

Association of Consulting Engineering Companies
CANADA
Canadian Consulting Engineering Awards 2015

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Contact Name:	Thomas Poon
Project Title:	Surrey Civic Centre
Location of Project	Surrey, British Columbia
Component Being Submitted:	Structural Engineering Consulting
Category of Entry:	A. Buildings
Joint Submitters (if any):	N/A
Project Owner:	City of Surrey
Project Client:	City of Surrey
Prime Consultant:	Kasian Architecture; Moriyama & Teshima
Summary Description of Project:	Plaza and concrete buildings linked by a three-sided glazed atrium structure.
Names of Other Consultants:	Gage-Babcock & Associates (Code & Security); MCW (Mechanical & Electrical); Moriyama & Teshima (Landscape); Aplin & Martin (Civil); Hemmera (Geoexchange);
Name of General Contractor:	PCL Constructors Westcoast Inc.
Names of Sub Contractors:	Bosa Construction (Forming); AI Industry (Structural Steel)

SURREY CIVIC CENTRE & PLAZA

PROJECT SUMMARY

Surrey Civic Centre was constructed to house municipal government and to grow a predominately sub-urban community. The heart of the project is the prominent light-filled atrium that fosters the visual and physical connections between the plaza and the City beyond. The Civic Centre now stands as an architectural landmark in the new downtown core of Surrey. RJC met all of the architectural requirements on schedule, while providing aesthetically pleasing solutions to a complex building.

PROJECT HIGHLIGHTS

1. Innovation

Read Jones Christoffersen Ltd. (RJC) was the structural consultant for the Surrey Civic Centre project. The complexity of the many feature elements of this project challenged RJC minds to innovate and be technically creative. Our team responded to these challenges and contributed towards the success of this stunning building.

The roof structure, with its long spans and large overhangs, was designed using structural steel as it reduced building weight, offered much quicker construction and eliminated the need for complex and costly shoring of the overhangs. The monumental cantilevered roof on the north, south, and east sides, overhangs up to 7.5 metres past the glazing line. Roof cantilevers were achieved by using 2 metre deep upstand steel trusses which cantilever 9 metres from the column location. The bottom chords of the truss cantilever is a further 6 metres. So the maximum 'true' length of the roof structure cantilevers is a generous 15 metres in places.

The two concrete building wings are linked by the structural steel sky-bridges located on the second to sixth floors. These bridges free span across the entire 18 metre wide atrium space. Dramatic, inter-connecting A-frame steel stringer staircases, which cantilever off the sides of the bridges, allow for access between floors. Our successful design ensured the architect's vision for connectivity was realized.

The atrium itself features a 28 metre high glazing system at the north and south sides, which provides an inviting passageway between 104th Avenue and the Civic Plaza. To maximize the amount of daylight that enters, the entire glazed wall was hung from roof beams by very small and slender steel tension columns. The 18 metre by 18 metre glazed sloped roof with spacious wood trellis ceiling allows abundant light into the atrium, while 700 light-gauge stainless steel birds appear suspended in mid-flight by aircraft cables attached from the primary roof structure, giving a sensation of a flock of birds flying within the space.

The feature wall on the west side of the building stands from the second floor to the roof. It appears as a continuation of the roof from the north and south elevations. Tapered and angled precast panels, penetrated by a series of abstract geometric shapes create a stunning west elevation. These shapes control light into select interior spaces, and are backed up by a specialized, tailored structural steel frame support system.

2. Complexity

Several site challenges occurred during the construction phase of the project and include the following:

- During the early stages of construction, crews faced the challenge of relocating an electrical duct bank, a fibre-optic line, and a water main located underneath the site.
- One adjacent building housed an eye care centre, which performed many sensitive procedures. Demolition of buildings, as well as the installation of secant piles and soil anchors all had to be coordinated with the eye care centre in order to minimize impact to their business, and ensuring safe procedures for the patients.
- Secant piles at the northeast side of the property encroached into the basement wall. These walls were re-designed accordingly to suit the site condition.
- Modifications to the structural steel backing for the west feature wall were made during the construction phase to assist the contractor in overcoming some unexpected erection challenges.
- The Client requested changes were required at the northwest side of the ground floor. RJC responded promptly, and incorporated all necessary structural revisions allowing the construction to proceed without delay.
- Various other challenges were encountered during the erection of the 28 metre tall glass and steel atrium. Brainstorming and team work by all parties resulted in modifications that allowed the construction to continue on schedule. Discrete horizontal rods and the use of a preload system for glazing installation were examples of the solutions developed by this collaborative team.

