

UNION PEARSON EXPRESS UNION STATION PLATFORM AND WAITING LOUNGE

CANADIAN CONSULTING ENGINEERING AWARDS 2016



Photo credit: Tom Arban Photography

PROJECT OUTLINE

The Union Pearson Express is a significant urban transportation project that provides express, high-quality rail service, connecting Union Station in downtown Toronto with Terminal 1 at Toronto Pearson International Airport. Given the scope change from a one-storey to a two-storey structure, as lead designers for this Metrolinx project, WSP used innovative approaches to overcome several design, project, and heritage challenges to complete this project in time for the 2015 Pan Am and Parapan Am Games.

INNOVATION

One of the most ambitious and important transportation projects in the history of the province of Ontario, the Union Pearson Express provides rapid, high-quality rail service, connecting Union Station in downtown Toronto with Terminal 1 at Toronto Pearson International Airport. WSP was originally retained by Metrolinx to design the new station as a renovation/fit-out of an existing space. The scope then evolved into the preliminary and detailed design for a two-level, 1,709-square-metre (18,000-square-foot) station including a main level (waiting platform, customer service, retail area, public washrooms, and janitor room) and mezzanine level (passenger lounge, crew room, staff and public washrooms, and electrical, mechanical, and communications rooms), as a partial renovation / addition to the existing building at 7 Station Street (the Skywalk), owned by Allied Properties REIT. Construction required partial demolition and modification of the existing building structural system.

With an aggressive and unadjusted project schedule, and many complexities, a number of innovative approaches were used to deliver the new two-storey station on time and on budget.

Platform Screen Door System

The station is unique in that the platform edge is enclosed with a Platform Screen Door System, with automatic sliding doors that open and close in-sync with the doors of the Diesel Multiple Unit (DMU) trains. These doors improve passenger safety by reducing wind effect, improve climate control within the station, prevent litter build up on track which can be a fire risk, and improve the sound quality of platform announcements by reducing background noise from arriving and departing trains.

Site Access

The physical constraints, already bound by a confined site in all directions, also included completing significant demolition and structural work within an existing, occupied building without affecting other tenants and building operations. All demolition work had to be conducted at night with respective dust and acoustic protection. Also the crane that was used to transport construction material needed to be positioned carefully and precisely so not to damage any existing structures.

Active Transit Hub

This project was located next to the busiest active transit hub in Toronto – the Union Station. Given the multiple stakeholders and tight timeline, the construction site layout and schedule required careful planning and coordination in order to finish the project on time without interrupting the operation of Union Station.

