SECTION 23000 – BASIC MECHANICAL REQUIREMENTS

PART 1 – GENERAL

1.1 – SUMMARY

A. THE ABBREVIATION "G.C." SHALL REFER TO THE GENERAL CONTRACTOR IN THESE MECHANICAL DRAWINGS AND SPECIFICATIONS.

B. DRAWINGS AND GENERAL PROVISIONS OF THE CONTRACT, INCLUDING GENERAL AND SUPPLEMENTARY CONDITIONS AND ALL OTHER SPECIFICATION SECTIONS, APPLY TO THIS AND THE OTHER SECTIONS OF DIVISION 15.

C. THE CONTRACTOR FOR THIS DIVISION OF WORK IS REQUIRED TO READ THE SPECIFICATIONS AND REVIEW DRAWINGS FOR ALL DIVISIONS OF WORK AND IS RESPONSIBLE FOR THE COORDINATION OF THEIR WORK AND THE WORK OF THEIR SUBCONTRACTORS WITH ALL DIVISIONS OF WORK. IT IS THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE THEIR SUBCONTRACTORS WITH A COMPLETE SET OF BID DOCUMENTS.

D. REFER TO RESPONSIBILITY MATRIX ON THE MECHANICAL DRAWINGS FOR INFORMATION IN REGARD TO RESPONSIBILITY OF WORK OR ITEMS WHICH MAY AFFECT BID.

E. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL LICENSES, PERMITS, INSPECTIONS, AND FEES REQUIRED OR RELATED TO THEIR WORK.

F. THE DRAWINGS AND SPECIFICATIONS ARE INTENDED TO SUPPLEMENT EACH OTHER AND ANY MATERIAL OR LABOR CALLED FOR IN ONE SHALL BE FURNISHED AND INSTALLED EVEN THOUGH NOT SPECIFICALLY MENTIONED IN BOTH. ANY MATERIAL OR LABOR WHICH IS NEITHER SHOWN ON THE DRAWINGS NOR CALLED FOR IN THE SPECIFICATIONS, BUT WHICH IS OBVIOUSLY NECESSARY TO COMPLETE THE WORK, AND WHICH IS USUALLY INCLUDED IN WORK OF SIMILAR CHARACTER, SHALL BE FURNISHED AND INSTALLED AS PART OF CONTRACT.

G. WHERE THE DRAWINGS OR SPECIFICATIONS CALL FOR ITEMS WHICH EXCEED CODES , THE CONTRACTOR IS RESPONSIBLE FOR FURNISHING AND INSTALLING THE SYSTEM WITH THE MORE STRINGENT REQUIREMENTS AS DESIGNED AND DESCRIBED ON THESE DRAWINGS, UNLESS SPECIFICALLY NOTED OTHERWISE.

H. ALL MECHANICAL WORK SHALL BE INSTALLED TO BE READILY ACCESSIBLE FOR OPERATING, SERVICING, MAINTAINING, AND REPAIRING. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING SUFFICIENT SERVICE ACCESS TO ALL EQUIPMENT.

I. ALL WORK SHALL BE PERFORMED IN A NEAT PROFESSIONAL MANNER USING GOOD ENGINEERING AND CONSTRUCTION PRACTICES.

1.2 – RELEVANT CODES AND CRITERIA

A. ALL WORK SHALL BE PERFORMED IN A NEAT AND PROFESSIONAL MANNER AND CONFORM TO THE LATEST ADOPTED EDITION OF THE FOLLOWING:

1) STATE CODES
2) LOCAL CODES AND ORDINANCES
3) HEALTH AND SAFETY CODES
4) NFPA
5) UNDERWRITER'S LABORATORIES
6) ENERGY CODES
7) ALL OTHER APPLICABLE CODES AND REQUIREMENTS

B. THE CONTRACTOR SHALL INQUIRE INTO AND COMPLY WITH ALL APPLICABLE CODES, ORDINANCES, AND REGULATIONS. THE CONTRACTOR SHALL INCLUDE ANY CHANGES REQUIRED BY CODES IN THE BID AND IF THESE CHANGES ARE NOT INCLUDED IN THE BID, THEY MUST BE QUALIFIED AS A SEPARATE LINE ITEM IN THE BID AFTER CONTRACT IS ISSUED, NO ADDITIONAL COST DUE TO CODE ISSUES SHALL BE REIMBURSED BY THE OWNER TO THE CONTRACTOR.

C. UNLESS SPECIFICALLY NOTED OTHERWISE, MATERIALS, PRODUCTS, AND EQUIPMENT, INCLUDING ALL COMPONENTS THEREOF, SHALL BE NEW, UNDERWRITERS LABORATORIES LISTED AND LABELED AND SIZED IN CONFORMITY WITH REQUIREMENTS OF STATE AND LOCAL CODES, WHICHEVER IS MORE STRINGENT.

1.3 – SUBMITTALS

A. SHOP DRAWINGS

1) CONTRACTOR SHALL COMPLETE SHOP DRAWINGS NECESSARY TO INSTALL THE MECHANICAL SYSTEMS IN COMPLIANCE WITH THE CONTRACT DRAWINGS. SHOP DRAWINGS NEED TO BE SUBMITTED FOR REVIEW.

2) SUBMIT STRUCTURAL AND/OR SEISMIC CALCULATIONS AS REQUIRED.

B. RECORD DRAWINGS

1) THE CONTRACTOR SHALL MAINTAIN ONE COPY OF DRAWINGS ON THE JOB SITE TO RECORD DEVIATIONS FROM CONTRACT DRAWINGS, SUCH AS:

- a. LOCATION OF CONCEALED PIPING, VALVES, DUCTS AND ROOF CURBS.
- b. REVISIONS, ADDENDUMS, AND CHANGE ORDERS.
- c. SIGNIFICANT DEVIATIONS MADE NECESSARY BY FIELD CONDITIONS, APPROVED EQUIPMENT SUBSTITUTIONS, AND CONTRACTOR'S COORDINATION WITH OTHER TRADES.

2) AT COMPLETION OF THE PROJECT AND BEFORE FINAL APPROVAL, THE CONTRACTOR SHALL MAKE ANY FINAL CORRECTIONS TO DRAWINGS AND CERTIFY THE ACCURACY OF EACH PRINT BY SIGNATURE THEREON. ONE COPY OF THE MOST RECENT SET OF DRAWINGS WITH TEMPERATURE CONTROL DRAWINGS INCLUDED SHALL BE STAMPED "DO NOT REMOVE" AND PLACED IN DRAWING TUBE LOCATED NEXT TO THE ELECTRICAL PANELS.

3) CONTRACTOR TO PROVIDE A SET OF MARKUPS TO CONSTRUCTION MANAGER.

C. DISCREPANCIES IN DOCUMENTS

1) DRAWINGS (PLANS, SPECIFICATIONS, AND DETAILS) ARE DIAGRAMMATIC AND INDICATE THE GENERAL LOCATION AND INTENT OF THE MECHANICAL SYSTEMS. WHERE DRAWINGS, EXISTING SITE CONDITIONS, SPECIFICATIONS OR OTHER TRADES CONFLICT OR ARE UNCLEAR, ADVISE THE G.C.'S CONSTRUCTION MANAGER, IN WRITING OF VARIATIONS TO CONTRACT DOCUMENTS PRIOR TO SUBMISSION OF BID. OTHERWISE, THE G.C.'S CONSTRUCTION MANAGER'S INTERPRETATION OF CONTRACT DOCUMENTS OR CONDITIONS SHALL BE FINAL WITH NO ADDITIONAL COMPENSATION PERMITTED.

D. SUBSTITUTIONS

1) WHERE TRADE NAMES AND MANUFACTURERS ARE USED ON THE DRAWINGS OR IN THE SPECIFICATIONS, THE EXACT EQUIPMENT SHALL BE USED AS A MINIMUM FOR THE BASE BID. ANY PROPOSED SUBSTITUTIONS MUST BE PRE-QUALIFIED, LISTED IN THE CONTRACTOR'S BID AND HAVE A COST SAVINGS FOR THE OWNER OF AT LEAST $500 PER TYPE OF EQUIPMENT. ADDITIONALLY, ONLY MANUFACTURERS CONSIDERED AS AN EQUAL OR BETTER IN ALL ASPECTS TO THAT SPECIFIED WILL BE REVIEWED. ALL SUBSTITUTIONS ARE SUBJECT TO APPROVAL IN WRITING, THROUGH THE SHOP DRAWING PROCESS, BY THE G.C.'S CONSTRUCTION MANAGER PRIOR TO ACCEPTANCE. THE OWNER RESERVES THE RIGHT TO REJECT ANY PROPOSED SUBSTITUTIONS. THE USE OF ANY UNAUTHORIZED EQUIPMENT SHALL BE SUBJECT TO REMOVAL AND REPLACEMENT AT THE CONTRACTOR'S EXPENSE.

2) THE MECHANICAL CONTRACTOR SHALL SUBMIT PROJECT SUBMITTALS PER THE REQUIRED SUBMITTAL TABLE ON THE PROJECT DOCUMENTS AND SUBSTITUTION REQUESTS TO THE G.C.'S CONSTRUCTION MANAGER FOR APPROVAL. SUBSTITUTION SUBMISSIONS SHALL BE MADE TO ALLOW FOUR (4) WORKING DAYS FOR THE CONSTRUCTION MANAGER'S REVIEW WITHOUT CAUSING DELAYS OR CONFLICTS TO THE JOB'S PROGRESS. SUBMITTALS SHALL BEAR THE STAMP OF THE G.C.'S OFFICE AND THE SUB-CONTRACTOR SHOWING THAT THEY HAVE REVIEWED AND CONFIRMED THAT THE SUBMITTALS ARE IN CONFORMANCE WITH THE CONTRACT DRAWINGS AND SPECIFICATIONS OR INDICATE WHERE EXCEPTIONS HAVE BEEN TAKEN.

1.4 – QUALITY ASSURANCE

A. FURNISH TO THE G.C.'S CONSTRUCTION MANAGER ALL CERTIFICATES OF INSPECTION AND FINAL INSPECTION APPROVAL AT COMPLETION OF PROJECT.

1.5 – PROJECT SITE/CONDITIONS

A. THE CONTRACTOR IS RESPONSIBLE FOR SCHEDULING THE COMPLETION AND INSPECTION OF THEIR WORK AND THE WORK OF THEIR SUBCONTRACTORS TO COMPLY WITH THE SCHEDULE AND THE PROJECT COMPLETION DATE.

B. THE CONTRACTOR SHALL VISIT THE SITE PRIOR TO SUBMITTAL OF BID TO DETERMINE CONDITIONS AFFECTING THE WORK. ANY ITEMS WHICH ARE NOT COVERED IN THE BID DOCUMENTS OR ANY PROPOSED SUBSTITUTIONS SHALL BE LISTED SEPARATELY AND QUALIFIED IN THE CONTRACTORS BID. SUBMITTAL OF BID SHALL SERVE AS EVIDENCE OF KNOWLEDGE OF EXISTING CONDITIONS AND ANY MODIFICATIONS WHICH ARE REQUIRED TO MEET THE INTENT OF THE DRAWINGS AND SPECIFICATIONS. FAILURE TO VISIT THE SITE DOES NOT RELIEVE THE CONTRACTOR OF RESPONSIBILITY IN PERFORMANCE OF WORK.

C. RELOCATION OF EXISTING DUCT MAINS OR BRANCHES TO MEET STORE DESIGN CRITERIA MUST BE INCLUDED IN BID PROPOSAL.

1.6 – WARRANTY

A. THE CONTRACTOR SHALL GUARANTEE ALL MATERIALS AND WORK PROVIDED UNDER THEIR CONTRACT AND SHALL REPAIR OR REPLACE, AT THEIR OWN EXPENSE, ANY DEFECTIVE WORK, MATERIAL, OR EQUIPMENT WHICH MAY BE DISCOVERED WITHIN A PERIOD OF 12 MONTHS FROM THE DATE OF ACCEPTANCE (IN WRITING) OF THE INSTALLATION BY THE GENERAL CONTRACTOR'S CONSTRUCTION MANAGER. EXTENDED WARRANTIES ARE AS SPECIFIED WITH INDIVIDUAL EQUIPMENT.

B. THE OWNER SHALL PROVIDE A COMPLETE 12-MONTH WARRANTY FOR ALL PARTS ON EQUIPMENT PROVIDED BY THE OWNER AND ITS VENDORS. THE CONTRACTOR SHALL NOT BEAR ADDITIONAL WARRANTIES BEYOND A COMPLETE WORKING SYSTEM, AND AS SUCH, NO ADDITIONAL MONIES SHOULD BE INCLUDED IN THE BID.

PART 2 – PRODUCTS

2.1 – EQUIPMENT

A. VIBRATION ISOLATION DEVICES

1) VIBRATION ISOLATION DEVICES SHALL BE FURNISHED AND INSTALLED IN ALL SUPPORTS BETWEEN VIBRATING EQUIPMENT (FANS, AIR HANDLERS, ETC.) AND STRUCTURE.

2) VIBRATING EQUIPMENT HUNG FROM STRUCTURE SHALL BE ISOLATED WITH RUBBER AND SPRING DEVICES. VIBRATING EQUIPMENT SUPPORTED FROM FLOOR OR DECK SHALL BE ISOLATED WITH HOUSED SPRING MOUNT DEVICES.

3) EXAMINE DEAD LOAD AND OPERATING LOAD CONDITION WHEN SELECTING DEVICES. ADJUST FOR PROPER ALIGNMENT AND LOADING. AVOID "GROUNDING " THE ISOLATOR.

4) CHECK HANGER ROD SIZE FOR ALLOWABLE LOADS AT THE ISOLATING DEVICE AND AT THE UPPER AND LOWER ATTACHMENTS TO STRUCTURES, DUCTS, EQUIPMENT, ETC.

5) CONSULT MANUFACTURER FOR APPLICATION DATA.

6) VIBRATION ISOLATION SHALL COMPLY WITH LOCAL CODES AND SEISMIC REQUIREMENTS AS APPLICABLE.

2.2 – SHEET METAL DUCTWORK

1) ALL DUCTWORK SHALL BE GALVANIZED SHEET STEEL OF GAUGES CALLED FOR AS STANDARD IN ASHRAE GUIDE AND COMPLETE INSTALLATION SHALL COMPLY WITH LATEST SMACNA STANDARDS. ALL DUCTWORK SHALL BE SEALED NOT TO EXCEED 5% AIR LEAKAGE. SEAL ALL DUCTS IN ACCORDANCE WITH SEAL CLASS "B" 2 "WG STATIC AS PER SMACNA STANDARDS.

2) ALL DUCTWORK CONNECTED TO ROTATING PARTS SHALL BE MADE OF FLEXIBLE CONNECTIONS WHICH SHALL BE HEAVY GLASS FABRIC COATED WITH NEOPRENE AND NON-COMBUSTIBLE, AND SHALL COMPLY WITH ALL APPLICABLE CODES.

3) "DUCTMATE" CONNECTIONS MAY BE USED WHEREVER POSSIBLE. DUCTWORK HAVING OTHER TYPE OF JOINTS SHALL BE SEALED WITH DUCT SEALANT OF A NON-HARDENING TYPE MASTIC OR LIQUID ELASTIC SEALANT, SUCH AS "DURA DYNE" TYPE S-2 OR EQUAL APPROVED. NO DUCT TAPE SHALL BE ALLOWED.

4) PROVIDE 1-1/2 HOUR U.L. LISTED FUSIBLE LINK, OUT OF AIRSTREAM TYPE, FIRE DAMPERS AND ACCESS DOORS FOR EACH WHERE SHOWN ON DRAWINGS AND AS REQUIRED BY APPLICABLE CODE.

2.3 – DUCTWORK INSULATION

1) ALL RECTANGULAR SUPPLY AND RETURN DUCTS ACCEPTABLE AS INDICATED ON DRAWINGS SHALL BE INTERNALLY LINED WITH MANVILLE "LINA-COUSTIC" 1-1/2" THICK, 1-1/2"# DENSITY. OTHERWISE INDICATE ON THE DRAWING NOTES. DUCTWORK SIZES SHOWN ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS. INCREASE DUCT SIZES ACCORDINGLY.

2) ALL ROUND SUPPLY DUCTWORK THAT RUNS EXPOSED SHALL BE UNINSULATED.

3) OTHER NOT-EXPOSED SUPPLY AND RETURN DUCTWORK NOT INTERNALLY LINED (AND NOT ROUND EXPOSED DUCTWORK, AS IN #3 ABOVE) SHALL BE INSULATED WITH FLEXIBLE BLANKET DUCT INSULATION WITH FOIL/KRAFT VAPOR BARRIER FACING 1-1/2" THICK MIN. R-8 OWENS CORNING FRK TYPE 75 OR EQUAL.

2.4 – DUCTWORK AIR DEVICES AND ACCESSORIES

1) DUCTWORK AND AIR DEVICE INSTALLATION SHALL COMPLY WITH NFPA STANDARD 90A "INSTALLATION OF AIR CONDITIONING AND VENTILATING SYSTEMS", UNLESS OTHERWISE NOTED.

2) UNLESS OTHERWISE NOTED, ALL NEW DUCTWORK SHALL BE GALVANIZED STEEL IN ACCORDANCE WITH SMACNA STANDARDS FOR MINIMUM 2-INCHES WATER GAGE PRESSURE CLASSIFICATION.

3) DUCTWORK SEALANT SHALL BE AIR SEAL HEAVY-DUTY MASTIC TYPE WITH EMBEDDED FIBERGLASS REINFORCEMENT TAPE, AS MANUFACTURED BY POLYMER ADHESIVE SEALANT SYSTEM, OR APPROVAL EQUIVALENT.

4) ALL SEALANT SHALL HAVE COMPOSITE FIRE AND SMOKE HAZARD RATINGS, AS TESTED BY PROCEDURE ASTM E-84, NFPA 225 AND UL 723, NOT EXCEEDING A "FLAME SPREAD" OF 25 AND "SMOKE DEVELOPED" OF 50.

5) ALL DUCTWORK SHALL BE INSTALLED IN STRICT ACCORDANCE WITH NFPA AND SMACNA STANDARDS, EXCEPT AS INDICATED OTHERWISE HEREIN.

6) ALL NEW SUPPLY, RETURN , EXHAUST AND FRESH AIR INTAKE DUCTWORK SHALL BE SEALED IN ITS ENTIRETY (ALL TRANSVERSE JOINTS, LONGITUDINAL SEEMS AND DUCT WALL PENETRATIONS SHALL BE SEALED). SEALANT MASTIC SHALL BE INSTALLED IN STRICT ACCORDANCE WITH MANUFACTURERS WRITTEN INSTALLATION INSTRUCTIONS.

7) PROVIDE SINGLE THICKNESS TURNING VANES FOR ALL SQUARE ELBOWS.

8) DUCT SIZES INDICATED ON THE DRAWINGS ARE CLEAR INSIDE DIMENSIONS. WHERE ACOUSTICAL LINING IS PROVIDED. INCREASE SHEET METAL DUCT SIZE AS REQUIRED TO MAINTAIN CLEAR INSIDE DUCT DIMENSIONS.

9) PROVIDE SHEET METAL NOSINGS AT ALL EXPOSED EDGES OF ACOUSTICAL LINING.

10) PROVIDE FLEXIBLE CONNECTIONS AT ALL CONNECTIONS TO ROTATING EQUIPMENT.

