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Reference: **Millburn Ave Apartments – MRY Associates, LLC**  
**397 Millburn Avenue – Millburn, NJ 07041**  
**MEP Design Narrative *Revision 1***  
**MCE Project – 20150**

The following is a Preliminary Mechanical, Electrical and Plumbing Design Narrative to be used for the new multi-family project in Millburn, NJ. The scope includes a three-story building with a ground floor garage. Two retail shell tenant spaces are located on the ground floor. There are amenity spaces on the ground floor as well as additional amenities space on the first floor. Note that all equipment sizing is preliminary and subject to change based upon updates to scope.

## **MECHANICAL**

### **Apartment Units:**

Each apartment will be conditioned by a split system air handling unit (AHU) with a direct expansion (DX) coil and remote air-cooled condensing unit (located on the roof). Heat will be provided via a hot water (HW) coil located in the AHU. The heat source will be a tankless hot water heater also used for domestic hot water generation (refer to Plumbing section for additional information). The AHU's shall be similar to First Co. HBQBX Hydronic Heat Air Handlers.

Supply air ductwork shall be distributed from the air handling unit to each room including Living, Kitchen, Bathrooms and Bedrooms. Single outlets shall be used in each room with the exception of spaces having double exposures which will utilize two outlets. The return air shall be ducted from strategically placed return grilles in the ceiling. AHU shall be fully concealed within the mechanical space provided. Space for supply and return ductwork within the mechanical space must be accommodated. A 24/7 digital programmable thermostat shall control each system.

Each bathroom shall be provided with a ceiling mounted exhaust fan similar to Panasonic Whisper Green Multi-Speed fan. The fans shall run at low speed and run at higher speed when room light is switched on. All exhaust shall be vented to the roof. Kitchen range exhaust, bathroom exhaust, and dryer vent shall be on separate duct systems. Each exhaust system shall terminate above the roof with a gooseneck or cap with flappers. The second-floor dryer vents will require booster fans and secondary

lint traps. Each exhaust duct system shall maintain the structure's fire rating by wrapping the ducts in fire resistant insulation to match ratings. Laundry closet shall be provided with a louvered door.

Amenities, Common Spaces and Retail:

Variable refrigerant flow (VRF) heat pump systems similar to Mitsubishi City-Multi system shall be provided for these spaces. This system shall utilize outdoor heat pump(s) (located on the roof) with simultaneous heating and cooling to serve a combination of ducted and non-ducted mini-split fan coils inside the building. The VRF systems' combined capacity will be approximately 20 tons of cooling. A wireless controller (with internet access) shall control each unit and allow for setback and adjustment by the owner or staff. Non-adjustable remote sensors shall be placed in each space to allow temperature control but avoid occupant tampering.

The following spaces shall be included on this system:

- Lobbies
- Fitness
- Yoga
- Leasing
- Mail
- Packaging
- Restrooms
- Vestibules
- Ancillary Amenities Spaces

Common corridors shall be served with a packaged rooftop air handling unit with DX cooling and gas-fire heating. This unit shall distribute via a common shaft to each floor. A 24/7 digital programmable thermostat shall control system with remote sensors on each floor for averaging.

Retail tenant spaces will be provided with stand-alone split systems (DX cooling with gas-fired heating) consisting of (1) indoor furnace and one outdoor condensing unit (located on the roof). Each system capacity will be approximately 4-tons of cooling. A 24/7 digital programmable thermostat shall control each system.

A combination of exhaust fans and electric unit heaters shall be provided in MEP and common storage rooms to ventilate and heat.

Stair towers shall be heated with electric cabinet unit heaters to prevent freezing.

Ventilation for the amenity spaces shall be provided by an energy recovery ventilator (ERV) providing both outside air and exhaust air. The outside air shall be ducted directly to the mini-splits. An energy recover core shall provide the heat transfer.

Ventilation for the retail tenant spaces shall be provided via louvers over the store fronts. Exhaust for these spaces shall terminate above the roof.

