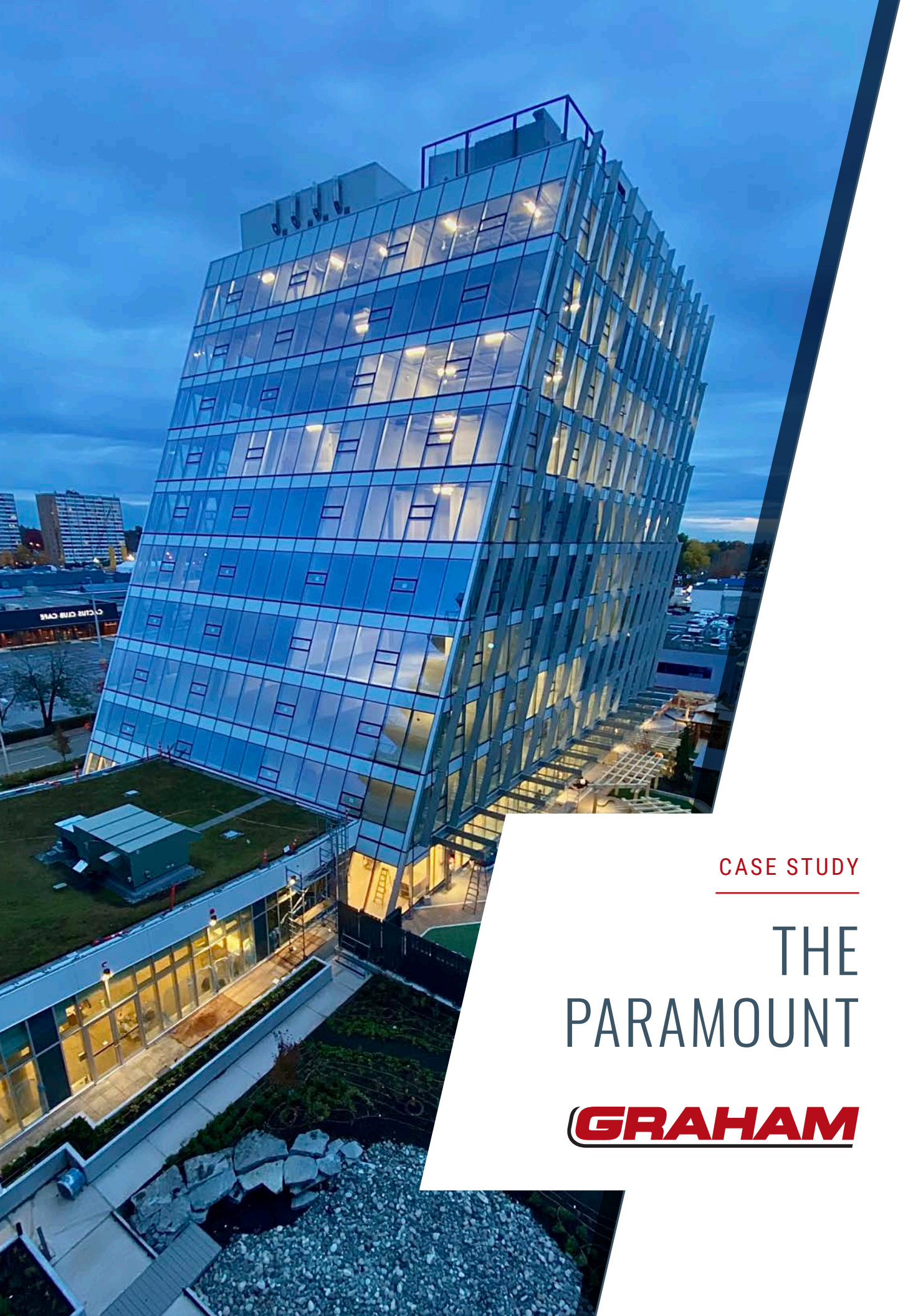


CASE STUDY

THE PARAMOUNT

GRAHAM

How Early Contractor Involvement Can Safeguard Complex Projects

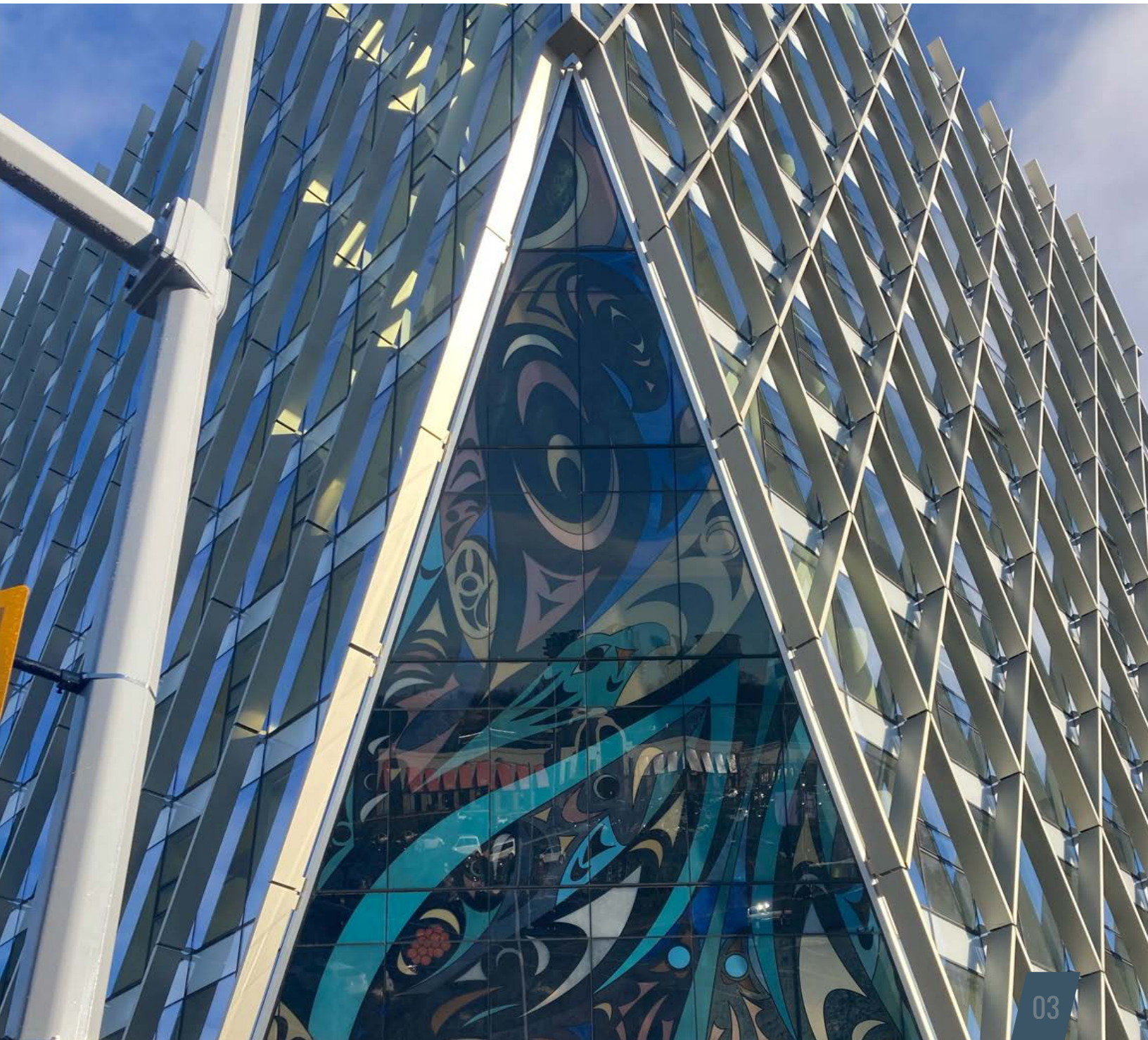
"The Paramount has been one of the highlights of my career," states Mike Wurm, Senior Construction Manager with Keltic (Canada) Developments Ltd. "I cannot think of any other project in the Vancouver market that met its schedule this well during this recent challenging period." Wurm is speaking of the nearly 600-unit, four-tower mixed-use development in the heart of Richmond, B.C. that was conceived and led by Vancouver-based Keltic and was recently completed and conveyed to strata owners. Being on budget, ahead of schedule and fully sold out, and with a satisfied municipal government, adds up to clear success.

