Powermaster M1

HVAC EQUIPMENT SCHEDULE

HVAC SYSTEM #1	
AHU #1 DIRECT EXPANSION FAN COIL UNIT	* CARRIER MODEL #FX4DNF043, 4 WAY, MULTIPOISE FAN COIL UNIT. 6 KW HEATER. NOMINAL CAPACITY = 42,000 BTUH, 1400 CFM NOMINAL. PROVIDE HARD SHUT-OFF TXV VALVE. 3.5 TON NOMINAL. PROVIDE PROGRAMMABLE THERMOSTAT AND FILTER RACK WITH HINGED DOOR. 1/2HP, 4.1A MOTOR FLA, 28.9A HEAT FLA, 208V, 1 PH, 44.7A MCA, 45A MOCP AHU & HEAT.
HP #1 OUTDOOR HEAT PUMP UNIT	* CARRIER MODEL #25HCC542A0030, 3.5 TON OUTDOOR HEAT PUMP UNIT, 15 SEER, PROVIDE CYCLE PROTECTOR, LOW PRESSURE SWITCH, CRANKCASE HEATER, 208 VOLT, 1 PHASE. COMP 21.1A RLA, FAN 1.2A FLA, OUTDOOR HEAT PUMP 28.5A MCA, 40A MOCP.
HVAC SYSTEM #2	
AHU #2 DIRECT EXPANSION FAN COIL UNIT	* CARRIER MODEL #FX4DNF043, 4 WAY, MULTIPOISE FAN COIL UNIT. 6 KW HEATER. NOMINAL CAPACITY = 42,000 BTUH, 1400 CFM NOMINAL. PROVIDE HARD SHUT-OFF TXV VALVE. 3.5 TON NOMINAL. PROVIDE PROGRAMMABLE THERMOSTAT AND FILTER RACK WITH HINGED DOOR. 1/2HP, 4.1A MOTOR FLA, 28.9A HEAT FLA, 208V, 1 PH, 44.7A MCA, 45A MOCP AHU & HEAT.
HP #2 OUTDOOR HEAT PUMP UNIT	* CARRIER MODEL #25HCC542A0030, 3.5 TON OUTDOOR HEAT PUMP UNIT, 15 SEER, PROVIDE CYCLE PROTECTOR, LOW PRESSURE SWITCH, CRANKCASE HEATER, 208 VOLT, 1 PHASE. COMP 21.1A RLA, FAN 1.2A FLA, OUTDOOR HEAT PUMP 28.5A MCA, 40A MOCP.

* OR APPROVED EQUAL

AHU CONTROL NOTE:

FOR EACH SYSTEM PROVIDE "SIMPLE ENGINEERED SOLUTIONS" MODEL #HPDM-XX HEAT PUMP DEHUMIDIFICATION CONTROL MODULE. PROVIDE PROGRAMMABLE ELECTRONIC THERMOSTAT WITH AUTO CHANGEOVER AND HUMIDISTAT FUNCTION. THERMOSTAT SHALL BE COMPATIBLE WITH DEHUMIDIFICATION CONTROL MODULE. PURPOSE OF DEHUMIDIFICATION CONTROL MODULE IS TO INITIATE COOLING MODE WHEN HUMIDISTAT SENSES HUMIDITY OVER SETPOINT AND ENERGIZE AND CONTROL ELECTRIC HEAT TO MAINTAIN SPACE TEMPERATURE. CONTACT SIMPLE ENGINEERED SOLUTIONS FOR INFORMATION ON DEHUMIDIFICATION CONTROL MODULE: (910) 231-9929. email: jmsuggs@yahoo.com.

