



2. Building Background

2.1 General Information

Quantum III is a product of the continuing expansion of American Eagle Outfitters Corporate Headquarters in the South Side of Pittsburgh, Pennsylvania. It is a genuine combination of structural design for flexibility and the blending of architectural tastes of the existing South Side of Pittsburgh with that of the developer, The Soffer Organization. At one end of Hot Metal Bridge, and bordering the Monongahela River lies Quantum III. The existing office building is five stories tall and contains loading, fire pump, and generator rooms on the first floor. The second through fifth stories have open plans for tenant fit-out.



Figure 1 – Location of AEO: QIII

Atlantic Engineering Services took QIII as a design-bid-build, core and shell project. The shell involves the building exterior and enclosures while the core contains layouts for elevators, stairs, mechanical shafts, telecommunications and bathrooms. They designed the steel framing system and strategically placed lateral force resisting systems to cause minimal interference with the open layout.

Quantum III is optimized for flexibility with 150,000 gross square feet of open layout. Floor to floor height for levels 2 through 5 is 13'-8" with the top and bottom story supplying extra space for added mechanical ductwork. Project construction is scheduled for May 2007 through October 2008 and total cost is estimated at \$16 million.



2.2 Architectural Overview and History

American Eagle Quantum III will expand the corporate office and retail space provided by American Eagle Outfitters in the Pittsburgh, PA area while broadening the spectrum of services offered in South Side Works.

South Side Works formerly was the home of 40,000 immigrants who would walk to neighboring steel mills for work, but the collapse of the industry in the 1970's cleared the area. Since then, the local Bingham Street Church has been converted to studio residential spaces and the Jones and Laughlin Steel Mill has been converted to a retail and dining plaza. Fine cuisine and upscale retailers to top-end living units now occupy the 34-acre site of the mill. See Figure 2.



Figure 2 – View of South Side Works

2.3 Building Envelope Architecture

Quantum III will reflect the existing mood in South Side works with an envelope that emphasizes mass through brick façade while providing transparency through aluminum and glass curtain walls. The building is set atop a solid concrete retaining wall, and the large yellow colored mass in the forefront of the renderings is a “branding wall” featuring a larger than life American Eagle Outfitters logo. Due to cost issues, the branding wall has since been removed from the project.



Figure 3 – North Perspective with Branding Wall



Vertical columns of façade brick backed by an airspace and 6” to 8” light gauge steel studs segment and add mass to a façade dominated by aluminum and glass on the south elevation. The north elevation includes this envelope but presents more brick with frequent large bay windows. Riverfront terrace, with the featured “Branding Wall” lines the north elevation as well. The east and west elevations are progressively clad with increasing amounts of brick façade, and the west elevation features the service entrances. Facades are all tied together with composite aluminum panel walls and a similar cornice.

The roofing system consists of fully adhered EPDM single ply membrane on rigid insulation; backed with 3”, 20 gauge, galvanized steel roof deck throughout. The deck has at least 3 continuous spans, and the rigid insulation is added to allow a ¼” per foot slope to drain water while providing an R-value of 30. The membrane is wrapped around the inside and top of the parapet to prevent leakage throughout the structure and wall systems.

2.4 Building Plan Architecture

American Eagle Outfitters South Side Works features an open plan featuring only those partitions required in the core of the building: where elevators, stairs, bathrooms, storage, and lateral resisting frames are present. The remainder of the plan is dotted with steel columns.

2.5 Zoning

B-2 new construction classified as B (business) in Pittsburgh County, Pennsylvania.

2.6 Structural Systems

The structural system for American Eagle Quantum III is primarily composed of wide-flange steel columns and composite beams. The typical floor is 3” composite light weight reinforced topping slab on 2” 20 gauge steel deck. Girders are typically W24x55 with W18x35 infill beams spaced at 10’ on center. The roof is constructed of W16’s with W12 infill beams with a portion of composite slab to support the mechanical units. A windscreen surrounds the mechanical equipment to counteract wind forces and hide it from sight of pedestrians below. Connections are mainly simple shear connections. Columns are typically W10’s and W12’s placed on a 30’x30’ grid.

Five vertical trusses are arranged throughout the building core and exterior. Three of the five trusses are forms of a Chevron truss, with one X-braced frame and the last being a single strut truss. Only one truss is on the exterior and is an excellent display of structure—a curtain wall provides a view of it from the exterior of the building. The remaining four trusses are interior and border stairs, elevators, or mechanical shafts. One of the interior trusses is eccentric to avoid a conflict with stair access doors on the easternmost corner of the building.