11) PROVIDE FIRE STOPS AT ALL PENETRATIONS THROUGH FIRE RATED WALLS AND PARTITIONS.

12) SLEEVES FOR PIPES PASSING THROUGH MASONRY FLOORS, WALLS AND PARTITIONS SHALL BE SCHEDULE 40 BLACK STEEL PIPE SLEEVES FOR PIPES PASSING THROUGH NON-MASONRY FLOORS, WALLS AND PARTITIONS SHALL BE 22 GAGE GALVANIZED STEEL.

13) WHERE DUCTS PASS THROUGH MASONRY FIRE RATED INTERIOR PARTITIONS INSTALL APPROPRIATELY RATED SLEEVE AND FIRESTOPPING SEALANT. SAFE OFF ALL OPENINGS AROUND DUCT PENETRATIONS THROUGH WALLS.

2.5 – HYDRONIC PIPING FOR HEATING WATER SHALL BE AS FOLLOWS:

1) MATERIALS:

- a. 2-1/2 INCH AND SMALLER: TYPE "L" HARD DRAWN COPPER
- ii. 3 INCHES AND LARGER: SCHEDULE 40 BLACK STEEL
- b. FITTINGS:
- i. 2-1/2 INCHES AND SMALLER: WROUGHT COPPER FITTINGS WITH 95/5 SOLDER OR SIL-FOS FOR PRESSURES GREATER THAN 50 PSI. ii. 1-1/4 INCHES THROUGH 2 INCHES: 300# MALLEABLE IRON FITTINGS.
- iii. 3 INCHES AND LARGER: BLACK STEEL GROOVED COUPLINGS BY VICTAULIC.
- c. PROVIDE DIELECTRIC UNIONS BETWEEN DISSIMILAR METALS. d. ALL PIPING SHALL BE IN STRICT CONFORMANCE WITH ASTM, ASA REQUIREMENTS, WHICHEVER IS MOST STRINGENT. e. UNIONS OR FLANGES MUST BE USED AT EQUIPMENT CONNECTIONS WHERE SERVICE OR REMOVAL MAY BE REQUIRED.

3) JOINING MATERIALS

- a. PIPE-FLANGE GASKET MATERIALS: SUITABLE FOR CHEMICAL AND THERMAL CONDITIONS OF PIPING SYSTEM CONTENTS.
- b. E B16.21, NONMETALLIC, FLAT, ASBESTOS FREE, 1/8-INCH (3.2-MM) MAXIMUM THICKNESS UNLESS OTHERWISE INDICATED.
- c. FULL-FACE TYPE: FOR FLAT-FACE, CLASS 125, CAST-IRON AND CAST-BRONZE FLANGES.
- d. NARROW-FACE TYPE: FOR RAISED-FACE, CLASS 250, CAST-IRON AND STEEL FLANGES.
- e. PLASTIC, PIPE-FLANGE GASKET, BOLTS, AND NUTS: TYPE AND MATERIAL RECOMMENDED BY PIPING SYSTEM MANUFACTURER UNLESS OTHER.
- f. SOLVENT CEMENTS FOR CPVC PIPING: ASTM F 493.
- g. ALL ELBOWS SHALL BE LONG RADIUS TYPE.

B. HYDRONIC SYSTEMS VALVES

1) VALVES FOR CONDENSER WATER AND HEATING WATER SHALL BE AS FOLLOWS:

- a. BALL VALVES, 2- INCHES AND SMALLER:
- i. CAST BRASS BODY, FULL PORT CHROME PLATED BRASS BALL, TEFLON SEATS AND LEVER HANDLE, 600 PSI COLD WORKING PRESSURE.
- ii. NIBCO OR APPROVED EQUAL.
- b. BUTTERFLY VALVES, 2-1/2 INCHES AND LARGER:
- i. CAST IRON BODY, 200 PSI PRESSURE RATING, EPDM SEAT, STAINLESS STEEL STEM WITH COPPER BUSHINGS, LEVER LOCK.
- ii. NIBCO OR APPROVED EQUAL.
- c. SWING CHECK VALVES, 2- INCHES AND SMALLER: i. CLASS 150, CAST BRONZE BODY AND CAP CONFORMING TO ASTM B62 WITH HORIZONTAL SWING, Y-PATTERN, RENEWABLE BRONZE DISC, AND HAVING THREADED OR SOLDERED ENDS.
- ii. NIBCO OR APPROVED EQUAL.
- d. SWING CHECK VALVES, 2-1/2 INCHES AND LARGER:
- i. CLASS 125, CAST IRON BODY AND BOLTED CAP, HORIZONTAL SWING, RENEWABLE BRONZE DISC, FLANGED ENDS AND CAPABLE OF BEING REFITTED WHILE THE VALVE REMAINS IN THE LINE.
- ii. NIBCO OR APPROVED EQUAL.

M. REFRIGERANT PIPING

1) REFRIGERANT PIPING SHALL BE TYPE "L" HARD DRAWN COPPER TUBING IN ACCORDANCE WITH ASTM B88. 2) ALL FITTINGS AND JOINTS SHALL BE WROUGHT COPPER OR CAST BRONZE IN ACCORDANCE WITH ANSI B16.22. 3) COPPER TO COPPER JOINTS SHALL BE BRAZED WITH A COPPER-PHOSPHORUS ALLOY.

4) COPPER TO BRONZE JOINTS SHALL BE BRAZED WITH SIL-FOS 5 ALLOY.

5) ALL ELBOWS SHALL BE LONG RADIUS TYPE.

N. CONDENSATE PIPING

1) INDOOR INSTALLATIONS: a. TYPE "L" DRAWN COPPER TUBE WITH 95/5 TIN-ANTIMONY SOLDERED JOINTS AND WROUGHT COPPER FITTINGS.

a. PROVIDE DIELECTRIC SEPARATION BETWEEN DISSIMILAR METALS.

2) OUTDOOR INSTALLATIONS:

a. SCHEDULE 40 UV RESISTANT PVC PIPING. b. PVC JOINTS SHALL BE SLIP FIT.

O. DUCTWORK INSULATION

1) INSULATE THE FOLLOWING DUCTWORK:

- a. CONCEALED SUPPLY DUCTWORK: 1 ½ INCHES
- b. UNTREATED OUTSIDE AIR DUCTWORK LOCATED WITHIN THE INTERIOR: 2 INCHES
- c. THERMAL RESISTANCE SHALL BE AT LEAST R-5.2 FOR INTERIOR DUCTWORK AND R-8.0 FOR EXTERIOR DUCTWORK, OR AS REQUIRED BY LOCAL CODE, WHICHEVER IS MORE STRINGENT. 3) INSULATION SHALL HAVE A FLAME SPREAD RATING OF NO MORE THAN 25 AND A SMOKE DEVELOPED RATING NO HIGHER THAN 50.

4) INSULATION SHALL BE JOHNS MANVILLE MICROLITE XG OR APPROVED EQUAL.

5) PROVIDE EXTERIOR DUCTWORK INSULATION WITH PVC WEATHERPROOF JACKETING.

6) INSULATION IS NOT REQUIRED ON SUPPLY DUCTWORK INSTALLED WITH INTERNAL DUCT LINING.

P. DUCT LINING

1) ALL RECTANGULAR SUPPLY DUCTWORK WITHIN 15 FEET AND RETURN DUCTWORK WITHIN 10 FEET OF THE HVAC UNIT SHALL BE INTERNALLY LINED. 2) INTERNAL LINING SHALL BE 1 INCH THICK FIBERGLASS LINER, JOHNS MANVILLE LINACOUSTIC RC OR APPROVED EQUAL. 3) LINER SHALL HAVE A COATED SURFACE EXPOSED TO AIRSTREAM TO PREVENT EROSION. APPLY ADHESIVES AND MECHANICAL FASTENERS AS RECOMMENDED BY SMACNA AND THE MANUFACTURER TO PREVENT LINER SEPARATION FROM THE DUCT. ALL TRANSVERSE EDGES SHALL BE COATED WITH ADHESIVE.

Q. PIPING INSULATION

1) INSULATION THICKNESS SHALL BE PER THE FOLLOWING:

- a. REFRIGERANT SUCTION LINES: 1 ½ INCH
- b. CONDENSATE LINES : 1 INCH
- c. HEATING HOT WATER SUPPLY AND RETURN: 1 ½ INCHES
- d. CHILLED WATER SUPPLY AND RETURN: 1 ½ INCHES 2) INSTALLED THERMAL RESISTANCE SHALL BE AT LEAST R-6.0 AT 1 ½ INCH THICKNESS.

3) INSULATION SHALL HAVE A FLAME SPREAD RATING OF NO MORE THAN 25 AND A SMOKE DEVELOPED RATING NO HIGHER THAN 50.

4) INSULATION SHALL BE ARMACELL ARMAFLEX AP OR APPROVED EQUAL.

5) DO NOT INSULATE HOT GAS LIQUID LINES, HOT GAS BYPASS LINES, OR CONDENSER WATER SYSTEMS, WHERE APPLICABLE.

6) PROVIDE EXTERIOR PIPING INSULATION WITH PVC WEATHERPROOF JACKETING.

7) INSULATION AT ALL HANGERS FOR PIPING 2-1/2 INCHES AND LARGER SHALL BE HARD AND NON-COMPRESSIBLE. 8) PROVIDE JOHNS MANVILLE ZESTON 300 INSULATION OR APPROVED EQUAL FOR ALL TEES, ELLS OR SPECIALTY FITTINGS.

PART 3 – EXECUTION

3.1 – INSTALLATION

A. EQUIPMENT SHALL BE INSTALLED AND START-UP PERFORMED IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS. ALL AIR CONDITIONING EQUIPMENT MUST BE TRAPPED IN ACCORDANCE WITH MANUFACTURERS DATA.

B. FURNISH AND INSTALL INSULATION PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS, AND IN ACCORDANCE WITH RECOGNIZED INDUSTRY PRACTICES. C. INSTALL WATER MAINS WITHOUT PITCH. USE ECCENTRIC REDUCING COUPLINGS AT CHANGES IN SIZE WITH THE TOP OF PIPES AT SAME ELEVATION.

D. BRANCHES TO UNITS BELOW PIPING MAINS SHALL BE TAKEN FROM BOTTOM OF MAINS AT A 45 DEGREE ANGLE, PITCH DOWNWARD TOWARD UNITS. BRANCHES TO UNITS ABOVE MAINS SHALL BE TAKEN FROM TOP OF MAINS AT A 45 DEGREE ANGLE PITCHED UPWARD TOWARDS UNITS. PITCH NOT LESS THAN 1 INCH PER 10 FEET.

E. INSTALL ALL NECESSARY PIPE HANGERS, AND SADDLES TO PROPERLY SUPPORT ALL CONDENSATE PIPING. HANGERS SHALL SUIT TYPE OF PIPING PROVIDED AND BE SPACED AT A MAXIMUM SPAN OF 5 FEET. PROVIDE SWAY AND SEISMIC BRACING AS REQUIRED BY CODES.

F. CONDENSATE DRAINS SHALL TERMINATE AT A CODE APPROVED LOCATION.

3.2 – FIELD QUALITY CONTROL

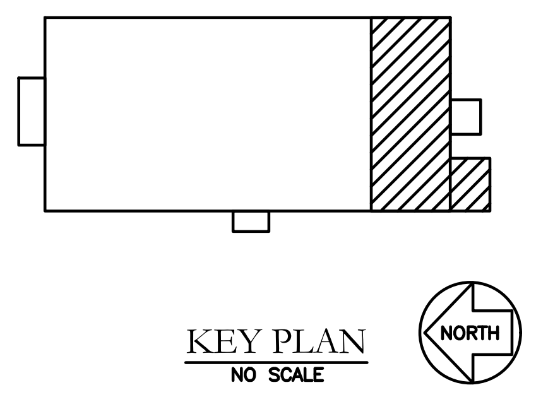
A. UPON COMPLETION OF TESTING, BUT BEFORE THE REFRIGERANT PIPING INSULATION IS APPLIED, THE PIPING MUST BE INSPECTED BY A REPRESENTATIVE OF THE LOCAL GOVERNING AUTHORITY AS NECESSARY.

B. ALL PIPING AND EQUIPMENT SHALL BE PRESSURE TESTED WITHOUT LEAKAGE AT A MINIMUM PRESSURE OF 125 PSI.

3.3 – CLEANING

A. ALL HYDRONIC PIPING AND EQUIPMENT CONNECTED TO THE HVAC PIPING SYSTEM SHALL BE CLEANED AND FLUSHED. REMOVE, CLEAN, AND REPLACE STRAINER SCREENS. FILL TENANT'S SYSTEM WITH DOMESTIC WATER, VENT ALL PIPING AND EQUIPMENT PRIOR TO CONNECTION TO THE LANDLORD'S SYSTEM. CONTRACTOR SHALL NOT FILL TENANT'S SYSTEM WITH WATER FROM THE LANDLORD'S SYSTEM UNLESS SPECIFICALLY INSTRUCTED TO DO SO FROM THE LANDLORD'S FIELD REPRESENTATIVE.

REV	DATE	DESCRIPTION
–	12-17-21	100% SCHEMATIC DESIGN



KEY PLAN
NO SCALE

252 East Avenue
Norwalk, CT 06855
(203) 866-4626 Tel
(203) 866-8019 Fax

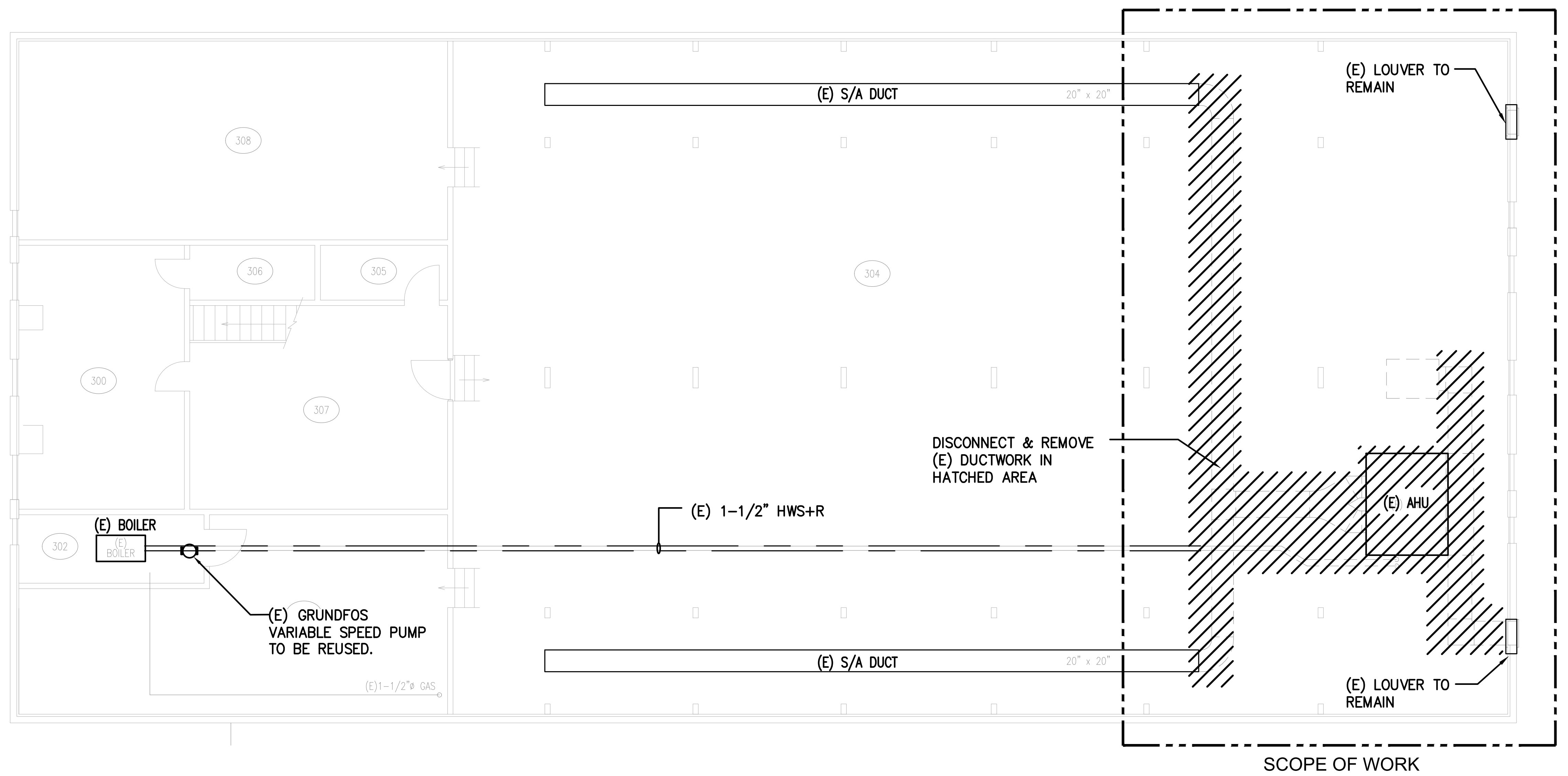
LFG
LANDMARK
FACILITIES
GROUP, INC.

HVAC EQUIPMENT UPGRADES
SHAKER VILLAGE MTG. HOUSE
25 MTG. HOUSE RD., ALBANY NY 12211

SCALE: AS NOTED	APPROVED BY:	DRAWN BY: JB
DATE: 2021/12/15		CHECKED BY: RS

MECHANICAL SPECIFICATIONS

FILE NAME:	JOB NUMBER:	DRAWING NUMBER:
\DIR\DWG	1018.002	M-001



THIRD FLOOR MECHANICAL DEMO PLAN
SCALE: 1/8" = 1'-0"

GENERAL DEMOLITION NOTES

1. ALL DEMOLITION WORK SHALL BE COORDINATED WITH THE BUILDING MANAGER. ALL DEMOLITION WORK TO BE DONE DURING THE HOURS DESIGNATED.

MAINTAIN STABLE AND SAFE CONDITIONS AT ALL TIMES TAKING CAUTION TO PROTECT THE EXISTING AND ADJACENT BUILDINGS, THEIR OCCUPANTS, STREET FRONT AND THE PUBLIC.

DEMOLISHED MATERIAL, NOT IDENTIFIED FOR SALVAGE BY OWNER, SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE COMPLETELY REMOVED FROM THE JOB SITE.

PROVIDE PROTECTION TO ALL EXISTING ELECTRICAL, MECHANICAL, AND PLUMBING EQUIPMENT TO REMAIN OR BE RE-USED.

5. COORDINATE WITH GENERAL CONTRACTOR TO REMOVE ALL ABANDONED ELECTRICAL CABLES FROM EXISTING LOCATION, TRACE BACK TO THEIR SOURCE AND TAG.

6. ALL LIFE SAFETY EQUIPMENT AND ASSOCIATED CONDUIT AND WIRING SHALL BE PROTECTED FROM ANY PHYSICAL DAMAGE DURING DEMOLITION AND/OR CONSTRUCTION.

7. THE SCOPE OF THE DEMOLITION WORK HAS GENERALLY BEEN INDICATED ON THE DRAWING FOR CONTRACTORS INFORMATION. IT SHALL BE THE CONTACTORS RESPONSIBILITY TO DETERMINE THE FULL SCOPE, EXTENT, NATURE AND MANNER OF DEMOLITION REQUIRED.

ONLY WORKMEN SKILLED AND KNOWLEDGEABLE IN THEIR RESPECTIVE TRADES SHALL BE ENGAGED IN THE DEMOLITION OF ANY WORK.

