAIN BUS: 600 AMPS VERT BUS: 600AMPS															
CIRCUIT	DESCRIPTION/TAG	LOAD		STARTER		OVERCURRENT DEVICE			ACCESSORIES				REMARKS		
		HP	KVA	NEMA SIZE	TYPE	CB	FUSE	MCP	PB	HOA	R	G		A	CPT
1A	INCOMING														
1B	EXIST PUMP P-1	3	4.0	0	FVNR			15	X	X	X	X	X	X	
1C	EXIST PUMP P-2	3	4.0	0	FVNR			15	X	X	X	X	X	X	
1D	SPACE														
1E	NEW PANEL H24		75					400						NOTE 2	
1F	SPACE														
2A	SPACE			1	FVNR			50	X	X	X	X	X	NOTE 1	
2B	SPACE			1	FVNR			50	X	X	X	X	X	NOTE 1	
2C	SPACE														
2D	SPACE			3	FVNR			100	X	X	X	X	X	NOTE 1	
2E	SPACE														
3A	SPACE														
3B	SPACE														
3C	SPACE														
3D	SPACE			3	FVNR			100	X	X	X	X	X	NOTE 1	
3E	SPACE														
3F	SPACE														
TOTAL CONNECTED KVA =		79													

NOTES:
1. PROVIDE NEW ENGRAVED NAMEPLATE TO MATCH EXISTING.
2. PROVIDE NEW 400A/3P CIRCUIT BREAKER AS ILLUSTRATED. CIRCUIT BREAKER TYPE AND AIC RATING SHALL MATCH EXISTING BREAKERS MANUFACTURED BY SIEMENS. PROVIDE NEW ENGRAVED NAMEPLATE AND RE-BALANCE LOADS TO WITHIN TO 10% PHASE TO PHASE UPON COMPLETION OF WORK.

KEYNOTES	
1	PROVIDE NEW ENGRAVED NAMEPLATE TO MATCH EXISTING.
2	REFER TO MECHANICAL EQUIPMENT SCHEDULE FOR ADDITIONAL INFORMATION.
3	PROVIDE WEATHERPROOF JUNCTION BOX AND UTILIZE HYPRESS COMPRESSION BUTT SPLICES WITH 600V HEAT SHRINK TUBES FOR EXTENSION OF EXISTING BRANCH CIRCUIT WIRING.
4	PROVIDE NEW STAINLESS STEEL WIREWAY. DISCONNECT SWITCHES AND WIREWAY SHALL BE MOUNTED ON STAINLESS STEEL UNISTRUT SUPPORT SYSTEM LOCATED ADJACENT TO ACC UNIT. EXACT LOCATION SHALL BE COORDINATED IN THE FIELD TO MAINTAIN ADEQUATE WORKSPACE CLEARANCE FOR ELECTRICAL AND MECHANICAL EQUIPMENT. CIRCUIT CONDUCTORS FROM WIREWAY TO DISCONNECT SWITCHES SHALL NOT EXCEED 10LF IN ACCORDANCE WITH NEC ARTICLE 240.21 (B)(1).
5	PROVIDE NEW CIRCUIT BREAKER AS ILLUSTRATED. CIRCUIT BREAKER TYPE AND AIC RATING SHALL MATCH EXISTING BREAKERS. PROVIDE NEW ENGRAVED NAMEPLATE TO MATCH EXISTING AND RE-BALANCE LOADS TO WITHIN 10% PHASE TO PHASE UPON COMPLETION OF WORK.

NOTES:
1 REFER TO SPECIFICATIONS AND DETAILS FOR ADDITIONAL INFORMATION.

N|V|5

200 Brickstone Square
Andover, MA 01810-1488
T. 978-296-6200
F. 978-296-6201
W. www.nv5.com

CGKV Architects, Inc.
204A Hampshire Street
Cambridge, MA 02139
Tel. 617-504-8196
Fax. 617-812-6364
cgkvarchitects.com

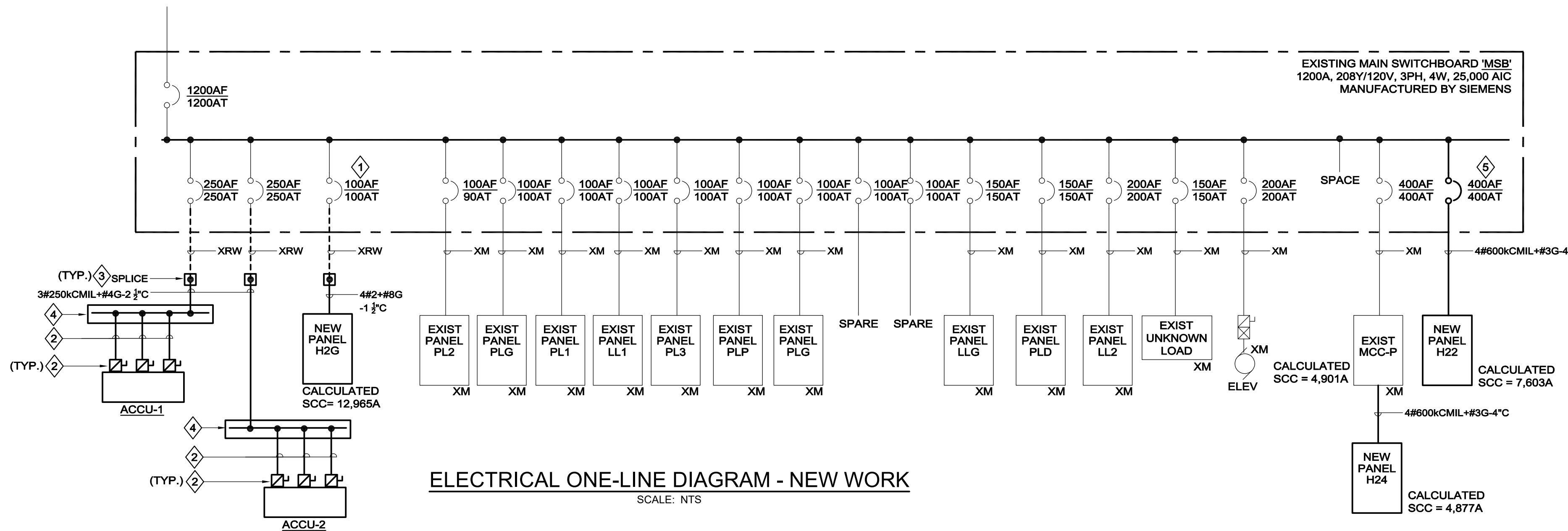
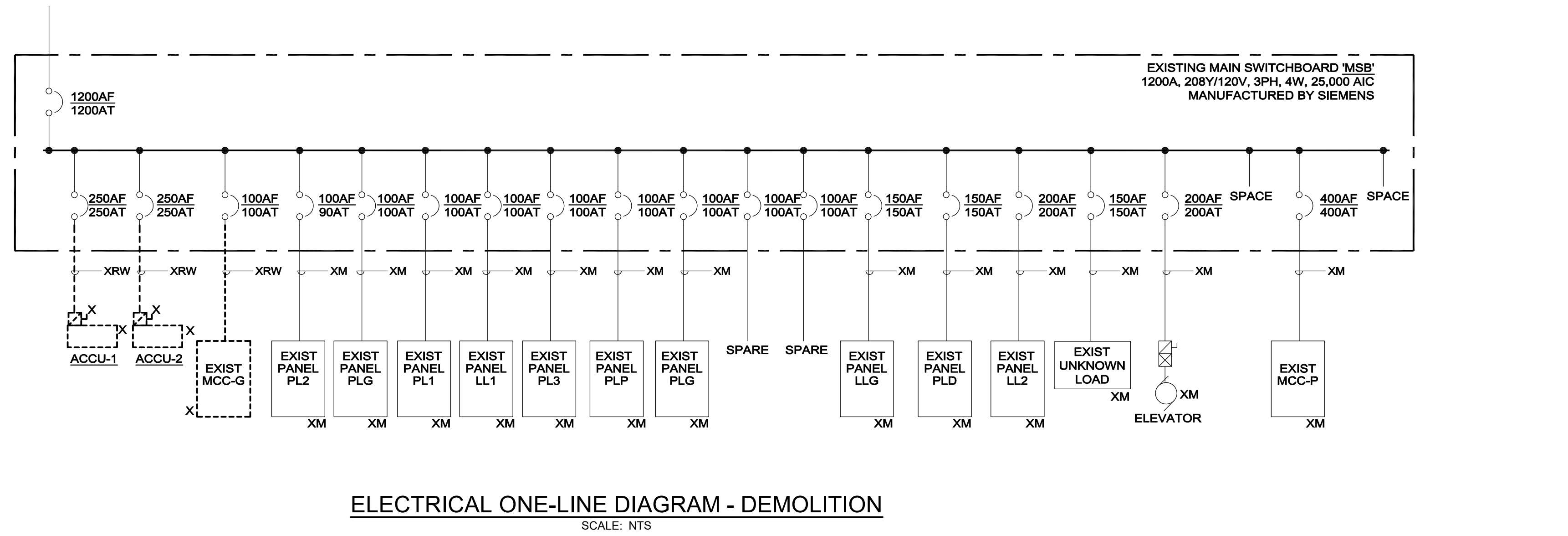
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Waltham, MA 02452