The success of The Paramount, which was initiated in 2017, hinged on careful coordination among the key parties – owner, designer and builder, plus the city, consultants and subcontractors – continuous collaboration and significant use of early contractor involvement. The complex project's financial viability required not only maintaining but advancing the schedule from the original target of May 2022, to a phased occupancy approach with Phase I being turned over in October 2021. Achieving Keltic's vision within budget required value engineering and serious decision-making regarding architectural features and materials. Building in the sea-level environment required strong technical skills. And keeping everything going amidst pandemic constraints followed by intensifying supply chain issues required expert project management and coordination of subcontractors and trades.

The Paramount comprises three 15-storey residential towers totalling 533 for-sale units plus 27 low-income market rental units, a 12-storey office tower and multiple retail units at ground level, built atop a four-level parkade (two below-grade and two above-grade) totalling 618 stalls, with a gross floor area of 625,000 square feet,

all finished to LEED Silver equivalent. The residential units were done at a mid/high-level of design and decor. Notable additional features include a state-of-the-art, $13 million, LEED Gold, 19,000-square-foot early childhood development hub that Keltic donated to the City of Richmond, a large courtyard, a district heating and energy distribution hub, and a spectacular back-painted glass art installation spanning six storeys by Indigenous artist Thomas Cannell of the Musqueam First Nations.

Meeting schedule on The Paramount was a top concern for Keltic in seeking a builder, says Wurm. Graham was selected through negotiation as general contractor for the stipulated sum, $267 million contract. Keltic wanted a partner and regarded one of Graham's foremost strengths as bringing the sophisticated processes and risk management characteristic of commercial and industrial construction to the residential world. Wurm had grown familiar over his 30-year career in construction