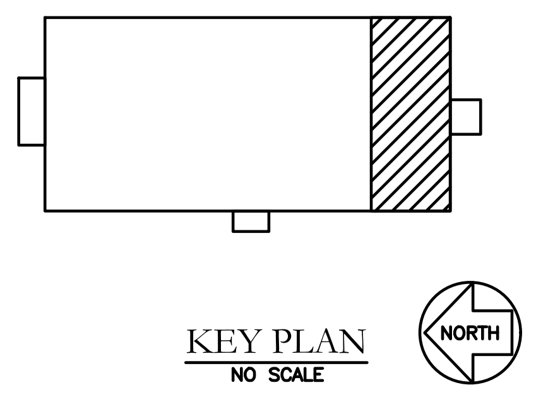
CONTRACTORS SHALL TAKE SPECIAL CARE TO DEMOLISH ONLY THAT WORK WHICH IS REQUIRED TO BE DEMOLISHED AND NOT TO DISTURB ANY WORK WHICH IS TO REMAIN. IF IN THE COURSE OF DEMOLITION, CONTRACTOR DESTROYS OR DISTURBS ANY WORK WHICH IS TO REMAIN, THEN HE SHALL AT HIS OWN EXPENSE, REPAIR OR REPLACE SUCH WORK AS NECESSARY.

10. REMOVE AND DISCARD ALL DEMOLISHED ITEMS IN A MANNER FULLY APPROVED BY THE AUTHORITY HAVING LOCAL JURISDICTION.

11. DO NOT SCALE DRAWINGS.

12. CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND JOB CONDITIONS PRIOR TO SUBMITTING BIDS AND SHALL REPORT TO THE OWNER'S REPRESENTATIVE ANY DISCREPANCIES OR OMISSIONS WHICH WOULD INTERFERE WITH SATISFACTORY COMPLETION OF WORK. ALL BUILDING DEPARTMENT PERMITS SHALL BE OBTAINED PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION WORK.

REV	DATE	DESCRIPTION
–	12-17-21	100% SCHEMATIC DESIGN



KEY PLAN
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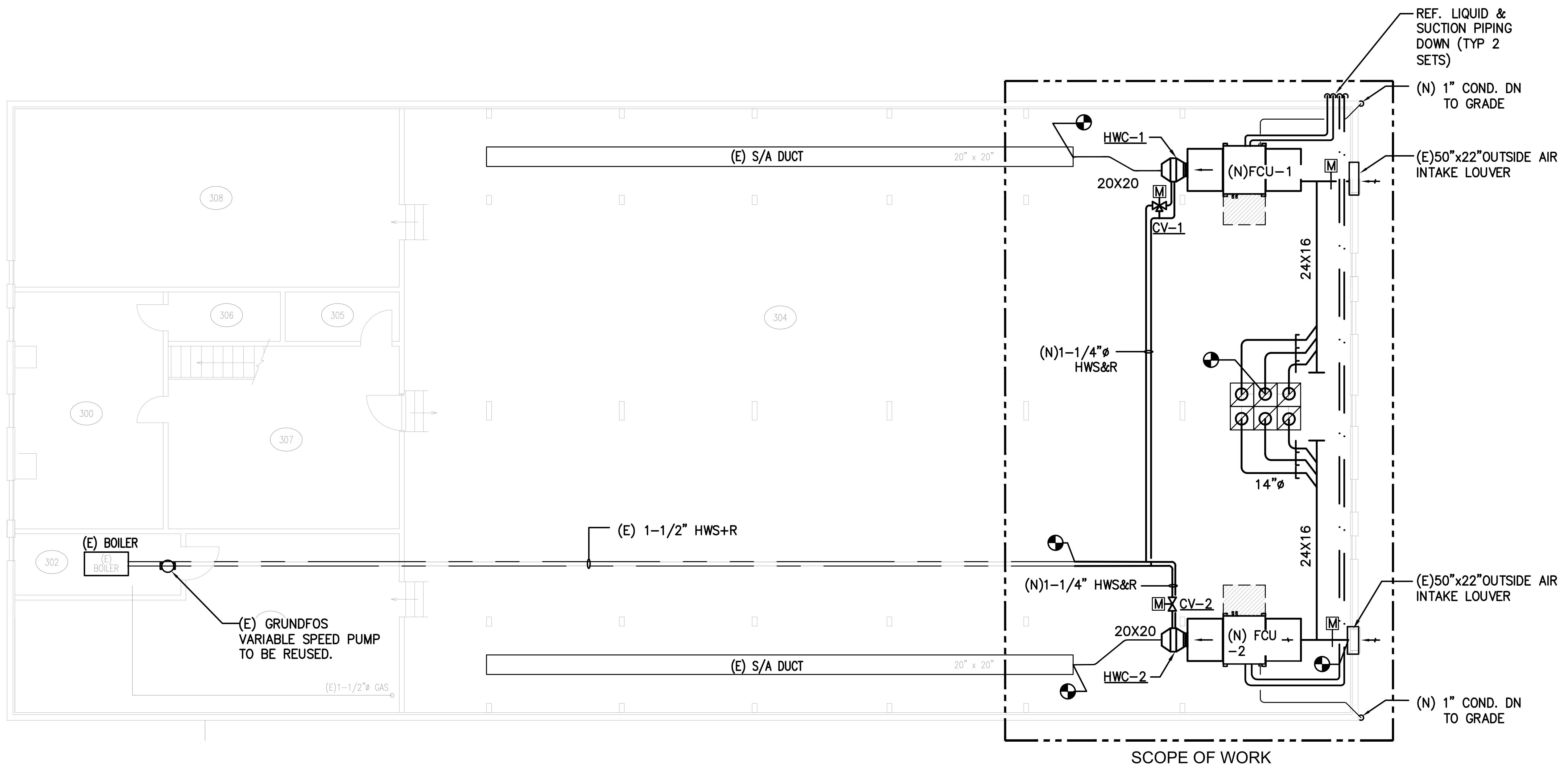
HVAC EQUIPMENT UPGRADES
SHAKER VILLAGE MTG. HOUSE
25 MTG. HOUSE RD., ALBANY NY 12211

SCALE: AS NOTED	APPROVED BY:	DRAWN BY: JB
DATE: 2021/12/15		CHECKED BY: RS

MECHANICAL DEMO PLAN
THIRD FLOOR

FILE NAME:	JOB NUMBER:	DRAWING NUMBER:
\DIR\DWG	1018.002	MD-100



THIRD FLOOR PROPOSED MECHANICAL PLAN

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

NOTES:

1. NEW FAN COIL UNITS SHALL BE SUSPENDED FROM ROOF RAFTERS USING THREADED ROD HANGERS WITH RUBBER VIBRATION ISOLATORS. PROVIDE FULL SIZE EMERGENCY DRAIN PAN BELOW UNIT WITH LEAK SENSOR INTERLOCKED WITH UNIT POWER.

2. ALL NEW DUCTWORK SHALL BE INTERNALLY LINED WITH 1.5" THICK INSULATION.

3. MOTORIZED DAMPERS AND CONTROL VALVES (CV-1, CV-2) SHALL BE EQUIPPED WITH 24 VOLT ACTUATORS AS MANUFACTURED BY BELIMO. HOT WATER CONTROL VALVES SHALL BE FULLY MODULATING TYPE. AIR DAMPERS SHALL BE TWO-POSITION TYPE.

4. FURNISH AND INSTALL DUCT MOUNTED HOT WATER COIL (HWC-1, HWC-2) AT EACH FAN COIL UNIT. COIL SHALL BE SELECTED FOR 180 EWT AND 160 LWT WITH A CAPACITY OF 110 MBH. PROVIDE AUTOMATIC BALANCING VALVE SIZED FOR 11 GPM AT EACH COIL AS MANUFACTURED BY HAYS FLUID CONTROLS.

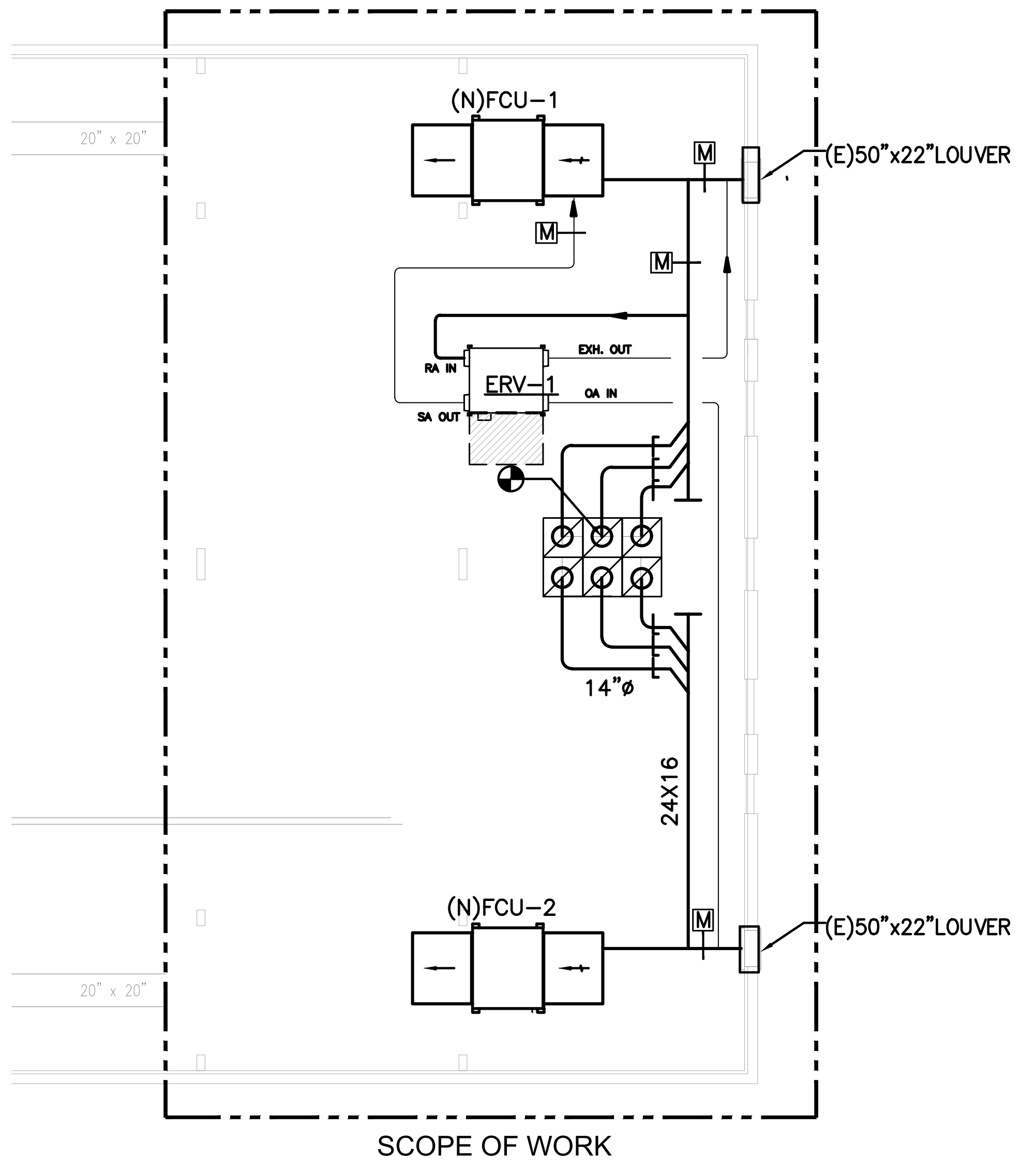
5. FCU-1 AND FCU-2 SHALL BE SETUP TO OPERATE AS STAGE 1 AND STAGE 2 COOLING FOR THE SPACE. FCU-2 SHALL HAVE TEMPERATURE SETPOINT NO LESS THAN 2 DEG F ABOVE FCU-1. IN HEATING MODE, BOTH UNITS SHALL RUN SIMULTANEOUSLY. IN THE EVENT HEAT PUMP FAILS TO START DURING A CALL FOR HEAT, HOT WATER COIL SHALL SERVE AS EMERGENCY BACKUP (STAGE 2) HEAT SOURCE. ALL PIPING SHALL BE INSULATED PER SPECIFICATIONS.

6. PROVIDE FREEZESTAT SAFETY IMMEDIATELY UPSTREAM OF HOT WATER COIL. FREEZESTAT SHALL TRIP AT AIR TEMPERATURE OF 37 DEG F AND BELOW. WHEN FREEZESTAT TRIPS, OUTSIDE AIR DAMPER SHALL CLOSE, FAN SHALL STOP AND ALARM SHALL BE INITIATED. FREEZESTAT MUST BE MANUALLY RESET BY OPERATOR IN ORDER FOR UNIT TO RESUME OPERATION.

7. MECHANICAL EQUIPMENT SELECTIONS ARE BASED ON THE FOLLOWING:

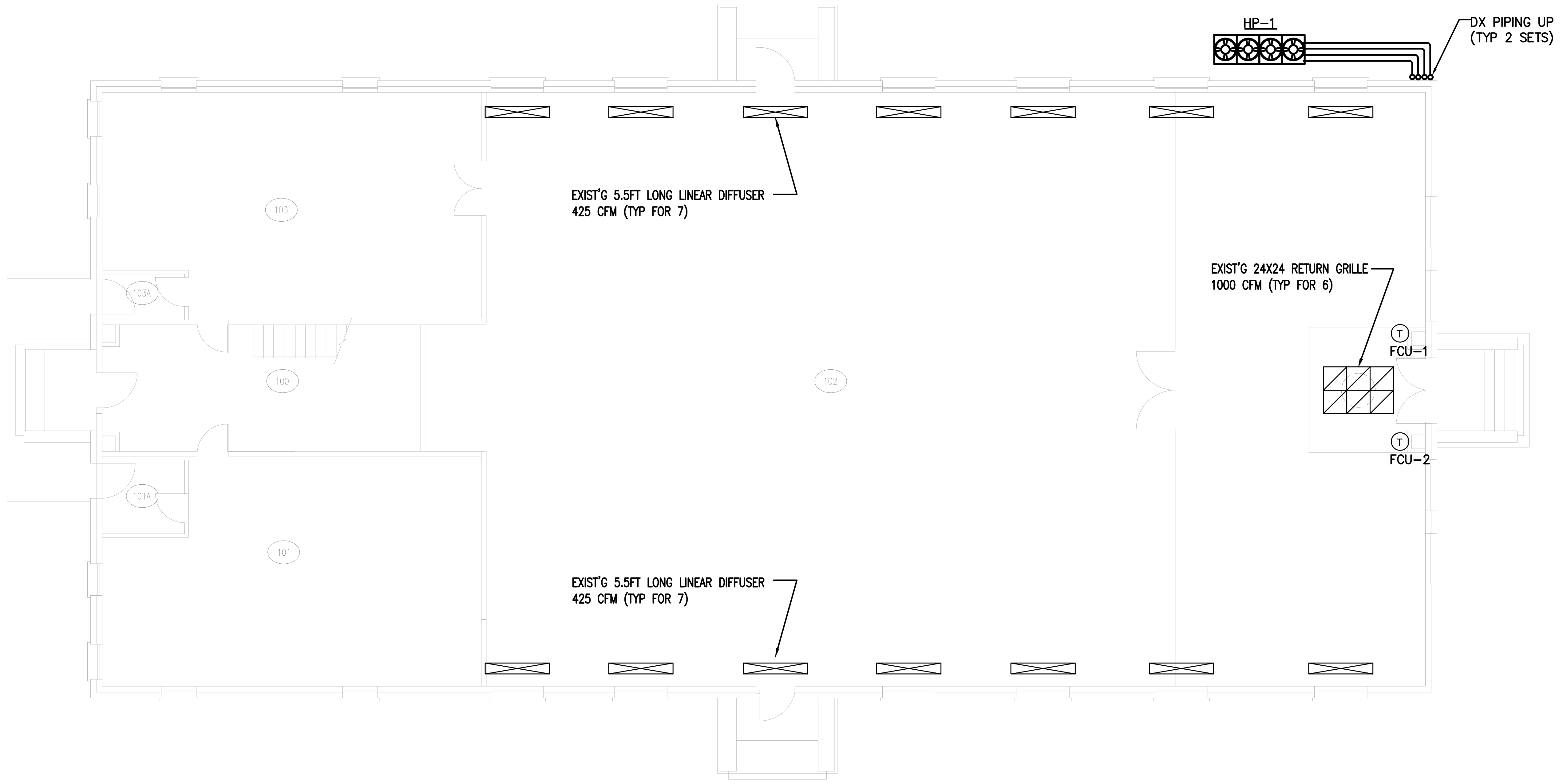
FCU-1: MITSUBISHI PEFY-P96NMHSU-E
FCU-2: MITSUBISHI PEFY-P96NMHSU-E
HP-1: MITSUBISHI PUHY-HP192TSNU-A
THERMOSTATS SHALL BE MODEL PAR-CT01MAU-SB

ERV-1 (ALTERNATE #1) SHALL BE LOSSNAY LGH-600.



THIRD FLOOR PROPOSED MECHANICAL PLAN (ADD ALT.#1)

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



FIRST FLOOR PROPOSED MECHANICAL PLAN

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

NOTES:

1. CONTRACTOR SHALL BALANCE ALL AIR OUTLETS FOR AIR FLOW RATES INDICATED ON PLANS.

2. PROVIDE POURED REINFORCED CONCRETE PAD AT GRADE FOR HEAT PUMP. UNIT SHALL BE SET ON FACTORY STAND NO LESS THAN 24" ABOVE PAD.

