0 Canal Plaza – MEP Basis of Design

Governing Codes & Regulations

2009 International Building Code
2009 International Energy Conservation Code
2009 Uniform Plumbing Code
2009 International Mechanical Code
ASHRAE 62.1 – 2007 Ventilation for Acceptable Indoor Air Quality
ASHRAE 90.1 – 2007 Energy Standard for Buildings except Low-Rise Residential Buildings
State of Maine Standard for the Design and Installation of Life-Safety Sprinkler Systems
City of Portland Design Manual
Portland Water District Construction Specifications

Mechanical

Heating and cooling will be provided by either a 6-Ton or a 12-Ton Variable Refrigerant (VRF) system with the exterior condensing unit(s) installed on the roof of 3 Canal Plaza. The design cooling load for the building fitted out as a restaurant with 50 people was approximately 8.5 tons, with almost 50% of that load due to solar gain. Final energy modeling should be performed prior to a tenant fit-out based on actual intended use of the building. Two sets of insulated refrigerant and control lines will be run through 3 Canal Plaza and underground to 0 Canal Plaza where they can serve multiple indoor units – one set of lines for a 6-Ton system and one set of lines for a 12-Ton system. Electrical capacity will be run to the roof to service two outdoor units (6-Tons each).

Ventilation is designed to be provided by an interior-mounted Energy Recovery Ventilator (ERV), which would exhaust bathrooms and kitchen areas, and provide fresh air to the main dining areas (if set up as a restaurant).

If Kitchen exhaust is required, provisions are in place for two kitchen venting options:

1. Option 1: Kitchen exhaust will be provided by a ventless, Type I, UL-listed kitchen exhaust hood(s) with integral fire suppression. These hood(s) will limit any kitchen equipment to electric-only cooking fuel. Maximum surface temperature must comply with the equipment UL listing. ERV will have to be sized to provide the general room exhaust air recommended by the ventless hood manufacturer(s).
2. Option 2: Kitchen exhaust will be provided by a vented Type 1, UL-listed kitchen exhaust hood discharging to a roof-mounted upblast fan through one of three bond-out locations in the roof. Make-up air will be provided by a dedicated (heating only) make-up air unit mounted inside the building. Non-kitchen exhaust and fresh air (bathrooms, seating areas) will be provided by an appropriately sized ERV. Basis of Design:
    a. Captiveaire Model 5424 – 6’ Type 1 Hood
    b. Captiveaire Model DU85HFA – Centrifugal Upblast Exhaust Fan
    c. Captiveaire Model D76 – Compact Gas-Fired Make Up Air Unit

Electrical

The new electrical service will be a 400A service from Manhole #5 in the sidewalk outside 3 Canal Plaza. Downstream of the meter two disconnects will feed one circuit (200A) feeding two breaker disconnects (100A each) for the heat pump condensing units on the roof of 3 Canal Plaza, and one circuit (400A) feeding the main panel in 0 Canal Plaza.

Plumbing

Water and fire sprinkler service for the 0 Canal Plaza will be provided by a 4" service connection from the existing 3 Canal Plaza water service, sub-metered downstream of the 3 Canal Plaza meter . The water supply may require a pressure-reducing valve to bring pressure down to 80 psig maximum inside the building. The water supply piping will split to serve a fire sprinkler system and a 1-1/2" domestic service in 0 Canal Plaza. Confirm final piping arrangement in 3 Canal Plaza and 0 Canal Plaza with the Portland Fire Department, the Portland Water District, and a licensed Fire Protection Engineer prior to Construction.

Sanitary sewer will connect to the city sewer system via manholes in the Plaza to Union Street. 0 Canal Plaza will have one 4" connection for non-grease sanitary waste, and a second 4" connection for grease interceptor sanitary waste. The grease interceptor is to be buried in the Plaza, exterior to the building with an H-20 rated cover. Install building and grease interceptor clean-outs in accordance with Code and the manufacturer's instructions. The (2) 4" grease and non-grease sanitary pipes will combine into a single 4" pipe downstream of the grease interceptor outlet. A 3" building vent will exit through the 0 Canal Plaza roof .

Storm water will be collected by (1) 3" roof drain, through the building, and connect below grade to the storm water drainage system in the Plaza. Secondary drainage will be addressed by the open-sided roof design.