Powermaster M1

EXHAUST FAN SCHEDULE

EXHAUST FAN #1 (EF-1)	* CARNES MODEL# VCDD010C EXHAUST FAN, 93 CFM @ 1/4" SP, 640 RPM, 1.1 AMPS, 120V. THE ELECTRICAL CONTRACTOR SHALL PROVIDE THE SWITCH AND WIRE THE UNIT. THE HVAC CONTRACTOR SHALL PROVIDE UNIT, 6" RIGID DUCT TO WALL CAP. LOCATE EXHAUST TERMINATION A MINIMUM OF 10'-0" FROM ANY INTAKES.
EXHAUST FAN #2 (EF-2)	* CARNES MODEL# VCDD010C EXHAUST FAN, 93 CFM @ 1/4" SP, 640 RPM, 1.1 AMPS, 120V. THE ELECTRICAL CONTRACTOR SHALL PROVIDE THE SWITCH AND WIRE THE UNIT. THE HVAC CONTRACTOR SHALL PROVIDE UNIT, 6" RIGID DUCT TO WALL CAP. LOCATE EXHAUST TERMINATION A MINIMUM OF 10'-0" FROM ANY INTAKES.
EXHAUST FAN #3 (EF-3)	* CARNES MODEL# VCDD010C EXHAUST FAN, 93 CFM @ 1/4" SP, 640 RPM, 1.1 AMPS, 120V. THE ELECTRICAL CONTRACTOR SHALL PROVIDE THE SWITCH AND WIRE THE UNIT. THE HVAC CONTRACTOR SHALL PROVIDE UNIT, 6" RIGID DUCT TO WALL CAP. LOCATE EXHAUST TERMINATION A MINIMUM OF 10'-0" FROM ANY INTAKES.
EXHAUST FAN #4 (EF-4)	* CARNES MODEL# VCDD010C EXHAUST FAN, 93 CFM @ 1/4" SP, 640 RPM, 1.1 AMPS, 120V. THE ELECTRICAL CONTRACTOR SHALL PROVIDE THE SWITCH AND WIRE THE UNIT. THE HVAC CONTRACTOR SHALL PROVIDE UNIT, 6" RIGID DUCT TO WALL CAP. LOCATE EXHAUST TERMINATION A MINIMUM OF 10'-0" FROM ANY INTAKES.
EXHAUST FAN #5 (EF-5)	* CARNES MODEL# VCDD010C EXHAUST FAN, 93 CFM @ 1/4" SP, 640 RPM, 1.1 AMPS, 120V. THE ELECTRICAL CONTRACTOR SHALL PROVIDE THE SWITCH AND WIRE THE UNIT. THE HVAC CONTRACTOR SHALL PROVIDE UNIT, 8" RIGID DUCT TO WALL CAP. LOCATE EXHAUST TERMINATION A MINIMUM OF 10'-0" FROM ANY INTAKES.
EXHAUST FAN #6 (EF-6)	* CARNES MODEL# VCDD020C EXHAUST FAN, 196 CFM @ 1/4" SP, 740 RPM, 1.8 AMPS, 120V. THE ELECTRICAL CONTRACTOR SHALL PROVIDE THE SWITCH AND WIRE THE UNIT. THE HVAC CONTRACTOR SHALL PROVIDE UNIT, 8" RIGID DUCT TO WALL CAP. LOCATE EXHAUST TERMINATION A MINIMUM OF 10'-0" FROM ANY INTAKES.
EXHAUST FAN #7 (EF-6)	* CARNES MODEL# LWBL-36S2 SIDEWALL PROPELLER EXHAUST FAN, 1HP, 600 RPM, 7,500 CFM AT 0.25" SP, PROVIDE WALL BOX WITH MOTORSIDE GUARD. PROVIDE MOTORIZED BACKDRAFT DAMPER ON EXTERIOR SIDE OF FAN. PROVIDE INTERLOCK WITH WALL INTAKE DAMPER ON OPPOSITE END OF FACILITY. BELT DRIVE, 208 VOLT, 1 PH.
EXHAUST FAN #8 (EF-7)	* CARNES MODEL# LWBL-36S2 SIDEWALL PROPELLER EXHAUST FAN, 1HP, 600 RPM, 7,500 CFM AT 0.25" SP, PROVIDE WALL BOX WITH MOTORSIDE GUARD. PROVIDE MOTORIZED BACKDRAFT DAMPER ON EXTERIOR SIDE OF FAN. PROVIDE INTERLOCK WITH WALL INTAKE DAMPER ON OPPOSITE END OF FACILITY. BELT DRIVE, 208 VOLT, 1 PH.

* OR APPROVED EQUAL

NOTE: RUN EXHAUST DUCTS HORIZONTALLY AS REQUIRED TO MAINTAIN 10'-0" MINIMUM SEPARATION FROM ANY INTAKES.

WASTE OIL HEATER SCHEDULE

UNIT HEATER 350,000 BTUH (WOH-1)	* ENERGY LOGIC# ELF350H NATURAL WAST OIL FIRED HEATER, AND 250 GAL. FLOOR MOUNTED OIL TANK. 350,000 BTUH INPUT, 2800 CFM, 8" FLUE, 1/3 HP, 120 VOLT, PROVIDE 25 AMP DEDICATED CIRCUIT. PROVIDE 8" DIA. TYPE "B" EXHAUST VENT TROUGH THE ROOF. PROVIDE ALL FLASHING AS REQUIRED.

* OR APPROVED EQUAL

AIR DISTRIBUTION SCHEDULE

MARK	* MANUFACTURER	MODEL NO.	NECK SIZE	FACE SIZE	MATERIAL	SERVICE	NOTES
A	CARNES	SPAB224	SEE FLEXIBLE DUCT SCHEDULE	24" X 24"	STEEL	SUPPLY	LAY-IN CEILING, WHITE 4-WAY BLOW
RA	CARNES	SPRB22	SEE FLEXIBLE DUCT SCHEDULE	24" X 24"	STEEL	RETURN	LAY-IN CEILING, WHITE

* OR APPROVED EQUAL

COORDINATE BORDER TYPE WITH THE CEILING TYPE. SEE ARCH SHEETS
PROVIDE CUT SHEETS TO OWNER/ARCH. PRIOR TO ORDERING.