REV	DATE	DESCRIPTION
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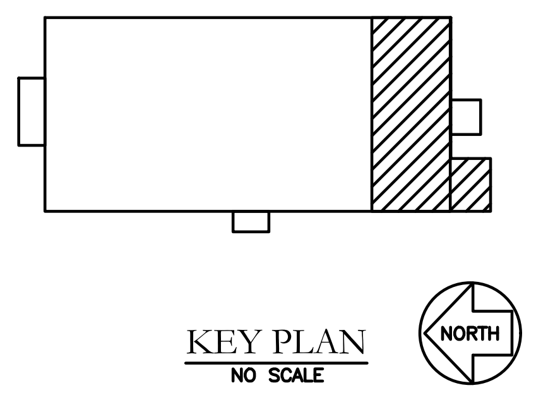

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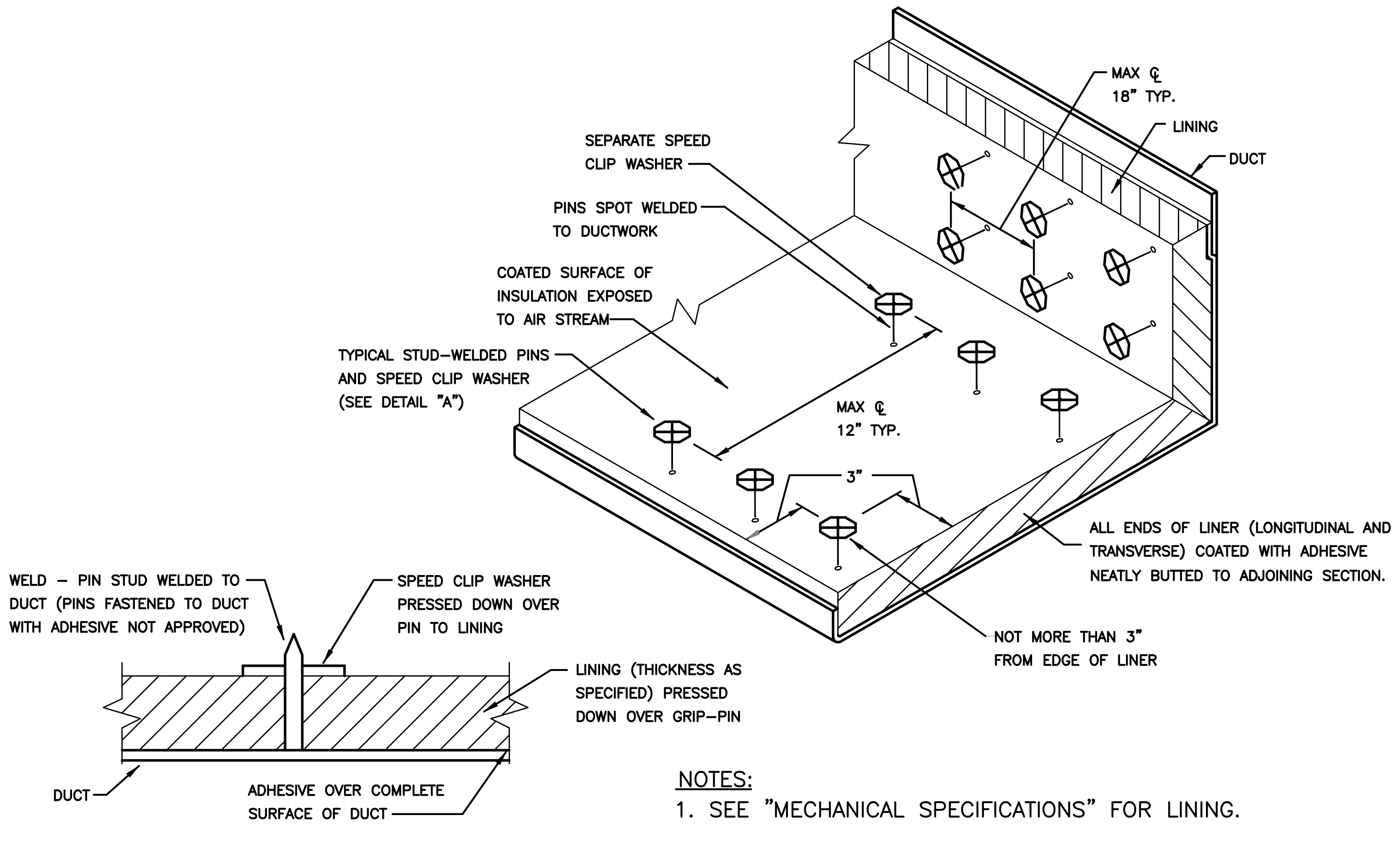
MECHANICAL PLANS
FIRST & THIRD FLOORS

FILE NAME:	JOB NUMBER:	DRAWING NUMBER:
\DIR\DWG	1155.003	M-100

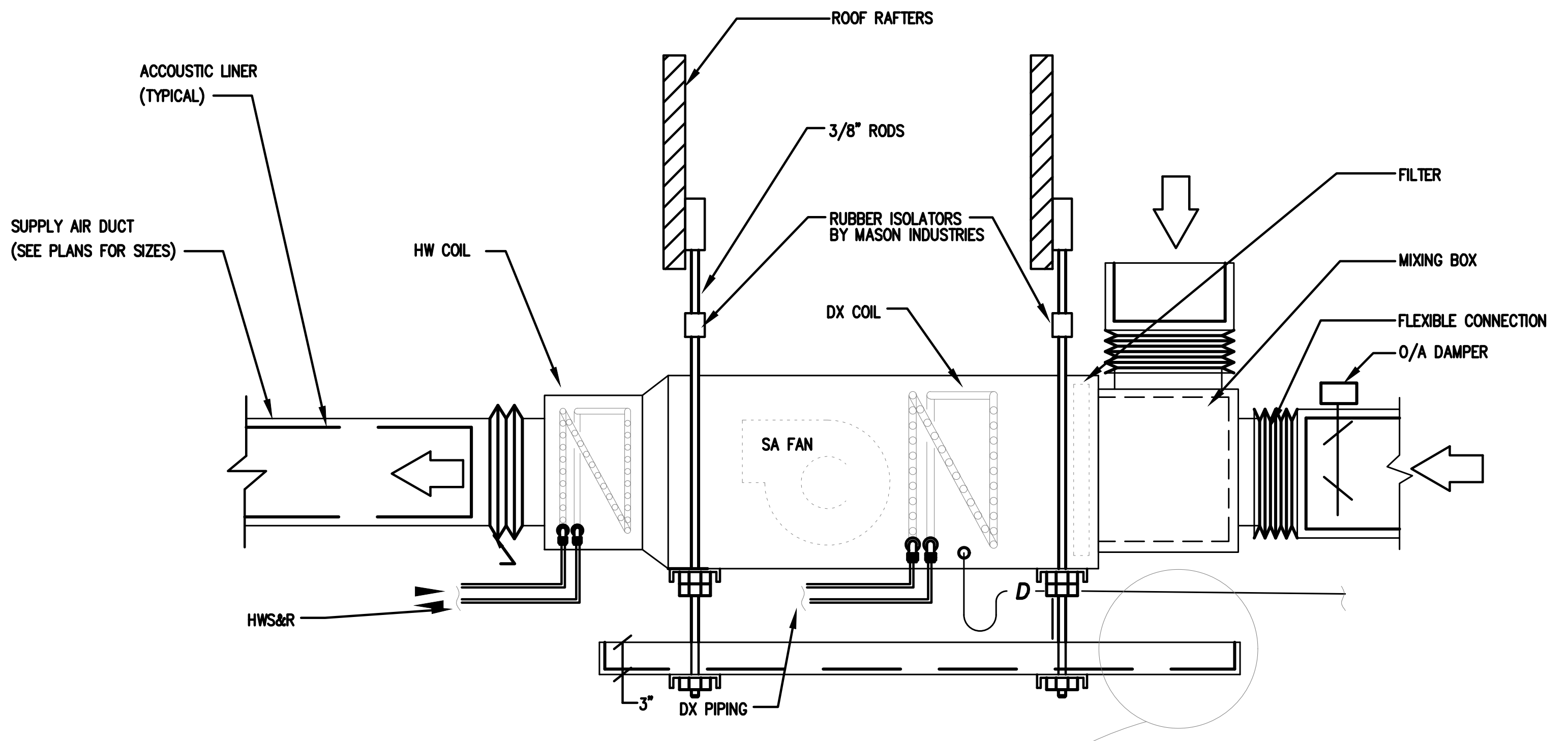


DETAIL 'A'

NOTES:
1. SEE "MECHANICAL SPECIFICATIONS" FOR LINING.

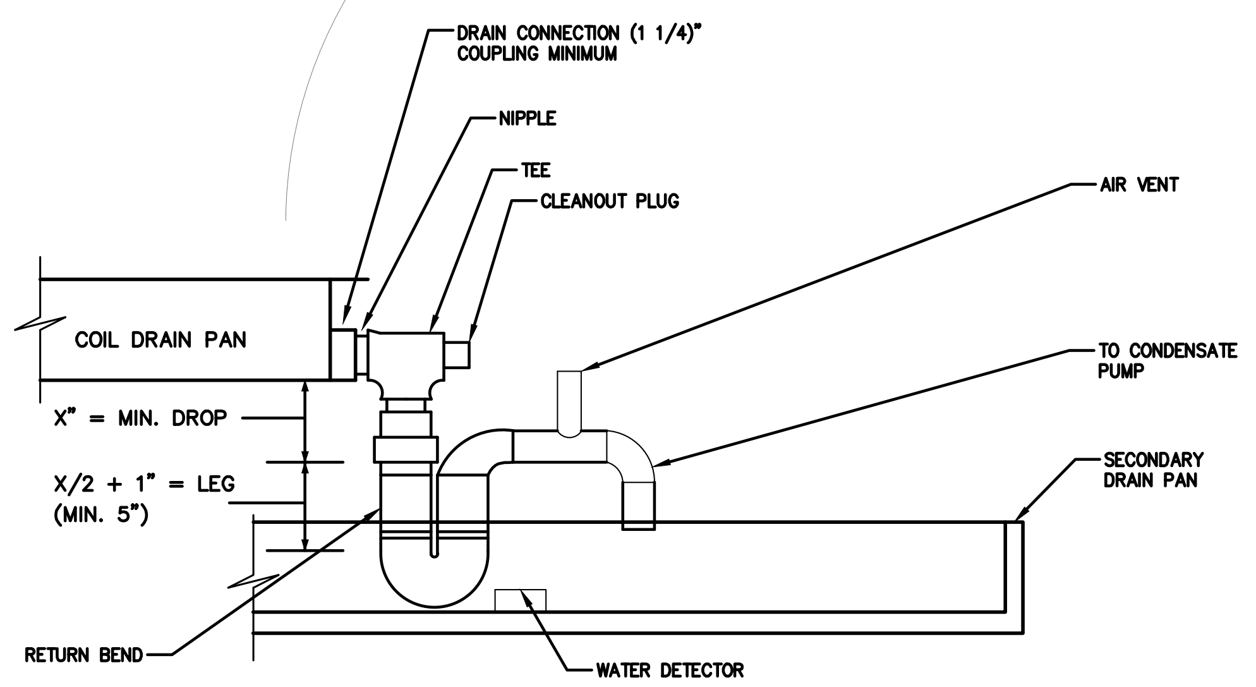
SOUND LINING INSTALLATION DETAIL

NO SCALE



FAN COIL UNIT DETAIL

NOT TO SCALE



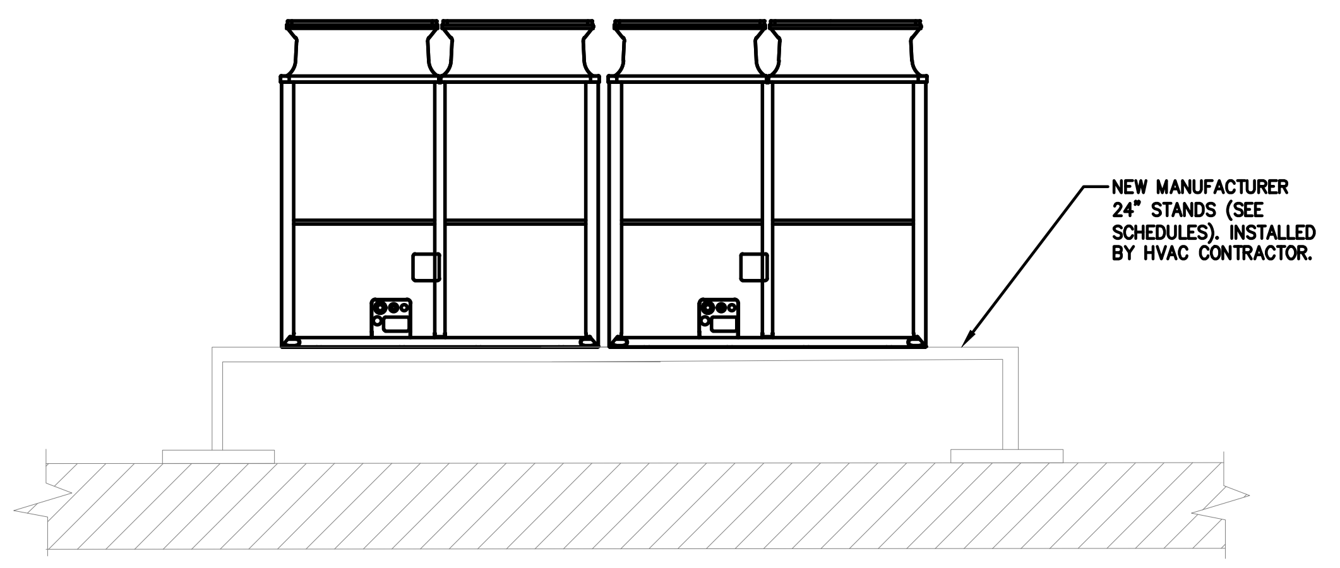
X = NEGATIVE INTERNAL STATIC PRESSURE AT FAN INLET

NOTES:
1. ALLOW SUFFICIENT SPACE BELOW DRAIN PAN FOR TRAP.
2. PITCH DRAIN FOR PROPER RUN-OFF
3. MANUALLY PRIME FILL TRAP BEFORE START-UP TO FORM INITIAL DRAIN SEAL.
4. SUPPORT LENGTHY DRAIN LINES TO PREVENT SAG AND CONDENSATE OVERFLOW.
5. MIN. CONDENSATE DRAIN LINE SHALL BE 1-1/4".
6. SHEET METAL SECONDARY DRAIN PAN WITH WELDED CORNERS TO BE PROVIDED BY MECHANICAL CONTRACTOR PROVIDE SENSOR SWITCH IN PAN INTERLOCKED WITH FCU AND ALARM

DRAIN PAN WATER SEAL PIPING

NO SCALE

HP-1



EQUIPMENT ON GRADE DETAIL

NO SCALE

REV	DATE	DESCRIPTION
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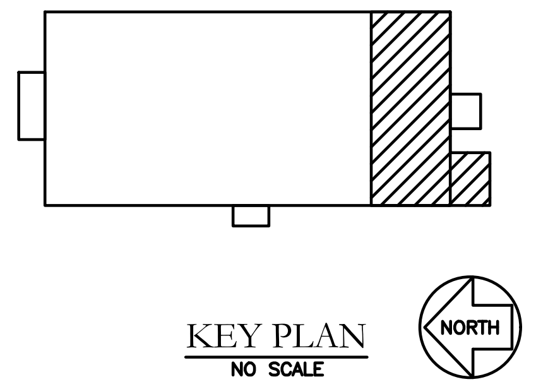

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MECHANICAL DETAILS

FILE NAME:	JOB NUMBER:	DRAWING NUMBER:
\DIR\DWG	1018.002	M-200

ELECTRICAL SPECIFICATIONS

NOTES:

GENERAL: SHOULD ANY REQUIREMENTS IN THESE NOTES, THE SPECIFICATIONS OR THE DRAWINGS CONFLICT, THE MOST RIGOROUS REQUIREMENT SHALL PREVAIL

THE WORK OF THIS DIVISION SHALL INCLUDE ALL LABOR, MATERIALS AND APPARATUS NECESSARY FOR THE COMPLETION OF ALL ELECTRICAL WORK AS SHOWN ON THE DRAWINGS AND AS HEREINAFTER SPECIFIED, LEFT READY FOR SATISFACTORY OPERATION.

ANY APPLIANCE, MATERIALS OR LABOR THAT ARE OBVIOUSLY A PART OF THE ELECTRICAL WORK NECESSARY TO ITS PROPER PERFORMANCE, ALTHOUGH NOT SPECIFICALLY MENTIONED HEREIN OR SHOWN ON THE DRAWINGS, SHALL BE FURNISHED AND INSTALLED AS IF CALLED FOR IN DETAIL WITHOUT ADDITIONAL COST.

WITHOUT INTENDING TO LIMIT AND/OR RESTRICT THE VOLUME OF WORK REQUIRED AND SOLELY FOR THE CONVENIENCE OF THE CONTRACTOR, THE WORK OF THIS DIVISION SHALL, IN GENERAL COMPRISE THE FOLLOWING:
FURNISHING AND INSTALLATION OF NEW LIGHTING FIXTURES INCLUDING LAMPS AND ASSOCIATED BRANCH CIRCUITRY.
FURNISHING AND INSTALLATION OF RECEPTACLES AND ASSOCIATED BRANCH CIRCUITRY WIRING.
FURNISHING AND INSTALLATION OF NEW PANELS.
CONNECTION (WIRING) OF HVAC UNITS.
EMPTY CONDUIT RACEWAYS FOR TELEPHONE AND DATA WIRING.
CONFORMING TO ALL EXISTING CONDITIONS AT THE SITE.
TEMPORARY FACILITIES (LIGHTING AND POWER).

SHOP DRAWINGS:

SUBMIT 3 HARD COPIES AND A CD WITH ACAD 2008 TO ENGINEER COMPLETE SHOP DRAWINGS, CATALOG CUTS, WIRING DIAGRAMS AND ASSOCIATED DATA, FOR ALL MAJOR ELEMENTS OF THE ELECTRICAL WORK FOR REVIEW, CHECKING AND APPROVAL. NO EQUIPMENT SHALL BE FABRICATED, DELIVERED, ERECTED OR RECONNECTED OTHER THAN FROM DRAWINGS APPROVED BY THE ENGINEER. SHOP DRAWINGS IN THE NUMBER DIRECTED SHALL BE SUBMITTED FOR NOT LESS THAN THE FOLLOWING:
NEW PANELS (INCLUDING INTERIORS TO BE INSTALLED IN EXISTING BACK BOXES).
SWITCHES
LIGHTING FIXTURES.
WIRING DEVICES.
OCCUPANCY SENSOR
IT SHALL BE UNDERSTOOD THAT APPROVAL OF DRAWINGS WILL NOT BIND THE ENGINEER OR THE OWNER TO THE FINAL ACCEPTANCE OF SUCH EQUIPMENT AS THE COMPLETED INSTALLATION AND TEST OF EQUIPMENT AS A WHOLE MUST BE PROVIDED AND GUARANTEED HEREIN AS SPECIFIED.

MATERIALS:

GENERAL
ELECTRIC RACEWAY AND SUPPORTING SYSTEMS SHALL BE FURNISHED AND INSTALLED COMPLETE, WITH ALL MATERIALS, FITTINGS, CONNECTIONS AND ACCESSORIES NECESSARY TO PROVIDE IN EACH INSTANCE, A COMPLETE OPERATING INSTALLATION, AS DESCRIBED HEREIN, AND INDICATED ON THE DRAWINGS.
THE DRAWINGS ARE DIAGRAMMATIC AND GENERALLY INDICATIVE OF THE WORK TO BE INSTALLED, BUT DO NOT SHOW ALL BENDS, FITTINGS, AND BOXES WHICH MAY BE REQUIRED. THE CONTRACTOR SHALL CAREFULLY INVESTIGATE THE STRUCTURAL AND FINISH CONDITIONS AFFECTING ALL HIS WORK AND ARRANGE SAME ACCORDINGLY, FURNISHING SUCH FITTINGS, BOXES AND SIMILAR ITEMS AS MAY BE REQUIRED TO MEET SUCH CONDITIONS.