2.7 Mechanical Systems

QIII has two 35,000 pound rooftop air handling units providing a total 120,000 CFM. Heat recovery wheels are installed and operate at 64% efficiency for cooling and 77% efficiency for heating. The system is designed to use 36,000 CFM, or 30%, outside air. The boiler room is located on the fifth floor, simplifying HVAC system layout by placing the units and boiler room close vertically and horizontally. Hot water is supplied via two pumps operating at 66% efficiency, pumping 250 gpm. There are typically two VAV boxes per floor, regulating air flow vertically throughout the building.

2.8 Construction and Management

The delivery method is design-bid-build, with The Soffer Organization managing and developing the land. American Eagle Outfitters Quantum III went out to bid December 2006, and bids were selected based on economy, constructability, and quality. Groundbreaking occurred in May 2007 and the building envelope and core construction is scheduled to be completed in October 2008.

The contractor is responsible for the demolition of existing steel mill foundations, estimated at +/- 40' thick, with their location to be field verified. The majority of the site is covered by the proposed building, with roads on two sides and the Monongahela River on another—construction will therefore be tight. Storage of materials and the construction process will require thinking outside of the box to limit interference with Pittsburgh area traffic and congestion.

2.9 Electrical Systems

American Eagle Outfitters Quantum III has 277/480 V incoming power in a 3 phase 4 wire system including a 150 kVA transformer, two 277/480 V panelboards, and four 208/120 V panelboards on the first floor. There is a separate panel for low voltage lighting as well. Floors 2 and 5 have four panels of each voltage while floors 3 and 4 have similar layouts, but only have two 277/480 V panels. Finally, power is transferred between floors via 2000A vertical bus systems.

2.10 Lighting Systems

Lighting fixtures will be provided only in stairs, emergency egress areas, and the receiving and storage facilities. Four foot fluorescent fixtures will be pendant mounted in receiving and storage, and fixtures are ceiling mounted in stair wells. Metal halide is provided for the terrace area, building façade, and aesthetically mounted in trees. Fluorescent bulbs must have a minimum of 80 color rendering index (CRI) while metal halide lamps must achieve a CRI of 70.

The curtain wall façade will provide natural light throughout the interior of Quantum III while allowing for spectacular views of the Pittsburgh skyline and historical bridges. Building tenants must supply all other lighting and electrical components to suit individual needs.



2.11 Fire Protection

All exit passageways, storage rooms over 100 square feet, and elevator shafts are rated for 2 hours, while stairwells are rated for 1 hour. A smoke control system is proposed though not required by code. The structural frame and other floor and roof construction require no specific fire protection—therefore no special protection is provided.

Two fire pumps supply water to the two sprinkler zones, with sprinklers located 12' on center—spacing is lowered where NFPA has special wall spacing requirements. Also, standpipes are located in each of the two stairwells of American Eagle Outfitters: Quantum III. One stairwell is located on the exterior wall towards the east corner of the building, and the other is an interior stairwell on the north half of QIII.

2.12 Transportation

There are three entrances/exits on the first floor with two exits on each floor above. Loading and unloading areas are provided on the north sides of the building. The loading docks are angled roughly 45 degrees to allow a semi trailer and trash collection to fit on the northeast side of the site, given the tight edge clearance of the building on all sides. The northwest side contains a separate entrance and overhead partitioned doors in each bay, resulting in six separate loading areas.

Three elevators are provided. The first is a cargo elevator provided by the interior stair, while the remaining two border the core bathrooms and mechanical shafts. These two elevators are open to future tenant use.

2.13 Communications

Two way communication between the building tenants/operators and fire agencies is provided with each individual tenant installing personal communication needs. Service and data rooms are provided with their own VAV boxes on each floor and are aligned vertically for easy installation of multiple floor systems.



2.14 Project Team

- Owner: American Eagle Outfitters
 - <http://www.ae.com/web/index.jsp>
- Architect: The Design Alliance Architects
 - <http://www.tda-architects.com/>
- Construction Manager/Developer: The Soffer Organization
 - <http://www.sofferorganization.com/>
- Structural Engineer: Atlantic Engineering Services
 - <http://www.aespi.com/index.html>
- MEP Engineer: Tower Engineering
 - <http://www.tei-usa.com/>
- Civil: The Gateway Engineers, Inc.
 - <http://www.gatewayengineers.com/>
- Landscape: Environmental Planning and Design