

DETAILS

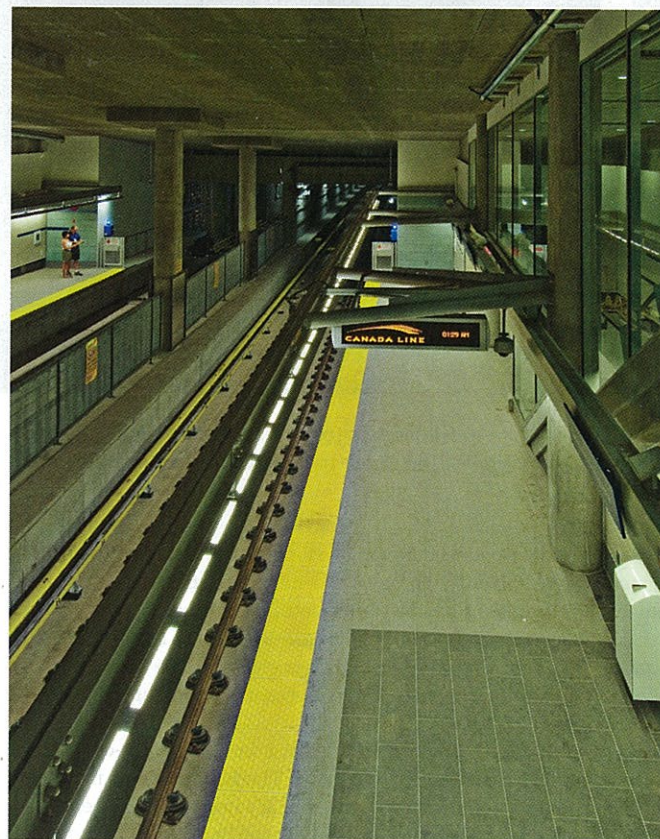
Project Canada Line, Cities of Vancouver and Richmond (including Sea Island, serving Vancouver International Airport), British Columbia, Canada
Owner Public-private partnership funded by the Government of Canada, Province of British Columbia, Vancouver Airport Authority, the South Coast British Columbia Transportation Authority (Translink), and City of Vancouver
Project Management SNC Lavalin, Vancouver
Architect of Record Allen Parker Consulting, Vancouver
Lighting Designer Total Lighting Solutions, Vancouver
Architects Varies according to station
VIA Architecture, Vancouver: Waterfront, Vancouver City Centre, Yaletown-Roundhouse, Marine Drive, and Bridgeport stations
Stantec Architecture, Vancouver: Olympic Village and Broadway-City Hall stations
Hotson Bakker Boniface Haden Architects + Urbanistes, Vancouver: King Edward, Oakridge-41st Avenue, and Langara-49th Avenue stations
Busby Perkins + Will, Vancouver: Aberdeen, Lansdowne, and Richmond-Brighouse stations
Walter Francl Architect, Vancouver: Templeton and Sea Island Centre stations
Kasian Architecture Interior Design and Planning, Vancouver: YVR-Airport station
Hywel Jones Architect Limited, Vancouver: North entrance and connector at the Waterfront station complex
Engineering More than 30 engineering firms worked on the project
Photographer Douglas A. Salin, San Francisco
Project Size 16 stations (eight above ground, eight below grade); 19 kilometers (11.8 miles)
Project Cost \$1.93 billion (\$2 billion Canadian)
Watts per Square Foot 0.64
Manufacturers B-K Lighting, Delray, Gotham, Hydrel, Insight, Peerless, Selux, Sistemalux, Zumtobel

Light Speed

FOR VANCOUVER'S NEW TRANSIT LINE, THE LIGHTING STRATEGY STAYS TRAINED ON ESSENTIALS AMID A KALEIDOSCOPE OF ARCHITECTURAL DEMANDS



Vancouver's new transit line covers 12 miles of track and 16 new stations. Station entrance areas are illuminated with 6-inch-diameter downlights to provide enough light so people feel safe, and so they can perform the task of purchasing their tickets, as seen here in the Broadway-City Hall station.



Lighting designer Galina Zbrizher's solution for illuminating Vancouver's new Canada Line rapid-transit rail system is as straightforward a design as it is complex. The massive project, a public-private partnership funded by the Government of Canada, the Province of British Columbia, the Vancouver Airport Authority, the South Coast British Columbia Transportation Authority, and the City of Vancouver, cost \$1.93 billion (\$2 billion Canadian). Constructed in preparation for Vancouver's hosting of the 2010 Winter Olympics, and to provide a link from downtown Vancouver out to the airport as well as meeting the region's expansion along its north-south corridor, the Canada Line runs on 12 miles of track and includes 16 stations designed by seven different architectural teams. There are both above-ground and below-grade stations, and all had to withstand the wear of 100,000-plus passengers a day and the often punishing weather of the Pacific Northwest. Given these factors, the lighting had to be up to the task so Total Lighting Solutions, Zbrizher's Vancouver firm, single-handedly devised a clean, elementary strategy that would unify the entire system

