REV. JAMES G. GAMBET

CENTER FOR BUSINESS AND HEALTHCARE EDUCATION

Brett Tallada | Construction Management
Advisor: Ray Sowers

Courtesy of Breslin Ridyard Fadero Architects

Project Information

Building Name	Gambet Center for Healthcare and Education
Location	DeSales University; Center Valley, PA
Occupancy	Business (B); Offices, Education, Research Labs
Gross Building Area	77,000 square feet
Total Number of Stories	2 Stories; above grade
Total Building Cost	Approx. $27,000,000
Project Delivery	Design-Bid-Build (CM at Risk)
Period of Construction	June 2011 through May 2013

Project Team	
Architect	Breslin Ridyard Fadero Architects
Construction Manager	Alvin H. Butz, Inc.
Mechanical/Electrical Engineer	Snyder Hoffman Associates
Civil/Structural Engineer	Barry Isett and Associates
Food Service Consultant	L2M Foodservice Design Group
Owner Representative	DeSales University Facilities Services

Structural Steel Frame

The structural steel frame consists mostly of two-story columns extending from the top of the footing or pier up to the roof. Wide flanged steel beams, spaced at 6' 8", support the second floor with a 1-½", 20-gauge metal deck that is topped with 3-½" of reinforced (W2.9xW2.9 WWF) lightweight concrete. Roof framing is comprised of a combination of wide flanged steel beams with open web steel joists ranging from a depth of 10" to 24", usually spaced at 5'. Roof decking consists of 22 gauge, 1-½" steel deck and a single-ply EPDM covering over rigid insulation tapered at ¼" per foot toward the roof drains. On site, a single crawler crane sized at 110 tons was used to erect the steel frame.

Cast-in-Place Concrete

In addition to all strip, step, and column footers, the Gambet Center required reinforced cast-in-place concrete for foundation walls, column piers, slab-on-grade, and floor slabs. The altitude of the slab-on-grade is 473' above sea level. This is roughly the natural height of the east side of the building, which slopes down to the west to roughly 460'. However, the top elevations of the different footings vary east to west from 471.67' to 462', respectively. Therefore, most of the excavation took place on the east side of the building, but there was approximately 3' of soft surface soils that also required excavation on the west side. A compacted layer of structural fill was added before the plywood formwork could be constructed, reinforced, and pumped into place. Plywood formwork was also used for the cast-in-place foundation walls and column piers. The concrete was also pumped into these forms in shallow lifts not greater than 24", and mechanically vibrated to consolidate; ensuring concrete is evenly distributed into corners and worked around reinforcement. The interior of the new foundation is then evenly backfilled to an elevation of approximately 472.33' and topped with at least 4" of drainage fill (gravel or crushed stone). Once erection of the steel columns began, the 4" slab-on-grade, covering a vapor barrier and welded wire fabric reinforcing was placed within the construction joints. Figure 1 below shows the excavated foundation and constructed cast-in-place and CMU foundation walls. The second floor metal decking provided the form for the floor slab, and the concrete was placed in a similar manner to that of the slab-on-grade.


Courtesy of DeSales University

Figure 1: Footing Excavation and Constructed Foundation Walls

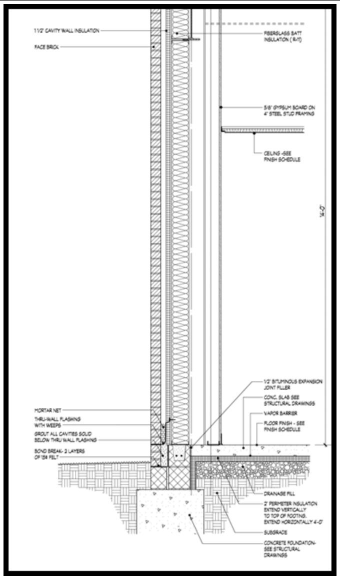

Figure 2: Facade Construction

Masonry

Depicted in Figure 2 on the right, the wall section shows the building enclosure of red face brick, with a 1-½" air cavity, 1-½" cavity wall insulation, and ½" sheathing on a 6" structural steel frame. Variances to this basic structure occur in the stair towers and mechanical room, where the brick veneer will be backed by CMUs, with 2" cavity wall insulation. Masonry ties are used to connect the brick veneer to the exterior sheathing. Limestone will be used for all sills, trim, and banding to compliment the brick. 8" CMUs are also used in the construction of a portion of the foundation walls, which can be seen in Figure 2 and Appendix A.