MAKE-UP AIR LOUVER SCHEDULE

LOUVER/DAMPER (LD-1)	* CARNES MODEL FKDC 48" X 48" WALL INTAKE LOUVER. PROVIDE MOTORIZED DAMPER BEHIND LOUVER. DAMPER CONTROLS SHALL BE INTERLOCKED WITH EXHAUST FAN EF-7 & EF-8 SO THAT LOUVER OPENS WHEN EITHER EXHAUST FAN FAN IS ENERGIZED AND DAMPER SHALL CLOSE WHEN BOTH FANS ARE DE-ENERGIZED. COORDINATE EXACT SIZE OF LOUVER WITH GENERAL CONTRACTOR PRIOR TO ORDERING.

* OR APPROVED EQUAL BY RUSKIN OR GREENHECK.

GENERAL NOTES – MECHANICAL

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE STATE CODE AND ALL LOCAL AND OTHER APPLICABLE CODES.
2. ANY PERMITS AND INSPECTION FEES SHALL BE SECURED AND PAID FOR BY THE MECHANICAL CONTRACTOR (MC).
3. ALL WORK SHALL BE PERFORMED BY EXPERIENCED AND SKILLED CRAFTSMEN. THE MC SHALL COORDINATE ALL OF HIS WORK WITH THE GENERAL CONTRACTOR (GC) AND OTHER TRADES.
4. THE LOCATION OF ALL DUCT, PIPING AND EQUIPMENT SHALL BE ADJUSTED TO ACCOMMODATE ANTICIPATED OR ENCOUNTERED INTERFERENCES.
5. THESE PLANS ARE DIAGRAMMATIC AND MAY NOT SHOW MINOR DETAILS AND LOCATIONS. FOR DIMENSIONS REFER TO THE ARCHITECTURAL PLANS.
6. THE MC SHALL BE RESPONSIBLE FOR ALL ELECTRICAL STARTERS INTERLOCKS, CONTROL WIRING CONDUIT AND POWER WIRING FROM DISCONNECTS TO HIS EQUIPMENT, USING A LICENSED ELECTRICIAN.
7. THE MC SHALL USE FIRE DAMPERS FOR PROTECTION OF THE OPENING IN ACCORDANCE WITH STATE AND LOCAL CODES IN ALL LOCATIONS WHERE PENETRATIONS OF RATED WALLS AND FLOORS OCCUR. SEE ARCHITECTURAL PLANS FOR RATED WALL AND FLOOR LOCATIONS. PROVIDE ACCESS DOORS AT ALL DAMPER LOCATIONS. LOCATE DOORS FOR EASY ACCESS.
8. INSTALL FLEXIBLE CONNECTORS ON SUPPLY AND RETURN DUCTWORK AHU. ALL MECHANICAL EQUIPMENT SHALL OPERATE FREE OF OBJECTIONAL NOISE AND VIBRATION.
9. INSTALL TURNING VANES IN SUPPLY DUCTS AT ALL ELBOWS AND SPLITTER DAMPERS. PROVIDE BALANCING DAMPERS IN ALL DUCTS WHERE SHOWN OR REQUIRED FOR SYSTEM BALANCING.
10. DUCT DIMENSIONS ARE SHOWN INSIDE CLEAR.
11. THE MC SHALL KEEP THE PREMISES CLEAR OF DEBRIS FROM HIS WORK DURING CONSTRUCTION AND LEAVE THE AREA AND BUILDING CLEAN AT THE COMPLETION OF HIS WORK. HE SHALL ALSO LEAVE CLEAN ALL EXPOSED EQUIPMENT IN HIS CONTRACT.
12. PROVIDE ALL REQUIRED ROOF PENETRATIONS FOR THE INSTALLATION OF THE NEW EQUIPMENT. ALL FLASHINGS ARE BY THE MECHANICAL CONTRACTOR. ALL ROOFING WORK SHALL BE DONE BY A LICENSED ROOFING CONTRACTOR SO AS TO MAINTAIN ORIGINAL WARRANTY.
13. THE M.C. SHALL COORDINATE WITH AND PROVIDE EQUIPMENT SPEC. SHEETS TO THE GENERAL AND ELECTRICAL CONTRACTORS FOR REVIEW PRIOR TO ORDERING EQUIPMENT.
14. PROPERLY SUPPORT ALL DUCT WORK, AND EQUIP FROM STRUCTURE. PROVIDE ALL STRUCTURAL SUPPORTS FOR THE LOADS AS REQUIRED AT NO ADDITIONAL COST TO THE OWNER.

OA SCHEDULE

OUTDOOR VENTILATION AIR PROVIDED PER TABLE 403.3 NCSBC MECHANICAL CODE.

