GENERAL PROJECT REQUIREMENTS

A. CODE COMPLIANCE:

1. THE CONTRACTOR SHALL COMPLY WITH THE LAWS, ORDINANCES, RULES, AND REGULATIONS OF ALL GOVERNMENTAL AUTHORITIES HAVING JURISDICTION, THE NATIONAL FIRE PROTECTION ASSOCIATION, THE NATIONAL ELECTRICAL CODE, AND THE PUBLIC UTILITIES HAVING JURISDICTION OVER ANY OF THE SYSTEMS HEREIN SPECIFIED.

B. PERMIT FEES:

1. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY PERMITS, INSPECTIONS, AND APPROVALS TO COMPLETE THE PROJECT WORK. ALL CERTIFICATES SHALL BE IN DUPLICATE AND BE DELIVERED TO THE OWNER'S REPRESENTATIVE.

C. DEFINITIONS:

1. "PROVIDE" UNDER THIS CONTRACT IS DEFINED AS FURNISH AND INSTALL.
2. "CONCEALED" UNDER THIS CONTRACT IS DEFINED AS HIDDEN BY ARCHITECTURAL WALLS AND CEILINGS.
3. "EXPOSED" UNDER THIS CONTRACT IS DEFINED AS VISIBLE TO VIEW.
4. "INDICATED" UNDER THIS CONTRACT IS DEFINED AS SHOWN IN THE CONTRACTED DOCUMENTS.

D. SCOPE OF WORK:

1. PROVIDE ALL WORK INDICATED IN THE CONTRACT DOCUMENTS.

E. EXISTING CONDITIONS:

1. THE SITE, LOCATION AND ROUTING OF SYSTEMS INDICATED TO HAVE NEW CONNECTIONS MADE TO THEM ARE SHOWN AS ACCURATELY AS FIELD CONDITIONS WOULD PERMIT. BIDDING CONTRACTORS SHALL VISIT THE SITE AND THOROUGHLY EXAMINE THE CONTRACT DRAWINGS. CONTRACTORS WHO DO NOT VISIT THE SITE MAY BE UNILATERALLY NOT PERMITTED TO SUBMIT A BID IF THE OWNER SO DECIDES. ALL EXISTING CONDITIONS SHALL BE EXAMINED AND THEIR EXACT LOCATIONS VERIFIED.
2. THE CONTRACTORS SHALL REPORT TO THE OWNER, BEFORE SUBMITTING A BID, ANY CONDITIONS WHICH MIGHT MAKE THE INSTALLATION OF THE REQUIRED EQUIPMENT A PROBLEM. NO CONSIDERATION OR ALLOWANCE WILL BE GRANTED FOR FAILURE TO INVESTIGATE EXISTING CONDITIONS OR MISUNDERSTANDINGS OF THE CONTRACT DOCUMENTS.

F. CONTRACT DOCUMENTS:

1. THE CONTRACT DOCUMENTS SHALL BE CONSIDERED AS DIAGRAMMATIC PURPOSES ONLY. ATTENTION IS CALLED TO THE FACT THAT WHILE THE DOCUMENTS ARE GENERALLY TO SCALE AND ARE AS ACCURATE AS THE SCALE WILL PERMIT, ALL IMPORTANT DIMENSIONS SHALL BE DETERMINED IN THE FIELD.
2. THE DRAWINGS ARE NOT TO BE CONSIDERED AS CONSTRUCTION SHOP DRAWINGS. THE DRAWINGS DO NOT INDICATE EVERY FITTING, ELBOW, OFFSET, VALVE, PULL BOX OR SIMILAR COMPONENTS WHICH ARE REQUIRED TO COMPLETE THE PROJECT WORK. PREPARE FIELD COORDINATION DRAWINGS TO ENSURE PROPER INSTALLATION. PROVIDE ALL NECESSARY OFFSETS AND FITTINGS TO INSTALL THE SYSTEMS AS DIAGRAMMED AT NO ADDITIONAL COST.

G. DEMOLITION:

1. ALL RECYCLABLE MATERIALS AS DIRECTED IN THE SCOPE OF WORK, SHALL BE TURNED OVER TO THE WINCHESTER CITY OR ITS REPRESENTATIVES. THE CONTRACTOR IS REQUIRED TO RECEIVE A WRITTEN WAIVER FROM WINCHESTER CITY BEFORE TAKING POSSESSION OR REMOVING ANY RECYCLABLE MATERIAL.
2. THE CONTRACTOR SHALL REMOVE ALL EQUIPMENT NOT INDICATED TO BE REUSED TO A DESIGNATED LOCATION AT THE PROJECT SITE. AFTER THE EQUIPMENT HAS BEEN ASSEMBLED FOR INSPECTION BY THE OWNER AND POSSIBLE RETENTION, ALL EQUIPMENT NOT TO BE RETAINED BY THE OWNER SHALL BE REMOVED FROM THE SITE BY THE CONTRACTOR.
3. THE CONTRACTOR SHALL COORDINATE WITH FACILITY DIRECTOR ON ISLAND AIR UNITS TO REMAIN FOR TEMPORARY REUSE.

H. EQUIPMENT AND MATERIALS:

1. ALL EQUIPMENT AND MATERIALS SHALL BE NEW, UNLESS INDICATED OTHERWISE, AND THE CURRENT MODEL FOR WHICH REPLACEMENT PARTS ARE AVAILABLE. SUBSTITUTIONS SHALL ONLY BE ACCEPTED AT THE DISCRETION OF THE OWNER'S REPRESENTATIVE OR THE ENGINEER.
2. THE CONTRACTOR SHALL INSTALL AND CONNECT ALL EQUIPMENT AND MATERIALS IN ACCORDANCE WITH THE BEST ENGINEERING PRACTICE AND UNLESS OTHERWISE INDICATED SHALL FOLLOW THE MANUFACTURER'S PUBLISHED INSTRUCTIONS AND RECOMMENDATIONS. FURNISH AND INSTALL ALL REQUIRED AUXILIARY ITEMS TO PROVIDE A COMPLETE & OPERABLE SYSTEM.
3. THE CONTRACTOR SHALL FURNISH AND INSTALL ALL REQUIRED AUXILIARY ITEMS FOR A COMPLETE. SYSTEM.
4. ALL EQUIPMENT SHALL BE MOUNTED VIBRATION FREE.
5. ALL EXISTING EQUIPMENT AND MATERIAL USED IN NEW WORK SHALL BE INSTALLED IN A SIMILAR FASHION AS NEW EQUIPMENT. CONTRACTOR SHALL CORRECT DAMAGE DUE TO THE DEMOLITION OR NEW WORK PHASE OF CONSTRUCTION. CONTRACTOR SHALL ALSO CORRECT EXISTING DEFECTS IN THE SUPPORT, INSULATION, HANGING, ETC. OF EXISTING TO REMAIN ITEMS.

I. COORDINATION:

1. THE CONTRACTOR SHALL INSTALL ALL DUCTWORK, PIPING, RACEWAYS, CIRCUITRY, CONDUIT, ETC., AS HIGH AS POSSIBLE TO MAXIMIZE HEADROOM. RUN PARALLEL OR PERPENDICULAR TO THE BUILDING WALLS IN A NEAT WORKMANLIKE MANNER. AVOID CONFLICT WITH EXISTING EQUIPMENT, LIGHTS, CABLE TRAYS, ETC. IF CONFLICT WITH EXISTING DOES OCCUR, THE CONTRACTOR SHALL REROUTE CONFLICTING PROJECT WORK AS DIRECTED BY THE OWNER'S REPRESENTATIVE AT NO ADDITIONAL COST.
2. THE CONTRACTOR SHALL PROVIDE COMPLETE COORDINATION DRAWINGS FOR EACH LEVEL. SHOW ALL RELEVANT TRADES AND AVAILABLE CEILING PLENUM HEIGHT.
3. THE CONTRACTOR SHALL TAKE ALL FIELD MEASUREMENTS NECESSARY FOR THIS WORK AND ASSURE RESPONSIBILITY FOR THEIR ACCURACY. THE DRAWINGS AS SHOWN ARE DIAGRAMMATIC AND SHALL NOT BE SCALED. REFER TO MANUFACTURER'S STANDARD ROUGH-IN DRAWINGS FOR PLUMBING FIXTURES, AND TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS. REPORT ANY CONFLICTS OR DISCREPANCIES TO THE ARCHITECT/ENGINEER.
4. SHOULD ANY STRUCTURAL IMPEDIMENTS (I.E. BEAMS, SLAB FOLDS, POST-TENSIONED SLABS, COLUMNS, SHEAR WALLS, ETC.) PREVENT THE SETTING OF CABINETS, PANELBOARDS, EQUIPMENT, FEEDER CONDUITS, ETC. AT THE LOCATION INDICATED ON THE PLANS, THE CONTRACTOR SHALL MAKE ANY NECESSARY DEVIATIONS, AS COORDINATED WITH THE ARCHITECT/ENGINEER AND IMPLEMENTED AT NO ADDITIONAL COST.
5. COORDINATE WITH ALL TRADES TO AVOID INTERFERENCE AMONG MECHANICAL, ELECTRICAL, ARCHITECTURAL, AND STRUCTURAL ITEMS. PROVIDE ALL NECESSARY OFFSETS AND FITTINGS IN CIRCUITRY AND OTHER ITEMS REQUIRED TO INSTALL THE WORK WITHOUT INTERFERENCES.
6. COORDINATE WITH THE WORK OF OTHER SECTIONS AND TRADES, WITH EQUIPMENT FURNISHED BY OTHERS, AND WITH THE CONSTRAINTS OF THE EXISTING CONDITIONS OF THE PROJECT SITE.

K. PARTITIONS AND DUCTWORK:

1. THE CONTRACTOR SHALL REPAIR ALL OPENINGS IN WALLS, CEILINGS, FLOORS, ROOF, ETC., WHICH ARE CREATED BY DEMOLITION AND/OR NEW PROJECT WORK. THE REPAIRS SHALL BE WITH MATERIALS AND FINISHED TO MATCH EXISTING. OPENINGS AND PENETRATIONS IN FIRE RATED PARTITIONS OR DUCTWORK SHALL BE SEALED PER U.L. APPROVED FIRE ASSEMBLY TO MAINTAIN FIRE RESISTANT INTEGRITY. DUCTWORK AND PIPING SHALL BE CAPPED, SEALED AIR AND WATERTIGHT AND INSULATED TO MATCH EXISTING.
2. WHERE IT IS NECESSARY TO CUT WALLS, FLOORS OR CEILINGS FOR THE INSTALLATION OF ANY ELECTRICAL WORK, SUCH CUTTING SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR. ALL AFFECTED AREAS SHALL BE PATCHED BY THE CONTRACTOR TO MATCH THE ORIGINAL CONDITION, RATING AND APPEARANCE. BEFORE CUTTING TAKES PLACE, THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ARCHITECT AND/OR BUILDING MANAGEMENT.
3. WHERE IT IS NECESSARY TO CORE DRILL THE FLOORS FOR INSTALLATION OF SPECIFIED WORK, THE CONTRACTOR SHALL HAVE THE AREA TO BE CORE DRILLED X-RAYED TO ENSURE THE STRUCTURAL SYSTEM WILL NOT BE COMPROMISED. DO NOT CORE DRILL, PENETRATE OR CUT EXISTING CONCRETE FLOOR SLABS WITHOUT CONSULTING WITH THE BASE BUILDINGS STRUCTURAL ENGINEER OF RECORD, AND/OR A REGISTERED PROFESSIONAL STRUCTURAL ENGINEER. DO NOT PROCEED WITH WORK WITHOUT WRITTEN PERMISSION FROM THE ABOVE PROFESSIONALS. ARRANGE MOBILIZATION AND PAYMENT FOR X-RAY EQUIPMENT, IF NECESSARY, TO INVESTIGATE ALL POTENTIAL STRUCTURAL IMPEDIMENTS.
4. ALL EXISTING AND NEW FLOOR OPENINGS, AND OPENINGS IN SLAB-TO-SLAB WALLS SHALL BE PATCHED BY THE CONTRACTOR OR TRADE WHOSE WORK REQUIRES PATCHING TO MATCH ORIGINAL CONDITION, APPEARANCE AND FIRE RATING.
5. PROTECT ADJACENT MATERIALS INDICATED TO REMAIN. INSTALL AND MAINTAIN DUST AND NOISE BARRIERS TO KEEP DIRT, DUST, AND NOISE FROM BEING TRANSMITTED TO ADJACENT AREAS. REMOVE PROTECTION AND BARRIERS AFTER DEMOLITION OPERATIONS ARE COMPLETE
6. FIRE STOPPING SHALL BE UL APPROVED AND COMPLIANT WITH ALL LOCAL AND FEDERAL CODES AND REGULATIONS. CONTRACTOR SHALL ENGAGE THE SERVICES OF TECHNICIAN'S TRAINED AND CERTIFIED IN THE APPLICATION OF FIRE STOP MATERIALS. WHERE REQUIRED BY LOCAL CODES, THE TECHNICIAN SHALL BE LICENSED.

L. SITE CLEANUP:

1. THE CONTRACTOR SHALL CLEAN UP THE JOBSITE DAILY. THE CONTRACT AREA AND ALL OTHER AREAS USED FOR STORAGE, STAGING, ETC. SHALL BE BROOM CLEANED AND MATERIALS, TOOLS, ETC. SHALL BE LEFT IN AN ORDERLY MANNER.
2. UPON COMPLETION OF THE WORK, THE CONTRACTOR SHALL THOROUGHLY CLEAN THE CONTRACT AREA AND ALL OTHER AREAS USED FOR STORAGE, STAGING, ETC. THIS SHALL INCLUDE, BUT NOT BE LIMITED TO WASHING AND/OR REPAIRING GLASS, REMOVING SPOTS AND STAINS, CLEANING ALL FIXTURES AND WASHING ALL FLOORS, WALLS AND CEILINGS IF APPROPRIATE.

M. GUARANTEES:

1. ALL EQUIPMENT, MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED IN FULL FROM DEFECT FOR ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE OF THIS WORK BY THE OWNER'S REPRESENTATIVE.
2. THE CONTRACTOR SHALL TEST ALL EQUIPMENT INSTALLED UNDER THIS CONTRACT AND DEMONSTRATE TO THE OWNER'S REPRESENTATIVE ITS PROPER OPERATION(S). ALL NEW EQUIPMENT SHALL BE MOUNTED VIBRATION FREE. THE CONTRACTOR SHALL PROVIDE ALL LABOR AS REQUIRED DURING COMMISSIONING AND INSTRUCTION OF OWNERS PERSONNEL PROCESSES.
3. THE CONTRACTOR SHALL REPAIR OR REPLACE ANY DEFECTIVE OR INOPERATIVE EQUIPMENT AND COMPONENTS FURNISHED BY THE CLIENT AT NO COST TO THE CLIENT.
4. THE CONTRACTOR'S GUARANTEE SHALL INCLUDE ALL EQUIPMENT SUPPLIED BY THE CONTRACTOR OR CLIENT.

N. RECORD DRAWINGS:

1. THE CONTRACTOR SHALL MAINTAIN THREE (3) SETS OF ALL RECORD DOCUMENTS, FOR DISTRIBUTION TO THE CLIENT. THESE DOCUMENTS SHALL INCLUDE; CONTRACT DRAWINGS AND SPECIFICATIONS, APPROVED SIGNED-OFF PERMIT DRAWINGS AND BUILDING PERMITS, ADDENDA(S), AND APPROVED SHOP DRAWINGS. THESE DOCUMENTS SHALL BE MARKED AS REQUIRED TO RECORD ALL CHANGES DURING CONSTRUCTION. THESE DRAWINGS SHALL BE DELIVERED TO THE OWNER, IN GOOD CONDITION AND ORDER TO THE FOLLOWING PARTIES: THE ORIGINAL DOCUMENTS TO THE TENANT, ONE (1) COPY TO THE BUILDING MANAGEMENT AND ONE COPY TO THE ARCHITECT.

O. BUILDING SMOKE/FIRE ALARM SYSTEM:

1. PROTECT THE EXISTING BUILDING SMOKE/FIRE ALARM DETECTION SYSTEM AS REQUIRED TO PREVENT FALSE ALARMS WITHIN THE PROJECT CONSTRUCTION AREA.

P. EQUIPMENT SERVICE ACCESS:

1. PROVIDE ACCESS DOORS IN DRYWALL CEILINGS AND PARTITIONS TO SERVICE EQUIPMENT, BALANCE DIFFUSERS, AND EXPOSE JUNCTION BOXES. COORDINATE THE EXACT LOCATIONS AND STYLE OF FLANGELESS ACCESS DOORS WITH THE ENGINEER.

