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Major Changes with the FGI 2010 Guidelines

The 2010 FGI Guidelines for Design and Construction of Healthcare have become a reality and there are several major changes to the MEP requirements. Known as the "FGI Guidelines," this health care industry standard is administered by the Facility Guidelines Institute (FGI) and developed by the all-volunteer, 116-person multidisciplinary Health Guidelines Revision Committee (HGRC) with representation from nurses, surgeons, anesthesiologists, neonatologists, infection preventionists, administrators, architects, facility managers, consulting engineers, safety and security professionals, risk managers and over 25 state, federal and private enforcing authorities. Foremost is the incorporation of ASHRAE Standard 170-2008 - Ventilation of Healthcare Facilities which addresses systems and equipment. Significant ventilation changes from the 2006 Guidelines include the following:

- Ventilation for Class B and C operating rooms has increased to a total of 20 air changes per hour (ACH) and four outside ach,
- If the total cooling capacity for the facility is greater than 400 tons, reserve cooling capacity is required to meet the "facility's operational plan",
- A single filter bank for Class A operating rooms (ambulatory surgery),
- Variable air volume (VAV) permitted for Airborne Infection Isolation (AII) and Protective Environment (PE) rooms (pressure differential must be maintained),
- Newly installed ductwork must be cleaned before space is occupied.

Copies of the FGI Guidelines are available for purchase at www.fgiguidelines.org.

Fenway Community Health Center Boston, Massachusetts

Architect: Anshen + Allen

The **scope** of this project was to design the HVAC, plumbing, fire protection and electrical systems for a 70,000 fit-out of an approximately 100,000 s.f. developer spec office building.

The **design challenge** was to work in parallel with the developer design team to provide cost effective HVAC, plumbing, electrical and fire protection systems that offered maximum flexibility for Fenway Community Health Center.

Our **solution** involved providing three large packaged gas fired roof top units to provide cooling, ventilation, night heating, and morning warm up. The units served all levels of the FCHC space including the lecture hall and 1st floor. Pressure independent Variable Air Volume (VAV) terminal boxes with hot water reheat coils were provided for air flow and temperature control.

The electrical design included an extension of the existing base building normal and emergency power distribution and fire alarm systems. Lighting consisted of high efficiency fluorescent and LED based fixtures. The building utilized energy-efficient lighting coupled to a lighting control system to meet energy code requirements. Local occupancy sensing was also provided to minimize lighting energy.

The plumbing design included domestic hot and cold water, natural gas and sanitary distribution from parent building risers located at several locations throughout the horizontal floor plan. The hot water system began at two new gas-fired water heaters supplied for the tenant spaces. Hot water demand was based on approximately 150 fixtures of various types requiring hot water, with a total demand of 300 gallons per hour.

The fire suppression design included a wet-type automatic fire sprinkler system designed for Light Hazard Occupancy throughout the tenant space. The lab and medical records storage areas were treated as Ordinary Hazard, Group 1 in accordance with the requirements of NFPA 13. Sprinkler heads were ordinary temperature throughout except in mechanical spaces where sprinkler heads were intermediate temperature. A dry-pipe double pre-action system protected the Server Room. As always, we welcome your questions and comments.

If you would like further information, please feel free to contact Stephen J. Montibello, PE, a Principal with F&T, who can be reached at 781-481-0210, ext. 175.



Monthly Publication of **Fitzmeyer & Tocci Associates, Inc.**

Thoughtful Practical Engineering

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The Acadia Hospital - Psychiatric Observation Unit Bangor, Maine

Architect: Morris/Switzer Environments for Health, Inc.

The **scope** of this project was to design HVAC, plumbing, fire protection and electrical systems to renovate approximately 3700 sf for a new psychiatric observation unit.

The **design challenge** was to provide cost effective HVAC, plumbing, electrical and fire protection systems.

Our **solution** involved renovation of the existing building HVAC systems. The existing variable-air-volume (VAV) air-handling unit provided primary heating and cooling. The supply air system used all new VAV terminal boxes for space control. Heating hot water for VAV re-heat coils and perimeter radiation was drawn from the extra capacity in the existing hot water piping. All HVAC control is extended from the existing DDC facilities management system. The unique challenges brought forth by a psychiatric observation unit required the specification of psych-safe air grilles with room-side duct access.

Electrical service for this space was extended from existing facilities for both normal and emergency (critical) circuits. New panels were located in an existing electric room along with low voltage control system panels. The remote control system is a combination of 'smart' line voltage panelboards and low voltage relay panels. The integration of control between the 'smart' line voltage panels and the low voltage control systems was possible by designing a system where the components to be controlled had a common control language. The low voltage control system was designed to provide central remote control for observation room lighting, night lights and power. In addition, staff has control of water flow in toilet and shower rooms, power and TV's in the family waiting areas. The staff has access to these controls via a custom panel mounted behind the nurses station interconnected with Cat 5 pre-wired cables requiring the electrical contractor to daisy chain all the components via plug-in connectors. A "psyche safe" fire alarm system consisted of covered ceiling detectors and manual pull stations provided with clear polycarbonate covers throughout the building. Other components included 'psyche safe' lighting, switches and tamper-proof receptacles.

Plumbing systems consisted of new cold, hot, and re-circulated hot water supply systems, along with sanitary drainage and storm water drainage.

The fire suppression design included a wet-type automatic fire sprinkler system designed for Light Hazard Occupancy throughout the renovated space utilizing institutional sprinkler heads.



Merrimack Valley Hospice Methuen, Massachusetts

Architect: Lavallee/Brensinger Architects

The **scope** of this project involved HVAC, plumbing, fire protection and electrical engineering for a new 23,000 square foot hospice with a future potential expansion to 30,400 square feet.

The HVAC **solution** included...

- Two new boilers rated for 1500 MBH input each will provide heating capacity and standby. The boilers will be natural gas fired, high efficiency type. New base-mounted, end-suction pumps will distribute 180 °F. 35 % glycol solution to heating loads through out the building. Heating loads include ventilation pre-heat within new rooftop make-up air units, 4-pipe fan coil units to serve space heating loads, and cabinet unit heaters, or unit heaters to serve spaces which have heating-only loads,
- Primary cooling support for the new building is intended to be provided a new 110 nominal ton air-cooled chiller. The new chiller will utilize scroll type compressors and non-CFC refrigerant. Cooling loads include ventilation pre-cooling within new rooftop make-up air units and 4-pipe fan coil units to serve space heating loads,
- Each Patient Room will be independently controlled and capable of year-round cooling.

The Electrical **solution** included...

- A new underground service lateral from the local utility will be brought into the site to a pad-mounted transformer,
- The emergency electrical distribution system shall consist of a life safety branch and an equipment branch. Emergency power shall be provided by an outdoor, pad-mounted, housed emergency diesel generator set. The enclosure shall be critically sound-attenuated and of weatherproof construction,
- Low-voltage systems shall include fire alarm, data and voice and a tone/visual nurse call system.

The Plumbing **solution** included domestic hot and cold water, storm drainage, sanitary waste and a piped medical oxygen system to resident rooms.

