



## GUILDWOOD STATION

2019 ONTARIO CONCRETE AWARD WINNING PROJECT FOR INFRASTRUCTURE

### PROJECT SUMMARY

Guildwood Station, a simple linear composition comprised of a station building, utility building, plazas and tunnel access pavilions, is located on a narrow interstitial space between an existing parking lot and bermed rail corridor on the north side of the property.



The station, established in 1977, used to serve a few thousand passengers annually before the growth of its surrounding neighbourhoods and commuter rail. The growth led to it serving up to nearly some quarter-million patrons a year and its eventual need for redevelopment.

Following Metrolinx's grand initiative to make improvements to its facilities, the station was redeveloped to provide enhanced accessibility, stronger visual identity and increased flexibility that would accommodate future track expansions and electrification.

The redevelopment involved seven major scope items requiring concrete construction to facilitate the structural and architectural requirements of the project.

### STATION BUILDING

Constructed using a combination of materials to achieve the architectural vision, the station building's steel-framed roof and canopy, lined in wood, establishes a strong horizontal datum against the site's slope; and is punctuated by an illuminated signage tower.

In contrast, the concrete construction roots the building from foundations and basement walls to green roofs and the signage tower. Internal staff spaces, tunnel entry, washrooms and utility rooms are found built in the berm and buried under the landscape using a concrete structural system, seamlessly transitioning from the landscape to the green roof, and up to the rooftop courtyard.

#### OWNER

Metrolinx

#### ARCHITECT OF RECORD

RDHA

#### ENGINEER OF RECORD

WSP

#### GENERAL CONTRACTOR

Kenaidan Contracting Ltd.

#### MATERIAL SUPPLIERS

Ontario Redimix, A division of  
CRH Canada Group Inc.  
Pre-Con

#### ADDITIONAL PARTICIPANTS

- BASF Canada Inc.
- Elias +, Landscape Architect
- Euclid Chemical
- Gilbert Steel Limited
- Ironworkers Local 72

#### PROJECT FACTS

**Location:** Toronto, Ontario

#### PROJECT FACTS

**COST:** \$62M

**DESIGN START:** February 2014

**Construction Start:** January 2016

**Official Opening:** June 19, 2019

**Structural Concrete Formwork:** 14,100 m<sup>2</sup>

**Concrete placed:** 5,374 m<sup>3</sup>

**Precast Pedestrian Tunnels:** Total 33.8 linear metres

**Number of Caissons installed:** 330+

**Number of precast curbs installed:** 2,150



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Found within the rooftop courtyard, on the low roof supported by a 430-millimetre-thick structural slab, are five river birch trees that present patrons a scenic view.

The west end of the building slopes into the ground and connects to the western tunnel via two small sloped walkways featuring linear LED lights extended up the cast-in-place walls and across the roofing, allowing patrons to enjoy the lighted archway that transitions to the tunnels leading to the platforms.

The main waiting floor finishes feature porcelain tiles mixed with granite inlay strips, which meet the Metrolinx Design Requirements Manual and allow the design language from the plaza outside to continue into the building. This design featured required precise construction as the thickness of the porcelain tile was 12mm while the granite inlay was 62mm, which required careful placement of formwork to ensure the granite inlay strips would align with the grout lines of the tile.

## UTILITY BUILDING



Straying from Metrolinx's traditional designs involving precast, the redeveloped station features a multi-purpose utility building incorporating a long cast-in-place design, and a green roof that blends in with the landscape.

The building plays an integral role in supporting the station's daily operations as it houses the boilers for the platform snowmelt system, electrical and communications rooms and generator. Moreover, it encompasses a rear wall design spanning 3m tall and 450mm thick that functions as a retaining wall to resist train loading, enable future rail expansions and support the sloping green roof which is supported by a 350mm-thick concrete slab.

## TUNNEL ENTRANCE STRUCTURES

The tunnel entrance structures are built into the berm and designed in reinforced cast-in-place concrete to blend in with the landscape and resist train loading. The southside tunnel entrances were constructed using raft foundations to provide sufficient mass and resistance to withstand the imposed lateral loads from passing trains.



## TUNNELS

As the existing tunnels at the station were dark, narrow, leaky and not fully AODA-compliant, it was critical to establish two new and accessible tunnels with enhanced safety and visibility features.



Because the Lakeshore East Corridor rail lines remained live throughout the redevelopment, constructing the tunnels required extensive work and involved the installation of 330 temporary caissons (nearly 300m of temporary shoring) during evenings and weekends to avoid service interruptions.



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Following the installation, concrete tunnels were positioned into place during a 53-hour period in which train traffic was shut down on two of the three rail lines during the weekends.



The precast tunnels were preassembled outside the rail corridor and pushed into place using a jack and slide method – a first for Metrolinx – which rendered great success.

Fortunately, the construction of the precast tunnel sections was completed after two successful weekends, and the tracks were fully reinstated to all commuter, VIA and freight traffic, allowing regular operations to proceed.

The station now features a unique tunnel design that provides a clear entrance to the roof of the platform canopy at the stairs and elevators, allowing in significantly more natural light into the tunnels than any other Metrolinx station.

## PLATFORMS



The two 315m-long platforms were constructed using precast curb (standard Metrolinx design) and involved overnight and weekend installation of 2150 precast curb sections to frame the platforms. On the platforms, cast-in-place concrete was utilized for the foundation of the platform shelters, canopy footings and walls for the elevators and stairs leading to the platforms.



## FOURTH TRACK RETAINING WALL

To accommodate the future fourth track expansion and avoid eliminating nearly 120 parking spaces, a retaining wall, spanning five-metres-high and 100m-long, was constructed using cast-in-place concrete.

## PLAZAS AND LANDSCAPE



The final project scope included the construction of several plazas and landscapes around the property to connect all the scope items and pull the whole design together.



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The plazas and sidewalks have sandblasted concrete paving that features a regular grid of 610 x 3660 saw-cut cast-in-place concrete with granite inlay that creates visual interest and strengthens the linear form of the station building and utility building.

As mentioned previously, the granite inlay extends into the station building connecting the interior to the exterior through design.

The redevelopment of the Guildwood Station required extensive construction involving the use of both cast-in-place and precast concrete, which were essential throughout the project as they ensured structural integrity and helped achieved the architectural vision established for the station.

Since its completion in June 2019, the station continues to provide its growing number of patrons with fully accessible and improved amenities featuring green roofs, enhanced lighting designs and various innovations, successfully fulfilling Metrolinx's objectives.



In 2000, the Ontario Cast-In-Place Concrete Development Council (OCCDC) was formed to aid the owner/developer, architect/engineer and design-build contractor in the decision-making process of choosing the best construction material for the framing system of new cast-in-place structures.

OCCDC promotes the benefits of reinforced concrete as the construction material of choice based upon the following advantages:

- fast-track construction
- costs savings
- structural advantages
- environmental considerations
- local economy benefits

The Members of the OCCDC include (alphabetical order):

- Carpenters District Council of Ontario
- Concrete Forming Association of Ontario
- Ironworkers District Council of Ontario
- LIUNA—Ontario Provincial District Council
- Ontario Formwork Association
- PERI Formwork Systems Inc.
- Ready Mixed Concrete Association of Ontario
- Reinforcing Steel Institute of Ontario



1 Prologis Blvd, Suite 102B  
Mississauga, ON L5W 0G2  
Tel: 905-564-2726  
Fax: 905-564-5680  
Email: [buildings@occdc.org](mailto:buildings@occdc.org)

[www.occdc.org](http://www.occdc.org)