Q. WORKING HOURS AND SYSTEM SHUTDOWNS:

1. ALL BUILDING SYSTEMS SHALL REMAIN IN SERVICE UNLESS INDICATED OTHERWISE. ALL OUTAGES OR INTERRUPTIONS SHALL BE KEPT TO MINIMUM DURATION. NOTIFY THE OWNER 48 HOURS IN ADVANCE OF ANY OUTAGE OR INTERRUPTION.
2. ALL WORK SHALL BE PERFORMED AS DEFINED BY THE PROJECT MANUAL. WORK PERFORMED OUTSIDE OF NORMAL WORKING HOURS SHALL BE NEGOTIATED WITH OWNER'S REPRESENTATIVE PRIOR TO THE CONSTRUCTION PHASE. REQUIRED EXISTING SYSTEM SHUTDOWNS SHALL BE COORDINATED IN WRITING WITH THE OWNER'S REPRESENTATIVE A MINIMUM OF 48 HOURS IN ADVANCE.

R. PROJECT COMPLETION:

1. THE CONTRACTOR SHALL NOTIFY THE ENGINEER WHEN THE PROJECT IS APPROXIMATELY 75% COMPLETE IN ORDER TO SCHEDULE A PRE-FINAL REVIEW OF CONSTRUCTION. NO WORK SHALL BE CONCEALED BY CEILINGS, WALLS, ETC. FINAL REVIEW SHALL BE SCHEDULED AT 100% COMPLETION OF CONSTRUCTION. ALL PUNCH LIST ITEMS MUST BE ACCOMPLISHED PRIOR TO FINAL ACCEPTANCE.

S. JOB RESPONSIBILITY:

1. PROVIDE ADEQUATE STORAGE FACILITIES FOR MATERIALS AND EQUIPMENT DURING THE PROGRESS OF THE WORK.
2. BE RESPONSIBLE FOR THE CONDITION OF ALL MATERIAL AND EQUIPMENT EMPLOYED IN THE INSTALLATION UNTIL FINAL ACCEPTANCE BY THE OWNER. PROTECT SAME FROM ANY CAUSE WHATSOEVER.
3. BE RESPONSIBLE FOR THE REPLACEMENT OF ALL DAMAGED OR DEFECTIVE WORK, MATERIALS EQUIPMENT. DO NOT INSTALL SENSITIVE OR DELICATE EQUIPMENT UNTIL MAJOR CONSTRUCTION WORK IS COMPLETED.
4. OBSERVE AND CONFORM TO APPLICABLE SAFETY REGULATIONS, INCLUDING THOSE REQUIRED BY THE OWNER'S REPRESENTATIVE.
5. ERECT AND MAINTAIN SUITABLE BARRIERS, PROTECTIVE DEVICES, LIGHTS AND WARNING SIGNS FOR THE PROTECTION OF OCCUPANTS, TRANSIENTS AND WORKMEN FROM DANGER DUE TO WORK PERFORMED BY THE CONTRACTOR.
6. MAKE GOOD ANY DAMAGE TO THE WORK CAUSED BY FLOODS, STORMS, ACCIDENTS, ACTS OF NEGLIGENCE, STRIKES, VIOLENCE OR THEFT UP TO THE TIME OF FINAL ACCEPTANCE BY THE OWNER.
7. BE RESPONSIBLE FOR ANY LOSS OR INJURY TO PERSONS OR PROPERTY RESULTING FROM NEGLECT OR ANY OTHER CAUSES ON THE PART OF THE EMPLOYEES.
8. DO NOT LEAVE ANY WORK IN A HAZARDOUS CONDITION, EVEN TEMPORARILY.
9. ERECT, MAINTAIN AND FINALLY REMOVE ALL SCAFFOLDING, STAGING, FORMS, PLATFORMS AND LADDERS REQUIRED FOR THE INSTALLATION.
10. DO NOT INSTALL WORK FOR WHICH AN EXTRA CHARGE IS TO BE MADE WITHOUT WRITTEN APPROVAL FROM THE OWNER'S REPRESENTATIVE AND THE OWNER. A WRITTEN REQUEST FOR EXTRA WORK SHALL STATE THE NATURE OF THE WORK, BY WHOM REQUESTED, AND THE PRICE TO BE CHARGED.
11. CONTRACTOR SHALL SUBMIT A COPY OF THEIR SAFETY TRAINING PROGRAM AND QUALITY CONTROL PROGRAM FOR REVIEW AND ACCEPTANCE.
12. CONTRACTOR SHALL ACCEPT ALL OWNER SUPPLIED EQUIPMENT AND PROVIDE ON OR OFF SITE STORAGE, RIGGING, AND HANDLING AS NEEDED.

MECHANICAL SPECIFICATIONS:

A. GENERAL

1. THE DRAWINGS PREPARED FOR THIS PROJECT ARE AN OUTLINE TO SHOW WHERE PIPES, DUCTS AND APPARATUSES MUST GO IN ORDER TO HARMONIZE WITH THE BUILDING AND INSTALLATION OF THE VARIOUS TRADES. WORK MUST BE INSTALLED IN ACCORDANCE WITH THE DRAWINGS AS MUCH AS POSSIBLE. DRAWINGS SHALL BE CAREFULLY CHECKED DURING THE COURSE OF CONSTRUCTION. IF DISCREPANCIES, ERRORS OR OMISSIONS ARE DISCOVERED PRIOR TO OR DURING CONSTRUCTION PHASE, NOTIFY THE ENGINEER IMMEDIATELY FOR INTERPRETATION OR CORRECTION. TAKE NECESSARY MEASUREMENTS AND RESPONSIBLE FOR SAME, INCLUDING CLEARANCES FOR EQUIPMENT THAT ARE TO BE FURNISHED. THE ARCHITECT /ENGINEER RESERVE THE RIGHT TO MAKE MINOR LOCATION CHANGES OF PIPING AND EQUIPMENT WHERE SUCH ADJUSTMENTS ARE DEEMED DESIRABLE FROM AN APPEARANCE OR OPERATIONAL STANDPOINT. SUCH CHANGES WILL BE ANTICIPATED SUFFICIENTLY IN ADVANCE TO AVOID EXTRA WORK OR DELAY THE PROGRESS OF THE PROJECT.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR VISITING THE SITE AND VERIFYING EXISTING FIELD CONDITIONS PRIOR TO INSTALLATION. THE CONTRACT DOCUMENTS INDICATE APPROXIMATE LOCATIONS OF DUCTWORK AND PIPING AND ARE DIAGRAMMATIC IN NATURE. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETERMINING THE ACTUAL LOCATION AND ROUTING OF THE EXISTING PIPING AND NEW DUCTWORK.
3. CONTRACTOR IS RESPONSIBLE FOR COORDINATING HIS WORK WITH THE WORK OF ALL TRADES AND MAKING ANY NECESSARY MODIFICATIONS TO HIS WORK, INCLUDING OFFSETS, AT NO ADDITIONAL COST TO THE OWNER.
4. ALL WORK SHALL BE DONE IN ACCORDANCE WITH LOCAL CODES. THESE CODES SHALL BE FOLLOWED AS MINIMUM PROVIDING HIGHER GRADES OF MATERIAL AND WORKMANSHIP. WHERE REQUIRED BY THESE DOCUMENTS, PROVIDE ALL TESTS REQUIRED BY LOCAL CODES.
5. ALL PERMITS, FEES, LICENSES, APPROVALS, AND OTHER ARRANGEMENTS FOR THE WORK SHALL BE OBTAINED BY THE CONTRACTOR AT HIS OWN EXPENSE.
6. CONTRACTOR SHALL GUARANTEE ALL WORK AND MATERIAL FOR ONE YEAR AFTER FINAL ACCEPTANCE AGAINST ALL DEFECTS OF MATERIAL, EQUIPMENT AND WORKMANSHIP. PROVIDE AN ADDITIONAL FOUR (4) YEAR WARRANTY (TOTAL OF 5 YEARS) ON ALL REFRIGERATION COMPRESSORS. DELIVER ALL WARRANTY CERTIFICATES TO THE OWNER PRIOR TO FINAL ACCEPTANCE AND BUILDING TURNOVER.
7. PROVIDE ASSEMBLED PRINTED INSTRUCTIONS FOR THE OPERATION AND MAINTENANCE OF EACH ITEM INSTALLED ALONG WITH THE EQUIPMENT CUTS AND CONTROL WIRING DIAGRAMS.
8. THE MECHANICAL DRAWINGS INDICATE THE GENERAL ROUTING AND LOCATION OF DUCTWORK, PIPING, EQUIPMENT, FIXTURES, TERMINAL DEVICES, ETC. CONTRACTOR SHALL DETERMINE THE EXACT LOCATION FROM ACTUAL FIELD MEASUREMENTS AT THE JOB SITE. ALL DUCTWORK AND PIPING SHALL BE COORDINATED WITH LIGHT FIXTURES, STRUCTURAL SYSTEM, CEILING GRID, SUPPORTS, SPRINKLER PIPING AND ARCHITECTURAL FEATURES OF THE BUILDING PRIOR TO FABRICATION OR INSTALLATION. NO EXTRAS WILL BE ALLOWED FOR DUCTWORK OR PIPING WHICH IS FABRICATED AND THEN FOUND UNABLE TO FIT IN THE INTENDED SPACE. ALL EQUIPMENT SHALL BE LOCATED TO ALLOW FOR CLEANING, INSPECTION AND SERVICE.
9. CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING CEILING TYPE AND DIFFUSER & GRILLE LOCATIONS WITH ARCHITECT'S REFLECTED CEILING PLANS. DIFFUSER AND GRILLE LOCATION ON SHOP DRAWINGS ARE SUBJECT TO APPROVAL BY ARCHITECT.
10. PROVIDE ACCESS PANELS FOR ANY PIECE OF EQUIPMENT LOCATED ABOVE NON-ACCESSIBLE CEILINGS. NO EQUIPMENT SHALL BE LOCATED ABOVE WALLS.
11. WHEREVER DUCTWORK OR OTHER ITEMS PASS THROUGH FIRE-RATED WALLS AND FLOORS, THE CONTRACTOR SHALL ADEQUATELY FIRE STOP THE SPACE BETWEEN ITEMS AND THE MASONRY OR THE SPACE BETWEEN THE ITEM AND THE SLEEVE. FIRE STOP SHALL BE NON-COMBUSTIBLE, NON-MELTING, APPROVED MATERIAL.
12. THE DRAWINGS INDICATE GENERAL CHARACTER AND LOCATION OF WORK INCLUDED, BUT MAY HAVE MINOR SPECIALTIES OMITTED THAT SHALL BE PROVIDED WITHOUT EXTRA COST.
13. CONTRACTOR SHALL PROVIDE ALL OPENINGS REQUIRED TO INSTALL IN THE NEW SYSTEMS AND EQUIPMENT. PROVIDE CUTTING AND PATCHING OF WALLS, PARTITIONS, CEILINGS AND FLOORS, AS REQUIRED. PATCH TO MATCH ADJACENT SURFACES UNLESS OTHERWISE NOTED. REFER TO ARCHITECTURAL PLANS FOR FINISHES. SLEEVE ALL PIPE PENETRATIONS AND SEAL ALL OPENINGS. REFER TO ARCHITECTURAL PLANS FOR ADDITIONAL REQUIREMENTS.
14. CONTRACTOR IS RESPONSIBLE FOR SEALING ALL PENETRATIONS TO THE INTERIOR OR EXTERIOR OF THE BUILDING AS A RESULT OF HIS WORK, IN SUCH A MANNER THAT THE DESIGN FIRE RATING IS MAINTAINED. CONTRACTOR SHALL COORDINATE WITH ALL OTHER TRADES AS REQUIRED FOR NECESSARY PENETRATIONS. IN THE ABSENCE OF ARCHITECTURAL SPECIFICATIONS, USE TWO (2) HOUR FIRE RATING.
15. CONTRACTOR SHALL FURNISH ALL PIPING, VALVES AND FITTINGS AT A PRESSURE RATING OF NO LESS THAN 125 PSI, OR AS REQUIRED BY LOCAL CODES AND REGULATIONS. WHERE LOCAL JURISDICTIONS ALLOW FOR A LOWER PRESSURE RATING THAN THAT SPECIFIED ABOVE, THE ABOVE SPECIFIED PRESSURE RATING SHALL DICTATE.
16. IN CASES WHERE MANUFACTURER PROVIDES INTERNAL MAXIMUM OVERCURRENT PROTECTION (MOCP) DEVICES INTERNALLY TO THE EQUIPMENT, THE MANUFACTURER SHALL SUPPLY LABELING STATING SUCH ON THE EQUIPMENT SERVED. OTHERWISE CONTRACTOR TO SUPPLY EXTERNAL FUSED DISCONNECT SIZED TO PROVIDE MOCP.
17. CONDENSATE PIPING SHALL BE TYPE "L" COPPER OR SCHEDULE 40 PVC. CONDENSATE PUMP WITH FLEX TUBING TO EXTERIOR ACCEPTABLE - AS REQUIRED BY SITE CONDITIONS.

B. INSULATION

1. DUCTWORK
   a. SIZES INDICATED ARE FREE INSIDE AREA, I.E. SIZES DO NOT INCLUDE INSULATION OR LINING THICKNESS.
   b. INSULATION SHALL BE WRAPPED ON DUCTS WITH 1/2" OUTWARD CLINCHING STAPLES ON 4" CENTERS. STAPLES AND SEAMS SHALL BE SEALED WITH A BRUSH COAT OF VAPOR BARRIER MASTIC.
   c. INSULATION SHALL BE FACED WITH FIRE RESISTANT VAPOR BARRIER JACKET WITH A 2" TAB ON ONE EDGE.
   d. SUPPLY, RELIEF AND EXHAUST DUCTWORK INSULATION SHALL BE A 1-1/2" THICK 3/4 LB. DENSITY FLEXIBLE FIBERGLASS BLANKET.
   e. OUTDOOR AIR DUCTWORK AND SUPPLY, RETURN AND OUTDOOR AIR PLENUM INSULATION SHALL BE A 1-1/2" THICK 2 LB. DENSITY RIGID FIBERGLASS BOARD.
   f. EXHAUST AND RELIEF DUCTWORK SHALL BE INSULATED FROM POINT OF EXHAUST FROM THE BUILDING TO THE BACKDRAFT DAMPER OR SHUT-OFF DAMPER CLOSEST TO THE EXIT FROM THE BUILDING.
   g. EXPOSED DUCTWORK SHALL BE EITHER INTERNALLY LINED OR COVERED W/ RIGID FIBERGLASS INSULATION OF SIMILAR THICKNESS AND PERFORMANCE.
   h. INTERNAL LINING OF SIMILAR THICKNESS AND PERFORMANCE MAY BE USED IN LIEU OF WRAPPING THE DUCTWORK WITH INSULATION.
   i. ALL DUCTWORK LOCATED IN UNCONDITIONED SPACES SHALL BE INSULATED WITH A MINIMUM OF R-6 INSULATION. ALL DUCTWORK LOCATED OUTSIDE OF THE BUILDING ENVELOPE SHALL HAVE A MINIMUM OF R-8 INSULATION.
2. INSULATION OF DUCTWORK AND PIPE PASSING THROUGH NON-RATED WALLS SHALL BE CONTINUOUS THROUGH THE WALL PENETRATION.
3. INSULATION OF CONDENSATE PIPING SHALL BE 1" THICK FIBERGLASS INSULATION WITH VAPOR BARRIER.
4. PROVIDE 1" THICK 3/4 LB. DENSITY ACOUSTICAL INTERIOR LINER WHERE INDICATED. ADJUST SHEET METAL SIZE AS REQUIRED TO PROVIDE CLEAR INSIDE DIMENSION INDICATED.

