GRANDVIEW HEIGHTS AQUATIC CENTRE

LOCATION
Surrey, British Columbia

SIZE
8,830 m²

COMPLETION
2016

ARCHITECT
HCMA Architecture + Design

STRUCTURAL ENGINEER
Fast + Epp

CONSTRUCTION MANAGER
Ellis Don

ENGINEERED WOOD FABRICATOR
Western Archrib

GLULAM INSTALLATION/ CONNECTORS
Seagate Consulting Ltd.

PROJECT OWNER
City of Surrey

Project Overview

Located at the centre of the fastest growing community within B.C.'s fastest growing municipality, this new facility is designed to accommodate both international swim meets and a wide variety of water-related community activities.

The aquatic centre, with its dramatic suspended roof form, is the first project to be completed on the 'super block' that is destined to become a regional campus of health, wellness and sports excellence. In addition to its natatorium which houses a competition-sized lap pool and a leisure pool - both overlooked from the main lobby - the complex includes two hot pools, a sauna, fitness centre and poolside cafe.

At one end is a diving tower, with boards and platforms from one metre to 10 metres in height. At the opposite end is a spiraling water slide positioned adjacent to the glazed curtain wall, so as to be clearly visible from the street.

These two structures create natural high points for the tensile roof, which swoops down from concrete buttresses at either end, to a transverse concrete frame that bridges the natatorium between the leisure and competition pools.

The roof form is both practical and economical. Compared to a flat roof, it reduces both the exterior surface area and the internal volume of the building, resulting in a reduction in capital cost for building materials and labour, as well as decreased operating costs related to heating and cooling. This effect is further enhanced by the shallow depth of the tensile structure compared to a conventional beam or truss system.

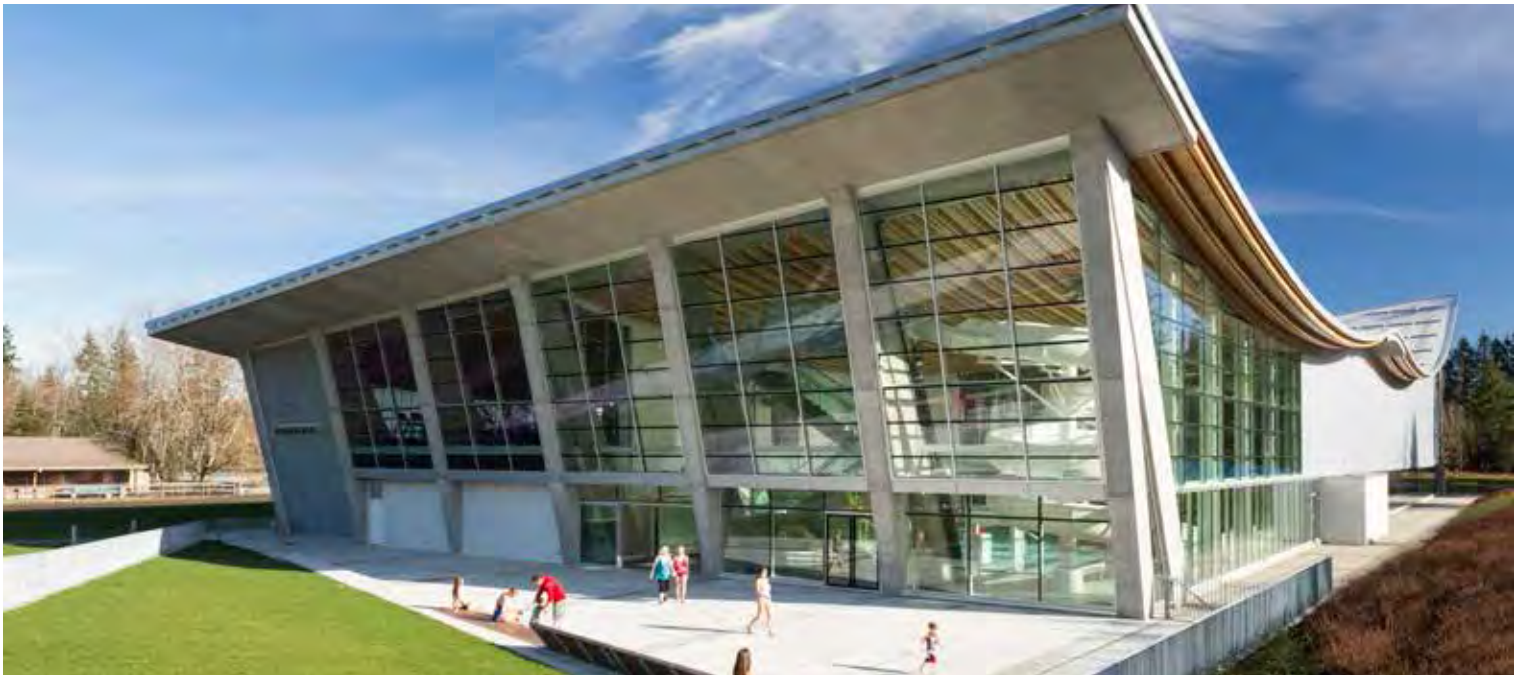


Image courtesy of HCMA Architecture + Design

"The City of Surrey is committed to building vibrant, healthy, sustainable communities and as part of that goal we have a policy to consider the use of wood in our capital projects. Because wood is a sustainable local resource and provides a sense of warmth, it fits well with these City goals."