COMPLEXITY

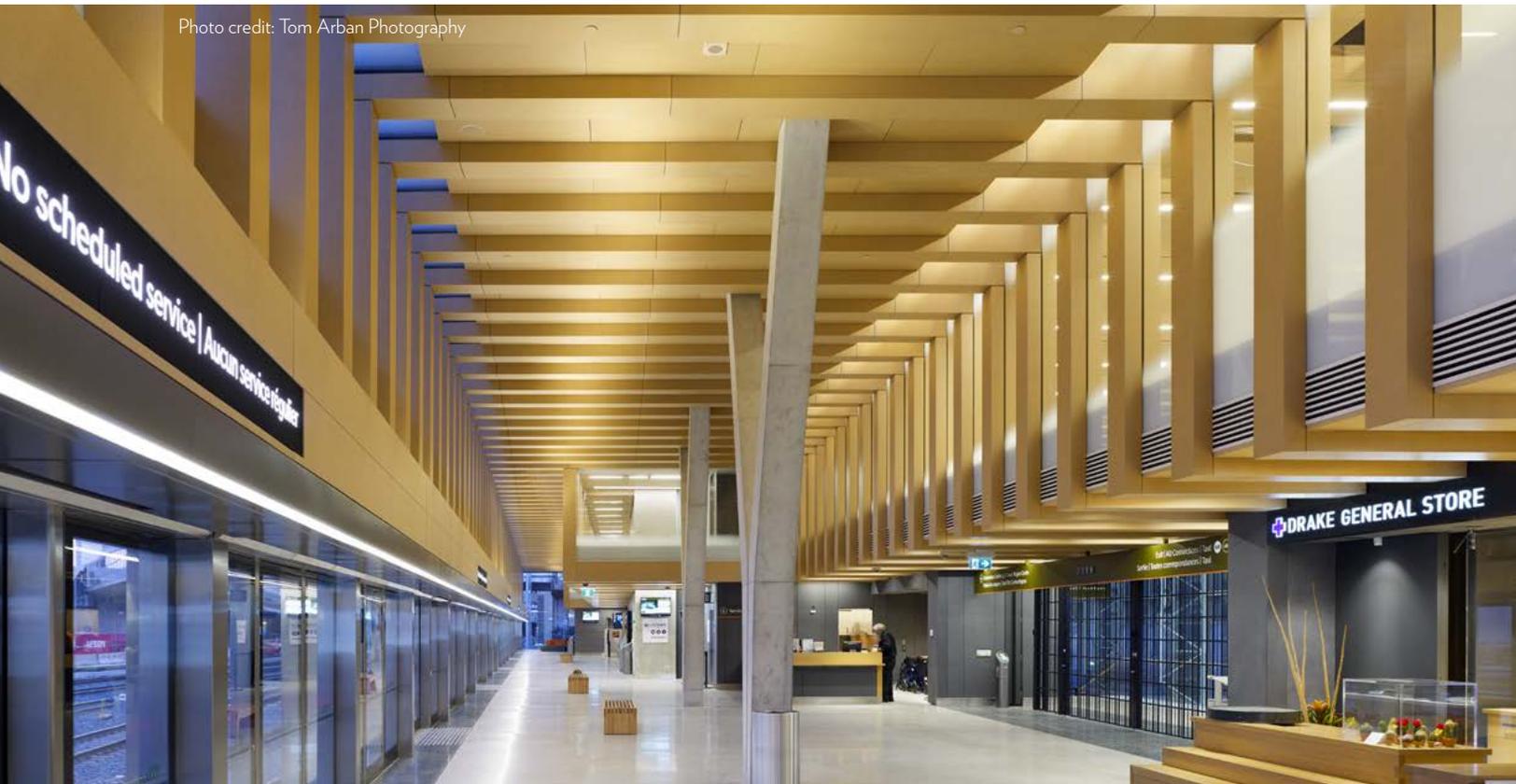
Multiple Stakeholders

As the project included renovations and addition to an existing building, the project had to respect the requirements of various stakeholders (Metrolinx, Allied Properties REIT, and UP Express) and the contract documents had to identify all required constraints. The WSP design team coordinated closely to deliver a building design that met all stakeholder requirements.

Client Scope Change

This station was initially conceived as a single-storey retro-fit of leased space within an existing structure. This evolved into a two-storey structure although the deadline for Pan Am/Parapan games remained fixed. The new scope was accommodated without impact to project schedule.

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Physical Constraints

Requirements included a retail space, public washrooms, waiting area, customer service area, mechanical room/electrical room/communications room/staff rooms, staff washrooms, and waiting platform. The height of the new building was constrained to 25 feet, 10 inches due to the adjoining Skywalk building. Other constraints included limitations posed by the existing building, the high traffic railway corridor to the South, the existing Union Station train shed to the East, and Simcoe Street to the West. Constraints were North, South, East, and West as well as vertically. Working closely with the architect, all constraints were realized through creative design and collaboration with the team.

Heritage consideration: The new structure was built on top of and adjacent to railway buildings dating to the 1930s. Working with a multidiscipline team and all stakeholders, careful consideration and management was needed to balance heritage value with a new contemporary context.

SOCIAL AND/OR ECONOMIC BENEFITS

Improving transit to Pearson Airport has been of interest to the GTA since the late 1950s. UP Express is North America's first dedicated air-rail link, offering travelers a comfortable and reliable way to get from Union Station to Toronto Pearson International Airport in 25 minutes and by avoiding city traffic congestion. It also offers amenities that make the journey easier and more pleasant, like airline check-in kiosks, power outlets, luggage racks, onboard Wi-Fi, multi-currency ATMs, up-to-the-minute flight information, unique retail opportunities and a lounge.

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UP Express Union Station is the flagship of the UP service. This state-of-the-art train shuttle runs from Union Station to Toronto Pearson every 15 minutes, 19.5 hours a day and seven days a week. Situated beside the Skywalk, the station, at over 18,000 square feet, is located between one of the busiest rail corridors and commuter stations in Ontario.

As of March 2016, an adult fare from Union Station to Pearson Airport was reduced to \$12, with further discounts for Presto card users (\$9 one way from Union to Pearson) and for those boarding at Bloor and Weston stations. With the adjustment to the fare price, ridership is trending upwards and UP Express continues to respond as a dedicated air rail link, with 80 percent of passengers destined to or from the airport.