C. DUCTWORK

1. ALL NEW DUCT TURNS, ELBOWS, ETC. SHALL BE INSTALLED WITH TURNING VANES OR MINIMUM 1-1/2 RADIUS ELBOWS.
2. PROVIDE VOLUME DAMPERS AT ALL BRANCH TAKE-OFFS.
3. CONSTRUCT ALL HIGH PRESSURE VAV DUCTWORK AND ACCESSORIES IN ACCORDANCE WITH THE LATEST EDITION OF SMACNA STANDARDS FOR 2" PRESSURE CLASS AND SEAL CLASS A.
4. CONSTRUCT ALL LOW PRESSURE DUCTWORK AND ACCESSORIES IN ACCORDANCE WITH THE LATEST EDITION OF SMACNA STANDARDS FOR 1/2" PRESSURE CLASS AND SEAL CLASS A.
5. METAL DUCTWORK: FABRICATE ALL DUCTWORK, HOUSINGS, DAMPERS, AND ALL OTHER DUCT RELATED ACCESSORIES FROM GALVANIZED STEEL SHEETS.
6. INSTALL ALL DUCTWORK ABOVE CEILING AND TIGHT TO UNDERSIDE OF STRUCTURE ABOVE UNLESS OTHERWISE INDICATED.
7. CHANGES TO DUCTWORK DUE TO FIELD CONDITIONS SHALL BE MADE PROVIDED THAT THE DUCT FREE AREA IS MAINTAINED AND SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL.
8. FLEXIBLE DUCTWORK: PROVIDE INSULATED U.L. LISTED CLASS 1 DUCT COMPLYING WITH NFPA 90A. THERMAFLEX G-KM OR APPROVED EQUAL. MAXIMUM LENGTH SHALL BE 8 LINEAR FEET.
9. LEAKAGE:
   a. ALL NEW DUCT JOINTS SHALL BE SEALED WITH HARDCAST 601 OR APPROVED EQUAL.
   b. LEAKAGE TESTING FOR ALL NEW DUCTWORK SHALL BE PER SMACNA.
   c. PERFORM ALL TESTING AFTER THE SEALS HAVE CURED COMPLETELY AND BEFORE COVERING WITH INSULATION OR CONCEALING IN MASONRY OR OTHER PARTITION MATERIAL.

D. TESTING AND BALANCING

1. SCOPE
   a. AN INDEPENDENT CONTRACTOR NEBB OR AABC CERTIFICATION SHALL PROVIDE ALL LABOR, MATERIALS, AND EQUIPMENT TO PERFORM ALL OPERATIONS REQUIRED FOR COMPLETE BALANCING OF THE AIR SYSTEMS AND RELATED WORK AS INDICATED ON DRAWINGS AND SPECIFIED HEREIN.
   b. BALANCING SHALL NOT BE PERFORMED UNTIL ALL MECHANICAL EQUIPMENT IS PROPERLY INSTALLED AND IS 100% OPERATIONAL, ALL TEMPERATURE CONTROLS ARE INSTALLED AND CALIBRATED, AND ALL SYSTEMS ARE CLEANED, PIPES, AND STRAINERS FLUSHED, AND CLEAN FILTERS INSTALLED.
   c. BALANCING SHALL BE WITHIN +/- 10% OF THE TOTAL INDICATED VALUES.
   d. IT IS THE INTENT OF THIS SPECIFICATION TO ENSURE THAT THE ENTIRE PROJECT IS SUBSTANTIALLY COMPLETE SO THAT ALL COMPONENTS OF ALL MECHANICAL SYSTEMS CAN BE PUT INTO NORMAL OPERATION WITH ALL WINDOWS AND DOORS CLOSED AND BALANCED IN THAT CONDITION. IN NO CASE IS THE CONTRACTOR TO PERFORM HIS WORK IN A PIECEMEAL FASHION.
2. BELTS AND SHEAVE CHANGES REQUIRED TO MEET SPECIFIED AIR VOLUMES SHALL BE MADE AT NO ADDITIONAL EXPENSE TO THE OWNER.
3. BALANCING REPORT - AFTER FINAL ADJUSTMENTS ARE COMPLETED, THE HVAC SYSTEM SHALL BE TESTED, AND THE FOLLOWING INFORMATION RECORDED AND INCLUDED IN THE BALANCING REPORT.
   a. EACH PIECE OF EQUIPMENT SHALL BE IDENTIFIED AS TO LOCATION, SERVICE MANUFACTURER, AND MODEL NUMBER.
   b. ELECTRICAL DATA, AND MEASURED STATIC PRESSURES (EXTERNAL AND TOTAL).
   c. TRAVERSE MAIN SUPPLY DUCT AND INDICATE SIZE. NOTE: TRAVERSE SHALL BE DONE IN A LOCATION NEAR THE FAN BUT AVOIDING TURBULENCE.
   d. EACH AIR DEVICE (NEW AND EXISTING) SHALL BE IDENTIFIED AS TO LOCATION AND SERVICE, TYPE, AND SIZE.
   e. BALANCE REPORT SHALL INDICATE REQUIRED CFM AND RESULTANT CFM FOR EACH AIR DEVICE.
4. SHOULD TOTAL INDICATED AIRFLOWS NOT BE ACHIEVABLE, CONTRACTOR SHALL STOP WORK, NOTIFY OWNER, BUILDING ENGINEER AND ARCHITECT. PROPORTIONAL BALANCING IS NOT PERMITTED. WORK SHALL NOT RESUME UNTIL CORRECTIVE MEASURES HAVE BEEN COMPLETED.

G. THERMOSTATS:

1. PROVIDE AND INSTALL ALL PROGRAMMABLE WALL MOUNT THERMOSTATS WITH PROGRAMMABLE FAN CYCLE OPTION.
2. PROGRAMMABLE FAN CYCLE SETTINGS: AHU BLOWER FANS SHALL BE SET TO RUN ON VENTILATION SCHEDULE DURING OCCUPIED PERIODS AND SET TO RUN ON TEMPERATURE/HUMIDITY DEMAND ONLY DURING UNOCCUPIED PERIODS.
3. COORDINATE VENTILATION SCHEDULE WITH PROGRAMMABLE THERMOSTATS FAN CYCLE OPTION SETTINGS AND OWNERS/DIRECTORS OF THE FACILITY.
4. WALL MOUNT THERMOSTATS SHALL HAVE CAPBILITY TO CONNECT WITH REMOTE TEMPERATURE/HUMIDITY SENSORS.(AS REQUIRED)

H. CO2 SENSORS:

1. PROVIDE AND INSTALL RETURN AIR DUCT MOUNT CO2 SENSORS AT THE UNITS RETURN AIR PLENUM BOX TO OPERATE AUTOMATIC OUTSIDE AIR (O/A) DAMPER FOR ALL AHU SYSTEMS.
2. CO2 SENSORS SHALL INTERLOCK TO AHU O/A DAMPER. O/A DAMPER SHALL BE SET TO DEFAULT AT FULLY CLOSED. WHEN CO2 SENSOR REACHES 700 PPM LEVEL, DAMPER SHALL OPEN TO MINIMUM SET POINT. WHEN CO2 SENSOR REACHES 1000 PPM DAMPER SHALL OPEN TO O/A PER CODE. SEE O/A TABLES.
3. OUTSIDE AIR DAMPERS SHALL HAVE ACTUATORS FOR SETTING POSITIONS. ACTUATORS SHALL HAVE MINIMUM POSITION SET POINT OF APPROXIMATELY 10% OF O/A PER CODE AND MAXIMUM POSITION SET POINT OF O/A PER CODE. SEE O/A TABLES.
4. ALL CONTROLS AND ACCESSORIES SHALL BE PROVIDED FOR A COMPLETE AND OPERATIONAL SYSTEM
5. DUCT MOUNT CO2 SENSORS SHALL HAVE CAPABILITY TO CONNECT WITH REMOTE CO2 SENSORS. (AS REQUIRED)

I. ZONE SYSTEM:

1. THE CONTROL SYSTEM SHALL BE VVT AND CONSIST OF PROGRAMMABLE, MULTIPLE COMMUNICATING ZONE CONTROLLERS; AND A BYPASS CONTROLLER. THE SYSTEM SHALL ALSO INCLUDE A COMPLETE ARRAY OF INPUT AND OUTPUT DEVICES. THE SYSTEM SHALL PROVIDE FULL CONTROL OF HVAC HEATING AND COOLING EQUIPMENT IN A MULTIPLE ZONE APPLICATION. THE SYSTEM SHALL BE CAPABLE OF OPERATING AS A STAND-ALONE SYSTEM OR NETWORKED WITH MULTIPLE SYSTEMS CONNECTED ON A COMMUNICATIONS BUS TO COMMUNICATING AIR SOURCE CONTROLLERS.
2. THE CONTROL SYSTEM SHALL BE AVAILABLE AS A COMPLETE PACKAGE WITH THE REQUIRED INPUT SENSORS AND DEVICES READILY AVAILABLE. THE SYSTEM SHALL BE CAPABLE OF PROVIDING COMPLETE CONTROL OF HVAC FUNCTIONS; ZONE CONTROL, BYPASS AIR CONTROL IN BOTH PRESSURE DEPENDENT AND PRESSURE INDEPENDENT APPLICATIONS. AIRSIDE CONTROLS SHALL BE CAPABLE OF OPERATING SYSTEM DAMPERS AS WELL AS WATER SOURCE HEAT PUMP SYSTEM AND WITHOUT SUPPLEMENTAL HEAT SOURCES AT THE ZONE.
3. THE SYSTEM SHALL BE CAPABLE OF OPERATING IN AN OCCUPIED OR UNOCCUPIED MODE WITH UP TO 8 PERIOD CHANGES PER DAY INCLUDING HOLIDAYS. ALL ZONE CONTROLLERS SHALL HAVE THE CAPABILITY TO FOLLOW INDEPENDENT LOCAL SCHEDULES OR RECEIVE THE SCHEDULE FROM OTHER APPLICATION SPECIFIC CONTROLLERS.
4. THE VVT ZONE CONTROLLER SHALL BE CAPABLE OF INDEPENDENT ZONE CONTROL. THE ZONE CONTROLLER SHALL OPERATE ALL VVT ZONE DAMPERS AS WELL AS THE FAN WSHP UNIT EQUIPPED WITH VVT ZONE CONTROLLERS. THE ZONE CONTROLLER SHALL HAVE THE CAPABILITY TO SUPPORT ADJUSTABLE MINIMUM AND MAXIMUM DAMPER POSITIONS. MULTIPLE ZONE CONTROLLERS BEING SERVICED BY THE SAME AIR HANDLER SHALL BE NETWORKED TOGETHER.
5. THE BYPASS CONTROLLER SHALL BE CAPABLE OF READING SUPPLY STATIC PRESSURE AND CONTROLLING THE BYPASS DAMPER TO MAINTAIN THE SUPPLY STATIC SET POINT. THIS OPERATION SHALL BE PROVIDED WHEN OPERATING WITH A SYSTEM APPLICATION OR IN A STAND-ALONE MODE. THE BYPASS CONTROLLER SHALL INCLUDE A PREPOSITIONING MODE FOR OPENING THE DAMPER PRIOR TO FAN OPERATION. THE BYPASS CONTROLLER SHALL PROVIDE CONFIGURABLE MINIMUM AND MAXIMUM DAMPER POSITION SETTINGS.
6. ALL VVT ZONE CONTROLLERS SHALL BE CAPABLE OF READING A SIGNAL FROM A CO2 SENSOR AT THE ZONE LEVEL, FOR INDEPENDENT DCV MODE OPERATION.
7. ALL ZONE DAMPERS SHALL BE SIZED TO MATCH DUCT SIZE SHOWN ON MECHANICAL DRAWINGS. THE LOCAL ZONE DAMPER DESIGNATION MARK ZD-XX DENOTES THE FIRST MARK TO BE WHSP UNIT NUMBER AND THE SECOND MARK TO BE ZONE DAMPER NUMBER FOR WSHP UNIT ZONE SYSTEM.

J. WSHP SYSTEM:

1. PROVIDE UNITS COMPLETE WITH CONTROLS, FLEXIBLE COLLARS, VIBRATION ISOLATION SPRINGS, COMPRESSOR SOUND BLANKETS, BALANCING VALVES, 20% EFFICIENT FILTERS, AUTOMATIC BALANCE VALVE KIT, LOW PRESSURE REFRIGERANT SWITCH, LEVEL-SENSITIVE FLOAT SWITCH IN CONDENSATE PAN AND STANDARD EQUIPMENT AS PROVIDED BY CARRIER OR APPROVED EQUAL.
2. THE CONDENSER WATER LOOP TEMPERATURE, COOLING TOWER, 3-WAY VALVES, BOILER STAGING/CONTROL & PUMP OPERATIONS SHALL BE MONITORED/ALARMED BY A WATER SOURCE HEAT PUMP CONTROL SYSTEM. THE SYSTEM SHALL BE MODULAR & PROVIDE SENSORS, ACTUATORS, DDC CONTROLLERS AND OPERATORS FOR A COMPLETE AND AUTOMATIC OPERATING WATER SOURCE HEAT PUMP SYSTEM. PROVIDE A REMOTE PANEL WITH AUDIBLE AND VISIBLE ALARMS IN ARCHITECT/OWNER DESIGNATED OFFICE TO NOTIFY OWNER OF MALFUNCTIONS. OBTAIN THE SERVICES OF AN APPROVED AND 5 YEARS EXPERIENCED CONTROLS ENGINEER OR CONTRACTOR. CONTRACTOR TO DESIGN AND INSTALL A CENTRAL CONTROL SYSTEM FOR THE HEAT PUMP UNITS, BOILER, CONDENSER WATER PUMPS, BOILER CIRCULATOR PUMPS, ALL CONTROL VALVES, ROOM THERMOSTAT/SENSORS AND COOLING TOWER SYSTEM. CENTRAL CONTROL/MONITORING SYSTEM SHALL PROVIDE AS A MINIMUM CRITICAL CONTROL STATUS AND ALARMS FOR THE HEATING AND AIR CONDITIONING EQUIPMENT AND CO2 SENSORS. PROVIDE WATER SOURCE HEAT PUMP CONTROL SYSTEM FOR APPROVAL BY OWNER/ENGINEER EQUAL.
3. CONTROLS CONTRACTOR SHALL PROVIDE A COMPLETE CENTRAL CONTROL SYSTEM WHICH CAN RESET AND CHANGE ALL OPERATIONS OF THE CRITICAL HVAC EQUIPMENT FROM A CENTRAL COMPUTER WITH PRINTER AND MONITOR. SYSTEM SHALL HAVE CAPABILITY TO SIGNAL THE SECURITY SYSTEM OR REMOTE DIALED NUMBER WHEN THERE IS A PROBLEM WITH ANY CRITICAL HVAC EQUIPMENT. AS A MINIMUM, THE SYSTEM SHALL MONITOR AND/OR CONTROL WATER SOURCE HEAT PUMP UNITS, CONDENSER WATER PUMPS, BOILER HOT WATER PUMPS, BOILERS, WATER TEMPERATURE SETPOINT AND RESET ON CONDENSER WATER LOOP AND BOILER HOT WATER LOOP. COOLING TOWER OPERATION, ROOM TEMPERATURE SENSORS SET AND RESET POINTS AND STATUS,

MECHANICAL SYMBOLS

ABBREVIATIONS

ABV	ABOVE
ACU	AIR CONDITIONING UNIT
AD	ACCESS DOOR
AFF	ABOVE FINISHED FLOOR
AHU	AIR HANDLING UNIT
BAS	BUILDING AUTOMATION SYSTEM
BOD	BOTTOM OF DUCT
BDD	BACK DRAFT DAMPER
CLG	CEILING
CP	CONDENSATE PUMP
CHWR	
CHWS	
CW	COLD WATER
CWR	
CWS	
D	CONDENSATE DRAIN
DN	DOWN
(E)	EXISTING
E/A	EXHAUST AIR
EF	EXHAUST FAN
(ER)	EXISTING RELOCATED
F	FAN
FC	FLEXIBLE CONNECTION
HWS	HOT WATER SUPPLY
HWR	HOT WATER RETURN
MD	MOTORIZED DAMPER
(N)	NEW
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
O/A	OUTSIDE AIR
R/A	RETURN AIR
S/A	SUPPLY AIR
TR	TRANSFER AIR
TOD	TOP OF DUCT

CONTROL SEQUENCE OF OPERATIONS SHALL INCLUDE:

OCCUPIED MODE:

DURING OCCUPIED PERIODS, THE SUPPLY FAN SHALL RUN PER FACILITY VENTILATION SCHEDULE AND THE OUTSIDE AIR DAMPER SHALL OPEN TO MAINTAIN MINIMUM VENTILATION REQUIREMENTS. THE COOLING AND HEATING SHALL MAINTAIN THE OCCUPIED SPACE TEMPERATURE SETPOINT. IF ECONOMIZING IS ENABLED THE OUTSIDE AIR DAMPER SHALL MODULATE TO MAINTAIN THE OCCUPIED SPACE TEMPERATURE SETPOINT.