To meet the aesthetic requirements and technical performance criteria of providing 20 footcandles on the train platforms, lighting designer Galina Zbrizher worked with a manufacturer to customize an existing fixture and transform it into a single-lamp T8 linear direct/indirect luminaire that could be used for the platform edge lighting (above). Depending on the station configuration (of the 16 stations, eight are above ground and eight are below grade) the platform lighting can either be pendant mounted (facing page top) or supported from a bracket armature (facing page bottom).

and perform under a multitude of different spatial configurations. The lighting concept is conceived as a line of light and the lighting layouts at each station are broken down into a series of dots and lines. The "dots" are typically 6-inch-diameter downlights. Depending on the location, they are either recessed and outfitted with 26W triple-tube fluorescent sources or surface mounted with 39W ceramic metal halide PAR lamps. The "lines" are a family of linear fluorescent fixtures that Zbrizher located along passenger pathways to mark the direction of movement between station entrances and platforms, as well as to

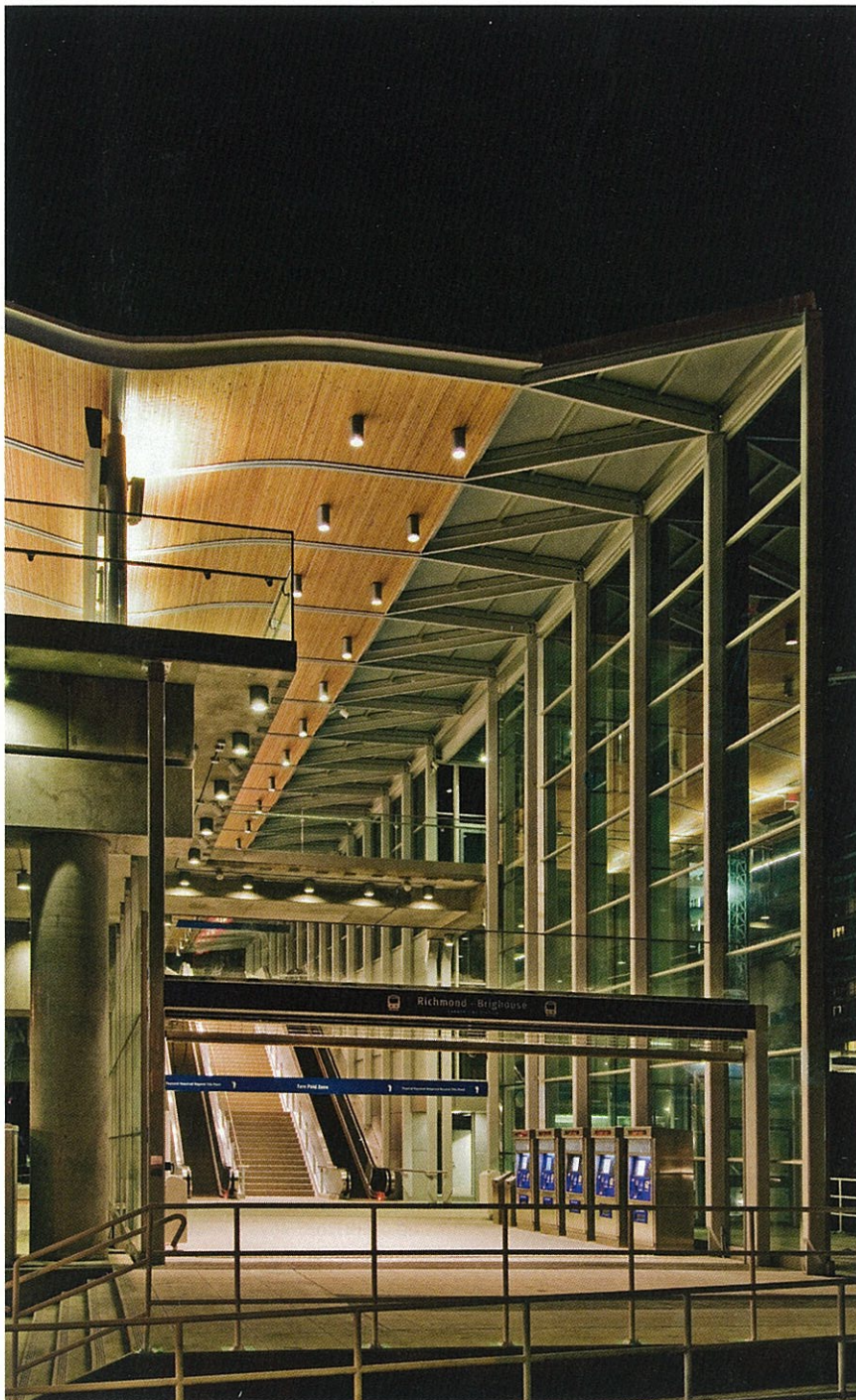
edge light the station platforms themselves.