APPLICATION	SQUARE FOOTAGE (SF)	AREA OUTDOOR AIR FLOW RATE (CFM/SF)	PEOPLE OUTDOOR AIR FLOW RATE (CFM/PERSON)	OCCUPANCY DENISTY RATE (# PEOPLE/ 1000SF)	OCCUPNCY (# PEOPLE)	AREA OUTDOOR AIR FLOW (CFM)	PEOPLE OUTDOOR AIR FLOW (CFM)	TOTAL (CFM)
OFFICE	2752	0.06	5	5	14	165	70	235
CORRIDOR	700	0.06	–	–	–	42	–	42
CONFERENCE	231	0.06	5	50	12	14	60	74
STORAGE	78	0.12	–	–	–	9	–	9
TOTAL REQUIRED								360

OUTDOOR AIR PROVIDED FROM EACH HVAC UNIT *	
HVAC UNIT	OUTDOOR AIR (CFM)
AHU-1	180 – 8" DIA. O.A. DUCT
AHU-2	180 – 8" DIA. O.A. DUCT
TOTAL PROVIDED	360

APPLICATION	CFM
TOILETS	70 CFM/FLUSHING FIXTURE

5 FLUSHING FIXTURE X 70 CFM = 350 CFM

EXHAUST PROVIDED BY FIVE EXHAUST FANS, MAKE UP AIR BY TRANSFER AIR

* SET OUTDOOR AIR DAMPER CONTROLS TO PROVIDE OUTDOOR AIR AS INDICATED IN THIS SCHEDULE.

OUTDOOR AIR CALCULATIONS

OUTDOOR VENTILATION AIR PROVIDED PER TABLE 403.3 NCSBC MECHANICAL CODE.
(SHOP AREA ONLY)

APPLICATION	CFM/SQ.FT.
SHOP AREA	0.75 CFM/SQ.FT.

6900 SQ. FT. X 0.75 CFM/SQ.FT. = 5175 CFM

TOTAL EXHAUST REQUIRED = 5175 CFM

15,000 CFM EXHAUST PROVIDED BY (2) ONE SIDEWALL PROPELLER EXHAUST FANS.

FLEXIBLE DUCTWORK SIZES

MAXIMUM CFM'S

SIZES	SUPPLY	RETURN
6"	100	100
8"	175	175
10"	250	250
12"	400	350
14"	550	500
16"	NA	900

(CHANGE OUT EXISTING FLEX DUCTS AND COLLARS AS REQUIRED TO GET NEW CFM'S SHOWN)

FLEXIBLE DUCTWORK NOTES

1) INSTALL FLEXIBLE DUCTWORK RUNS AS STRAIGHT AS POSSIBLE.
2) DO NOT ALLOW FLEXIBLE DUCT TO SAG BETWEEN SUPPORTS.
3) DO NOT STRETCH A SHORT SECTION TO FIT. A SLIGHTLY LONGER SECTION. THIS DISTORTS THE DUCT SHAPE AND IMPEDES AIR FLOW.
4) DO NOT CRUSH DUCTWORK TO FIT IN A SPACE SMALLER THAN ITS ORIGINAL OUTSIDE DIAMETER. MAXIMUM ALLOWABLE DEFORMATION IS 15% OF ORIGINAL VOLUME.
5) USE RIGID 90 DEGREE ELBOWS AT ANY LOCATION WHERE THE DUCTWORK BECOMES DISTORTED.
6) EXTREME CARE SHALL BE TAKEN TO ELIMINATE ANY REDUCTION IN FLOW WITHIN THE FLEXIBLE DUCTS. THE MECH. CONTRACTOR WILL BE REQUIRED TO REPLACE THE FLEXIBLE DUCT WITH RIGID IF PROPER FLOW IS NOT OBTAINED.
7) SIZE ALL FLEXIBLE DUCT SO AS NOT TO EXCEED MAXIMUM CFM'S GIVEN IN TABLE.

LEGEND – MECHANICAL

- 12 X 8 — RECTANGULAR DUCTWORK. INSIDE CLEAR DIMENSION INDICATED (WIDTH X HEIGHT)
- FLEXIBLE DUCTWORK
- 12" DIA. — ROUND GALVANIZED STEEL DUCT INSIDE CLEAR DIMENSION INDICATED.
- 12" DIA. — DOUBLE WALLED GALVANIZED STEEL SPIRAL DUCT INSIDE CLEAR DIMENSION INDICATED.
- SUPPLY DIFFUSER
- RETURN GRILLE
- T AHU-1 — WALL MOUNTED THERMOSTAT (UNIT SERVED IS INDICATED)
- X / XXX — GRILLE TYPE / MIN. CFM
- 1 HOUR FIRE BARRIER
- 2 HOUR FIRE BARRIER
- D D — CONDENSATE PIPING
- R R — REFRIGERANT PIPING