UNOCCUPIED MODE:

WHEN THE SPACE TEMPERATURE IS BELOW THE UNOCCUPIED HEATING SETPOINT. THE SUPPLY FAN SHALL START, THE OUTSIDE AIR DAMPER SHALL REMAIN CLOSED AND THE HEATING COIL SHALL BE ENABLED. WHEN THE SPACE TEMPERATURE RISES ABOVE THE UNOCCUPIED HEATING SETPOINT PLUS THE UNOCCUPIED DIFFERENTIAL OF 2.0-4.0 DEG. F (ADJ.) THE SUPPLY FAN SHALL STOP AND THE HEATING COIL SHALL BE DISABLED. WHEN THE SPACE TEMPERATURE IS ABOVE THE UNOCCUPIED COOLING SETPOINT THE SUPPLY FAN SHALL START, THE OUTSIDE AIR DAMPER SHALL OPEN IF ECONOMIZING IS ENABLED AND REMAIN CLOSED IF ECONOMIZING IS DISABLED AND THE COOLING COIL SHALL BE ENABLED. WHEN THE SPACE TEMPERATURE FALLS BELOW THE UNOCCUPIED COOLING SETPOINT MINUS THE UNOCCUPIED DIFFERENTIAL OF 2.0-4.0 DEG. F (ADJ.) THE SUPPLY FAN SHALL STOP, THE COOLING COIL SHALL BE DISABLED AND THE OUTSIDE AIR DAMPER SHALL CLOSE.

COOLING MODE:

THE UNIT CONTROLLER SHALL USE SPACE TEMPERATURE AND SPACE TEMPERATURE SETPOINT TO DETERMINE WHEN TO INITIATE REQUESTS FOR COOLING. WHEN THE SPACE TEMPERATURE RISES ABOVE THE SETPOINT, THE UNIT CONTROLLER SHALL MODULATE THE ECONOMIZER OR THE COOLING COIL AS REQUIRED TO MAINTAIN THE SPACE TEMPERATURE SETPOINT. THE COMPRESSOR SHALL ENERGIZE AFTER ITS MINIMUM 3 TO 5 MINUTE OFF TIME HAS EXPIRED. ONCE THE SPACE TEMPERATURE FALLS BELOW THE SETPOINT THE COMPRESSORS SHALL BE DEACTIVATED.

HEATING MODE:

THE UNIT CONTROLLER SHALL USE THE SPACE TEMPERATURE AND SPACE TEMPERATURE SETPOINT TO DETERMINE WHEN TO INITIATE REQUESTS FOR HEAT. WHEN THE SPACE TEMPERATURE DROPS BELOW THE SETPOINT, THE UNIT CONTROLLER SHALL ENABLE THE HEATING COIL TO MAINTAIN THE SPACE TEMPERATURE SETPOINT. ONCE THE SPACE TEMPERATURE RISES ABOVE THE SETPOINT THE COMPRESSOR SHALL BE DEACTIVATED.

VENTILATION MODE:

THE SUPPLY FAN SHALL BE ENABLED TO LOW SPEED WHILE IN VENTILATION MODE. THE O/A DAMPER SHALL OPEN TO THE MINIMUM POSITION SET POINT OF APPROXIMATELY 10% OF O/A PER CODE.

MECHANICAL SYMBOLS

PLAN SYMBOLS

Symbol	Description
RTU 1	MECHANICAL EQUIPMENT IDENTIFICATION
	DETAIL IDENTIFICATION DETAIL NUMBER AND DRAWING NUMBER AS INDICATED.
	NEW WORK NOTE IDENTIFICATION

MECHANICAL SYMBOLS

Symbol	Description
100	SUPPLY DIFFUSER/TYPE IDENTIFICATION CFM
	RETURN REGISTER/TYPE IDENTIFICATION
	EXHAUST REGISTER/TYPE IDENTIFICATION
	AIR FLOW DIRECTION
	SUPPLY AIR DUCTWORK
	RETURN AIR DUCTWORK
	EXHAUST AIR DUCTWORK
	MAKE-UP/OUTSIDE AIR DUCTWORK
	FLEXIBLE DUCTWORK-PROVIDE VOLUME DAMPER ON ALL FLEX DUCT WITH LOCKING QUADRANTS
	DUCTWORK TURNED UP OR TOWARDS
	DUCTWORK TURNED DOWN OR AWAY
	DUCTWORK TRANSITION
AD	ACCESS DOOR, SIZED AS INDICATED
FD	1-1/2 or 3 HR FIRE DAMPER WITH ACCESS DOOR SEE ARCHITECTURAL FOR WALL FIRE RATING
SD	SMOKE DAMPER WITH ACCESS DOOR
	VOLUME DAMPER WITH LOCKING QUADRANTS
M	MODULATING MOTORIZED DAMPER
T	DUCT MOUNTED TEMPERATURE SENSOR
AHU-# T	WALL THERMOSTAT
AHU-# H	WALL HUMIDISTAT
SD	DUCT SMOKE DETECTOR
U	3/4" DOOR UNDERCUT 1
	EXISTING CONDENSATE DRAIN
	EXISTING HEAT PUMP SUPPLY PIPE
	EXISTING HEAT PUMP RETURN PIPE
D	NEW CONDENSATE DRAIN
HPS	NEW HEAT PUMP SUPPLY PIPE
HPR	NEW HEAT PUMP RETURN PIPE

Creamery Building Renovation
21 Kent Street, Winchester, Virginia, 22601

City of Winchester

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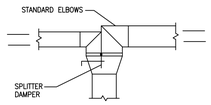
Drawing Title
MECHANICAL SCOPE & SPECIFICATIONS

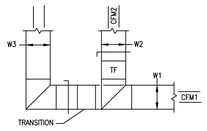
Issue/Revision Seal

BID SET
NOT FOR
CONSTRUCTION

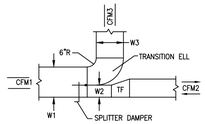
Date 4/19/2019
Scale: As Noted Project Number: 18545
Drawing Number CDI Project No: E1923



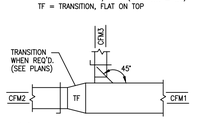
1 UNEQUAL HORIZONTAL SPLIT
(NO CHANGE IN DUCT HEIGHT)



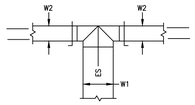
2 EQUAL/UNEQUAL VERTICAL SPLIT
W2 = W1
TOP SPLIT = CFM2/CFM1 (DUCT HT. = W1)
TF = TRANSITION, FLAT ON TOP



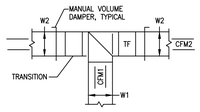
3 SPECIAL BRANCH TAKEOFF
W2 = (CFM2/CFM1) x W1
W3 = REQUIRED DUCT WIDTH
CFM3 = 30% OR MORE OF CFM1
(NO CHANGE IN DUCT HEIGHT)
SEE SMACNA FIG. 2-7



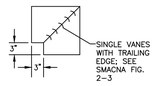
4 STANDARD BRANCH TAKEOFF
CFM3 = LESS THAN 30% OF CFM1
TF = TRANSITION, FLAT ON TOP
SEE SMACNA FIG. 2-8 AND 2-9



5 EQUAL HORIZONTAL SPLIT
W2 = W1 x 0.6
ES = EQUAL SPLIT



6 EQUAL/UNEQUAL VERTICAL SPLIT
W2 = W1
TOP SPLIT = CFM2/CFM1 (DUCT HT. = W1)
TF = TRANSITION, FLAT ON TOP



7 STANDARD ELBOW
SEE SMACNA FIG. 2-2

8 RADIUS ELBOW
USE ONLY WHEN NOTED ON PLANS; OTHERWISE USE STANDARD ELBOW.
SEE SMACNA FIG. 2-2

NOTES:

1. REFER TO PLANS FOR SPECIFIC FITTING TYPES.

DUCTWORK FITTINGS DETAIL
NOT TO SCALE

WATER SOURE HEAT PUMP SCHEDULE

UNIT DESIGNATION	INDOOR UNIT															
OUTDOOR	TOTAL CFM	MIN. O.A. CFM	NOMINAL TONS	FAN FLA	FAN HP (BHP)	E.S.P. IN. W.C.	WEIGHT (LBS)	V/PH/HZ	MCA	MOCP	BASIS OF DESIGN	COOLING MBH	HEATING MBH	WATER FLOW GPM	EER AT ARI	COP AT ARI	NOTES
HP 6 / HP 10 / HP 11 / HP 12 / HP 13	2000	SEE O/A TABLES	5.0	7.0	1	0.5	310	208-230/3/60	27.6	40	YKTV064	62.0	70.6	16.0	16.3	5.2	
HP 1 / HP 8 / HP 9	1600	SEE O/A TABLES	4.0	7.0	1	0.5	290	208-230/3/60	21.5	35	YKTV049	50.3	56.1	12.0	17.1	5.2	
HP 2 / HP 3 / HP 4 / HP 5	1200	SEE O/A TABLES	3.0	4.0	1/2	0.5	240	208-230/3/60	18.5	30	YKTV038	39.0	40.3	9.0	18.0	5.4	

NOTES:
1. ALL UNITS SHALL HAVE ECM MOTORS, HOT GAS BYPASS, AND HOT GAS REHEAT COILS.
2. INDOOR UNITS SHALL BE PROVIDED WITH CONDENSATE DRAIN TRAP KIT. ALSO SEE NOTE 8.
3. ALL UNITS SHALL BE PROVIDED WITH UNIT DISCONNECT SWITCH.
4. ALL UNITS SHALL BE PROVIDED WITH A MINIMUM MERV 8 DISPOSABLE FILTER. SPARE SET TO OWNER
5. ALL UNIT ARE R-410 REFRIGERANT AND CAPACITIES ARE BASED ON WATER LOOP TEMPERATURES 85F COOLING & 65F HEATING
6. AIRFLOW THROUGH COOLING COIL SHALL NOT EXCEED 550 FPM.
7. PROGRAMMABLE THERMOSTAT WITH PROGRAMMABLE FAN CYCLE.
8. PROVIDE AUTOMATIC CONTROLS TO SHUT DOWN UNIT IN CASE OF OVERFLOW INTO SECONDARY CONDENSATE PAN. UPON SENSING IMPROPER CONDITIONS, WATER LEVEL DETECTOR SHALL STOP THE FAN AND DE-ENERGIZE THE COOLING CYCLE. PROVIDE REMOTE INDICATOR FOR WATER LEVEL DETECTOR ON CEILING OR WALL NEAR UNIT LOCATION.
9. COORDINATE EQUIPMENT CONFIGURATION AND ACCESSORIES PER MECHANICAL DRAWING LAYOUT.
10. CONNECT CONDENSER WATER PIPING TO THE EXISTING BUILDING MAIN CONDENSER LOOPS SUPPLY/RETURN.

DIFFUSER, REGISTER AND GRILLE SCHEDULE – SELECT AS APPLICABLE

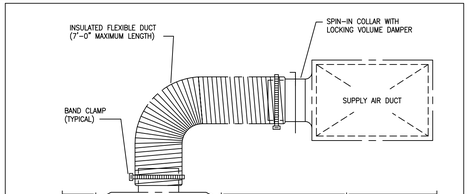
TYPE	SERVICE	CFM RANGE	FACE DIMENSION	NECK DIMENSION	FINISH	BASIS OF DESIGN	NOTES
1	SUPPLY AIR DIFFUSER	0 – 125	24"x24"	6"ø	WHITE	TUTTLE & BAILEY: 1300A	1,2,3,4
		126 – 250		8"ø			
		251 – 400		10"ø			
2	SUPPLY AIR DIFFUSER	0 – 125	12"x12"	6"ø	WHITE	TUTTLE & BAILEY: 1300A	1,2,3,4
		126 – 250		8"ø			
3	SUPPLY AIR DIFFUSER	0 – 150	10"x4"	N/A	WHITE	TUTTLE & BAILEY: A64SDG-R	1,2,4
		151 – 300	16"x4"				
4	SUPPLY AIR DIFFUSER	0 – 200	8"X6"	8"ø	WHITE	TUTTLE & BAILEY: T54	1,2,4
		201 – 400	12"X8"	10"ø			
5	THERMA-FUSER ADJUSTABLE	0 – 125	24"x24"	6"ø	WHITE	ACUTHERM TF-HC SERIES	1,2,3,4
		126 – 225		8"ø			
		126 – 250		10"ø			
1	RETURN AIR GRILLE	226 – 300	24"x24"	8"ø	WHITE	TUTTLE & BAILEY: PR	1,2,5
		251 – 400		10"ø			
		401 – 600		12"ø			
2	RETURN AIR GRILLE	0 – 125	12"X12"	6"ø	WHITE	TUTTLE & BAILEY: PR	1,2,5
3	RETURN AIR GRILLE	1501 – 2250	24"x24"	N/A	WHITE	TUTTLE & BAILEY: T70D	1,2
4	RETURN AIR GRILLE	851 – 1300	24"X14"	N/A	WHITE	TUTTLE & BAILEY: T70D	1,2
5	RETURN AIR GRILLE	651 – 1000	16"X16"	N/A	WHITE	TUTTLE & BAILEY: T70D	1,2
6	RETURN AIR GRILLE	501 – 750	14"X14"	N/A	WHITE	TUTTLE & BAILEY: T70D	1,2
7	RETURN AIR GRILLE	0 – 350	10"x10"	N/A	WHITE	TUTTLE & BAILEY: T70D	1,2
8	RETURN AIR GRILLE	N/A	30"x30"	N/A	WHITE	REGGIO REGISTER: 3232	1,2,6
9	RETURN AIR GRILLE	N/A	18"x18"	N/A	WHITE	REGGIO REGISTER: 2020	1,2,6
10	RETURN AIR GRILLE	501 – 650	14"x14"	N/A	WHITE	TUTTLE & BAILEY: T70D	1,2

NOTES:
1. COORDINATE WITH OWNER COLOR & FINISH.
2. CONTRACTOR SHALL CONFIRM ACTUAL FINAL DIFFUSER DIMENSIONS WITH VENDOR, AND COORDINATE WITH CEILING/DOOR TYPE AS NECESSARY.
3. 4 WAY THROW PATTERN.
4. PROVIDE WITH OPPOSED BLADE DAMPER.
5. PERFORATED PATTERN

FAN SCHEDULE

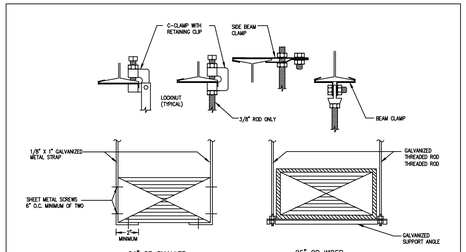
		PERFORMANCE DATA			CONSTRUCTION DATA		ELECTRICAL DATA					
MARK	AREA / SERVICE	CFM	SP (IN. W.G.)	RPM	TYPE	DRIVE	WATTS (HP)	VOLT	PH	MAX. WEIGHT LBS.	MANUFACTURER	NOTES
EF 1	BATHROOMS	90	0.5	950	CEILING MOUNTED	DIRECT	100	120	1	12	GREENHECK SP-B110	1-4
EF 2	KITCHENETTES	140	0.5	1050	CEILING MOUNTED	DIRECT	128	120	1	16	GREENHECK SP-B150	1-3

NOTES:
1. STANDARD PREWIRED DISCONNECT SWITCH. EF-2 SHALL HAVE WALL SWITCH. COORDINATE WITH ELECTRICAL CONTRACTOR.
2. VIBRATION ISOLATORS AND BRACKETS
3. W/ MANUFACTURER WALL/ROOF CAP
4. BATHROOM EXHAUST FANS SHALL HAVE OCCUPANCY SENSORS.



NOTE:
1. FLEXIBLE DUCT SHALL BE SUPPORTED FROM STRUCTURE ABOVE TO PREVENT SAGGING.