### Enclosed Garage:

The 1-story garage will require ventilation. This will be achieved with a carbon monoxide (CO) and nitrogen dioxide (N<sub>2</sub>O) detection system, two exhaust fans located on the roof and ductwork routed down through a shaft to garage level. During normal operation, the minimum continuous airflow shall be provided by a small horsepower (hp) fan. If the CO/N<sub>2</sub>O detection system is activated the larger fan shall energize to alleviate the build-up of hazardous fumes. Make up air for this system will be located during design development but will require several louvers or screened openings. The ceiling space below occupiable spaces shall be heated with electric unit heaters.

### Materials:

All ductwork shall be galvanized steel meeting SMACA standards with insulated flexible duct provided at end of branches to terminal outlets.

In general, terminal outlets shall be steel supply double deflection registers. Aluminum models are recommended in bathrooms and other spaces where high moisture or humidity is present. All registers and diffusers penetrating rated floor/ceiling assemblies shall include radiation damper to meet code requirements.

Fiberglass duct insulation with vapor barrier shall be provided on all supply and outside air ductwork. A higher R-value shall be provided where outside the building envelope to meet energy code.

Air conditioning condensate drains shall terminate at hub drains inside the HVAC closets and be routed to the sanitary system. It is recommended that this piping be Type L copper with fiberglass pipe insulation.

## **ELECTRICAL**

### Electric Service:

A new underground concrete-encased utility primary ductbank shall be routed to the pad-mounted Utility Transformer Vault on grade in the rear of the building (parking lot side), designed per the Utility Company's standards. The utility transformer will transform the Utility primary voltage down to 120/208 Volt, 3-phase for distribution to the building. The design intent is to feed utility meter bank(s) located on the exterior of the rear Parking Garage wall which will distribute the 120/208V, 3-phase power from the meter bank(s) to the Residential units, the Retail units and the House Main distribution panel (which will subfeed the House panels). The House service will most likely utilize a separate underground feed from the Utility Transformer thru a separate Utility CT cabinet for metering purposes, given the preliminary estimates of the size of the overall House service and utility metering requirements. The Fire Pump feeder (if required) will be tapped off of the House service, ahead of any disconnecting means, as required by Code.

### Distribution:

Each retail space shall be provided with a 200 Amp, 120/208 Volt, 3-phase service to a dedicated panelboard, equipped with a main circuit breaker (Note that is assumed, based on initial scope discussions with the Client that the Retail units will not be food-service/restaurant-type occupancies). Each residential unit shall be provided with a 100 Amp, 120/208 Volt single-phase service (based on preliminary load estimates), which will feed a flush-mounted load center (residential panelboard) in the unit. 120/208 Volt, 3-phase House panels shall be fed from the House Main distribution panel in the

Main Electric Room and it shall feed House Panels provided on the Ground Floor (serving the Ground and First Floors) and the Second Floor (serving the Second Floor and the Roof). The sizes of these panels (and the House Main distribution panel) shall be determined based on the final demanded load calculations for House electrical loads. The House Main distribution panel, all House and Retail panelboards and all residential load centers shall be equipped with aluminum buswork.

Distribution wiring to the House Main distribution panel, the Retail and House panels, all residential meterbanks and all large pieces of equipment (i.e. roof-top HVAC units, elevators, Garage ventilation equipment, trash compactor, etc.) shall be in conduit with copper conductors. All exposed wiring throughout (i.e. Garage lighting, etc.) shall be in conduit with copper conductors. Concealed branch wiring in common spaces may be conduit with copper conductors or Type MC Cable. Feeders from the residential meterbanks to the residential load centers shall be aluminum Type MC Cable due to the requirements of the National Electrical Code based on distribution from the meterbanks(s) through the Parking Garage construction to the upper levels of the building, sized as required for load and voltage drop. Branch circuits in residential units shall be Type NM ("Romex") cable as permitted per Code.

