DUCTWORK NOTES

1. ALL DUCTWORK SIZES SHOWN ON THE DRAWINGS ARE INSIDE DIMENSIONS.
2. ALL DUCTWORK CONNECTIONS TO AIR MOVING EQUIPMENT SHALL BE MADE WITH FLEXIBLE DUCT CONNECTIONS ON THE INLET AND DISCHARGE OF ALL SUPPLY, RETURN AND EXHAUST FANS (EXCEPT ROOF MOUNTED EXHAUST FANS).
3. INSTALL TURNING VANES IN ALL SQUARE DUCT ELBOWS. INSTALL MANUAL VOLUME DAMPERS IN EACH BRANCH DUCT AT CONNECTION TO MAIN DUCT AND IN EACH DUCT AFTER A BRANCH DUCT SPLIT.
4. THE LOCATIONS SHOWN FOR ALL DIFFUSERS, REGISTERS AND GRILLES, ETC. ARE DIAGRAMMATIC. EXACT LOCATION SHALL BE DETERMINED FROM THE REFLECTED CEILING PLANS AND/OR ON THE JOB SITE BY THE CONSTRUCTION MANAGER REPRESENTATIVES.
5. INSTALL A MINIMUM 12"x12" ACCESS DOOR (INLET SIDE) AT EACH MOTORIZED DAMPER, FIRE DAMPER, SMOKE DAMPER, INTAKE AND EXHAUST PLENUMS AND AN ACCESS DOOR AT AIR SUPPLY UNIT FILTER SECTION.
6. INSTALL AMCA APPROVED FUSIBLE LINK FIRE DAMPERS IN ALL DUCTS WHICH PASS THROUGH FIRE RATED WALLS AND FLOORS AND AS INDICATED ON DRAWINGS. WHERE FIRE DAMPERS CANNOT BE CHECKED FROM A REGISTER OR GRILLE, INSTALL AN ACCESS DOOR IN THE DUCT NEXT TO THE DAMPER AND ACCESS PANEL IN ALL NEW ACCESSIBLE CEILINGS.
7. ALL DUCTS JOINTS SEALED WITH DUCT MASTIC OR APPROVED TAPE.
8. ALL DUCTWORK SHALL BE CONSTRUCTED TO SMACNA SEAL CLASS "A" STANDARDS.

CITY OF CHICAGO NOTES

1. ALL OUTSIDE AIR INTAKE OPENINGS SHALL BE LOCATED A MINIMUM OF 15'-0" AWAY FROM ANY EXHAUST, FLUES, VENTS AND ETC. AND A MINIMUM OF 10'-0" ABOVE PUBLIC WAY.
2. SEE REFRIGERANT SCHEDULE FOR PROJECT REFRIGERATION SCOPE AND NOTES.
3. ALL REFRIGERANT PIPING SHALL BE TYPE K COPPER. ALL JOINTS SHALL BE BRAZED.
4. COMBUSTION AIR, GAS PIPING, AND FLUES SHALL BE IN FULL COMPLIANCE WITH ARTICLES 7, 8, & 14 OF THE CITY OF CHICAGO MECHANICAL CODE (APPROVED 2015) AND THE LATEST VERSION OF THE INTERNATIONAL FUEL GAS CODE (IFGC) AS REFERENCED BY THE CITY OF CHICAGO CODE.
5. AIR PLENUMS: NO FLOOR DRAINS, SANITARY WASTE, AND VENT PIPING OR OTHER MATERIAL WITH POTENTIAL OF CONTAMINATING THE VENTILATION AIR SUPPLY SHALL BE LOCATED IN THE AIR PLENUMS.
6. DUCT SMOKE DETECTORS SHALL BE ACCESSIBLE FOR SERVICE.
7. ALL WORK PERFORMED AND EQUIPMENT INSTALLED UNDER THIS CONTRACT SHALL BE IN ACCORDANCE WITH ALL APPLICABLE CITY OF CHICAGO CODES.
8. ALL NEW DUCTWORK SHALL BE FABRICATED FROM PRIME FIRST QUALITY GALVANIZED SHEET METAL, UNLESS OTHERWISE NOTED. GAUGES OF METAL, HANGER SPACING, ETC. SHALL CONFORM TO THE LATEST EDITION OF SMACNA HVAC DUCT CONSTRUCTION STANDARDS FOR DUCT CONSTRUCTION (18-28-603.3). SEE SPECIFICATIONS FOR MORE DETAILS.
9. ALL FLEXIBLE LOW-PRESSURE DUCTWORK SHALL BE INSULATED, CHICAGO APPROVED AND NOT EXCEED 5'-0" IN LENGTH. MANUFACTURER TO BE WIREMOLD, TYPE WK UL-181, CLASS 1.
10. THE CONTRACTOR SHALL GURANTEE THAT THE PLENUM CHAMBER USED FOR RECIRCULATION OF AIR WILL BE OF TIGHT CONSTRUCTION AND THAT ALL SOURCES OF AIR CONTAMINATION FROM TRAPS, SOIL STACKS, DOWN SPOUTS, VENTS, EXHAUST DISCHARGES AND OTHER SOURCES WILL BE ENCLOSED SO THAT NO CONTAMINATED AIR WILL BE RECIRCULATED.
11. ALL EXPANSION VALVES, DEVICES AND CONNECTIONS SHALL BE REMOVED FROM THE AIRSTREAM OF ALL MECHANICAL EQUIPMENT AS PER CITY OF CHICAGO CODE. (13-192-380)

PIPING NOTES

1. ALL PIPING SHALL BE SUSPENDED WITH CLEVIS AND/OR TRAPEZE PIPE HANGERS. INSULATED PIPING SHALL REST ON STEEL OR WOOD PIPE COVERING PROTECTION SADDLES OR SHEET METAL INSULATION SHIELDS AS CALLED FOR IN THE SPECIFICATIONS AND/OR DETAILED ON THE DRAWINGS.
2. ALL PIPING PASSING THRU FLOOR CONSTRUCTION SHALL HAVE A SCHEDULE 40 STEEL PIPE SLEEVE INSTALLED AROUND PIPE ONLY. ALL PIPE PASSING THRU WALLS SHALL HAVE A GALVANIZED SHEET METAL OR SCHEDULE 40 STEEL PIPE SLEEVE INSTALLED AROUND THE PIPE AND PIPE INSULATION. SEE SLEEVE DETAILS THESE DRAWINGS.
3. SEE LARGE SCALE DRAWINGS (DETAILS) FOR ALL REQUIRED VALVES, FITTINGS, GAUGES, VENTS, THERMOMETERS WHICH ARE CONNECTED TO MECHANICAL EQUIPMENT. ALL WORK SHOWN ON DETAILS SHALL BE BY INSTALLING CONTRACTOR UNLESS OTHERWISE NOTED.
4. INSTALL A MANUAL SHUT OFF COCK AND DIRT LEG ON EACH BRANCH GAS LINE CONNECTED TO GAS FIRED EQUIPMENT.
5. MECHANICAL CONTRACTOR TO FURNISH AND INSTALL ALL GAS REGULATORS ON THE LEAVING SIDE OF THE GAS METER. ALL GAS REGULATORS WILL HAVE A VENT PIPE RUNNING TO A COMMON VENT HEADER WHICH TERMINATES 18" ABOVE THE ROOF WITH A GOOSENECK.
6. GAS PIPES MUST BE SLOPED AT 1/4 INCH IN EVERY 15 FEET. FUEL GAS PIPING CONTROLS MUST CONFORM TO THE IFGC, CHAPTER 4 (WITH MODIFICATIONS AS NOTED IN CHAPTER 14). GAS PIPING MATERIALS MUST CONFORM TO THE GAS PIPING & TUBING MATERIAL MATRIX (IFGC 403 REQUIREMENTS). PIPING IN CONCEALED LOCATIONS MUST CONFORM TO THIS IFGC 404.3. [IFGC 404.3].
7. MECHANICAL CONTRACTOR SHALL RUN INSULATED DRAIN PIPES FROM ALL HEATING/COOLING FAN COIL UNITS. SEE DRAWINGS AND DETAILS FOR LOCATION OF TERMINATION OF DRAIN PIPING. ALL CONDENSATE DRAIN PIPES MUST BE PITCHED AWAY FROM THE DRAIN PAN. ALL CONDENSATE DRAIN PIPES WILL BE INSULATED FROM UNIT TO TERMINATION POINT.

GENERAL NOTES

1. DRAWINGS ARE GENERALLY DIAGRAMMATIC. ROUTING OF PIPING AND DUCTWORK AS SHOWN DOES NOT INTEND TO SHOW EVERY RISE, DROP, OFFSET, FITTING NOR EVERY STRUCTURAL ELEMENT THAT MAY BE ENCOUNTERED DURING THE INSTALLATION OF THIS WORK. EACH CONTRACTOR SHALL MAKE ANY REQUIRED CHANGES FROM THE GENERAL ROUTING SHOWN ON THESE DRAWINGS, SUCH AS OFFSETS, BENDS OR CHANGES IN ELEVATION DUE TO COORDINATION WITH THE WORK OF OTHER TRADES AND BUILDING CONSTRUCTION. ALL CHANGES SHALL BE MADE WITHOUT ADDITIONAL COST TO THE OWNER OR DELAY IN COMPLETION DATE OF THE PROJECT.
2. IT IS INTENDED THAT EQUIPMENT SHALL BE LOCATED SYMMETRICALLY WITH THE ARCHITECTURAL ELEMENTS OF THE BUILDING, NOTWITHSTANDING THE FACT THAT LOCATIONS INDICATED BY THESE DRAWINGS MAY BE DISTORTED FOR CLEARNESS OF PRESENTATION.
3. CONTRACTOR SHALL CHECK DRAWINGS OF OTHER TRADES TO VERIFY THAT SPACES IN WHICH THEIR WORK WILL BE INSTALLED ARE CLEAR OF OBSTRUCTIONS. WORK SHALL BE INSTALLED TO MAINTAIN MAXIMUM HEADROOM AND SPACE CONDITION AT ALL POINTS IN THE BUILDING. WHERE HEADROOM OR SPACE CONDITIONS APPEAR INADEQUATE, CONTRACTOR SHALL NOTIFY ARCHITECT/ENGINEER BEFORE PROCEEDING WITH THE INSTALLATION OF THEIR WORK. DUCT TO BE INSTALLED AS TIGHT TO THE UNDERSIDE OF THE DECK AS CLEARANCES ALLOW TO MAXIMIZE CEILING HEIGHT.
4. CONTRACTOR SHALL FURNISH OTHER TRADES ADVANCE INFORMATION AND/OR SHOP DRAWINGS ON LOCATIONS AND SIZES OF PIPING, DUCTWORK, CONDUIT, RACEWAYS, EQUIPMENT, FRAMES, BOXES, SLEEVES AND OPENINGS, ETC. NEEDED FOR THEIR WORK TO PERMIT OTHER TRADES AFFECTED TO INSTALL THEIR WORK PROPERLY AND WITHOUT DELAY.
5. WHERE THERE IS EVIDENCE THAT WORK OF ONE TRADE WILL INTERFERE WITH WORK OF OTHER TRADES, ALL TRADES SHALL MEET ON JOB SITE TO WORK OUT SPACE CONDITIONS AND MAKE SATISFACTORY ADJUSTMENTS TO INSTALLATION OF THE NEW WORK. CONTRACTORS SHALL VERIFY EXACT LOCATIONS OF ALL DEVICES AND EQUIPMENT WITH FIELD CONDITIONS, SHOP DRAWINGS, AND WORK OF OTHER TRADES PRIOR TO ROUGH-IN. CONTRACTOR SHALL BE RESPONSIBLE, AT THEIR OWN EXPENSE, FOR THE REMOVAL AND REINSTALLATION OF ANY PART OF THEIR WORK IF SAME WAS INSTALLED WITHOUT CONSULTING WITH OTHER TRADES BEFORE INSTALLING THEIR WORK.
6. CONTRACTOR SHALL PROVIDE SLEEVES IN BEAMS, FLOORS, COLUMNS AND WALLS AS SHOWN ON THE DRAWINGS, AS REQUIRED BY JOB SITE CONDITIONS, AND/OR AS SPECIFIED, WHEN INSTALLING THEIR WORK. ALL BEAMS AND COLUMNS WHICH ARE REQUIRED TO BE SLEEVED SHALL BE CUT AND REINFORCED AS REQUIRED BY FIELD CONDITIONS AND LOCATIONS AND SIZES SHALL BE CHECKED AND APPROVED BY STRUCTURAL ENGINEERS BEFORE CONTRACTOR CUTS ANY STRUCTURAL BUILDING MEMBER.
7. THE SEQUENCE FOR THE INSTALLATION OF ALL WORK SHALL BE COORDINATED BETWEEN ALL CONTRACTORS ON THE PROJECT AND IN STRICT ACCORDANCE WITH CONSTRUCTION MANAGER AND OWNERS STIPULATION AS CALLED FOR IN THE SPECIFICATION AND/OR AS DIRECTED.
8. CONTRACTOR SHALL REFER TO THE ARCHITECTURAL AND STRUCTURAL CONTRACT DRAWINGS (BEFORE SUBMITTING THEIR BIDS) TO FAMILIARIZE THEMSELVES WITH THE EXTENT OF THE OTHER TRADES CONTRACTORS WORK, CEILING HEIGHTS AND CLEARANCE FOR INSTALLING THEIR WORK.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR THEIR OWN CLEAN-UP DURING CONSTRUCTION. IF CONTRACTOR FAILS TO PROVIDE SUCH CLEAN-UP, THE ARCHITECT/ENGINEER WILL DIRECT ANOTHER CONTRACTOR TO PERFORM THE CLEAN-UP AND THE NEGLIGENT CONTRACTOR SHALL PAY THE ASSOCIATED BACK-CHARGES AS DEEMED APPROPRIATE BY THE CONSTRUCTION MANAGER.
10. CONTRACTOR SHALL STORE ALL MATERIALS AND EQUIPMENT SHIPPED TO THE SITE IN A PROTECTED AREA. IF MATERIAL IS STORED OUTSIDE OF THE BUILDING, IT MUST BE STORED OFF THE GROUND A MINIMUM OF SIX INCHES (6") SET ON 6 X 6 PLANKS AND/OR WOOD PALLETS. ALL MATERIAL AND EQUIPMENT MUST BE COMPLETELY COVERED WITH WATERPROOF TARPS OR VISQUIN. ALL PIPING AND DUCTWORK WILL HAVE THE ENDS CLOSED TO KEEP OUT DIRT AND OTHER DEBRIS. NO EQUIPMENT WILL BE ALLOWED TO BE STORED ON THE SITE UNLESS IT IS SITTING ON WOOD PLANKS AND COMPLETELY PROTECTED WITH WEATHERPROOF COVERS.
11. THE DRAWINGS, SCHEDULES AND SPECIFICATIONS HAVE BEEN PREPARED USING ONE MANUFACTURER FOR EACH PIECE OF EQUIPMENT AS THE BASIS FOR DIMENSIONAL DESIGN. IF THE CONTRACTOR PURCHASES EQUIPMENT LISTED AS A SPECIFIED ACCEPTABLE MANUFACTURER BUT IS NOT THE SCHEDULED MANUFACTURER USED FOR THE BASE DESIGN, THE CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING ALL THE DIMENSIONS OF THE EQUIPMENT TO VERIFY THAT IT WILL FIT IN THE SPACE SHOWN ON THE DRAWINGS. MINOR DEVIATIONS IN DIMENSIONS WILL BE PERMITTED, PROVIDED THE RATINGS MEET THOSE SHOWN ON THE DRAWINGS AND EQUIPMENT WILL PHYSICALLY FIT INTO THE SPACE ALLOCATED WITH SUITABLE ACCESS AROUND EQUIPMENT FOR OPERATION AND MAINTENANCE ON THE EQUIPMENT.
12. CONTRACTOR AND/OR MANUFACTURER SHALL VERIFY THAT THE CHARACTERISTICS OF THE EQUIPMENT THEY SUBMIT FOR REVIEW MEETS THE CAPACITY AND DUTY SPECIFIED. WHEN EQUIPMENT IS SUBMITTED FOR REVIEW AND DOES NOT MEET THE PHYSICAL SIZE OR ARRANGEMENT OF THAT SCHEDULED AND SPECIFIED, CONTRACTOR SHALL PAY FOR ALL ALTERATIONS REQUIRED TO ACCOMMODATE SUCH EQUIPMENT AT NO ADDITIONAL COST TO OWNER. CONTRACTOR WILL ALSO PAY ALL COSTS FOR ADDITIONAL WORK REQUIRED BY OTHER CONTRACTORS, OWNER, ARCHITECT OR ENGINEER TO MAKE CHANGES WHICH WOULD ALLOW THE EQUIPMENT TO FIT IN THE SPACE AND FUNCTION AS INTENDED.
13. MECHANICAL CONTRACTOR SHALL PROVIDE ON SITE TRAINING OF OWNERS OPERATING PERSONNEL FOR ALL SYSTEMS AND EQUIPMENT INSTALLED UNDER THEIR CONTRACT.
14. BEFORE STARTING ANY SYSTEM INSTALLING CONTRACTOR SHALL CONTACT EQUIPMENT MANUFACTURER TO VERIFY THAT EACH PIECE OF EQUIPMENT OR SYSTEM HAS BEEN CHECKED FOR PROPER LUBRICATION, DRIVE ROTATION, BELT TENSION, CONTROL SEQUENCE OR OTHER CONDITIONS WHICH MAY CAUSE DAMAGE TO THE EQUIPMENT.
15. CONTRACTOR AND/OR MANUFACTURER SHALL VERIFY THAT THE CHARACTERISTICS OF THE EQUIPMENT THEY SUBMIT FOR REVIEW MEETS THE CAPACITY AND DUTY SPECIFIED.
16. THE MECHANICAL CONTRACTOR TO PROVIDE 1/4 INCH SCALE PIPING AND DUCTWORK DRAWINGS FOR COORDINATION WITH OTHER TRADES. DRAWINGS TO INDICATE DIMENSIONS AND ELEVATIONS OF ALL PIPING AND DUCTWORK. DRAWINGS TO ALSO INCLUDE ALL WALL/FLOOR/ROOF OPENINGS.

MECHANICAL GENERAL NOTES

1. CONTRACTOR SHALL ABIDE BY CONDITIONS OF CONTRACT AGREEMENT AND DIVISION 01 SPECIFICATIONS
2. ALL WORK SHALL BE IN ACCORDANCE WITH DIVISION 23 SPECIFICATIONS.
3. ALL AIR MOVING EQUIPMENT SHALL BE INSTALLED WITH VIBRATION ISOLATORS AND PROVIDED WITH FLEXIBLE DUCT CONNECTIONS.
4. ALL EQUIPMENT SHALL HAVE TOTALLY ENCLOSED MOTORS AND BE RATED TO OPERATE IN PLENUM CEILINGS, INCLUDING ALL SUPPLY AIR AND RETURN AIR FAN MOTORS EXPOSED TO THE AIR STREAM.
5. ALL DUCT SIZES INDICATED ON PLANS AND RISERS ARE CLEAR INTERNAL DIMENSIONS. DUCT SIZES NOT SHOWN SHALL BE SIZED TO VELOCITIES NO GREATER THAN UPSTREAM SECTIONS USING SIMILAR ASPECT RATIOS.
6. ALL SUPPLY AIR TAKEOFFS FROM MAIN TRUNK DUCTS ARE TO BE INSTALLED WITH BELLMOUTH FITTINGS OR 45 DEGREE ENTRY TO PROVIDE THE SMOOTHEST AIR FLOW POSSIBLE.
7. PROVIDE GUIDES, HANGERS, EXPANSION LOOPS AND SUPPLEMENTARY STEEL SUPPORT WHERE REQUIRED FOR ALL PIPING.

MECHANICAL SYMBOLS LEGEND

ABBREVIATIONS:

AFF	ABOVE FINISHED FLOOR
BOD	BOTTOM OF DUCT
BTU	BRITISH THERMAL UNIT
CFM	CUBIC FEET PER MINUTE
DB	DRY BULB
EAT	ENTERING AIR TEMPERATURE
ESP	EXTERNAL STATIC PRESSURE
FOB	FLAT ON BOTTOM
HZ	FREQUENCY
NC	NOISE CRITERIA
PSI	POUNDS PER SQUARE INCH
RTU	ROOFTOP UNIT
TYP	TYPICAL
WC	WATER COLUMN
WB	WET BULB

GRILLES/DIFFUSERS:

- SUPPLY DIFFUSER
- SUPPLY DIFFUSER WITH 3-WAY THROW
- SUPPLY DIFFUSER WITH 2-WAY THROW
- SIDEWALL MOUNTED SUPPLY REGISTER
- RETURN GRILLE
- EXHAUST GRILLE
- LINEAR DIFFUSER

EQUIPMENT:

- ROOF MOUNTED EXHAUST FAN
- CEILING MOUNTED EXHAUST FAN
- FAN COIL UNIT
- MAKE-UP AIR UNIT
- TS — TEMPERATURE SENSOR - ELECTRIC
- T — THERMOSTAT
- CO2 — CARBON DIOXIDE SENSOR
- SD — DUCT SMOKE DETECTOR
- A — AUDIO/VISUAL REMOTE SMOKE DETECTOR ANNUNCIATOR
- H — HUMIDITY SENSOR

DOUBLE LINE DUCT SYMBOLS:

- NEW SHEET METAL DUCTWORK
- SUPPLY OR OUTSIDE AIR DUCT
- RETURN AIR DUCT
- EXHAUST AIR DUCT
- DUCTWORK TRANSITION
- DUCTWORK TRANSITION - RECTANGULAR TO ROUND
- SUPPLY DUCT ELBOW UP OR DOWN
- RETURN DUCT ELBOW UP OR DOWN
- EXHAUST DUCT ELBOW UP OR DOWN
- DUCT ELBOW WITH FIXED TURNING VANES
- DUCT BRANCH TAKE-OFF
- ROUND SPIN-IN WITH DAMPER
- SQUARE TO ROUND TAP WITH DAMPER
- FLEXIBLE DUCT CONNECTION
- VOLUME DAMPER
- BD — BACKDRAFT DAMPER
- FLEXIBLE DUCTWORK

GENERAL REFERENCES/NOTATIONS:

- CONNECT TO EXISTING
- # — NOTE DESIGNATION
- # — REVISION DESIGNATION
- TYPE / # — MECHANICAL EQUIPMENT DESIGNATION
- TAG / CFM — DIFFUSER DESIGNATION AND CFM

SYMBOLS LEGEND NOTES:

1. REFER TO SPECIFICATIONS AND PLAN NOTES FOR DETAILED DESCRIPTION OF ALL DEVICES SHOWN IN THIS SCHEDULE.
2. PROJECT MAY NOT USE EVERY SYMBOL OR DEVICE INDICATED ON THIS LEGEND.

MECHANICAL GENERAL NOTES (CONTINUED)

8. ANY DISCREPANCY BETWEEN DRAWINGS, SPECIFICATIONS AND NOTES SHALL BE CLEARED WITH ENGINEER BEFORE THE BIDDING. NO EXTRAS SHALL BE ALLOWED FOR CLARIFICATIONS DURING CONSTRUCTION.
9. MECHANICAL CONTRACTOR SHALL SEAL ALL MECHANICAL PENETRATIONS THRU FIRE RATED FLOORS AND PARTITIONS WITH FIRE RATED MATERIAL INSTALLED PER MANUFACTURERS GUIDELINES AND U.L. REQUIREMENTS. MATERIAL SELECTION SHALL BE BASED ON RATING OF PARTITION PENETRATED. SEE ARCHITECTURAL DRAWINGS FOR FIRE RATINGS OF WALLS AND FLOORS
10. ALL GAS FIRED APPLIANCES SHALL BE VENTED IN ACCORDANCE WITH CHICAGO BUILDING CODE ARTICLE 8 - CHIMNEYS AND VENTS, THE 2012 INTERNATIONAL FUEL GAS CODE AND NFPA 31.
11. NOISE LEVEL AT LOT LINE SHALL NOT EXCEED 55 DBA.
12. ALL NATURAL GAS PIPEWORK SHALL BE SCHEDULE 40 STEEL PIPE WITH THREADED FITTINGS BELOW 2" AND WELDED FITTINGS ABOVE 2".

DEMOLITION NOTES

1. ALL DEMOLITION WORK SHALL BE PERFORMED WITH DUE CARE AND DILIGENCE SO AS TO PREVENT THE UNNECESSARY DESTRUCTION AND / OR DAMAGE TO SYSTEMS THAT SHALL REMAIN IN OPERATION AT THE CONCLUSION OF THIS WORK. DETERMINE THE EXACT LOCATION OF ALL EXISTING EQUIPMENT, DEVICES AND WIRING BEFORE COMMENCING WORK.
2. LOCATE AND PRESERVE ALL PORTIONS OF THE EXISTING HVAC SYSTEMS WHICH SHALL REMAIN.
3. CONTROLS DEVICES AND WIRING ARE NOT SHOWN ON THE DEMOLITION PLAN AND SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
4. THE CONTRACTOR SHALL DETERMINE THE EXACT LOCATION OF ALL EXISTING HVAC DEVICES, EQUIPMENT, AND WIRING BEFORE COMMENCING WORK. THE CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGED THAT MIGHT OCCUR BECAUSE OF THE CONTRACTORS FAILURE TO ACCURATELY DISCOVER, LOCATE, AND PROTECT ANY AND ALL PORTION OF THE EXISTING HVAC SYSTEM.
5. REMOVE AND REINSTALL (OR PROTECT IN PLACE) ALL EXISTING EQUIPMENT AND DEVICES TO REMAIN ON OR IN WALLS, CEILINGS AND FLOORS WHICH SHALL BE EXPOSED TO DEMOLITION AND CONSTRUCTION ACTIVITIES AND WHICH MAY BE DAMAGED BY DUST, DEBRIS, ETC.
6. WHERE EXISTING EQUIPMENT AND DEVICES SHALL BE REMOVED, THE CONTRACTOR SHALL REMOVE ALL THE ASSOCIATED DUCTWORK, PIPING, AND CONTROLS THAT SHALL NOT REMAIN IN OPERATION BACK TO THEIR RESPECTIVE SOURCE OR TO THE POINT ON A SHARED SYSTEM FROM WHERE THE EQUIPMENT OR DEVICE IS SERVED.
7. RELOCATE AS NECESSARY ALL EXISTING DUCTWORK, PIPING AND CONTROLS FOUND PASSING THROUGH THE AREA OF CONSTRUCTION, AND WHICH ARE PRESENTLY IN USE TO THE OTHER PORTIONS OF THE BUILDING UNAFFECTED BY THIS PROJECT PHASE. MAINTAIN THE CONTINUITY OF SERVICES AND GROUNDING, AND CONCEAL THEM ABOVE NEW CEILINGS.
8. ALL EXISTING DAMAGED DUCTWORK, GRILLES AND DEVICES WITHIN THE AREA OF CONSTRUCTION AND SHOWN TO REMAIN IN OPERATION SHALL BE REPLACED WITH NEW MATERIALS CONFORMING TO THESE CONTRACT DOCUMENTS.
9. ALL EQUIPMENT, DEVICES AND MATERIALS REMOVED DURING DEMOLITION WORK AND NOT INDICATED TO BE REUSED OR TURNED OVER TO THE USING AGENCY SHALL BECOME THE RESPONSIBILITY OF THE CONTRACTOR FOR DISPOSAL.
10. THE CONTRACTOR SHALL PROVIDE ALL CUTTING AND PATCHING NECESSARY TO REPAIR ANY DAMAGE CAUSED BY CONSTRUCTION ACTIVITIES PERFORMED BY THE CONTRACTOR. THIS WORK INCLUDES AREAS OUTSIDE ANY LIMITS OF CONSTRUCTION LINES SHOWN ON THE DRAWINGS.

ENERGY NOTES

1. MOTORIZED DAMPERS SHALL BE INSTALLED ON ALL INTAKES AND EXHAUST OPENINGS UNLESS NOTED OTHERWISE.
2. MAXIMUM FAN NAMEPLATE HORSEPOWER SHALL NOT EXCEED 1.1 HP/1000CFM.
3. LOAD CALCULATIONS WERE BASED ON ASHRAE 2021 FUNDAMENTALS
4. ALL PROGRAMMABLE THERMOSTATS SHALL HAVE 5 DEGREE DEADBAND AND SHALL HAVE 7-DAY CLOCK, 2-HOUR MANUAL OVERRIDE, 10 HOUR BACKUP AND SETBACK CAPABLE OF 55 DEGREES HEATING AND 85 DEGREES COOLING. (EXCEPT CONTINUOUS OPERATING ZONES)
6. ALL DUCTWORK SHALL BE SEALED PRESSURE SENSITIVE TAPE IS NOT USED AS THE PRIMARY SEALANT. LONGITUDINAL AND TRANSVERSE SEAMS FOR DUCTS IN UNCONDITIONED SPACES AND WALL PENETRATIONS. TRANSVERSE SEAMS ON BURIED DUCTS.
7. ALL MOTORS SHALL MEET THE REQUIREMENTS OF 2021 IECC.
8. PROVIDE COMMISSIONING PER 2021 IECC.

OWNER'S REQUIREMENTS

1. ALL CONTROL WORK SHALL BE CONTRACTED WITH JOHNSON CONTROLS.
2. CONTRACTOR SHALL BE REQUIRED TO REVIEW ANY NEW OR DEMOLISHED FIRE DAMPERS WITH NM FACILITIES TEAM. DEMOLISHED FIRE DAMPERS SHALL BE REMOVED FROM THE MASTER BUILDING LOG AND NEW DAMPERS ADDED. CONTRACTOR SHALL INSTALL NM PROVIDED BAR CODES ON ALL NEW FIRE DAMPERS.
3. CONTRACTOR SHALL BE REQUIRED TO TEST THE FIRE DAMPER AND CERTIFY ON IDPH MATRIX 4E THAT THE DAMPER OPERATES PROPERLY AND IS ACCESSIBLE. CONTRACTOR SHALL ALSO TEST AND INCLUDE IN IDPH MATRIX 4E ANY EXISTING FIRE DAMPERS IN THE AREA OF WORK THAT ARE EXISTING TO REMAIN.
4. CONTRACTOR SHALL CONTRACT THE TEST AND BALANCING SERVICES TO NM APPROVED VENDOR ONLY.
5. ALL TEST AND BALANCING ACTIVITIES SHALL BE COORDINATED WITH NM FACILITIES PRIOR TO THE START OF WORK.

DESIGN CRITERIA

BASED ON ASHRAE HANDBOOK - 2021 FUNDAMENTALS

CHICAGO, IL

OUTDOOR DESIGN CONDITION (WITH AMENDMENTS)

0.4% COOLING: 95°/75°F DB/WB

99.6% HEATING: -10°F DB

INDOOR DESIGN CONDITION (ADJUSTABLE)

SUMMER: 75°F DB/50% RH

WINTER: 70°F DB

RENOVATION LEGEND

<E>	EXISTING TO REMAIN
<ED>	EXISTING LOCATION (NEW DEVICE OR EQUIPMENT TO BE INSTALLED IN PLACE)
<ER>	EXISTING TO BE RELOCATED
<X>	EXISTING TO BE REMOVED
<EN>	EXISTING IN NEW LOCATION
<N>	NEW

APPLICABLE CODES / STANDARDS

- CITY OF CHICAGO MECHANICAL CODE
- 2021 INTERNATIONAL ENERGY CONSERVATION CODE
- SMACNA DUCT CONSTRUCTION STANDARDS

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AOR PROJECT NUMBER: CAV061

ISSUE	DATE
PERMIT SET	10/09/2024
LANDLORD/BID	11/08/2024
CONSTRUCTION SET	01/29/2025

MECHANICAL GENERAL NOTES, SYMBOLS & LEGEND

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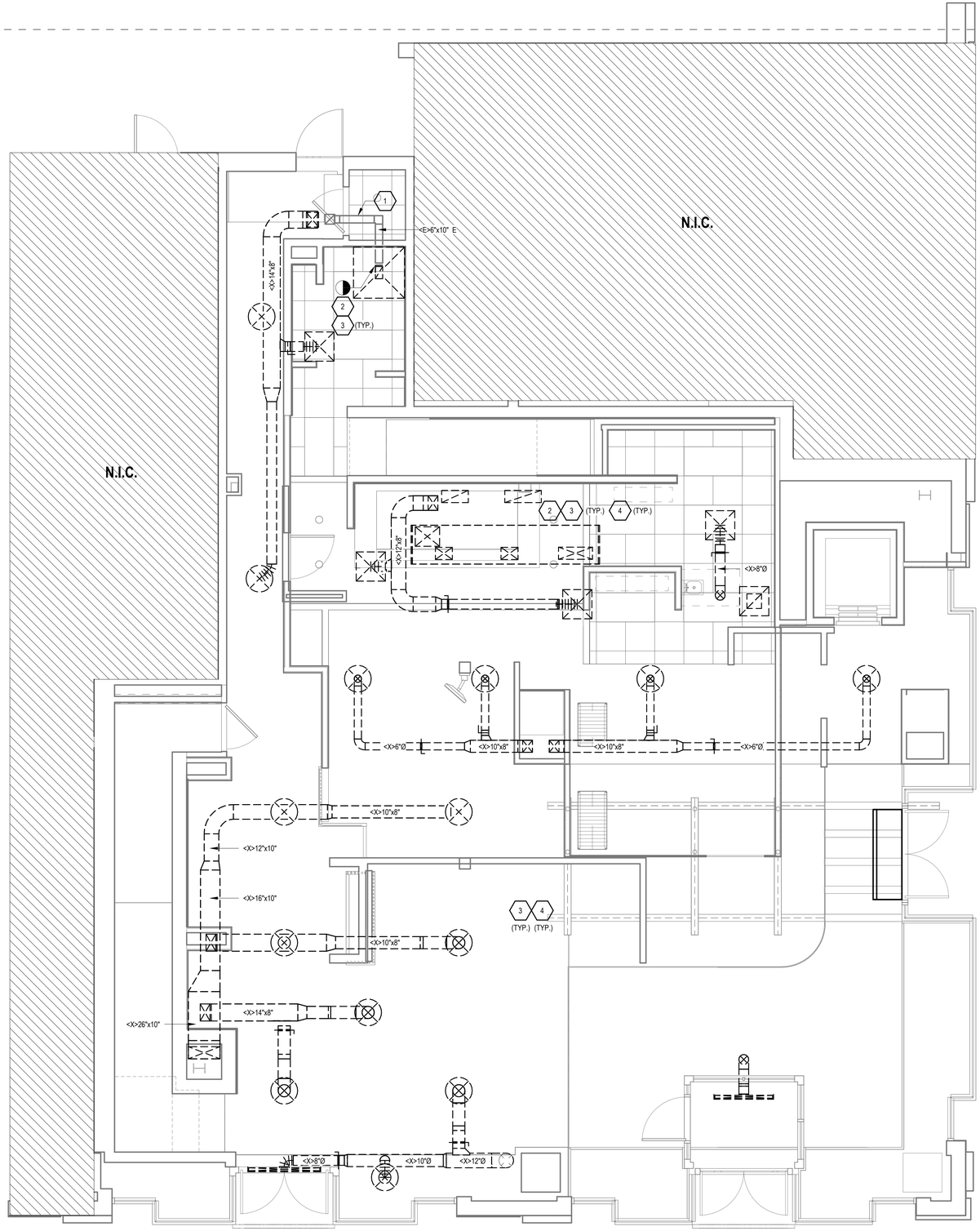

KEYNOTES (#)

1 EXISTING DUCTWORK TO REMAIN FOR NEW CONNECTION TO JANITOR'S CLOSET EXHAUST.

2 EXISTING KITCHEN EXHAUST HOOD TO BE DEMOLISHED.

3 EXISTING MECHANICAL SYSTEM SHALL BE COMPLETELY DEMOLISHED UNLESS NOTED OTHERWISE. ALL MATERIALS AND EQUIPMENT ALONG WITH ITS ASSOCIATED SUPPORTS ARE TO BE DISCONNECTED AND PROPERLY DISPOSED.