WIRING:
ALL WIRE AND CABLE, AS INDICATED, SPECIFIED OR REQUIRED, SHALL BE INSTALLED COMPLETE, INCLUDING ALL NECESSARY SPLICES AND CONNECTIONS TO EQUIPMENT DEVICES.
ALL WIRE NO. 8 WIRE AND LARGER SHALL BE SINGLE CONDUCTOR STRANDED COPPER OF NOT LESS THAN 98% CONDUCTIVITY, WITH 600 VOLT WITH THHN INSULATION (THWN FOR DAMP LOCATIONS). WIRE NO. 10 AWG AND SMALLER SHALL BE SOLID COPPER.
WIRE AND CABLE SHALL BE NO. 12 AWG MINIMUM, UNLESS, U.O.N
20A AND 20A BRANCH CIRCUITS SHALL UTILIZE #12 L & N CONDUCTORS, U.O.N.
25A AND 30A BRANCH CIRCUITS SHALL UTILIZE #10 L & N CONDUCTORS, U.O.N
35A THROUGH 50A BRANCH CIRCUITS SHALL UTILIZE #8 L & N CONDUCTORS, U.O.N.
ALL BRANCH CIRCUITS SHALL HAVE GROUND CONDUCTORS IN ACCORDANCE WITH TABLE 250–122 OF THE NEC, U.O.N.
SUB FEEDERS AND BRANCH CIRCUITS IN EXCESS OF 100LF AND LESS THAN 200LF SHALL UTILIZE THE NEXT LARGER SIZE CONDUCTOR, U.O.N.
BRANCH CIRCUIT NUMBERS INDICATED ON THE DRAWINGS ARE FOR IDENTIFICATION PURPOSES ONLY AND DO NOT NECESSARILY REFER TO PANELBOARD CIRCUIT NUMBERS. BRANCH CIRCUITS SHALL BE CONNECTED TO CIRCUITS ON PANELBOARDS SO AS TO SECURE A REASONABLE BALANCE ON THE THREE PHASES. WHERE MORE THAN ONE CIRCUIT, WITH A COMMON NEUTRAL IS INSTALLED IN THE SAME CONDUIT, EACH PHASE WIRE SHALL BE CONNECTED TO A DIFFERENT LEG OF THE SYSTEM.
ALL CONDUCTORS SHALL BE COLOR CODED THROUGHOUT AND NUMBERED AND TAGGED AT EACH JUNCTION BOX, PULL BOX, PANEL AND DEVICE WITH SUITABLE FIREPROOF TAGS OR ADHESIVE IDENTIFICATION BANDS.

CONDUIT:
EXCEPT AS OTHERWISE INDICATED OR SPECIFIED, ALL WIRING INSIDE AND BEYOND CONFINES OF ELECTRIC CLOSET SHALL BE INSTALLED IN EMT (ELECTROGALVANIZED STEEL ELECTRICAL METALLIC TUBING).
RGS SHALL BE UTILIZED FOR EXTERIOR INSTALLATIONS WHERE EXPOSED
PVC MAY BE USED FOR INSTALLATION WHERE BURIED BELOW GRADE AND WHERE EMBEDDED IN A COVER OF AT LEAST 2"s OF CONCRETE WITH COLORADO (BOULDER) DoB "SPECIAL PERMISSION"
LIQUIDTIGHT FLEXIBLE, GALVANIZED STEEL CONDUIT, WITH CONTINUOUS COPPER BONDING CONDUCTOR, SHALL BE USED FOR CONNECTIONS, NOT EXCEEDING 18" IN LENGTH, TO MOTORS AND AT A OTHER LOCATIONS WHERE VIBRATION, OR MOVEMENT ARE ENCOUNTERED.
UNLESS OTHERWISE INDICATED OR SPECIFIED, ALL WIRING SHALL BE INSTALLED CONCEALED IN CEILINGS, WALLS, SLABS, PIPE CHASES AND FURRED SPACES WHENEVER POSSIBLE.
CONDUIT AND FITTINGS SHALL CONFORM TO LATEST ACCEPTABLE CODE.
CONDUIT SHALL BE 3/4" TRADE SIZE MINIMUM, U.O.N
ALL CONDUITS WHICH ARE TO REMAIN EMPTY FOR FUTURE INTRODUCTION OF CONDUCTORS SHALL BE PROVIDED WITH A #12 NYLON DRAG WIRE WITH IDENTIFICATION TAG AT BOTH ENDS.
METAL CLAD CABLE (MC) CAN BE USED FOR FINAL CONNECTION OF LIGHTING AND, WITH WRITTEN PERMISSION OF THE ENGINEER, APPLIANCE BRANCH CIRCUITRY IN VOIDS OF CEILING AND PARTITIONS. PROVIDED THAT THIS TYPE OF WIRING IS ACCEPTABLE TO THE BUILDING OWNER OR HIS REPRESENTATIVE, AND IN COMPLIANCE WITH GOVERNING ELECTRICAL CODE. VERIFY ALL OF THE ABOVE PRIOR TO SUBMITTAL OF BID PROPOSAL. WHEN THIS METHOD OF WIRING IS USED HOMERUNS MUST BE IN EMT.
CONDUIT FITTINGS SHALL BE APPROPRIATE FOR USE WITH THE CONDUIT TYPE AND LOCATION – COMPRESSION OR TWO SCREW FITTINGS FOR EMT, THREADED FITTINGS FOR RGS, SOCKET FITTINGS FOR PVC, ETC...

JUNCTION BOXES:
JUNCTION BOXES AND PULL BOXES SHALL BE PROVIDED WHERE INDICATED OR SPECIFIED, WHERE REQUIRED BY CODE AND WHERE NECESSARY TO FACILITATE THE INSTALLATION OF EQUIPMENT OR WIRING
THEY SHALL BE NEMA 3R FOR EXTERIOR LOCATIONS
THEY SHALL BE APPROPRIATE FOR USE WITH THE CONDUIT TYPE AND LOCATION – PLASTIC FOR PVC, SHEET METAL FOR EMT AND CAST STL OR DUCTILE IRON FOR RGS, ETC...

OUTLET BOXES:
EACH OUTLET FOR LIGHTING FIXTURE, WALL SWITCH, WALL RECEPTACLE, TELEPHONE OR OTHER USE SHALL BE PROVIDED WITH AN OUTLET BOX SUITABLE FOR THE USE FOR WHICH THE OUTLET IS TO BE INSTALLED AND TO THE LOCATION IN WHICH IT OCCURS, SECURED FIRMLY IN PLACE AND SET TRUE AND SQUARE WITH THE FINISHED SURFACE.
THEY SHALL BE NEMA 3R FOR EXTERIOR LOCATIONS
THEY SHALL BE APPROPRIATE FOR USE WITH THE CONDUIT TYPE AND LOCATION – SHEET METAL FOR EMT AND CAST STL OR DUCTILE IRON FOR RGS, ETC...

FASTENINGS, SUPPORTS AND HANGERS:
ALL PARTS OF THE ELECTRICAL INSTALLATION SHALL BE ADEQUATELY SUPPORTED FROM THE BUILDING CONSTRUCTION USING APPROVED CLAMP SCREWS WITH INSERTS OR EXPANSION ANCHORS, EXPANSION BOLTS AND TOGGLE BOLTS "IN NO CASE SHALL THE HUNG CEILING MEMBERS OR WIRES BE USED TO SUPPORT CONDUIT".
ALL FASTENINGS, SUPPORTS, CLAMPS, ANCHORS, AND SIMILAR ITEMS SHALL BE OF TYPE SUITABLE FOR THE PURPOSE – IF SUPPORTING LOADS IN TENSION IN EXCESS OF 200#S OR LOADS IN SHEAR IN EXCESS OF 400#S THE CONTRACTOR SHALL PROVIDE A REPORT CERTIFIED BY AN ENGINEER ATTESTING TO THE VORACITY OF HIS SELECTION

7. WIRING DEVICES:
ALL DEVICES SHALL BE SPECIFICATION GRADE, U.L. APPROVED.
A. DUPLEX RECEPTACLE 20 AMP, 2 POLE, 3 WIRE, 125 V, GRD. TYPE HUBBELL #5362 WHI, OR APP. EQUAL.
B. SINGLE RECEPTACLE 20 AMP, 2 POLE, 3 WIRE, 125 V, GRD. TYPE HUBBELL #5361 WHI, OR APP. EQUAL.
C. SINGLE POLE SWITCH 20 AMP, 125 V, GRD. TYPE, HUBBELL #1221 WHI, OR APP. EQUAL.
D. THREE WAY SWITCH 20 AMP, 125 V, GRD. TYPE, HUBBELL #1223 WHI, OR APP. EQUAL.
E. PLATE FOR SINGLE SWITCH – SMOOTH NYLON WHITE, HUBBELL #PIW, OR APP. EQUAL.
F. PLATE FOR DUPLEX RECEPTACLE – SMOOTH NYLON WHITE, HUBBELL #P8W, PR APP. EQUAL.
G. PLATE FOR SINGLE RECEPTACLE – SMOOTH NYLON WHITE, HUBBELL #P7W, OR APP.
H. WHERE MORE THAN ONE SWITCH OR RECEPTACLE ARE PLACED IN THE SAME LOCATION CONTRACTOR SHALL GANG DEVICES AND USE COMMON MULTI GANG PLATES.
I. ALL SWITCHES SHALL BE QUIET TYPE.
J. ALL DEVICES AND PLATES SHALL BE FURNISHED IN WHITE COLOR. OR AS INDICATED BY THE ARCHITECT

8. PANELBOARD AND CABINETS
A. GENERAL: TIN PLATED COPPER BUSSES, BOLTED BUS BREAKER CONNECTIONS, SOLDERLESS LUGS, DISTRIBUTIVE PHASING, SEPARATE EQUIPMENT GROUNDING BAR, NEUTRAL BAR.
B. CABINETS: GALVANIZED BOXES, BONDERIZED ENAMELED TRIMS AND DOORS, INDICATING TRIM CLAMPS. HINGED DOORS WITH LOCKS AND LATCHES, ALL KEYED ALIKE. PROVIDE ALL NECESSARY STRUCTURAL SUPPORTS FOR MOUNTING PANELBOARDS. GALVANIZED UNISTRUT OR EQUAL CHANNEL IS RECOMMENDED. NEMA 1 ENCLOSURE FOR INTERIOR NEMA 3R ENCLOSURE FOR EXTERIOR.
C. POWER, LIGHTING AND MISCELLANEOUS: BUS STRUCTURE AND MAIN LUGS OR MAIN BREAKER WITH CURRENT RATINGS (INCLUDING CAPACITY) AS INDICATED ON PANELBOARD SCHEDULE. PROVIDE BOLT ON, THERMAL MAGNETIC QUICK–MAKE AND CIRCUIT BREAKERS TYPE, COMMON TRIP WHEN MULTIPOLE, ARRANGED IN TWO VERTICAL ROWS, ODD NUMBERS ON LEFT, EVEN NUMBERS ON RIGHT, WITH PERMANENT NUMBER TABS. WESTINGHOUSE TYPE NBQ OR EQUAL BY G.E., ITE, SQUARE D, OR APPROVED EQUAL, USING QUICKLAG "B" CIRCUIT BREAKERS. BREAKERS MUST OCCUPY POSITION AND NUMBER ASSOCIATED ON PANELBOARD SCHEDULE.

D. PANELBOARD SCHEDULES: PROVIDE A TYPED PANELBOARD SCHEDULE ENCLOSED IN A PLASTIC ENVELOPE ON THE INSIDE OF THE PANEL DOOR, INDICATING CIRCUIT NUMBERS AND CORRESPONDING LOADS AS SHOWN ON THE PANELBOARD SCHEDULE. APPLIES TO NEW AND EXISTING PANELS.

9. SELECTION OF OVERCURRENT PROTECTION AND SWITCHING DEVICES FOR LIGHT AND POWER DISTRIBUTION
A. DEVICES SHALL HAVE VOLTAGE RATINGS SUITABLE FOR THE SUPPLY CHARACTERISTICS TO WHICH THEY ARE APPLIED.

B. SHORT CIRCUIT CURRENT RATINGS, AND THE MANUFACTURER'S LABELS ATTESTING TO THESE RATINGS (BASED ON U.L. LISTINGS), SHALL BE REQUIRED FOR OVERCURRENT PROTECTION AND SWITCHING DEVICES, WHERE THEY ARE INDIVIDUALLY MOUNTED (AS FUSED SWITCHES OR AS FUSED SWITCH BUS DUCT PLUG–IN DEVICES). AND FOR THE EQUIPMENT ASSEMBLIES WHEN THEY ARE INCORPORATED IN PANELS. SWITCHBOARDS, ETC. SUCH RATINGS SHALL BE IN ACCORDANCE WITH THE FOLLOWING:–
1. IN ORDER TO INSURE THAT THEY ARE AT LEAST EQUAL TO THE AVAILABLE FAULT CURRENT, MINIMUM RATINGS HAVE BEEN SPECIFIED HEREIN FOR THE INDIVIDUAL OVERCURRENT DEVICE TYPES, AND OTHER ASSEMBLIES OF DEVICES. "SERIES CONNECTED RATINGS" WILL BE ACCEPTABLE FOR CIRCUIT BREAKER TYPE PANELBOARDS, THESE MINIMUM RATINGS ARE BASED ON THE USE OF UPSTREAM FUSES WHICH SHALL BE SPECIFICALLY TESTED WITH THE EC's SELECTED CIRCUIT BREAKERS, AND SHALL BE U.L. LISTED ACCORDINGLY, PROVIDE THE ENGINEER ALL PERTINENT U.L. DOCUMENTATION AND ARRANGE TO REPLACE EXISTING SERVICE SWITCH FUSES AS REQUIRED TO OBTAIN REQUIRED SERIES RATING.
2. WHERE SUCH FUSE–CIRCUIT BREAKER SERIES RATINGS ARE NOT AVAILABLE FROM A PARTICULAR MANUFACTURER, A CURRENT LIMITING CIRCUIT BREAKER MAY BE UTILIZED AS THE UPSTREAM DEVICE IN ORDER TO OBTAIN THE REQUIRED SERIES RATED. SUCH CURRENT LIMITING BREAKERS SHALL BE INCORPORATED AS MAIN DEVICES IN THE PANELBOARDS, AS PART OF UPSTREAM PANELBOARDS, METERING ASSEMBLIES, OR AS INDIVIDUALLY MOUNTED DEVICES OR BUS DUCT PLUG–IN–DEVICES, AS THE CASE MAY BE. WHERE THE REQUIRED RATINGS CAN BE MET WITH MAIN OR UPSTREAM NON–CURRENT LIMITING BREAKERS HAVING APPROPRIATE INTERRUPTING CAPACITIES AS APPROVED BY U.L., SUCH ARRANGEMENTS WILL ALSO BE CONSIDERED ACCEPTABLE.

C. IN ADVANCE OF, OR IN CONJUNCTION WITH, THE SUBMISSION OF SHOP DRAWINGS FOR APPROVAL, PROVIDE DATA DEFINING IN DETAIL HOW THE REQUIRED SHORT CIRCUIT CURRENT RATINGS WILL BE ACHIEVED WITH THE EQUIPMENT BEING FURNISHED. THE DATA SHALL, IN NARRATIVE OR GRAPHIC FASHION, FULLY DEFINE HOW THE VARIOUS DEVICES, INDIVIDUALLY, OR IN COMBINATION WITH THE "FULLY RATED" OR "SERIES CONNECTED" SHORT CIRCUIT REQUIREMENTS. INCLUDE SPECIFICATIONS FROM MANUFACTURER AS TO THE U.L. APPROVALS FOR THESE RATINGS FOR ALL PROPOSED EQUIPMENT. ALL OVERCURRENT PROTECTION AND SWITCHING DEVICES SHALL BE U.L. LISTED AS SUITABLE FOR THE TERMINATION OF 75°C CONDUCTORS, SIZED IN ACCORDANCE WITH THEIR 75°C AMPACITY RATINGS. DEVICES SHALL BE SPECIFICALLY IDENTIFIED ACCORDINGLY AND SHALL BEAR THE DESIGNATION "60°/75°C" OR "75°C", REGARDLESS OF WHETHER INCORPORATED IN PANELBOARDS, SWITCHBOARDS, OR OTHER ASSEMBLIES OR WHETHER INDIVIDUALLY MOUNTED.

D. SELECT OVERCURRENT PROTECTION AND SWITCHING DEVICES AS FOLLOWS:

CATEGORY OF APPLICATION	ACCEPTABLE DEVICE TYPES (SEE LEGEND BELOW)
MAIN OR BRANCH UNIT IN DISTRIBUTION PANEL OR POWER PANEL	SW–QMQB/CF, EXCEPT, CLCB IF NEEDED IN IN ORDER TO MEET THE SPECIFIED SERIES CONNECTED RATING OF DOWNSTREAM LIGHTING OR APPLIANCE PANEL.
MAIN UNIT IN LIGHTING OR APPLIANCE PANEL	CB–SMC, EXCEPT CLCB OF NEEDED IN ORDER TO MEET SPECIFIED SERIES CONNECTED RATING OF THE PANEL.
BRANCH UNIT IN LIGHTING OR APPLIANCE PANEL	CB–SMC

E. EXPLANATION OF ABBREVIATIONS USED ABOVE IS AS FOLLOWS:

ABBREVIATION	DESCRIPTION
SW–BP	DISTRIBUTION SWITCH;BOLTED PRESSURE TYPE.
SW–QMQB	DISTRIBUTION SWITCH; QUICK–MAKE, QUICK–BREAK TYPE.
/	FUSIBLE––FUSED WITH.
CLCB–MC	CURRENT LIMITING CIRCUIT BREAKER; MOLDED CASE TYPE.

F. SELECT QUICK–MAKE, QUICK–BREAK TYPE DISTRIBUTION SWITCHES IN ACCORDANCE WITH THE FOLLOWING:

1. THEY SHALL EQUAL OR EXCEED THE PERFORMANCE REQUIRED FOR NEMA TYPE H.D HORSEPOWER RATED SWITCHES.

2. THEY SHALL HAVE ARC QUENCHERS AND CIRCUIT BREAKER TYPE PRESSURE CONTACTS.

3. WHERE INTENDED FOR PANELBOARDS OR SWITCHBOARD MOUNTING, THEY SHALL BE OF THE "BOLTED–IN" TYPE.

4. WHERE OF THE FUSIBLE TYPE. THEY SHALL BE DESIGNED FOR USE ONLY WITH CLASS "J" FUSES UP TO 600 AMPS, AND CLASS "L" FUSES ABOVE 600 AMPS, AND SHALL INCORPORATE FACTORY INSTALLED CLIPS DESIGNED TO INSURE THE USE OF PROPER FUSES. COORDINATE TO INSURE THAT FUSES SUPPLIED FOR THE PROJECT MATCH THESE FUSE GAPS.

H. SELECT CARTRIDGE FUSES IN ACCORDANCE WITH THE FOLLOWING:

1. REGARDLESS OF THE ACTUAL AVAILABLE FAULT CURRENT THEY SHALL, AT FULL RECOVERY VOLTAGE, BE CAPABLE OF SAFELY INTERRUPTING FAULT CURRENTS OF 200,000 AMPERES RMS SYMMETRICAL DELIVERABLE AT THE LINE SIDE OF THE FUSE.
2. EXCEPT AS NOTED HEREINAFTER, IN SIZES OVER 600 AMPS, THEY SHALL BE OF THE CURRENT LIMITING TYPE, U.L. LISTED AS "CLASS L".
3. THEY SHALL BE SUITABLE FOR APPLICATION TO FUSE GAPS WHICH REJECT OTHER TYPES OF FUSING. COORDINATE WITH SUPPLIER(S) OF ALL FUSIBLE SWITCH UNITS (IN PANELS, SWITCHBOARDS, ETC.) FOR THE PROJECT TO INSURE THAT FUSE GAPS MATCH THE SPECIFIED FUSE TYPES.

