

FEATURE

THE ONE WAY TO BUILD THE TALLEST

Steel proves to be essential for constructing the 85-storey building

By Tim Verhey, Executive Vice-President, Engineering & Operations, Walters Group



CONDOMINIUM TOWER IN CANADA

at Toronto's most prestigious address



STEPS FROM CANADA'S most stylish neighbourhood and at the crossroads of two of Toronto's busiest subway lines is a bustling construction site soon to be home to the first super-tall skyscraper in Canada.

It will be called The One, a towering 85-storey building at the intersection of Yonge and Bloor that will rise 308 metres to house 416 condominium units, a hotel, restaurants and 200,000 square feet of column-free retail space.

The design ingenuity behind The One came from the British firm Foster and Partners as well as Core Architects in Toronto. Bringing it to life involves many businesses, including the engineering work of RJC and the design/supply/installation expertise of Canada's own steel fabricator and constructor, Walters Group.

COME TOGETHER

In 2018 Walters Group joined with other trades to work on the design-assist component of the project.

Although a design was already well on its way when Walters was brought onboard, RJC and Walters worked on many challenges, starting with the foundation, all the way to the 85th floor.

"You don't often get to see a large, capable fabricator like Walters get involved in a residential job," says Kevin MacLean, Principal, BSc, MSc, P.Eng., at RJC. "Combined with all of our other

FACTS:

ADDRESS: 1 BLOOR WEST, TORONTO, ONTARIO

HEIGHT: 1,013 FEET / 308.60 METRES **STOREYS:** 85 **NUMBER OF**

UNITS IN CONDOMINIUM: 416 **OWNER:** MIZRAHI DEVELOPMENTS

ARCHITECT: FOSTER + PARTNERS, CORE ARCHITECTS **STRUCTURAL**

ENGINEER: RJC ENGINEERS **CONSTRUCTION MANAGER:** MIZRAHI DEVELOPMENTS



FABRICATING TALLER, FASTER, BETTER

Creating the massive steel components of The One is a task that Walters Group takes on with pride.

“All of the 4,500 metric tons of heavy structural steel on site are the responsibility of Walters Group, and we take that responsibility very seriously,” says Tim Verhey, M.Eng., P.Eng. Executive Vice-President, Engineering & Operations of Walters Group. “Most components on this project are very heavy but need to be fabricated to incredibly tight tolerances. Some are 50-60 metric tons in weight, yet dimensionally they need fabrication within a couple of millimetres of accuracy.”

With the design work and fabrication work well on its way, Walters Group delivered its first truckload of steel in August 2019.

STEEL INNOVATION FROM THE GROUND UP

On each side of the tower’s four sides are groups of very large diameter caissons stretching 37 metres (120 feet) into the bedrock below. These caissons support heavy reinforced concrete basement mega-columns which transition to composite mega-columns at the P2 level which are approximately 3 metres by 3 metres in plan dimension. Walters provided an innovative solution which was to pre-install the reinforcing steel onto the composite columns prior to being shipped to site and installed. This was a huge undertaking for Walters Group and required tremendous coordination to ensure the rebar and structural steel were precisely located once placed in the field. This innovation provided significant value to the project.

“There was no readily available solution to quickly install the large rebar on site as needed, so we modularized the structural rebar and installed it in a fabrication shop,” says Verhey. The rebar needed was 55 millimetres (2 inches) in diameter and it was simply not an option to install each piece individually on site using a tower crane. Walters worked alongside Rebar Enterprises Inc. to coordinate the rebar detailing, making extensive use of 3D models to arrive at practical solutions.

The team created massive composite structural steel and rebar assemblies in the Walters fabrication shops using unique processes that have never been done before, cutting many months off the construction schedule. Upon installation, each mega-column was formed, then filled with concrete. At the ground floor, the composite columns were capped with specialized structural steel nodes



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trades partaking in the process, we were able to use high-performance concrete and steel materials in the right way. We leveraged the strength and stiffness of structural steel on the

lower levels, allowing us to transfer the loads to the perimeter of the ground floor commercial space, and together came up with innovative solutions for the project’s challenges.”

to support the heavy structural steel diagonal framing, which will eventually reach the tower's ninth floor.

THE ONE'S NEED FOR SPEED

One of the highest-capacity tower cranes in North America was brought in from New York to hoist the giant rebar cages, structural steel and other construction materials to be erected with ease and speed.

"This rebar prefabrication and installation process has allowed steel installation to go very quickly," says MacLean. "And the quality of the work and the precision done in the Walters plant is remarkable, and inspected off site, which saves significant time."

"Our fabrication facilities are just outside the GTA, but we still often stage large assemblies just off site down at the docks, or at partners' locations," Verhey continues. "This has helped us to cut down on the waiting time, even though we're only an hour away from the site on days with good traffic."

TOPPING IT ALL OFF

Connected to the caissons and basement columns are mega-columns that could only be possible with steel, spreading the tower's load to the perimeter. The heavy structural steel will continue until the ninth floor, which is where the primary building structure will transition from composite steel and reinforced concrete to just concrete, stretching to the 85th storey. Steel hangers on a six-floor module will be installed by Walters to support the corners of the building from Level 3 to the top of the tower, structural features which are accentuated in the facade detailing of the tower.

Also on the plate of Walters Group is the supply and installation of The One's tuned mass damper. The shaping of the tower's massing on the mechanical levels will improve wind performance, but it will be the damper that ultimately plays the biggest role in controlling vibrations and movements.

"Walters has probably erected more tons of tuned mass dampers than any steel fabricators out there," says MacLean. "They have a lot of experience in this area, so we were very lucky to have their expertise from the start."

By spring 2023, when Walters scope of work is scheduled to be completed, more than 250 truckloads of steel will have been delivered to the downtown Toronto site, including tens of thousands of bolts, the heaviest being over 3.6 kg (8 lbs).

ABOVE THE CLOUDS AND BEYOND

Walters Group has recently completed and is actively working on no less than half a dozen sites in the City of Toronto – yet working on The One is a badge of honour for the whole team.

"Every project we work on is special, but we're especially proud to be involved with this record-breaking tower," Verhey continues. "Through innovation and hard work, we're fortunate to work on some of Canada's most challenging steel projects, especially in the high-rise market."

MacLean agrees with his sentiments, adding, "It is an absolute pleasure to work with Walters on building the tallest building in Canada. They bring a big picture strategic look to the project. They go in with an open mind and make decisions to benefit everyone."

Cooperatively working with design and construction teams to come up with better, faster and more cost-effective ways to build has certainly paid off for the family-owned Walters Group, which has built decades of expertise and an innate ability to make the impossible, possible. **AS**



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