HVAC Replacement at:
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SCALE: NO SCALE
DATE: 2024-01-31
REVISIONS:
2024-02-16: ADDENDUM 1

DRAWN BY: MVM
ELECTRICAL ONE-LINE DIAGRAM AND SCHEDULES

E-7.0



EXISTING DISTRIBUTION PANEL SCHEDULE						
PANEL: MSB VOLT: 120/208V 3 4 WIRE						
BUS: 1200 AMPS MAIN: 1200 AMPS AIC: AMPS SYM						
CIRCUIT NUMBER	LOAD DESIGNATION	OVERCURRENT DEVICE			LOAD CONNECTED KVA	REMARKS
		FRAME	TRIP	POLE		
1	MAIN CIRCUIT BREAKER		1200	3		
2	UTILITY METERING					
3	ACCU-1	250	250	3		
4	ACCU-2	250	250	3		
5	SPACE	100	100	3		
6	EXIST PANEL PL2	100	90	3		NOTE 1
7	EXIST PANEL PLG	100	100	3		NOTE 1
8	EXIST PANEL PL1	100	100	3		NOTE 1
9	EXIST PANEL LL1	100	100	3		NOTE 1
10	EXIST PANEL PL3	100	100	3		NOTE 1
11	EXIST PANEL PLP	100	100	3		NOTE 1
12	EXIST PANEL PLG	100	100	3		NOTE 1
13	SPACE					
14	SPACE					
15	EXIST PANEL LLG	150	150			NOTE 1
16	EXIST PANEL PLD	150	150			NOTE 1
17	EXIST PANEL LL2	200	200			NOTE 1
18	EXIST UNKNOWN LOAD	150	150			NOTE 1
19	EXIST ELEVATOR	200	200			NOTE 1
20	NEW PANEL H2G	200	200		35.2	
21	EXIST MCC-P	400	400		79	NOTE 1
22	NEW PANEL H22	400	400		112.4	
TOTAL KVA =					237	NOTE 2

NOTES:
1. EXISTING LOAD IS BASED ON PEAK DEMAND (INCLUDING EXISTING MECHANICAL LOADS) 190KW/237KVA PROVIDED BY EVERSOURCE.
2. THE MECHANICAL EQUIPMENT UPGRADES WILL NOT INCUR ANY ADDITIONAL LOAD ON THE EXISTING SERVICE.

W:\BLD\Projects\2023\0220164 - Waltham Public Library HVAC System\300 Drawings\305 Electrical\0220164 E-7.0 ELECTRICAL ONE-LINE DIAGRAM - SCHEDULES.dwg [PAPER] February 14, 2024 - 10:48am MariaMcDonnell

W:\BLD\Projects\2023\0220164 - Waltham Public Library HVAC System\300 Drawings\305 Electrical\0220164 E-9.0 ELECTRICAL SCHEDULES.dwg [PAPER] February 14, 2024 - 10:49am Mario.McDonnell

MECHANICAL EQUIPMENT SCHEDULE																													
LOAD TAG	STARTER LOCATION	LOAD					STARTER										POWER SOURCE		CONNECTION							BRANCH CIRCUIT	REMARKS		
		HP	FLA	KVA	VOLT	PH	NEMA SIZE	TYPE	OVERCURRENT			PB	HOA	INDICATING LIGHTS			AUXILIARY		PANEL	C/B	FLEX	JB	REC	DISC					
									CB	RK1 FUSE	MCP			R	G	A	CPT	CONTACTS						AS	AF			NEMA	
																		NO											NC
AHU-1	NOTE 8		43	15.6	208	3												H24-9	70A/3P	X				100	70	1	3#4+#8G-1 1/2"C	NOTE 11	
AHU-2	NOTE 8		43	15.6	208	3												H24-15	70A/3P	X				100	70	1	3#4+#8G-1 1/2"C	NOTE 11	
AHU-3	NOTE 8		4.8	1.7	208	3												H2G-3	15A/3P					30	15	1	3#12+#12G-3/4"C	NOTE 11	
AHU-4	NOTE 8		7.5	2.7	208	1												H2G-9	15A/2P					30	15	1	2#12+#12G-3/4"C	NOTE 11	
ACCU-1	NOTE 8		38.2	31.7	208	3												MSB	250A/3P		X			60	50	3R	3#6+#10G-3/4"C	NOTE 11,13	
ACCU-2	NOTE 8		38.2	31.7	208	3												MSB	250A/3P		X			60	50	3R	3#6+#10G-3/4"C	NOTE 11,13	
ACC-3	NOTE 8		29	10.4	208	3												H2G-15	60A/3P	X				60	50	3R	3#6+#10G-3/4"C	NOTE 11	
ACC-4	NOTE 8		23	8.4	208	3												H2G-21	35A/3P	X				60	35	3R	3#8+#10G-3/4"C	NOTE 11	
F-1	AT UNIT	7.5	24.2	8.7	208	3												H24-21	60A/3P	X				60	60	1	3#8+#10G-3/4"C	NOTE 11	
F-2	AT UNIT	7.5	24.2	8.7	208	3												H24-27	60A/3P	X				60	60	1	3#8+#10G-3/4"C	NOTE 11	
EF-7	AT UNIT	1/2	7.6	1.6	208	1	00				15		X	X	X	X	2	2	H2G-2	15A/2P	X				30	15	3R	2#12+#12G-3/4"C	
FB-1.1	NOTE 8		9.8	1.2	120	1												H22-16	15A/1P	X				30	15	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-2.1	NOTE 8		9.8	1.2	120	1												H2G-10	15A/1P	X				30	15	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-2.2	NOTE 8		9.8	1.2	120	1												H2G-12	15A/1P	X				30	15	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-2.3	NOTE 8		9.8	1.2	120	1												H2G-14	15A/1P	X				30	15	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-2.4	NOTE 8		9.8	1.2	120	1												H2G-16	15A/1P	X				30	15	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-2.5	NOTE 8		9.8	1.2	120	1												H22-8	15A/1P	X				30	15	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-2.6	NOTE 8		9.8	1.2	120	1												H22-10	15A/1P	X				30	15	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-2.7	NOTE 8		9.8	1.2	120	1												H22-12	15A/1P	X				30	15	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-2.8	NOTE 8		9.8	1.2	120	1												H22-14	15A/1P	X				30	15	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-2.9	NOTE 8		9.8	1.2	120	1												H24-26	15A/1P	X				30	15	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-2.10	NOTE 8		9.8	1.2	120	1												H24-28	15A/1P	X				30	15	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-3.1	NOTE 8		9.8	1.2	120	1												H2G-18	15A/1P	X				30	15	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-3.2	NOTE 8		9.8	1.2	120	1												H24-30	15A/1P	X				30	15	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-3.3	NOTE 8		9.8	1.2	120	1												H24-32	15A/1P	X				30	15	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-3.4	NOTE 8		9.8	1.2	120	1												H24-34	15A/1P	X				30	15	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-4.1	NOTE 8		9.8	1.2	120	1												H2G-20	20A/1P	X				30	20	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-4.2	NOTE 8		16	1.8	120	1												H22-18	20A/1P	X				30	20	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-4.3	NOTE 8		16	1.8	120	1												H22-20	20A/1P	X				30	20	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-4.4	NOTE 8		16	1.8	120	1												H24-38	20A/1P	X				30	20	1	2#10+#10G-3/4"C	NOTE 11,12	
FB-4.5	NOTE 8		16	1.8	120	1												H24-40	20A/1P	X				30	20	1	2#10+#10G-3/4"C	NOTE 11,12	
ERV-1	NOTE 8	24	8.6	208	3													H24-3	45A/3P	X				60	45	3R	3#6+#10G-3/4"C	NOTE 11	
EV-1		1	0.12	208	1													H24-16	15A/2P	X	X						2#12+#12G-3/4"C		
EV-2		1	0.12	208	1													H24-20	15A/2P	X	X						2#12+#12G-3/4"C		
EV-3		1	0.12	208	1													H24-20	15A/2P	X	X						2#12+#12G-3/4"C		
EV-4		1	0.12	208	1													H2G-6	15A/2P	X	X						2#12+#12G-3/4"C		
EV-5		1	0.12	208	1													H2G-6	15A/2P	X	X						2#12+#12G-3/4"C		
EV-6		1	0.12	208	1													H2G-6	15A/2P	X	X						2#12+#12G-3/4"C		
EV-7		1	0.12	208	1													H2G-26	15A/2P	X	X						2#12+#12G-3/4"C		
EV-8		1	0.12	208	1													H2G-26	15A/2P	X	X						2#12+#12G-3/4"C		
FCU-1	NOTE 8		1	0.2	208	1												H22-2	15A/2P	X				30	15	1	2#12+#12G-3/4"C	NOTE 14	
HP-1	NOTE 8		6.9	1.4	208	1												H24-10	15A/2P	X				30	15	3R	2#12+#12G-3/4"C	NOTE 14	
FCU-2	NOTE 8		1	0.2	208	1												H24-10	15A/2P	X				30	15	1	2#12+#12G-3/4"C	NOTE 14	
HP-2	NOTE 8		6.9	1.4	208	1												H24-10	15A/2P	X				30	15	3R	2#12+#12G-3/4"C	NOTE 14	
P-6	AT UNIT	1/8	4.4	0.52	120	1												H24-24	15A/1P	X				MMS		1	2#12+#12G-3/4"C		
P-7	AT UNIT	1/8	4.4	0.52	120	1												H24-24	15A/1P	X				MMS		1	2#12+#12G-3/4"C		
RTU-5	NOTE 8		142.4	51.3	208	3												H22-3	200A/3P	X				200	200	3R	4#3/0+#8G-2"C	NOTE 11	
RTU-6	NOTE 8		68	24.5	208	3												H22-9	90A/3P	X				100	90	3R	3#2+#8G-1 1/2"C	NOTE 11	
RTU-7	NOTE 8		55	19.8	208	3												H22-15	70A/3P	X				100	70	3R	3#4+#8G-1 1/2"C	NOTE 11	
UH-1	NOTE 8	1/20	1	0.12	120	1												H22-22	20A/1P	X				30	15	1	2#12+#12G-3/4"C	NOTE 11	
UH-2	NOTE 8	1/20	1	0.12	120	1												H22-22	20A/1P	X				30	15	1	2#12+#12G-3/4"C	NOTE 11	
UH-3	NOTE 8	1/20	1	0.12	120	1												H24-16	15A/1P	X				30	15	1	2#12+#12G-3/4"C	NOTE 11	
UH-4	NOTE 8	1/12	2	0.24	120	1												H24-16	15A/1P	X				30	15	1	2#12+#12G-3/4"C	NOTE 11	

