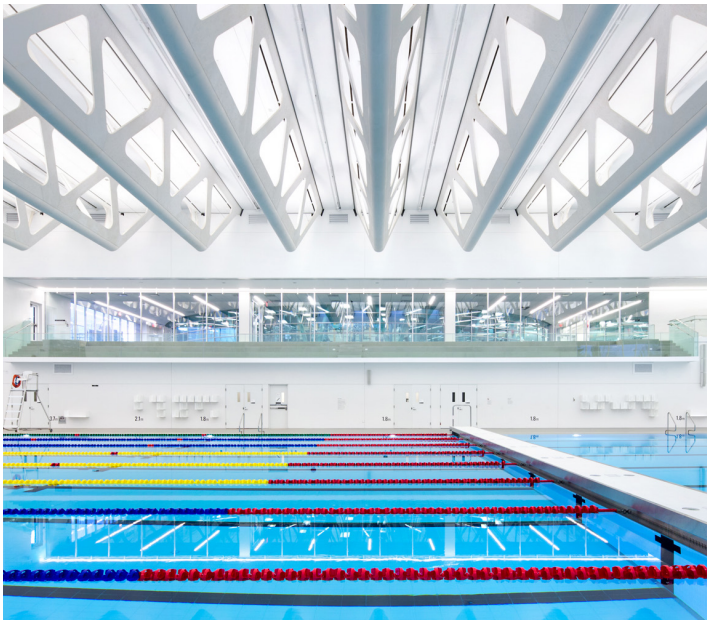
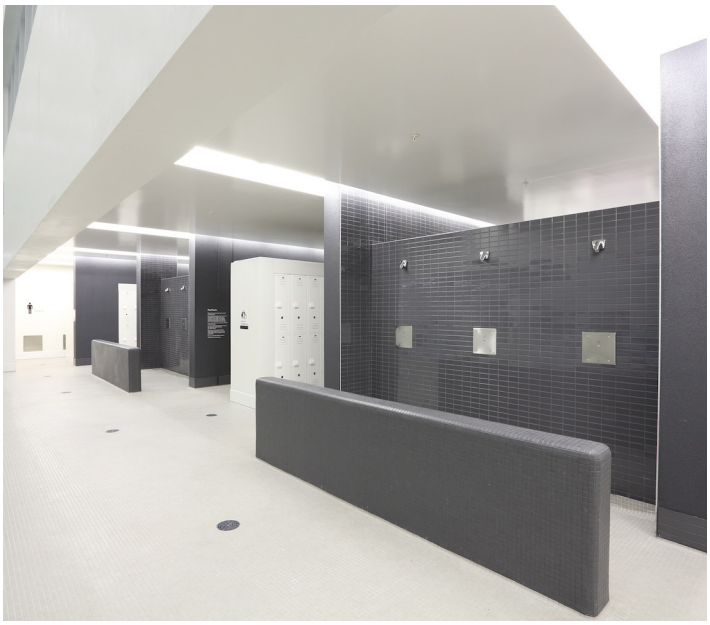




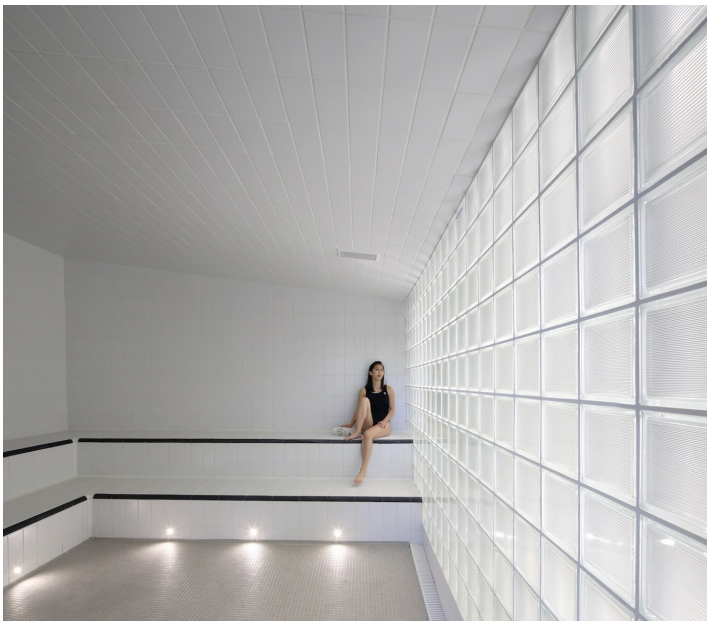
The Guildford Recreation Centre Aquatic Addition