3. Social and/or Economic Benefits

The Civic Centre is conveniently located close to transit, businesses, emerging high-density housing, and the busy King George Highway. The 210,000 square foot building is more than a City Hall. This multi-phased project consisted of two seven-storey towers on three levels of underground parking; housing the new Surrey City Hall, mixed-use office, ancillary service-commercial and retail uses, and an expansion of Simon Fraser University's Surrey campus.

The heart of Surrey will be brought to life, with features like a City Hall Plaza - which will serve as a central business district focal point, as well as a Performing Arts Venue, new rental spaces, and plaza community events. City Hall Plaza is intended to be the heart of its public realm. It provides a pedestrian corridor which acts as the spine of the Precinct. Future plans for the area include an arena, recreation centre, connection to a new LRT line, and increased housing which will double the City Centre population from 28,000 to 50,000 by 2026.

4. Environmental Benefits

The Surrey Civic Centre was designed to achieve LEED Gold standards of sustainability, in conjunction with minimizing environmental impacts through the building's life cycle and providing a healthy indoor environment for its occupants. RJC utilized its in-house Sustainable Design Framework to further explore green strategies with the design team.

Many sustainable features were included in the design, such as the use of locally sourced materials, high fly-ash concrete, low-VOC materials, a location close to public transportation, and a partial green roof that contributes to the building's energy performance. The geo-exchange heating and cooling system is the largest of its kind in Canada, with more than 400 boreholes drilled as part of the system. Translucent glass fins provide shade to protect the building from excessive solar gain, and the atrium is naturally vented, allowing heat to dissipate in the summer and encouraging air circulation throughout the building. Not only does this help reduce energy costs, but most importantly, it contributes to the liveability and comfort of the occupants of the building.

5. Meeting Client's Needs

The City of Surrey visualized a major transformation for its "new downtown." Therefore, the goal of the entire project team was to create a work of art that would create an energetic hub for the region. The vision of the City was to have the new Civic Centre play an integral role in the advancement of the City Centre precinct. This was further enhanced due to the close proximity to Sky Train, making the Civic Centre easily accessed by residents and visitors.

Many of the interior main spaces are designed for multiple functions. The Council Chamber serves as a community space and a performance hall, and the atrium serves the public and various events. It also seamlessly links the Civic Centre to the outdoor plaza, which was a requirement of the City.

The Civic Centre is not just a piece of architecture. It is a catalyst for the growth of Surrey as a city, and the Civic Centre stands as an impressive architectural landmark in the emerging downtown core.