I. SELECT STANDARD, MOLDED CASE TYPE CIRCUIT BREAKERS IN ACCORDANCE WITH THE FOLLOWING:

1. THEY SHALL CONSIST OF MANUALLY OPERATED QUICK–MAKE, QUICK–BREAK MECHANICALLY TRIP FREE OPERATING MECHANISMS FOR SIMULTANEOUS OPERATION OF ALL POLES, WITH CONTACTS, ARC INTERRUPTERS AND TRIP ELEMENTS FOR EACH POLE, ALL ENCLOSED IN MOLDED PHENOLIC PLASTIC CASES.
2. THEIR TRIPPING UNITS SHALL BE OF THE "THERMAL MAGNETIC" TYPE HAVING BIMETALLIC ELEMENTS FOR TIME DELAY OVERLOAD PROTECTION, AND MAGNETIC ELEMENTS FOR SHORT CIRCUIT PROTECTION.
3. THEY SHALL BE MANUALLY OPERABLE BY MEANS OF TOGGLE TYPE OPERATING HANDLES HAVING "TRIPPED" POSITIONS MIDWAY BETWEEN THE "ON–OFF" POSITION.
4. THEY SHALL EACH BE CONTAINED IN AN INDIVIDUAL CASE ENCLOSING ONLY THE NUMBER OF POLES REQUIRED FOR THE PARTICULAR BREAKER.
5. WHERE NO FRAME SIZES ARE INDICATED, THEIR INTERRUPTING CAPACITIES (IN RMS SYMMETRICAL AMPERES) SHALL BE NOT LESS THAN THE FOLLOWING:

WHERE INSTALLED	INTERRUPTING CAPACITY
120/208V LIGHTING OR APPLIANCE PANE	10,000A

6. WHERE FRAME SIZES ARE INDICATED, THE INTERRUPTING CAPACITIES SHALL BE NO LESS THAN THE FOLLOWING:

WHERE INDICATED FRAME SIZE		MINIMUM ACCEPTABLE SYMMETRICAL AMPERES INTERRUPTING RATING IN	RMS
AMPERES	100		22,000
225		22,000	
400		42,000	
600		42,000	
800		42,000	

7. THE MINIMUM INTERRUPTING CAPACITY IN SYMMETRICAL RMS AMPERES OF THE CIRCUIT BREAKERS INTENDED FOR USE IN PANELBOARDS SHALL BE AS NOTED ABOVE. WHERE NECESSARY IN ORDER TO PROVIDE THE U.L. APPROVED "SERIES CONNECTED" SHORT CIRCUIT PANEL RATINGS SPECIFIED ELSEWHERE, BREAKERS WITH HIGHER INTERRUPTING CAPACITIES SHALL BE PROVIDED AS REQUIRED.
8. WHERE NECESSARY TO ACCOMMODATE OTHER REQUIREMENTS (E.G., PANELBOARDS TO BE CONVERTIBLE TYPE), THEIR FRAME SIZES SHALL BE INCREASED TO CONFORM TO SUCH REQUIREMENTS, FRAME SIZES BEING INDICATED ONLY AS A REFERENCE TO THE MINIMUM ACCEPTABLE INTERRUPTING RATING NOTED ABOVE.
9. THEY SHALL HAVE INTERCHANGEABLE TRIPS IN ALL SIZES FOR WHICH SUCH TRIPS ARE MANUFACTURED AS STANDARD.
10. THEY SHALL BE EQUIPPED WITH AMBIENT TEMPERATURE COMPENSATING FEATURES EXTENDED TO 40°C.
11. THEY SHALL BE EQUIPPED WITH 5 MILI AMP SENSITIVITY GROUND FAULT INTERRUPTING FEATURES WHERE SO INDICATED, AND/ OR WHERE THEY SUPPLY STANDARD CONVENIENCE RECEPTACLES IN BATHROOMS AND OTHER SUCH CODE MANDATORY LOCATIONS.
12. WHERE SINGLE POLE IN TRIP SIZES 20 AMPS OR LESS, THEY SHALL BE RATED FOR SWITCH DUTY.

J. IF REQUIRED TO PROVIDE "SERIES CONNECTED" RATINGS (AS SPECIFIED ELSEWHERE) WHERE FUSE–BREAKER RATINGS HAVE NOT BEEN LISTED BY U.L., SELECTED MOLDED CASE TYPE CURRENT LIMITING CIRCUIT BREAKERS IN ACCORDANCE WITH THE FOLLOWING:
1. IN FRAME SIZES UP TO 400 AMPS, THEY SHALL EACH BE OF THE FUSE–LESS TYPE AND HAVE AN INTERRUPTING CAPACITY OF 200,000 AMPS SYMMETRICAL AT 120/208 (240) VOLTS.
2. IN FRAME SIZES LARGER THAN 400 AMPS, THEY SHALL EACH CONSISTING OF A MOLDED CASE CIRCUIT BREAKER WITH A CURRENT LIMITING FUSE CONNECTED IN EACH POLE, AS NOTED BELOW:
A. THEIR FUSES SHALL BE EQUIPPED WITH RELEASE BUTTONS ARRANGED TO TRIP OPEN THE LATCHES OF THEIR CIRCUIT BREAKER ELEMENTS.
B. SIZING OF THE FUSES SHALL BE AS DIRECTED.
C. EACH SHALL HAVE ITS FUSES AND BREAKER ELEMENTS INTEGRALLY MOUNTED IN A SINGLE OVERALL MOLDED PHENOLIC PLASTIC CASE.
3. THEIR BREAKER ELEMENTS SHALL CONSIST OF MANUALLY OPERATED, QUICK–MAKE, QUICK–BREAK, MECHANICALLY TRIP FREE OPERATING MECHANISMS FOR SIMULTANEOUS OPERATION OF ALL POLES, WITH CONTACTS, ARC INTERRUPTERS AND TRIP ELEMENTS FOR EACH POLE.
4. THEIR BREAKER TRIPPING UNITS SHALL BE OF THE "THERMALMAGNETIC" TYPE HAVING BIMETALLIC ELEMENTS FOR TIME DELAY OVERLOAD PROTECTION, AND MAGNETIC ELEMENTS FOR SHORT CIRCUIT PROTECTION.
5. THEY SHALL BE MANUALLY OPERABLE BY MEANS OF TOGGLE TYPE OPERATING HANDLES HAVING "TRIPPED" POSITIONS MIDWAY BETWEEN THE "ON–OFF" POSITION.
6. THEY SHALL BE OF THE "BOLTED–IN" TYPE.
7. THEY SHALL HAVE INTERCHANGEABLE TRIPS.
8. THEY SHALL BE EQUIPPED WITH AMBIENT TEMPERATURE COMPENSATING FEATURES EXTENDED TO 40°C.

K. THE FUSE TO BE USED IN CURRENT LIMITING CIRCUIT BREAKER SHALL, REGARDLESS OF ACTUAL AVAILABLE FAULT CURRENT, AT FULL RECOVERY VOLTAGE, BE CAPABLE OF SAFELY INTERRUPTING FAULT CURRENTS IN THE ORDER OF 200,000 AMPERE RMS SYMMETRICAL OF 280,000 AMPERES RMS ASYMMETRICAL, THE CURRENT LIMITING FUSES SHALL COORDINATE WITH AND BACK UP THE CIRCUIT BREAKERS THEY ARE ASSOCIATED WITH SO THAT ALL FAULT OVERLOAD CURRENTS ACCRUING WITHIN THE SAFE CAPABILITY OF THE BREAKERS SHALL CAUSE THE BREAKERS TO OPEN, AND ALL CURRENTS OCCURRING BEYOND THE SAFE CAPABILITY OF THE BREAKERS SHALL CAUSE THE FUSES TO OPEN; THE OPENING OF THE FUSES BEING SUCH AS TO PREVENT DAMAGE TO ANY CIRCUIT BREAKER COMPONENT PARTS. WHERE DIRECTED, FUSES SHALL BE REDUCED IN SIZE SO AS TO PROVIDE BACKUP PROTECTION FOR DOWNSTREAM OVERCURRENT DEVICES.

L. ALL APPLICATIONS OF FUSES SHALL BE ON A "SINGLE FUSE PER PHASE LEG" (I.E., EXCLUDE FUSES IN MULTIPLE).

M. FUSES SHALL BE MOUNTED SO THAT THE LABELS SHOWING THEIR RATINGS CAN BE READ WITHOUT REQUIRING FUSE REMOVAL.

N. WHERE THE SIZE OF THE OVERCURRENT PROTECTION AND SWITCHING DEVICES ARE INDICATED BY MEANS OF SINGLE NUMBER AMPERAGES, IT SHALL BE UNDERSTOOD THAT THESE AMPERAGES REPRESENT AS APPLICABLE THE SIZE OF THE TRIPS OF FUSES SUPPLIED IN THE SMALLEST CIRCUIT BREAKER FRAMES OR SWITCHES THAT WILL HOLD THEM.

O, FURNISHED AND DEPOSIT SPARE FUSES AT THE JOB SITE AS FOLLOWS:

1. THREE SPARES FOR EACH TYPE AND SIZE, IN EXCESS OF 60 AMPERES, USED FOR INITIAL FUSING.
2. TEN PERCENT SPARES FOR EACH TYPE AND SIZE, UP TO AND INCLUDING 60 AMPERES, USED FOR INITIAL FUSING. (IN NO CASE SHALL LESS THAN THREE FUSES OF ONE PARTICULAR TYPE AND SIZE BE FURNISHED).

P. WHERE FUSES ARE REQUIRED TO BE INSTALLED IN FUSE GAPS WHICH ARE TOO LARGE OR ARE OTHERWISE NOT MATCHED TO THE FUSES, UTILIZE SINGLE STEP REDUCERS OR ADAPTORS TO ACCOMMODATE THE MOUNTING. IN ADDITION, PROVIDE CLIP CLAMPS TO ANCHOR THE REDUCERS OR ADAPTORS INTO THE FUSE GAPS.

Q. DISTRIBUTION SWITCHES OF THE QUICK–MAKE, QUICK–BREAK TYPE SHALL BE MANUFACTURED BY SIEMENS, GENERAL ELECTRIC, WESTINGHOUSE, OR SQUARE D OR OTHER APPROVED.
R. CIRCUIT BREAKERS SHALL BE MANUFACTURED BY WESTINGHOUSE, GENERAL ELECTRIC, SIEMENS, OR SQUARE D OR OTHER APPROVED.
S. FUSES SHALL BE MANUFACTURED BY BUSSMAN, OR MERSEN OR OTHER APPROVED.

10. SAFETY SWITCHES A. SAFETY SWITCHES SHALL BE OF SIZE NOTED ON THE DRAWINGS, OR AS REQUIRED, FUSIBLE OR NON FUSIBLE AND EACH CONTAINED IN A GENERAL PURPOSE NEMA I ENCLOSURE WHEN INSTALLED INDOORS AND NEMA 3R ENCLOSURE FOR OUTDOOR INSTALLATION. ALL SWITCHES SHALL BE HEAVY DUTY TYPE AND SHALL HAVE QUICK MAKE QUICK BREAK MECHANISM

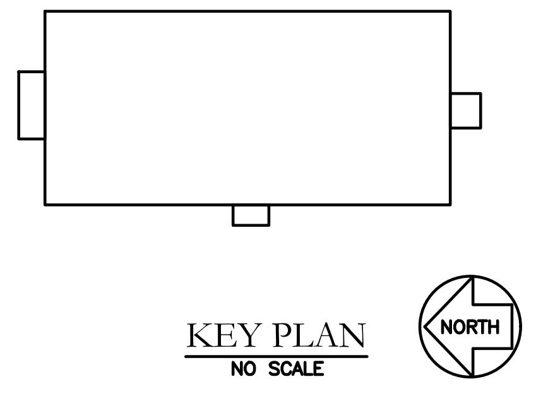
B. ALL SWITCHES SHALL BE OF PROPER HORSEPOWER RATING AS APPLICABLE AND HAVE DUAL INTERLOCKS DESIGNED TO INTERLOCK THE SWITCH BOX DOOR WITH THE SWITCH OPERATING MECHANISM.

11. GROUNDING A. ALL ELECTRICAL WORK SHALL BE GROUNDED IN ACCORDANCE WITH NEC 250 AS AMENDED BY LOCAL LAWS OF COLORADO (BOULDER)
B. PROVIDE BOTH SYSTEM AND EQUIPMENT GROUNDING IN ACCORDANCE WITH THE REQUIREMENTS OF THE LOCAL INSPECTION AUTHORITIES: USE COPPER STRAPS, WIRES, AND CABLES BRAZED OR BOLTED TO CLAMPS, BUSHINGS, LUGS OR FITTINGS APPROVED FOR THE PURPOSE.
C. ALL ENCLOSURES AND OTHER NON CURRENT CARRYING METALLIC PARTS OF ELECTRICAL EQUIPMENT, RACEWAY SYSTEMS AND EQUIPMENT GROUND BUSES SHALL BE EFFECTIVELY GROUNDED TO THE BUILDING GROUNDING SYSTEMS THROUGH THE SYSTEM GROUND CONDUCTORS, METALLIC CONDUITS AND OTHER RACEWAYS AND ENCLOSURES FOR CONDUCTORS SHALL BE METALLICALLY JOINED TOGETHER INTO A CONTINUOUS ELECTRICAL CONDUCTOR, AS TO PROVIDE EFFECTIVE ELECTRICAL CONTINUITY.
D. EQUIPMENT LOCATED REMOTELY FROM THE GROUND CONDUCTORS SHALL BE GROUNDED TO THE NEAREST AVAILABLE COLD WATER PIPING, MOTOR FRAMES SHALL BE GROUNDED THROUGH THEIR CONDUITS.
12. LIGHTING FIXTURES
A. ALL LIGHTING FIXTURES SHALL BE APPROVED FOR USE IN COLORADO (BOULDER).
B. ALL LIGHTING FIXTURES SHALL BE APPROVED PRIOR TO INSTALLATION C. ALL LIGHTING FIXTURES SHALL BE FURNISHED AND INSTALLED COMPLETE, WITH NECESSARY COMPONENTS, ACCESSORIES AND LAMPS OF CORRECT TYPE AND RATING, AS INDICATED ON ARCHITECT DRAWINGS. D. FIXTURES SHALL BE CAREFULLY SUPPORTED AND ALIGNED WITH NECESSARY HANGERS, SUPPORTING MEMBERS AND PLASTER FRAMES FOR PROPER INSTALLATION, E. ALL FIXTURES SHALL BE PROPERLY WIRED AND CONNECTED TO BRANCH CIRCUITS, TESTED AND LEFT READY FOR OPERATION. F. FOR TYPE, MAKE AND QUANTITIES OF LIGHTING FIXTURES REQUIRED SEE ARCHITECT'S DRAWINGS AND SPECIFICATIONS. G. FIXTURES AND/OR FIXTURE OUTLET BOXES SHALL BE PROVIDED WITH HANGERS TO ADEQUATELY SUPPORT THE COMPLETE WEIGHT OF THE FIXTURE
H. BALLASTS: MAGNETEK #B140T/B240T OR APPROVED EQUAL FULL LIGHT OUTPUT, ELECTRONIC ENERGY SAVING, HIGH POWER FACTOR, ETL CERTIFIED SOUND RATING "A", OR AS INDICATED ON DRAWINGS
I. LAMPS, WESTINGHOUSE, SYLVANIA, OR GE, EXTENDED SERVICE OR 130 VOLT FILAMENT J. RATING FOR INCANDESCENT LAMPS, ENERGY– SAVING TYPE (ECON–O–WATT, PER–SAVER, OR WATT–MISER) FOR FLUORESCENT. LAMP TYPES AND WATTAGES SCHEDULED ON DRAWINGS

GENERAL:

A. ALL WORK SHALL BE DONE IN STRICT COMPLIANCE WITH THE NEC, AND AS AMENDED BY LOCAL CODES OF THE STATE OF NEW YORK.
B. CONNECTION OF NEW PANELS SHALL BE AT A TIME CONVENIENT TO THE BUILDING OWNER AFTER SUFFICIENT TIME HAS BEEN GIVEN AND HIS APPROVAL OBTAINED.
C. CONTRACTOR SHALL CHECK ALL EXISTING CONDITIONS IN THE FIELD. RELOCATE ALL EXISTING WIRING WHICH INTERFERES WITH NEW INSTALLATION AND MUST BE MAINTAINED.
D. ELECTRICAL CONTRACTOR SHALL FURNISH AND INSTALL ALL ADDITIONAL CONDUITS, CABLES AND PULL BOXES AS REQUIRED FOR ROUTING OF CONDUITS AND PULLING OF CABLES.
E. E. ELECTRICAL CONTRACTOR SHALL FILE AND OBTAIN AN APPROVED ELECTRICAL CERTIFICATE FROM THE BUILDING DEPT.
F. F. LOCATION OF ALL ELECTRICAL EQUIPMENT IS APPROXIMATE, EXACT LOCATION TO BE VERIFIED IN THE FIELD.
G. G. STUDY OTHER SECTIONS OF THE SPECIFICATIONS AND DRAWINGS COOPERATE WITH OTHER TRADES. COORDINATE WORK TO AVOID INTERFERENCES. WHEN IN DOUBT, CONSULT ENGINEER BEFORE PERFORMANCE.
H. PERFORM ALL NECESSARY CUTTING AND PATCHING. LEAVE PREMISES IN CONDITION SATISFACTORY TO THE ENGINEER/ARCHITECT.
I. OBTAIN PERMISSION OF ARCHITECT BEFORE CUTTING STRUCTURAL MEMBERS.
J. NOTIFY ENGINEER OF CONFLICTS BETWEEN DRAWINGS AND SPECIFICATIONS BEFORE BIDDING. THE ENGINEER'S DECISION WILL GOVERN EITHER BEFORE OR AFTER BIDDING.
K. ELECTRICAL DRAWINGS ARE DIAGRAMMATIC EXCEPT WHERE DIMENSIONED. DO NOT SCALE. FOLLOW ARCHITECTURAL, STRUCTURAL AND MANUFACTURER'S SHOP DRAWINGS FOR GREATER ACCURACY. CONSULT ENGINEER IN CASE OF DOUBT OR CONFLICT. UNLESS NOTED, FIXED DIMENSIONS ARE BASED ON THE PRODUCT OF ONE MANUFACTURER, VERIFY DIMENSIONS WITH THE PRODUCT OF THE SHOP DRAWINGS OF THE MATERIALS ACTUALLY APPROVED OR PURCHASED. THE CONTRACTOR IS RESPONSIBLE FOR ANY ADDITIONAL COST AND DELAYS IN THE WORK RESULTING FROM SUBSTITUTION UNDER THIS DIVISION; INCLUDING, BUT NOT LIMITED TO, ANY CHANGES IN DECISION, INSTALLATION,
L. EQUIPMENT, SUCH AS PANELS, JUNCTION BOXES, SAFETY SWITCHES, MOTOR STARTERS, CIRCUIT BREAKERS, AND SIMILAR ITEMS SHALL BE IDENTIFIED BY NAME, WITH ENGRAVED LAMINATED PHENOLIC NAMEPLATES NOT SMALLER THAN 1" X 3" WITH CHARACTERS NOT LESS THAN 1/2" AND FASTENED WITH COUNTER OVAL HEAD BRASS MACHINE SCREWS OR RIVETS. 18. TELEPHONE & SIGNAL REQUIREMENTS
M. EMPTY CONDUIT SHALL BE OF SIZE INDICATED AND STUB UP 6" ABOVE HUNG CEILING FROM OUTLET BOX.
N. TELEPHONE OUTLETS SHALL HAVE SMOOTH WHITE NYLON PLATE WITH BUSHED HOLE. OR AS INDICATED BY THE ARCHITECT.
O. CONDUIT SHALL BE 3/4" MIN. UNLESS OTHERWISE NOTED.
P. COLOR, FINISH AND TYPE OF PLATES SHALL BE APPROVED BY THE ARCHITECT PRIOR TO PURCHASE.
Q. ALL CUTTING PATCHING AND FIRE–STOPPINGREQUIRED FOR WORK OF THIS DIVISION IS INCLUDED HEREIN. COORDINATION WITH GENERAL CONTRACTOR AND OTHER TRADES IS IMPERATIVE. CONTRACTOR SHALL BEAR THE RESPONSIBILITY FOR AND THE ADDED EXPENSE OF ADJUSTING FOR IMPROPER HOLES, SUPPORTS, ETC
R. SINGLE GANG BOXES SHALL BE PROVIDED WHERE TELEPHONE OUTLETS ARE INDICATED. 19. AS–BUILT (DRAWINGS) UPON COMPLETION OF THE ELECTRICAL INSTALLATION,
S. THE CONTRACTOR SHALL FURNISH THE ENGINEER TWO SETS OF AS BUILT DRAWINGS IN HARD COPY AND ACAD 2008 FOR REVIEW AND APPROVAL. AFTER THE ENGINEERS APPROVAL OF THE DRAWINGS, THE CONTRACTOR SHALL FURNISH THE OWNER WITH ACAD 2008 AND REPRODUCIBLE SETS OF THE SAME FOR HIS RECORDS. THE AS–BUILT DRAWINGS SHALL SHOW THE FOLLOWING INFORMATION: 1. LOCATION OF ALL RECEPTACLES, SWITCHES AND LIGHTING FIXTURES. 2. LOCATION OF JUNCTION BOXES, PULL BOXES AND PANELS. 3. LOCATION (ROUTING) OF ALL BRANCH CIRCUITS AND PANELS. 4. DESIGNATION OF ALL BRANCH CIRCUITS. 5. WIRE SIZES WHERE WIRE LARGER THAN #12 AWG IS USED. 6. CONDUIT SIZE 7.LOCATION OF ALL FIRE ALARM DEVICES. 8. FIELD ANNOTATED (CORRECTED) CONTRACT DRAWINGS ARE NOT ACCEPTABLE AS "AS–BUILT" OR "SHOP DRAWINGS".
T. IN THE EVENT OF ANY CONFLICT BETWEEN INFORMATION ON THE DRAWINGS AND INFORMATION IN THE SPECS, THE MOST COSTLY ALTERNATIVE WILL GOVERN.
U. APPLY FIRESTOPPING TO ELECTRICAL PENETRATIONS OF FIRE–RATED FLOOR AND WALL ASSEMBLIES TO RESTORE ORIGINAL FIRE–RESISTANCE RATING OF ASSEMBLY. FIRESTOPPING MATERIALS AND INSTALLATION REQUIREMENTS ARE SPECIFIED IN DIVISION 7 SECTION "THROUGH–PENETRATION FIRESTOP SYSTEMS."