Mechanical System

The HVAC system is comprised of a combination of air and water based systems. Located in the first floor mechanical room, two hot water boilers fired by natural gas and powered by two variable speed pumps supply heated water to all heating equipment in the building. Packaged gas fired VAV systems, located on the roof, will provide heated air to the faculty offices, physician assistant (PA), business and nursing administration suites, the standardized patient exam suite, and basic nursing/PA labs, in addition to the lounge area, lobby, and corridors. Rooftop central air handlers supplying air to VAV energy recovery units will deliver either heated or cooled air to areas requiring large amounts of outdoor air (classrooms, seminar rooms, lecture halls, and conference rooms). A gas fired constant volume heat recovery unit, also placed on the roof, will heat the anatomy lab. For the remaining areas, such as toilets, stair towers, and vestibules, comfortable hydronic heaters will be implemented.

For air conditioning, the aforementioned rooftop and heat recovery units will be equipped with cooling coils that supply chilled air to all areas except mechanical spaces, restrooms, and custodial closets in the same way as described above. For areas along the perimeter of the building, fan powered VAV boxes with a reheat coil will be utilized. The interior spaces will also use VAV boxes with reheating coils, but these will not be fan powered. Exhaust systems are not required, except for the toilets and mechanical room, since the implemented system conditions with a percentage of outdoor air. Automatic temperature controls will be connected to the existing Campus Building Automation System, and give direct electric damper and valve control.

To help attain LEED® accreditation, the boilers will be 94 percent high efficiency units, and all VAV boxes will contain electronically controlled motors, helping to save energy. All hot water piping will be wrapped with fiberglass insulation, and the cooling coils in the rooftop units will contain R410A refrigerant, also helping to achieve LEED® credits. To gain credits for thermal comfort, all offices except corner offices will share a single fan powered VAV box.

Electrical System

The Gambet Center will receive its electrical power from the existing campus distribution system from the S&C PMH (pad mounted gear) switch, positioned to the south of the University Center. Existing empty underground conduits run from the PMH and extend to the south under Station Ave. A new 12,470-volt service will connect to these existing conduits and feed a 480/277-volt exterior transformer located near the service area on the east side of the building, and enter into the switchboard in the mechanical room.

In the 2000 amp switchboard, incoming power is metered and fused, and then distributed to equipment requiring 480/277 volts of power. This includes all mechanical equipment (480V or 277V) and the lighting system (277V). A 208/120-volt transformer is also included in the switchgear to source the receptacles (120V) and any equipment requiring 208V.

Two natural gas fired emergency generators (100 kW and 70 kW) will be provided, and also housed in the mechanical room on the first floor. The 100 kW generator is connected to two automatic transfer switches, one that will power the anatomy lab's heat recovery unit, and the other for lighting, controls, and the fire alarm system. The third ATS, connected to the 70 kW generator, will provide emergency power for two air-cooled chillers and the two air handling units in the computer room. The uninterruptible power supply (UPS) in the will also receive emergency power in order to keep the computer systems from shutting down.

Lighting System

The majority of lighting fixtures will have four foot fluorescent lamps. The lamps will be mostly T8 or T5 configuration, consuming 32 and 21 watts, respectively. The lamps are to have a Kelvin color temperature of 3500° and a color rendering index of 85. Where dimming or accent lighting is required, a limited amount of incandescent lamps will be used.

Selected light fixtures in the corridors and and stairwells will be connected to normal/ emergency lighting circuits. The remainder of the light fixtures in these spaces will be controlled by local wall switches and the centralized lighting control system. The use of occupancy sensors and low-voltage relay controls will be provided for all building lighting to meet the requirements of the International Energy Conservation Code.

Appendix A: Typical Brick Veneer Façade Wall Section