However, before the lighting layout could be diagrammed, Zbrizher took on a wholesale evaluation of the transit system's lighting standards, which dated to the construction of the Millennium Line in 2000. These guidelines were based on outdated lighting technologies and had to be updated to establish the new lighting design criteria. "Today, we have a better understanding about how we, as human beings, function with different aspects of lighting," Zbrizher says. "And we're still learning." The business of electrified lighting is, she stresses, only slightly more than a century old and continually evolving.

One key to the updated guidelines Zbrizher developed specifically for the Canada Line stations is the illumination of vertical surfaces—lighting the walls to reap the multiplier effects those brightened surfaces produce in extending the boundaries of a space. The goal this time around was to light the people, not the floors, to provide an enhanced sense of security for riders.

Vertical illumination had not really figured into the transit system's earlier standards. "[Vertical illumination] was only addressed in the ticketing machine areas, which were not computerized and needed to be lit. Now, they are digital and the LCD screens are backlit. If you light them you will obscure the [screen] readout," Zbrizher explains. "It's about understanding what the lighting is for—not for the machine but for people to see what's happening with the machine."

The other crucial aspect to the new lighting design is integrating the lighting requirements with those of the architecture. This means a lighting scheme that considers the variety of material finishes and their reflective qualities, which are the actual light levels people respond to and determine what a person actually sees. If the design as a whole doesn't consider both dynamically, it won't produce the correct result. "It's a symbiotic relationship," Zbrizher says. "The lighting and



Creating clear layers of light was paramount to the lighting design concept, particularly when it came to vertical illumination. Downlights at the station entrances provide enough light for people to purchase tickets without interfering with the LCD screen of the ticket machines, as seen in the Richmond-Brighouse station (above left). The Canada Line was constructed to meet Vancouver's growing population and provide a direct connection from the downtown out to the airport (above right).

architecture are interrelated. They need to be in harmony."

A key aspect of the project is the lighting on the train platform. Zbrizher didn't want to blind passengers with light, rather, she wanted a clear, non-glary line of illumination on the platform edge. In search of a fixture that was simple, tough, attractive, energy efficient, and met her strategic lighting goals, she could not find an available market-ready fixture. "All the available platform edge lighting that I'm aware of were two- and three-lamp luminaires," she says.

The fixture that came closest to meeting Zbrizher's requirements was an existing luminaire in a line from Peerless Lighting—a single-lamp linear uplight of extruded aluminum with a flat top and a curved

bottom. Zbrizher believed that if she flipped the fixture so the curved plane became the top (which would help shed moisture as well as prevent the trains' break dust from getting into the fixtures) and the flat edge became the bottom, the fixture could work as the platform's lighting solution. She approached Peerless, and the company was open to the collaboration needed to customize the fixture to meet the project's specifications.

Flipping the housing to transform it from an uplight-only into a direct/indirect fixture was the easy part. The hard part was modifying the luminaire so that it could become IP65 rated for moisture protection. "It's always a challenge to take a modified fixture and make it

meet an IP65 requirement," says Jim Young, vice president and general manager of Peerless Lighting, with whom Zbrizher worked closely.

The resulting custom linear direct/indirect fixture for the Canada Line not only meets all of the lighting criteria, but it does so with a single lamp. This was a bit of a coup since it reduced the number of lamps required throughout the system—no small feat in terms of cost and energy savings given the scale of the project, the number of stations, and the number of luminaires. The extruded aluminum housing is based on a module 5 meters long and has a single T8 lamp that meets the project's goal of 20 footcandles on the platform. T8 lamps were selected for their thermal performance; T5s would not have worked well at outdoor temperatures that fall to near freezing.

Every aspect of the custom fixture needed special detailing, including the addition of a gasket (the existing luminaire did not have one) to meet the seal requirements for an IP65 rating. The luminaire's hinge

also needed to run along the side of the track so that the luminaire could be accessed from the platform for easy relamping. Additionally, every fourth lamp along the track is connected to an emergency lighting circuit. This allowed Zbrizher to counter-balance the ballasts and, overall, reduce the quantity needed along the run. This also helped to reduce the amount of weight on the fixtures and ensure a visibly smooth connection between luminaires.

"One of the major contributors to [the project's] success was that the client recognized the value of quality lighting," Zbrizher says. "Any detail developed, starting with the building module and the lighting module, is repeated hundreds and thousands of times. It's a huge scale." Throughout the Canada Line, the spectrum of interior and exterior conditions are expressed at the individual stations. The result is a crisp beautiful ensemble of lighting that complements the architecture while lending an intimate feel to these public spaces. **BRADFORD MCKEE**