ENVIRONMENTAL BENEFITS

The UP Express solution offers people more transit options, a faster ride that includes world-class amenities which ultimately reduces travel congestion.

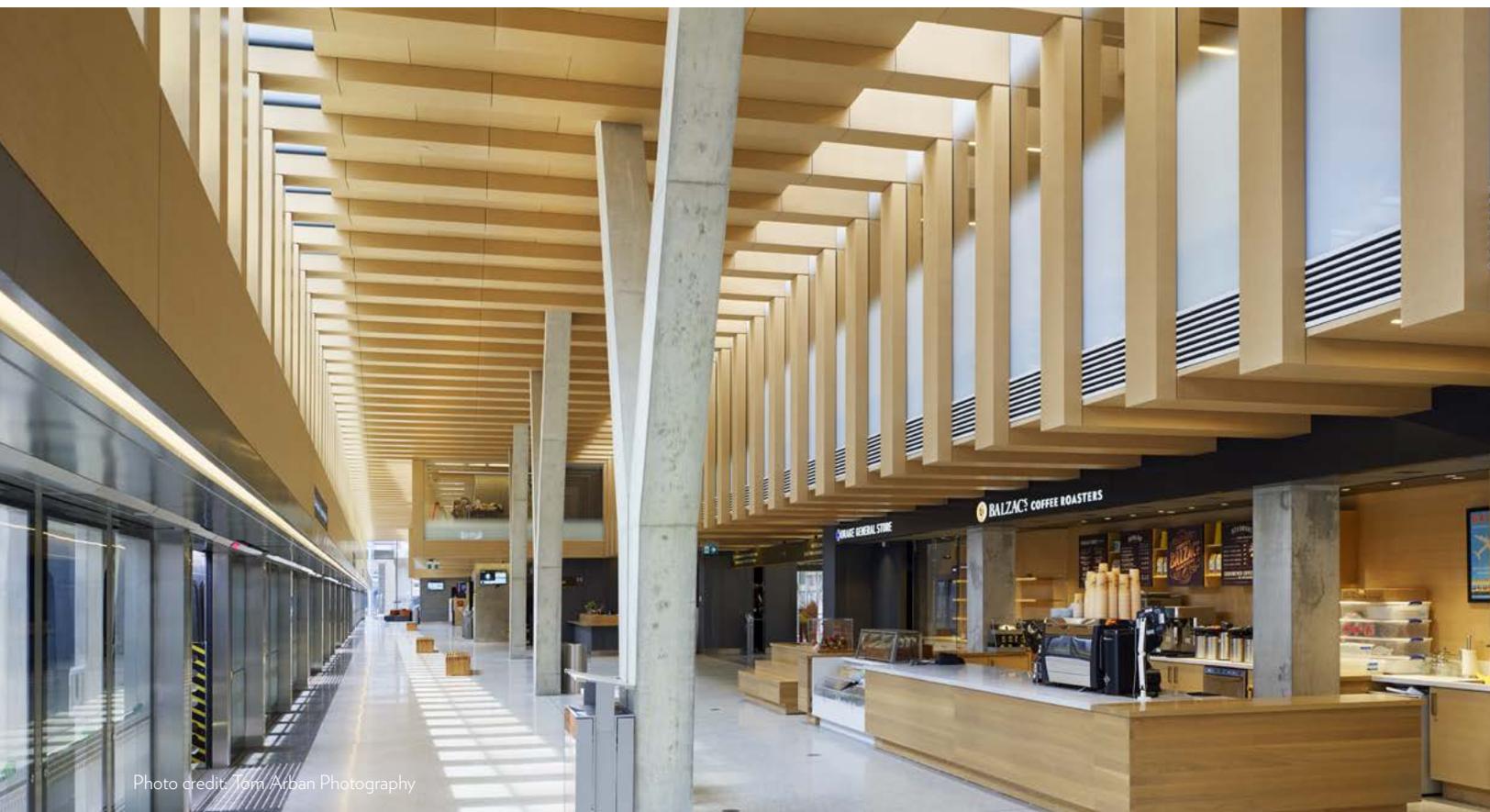
Emission Reductions

UP Express trains are newly designed and manufactured, “Tier 4,” clean-diesel, Diesel Multiple Units (DMUs). UP Express is the first rail service in North America to use Tier 4 clean-diesel which reduces airborne particulate emissions by 90 percent and nitrogen oxides by 80 percent, compared to existing technology. These state-of-the-art vehicles can be converted to electric propulsion in the future. A convenient option for commuters, the UP Express reduces the use of cars and taxis as the only other reliable way to get from downtown to Toronto Pearson International Airport.

