



By Carlo Cordi

Parking Expansion at GTAA

The Greater Toronto Airports Authority is poised to open a brand new 8,034 space parking facility that is uniquely designed to house both airport employees and the public.

■ BACKGROUND

Development of the original Area 6B employee surface parking lot on Viscount Road into a multi-level parking structure was originally envisaged as proceeding in three phases.

Phase 1 saw the construction of a three level Lobby Tower and enclosed pedestrian bridge. The tower provided necessary circulation systems and infrastructure to link the parking lot with the platform level of the Airport LINK station located across Viscount Road. The LINK is the on-site train which connects the Viscount Road parking area with Terminals 1 and 3.

Phase 2 construction added five elevated parking decks providing parking for approximately 5,500 cars. This garage will offer both public and employee parking while the residual 2,000 surface lot spaces to the north of the new structure will be integrated with the new parking facility. The Lobby Tower was to be vertically extended two stories, as provided for in the Phase 1 design, and serve as the core of the combined Phase 1 and 2 Parking Facility.



Phase 3 build-out of Area 6B was to provide a new parking structure with a capacity of approximately 3,000 spaces, resulting in a reduction in surface spaces to approximately 1,200.

■ TIMELINE

Construction of Phase 1, the Lobby Tower and pedestrian bridge, commenced in June 2005 and was completed in the fall of 2006.

The preliminary design of Phase 2 was underway during 2006, and the preliminary design report, defining the concept of Phase 2, was submitted for GTAA approval by the architectural and engineering consultant on November 30, 2006, with a view to completing detailed design and tendering the project in late April 2007.

In March 2007 GTAA elected to increase the capacity of Phase 2 by 2,000 cars, effectively combining Phases 2 and 3. To accommodate this addition to the program, the garage plan was increased by three bays northward and a sixth parking level was added; a strategy considered the most advantageous on structural, economical and level of service grounds.

Revision of the Phase 2 detailed design was effected over the summer of 2007 and the project tendered in late August of that year. Construction commenced in late October 2007 and the project was deemed substantially performed on September 8, 2009. Total completion is anticipated early in December 2009.

■ GENERAL OVERVIEW

The total footprint of the parking structure is 43,147 square metres and that of the lobby tower 585 square metres, providing a total gross parking floor plate area, over 6 levels, of 258,882 square

metres; providing 8,034 parking spaces within the structure and a residual 1,200 surface parking spaces in the north lot.

Two internal vehicle ramps are provided, located along the east and west sides of the structure. The ramps ensure a continuous vehicle circulation weave within the parking levels while simultaneously maximizing the flexibility of operational requirements in the accommodation of both employee and public parking. Parking is available along both sides of the two-way ramps but the vast majority of parking spaces are on level floor plates.

Architecturally, on the east and west elevations the ramp element is articulated as an inclined shape, with openings in the precast concrete façade panels parallel to the ramp slope. The balance of the east and west elevations, where the thin edge of the structural tee sections are exposed, features a more open solution in the form of aluminum architectural screens.

On the north and south elevations, where the structural tee end is presented, a combined beam and spandrel precast element has been provided.

The parking structure stair towers, required by code at 60 metre intervals around the perimeter of the structure, are located outboard of the floor plates to maximize the efficiency of the space while the glass façade, matching the main lobby façade, provides contrasting vertical massing to the garage.

■ INTERNAL LAYOUT

In order to provide six parking levels and to optimize the natural south to north downward slope of the site, the at-grade parking level was set at 1.2 metres below the level of the Phase 1 Lobby Tower grade level and a suspended parking deck

inserted at the normal 3.5 metre floor-to-floor spacing in the original, enhanced height lowest level.

Pedestrian access to the Lobby Tower for people using the north surface lot, the lower parking level and the mezzanine Level 2 deck is provided via an atrium area, contiguous with the north face of the Lobby Tower, which is open the full height of the structure, providing natural light and ventilation. This atrium also provides pedestrian access up to the Level 4 deck, which coincides with the Pedestrian Bridge level.

■ STRUCTURAL OVERVIEW

The Parking Garage is a precast concrete structure of five suspended levels founded upon large diameter poured concrete caissons extending approximately 11 metres below grade.

Precast concrete shear walls founded upon massive poured concrete caisson caps located throughout the structure, provide lateral stability along both axes. The precast structure wraps around the Lobby Tower and adjacent cast in place atrium area.

The typical bay dimensions of the structure, 18.25m x 10.95m, were derived from the most economical use of material in a precast parking garage system. The precast tee beams run in a north/south direction, supported upon beams running in an east/west direction. An 80 mm thick poured concrete topping to the precast tee beams completes the structural integrity of the deck system. The topping, by means of a designed arrangement of thickenings, also establishes the drainage patterns, directing surface water to the floor drains provided throughout the precast deck system. Additives incorporated into the





specially designed concrete topping mix also provide corrosion protection to the prestressing tendons in the precast tees, eliminating the requirement for traffic membrane.

The structure as a whole is divided into six major full height building elements; the Lobby Tower and the cast in place Atrium area and, to the north, east and west of those structures, four precast elements. Expansion joints are provided to accommodate movement of these elements relative to one another. The expansion joint system both maintains the fire separation between floors required by code and provides a waterproof seal.

■ SIGNAGE AND WAY-FINDING

Vehicles access the parking garage via entry/exit plazas located in the north surface lot controlled by a system of gate arms associated with the parking access and revenue control system.

Public access is via a dedicated plaza to the west vehicular entrance on the north elevation. Signage within the garage directs public vehicles to the west ramp and onwards to the upper levels.

Employees access the facility via a plaza located further north in the surface lot, which initially facilitates access into the employee-only surface parking area. A transfer plaza is located immediately outside the east vehicular entrance on the north elevation, which allows access to the structure for employees authorized to park inside. Signage within the garage directs employees to the east ramp and thereby upper levels.

At both garage entrances dynamic signage, associated with the access system, indicates space available by parking level.

Level 1 is divided down the centre into east and west sectors by the main pedestrian walkway. Bollards protecting this walkway prevent vehicular east/west transfer. Above Level 1, access to the whole of the parking floor plate is possible from either ramp and may be controlled by the placement of barriers to establish segregated public/employee proportions as desired to suit operational requirements.

General way-finding signage is provided throughout all floor areas to promote orderly circulation of traffic and

to guide clients, having parked their vehicles, to their destinations. Particular attention has been given to identifying the coordinates of locations within the facility as intuitively as possible to assist returning clients in the location of their vehicles. In view of the pre-pay system, intensive signage reminds clients to take their ticket with them.

■ PARKING ACCESS AND REVENUE CONTROL SYSTEM

The system was awarded in April 2009. The system will be totally automated with no cashiers at exit. Pay on Foot (POF) stations are located in the LINK Train Lobby Tower as well as the exit plaza. The Public has the option of paying by credit card or cash at the POF machines or at the exit terminals with credit card only should they bypass the POF machines. The system incorporates both license plate recognition (LPR) as well as license plate inventory. Employees access the garage by a proximity card system which is connected to the GTAA employee database for billing purposes. ■

THIS ARTICLE HAS BEEN PROVIDED THROUGH THE CO-OPERATION OF MGP PROJECT MANAGERS AND THE GREATER TORONTO AIRPORTS AUTHORITY