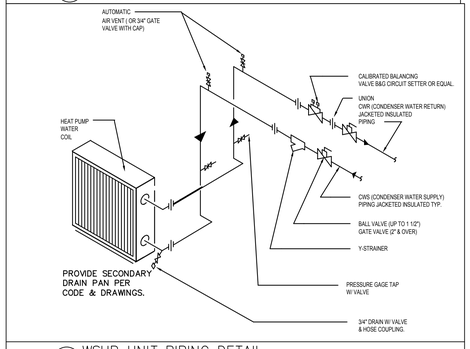
4 SUPPLY AIR DIFFUSER IN ACOUSTICAL CEILING
NOT TO SCALE



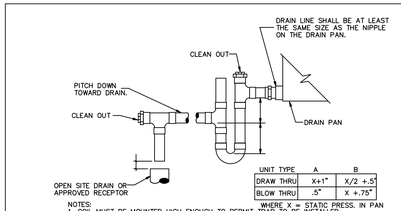
DUCT WIDTH	ROD DIA.	SUPPORT ANGLE OR EQUIV. CHANNEL	MAXIMUM SPACING	MAXIMUM AREA *
25" TO 30"	3/8"	1 1/2" X 1 1/2" X 1/8"	8'-0" O.C.	4 SQ. FT.
31" TO 42"	3/8"	1 1/2" X 1 1/2" X 1/8"	6'-0" O.C.	10 SQ. FT.
43" TO 60"	1/2"	1 1/2" X 1 1/2" X 1/8"	6'-0" O.C.	10 SQ. FT.
61" TO 84"	1/2"	2" X 2" X 1/4"	4'-0" O.C.	--------
85" AND UP	1/2"	2" X 2" X 1/4"	4'-0" O.C.	--------

* REDUCE SPACING TO NEXT SMALLER INTERVAL IF DUCT AREA EXCEEDS MAXIMUM

7 DUCT SUPPORT DETAIL
NOT TO SCALE



8 WSHP UNIT PIPING DETAIL
NOT TO SCALE

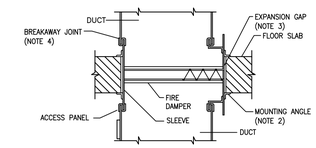


UNIT TYPE	A	B
DRAW THRU	X+1"	X/2 +.5"
BLOW THRU	.5"	X +.75"

WHERE X = STATIC PRESS. IN PAN

NOTES:
1. COIL MUST BE MOUNTED HIGH ENOUGH TO PERMIT TRAP TO BE INSTALLED.
2. PROVIDE SHIMS OR STRUCTURAL PLATFORMS REQUIRED TO ELEVATE FACTORY PACKAGED AIR HANDLING UNITS TO OBTAIN REQUIRED TRAP HEIGHT.

2 AIR HANDLING DRAIN TRAP
NOT TO SCALE



1. FIRE DAMPER AND SLEEVE SHALL BE A FACTORY INSTALLED ASSEMBLY BY THE DAMPER MANUFACTURER. PROVIDE WITH 165° FUSIBLE LINK.

2. MOUNTING ANGLES SHALL BE INSTALLED ON ALL SIDES OF DAMPER SLEEVE BOTH SIDES OF FLOOR SLAB. ANGLES SHALL NOT OVERLAP EACH OTHER AT CORNERS. ANGLE SHALL BE INSTALLED TIGHT TO FLOOR SLAB AND SECURED TO SLEEVE ONLY WITH 1/4" – 20 BOLTS, MAXIMUM 6" ON CENTERS. ANGLES SHALL BE MINIMUM 1-1/2" X 1-1/2" X 16 GA. STEEL.

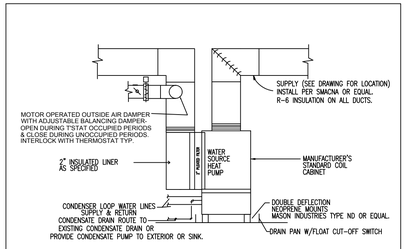
3. PROVIDE EXPANSION GAP BETWEEN FLOOR SLAB OPENING AND SLEEVE. GAP SHALL A MINIMUM OF 1/8" FOR EVERY 12" OF SLEEVE DEPTH, OR PER DAMPER MANUFACTURER'S INSTALLATION INSTRUCTIONS.

4. PROVIDE BREAKAWAY JOINT BETWEEN SLEEVE AND DUCT WITH STANDING SLIP CONNECTOR (NO SCREWS ARE ALLOWED) ON BOTH SIDES OF FLOOR SLAB.

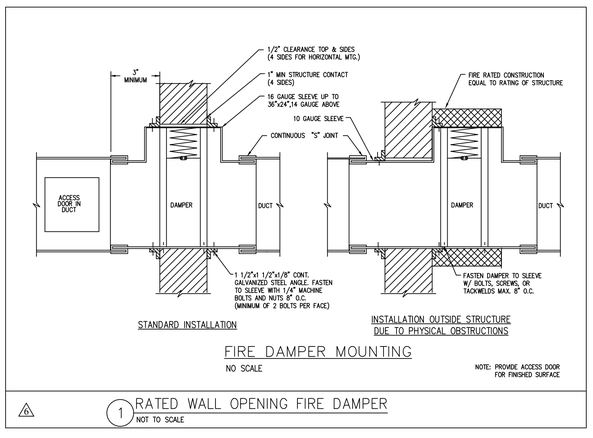
5. WHERE THIS DETAIL CONFLICTS WITH THE DAMPER MANUFACTURER'S INSTALLATION INSTRUCTIONS, THE MANUFACTURER'S INSTRUCTIONS SHALL BE FOLLOWED.

6. CONTRACTOR SHALL NOTE MANUFACTURER'S INSTALLATION STICKERS ON DAMPER. STICKERS SHALL NOT BE REMOVED OR TAMPERED WITH. DAMPERS SHALL BE INSTALLED IN ACCORDANCE WITH MANUFACTURER'S FLOW ARROW STICKER.

5 SLAB MOUNTED FIRE DAMPER
NOT TO SCALE



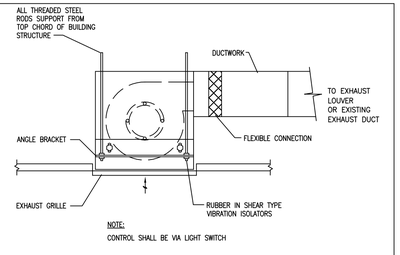
9 VERTICAL WSHP UNIT TYP. DETAIL
NOT TO SCALE



FIRE DAMPER MOUNTING
NO SCALE
NOTE: PROVIDE ACCESS DOOR FOR FINISHED SURFACE.

6

1 RATED WALL OPENING FIRE DAMPER
NOT TO SCALE



NOTE:
CONTROL SHALL BE VIA LIGHT SWITCH

3 CEILING CABINET EXHAUST FAN DETAIL
NOT TO SCALE

Creamery Renovation — GREENHECK LOUVER SCHEDULE

ID	Tag	Mark Name	Qty	Model	Width (in.)	Height (in.)
WL-1	WL-1	WL-1	PER DWG	ESD-603	15	25
ID	Tag	Mark Name	Qty	Model	Width (in.)	Height (in.)
WL-2	WL-2	WL-2	PER DWG	ESD-603	12	19

Creamery Building Renovation
21 Kent Street, Winchester, Virginia, 22601

City of Winchester

Architect
GROVE & DALL'OLIO ARCHITECTS PLLC
18 West Boscawen Street
Winchester, VA 22601

Mech/Elect Engineer
Comfort Design Inc.
620 Pennsylvania Avenue
Winchester, VA 22601
(540) 665-2846

Structural Engineer
PAINTER-LEWIS, P.L.C.
817 Cedar Creek GRADE, Suite 120
Winchester, Virginia 22601
(540) 662-5792

Drawing Title
MECHANICAL SCHEDULE & DETAILS

Issue/Revision — Seal

BID SET
NOT FOR CONSTRUCTION

Date 4/19/2019
Scale: As Noted — Project Number: 18545
Drawing Number — CDI Project No: E1923

M1.2

HP-1

Project Name: Creamery Bldg Renovation	Unit Total Supply Air: 1090 CFM
Date: 4/20/2019	Unit Total Outdoor Air: 165 CFM
Unit Designation: HP-1	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Room Number	Description	Area (ft^2) (Az)	Area Outdoor Air Rate per VMC Table 403.3 (Ra)	Area Outdoor Air (RaAz)	Occupant Load Rate per VMC Table 403.3 (People/ 1000 ft2)	Occupancy C x F/1000 (Pz)	Occupant Outdoor Air Rate per VMC Table 403.3 (Rp)	Occupant Outdoor Air (RpPz)	Breathing Zone Outdoor Air (Vbz = RpPz + RaAz)	Zone Air Distribution Effectiveness (Ez)	Zone Outdoor Air (Voz = Vbz / Ez)	Supply Air Design (Vpz)	Secondary Recirculated Air	Outdoor Air Fraction (Zp = Voz / Vpz)
101 Office	Office	120	0.06	7	5	1	5	5	12	0.8	15	170	0	0.088
102 Open Work	Office	435	0.06	26	5	3	5	15	41	0.8	52	310		0.168
103 Office	Office	130	0.06	8	5	1	5	5	13	0.8	17	200		0.085
111 Public Area	Reception	290	0.06	17	30	9	5	45	62	0.8	78	410		0.190
			0	0			0	0	0	0.8	0	0	0	0.000
Totals		975		58		14		70	128		162	1090	0	0.190

2009 OA Version 6.0 A-1 Option - FFX - REG - 3/15/10

Do not utilize Occupant Diversity without specific approval from the Authority Having Jurisdiction

System Population (Ps): Diversity → 14

Occupant Diversity D = Ps/∑all zones Pz: 1.000

Uncorrected O.A Vou = D ∑all zones RpPz + ∑all zones RaAz: 128

Total Required Outdoor Air: 134

Percentage of Outdoor Air: 12%

E_v: 0.960

Method: IMC Chart

HP-2

Project Name: Creamery Renovation	Unit Total Supply Air: 1200 CFM
Date: 4/20/19	Unit Total Outdoor Air: 120 CFM
Unit Designation: HP-2	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Room Number	Description	Area (ft^2) (Az)	Area Outdoor Air Rate per VMC Table 403.3 (Ra)	Area Outdoor Air (RaAz)	Occupant Load Rate per VMC Table 403.3 (People/ 1000 ft2)	Occupancy C x F/1000 (Pz)	Occupant Outdoor Air Rate per VMC Table 403.3 (Rp)	Occupant Outdoor Air (RpPz)	Breathing Zone Outdoor Air (Vbz = RpPz + RaAz)	Zone Air Distribution Effectiveness (Ez)	Zone Outdoor Air (Voz = Vbz / Ez)	Supply Air Design (Vpz)	Secondary Recirculated Air	Outdoor Air Fraction (Zp = Voz / Vpz)
122 Open Work	Office	415	0.06	25	5	3	5	15	40	0.8	50	550	0	0.091
133 Office	Office	170	0.06	10	5	1	5	5	15	0.8	19	140		0.136
134 Shared Office	Office	190	0.06	11	5	1	5	5	16	0.8	20	260		0.077
135 IT Room	Office	60	0.06	4	5	1	5	5	9	0.8	12	50		0.240
121 Hall	Corridor	115	0.06	7	0	0	0	0	7	0.8	9	150		0.060
112 WC	TRANSFER AIR	55	0	0	0	0	0	0	0	0.8	0	50		0.000
			0	0			0	0	0	0.8	0	0	0	0.000
Totals		1005		57		6		30	87		110	1200	0	0.240

2009 OA Version 6.0 A-1 Option - FFX - REG - 3/15/10

Do not utilize Occupant Diversity without specific approval from the Authority Having Jurisdiction

System Population (Ps): Diversity → 6

Occupant Diversity D = Ps/∑all zones Pz: 1.000

Uncorrected O.A Vou = D ∑all zones RpPz + ∑all zones RaAz: 87

Total Required Outdoor Air: 96

Percentage of Outdoor Air: 8%

E_v: 0.910

Method: IMC Chart

HP-3

Project Name: Creamery Bldg Renovation	Unit Total Supply Air: 1000 CFM
Date: 4/20/2019	Unit Total Outdoor Air: 150 CFM
Unit Designation: HP-3	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Room Number	Description	Area (ft^2) (Az)	Area Outdoor Air Rate per VMC Table 403.3 (Ra)	Area Outdoor Air (RaAz)	Occupant Load Rate per VMC Table 403.3 (People/ 1000 ft2)	Occupancy C x F/1000 (Pz)	Occupant Outdoor Air Rate per VMC Table 403.3 (Rp)	Occupant Outdoor Air (RpPz)	Breathing Zone Outdoor Air (Vbz = RpPz + RaAz)	Zone Air Distribution Effectiveness (Ez)	Zone Outdoor Air (Voz = Vbz / Ez)	Supply Air Design (Vpz)	Secondary Recirculated Air	Outdoor Air Fraction (Zp = Voz / Vpz)
104 Office	Office	190	0.06	11	5	1	5	5	16	0.8	20	270	0	0.074
114 Kitchenette	Galley	180	0.06	11	5	1	5	5	16	0.8	20	260		0.077
124 Conference	Breakout Room	175	0.06	11	30	6	7.5	45	56	0.8	70	250		0.280
136 Files	Warehouse	290	0.06	17	0	0	0	0	17	0.8	22	100		0.220
Receptionist	Office	90	0.06	5	5	1	5	5	10	0.8	13	120		0.108
			0	0			0	0	0	0.8	0	0	0	0.000
Totals		925		55		9		60	115		145	1000	0	0.280

2009 OA Version 6.0 A-1 Option - FFX - REG - 3/15/10

Do not utilize Occupant Diversity without specific approval from the Authority Having Jurisdiction

System Population (Ps): Diversity → 9

Occupant Diversity D = Ps/∑all zones Pz: 1.000

Uncorrected O.A Vou = D ∑all zones RpPz + ∑all zones RaAz: 115

Total Required Outdoor Air: 133

Percentage of Outdoor Air: 13%

E_v: 0.870

Method: IMC Chart

HP-4

Project Name: Creamery Bldg Renovation	Unit Total Supply Air: 1200 CFM
Date: 4/20/2019	Unit Total Outdoor Air: 120 CFM
Unit Designation: HP-4	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Room Number	Description	Area (ft^2) (Az)	Area Outdoor Air Rate per VMC Table 403.3 (Ra)	Area Outdoor Air (RaAz)	Occupant Load Rate per VMC Table 403.3 (People/ 1000 ft2)	Occupancy C x F/1000 (Pz)	Occupant Outdoor Air Rate per VMC Table 403.3 (Rp)	Occupant Outdoor Air (RpPz)	Breathing Zone Outdoor Air (Vbz = RpPz + RaAz)	Zone Air Distribution Effectiveness (Ez)	Zone Outdoor Air (Voz = Vbz / Ez)	Supply Air Design (Vpz)	Secondary Recirculated Air	Outdoor Air Fraction (Zp = Voz / Vpz)
126/141 Hall	Corridor	205	0.06	12	0	0	0	0	12	0.8	15	200	0	0.075
127 Waiting	Reception	130	0.06	8	30	4	5	20	28	0.8	35	210		0.167
129 Case Manager	Office	90	0.06	5	5	1	5	5	10	0.8	13	130		0.100
130 Supervisor	Office	125	0.06	8	5	1	5	5	13	0.8	17	190		0.089
131 Director	Office	180	0.06	11	5	1	5	5	16	0.8	20	270		0.074
132 Clinician	Office	95	0.06	6	5	1	5	5	11	0.8	14	150		0.093
128 Client Toilet	Transfer Air	85	0	0			0	0	0	0.8	0	50	0	0.000
Totals		910		50		8		40	90		114	1200	0	0.167

2009 OA Version 6.0 A-1 Option - FFX - REG - 3/15/10

Do not utilize Occupant Diversity without specific approval from the Authority Having Jurisdiction

System Population (Ps): Diversity → 8

Occupant Diversity D = Ps/∑all zones Pz: 1.000

Uncorrected O.A Vou = D ∑all zones RpPz + ∑all zones RaAz: 90

Total Required Outdoor Air: 92

Percentage of Outdoor Air: 8%

E_v: 0.980

Method: IMC Chart

HP-5

Project Name: Creamery Bldg Renovation	Unit Total Supply Air: 1050 CFM
Date: 4/20/2019	Unit Total Outdoor Air: 170 CFM
Unit Designation: HP-5	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Room Number	Description	Area (ft^2) (Az)	Area Outdoor Air Rate per VMC Table 403.3 (Ra)	Area Outdoor Air (RaAz)	Occupant Load Rate per VMC Table 403.3 (People/ 1000 ft2)	Occupancy C x F/1000 (Pz)	Occupant Outdoor Air Rate per VMC Table 403.3 (Rp)	Occupant Outdoor Air (RpPz)	Breathing Zone Outdoor Air (Vbz = RpPz + RaAz)	Zone Air Distribution Effectiveness (Ez)	Zone Outdoor Air (Voz = Vbz / Ez)	Supply Air Design (Vpz)	Secondary Recirculated Air	Outdoor Air Fraction (Zp = Voz / Vpz)
105 Volunteer/Hall	Office	455	0.06	27	5	3	5	15	42	0.8	53	80	0	0.663
106-109 Probation	Office	140	0.06	8	5	1	5	5	13	0.8	17	740		0.023
110 Supervisor	Office	175	0.06	11	5	1	5	5	16	0.8	20	190		0.105
120 Probation 5	Office	100	0.06	6	5	1	5	5	11	0.8	14	140		0.100
			0	0			0	0	0	0.8	0	0	0	0.000
Totals		870		52		6		30	82		104	1150	0	0.663