SURREY, BC

ASSOCIATION OF CONSULTING ENGINEERING COMPANIES | CANADA

Canadian Consulting Engineering Awards 2015

SUBMITTED BY:
APPLIED ENGINEERING SOLUTIONS LTD.
2ND FLOOR, 1330 GRANVILLE STREET
VANCOUVER, BC V6Z 1M7



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AES

Mary Merraro

Subject: RE: Applied Engineering - Guildford Recreational Centre Addition - 2015 Canadian Consulting Engineering Awards

From: Parsons, Bronwen [mailto:bparsons@ccemag.com]
Sent: Thursday, March 12, 2015 1:53 PM
To: Elaine Chong
Subject: Applied Engineering - Guildford Recreational Centre Addition - 2015 Canadian Consulting Engineering Awards

Dear Elaine Chong :

This is to confirm that we have received your Notice of Intention to Enter the above project in the 2015 Canadian Consulting Engineering Awards.
We have also received your entry fee cheque for $350.00 + $45.50 HST @ 13%.
On behalf of the Association of Consulting Engineering Companies-Canada (ACEC /AFIC) and Canadian Consulting Engineer magazine, thank you very much for taking part in the program.
You have now fulfilled the requirements for **Stage 1**. There are two more stages to the entry process:

Stage 2 - deadline Tuesday, April 21, 5:00 p.m. EDT
Documents required:
- Official Entry Form / Project Outline
This is an electronic form to be completed online at
http://www.canadianconsultingengineer.com/official-entry-form-project-outline/

Once submitted, you will receive a confirmation receipt by e-mail.
Please note that when completing the Official Entry Form at (2) Project Highlights, you should complete only the questions related to your project's category. For example, entries in Technical Categories A-F complete Questions 1-5; Entries in Category G Project Management complete Questions 6-10, etc.

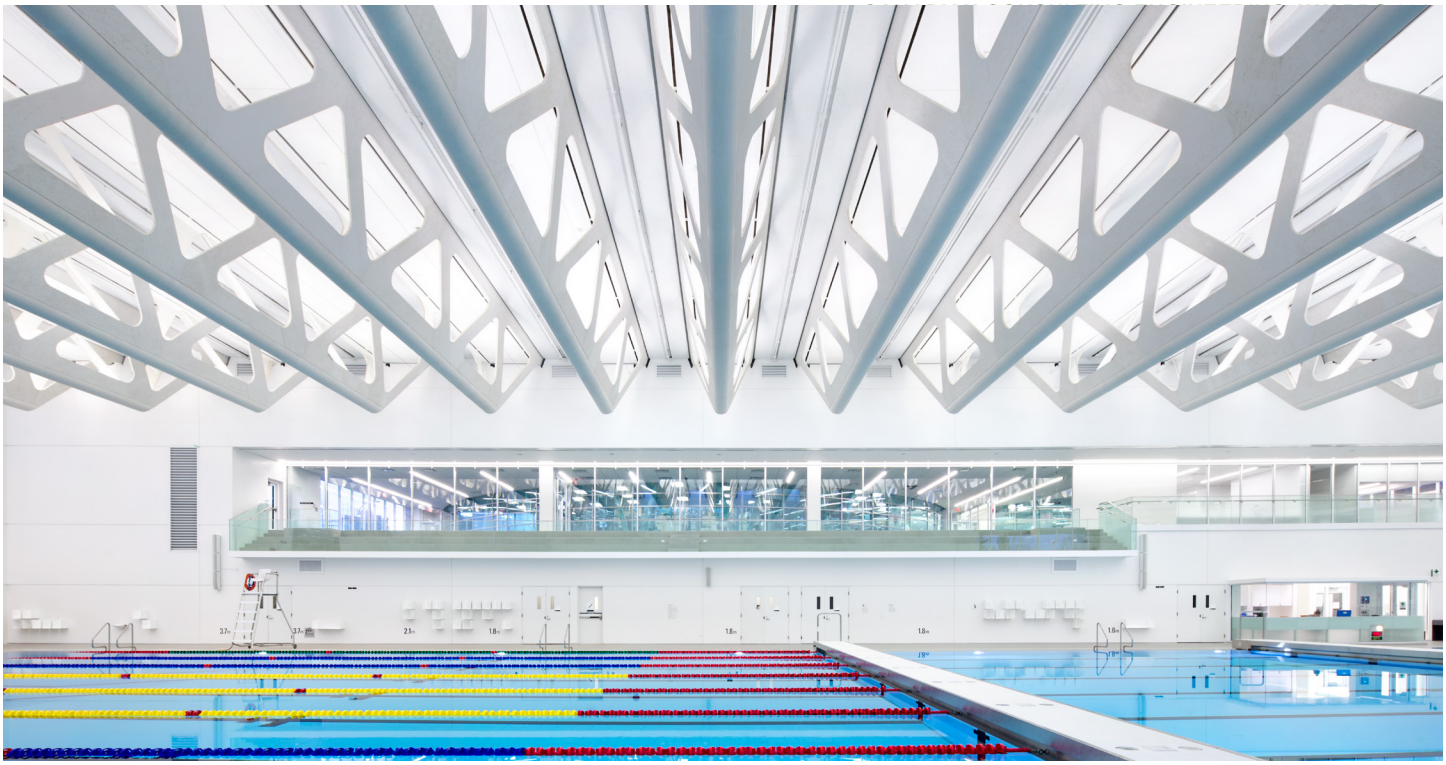
Stage 3 - deadline Thursday, April 23, 5:00 p.m. EDT
Documents required:
- Entry Consent Form - print. Signed by entering firm and owner/client. Form attached.
- Project Entry Binder - print. Description and photographs of project in loose leaf binder, maximum 10 pages + forms.
- Project Entry - PDF. An electronic file of the Project Entry Binder to be posted at a special ftp site.