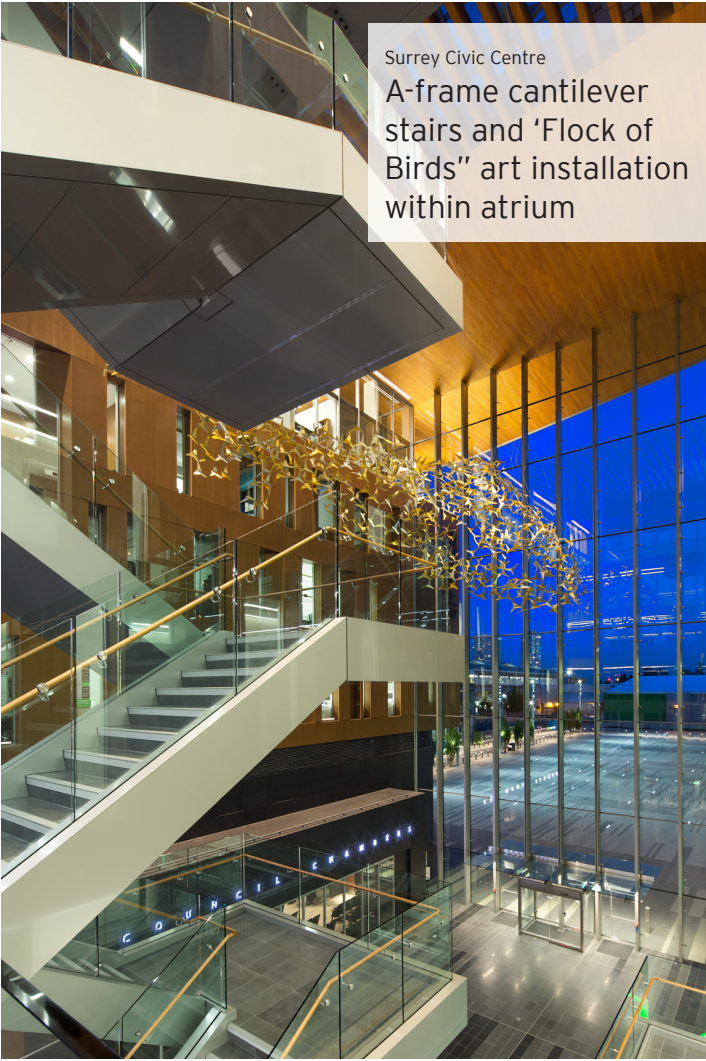
Surrey Civic Centre
West feature wall



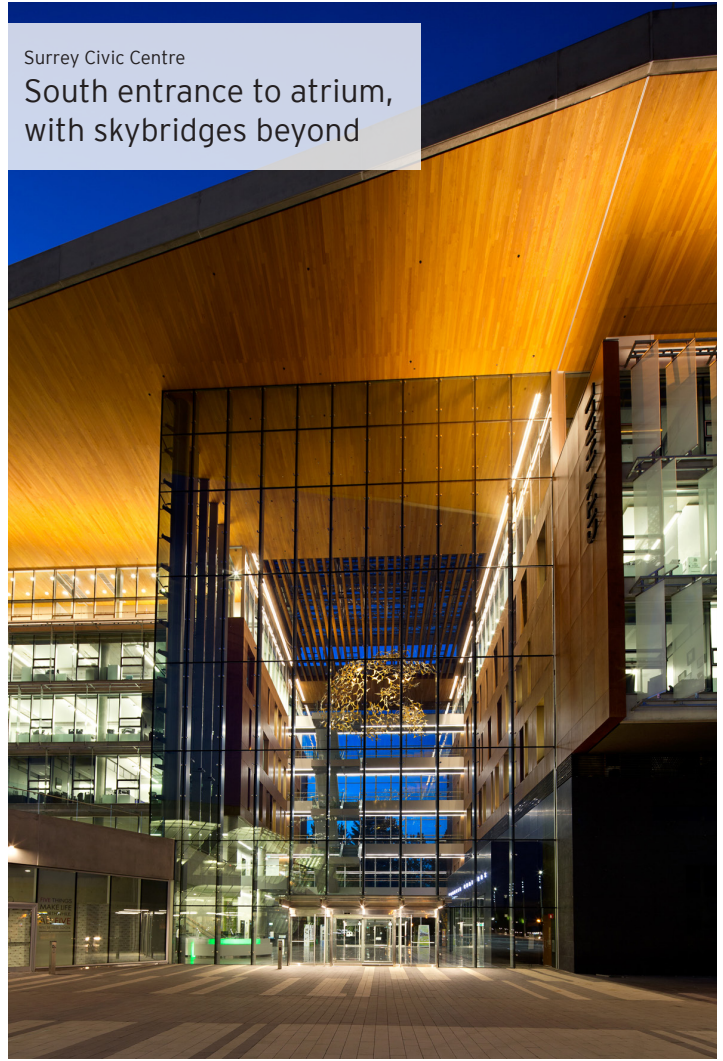
Surrey Civic Centre
South elevation of Surrey Civic Centre
with City Hall Plaza in the foreground