- NOTES:
- NOTES 2-6 APPLY TO ALL APPLICABLE LOADS.
 - PROVIDE THERMAL OVERLOAD UNITS FOR ALL STARTERS SIZED TO MATCH LOAD NAMEPLATE AND NEC REQUIREMENTS.
 - BRANCH CIRCUIT WIRING METHODS SHALL BE AS NOTED ON THE DRAWINGS AND/OR SPECIFICATIONS FOR THE APPLICABLE LOCATION. THE FINAL THREE FEET (MAXIMUM) SHALL BE FLEXIBLE METAL OR LIQUIDTIGHT FLEXIBLE METAL CONDUIT.
 - COPPER BRANCH CIRCUIT CONDUCTOR SIZING BASED UPON NEC TABLE 310.16. MAKE ADJUSTMENTS TO CONDUCTORS FOR TEMPERATURE OR VOLTAGE DROP THAT EXCEED NEC AND SPECIFICATION CRITERIA.
 - RACEWAY SIZES ARE BASED UPON GRSC AND LFMC WITH THWN CONDUCTORS.
 - VFD SHALL BE CONTROLLED VIA REMOTE 4-20mA OR 0-5V SIGNAL PROVIDED BY THE HVAC ATC CONTRACTOR.
 - REQUIRED DISCONNECT IS PROVIDED INTEGRAL/PREWIRED TO MECHANICAL EQUIPMENT.
 - REQUIRED STARTER IS PROVIDED INTEGRAL/PREWIRED TO MECHANICAL EQUIPMENT.
 - DISCONNECT FOR 2S1W AND 2S2W MOTORS SHALL BE SIX POLE.
 - PROVIDE NEUTRAL FROM SOURCE TO STARTER ONLY FOR 120V CONTROL POWER OF 208V 3PH UNITS.
 - FUSES FOR DISCONNECT SWITCHES SHALL BE CLASS RK5.
 - SCOPE OF WORK SHALL BE CARRIED AS ADD ALTERNATE. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
 - UTILIZE EXISTING BREAKER IN MAIN SWITCHBOARD TO POWER NEW EQUIPMENT. SEE ONE-LINE DIAGRAM FOR ADDITIONAL INFORMATION.
 - OUTDOOR UNIT POWERS INDOOR UNIT.

- KEY
- FVNR FULL VOLTAGE NON-REVERSING
 - FVR FULL VOLTAGE REVERSING
 - 2S1W TWO SPEED SINGLE WINDING
 - 2S2W TWO SPEED TWO WINDING
 - RVAT REDUCED VOLTAGE AUTOTRANSFORMER
 - RVPW REDUCED VOLTAGE PART WINDING
 - RVYDOT REDUCED VOLTAGE WYE DELTA OPEN TRANSITION
 - RVYDCT REDUCED VOLTAGE WYE DELTA CLOSED TRANSITION
 - MMS MANUAL MOTOR STARTER
 - CB CIRCUIT BREAKER
 - MCP MOTOR CIRCUIT PROTECTOR
 - PB START AND STOP PUSH BUTTON
 - HOA HAND-OFF-AUTOMATIC SELECTOR SWITCH
 - CPT CONTROL POWER TRANSFORMER
 - VFD VARIABLE FREQUENCY DRIVE W/O BYPASS
 - VFD/B VARIABLE FREQUENCY DRIVE W/ BYPASS
 - CNTR CONTACTOR - NO THERMAL OVERLOAD



208 Brickstone Square
Andover, MA 01810-1488
T. 978-296-6200
F. 978-296-6201
W. www.nv5.com

CGKV Architects, Inc.

204A Hampshire Street
Cambridge, MA 02139
Tel. 617-504-8196
Fax. 617-812-6364
cgkvarchitects.com

CITY OF WALTHAM

610 Main Street
Waltham, MA 02452

HVAC Replacement at:

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DATE: 2024-01-31
REVISIONS:
2024-02-16: ADDENDUM 1

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ELECTRICAL SCHEDULES

W:\BLD\Projects\2023\0220164 - Waltham Public Library HVAC System\300 Drawings\305 Electrical\0220164 E-9.1 ELECTRICAL SCHEDULES.dwg [PAPER] February 14, 2024 - 10:49am Mario.MoDamed