4 DEMOLISH EXISTING THERMOSTATS AND TEMPERATURE SENSORS. WIRING TO BE REMOVED ENTIRELY BACK TO SOURCE.

N

1 M101

MECHANICAL LEVEL 1 DEMO PLAN

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

0 1 2 4 8

3/16"=1'-0"

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AOR PROJECT NUMBER:
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LEVEL 1 MECHANICAL DEMOLITION PLAN

SHEET:
M101

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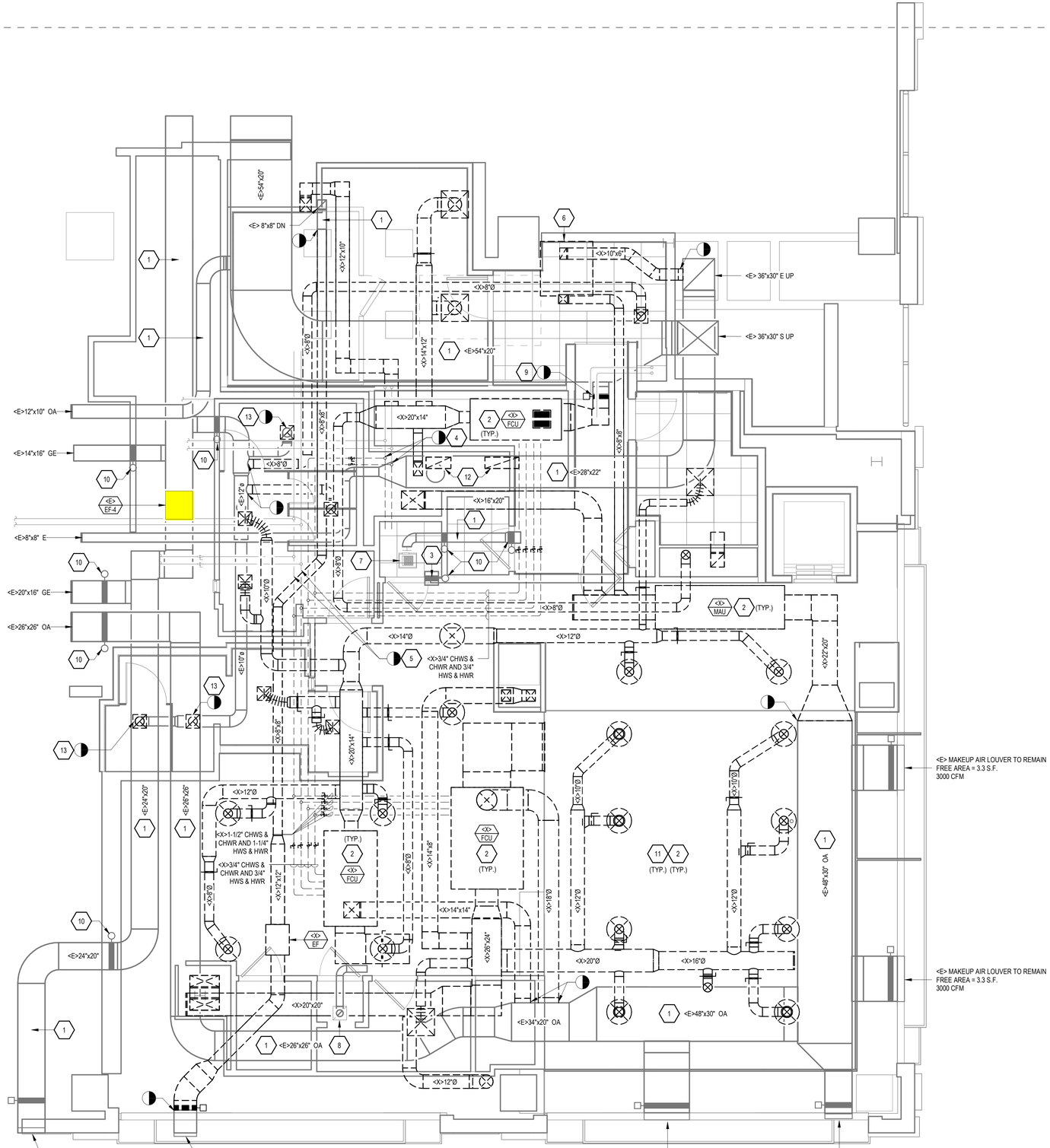

KEYNOTES

1. EXISTING DUCTWORK TO REMAIN.
2. EXISTING MECHANICAL SYSTEM SHALL BE COMPLETELY DEMOLISHED UNLESS NOTED OTHERWISE. ALL MATERIALS AND EQUIPMENT ALONG WITH ITS ASSOCIATED SUPPORTS ARE TO BE DISCONNECTED AND PROPERLY DISPOSED.
3. EXISTING TRANSFER DUCT TO REMAIN.
4. DEMOLISH EXISTING CHWS & CHWR PIPING BACK TO MAIN. PREPARE FOR NEW CONNECTION.
5. DEMOLISH EXISTING HWS & HWR PIPING BACK TO MAIN. PREPARE FOR NEW CONNECTION.
6. EXISTING KITCHEN EXHAUST HOOD TO BE DEMOLISHED.
7. EXISTING EF-2 TO REMAIN.
8. EXISTING EF-3 TO REMAIN.
9. DEMOLISH EXISTING DAMPER AND DUCTWORK BACK TO MAIN AND CAP.
10. EXISTING FIRE/SMOKE DAMPER TO REMAIN.
11. DEMOLISH EXISTING THERMOSTATS AND TEMPERATURE SENSORS. WIRING TO BE REMOVED ENTIRELY BACK TO SOURCE.
12. EXISTING VERTICAL KITCHEN EXHAUST AIR DUCT TO BE DEMOLISHED.
13. DEMOLISH EXISTING DIFFUSER AND PREPARE DUCT CONNECTION FOR NEW DIFFUSER.

N

1 M102 **MECHANICAL LEVEL 1.5 DEMOLITION PLAN**

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

0 1 2 4 8

3/16"=1'-0"

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STREETERVILLE, ILLINOIS, 60611
FOR
CAVA
14 Ridge Square NW #500, WASHINGTON, DC 20016

AOR PROJECT NUMBER:
CAV061

ISSUE	DATE
PERMIT SET	10/09/2024
LANDLORD/BID	11/08/2024
CONSTRUCTION SET	01/29/2025

LEVEL 1.5 MECHANICAL DEMOLITION PLAN

SHEET:
M102

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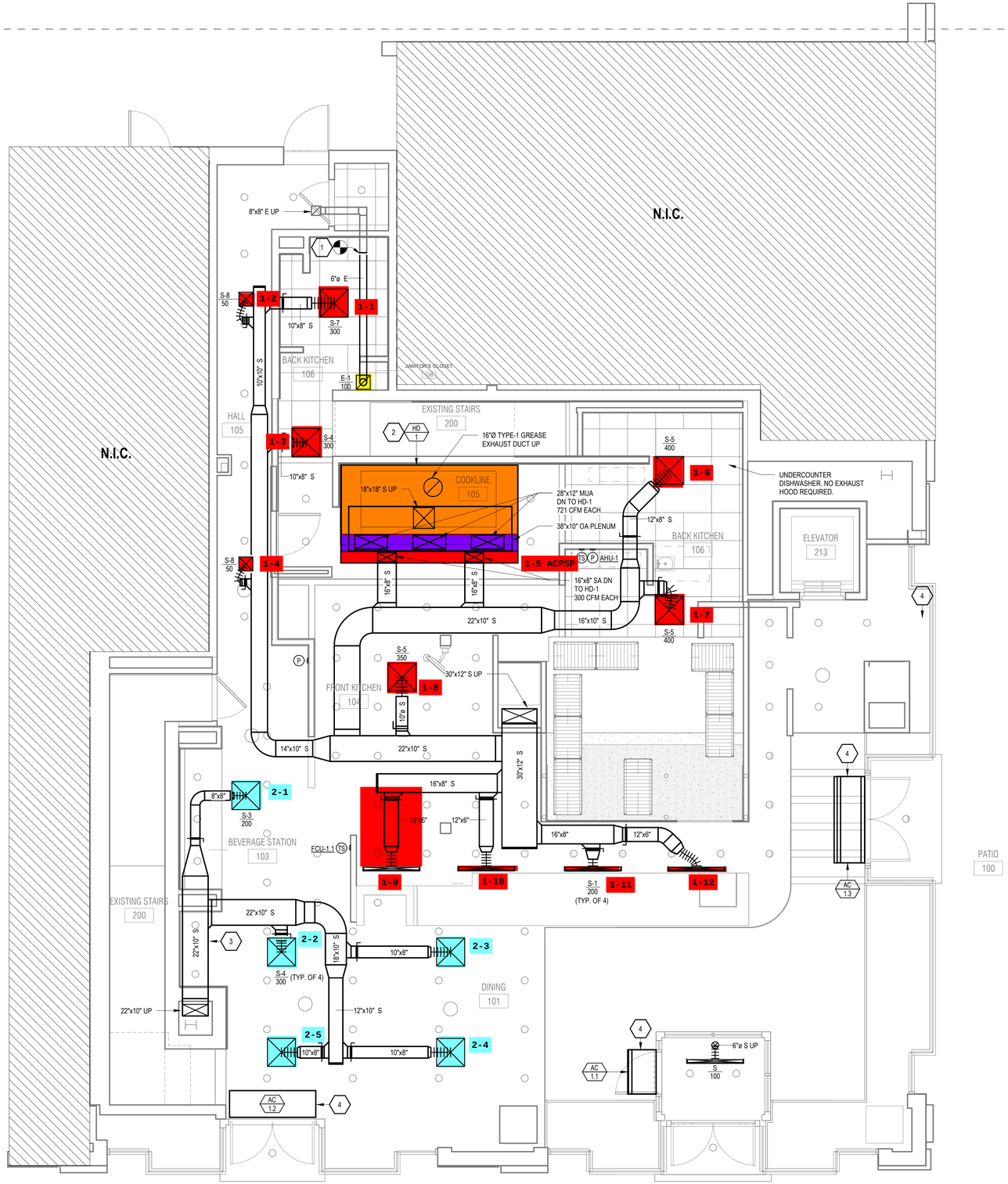

KEYNOTES

1. CONNECT NEW 6"Ø EXHAUST DUCT TO JANITOR'S CLOSET FROM EXISTING DUCTWORK.
2. INSTALL OWNER FURNISHED TYPE I GREASE EXHAUST HOOD. SUPPORT HOOD PER MANUFACTURER'S INSTALLATION INSTRUCTIONS. PROVIDE TRAPEZE HANGERS AND MOUNTING BRACKETS FOR ALL THREAD SUPPORT UNDER DUCTWORK AS REQUIRED. REFER TO HOOD DRAWINGS FOR HOOD SPECIFICATION AND ADDITIONAL INFORMATION INCLUDING BALANCE OF MAKEUP AND CONDITIONED SUPPLY AIR TO HOOD.
3. PROVIDE REMOTE TEMPERATURE SENSOR COMPATIBLE WITH THERMOSTAT.
4. PROVIDE AIR CURTAIN ABOVE ENTRANCE DOOR. INSTALL PER MANUFACTURER'S RECOMMENDATIONS. COORDINATE EQUIPMENT MOUNTING HEIGHT AND LOCATION IN FIELD WITH OTHER SYSTEMS.

N

1 M201

MECHANICAL LEVEL 1 REFLECTED CEILING PLAN

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

0 1 2 4 8

3/16"=1'-0"

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MECHANICAL LEVEL 1 PLAN

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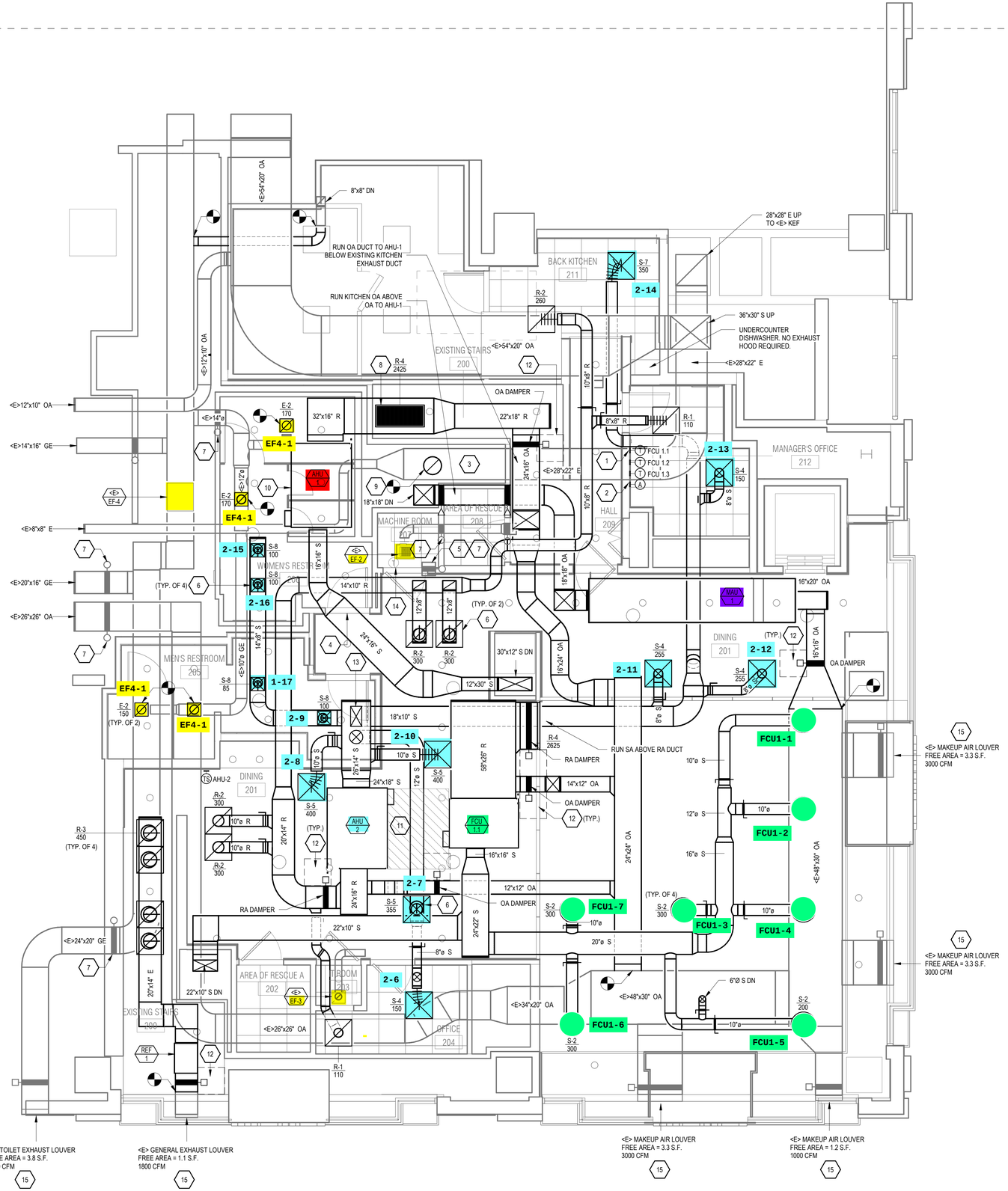

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MECHANICAL LEVEL 1.5 REFLECTED CEILING PLAN

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

3/16"=1'-0"

KEYNOTES

1 PROVIDE HONEYWELL WI-FI VISION PRO 8000 TOUCHSCREEN 7-DAY PROGRAMMABLE THERMOSTAT WITH AUTO-CHANGEOVER AND AUTOMATIC START CAPABILITY. MOUNT THERMOSTAT 48" ABOVE FINISHED FLOOR.

2 PROVIDE AUDIO/VISUAL REMOTE SMOKE DETECTOR ANNUNCIATOR WITH REMOTE KEY OPERATED RESET FOR SMOKE DETECTOR MOUNTED AT 48" AFF. ALIGN ANNUNCIATOR WITH THERMOSTAT SENSOR WHERE APPLICABLE.

3 PROVIDE UL-2221 LISTED DOUBLE-WALL GREASE DUCT EQUAL TO CAPTIVEAIRE SYSTEMS MODEL DW-3R OR 32 ROUND 20 GAUGE 430 STAINLESS OUTER SHELL, FROM HOOD COLLAR UP TO EXISTING EXHAUST FAN ON LEVEL 10. INSTALL EXHAUST DUCT PER MANUFACTURER'S INSTRUCTIONS. PROVIDE CLEANOUTS AT EVERY CHANGE OF DIRECTION IN THE DUCT AND/OR EVERY 10 FEET WITH A MINIMUM OF 3 FEET OF CLEARANCE IN FRONT OF CLEANOUT. COORDINATE ROUTING OF DUCTWORK WITH OWNER'S CAPTIVEAIRE REPRESENTATIVE.

4 UNDERCUT RESTROOM DOOR 1" FOR TRANSFER AIR (TYP.)

5 EXISTING TRANSFER DUCT TO REMAIN.

6 INSTALL BALANCING DAMPERS ON TAKE-OFF TO DIFFUSER.

7 EXISTING FIRE/SMOKE DAMPER TO REMAIN.

8 INSTALL RA MODULATING DAMPER ON DUCT CONNECTION TO R-4 GRILLE.

9 16"Ø E DN TO KITCHEN HOOD.

10 PROVIDE MIN. (2) 36"X36" ACCESS PANELS IN CEILING OF TOILET TO PROVIDE ACCESS TO THE COIL SIDE OF THE AHU

11 SHARED ACCESS SPACE FOR AHU COILS. PROVIDE (2) 36"X26" ACCESS PANELS TO ACCESS COILS.

12 PROVIDE 24"X24" ACCESS PANELS FOR AIR DAMPERS (TYP.)

13 TAKE-OFFS AT TOP OF SA MAIN. INSTALL SA DUCT HIGH AND TIGHT TO CEILING DECK TO ALLOW CLEAR ACCESS TO FCU-1.1 AND AHU-2.

14 DEMOLISH EXISTING THERMOSTATS AND TEMPERATURE SENSORS. WIRING TO BE REMOVED ENTIRELY BACK TO SOURCE.

15 ENSURE ALL EXISTING LOUVERS ARE CLEANED FOR DEBRIS AND OTHER OBSTRUCTIONS TO ENSURE PROPER AIRFLOW.

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MECHANICAL LEVEL 1.5 PLAN

SHEET: M202

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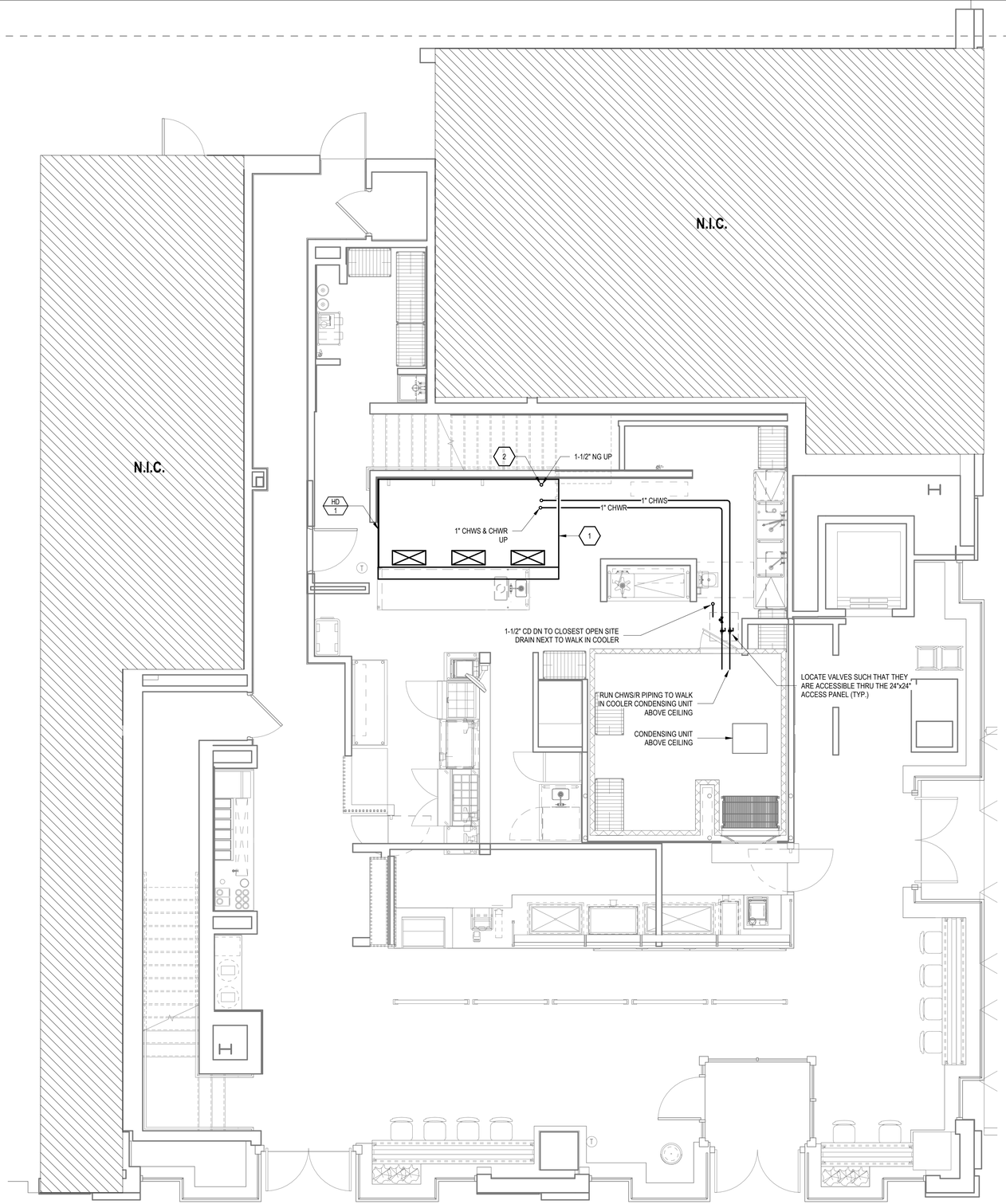

KEYNOTES (#)

1 PROVIDE SHUTOFF VALVE, AND EMERGENCY SOLENOID SHUTOFF FOR NATURAL GAS PIPING SERVING APPLIANCES UNDER HOOD. COORDINATE EMERGENCY SHUTOFF CONNECTION WITH ELECTRICAL CONTRACTOR.

2 1-1/2" NG CONTINUATION TO KITCHEN EQUIPMENT. REFER TO KITCHEN PLANS FOR EQUIPMENT CONNECTION SIZES.

N

1 / M301 **MECHANICAL PIPING LEVEL 1 PLAN**

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

0 1 2 4 8

3/16"=1'-0"

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LEVEL 1 MECHANICAL PIPING PLAN

SHEET:
M301

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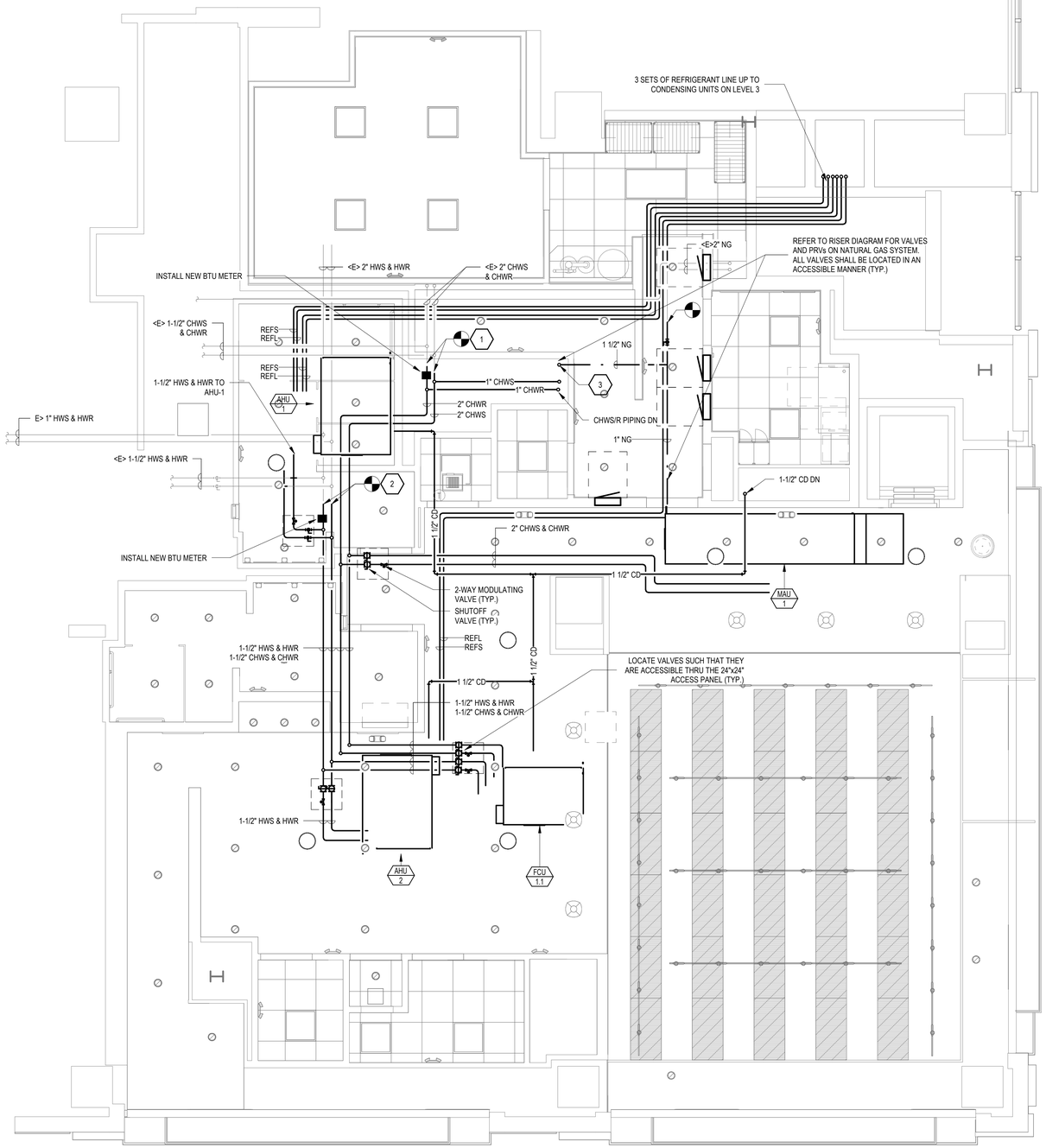
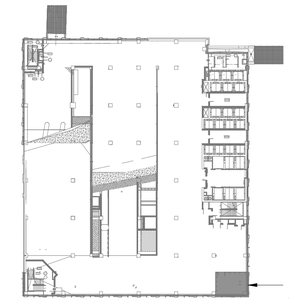


KEYNOTES

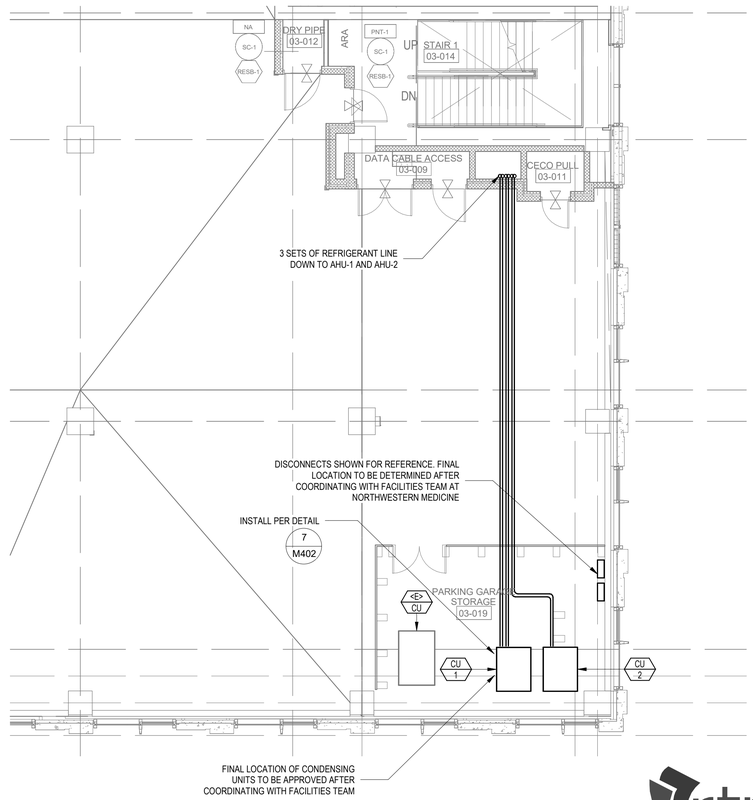
1 CONNECT NEW 2" CHWS & CHWR PIPING FROM EXISTING PIPING. VERIFY THAT SHUT-OFF VALVES ARE INSTALLED.

2 CONNECT NEW 1-1/2" HWS & HWR PIPING FROM EXISTING PIPING. VERIFY THAT SHUT-OFF VALVES ARE INSTALLED.

3 1-1/2" NG DN TO KITCHEN EQUIPMENT



KEYPLAN



N 1 M302 **MECHANICAL PIPING LEVEL 1.5 PLAN**
SCALE: 1/4" = 1'-0"

0 1 2 4 8
3/16"=1'-0"

N 2 M302 **MECHANICAL PIPING LEVEL 3 PLAN**
SCALE: 1/8" = 1'-0"

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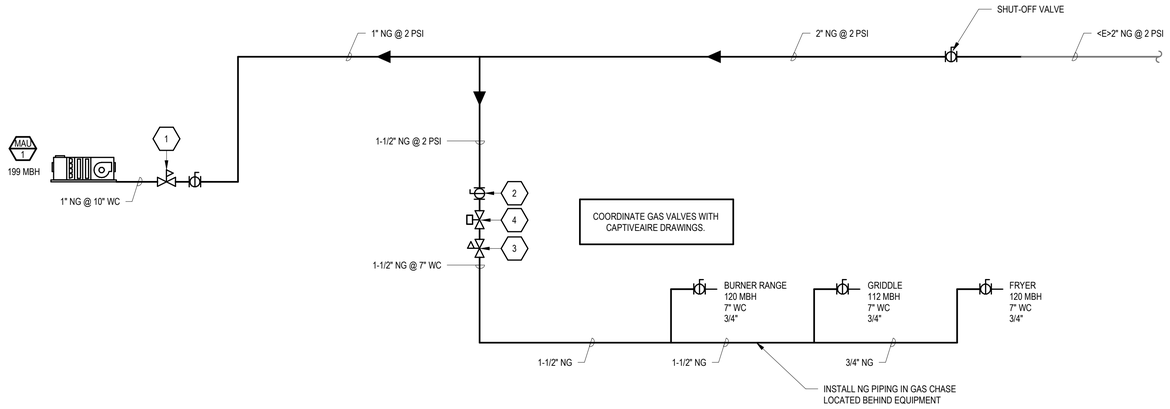
LEVEL 1.5 MECHANICAL PIPING PLAN

SHEET:
M302



1 MECHANICAL RISERS - NATURAL GAS
SCALE: N.T.S.

KEYNOTES (#)

1 INSTALL PRESSURE REDUCING VALVE SIMILAR TO ACTARIS B34SR 5/8" X 3/4" ORIFICE FOR KMAU-1. OUTLET PRESSURE TO BE SET AT 10" WC. PRV ASSEMBLY TO BE EQUIPPED WITH A SHUTOFF VALVE.

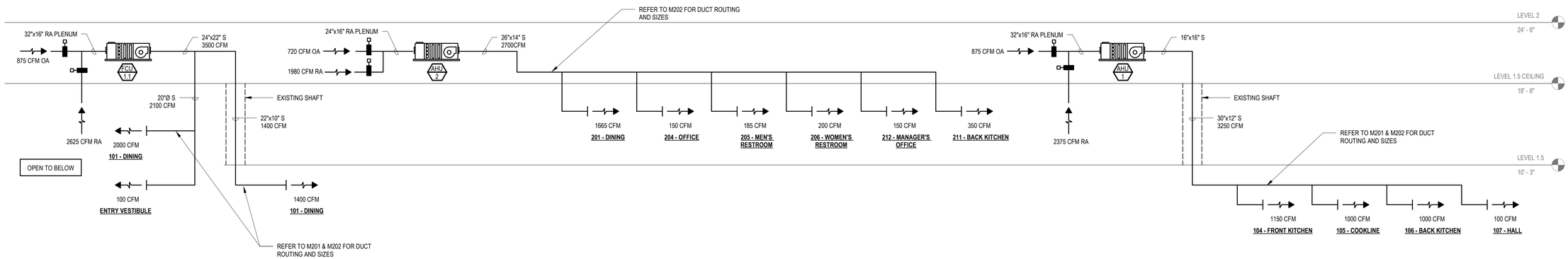
2 1-1/2" NG DN TO MANIFOLD BOX. SHUTOFF VALVE TO ISOLATE GAS EQUIPMENT TO BE INSTALLED IN MANIFOLD BOX AND SHALL BE LOCATED IN AN ACCESSIBLE MANNER.