Energy Efficient

The train’s braking energy is converted into electricity by the auxiliary power generator, and helps to provide onboard lighting and heating. Station lighting design was carefully coordinated with the architectural concept and met the client’s expectations and goal for light levels, sustainability, and energy.

Ergonomics and Safety: A Platform Screen Door System was used to ensure a comfortable, seamless and safe transition from the platform to the arriving trains.



Sustainability Principles

The project followed the latest principles of sustainability such as using 100 percent energy-efficient LED lighting, connected to DX controls and photo sensors for daylight harvesting.

Efficient Design

The UP Express is projected to carry 2.5 million people annually. The trains, fitting in a maximum of three-car sets, allows for flexibility in convenience and maintenance.

MEETING CLIENT'S NEEDS

The new project design and objectives were seen as an opportunity to showcase a state-of-the-art transit experience to residents and visitors to the city. Although the project involved multiple stakeholders and a significant scope change, meeting the client's objectives was critical to the success of the project. Two rigorous and creative design options were provided to the client and the option selected included a second level passenger lounge and waiting area. All aspects of the design, the look-and-feel of the station, as well as the entire system, would ultimately position UP Express as a player on the world stage.

Despite the scope change, project remained on schedule. Daily communication was imperative to understand all the new requirements. Capitalizing on WSP's intimate knowledge with Union Station and its surroundings, the team also established contacts and working relationships with other relevant agencies and property owners in the area. Using a progressive and creative approach, the team was able to think outside the box to solve technical problems and overcome constraints.

The trains and facility were designed to meet the current needs and those of the future. The trains themselves are energy-efficient and house cutting-edge amenities. The design, itself, was created to meet sustainability principles. The passenger ride is ergonomically devised to create a relaxing experience.

Having the resources, knowledge and skills available to react to the scope change, which caused a massive structural engineering challenge, a sound solution was designed and delivered to meet the client's objectives.