NEW PANELBOARD SCHEDULE										
PANEL: H2G		VOLTS: 208Y/120		MOUNT: SURFACE		GROUND BUS: Y				
MAIN: MCB		AMPS: 100		AIC: 22,000		ISOLATED GROUND BUS: N				
		PH/WIRE: 3/4		LOC.: GND/FLR		200% NEUTRAL: N				
CR.	AMPS/ POLES	DESCRIPTION OF LOAD	LOAD KVA	LOAD BY PHASE, KVA			LOAD KVA	DESCRIPTION OF LOAD	AMPS/ POLES	CR.
				A	B	C				
1	20/1	EXTERIOR RECPT	0.18	0.98			0.80			2
3			0.60		1.40		0.80	EF-7	15/2	4
5	15/3	AHU-3	0.60			0.70	0.10	EV-5,6	15/2	6
7			0.60				0.10			8
9			0.90		2.10		1.20	FB-2.1	15/1	10
11	15/3	AHU-4	0.90			2.10	1.20	FB-2.2	15/1	12
13			0.90	2.10			1.20	FB-2.3	15/1	14
15			3.50		4.70		1.20	FB-2.4	15/1	16
17	45/3P	ACC-3	3.50			4.70	1.20	FB-3.1	15/1	18
19			3.50	5.30			1.80	FB-4.1	15/1	20
21			2.80		3.80		1.00	ATC CONTROLS	20/1	22
23	35/3P	ACC-4	2.80			3.80	1.00	ATC CONTROLS	20/1	24
25			2.80	2.90			0.10			26
27	20/1	SPARE			0.10		0.10	EV-7,8	15/2	28
29	20/1	SPARE				0.00		SPARE	20/1	30
31	20/1	SPARE		0.00				SPARE	20/1	32
33	20/1	SPARE			0.00			SPARE	20/1	34
35		SPACE				0.00		SPACE		36
37		SPACE		0.00				SPACE		38
39		SPACE			0.00			SPACE		40
41		SPACE				0.00		SPACE		42
CONNECTED KVA BY PHASE -				11.98	12.10	11.30		TOTAL CONNECTED KVA-	35.38	
									DEMAND FACTOR	0.80
									TOTAL DEMAND KVA-	28.30
									TOTAL DEMAND AMPERES-	78.57

NEW PANELBOARD SCHEDULE										
PANEL: H22		VOLTS: 208Y/120		MOUNT: SURFACE		GROUND BUS: Y				
MAIN: MCB		AMPS: 400		AIC: 10,000		ISOLATED GROUND BUS: N				
		PH/WIRE: 3/4		LOC.: 2ND/FLR		200% NEUTRAL: N				
CR.	AMPS/ POLES	DESCRIPTION OF LOAD	LOAD KVA	LOAD BY PHASE, KVA			LOAD KVA	DESCRIPTION OF LOAD	AMPS/ POLES	CR.
				A	B	C				
1	20/1	EXTERIOR RECPT/ILT	1.80	2.60			0.80			2
3			17.00		17.80		0.80	FC-1/HP-1	15/2	4
5	200/3	RTU-5	17.00			17.00				6
7			17.00	18.20			1.20	FB-2.5	15/1	8
9			8.20		9.40		1.20	FB-2.6	15/1	10
11	90/3	RTU-6	8.20			9.40	1.20	FB-2.7	15/1	12
13			8.20	9.40			1.20	FB-2.8	15/1	14
15			6.60		7.80		1.20	FB-1.1	15/1	16
17	70/3	RTU-7	6.60			8.40	1.80	FB-4.2	20/1	18
19			6.60	8.40			1.80	FB-4.3	20/1	20
21	15/2	HP-1	0.80		1.16		0.36	UH-1,2,3	20/1	22
23			0.80			1.80	1.00	ATC CONTROLS	20/1	24
25	20/1	SPARE		1.00			1.00	ATC CONTROLS	20/1	26
27	20/1	SPARE			0.00			SPARE	20/1	28
29	20/1	SPARE				0.00		SPARE	20/1	30
31	20/1	SPARE		0.00				SPARE	20/1	32
33		SPACE			0.00			SPACE		34
35		SPACE				0.00		SPACE		36
37		SPACE		0.00				SPACE		38
39		SPACE			0.00			SPACE		40
41		SPACE				0.00		SPACE		42
CONNECTED KVA BY PHASE -				39.60	36.16	36.60		TOTAL CONNECTED KVA-	112.36	
									DEMAND FACTOR	1.00
									TOTAL DEMAND KVA-	112.36
									TOTAL DEMAND AMPERES-	311.89

NEW PANELBOARD SCHEDULE										
PANEL: H24		VOLTS: 208Y/120		MOUNT: SURFACE		GROUND BUS: Y				
MAIN: MCB		AMPS: 400		AIC: 10,000		ISOLATED GROUND BUS: N				
		PH/WIRE: 3/4		LOC.: PENTHSE		200% NEUTRAL: N				
CR.	AMPS/ POLES	DESCRIPTION OF LOAD	LOAD KVA	LOAD BY PHASE, KVA			LOAD KVA	DESCRIPTION OF LOAD	AMPS/ POLES	CR.
				A	B	C				
1	20/1	EXTERIOR RECPT/ILT	1.80	2.80			1.00	ATC CONTROLS	20/1	2
3			2.80		3.80		1.00	ATC CONTROLS	20/1	4
5	45/3	ERV-1	2.80			2.80		SPARE	20/1	6
7			2.80	3.80			1.00	ATC CONTROL PANEL	20/1	8
9			5.20		6.00		0.80			10
11	70/3	AHU-1	5.20			6.00	0.80	FC-2/HP-2	15/2	12
13			5.20	5.44			0.24	UH-4	15/1	14
15			5.20		5.50		0.30			16
17	70/3	AHU-2	5.20			5.50	0.30	EV-1,2,3	15/2	18
19			5.20	5.50			0.30			20
21			2.90		3.20		0.30			22
23	60/3	F-1	2.90			3.90	1.00	PUMPS P-6,P-7	15/1	24
25			2.90	4.10			1.20	FB-2.9	15/1	26
27			2.90		4.10		1.20	FB-2.10	15/1	28
29	60/3	F-2	2.90			4.10	1.20	FB-3.2	15/1	30
31			2.90	4.10			1.20	FB-3.3	15/1	32
33	20/1	SPARE			1.20		1.20	FB-3.4	15/1	34
35	20/1	SPARE				1.80	1.80	FB-4.4	20/1	36
37	20/1	SPARE		1.80			1.80	FB-4.5	20/1	38
39	20/1	SPARE			0.00			SPACE	20/1	40
41	20/1	SPARE				0.00		SPACE	20/1	42
CONNECTED KVA BY PHASE -				27.54	23.80	24.10		TOTAL CONNECTED KVA-	75.44	
									DEMAND FACTOR	1.00
									TOTAL DEMAND KVA-	75.44
									TOTAL DEMAND AMPERES-	209.41



200 Brickstone Square
Andover, MA 01810-1488
T. 978-296-6200
F. 978-296-6201
W. www.nv5.com

CGKV Architects, Inc.

204A Hampshire Street
Cambridge, MA 02139
Tel. 617-504-8196
Fax. 617-812-6364
cgkvarchitects.com

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610 Main Street
Waltham, MA 02452