The Information & Entry Rules document attached gives you further details.

Please send all material to:

Bronwen Parsons, Editor
Canadian Consulting Engineer magazine
80 Valleybrook Drive
Toronto, Ontario, M3B 2S9
Tel. 416-510-5119, Fax 416-510-5134
E-mail: bparsons@ccemag.com
www.canadianconsultingengineer.com

We thank you again for your participation in the awards. Don't hesitate to call me if you have any questions.



PROJECT: THE GUILDFORD RECREATION CENTRE AQUATIC ADDITION

Name of Member Firm Submitting:	Applied Engineering Solutions Ltd.
Address of Firm:	2nd Floor, 1330 Granville Street Vancouver, BC V6Z 1M7 Tel: (604) 569-6500 Fax: (604) 569-6501 Email: sghataurah@appliedengineering.ca
Contact Name:	Sunny Ghataurah
Project Title:	The Guildford Recreation Centre Aquatic Addition
Location of Project:	Surrey, BC
Category of Entry:	Technical – A. Buildings
Project Owner:	City of Surrey
Project Client:	City of Surrey
Prime Consultant:	Bing Thom Architects
Summary Description of Project:	The Guildford Recreation Centre Aquatic Addition was designed as a destination aquatic facility for both recreation and therapeutic users, offering a 50m FINA certified lap pool as well as a leisure pool that contains: a therapeutic area, waterslide, family friendly hot tub, and children's area. The wood trusses for the natatorium were pre-assembled offsite and house the lighting and HVAC. This allowed for easier installation, reduced waste and cost, and time savings for the accelerated schedule.
Names of Other Consultants Involved:	Project Manager: Turnbull Construction Project Managers Mechanical Engineer: The AME Consulting Group Ltd. Structural Engineer: Fast + Epp
Names of Contractors Involved:	Heatherbrae Builders

INNOVATION

The Guildford Recreation Centre Aquatic Addition features the expansion of the existing facility in Surrey, BC. Surrey's "Wood First Policy" was achieved in the design of the structure which incorporated the lighting and HVAC for the natatorium. Initially destined to be open web steel joist, the final product consists of three dimensional timber trusses. This solution became a defining feature.

The timber space trusses spaced at 4.0m conceal the mechanical ducts and electrical conduits. These trusses are comprised of glulam top and bottom chords with CNC cut Timberstrand LSL web members. The bottom chord within the truss also acts as a catwalk which facilitates easy maintenance in the truss space above the pool.

