

# ISABEL BADER CENTRE FOR THE PERFORMING ARTS

CANADIAN CONSULTING ENGINEERING AWARDS 2016





## PROJECT OUTLINE

On the shores of Lake Ontario, the historic 1830's Morton Brewery site has been reconceived into a world-class Performing Arts Centre by Queen's University in Kingston. The 80,000-square-foot Isabel Bader Centre unites performance and creative art disciplines under a single roof, housing a 566-seat performance hall, classrooms, rehearsal and performance spaces. WSP provided structural engineering, including an effective sustainable design for the adaptive reuse of the heritage structures and the state-of-the-art Performance Hall addition.

## INNOVATION

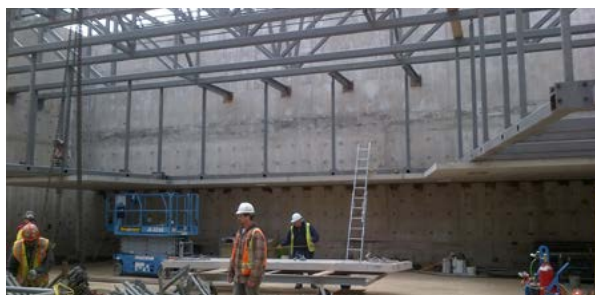
Situated on the shores of Lake Ontario, the Isabel Bader Centre for the Performing Arts is home to the creative arts at Queen's University and a hub of artistic study, creation, and exhibition in the community. The project included the 21,500-square-foot renovation of two 19th century stone buildings: the Stella Buck building (formerly the historic Morton brewery) and the Domino Theatre building (formerly the brewery stable). The bulk of the new three-storey building is in the courtyard, designed to include these original heritage buildings. The centerpiece of the facility is a 566-seat 'world class' performance hall surrounded by supporting spaces including a separate full scale music rehearsal hall.

Our team provided structural engineering services for the project, including support during the masonry restoration phase and seismic stabilization for the original walls of the two heritage stone buildings. Specific structural design challenges involved:

- › incorporating the historical building components;
- › providing for the stringent acoustical separations;
- › selecting appropriate supports for the specific equipment used in the performance aspect of the project; and
- › accommodating large special purpose program and mechanical spaces.

In particular, with respect to the heritage buildings, only the stone masonry walls were retained and restored, with a complete new structure inserted to provide seismic support for the stone walls with new robust floors at appropriate levels to support the new arts education function. In order to preserve the heritage buildings while incorporating a new support structure, an innovative hybrid building design with different building materials was used to maximize effectiveness and constructability. Concrete was used where mass and control of vibration is important, while steel was used to accommodate long spans and create the visual lightness in the dramatic entrance lobby.

Working with multiple stakeholders required careful communication and participation from the WSP team. Throughout the integrated design process, which involved a significant collaborative process with all of the design consultants and stakeholders, we were able to understand the client's objectives in the short-, medium- and long-term time frames. We reviewed the documentation explaining the construction and significance of the historic buildings and visited the site to investigate and document the current building condition, performance and state of deterioration. Repair strategies were developed in consultation with various heritage consultants and to satisfy local heritage conservation organizations. The strategies were designed to enhance performance while being as minimally invasive as possible.