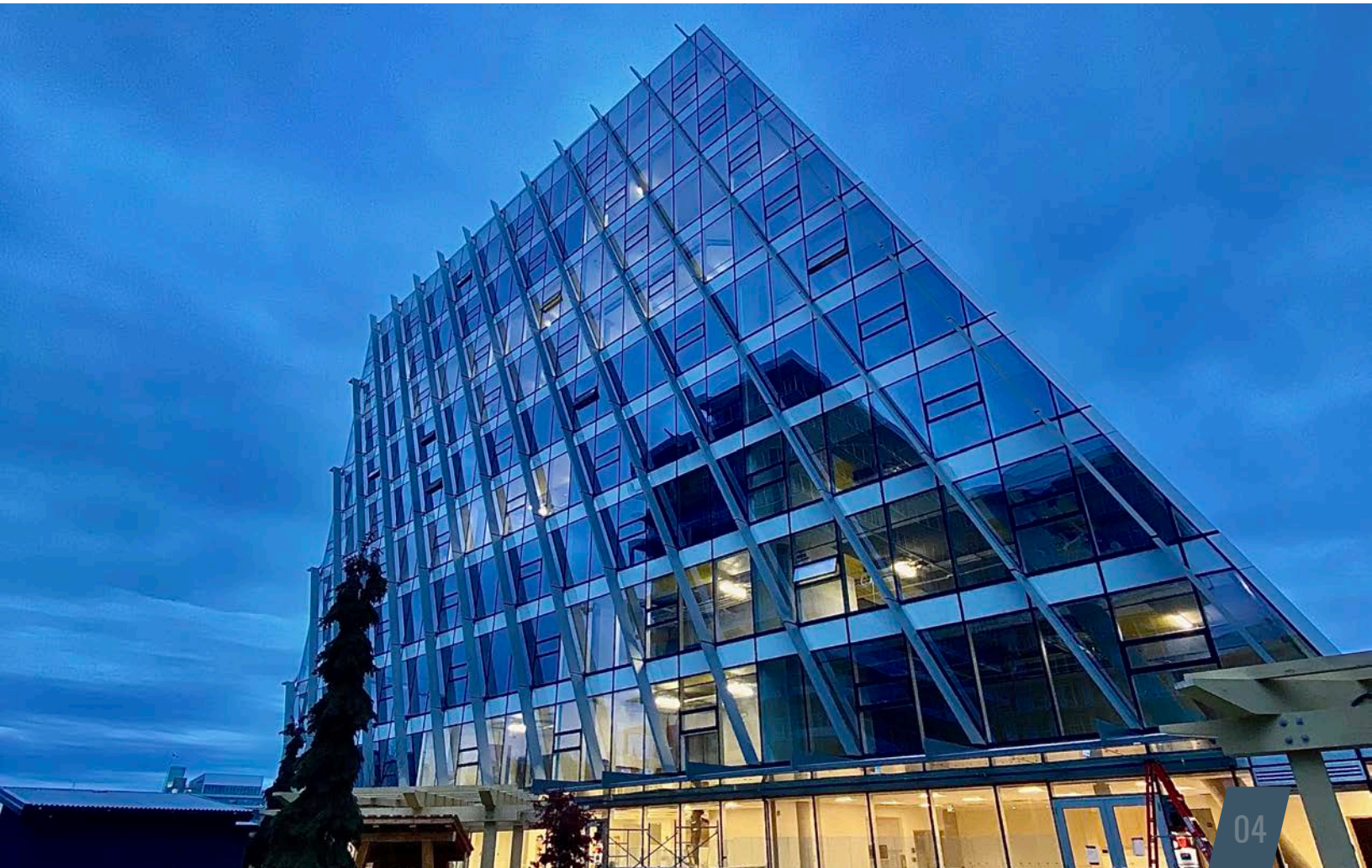


with some of these differences. And, he says, it showed. “Midway through the first year of construction, COVID hit,” Wurm recalls. “We didn’t lose anything off the schedule, we worked right through it, and that’s a testament to Graham, how well they staffed their team, and all their subcontractors.” These strengths proved critical when, in March 2020, the schedule was advanced.

Early contractor involvement (ECI) aims to improve process efficiencies and project outcomes by leveraging the builder’s expertise and experience to recognize and resolve construction-related problems before materials have been procured or things have been built. “ECI is a fantastic element because it allows the contractor to get ahead of the curve and mitigate a lot of the problems that could come up during actual construction. By getting the contractor in early, there are fewer surprises,” says Wurm. ECI demonstrated its efficacy in this project. Keltic was so pleased with its benefits, Wurm notes, that Graham is now undertaking ECI on another Keltic project.

Graham’s input on The Paramount was sought when design was at approximately 30 percent, or still largely conceptual. With its location at Richmond’s main No. 3 Road and Cook Street intersection, across from City Hall and at the terminus of the new elevated CanadaLine LRT, the project’s design team had been “tasked with doing a landmark building, something really memorable, something the city could be proud of,” recalls Amela Brudar, a Principal at GBL Architects. Leaning glass with a dramatic “inward cut” became the office tower’s most prominent aesthetic element, while the residential and retail sections had a number of other features.

“There are different opinions about ECI in the design sector, even within firms, but from my personal experience I think ECI is very valuable, because you are designing with your budget in mind, and there are checks and balances to make sure the things that need to be executed are vetted, and you are working with a contractor who knows the materials and the processes,” says Brudar. “I always



suggest this to my clients, from the permitting onward, having the contractor at the table and checking the drawings." Brudar focuses especially on "the integration of the design with the mechanical and electrical, where we run into the most problems."

