

CODE REVIEW:

- A. IBC, International Building Code - 2009
- B. ASHRAE Standard 62.1 - 2007
- C. ASHRAE Standard 90.1 - 2010
- D. Maine Internal Plumbing Code 2007
- E. NFPA 1, Fire Code with amendments
- F. NFPA 13, Standard for the Installation of Sprinkler Systems
- G. NFPA 54, National Fuel Gas Code
- H. NFPA 90A, Standard for the Installation of Air-Conditioning and Ventilating Systems
- I. NFPA 101, Life Safety Code

PART 1 - GENERAL - COMMON TO DIVISION 21, 22, and 23

1.1 SCOPE OF WORK

- A. Refer to the HVAC, Plumbing, and Fire Protection sections.

1.2 GENERAL

- A. Furnish all services, skilled and common labor, and all apparatus and materials required for the complete installation as shown and within the intent of the drawings and/or these Specifications.
- B. Provide finished work, fully tested and ready for operation. Any components or labor not mentioned but required for functioning systems shall be provided.
- C. The Contractor, his Subcontractors and Suppliers shall provide to the Owner all paperwork necessary to support the Owners pursuit of incentive grants related to energy conservation.

1.3 SUBMITTALS

- A. Provide in accordance with Division 1 of the specifications.
- B. Submit on the following items:
 1. Package gas/electric Roof Top Units (RTUs) with curbs.
 2. Exhaust Fan (EF).
 3. Ductwork, dampers, flexible ductwork, hangers, and ductwork specialties.
 4. Registers, grilles, and diffusers (RGDs).
 5. Mechanical insulation for domestic piping and ductwork.
 6. Natural gas piping, valves, hangers, and seismic restraints as required.
 7. Domestic water distribution piping, valves, and hangers.
 8. Sanitary & Storm water piping, fittings, hangers, specialties, overflow outlets, and roof drains.
 9. Plumbing fixtures and accessories.
 10. Mechanical ID for all HVAC equipment.
 11. TAB report for renovated areas and Phase 1 addition.
 12. Startup reports for RTUs and EF.
 13. Owner's manuals for all plumbing and HVAC equipment.

1.4 COORDINATION & QUALITY ASSURANCE

- A. All work, materials, and equipment shall comply with the rules and regulations of all codes and ordinances of the local, state, and federal authorities.
- B. Follow the recommended procedures of the SMACNA IAQ Guidelines for Occupied Buildings under Construction.
- C. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces.
- D. Coordinate location of piping, sleeves, inserts, hangers, ductwork and equipment. Locate piping, sleeves, inserts, hangers, ductwork and equipment clear of windows, doors, openings, light outlets, and other services and utilities. Follow manufacturer's published recommendations for installation methods not otherwise specified.
- E. Coordinate roof drains with roofing DIV 7. Roof drains to be provided by DIV 22 and installed by DIV 7.
- F. General Requirements
 1. Install equipment in accordance with manufactures recommendations.
 2. Install piping, ductwork, and equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
 3. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
 4. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
 5. Install piping and ductwork in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
 6. Install mechanical systems above accessible ceilings to allow sufficient space for ceiling panel removal.
 7. Install piping to permit valve servicing.
 8. Make allowances for application of insulation.
 9. Verify final equipment locations for roughing-in.

1.5 IDENTIFICATION

- A. Provide pipe labeling per ASME A13.1, "Scheme for the Identification of Piping Systems," for letter size, length of color field, colors, and viewing angles of identification devices for piping.
- B. Equipment Markers: Engraved, color-coded laminated plastic; attach with screws or contact-type, permanent adhesive. Size: 2-1/2" x 1" or as applicable