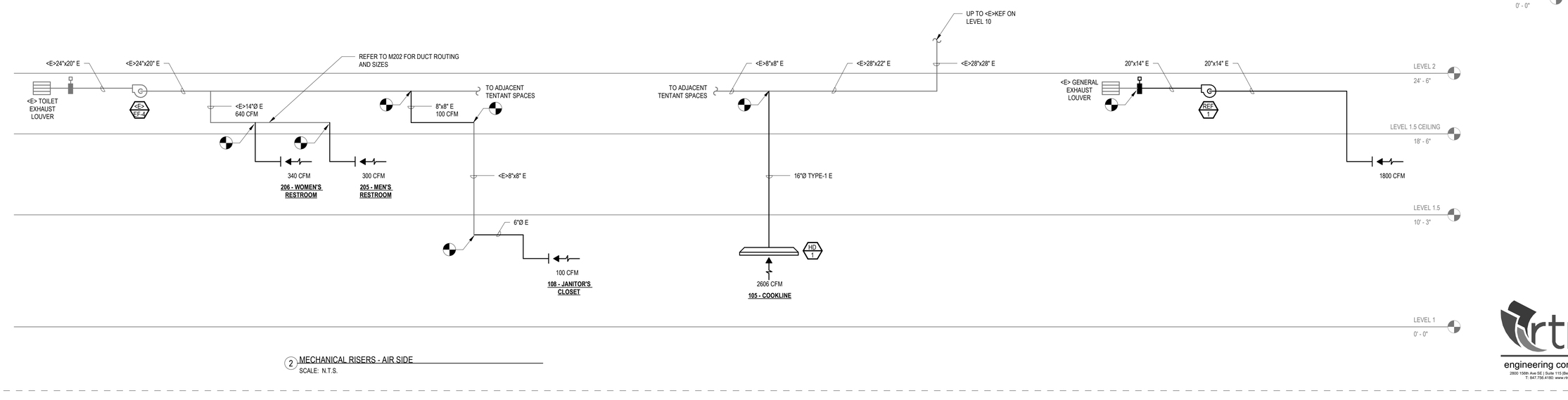
3 INSTALL VENT-LESS PRESSURE REDUCING VALVE. TURN DOWN 2 PSI NG TO 7" W.C. INSTALL BALL VALVE UPSTREAM OF PRV TO ISOLATE GAS EQUIPMENT.

4 INSTALL EMERGENCY SOLENOID VALVE FOR EMERGENCY CUTOFF.

NATURAL GAS LOADS

EQUIPMENT / TAG	INDIVIDUAL LOAD (CFH)	QTY.	PRESSURE	PIPE SIZE
FRYER	120 MBH	1	7" WC	3/4"
GRIDDLE	112 MBH	1	7" WC	3/4"
BURNER RANGE	120 MBH	1	7" WC	3/4"
MAU-1	199 MBH	1	10" WC	1"
TOTAL GAS LOAD = 551 CFH @ 2 PSI				





2 MECHANICAL RISERS - AIR SIDE
SCALE: N.T.S.

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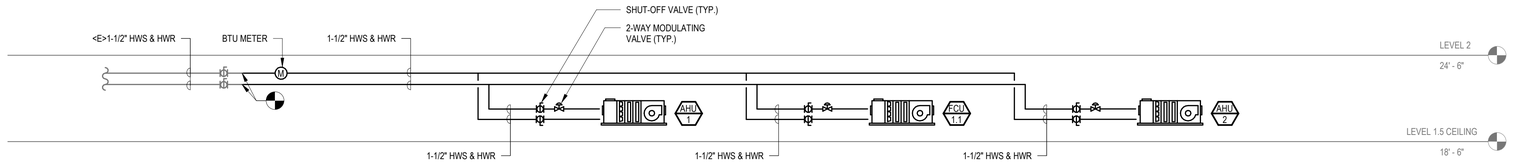
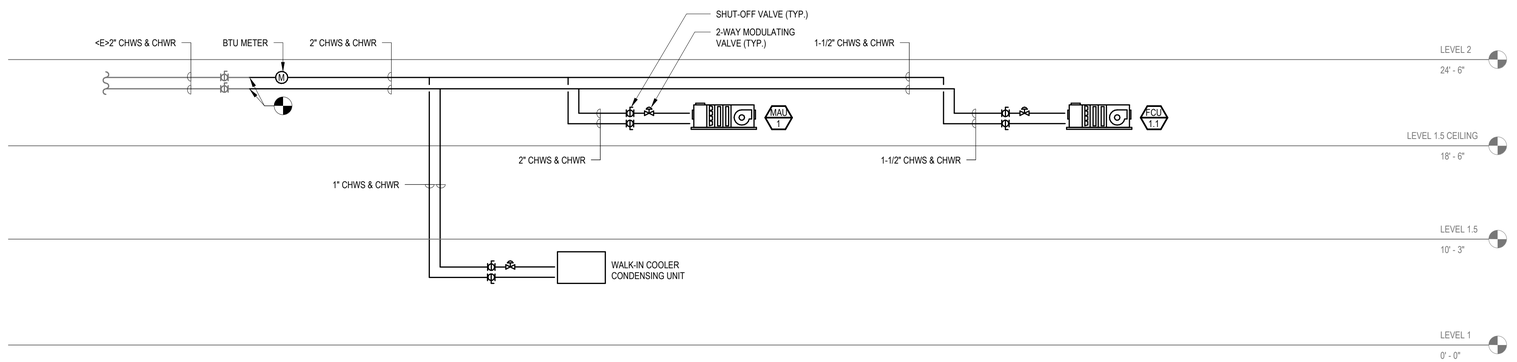
MECHANICAL RISERS

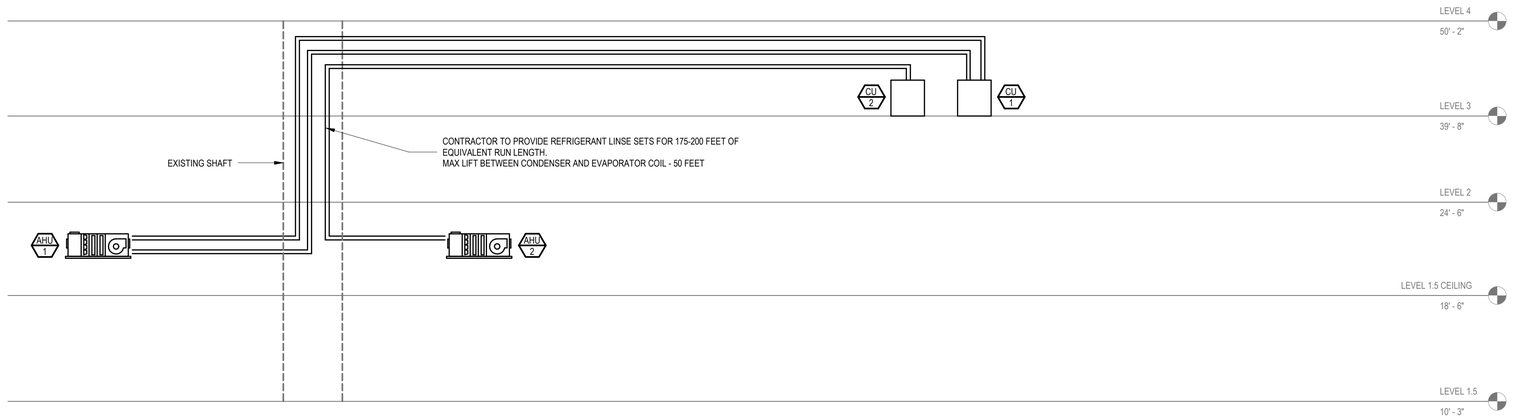
SHEET:
M400



1 MECHANICAL RISERS - HEATING HOT WATER
SCALE: N.T.S.



2 MECHANICAL RISERS - CHILLED WATER
SCALE: N.T.S.



3 MECHANICAL RISERS - REFRIGERANT PIPING
SCALE: N.T.S.

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MECHANICAL RISERS

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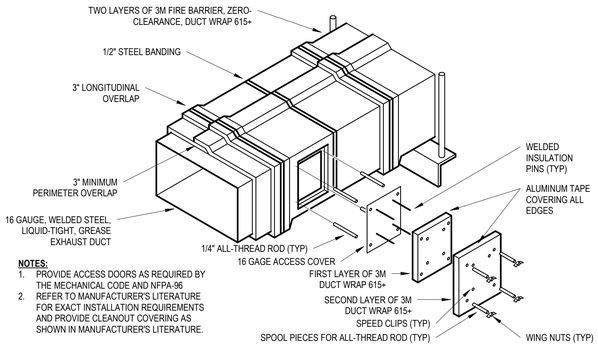
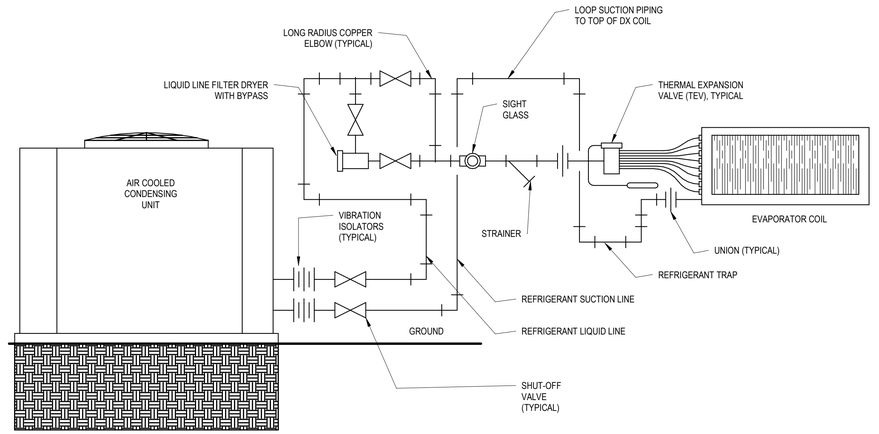
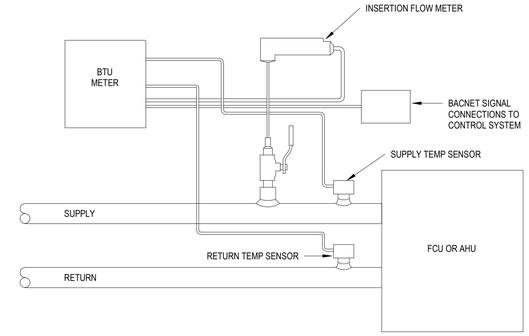


NOTES:
1. PROVIDE ACCESS DOORS AS REQUIRED BY THE MECHANICAL CODE AND NFPA-96
2. REFER TO MANUFACTURER'S LITERATURE FOR EXACT INSTALLATION REQUIREMENTS AND PROVIDE CLEANOUT COVERING AS SHOWN IN MANUFACTURER'S LITERATURE.

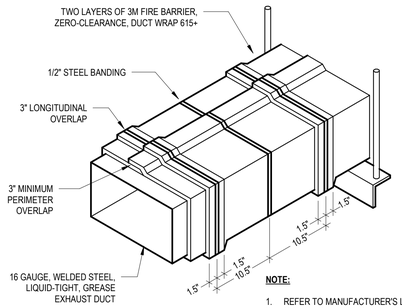


NOTES:
1. SUCTION LINE TRAP TO BE EXTENDED ABOVE EVAPORATOR.
2. CONTRACTOR TO VERIFY PIPE SIZES REQUIRED WITH EQUIPMENT SUPPLIER.
3. PITCH SUCTION LINE TOWARD CONDENSING UNITS.
4. SIGHT GLASS TO BE FULL LINE SIZE AND INSTALLED IN THE MAIN LIQUID LINE.
5. LOCATE TEV BULB 45° ABOVE BOTTOM OF PIPE.

2 CHICAGO SPLIT SYSTEMDX PIPING DETAIL
NOT TO SCALE

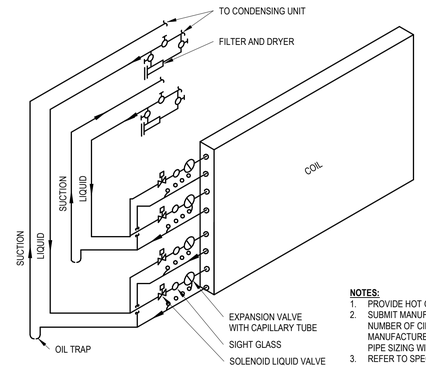


8 BTU METER DETAIL
NOT TO SCALE



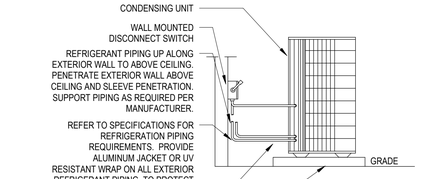
NOTE:
1. REFER TO MANUFACTURER'S LITERATURE FOR EXACT INSTALLATION REQUIREMENTS.
2. GREASE DUCTS MUST HAVE A MINIMUM AIR VELOCITY OF 1500 FT/MIN. [18-28-506.3.5]

1 GREASE DUCT AND WRTAP DETAILS
NOT TO SCALE



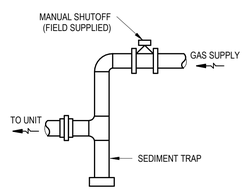
NOTES:
1. PROVIDE HOT GAS BYPASS LINE.
2. SUBMIT MANUFACTURE PIPING DIAGRAM FOR REVIEW. THE NUMBER OF CIRCUITS AND PIPES SIZES MAY VARY BETWEEN MANUFACTURE. THIS CONTRACTOR IS RESPONSIBLE FOR FINAL PIPE SIZING WITH NO EXTRA COMPENSATION ALLOWED.
3. REFER TO SPECIFICATIONS FOR CORRECT BRAZING MATERIAL.

10 DX SINGLE COIL DUAL CIRCUIT CONNECTION DETAIL
NOT TO SCALE

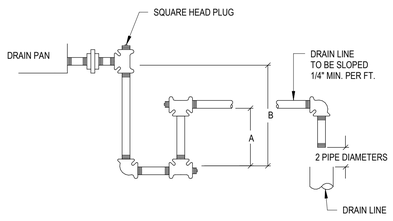


NOTE:
1. MAINTAIN CLEARANCE REQUIREMENTS IN FRONT OF DISCONNECT SWITCH PER NATIONAL ELECTRIC CODE.

7 CONDINSING UNIT DETAIL
NOT TO SCALE

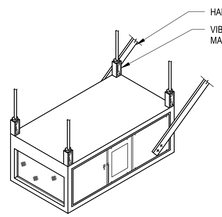


9 GAS PIPING DETAIL
NOT TO SCALE

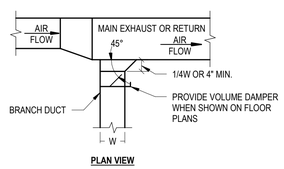


NOTES:
1. FILL TRAP MANUALLY ON INITIAL START-UP.
2. TRAP EACH COMPONENT DRAIN CONNECTION.
3. PIPE SIZE SHALL NOT BE LESS THAN DRAIN PAN CONNECTION SIZE.
4. A = NEGATIVE OR POSITIVE S.P. ON THE DRAIN PAN + 2" B = (2 NEGATIVE S.P.) + 4" FOR DRAW THRU UNITS B = A + 2" FOR BLOW THRU UNITS

3 CONDENSATE DRAIN TRAP PIPING DETAIL
NOT TO SCALE

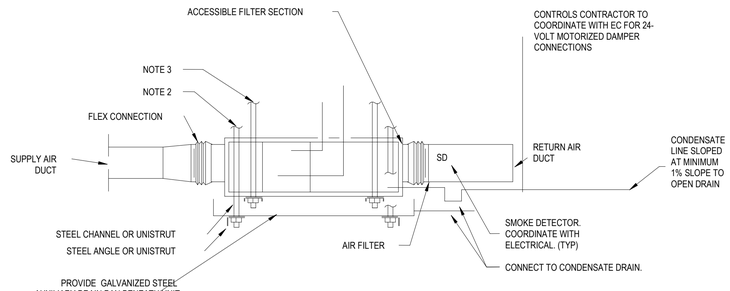


4 CEILING SUSPENDED EQUIPMENT DETAIL
NOT TO SCALE



PLAN VIEW

5 EXHAUST OR RETURN BRANCH DUCTOWRK DETAIL
NOT TO SCALE



NOTES:
1. PROVIDE MISCELLANEOUS GALVANIZED SUPPORT ANGLE OR CHANNEL AS REQUIRED TO BRIDGE STRUCTURE.
2. SUSPEND DRAIN PAN WITH SUPPORT RODS WHEN ATTACHED TO BUILDING STRUCTURE.
3. ATTACH TO STRUCTURE WITH VIBRATION ISOLATION.

6 HORIZONTAL AHU INSTALLATION DETAIL
NOT TO SCALE

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SHEET:
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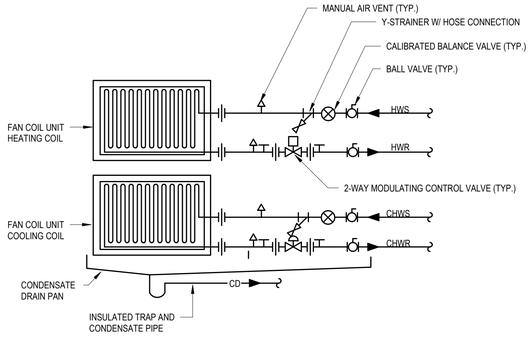
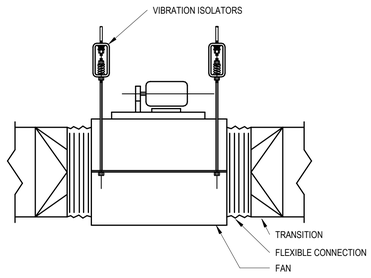
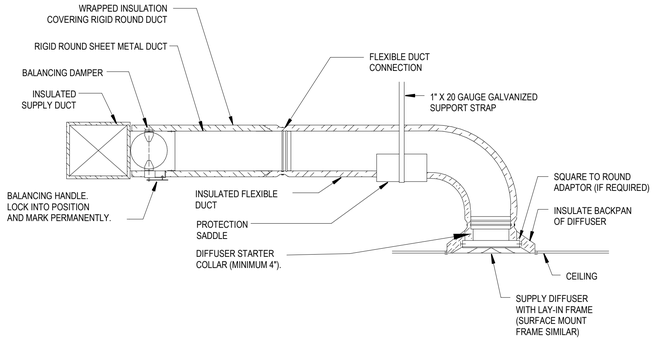


1 4-PIPE FAN COIL PIPING DETAIL
SCALE: N.T.S.

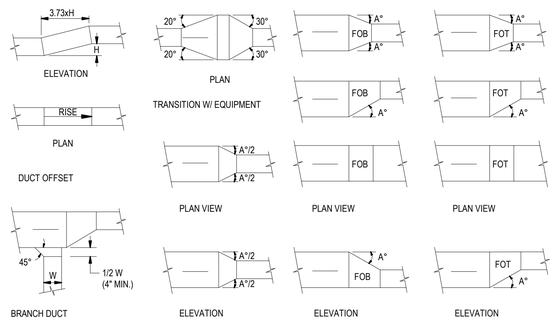


9 INLINE EXHAUST FAN DETAIL
SCALE: N.T.S.



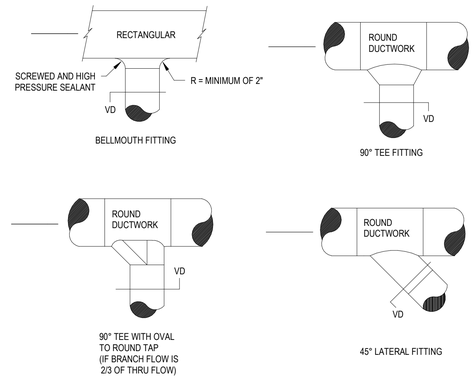
NOTES:
1) PROVIDE AT FLEXIBLE DUCT CONNECTION METAL OR "PANDUIT" DRAWBAND ON THE INTERIOR FLEXIBLE DUCT HELIX. SECURE THE INSULATION OVER THE DRAW BAND WITH AN ADDITIONAL DRAWBAND.
2) PROVIDE BEADING ON ROUND METAL DUCT 12" OR LARGER IN DIAMETER.
3) PROVIDE MINIMUM 4" COLLARS FOR ATTACHMENT OF THE FLEXIBLE DUCT TO ROUND DUCT, DAMPERS AND DIFFUSERS.
4) BAND RIGID ROUND DUCT INSULATION TO DUCT AND PROVIDE TAPE FOR INSULATION OVERLAP.

3 DIFFUSER CONNECTION DETAIL
SCALE: N.T.S.

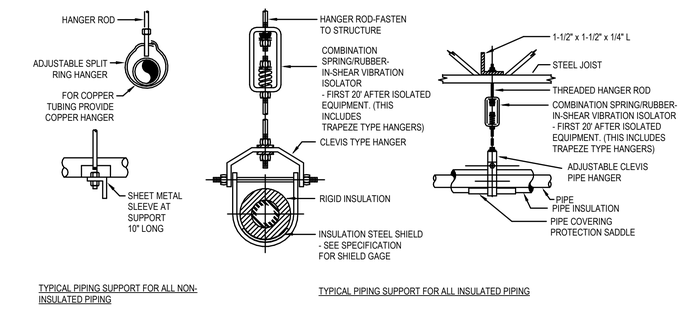


NOTES:
1) ANGLE A = 30° WHEN AIR FLOWS IN DIRECTION OF ARROW (SUPPLY AIR).
2) ANGLE A = 20° WHEN AIR FLOWS IN OPPOSITE DIRECTION OF ARROW (RETURN OR EXHAUST).

4 LOW VELOCITY DUCT FITTINGS DETAIL
SCALE: N.T.S.



5 ROUND DUCTWORK FITTINGS
SCALE: N.T.S.



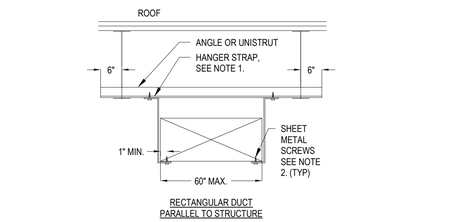
TYPICAL PIPING SUPPORT FOR ALL NON-INSULATED PIPING

TYPICAL PIPING SUPPORT FOR ALL INSULATED PIPING

PIPE SUPPORT SCHEDULE												
PIPE SIZE (INCHES)		1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4	5	6-8
SPACING (FEET)	STEEL	5	6	7	8	9	10	11	12	12	12	12
	COPPER	6	6	6	6	10	10	10	10	10	10	10

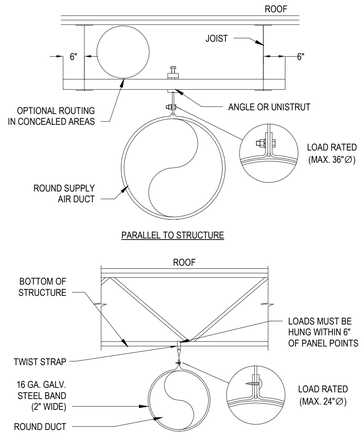
NOTE: HANGER ROD SIZE - 3/8 INCH

2 TYPICAL HVAC PIPING SUPPORT DETAIL
SCALE: N.T.S.



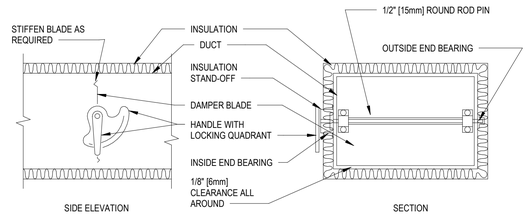
NOTE:
1. USE THREADED ROD FOR ALL DUCTS LARGER THAN 60" WIDE.
2. SHEET METAL SCREWS MAY BE OMITTED IF HANGER STRAP IS CONTINUOUS AND LOOPS UNDER ENTIRE DUCT.

6 RECTANGULAR DUCT SUPPORT FROM CEILING STRUCTURE/JOISTS DETAIL
SCALE: N.T.S.



NOTE:
1. FOR DUCTS LARGER THAN 36"Ø, USE TWO HANGER RODS, WIRES OR STRAPS TO SUPPORT DUCT FROM EACH SIDE.

7 ROUND DUCT SUPPORT DETAIL
SCALE: N.T.S.



NOTE:

1. REMOVE INSULATION STAND-OFF ON DUCTWORK WITHOUT EXTERIOR INSULATION.

2. DETAIL SHOWS SINGLE BLADE DAMPER. DAMPER INSTALLATION SHALL BE SIMILAR FOR MULTI-BLADE DAMPERS & ROUND DAMPERS.

8 VOLUME DAMPER DETAIL
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AOR PROJECT NUMBER:
CAV061

ISSUE	DATE
PERMIT SET	10/09/2024
LANDLORD/BID	11/08/2024
CONSTRUCTION SET	01/29/2025

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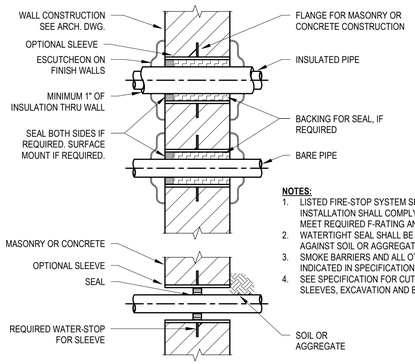

NOTES:

1. LISTED FIRE-STOP SYSTEM SHALL BE ON FIRE RESISTIVE CONSTRUCTION. INSTALLATION SHALL COMPLY WITHIN THE LIMITATIONS OF THE LISTING AND MEET REQUIRED F-RATING AND T-RATING.
2. WATERTIGHT SEAL SHALL BE REQUIRED FOR PENETRATION THRU WALL AGAINST SOIL OR AGGREGATE.
3. SMOKE BARRIERS AND ALL OTHER PENETRATIONS, PROVIDE SEAL AS INDICATED IN SPECIFICATION.
4. SEE SPECIFICATION FOR CUTTING, PATCHING, PENETRATION SEAL, SLEEVES, EXCAVATION AND BACKFILLING.

1 PIPING PENETRATION THRU WALL DETAIL

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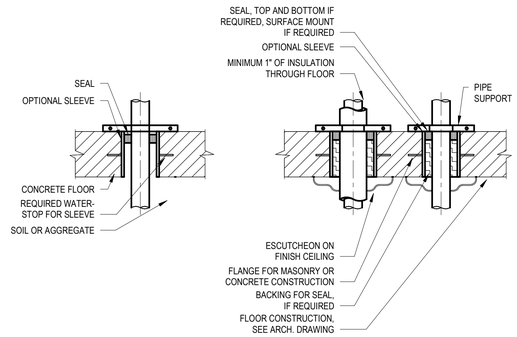
LISTED FIRE-STOP SYSTEM SHALL BE ON FIRE-RESISTIVE CONSTRUCTION. INSTALLATION SHALL COMPLY WITHIN THE LIMITATION OF THE LISTING AND MEET REQUIRED F-RATING AND T-RATING.

WATERTIGHT SEAL SHALL BE REQUIRED FOR PENETRATION THROUGH FLOOR AGAINST SOIL OR AGGREGATE.

SMOKE BARRIERS AND ALL OTHER PENETRATIONS, PROVIDE SEAL AS INDICATED IN SPEC.

SEE SPEC. FOR CUTTING, PATCHING, PENETRATION SEAL, SLEEVES, EXCAVATION AND BACKFILLING.



2 FLOOR PENETRATION

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EXISTING KITCHEN EXHAUST FAN SCHEDULE - FOR REFERENCE ONLY

ITEM TAG	TYPE	AIR FLOW (CFM)	EXTERNAL STATIC (IN W.C)	V/PH/HZ	SERVICE LOCATION
KEF	MIXED FLOW INLINE	7500	-	480/3/60	LEVEL 10 / KITCHEN EXHAUST

REMARKS:
1. CONTROLS CONTRACTOR SHALL PROVIDE INTERFACE BETWEEN KITCHEN EXHAUST FAN AND HOOD AND NEW KITCHEN MAKEUP AIR UNIT

KITCHEN HOOD SCHEDULE - TENANT FURNISHED

ITEM TAG	MANUFACTURER	MODEL	HOOD LENGTH	MAX COOKING TEMP (°F)	TOTAL EXHAUST CFM	LIGHTS		MISC.		REMARKS
						QTY.	TYPE	FIRE SUPP. SYSTEM	HANGING WEIGHT (LB)	
HD-1	CAPTIVEAIRE	6030 ND-2-ACPSP-F	11'-7"	600	2606	6	L55 SERIES E26	YES	1224	ALL

REMARKS:
1. REFER TO KES AND CAPTIVEAIRE DRAWINGS FOR ACCESSORY INFORMATION.

EXISTING EXHAUST FAN SCHEDULE - FOR REFERENCE ONLY

ITEM TAG	TYPE	DRIVE	PERFORMANCE		ELECTRICAL	APPROX. WEIGHT (LBS)	LOCATION / SERVICE
			AIR FLOW (CFM)	EXT. STATIC (IN W.C)	V/PH/HZ		
EF-2	INLINE	DIRECT	200	0.2	120/1/60	30	MEZZ / ELEVATOR MACHINE ROOM
EF-3	CEILING MOUNTED	DIRECT	100	0.2	120/1/60	10	MEZZ / IT CLOSET
EF-4	INLINE CENTRIFUGAL	DIRECT	3800	1.5	480/3/60		MEZZ / TOILET EXHAUST

MAKE-UP AIR UNIT SCHEDULE - TENANT FURNISHED

ITEM TAG	MANUFACTURER	MODEL	CONFIGURATION	DRIVE	AIR FLOW (CFM)	EXTERNAL STATIC (IN W.C.)	FAN SPEED (RPM)	FLUID FLOW RATE (GPM)	COOLING		GAS HEATING			ELECTRICAL				WEIGHT (LB)	REMARKS
									TOTAL (MBH)	SENSIBLE (MBH)	INPUT (MBH)	OUTPUT (MBH)	BURNER EFF.	FAN					
														V/PH/HZ	HP	MCA	MOCP		
MAU-1	CAPTIVEAIRE	A1-D.500-16Z	CEILING MOUNTED	DIRECT	2170	0.75	2441	9.1	40.9	33.9	198.5	182.6	92%	208/3/60	2.5	8.3	15	1050	ALL

REMARKS:
1. REFER TO CAPTIVEAIRE DRAWINGS FOR ADDITIONAL INFORMATION.
2. COOLING COIL SIZED FOR 40% PG.
3. INCLUDE VFD AND NEMA 1 DISCONNECTS AND PROVIDE ELECTRICAL CONNECTIONS.
4. INCLUDE STAINLESS STEEL DRIP PAN BELOW UNIT WITH A 3/4" DRAIN LINE TO CLOSEST FLOOR DRAIN.

AIR CURTAIN SCHEDULE - ELECTRIC HEAT

MARK	AREA SERVED	MANUFACTURER	MODEL	UNIT SPECS					ELECTRICAL			WEIGHT (LBS)	NOTES
				LENGTH (IN)	MAX AIRFLOW (CFM)	HEATING CAPACITY (KW)	FAN QUANTITY	MOTOR HP	V/PH	MCA	MOCP		
AC-1.1	ENTRY	BERNER	AE08-E-1036EX	38	904	10	2.0	1@1/5	208/3/60	30.3	40	57	ALL
AC-1.2	ENTRY	BERNER	AE08-E-1072EX	74	1978	15	2.0	1@1/5	208/3/60	44.1	60	100	ALL
AC-1.3	ENTRY	BERNER	AE08-E-1072EX	74	1978	15	2.0	1@1/5	208/3/60	44.1	60	100	ALL

REMARKS:
1. EQUIPMENT PROVIDED BY MC.
2. PROVIDE UNITS WITH MOUNTING BRACKET, FILTER, INTEGRAL STARTER AND DISCONNECT SWITCH.
3. MOUNT UNIT PER MANUFACTURER'S RECOMMENDATIONS.
4. INTERLOCK AIR CURTAIN WITH DOOR/WINDOW LIMIT SWITCH TO ENERGIZE WHEN THE DOOR/WINDOW OPENS.
5. PROVIDE AIR CURTAIN WITH MAGNETIC NORMALLY CLOSED DOOR LIMIT SWITCH FOR INSTALLATION ON DOOR.
6. PROVIDE WITH INTEGRAL THERMOSTAT AND CONTROLLER. ADJUST CONTROL SET-UP WITH AIR CURTAIN USER MANUAL.
7. PROVIDE WITH TIME DELAY MICROSWITCH WITH ADJUSTABLE DELAY TIMERS PRE MOUNTED IN THE AIR CURTAIN CONTROL PANEL.
8. PROVIDE WITH POWDER COATED FINISH COLOR AS SELECTED BY THE ARCHITECT.
9. AIR CURTAIN WITH INTEGRAL HEATING SHALL BE PROVIDED WITH CONTROLS CONFIGURED TO SHUT OFF THE SOURCE OF HEATING WHEN THE OA TEMPERATURE IS GREATER THAN 45°F.

