{IN THIS ISSUE: }

BUILDING A LEGACY:  
TORONTO PAN AM SPORTS CENTRE

PEARL HARBOR MEMORIAL BRIDGE:  
KEEPING THE MEMORY ALIVE

REJUVENATING THE SHOWCASE:  
A FRESH LOOK AT THE ORANGE COUNTY CONVENTION CENTER
With 51 sports played across 15 municipalities throughout the Greater Toronto Area, the Toronto 2015 Pan American & Parapan American Games (TO2015) is the largest international multi-sport event ever held in Canada, drawing more than 10,000 athletes, coaches, and officials from across the Caribbean and Central, South, and North America this past summer.

PCL was involved in the construction of six sports facilities that hosted competitions, including the Toronto Pan Am Sports Centre (TPASC). Also known as the CIBC Pan Am/Parapan Am Aquatics Centre and Field House, it’s the largest purpose-built venue for the Games, and the greatest investment made in Canadian amateur sport history.

Co-owned by the University of Toronto Scarborough (UTSC) and the City of Toronto in a unique partnership, the project is a tribute to the collaborative efforts of multiple stakeholders with varying needs, including TO2015, Infrastructure Ontario, and Sport Canada, among others. National amateur sport organizations also call TPASC home, including Wheelchair Basketball Canada and the Canadian Sport Institute Ontario.
Delivered in 24 months, the design-build-finance project was handed over a year in advance of the Games. Building on a remediated landfill site kept the entire cross-functional team on their toes, as they ensured that requirements of the Ministry of the Environment and Climate Change stayed at the forefront of design and construction.

Owing to the corrosive nature of chemicals and the humidity levels present in the pool environment, construction of the pools was operationally separated from the rest of the building. To uphold the project’s quality management plan, the team implemented an extensive program to review the pools’ effects on finishes and materials, and included the client team in first installation reviews and on-site mock-ups.

Sequencing was critical to holding to the aggressive schedule. To accelerate work at the pools and overhead levels concurrently, the team engineered a suspended scaffold platform. After completing the pools, they used large, cantilevered precast platforms to create the dive tower’s grand entrance through an opening in the roof.

Open pool areas that limited craning of materials, and a building footprint that proved unsuited to a material hoist, reduced access to the building’s lower levels. To circumvent this, the team innovated an access ramp for transporting material and equipment from the main level down one floor to an area that had the least aggressive finishes schedule, thus providing access for large and heavy equipment that would not fit in the freight elevator.

“PCL’s work on this project exemplifies the high standards we set for Ontario’s infrastructure program which enable projects of the highest quality to be delivered both on time and on budget.”

— John McKendrick, executive vice president, project delivery, Infrastructure Ontario

PHOTO: TPASC hosted eight international events during the 2015 Pan American & Parapan American Games.
LEED-ING THE WAY

With a shared vision of a building that showcases cutting-edge and sustainable design, it was imperative to provide universal accessibility while minimizing long-term operating costs.

To mitigate the pools’ significant utility consumption, the team constructed a geothermal heat pump under the parking lot. The 100 geothermal boreholes, each extending 600 feet deep, act as a central heating and cooling system, transferring heat to and from the ground. Because LED lighting was still in development when the project was originally designed, an LED lighting plan was rolled out after the contract was awarded, replacing plans for high-efficiency fluorescent lighting and resulting in longer life for fixtures and reduced operating costs.

More than 1800 solar panels capable of generating up to 593 kW of power per hour complement a green roof that covers 30 percent of the building. Reduced water consumption and a construction waste diversion rate of 95 percent contributed to the LEED certification achievement for the first facility built for the Games—exceeding initial LEED Silver targets to reach LEED Gold.

A LASTING LEGACY

More than a world-class sports venue purpose-built to host the Pan Am Games, the TPASC and the amenities it provides are creating a lasting legacy, attracting residents of the community, UTSC students, faculty and staff, and recreational and high-performance athletes for years to come.

“I am very proud of the fact that we have given our students and our community the best possible facility for athletics, recreation, and wellness.”

— Prof. Bruce Kidd, OC, PhD, LLD, vice president and principal, University of Toronto Scarborough
PHOTO: Extradosed bridge design is relatively new, and the first bridge of this type was built in Japan. The design combines elements of a cable-stayed bridge (where cables support the roadway anchored in the tower) and a box-girder bridge (where the bridge structure is in the shape of a hollow box).

The Pearl Harbor Memorial (Q) Bridge is a powerful reminder for Connecticut residents of the “date which will live in infamy”—the attack on Pearl Harbor. The bridge commemorates Pearl Harbor veterans and the 17 Connecticut residents who died in the attack on December 7, 1941.

The battleship-inspired bridge is the first extradosed, prestressed concrete bridge built in the United States and stands as the centerpiece of the highway improvement project that replaced a structure that returned World War II veterans built in the late 1950s.