APPENDIX B

2018 BUILDING CODE SUMMARY FOR ALL COMMERCIAL PROJECTS

MECHANICAL DESIGN
(PROVIDE ON THE MECHANICAL SHEETS IF APPLICABLE)
MECHANICAL SUMMARY

MECHANICAL SYSTEMS, SERVICE SYSTEM AND EQUIPMENT

Thermal Zone

winter dry bulb 16F
summer dry bulb 93F

Interior Design Conditions

winter dry bulb 72F
summer dry bulb 75F
relative humidity 50%

Building Heating Load (Office space only) 42,400 BTU/hr

Building Cooling Load (Office space only) 69,000 BTU/hr

Building Cooling Load (Shop area only) 145,000 BTU/hr

Mechanical Spacing Conditioning System

Unitary – The office space is served the following systems:
(2) 3.5 Ton split system heat pump units.
The shop space is served the following system:
(1) 350,000 btuh waste oil heater.

Boiler – Not applicable to this project.

Chiller – Not applicable to this project.

Equipment efficiencies

Efficiencies and outputs are listed on equipment schedules – See drawings.

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 22058 BENJAMIN E. BURKE

PROJECT TITLE
POWERMASTER ELECTRIC

311 JARCO DRIVE
FUQUAY-VARINA, NORTH CAROLINA

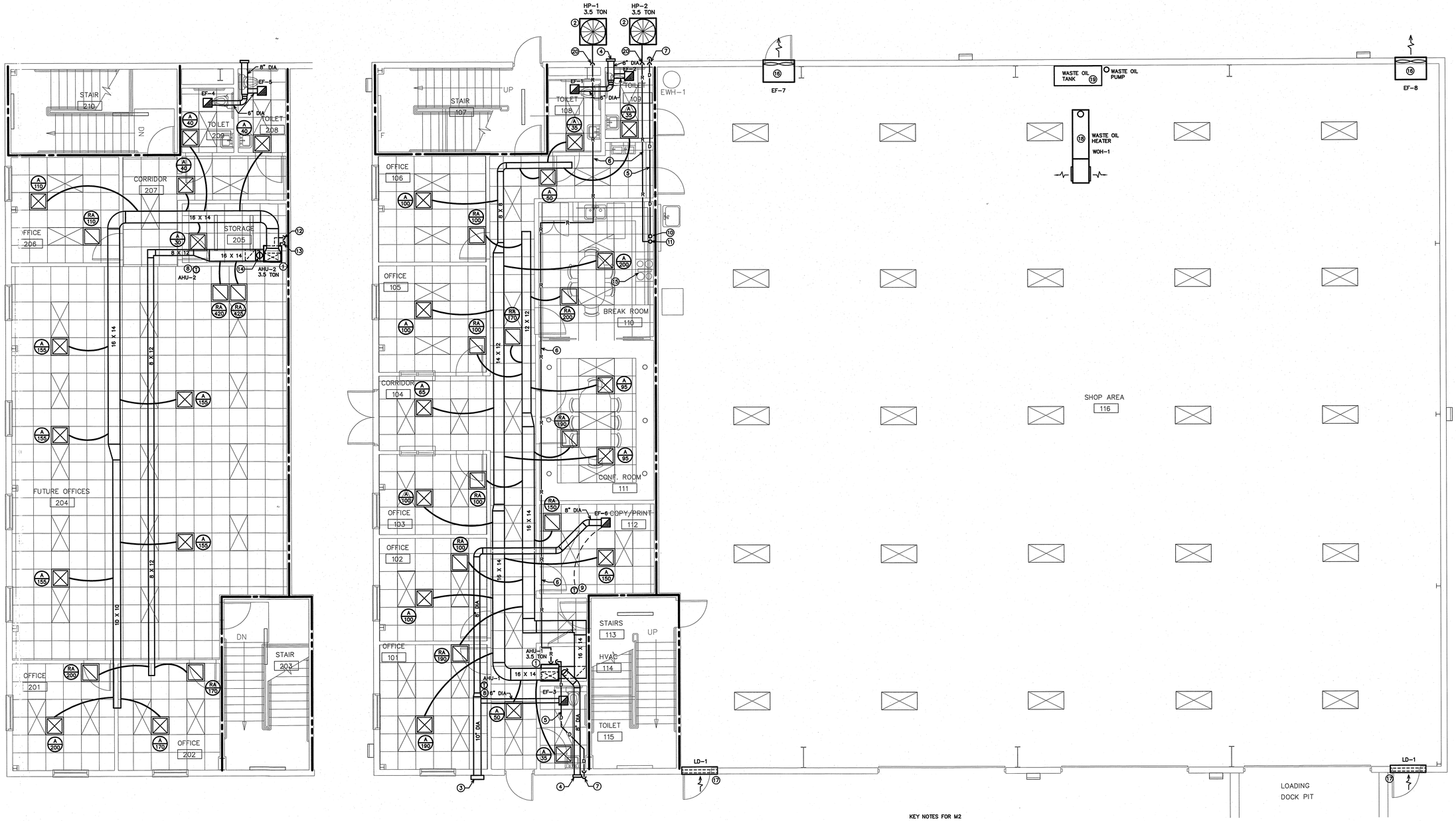
PROJECT NO.
2019

DRAWING TITLE
HVAC SCHEDULES

M1

PLOT DATE 8/11/2021

This original sheet is 24" x 36"; other dimensions indicate it has been altered.



