Kwantlen Polytechnic University - Administration Building
Vancouver, BC Canada

GENERAL DESCRIPTION

The new Administrative Centre for Kwantlen Polytechnic University provides this campus with a unique and contemporary 'front door' through which to welcome and integrate students and visitors. The entrance features a striking canopy with a copper ringed oculus and wood soffit, while the light-filled three storey atrium bridges the gap between the old and the new administrative buildings. Large glulam beams provide a dramatic focal point for this unique space.

The new entrance features a dramatic canopy with copper ringed oculus and wood soffit

DESIGN PROCESS

Bunting Coady Architects, www.buntingcoady.com, is an innovative, full service, architectural practice with a global reputation for "Creating Living, Breathing, Buildings®". The new Administrative Centre for Kwantlen Polytechnic University is characteristic of our approach to sustainable design in that it uses half the energy of typical buildings. As Prime Architectural Consultants for the project, we employed The Integrated Design Process, (IDP), first pioneered by this practice in 1994, to create this healthy, comfortable and durable facility. The clearly defined, eight-step procedure, enabled structural, mechanical and electrical consultants to work collaboratively with the architect and the client to develop the building shape, optimizing natural ventilation, day lighting and passive solar and wind opportunities. The IDP reduced the need for complex solutions for the facility and enabled us to completely eliminate most mechanical systems.

As a practice, we credit the systematic use of the IDP with helping us to achieve over a million square feet of LEED® Gold certified projects. In addition, this process has achieved universal recognition as the most effective approach for creating comprehensive green buildings on a reasonable budget.

Preliminary massing exercises combined with wind studies and energy models shaped the building into a distinct architectural form. Natural Ventilation Chimneys are clearly visible architectural elements. The large atrium that links the existing administration building with the new Administration Centre provides ample amounts of natural light to the adjacent classrooms and offices. Based on the desktop analysis of the microclimate and weather data logged during the schematic design stage, it was determined that the prevalent wind flow was from the S, SW, and Westerly directions between the months of May to July. To take advantage of this phenomenon, the atrium roof was sloped up towards the North. This allows the architectural form to harness wind pressure effects caused by winds from the South. Relief louvers were also placed in the North Face of the Atrium. As the wind rises over the sloped roof it produces negative pressures below the edges of the roof line, at the relief louvers. These negative pressures assist in drawing the exhaust air up and out of the building. Mechanically operated relief is also included on the east and west building faces.

Large curved glulam beams are the focal point of the three storey atrium space for the new Administration Building. The light-filled atrium bridges the gap between the old and the new buildings

HVAC DESCRIPTION

The primary focus of this project was to reduce energy consumption and over- reliance on mechanical systems. Emphasis was placed on developing a passive design, optimizing the building orientation, utilizing the microclimate, providing a high performance envelope and employing natural ventilation.

The mechanical plant consists of a geothermal field and water source heat pumps. Circulating pumps distribute the heating/cooling water throughout the building while the thermal storage capacity (mass) of the opaque elements stabilizes temperatures within the spaces. This provides a considerable reduction in cooling and heating energy requirements. By optimizing thermal mass in combination with nocturnal pre-cooling techniques, a significant portion of the cooling load can be provided. Internal mass has also be used to absorb heat during the day and release it at night.

The effects of buoyancy, stack, and wind pressure provide three naturally occurring, reliable options for utilizing free wind energy. The lower two floors are fed with 100% outdoor air through operable windows and louvers. Abiding by the three natural effects listed above, the air will flow into the corridors on each floor, then into the atrium where it will be exhausted through the top, via a wind tower. The third floor will release exhaust through separate wind towers.

In addition, by supplying 100% outdoor air into the occupied spaces and exhausting/relieving polluted air without recirculation, superior air quality can be achieved within the building. CO_2 levels will be monitored throughout the interior spaces, and ventilation intake dampers within the louver system will open if levels exceed set points.

SUSTAINABILITY PERFORMANCE

The energy use of the mechanical system has been minimized by employing natural/wind driven ventilation, high thermal mass usage, high performance envelope, other passive heating and cooling concepts and highly efficient building systems such as radiant slab heating and cooling with geothermal.

The north façade features horizontal louvers, operable windows and high performance glazing