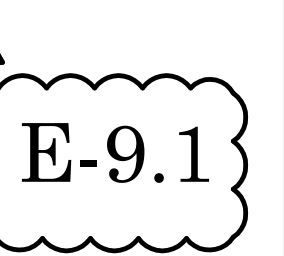
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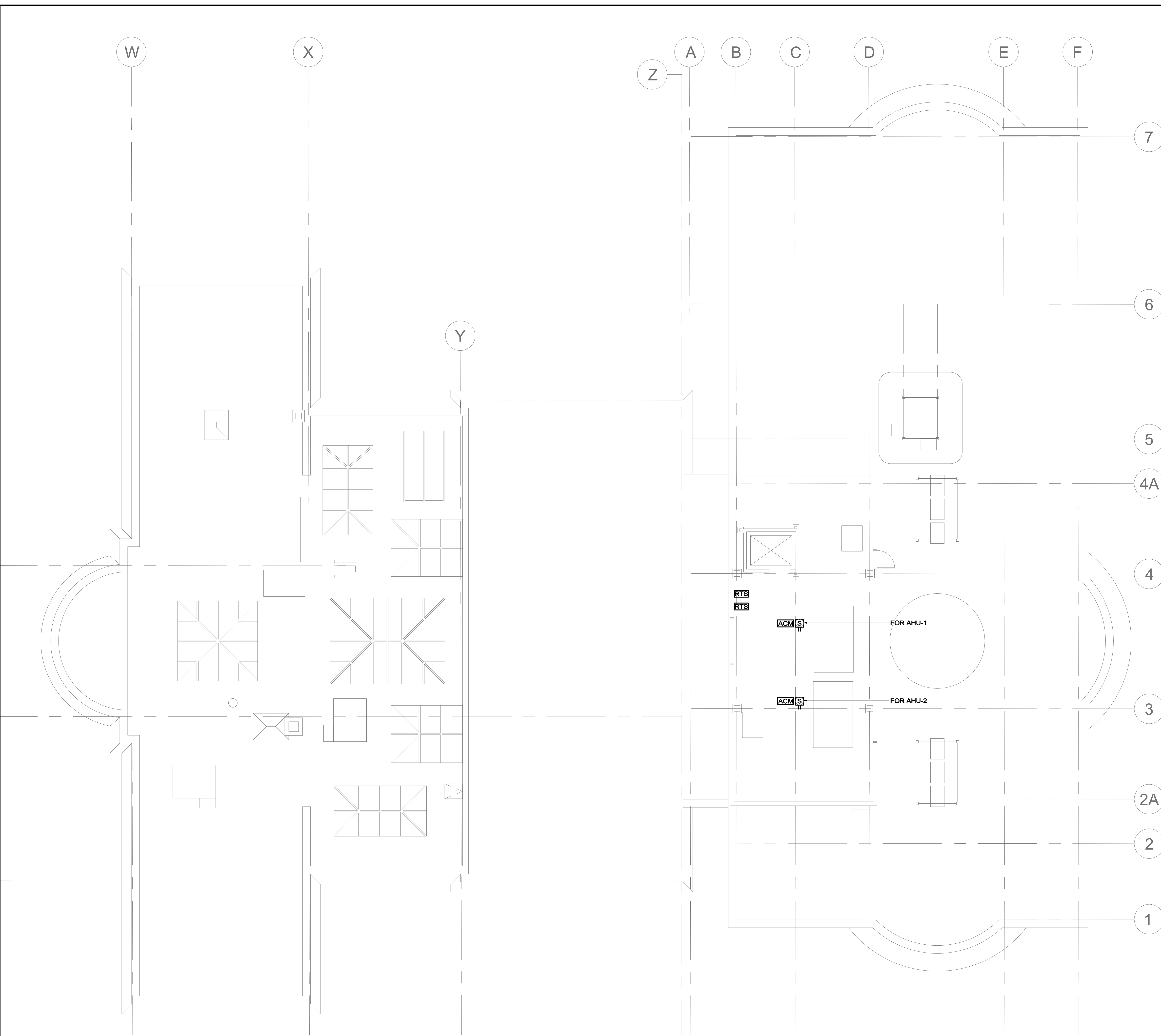
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**ELECTRICAL
SCHEDULES**



W:\BLD\Projects\2023\0220164 - Waltham Public Library HVAC System\500 Drawings\305 Electrical\0220164 PA-2.4 FIRE ALARM ROOF NEW WORK PLAN.dwg [P:\PEP] February 19, 2024 - 12:44pm Maria.Mosmann



- FIRE ALARM NOTES:**
1. REFER TO DRAWING E-0.0 FOR LEGEND, SYMBOLS AND GENERAL NOTES.
 2. REFER TO ARCHITECTURAL DRAWINGS FOR ASSOCIATED NOTES, MOUNTING DETAILS, HEIGHTS AND EXACT LOCATIONS OF ALL DEVICES.
 3. FIRE ALARM BRANCH CIRCUITRY SHALL BE INSTALLED IN CONDUIT FROM THE PANEL TO THE FIRST DEVICE AND/OR WHERE EXPOSED. FIRE ALARM BRANCH CIRCUITRY MAY BE TYPE MC CABLE WHERE CONCEALED ABOVE SUSPENDED CEILINGS AND IN METAL STUD WALLS.
 4. MC CABLE FOR FIRE ALARM SERVICE SHALL HAVE A RED IDENTIFIER ALONG ITS ENTIRE LENGTH. JUNCTION BOX COVERS AND CONDUIT COUPLINGS FOR ALL FIRE ALARM WIRING RACEWAYS SHALL BE PAINTED RED PRIOR TO INSTALLATION.
 5. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL EXISTING FIRE ALARM DEVICES TO REMAIN.



209 Brickstone Square
Andover, MA 01810-1488
T. 978-296-6200
F. 978-296-6201
W. www.nv5.com

CGKV Architects, Inc.

204A Hampshire Street
Cambridge, MA 02139
Tel. 617-504-8196
Fax. 617-812-6364
cgkvarchitects.com

CITY OF WALTHAM

610 Main Street
Waltham, MA 02452

HVAC Replacement at:

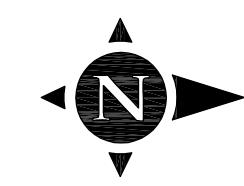
WALTHAM PUBLIC LIBRARY
735 Main Street
Waltham, MA 02451

SCALE: 1/8" = 1'-0"
DATE: 2024-01-31
REVISIONS:
2024-02-16: ADDENDUM 1

DRAWN BY: MVM

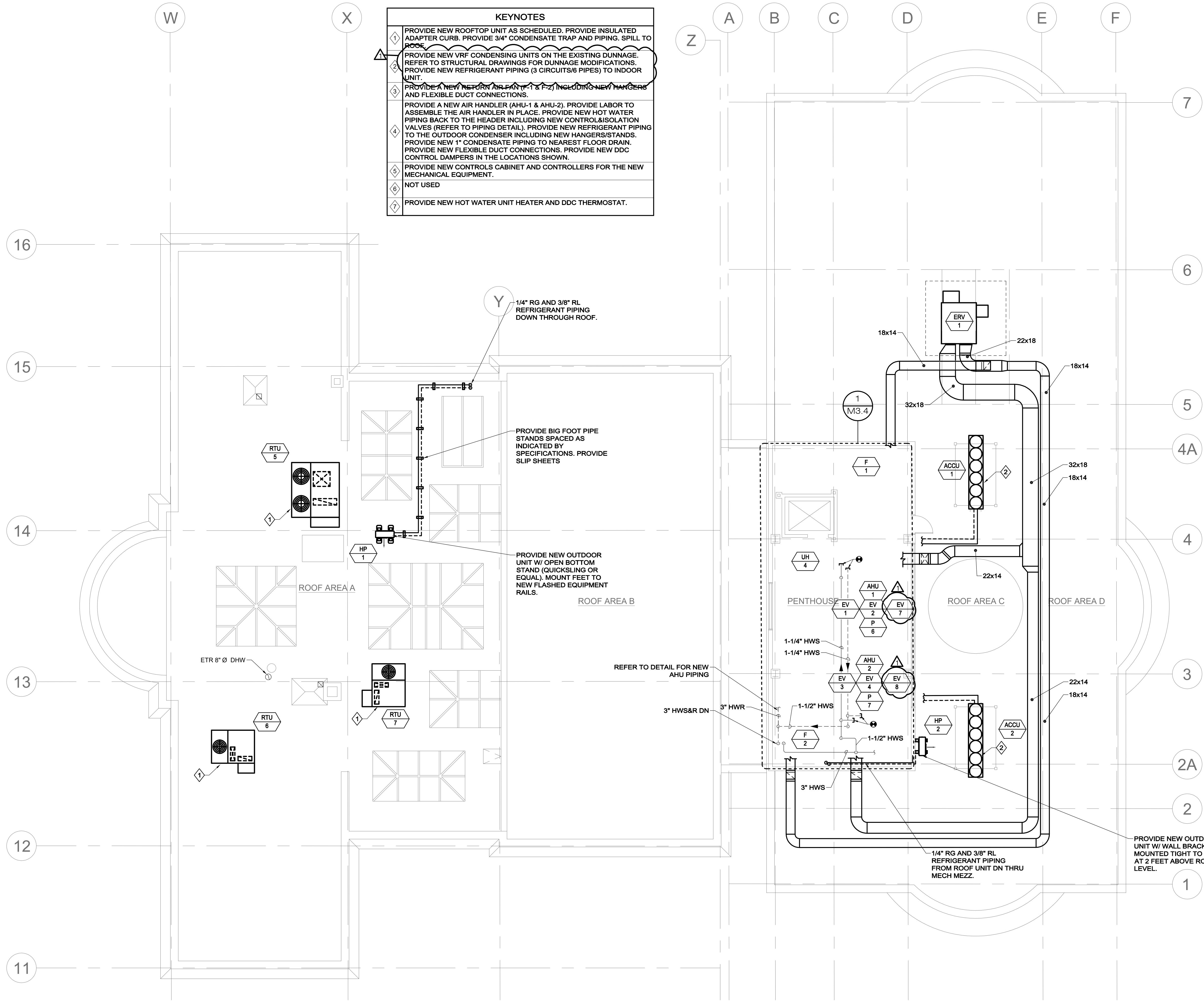
**FIRE ALARM
ROOF PLAN
NEW WORK**

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



1/8" = 1'-0"
0 8' 16'