2 MEZZANINE HVAC PLAN
SCALE: 3/16" = 1'-0"

1 1ST FLOOR HVAC PLAN
SCALE: 3/16" = 1'-0"

KEY NOTES FOR M2

1. VERTICAL AIR HANDLING UNIT MOUNTED ON FLOOR. SEE DETAIL 1/M3.
2. OUTDOOR HEAT PUMP UNIT MOUNTED ON 4" THICK CONCRETE PAD. PROVIDE ALL MANUFACTURER'S REQUIRED CLEARANCES AROUND UNIT.
3. WALL MOUNTED OUTSIDE AIR INTAKE HOOD. INTAKE SHALL BE 10'-0" MIN. FROM ANY EXHAUST DISCHARGE.
4. WALL MOUNTED EXHAUST CAP. EXHAUST DISCHARGE SHALL BE 10'-0" MIN. FROM ANY OUTSIDE AIR INTAKE.
5. RUN PUMPED CONDENSATE CONCEALED ABOVE CEILING.
6. RUN REFRIGERANT PIPING CONCEALED ABOVE CEILING.
7. RUN CONDENSATE PIPING DOWN CONCEALED IN WALL. STUB-OUT AT 6" ABOVE FINISH GRADE IN PLANTED AREA.
8. MOUNT THERMOSTAT AT 48" AFF.
9. THERMOSTAT TO CONTROL EXHAUST FAN. MOUNT AT 48" AFF.
10. CONDENSATE PIPE UP TO MEZZANINE LEVEL.
11. REFRIGERANT PIPING UP TO MEZZANINE LEVEL.
12. CONDENSATE PIPE DOWN TO FIRST FLOOR.
13. REFRIGERANT PIPING DOWN TO FIRST FLOOR.
14. 8" DIA. RIGID OUTSIDE AIR DUCT UP TO ROOF MOUNTED OUTSIDE AIR INTAKE HOOD. INTAKE SHALL BE 10'-0" MIN. FROM ANY EXHAUST DISCHARGE OR PLUMBING VENT.
15. KITCHEN RANGE HOOD IS RECIRCULATING TYPE AND DOES NOT REQUIRE A VENT DUCT TO THE EXTERIOR.
16. SIDE WALL MOUNTED EXHAUST FAN. SEE BUILDING ELEVATIONS IN ARCHITECTURAL PLANS FOR FAN LOCATION/MOUNTING HEIGHT.
17. SIDE WALL MOUNTED OUTSIDE AIR INTAKE LOUVER. PROVIDE MOTORIZED DAMPER BEHIND LOUVER. THE DAMPER SHALL OPEN WHEN EXHAUST FAN EF-7 OR EF-8 IS ENERGIZED AND CLOSE WHEN THE FANS ARE DE-ENERGIZED. SEE BUILDING ELEVATIONS IN ARHITECTURAL PLANS FOR LOUVER LOCATION/MOUNTING HEIGHTS.
18. WASTE OIL HEATING UNIT SUSPENDED FROM ROOF STRUCTURE. PROVIDE "B" VENT, SIZE AS REQUIRED BY THE UNIT MANUFACTURER THROUGH THE ROOF. ENTIRE UNIT INSTALLATION SHALL BE PER UNIT MANUFACTURER'S REQUIREMENT.
19. WASTE OIL TANK MOUNTED ON FLOOR.
20. RUN REFRIGERANT PIPING DOWN CONCEALED IN WALL.

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NORTH CAROLINA REGISTERED PROFESSIONAL ENGINEER SEAL 22038 BENJAMIN E. BURKE

PROJECT TITLE
POWERMASTER ELECTRIC

311 JARCO DRIVE
FUQUAY-VARINA, NORTH CAROLINA

PROJECT NO.
2019

DRAWING TITLE
HVAC PLAN

M2

PLOT DATE 8/6/2021

DIVISION 15 B – HEATING, VENTILATING AND AIR CONDITIONING

1.1 DESCRIPTION OF THE WORK

A. Work under this section includes, but is not necessarily limited to, furnishing and installing the following:

1. Heating, ventilation, and air conditioning equipment.
2. Ductwork.
3. Grilles and diffusers.
4. Controls and control wiring.
5. Condensate piping.

B. All work under this contract shall be installed in compliance with the latest edition of the following codes and standards insofar as they apply:

1. ASHRAE Guide
2. National Electric Code.
3. 2018 NC State Building Code: Mech Code.
4. The Electrical Specifications for this project.
5. SMACNA HVAC Duct Construction Standards.
6. All local codes and ordinances.
7. ARI rating.
8. 2018 NC State Building Code: Energy Conservation Code.