***Scott Groves**, Manager, Civic Facilities Division, City of Surrey*

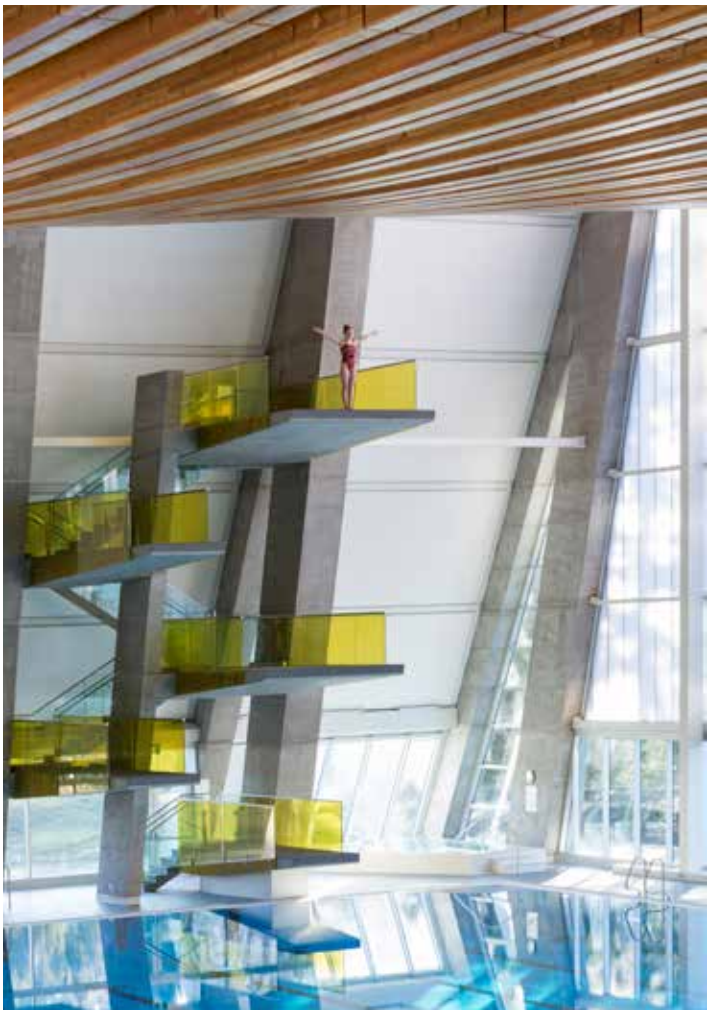
Wood Use

Wood was chosen for the roof structure as it met several important design considerations, both architectural and structural. Wood structures have a proven track record in high humidity environments, as glue laminated (glulam) beam roof systems have often been used in aquatic facilities for their resistance to warping due to moisture. The natural appearance of wood also lends a warm atmosphere to facilities that, of necessity, have large areas of hard, impervious surfaces.

For the suspended roof at Grandview Heights, glulam beams also offered the required tensile capacity, self weight and inherent stiffness required to resists wind uplift, when compared to the commonly used steel cable system. Because such systems generally come with expensive proprietary connectors, the glulam system also proved to be the more economical option.

The paired 130mm x 220mm glulam beams are spaced at 700mm centres and oriented along the length of the pools below. The larger (65m) span is divided into three sections, and the shorter (45m) span into two sections. In each case the paired beams were fitted in the factory with steel knife plates at either end, enabling the field connections to be steel to steel. This is an important aspect of 'constructability', and shows how a 65 metre long catenary curve can be realized in wood. The end beams are anchored to steel plates embedded in the concrete buttresses at either end of the natatorium, and in the concrete frame that separates the spans. The roof diaphragm consists of two layers of plywood installed on site.

Suspended roofs can be subject to considerable deflection as they lack the rigidity of truss and beam structures. The design team worked carefully to ensure that the deflection of the roof under different loading conditions (most critically a heavy snow load) would not exceed 200mm - the maximum that could be accommodated at the roof edges by a standard curtain wall slip joint detail.



Images courtesy of HCMA Architecture + Design

The wood grain featured in this profile is Douglas-fir.

FOR MORE INFORMATION

This profile is published by Forestry Innovation Investment, the Government of British Columbia's market development agency for forest products.

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naturallywood.com