1 - Project Background

1.1 - Monmouth University

Monmouth University is located in West Long Beach, New Jersey in the county of Monmouth. The university is a moderate sized institution that offers 26 degrees from 5 different schools. The 153-acre campus currently features 53 buildings and is set within a residential community near the Atlantic Ocean. Being on the east coast of central New Jersey, Monmouth University's campus is within 90 minutes of both Philadelphia and New York.

Figure 1A: West Long Branch, NJ

1.2 - Building Overview

The Multi-Purpose Activity Center (MAC) is to be built in the middle of Monmouth University's campus. The MAC building is 140,000 square foot, 3-story athletic center, as well as a 20,000 square foot renovation of an existing facility. The MAC building will be located on an existing parking lot, the site was chosen due to the surrounding existing buildings. The MAC building is to be positioned in the heart of Monmouth Universities Campus surrounded by buildings of similar function and occupation. The adjacent buildings include the existing

Figure 1B: MAC Rendering

Boylan gymnasium, natatorium, and the student center. In addition, the MAC building will include a balcony overlooking the adjacent existing football field. Furthermore, the student center is located southeast of the MAC building. In the end, the university determined that the MAC building site would be better fitted for the building than the parking lot that was originally on the site.

The building will become the core of student athletic activity. The building is designed to accommodate a variety of programs and events. Many of the NCAA varsity teams along with the intramural sport teams will make the new multi-purpose facility their home. The multi-purpose building will be used for sporting events, as well as, commencement, exhibitions, and concerts. The building will offer an indoor track, basketball arena, student fitness center, university bookstore, copy center, weight training center, and conference center along with private suites. Included in the building, is a 4,000 square foot student fitness center along with a 4,000 square foot athletic weight training center. In addition, the facility will offer recreation for athletic events involving students, faculty, staff, and the neighboring community.

Figure 1C: Interior Rendering

The design of the MAC building started in 2000 and finished in the summer of 2004. There have been a number of key issues that have kept the project from going forward into the construction stage. These issues will be explored and discussed later.

Owner:	Monmouth University
Architects:	Ewing Cole
Consulting Architect:	Rosser International
Engineers:	Ewing Cole

Civil Engineer:	William Fitzgerald
Geotechnical Engineer:	James Johnson of PMK Group
Landscape Architect:	H.M. White
Food Service Consultant:	William Caruso and Associates
AV/Sound Consultant:	Pelton Marsh Kinsella
Contractor:	To be determined

Architecture:

The MAC center was designed to be flexible while holding onto the functional components of the building. The building maximizes the multiple use aspect by providing a gymnasium that can be used for basketball, volleyball, concerts, wrestling, summer camps, practices, and convocation ceremonies. Furthermore, there is a state of the art fitness center. The building serves the students, faculty, and surrounding community.

The exterior walls on the building consist of concrete masonry units with a face brick. In addition to the concrete wall with brick, there is glass on the exterior surface. The roof system is a metal deck with insulation covered with a single ply roof membrane.

1.3 - Building System

The building systems were collected from the existing drawings and specifications. Since the MAC building is not yet under construction these document were the best means available to determine the buildings systems. The mechanical section will be discussed in more detail in the next section of this report.

Electrical:

The campus is supplied power from Jersey Central Power & Light Corporation (JCP&L) in New Jersey. The buildings main terminal bus is a 4000 amp, 470/277V, 3 phase, 4 wire system. The main switchboard system serves 14 distribution panels and then from there the voltage either remains at 470/277V or stepped down to 208/120V. The distribution panels range from 225 amps to 1200 amps. A few of the distribution panels are broken down and serve power panels that range from 100 amps to 800 amps. The

building also has an emergency generator sized at 275 kW, 470/277V, and 3-phase. Monmouth University campus is built in a residential area; therefore, the power lines do not have the capacity to supply the addition of the MAC building. This provides a unique situation that will be the basis of the mechanical redesign and will be explored later in this report.

Lighting:

There are many different types of lights within the building since the building has so many different functions. Most of the areas are served by recessed fluorescent lights either 2' x 2' or 2' x 4' consisting of either two or three lamps. The other popular lighting system in the building is the aperture compact fluorescent down light. The gymnasium section of the building consists of 1000 watt high bay metal halide lights serving the sporting areas of the facility.

Structural:

The MAC building is a slab on grade building that consists of reinforced 5 inch concrete. The facility is a three story building built up using steel frame construction. The floors of the building are metal deck with poured concrete of 4 ½ inches. The roof consists of 1 ½ inches of galvanized metal deck.

Fire Protection:

The fire protection system is a wet sprinkler system serving the MAC building. The sprinkler system is broken down to six zones ranging from 17,000 square feet to 31,000 square feet. The total sprinkled area is 143,024 square feet. The sprinkler system consists of two pumps, one being the fire pump and the second being the jockey pump. The fire pump room is located on the second floor near the other mechanical equipment and is supplied by an 8 inch pipe. The system is designed to provide 0.10 to 0.20 gallons of water per square foot.

Transportation:

The front of the building is located in an orientation that allows people to drop people off before they go and park there cars in the neighboring parking lot. Within the building there are two elevators and eleven sets of stairs. The elevators consist of one freight elevator and another elevator for the general public. The staircases include stairwells and the lobby staircase that allow people to transfer to and from the second floor.

Telecommunication:

There are four telecommunication rooms throughout the building. The MAC building has telephone lines throughout the building serving the different office spaces. The building also has data outlets for the computers that are going to be within the offices. The building has a speaker system for the gymnasium.

Specialty Systems:

Due to the nature of the building and the fact that it will be used for sporting events, the building provides food services in the form of concession stands. These rooms have a considerable amount of equipment that needs to be taken into account with the mechanical load and the structural load. There will be exhaust hoods that weigh up to 950 lbs. that are hung that need to be taken into account both mechanically and structurally. The structural needs to provide the support to hold this system and the mechanical system needs to determine how to make up the exhausted air.