REV	DATE	DESCRIPTION
–	12-17-21	100% SCHEMATIC DESIGN



KEY PLAN
NO SCALE

252 East Avenue
Norwalk, CT 06855
(203) 866-4626 Tel
(203) 866-8019 Fax

LFG
LANDMARK
FACILITIES
GROUP, INC.

HVAC EQUIPMENT UPGRADES
SHAKER VILLAGE MTG. HOUSE
25 MTG. HOUSE RD., ALBANY NY 12211

SCALE: AS NOTED
DATE: 2021/12/15
APPROVED BY:
DRAWN BY: LFG
CHECKED BY: RS

ELECTRICAL SPECIFICATIONS

FILE NAME: \DIR\DWG
JOB NUMBER: 1155.003
DRAWING NUMBER: E-001

GENERAL NOTES

1. DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES, REGULATIONS, BUILDING STANDARDS AND THE BEST PRACTICES OF THE TRADE FOR FIRST CLASS ELECTRICAL INSTALLATION.
2. THE DRAWINGS INDICATE SIZE AND GENERAL LOCATION OF WORK. SCALED DIMENSIONS SHALL NOT BE USED. THE EXACT LOCATION AND ELEVATION OF ALL ELECTRICAL EQUIPMENT SHALL BE COORDINATED IN FIELD WITH RESPECTIVE CONTRACTOR/OWNER.
3. FEEDERS AND BRANCH CIRCUITRY SHALL BE RUN IN CONDUIT MINIMUM 3/4" CONDUIT UNLESS OTHERWISE NOTED. FINAL CONNECTIONS TO MOTORS MAY BE DONE WITH FLEXIBLE METALLIC CONDUIT (NO LONGER THAN 18"). IN UNFINISHED AREA CONDUIT SHALL BE RUN EXPOSED AND IN FINISHED AREAS CONDUIT SHALL BE RUN CONCEALED.
4. PROVIDE PANEL NAME PLATE MADE OF BLACK LAMINATED PLASTIC WITH WHITE ENGRAVED LETTERING AND TYPE WRITTEN DIRECTORY FOR ALL NEW PANELBOARDS.
5. ALL CONDUCTORS SHALL BE COPPER, TYPE THHN/THWN INSULATED. ALL CONDUCTORS SHALL HAVE 600 VOLT RATED INSULATION UNLESS OTHERWISE NOTED.
6. PROVIDE LOCK–ON CIRCUIT BREAKERS FOR CIRCUITS SERVING EXIT SIGN FIXTURES.
7. REFER TO ARCHITECT'S REFLECTED CEILING PLAN FOR EXACT LOCATION OF ALL CEILING MOUNTED LIGHTING FIXTURES AND OTHER CEILING INSTALLED ITEMS.
8. THE USE OF FLEXIBLE CONDUIT FROM LIGHTING FIXTURES TO JUNCTION BOX IS PERMITTED ONLY WHEN A SEPARATE GROUND WIRE IS INSTALLED WITH THE CONDUCTORS INSIDE FLEXIBLE CONDUIT. THE GROUND WIRE MUST BOND THE FIXTURE HOUSING TO THE JUNCTION BOX. MAXIMUM LENGTH 6'–0".
9. EXACT LOCATION AND MOUNTING HEIGHTS OF ALL WIRING DEVICES SHALL BE COORDINATED WITH THE ARCHITECT PRIOR TO THE INSTALLATION.
10. WALL MOUNTED EQUIPMENT (SWITCHES, RECEPTACLES, ETC.,) SHALL BE SURFACE MOUNTED IN UNFINISHED AREAS AND FLUSH MOUNTED IN FURNISHED AREAS.
11. CONDUIT RUNS SHALL BE PARALLEL WITH OR AT RIGHT ANGLES TO WALLS AND CEILINGS. CONDUIT SHALL BE SUPPORTED BY APPROVED MEANS. SUPPORTS FOR HORIZONTAL RUNS OF CONDUIT SHALL NOT EXCEED SEVEN FEET ON CENTERS.
12. PROVIDE PULL BOXES, JUNCTION BOXES, CONDUIT ELBOWS AND OFFSETS TO SUIT FIELD CONDITIONS AND THE NATIONAL ELECTRICAL CODE.
13. CONTRACTOR SHALL COORDINATE WITH THE FIRE DEPARTMENT AND F.A. VENDOR BEFORE PROCEEDING WITH WORK INVOLVING FIRE ALARM SYSTEM.
14. ALL EMPTY CONDUIT SHALL BE PROVIDED WITH A DRAGWIRE.
15. THE MINIMUM WIRE SIZE FOR 120 VOLT BRANCH CIRCUITS SHALL BE NO. 12 AWG, EXCEPT OVER 100' IN LENGTH SHALL BE NO. 10 AWG.
16. PROVIDE ALL REQUIRED AND NECESSARY ACCESSORIES (EX. CONNECTORS, ADAPTERS, BUSHINGS, CLAMPS, ETC.) TO FACILITATE COMPLETE INSTALLATION.
17. THE ELECTRICAL CONTRACTOR SHALL CONFIRM THE CONFIGURATION TYPE FOR ALL SPECIAL RECEPTACLES FOR COPIERS, DATA PROCESSING EQUIPMENT. ETC. WITH OWNER AND ENGINEER PRIOR TO ORDERING.
18. COORDINATE LOCATION OF ALL MECHANICAL EQUIPMENT WITH HVAC CONTRACTOR IN FIELD. FUSES FOR ALL MOTOR LOADS SHALL BE DUAL ELEMENT TIME DELAY TYPE.
19. ALL JUNCTION OR OUTLET BOXES SHALL BE INSTALLED SO AS TO ALLOW ACCESS TO COVER. PROVIDE ARCHITECT APPROVED ACCESS DOORS OR PLATES AS REQUIRED IN AREAS WHERE UNOBSTRUCTED ACCESS TO BOX OR OUTLET IS NOT POSSIBLE.
20. PRIOR TO ORDERING LIGHTING FIXTURES, COORDINATE WITH ARCHITECTURAL DRAWINGS AND SPECIFICATIONS. IF DISCREPANCIES EXIST BETWEEN ARCHITECTURAL AND ENGINEERING INFORMATION OBTAIN CLARIFICATION PRIOR TO PROCEEDING.
21. MULTIPLE SWITCHES SHOWN IN SAME LOCATION SHALL BE GANGED TOGETHER WITH A COMMON FACEPLATE.
22. ALL LIGHTING FIXTURES UTILIZING ELECTRONIC BALLASTS SHALL BE PROVIDED WITH A DEDICATED NEUTRAL OR AN OVERSIZED NEUTRAL WHEN SHARED.
23. PREPARE 'AS–BUILT' TRACINGS SHOWING ALL CHANGES IN WIRE SIZE, CIRCUIT NUMBERING, CIRCUIT ROUTING, EQUIPMENT LOCATIONS AND ALL ELECTRICAL WORK AS ACTUALLY INSTALLED.
24. LIGHT FIXTURES SHALL BE CONSTRUCTED TO SUIT PARTICULAR TYPE OF CEILING AND WALL CONSTRUCTION AND SHALL BE PROVIDED WITH APPROPRIATE TRIMS, MOUNTING FRAMES AND ADAPTERS AS REQUIRED.
25. COORDINATE WITH MECHANICAL CONTRACTOR BEFORE THE START OF ANY WORK FOR ALL STARTERS REQUIRED BEING INTERFACED WITH ALL MECHANICAL EQUIPMENT. STARTER WILL BE FURNISHED BY OTHERS. IT SHALL BE INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR.
26. ALL WORK SHALL CONFORM BUILDING STANDARDS, AND WHERE REQUIRED SHALL BE SUBMITTED TO APPROPRIATE AGENCIES AND PUBLIC JURISDICTIONS FOR INSPECTION AND APPROVAL.
27. PROOF OF INSPECTION, AND APPROVAL OF SHOP DRAWINGS, OPERATING AND MAINTENANCE MANUALS, VALVE SCHEDULES, AND ALL OTHER PERTINENT INFORMATION SHALL BE FILED WITH THE BUILDING OWNER PRIOR TO ACCEPTANCE OF WORK.
28. THE LOCATION OF PIPING, DUCTS, CONDUITS, OR OTHER EQUIPMENT OUTSIDE OF THIS FLOOR SHALL BE REVIEWED TO LIMIT WORK AND MINIMIZE THE DISTURBANCE TO OTHER TENANTS.
29. BUILDING OWNER APPROVAL SHALL BE OBTAINED PRIOR TO UTILITIES SHUT DOWN.
30. DEPARTMENT OF BUILDINGS APPROVAL SHALL BE OBTAINED, AND ISSUED PERMITS ON SITE PRIOR TO COMMENCEMENT OF ANY WORK.
31. IT IS THE INTENT THAT THE FOREGOING WORK SHALL BE COMPLETE IN EVERY RESPECT AND THAT ANY MATERIAL OR WORK NOT SPECIFICALLY MENTIONED OR SHOWN ON THE DRAWINGS, BUT NECESSARY TO FULLY COMPLETE THE WORK SHALL BE PROVIDED.
32. ALL EXPOSED CONDUIT TO BE LOCATED IN FIELD WITH OWNER PRIOR TO INSTALLATION.
33. ALL EXPOSED CONDUIT TO BE PAINTED. VERIFY COLOR WITH OWNER.
34. ALL ELECTRICAL ROUGH–IN: EQUIPMENT LAYOUT TO BE VERIFIED IN FIELD WITH OWNER PRIOR TO INSTALLATION.
35. USE LIGHTING PLAN FOR CIRCUITING ONLY. CONTRACTOR TO USE FINISH RCP PLAN FOR LIGHT FIXTURE SPECS. COUNT AND LOCATION.
36. DATA PORT INDICATED ON POWER PLANS IS FOR REFERENCE ONLY. CONTRACTOR TO USE FINISH LOW VOLTAGE PLANS & NOTES FOR SPEC'S, COUNT, LOCATION AND INSTALLATION.

ELECTRICAL LEGEND

◬	SPECIALTY SIMPLEX ELECTRICAL OUTLET. NUMBER INDICATES CIRCUIT NUMBER. 15A, 208V, NEMA 6–15R. 20A, 208V, NEMA 6–20R OR 30A, 208V, NEMA 6–30R.
⊖	DUPLEX ELECTRICAL OUTLET. NUMBER INDICATES CIRCUIT NUMBER.
⊖ GFI	DUPLEX ELECTRICAL OUTLET. NUMBER INDICATES CIRCUIT NUMBER AND "GFI" INDICATES GROUND FAULT INTERRUPT.
⊕	QUAD ELECTRICAL OUTLET. NUMBER INDICATES CIRCUIT NUMBER AND "GFI" INDICATES GROUND FAULT INTERRUPT.
Ⓙ	WALL/CEILING JUNCTION BOX WITH 3/4" (U.O.N.) DIA. CONDUIT STUB–UP 6" ABOVE FINISHED CEILING.
S_T	THERMAL SWITCH
◢	EXISTING PANELBOARD
▭ 30A	HEAVY DUTY TYPE NON–FUSED DISCONNECT SWITCH WITH FINAL FLEXIBLE EQUIPMENT CONNECTION. 30A INDICATES AMPERE RATING 'WP' WHERE USED INDICATES WEATHERPROOF ENCLOSURE (NEMA 3R).
GFI	GROUND FAULT INTERRUPTER
WP	WEATHERPROOF
ME–#	HOME RUN TO DESIGNATED PANEL AND CIRCUIT #
∈□	MANUALLY OPERATED REMOTE SHUTDOWN SWITCH

EXISTING PANEL SCHEDULE "B" (NOT SHOWN ON PLAN)

PANEL "B" BASEMENT — BUS 200 AMP MAIN CIRCUIT BREAKER — VOLTAGE 120/208V, 3PH, 4 WIRE
LOAD – — POLES 30
MOUNTING SURFACE — SPEC — AIC SYMM 10,000

DESCRIPTION	WIRE	GRD.	COND.	TRIP	CKT.	KVA A PHASE		KVA B PHASE		KVA C PHASE		CKT.	TRIP	COND.	GRD.	WIRE	DESCRIPTION	
EXISTING				30A	1	–	–					2	70A				EXISTING	
					3			–	–			4						
EXISTING				20A	5					–	–	6	20A				EXISTING	
EXISTING				20A	7	–	–					8						
EXISTING				20A	9			–	–			10	20A				EXISTING	
EXISTING				20A	11					–	–	12						
EXISTING				20A	13	–	–					14	50A				EXISTING	
EXISTING				20A	15			–	–			16						
EXISTING				20A	17					–	5164	18	70A	1"	10	6	HP–1 (MODULE 1)	1
EXISTING				20A	19	–	5164					20					$\boxed{1}$	
EXISTING				20A	21			–	5164			22						
EXISTING				15A	23					–	–	24	20A				EXISTING	
				20A	25	–	5164					26	70A	1"	10	6	HP–1 (MODULE 2)	1
SPACE	–	–	–		27			–	5164			28					$\boxed{1}$	
SPACE	–	–	–		29					–	5164	30						
				SUBTOTAL		XXX		XXX		XXX								
				TOTAL DESIGN LOAD		XXXXX va		XX.X amps										
				TOTAL CONNECTED LOAD		XXXXX va		XX.X amps										
				125% TOTAL LOAD		XX.X kva		XX.X amps										

$$\left(\frac{XXX\ \ KVA}{208V * \sqrt{3}}\right) = \text{AMPERES}$$

EXISTING PANEL SCHEDULE "P1"

PANEL "P1" — BUS 125 AMP MAIN LUGS ONLY — VOLTAGE 120/208V, 1PH, 3 WIRE
LOAD – — POLES 20
MOUNTING RECESSED — SPEC — AIC SYMM 10,000

DESCRIPTION	WIRE	GRD.	COND.	TRIP	CKT.	KVA A PHASE		KVA B PHASE		CKT.	TRIP	COND.	GRD.	WIRE	DESCRIPTION
EXISTING				20A	1	XXX	XXX			2	20A				EXISTING
EXISTING				20A	3			XXX	XXX	4	20A				EXISTING
EXISTING				20A	5	XXX	XXX			6	20A				EXISTING
EXISTING				20A	7			XXX	XXX	8	20A				EXISTING
EXISTING				20A	9	XXX	XXX			10	20A				EXISTING
SPACE	–	–	–		11			XXX	XXX	12	20A				EXISTING
FCU–1 1	12	12	3/4"	20A	13	853	XXX			14	20A				EXISTING
					15			853	1212	16	20A	3/4"	12	12	ERV–1*
FCU–2 1	12	12	3/4"	20A	17	853	1212			18					
					19			853	200	20	20A	3/4"	12	12	MOTORIZED DAMPERS/CONTROL VALVES
				SUBTOTAL		XXX		XXX							
				TOTAL DESIGN LOAD		XXXXX va		XX.X amps							
				TOTAL CONNECTED LOAD		XXXXX va		XX.X amps							
				125% TOTAL LOAD		XX.X kva		XX.X amps							

$$\left(\frac{XXX\ \ KVA}{208V}\right) = \text{AMPERES}$$

853
1212
1212
953

EXISTING PANEL SCHEDULE "P2"

PANEL "P2" — BUS 100 AMP MAIN CIRCUIT BREAKER — VOLTAGE 120/208V, 1PH, 3 WIRE
LOAD – — POLES 24
MOUNTING RECESSED — SPEC — AIC SYMM 10,000

DESCRIPTION	WIRE	GRD.	COND.	TRIP	CKT.	KVA A PHASE		KVA B PHASE		CKT.	TRIP	COND.	GRD.	WIRE	DESCRIPTION
EXISTING				100A	1	XXX	XXX			2		–	–	–	SPACE
					3			XXX	XXX	4		–	–	–	SPACE
EXISTING				15A	5	XXX	XXX			6	15A				EXISTING
EXISTING				15A	7			XXX	XXX	8	15A				EXISTING
EXISTING				15A	9	XXX	XXX			10	15A				EXISTING
EXISTING				15A	11			XXX	XXX	12	15A				EXISTING
EXISTING				15A	13	XXX	XXX			14	15A				EXISTING
EXISTING				15A	15			XXX	XXX	16	15A				EXISTING
EXISTING				15A	17	XXX	XXX			18	15A				EXISTING
EXISTING				15A	19			XXX	XXX	20	15A				EXISTING
EXISTING				15A	21	XXX	XXX			22	15A				EXISTING
EXISTING				15A	23			XXX	XXX	24	15A				EXISTING
				SUBTOTAL		XXX		XXX							
				TOTAL DESIGN LOAD		XXXXX va		XX.X amps							
				TOTAL CONNECTED LOAD		XXXXX va		XX.X amps							
				125% TOTAL LOAD		XX.X kva		XX.X amps							

$$\left(\frac{XXX\ \ KVA}{208V}\right) = \text{AMPERES}$$

1. PROVIDE HACR TYPE CIRCUIT BREAKERS
2. PROVIDE LOCKING CLIPS
3. VERIFY POWER REQUIREMENTS FOR ACTUAL EQUIPMENT BEFORE INSTALLATION
4. PROVIDE GFI CIRCUIT BREAKER

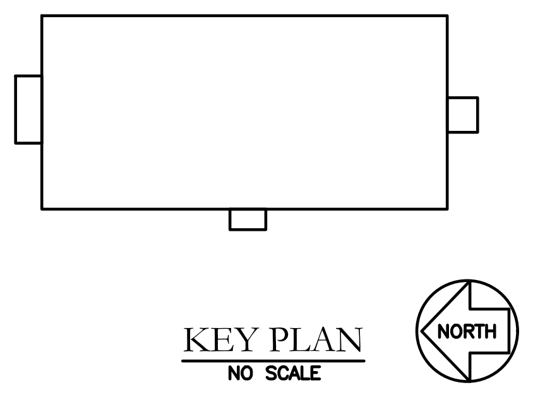
GENERAL NOTES:

1. PROVIDE MATCHING BRANCH CIRCUIT BREAKERS IN EXISTING PANELS FOR NEW LOADS AS SHOWN.

KEYED NOTES:

$\boxed{1}$ REMOVE ONE EXISTING 20A/1P CIRCUIT BREAKER (SLOT 26) AND REFEED CIRCUIT FROM A NEW 20A/1P CIRCUIT BREAKER IN EXISTING PANEL "P1" OR "P2" IN PLACE OF AN EXISTING 1P SPACE. PROVIDE TWO NEW 3P/70A CIRCUIT BREAKERS IN EXISTING PANEL "B" AS SHOWN. REMOVE EXISTING 3P/20A CIRCUIT BREAKER WHERE SHOWN.