#### Generator:

A 120/208 Volt, 3-phase emergency generator is included in the design to accommodate emergency lighting loads, the Fire Alarm system, one elevator, certain house loads (i.e. lighting, power and HVAC for certain amenity spaces and the Lobby, IT closets, corridors, etc.) and potentially the fire pump. The generator shall operate on natural gas and shall be mounted in a weather-tight, sound attenuated enclosure on grade in the rear of the building (parking lot side) adjacent to the utility transformer. Based on initial load estimates and assumptions, we estimate the generator to be in the 150kW to 250kW size range – this will be confirmed and adjusted as more load information becomes available (in particular, the local requirements for fire pump power). Currently, we anticipate both a distribution panel (for larger emergency loads) and a branch circuit panel (for smaller emergency loads) to be fed from the generator. Two Automatic Transfer Switches (ATS) and associated panels will be required to separate the Life safety loads from the optional loads. The (ATS) and associated panels shall be located in the Main Electric Room.

#### Lighting:

All lighting selections will be provided by the Owner/Architect. Based on these selections, common space layouts (coordinated with the Architect), circuiting and controls will be shown as required by Code on the engineering drawings. All residential lighting selections and layout will be provided by the Architect/Owner. All controls will be based on the requirements of the applicable Energy Code. It is assumed that the majority of the lighting will be LED, which aids in keeping in line with the current Energy Code lighting power density requirements.

All exterior building-mounted lighting and site lighting shall be provided by others – circuiting only shall be indicated on the electrical drawings for this work.

#### Electrical Devices:

All electrical devices (receptacles, wall switches, etc.) in the residential spaces shall be residential grade. All electrical devices in all other areas shall be commercial grade devices. Watertight in-use extra duty covers shall be provided for all receptacles in wet/exterior locations per Code.

All residential toilet rooms, kitchens and exterior locations shall be provided with GFCI-type receptacles. GFCI-type circuit breakers shall serve all residential dishwashers (due to limited accessibility to the devices serving the dishwashers). All residential living spaces devices shall be served with tamper-resistant receptacles per Code.

All residential bedrooms shall be equipped with the top half of a duplex receptacle switched for table lamp operation to meet Code requirements in lieu of a bedroom ceiling light fixture.

AFCI-type (Arc-fault circuit interrupter) circuit breakers shall serve all receptacle circuits in all residential units where required per Code.

Per the Owner's request several parking spots (5 or 6 TBD) in the Parking Garage will be equipped with Electric Vehicle Charging stations.

#### Fire Alarm:

The building shall be equipped with a manual Fire Alarm system with limited detection designed to comply with State and Local Life Safety Code requirements. The main Fire Alarm Control Panel (FACP) shall be installed in the **Residential Entrance Lobby Vestibule at Essex and Spring Streets** for fireman reporting and control. Manual fire alarm pull boxes shall be dual action (requiring two distinct actions to pull the alarm) and located on each floor at egress points. Detection devices shall be limited to smoke detectors in Elevator Lobbies, at the FACP and at the top of stair and elevator shafts as well as HVAC system duct detectors where required by Code. Heat detectors shall be provided at the top of stair and elevator shafts. Notification devices (i.e. Fire Alarm horns, strobes and combination horn/strobes) shall be provided throughout all common and back of house spaces to meet Code.

All residential units shall be equipped with stand-alone smoke alarms inside and outside of each bedroom. CO alarms shall also be provided outside of each bedroom. Combination CO/smoke alarms equipped with unique alarms for CO detection vs smoke detection shall be acceptable. All units shall be equipped with a minimum of one Fire Alarm system-connected combination horn/strobe alarm device.

#### Low Voltage Infrastructure:

Separate service conduits for Verizon and Comcast shall be provided (per Owner's request) and routed to a Telecom MDF closet.