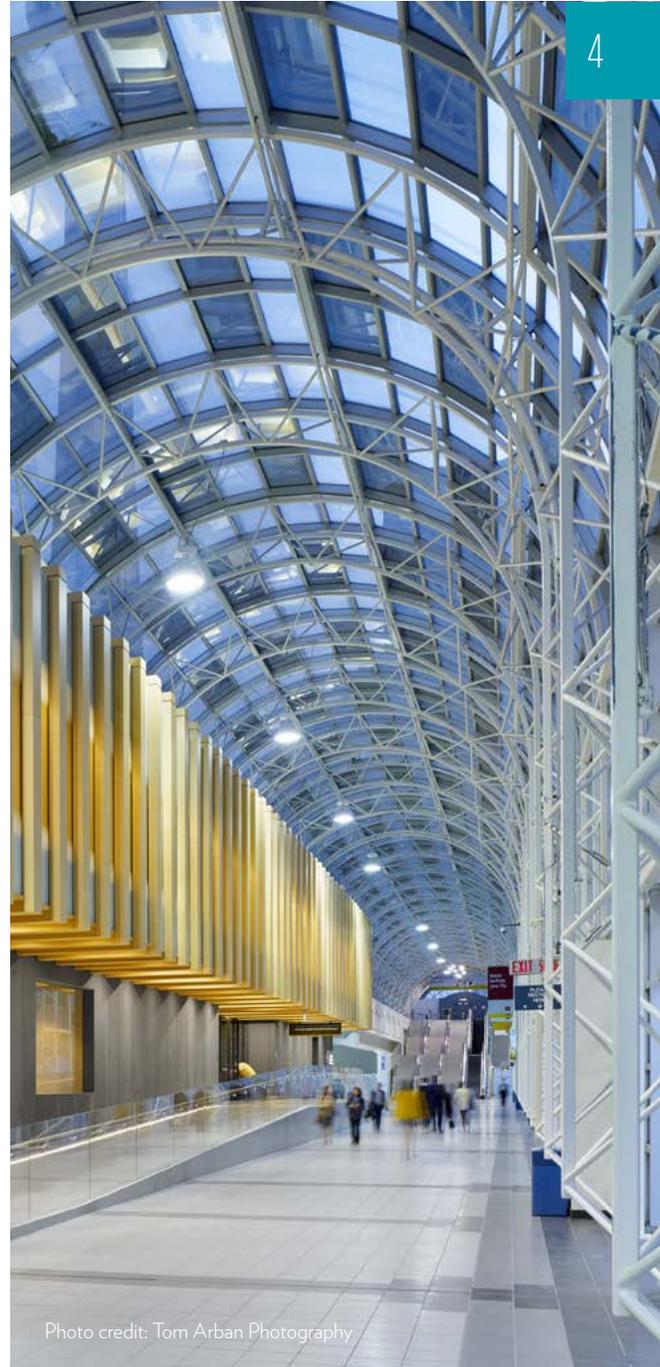
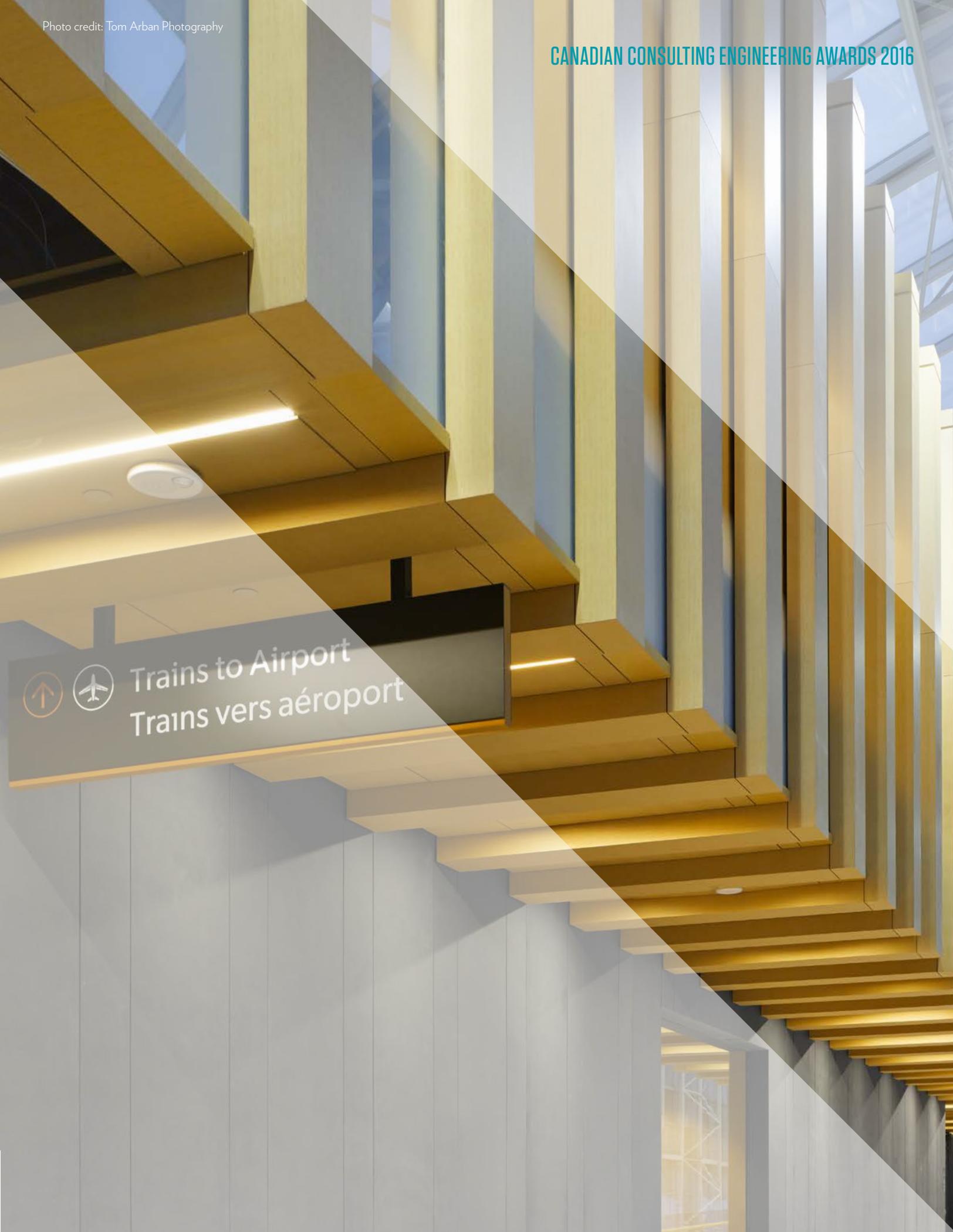


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Trains to Airport
Trains vers aéroport