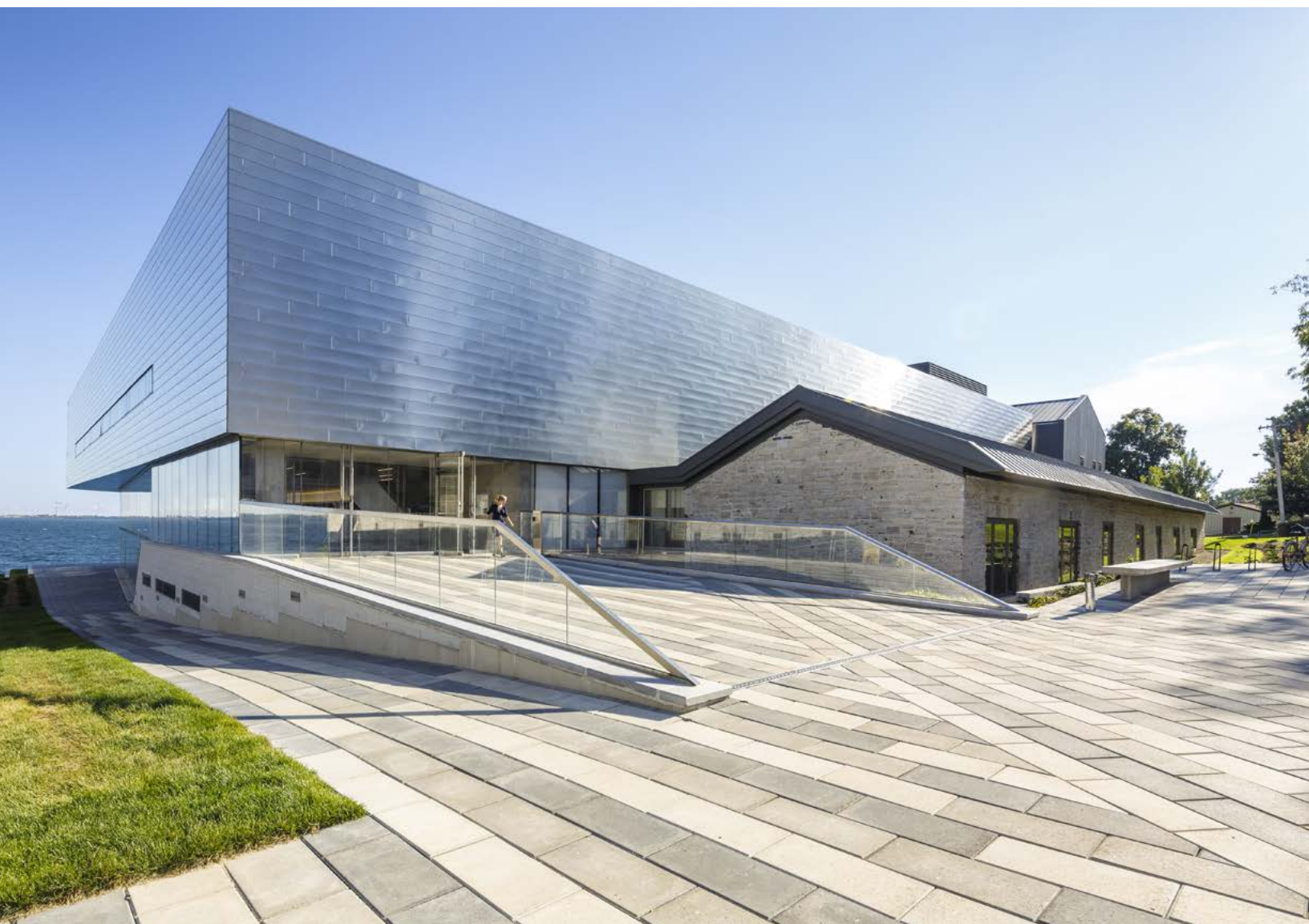
## COMPLEXITY

The centerpiece of the new performing arts centre is the 566-seat performance hall. Designed as a classical music theatre, the proportions and acoustics are based on studies of the great historic 'jewel box' concert halls of Europe. Through close collaboration of the entire design team, the concert hall design allows for superior live acoustical musical performances without relying on electronic amplification for optimum sound quality. The hall provides an engaging and intimate experience for both performers and audiences.

Historically, classical music theatres were designed as relatively symmetrical spaces based on the architectural and stylistic preferences during the Baroque and Renaissance periods, but through continual feedback and acoustic modeling studies, the design team was able to develop optimized wall shaping and recognized that employing an asymmetrical ceiling layout in a symmetrical room could also provide excellent acoustical experience.