REV	DATE	DESCRIPTION
–	12–17–21	100% SCHEMATIC DESIGN



KEY PLAN
NO SCALE

LFG
LANDMARK
FACILITIES
GROUP, INC.

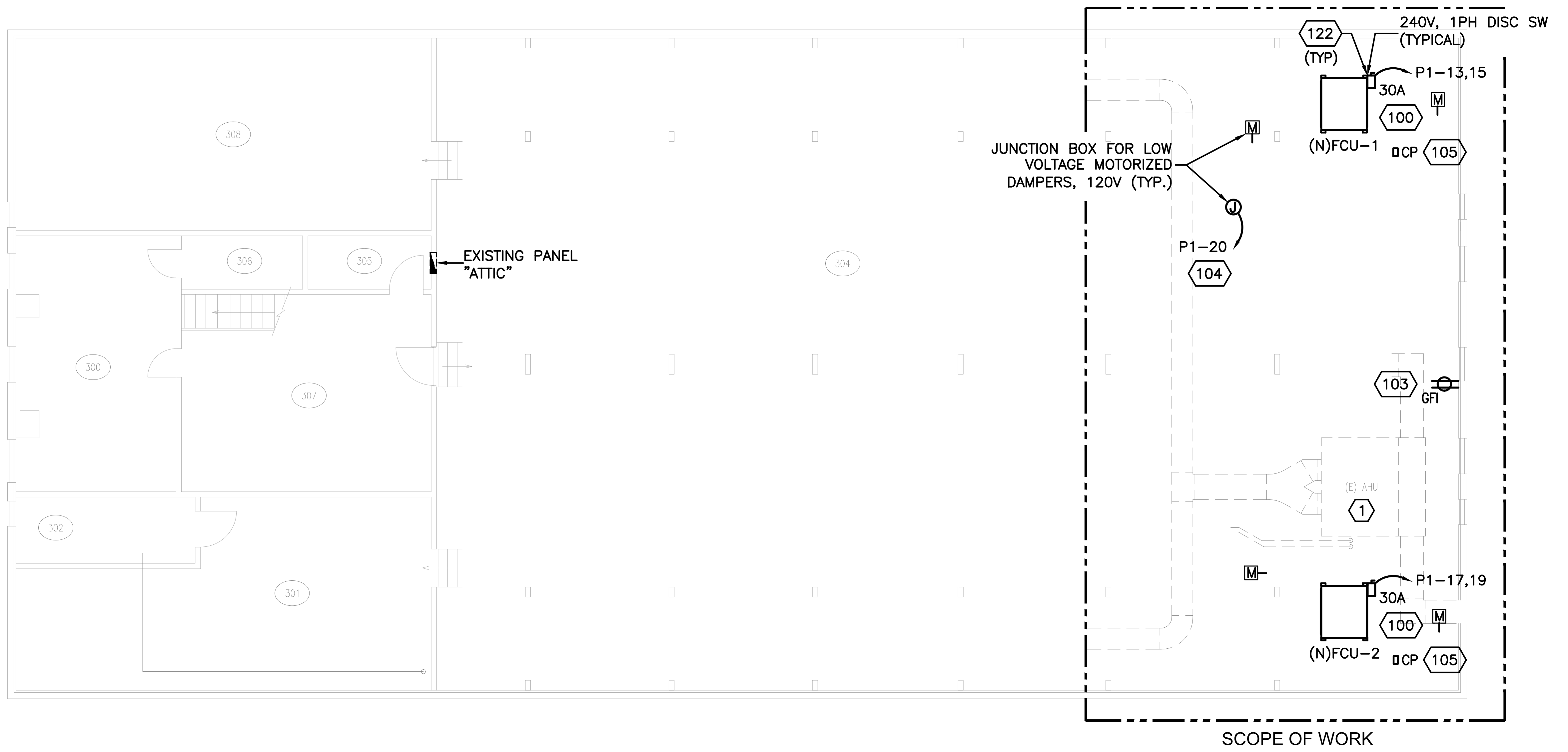
252 East Avenue
Norwalk, CT 06855
(203) 866-4626 Tel
(203) 866-8019 Fax

HVAC EQUIPMENT UPGRADES
SHAKER VILLAGE MTG. HOUSE
25 MTG. HOUSE RD., ALBANY NY 12211

SCALE: AS NOTED
DATE: 2021/12/15
APPROVED BY:
DRAWN BY: LFG
CHECKED BY: RS

ELECTRICAL NOTES,
LEGEND & SCHEDULE

FILE NAME: \DIR\DWG
JOB NUMBER: 1155.003
DRAWING NUMBER: E-002



THIRD FLOOR PROPOSED ELECTRICAL PLAN

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

GENERAL NOTES:

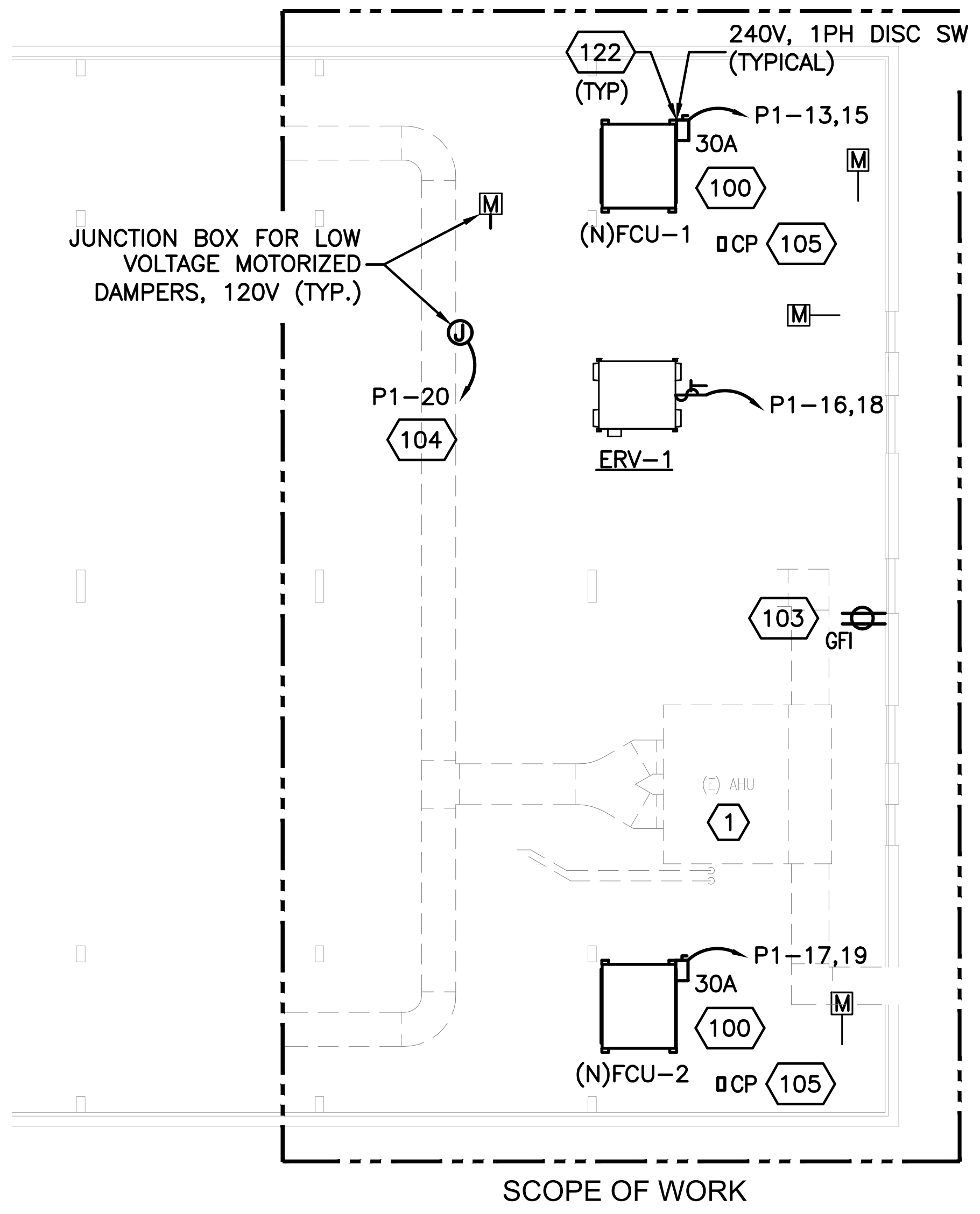
1. THE DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE NOT INTENDED TO SHOW EVERY FITTING (i.e. PULL BOX), ETC. THE CONTRACTOR SHALL COORDINATE WITH ALL TRADES PRIOR TO INSTALLATION OF ANY MATERIAL OR EQUIPMENT.
2. ELECTRICAL CONTRACTOR SHALL FIELD VERIFY ALL EQUIPMENT ELECTRICAL REQUIREMENTS WITH EXACT EQUIPMENT PROVIDED AND COORDINATE WITH EQUIPMENT SPECIFICATIONS PRIOR TO INSTALLATION. NOTIFY ENGINEER IF ELECTRICAL DEVICES AND FEEDER SIZES REQUIRE ADJUSTING TO SUIT ANY DISCREPANCIES.
3. COORDINATE WITH OWNER/ARCHITECT FOR EXACT DEVICE LOCATIONS AND MOUNTING REQUIREMENTS FOR ALL ELECTRICAL DEVICES AND FIXTURES.
4. ALL EXPOSED CONDUIT SHALL BE LOCATED IN FIELD WITH OWNER PRIOR TO INSTALLATION. EXPOSED CONDUIT TO BE PAINTED, COLOR TO BE DETERMINED.

POWER CODED NOTES

100	CONNECT TO DESIGNATED EXISTING PANEL AS NOTED WITH A SPARE OR NEW DEDICATED 2P–20A CIRCUIT BREAKER. PROVIDE 2#12 + 1#12G WIRING IN 3/4"C FROM NEW EQUIPMENT TO EXISTING PANEL.
101	CONNECT TO DESIGNATED EXISTING PANEL AS NOTED WITH A SPARE OR NEW DEDICATED 3P–70A CIRCUIT BREAKER. PROVIDE 3#6 + 1#10G WIRING IN 1"C FROM NEW EQUIPMENT TO EXISTING PANEL.
102	WEATHERPROOF GFCI RECEPTACLE PROVIDED FOR SERVICING MECHANICAL EQUIPMENT WIRE TO EXISTING RECEPTACLE CIRCUIT IN ROOM OR AREA. COORDINATE LOCATION WITH G.C. PRIOR TO ROUGH–IN.
103	GFCI RECEPTACLE PROVIDED FOR CONVENIENCE FOR MECHANICAL EQUIPMENT WIRE TO EXISTING RECEPTACLE CIRCUIT IN ROOM OR AREA. COORDINATE LOCATION WITH G.C. PRIOR TO ROUGH–IN.
104	JUNCTION BOX FOR LOW VOLTAGE MOTORIZED DAMPERS AND/OR CONTROL VALVES SUPPLIED WITH 120V TRANSFORMER FOR CONTROL POWER. COORDINATE EXACT LOCATIONS AND REQUIREMENTS WITH MECHANICAL CONTRACTOR PRIOR TO ROUGH–IN.
105	CONNECT 120V CONDENSATE PUMP(S) (IF PROVIDED) TO 120V FEEDER FOR MECHANICAL EQUIPMENT IN ROOM OR AREA IF NOT INCLUDED IN ONE–POINT POWER CONNECTION FOR EQUIPMENT.
122	MOTOR STARTERS/DISCONNECT SWITCHES PROVIDED BY MECHANICAL CONTRACTOR, INSTALLED AND WIRED BY ELECTRICAL CONTRACTOR.

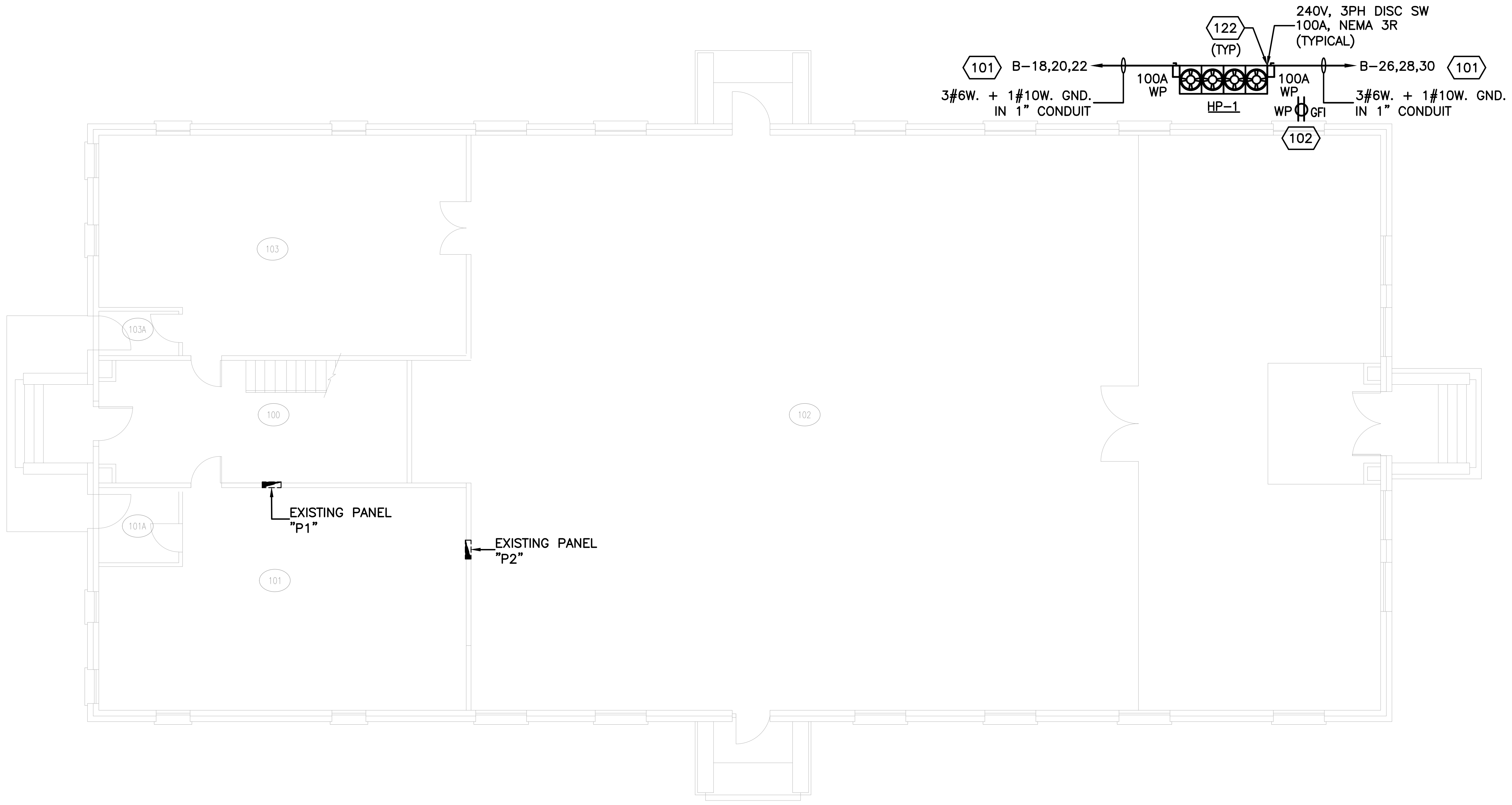
DEMOLITION CODED NOTES

1	REMOVE AND PROPERLY DISPOSE OF EXISTING ELECTRICAL EQUIPMENT AND DEVICES SERVING MECHANICAL EQUIPMENT TO BE REMOVED. REMOVE ALL CONDUIT AND CONDUCTORS BACK TO THEIR RESPECTIVE ELECTRICAL PANELS. FIELD VERIFY EXACT LOCATION OF EQUIPMENT AND DEVICES PRIOR TO BID. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION AND EXACT LOCATIONS OF MECHANICAL EQUIPMENT TO BE REMOVED.



THIRD FLOOR PROPOSED ELECTRICAL PLAN (ADD ALT.#1)

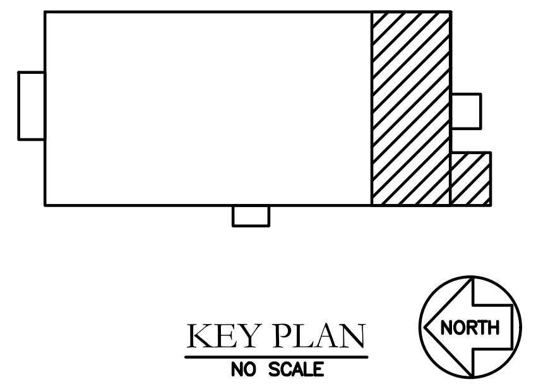
SCALE: 1/8" = 1'-0"



FIRST FLOOR PROPOSED ELECTRICAL PLAN

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

REV	DATE	DESCRIPTION
–	12–17–21	100% SCHEMATIC DESIGN



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NO SCALE

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LANDMARK
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HVAC EQUIPMENT UPGRADES
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25 MTG. HOUSE RD., ALBANY NY 12211

SCALE: AS NOTED	APPROVED BY:	DRAWN BY: LFG
DATE: 2021/12/15		CHECKED BY: RS

ELECTRICAL PLANS
FIRST & THIRD FLOORS

FILE NAME:	JOB NUMBER:	DRAWING NUMBER:
\DIR\DWG	1155.003	E-100