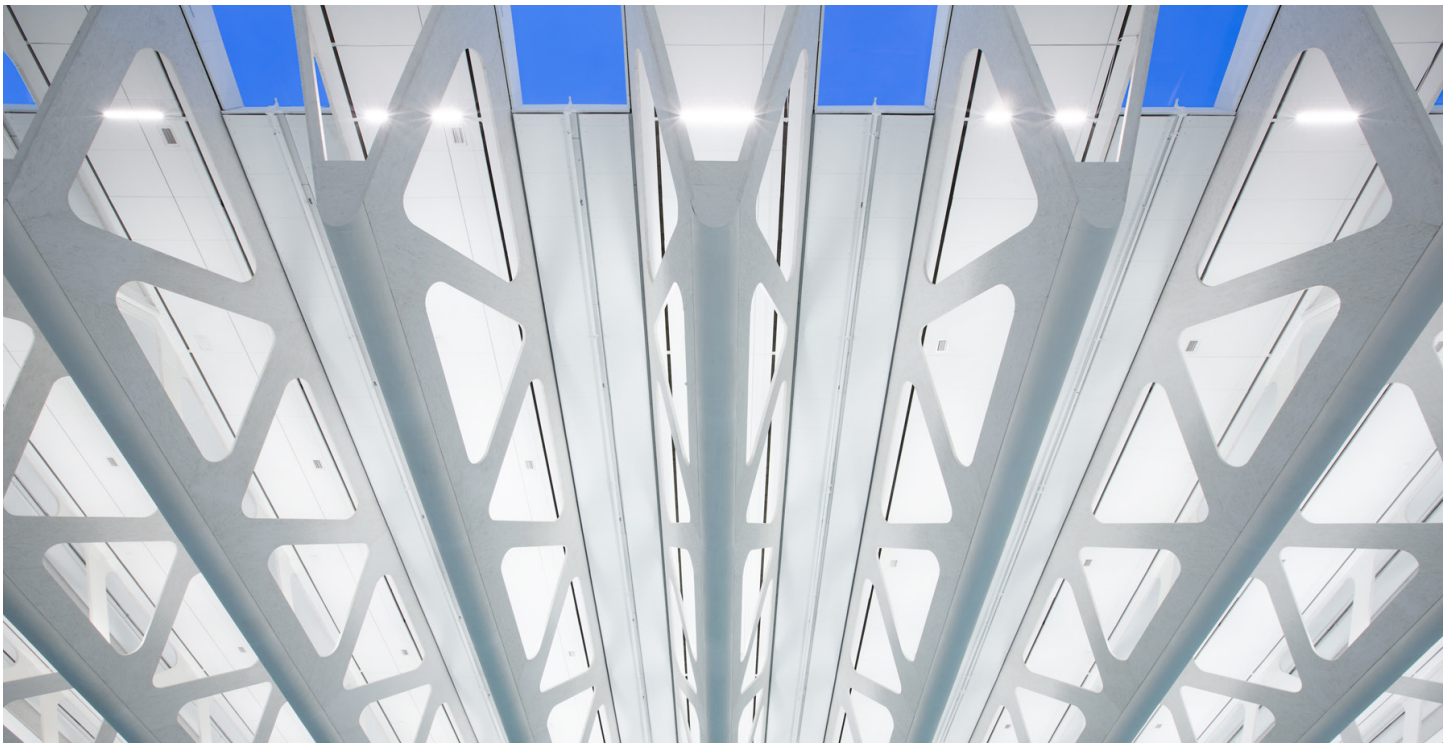
Fully threaded screws acting in tension/compression connect the web members to the top and bottom chords. The roof deck is comprised of two layers of standard 4x10 sheets of plywood lapped and staggered which accommodate both gravity and lateral load conditions. A four metre wide cast-in-place concrete bridge, spanning over 28 metres without intermediate supports, visually divides the swim and leisure areas.

Applied Engineering Solutions (AES) utilized various software tools to maximize the light output from both the coves and the trusses including Revit, Visual and ElumTools. Through modelling of various lighting types at multiple angles and positions, it was concluded that two rows of fluorescent vapour proof luminaires, using specular reflectors, would provide the best light quality and efficiency within the trusses. To further increase the light output, high reflectivity paint was selected and specified by the Architect, and lights were mounted at the optimal angles to maximize the amount of light reflected onto the pool.

The use of low voltage (LV) lighting controls was implemented to provide flexibility to the truss lighting system. Three levels of lighting have been implemented to provide selection options to suit its current use. Traditionally, lights are switched in rows or groups, but the lights in the trusses are configured to switch in an interweaving pattern so that an even light output is achieved no matter what level of light is selected.

