RENDERINGS COURTESY BING THOM ARCHITECTS / SHAPE ARCHITECTS / ISAAC EPP

Guildford Aquatic Centre

by Jessica Krippendorf

LOCATION
15105 - 105 Avenue, Surrey, B.C.

OWNER/DEVELOPER
City of Surrey

DESIGN ARCHITECT/PRIME CONSULTANT
Bing Thom Architects

ASSOCIATE ARCHITECT
Shape Architects

GENERAL CONTRACTOR
Heatherbrae Builders Co. Ltd.

STRUCTURAL CONSULTANT
Fast + Epp

MECHANICAL CONSULTANT
AME Consulting Group

ELECTRICAL CONSULTANT
Applied Engineering Solutions

TOTAL SIZE
75,000 square feet

TOTAL CONSTRUCTION COST
$32.8 million

A beautiful new aquatic centre has created a visual gateway for visitors to Surrey's Guildford community in B.C., and a recreation and therapeutic aquatic destination for community residents.

Combining a leisure pool, walking lanes, a lazy river and a toddlers area with a FINA-certified, 50-metre lap pool, the Guildford Aquatic Centre serves one of the City's primary goals for the project – a welcoming, inclusive facility for people of all ages and abilities.

Scott Groves, manager of Civic Facilities for the City of Surrey, says the City's vision was to create a community hub for Guildford Town Centre. "Due to this prominent location, we also looked for a high level of architecture, both to greet first-time visitors and to make the local neighbourhood proud," says Groves.

The expansion includes 2,600 square feet of enlargement to the fitness centre, new entries with a lobby and administrative space, an access bridge overlooking the natatorium, a sauna, steam room and change area, plus 300 fixed spectator seating with direct views into the natatorium.

The design takes into account the energy consumption of pool buildings and reduces the impact of heat gained from direct sunlight with selective and strategically placed glazing.

"A ribbon of glazing is located at pool deck level," says Michael Heeney, principal with Bing Thom Architects (BTA). "It opens up the lower corners of the natatorium box and will reveal the white pearl interior." The lightness of the glazing ribbon and white interior palette contrasts with pixelated grey tones of exterior precast panels, with the intention to "provide a tension of materials and a play between solid and void," says Heeney.

The design takes advantage of the building's low setting on the site, using the concrete panels, landscaping and a stormwater retention pond to create the image of the earth evolving into a building encircled by greenery.

"Surrounded by two main streets, the facade needed to be animated," says Heeney. "For budget reasons, we could only have a limited number of panel sizes, however, we created two-dozen panel types using four different pigments in concrete mix and two different degrees of sandblast finish. The result is a highly varied pixelated grey toned facade that gives a new face to the Guildford Community Centre complex."

Alec Smith, architect with Shape Architecture, associate architect on the project, says his firm's primary focus was the aquatic components and change rooms. "The exterior form and component was meant to be striking and notable, while Bing Thom conceived the interior as a 'magic box' lit from above," says Smith. "The design works around a theme of the interaction between light and water to create a glowing, luminous interior."

Smith adds that the lap pool had very specific technical and intense lighting requirements in order to be suitable for televised competitions. "It is a challenge to hang large, artificial lighting in a pool space because of logistical access problems," says Smith.

The BTA design team worked intensively with StructureCraft Builders to create a sustainable hybrid wood truss system known as laminated strand timber that acts as the main natatorium roof structure and contains the mechanical systems, acoustical dampening system and sprinklers, while also housing enough lighting to meet the 600-lux requirement.

Mehrdad Jahangiri, senior structural engineer with Fast + Epp, structural engineers for the project, designed the 22 repeating wood, V-shaped trusses, which were prefabricated and installed with the services in place by StructureCraft Builders. "This allowed for rapid on-site assembly with no scaffolding," says Jahangiri. "The design approach taken by the team to use wood trusses has many benefits, among them corrosion resistance, ease of maintenance, and the fact that wood is renewable and sequesters carbon."

The tall concrete perimeter walls, characteristic of pool buildings, meant particular care had to be taken regarding the interaction of the roof and walls under seismic loading, with the concrete walls providing shear resistance for the roof and the wooden roof providing out-of-plane support for the concrete walls.

"This interaction is particularly important at the southeast corner of the natatorium, where there is a large glazed opening with no corner column. Each wall cantilevers 30 feet to the corner of the building," says Jahangiri.

David Chung, electrical designer with Applied Engineering Solutions, says the lighting system in each truss consists of two rows of fluorescent vapour proof luminaires.

"A vapour proof enclosure was chosen for its long service life in chlorinated environments," says Chung. "A lamp type of T5HO was selected for its ability to provide soft, bright and directional lighting, and by using computer modelling, specular reflectors, special mounting brackets and high-reflectivity paint, competition lighting levels were achieved."

On the ground plane, the pools and a translucent, spiralling water slide positioned below one of the skylights continue the design theme. "The theme of interaction of water and light is the driving force behind the esthetic of the pool components, instead of simply relying on colour or material," says Smith.

Clever design solutions were required as the team was challenged by the building site – poor soil conditions, varying grades and the requirement to accommodate large volumes of stormwater – all exacerbated by the need to construct the building while the existing busy facility stayed operational.

The northeast corner of the site was at one point a ravine and had been filled, resulting in loose soils. Rather than excavate and refill the area with structural soil, the design team suggested it as the location of a two-level parkade, simultaneously solving the issue of insufficient parking.

The soil conditions were also a problem in that several long-spanning concrete, wood and steel elements in the building superstructure meant significant load accumulation at points where bearing was designed to transfer down to the foundation.

"A finite element model of the entire natatorium and parkade was built so we could quickly quantify the stresses imposed onto the foundations while optimizing the footing design along with other structural elements," says Jahangiri.

"The model not only allowed for rapid evaluation of geometry changes during design, but also allowed for accurate assessment of co-ordination items during construction," he concludes. ■