C. These codes are minimum standards. If codes require a more stringent method of construction than the specifications require, the codes shall govern.

D. The HVAC Contractor shall be licensed in North Carolina and have all local licenses required for the work.

1.2 INTENT

A. The intent of these specification and the accompanying drawing is to convey as reasonably as possible the requirements for a complete job ready for the building to operate. The HVAC Contractor shall take this into consideration and include in his bid allowance for contingencies as will allow him to provide minor pieces of equipment and labor not specifically indicated but required for the job to operate properly, at no additional cost to the Owner.

1.3 COORDINATION

A. Coordinate work with other contractors. Notify Owner of apparent conflicts early to expedite construction. If structural damage appears imminent, stop work and notify Owner for a decision before resuming operations.

B. Locations shown are approximate. The HVAC Contractor shall verify with owner, the placement of equipment, fixtures, outlets, etc. The drawings do not give exact details as to elevations and locations of various pipes, fittings, ducts, conduit, etc., and do not show all offsets and other installation details which may be required.

C. Changes in duct or piping design caused by obstructions shall be submitted to Engineer in sketch form for study and comment prior to execution. Additional cost will not be allowed for this type of work.

1.4 SHOP DRAWINGS

A. Shop drawings shall be submitted for all major items of equipment. These may consist of the manufacturer's standard catalog or tear sheets and shall have the exact items being offered clearly identified. Shop drawings shall include but are not limited to the following:

1. All equipment and accessories.
2. Grilles and diffusers.
3. Unit sizes and requirements.

PART 2 –PRODUCTS

2.1 EQUIPMENT

A. All air handling devices must have the manufacturer's recommended filter rack, for 1" thick filters.

2.2 PIPING

A. Condensate drain piping shall be PVC pipe. Provide tee and plug at changes in direction. Route pipe to proper termination point. All condensate piping shall be insulated with flexible elastomeric insulation. Provide copper piping in plenum areas.

2.3 DUCTWORK

A. Ductwork shall be built in accordance with SMACNA HVAC Duct construction standards. Furnish and install all supply, return, and ventilation ductwork shown, together with splitters, deflectors, dampers, etc. This work shall be constructed of new galvanized prime grade steel sheets. The gauges of metal to be used and the construction and bracing of joints shall be in accordance with the SMACNA recommendations.

B. Seal all sheet metal joints with fiber impregnated mastic.

C. Support from building structure on strap hangers not over 8 feet apart.

D. Use manufactured turning vanes in each elbow where required or where indicated on drawings.

E. Flexible connectors shall be 3 inches wide, of fireproof material and used to isolate noise between equipment and ductwork on supply and return side of all units.

F. Round runouts, where used, shall be built in accordance with the above standards, and each runout shall also have manufactured side take off, adjustable quadrant damper at all accessible locations and shall be of Owens Corning INL–25 flexible duct with UL label. Flex duct lengths allowed up to 14 feet. Duct must be supported with sufficient hangers in order to prevent sags. Serpentine routing will not be permitted. Quadrant damper to be 22 gauge easily adjustable manually with exterior handle (similar to H&C Kwik–set) and is not to be mounted in side take–off.

2.4 DUCT INSULATION (LOW PRESSURE)

A. All insulation, linings, coverings and adhesives shall have a flame spread classification of 25 or less and a smoke developed rating of not more than 50, exposed exterior piping.

B. All duct insulation shall comply with Section 604, of the N. C. Building Code: Mechanical Code

C. All supply and return ductwork shall be completely insulated, either internally or externally.

D. Rectangular ductwork shall be lined with two–inch thick, 1.5 lb. per cubic foot density, duct liner, Armstrong, CSG Ultraliner, Johns Manville or approved equal.

E. As an alternative to duct liner rectangular duct may be wrapped with Class 1 – 2", 3/4 lb. density (R–6.5) thick reinforced foil back fiberglass insulation, Owens–corning Series ED or equal. Tape shall be Kraft reinforced foil tape or equal.

F. Exhaust air duct does not require insulation, unless otherwise noted on the plans.

G. Insulation shall be held inplace with adhesive and welding pins 16" on center.

H. Duct dimensions shown on the drawings are Net Inside Dimensions

2.5 THERMOSTATS

A. Provide programmable electronic thermostats.
B. Submit proposed thermostats for approval.

2.6 ROOF PENETRATIONS

A. Provide pre–manufactured roof flashings compatible with equipment served.
B. Coordinate roof work with roof system used. Provide proper flashing as required.
C. Provide 1 year warranty on all roof work performed.