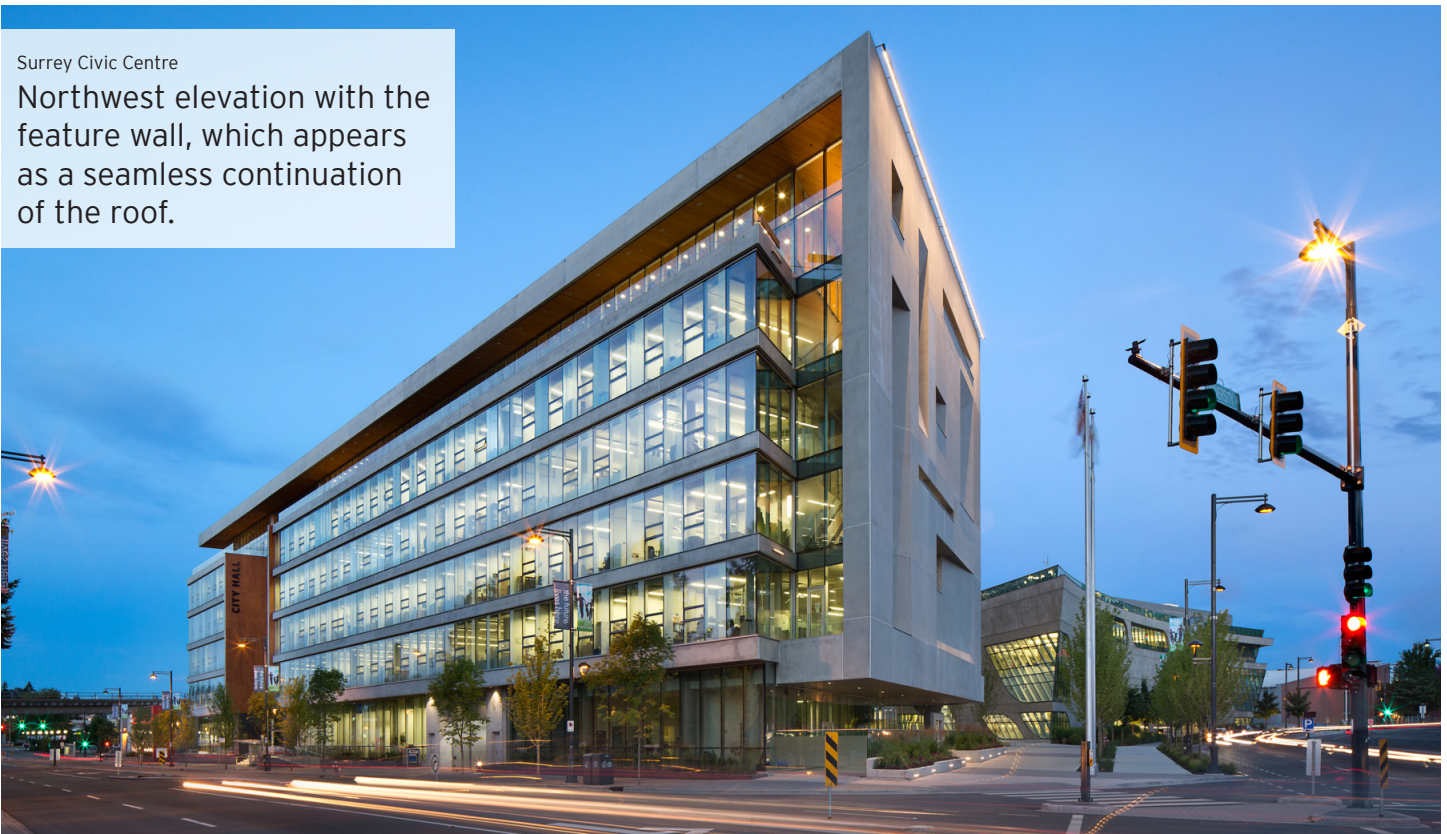
Surrey Civic Centre
A-frame cantilever
stairs and 'Flock of
Birds" art installation
within atrium