CHICAGO VENTILATION SCHEDULE

ROOM NUMBER	ROOM NAME	ROOM TYPE	FLOOR AREA (SF)	CODE REQUIRED MECHANICAL VENTILATION					ACTUAL			EQUIPMENT	
				SUPPLY (CFM/SF)	EXHAUST (CFM/SF)	SUPPLY (CFM)	OA (CFM)	EXHAUST (CFM)	SUPPLY (CFM)	OA (CFM)	EXHAUST (CFM)	SUPPLY FAN	EXHAUST FAN
1ST FLOOR LEVEL													
101	DINING	PUBLIC DINING ROOMS - NO COOKING EQUIPMENT	1170	1.50	1.50	1754	584	1754	3500	875	3500	FCU-1.1	FCU-1.1
104	FRONT KITCHEN	PUBLIC DINING ROOMS - NO COOKING EQUIPMENT	425	1.50	1.50	638	212	638	1150	290	1150	AHU-1	AHU-1
105	COOKLINE	PUBLIC KITCHEN	106	1.20	4.00	128	43	425	1000	250	1000	AHU-1	AHU-1/ EXISTING KITCHENE XHAUST
106	BACK KITCHEN	PUBLIC KITCHEN	383	1.20	4.00	460	153	1533	1000	250	1620	AHU-1	AHU-1
107	HALL	CORRIDORS	154	0.00	0.00	0	0	0	100	25	100	AHU-1	AHU-1
108	JANITOR'S CLOSET	JANITOR'S CLOSET	8	0.00	2.00	0	0	16	0	0	100	AHU-1	AHU-1 / <E> EXHAUST FAN
200	EXISTING STAIRS	CORRIDORS	220	0.00	0.00	0	0	0	0	0	0	-	-
2ND FLOOR LEVEL													
200	EXISTING STAIRS	CORRIDORS	142	0.00	0.00	0	0	0	0	0	0	-	-
201	DINING	PUBLIC DINING ROOMS - NO COOKING EQUIPMENT	833	1.50	1.50	1250	416	1250	1515	416	1515	AHU-2	AHU-2
202	AREA OF RESCUE A	STORAGE INACTIVE	36	0.00	0.00	0	0	0	0	0	0	-	-
204	OFFICE	OFFICES AND COMPUTER ROOMS	63	0.60	0.30	38	13	19	150	38	150	AHU-2	AHU-2
205	MEN'S RESTROOM	TOILET ROOMS	140	0.00	2.00	0	0	281	185	46	300	AHU-2	AHU-2
206	WOMEN'S RESTROOM	TOILET ROOMS	168	0.00	2.00	0	0	336	200	50	340	AHU-2	AHU-2
208	AREA OF RESCUE B	STORAGE INACTIVE	26	0.00	0.00	0	0	0	0	0	0	-	-
209	HALL	CORRIDORS	103	0.00	0.00	0	0	0	0	0	0	-	-
211	BACK KITCHEN	PUBLIC KITCHEN	109	1.20	4.00	130	43	435	350	88	350	AHU-2	AHU-2
212	MANAGER'S OFFICE	OFFICES AND COMPUTER ROOMS	87	0.60	0.30	52	17	26	150	38	150	AHU-2	AHU-2
			4174			4450	1482	6713	9300	2366	10275		

REMARKS:
1. NEW MAU-1 IS PROVIDING CONDITIONED KITCHEN MAKEUP AIR
2. EXISTING KITCHEN EXHAUST FAN KEF LOCATED ON LEVEL 10 IS PROVIDING THE KITCHEN EXHAUST FROM HOOD
3. TOILET AND JANITORS EXHAUST PROVIDED BY EXISTING EF-4
4. REFER TO SCHEDULES FOR AIRFLOW
5. NEW RELIEF EXHAUST FAN OPERATES DURING BOTH NORMAL AND ECONOMZIER MODES FOR SPACE PRESSURIZATION
6. FCU-1 IS CONNECTED TO THE BASE BUILDING CHILLED WATER SYSTEM AND HAS WATER SIDE ECONOMIZER
7. AHU-1 WILL BE PROVIDED WITH AIRSIDE ECONOMIZER CONTROLS
8. AHU-2 IS LESS THAN 54 MBH AND DOES NOT NEED ECONOMIZER

GRILLE, REGISTERS, AND DIFFUSER SCHEDULE

TAG	TYPE	MAKE / MODEL	AIR STREAM	INLET SIZE (IN.)			FACE DIMENSIONS	MAX NC	MAX PD (IN WC)	REMARKS
				DIA.	HEIGHT	WIDTH				
S-1	LINEAR SLOT DIFFUSER	TITUS / FL 20-22	SUPPLY	8			48"x4-3/4"	25	0.10	ALL
S-2	CIRCULAR DIFFUSER	TITUS / R 300F	SUPPLY	10			22" DIA	25	0.10	ALL
S-3	SQUARE PLAQUE DIFFUSER	TITUS / OMNI	SUPPLY	6			24"x24"	25	0.10	ALL
S-4	SQUARE PLAQUE DIFFUSER	TITUS / OMNI	SUPPLY	8			24"x24"	25	0.10	ALL
S-5	SQUARE PLAQUE DIFFUSER	TITUS / OMNI	SUPPLY	10			24"x24"	25	0.10	ALL
S-6	SQUARE PLAQUE DIFFUSER	TITUS / PAS	SUPPLY	6			24"x24"	25	0.10	ALL
S-7	SQUARE PLAQUE DIFFUSER	TITUS / PAS	SUPPLY	10			24"x24"	25	0.10	ALL
S-8	SQUARE PLAQUE DIFFUSER	TITUS / OMNI	SUPPLY	6			12"X12"	25	0.10	ALL
E-1	SQUARE PLAQUE DIFFUSER	TITUS / PAR	EXHAUST	6			12"X12"	25	0.10	ALL
E-2	SQUARE PLAQUE DIFFUSER	TITUS / PAR	EXHAUST	8			12"X12"	25	0.10	ALL
R-1	SQUARE PLAQUE DIFFUSER	TITUS / PAR	RETURN	8			24"X24"	25	0.10	ALL
R-2	SQUARE PLAQUE DIFFUSER	TITUS / PAR	RETURN	10			24"X24"	25	0.10	ALL
R-3	SQUARE PLAQUE DIFFUSER	TITUS / PAR	RETURN	12			24"X24"	25	0.10	ALL
R-4	STEEL RETURN GRILLE	TITUS / 350RL	RETURN		18	42	19-1/2"X43-1/2"	25	0.10	ALL

REMARKS:
1. PROVIDE WITH MANUAL VOLUME DAMPERS FOR ALL DIFFUSERS. OPPOSED BLADE DAMPERS SHALL NOT BE USED.
2. PROVIDE WITH SURFACE MOUNTING FRAME WHERE APPLICABLE.
3. COORDINATE FINISH AND LOCATION WITH ARCHITECT.
4. PROVIDE WITH REMOTE OPERATED DAMPERS FOR ALL DIFFUSERS LOCATED ABOVE GYPSUM CEILINGS TO ALLOW BALANCING WITHOUT ACCESS PANELS.

FAN COIL UNIT SCHEDULE - TENANT FURNISHED

TAG	MANUFACTURER	MODEL #	AREA SERVED	FAN/MOTOR DATA					FILTERS				COOLING CAPACITY										HEATING CAPACITY								ELECTRICAL DATA					WEIGHT (LBS)
				AIRFLOW CFM	OA CFM	ESP (IN. W.C.)	RPM	HP	PRE		FINAL		GROSS (MBH)	SENSIBLE (MBH)	EAT (DB°F)	EAT (WB°F)	LAT (DB°F)	LAT (WB°F)	EWT (°F)	LWT (°F)	GPM	ROWS	WPD (FT)	CAPACITY (MBH)	EAT (DB°F)	LAT (DB°F)	EWT (°F)	LWT (°F)	GPM	ROWS	WPD (FT)	MCA	MOCP	V	PH	HZ	
									TYPE	WIDTH (IN.)	TYPE	WIDTH (IN.)																								
FCU-1.1	CARRIER	42BHE40QD5L63515HH	FIRST FLOOR DINING	3500	875	1.50	1032	3	MERV 8	2	MERV 11	2	112.9	87.5	80	67	57.3	56.8	45	61	15.3	6	7.2	121.7	60	91.6	145	110	7.6	2	2	10.25	20	208	3	60	674

REMARKS:
1. SIZED FOR 40% PROPYLENE GLYCOL ON BOTH CHILLED AND HOT WATER COILS
2. COORDINATE UNIT CONTROL AND ACCESS DOOR SIDE ON SITE PRIOR TO PROCUREMENT
3. COIL CONNECTIONS SHALL BE SAME END
4. REAR RETURN AND FRONT SUPPLY
5. MERV 11 WITH 2" MERV 8 PLEATED PRE-FILTER
6. NO MIXING BOX - MECHANICAL CONTRACTOR TO FABRICATE PLENUM BOX AS SHOWN IN DRAWINGS WITH MOTORIZED OA AND RA DAMPERS
7. PROVIDE CONDENSATE OVERFLOW WITH OVERFLOW SWITCH
8. COILS SHALL BE RATED FOR 350 PSI
9. MOTOR CONTROL INFUSED DISCONNECT
10. THERMOSTAT AND SENSOR AND ALL ASSOCIATED WIRING TO BE INCLUDED
11. PROVIDE CEILING SUSPENDED HANGING SUPPORTS AND VIBRATION ISOLATROS
12. PROVIDE WITH COMPANION FLANGES BOLTED TO FAN AND FLEXIBLE SLEEVE ON THE INLET AND OUTLET CONNECTIONS.
13. ALL COILS SHALL BE ARI CERTIFIED AND PRESSURE TESTED.
14. COIL TUBE SHALL BE COPPER AND HAVE 5/8" DIAMETER, 0.035" TUBE THICKNESS, AND 0.095" ALUMINIUM FINS.
15. FACE VELOCITY OF THE CHILLED WATER COILS SHALL NOT EXCEED 450 FPM.

AIRFLOW PRESSURIZATION MATRIX

KITCHEN EXHAUST (CFM)	2606
TOILET AND GENERAL EXHAUST (CFM)	740
TOTAL EXHAUST (CFM)	3346
KITCHEN MAKEUP AIRFLOW (CFM)	2163
FCU AND AHU OUTDOOR AIRFLOW (CFM)	2376
TOTAL OUTDOOR AIRFLOW (CFM)	4539
NET AIRFLOW (CFM)	1193

REMARKS:
1. RELIEF FAN SHALL OPERATE DURING NORMAL MODE TO EXHAUST 800 CFM AND MAINTAIN POSITIVE PRESSURIZATION.
2. DURING ECONOMIZER MODE, RELIEF FAN SHALL EXHAUST 1800 CFM AND MAINTAIN POSITIVE PRESSURIZATION.
3. FCU-1 AND AHU-2 DO NOT HAVE ECONOMIZER MODE.
4. AHU-1 WILL OPERATE IN ECONOMZIER MODE.

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SEQUENCE OF OPERATION

A. PROVIDE STAND ALONE OR APPLICATION SPECIFIC CONTROLLERS AS REQUIRED TO PERFORM THE FOLLOWING SEQUENCES OF OPERATIONS.

B. CONTROLS CONTRACTOR SHALL COORDINATE STANDARDS AND BAS REQUIREMENTS WITH NORTHWESTERN FACILITIES TEAM

C. 4-PIPE CHILLED WATER AND HOT WATER FAN COIL UNIT:

a. UNIT CONSISTS OF SUPPLY AIR FAN, CHILLED AND HOT WATER COILS, FAN FILTERS AND 7-DAY PROGRAMMABLE THERMOSTAT. 2-WAY CONTROL VALVES FOR THE CHILLED AND HOT WATER PIPING SHALL BE PROVIDED WITH ACTUATORS INTERFACED WITH BAS. SEPARATE OA AND RA DAMPERS TO BE FIELD INSTALLED AND WIRED TO BAS BY TC AND EC.

b. PROVIDE AN OVERRIDE SWITCH TO OPERATE THE UNIT DURING UNOCCUPIED HOURS. THIS SWITCH SHALL BE PART OF THE PROGRAMMABLE THERMOSTAT. OVERRIDE SWITCH ALLOWS THE UNIT TO OPERATE FOR TWO HOURS (ADJUSTABLE).

c. OCCUPIED MODE:

UNIT TO BE PROVIDED WITH FACTORY INSTALLED, WIRED AND PROGRAMMED CONTROLS. THE BAS INTEGRATES TO THE ON BOARD CONTROLLERS VIA BACNET MS/TP. UNIT TO RUN BASED ON USER DEFINED SCHEDULE. UNIT CONTROLS ITS STAGES TO MAINTAIN TEMEPRATURE SETPOINT 75°F COOLING AND 70°F HEATING.

d. OA/RA DAMPER OPERATION:
- BOTH DAMPERS OPERATE IN UNISON. OAD IS LINKED NORMALLY CLOSED AND RAD IS LINKED NORMALLY OPEN. WHEN FAN SYSTEM IS NOT ACTIVE, THE DAMPERS ARE TO BE COMMANDED TO THE NORMAL POSITION. DURING SHUT DOWN, EACH DAMPER WILL BE COMMANDED TO THEIR NORMAL POSITIONS.
- DAMPERS ARE CONTROLLED BY EITHER THE MIN OUTDOOR SETPOINT OF 20% OR DURING ECONOMIZER MODE. PROVIDE MIXED AIR TEMP SENSOR BY FACTORY CONTROLS TO DETECT RA TEMP FROM SPACE.

e. UPON DETECTION OF SMOKE BY UNIT SMOKE DETECTOR, THE UNIT SHALL SHUT DOWN AND AN ALARM SHALL BE SENT TO THE FIRE ALARM CONTROL PANEL (WHERE APPLICABLE). LOCAL REMOTE ANNUNCIATORS SHALL ALSO BE ACTIVATED.

D. AHU DX COOLING COIL AND HOT WATER WITH AND WITHOUT ECONOMIZER

1. UNIT CONSISTS OF SUPPLY AIR FAN, DX COIL AND CONDENSING UNIT, AND HOT WATER COILS WITH ECONOMIZER CONTROLS, FAN FILTERS AND 7-DAY PROGRAMMABLE THERMOSTAT. SEPARATE OA AND RA DAMPERS TO BE FIELD INSTALLED AND WIRED TO BAS BY TC AND EC. PROVIDE CONNECTIONS AND WIRING FOR 2-WAY CONTROL VALVE

2. REFER TO ABOVE FOR OCCUPIED MODE AND OA/RA DAMPER OPERATION

3. ECONOMIZER MODE:
- THE DISCHARGE AIR TEMPERATURE SENSOR SHALL MEASURE THE DRY BULB TEMPERATURE OF THE AIR LEAVING THE COOLING COIL WHILE ECONOMIZING. WHEN ECONOMIZING IS ENABLED AND THE UNIT IS OPERATING IN THE COOLING MODE, THE ECONOMIZER DAMPERS SHALL BE MODULATED BETWEEN ITS MINIMUM POSITION AND 100% TO MAINTAIN THE DISCHARGE AIR TEMPERATURE SETPOINT. THE ECONOMIZER DAMPERS SHALL MODULATE TOWARD MINIMUM POSITION IN THE EVENT THE MIXED AIR TEMPERATURE FALLS BELOW THE LOW TEMPERATURE LIMIT SETTING.
- REFERENCE DRY BULB : OUTSIDE AIR (OA) TEMPERATURE SHALL BE COMPARED WITH A REFERENCE DRY BULB SETPOINT. THE ECONOMIZER SHALL ENABLE WHEN THE OA TEMPERATURE IS LESS THAN THE REFERENCE DRY BULB SETPOINT. THE ECONOMIZER SHALL BE DISABLED WHEN OA TEMPERATURE IS GREATER THAN THE REFERENCE DRY BULB SETPOINT + 2.0 DEG. F.

4. WHENEVER THE UNIT CALLS FOR COOLING AND THE ECONOMIZER IS DISABLED OR LOCKED OUT DUE TO OUTDOOR AIR CONDITIONS, THE FAN COIL USES MECHANICAL COOLING. THE UNIT STAGES ITS FACTORY CONTROLS TO MAINTAIN SPACE TEMPERATURE SETPOINT.

5. UPON DETECTION OF SMOKE BY UNIT SMOKE DETECTOR, THE UNIT SHALL SHUT DOWN AND AN ALARM SHALL BE SENT TO THE FIRE ALARM CONTROL PANEL (WHERE APPLICABLE). LOCAL REMOTE ANNUNCIATORS SHALL ALSO BE ACTIVATED.

A. KITCHEN HOOD EXHAUST
a. BASE BUILDING EXISTING EXHAUST FAN
b. GENERAL:
- THE KITCHEN HOOD SHALL OPERATE BASED ON MANUFACTURER SUPPLIED CONTROLS.

c. SYSTEM OFF:
- THE KITCHEN HOOD SHALL BE STOPPED AND STARTED LOCALLY BY THE USER.

d. SYSTEM ON:
- WHEN THE KITCHEN HOOD IS OPERATING, THE BAS SHALL MONITOR THE EXHAUST FAN SPEED OUTPUT.
- WHEN THE KITCHEN HOOD IS OPERATING, THE BAS SHALL MONITOR THE SUPPLY FAN SPEED OUTPUT.

e. LIFE SAFETY OPERATION:
- WHEN THE FIRE SUPPRESSION SYSTEM IS MANUALLY OR AUTOMATICALLY ACTIVATED AT THE TYPE I HOOD VIA HARDWIRED INTERLOCK
- THE ASSOCIATED HOOD EXHAUST FAN SHALL BE DE-ENERGIZED BY HARDWIRE INTERLOCK.
- THE ASSOCIATED CONDITIONED MAKE-UP AIR UNIT SHALL BE DE-ENERGIZED.

f. SAFETIES AND ALARMS:
- COMMUNICATE FAILURE: IF THE BAS LOSES COMMUNICATION WITH THE KITCHEN HOOD, THE FAN COILS TO OPERATE OR STATUS CHANGES TO OFF WHEN THE KITCHEN HOOD IS OPERATING, AN ALARM SHALL BE PRESENTED AT THE BAS WORKSTATION.
- POWER FAILURE: UPON RESTORATION OF POWER, THE EXHAUST FAN SHALL RESTART AND OPERATE AT THE SPEED DETERMINED BY THE HOOD SIGNAL.

g. FAILURE MODES:
- COMMUNICATION FAILURE: IF THE BAS LOSES COMMUNICATION WITH THE KITCHEN HOOD, THE SUPPLY BOXES AND EXHAUST FAN SHALL OPERATE AT LAST OPERATING POINTS AND AN ALARM SHALL BE PRESENTED AT THE BAS WORKSTATION.

B. MAKE UP AIR UNIT:
a. THE MAKE UP AIR UNIT SHALL BE ENABLED WHEN THE KITCHEN HOOD EXHUAST FAN (KF-1) IS ENERGIZED. THE INTERNAL MOTORIZED DAMPER WITHIN WITH MAU-1 SHALL OPEN AND THE FAN SHALL RUN. IF OA IS LESS THAN 65° (ADJ.), THE MAU-1 GAS-FIRED HEAT SECTION SHALL BE ENABLED TO MAINTAIN A MINIMUM OF 65°.
b. WHEN KF-1 IS OFF, MAU-1 SHALL BE DE-ENERGIZED AND THE INTERNAL MOTORIZED DAMPER SHALL CLOSE.
c. ECONOMIZER MODE:
- MAKEUP AIR UNIT SHALL RAMP DOWN TO LOWEST POSSIBLE AIRFLOW SETTING (30%)

NEW EXHAUST FAN SCHEDULE

ITEM TAG	TYPE	SERVICE	AIRFLOW (CFM)	ESP (IN.WC.)	ELECTRICAL HP/V/PH/HZ	APPROX. WEIGHT (LBS)	MANUFACTURER / MODEL
REF-1	INLINE CENTRIFUGAL	RELIEF EXHAUST	1600	1.5	1/208/3/60	120	GREENHECK / SQ-160HP-VG

REMARKS:
1. PROVIDE WITH MOTORIZED DAMPER WITH ACTUATOR
2. SHALL OPERATE IN VARIABLE SPEED DURING BOTH NORMAL AND ECONOMIZER MODES TO MAINTAIN SPACE PRESSURIZATION
3. PROVIDE FAN MOUNTED SPEED CONTROLLER FOR BALANCING
4. PROVIDE START STOP STATUS VIA EXISTING BAS
5. PROVIDE EC MOTOR, STARTER AND ALL WIRING AS REQUIRED
6. PROVIDE NEMA 1 DISCONNECT SWITCH

STANDARD CITY OF CHICAGO REFRIGERATION SCHEDULE

ITEM TAG	MANUFACTURER / MODEL	TYPE OF REFRIGERANT	# OF COMRESSORS	NOMINAL TONS	WEIGHT OF REFRIGERANT (LBS)	REMOTE / SELF CONTAINED
CU-1	CARRIER / 38AU	R410A	1	6	145	REMOTE
CU-2	CARRIER / 38AU	R410A	2	10	90	REMOTE

REMARKS:
1. COPPER TUBING MAY BE TYPE ACR OR TYPE 'K' REFRIGERANT LINES UNLESS PRESSURE EXCEEDS THE RATED CAPACITY OF ACR TUBING [18-28-1107.4.3]
2. ALL JOINTS SHALL BE BRAZED.
3. INSTALL SAFETY REFIEF VALVE ON HIGH SIDE, UPSTREAM OF ANY INTERVENING DEVICES. SET AT 450 PSI.
4. REFRIGERANT PIPING TO BE SIZED PER MANUFACTURER'S RECOMMENDATIONS.
5. LOCATE ALL REFRIGERATION EXPANSION VALVES, DEVICES AND CONNECTION OUT OF THE AIRSTREAM.
6. REFRIGERANT LINES MAY NOT BE LOCATED IN ANY ELEVATOR, DUMBWAITER OR SHAFT CONTAINING MOVING OBJECTS OR IN STAIRWELLS OR OTHER MEANS OF EXIT. NOT PERMITTED UNDER STAIRS, FIRE ESCAPES OR HALLWAYS. [18-28-11107.2.1 & 1101.11]

DUCT SPECIFICATIONS

CONDITION / LOCATION	TYPE	INSULATION
LOW PRESSURE SUPPLY	3" STATIC PRESSURE CLASSS, GALVANIZED STEEL, CLASS A SEALING	1-1/2" FLEXIBLE FIBERGLASS INSULATION W/ ALUMINUM FOIL JACKET
MEDIUM PRESSURE SUPPLY	4" STATIC PRESSURE CLASSS, GALVANIZED STEEL, CLASS A SEALING	1-1/2" FLEXIBLE FIBERGLASS INSULATION W/ ALUMINUM FOIL JACKET
EXHAUST AIR	2" STATIC PRESSURE CLASSS, GALVANIZED STEEL, CLASS A SEALING	N/A
RETURN AIR	2" STATIC PRESSURE CLASSS, GALVANIZED STEEL, CLASS A SEALING	N/A

DX SPLIT CONDENSING UNIT SCHEDULE - TENANT FURNISHED

ITEM TAG	DESCRIPTION	INDOOR UNIT	MANUFACTURER / MODEL	TYPE OF REFRIGERANT / CHARGE LBS	EER	COOLING CAPACITY (TONS)	MCA / MOCP / V / PH / HZ	WEIGHT (LBS)	REMARKS
CU-1	DUAL CIRCUIT 3 STAGE COOLING ONLY AC SCROLL COMPRESSOR	AHU-1	CARRIER / 38AUD	R410A / 145	11.2	10	44 / 60 / 208 / 3 / 60	516	ALL
CU-2	SINGLE CIRCUIT 3 STAGE COOLING ONLY AC SCROLL COMPRESSOR	AHU-2	CARRIER / 38AUD	R410A / 90	12	6	30 / 45 / 208 / 3 / 60	389	ALL

REMARKS:
1. MAINTAIN REQUIRED CLEARANCES FOR PROPER AIR FLOW AND MAINTENANCE. INSTALL AS PER MANUF. RECOMMENDATIONS
2. FINAL ROUTING AND SIZING OF THE REFRIGERANT LINES TO BE COORDINATED WITH MANUFACTURER BASED ON ACTUAL SITE CONDITIONS
3. PROVIDE CONVENIENCE OUTLET AND FIELD MOUNTED NEMA 3R DISCONNECT SWITCH (BY ELECTRICAL CONTRACTOR)-1 PER UNIT
4. CONTRACTOR SHALL PROVIDE LONG LINE ACCESSORIES AS REQUIRED PER MANUFACTURERS INSTRUCTIONS

DX COOLING AND HOT WATER AIR HANDLING UNIT SCHEDULE - TENANT FURNISHED

TAG	MANUFACTURER	MODEL #	AREA SERVED	FAN/MOTOR DATA					COOLING CAPACITY									HEATING CAPACITY										ELECTRICAL DATA					WEIGHT (LBS)
				AIRFLOW CFM	OA CFM	ESP (IN. W.C.)	RPM	HP	GROSS (MBH)	SENSIBLE (MBH)	EAT (DB°F)	EAT (WB°F)	LAT (DB°F)	LAT (WB°F)	ROWS	FPI	APD (IN. WG)	CAPACITY (MBH)	EAT (DB°F)	LAT (DB°F)	EWT (°F)	LWT (°F)	GPM	ROWS	FPI	APD (IN. WG)	WPD (FT. WG)	MCA	MOCP	V	PH	HZ	
AHU-1	CARRIER	39LC SIZE 08	FIRST FLOOR KITCHEN	3250	875	1.12	1800	5	100	80	80	67	57.6	57.3	8	11	1.12	94.2	60	86	145	120	8	2	14	0.27	0.9	17.9	30	208	3	60	674
AHU-2	CARRIER	39LC SIZE 06	MEZZANINE FLOOR	2700	676	1.30	1800	3	50	58	80	67	60	60	8	11	1.30	75.5	60	85	145	122	7	2	14	0.35	1.0	10.8	15	208	3	60	479

REMARKS:
1. SIZED FOR R410A REFRIGERANT
2. SIZED FOR 40% PROPYLENE GLYCOL HOT WATER COILS
3. COORDINATE UNIT CONTROL AND ACCESS DOOR SIDE ON SITE PRIOR TO PROCUREMENT
4. COIL CONNECTIONS SHALL BE SAME END
5. PROVIDE FACTORY INSTALLED AND PROGRAMMED CONTROLS WITH USER OVERRIDE
6. PROVIDE ALL BAS INTEGRATION REQUIREMENTS
7. MERV 11 WITH 2" MERV 8 PLEATED PRE-FILTER
8. NO MIXING BOX - MECHANICAL CONTRACTOR TO FABRICATE PLENUM BOX AS SHOWN IN DRAWINGS WITH MOTORIZED OA AND RA DAMPERS
9. FRONT SUPPLY AND REAR RETURN
10. ALL COILS SHALL BE RATED FOR MIN. 350 PSI
11. PROVIDE COMBINATION STARTER AND DISCONNECT (NEMA 1)
12. PROVIDE FACTORY MOUNTED VARIABLE FREQUENCY DRIVE
13. COIL TUBE SHALL BE COPPER AND HAVE 5/8" DIAMETER, 0.035" TUBE THICKNESS, AND 0.095" ALUMINIUM FINS.
14. CASING PANELS SHALL BE 1" MIN. THICKNESS
15. PROVIDE CONDENSATE DRAIN PANS
16. PROVIDE CONDENSATE PUMP
17. COILS SHALL BE AHRI RATED AND ADHERE TO ASHRAE 15 REQUIREMENTS
18. PROVIDE CEILING SUSPENDED HANGING SUPPORTS AND VIBRATION ISOLATROS
19. THERMOSTAT AND SENSOR AND ALL ASSOCIATED WIRING TO BE INCLUDED

DUCT MATERIAL SCHEDULE

DUCT SYSTEM	COMPONENT	EXTERIOR	INTERIOR
DUCTWORK	DUCTWORK	HVAC GALV	HVAC GALV
	INSULATION	MINERAL FIBER BOARD	MINERAL FIBER BOARD
	INSULATION THICKNESS	2.0-INCH	1.5-INCH
	VAPOR RETARDER	FSK	FSK
	FIELD-APPLIED JACKET	ALUM	N/A

MATERIAL ABBREVIATIONS

HVAC GALV G90 GALVANIZED STEEL COMMERCIAL DUCT CONSTRUCTION PER SMACNA "HVAC DUCT CONSTRUCTION STANDARDS"

GREASE DUCT INSULATION:

A. KITCHEN GREASE DUCT WRAP"
a. HIGH TEMPERATURE FLEXIBLE FIBER BLANKET ENCAPSULATED IN FIBERGLASS FOIL FACING SHALL BE SUITABLE FOR KITCHEN GREASE DUCT WRAP. WRAP SHALL BE TWO LAYERS, EACH 1-1/2" THICK, RATED AS 2 HR SHAFT ALTERNATIVE.
- ASTM STANDARD: E2336 AND RELATED ICC ESR (2 HR GREASE DUCT ENCLOSURE)
- CODES/STANDARDS: IMC, UMC, NFPA 96.
- DENSITY: NOMINAL 6 LB/FT^3
- SERVICE TEMPERATURE: CONTINUOUS 1832°F.

b. MANUFACTURERS/PRODUCTS:
- THERMAL CERAMICS, FIREMASTER FASTWRAP XL
- 3M, FIRE BARRIER DUCT WRAP 615+
- UNIFRAX, FYREWRAP ELITE 1.5 DUCT INSULATION

c. DUCT ACCESS DOORS SHALL BE FURNISHED BY DUCT WRAP MANUFACTURE AS PART OF DUCT WRAP SYSTEM. ACCESS DOORS SHALL PASS ASTM E2336 TEST STANDARD.

COPPER PIPE SUPPORT SCHEDULE

PIPE SIZE (IN)	HANGER ROD SIZE (IN)	MAX SPAN (FT)	SADDLE GAGE	SADDLE LENGTH (IN)
1/2" & SMALLER	3/8"	5	16	8
3/4"	3/8"	7	16	8
1"	3/8"	7	16	8
1 1/4"	3/8"	9	16	8
1 1/2"	3/8"	9	16	8
2"	3/8"	10	16	8
2 1/2"	1/2"	11	14	10
3"	1/2"	12	14	10

REMARKS
1. ALL HANGERS AND SUPPORTS MUST COMPLY WITH MATERIAL AND FINISH SCHEDULE.

HEATING TABLE

BUILDING LOAD (MBH)	2606
VENTILATION LOAD (MBH)	740
TOTAL HEATING LOAD (MBH)	3346
HEATING SYSTEM OUTPUT CAPACITY (MBH)	2163
HEATING SYSTEM EQUIPMENT INCLUDED IN THIS TABLE:	2338
FAN COIL AND AIR HANDLING UNITS WITH HEATING HOT WATER SYSTEM	

HEATING CERTIFICATION STATEMENT

I HEREBY CERTIFY THAT THE HEATING SYSTEM WILL HEAT ALL ROOMS REGULARLY OCCUPIED BY HUMANS TO AN INSIDE TEMPERATURE OF 68°F WHEN THE OUTSIDE TEMPERATURE IS MINUS 10°F (AS REQUIRED BY THE SECTIONS 34(13-196-410) AND 4(5-4-270) OF THE 2018 CHICAGO BUILDING CODE AND BY PARAGRAPH 1204.1 OF CHAPTER 18-12 (INTERIOR ENVIRONMENT) OF THE PROPOSED BUILDING PLANNING AND LIFE SAFETY PORTION OF THE CODE).

OWNER, CONTRACTOR OR OWNER'S LICENSED ENGINEER REPRESENTATIVE	

COPPER PIPE HANGER SPACING

PIPE SIZE	MAX HANGER SPACING
3/4" TO 1"	5'
1-1/4" TO 1-1/2"	7'
2" TO 2-1/2"	8'
3" AND ABOVE	10'

PIPE SPECIFICATIONS

CONDITION / LOCATION	TYPE	JOINTS	INSULATION
CONDENSATE DRAIN	TYPE L COPPER	SOLDERED	1-1/2" FIBERGLASS WITH A FOIL SCRIM JACKET
HOT AND CHILLED WATER (2" AND SMALLER)	TYPE L COPPER	SOLDERED JOINTS	2" RIGID FIBERGLASS INSULATION, W/ FULL PVC JACKET

ferris+sloane
100 N. Howard Street, Suite 4563 Spokane, WA 99201

CAVA

CAVA #000000
270 E ONTARIO STREET
STREETERVILLE, ILLINOIS, 60611
FOR
CAVA
14 Ridge Square NW #500, WASHINGTON, DC 20016

AOR PROJECT NUMBER: CAV061

ISSUE	DATE
PERMIT SET	10/09/2024
LANDLORD/BID	11/08/2024
CONSTRUCTION SET	01/29/2025

rtm
engineering consultants

MECHANICAL SCHEDULES

SHEET: M502

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FOR QUESTIONS, CALL THE
Maryland Office
REGION 32
PHONE: (800) 988 - 0881
EMAIL: reg32@captiveaire.com

PATENT NUMBERS

AC-PSP (UNITED STATES) - US PATENT 7963830 B2.
AC-PSP WALL (CANADA) - CA PATENT 2820509.
AC-PSP ISLAND (CANADA) - CA PATENT 2520330.

HOOD INFORMATION - JOB#7020062

HOOD NO	TAG	MODEL	MANUFACTURER	LENGTH	MAX. COOKING TEMP	TYPE	APPLIANCE DUTY	DESIGN CFM/FT	TOTAL EXH CFM	EXHAUST PLENUM RISER(S) WIDTH	LENG	HEIGHT	DIA	CFM	VEL	SP	MUA CFM	AC CFM	HOOD CONSTRUCTION	HOOD CONFIG END TO END	ROW
1	33	6030 ND-2-ACPSP-F	CAPTIVEAIRE	11' 7"	600 DEG	I	HEAVY	225	2606			4"	16"	2606	1866	-0.968"	2163	600	430 SS WHERE EXPOSED	ALONE	ALONE

HOOD INFORMATION

HOOD NO	TAG	FILTER(S) TYPE	QTY	HEIGHT	LENGTH	EFFICIENCY @ 7 MICRONS	LIGHT(S) QTY	TYPE	WIRE GUARD	UTILITY CABINET(S) LOCATION	SIZE	FIRE SYSTEM TYPE	FIRE SYSTEM SIZE	ELECTRICAL MODEL #	SWITCHES QUANTITY	FIRE SYSTEM PIPING	HOOD HANGING WEIGHT
1	33	CAPTRATE SOLO FILTER	8	20"	16"	85% SEE FILTER SPEC	6	L55 SERIES E26	NO	RIGHT	12"x60"x30"	TANK FS	4.0/4.0	SC-311110MA	1 LIGHT 1 FAN	YES	1224 LBS

HOOD OPTIONS

HOOD NO	TAG	OPTION
1	33	FIELD WRAPPER 10.00" HIGH FRONT, LEFT, RIGHT.
		LEFT END STANDOFF (FINISHED) 1" WIDE 60" LONG INSULATED.
		RIGHT VERTICAL END PANEL 27" TOP WIDTH, 21" BOTTOM WIDTH, 80" HIGH INSULATED 430 SS.

