2.6 TEMPERATURE CONTROLS

A. Standalone factory controls supplied with RTU. Controls shall have BACnet interface.

B. Features and options shall include the following:

1. RTU-1
   a. Trane VariTrac bypass control package.
      1) VariTrac zone sensors with adjustable setpoint, night setback and display.
      2) VariTrac central control panel with memory backup.
      3) VariTrac communicating bypass controller.
      4) VariTrac unit control module for bypass and zone dampers.
   b. Differential pressure switches.
   c. Discharge air sensing.
   d. Comparative Enthalpy.
   e. CO2 Demand control ventilation.

2. RTU-2
   a. Differential pressure switches.
   b. Discharge air sensing.
   c. Comparative Enthalpy.
   d. Remote potentiometer.
   e. Zone sensors.
   f. CO2 Demand control ventilation.

C. Control Sequences:

1. RTU-1
   a. RTU-1 operates via set occupied and unoccupied preset schedule.
   b. Operates with changer over by pass control.
      Occupied: the fan runs continuously, OA damper goes to set minimum position, and unit operates in heating or cooling modes with set dead band between modes. VAV terminals modulate zone air flow in sequence with VAV by pass terminal to maintain zone temperature setpoint. Economizer cooling shall operate in sequence with mechanical cooling when OA and RA enthalpy conditions allow.
   c. CO2 sensor modulates OA damper open when levels of CO2 rise above 1,000 ppm setpoint.

2. RTU-2
   a. RTU-2 operates via set occupied and unoccupied preset schedule.
      Occupied: the fan runs continuously, OA damper goes to set minimum position, and unit operates in heating or cooling modes with set dead band between modes. RTU-2 operates as a single zone VAV system. Economizer cooling shall operate in sequence with mechanical cooling when OA and RA enthalpy conditions allow.
   b. CO2 sensor modulates OA damper open when levels of CO2 rise above 1,000 ppm setpoint.

3. Staff EF
   a. EF shall operate continuously during occupied hours via electronic timer with adjustable occ/unocc scheduling.

2.7 TESTING, ADJUSTING, & BALANCING

A. Test adjust, and balance new and affected work in accordance with AABC procedures.

B. Work shall be performed by an independent TAB agency.

C. Provide air balance for RTU-1. RTU-2, and EF systems.

D. Measure and record existing air flows of all grilles and diffusers removed for reuse in the renovation portion of this project. The recorded air flows will the basis for the re located grilles and diffusers.

2.8 START UP

A. Provide factory startup of equipment.

B. Provide a minimum of 8 hours of training by factory-trained field service technicians during the factory start up.

PART 3 - PLUMBING SCOPE OF WORK

3.1 REMOVALS

A. Remove existing plumbing fixtures and piping where shown on the demolition plans.

3.2 CONNECTIONS TO EXISTING

A. Sanitary main is below slab. Existing above slab sanitary exists in walls to be demolished and may be able to be connected to prior to waste drop to below slab.

B. Existing potable water is located at the ceiling in adjacent bathrooms.

3.3 PLUMBING FIXTURES

A. Provide new plumbing fixtures where indicated and scheduled on drawings.

B. Provide ADA fixtures and trim where indicated.

C. P-1 - Water closet: Floor mount tank type ADA.

1. Acceptable manufacturers: American Standard, Eljer, Kohler.
2. Basis of Design: American Standard, Champion Pro, Right Height Elongated Bowl. 1.28 gallons/flush, 1,000 g MaP Score at 1.28 gpf. #211AA.105, white.
3. Heavy duty toilet seat equal to American Standard #5325.010.

D. P-2 - Utility Tub:

1. Mustee model 18F, floor mount, 34" x 20" x 24", white, fiberglass & stone molded construction.
2. Faucet: Mustee model 93.600, chrome finish, 4" centers, 7" swing spout with aerator.
3. Tub to include complete drain assembly.

E. P-3 Breakroom Sink & Faucet:

1. Elkay Model LRAD2219R, 22"l x 19"w x 6"d, 18 gauge 304 stainless steel.
2. Include supplies with stops and drain assembly with basket strainer.
3. Faucet equal to Symmons Andora, S-26, single handle faucet with pull out spray.
4. Integral check valves, ceramic control components, polished chrome finish.

3.4 PLUMBING EQUIPMENT AND COMPONENTS

A. Systems to be furnished and installed in accordance with the Maine Plumbing Code. Plumbing work shall be performed by, or under, the direct supervision of a licensed master plumber.

B. Water Piping: Copper piping as per Maine Plumbing code. Solder shall be SilverBrite 100. CPVC not permitted.

C. Waste and Vent Piping: PVC, CPVC, or cast iron. PVC solvent-welded joints shall be made with a PVC primer-containing purple primer dye.