1.6 PIPING

- A. Fire protection
 1. Pipe and fittings shall conform to the requirements of NFPA 13. Pipe shall be listed by UL and be FM approved, and installed per its listing and approval.
 2. Sprinkler piping shall be equal to black steel schedule 40, 2 inch and smaller, and thinwall 2 1/2 inch and larger.
- B. Plumbing
 1. Distribution: Soft Copper Tube, ASTM B 88, Types K and L, water tube, annealed temper.
 - a. Copper Pressure Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
 2. Ball Valves
 - a. The valve body and adapter shall be constructed using Lead Free brass. Lead Free ball valves shall comply with state codes and standards, where applicable, requiring reduced lead content.
 3. PVC Drainage, Storm water piping and specialties
 - a. Pipe and fittings shall be manufactured from PVC compound with a cell class of 12454 per ASTM D-1784 and conform with National Sanitation Foundation (NSF) standard 14. Pipe shall be iron pipe size (IPS) conforming to ASTM D-1785 and ASTM D-2665. Fittings shall conform to ASTM D-2665.
 - b. Roof drains: Equal to Zurn Z165 combination main with overflow drain, low silhouette domes & double top-set deck plate. Drain size as indicated on drawings.
 - c. Roof drain overflow downspout outlet cover: Equal to JR Smith #1775.
- C. Natural Gas Piping
 1. Per NFPA 54 and FM Standard approved.
 2. Seismic restraint installation per design category B.
 3. Corrugated SS system equal to Omega Flex, Inc.
 4. Black steel pipe: ASTM A 106 Grade B, Sched 40.
 5. Valves: ASME B1.20.1 for pipe threads.
 6. Appliance connector valves IAS listed.
 7. At gas entrance, all exposed outdoor piping shall be painted to match existing Utility's color. In all other locations piping shall be painted safety yellow under Phase 1.

1.7 PIPE INSULATION

- A. Knauf 1000 Pipe Insulation with ECOSE Technology meeting ASTM C547 Type IV Grade A, ASTM C585, and ASTM C795.
- B. Domestic
 1. Domestic cold water: Glass Fiber, 1/2" thickness.
 2. Domestic hot water: 1-1/4" and less: Glass Fiber, 1" thickness; 1-1/2 and larger: Glass Fiber, 1.5" thickness.
- C. Horizontal rain water piping
 1. Glass Fiber, 1" thickness.
 2. Roof Drain Bodies: Flexible Elastomeric, 1/2" thickness.

1.8 PIPE HANGERS

- A. Install in accordance with MSS SP69 - Manufacturers Standardization Society: Pipe Hangers and Supports- Selection and Application.

1.9 PIPE PENETRATIONS

- A. Escutcheons: Provide for wall, ceiling, and floor penetrations in finished spaces where pipes are exposed.

PART 2 - HVAC SCOPE OF WORK

2.1 REMOVALS

- A. Remove existing ductwork, and other HVAC items shown on demolition plans. Some items (diffusers) will be removed for reuse with renovated layout. Refer to Demolition Drawings.

2.2 NATURAL GAS SERVICE

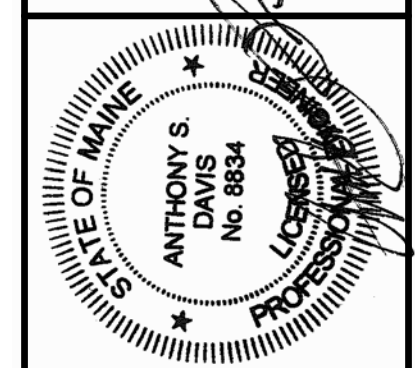
- A. Extend natural gas service from the existing gas utility's entrance. The existing entrance regulator may not have the capacity to meet the proposed additional demand, which will require upgrading the regulator. Gas piping shown on drawings is designed at 2 psi initial building pressure with 1 psi drop.