W:\BLD\Projects\2023\0220164 - Waltham Public Library HVAC System\500 Drawings\304 HVAC\0220164 M-2.4 MECHANICAL ROOF NEW WORK PLAN.dwg [M-2.4] February 14, 2024 10:31am MariaMcDonnell



KEYNOTES	
1	PROVIDE NEW ROOFTOP UNIT AS SCHEDULED. PROVIDE INSULATED ADAPTER CURB. PROVIDE 3/4" CONDENSATE TRAP AND PIPING. SPILL TO ROOF.
2	PROVIDE NEW VRF CONDENSING UNITS ON THE EXISTING DUNNAGE. REFER TO STRUCTURAL DRAWINGS FOR DUNNAGE MODIFICATIONS. PROVIDE NEW REFRIGERANT PIPING (3 CIRCUITS/6 PIPES) TO INDOOR UNIT.
3	PROVIDE A NEW RETURN AIR FAN (F-1 & F-2) INCLUDING NEW HANGERS AND FLEXIBLE DUCT CONNECTIONS.
4	PROVIDE A NEW AIR HANDLER (AHU-1 & AHU-2). PROVIDE LABOR TO ASSEMBLE THE AIR HANDLER IN PLACE. PROVIDE NEW HOT WATER PIPING BACK TO THE HEADER INCLUDING NEW CONTROL & ISOLATION VALVES (REFER TO PIPING DETAIL). PROVIDE NEW REFRIGERANT PIPING TO THE OUTDOOR CONDENSER INCLUDING NEW HANGERS/STANDS. PROVIDE NEW 1" CONDENSATE PIPING TO NEAREST FLOOR DRAIN. PROVIDE NEW FLEXIBLE DUCT CONNECTIONS. PROVIDE NEW DDC CONTROL DAMPERS IN THE LOCATIONS SHOWN.
5	PROVIDE NEW CONTROLS CABINET AND CONTROLLERS FOR THE NEW MECHANICAL EQUIPMENT.
6	NOT USED
7	PROVIDE NEW HOT WATER UNIT HEATER AND DDC THERMOSTAT.

GENERAL NOTES:
 1. UNLESS NOTED OTHERWISE ALL REGISTERS GRILLES, AND DIFFUSERS ARE EXISTING TO REMAIN AND SHALL BE CLEANED BY HVAC CONTRACTOR

N|V|5

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DRAWN BY: NG

**MECHANICAL ROOF
 NEW WORK PLAN**

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



M-2.4

PACKAGED ROOF TOP UNITS

Table with columns: ITEM, SERVICE, LOCATION, UNIT TOTAL CFM, MIN. OA CFM, NOM TONS, 47 F COP @ AHRI, HSPF @ AHRI, EER @ AHRI, IEER @ AHRI, SEER @ AHRI, SUPPLY FAN, EXHAUST FAN, REF., EVAPORATOR - HEATING 10 DEG F AMBIENT, EVAPORATOR - COOLING - 95 DEG F AMBIENT, SUPPLEMENTAL HEAT, CONDENSER FANS, COMPRESSOR(S), ELECTRICAL, OP. WEIGHT (LBS), MFR & MODEL NO., NOTE(S)

NOTES:
1. PROVIDE VARIABLE SPEED SCROLL COMPRESSORS. FOR AHU-5 & AHU-7, PROVIDE WITH VFD FOR SUPPLY FAN TO RAMP FAN DOWN WHEN DIFFUSERS CLOSE.
2. ISOLATED BLOWER(S), CONDENSER FAN MOTORS, AND COMPRESSORS
3. FACTORY MOUNTED VFD ON SUPPLY BLOWER
4. BACNET INTERFACE CARD
5. PROVIDE WITH ECONOMIZER.
6. WITH ADAPTER CURB TO EXISTING ROOF CURB
7. HYBRID HEAT - UNIT SHALL OPERATE AS HEAT PUMP DOWN TO ADJUSTABLE CHANGEOVER POINT OF 40 F AND SUPPLEMENTAL HEAT BELOW
8. GAS HEAT STAGE TO OPERATE ON 3.5" WC MINIMUM INLET PRESSURE, 14" WC MAXIMUM INLET PRESSURE
9. PROVIDE MERV 8 AND MERV 14 FILTERS

AIR HANDLERS

Table with columns: ITEM, SERVICE, LOCATION, ORIENTATION, UNIT TOTAL CFM, MINIMUM OUTDOOR AIR CFM, SUPPLY FAN, EVAPORATOR - HEATING 0 DEG F AMBIENT, EVAPORATOR - COOLING - 95 DEG F AMBIENT, HOT WATER COIL/STEAM COIL, ELECTRICAL, OPERATING WEIGHT (LBS), MFR / MODEL NO., NOTE(S)

NOTES:
1. DIRECT DRIVE 3 MOTOR PLENUM FAN ARRAY
2. DIRECT DRIVE PLENUM
3. FACTORY MOUNTED VFD ON SUPPLY FAN(S)
4. BACNET INTERFACE CARD
5. MIXING BOX, MERV 13 FILTER RACK, DX COIL, HOT WATER COIL IN BOTTOM TUNNEL, SUPPLY FAN IN TOP TUNNEL.
6. COIL ENTERING CONDITIONS REFLECT ERV CONTRIBUTION
7. UNIT SHALL OPERATE AS HEAT PUMP AND SHALL UTILIZE STEAM OR HOT WATER COIL AS SUPPLEMENTAL HEAT
8. ENTHALPY ECONOMIZER, INTERLOCK SUCH THAT ERV IS IDLE WHEN UNIT IS IN UNOCCUPIED OR ECONOMIZER MODE, AND RUNS OTHERWISE.
9. PROVIDE FIELD FABRICATED MIXING BOX, FACTORY FILTER RACK, VRF COIL, STEAM COIL.

VRF HEAT PUMP OUTDOOR UNITS

Table with columns: ITEM, LOCATION, SERVICE, NOM. TONS @ AHRI, MIN EER @ AHRI, MIN IEER @ AHRI, EER2, MIN COP @ 47 DEG F, MIN COP @ 17 DEG F, HSPF 2, MIN COP @ 5 DEG F, REFRIG-ERANT, ELECTRICAL DATA (V, PH, HZ, CIRCUIT A MCA, CIRCUIT A MOCP, CIRCUIT B MCA, CIRCUIT B MOCP, CIRCUIT C MCA, CIRCUIT C MOCP), OPERATING WEIGHT (LBS), MANUFACTURER / MODEL NUMBER, NOTES

NOTES:
1. REFER TO SPECIFICATIONS, DETAILS, AND CONTROL DRAWINGS FOR FURTHER INFORMATION.
2. DISCONNECT BY DIV. 26
3. PROVIDE WITH SNOW/HAIL GUARDS, WIND BAFFLES AND BASEPAN HEATERS. MOUNT CONDENSERS AS INDICATED ON DRAWINGS (STANDS OR DUNNAGE).
4. PROVIDE WITH BACNET CARD AND SERVER LICENSE FOR BAS INTEGRATION.
5. PROVIDE REFRIGERANT PIPING SIZED PER MANUFACTURER'S RECOMMENDATIONS BASED ON PROPOSED FILED ROUTING. PROVIDE ANY ADDITIONAL REFRIGERANT CHARGE REQUIRED.