Structurally, the key in the acoustic design of the performance hall is ensuring that the hall is isolated from the surrounding building with sufficient mass on all surfaces, including the roof, to protect its internal acoustics. This provides complete vibration isolation to ensure optimum acoustical performances. The concrete walls of the performance hall achieve these requirements, while also providing robust support for the cantilevered balconies inside the hall.

A carefully designed system of roof trusses supports lighting, rigging, and precast concrete ceiling elements. With two 250-millimetre layers of precast panels to provide the density for both internal reverberation and to mitigate external air born sound, acoustical performance is greatly improved.





## SOCIAL AND/OR ECONOMIC BENEFITS

At the onset, the project site was blessed with a spectacular location on the shores of Lake Ontario but challenged with the need to reuse and incorporate two buildings from the historic Morton Brewery. These buildings, originally a brewery, distillery and a stable, had deteriorated as used, distressed, industrial structures. The site is restricted by the lake to the south, the Kingston Penitentiary to the west, and a residential area to the east.

WSP, N45 Architecture, Snøhetta and Queen's University worked closely to develop a collaborative, supportive learning environment for young artists and performers to grow in their discipline. The breath-taking views and natural calm inspired the design choices for the project, resulting in an open, crisp and clear space for students to focus on arts education. By adding beautifully designed theatres and studio spaces, the community and university benefit from attracting world-class performers as well as improving the University's economic model.

When entering The Isabel, students and guests are greeted by a large public lobby with stunning waterfront views. This social meeting place creates a seamless continuation of the spectacular landscape. The architectural finishes bring reflections of the lake and landscape into the building. At night, the activities and light of the lobby spill out onto the waterfront, creating a bright, safe environment for visitors to enjoy. Envisioning a renewed pedestrian access along the lakeshore, the new patio allows patrons to sit close to the lake, while also maintaining a natural edge between land and water.





## ENVIRONMENTAL BENEFITS

The adaptive reuse of the historic Morton Brewery complex is a hallmark of sustainability. WSP was key in stabilizing and upgrading the heritage structures to become integrated into the exciting new facility while maintaining this important link to the history of the site. WSP worked closely with the constructor to ensure the protection of the existing heritage structures both during construction through temporary shoring and bracing and in the long term with new seismic reinforcing and new roof structure matching the original profile but capable of supporting current snow loads.

The design team reclaimed and recycled large quantities of wood flooring, structural columns and beams discovered in the historic buildings to use as wall and ceiling cladding in the public interior spaces, as well as millwork in the greenroom and lobby. These recycled materials were carefully sorted, stored, and protected until they could be reintroduced into the structure.

WSP, through our corporate commitment to sustainability, specified using significant supplementary cementing materials to ensure a substantial component of post-industrial and post-consumer recycled materials was used on the project.

## MEETING CLIENT'S NEEDS

In 2007, Queen's University envisioned the project as a learning and performing space for the departments of Art, Drama, Film, and Music. The new and renovated facility was to be an integral, interdependent and vibrant "Creative Campus", creating another "Jewel" along Kingston's Waterfront. Geographically well positioned between Toronto, Montreal, Ottawa and upstate New York (Buffalo, Albany, Syracuse), the university can now offer arts programs to a greater audience.

In 2014, The Isabel succeeded in bringing the "Arts" departments under one roof allowing for collaboration and sharing of space and equipment. The iconic centre will help shape the identity of the institution and the region, promoting the Arts and Humanities while at the same time contributing to a revitalized lakefront at the west end of the city.

The building was recognized by the Frontenac Heritage Foundation at the 2014 Heritage Conservation Awards for combining cutting-edge design with the preservation of heritage elements including limestone walls and multi-pane windows at the former Morton's Brewery site.

"[Heritage] is a key element for us and for the city in which we are situated," said Ms. Holland, Director of Campus Planning at Queen's. "We have 88 historic facilities here, which is more per capita than anywhere else, so we absolutely respect that as part of the fabric of our city."

In May 2015 the inaugural Lieutenant Governor's Award of Excellence was presented by the OAA to N45 Architecture Inc. in association with Snøhetta Architecture for the Isabel Bader Centre for the Performing Arts.