2.3 DUCTWORK

- A. Duct shall be constructed of galvanized, sheet steel, normal service: Lock-forming quality; ASTM A G60 (interior concealed), G90 (exterior), Galvannealed finish (exposed to be painted where noted on drawings), and Aluminum spiral (Exposed in waiting area). Hangers shall be sheet steel or round, threaded steel rod for concealed ductwork; for ALL exposed spiral ductwork use aviation wire hanger equal to: Ductmate Clutcher model CL20 (250#) with 5:1 safety factor, and WR20500 #20 steel cable. Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction with sheet steel, according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible." Comply with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals. Fabricate supply ducts of galvanized steel according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" latest edition.
 - B. Round ducts: Concealed round ducts shall be longitudinal Grooved Seam Flat lock (RL-5 seam) at 2-inch wg construction.
 - C. Round joints shall be interior slip coupling beaded at center and fastened to duct with screws shall be used to join ducts. Seal joint with an approved sealing compound, continuously applied around joint prior to assembling and after fastening, making certain that majority of sealant resides on interior of the joint.
 - D. Manual volume dampers shall be factory fabricated with required hardware and accessories. Stiffen damper blades for stability. Include locking device to hold single-blade dampers in a fixed position without vibration.
 - E. Duct access panels shall be rated for 2" w.g. minimum operating pressure (SMACNA Seal Class A). Construct doors in accordance with Figure 2-10 of the 1995 SMACNA Manual, "HVAC Duct Construction Standards, Metal & Flexible" Second Edition. Manufacturer to provide an installed neoprene gasket around perimeter of access door for airtight seal.
 - F. Seam And Joint Sealing:
 1. Joint sealant/mastic shall be flexible, water-based, adhesive sealant designed for use in all pressure duct systems. Maximum 5 flame spread and 0 smoke developed (ASTM E-84 Tunnel Test) for mastics/sealers, resistant to mold, mildew and water, gray in color.
 2. Exposed spiral ductwork shall be sealed at all joints. Sealing system equal to SURE-SEAL, self-sealing spiral ductwork system.
 3. Seal duct seams and joints according to the duct pressure class indicated and as described in SMACNA's "HVAC Duct Construction Standards--Metal and Flexible." Seal to SMACNA Class A; all joints, longitudinal and transverse seams, and connections in ductwork shall be securely fastened and sealed with welds, gaskets, or duct sealant.
 - G. Ductwork Insulation:
 1. Knauf mfg or equal.
 2. Flexible Fiber Glass Blanket, ASTM C553, k value 0.29 at 75F mean temperature, vapor retarder jacket:FSK.
 3. Return ducts within conditioned space: No Insulation.
 4. Supply ducts within conditioned envelope: R-6, 1.5" thickness.
 5. Supply ducts exposed: No Insulation.
 6. Exhaust ducts: No Insulation.
- 2.4 REGISTER, GRILLES, & DIFFUSERS
- A. Diffusers, registers, and grilles are scheduled on Drawings.
 - B. Equal to PRICE mfg. models: SCD, 520D, 530, and LV1 with 500 border.
 1. Primed steel for field painting at locations where ductwork is to be painted.
 2. Factory steel white for finished ceiling and wall locations.
 3. Aluminum with aluminum mill finish at all aluminum ductwork locations and vestibules.
- 2.5 HVAC SYSTEMS
- A. The Phase I Addition is served by (2) gas fired-electric packaged roof top units. (RTU-1) serves the two story pilots area and upper offices and (RTU-2) serves the open waiting area.
 1. RTU-1 is equal to Trane YCZ model as scheduled on drawings. Unit shall have high efficiency compressors, economizer cooling with power exhaust, staged gas heating, stainless steel heat exchanger, and complete coat coils. RTU-1 operates as a VAV by-pass system. Variable volume air terminals (VAVs) vary air flow based on zone heating or cooling loads. The VAV terminals do not have reheat coils and are scheduled on drawings. VAV system shall operate via Trane VariTrac change over by pass control package. Roof curb shall be 24" in height with 1 1/2" insulation.
 2. RTU-2 is equal to Trane Voyager (eFlex) YZD as scheduled on drawings. Unit shall be high efficiency, have economizer cooling with power exhaust, variable speed compressors and fans, VFD supply fan, fully modulating gas heating, factory smoke detector, stainless steel heat exchanger, complete coat coils. RTU-2 operates as a single zone VAV system. Roof curb shall be 24" in height with 1 1/2" insulation.
 - B. Staff toilet exhaust fan (EF) shall be a ceiling mounted fan ducted to the roof terminating with a roof jack.
 1. EF is equal to Cook GC series as scheduled on drawings. Provide variable speed controller, vibration isolators, and manual starter switch.
 - C. ITE room 105 shall be served by cooling only wall-mounted ductless air conditioner.
 1. Ductless air conditioning (DAC-1 & DCU-1), equal to Mitsubishi Seacoast model PKA (indoor) and PUY (outdoor) unit size as scheduled on drawings.
 2. Advanced wiring controller.
 3. Wall bracket for outdoor unit.
 4. Condensate pump for indoor unit.

160 Veranda Street
Portland, Maine 04103
T: 207.221.2260
F: 207.221.2266
Web: www.allied-eng.com

Allied Engineering
Structural Mechanical Electrical Commissioning



GRANT HAYS ASSOCIATES
ARCHITECTURE & INTERIOR DESIGN
P.O. BOX 0179 FALMOUTH MAINE 04103
207.871.9500 www.granthays.com

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NORTHEAST AIR
PORTLAND INTERNATIONAL AIRPORT
PORTLAND, MAINE 04102
1011 WESTBROOK STREET
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