One of the unique features of an extradosed bridge is that the towers are lower than those found on a traditional cable-stayed bridge, which means it’s easier and more cost-efficient to replace or maintain stay cables. Plus, a lower height means they won’t interfere with air traffic from the nearby airport.

The new cast-in-place, segmental concrete, box-girder bridge (built in sections) features 10 lanes crossing the Quinnipiac (Q) River in New Haven.
COORDINATION OF CONTRACTS

PCL constructed the bridge in two main stages and one transitional stage. The project team recognized early on that the schedule was compressed for the third stage, and that to stay on schedule, they had to do some creative rethinking. The original contract detailed the demolition of the existing northbound bridge during stage two, the transitional stage, while traffic was still on the existing southbound bridge. The plan needed a revision because it was possible to reach the northbound bridge only over live traffic, which meant multiple lane closures that would impact the traveling public, ultimately resulting in additional cost and schedule delays.

Another key challenge in the overall construction was coordinating the schedule for the two construction teams that needed to complete work on anchor pier one, the final piece of the bridge. This bridge support is the shared transition point of PCL’s segmental bridge to the structural steel approach built adjacent by another contractor. The concern was that the original contract didn’t have an interim date for completion of anchor pier one, only a final date for the entire bridge structure. Without an early turnover on the bridge, the structural steel contractor would have a significant wait time before they could “land” their steel girders on the shared support and complete the project.

The PCL team developed a plan to begin construction of anchor pier one early, adjusting the schedule and resources. This solution led to an early turnover of anchor pier one, which enabled the structural steel contractor to speed up their schedule for the final phase and turn over the project to the traveling public. It was a win for all parties involved.

Completed on July 20, 2015, the bridge opened to traffic after Labor Day, keeping the Pearl Harbor memory alive in Connecticut.
REJUVENATING THE SHOWCASE: A FRESH LOOK AT THE ORANGE COUNTY CONVENTION CENTER

Located in the heart of Orlando’s tourism district, the Orange County Convention Center is a world-class convention facility that hosts some of the largest conventions in the United States, including the Premiere Beauty Show, PGA Merchandise Show, Surf Expo, and GeekyCon. With many of these exhibitions hosting tens of thousands of guests, the center has an economic impact of over $2 billion each year, benefiting more than 1,000 local businesses and 25,000 employees in Central Florida.

The Orange County Convention Center aims to provide users with a positive experience and counts on repeat business from a multitude of clients. PCL’s renovation of approximately 460,000 square feet of the center’s West Building delivers expertly finished, modern spaces that enable the facility’s operations team to deliver complete guest satisfaction time and again.

PHOTO: Terrazo flooring is a design feature of the Orange County Convention Center’s main concourse.

PHOTO (NEXT PAGE): The Tangerine Ballroom features fun, decorative LED lighting.
When guests arrive for a convention hosted within the spacious halls of the Orange County Convention Center, they are funneled through one of the center’s main concourses. PCL’s renovation of the West Building included the installation of tile and terrazzo flooring in the main concourse. During demolition, the team removed the existing carpet to find that the layer of topping that creates a smooth, level surface for the installation of flooring was not bonded to the concrete slab below. Installing tile over this topping would cause the new tile floor to be at risk of failing or becoming damaged. In addition, the varying thickness of the tile and terrazzo would set the terrazzo lower than the adjacent tile.

The team proposed that the existing topping be removed and new topping installed. By manipulating the thickness of this new topping to compensate for the height difference between the terrazzo and tile, they could make the floor level throughout the concourse. The owner agreed to PCL’s plan, but also requested that the space be turned over months before originally scheduled, in preparation for an upcoming tradeshow. The implementation of an accelerated work plan and balanced installation of the new topping allowed for the tile to run flush with the terrazzo, and the owner received the concourse in time for the exhibition.

In addition to the Orange County Convention Center’s vast halls and ballrooms, the facility offers modestly sized and opulently finished signature meeting rooms. The project team set about renovating these existing meeting rooms while providing access to a new terraced balcony overlooking Orlando’s bustling tourism district. The project drawings showed four 27-foot by 22.5-foot holes that were to be cut in the side of the building, allowing access to the new balcony and keeping intact the existing precast concrete beams supporting the ceiling and roof. After starting the demolition of the interior wall, the team discovered the beams would not have adequate support to stay in place after they removed the four sections of wall.

A structural engineer proposed reinforcing the concrete beams by building a large support system, to be flown in over the balcony. This option would have been costly, so the project team pitched an idea of their own. They suggested adding several posts positioned to bookend doors along the exterior wall. This would allow the installation of steel headers connecting to the existing precast. The structural engineer determined the plan would provide adequate support. The solution avoided a potential major problem at a minimal cost and managed to keep the design intact without adding time to the schedule.
The PCL family of companies is a group of independent construction companies which carry out diverse operations in the civil infrastructure, heavy industrial, and buildings markets.

WATCH US BUILD AT PCL.COM