General Description

Site

The Athletic Center fits into an extremely tight space between the Nippert Football Stadium, Shoemaker Center, and Recreation Center (Figure 2). The footprint of the building turns a corner to accommodate these existing facilities. Part of the Shoemaker Center was demolished to make space for the new construction; however a portion of its below-grade spaces, namely the underground gym and locker rooms, still exists for connection to the Athletic Center. The area on which the building sits is quite populated due to neighboring athletic facilities and plans of future expansion for football and soccer fields, tennis courts, and a baseball stadium (Figure 3). Site traffic is therefore quite heavy, and pedestrian circulation paths are provided continuously around the entire building.

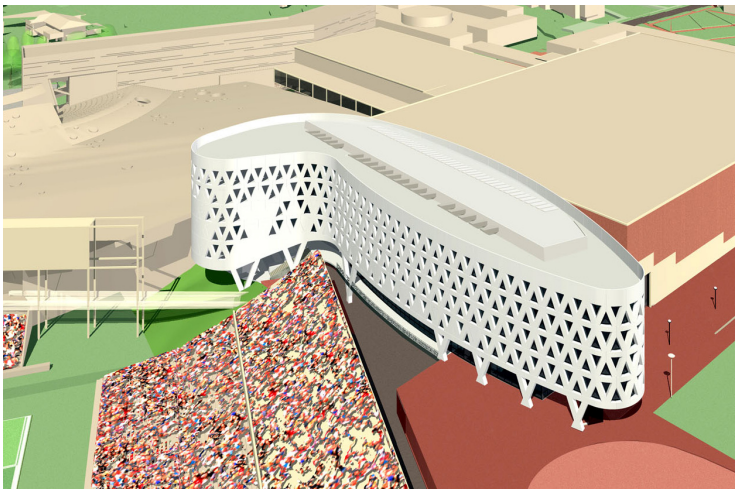

Figure 2: Site context rendering

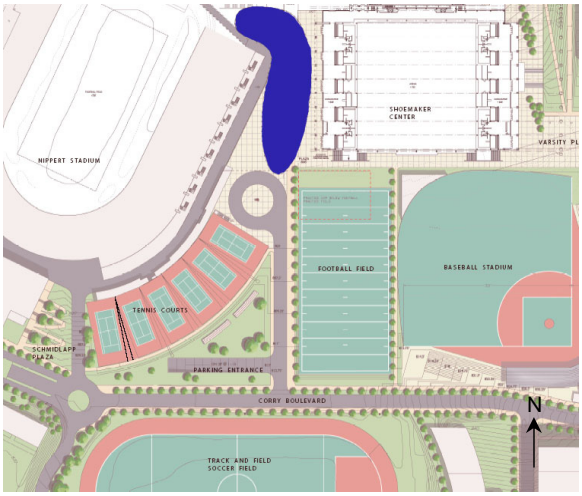

Figure 3: Expanded site plan

Architecture

Architecturally, the design is characterized by its unique exterior façade (Figure 4). The façade consists of a triangulated "exo-skeleton" of concrete-covered steel. This skeleton, referred to as a "diagrid", forms a visually dominant shell around the building. The heaviness of this exterior system is offset by its light color and appears to be lifted off the ground by a series of v-shaped columns.

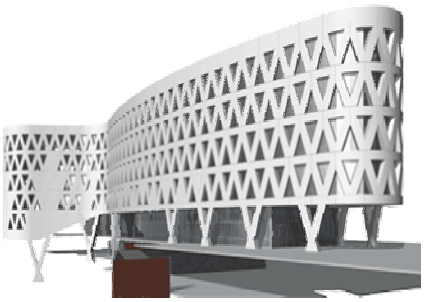

Figure 4: Façade close-up

Also unique to the building is its curved shape. There are no corners in above-grade plan, creating a rather unusual kidney or "link-pin" shape (Figure 5). The interior space of the building itself is divided by a 5-story atrium running down the middle of its main section. To each side are offices, meeting rooms, and administrative areas. Below ground is a more conventional rectangular footprint, with mainly sports facilities and locker rooms. Horizontal movement through the building is kept simple by its compact design, however vertical movement is facilitated by a set of elevators and a grand staircase in the atrium.

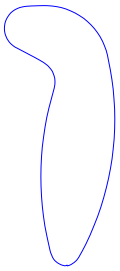

Figure 5: Plan outline

Building Systems

Electrical

Power for the building is taken from a 12.5 kV campus loop. Medium voltage switchgear in a redundant double-ended unit substation transforms the utility tap down to 480/277V. A 480V switchboard located in an adjacent room distributes power to each floor's electrical closet vertically via cable feeders in conduit. Voltage is then transformed down to service 208/120V panelboards, where it is fed to branch circuits. Sufficient spare capacity is provided for future loads. Typical 20A grounded power receptacles are placed in each room. Isolated circuits are provided for computer equipment outlets to reduce detrimental harmonic effects. An 800 kW diesel generator supplies four hours of autonomous backup.

Mechanical

The building is fully air conditioned and heated. The mechanical system is served by low velocity double wall air handling units in two equipment rooms. Chilled water for cooling is supplied by a University of Cincinnati central chilled water plant. The 45 degree water is metered upon entrance to the building. Two secondary, variable speed pumps sized for 100% of the 720 ton cooling load circulate the water. The building heating taps into the University's campus steam system. Two parallel pressure reducing valves reduce the loop's high pressure steam to low pressure steam. The steam is also converted to hot water by two straight-tube heat exchangers, operating independently or together. Perimeter fin tube radiation and VAV boxes with hot water reheat condition each individual space. Zone carbon dioxide sensors connected to the Building Management System control indoor air quality.

Lighting

The majority of luminaires are high-efficiency fluorescent modular ceiling recessed fixtures, predominant in the office and non-public areas. Compact fluorescent with rapid start electronic ballasts are also used. Local switches and occupancy sensors provide their control. In more specialized spaces, such as kitchens and multi-purpose rooms, tungsten accents lights and track lighting combine with time programs and scene set dimmers to allow detailed control. In the atrium, linear fluorescent lamps with louvers respond to daylight levels in the atrium through the use of an array of light level sensors. The exterior diagrid facade is floodlit in an upward direction by luminaires with changeable optics. Emergency lighting is provided as specified by code.

Fire Protection

Active fire protection occurs through the fire alarm and sprinkler systems. The fire alarm system is fully addressable and networked throughout the building. Remote annunciation panels are provided. Horns, strobe lights, smoke detectors, pull stations, and door release are integrated into the system. The entire building is served by an automatic combined sprinkler and standpipe system, connected to the 12" campus water main. It is a wet system, with quick-response fusible link or frangible bulb sprinkler heads. Areas where freezing occurs are protected by an automatic dry type system. Pressure-reducing valves regulate smoke buildup pressures on each sprinkler connection. Standpipes are equipped with 2.5" hose valves, but no hoses. In the case of fire during power loss, 1250 gpm fire and jockey pumps are connected to the emergency power supply.