2009 OA Version 6.0 A-1 Option - FFX - REG - 3/15/10

Do not utilize Occupant Diversity without specific approval from the Authority Having Jurisdiction

System Population (Ps): Diversity → 6

Occupant Diversity D = Ps/∑all zones Pz: 1.000

Uncorrected O.A Vou = D ∑all zones RpPz + ∑all zones RaAz: 82

Total Required Outdoor Air: 168

Percentage of Outdoor Air: 15%

E_v: 0.490

Method: IMC Chart

HP-6

Project Name: Creamery Bldg Renovation	Unit Total Supply Air: 1800 CFM
Date: 4/20/2019	Unit Total Outdoor Air: 100 CFM
Unit Designation: HP-6	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Room Number	Description	Area (ft^2) (Az)	Area Outdoor Air Rate per VMC Table 403.3 (Ra)	Area Outdoor Air (RaAz)	Occupant Load Rate per VMC Table 403.3 (People/ 1000 ft2)	Occupancy C x F/1000 (Pz)	Occupant Outdoor Air Rate per VMC Table 403.3 (Rp)	Occupant Outdoor Air (RpPz)	Breathing Zone Outdoor Air (Vbz = RpPz + RaAz)	Zone Air Distribution Effectiveness (Ez)	Zone Outdoor Air (Voz = Vbz / Ez)	Supply Air Design (Vpz)	Secondary Recirculated Air	Outdoor Air Fraction (Zp = Voz / Vpz)
115 Hall	Corridor	300	0.06	18	0	0	0	0	18	0.8	23	700	0	0.033
117 Split Office	Office	170	0.06	10	5	1	5	5	15	0.8	19	250		0.076
118 Case Mgr	Office	150	0.06	9	5	1	5	5	14	0.8	18	210		0.086
119 Files	warehouse	120	0.06	7	0	0	0	0	7	0.8	9	180		0.050
Hallway	Corridor	330	0.06	20	0	0	0	0	20	0.8	25	460		0.054
			0	0			0	0	0	0.8	0	0	0	0.000
Totals		1070		64		2		10	74		94	1800	0	0.086

2009 OA Version 6.0 A-1 Option - FFX - REG - 3/15/10

Do not utilize Occupant Diversity without specific approval from the Authority Having Jurisdiction

System Population (Ps): Diversity → 2

Occupant Diversity D = Ps/∑all zones Pz: 1.000

Uncorrected O.A Vou = D ∑all zones RpPz + ∑all zones RaAz: 74

Total Required Outdoor Air: 74

Percentage of Outdoor Air: 4%

E_v: 1.000

Method: IMC Chart

HP-7

Project Name: Creamery Bldg Renovation	Unit Total Supply Air: 1200 CFM
Date: 4/20/2019	Unit Total Outdoor Air: 140 CFM
Unit Designation: HP-7	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Room Number	Description	Area (ft^2) (Az)	Area Outdoor Air Rate per VMC Table 403.3 (Ra)	Area Outdoor Air (RaAz)	Occupant Load Rate per VMC Table 403.3 (People/ 1000 ft2)	Occupancy C x F/1000 (Pz)	Occupant Outdoor Air Rate per VMC Table 403.3 (Rp)	Occupant Outdoor Air (RpPz)	Breathing Zone Outdoor Air (Vbz = RpPz + RaAz)	Zone Air Distribution Effectiveness (Ez)	Zone Outdoor Air (Voz = Vbz / Ez)	Supply Air Design (Vpz)	Secondary Recirculated Air	Outdoor Air Fraction (Zp = Voz / Vpz)
216 Hall	Corridor	200	0.06	12	0	0	0	0	12	0.8	15	270	0	0.056
201 Conference	Breakout Room	220	0.06	13	30	7	7.5	52.5	65.5	0.8	82	340		0.241
212 Dir. Legal Spt	Office	116	0.06	7	5	1	5	5	12	0.8	15	170		0.088
203 Hall	warehouse	130	0.06	8	0	0	0	0	8	0.8	10	170		0.059
204 Attorney	Office	125	0.06	8	5	1	5	5	13	0.8	17	200		0.085
205 RR/206 Jan.	Transfer Air	80	0	0			0	0	0	0.8	0	50	0	0.000
Totals		871		48		9		62.5	110.5		139	1200	0	0.241

2009 OA Version 6.0 A-1 Option - FFX - REG - 3/15/10

Do not utilize Occupant Diversity without specific approval from the Authority Having Jurisdiction

System Population (Ps): Diversity → 9

Occupant Diversity D = Ps/∑all zones Pz: 1.000

Uncorrected O.A Vou = D ∑all zones RpPz + ∑all zones RaAz: 111

Total Required Outdoor Air: 122

Percentage of Outdoor Air: 10%

E_v: 0.910

Method: IMC Chart

HP-8

Project Name: Creamery Bldg Renovation	Unit Total Supply Air: 1600 CFM
Date: 4/20/2019	Unit Total Outdoor Air: 140 CFM
Unit Designation: HP-8	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Room Number	Description	Area (ft^2) (Az)	Area Outdoor Air Rate per VMC Table 403.3 (Ra)	Area Outdoor Air (RaAz)	Occupant Load Rate per VMC Table 403.3 (People/ 1000 ft2)	Occupancy C x F/1000 (Pz)	Occupant Outdoor Air Rate per VMC Table 403.3 (Rp)	Occupant Outdoor Air (RpPz)	Breathing Zone Outdoor Air (Vbz = RpPz + RaAz)	Zone Air Distribution Effectiveness (Ez)	Zone Outdoor Air (Voz = Vbz / Ez)	Supply Air Design (Vpz)	Secondary Recirculated Air	Outdoor Air Fraction (Zp = Voz / Vpz)
224 Hall	Corridor	265	0.06	16	0	0	0	0	16	0.8	20	360	0	0.056
218 Attorney	Office	200	0.06	12	5	1	5	5	17	0.8	22	270		0.081
221 Attorney	Office	150	0.06	9	5	1	5	5	14	0.8	18	210		0.086
222 Attorney	Office	225	0.06	14	5	2	5	10	24	0.8	30	310		0.097
223 Attorney	Office	150	0.06	9	5	1	5	5	14	0.8	18	210		0.086
219 Legal Sec.	Office	85	0.06	5	5	1	5	5	10	0.8	13	120		0.108
220 Legal Sec.	Office	75	0.06	5	5	1	5	5	10	0.8	13	120		0.108
			0	0			0	0	0	0.8	0		0	0.000
Totals		1150		70		7		35	105		134	1600	0	0.108

2009 OA Version 6.0 A-1 Option - FFX - REG - 3/15/10

Do not utilize Occupant Diversity without specific approval from the Authority Having Jurisdiction

System Population (Ps): Diversity → 7

Occupant Diversity D = Ps/∑all zones Pz: 1.000

Uncorrected O.A Vou = D ∑all zones RpPz + ∑all zones RaAz: 105

Total Required Outdoor Air: 105

Percentage of Outdoor Air: 7%

E_v: 1.000

Method: IMC Chart

HP-9

Project Name: Creamery Bldg Renovation	Unit Total Supply Air: 1570 CFM
Date: 4/20/2019	Unit Total Outdoor Air: 120 CFM
Unit Designation: HP-9	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Room Number	Description	Area (ft^2) (Az)	Area Outdoor Air Rate per VMC Table 403.3 (Ra)	Area Outdoor Air (RaAz)	Occupant Load Rate per VMC Table 403.3 (People/ 1000 ft2)	Occupancy C x F/1000 (Pz)	Occupant Outdoor Air Rate per VMC Table 403.3 (Rp)	Occupant Outdoor Air (RpPz)	Breathing Zone Outdoor Air (Vbz = RpPz + RaAz)	Zone Air Distribution Effectiveness (Ez)	Zone Outdoor Air (Voz = Vbz / Ez)	Supply Air Design (Vpz)	Secondary Recirculated Air	Outdoor Air Fraction (Zp = Voz / Vpz)
208 Attorney	Office	150	0.06	9	5	1	5	5	14	0.8	18	220	0	0.082
209 Attorney	Office	175	0.06	11	5	1	5	5	16	0.8	20	260		0.077
210 Attorney	Office	180	0.06	11	5	1	5	5	16	0.8	20	270		0.074
211 Attorney	Office	210	0.06	13	5	2	5	10	23	0.8	29	310		0.094
213 Paralegal	Office	100	0.06	6	5	1	5	5	11	0.8	14	210		0.067
214 Paralegal	Office	110	0.06	7	5	1	5	5	12	0.8	15	200		0.075
IT Closet	warehouse	30	0.06	2	0	0	0	0	2	1	2	50		0.040
212 Restroom	Transfer Air	55	0	0			0	0	0	0.8	0	50	0	0.000
Totals		1010		59		7		35	94		118	1570	0	0.094

2009 OA Version 6.0 A-1 Option - FFX - REG - 3/15/10

Do not utilize Occupant Diversity without specific approval from the Authority Having Jurisdiction

System Population (Ps): Diversity → 7

Occupant Diversity D = Ps/∑all zones Pz: 1.000

Uncorrected O.A Vou = D ∑all zones RpPz + ∑all zones RaAz: 94

Total Required Outdoor Air: 94

Percentage of Outdoor Air: 6%

E_v: 1.000

Method: IMC Chart

HP-10

Project Name: Creamery Bldg Renovation	Unit Total Supply Air: 1940 CFM
Date: 4/20/2019	Unit Total Outdoor Air: 160 CFM
Unit Designation: HP-10	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Room Number	Description	Area (ft^2) (Az)	Area Outdoor Air Rate per VMC Table 403.3 (Ra)	Area Outdoor Air (RaAz)	Occupant Load Rate per VMC Table 403.3 (People/ 1000 ft2)	Occupancy C x F/1000 (Pz)	Occupant Outdoor Air Rate per VMC Table 403.3 (Rp)	Occupant Outdoor Air (RpPz)	Breathing Zone Outdoor Air (Vbz = RpPz + RaAz)	Zone Air Distribution Effectiveness (Ez)	Zone Outdoor Air (Voz = Vbz / Ez)	Supply Air Design (Vpz)	Secondary Recirculated Air	Outdoor Air Fraction (Zp = Voz / Vpz)
227 Hall	Corridor	75	0.06	5	0	0	0	0	5	0.8	7	100	0	0.070
229 Receptionist	Reception	115	0.06	7	30	4	5	20	27	0.8	34	170		0.200
231 Hall	Corridor	95	0.06	6	0	0	0	0	6	0.8	8	140		0.057
217 Copy Room	Office	980	0.06	59	5	5	5	25	84	0.8	105	1530		0.069
Totals		1265		77		9		45	122		154	1940	0	0.200

2009 OA Version 6.0 A-1 Option - FFX - REG - 3/15/10

Do not utilize Occupant Diversity without specific approval from the Authority Having Jurisdiction

System Population (Ps): Diversity → 9

Occupant Diversity D = Ps/∑all zones Pz: 1.000

Uncorrected O.A Vou = D ∑all zones RpPz + ∑all zones RaAz: 122

Total Required Outdoor Air: 129

Percentage of Outdoor Air: 7%

E_v: 0.950

Method: IMC Chart

HP-11

Project Name: Creamery Bldg Renovation	Unit Total Supply Air: 1780 CFM
Date: 4/20/2019	Unit Total Outdoor Air: 180 CFM
Unit Designation: HP-11	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Room Number	Description	Area (ft^2) (Az)	Area Outdoor Air Rate per VMC Table 403.3 (Ra)	Area Outdoor Air (RaAz)	Occupant Load Rate per VMC Table 403.3 (People/ 1000 ft2)	Occupancy C x F/1000 (Pz)	Occupant Outdoor Air Rate per VMC Table 403.3 (Rp)	Occupant Outdoor Air (RpPz)	Breathing Zone Outdoor Air (Vbz = RpPz + RaAz)	Zone Air Distribution Effectiveness (Ez)	Zone Outdoor Air (Voz = Vbz / Ez)	Supply Air Design (Vpz)	Secondary Recirculated Air	Outdoor Air Fraction (Zp = Voz / Vpz)
228 Legal Sec.	Office	90	0.06	5	5	1	5	5	10	0.8	13	130	0	0.100
230 Reception	Reception	110	0.06	7	30	4	5	20	27	0.8	34	170		0.200
233 Elev. Mach.	Warehouse	90	0.06	5	0	0	0	0	5	0.8	7	130		0.054
232 Conference	Conference	105	0.06	6	50	6	5	30	36	0.8	45	160		0.281
234 Kitchenette	Galley	190	0.06	11	5	1	5	5	16	0.8	20	280		0.071
235 Paralegal	Office	105	0.06	6	5	1	5	5	11	0.8	14	160		0.088
236 Attorney	Office	175	0.06	11	5	1	5	5	16	0.8	20	260		0.077
237 File Room	Warehouse	335	0.06	20	0	0	0	0	20	0.8	25	490		0.051
Totals		1200		71		14		70	141		178	1780	0	0.281

2009 OA Version 6.0 A-1 Option - FFX - REG - 3/15/10

Do not utilize Occupant Diversity without specific approval from the Authority Having Jurisdiction

System Population (Ps): Diversity → 14

Occupant Diversity D = Ps/∑all zones Pz: 1.000

Uncorrected O.A Vou = D ∑all zones RpPz + ∑all zones RaAz: 141

Total Required Outdoor Air: 163

Percentage of Outdoor Air: 9%

E_v: 0.870

Method: IMC Chart

HP-12

Project Name: Creamery Bldg Renovation	Unit Total Supply Air: 2040 CFM
Date: 4/20/2019	Unit Total Outdoor Air: 220 CFM
Unit Designation: HP-12	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Room Number	Description	Area (ft^2) (Az)	Area Outdoor Air Rate per VMC Table 403.3 (Ra)	Area Outdoor Air (RaAz)	Occupant Load Rate per VMC Table 403.3 (People/ 1000 ft2)	Occupancy C x F/1000 (Pz)	Occupant Outdoor Air Rate per VMC Table 403.3 (Rp)	Occupant Outdoor Air (RpPz)	Breathing Zone Outdoor Air (Vbz = RpPz + RaAz)	Zone Air Distribution Effectiveness (Ez)	Zone Outdoor Air (Voz = Vbz / Ez)	Supply Air Design (Vpz)	Secondary Recirculated Air	Outdoor Air Fraction (Zp = Voz / Vpz)
304 EM Ofc #!	Office	150	0.06	9	5	1	5	5	14	0.8	18	220	0	0.082
305 EM Ofc #2	Office	150	0.06	9	5	1	5	5	14	0.8	18	220		0.082
322 Part-time Ofc	Office	90	0.06	5	5	1	5	5	10	0.8	13	130		0.100
323 Asst. Director	Office	140	0.06	8	5	1	5	5	13	0.8	17	220		0.077
328 Conference	Conference	105	0.06	6	50	6	5	30	36	0.8	45	160		0.281
327 Reception	Reception	190	0.06	11	30	6	5	30	41	0.8	52	270		0.193
324 Director	Office	200	0.06	12	5	1	5	5	17	0.8	22	290		0.076
325 VW Storage	Warehouse	180	0.06	11	0	0	0	0	11	0.8	14	250		0.056
300 Storage	Warehouse	200	0.06	12	0	0	0	0	12	0.8	15	280		0.054
			0	0			0	0	0	0.8	0		0	0.000
Totals		1405		83		17		85	168		214	2040	0	0.281

2009 OA Version 6.0 A-1 Option - FFX - REG - 3/15/10

Do not utilize Occupant Diversity without specific approval from the Authority Having Jurisdiction

System Population (Ps): Diversity → 17

Occupant Diversity D = Ps/∑all zones Pz: 1.000

Uncorrected O.A Vou = D ∑all zones RpPz + ∑all zones RaAz: 168

Total Required Outdoor Air: 194

Percentage of Outdoor Air: 10%

E_v: 0.870

Method: IMC Chart

HP-13

Project Name: Creamery Bldg Renovation	Unit Total Supply Air: 2000 CFM
Date: 4/20/2019	Unit Total Outdoor Air: 160 CFM
Unit Designation: HP-13	