PERFORATED SUPPLY PLENUM(S)

HOOD NO	TAG	PDS	LENGTH	WIDTH	HEIGHT	TYPE	RISER(S) WIDTH	LENG	DIA	CFM	SP
1	33	Front	152"	24"	6"	MUA	12"	28"		721	0.196"
						MUA	12"	28"		721	0.196"
						MUA	12"	28"		721	0.196"
						AC	8"	16"		300	0.082"
						AC	8"	16"		300	0.082"

GREASE DUCT & CHIMNEY SPECIFICATIONS:
PROVIDE GREASE DUCT EQUAL TO CAPTIVEAIRE SYSTEMS MODEL "DW" ROUND 20 GAUGE 430 STAINLESS STEEL DUCTWORK. MODEL "DW" IS LISTED TO UL-1978 AND IS INSTALLED USING "V" CLAMP LOCKING CONNECTIONS SEALED WITH 3M FIRE BARRIER 2000 PLUS. MODEL "DW" DOES NOT REQUIRE WELDING PROVIDING IT HAS BEEN INSTALLED PER THE MANUFACTURES INSTALLATION GUIDE.
PROVIDE RATED ACCESS DOORS AT EVERY CHANGE IN DIRECTION AND EVERY 12' ON CENTER. PER MANUFACTURES LISTING MODEL "DW" HORIZONTAL RUNS LESS THAN 75 FT. CAN BE SLOPED 1/16" PER 12", HORIZONTAL RUNS MORE THAN 75 FT. CAN BE SLOPED 3/16" PER 12". DUCT SHOULD BE SLOPED AS MUCH AS POSSIBLE TO REDUCE THE CHANCE OF GREASE ACCUMULATION IN HORIZONTAL RUNS.

IF THE DUCT OR CHIMNEY IS WITHIN 18 INCHES OF COMBUSTIBLE MATERIAL, PROVIDE UL-2221 OR UL-103 HT LISTED DOUBLE WALL GREASE DUCT OR DOUBLE WALL CHIMNEY EQUAL TO CAPTIVEAIRE SYSTEMS MODEL "DW- 2R, 2R TYPE HT, 3R, OR 3Z" ROUND 20 GAUGE 430 STAINLESS INNER DUCT INSULATED WITH A 24 GAUGE 430 STAINLESS OUTER SHELL.

CAPTIVEAIRE SYSTEMS RECOMMENDS THE USE OF LISTED, PRE-FABRICATED ROUND GREASE EXHAUST DUCT TO REDUCE STATIC PRESSURE IN THE SYSTEM, MINIMIZE INSTALLATION AND INSPECTION TIMES, AND ENSURE DUCT IS LIQUID TIGHT

HVAC DISTRIBUTION NOTE

HIGH VELOCITY DIFFUSERS OR HVAC RETURNS SHOULD NOT BE PLACED WITHIN TEN (10) FEET OF THE EXHAUST HOOD. PERFORATED DIFFUSERS ARE RECOMMENDED.

VERIFY CEILING HEIGHT

___' - ___"

HEIGHT REQUIRED TO VERIFY THAT HOOD FITS SPACE AND TO SIZE THE ENCLOSURE PANELS

CUSTOMER APPROVAL TO MANUFACTURE:

APPROVED AS NOTED ☐
APPROVED WITH NO EXCEPTION TAKEN ☐
REVISE AND RESUBMIT ☐
SIGNATURE _____
YOUR TITLE _____ DATE _____

GAS VALVE FOR FS#1 →

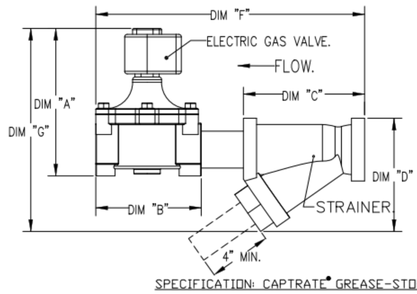
GAS VALVES AND STRAINERS

TYPE	SIZE	VOLTAGE	GAS VALVE SIZING MIN. INLET PRESSURE	MAX. INLET PRESSURE	FLOW AT 1 IN.W.C. DROP NATURAL GAS	FLOW AT 1 IN.W.C. DROP PROPANE	GAS VALVE DIMENSIONS DIM "A"	DIM "B"	DIM "C"	DIM "D"	DIM "F"	DIM "G"	INSTALLATION MOUNTING ORIENTATION	PART NUMBERS GAS VALVE PART NUMBER	STRAINER PART NUMBER	GAS VALVE/STRAINER KIT
ELECTRICAL	1"	120 VAC	0 PSI (0 IN.W.C.)	5 PSI (138 IN.W.C.)	1,132,300 BTU/HR	734,733 BTU/HR	6-15/16"	5-15/16"	4-7/8"	5-3/16"	12-13/16"	10-11/16"	HORIZONTAL	8214250	4417K65	(SC)E0VA1

ELECTRIC GAS VALVES ONLY:
3/4"-2" 120VAC GAS VALVES CAN BE MOUNTED WITH THE SOLENOID IN ANY POSITION ABOVE HORIZONTAL.
2 1/2"-3" 120VAC GAS VALVES MUST BE MOUNTED WITH THE SOLENOID VERTICAL AND UPRIGHT.
24VDC GAS VALVES MUST BE MOUNTED WITH THE SOLENOID VERTICAL AND UPRIGHT.

ALL GAS VALVES/STRAINERS
PROPER CLEARANCE MUST BE PROVIDED IN ORDER TO SERVICE THE STRAINERS A MINIMUM OF 4" CLEARANCE DISTANCE MUST BE PROVIDED AT THE BASE OF THE STRAINER CUSTOMER MUST VERIFY BTU CONSUMPTION AS WELL AS PRESSURE RATING SPECIFIC GRAVITY OF NATURAL GAS = 0.64, SPECIFIC GRAVITY OF LP = 1.52.

CALCULATIONS
TO CALCULATE GAS FLOW FOR OTHER THAN 1 IN.W.C. PRESSURE DROP
NEW BTU/HR = (BTU/HR AT 1 IN.W.C. PRESSURE DROP) X NEW PRESSURE DROP$^{0.5}$
TO CALCULATE GAS FLOW FOR OTHER THAN 0.64 SPECIFIC GRAVITY
NEW BTU/HR = (BTU/HR AT 0.64) X (0.64 / NEW SPECIFIC GRAVITY)$^{0.5}$.



SPECIFICATION: CAPTRATE® GREASE-STOP® SOLO FILTER

THE CAPTRATE GREASE-STOP SOLO FILTER IS A SINGLE-STAGE FILTER FEATURING A UNIQUE S-BAFFLE DESIGN IN CONJUNCTION WITH A SLOTTED REAR BAFFLE DESIGN, TO DELIVER EXCEPTIONAL FILTRATION EFFICIENCY.

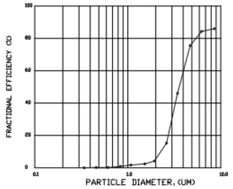
FILTER IS STAINLESS STEEL CONSTRUCTION, AND SIZED TO FIT INTO STANDARD 2-INCH DEEP HOOD CHANNEL(S).

UNITS SHALL INCLUDE STAINLESS STEEL HANDLES AND A FASTENING DEVICE TO SECURE THE TWO COMPONENTS WHEN ASSEMBLED.

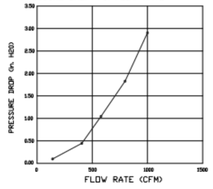
GREASE EXTRACTION EFFICIENCY PERFORMANCE SHALL REMOVE AT LEAST 75% OF GREASE PARTICLES FIVE MICRONS IN SIZE, AND 85% GREASE PARTICLES SEVEN MICRONS IN SIZE AND LARGER, WITH A CORRESPONDING PRESSURE DROP NOT TO EXCEED 1.0 INCHES OF WATER GAUGE.

THE CAPTRATE GREASE-STOP SOLO WAS TESTED TO ASTM STANDARD ASTM F2519-05. MANUFACTURER APPROVED FOR USE IN SOLID FUEL APPLICATIONS AS A SPARK ARRESTER.

EFFICIENCY VS. PARTICLE DIAMETER



PRESSURE DROP VS. FLOW RATE



CAPTRATE FILTERS ARE BUILT IN COMPLIANCE WITH:
NFPA #96.
NSF STANDARD #2.
UL STANDARD #1046.
INT. MECH. CODE (IMC).
ULC-S649.

REVISIONS

	DESCRIPTION	DATE
△		
△		
△		
△		

CAPTIVEAIRE
Maryland Office
8120 Woodmont Avenue, Suite 720, Bethesda, MD, 20814 PHONE: (800) 988 - 0881 FAX: 9192275931 EMAIL: reg32@captiveaire.com
www.captiveaire.com

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DATE: 9/24/2024
DWG.#: 7020062
DRAWN BY: ABS-76
SCALE: NTS
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100 N. Howard Street, Suite 4500 Spokane, WA 99201

CAVA
CAVA #000000
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STREETERVILLE, ILLINOIS, 60611
FOR
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14 Ridge Square NW #500, WASHINGTON, DC 20016

AOR PROJECT NUMBER: CAV061

ISSUE	DATE
PERMIT SET	10/09/2024
LANDLORD/BID	11/08/2024
CONSTRUCTION SET	01/29/2025

MECHANICAL SCHEDULES

SHEET: **M601**

rtm engineering consultants
2800 156th Ave SE | Suite 115 |Bellevue, WA 98007
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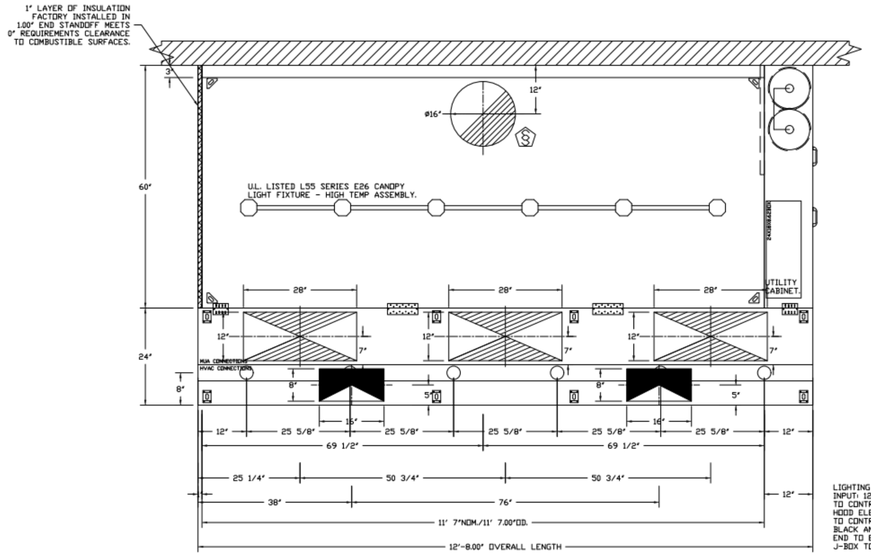
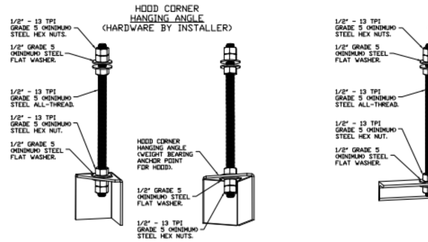
FOR REFERENCE ONLY



PLAN VIEW - HOOD #1 (33)
11' 7.00" LONG 6030ND-2-ACPSP-F

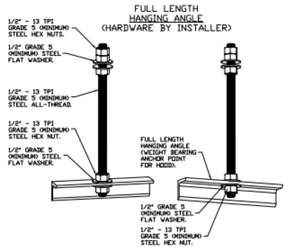
ACPSP SHIPS LOOSE FOR FIELD INSTALLATION

LIGHTING FOR ACPSP JOB # 7020062 - HOOD #1
INPUT: 120V AC, 1 PHASE, 50/60HZ, 3.5 WATTS PER LIGHT.
TO CONTROL LIGHTS WITH HOOD LIGHT SWITCH, WIRE PER HOOD ELECTRICAL CONTROL PANEL SCHEMATIC.
TO CONTROL LIGHTS WITH BUILDING LIGHT SWITCH, WIRE BLACK AND WHITE WIRE TO A 120VAC SERVICE.
END TO END ACPSPS REQUIRE 120VAC FIELD WIRING FROM J-BOX TO J-BOX. REPLACE LIGHTS WITH LED LIGHTS ONLY.



ASSEMBLY INSTRUCTIONS

HANGING ANGLE MUST BE SUPPORTED WITH 1/2" - 13 TPI GRADE 5 (MINIMUM) ALL-THREAD. SANDWICH HANGING ANGLES AND CEILING ANCHOR POINTS WITH 1/2" GRADE 5 (MINIMUM) STEEL FLAT WASHERS AND 1/2" - 13 TPI GRADE 5 (MINIMUM) HEX NUTS AS SHOWN. MUST USE DOUBLED HEX NUT CONFIGURATION BENEATH HOOD HANGING ANGLES AND ABOVE CEILING ANCHORS. MAINTAIN 1/4" OF EXPOSED THREADS BENEATH BOTTOM HEX NUT. TORQUE ALL HEX NUTS TO 57 FT-LBS.



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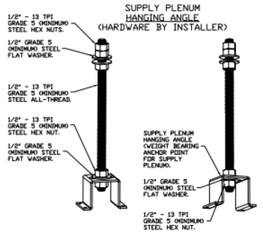

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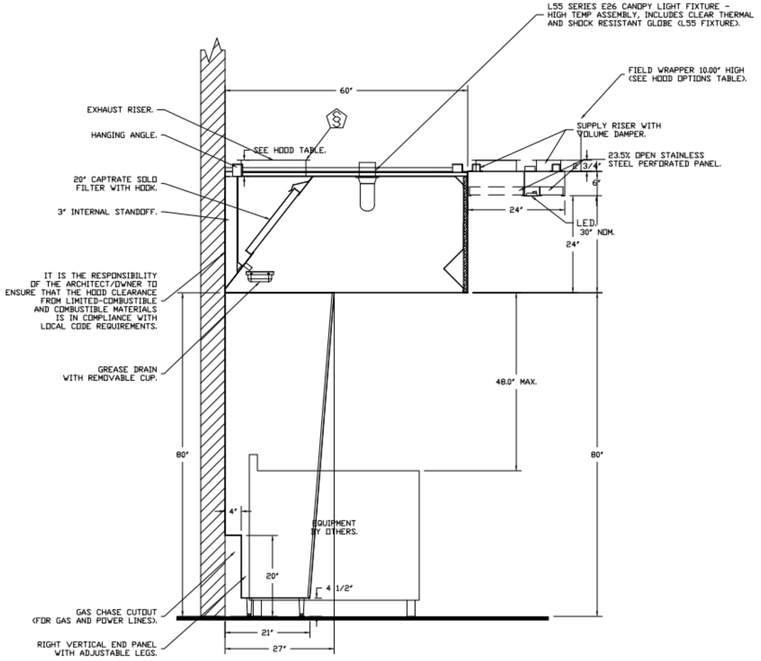
CLEARANCE TO COMBUSTIBLES

HOODS #	SURFACE	*CLEARANCE
1	TOP	18"
	FRONT	0"
	BACK	18"
	LEFT	0"
	RIGHT	0"

- *0" CLEARANCE TO COMBUSTIBLES CONFORMS TO UL710 STANDARD.
- HOOD MOUNTED UTILITY CABINETS REQUIRE 36" SERVICE CLEARANCE.



SECTION VIEW - MODEL 6030ND-2-ACPSP-F HOOD - #1 (33)

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www.captiveaire.com

REVISIONS

	DESCRIPTION	DATE:
1		
2		
3		
4		

Cava - Chicago, IL [STREETERVILLE]
270 East Ontario Street,
Chicago, IL, 60611

DATE: 9/24/2024

DWG.#: 7020062

DRAWN BY: ABS-76

SCALE: NTS

MASTER DRAWING

SHEET NO. 2

ferris+sloane
109 N. Howard Street, Suite 4500 Spokane, WA 99201

CAVA

CAVA #000000
270 E ONTARIO STREET
STREETERVILLE, ILLINOIS, 60611
FOR
CAVA
14 Ridge Square NW #500, WASHINGTON, DC 20016

AOR PROJECT NUMBER: CAV061

ISSUE	DATE
PERMIT SET	10/09/2024
LANDLORD/BID	11/08/2024
CONSTRUCTION SET	01/29/2025

MECHANICAL SCHEDULES

SHEET: **M602**

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1/29/2025 12:19:42 PM

FIRE SYSTEM INFORMATION – JOB#7020062

FIRE SYSTEM NO	TAG	TYPE	SIZE	MAX FP	DESIGN FP	INSTALLATION	
						SYSTEM	LOCATION ON HOOD
1		TANK FS	4.0/4.0	40	37	FIRE CABINET RIGHT	RIGHT, HOOD 1

GAS VALVE(S)

FIRE SYSTEM NO	TAG	TYPE	SIZE	SUPPLIED BY
1		SC ELECTRICAL	1.000	CAPTIVEAIRE SYSTEMS

FIRE SYSTEM PARTS LIST KEY

FIRE SYSTEM NO	TAG	KEY NUMBER – PART DESCRIPTION	QTY BY FACTORY	QTY BY DIST
1		0 – 0 – TANK FIRE SUPPRESSION POST-DISCHARGE PROCEDURE UTILITY CABINET LABEL SHEET.	1	0
		0 – 0 – TANK FIRE SUPPRESSION MAINTENANCE GUIDE UTILITY CABINET LABEL SHEET.	1	0
		0 – 0 – 12-F28021-32144-DT-360 DUCT FIRE THERMOSTAT WITH 12 FOOT WIRE LEADS. NO, CLOSE ON TEMP RISE AT 360°F. (A0034310).	1	0
		0 – 0 – 32-00002 QUIK SEAL – 1/2" (UL).	1	0
		0 – 0 – 4429K153 1/2" MALE NPT TO 1/2" FEMALE NPT ELBOW, BRASS.	2	0
		0 – 0 – 4429K422 1/2" X 1/4" BRASS REDUCING BUSHING.	1	0
		0 – 0 – 79525 1/2" 90 PRO-PRESS ELBOW WITH 1/2" NPT FEMALE CONNECTION, VIEGA.	1	0
		0 – 0 – 79580 1/2" X 1/2" PRO-PRESS TEE X 1/2" NPT FEMALE CONNECTION, VIEGA.	2	0
		0 – 0 – 87-120042-001 SECONDARY ACTUATOR VALVE (SVA) – SINGLE ACTUATOR, REQUIRES PRIMARY RELEASE ACTUATOR, TANK FIRE SUPPRESSION.	1	0
		0 – 0 – 87-120045-001 HOSE, SECONDARY ACTUATOR HOSE, 7.5" BRAIDED STAINLESS STEEL, TANK FIRE SUPPRESSION.	1	0
		0 – 0 – 87-300001-001 TANK – PRESSURIZED TANK USED FOR TANK FIRE SUPPRESSION.	2	0
		0 – 0 – 87-300030-001 PRIMARY ACTUATOR KIT (PAK) – ACTUATOR AND RELEASE SOLENOID ASSEMBLY, ONE NEEDED PER FIRE SYSTEM, SUPERVISED, TANK FIRE SUPPRESSION.	1	0
		0 – 0 – 87-300030-001 PRIMARY ACTUATOR KIT (PAK) – ACTUATOR AND RELEASE SOLENOID ASSEMBLY, ONE NEEDED PER FIRE SYSTEM, SUPERVISED, TANK FIRE SUPPRESSION.	1	0
		0 – 0 – 87-300152-001 HARDWARE, SVA BOLTS, TANK FIRE SUPPRESSION.	8	0
		0 – 0 – 9055455PC PRO PRESS 1/2 PRESS X PRESS 90 ELBOW LD.	6	0
		0 – 0 – 9097200PC PRO PRESS PC611 1/2 PRESS TEE LD.	7	0
		0 – 0 – 98694A115 HARDWARE, DATANKLOCK LOCKING BRACKET SQUARE NUTS 5/16" ZINC, TANK FIRE SUPPRESSION.	4	0
		0 – 0 – A0034332 JUNCTION BOX FOR MANUAL PULL STATION. 1.5" DEEP BACK BOX, RED COLOR.	1	0
		0 – 0 – A31484 1/4" NPT SCHRADER VALVE AND CAP, JB INDUSTRIES. 1/4" FLARE X 1/4" MPT HALF UNION. USED ON TANK SERVICE PORT.	1	0
		0 – 0 – BI145 3/8" BLACK IRON 90 ELL.	3	0
		0 – 0 – DATANKLOCK DISCHARGE ADAPTER TANK LOCKING PLATE FOR FIRE SYSTEM TANK INSTALLATION IN UTILITY CABINETS, TANK FIRE SUPPRESSION.	2	0
		0 – 0 – TANK STRAP TANK STRAP – USED FOR TANK FIRE SUPPRESSION.	6	0
		0 – 0 – TFS-UCTANKBRACKET TANK BRACKET FOR FIRE SYSTEM TANK INSTALLATION IN UTILITY CABINETS, TANK FIRE SUPPRESSION.	2	0
		0 – 0 – WK-283952-000 DISCHARGE ADAPTER, TANK FIRE SUPPRESSION.	2	0
		16 – 16 – 79210 1/2" X 3/8" NPT MALE ADAPTER, VIEGA.	8	0
		16 – 16 – DL-F NOZZLE – TANK PROTECTION APPLIANCE COVERAGE NOZZLE (INCLUDES METAL BLOW OFF CAP, LANYARD, USED WITH CHROME-PLATED PIPE).	8	0
		26 – 26 – QSA-3/8 QUIK SEAL – 3/8" (UL).	8	0
		34 – 34 – A0034331 24VDC SINGLE ACTION MANUAL ACTUATION DEVICE (PUSH/PULL STATION) WITH PROTECTIVE COVER, ONE (1) NORMALLY OPEN CONTACT. RED COLOR.	1	0

NOTES
- FIELD PIPE DROPS AS SHOWN
  PIPING, ELBOWS, TEES, AND NOZZLES SUPPLIED BY CAS.
- FIELD INSTALLED DROP: FACTORY WILL PROVIDE QTY 2 60IN LONG PIECES OF CHROME PLATED PIPING SHIPPED LOOSE TO BE FIELD-INSTALLED.
- SHIP LOOSE DROP: FACTORY WILL PROVIDE THE EXACT CHROME PIPE LENGTH NEEDED SHIPPED LOOSE TO BE FIELD-INSTALLED.
- RELOCATE NOZZLES IF FLOW PATTERN IS BLOCKED BY SHELVING, SALAMANDERS, ETC.
- OVERLAPPING COVERAGE SHALL NOT BE USED ON ANY APPLIANCE WITH AN OBSTRUCTION.
- IF APPLICABLE, EXTENDED PRE-PIPED DROPS ARE SHIPPED LOOSE.
- FACTORY PIPING EXTENDS A MAXIMUM OF 6" ABOVE THE TOP OF THE HOOD.

- APPLIANCE DIMENSIONS LISTED REPRESENT THE COOKING SURFACE SIZE, NOT THE OVERALL APPLIANCE SIZE.

- THIS FIRE SYSTEM COMPLIES WITH U.L. 300 REQUIREMENTS.

- DL-F NOZZLE PART NUMBER REPLACES 3070-3/8H-10-SS

JOB #: 7020062.
JOB NAME: CAVA – CHICAGO, IL (STREETERVILLE).

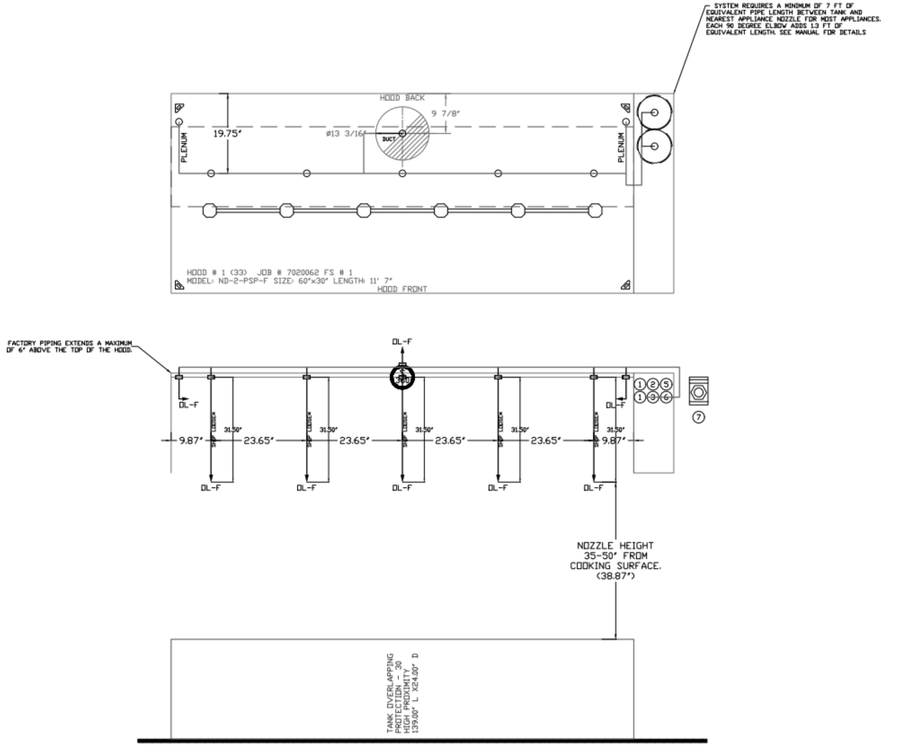
SYSTEM SIZE: TANK-SP-2 DESIGN FP: 37, MAXIMUM FP: 40.
HOOD # 1 11' 7.00" LONG x 60" WIDE x 30" HIGH.
RISER # 1 SIZE: 16" DIA.
HOOD # 1 METAL BLOW-OFF CAPS INCLUDED.

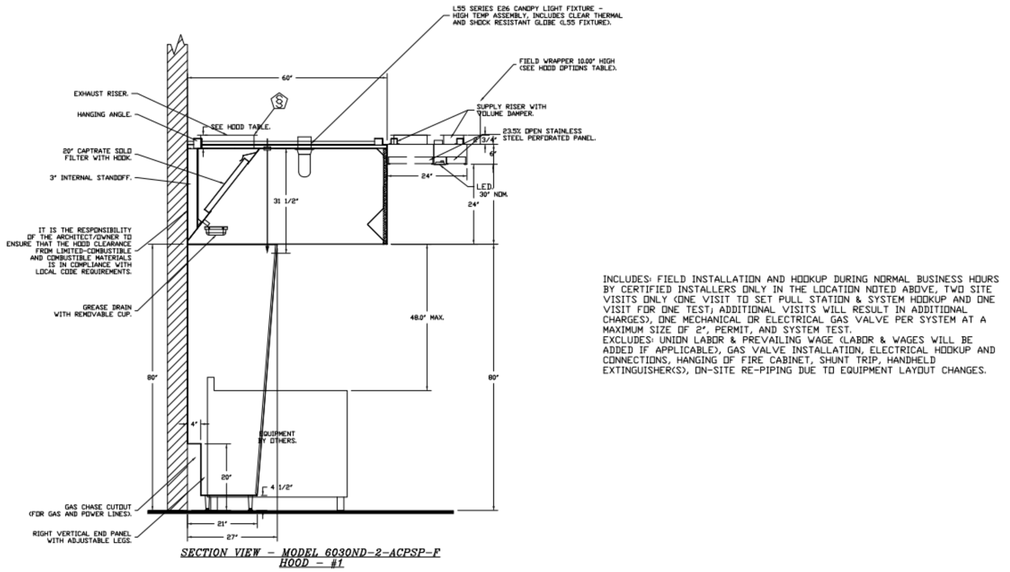
- HEAVY-DUTY APPLIANCES (RATED 600°F) WILL REQUIRE AN ADDITIONAL DOWNSTREAM FIRESTAT IN THE EVENT THAT THE DUCTWORK CONTAINS ANY HORIZONTAL RUNS OVER 25 FT IN LENGTH.
- MEDIUM TO LIGHT-DUTY APPLIANCES (RATED 450°F) WILL NOT REQUIRE ANY ADDITIONAL DOWNSTREAM DETECTION.

AGENT DISTRIBUTION PIPING LIMITATIONS	
PIPE SECTION	MAX PIPE LENGTH (FT)
MAX SUPPLY LINE TO FIRST OVERLAPPING NOZZLE	42
OVERLAPPING NOZZLE APPLIANCE BRANCH	10
DEDICATED NOZZLE APPLIANCE BRANCH	10

LEGEND – FIRE CABINET TANK SYSTEM

1 4 GALLON TANK.
2 PRIMARY ACTUATOR RELEASE.
3 SECONDARY ACTUATOR RELEASE.
4 PRESSURE SUPERVISION SWITCH.
5 PRIMARY HOSE ASSEMBLY.
6 SECONDARY HOSE ASSEMBLY.
7 REMOTE MANUAL ACTUATION DEVICE.





SECTION VIEW – MODEL 6030ND-2-ACPSP-F HOOD – #1

INCLUDES: FIELD INSTALLATION AND HOOKUP DURING NORMAL BUSINESS HOURS BY CERTIFIED INSTALLERS ONLY IN THE LOCATION NOTED ABOVE, TWO SITE VISITS ONLY (ONE VISIT TO SET PULL STATION & SYSTEM HOOKUP AND ONE VISIT FOR ONE TEST; ADDITIONAL VISITS WILL RESULT IN ADDITIONAL CHARGES), ONE MECHANICAL OR ELECTRICAL GAS VALVE PER SYSTEM AT A MAXIMUM SIZE OF 2", PERMIT, AND SYSTEM TEST.
EXCLUDES: UNION LABOR & PREVAILING WAGE (LABOR & WAGES WILL BE ADDED IF APPLICABLE), GAS VALVE INSTALLATION, ELECTRICAL HOOKUP AND CONNECTIONS, HANGING OF FIRE CABINET, SHUNT TRIP, HANDHELD EXTINGUISHER(S), ON-SITE RE-PIPING DUE TO EQUIPMENT LAYOUT CHANGES.

FOR REFERENCE ONLY

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REVISIONS

DESCRIPTION	DATE:

Cava - Chicago, IL (STREETERVILLE)
270 East Ontario Street,
Chicago, IL, 60611

DATE: 9/24/2024
DWG.#: 7020062
DRAWN BY: ABS-76
SCALE: NTS
MASTER DRAWING
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ferris+sloane
100 N. Howard Street, Suite 4560 Spokane, WA 99201

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CAVA #000000
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FOR
CAVA
14 Ridge Square NW #500, WASHINGTON, DC 20016

AOR PROJECT NUMBER: CAV061

ISSUE	DATE
PERMIT SET	10/09/2024
LANDLORD/BID	11/08/2024
CONSTRUCTION SET	01/29/2025

MECHANICAL SCHEDULES

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1/29/2025 12:19:43 PM

MUA FAN INFORMATION – JOB#7020062

FAN UNIT NO	TAG	QTY	FAN UNIT MODEL #	BLOWER	HOUSING	MIN CFM	DESIGN CFM	ESP	RPM	MOTOR ENCL	HP	BHP	PHASE	VOLT	FLA	MCA	MOCP	WEIGHT (LBS)	SONES
1		1	A1-D.500-16Z	16Z-1-MOD	A1-D.500	1000	2163	0.750	2441	ODP-ECM	2.500	1.7830	3	208	5.7	8.3A	15A	1050	27.9

COILS – JOB#7020062

FAN UNIT NO	TAG	COIL TYPE	DESIGN CFM	COOLING											HEATING								
				ENTERING DB TEMP	ENTERING WB TEMP	LEAVING DB TEMP	LEAVING WB TEMP	ENTERING FLUID TEMP	LEAVING FLUID TEMP	FLUID FLOW RATE	PERCENT GLYCOL	TOTAL CAPACITY	SENSIBLE CAPACITY	LATENT CAPACITY	ENTERING DB TEMP	LEAVING DB TEMP	ENTERING FLUID TEMP	LEAVING FLUID TEMP	FLUID FLOW RATE	PERCENT GLYCOL	STEAM PRESSURE	TOTAL CAPACITY	SENSIBLE CAPACITY
1		CHILLED WATER	2163	95.0°F	78.0°F	79.7°F	73.0°F	45.0°F	54.0°F	9.1 GAL/MIN	40%	40.9 MBH	33.9 MBH	7 MBH	---	---	---	---	---	---	---	---	---

GAS FIRED MAKE-UP AIR UNIT(S)

FAN UNIT NO	TAG	INPUT BTUs	OUTPUT BTUs	TEMP RISE	REQUIRED INPUT GAS PRESSURE	GAS TYPE	BURNER EFFICIENCY(%)
1		198507	182626	80°F	7 IN. W.C. - 14 IN. W.C.	NATURAL	92

FAN OPTIONS

FAN UNIT NO	TAG	QTY	DESCRIPTION
1		1	INLET PRESSURE GAUGE, 0-35"
		1	MANIFOLD PRESSURE GAUGE, -5 TO 15" WC
		1	SHIP LOOSE GAS STRAINER 3/4"
		1	CASLINK BUILDING MONITORING SYSTEM - INTERNET OR CELLULAR CONNECTION REQUIRED
		1	MOTORIZED BACKDRAFT DAMPER FOR A1-D HOUSING - MEETS AMCA CLASS 1A RATING
		1	INSULATION OPTION FOR VBANK FILTER SECTION
		1	DF1 INDOOR HANGING OPTION - INCLUDES 2 HSA125 HANGING SPRING ISOLATORS PER UNI-STRUT
		1	CHILLED WATER MODULE - 1,000 TO 3,250 CFM (3 TON). NOT STOCKED. ALLOW 5-6 WEEKS LEAD TIME. TEMPERATURE CONTROLS, MIXING VALVES, THERMOSTATS, AND FREEZE PROTECTION BY OTHERS. CUSTOM COIL
		1	FULL CRATING FOR COMMERCIAL HEATER
		1	ECM WIRING PACKAGE-SUPPLY - PWM SIGNAL FROM ECPM03 PREWIRE (3 - PHASE ZIEHL MOTOR)
		1	2 YEAR PARTS WARRANTY
		1	EXTERIOR GAS CONNECTION PROVIDED BY FACTORY WITH QUICK SEAL AND ANTI-ROTATION BRACKET

FAN ACCESSORIES

FAN UNIT NO	TAG	EXHAUST			SUPPLY			
		GREASE CUP	GRAVITY DAMPER	WALL MOUNT	SIDE DISCHARGE	GRAVITY DAMPER	MOTORIZED DAMPER	WALL MOUNT
1					YES		YES	

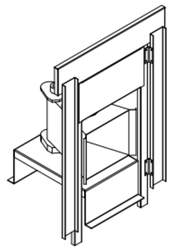
HMI SCHEDULE				
UNIT NUMBER	HMI #	HMI LOCATION	TEMP AVERAGING	MODBUS ADDRESS
FAN #1	HMI #1 - UNIT	IN UNIT	NOT AVERAGED	55

FAN #1 A1-D.500-16Z - HEATER
1. DIRECT GAS FIRED HEATED MAKE UP AIR UNIT WITH 16" DIRECT DRIVE FAN.
2. V-BANK EZ FILTERS - INDOOR.
3. SIDE DISCHARGE - AIR FLOW RIGHT -> LEFT.
4. GAS PRESSURE GAUGE, 0-35", 2.5" DIAMETER, 1/4" THREAD SIZE.
5. GAS PRESSURE GAUGE, -5 TO +15 INCHES WC, 2.5" DIAMETER, 1/4" THREAD SIZE.
6. SHIP LOOSE GAS STRAINER. TO BE INSTALLED UPSTREAM OF UNIT CONNECTION. 3/4" CONNECTION.
7. CASLINK BUILDING MONITORING SYSTEM COMMUNICATIONS MODULE. REQUIRES INTERNET & FIELD WIRED ETHERNET CONNECTION OR 3G CELLULAR SERVICE. INCLUDES REV 3 COMM MODULE, RJ45 TO MODBUS CONVERTER, 3 FT CAT5 CABLE, AND 1 FT OF SHIELDED TWISTED PAIR.
8. MOTORIZED BACK DRAFT DAMPER 16" X 18" FOR SIZE 1 STANDARD & MODULAR HEATER UNITS W/EXTENDED SHAFT, STANDARD GALVANIZED CONSTRUCTION, 3/4" REAR FLANGE, LOW LEAKAGE, TFB120S ACTUATOR INCLUDED.
9. "INSULATION" FOR V-BANK INTAKE OPTION.
10. INDOOR HANGING CRADLE FOR THE SIZE 1 DIRECT FIRED UNIT. 2 HSA125 HANGING ISOLATORS PER UNI-STRUT INCLUDED.
11. CV COIL MODULE FOR SIZE 1 MODULAR FANS - 1,000 THRU 3,250 CFM (SMS100A-315X27.0) NOT STOCKED. ALLOW 5-6 WEEKS LEAD TIME. TEMPERATURE CONTROLS, MIXING VALVES, THERMOSTATS, AND FREEZE PROTECTION BY OTHERS.
12. FULL CRATING FOR COMMERCIAL HEATERS FOR SHIPPING.
13. ECM WIRING PACKAGE FOR ZIEHL SUPPLY MOTORS WITH PWM SIGNAL FROM ECPM03 PREWIRE.
14. HINGED DOUBLE WALL INSULATED DOOR ASSEMBLY (BURNER/BLOWER SECTION).
15. EXTERIOR GAS CONNECTION PROVIDED BY FACTORY WITH QUICK SEAL AND ANTI-ROTATION BRACKET.
16. 2 YEAR PARTS WARRANTY.