Natural gas will be provided to the building by a 1-1/4" service connection from outside 3 Canal Plaza.

Domestic hot water will be provided by a gas-fired commercial storage water heater (if the building is fit out as a restaurant). If the building is not a restaurant, a wall-hung gas-fired on-demand water heater or an electric storage water heater would be suitable.

Core & Shell Equipment Plan

Mechanical

Route two insulated refrigerant line sets (includes control wiring) for a 6-Ton and a 12-Ton Mitsubishi City Multi VRF from the intended mounting location on the roof of 3 Canal Plaza and stub up into 0 Canal Plaza. Confirm line set sizing with manufacturer, reference schedule on Drawing MEP600.

Provide exterior wall penetrations for future ERV(s) and direct-fired make-up air unit with a minimum 10 foot separation from each other in accordance with the Architectural and Structural drawings. The fresh air intake location must maintain Code required separation distances from building exhausts, vehicle traffic, and other items such as water heater flue gas vents and plumbing vents.

Electrical

Install a new 400A feeder from the mole rack in MH-05 in 4" PVC conduit to the new meter to be located at 0 Canal Plaza. From the meter install cabling to feed a 400A and 200A disconnect switch. Run (1) 200A feed to two fused disconnects (100A each) on the roof of 3 Canal Plaza for the heat pumps. Run from the 400A disconnect to a new 400A main power panel.

Plumbing

Provide water service connection for building supply. Install isolation valves and back flow preventers as required by the Portland Water District. Stub up in 0 Canal Plaza.

Stub up (1) 4" sanitary connection in 0 Canal Plaza. Install exterior building clean-out. Install Schier GB-75 grease interceptor in the Plaza at the outlet of the 0 Canal Plaza grease piping. Connect a second 4"

connection to the grease interceptor and stub up grease piping inside 0 Canal Plaza. Install grease interceptor clean-outs as required by the manufacturer. Connect sanitary sewer to sewer manhole as shown on Civil drawings.

Provide 3" building plumbing vent through roof of 0 Canal Plaza, in accordance with Code.

Tenant Fit-Out Equipment Plan

Mechanical

Install one or two 6-Ton Mitsubishi City Multi VRF condensing units with cold weather kit on the roof of 3 Canal Plaza, connect to insulated refrigerant line set as required to meet calculated Tenant cooling and heating loads. Mount condensing unit(s) above expected snow level – minimum 2' above the roof, 3' – 4' ideal. Use Quick Sling or Bigfoot heat pump stands or equivalent.

Install Mitsubishi indoor unit(s) as required to meet heating and cooling requirements and distribution. Indoor unit options include ceiling concealed ducted, ceiling suspended, ceiling cassettes, wall-mounted, or floor-mounted.

Install a Renewaire ERV with electrically commutated motor (ECM), motorized isolation dampers on exhaust and outdoor airstreams, and remote potentiometer speed control as required to meet ventilation air requirements based on occupancy type. Connect exhaust and outside air ducts to existing penetrations with weather hood and backdraft damper. Duct supply (fresh) air to dining area and return (exhaust) air from bathrooms and kitchen area. Ducts to the outside shall be insulated with duct wrap with vapor barrier in accordance with Code.

Install kitchen vent and make-up air system in accordance with Code. Cooking line must meet hood limitations per the UL listing.

Electrical

Tenant will move main panel to final location per the interior design. Tenant will connect heat pump condensing units on the roof of 3 Canal Plaza to the fused disconnects.

Plumbing

Tenant will install all plumbing fixtures as required. Install floor sinks as required for indirect waste connections as required by code. Connect non-grease sanitary waste to 4" building sanitary drain. Connect grease fixtures (as required by Code) to 4" building grease drain. Connect fixture venting to building plumbing vent through roof.

Assuming a restaurant serving a maximum of 75 meals per hour, per the 2015 ASHRAE Handbook – HVAC Applications, Chapter 50 *Service Water Heating*, the water heater will need to be able to produce a minimum of 75 GPH of hot water. Recommend AO Smith Cyclone Xi Model BTXL 100 or equivalent.

Ensure that thermostatic mixing valves are installed on all public lavatories to prevent scalding, in accordance with Code.