OUTDOOR AIR DESIGN TEMPERATURES

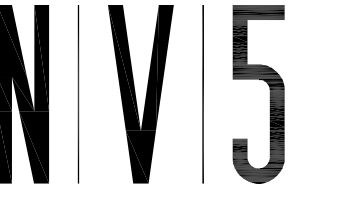
Table with columns: DRY BULB (DEG F), WET BULB (DEG F)
SUMMER: 91, 73
WINTER: 7, 5

NOTES:
1. PER ASHRAE FUNDAMENTALS FOR BOSTON, MA

FAN SCHEDULE

Table with columns: TAG, LOCATION, SERVICE, CFM, STYLE, FAN RPM, DRIVE, S.P. (IN.), MOTOR RPM, BRAKE HP, MOTOR HP, VOLTS, PHASE, HERTZ, FLA, MCA, MOCP, OPERATING WEIGHT (LBS), MANUFACTURER, MODEL NUMBER, REMARKS

NOTES:
1. REFER TO PLANS, SPECIFICATIONS AND CONTROL DRAWINGS FOR FURTHER INFORMATION.
2. MOTOR SHALL BE INVERTER DUTY RATED FOR CONNECTION TO A VFD. PROVIDE BEARING SHAFT RING FOR SHAFT GROUNDING. PROVIDE WITH VFD.
3. HANG WITH WITH VIBRATION ISOLATORS.
4. DISCONNECT BY DIV 26.
5. PROVIDE ECM FAN WITH VARIABLE SPEED INPUT SIGNAL AND FLEXIBLE CONNECTIONS.
6. PROVIDE F-2 IN THE VERTICAL CONFIGURATION WITH FIELD FABRICATED SUPPORTS AND SPRING ISOLATORS.



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MECHANICAL SCHEDULES

M-8.0

PIPE INSULATION (IECC - 2021 AND ASHRAE 90.1 2019 COMPLIANT)

MINIMUM INSULATION THICKNESS IN INCHES OF INDOOR PIPE SIZES (SEE NOTES BELOW)

PIPING SYSTEM TYPES	FLUID TEMP RANG (DEG F)	<1"	1" & 1-1/4"	1-1/2" - 3"	4" - 6"	8" & UP	K-FACTOR (BTU-INCH/DEG F-HR-SF) AT AVG. TEMP (DEG F)
UNCONDITIONED SPACE (SHAFT OR CEILING WITH DUCTED RETURN AIR)	R-6	2.5	2.5	2.5	3	3	0.27-0.30 @ 150 F
RETURN AIR PLENUM	R-4	1.5	1.5	2	2	2	0.25-0.29 @ 125 F
EXPOSED IN MECHANICAL ROOM	R-6	0.5	1	1	1	1.5	0.20 - 0.27 @ 75 F

NOTES:

- FOR MINIMUM THICKNESS OF ALTERNATIVE INSULATION TYPES OUTSIDE THE STATED CONDUCTIVITY RANGE, SEE TEST METHOD FOR STEADY STATE HEAT TRANSFER PROPERTIES OF HORIZONTAL PIPE INSULATIONS, ASTM C 335-95, AND THE STATE ENERGY CODE.
- REFER TO SPECIFICATIONS AND DETAILS FOR ADDITIONAL INFORMATION.

VRF EXPANSION VALVE AND CONTROLLER

TAG	SERVICE	LOCATION	ELECTRICAL DATA			MANUFACTURER AND MODEL NUMBER (AS STANDARD)	REMARKS
			V	PH	MAX AMPS		
EV-1	AHU-1	MECH PENTHOUSE	208	1	<1A	DAIKIN	SEE NOTES
EV-2	AHU-1	MECH PENTHOUSE	208	1	<1A	DAIKIN	SEE NOTES
EV-3	AHU-2	MECH PENTHOUSE	208	1	<1A	DAIKIN	SEE NOTES
EV-4	AHU-2	MECH PENTHOUSE	208	1	<1A	DAIKIN	SEE NOTES
EV-5	AHU-3	GROUND FLR MECH	208	1	<1A	DAIKIN	SEE NOTES
EV-6	AHU-1	GROUND FLR MECH	208	1	<1A	DAIKIN	SEE NOTES
EV-7	AHU-1	MECH PENTHOUSE	208	1	<1A	DAIKIN	SEE NOTES
EV-8	AHU-2	MECH PENTHOUSE	208	1	<1A	DAIKIN	SEE NOTES

NOTES:

- INSTALL CONTROLLER AND EXPANSION VALVE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
- WIRE AND MOUNT THE INCLUDED THERMISTORS.
- SEPARATE DISCONNECT AND ELECTRICAL CONNECTION BY DIV. 26.

ENERGY RECOVERY VENTILATOR SCHEDULE

TAG	DESCRIPTION	COMPONENT	FAN DATA							ELEC DATA					THERMAL DATA						FILTER DATA					NOTES										
			SUPPLY CFM	EXHAUS T CFM	ESP	TSP	FAN RPM	FAN BHP	FAN MOTOR HP	MOTOR NOM. RPM	MCA	MOCP	VOLTS	PHASE	HERTZ	EOA DB (DEG F)	EOA WB (DEG F)	EEA DB (DEG F)	EEA WB (DEG F)	SENS MBH	TOTAL MBH	SA LVG DB	SA LVG WB	MAX FPM	MERV		CLEAN PD	DIRTY PD	TYPE							
ERV-1	OUTDOOR, CONSTANT VOLUME, 2" FOAM PANEL CONSTRUCTION, WHEEL TYPE ENERGY RECOVERY, PACKAGED ENERGY RECOVERY VENTILATOR, 1922 LBS OPERATING WEIGHT PLUS CURB	OUTDOOR AIR FILTER	5400	3600	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	13	-	-	2" THROW AWAY					
		EXHAUST AIR FILTER			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	8	-	-	2" THROW AWAY	
		ENERGY RECOVERY WHEEL WINTER			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
		ENERGY RECOVERY WHEEL SUMER			-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		EXHAUST FAN (FC BELT DRIVE) W/ VFD			0.63	0.81	781	3.51	5	1750	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
		SUPPLY FAN (FC BELT DRIVE) W/ VFD			0.63	1.25	1038	1.28	1.5	1750	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
		SINGLE POINT POWER CONNECTION			-	-	-	-	-	-	-	-	-	29.8	45	208	3	60	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

NOTES:

- END INTAKE END DISCHARGE FOR SUPPLY AND EXHAUST
- PREMIUM EFFICIENCY, OPEN DRIP PROOF FAN MOTORS
- BASIS OF DESIGN: VALENT MODEL #VXE-312-74E-0-2-D1
- WITH DOWNTURN WEATHERHOOD ON SA AND OA OPENINGS
- WITH INSULATED LOW LEAK DAMPERS ON INTAKE AND EXHAUST

MINIMUM DUCT INSULATION R-VALUES (IECC - 2021 AND ASHRAE 90.1 2019 COMPLIANT)

LOCATION	SUPPLY	RETURN	RAW OUTDOOR AIR	EXHAUST	
				WITH ENERGY RECOVERY	WITHOUT ENERGY RECOVERY
UNCONDITIONED SPACE (SHAFT OR CEILING WITH DUCTED RETURN AIR)	R-6	R-6	R-6	R-6	R-6*
RETURN AIR PLENUM	R-4	-0-	R-6	R-6 (ONLY IF ABOVE ROOF)	R-6* (ONLY IF ABOVE ROOF)
EXPOSED IN MECHANICAL ROOM	R-6	R-6	R-6	R-6	R-6*
EXPOSED IN ZONE SERVED (**ONLY DUCTS THAT PROVIDE COOLING)	R-4**	-0-	R-6	-0-	-0-

* R-VALUE SHOWN IS ONLY IF AREA OF BUILDING BEING ECXHAUSTED I HUMIDIFIED. IF NOT HUMIDIFIED, NO INSULATION (-0-) UNLESS FIRE WRAP OR LINING IS NEEDED

DUCT LINING SCOPE: ACOUSTIC DUCT LINING OF THE TYPE AND THICKNESS SPECIFIED SHALL BE INSTALLED ON ALL SUPPLY, RETURN, AND EXHAUST DUCTWORK WITHIN 20 FEET OF ALL TYPES OF AIR HANDLING UNITS (INCLUDING RTU, ERU, FCU, MUA, ETC., AND ALL BRANCHES WITHIN 20') ALL FANS (INCLUDING BRANCHES), ALL LOW PRESSURE DUCTWORK DOWNSTREAM OF ALL TYPES OF SUPPLY VOLUME BOXES (CV, VAV, FPAV, ETC.), AND WHERE DETAILED OR SHOWN ON DRAWINGS. LINING SHALL NOT BE USED ON DUCTWORK SERVING SURGICAL SUITES, DELIVERY ROOMS, INTENSIVE CARE UNITS AND ISOLATION AREAS OF HOSPITALS AND MEDICAL FACILITIES OR ON KITCHEN AND FUME HOOD EXHAUST AND WET/HUMID EXHAUST SUCH AS DISHWASHER, CLOTHES DRYER, AND SHOWER SYSTEMS.