"We were engaged nearly two years before construction was to start, through the Presentation Centre and the demolition and enabling works contract, and this helped us work early on the overall project budget to match expectations with what was realistically achievable and also with what would sell in the Vancouver market," recalls Jordan Hood, Graham's Senior Operations Manager on The Paramount project. Graham's preconstruction work on several other area projects provided useful insight into market dynamics.

Graham's ECI effort included 3D pre-modelling to create a constructability methodology, making sure that drawings encompassed all construction issues, and numerous meetings to identify clashes and resolve problems. "The project was highly collaborative among everyone involved," notes James Cassano, a Senior Project Manager at Graham. Among other benefits of this approach was generating the confidence needed to start early procurement and stockpile materials nearby, which in turn helped keep construction on schedule.

Perhaps the most important issue ECI raised – and emblematic of the close cooperation that the Keltic-GBL-Graham trio of teams was able to forge – concerned the balcony partitions on the three residential towers. While Keltic had its heart set on achieving a very high-end building, GBL had grown concerned about a mismatch between expectations and likely costs. Graham determined that the envisioned thick balcony partitions, to be clad in very high-end aluminum products, were simply not achievable.

Combining its deep experience, extensive supplier network and value engineering, Graham developed an alternative that was less costly and simpler to execute

while maintaining acceptable aesthetics. A subcontractor proposed using prefabricated, stand-alone honeycomb sandwich panels, delivering the required privacy with adequate structural rigidity while dispensing with a heavy wall structure of steel framing and backing. “This saved a huge amount of labour and cost, many millions of dollars,” notes Hood. “But we did this collaboratively, presenting the design team and client with mockups to consider, rather than just stripping the project of its aesthetics, and thereby finding lower-cost alternatives that still look good and work well.” Brudar agrees. “It was a great team,” she recalls. “We remained friends all along, even when we were disagreeing.”

Before main construction could begin, extensive geotechnical work was required, and Graham also constructed enabling works, including an innovative deep soil mixing (DSM) water cut-off perimeter wall. The City of Richmond is only 1 metre (3 ft.) above sea-level, generating immense hydrostatic pressure in any deep excavation. This system used drilled concrete columns, greatly reducing the amount of seepage and pumping required during construction.

The key challenge during the course of construction itself became advancing the completion date and switching to a phased occupancy. “We needed a multitude of different ideas to accelerate the schedule, amidst COVID, and we needed to get everyone onboard and coming up with smart ideas to do that,” says Cassano. Graham installed a third tower crane, used a separate yard for off-site re-bar assembly to ensure that the concrete teams worked without interruption, hired a logistics software company to synchronize delivery of materials with the use of tower cranes and hoists, and used a new product that provides real-time monitoring of concrete curing, enabling removal of shoring sooner than under the traditional set-time approach.

“Our whole flow mid-way through construction had to change, the tower that had been deemed least priority became first priority half-way through construction,”

recalls Hood. Key to making it all work, says Hood: "We were a cohesive team that was willing to pitch in and meet all the challenges that were thrown at us. We had a fantastic relationship with the client and architects, and this drew everyone in to work collaboratively and deliver on some of the aggressive asks." Hood praises Keltic for "Fully jumping in and helping wherever they could to achieve their goals." Among Keltic's contributions were paying for overtime and renting the aforementioned rebar pre-fabrication yard.

Today, with The Paramount sold out and in full operation, Keltic and GBL look back on the project with great satisfaction. "It was a very positive experience with Graham, and I can't emphasize that enough, especially because that is not all that common between architects and construction companies," says Brudar. "They're well organized, everything we needed to do our job in terms of submissions, they had when we needed, on a very complex project. In terms of execution, it was a very competently run site and an outstanding performance on Graham's part." Adds Wurm: "From a management standpoint the greatest strength of Graham is the agency the company instills in every employee to make things part of their responsibility, to go out and seek solutions to problems, and not let the issue go until they have a solution that benefits the project."