*NOTE: SUPPLY DUCT MUST BE INSTALLED TO MEET SMACNA STANDARDS. A MINIMUM STRAIGHT DUCT LENGTH MUST BE MAINTAINED DOWNSTREAM OF UNIT DISCHARGE AS OUTLINED IN AMCA PUBLICATION 201. WHEN USING RECTANGULAR DUCTWORK, ELBOWS MUST BE RADIUS THROAT, RADIUS BACK WITH TURNING VANES. FLEXIBLE DUCTWORK AND SQUARE THROAT/SQUARE BACK ELBOWS SHOULD NOT BE USED. ANY TRANSITION AND/OR TURNS IN THE DUCTWORK WILL CAUSE SYSTEM EFFECT. SYSTEM EFFECT WILL DRASTICALLY INCREASE STATIC PRESSURE AND REDUCE AIRFLOW. DO NOT RELY ON UNIT TO SUPPORT DUCT IN ANY WAY. FAILURE TO PROPERLY SIZE DUCTWORK MAY CAUSE SYSTEM EFFECTS AND REDUCE PERFORMANCE OF THE EQUIPMENT. SUGGESTED STRAIGHT DUCT SIZE IS 20" x 20".

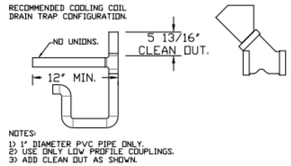
SUPPLY SIDE HEATER INFORMATION:

WINTER TEMPERATURE = -10°F. TEMP. RISE = 80°F.
BTUs CALCULATED OFF ACTUAL AIR DENSITY.
OUTPUT BTUs AT ALTITUDE OF 0.0 FT. = 170477.
INPUT BTUs AT ALTITUDE OF 0.0 FT. = 185302.
OUTPUT BTUs AT ALTITUDE OF 596 FT. = 166838.
INPUT BTUs AT ALTITUDE OF 596 FT. = 181345.



DIRECT FIRED (DF) PROFILE PLATE ASSEMBLY

TYPICAL DRAIN TRAP INSTALL.



RECOMMENDED COOLING COIL DRAIN TRAP CONFIGURATION.

WATER FLOW CONTROL VALVES, DRAINS AND PRESSURE RELIEF BY OTHERS.

NOTES:
1) 1" DIAMETER PVC PIPE ONLY.
2) USE ONLY LOW PROFILE COUPLINGS.
3) ADD CLEAN OUT AS SHOWN.

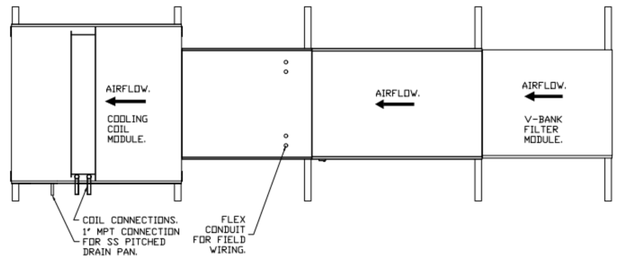
DIRECT FIRED PROFILE PLATE SPECIFICATIONS:

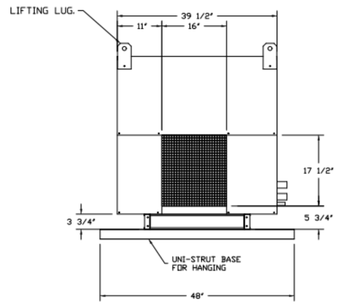
DESCRIPTION:
DIRECT FIRED BURNERS SHALL HAVE PATENTED (US PATENT NO: US6629523B2), SELF-ADJUSTING PROFILE PLATES DESIGNED TO ENSURE PROPER AIR VELOCITY AND PRESSURE DROP ACROSS THE BURNER. PROFILE PLATES SHALL ALLOW BURNERS TO ACHIEVE CLEAN COMBUSTION BY LIMITING BY-PRODUCT LEVELS TO A MAXIMUM OF 5PPM OF CARBON MONOXIDE (CO), AND 0.5PPM OF NITROGEN DIOXIDE (NO2)DIRECT FIRED UNITS SHALL BE CONFIGURED WITH THE BLOWER MOUNTED DOWNSTREAM OF THE BURNER. THIS ARRANGEMENT WILL ENSURE A CONSISTENT AIRFLOW, REGARDLESS OF INLET AIR TEMPERATURE.

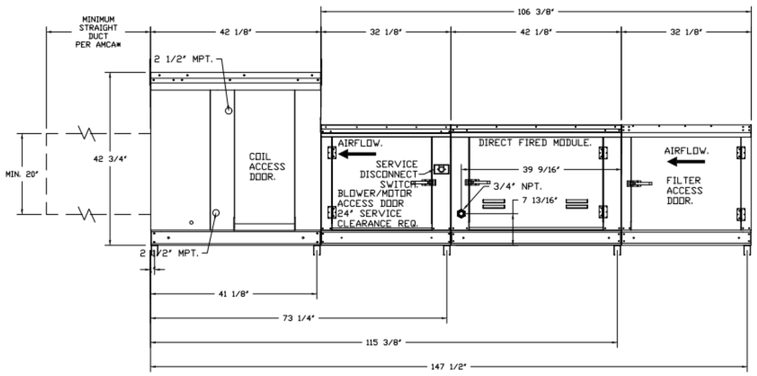
APPLICATION:
SPRING-LOADED BURNER PROFILE PLATES ARE ENGINEERED TO AUTOMATICALLY REACT TO THE MOMENTUM OF A FRESH AIR STREAM, WITHOUT THE NEED FOR ANY MOTORS OR ACTUATORS TO MECHANICALLY ADJUST THEM. WITH THIS FEATURE, ALL DF UNITS ARE DESIGNED FOR DEMAND CONTROL VENTILATION (DCV) REQUIREMENTS.

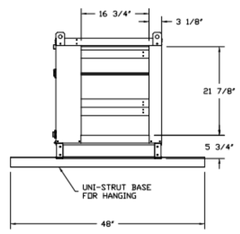
CERTIFICATIONS:
ALL PROFILE PLATE ASSEMBLIES SHALL BE INCLUDED IN THE DF UNIT'S ETL LISTING AND COMPLY WITH COMBINED SAFETY STANDARDS ANSI Z83.4 AND CSA 3.7 (NON-RECIRCULATING DF HEATERS) AND ANSI Z83.18 (RECIRCULATING DF HEATERS).

GENERAL CONSTRUCTION:
-PROFILE PLATES SHALL BE FORMED FROM G90 GALVANIZED STEEL.
-PROFILE PLATES SHALL VARY IN SIZE PER UNIT.
-PROFILE PLATES SHALL BE MOUNTED ALONG THE SAME PLANE AS THE DISCHARGE OF THE BURNER.
-DESIGN SHALL INCORPORATE PROPERLY TORQUED, PERMANENTLY MOUNTED SPRING HINGES.
-SPRING HINGES SHALL BE MADE FROM PLATED STEEL.









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Cava - Chicago, IL [STREETERVILLE]
270 East Ontario Street,
Chicago, IL, 60611

DATE: 9/24/2024

DWG.#: 7020062

DRAWN BY: ABS-76

SCALE: NTS

MASTER DRAWING

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FOR
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AOR PROJECT NUMBER: CAVC061

ISSUE	DATE
PERMIT SET	10/09/2024
LANDLORD/BID	11/08/2024
CONSTRUCTION SET	01/29/2025

MECHANICAL SCHEDULES

SHEET: **M604**

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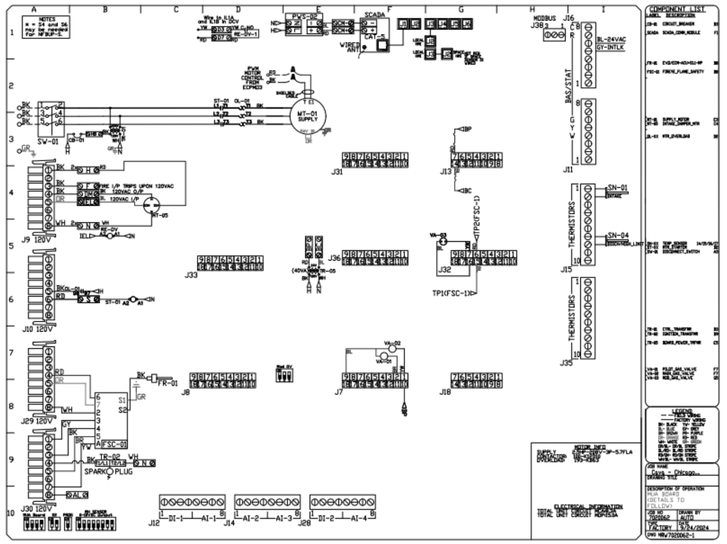

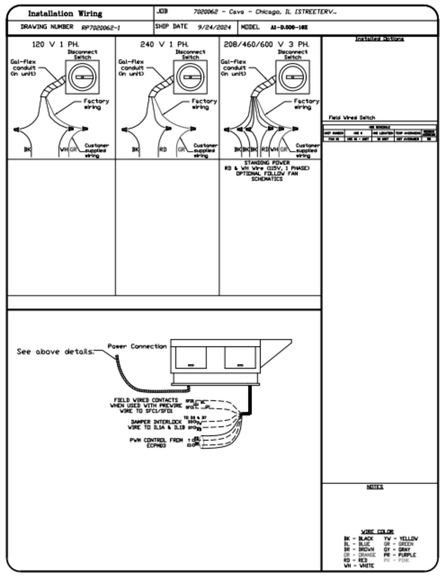

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Cava - Chicago, IL [STREETERVILLE]
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DATE: 9/24/2024

DWG.#: 7020062

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SCALE: NTS

MASTER DRAWING

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AOR PROJECT NUMBER: CAV061

ISSUE	DATE
PERMIT SET	10/09/2024
LANDLORD/BID	11/08/2024
CONSTRUCTION SET	01/29/2025

MECHANICAL SCHEDULES

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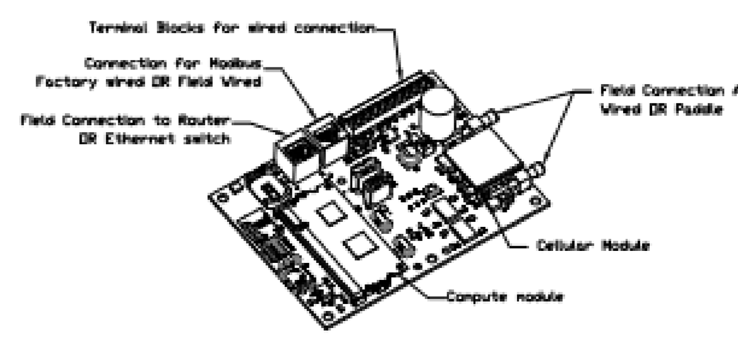
ELECTRICAL PACKAGE – JOB#7020062

NO	TAG	PACKAGE #	LOCATION	SWITCHES		OPTION	FANS CONTROLLED				
				LOCATION	QUANTITY		TYPE	ϕ	HP	VOLT	FLA
1		SC-311110MA	UTILITY CABINET RIGHT	UTILITY CABINET RIGHT	1 LIGHT	SMART CONTROLS THERMOSTATIC CONTROL W/ RELAY ON/OFF WITH SUPPLY	SUPPLY	3	2.500	208	5.7
				HOOD # 1	1 FAN		EXHAUST	3	0.250	208	1.2



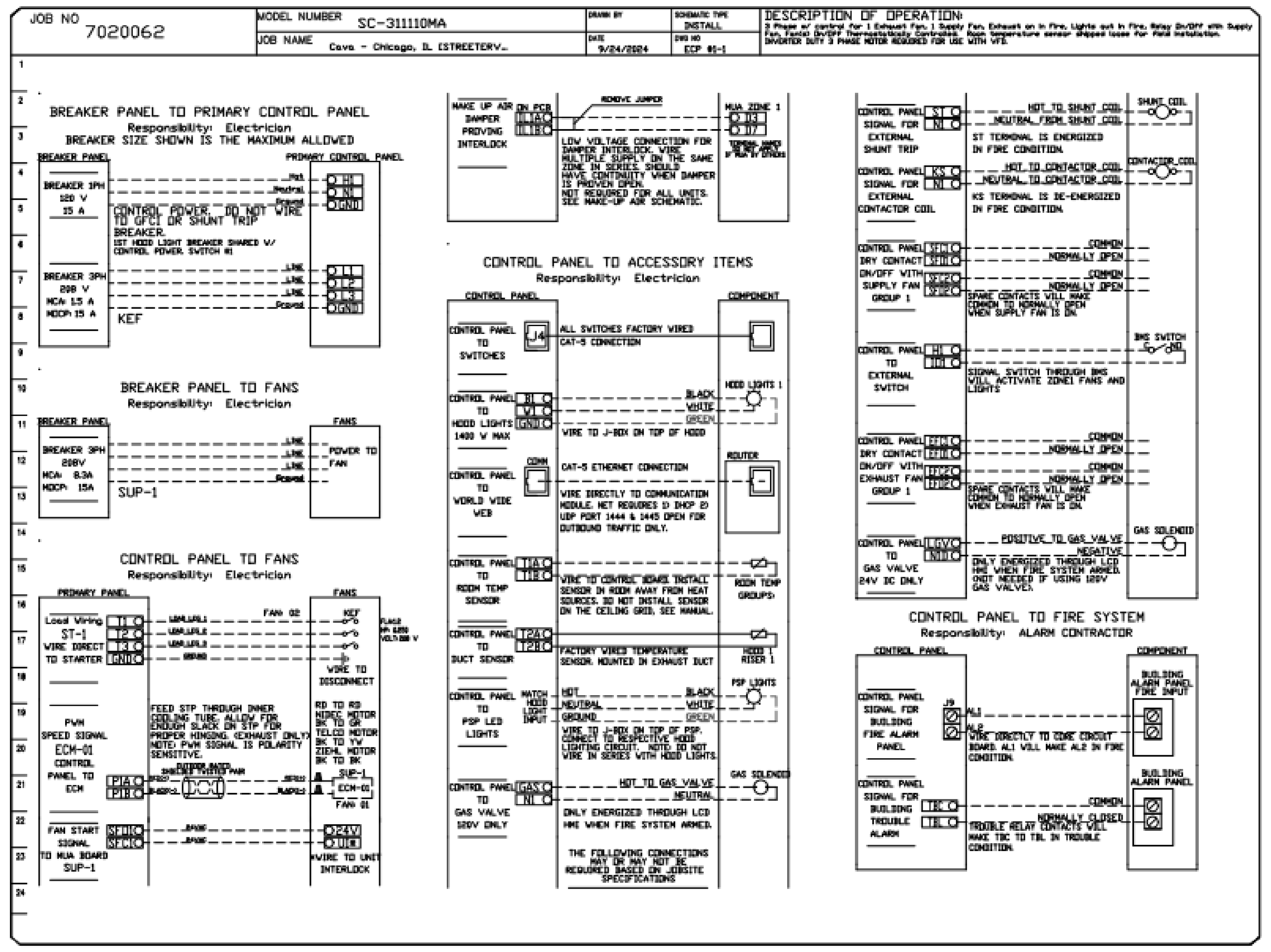
CASlink Monitor and Control

- Hood control panel to support communications to cloud-based Building Management System.
- Hood Control Panel to allow cloud-based Building Management System to monitor real time parameters outlined as MONITOR in the points list.
- Hood Control Panel to allow cloud-based Building Management System to control parameters outlined as CONTROL in the points list.
- Hood Control Panel to allow cloud-based Building Management System to implement SYSTEM ECONOMIZER control strategies for fully integrated Building Management.

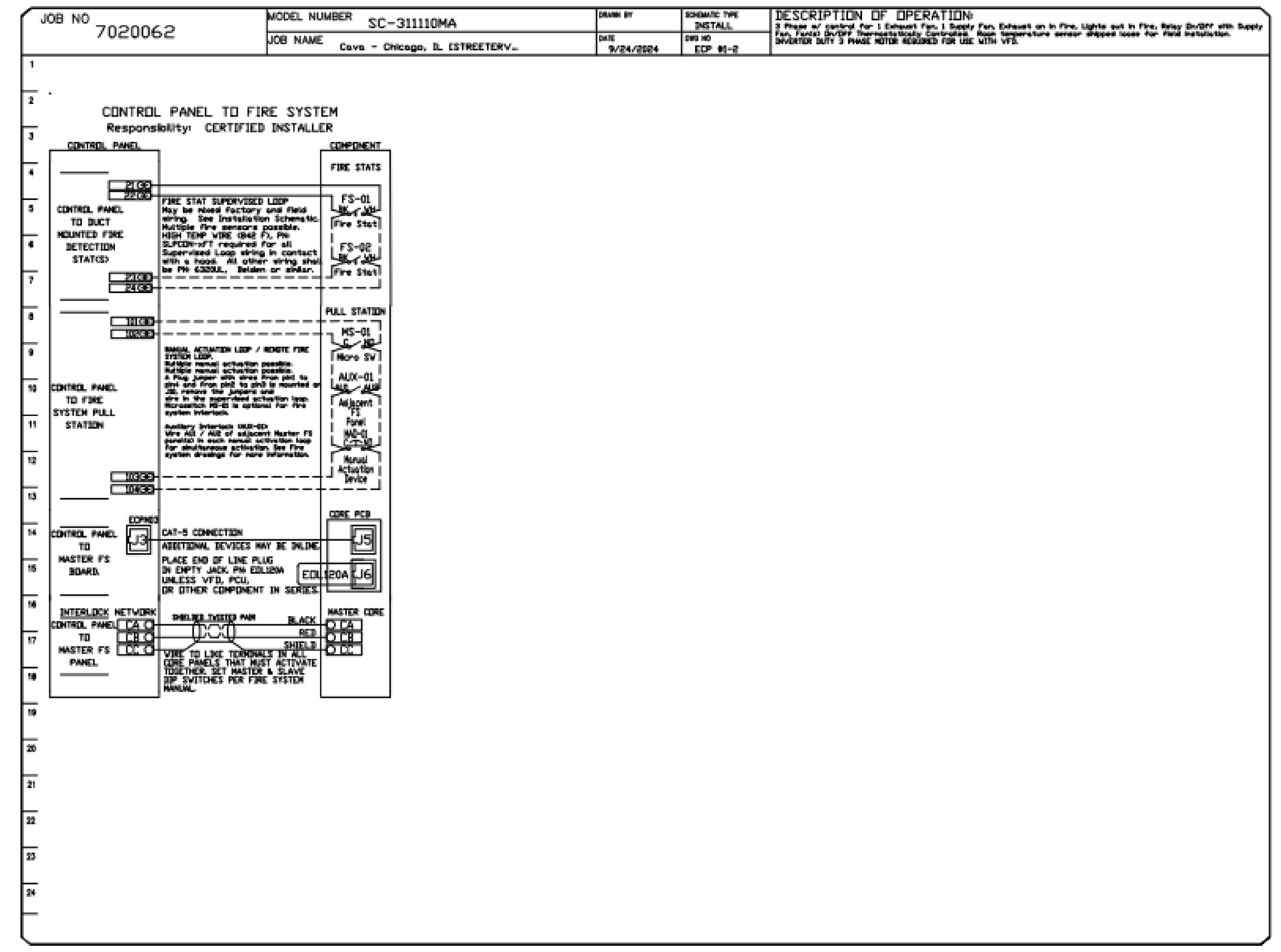
MONITORING AND CONTROL POINTS LIST

DCV Packages	Function
Room Temperature	MONITOR
Duct Temperature(s)	MONITOR
MUA Discharge Temperature	MONITOR
Kitchen RTU Discharge Temperature	MONITOR
Fan Speed	MONITOR
Fan Amperage	MONITOR
Fan Power	MONITOR
VFD Faults	MONITOR
Controller Faults	MONITOR
Fan Faults	MONITOR
Fan Status	MONITOR
PCU Faults	MONITOR
PCU Filter Clog Percentages	MONITOR
Fire Condition	MONITOR
CORE Fire System	MONITOR
Building Pressures	MONITOR
Prep Time Button	MONITOR & CONTROL
Fans Button	MONITOR & CONTROL
Lights Button	MONITOR & CONTROL
Wash Button	MONITOR & CONTROL

SC Packages	Function
Room Temperature(s)	MONITOR
Duct Temperature(s)	MONITOR
MUA Discharge Temperature	MONITOR
Kitchen RTU Discharge Temperature	MONITOR
Controller Faults	MONITOR
Fan Faults	MONITOR
Fan Status	MONITOR
PCU Faults	MONITOR
PCU Filter Clog Percentages	MONITOR
Fire Condition	MONITOR
CORE Fire System	MONITOR
Building Pressures	MONITOR
Fans Button(s)	MONITOR & CONTROL
Lights Button(s)	MONITOR & CONTROL
Wash Button	MONITOR & CONTROL



JOB NO 7020062
MODEL NUMBER SC-311110MA
JOB NAME Cava - Chicago, IL [STREETERV...
DATE 9/24/2024
DESCRIPTION OF OPERATION:
BREAKER PANEL TO PRIMARY CONTROL PANEL
Responsibility: Electrician
BREAKER SIZE SHOWN IS THE MAXIMUM ALLOWED
BREAKER PANEL TO FANS
Responsibility: Electrician
CONTROL PANEL TO FANS
Responsibility: Electrician
CONTROL PANEL TO ACCESSORY ITEMS
Responsibility: Electrician
CONTROL PANEL TO FIRE SYSTEM
Responsibility: ALARM CONTRACTOR



JOB NO 7020062 | MODEL NUMBER SC-311110MA | JOB NAME Cava - Chicago, IL [STREETERV... | SCHEMATIC TYPE INSTALL | DATE 9/24/2024 | DWG NO ECP #1-3 | DESCRIPTION OF OPERATION: Fire System #1 TANK FS - 40/40

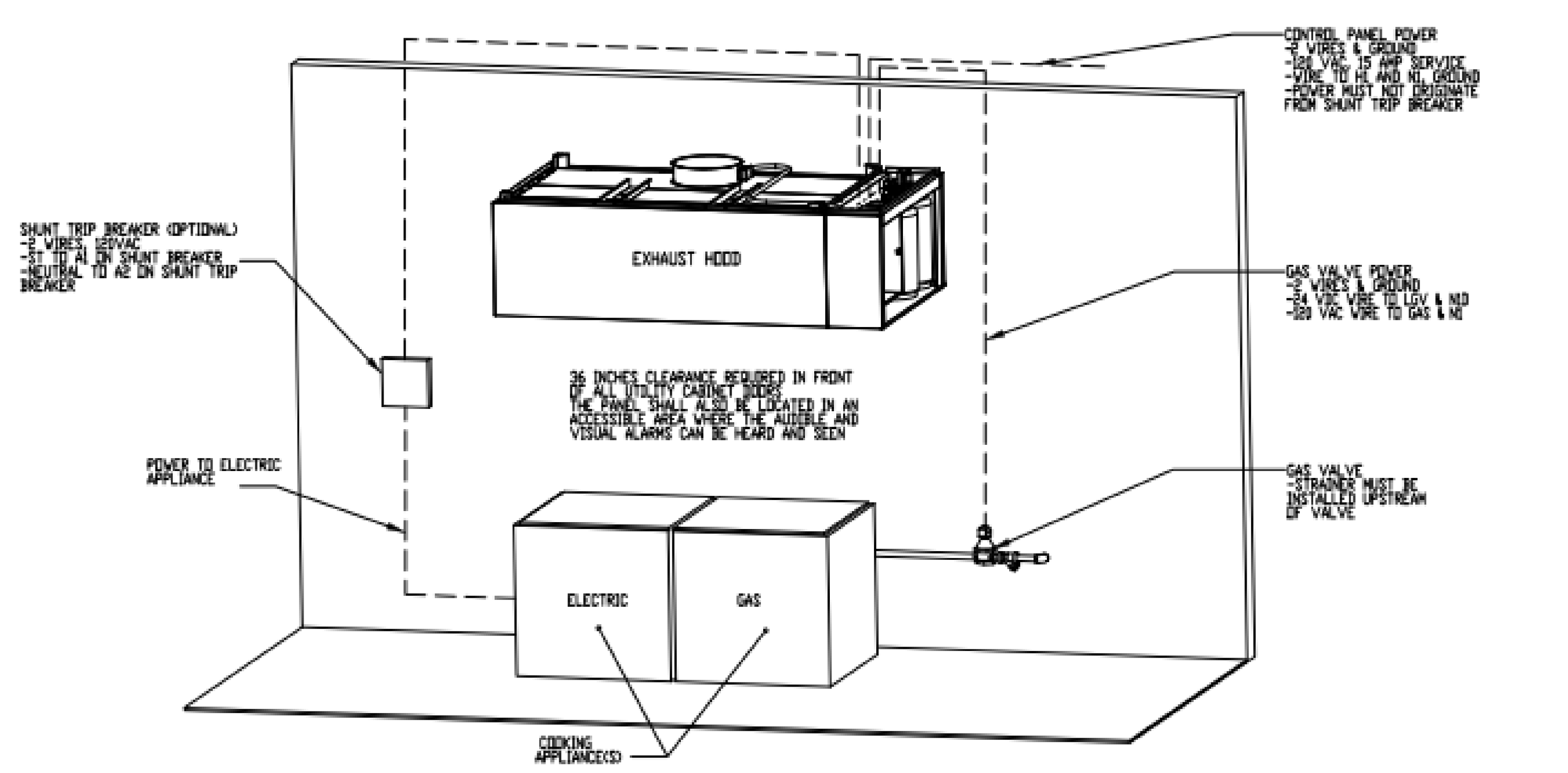
TANK PROTECTION ELECTRICAL DETAIL

02/10/2021 Rev. 2

FS-1: MASTER

ELECTRICIAN:
1. WIRE MAIN CONTROL PANEL PER INCLUDED SCHEMATIC
2. WIRE ALL FANS PER INCLUDED SCHEMATIC
3. WIRE SHUNT TRIP BREAKER (OPTIONAL)
4. WIRE UDS APPLIANCE KILL SWITCH, IF EQUIPPED (OPTIONAL)
5. WIRE GAS VALVE

ELECTRICAL CONTRACTOR REQUIREMENT					
ITEM	CONNECTION IN PANEL	CONNECTION IN DEVICE	VOLTAGE	AMPERAGE	COMMENTS
SHUNT TRIP BREAKER (OPTIONAL)	ST & N1	BREAKER COIL (A1 & A2)	120 VAC	< 4 AMPS	ST TO A1 ON SHUNT BREAKER COIL, AND NEUTRAL TO A2 ON SHUNT TRIP BREAKER COIL
CONTROL PANEL POWER	H1 & N1 + GROUND	CIRCUIT BREAKER	120 VAC	15 AMPS	CONTROL PANEL POWER MUST NOT BE RUN THROUGH SHUNT TRIP BREAKER
UDS APPLIANCE KILL SWITCH (OPTIONAL)	KTS & N1	KTS & N1	120 VAC	< 4 AMPS	KILL SWITCH TERMINALS MUST BE IN SERIES WITH OTHER KILL SWITCHES
REMOTE 120VAC ANSUL AUTOMAN (OPTIONAL)	AU1, AU2	SOLENOID	120 VAC	< 6 AMPS	120V TO AU1, AU2 TO ANSUL ELECTRIC AUTOMAN, ANSUL SOLENOID TO NEUTRAL
GAS VALVE	LGV & N1D (IF 24 VDC) GAS & N1 (IF 120 VAC)	RED/RED/GREEN	24 VDC OR 120 VAC	< 10 AMPS	IF 24 VDC - 2 WIRES & GROUND, N1D TO RED, LGV TO RED, AND GREEN TO GROUND IF 120 VAC - 2 WIRES & GROUND GAS TO RED, N1 TO RED, AND GREEN TO GROUND



CONTROL PANEL POWER
-2 WIRES & GROUND
-120 VAC, 15 AMP SERVICE
-WIRE TO H1 AND N1, GROUND
-POWER MUST NOT ORIGINATE FROM SHUNT TRIP BREAKER
EXHAUST HOOD
SHUNT TRIP BREAKER (OPTIONAL)
GAS VALVE POWER
POWER TO ELECTRIC APPLIANCE
36 INCHES CLEARANCE REQUIRED IN FRONT OF ALL UTILITY CABINET DOORS
GAS VALVE
ELECTRIC
GAS
COOKING APPLIANCE(S)

NOTE: SEE INSTALLATION, OPERATION, AND MAINTENANCE MANUAL FOR FURTHER INSTRUCTIONS

JOB NO 7020062 | MODEL NUMBER SC-311110MA | JOB NAME Cava - Chicago, IL [STREETERV... | SCHEMATIC TYPE INSTALL | DATE 9/24/2024 | DWG NO ECP #1-4 | DESCRIPTION OF OPERATION: Fire System #1 TANK FS - 40/40

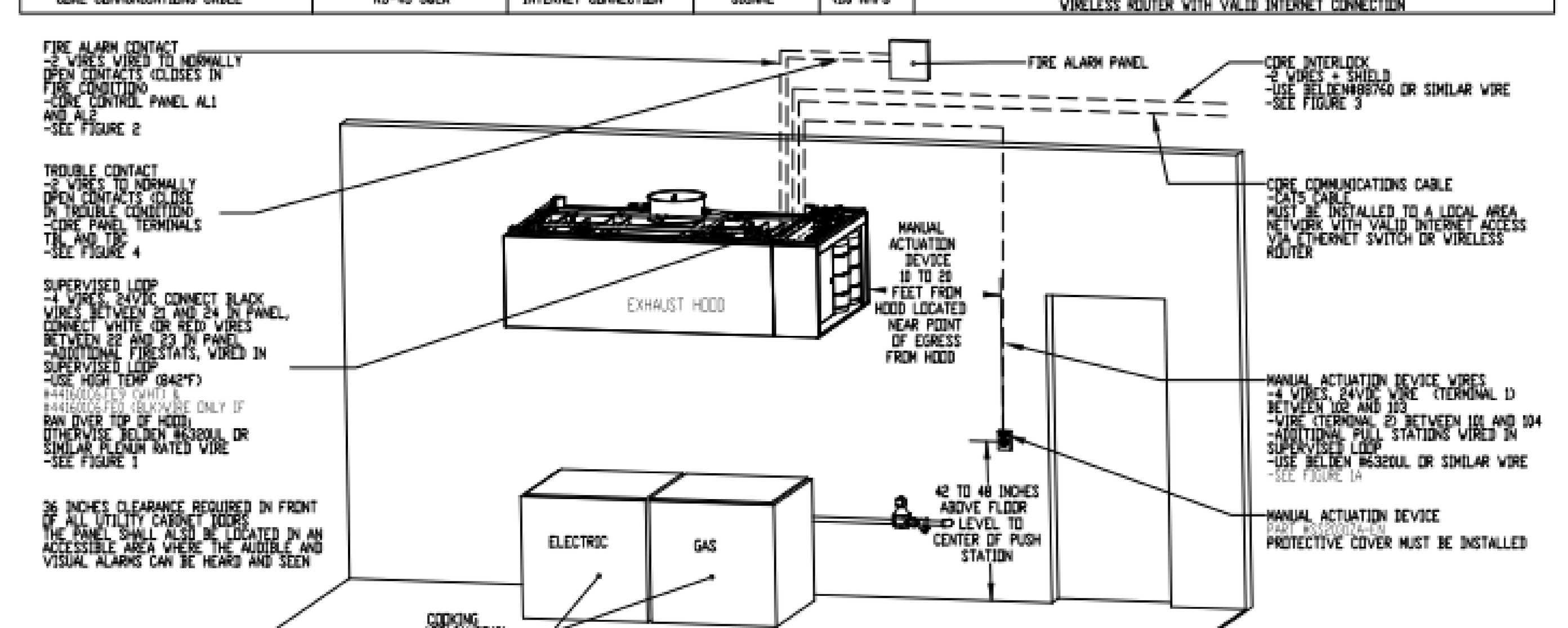
TANK PROTECTION LOW-VOLTAGE DETAIL

10/01/2023 Rev. 3

FS-1: MASTER

ALARM CONTRACTOR:
1. WIRE MANUAL ACTUATION DEVICE(S), REMOTE FIRESTAT(S), CORE INTERLOCK(S), FIRE SENSOR(S) AND FIRE ALARM CONTACTS
2. COMPLETE FINAL HOOKUP OF SYSTEM
3. VERIFY FINAL FIRE SYSTEM TEST