2.7 DUCT SMOKE DETECTORS

A. Duct detectors are not required since units air flows are 2000 cfm or less per NCSBC: Mechanical Code, Section 606.2.

PART 3 – EXECUTION

3.1 PIPING

A. The HVAC Contractor shall coordinate such routing with others, to line his work true to adjacent spaces and in a workmanlike manner and to use only short radius 90 degree elbows. Where required, piping to be sturdily supported and separated in a manner satisfactory to the Engineer.

B. The HVAC Contractor shall paint all exterior refrigerant piping. with UV resistant paint as recommended by the closed cell insulation manufacturer.

C. Insulate all condensate lines for their entire length with 1/2" closed cell insulation. Install insulation per the manufacturers recommendations.

3.2 ELECTRICAL WORK

A. The electrical contractor shall provide all switches, starters, wire conduit for the air conditioning, heating and ventilation equipment. Control wiring shall be by the heating and air conditioning contractor.

B. HVAC Contractor is responsible for verifying that power terminals have been properly grounded prior to operating equipment and must find connections to all equipment including control wiring.

C. All materials and workmanship shall be in accordance with the electrical specifications for the project. All wiring shall be color coded, and as–built wiring diagram prepared showing all connections and colors of wiring and delivered to the Owner.

D. Furnish certification for acceptance of control wiring from local electrical inspector prior to acceptance.

3.3 CLEAN UP

A. During construction, keep the site clean of debris. Upon completion, and before final inspection, clean up the premises to remove all evidence of work. In addition upon completion of construction leave equipment clean.

B. Furnish one box of clean filters, for each size required, at the time of final inspection to the owner.

3.4 OPERATOR'S MANUAL AND DIAGRAM

A. The HVAC Contractor shall prepare in one copy a manual describing the proper maintenance and operation of the systems. This manual shall not consist of standard factory instructions (although these may be included) but shall be prepared to describe this particular job.

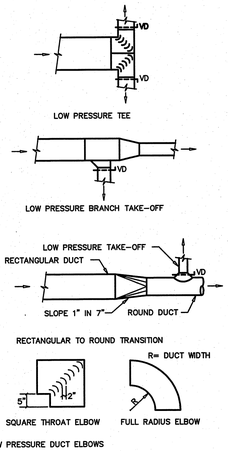
B. The manual shall be bound, indexed, dated and signed by the HVAC Contractor.

C. Qualified representative of the HVAC contractor shall meet with the designated representatives of the Owner and the Owner's representative shall be instructed in the proper operation and maintenance of the control system and other systems.

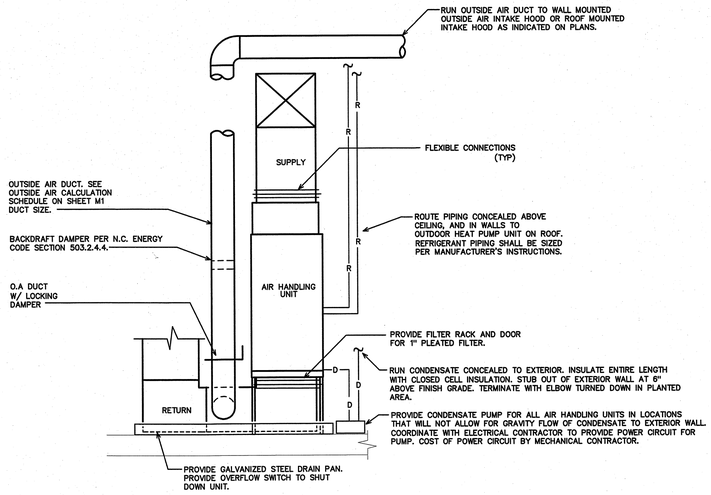
3.5 GUARANTEE

A. Guarantee all materials and labor included in the HVAC work for a period of one year from date of final acceptance by the owner. In addition, motor compressors shall be a nonprorated five year warranty. Any part or parts of the work or equipment which prove to be defective during the guarantee period shall be replaced at no additional cost to the owner or tenant.

B. All air flows must be measured and balanced to within 10% of design airflows. All equipment used must have a current certification. Provide two copies of the balance report to the owner at closeout. The HVAC contractor shall return and re–balance to occupant comfort after 90 days from close–out
Provide all balance dampers needed for satisfactory operation regardless if shown on the drawings or not, and shift location of thermostats thermostats if required for occupancy comfort.



2 DUCT CONSTRUCTION DETAIL
SCALE: NOT TO SCALE



1 TYPICAL VERTICAL AIR HANDLING UNIT DETAIL
SCALE: NOT TO SCALE

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 20038 BENJAMIN E. BURKE
8/4/14

PROJECT TITLE
POWERMASTER ELECTRIC

311 JARCO DRIVE
FUQUAY–VARINA, NORTH CAROLINA

PROJECT NO.
2019

DRAWING TITLE
HVAC SPECIFICATIONS

M3

PLOT DATE 8/11/2021

This original sheet is 24" x 36"; other dimensions indicate it has been altered.