D. Common Plumbing Fixture Requirements

1. Fixtures shall be water conservation type in accordance with local, state, and federal requirements.
2. Vitreous china, nonabsorbent, hard-burned, and vitrified throughout the body shall be provided. Porcelain enameled ware shall have specially selected, acid-resisting enamel coating evenly applied on surfaces. No fixture will be accepted that shows cracks, crazes, blisters, thin spots, or other flaws.
3. Fixture color shall be white except as specified herein.
4. Fixtures shall be equipped with appurtenances such as traps, faucets, stop valves, and drain fittings.
5. Provide access panels to concealed valves and components. All components shall have proper access in accordance with manufactures' recommendations.

E. Valves:

1. Shutoff valves: ball type.
2. Low point drains shall be ball valves with end caps.
3. Each water service main, branch main, riser and branch to a group of fixtures shall have valves.
4. Stop valves shall be provided for each fixture.

F. Insulation

1. Domestic hot and recirculated hot water: Pipe size 1-1/4" and less: Mineral fiber; k 0.23; ½" thickness. Pipe size 1-1/2 and larger: Mineral fiber; k 0.23; 1" thickness.
2. Domestic cold water, roof drains:
   a. Pipe size 1-1/4" and less: Mineral fiber; k 0.23; ½" thickness; with vapor retarder.
   b. Pipe size 1-1/2 and larger: Mineral fiber; k 0.23; 1" thickness; with vapor retarder.

PART 4 - FIRE PROTECTION SCOPE OF WORK

4.1 CONNECTIONS TO EXISTING

A. Extension of Fire Sprinkler System from entrance located in adjacent Hangar building.

4.2 OUTLINE SCOPE OF WORK

A. Provide a NFPA 13 wet sprinkler system serving the entire renovated space and phase-I addition.

B. Conceal piping in areas with hung ceilings. Areas with exposed ceilings will have exposed sprinklers pipes, these exposed piping layouts will need to be approved by the Architect and shall be painted to match adjacent colors.

C. Design sprinklers and obtain approval the State Fire Marshal and the City of Portland. The design of the automatic sprinkler system shall be complete with all necessary accessories for proper operation.

D. Sprinkler Occupancy Hazard Classifications shall be per NFPA 13.

E. Contractor shall obtain and pay for required permits.

F. Shop Drawings: Submit working plans, prepared according to NFPA 13, and hydraulic calculations with cross reference to applicable drawings, water supply data, and equipment schedule with ratings for the system.

G. Engineering Responsibility: Preparation of working plans, calculations, and field test reports by a qualified sprinkler designer. Base calculations on results of fire hydrant flow test. Sprinkler designer shall be legally qualified and licensed to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of fire-suppression piping that are similar to those indicated for this Project in material, design, and extent.

H. Contractor shall be a licensed fire sprinkler contractor. Sprinkler work shall be performed by, or under the direction of a NICET Level III sprinkler technician.

I. Piping and materials shall be in accordance with NFPA 13. Piping shall be Schedule 40 black iron; painted.

J. Sprinklers shall be quick response. General: Use sprinklers according to the following applications:

1. Open Waiting Room: Pendant--WHITE Color.
2. All occupied rooms with Finished Ceilings: Recessed Pendant--WHITE Color.
3. Wall Mounting: Sidewall sprinklers--Color to be approved by Architect.
4. Finishes: Unfinished spaces not exposed to view: rough bronze.

PART 5 - EXECUTION

5.1 DEMOLITION AND REMOVALS

K. Refer to Division 1 for general demolition requirements and procedures.

L. Coordinate requirements for access panels and doors for mechanical items requiring access that are concealed behind finished surfaces. Access panels and doors are specified in Division 8.

M. 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.

5.2 COMMON REQUIREMENTS

N. 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. Any structural member weakened or impaired by cutting, notching, or otherwise shall be reinforced, repaired, or replaced so as to be left in safe structural condition in accordance with the local building code requirements.
6. Install piping and ductwork in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
7. Install mechanical systems above accessible ceilings to allow sufficient space for ceiling panel removal.
8. Install piping to permit valve servicing.
9. Install free of sags and bends.
10. Install fittings for changes in direction and branch connections.
11. Make allowances for application of insulation.
12. Verify final equipment locations for roughing-in.
13. Coordinate work between trades, such as sheet metal contractor installs motor dampers provided by the temperature controls contractor.

O. TAB: perform air balance report per AABC and NEBB.

1. ERU shall be initially balanced via ECM controlled motors.

P. Painting of plumbing and mechanical systems, equipment, and components is specified in Division 9.

Q. ROOFING

1. Refer to Division 7.
2. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

R. PROJECT CLOSEOUT

1. Provide Demonstration and Training in accordance Division 1.

END OF SECTION 21-22-23

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Project No:	15028
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MECHANICAL SPECIFICATIONS
~ CONTINUED

NEA NORTHEAST AIR
PORTLAND INTERNATIONAL JETPORT
1011 WESTBROOK STREET PORTLAND, MAINE 04102

90% PRICING SET ~ 14 DECEMBER 2015 ~ NOT FOR CONSTRUCTION

MH-4

A1 MECHANICAL SPECIFICATIONS

NONE

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