NOTES: (SEE SPECIFICATIONS FOR R-VALUES OF VARIOUS DUCT INSULATION AND LINERS).

- R-VALUES SHOWN MAY BE OBTAINED BY ADDING THE R-VALUES OF BOTH THE LINING (WHERE SHOWN OR USED) AND EXTERNAL DUCT INSULATION.
- R-VALUES SHOWN ARE AS INSTALLED. USE R-VALUES FOR 25% COMPRESSION FOR NON-RIGID INSULATION.
- REFER TO SPECIFICATIONS AND DETAILS FOR ADDITIONAL INFORMATION.

DUCTWORK PRESSURE CLASS AND SEAL CLASS

PRESSURE CLASS	STATIC PRESSURE CLASS	SMACNA SEAL CLASS	SMACNA LEAKAGE CLASS		MAXIMUM DESIGN VELOCITY
			RECTANGULAR	ROUND	
4"	4" POS. OR NEG.	A	6	3	3000
3"	3" POS. OR NEG.	A	6	3	2500
2"	2" POS. OR NEG.	A	6	3	2000

UNLESS OTHERWISE SPECIFIED OR SHOWN ON DRAWINGS, USE THE FOLLOWING PRESSURE CLASSIFICATIONS FOR THE TYPES OF DUCTWORK LISTED BELOW

4" (POS) CLASS	ALL SUPPLY DUCTWORK BETWEEN THE DISCHARGE OF AIR SUPPLY UNITS TO THE INLETS OF SUPPLY TERMINAL VOLUME BOXES.
3"	ALL SUCTION AND DISCHARGE FUME HOOD, KITCHEN EXHAUST DUCTWORK AND FOR MEDIUM PRESSURE EXHAUST AND RETURN SYSTEMS, ALL DUCTWORK BETWEEN AIR EXHAUST AND RETURN UNITS TO OUTLETS OF EXHAUST AND RETURN TERMINAL VOLUME BOXES.
2"	ALL OTHER DUCTWORK

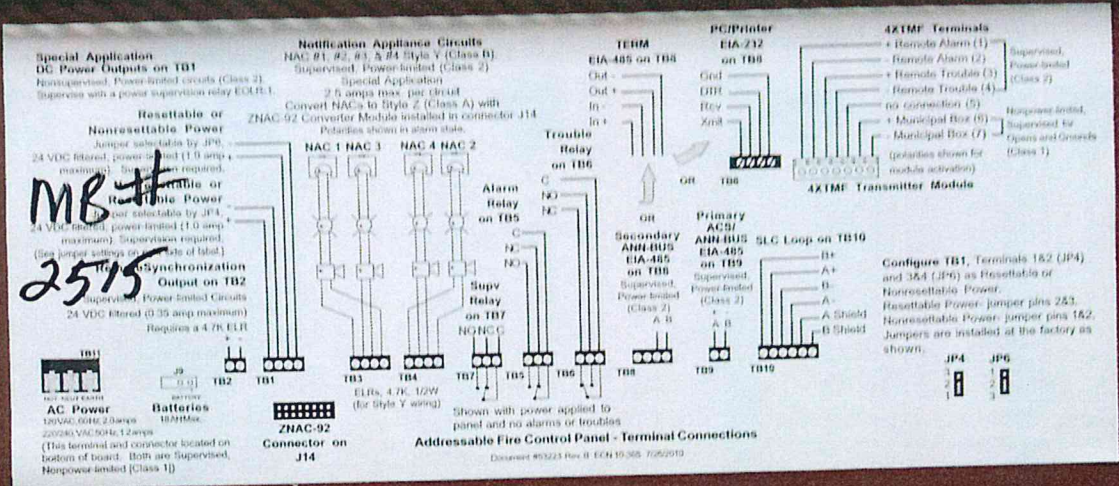
NOTES:

- CONTRACTOR SHALL LEAK TEST (SUBMIT REPORT) A MINIMUM OF 25% OF THE SURFACE AREA FOR ALL DUCTWORK ABOVE PRESSURE CLASS 3" AND 100% OF ALL DUCTWORK LOCATED OUTDOORS.
- FOR NEGATIVE PRESSURE OVER 3"W.G., REFER TO SMACNA ROUND AND RECTANGULAR INDUSTRIAL DUCT CONSTRUCTION STANDARDS FOR JOINT AND INTERMEDIATE REINFORCEMENT REQUIREMENTS.
- FOR ROUND DUCTWORK, NEGATIVE PRESSURE OVER 2"W.G., REFER TO SMACNA ROUND INDUSTRIAL DUCT CONSTRUCTION STANDARDS AND BUILD TO NEGATIVE RATING SPECIFIED (-4"W.G. MIN.).
- LEAKAGE CLASS AND THE ASSOCIATED DUCT SEALING FOR DUCTWORK SERVING LABORATORIES, HOSPITAL OPERATING ROOMS, AND CLEAN ROOMS SHALL ALLOW FOR 1/2 THE LEAKAGE LISTED.
- REFER TO SPECIFICATIONS AND DETAILS FOR ADDITIONAL INFORMATION.

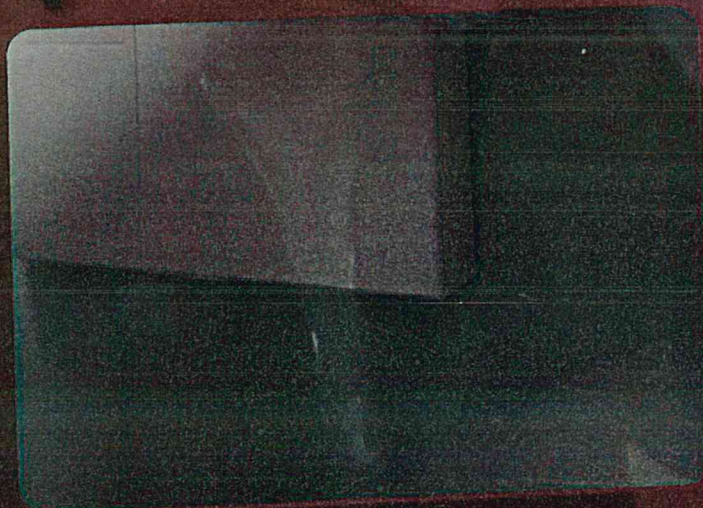


**MS-9200UDLS
ADDRESSABLE
FIRE ALARM CONTROL PANEL**

FIRE-LITE Alarms
by Honeywell



MB #
2515



Seismic Certification Label
 International Building Code

Reference Certificate of Compliance:
 VMA-45984-01C, -02C, -03C, -04C, -05C, -06C, -07C, -08C, -09C

Product Type: Fire Control Panels
 Model Family: Honeywell Fire Systems

Seismic Performance Characteristics:
 S_{vs}(g) = 2.59 z_s = 1.0 L = 1.5

Examine Seismic Labels Attached To Any New Facility Components To Verify System Compliance

OSHO Special Seismic Certification Preapproved OSP-6071-10

Addressable Fire Control Panel

Operating Instructions

NORMAL - Only the GREEN A.C. POWER LED is on. All other LEDs are off. LCD displays SYSTEM ALL NORMAL.

PANEL KEY - The key to open the panel can be found at the following location:

NOTIFICATION APPLIANCES ARE ACTIVE - FOR AN ALARM

Power failure or brownout - AC POWER LED will go out for AC fail or brownout. TROUBLE LED and panel buzzer will turn on for either condition and other audible trouble devices will sound. Contact authorized service personnel immediately.

Manual activation (Fire Drill or otherwise) - Notification Appliance Circuits can be activated by Manual Pull Box or by pressing the DRILL key. NOTE: When conducting a fire drill or test, you may want to disconnect the municipal alarm by sliding the 4X TIME Disconnect switch to the right. If a DACT is connected, notify the monitoring service by pressing the ALARM SILENCE key.