ALARM CONTRACTOR REQUIREMENT					
ITEM	CONNECTION IN PANEL	CONNECTION ON DEVICE	VOLTAGE	AMPERAGE	COMMENTS
MANUAL ACTUATION DEVICE(S)	101 AND 104 102 AND 103	1 & 2	24 VDC	< 10 AMPS	WIRE MANUAL ACTUATION DEVICE TERMINAL 1 BETWEEN CORE PANEL TERMINALS 102 AND 103 WIRE MANUAL ACTUATION DEVICE TERMINAL 2 BETWEEN CORE PANEL TERMINALS 101 AND 104 JUMPER 101 TO 104 AND 102 TO 103 IF NO MANUAL ACTUATION DEVICE IS INSTALLED
MANUAL ACTUATION DEVICE COVER	N/A	N/A	N/A	N/A	MANUAL ACTUATION DEVICE COVER MUST BE INSTALLED IF SURFACE MOUNTED, USE COVER EXTENSION STI-6531B
REMOTE FIRESTAT SENSOR(S)	21 AND 24 22 AND 23	BLACK AND WHITE	24 VDC	< 10 AMPS	WIRE FIRE SENSOR WHITE WIRES BETWEEN HOOD CORE PANEL TERMINALS 22 AND 23 WIRE FIRE SENSOR BLACK WIRE BETWEEN HOOD CORE PANEL TERMINALS 21 AND 24 HIGH TEMP (842°F) #441600C&FE9 (WHT) & #441601C&FE0 (BLK) WIRE OR SIMILAR ONLY IF RAN OF HOOD, OTHERWISE BELDEN #6320UL OR SIMILAR PLENUM RATED WIRE, SEE FIGURE 1
FIRE ALARM CONTACT	AL1, AL2	VARIES	50V MAX (AC/DC)	UP TO 1 AMP	FIRE ALARM RELAY CONTACTS FOR BUILDING FIRE ALARM LOCATED IN THE CORE ELECTRICAL CONTROL PANEL
CORE INTERLOCK(S)	CA, CB, CC	CA, CB, CC	RS-485 COMMUNICATIONS SIGNAL		CORE SYSTEM (1) CA, TO CORE SYSTEM (2) CA, CORE SYSTEM (1) CB, TO CORE SYSTEM (2) CB, CORE SYSTEM (1) CC, TO CORE SYSTEM (2) CC. USE BELDEN# 88760 OR SIMILAR WIRE
TROUBLE CONTACT	TBC, TBL, TOK	VARIES	MAX 120 VAC	UP TO 6 AMPS	WIRE TO TBL & TBC NORMALLY OPEN CONTACT, CLOSES IN TROUBLE CONDITION
CORE COMMUNICATIONS CABLE	RJ-45 Jack	INTERNET CONNECTION	SIGNAL	<1.0 AMPS	TYPICAL CONNECTION CAT5 CABLE TO LOCAL AREA NETWORK VIA ETHERNET SWITCH OR WIRELESS ROUTER WITH VALID INTERNET CONNECTION



FIRE ALARM CONTACT
-2 WIRES WIRED TO NORMALLY OPEN CONTACTS (CLOSES IN FIRE CONDITION)
-CORE CONTROL PANEL AL1 AND AL2
-SEE FIGURE 2
TROUBLE CONTACT
-2 WIRES TO NORMALLY OPEN CONTACTS (CLOSE
FIRE ALARM PANEL
CORE INTERLOCK
-2 WIRES + SHIELD
-USE BELDEN#88760 OR SIMILAR WIRE
-SEE FIGURE 3
CORE COMMUNICATIONS CABLE
-CAT5 CABLE
EXHAUST HOOD
MANUAL ACTUATION DEVICE
ELECTRIC
GAS
COOKING APPLIANCE(S)

ATTENTION: LOW-VOLTAGE DC OR SIGNALING WIRE SHOULD BE ROUTED IN SEPARATE CONDUIT FROM ALL AC SOURCES

NOTE: SEE INSTALLATION, OPERATION, AND MAINTENANCE MANUAL FOR FURTHER INSTRUCTIONS

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Cava - Chicago, IL [STREETERVILLE]
270 East Ontario Street,
Chicago, IL, 60611

DATE: 9/24/2024

DWG.#: 7020062

DRAWN BY: ABS-76

SCALE: NTS

MASTER DRAWING

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CAVA #000000
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STREETERVILLE, ILLINOIS, 60611
FOR
CAVA
14 Ridge Square NW #500, WASHINGTON, DC 20016

AOR PROJECT NUMBER: CAV061

ISSUE	DATE
PERMIT SET	10/09/2024
LANDLORD/BID	11/08/2024
CONSTRUCTION SET	01/29/2025

MECHANICAL SCHEDULES

SHEET: M606

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SPECIFICATIONS - DIVISION 23 - HVAC

SECTION 230500 - GENERAL MECHANICAL REQUIREMENTS:

HVAC SUBCONTRACTOR SHALL PROVIDE A BID OF PREVENTATIVE MAINTENANCE SERVICES FOR ONE YEAR AT TIME OF BID.

FURNISH TO THE OWNER ALL OPERATING & MAINTENANCE MANUALS, RECORD DRAWINGS, TEST & BALANCE REPORT. CONTRACTOR SHALL COORDINATE WITH MANUFACTURER REPRESENTATIVES FOR EMPLOYEE TRAINING REQUIREMENTS FOR ALL EQUIPMENT.

MECHANICAL CONTRACTOR SHALL SUBMIT COMPLIANCE CHECKLIST TO BUILDING OFFICIAL UPON SUBSTANTIAL COMPLETION OF PROJECT.
PROVIDE EQUIPMENT INDICATED ON THE DRAWINGS, AND AS REQUIRED FOR A COMPLETE FUNCTIONING SYSTEM.

DEFINITIONS:
FURNISH MEANS TO SUPPLY AND DELIVER TO PROJECT SITE, READY FOR INSTALLATION.
INSTALL MEANS TO PLACE IN POSITION AND MAKE CONNECTIONS FOR SERVICE OR USE.
PROVIDE MEANS TO FURNISH AND INSTALL, COMPLETE AND READY FOR INTENDED USE.

WARRANTY:
PROVIDE LABOR AND MATERIALS TO REPAIR OR REPLACE DEFECTIVE PARTS AND MATERIALS AS REQUIRED FOR ONE YEAR AFTER SUBSTANTIAL COMPLETION OR OWNER ACCEPTANCE OF THE COMPLETED PROJECT. PROVIDE A SEPARATE LINE ITEM DEDUCT AMOUNT ON THE PROPOSAL FORM TO DELETE WARRANTY SERVICE, AT THE OWNER'S OPTION. CONTRACTOR SHALL INCLUDE ONE YEAR WARRANTY ON OWNER FURNISHED EQUIPMENT. CONTRACTOR SHALL INCLUDE COSTS FOR RECEIVING, HANDLING, STORAGE, AND HOISTING OF OWNER FURNISHED EQUIPMENT.

COORDINATION:
COORDINATE WITH THE WORK OF OTHER SECTIONS, EQUIPMENT FURNISHED BY OTHERS, REQUIREMENTS OF THE OWNER, AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE.

DUCT DIMENSIONS:
UNLESS OTHERWISE NOTED, DUCT DIMENSIONS ON THE DRAWINGS ARE INSIDE CLEAR DIMENSIONS.

MAKE-UP AIR UNIT:
UNIT SHALL HAVE AN INTEGRAL DISCHARGE THERMOSTAT LINKED TO THE INTERNAL CONTROLS. THE HEATER SHALL BE SET TO MAINTAIN DUCT SUPPLY TEMPERATURE AT NO LESS THAN 65 DEG. F. (ADJ.).
HIGH LIMIT SWITCH SET TO 180 DEG. F.
INTAKE AIR SENSOR SET TO 10 DEG. F. (ADJ.) LOWER THAN DISCHARGE AIR SENSOR.

TEMPERATURE CONTROLS:
PROVIDE PROGRAMMABLE THERMOSTATS WITH REMOTE TEMPERATURE SENSORS AND REMOTE HUMIDISTATS COMPATIBLE WITH ROOFTOP UNIT. CONTROL WIRING SHALL BE INSTALLED IN CONDUIT. THERMOSTAT SHALL MEET SETPOINT ADJUSTMENT FOR UNOCCUPIED MODE: HEATING DOWN TO 55 DEGREES AND COOLING UP TO 85 DEGREES. PROVIDE INTERLOCK CONTROL WIRING BETWEEN HOOD EXHAUST FANS AND ROOFTOP UNITS.

END OF SECTION

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. SUBMITTALS:

1. CERTIFIED TAB REPORTS.

B. TAB FIRM QUALIFICATIONS: NBC CERTIFIED.

C. TAB REPORT FORMS: STANDARD TAB CONTRACTOR'S FORMS APPROVED BY ARCHITECT.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION
A. EXAMINE THE CONTRACT DOCUMENTS TO BECOME FAMILIAR WITH PROJECT REQUIREMENTS AND TO DISCOVER CONDITIONS IN SYSTEMS' DESIGNS THAT MAY PRECLUDE PROPER TAB OF SYSTEMS AND EQUIPMENT.

B. EXAMINE THE APPROVED SUBMITTALS FOR HVAC SYSTEMS AND EQUIPMENT.

C. EXAMINE SYSTEMS FOR INSTALLED BALANCING DEVICES, SUCH AS TEST PORTS, GAGE COCKS, THERMOMETER WELLS, FLOW-CONTROL DEVICES, BALANCING VALVES AND FITTINGS, AND MANUAL VOLUME DAMPERS. VERIFY THAT LOCATIONS OF THESE BALANCING DEVICES ARE ACCESSIBLE.

D. EXAMINE SYSTEM AND EQUIPMENT INSTALLATIONS AND VERIFY THAT FIELD QUALITY-CONTROL TESTING, CLEANING, AND ADJUSTING SPECIFIED IN INDIVIDUAL SECTIONS HAVE BEEN PERFORMED.

E. EXAMINE HVAC EQUIPMENT AND FILTERS AND VERIFY THAT BEARINGS ARE GREASED, BELTS ARE ALIGNED AND TIGHT, AND EQUIPMENT WITH FUNCTIONING CONTROLS IS READY FOR OPERATION.

F. EXAMINE TERMINAL UNITS, SUCH AS VARIABLE-AIR-VOLUME BOXES, AND VERIFY THAT THEY ARE ACCESSIBLE AND THEIR CONTROLS ARE CONNECTED AND FUNCTIONING.

G. EXAMINE AUTOMATIC TEMPERATURE SYSTEM COMPONENTS TO VERIFY THE FOLLOWING:

1. DAMPERS, VALVES, AND OTHER CONTROLLED DEVICES ARE OPERATED BY THE INTENDED CONTROLLER.

2. DAMPERS AND VALVES ARE IN THE POSITION INDICATED BY THE CONTROLLER.

3. INTEGRITY OF DAMPERS AND VALVES FOR FREE AND FULL OPERATION AND FOR TIGHTNESS OF FULLY CLOSED AND FULLY OPEN POSITIONS. THIS INCLUDES DAMPERS IN MULTIZONE UNITS, MIXING BOXES, AND VARIABLE-AIR-VOLUME TERMINALS.

4. AUTOMATIC MODULATING AND SHUTOFF VALVES, INCLUDING TWO-WAY VALVES AND THREE-WAY MIXING AND DIVERTING VALVES, ARE PROPERLY CONNECTED.

5. THERMOSTATS AND HUMIDISTATS ARE LOCATED TO AVOID ADVERSE EFFECTS OF SUNLIGHT, DRAFTS, AND COLD WALLS.

6. SENSORS ARE LOCATED TO SENSE ONLY THE INTENDED CONDITIONS.

7. SEQUENCE OF OPERATION FOR CONTROL MODES IS ACCORDING TO THE CONTRACT DOCUMENTS.

8. CONTROLLER SET POINTS ARE SET AT INDICATED VALUES.

9. INTERLOCKED SYSTEMS ARE OPERATING.

10. CHANGEOVER FROM HEATING TO COOLING MODE OCCURS ACCORDING TO INDICATED VALUES.

H. REPORT DEFICIENCIES DISCOVERED BEFORE AND DURING PERFORMANCE OF TEST AND BALANCE PROCEDURES.

3.2 GENERAL PROCEDURES FOR TESTING AND BALANCING

A. PERFORM TESTING AND BALANCING PROCEDURES ON EACH SYSTEM ACCORDING TO THE PROCEDURES CONTAINED IN AABC'S "NATIONAL STANDARDS FOR TOTAL SYSTEM BALANCE", NBC, ASHRAE 111, NEBB'S "PROCEDURAL STANDARDS FOR TESTING, ADJUSTING, AND BALANCING OF ENVIRONMENTAL SYSTEMS" OR SMACNA'S "HVAC SYSTEMS - TESTING, ADJUSTING, AND BALANCING" AND IN THIS SECTION.

B. CUT INSULATION, DUCTS, PIPES, AND EQUIPMENT CABINETS FOR INSTALLATION OF TEST PROBES TO THE MINIMUM EXTENT NECESSARY FOR TAB PROCEDURES. AFTER TESTING AND BALANCING, PATCH PROBE HOLES IN DUCTS WITH SAME MATERIAL AND THICKNESS AS USED TO CONSTRUCT DUCTS. INSTALL AND JOIN NEW INSULATION THAT MATCHES REMOVED MATERIALS. RESTORE INSULATION, COVERINGS, VAPOR BARRIER, AND FINISH.

C. MARK EQUIPMENT AND BALANCING DEVICES, INCLUDING DAMPER-CONTROL POSITIONS, VALVE POSITION INDICATORS, FAN-SPEED-CONTROL LEVERS, AND SIMILAR CONTROLS AND DEVICES, WITH PAINT OR OTHER SUITABLE, PERMANENT IDENTIFICATION MATERIAL TO SHOW FINAL SETTINGS.

3.3 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS

A. PREPARE SCHEMATIC DIAGRAMS OF SYSTEMS' "AS-BUILT" DUCT LAYOUTS.

B. FOR VARIABLE-AIR-VOLUME SYSTEMS, DEVELOP A PLAN TO SIMULATE DIVERSITY.

C. DETERMINE THE BEST LOCATIONS IN MAIN AND BRANCH DUCTS FOR ACCURATE DUCT AIRFLOW MEASUREMENTS.

D. VERIFY THAT MOTOR STARTERS ARE EQUIPPED WITH PROPERLY SIZED THERMAL PROTECTION.

E. CHECK FOR AIRFLOW BLOCKAGES.

F. CHECK CONDENSATE DRAINS FOR PROPER CONNECTIONS AND FUNCTIONING.

G. CHECK FOR PROPER SEALING OF AIR-HANDLING UNIT COMPONENTS.

H. CHECK FOR PROPER SEALING OF AIR DUCT SYSTEM.

3.4 TOLERANCES

A. SET HVAC SYSTEM AIRFLOW AND WATER FLOW RATES WITHIN THE FOLLOWING TOLERANCES:

1. SUPPLY, RETURN, AND EXHAUST FANS AND EQUIPMENT WITH FANS: PLUS OR MINUS 5 PERCENT.
2. AIR OUTLETS AND INLETS: PLUS OR MINUS 10 PERCENT.

END OF SECTION

SECTION 230700 - HVAC INSULATION

PART 1 - GENERAL

1.1 SECTION REQUIREMENTS

A. QUALITY ASSURANCE: LABELED WITH MAXIMUM FLAME-SPREAD INDEX OF 25 AND MAXIMUM SMOKE-DEVELOPED INDEX OF 50 ACCORDING TO ASTM E 84.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. SURFACE-BURNING CHARACTERISTICS:

1. INDOOR INSULATION AND RELATED MATERIALS: TO BE FACTORY LABELED DESIGNATING MAXIMUM FLAME-SPREAD INDEX OF 25 OR LESS, AND SMOKE-DEVELOPED INDEX OF 50 OR LESS ACCORDING TO ASTM E 84.

2.2 INSULATION MATERIALS

A. FLEXIBLE ELASTOMERIC: CLOSED-CELL, SPONGE- OR EXPANDED-RUBBER MATERIALS. COMPLY WITH ASTM C 534, TYPE I FOR TUBULAR MATERIALS AND TYPE II FOR SHEET MATERIALS.

B. MINERAL-FIBER BLANKET INSULATION: COMPLY WITH ASTM C 553, TYPE II AND ASTM C 1290, TYPE I.

1. FSK JACKET: ALUMINUM-FOIL, FIBERGLASS-REINFORCED SCRIM WITH KRAFT-PAPER BACKING; COMPLYING WITH ASTM C 1136, TYPE II.

2. FSK TAPE: FOIL-FACE, VAPOR-RETARDER TAPE MATCHING FACTORY-APPLIED JACKET WITH ACRYLIC ADHESIVE; COMPLYING WITH ASTM C 1136.

C. MINERAL-FIBER, PIPE AND TANK INSULATION: COMPLYING WITH ASTM C 1393, TYPE II OR TYPE IIIA CATEGORY 2, OR WITH PROPERTIES SIMILAR TO ASTM C 612, TYPE IB; AND HAVING FACTORY-APPLIED ASJ JACKET. NOMINAL DENSITY IS 2.5 LB/CU. FT. OR MORE. THERMAL CONDUCTIVITY (K-VALUE) AT 100 DEG F IS 0.29 BTU X IN./H X SQ. FT. X DEG F OR LESS.

1. ASJ: WHITE, KRAFT-PAPER, FIBERGLASS-REINFORCED SCRIM WITH ALUMINUM-FOIL BACKING; COMPLYING WITH ASTM C 1136, TYPE I.

2. ASJ TAPE: WHITE VAPOR-RETARDER TAPE MATCHING FACTORY-APPLIED JACKET WITH ACRYLIC ADHESIVE, COMPLYING WITH ASTM C 1136.

D. FLEXIBLE ELASTOMERIC ADHESIVE: COMPLY WITH MIL-A-24179A, TYPE II, CLASS I.

E. MINERAL-FIBER ADHESIVE: COMPLY WITH MIL-A-3316C, CLASS 2, GRADE A.

F. VAPOR-BARRIER MASTIC: WATER BASED; SUITABLE FOR INDOOR AND OUTDOOR USE ON BELOW AMBIENT SERVICES; COMPLY WITH MIL-PRF-19565C, TYPE II.

PART 3 - EXECUTION

3.1 INSULATION INSTALLATION

A. COMPLY WITH REQUIREMENTS OF THE MIDWEST INSULATION CONTRACTORS ASSOCIATION'S "NATIONAL COMMERCIAL & INDUSTRIAL INSULATION STANDARDS" FOR INSULATION INSTALLATION ON PIPES AND EQUIPMENT.

B. INSULATION INSTALLATION AT INTERIOR WALL AND PARTITION PENETRATIONS (THAT ARE NOT FIRE RATED): INSTALL INSULATION CONTINUOUSLY THROUGH WALLS AND PARTITIONS.

C. INSULATION INSTALLATION AT FIRE-RATED WALL, PARTITION, AND FLOOR PENETRATIONS: INSTALL INSULATION CONTINUOUSLY THROUGH PENETRATIONS. SEAL PENETRATIONS. COMPLY WITH REQUIREMENTS IN SECTION 078400.

D. FLEXIBLE ELASTOMERIC INSULATION INSTALLATION:

1. SEAL LONGITUDINAL SEAMS AND END JOINTS WITH ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.

2. INSULATION INSTALLATION ON PIPE FITTINGS AND ELBOWS: INSTALL MITERED SECTIONS OF PIPE INSULATION. SECURE INSULATION MATERIALS AND SEAL SEAMS WITH ADHESIVE TO ELIMINATE OPENINGS IN INSULATION THAT ALLOW PASSAGE OF AIR TO SURFACE BEING INSULATED.

E. MINERAL-FIBER INSULATION INSTALLATION:

1. INSULATION INSTALLATION ON STRAIGHT PIPES AND TUBES: WHERE VAPOR BARRIERS ARE INDICATED, SEAL LONGITUDINAL SEAMS, END JOINTS, AND PROTRUSIONS WITH VAPOR-BARRIER MASTIC AND JOINT SEALANT.

2. FOR INSULATION WITH FACTORY-APPLIED JACKETS ON ABOVE AMBIENT SURFACES, SECURE LAPS WITH OUTWARD CLINCHED STAPLES AT 6 INCHES O.C.

3. FOR INSULATION WITH FACTORY-APPLIED JACKETS ON BELOW AMBIENT SURFACES, DO NOT STAPLE LONGITUDINAL TABS BUT SECURE TABS WITH ADDITIONAL ADHESIVE AS RECOMMENDED BY INSULATION MATERIAL MANUFACTURER AND SEAL WITH VAPOR-BARRIER MASTIC AND FLASHING SEALANT.

4. BLANKET INSULATION INSTALLATION ON DUCTS AND PLENUMS: SECURE WITH ADHESIVE AND INSULATION PINS.

5. FOR DUCTS AND PLENUMS WITH SURFACE TEMPERATURES BELOW AMBIENT, INSTALL A CONTINUOUS UNBROKEN VAPOR BARRIER.

F. PLENUMS AND DUCTS REQUIRING INSULATION:

1. CONCEALED SUPPLY AIR.

2. CONCEALED AND EXPOSED OUTDOOR AIR.

3. CONCEALED AND EXPOSED RETURN AIR LOCATED IN NONCONDITIONED SPACE.

3.2 DUCT AND PLENUM INSULATION SCHEDULE
RETAIN " ONE OF" OPTION IN PARAGRAPHS IN THIS ARTICLE TO ALLOW CONTRACTOR TO SELECT PIPING MATERIALS FROM THOSE RETAINED.

A. CONCEALED DUCT INSULATION SHALL BE 1-1/2" THICK MINERAL-FIBER BLANKET WITH A 1.5-LB/CU. FT. NOMINAL DENSITY.

3.3 HVAC PIPING INSULATION SCHEDULE

A. CONDENSATE PIPING: INSULATION SHALL BE 1" THICK FLEXIBLE ELASTOMERIC.

B. REFRIGERANT PIPING: INSULATION SHALL BE 1" THICK FLEXIBLE ELASTOMERIC.

END OF SECTION

SECTION 232300 - REFRIGERANT PIPING

PART 2 - PRODUCTS

2.1 TUBES AND FITTINGS

A. COPPER TUBE: ASTM B 88, TYPE K OR TYPE L, ANNEALED OR DRAWN-TEMPER TUBING AND WROUGHT-COPPER FITTINGS WITH BRAZED OR SOLDERED JOINTS.

B. WROUGHT-COPPER FITTINGS AND UNIONS: ASME B16.22.
C. SOLDER FILLER METALS: ASTM B 32. USE 95-5 TIN ANTIMONY OR ALLOY HB SOLDER TO JOIN COPPER SOCKET FITTINGS ON COPPER PIPE.

D. BRAZING FILLER METALS: AWS A5.8.

2.2 VALVES AND SPECIALTIES

A. AS REQUIRED BY THE KITCHEN EQUIPMENT MANUFACTURER.

PART 3 - EXECUTION

3.1 INSTALLATION

A. INSTALL REFRIGERANT PIPING AND CHARGE WITH REFRIGERANT ACCORDING TO ASHRAE 15.

B. INSTALL REFRIGERANT PIPING AS REQUIRED BY THE KITCHEN EQUIPMENT MANUFACTURER.

END OF SECTION

SECTION 233100 - HVAC DUCTS AND CASINGS

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE."

B. STRUCTURAL PERFORMANCE: DUCT HANGERS AND SUPPORTS SHALL WITHSTAND THE EFFECTS OF GRAVITY LOADS AND STRESSES WITHIN LIMITS AND UNDER CONDITIONS DESCRIBED IN SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE".

C. COMPLY WITH NFPA 96 FOR DUCTS CONNECTED TO COMMERCIAL KITCHEN HOODS.

2.2 DUCTS

A. ELECTROGALVANIZED-STEEL SHEET: ASTM A 879

1. PAINTLOK/PAINTLOCK OR EQUAL.

B. GENERAL DUCTWORK SHALL BE GALVANIZED STEEL, ASTM A653/A635M, AND CONSTRUCTED TO THE GAUGE AND CORRESPONDING REINFORCING SCHEDULE AS SPECIFIED IN THE SMACNA SEAL CLASS "A" STANDARDS.

C. TYPE 1 KITCHEN EXHAUST DUCTWORK

1. FACTORY-BUILT COMMERCIAL KITCHEN GREASE DUCT:

a. ALL REDUCED CLEARANCE, ROUND, DOUBLE-WALL GREASE DUCT AS SPECIFIED MEETING UL 1978 REQUIREMENTS. REFER TO KITCHEN EQUIPMENT SUPPLIER DRAWINGS FOR REQUIREMENTS.

b. DUCTWORKS AND FITTINGS FURNISHED BY OWNER FOR INSTALLATION BY THIS CONTRACTOR.

c. NO FIRE WRAP SHALL BE REQUIRED FOR THIS INSTALLATION.

D. TYPE 2 KITCHEN EXHAUST DUCTWORK: 18 GAUGE ALUMINUM OR STAINLESS STEEL. SEAMS SHALL BE CONTINUOUSLY WELDED LIQUID TIGHT.

E. JOINT AND SEAM TAPE, AND SEALANT: COMPLY WITH UL 181A. PROVIDE POLYMERIC RUBBER TYPE SEALANT FOR USE ON BOTH INTERIOR LOCATED DUCTWORK AND DUCTWORK EXPOSED TO OUTDOOR CONDITIONS. SEALER SHALL HAVE HIGH BONDING STRENGTH FOR SURE, FIRST TIME SEALING OF JOINTS IN LOW, MEDIUM, AND HIGH PRESSURE DUCT SYSTEMS. SEALER SHALL BE HIGH IN SOLID CONTENT. PROVIDE A TWO PART TAPE SEALING SYSTEM, CONSISTING OF WOVEN FIBER TAPE IMPREGNATED WITH A GYPSUM MINERAL COMPOUND, AND A MODIFIED ACRYLIC/SILICONE ACTIVATOR THAT REACTS EXOTHERMICALLY WITH THE TAPE. TWO PART TAPE SEALING SYSTEM MUST BE RATED FOR BOTH INDOOR AND OUTDOOR APPLICATION. TAPE SHALL NOT CONTAIN ASBESTOS.

F. METAL DUCT FABRICATION: COMPLY WITH SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE."

2.3 ACCESSORIES

A. VOLUME DAMPERS AND CONTROL DAMPERS: SINGLE-BLADE AND MULTIPLE OPPOSED-BLADE DAMPERS, STANDARD LEAKAGE RATING, HEAVY DUTY, AND SUITABLE FOR HORIZONTAL OR VERTICAL APPLICATIONS; FACTORY FABRICATED AND COMPLETE WITH REQUIRED HARDWARE AND ACCESSORIES.

2. ROUND VOLUME DAMPERS: PROVIDE MINIMUM 20 GAUGE GALVANIZED STEEL FRAME AND BLADES, MINIMUM 3/8" SQUARE STEEL AXLE, MOLDED SYNTHETIC BEARINGS, WITH LOCKING POSITION REGULATOR. REGULATOR SHALL BE POSITIONED WITH SHEET METAL BRACKET BEYOND DUCT COVERING. WHERE POSITIONING REGULATOR IS NOT ACCESSIBLE, PROVIDE COUPLING AND EXTENSION ROD WITH REGULATOR FOR CEILING OR WALL INSTALLATION, AS REQUIRED.

3. RECTANGULAR VOLUME DAMPERS: PROVIDE MINIMUM 16 GAUGE GALVANIZED STEEL CHANNEL FRAME, 16 GAUGE GALVANIZED STEEL BLADES, MINIMUM ½" HEXAGONAL AXLE, BOLDED SYNTHETIC BEARINGS, WITH 3/8" SQUARE PLATED STEEL CONTROL SHAFT. LINKAGES SHALL BE CONCEALED IN THE FRAME. OPERATING SHAFT SHALL EXTEND BEYOND FRAME AND DUCT TO A LOCKING QUADRANT WITH ADJUSTABLE LEVER. MAXIMUM BLADE WIDTH SHALL NOT EXCEED 6".

B. FLEXIBLE DUCT CONNECTORS: FLAME-RETARDED OR NONCOMBUSTIBLE FABRICS, COATINGS, AND ADHESIVES COMPLYING WITH UL 181, CLASS 1. CONNECTOR TO BE 30 OUNCE, NEOPRENE COATED, FIBERGLASS FABRIC.

C. FLEXIBLE DUCTS: FACTORY ASSEMBLED, UL 181, CLASS 1, WITH 1-1/2-INCH THICK (R-5 MIN.), 1 PCF FIBERGLASS INSULATION AND REINFORCED OUTER PROTECTIVE COVER/VAPOR BARRIER. FLEXIBLE DUCT SHALL MEET NFPA 90A WITH FLAME SPREAD UNDER 25, SMOKE DEVELOPED UNDER 50, AND SHALL BE RATED FOR MINIMUM 2-INCH WG PRESSURE AND 0 TO 250°F TEMPERATURE. PROVIDE SCREW-OPERATED METAL ADJUSTABLE CLAMPING DEVICES. USE TWIST-LOCK CONICAL TAP COLLARS AT CONNECTIONS INTO SHEET METAL DUCTWORK. MAXIMUM EXTENDED LENGTH OF FLEXIBLE DUCT SHALL NOT EXCEED 5 FEET.

D. TURNING VANES: PROVIDE FABRICATED TURNING VANES AND VANE RUNNERS, CONSTRUCTED IN ACCORDANCE WITH SMACNA "HVAC DUCT CONSTRUCTION STANDARDS". PROVIDE TURNING VANES CONSTRUCTED OF CURVED BLADES, SUPPORTED WITH BARS PERPENDICULAR TO BLADES, AND SET INTO SIDE STRIPS SUITABLE FOR MOUNTING IN DUCTWORK. FOLLOW SMACNA GUIDELINES FOR SPACING SUPPORT, AND CONSTRUCTION. ALL BLADES SHALL BE DOUBLE THICKNESS AIRFOIL TYPE.

E. BIRD SCREENS AND FRAMES: PROVIDE BIRD SCREENS THAT CONFORM TO ASTM E 2016, NO. 2 MESH, ALUMINUM OR STAINLESS STEEL. PROVIDE "MEDIUM-LIGHT" RATED ALUMINUM SCREENS. PROVIDE "LIGHT" RATES STAINLESS STEEL SCREENS.

F. DUCT-MOUNTED ACCESS DOORS: FABRICATE ACCESS PANELS ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE"; FIGURES 2-10, "DUCT ACCESS DOORS AND PANELS," AND 2-11, "ACCESS PANELS - ROUND DUCT."

PART 3 - EXECUTION

3.1 INSTALLATION

A. INSTALL DUCTWORK, ACCESSORIES, AND SUPPORTS ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE" UNLESS OTHERWISE INDICATED.

B. SEAL DUCTS TO THE FOLLOWING SEAL CLASSES ACCORDING TO SMACNA'S "HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE": 1-INCH WG, SEAL CLASS A.

C. AVOID PASSING THROUGH OR ABOVE ELECTRICAL EQUIPMENT SPACES AND ENCLOSURES.

D. CLEAN DUCT SYSTEMS BEFORE TESTING, ADJUSTING, AND BALANCING.

3.2 DUCTWORK SCHEDULE

A. EXPOSED DUCTWORK IN ARCHITECTURALLY FINISHED SPACES- ELECTRO-GALVANIZED STEEL SHEET.

B. CONCEALED DUCTWORK AND DUCTWORK IN UNFINISHED ARCHITECTURAL SPACES- GALVANIZED STEEL.

END OF SECTION

SECTION 233423 - HVAC EXHAUST FANS

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. PRODUCTS SHALL BE LICENSED TO USE THE AMCA-CERTIFIED RATINGS SEAL.

B. EXHAUST FANS SHALL COMPLY WITH UL 705. TYPE 1 FANS SHALL ALSO COMPLY WITH UL 762.

C. TYPE 1 FANS TO BE DESIGNED FOR HIGH HEAT OPERATION AT 300°F.

D. ELECTRICAL COMPONENTS, DEVICES, AND ACCESSORIES: LISTED AND LABELED AS DEFINED IN NFPA 70, BY A QUALIFIED TESTING AGENCY, AND MARKED FOR INTENDED LOCATION AND APPLICATION.

2.2 CENTRIFUGAL VENTILATORS

A. HOUSING: REMOVABLE, SPUN-ALUMINUM, DOME TOP AND OUTLET BAFFLE; SQUARE, ONE-PIECE, ALUMINUM BASE WITH VENTURI INLET CONE.

1. UPBLAST UNITS: ALUMINUM DISCHARGE BAFFLE TO DIRECT DISCHARGE AIR UPWARD, WITH RAIN AND SNOW DRAINS.

B. FAN WHEELS: ALUMINUM HUB AND WHEEL WITH BACKWARD-INCLINED BLADES.

C. BELT-DRIVEN DRIVE ASSEMBLY: RESILIENTLY MOUNTED TO HOUSING.

1. FAN SHAFT: TURNED, GROUND, AND POLISHED STEEL; KEYED TO WHEEL HUB.

2. SHAFT BEARINGS: PERMANENTLY LUBRICATED, PERMANENTLY SEALED, SELF-ALIGNING BALL BEARINGS.

3. PULLEYS: CAST-IRON, ADJUSTABLE-PITCH MOTOR PULLEY.

4. FAN AND MOTOR ISOLATED FROM EXHAUST AIRSTREAM.

D. ACCESSORIES:

1. DISCONNECT SWITCH: NON-FUSIBLE TYPE, WITH THERMAL-OVERLOAD PROTECTION, FACTORY WIRED THROUGH AN INTERNAL ALUMINUM CONDUIT.

2. BIRD SCREENS: REMOVABLE, 1/2-INCH MESH, ALUMINUM OR BRASS WIRE.

3. DAMPERS: COUNTERBALANCED, PARALLEL-BLADE, BACKDRAFT DAMPERS MOUNTED IN CURB BASE; FACTORY SET TO CLOSE WHEN FAN STOPS.