- this solution became a defining feature of the Guildford Aquatic Centre

Guildford aquatic centre was the first aquatic centre designed in 3D Revit by The AME Consulting Group Ltd. (AME). All of the HVAC systems, pool, hydronic, and plumbing piping, pool regenerative filters, UV pool filters, boilers, chillers and pumps were included in the mechanical 3D model. Revit enabled AME to co-ordinate these systems with the structural, architectural and electrical requirements and reduced on site coordination.



COMPLEXITY

The City of Surrey wanted the lap pool designed to the Federation Internationale De Natation (FINA) swimming pool guidelines in order to host FINA competitions within their facility; allowing both the public and competitors to enjoy the facility.

Electrical engineering design was of key importance to meet the competition lighting levels, as well as the architectural intent. Working together with the other project team members in an integrated environment, AES proposed the use of indirect high efficiency lighting, to create a soft diffused light which would provide the swimming pool with a pleasant glare free light, competition lighting levels, and remain within energy use requirements. The project team was able to maximize the light output from the lighting systems and utilize indirect lighting throughout the lobby level and change rooms.

Project management was crucial to keeping the project on schedule and on budget as the City of Surrey had set an accelerated timeline. In order to meet this, the project had to be designed in multiple packages; the foundation package was designed in October 2012, well in advance of the systems inside the building; while the second package contained the remainder of the project design.

AES worked in a construction management environment, with contractors who could advise what materials would be available in time to fit the schedule. The prime consultant's project schedule and AES's internal deadlines allowed the project to reach substantial completion by December 17, 2014, as required by the City of Surrey.

SOCIAL AND ECONOMIC BENEFITS

The Guildford Recreation Centre is surrounded by commercial and residential buildings; therefore, extra care was taken to minimize disruption and contamination during and after construction. This was achieved through best management practices in areas such as storm water runoff control, dust control, and noise control.

The design of the building took into consideration the surrounding environment, and sought to minimize glare in nearby areas. Exterior lighting was chosen to enhance the inviting atmosphere embodied throughout the facility. The illumination provides a softer light, rather than the traditional high-glare lighting used in aquatic facilities. The trusses for the lighting system also were pre-assembled offsite, which reduced overall waste and cost.

The pool filtration system is crucial to achieving water clarity and assists the chemical balance in the pool tanks. The industry standard for pool filters is high rate sand filters. In the Addition, regenerative filters, which provide a better water clarity than sand filters, were specified and installed. These filters use less water for cleaning and the filter media is environmentally safe.