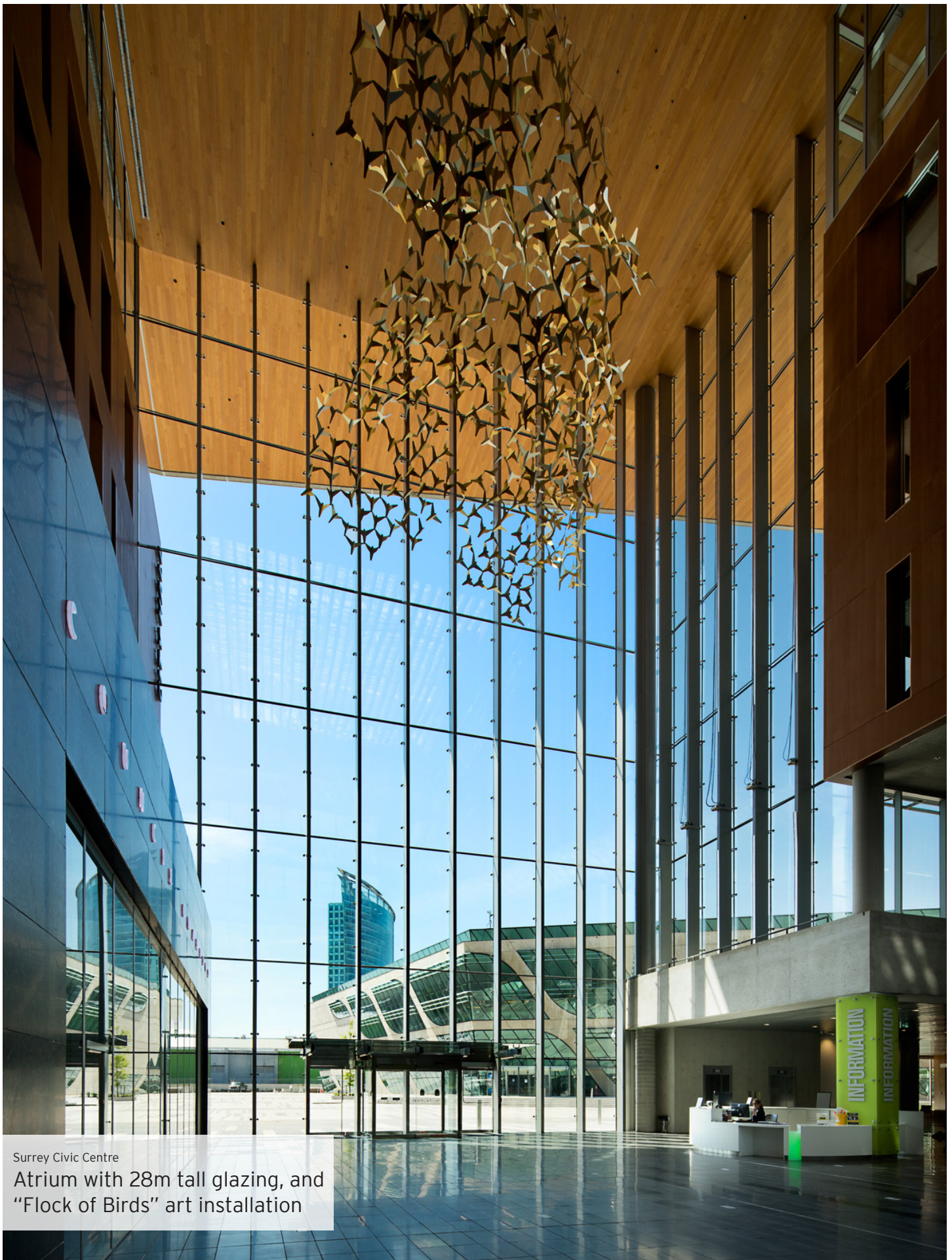


Surrey Civic Centre
South entrance to atrium,
with skybridges beyond



Surrey Civic Centre
Northwest elevation with the
feature wall, which appears
as a seamless continuation
of the roof.





Surrey Civic Centre

Atrium with 28m tall glazing, and
"Flock of Birds" art installation



Surrey Civic Centre

An inviting south entrance
from the City Hall Plaza