A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
Room Number	Description	Area (ft^2) (Az)	Area Outdoor Air Rate per VMC Table 403.3 (Ra)	Area Outdoor Air (RaAz)	Occupant Load Rate per VMC Table 403.3 (People/ 1000 ft2)	Occupancy C x F/1000 (Pz)	Occupant Outdoor Air Rate per VMC Table 403.3 (Rp)	Occupant Outdoor Air (RpPz)	Breathing Zone Outdoor Air (Vbz = RpPz + RaAz)	Zone Air Distribution Effectiveness (Ez)	Zone Outdoor Air (Voz = Vbz / Ez)	Supply Air Design (Vpz)	Secondary Recirculated Air	Outdoor Air Fraction (Zp = Voz / Vpz)
Existing Hallway	Corridor	340	0.06	20	0	0	0	0	20	0.8	25	100	0	0.250
Exist. Kitchnette	Galley	310	0.06	19	5	2	5	10	29	0.8	37	300		0.123
330 Office	Office	275	0.06	17	5	2	5	10	27	0.8	34	430		0.079
331 Stg Area #2	Warehouse	295	0.06	18	0	0	0	0	18	0.8	23	410		0.056
331 Stg Area #3	Warehouse	265	0.06	16	0	0	0	0	16	0.8	20	380		0.053
Hallway	Corridor	270	0.06	16	0	0	0	0	16	0.8	20	380		0.053
			0	0			0	0	0	0.8	0		0	0.000
Totals		1755		106		4		20	126		159	2000	0	0.250

2009 OA Version 6.0 A-1 Option - FFX - REG - 3/15/10

Do not utilize Occupant Diversity without specific approval from the Authority Having Jurisdiction

System Population (Ps): Diversity → 4

Occupant Diversity D = Ps/∑all zones Pz: 1.000

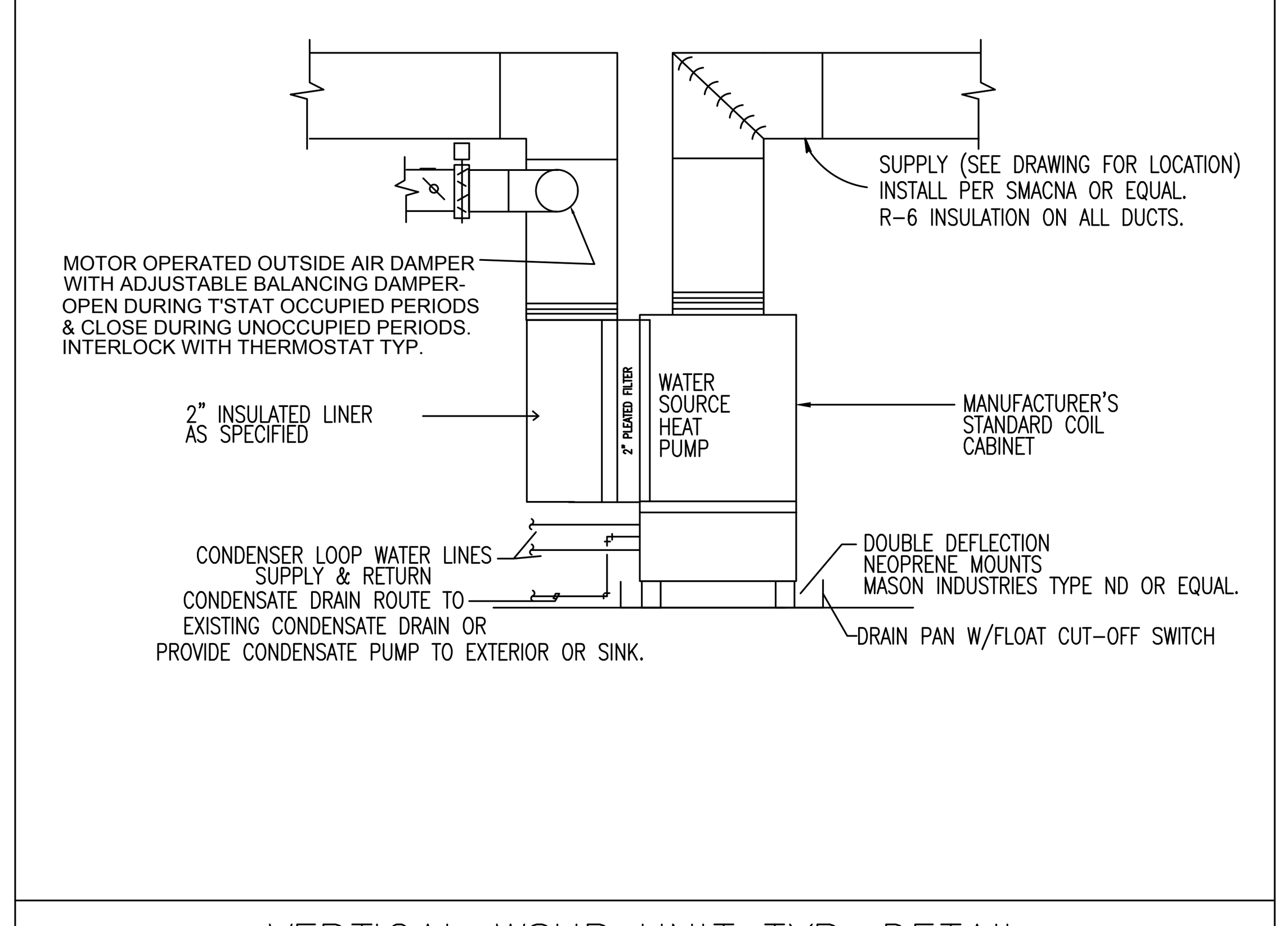
Uncorrected O.A Vou = D ∑all zones RpPz + ∑all zones RaAz: 126

Total Required Outdoor Air: 140

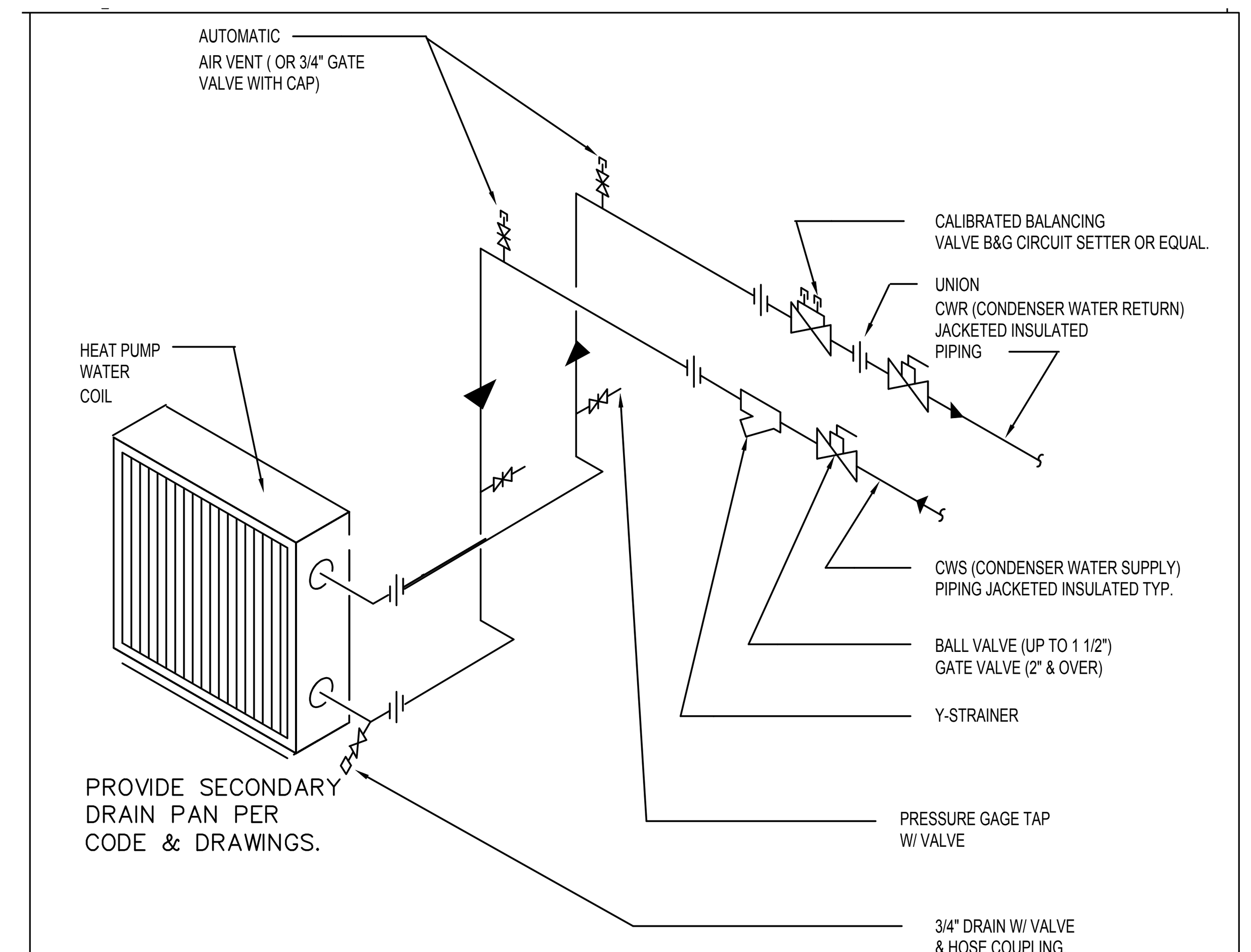
Percentage of Outdoor Air: 7%

E_v: 0.900

Method: IMC Chart



9 VERTICAL WSHP UNIT TYP. DETAIL
NOT TO SCALE



8 WSHP UNIT PIPING DETAIL
NOT TO SCALE

Creamery Building Renovation
21 Kent Street, Winchester, Virginia, 22601

City of Winchester

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A R C H I T E C T S
PLLC
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Structural Engineer
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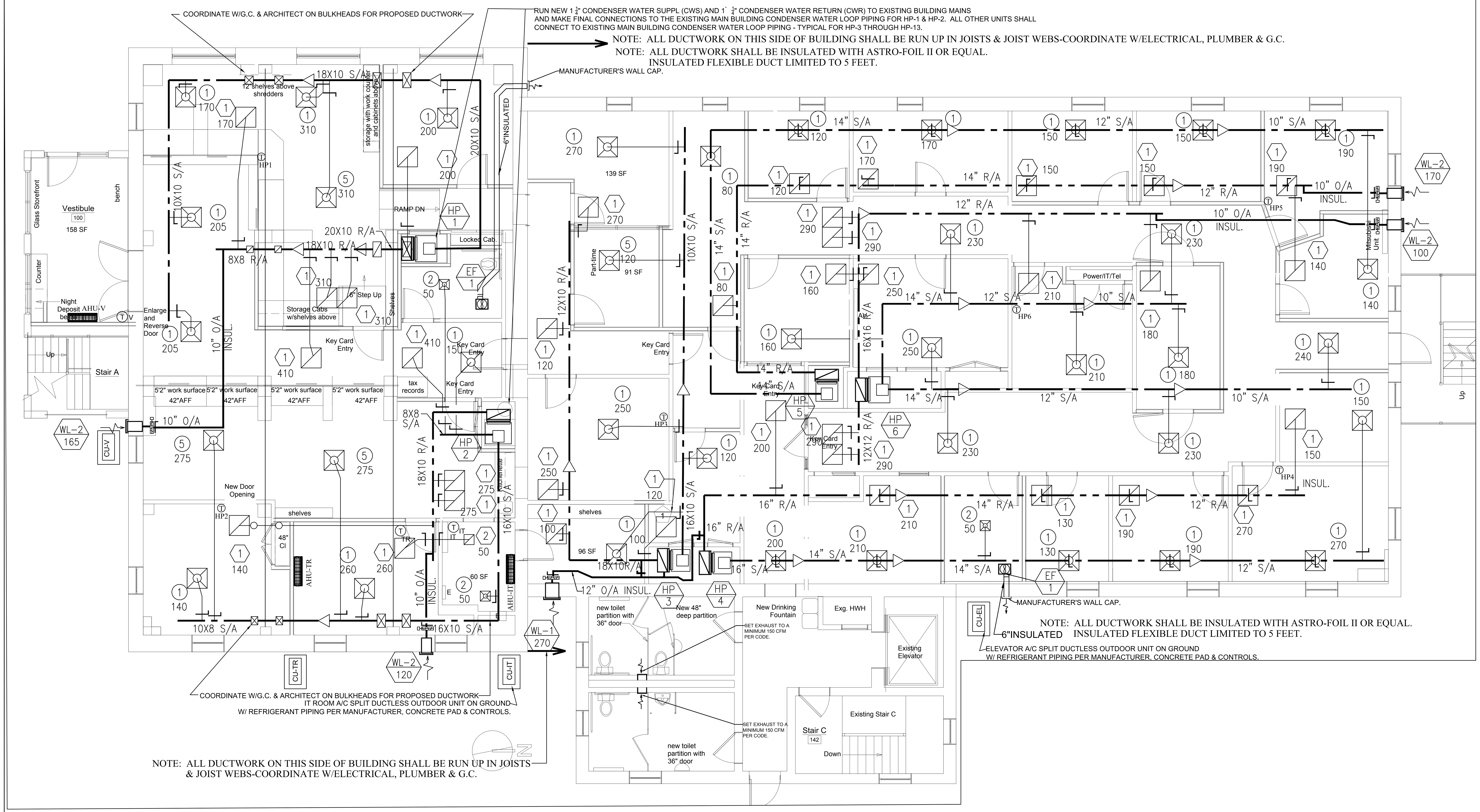
Drawing Title
MECHANICAL WSHP PIPING DIAGRAMS

Issue/Revision
Seal

BID SET NOT FOR CONSTRUCTION

Date 4/19/2019
Scale: As Noted
Project Number: 18545
Drawing Number
CDI Project No: E1923

M1.3



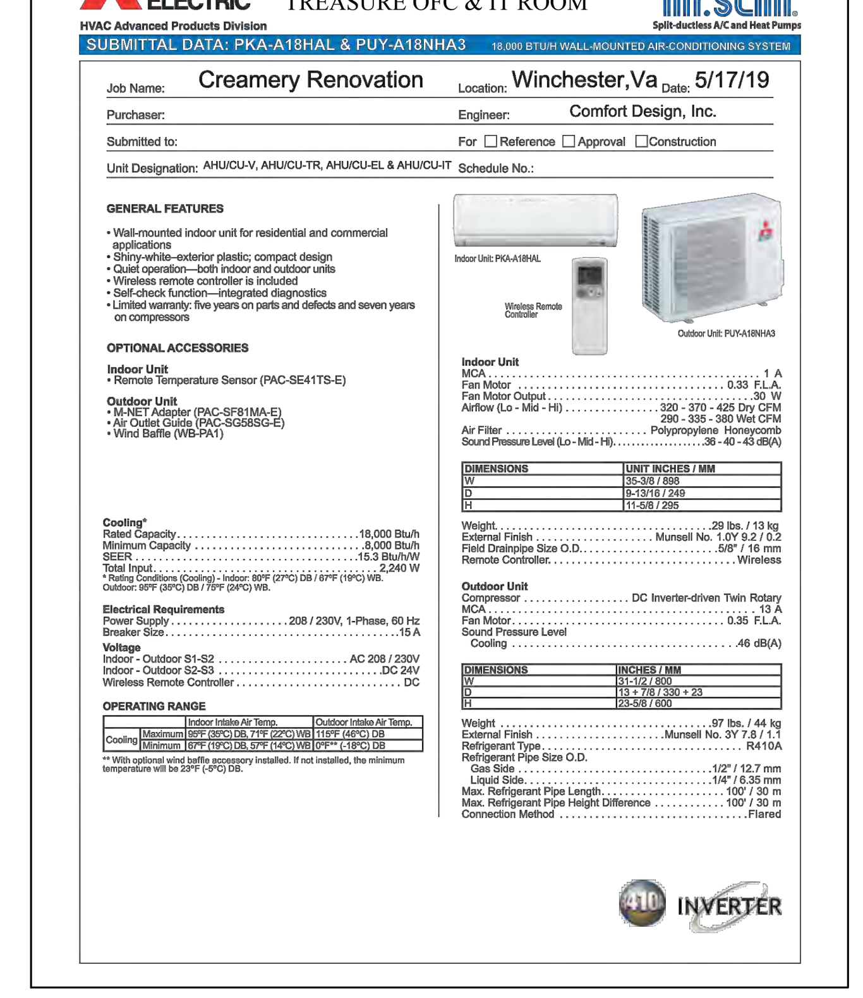
COORDINATE W/G.C. & ARCHITECT ON BULKHEADS FOR PROPOSED DUCTWORK
RUN NEW 1 ¼" CONDENSER WATER SUPPL (CWS) AND 1" ¼" CONDENSER WATER RETURN (CWR) TO EXISTING BUILDING MAINS AND MAKE FINAL CONNECTIONS TO THE EXISTING MAIN BUILDING CONDENSER WATER LOOP PIPING FOR HP-1 & HP-2. ALL OTHER UNITS SHALL CONNECT TO EXISTING MAIN BUILDING CONDENSER WATER LOOP PIPING - TYPICAL FOR HP-3 THROUGH HP-13.
NOTE: ALL DUCTWORK ON THIS SIDE OF BUILDING SHALL BE RUN UP IN JOISTS & JOIST WEBS-COORDINATE W/ELECTRICAL, PLUMBER & G.C.
NOTE: ALL DUCTWORK SHALL BE INSULATED WITH ASTRO-FOIL II OR EQUAL. INSULATED FLEXIBLE DUCT LIMITED TO 5 FEET.
MANUFACTURER'S WALL CAP.
Vestibule
158 SF
139 SF
91 SF
60 SF
96 SF
Stair A
Existing Elevator
Existing Stair C
Stair C
Power/IT/Tel
New Drinking Fountain
Exg. HWH
New 48" deep partition
new toilet partition with 36" door
SET EXHAUST TO A MINIMUM 150 CFM PER CODE.
NOTE: ALL DUCTWORK SHALL BE INSULATED WITH ASTRO-FOIL II OR EQUAL. INSULATED FLEXIBLE DUCT LIMITED TO 5 FEET.
6"INSULATED
ELEVATOR A/C SPLIT DUCTLESS OUTDOOR UNIT ON GROUND W/ REFRIGERANT PIPING PER MANUFACTURER, CONCRETE PAD & CONTROLS.
COORDINATE W/G.C. & ARCHITECT ON BULKHEADS FOR PROPOSED DUCTWORK
IT ROOM A/C SPLIT DUCTLESS OUTDOOR UNIT ON GROUND W/ REFRIGERANT PIPING PER MANUFACTURER, CONCRETE PAD & CONTROLS.
NOTE: ALL DUCTWORK ON THIS SIDE OF BUILDING SHALL BE RUN UP IN JOISTS & JOIST WEBS-COORDINATE W/ELECTRICAL, PLUMBER & G.C.