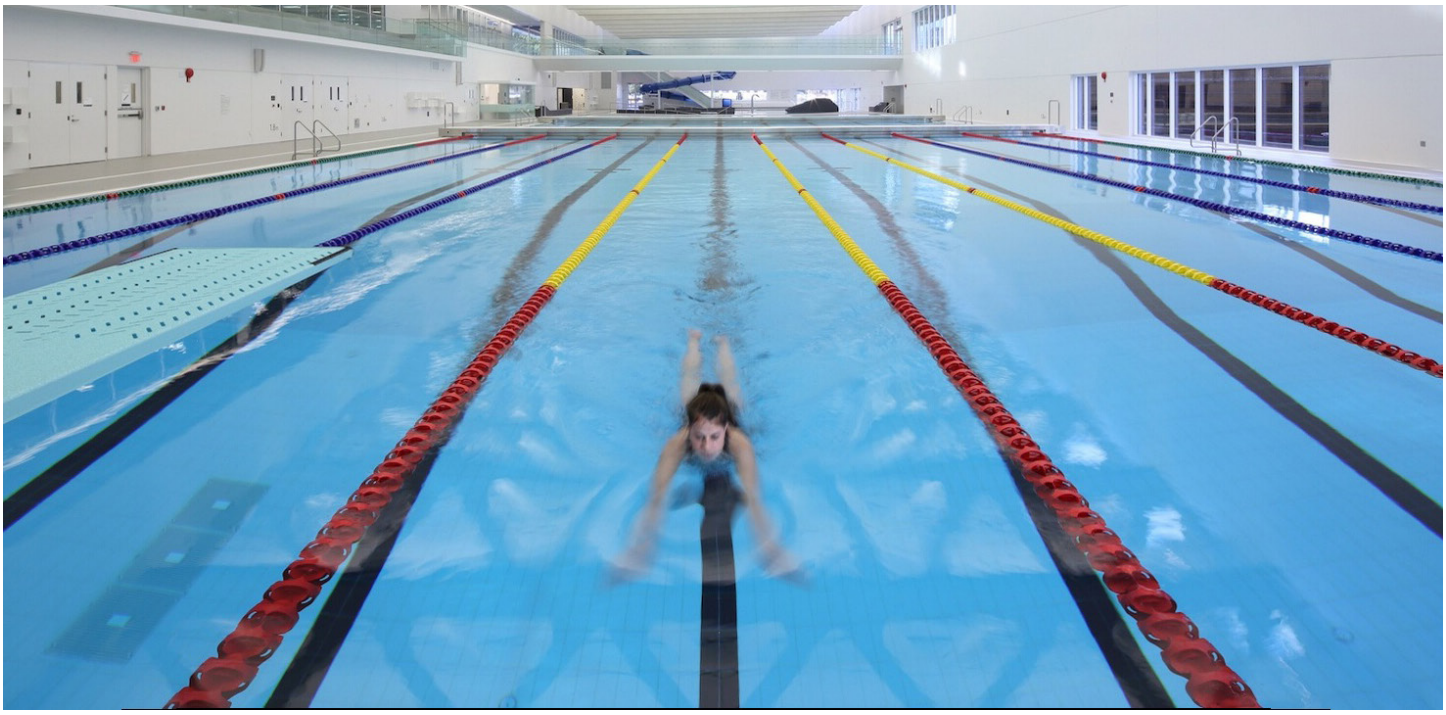
A tricholormine exhaust system was also designed and installed in the lap pool. Chloromines are heavier than air and typically sit up to 6" above the water surface. An exhaust system connected to the pool gutters pulls the chloromines off the surface of the water and exhausts them out of the building. However, this exhaust system does not create drafts above the pool and is sufficient to remove chloromines without affecting swimmers.

ENVIRONMENTAL BENEFITS

Highly functional and sustainable practices are the foundation of the Addition. By providing an even illumination using a minimal number of lights, overall energy consumption is reduced without sacrificing comfort or safety. The LV system is scheduled to sweep off lights when not required, and the use of LED underwater lights rather than traditional halogen lighting further reduce the carbon footprint.

Additional facility features include heat recovery systems to reduce environmental impact and a tricholoromine exhaust system to provide a more pleasant and healthy environment. The Addition is heat dominated due to the heating load of the two large pools. Primary heat is produced by two 120 ton chillers that recover heat from the building AHU's (natatorium dehumidification/ exhaust, fitness room exhaust, change room heat recovery, administration heat recovery and electrical, mechanical and data rooms cooling systems). The recovered heat provides up to 46% of the heat required for the building. The chillers move this "low-grade" recovered heat to the low-temperature heating system for use by the rest of the building systems.

Secondary heat is provided by three high-efficiency gas-fired boilers; each sized for 50% of the building heating load. The secondary heat delivers any additional heat required and provides high temperature water to the heat the pools when they are filled only. Low temperature heat is used to maintain the temperature of the pools throughout the year. Final heat for the domestic water is provided by two gas-fired domestic hot water heaters, separate from the heating boilers.



MEETING OUR CLIENT'S NEEDS

The initial project objectives of the City of Surrey included increasing the value of the facility to the city and the community, reducing waste, and maximizing efficiency. A main goal was to create a building that would provide the public with a welcoming swimming pool where they can compete, exercise, and play. It was a top priority to meet the client's objectives of an aesthetically pleasing and versatile swimming pool, while staying within the energy code requirements, and budget.

AES considered the needs of other project team members, such as the architectural and mechanical teams, and how their system and design selections would ultimately govern the lighting design throughout the building. Working closely with the multidisciplinary team allowed all systems within the trusses and coves to be configured such that maximum light output was achieved, resulting in a lower overall energy consumption throughout the facility. Various dimensions, angles, material types, and finishes, were modelled for the coves and trusses to achieve optimum design characteristics and maximize light output. The resulting design provides the public with comfortable levels of lighting, while using minimal amounts of energy.

As the City of Surrey had set an accelerated timeline, AES collaborated with the design team to keep the project on time and on budget while still accommodating the initial design intent, enabling the Guildford Centre Aquatic Addition to provide enjoyment for the community and its visitors for years to come.