Stacked low voltage distribution closets will be provided on each floor. Interconnecting conduits shall be provided between the closets on each floor for routing of cables. Dedicated quad receptacles and a plywood backboard shall be provided in each closet.

Based on layouts provided by the Owner and their Low Voltage (voice/data/sound/security), a box/empty conduit infrastructure and required power shall be shown for these Low Voltage components and devices.

All low voltage cabling and devices will be provided by Others.

## **PLUMBING**

#### Domestic Water System:

Preliminary calculations indicate a 3" domestic water service will be adequate to serve the building. The new 3" domestic water service shall be extended to the building entering in the proposed ground level water service room with a single meter and backflow preventor.

A separate water meter shall be Additional water sub-meters may be installed at each apartment unit at the owner's request. Water distribution will be extended to amenities and retail spaces as needed. **Hose bibbs will be provided in courtyards, maintenance spaces, the**

***main refuse rooms and other locations as needed.*** A pending water flow test will confirm the final incoming service size and potential need for a domestic water booster pump system. Water piping shall be distributed throughout the building with separate valved connections (in water heater rooms) to each unit.

Domestic Hot Water:

Apartment Units:

Each unit will be provided with a high efficiency gas -fired tankless water heater (WH). This water heater will provide all domestic hot water (DHW), to plumbing fixtures, clothes and dishwashers as well as provide circulated HW to the HVAC AHU heating coil in each unit. Typical heater sizes shall be 180 MBH and 130 MBH for two-bathroom and one-bathroom units, respectively. PVC combustion and ventilation piping shall be routed through each floor and terminate on the roof with factory concentric vent kits. Condensate from each WH will terminate to a drain with an acid neutralization kit, in the water room

Amenities, Common Spaces and Retail:

The current layout includes small toilet rooms adjacent to the fitness room. These may be served by a below the sink electric tankless WH. Any other sinks in the 2<sup>nd</sup> floor amenity spaces may be served with a similar WH.

The retail shell tenant spaces will be provided with sanitary and vent stub ups for future toilet room fit out. Any additional requirements would be under a separate fit-out.

Sanitary and Vent System:

A 6” sanitary main is required for the building. The location of the main shall be determined by Civil/Site.

***Floor or hub drains will be provided in all equipment rooms, maintenance spaces, the main refuse rooms, and other locations as needed.***

Storm Drainage System:

Storm drainage shall be routed from the roof drains to the exterior with multiple risers as coordinated with Civil/Site.

The storm system will also serve the garage area drains and trench drains within the building.

Natural Gas:

Each unit will be separately metered from the utility. A separate “House” meter will be included for the common RTU as well as amenity spaces for fire pits, grills, and heaters and an emergency generator.

Separate meters will be provided for the two retail tenant spaces.

Piping Materials:

<u>System</u>	<u>Material</u>	<u>Insulation</u>
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DCW Mains and risers	CPVC	Fiberglass w PVC Fittings
DCW Within Units (after valve)	PEX A	None
	Non-Restrictive Fittings	
DHW First 2 ft off WH	Type L Copper	Fiberglass w PVC Fittings
DHW Within Units	PEX A with brass T/F	Pre-Insulated
	Non-Restrictive Fittings	
Sanitary & Vent	PVC	None
Storm	PVC	Fiberglass w PVC Fittings (Drain to After First Elbow)

## **Fire Protection**

### **Automatic Fire Suppression System:**

The building shall be completely sprinklered with an NFPA 13 compliant system. A new 8" fire line shall enter the building in the basement water room adjacent to the domestic water assembly. A pending water flow test will confirm final size and potential need for a fire pump. The majority of the building shall utilize a wet sprinkler system. A dry system shall be provided in the garage levels and in other unconditioned spaces. Each stair tower shall be provided with a wet standpipe. Schedule 40 steel grooved end piping shall be provided in the pump room (part of the basement water room), for mains and standpipes. NFPA 13 CPVC piping similar to BlazeMaster may be used to distribute throughout the units and common spaces.