1 / M2.1 FIRST FLOOR MECHANICAL PLAN
3/16" = 1'-0"

MECHANICAL DEMOLITION SCOPE:

1. CONTRACTOR SHALL REMOVE ALL HVAC UNITS ON 1ST AND 2ND FLOOR AND ONLY THE UNITS ON 3RD FLOOR FOR THE REMAINING RENOVATED SPACES. CONTRACTOR SHALL CAP EXISTING CONDENSER WATER SUPPLY AND RETURN PIPING AND MODIFY CONDENSER WATER PIPING FOR NEW HVAC WATER SOURCE HEAT PUMP UNITS.
2. REMOVE AND DISPOSE OF EXISTING DUCTWORK, EXHAUST FANS EXHAUST DUCTWORK, OUTSIDE DUCTS, DIFFUSERS/REGISTERS, FLEXIBLE /METAL DUCTS, ETC., ON 1ST AND 2ND FLOOR AND THE RENOVATED AREAS ON 3RD FLOOR.
3. COORDINATE WITH G.C., PLUMBING AND ELECTRICAL CONTRACTORS ON REMOVAL OF THE HVAC SYSTEM AND DE-ENERGIZING THE EXISTING HVAC WATER SOURCE HEAT PUMP UNITS FOR REMOVAL.
4. CONTRACTOR SHALL TAKE ALL MEANS TO KEEP THE REMAINING OCCUPIED 3RD FLOOR IN HVAC OPERATION DURING THE RENOVATION. OWNER WILL BE NOTIFIED AT LEAST 48 HOURS IN ADVANCE FOR ANY SHUTDOWN OF HVAC SYSTEMS TO OCCUPIED SPACES.
5. CONTRACTOR SHALL VISIT THE SITE AND MAKE A THOROUGH INVESTIGATION OF EXISTING CONDITIONS & EQUIPMENT PRIOR TO FINAL BID OR ORDERING EQUIPMENT.

SPLIT DUCTLESS UNITS FOR VESTIBULE 100, ELEVATOR MACHINE ROOM, TREASURE OFC & IT ROOM



Creamery Renovation — GREENHECK LOUVER SCHEDULE

ID#	Tag	Mark Name	Qty	Model	Width (in.)	Height (in.)
WL-1	WL-1	WL-1	PER DWG	ESD-603	15	25
ID#	Tag	Mark Name	Qty	Model	Width (in.)	Height (in.)
WL-2	WL-2	WL-2	PER DWG	ESD-603	12	19

Creamery Building Renovation
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City of Winchester

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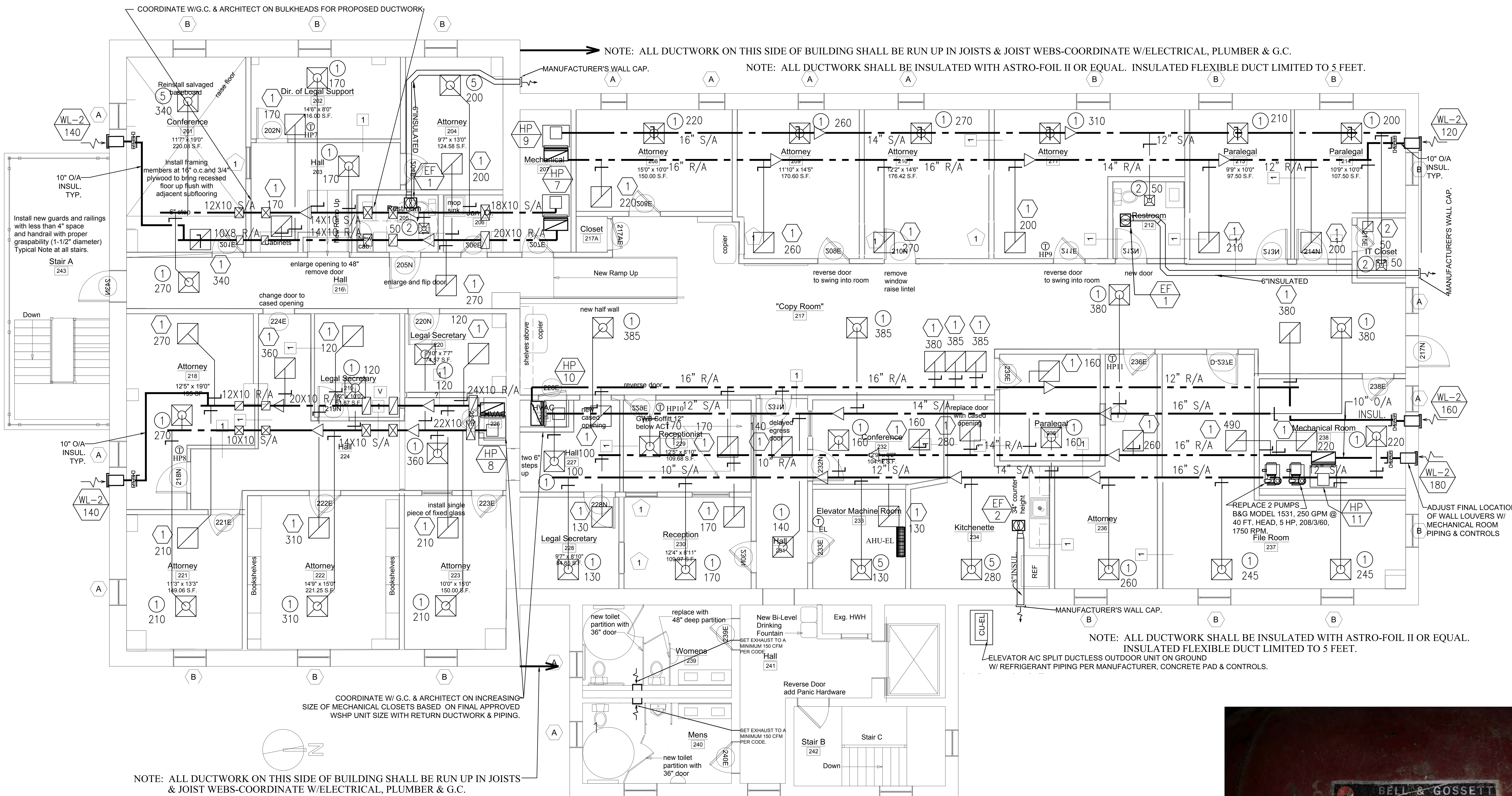
Drawing Title
MECHANICAL 1ST FLOOR PLAN

Issue/Revision
Seal

BID SET NOT FOR CONSTRUCTION

Date 4/19/2019
Scale: As Noted
Project Number: 18545
Drawing Number
CDI Project No: E1923

M2.1



COORDINATE W/G.C. & ARCHITECT ON BULKHEADS FOR PROPOSED DUCTWORK
NOTE: ALL DUCTWORK ON THIS SIDE OF BUILDING SHALL BE RUN UP IN JOISTS & JOIST WEBS-COORDINATE W/ELECTRICAL, PLUMBER & G.C.
NOTE: ALL DUCTWORK SHALL BE INSULATED WITH ASTRO-FOIL II OR EQUAL. INSULATED FLEXIBLE DUCT LIMITED TO 5 FEET.
MANUFACTURER'S WALL CAP.
10" O/A INSUL. TYP.
Install new guards and railings with less than 4" space and handrail with proper graspability (1-1/2" diameter) Typical Note at all stairs.
Stair A
Conference
Dir. of Legal Support
Attorney
Hall
Mechanical
Restroom
Closet
New Ramp Up
"Copy Room"
Legal Secretary
Paralegal
Receptionist
Reception
Conference
Elevator Machine Room
Kitchenette
Mechanical Room
File Room
IT Closet
REPLACE 2 PUMPS B&G MODEL 1531, 250 GPM @ 40 FT. HEAD, 5 HP, 208/3/60, 1750 RPM.
ADJUST FINAL LOCATION OF WALL LOUVERS W/ MECHANICAL ROOM PIPING & CONTROLS
NOTE: ALL DUCTWORK SHALL BE INSULATED WITH ASTRO-FOIL II OR EQUAL. INSULATED FLEXIBLE DUCT LIMITED TO 5 FEET.
ELEVATOR A/C SPLIT DUCTLESS OUTDOOR UNIT ON GROUND W/ REFRIGERANT PIPING PER MANUFACTURER, CONCRETE PAD & CONTROLS.
COORDINATE W/ G.C. & ARCHITECT ON INCREASING SIZE OF MECHANICAL CLOSETS BASED ON FINAL APPROVED WSHP UNIT SIZE WITH RETURN DUCTWORK & PIPING.
Womens
Mens
Stair B
Stair C
Exg. HWH
NOTE: ALL DUCTWORK ON THIS SIDE OF BUILDING SHALL BE RUN UP IN JOISTS & JOIST WEBS-COORDINATE W/ELECTRICAL, PLUMBER & G.C.

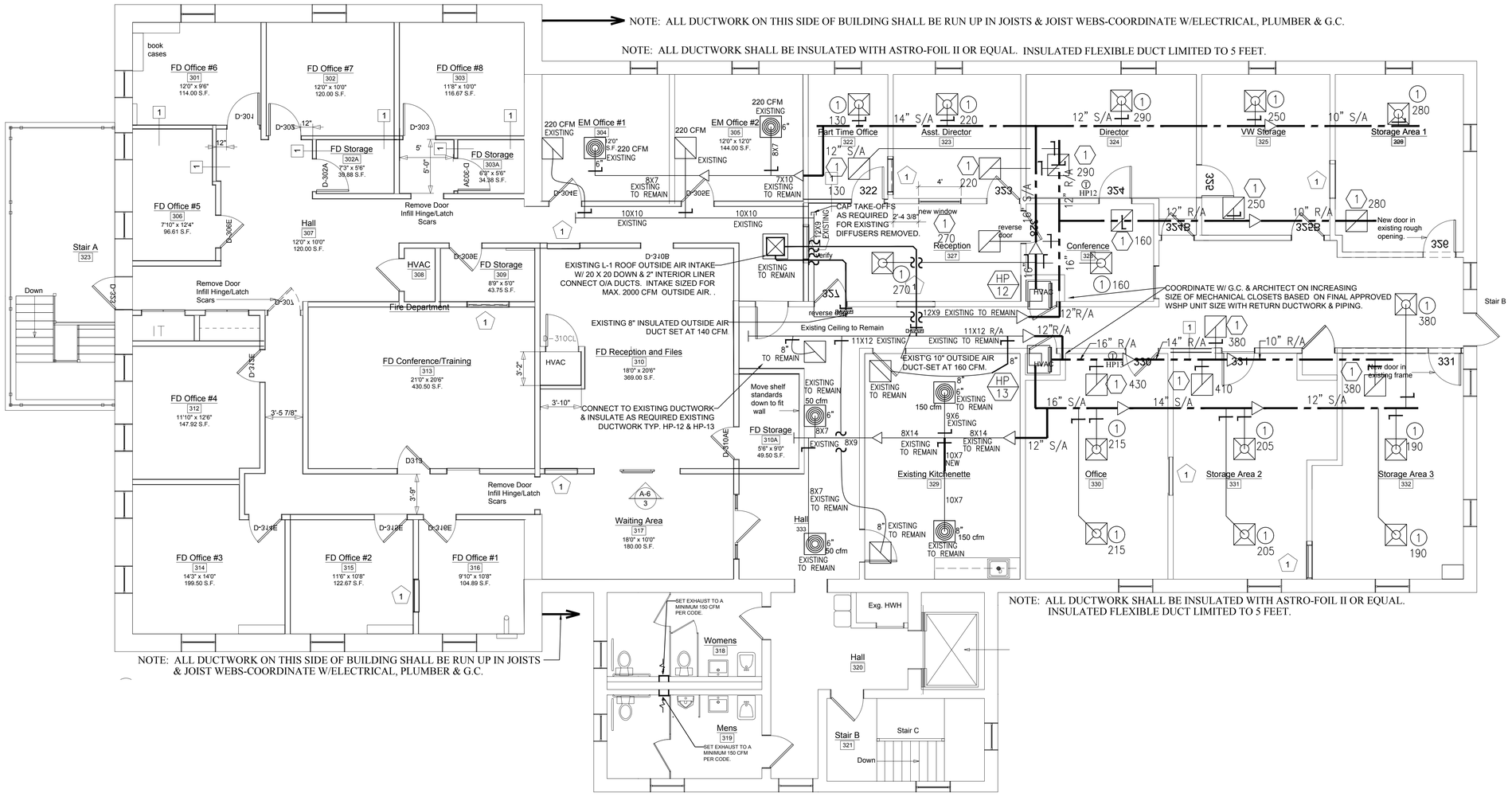
1 M2.2 SECOND FLOOR MECHANICAL PLAN
3/16" = 1'-0"

PUMP MOTOR TAG

PUMP TAG

REPLACE 2 EXISTING CONDENSER LOOP PUMPS WITH MOTORS-COORDINATE W ELECTRICAL CONTRACTOR.

Creamery Building Renovation 21 Kent Street, Winchester, Virginia, 22601	City of Winchester	Architect GROVE & DALL'OLIO ARCHITECTS PLLC 18 West Boscawen Street Winchester, VA 22601	Mech/Elect Engineer Comfort Design Inc. 620 Pennsylvania Avenue Winchester, VA 22601 (540) 665-2846	Structural Engineer PAINTER-LEWIS, P.L.C. 817 Cedar Creek GRADE, Suite 120 Winchester, Virginia 22601 (540) 662-5792	Drawing Title MECHANICAL 2ND FLOOR PLAN	Issue/Revision	Seal BID SET NOT FOR CONSTRUCTION	Date 4/19/2019 Scale: As Noted Project Number: 18545 Drawing Number CDI Project No: E1923 M2.2



1 M2.3 THIRD FLOOR MECHANICAL PLAN

3/16" = 1'-0"

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Drawing Title
MECHANICAL 3RD FLOOR PLAN

Issue/Revision
Seal
BID SET NOT FOR CONSTRUCTION

Date 4/19/2019
Scale: As Noted
Project Number: 18545
Drawing Number
CDI Project No: E1923

M2.3