



ast + Epp was the structural engineering firm for an ambitious expansion of Metrotown Skytrain Station in Burnaby, British Columbia. The result was a fully modernized station which more than doubled in length from 80 meters to 200 meters, with all work being achieved while the station remained fully operational.

The crowning achievement was an expressive "loop truss" which allowed for unobstructed pedestrian flow below, and has ultimately become the signature feature of the station.





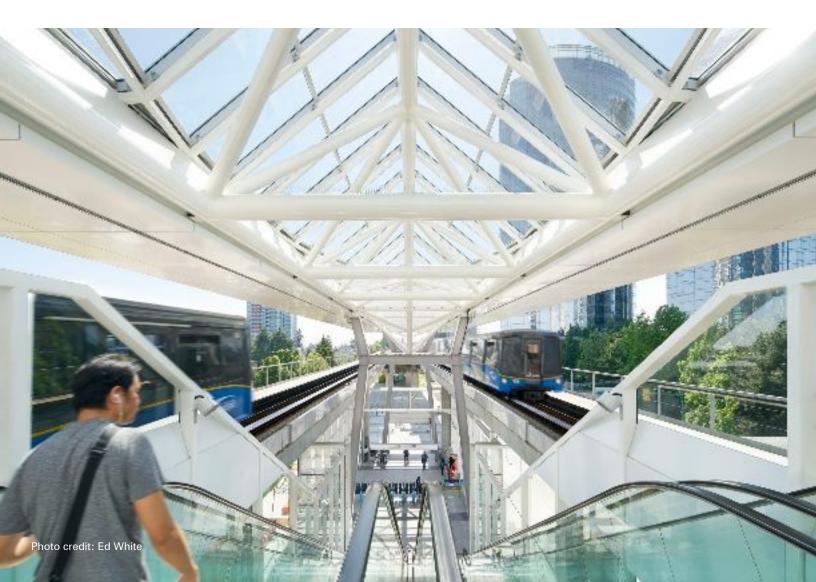
COMPLEXITY

As the saying goes, "it takes hard work to develop a simple solution to a complex problem." This project was no exception. From TransLink's initial vision to the strong collaboration with the Architect, the project overcame a number of complexities along the way. Key challenges included:

- Creating an elegant long spanning truss over the new east and west entrances, with minimal column supports. To our knowledge, the "loop truss" configuration is the first of its kind.
- The loop trusses were successfully installed during the very brief non-revenue time period (between 1:50am – 4:50am), and required a high level of design, preplanning, coordination and prefabrication. Ultimately, the truss sections (spanning up to 30m) were each installed in less than an hour.
- Designing and constructing a structure that worked within the geometric constraints of the existing station, including working over and within the existing guideway structure.
- All work was designed and preplanned to ensure that the station remained open during the entire construction period.







ENVIRONMENTAL BENEFITS

From an environmental perspective, preserving and breathing new life into existing infrastructure is generally a more sustainable approach, as compared to demolition and reconstruction.

Metrotown Station is one member of a family of stations that make up the Expo Line, which features a unique "kit-of-parts" character reflective of the period of time it was designed. Preserving the original "look and feel" of the existing station, as well as ensuring that the new east and west entries respected the original design, was paramount.

With that in mind, the structural response for the expansion and upgrade embraced a "minimalist approach", with strategies including the following:

- Creating a relatively light structure and aesthetically pleasing structure, with the "loop truss" becoming the signature architectural element in the station, thereby negating the need for additional architectural finishes.
- Utilizing the steel HSS columns as direct glazing support, thereby negating the need for additional aluminum curtain wall framing.
- Also utilizing the HSS columns as vertical raceways for electrical conduits (for lighting, CCTV cameras, speakers, etc.), thereby reducing the visual clutter.

ECONOMIC BENEFITS

- 1. The design of the renovation and expansion allowed the station to remain fully operational during construction.
- 2. The design represents good value for money and met the budgetary expectations.

SOCIAL BENEFITS

- 1. The station design respects the visual impact of both passengers and people viewing the station from the adjacent tower blocks.
- 2. The "loop truss" has become the unifying signature feature of the expansion. The Architect and TransLink have both expressed their delight at the new look of the station.