4. MOTORIZED DAMPERS: PARALLEL-BLADE DAMPERS MOUNTED IN CURB BASE WITH ELECTRIC ACTUATOR; WIRED TO CLOSE WHEN FAN STOPS.

E. ROOF CURBS: 20 GAUGE GALVANIZED STEEL; MITERED AND WELDED CORNERS; 1-1/2-INCH THICK, RIGID, FIBERGLASS INSULATION ADHERED TO INSIDE WALLS; AND 1-1/2-INCH WOOD NAILER. SIZE AS REQUIRED TO SUIT ROOF OPENING AND FAN BASE.

1. CONFIGURATION: SELF-FLASHING WITHOUT A CANT STRIP, WITH MOUNTING FLANGE.

2. OVERALL HEIGHT: 12 INCHES FOR GENERAL EXHAUST FANS; 20 INCHES FOR KITCHEN EXHAUST FANS.

3. PITCH MOUNTING: MANUFACTURE CURB FOR ROOF SLOPE.

4. MOUNTING PEDESTAL: GALVANIZED STEEL WITH REMOVABLE ACCESS PANEL.

5. TYPE 1 ROOF CURBS TO BE VENTED TYPE.

6. TYPE 1 AND TYPE 2 ROOF CURBS TO BE HINGED TYPE.

F. CAPACITIES AND CHARACTERISTICS:

1. SEE SCHEDULE.

G. MOTORS

1. COMPLY WITH NEMA DESIGNATION, TEMPERATURE RATING, SERVICE FACTOR, ENCLOSURE TYPE, AND EFFICIENCY REQUIREMENTS FOR MOTORS.

2. MOTOR SIZES: MINIMUM SIZE AS INDICATED. IF NOT INDICATED, LARGE ENOUGH SO DRIVEN LOAD WILL NOT REQUIRE MOTOR TO OPERATE IN SERVICE FACTOR RANGE ABOVE 1.0.

3. ENCLOSURE TYPE: TOTALLY ENCLOSED, FAN COOLED.

PART 3 - EXECUTION

3.1 INSTALLATION

A. INSTALL UNITS WITH CLEARANCES FOR SERVICE AND MAINTENANCE.

B. ROOF-MOUNTED UNITS: INSTALL ROOF CURB ON ROOF STRUCTURE, ACCORDING TO ARI GUIDELINE B. INSTALL AND SECURE ROOF-MOUNTED FANS ON CURBS, AND COORDINATE ROOF PENETRATIONS AND FLASHING WITH ROOF CONSTRUCTION.

END OF SECTION

SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

PART 2 - PRODUCTS

2.1 DIFFUSERS, REGISTERS, AND GRILLES:

A. REFER TO SCHEDULES FOR FINISH TYPE, COLOR, MATERIAL, AND MOUNTING.

PART 3 - EXECUTION

3.1 INSTALLATION

A. INSTALL DIFFUSERS, REGISTERS, AND GRILLES LEVEL AND PLUMB.

B. CEILING-MOUNTED OUTLETS AND INLETS: DRAWINGS INDICATE GENERAL ARRANGEMENT OF DUCTS, FITTINGS, AND ACCESSORIES. MAKE FINAL LOCATIONS WHERE INDICATED, AS MUCH AS PRACTICAL. FOR UNITS INSTALLED IN LAY-IN CEILING PANELS, LOCATE UNITS IN THE CENTER OF PANEL UNLESS OTHERWISE INDICATED. WHERE ARCHITECTURAL FEATURES OR OTHER ITEMS CONFLICT WITH INSTALLATION, NOTIFY ARCHITECT FOR A DETERMINATION OF FINAL LOCATION.

C. AFTER INSTALLATION, ADJUST DIFFUSERS, REGISTERS, AND GRILLES TO AIR PATTERNS INDICATED, OR AS DIRECTED, BEFORE STARTING AIR BALANCING.

END OF SECTION

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AOR PROJECT NUMBER:
CAV061

ISSUE	DATE
PERMIT SET	10/09/2024
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CONSTRUCTION SET	01/29/2025

MECHANICAL SPECIFICATIONS

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SPECIFICATIONS - DIVISION 23 - HVAC (CONTINUED)

SECTION 237339 - DIRECT GAS-FIRED MAKE-UP AIR UNIT

PART 2 - PRODUCTS

2.1 PACKAGED UNITS

A. FACTORY-ASSEMBLED, PREWIRED, SELF-CONTAINED UNIT CONSISTING OF CABINET, SUPPLY FAN, CONTROLS, FILTERS, AND DIRECT-FIRED GAS FURNACE TO BE INSTALLED OUTSIDE THE BUILDING.

2.2 CABINET

A. CABINET: GALVANIZED-STEEL PANELS WITH LIFTING LUGS. CABINET SHALL BE FULLY WEATHERIZED FOR OUTDOOR INSTALLATION. HEAT-RESISTANT, BAKED-ENAMEL FINISH. VERTICAL-PATTERN, GALVANIZED-STEEL DISCHARGE PLENUM WITH DIFFUSERS INCORPORATING INDIVIDUALLY ADJUSTABLE VANES.

B. ROOF CURB: FULL-PERIMETER CURB OF SHEET METAL, MINIMUM 20 INCHES HIGH, WITH WOOD NAILER, NEOPRENE SEALING STRIP, AND WELDED Z-BAR FLASHING.

C. OUTDOOR-AIR INTAKE: GALVANIZED-STEEL HOOD WITH RAIN BAFFLES, BIRD SCREEN, AND FINISH TO MATCH CABINET; AND SIZED TO SUPPLY 100 PERCENT OUTDOOR AIR. GALVANIZED-STEEL, OPPOSED-BLADE MOTORIZED DAMPERS WITH VINYL BLADE SEALS AND STAINLESS-STEEL JAMB SEAL.

D. FILTERS: COMPLY WITH NFPA 90A; 1 INCH THICK.

2.3 SUPPLY-AIR FAN

A. FAN: CENTRIFUGAL, RATED ACCORDING TO AMCA 210; STATICALLY AND DYNAMICALLY BALANCED, GALVANIZED STEEL; MOUNTED ON SOLID-STEEL SHAFT.

B. MOTOR: TOTALLY ENCLOSED, SINGLE SPEED MOTOR.

C. DRIVE: V-BELT DRIVE WITH MATCHING FAN PULLEY AND ADJUSTABLE MOTOR SHEAVES AND BELT ASSEMBLY.

D. GAS PRESSURE GAUGE: 2-1/2 INCH DIAMETER AND 1/4 INCH THREAD SIZE.

2.4 DIRECT-FIRED GAS FURNACE

A. DESCRIPTION: FACTORY ASSEMBLED, PIPED, AND WIRED; AND COMPLYING WITH ANSI Z83.4, ANSI Z83.18, AND NFPA 54. CAST-IRON BURNER WITH STAINLESS-STEEL MIXING PLATES. SINGLE-STAGE CONTROL VALVE. FUEL: NATURAL GAS.

B. SAFETY CONTROLS: AIRFLOW PROVING SWITCH; HIGH-TEMPERATURE LIMIT; SAFETY LOCKOUT; REDUNDANT, AUTOMATIC, MAIN GAS VALVES; ELECTRIC PILOT VALVE; MODULATING TEMPERATURE CONTROL VALVE; MAIN AND PILOT GAS REGULATORS; MAIN AND PILOT MANUAL SHUTOFF VALVES; MAIN AND PILOT PRESSURE TAPS; AND HIGH-LOW GAS PRESSURE SWITCHES TO COMPLY WITH ANSI STANDARDS.

2.5 CONTROLS

A. FACTORY-WIRED, FUSE-PROTECTED CONTROL TRANSFORMER, CONNECTION FOR POWER SUPPLY AND FIELD-WIRED UNIT TO REMOTE CONTROL PANEL.

1. FAN CONTROL: INTERLOCK FAN TO START WITH EXHAUST FAN(S) AND WITH RTU COOLING CYCLE.

2. OUTDOOR-AIR DAMPER CONTROL: OUTDOOR-AIR DAMPER OPENS WHEN SUPPLY FAN STARTS, AND CLOSES WHEN FAN STOPS.

3. TEMPERATURE CONTROL: OPERATES GAS VALVE TO MAINTAIN SUPPLY-AIR TEMPERATURE.

2.6 INSTALLATION

A. INSTALL GAS-FIRED UNITS ACCORDING TO NFPA 54.

B. INSTALL ROOF CURB ON ROOF STRUCTURE, ACCORDING TO ARI GUIDELINE B OR NRCA'S "LOW-SLOPE MEMBRANE ROOFING CONSTRUCTION DETAILS MANUAL."

C. CONNECT GAS PIPING WITH SHUTOFF VALVE AND UNION AND WITH SUFFICIENT CLEARANCE FOR BURNER REMOVAL AND SERVICE.

D. DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF DUCTS. CONNECT SUPPLY DUCTS TO DIRECT-FIRED MAU WITH FLEXIBLE DUCT CONNECTORS; FLEXIBLE DUCT CONNECTORS ARE SPECIFIED IN SECTION 233100 "HVAC DUCTS AND CASINGS."

END OF SECTION

SECTION 237413 - PACKAGED ROOFTOP UNITS

1.1 SUMMARY

A. THIS SECTION INCLUDES PACKAGED, ROOFTOP UNITS WITH THE FOLLOWING COMPONENTS AND ACCESSORIES:

1. DIRECT-EXPANSION COOLING.

2. HUMIDITY CONTROL WITH HOT-GAS REHEAT (OPTIONAL)

3. GAS FURNACE.

4. ECONOMIZER OUTDOOR-AND RETURN-AIR DAMPER SECTION.

5. INTEGRAL, SPACE TEMPERATURE CONTROLS.

6. ROOF CURBS.

1.2 SECTION REQUIREMENTS

A. SUBMITTALS:

1. PRODUCT DATA: INCLUDE MANUFACTURER'S TECHNICAL DATA FOR EACH RTU, INCLUDING RATED CAPACITIES, DIMENSIONS, REQUIRED CLEARANCES, CHARACTERISTICS, FURNISHED SPECIALTIES, AND ACCESSORIES.

PART 2 - PRODUCTS

2.1 CASING

A. GENERAL FABRICATION REQUIREMENTS FOR CASINGS: FORMED AND REINFORCED INSULATED PANELS, FABRICATED TO ALLOW REMOVAL FOR ACCESS TO INTERNAL PARTS AND COMPONENTS, WITH JOINTS BETWEEN SECTIONS SEALED.

B. EXTERIOR CASING MATERIAL: GALVANIZED STEEL WITH FACTORY-PAINTED FINISH, WITH PITCHED ROOF PANELS AND KNOCKOUTS WITH GROMMET SEALS FOR ELECTRICAL AND PIPING CONNECTIONS AND LIFTING LUGS.

1. CASING THICKNESS: 16 GAUGE THICK.

C. CASING INSULATION AND ADHESIVE: COMPLY WITH NFPA 90A.

1. MATERIALS: ASTM C 1071, TYPE I.

2. THICKNESS: 1/2 INCH

3. LINER MATERIALS SHALL HAVE AIR-STREAM SURFACE INSULATED WITH A MINIMUM 1/2-IN. THICK, MINIMUM 1 1/2 LB DENSITY, FLEXIBLE FIBERGLASS INSULATION BONDED WITH A PHENOLIC BINDER, NEOPRENE COATED ON THE AIR SIDE.

4. LINER ADHESIVE: COMPLY WITH ASTM C 916, TYPE I.

D. UNIT SHALL HAVE A THRU-THE-BASE GAS AND ELECTRICAL CONNECTIONS.

2.2 FANS

OPTION A OR B:

A. DIRECT-DRIVEN SUPPLY-AIR FANS: DOUBLE WIDTH, BACKWARD INCLINED, CENTRIFUGAL; WITH PERMANENTLY LUBRICATED, MOTOR RESILIENTLY MOUNTED IN THE FAN INLET. ALUMINUM OR PAINTED-STEEL WHEELS, AND GALVANIZED- OR PAINTED-STEEL FAN SCROLLS.

B. BELT-DRIVEN SUPPLY-AIR FANS: DOUBLE WIDTH, FORWARD CURVED, CENTRIFUGAL; WITH PERMANENTLY LUBRICATED, SINGLE-SPEED MOTOR INSTALLED ON AN ADJUSTABLE FAN BASE RESILIENTLY MOUNTED IN THE CASING. ALUMINUM OR PAINTED-STEEL WHEELS, AND GALVANIZED- OR PAINTED-STEEL FAN SCROLLS.

C. CONDENSER-COIL FAN: DIRECT DRIVE, PROPELLER, MOUNTED ON SHAFT OF PERMANENTLY LUBRICATED MOTOR WITH THERMAL OVERLOAD PROTECTION.

D. POWER EXHAUST: FORWARD CURVED, SHAFT MOUNTED ON PERMANENTLY LUBRICATED MOTOR.

2.3 COILS

A. SUPPLY-AIR REFRIGERANT COIL:

1. ALUMINUM-PLATE FIN AND SEAMLESS INTERNALLY GROOVED COPPER TUBE IN STEEL CASING WITH EQUALIZING-TYPE VERTICAL DISTRIBUTOR.

2. POLYMER STRIP SHALL PREVENT ALL COPPER COIL FROM CONTACTING STEEL COIL FRAME OR CONDENSATE PAN.

3. CATHODIC EPOXY COATING.

4. CONDENSATE DRAIN PAN: GALVANIZED STEEL WITH CORROSION-RESISTANT COATING FORMED WITH PITCH AND DRAIN CONNECTIONS.

B. OUTDOOR-AIR REFRIGERANT COIL:

1. ALUMINUM-PLATE FIN AND SEAMLESS INTERNALLY GROOVED COPPER TUBE IN STEEL CASING WITH EQUALIZING- TYPE VERTICAL DISTRIBUTOR.

2. POLYMER STRIP SHALL PREVENT ALL COPPER COIL FROM CONTACTING STEEL COIL FRAME OR CONDENSATE PAN.

3. CATHODIC EPOXY COATING.

C. HOT-GAS REHEAT REFRIGERANT COIL (OPTIONAL):

1. ALUMINUM-PLATE FIN AND SEAMLESS INTERNALLY GROOVED COPPER TUBE IN STEEL CASING WITH EQUALIZING-TYPE VERTICAL DISTRIBUTOR.

2. POLYMER STRIP SHALL PREVENT ALL COPPER COIL FROM CONTACTING STEEL COIL FRAME OR CONDENSATE PAN.

3. CATHODIC EPOXY COATING.

2.4 REFRIGERANT CIRCUIT COMPONENTS

A. NUMBER OF REFRIGERANT CIRCUITS: TWO

B. COMPRESSOR: HERMETIC, SCROLL, MOUNTED ON VIBRATION ISOLATORS; WITH INTERNAL OVERCURRENT AND HIGH-TEMPERATURE PROTECTION, INTERNAL PRESSURE RELIEF AND CRANKCASE HEATER.

C. REFRIGERATION SPECIALTIES:

1. REFRIGERANT: R-410A

2. EXPANSION VALVE WITH REPLACEABLE THERMOSTATIC ELEMENT.

3. REFRIGERANT FILTER/DRYER.

4. MANUAL-RESET HIGH-PRESSURE SAFETY SWITCH.

5. AUTOMATIC-RESET LOW-PRESSURE SAFETY SWITCH.

6. MINIMUM OFF-TIME RELAY.

7. AUTOMATIC-RESET COMPRESSOR MOTOR THERMAL OVERLOAD.

8. BRASS SERVICE VALVES INSTALLED IN COMPRESSOR SUCTION AND LIQUID LINES.

9. LOW-AMBIENT KIT HIGH-PRESSURE SENSOR.

10. HOT-GAS REHEAT SOLENOID VALVE WITH A REPLACEABLE MAGNETIC COIL.

2.5 AIR FILTRATION

A. PROVIDE 2" THROW-AWAY FIBERGLASS FILTERS.

2.6 GAS FURNACE

A. BURNERS: IN-SHOT TYPE CONSTRUCTED OF ALUMINUM-COATED STEEL.

1. FUEL: NATURAL GAS.

2. IGNITION: DIRECT SPARK IGNITION (DSI).
VERIFY AVAILABILITY OF HIGH-ALTITUDE FEATURE WITH MANUFACTURERS.

3. HIGH-ALTITUDE KIT: FOR PROJECT ELEVATIONS MORE THAN 2,000 FEET ABOVE SEA LEVEL.

B. HEAT-EXCHANGER AND DRAIN PAN: STAINLESS STEEL.

C. INDUCED DRAFT COMBUSTION BLOWER.

D. SAFETY CONTROLS:

1. GAS CONTROL VALVE: TWO STAGE.

2. GAS TRAIN: SINGLE-BODY, REGULATED, REDUNDANT, 24-V AC GAS VALVE ASSEMBLY CONTAINING PILOT SOLENOID VALVE, PILOT FILTER, PRESSURE REGULATOR, PILOT SHUTOFF, AND MANUAL SHUTOFF.

2.7 DAMPERS

A. OUTDOOR AND RETURN AIR MIXING DAMPERS: PARALLEL OR OPPOSED-BLADE GALVANIZED-STEEL DAMPERS MECHANICALLY FASTENED TO CADMIUM PLATED FOR GALVANIZED-STEEL OPERATING ROD IN REINFORCED CABINET. CONNECT OPERATING RODS WITH COMMON LINKAGE AND INTERCONNECT LINKAGES SO DAMPERS OPERATE SIMULTANEOUSLY.

1. DAMPER MOTOR: MODULATING WITH ADJUSTABLE MINIMUM POSITION.

2. RELIEF AIR DAMPER: GRAVITY ACTUATED, WITH BIRD SCREEN AND HOOD.

2.8 ELECTRICAL POWER CONNECTION

A. PROVIDE FOR SINGLE CONNECTION OF POWER TO UNIT WITH UNIT-MOUNTED DISCONNECT SWITCH ACCESSIBLE FROM OUTSIDE UNIT AND CONTROL-CIRCUIT TRANSFORMER WITH BUILT-IN OVERCURRENT PROTECTION.

2.9 CONTROLS

A. BASIC UNIT CONTROLS:

1. CONTROL-VOLTAGE TRANSFORMER.

2. WALL-MOUNTED THERMOSTAT OR SENSOR WITH THE FOLLOWING FEATURES:
a. HEAT-COOL-OFF SWITCH.
b. FAN ON-AUTO SWITCH.
c. FAN-SPEED SWITCH.
d. AUTOMATIC CHANGEOVER.
e. ADJUSTABLE DEADBAND.
f. EXPOSED SET POINT.
g. EXPOSED INDICATION.
h. DEGREE F INDICATION.
i. UNOCCUPIED-PERIOD-OVERRIDE PUSH BUTTON.
j. DATA ENTRY AND ACCESS PORT TO INPUT TEMPERATURE AND HUMIDITY SET POINTS, OCCUPIED AND UNOCCUPIED PERIODS, AND OUTPUT ROOM TEMPERATURE AND HUMIDITY, SUPPLY-AIR TEMPERATURE, OPERATING MODE, AND STATUS.

3. WALL-MOUNTED HUMIDISTAT OR SENSOR WITH THE FOLLOWING FEATURES:

a. EXPOSED SET POINT.
b. EXPOSED INDICATION.

4. REMOTE WALL-MOUNTED ANNUNCIATOR PANEL WITH KEYED ACCESS FOR EACH UNIT:
a. LIGHTS TO INDICATE POWER ON, UNIT ALARM OR FAILURE, SMOKE DETECTION.

B. DDC CONTROLLER:

1. CONTROLLER SHALL HAVE VOLATILE-MEMORY BACKUP.

2. SAFETY CONTROL OPERATION:
a. SMOKE DETECTORS: STOP FAN AND CLOSE OUTDOOR-AIR DAMPER IF SMOKE IS DETECTED. PROVIDE ADDITIONAL CONTACTS FOR ALARM INTERFACE TO FIRE ALARM CONTROL PANEL.
b. FIRE ALARM CONTROL PANEL INTERFACE WHERE APPLICABLE.
c. LOW-DISCHARGE TEMPERATURE: STOP FAN AND CLOSE OUTDOOR-AIR DAMPER IF SUPPLY AIR TEMPERATURE IS LESS THAN 40°F.
RETAIN FIRST SUBPARAGRAPH BELOW FOR AIR-TO-AIR HEAT-PUMP FEATURE.
d. DEFROST CONTROL FOR CONDENSER COIL: PRESSURE DIFFERENTIAL SWITCH TO INITIATE DEFROST SEQUENCE.

3. UNIT SHALL BE CAPABLE OF DIRECT COMMUNICATION WITH GENERIC OPEN PROTOCOL SUCH AS BACNET MS/TP, LONTALK, OR MODUS. THIS WILL ALLOW THE UNIT TO INTEGRATE WITH A FACILITY ENERGY MANAGEMENT SYSTEM.

4. SCHEDULED OPERATION: OCCUPIED AND UNOCCUPIED PERIODS ON SEVEN-DAY CLOCK WITH A MINIMUM OF FOUR PROGRAMMABLE PERIODS PER DAY.

5. UNOCCUPIED PERIOD:
a. HEATING SETBACK: 10°F.
b. COOLING SETBACK: SYSTEM OFF.
c. OVERRIDE OPERATION: TWO HOURS.

6. SUPPLY FAN OPERATION:
a. OCCUPIED PERIODS: RUN FAN CONTINUOUSLY.
b. UNOCCUPIED PERIODS: CYCLE FAN TO MAINTAIN SETBACK TEMPERATURE.

7. REFRIGERANT CIRCUIT OPERATION:
a. OCCUPIED PERIODS: CYCLE OR STAGE COMPRESSORS, AND OPERATE HOT-GAS BYPASS TO MATCH COMPRESSOR OUTPUT TO COOLING LOAD TO MAINTAIN ROOM TEMPERATURE AND HUMIDITY. CYCLE CONDENSER FANS TO MAINTAIN MAXIMUM HOT-GAS PRESSURE. OPERATE LOW-AMBIENT CONTROL KIT TO MAINTAIN MINIMUM HOT-GAS PRESSURE
b. UNOCCUPIED PERIODS: CYCLE COMPRESSORS AND CONDENSER FANS FOR HEATING TO MAINTAIN SETBACK TEMPERATURE.

8. HOT-GAS REHEAT-COIL OPERATION (OPTIONAL):
a. OCCUPIED PERIODS: HUMIDISTAT OPENS HOT-GAS VALVE TO PROVIDE HOT-GAS REHEAT, AND CYCLES COMPRESSOR.
b. UNOCCUPIED PERIODS: REHEAT NOT REQUIRED.

9. GAS FURNACE OPERATION:
a. OCCUPIED PERIODS: STAGE BURNER TO MAINTAIN ROOM TEMPERATURE.
b. UNOCCUPIED PERIODS: CYCLE BURNER TO MAINTAIN SETBACK TEMPERATURE.

10. FIXED MINIMUM OUTDOOR-AIR DAMPER OPERATION:
a. OCCUPIED PERIODS: OPEN TO 25 PERCENT.
b. UNOCCUPIED PERIODS: CLOSE THE OUTDOOR-AIR DAMPER.

11. ECONOMIZER OUTDOOR-AIR DAMPER OPERATION:
a. OCCUPIED PERIODS: OPEN TO 25 PERCENT FIXED MINIMUM INTAKE, AND MAXIMUM 100 PERCENT OF THE FAN CAPACITY TO COMPLY WITH ASHRAE CYCLE II. CONTROLLER SHALL PERMIT AIR-SIDE ECONOMIZER OPERATION WHEN OUTDOOR AIR IS LESS THAN 60 ° F. USE MIXED-AIR TEMPERATURE AND SELECT BETWEEN OUTDOOR-AIR AND RETURN-AIR ENTHALPY TO ADJUST MIXING DAMPERS DURING ECONOMIZER CYCLE OPERATION, LOCK OUT COOLING.
b. UNOCCUPIED PERIODS: CLOSE OUTDOOR-AIR DAMPER AND OPEN RETURN-AIR DAMPER.

2.10 ACCESSORIES

A. DUPLEX, 115-V, GROUND-FAULT-INTERRUPTER OUTLET WITH 15-A OVERCURRENT PROTECTION. INCLUDE TRANSFORMER IF REQUIRED.

B. LOW-AMBIENT KIT STAGED DOWN TO 0°F.

C. FILTER DIFFERENTIAL PRESSURE SWITCH WITH SENSOR TUBING ON EITHER SIDE OF FILTER. SET FOR FINAL FILTER PRESSURE LOSS.

D. HAIL GUARDS OF GALVANIZED STEEL, PAINTED TO MATCH CASING.

E. DUCT MOUNTED SMOKE DETECTOR IN RETURN AIR STREAM CAPABLE OF SHUTTING DOWN THE UNIT IN THE PRESENCE OF SMOKE DETECTION.

2.11 ROOF CURBS

A. MATERIALS: GALVANIZED STEEL WITH CORROSION-PROTECTION COATING, WATERTIGHT GASKETS, AND FACTORY-INSTALLED WOOD NAILER; COMPLYING WITH NRCA STANDARDS.

1. CURB INSULATION AND ADHESIVE: COMPLY WITH NFPA 90A OR NFPA 90B.
a. MATERIALS: ASTM C 1071, TYPE I OR II.
b. THICKNESS: 1-1/2 INCHES.

2. APPLICATION: FACTORY APPLIED WITH ADHESIVE AND MECHANICAL FASTENERS TO THE INTERNAL SURFACE OF CURB.
a. LINER ADHESIVE: COMPLY WITH ASTM C 916, TYPE I.
b. MECHANICAL FASTENERS: GALVANIZED STEEL, SUITABLE FOR ADHESIVE ATTACHMENT, MECHANICAL ATTACHMENT, OR WELDING ATTACHMENT TO DUCT WITHOUT DAMAGING LINER WHEN APPLIED AS RECOMMENDED BY MANUFACTURER AND WITHOUT CAUSING LEAKAGE IN CABINET.
c. LINER MATERIALS SHALL HAVE AIR-STREAM SURFACE INSULATED WITH A MINIMUM 1/2-IN. THICK, MINIMUM 1 1/2 LB DENSITY, FLEXIBLE FIBERGLASS INSULATION BONDED WITH A PHENOLIC BINDER, NEOPRENE COATED ON THE AIR SIDE.
d. LINER ADHESIVE: COMPLY WITH ASTM C 916, TYPE I.

B. CURB HEIGHT: 14 INCHES TYPICAL UNO. PROVIDE 24 INCH CURB IN AREAS WITH EXPECTED HEAVY SNOWFALL.

PART 3 - EXECUTION

3.1 EXAMINATION

A. EXAMINE SUBSTRATES, AREAS, AND CONDITIONS, WITH INSTALLER PRESENT, FOR COMPLIANCE WITH REQUIREMENTS FOR INSTALLATION TOLERANCES AND OTHER CONDITIONS AFFECTING PERFORMANCE OF RTUS.

B. EXAMINE ROUGHING-IN FOR RTUS TO VERIFY ACTUAL LOCATIONS OF PIPING AND DUCT CONNECTIONS BEFORE EQUIPMENT INSTALLATION.

C. EXAMINE ROOFS FOR SUITABLE CONDITIONS WHERE RTUS WILL BE INSTALLED.

D. PROCEED WITH INSTALLATION ONLY AFTER UNSATISFACTORY CONDITIONS HAVE BEEN CORRECTED.

3.2 INSTALLATION

A. ROOF CURB: INSTALL ON ROOF STRUCTURE. LEVEL AND SECURE. INSTALL RTUS ON CURBS AND COORDINATE ROOF PENETRATIONS AND FLASHING WITH ROOF CONSTRUCTION. RTUS TO UPPER CURB RAIL, AND SECURE CURB BASE TO ROOF FRAMING OR CONCRETE BASE WITH ANCHOR BOLTS.

3.3 CONNECTIONS

A. THE FOLLOWING ARE SPECIFIC CONNECTION REQUIREMENTS:

1. INSTALL DUCTS TO TERMINATION AT TOP OF ROOF CURB.

2. REMOVE ROOF DECKING ONLY AS REQUIRED FOR PASSAGE OF DUCTS. DO NOT CUT OUT DECKING UNDER ENTIRE ROOF CURB.

3.4 COORDINATION

A. CONTRACTOR TO COORDINATE WITH KITCHEN EQUIPMENT SUPPLIER TO ENSURE THAT THE RTUS ARE COORDINATED WITH THE KITCHEN EQUIPMENT, PARTICULARLY THE EXHAUST HOODS AND THE MAKE-UP AIR UNIT, TO PROPERLY PRESSURIZE THE BUILDING/SPACE.

B. CONTRACTOR TO ENSURE THAT ALL THERMOSTATS AND SENSORS ARE COMPATIBLE WITH THE RTU CONTROLS.

3.5 FIELD QUALITY CONTROL

A. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT, TEST, AND ADJUST COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS. REPORT RESULTS IN WRITING.

B. PERFORM TESTS AND INSPECTIONS AND PREPARE TEST REPORTS.

1. MANUFACTURER'S FIELD SERVICE: ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO INSPECT COMPONENTS, ASSEMBLIES, AND EQUIPMENT INSTALLATIONS, INCLUDING CONNECTIONS, AND TO ASSIST IN TESTING. REPORT RESULTS IN WRITING.

C. TESTS AND INSPECTIONS:

1. AFTER INSTALLING RTUS AND AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, TEST UNITS FOR COMPLIANCE WITH REQUIREMENTS.

2. OPERATIONAL TEST: AFTER ELECTRICAL CIRCUITRY HAS BEEN ENERGIZED, START UNITS TO CONFIRM PROPER MOTOR ROTATION AND UNIT OPERATION.

3. TEST AND ADJUST CONTROLS AND SAFETIES. REPLACE DAMAGED AND MALFUNCTIONING CONTROLS AND EQUIPMENT.

D. REMOVE AND REPLACE MALFUNCTIONING UNITS AND RETEST AS SPECIFIED ABOVE.

3.6 STARTUP SERVICE

A. ENGAGE A FACTORY-AUTHORIZED SERVICE REPRESENTATIVE TO PERFORM STARTUP SERVICE.

B. COMPLETE INSTALLATION AND STARTUP CHECKS ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS AND DO THE FOLLOWING:

1. INSPECT FOR VISIBLE DAMAGE TO UNIT CASING, FURNACE COMBUSTION CHAMBER, COMPRESSOR, COILS, AND FANS.

2. VERIFY THAT LABELS ARE CLEARLY VISIBLE, CLEARANCES HAVE BEEN PROVIDED FOR SERVICING, CONTROLS ARE CONNECTED AND OPERABLE, AND FILTERS ARE INSTALLED.

3. CLEAN CONDENSER COIL AND FURNACE AND INSPECT FOR CONSTRUCTION DEBRIS.

4. REMOVE PACKING FROM VIBRATION ISOLATORS.

5. VERIFY LUBRICATION ON FAN AND MOTOR BEARINGS.

6. INSPECT FAN-WHEEL ROTATION FOR MOVEMENT IN CORRECT DIRECTION WITHOUT VIBRATION AND BINDING.

7. ADJUST FAN BELTS TO PROPER ALIGNMENT AND TENSION.

8. START UNIT ACCORDING TO MANUFACTURER'S WRITTEN INSTRUCTIONS.
a. INSPECT AND RECORD PERFORMANCE OF INTERLOCKS AND PROTECTIVE DEVICES; VERIFY SEQUENCES.

10. OPERATE UNIT FOR AN INITIAL PERIOD AS RECOMMENDED OR REQUIRED BY MANUFACTURER.

11. PERFORM THE FOLLOWING OPERATIONS FOR BOTH MINIMUM AND MAXIMUM FIRING. ADJUST BURNER FOR PEAK EFFICIENCY.
a. MEASURE GAS PRESSURE ON MANIFOLD.
b. INSPECT OPERATION OF POWER VENTS.
c. MEASURE SUPPLY-AIR TEMPERATURE AND VOLUME WHEN BURNER IS AT MAXIMUM FIRING RATE AND WHEN BURNER IS OFF. CALCULATE USEFUL HEAT TO SUPPLY AIR.

12. ADJUST AND INSPECT HIGH-TEMPERATURE LIMITS.

13. INSPECT OUTDOOR-AIR DAMPERS FOR PROPER STROKE AND INTERLOCK WITH RETURN-AIR DAMPERS.

14. INSPECT CONTROLS FOR CORRECT SEQUENCING OF HEATING, MIXING DAMPERS, REFRIGERATION, AND NORMAL AND EMERGENCY SHUTDOWN.

15. SIMULATE MAXIMUM COOLING DEMAND AND INSPECT THE FOLLOWING:
a. COMPRESSOR REFRIGERANT SUCTION AND HOT-GAS PRESSURES.
b. SHORT CIRCUITING OF AIR THROUGH CONDENSER COIL OR FROM CONDENSER FANS TO OUTDOOR-AIR INTAKE.

16. VERIFY OPERATION OF REMOTE PANEL INCLUDING PILOT-LIGHT OPERATION AND FAILURE MODES. INSPECT THE FOLLOWING:
a. HIGH-TEMPERATURE LIMIT ON GAS-FIRED HEAT EXCHANGER.
b. LOW-TEMPERATURE SAFETY OPERATION.
c. FILTER HIGH-PRESSURE DIFFERENTIAL ALARM.
d. ECONOMIZER TO MINIMUM OUTDOOR-AIR CHANGEOVER.
e. RELIEF-AIR FAN OPERATION.
f. SMOKE ALARMS.

17. AFTER STARTUP AND PERFORMANCE TESTING AND PRIOR TO SUBSTANTIAL COMPLETION, REPLACE EXISTING FILTERS WITH NEW FILTERS.

3.7 CLEANING AND ADJUSTING

A. OCCUPANCY ADJUSTMENTS: WHEN REQUESTED WITHIN 12 MONTHS OF DATE OF SUBSTANTIAL COMPLETION, PROVIDE ON-SITE ASSISTANCE IN ADJUSTING SYSTEM TO SUIT ACTUAL OCCUPIED CONDITIONS. PROVIDE UP TO TWO VISITS TO SITE DURING OTHER-THAN-NORMAL OCCUPANCY HOURS FOR THIS PURPOSE.

B. AFTER COMPLETING SYSTEM INSTALLATION AND TESTING, ADJUSTING, AND BALANCING RTU AND AIR-DISTRIBUTION SYSTEMS, CLEAN FILTER HOUSINGS AND INSTALL NEW FILTERS.

END OF SECTION

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AOR PROJECT NUMBER:
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ISSUE	DATE
PERMIT SET	10/09/2024
LANDLORD/BID	11/08/2024
CONSTRUCTION SET	01/29/2025

MECHANICAL SPECIFICATIONS

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