

CUT ABOVE





R-Hauz pilot project could signal a new era for mid-rise wood

BY TED MCINTYRE

“I’m standing in Berlin on a Building Industry and Land Development Association tour in 2013, looking at these brilliant 20 foot-wide, six-storey concrete townhouses,” relates Leith Moore, “and I thought to myself, ‘That’s what we need in Toronto. Except I want to build them out of wood!’”

Vice-President of Development with the Sorbara Development Group at the time, Moore had long been familiar with elaborate developments and high-rise construction. But a burning desire to pursue smaller, more efficient infill projects had long been incubating between his ears, eventually leading to the formation of R-Hauz, a laneway suites and six-storey townhouse development company co-founded by Moore, Michael Barker and R-Labs CEO George Carras.

“I’d been in the business a long time and things had become more and more high-rise-focused,” Moore shares. “It was a form of building I was just never that attracted to. But the problem has always been, ‘How do you make mid-rise projects economically sustainable?’ The industry has had a hard time adapting to small projects. They were always one-off boutique builds, and by the time you finish your design and approval work, figure out how to build it and work around these small sites, you just couldn’t make money. A lot of companies have tried mid-rise projects, because there is a big market for them, but then they find that it takes just as long to get a mid-rise approved as a high-rise, and you’re using a lot of resources for fewer units. And it’s hard to get the parking to work in a mid-rise setting, so it’s actually costing you more per square foot. So the model starts to fall apart.”

But as Moore surveyed those Berlin townhouses, the puzzle pieces slowly began to fall into place, beginning with the primary building material. “Wood is easier to panelize,” he notes. “I didn’t want to bring in big cranes and pour concrete for six storeys; I wanted to panelize them, bring them in, tilt them up, and do them in 20’ increments—not 150’ or 200’.

“But there was still the issue of scalability,” Moore adds. “It took me a couple more years to finally come to the conclusion that the building policy we had in place was not the problem; we just had to adapt how we build, design and approve things to make that policy work for us.”

The next key element was off-site factory construction, Moore deduced, “so that it’s less wasteful and easier to build. And if I panelized them at the right size, I could bring them in through a rear lane situation, which Toronto has a ton of, and not have to pay to close roads. And with fewer trades involved, you don’t have to use hoists and elevators to get people in and out, so



• Laneway access meant no blocking of main roads for R-Hauz's pilot, while prefab construction kept the site tidy.

there's a lot less traffic management."

But there was one last piece missing: a repeatable design. "You spend six months designing a little mid-rise building—all-new structural engineering, mechanical, electrical, architectural. And then you price it, and every time it's a brand new experience for everyone involved and new pricing," Moore explains. "So I realized that the only way to take advantage of the existing policy was to create a structure you could repeat. So that's what we've done."

A repeatable product has multiple inherent financial advantages. "Since we have a pre-design, we can amortize design costs over a hundred of these buildings rather than just one," Moore says. "And our Integrated Program Delivery formula allows our key trades to be part of an integrated design team that becomes part of a 50-unit build rather than a one-off. So it gets faster, more efficient and less expensive."

The degree of completion of the pre-assembled products will also improve, adds Moore. "The level of completion of the side panels is high, but as we go forward the cross-laminated timber (CLT), exterior cladding, insulation, vapour barrier and interior studding will all be included when the panels arrive and get tilted up. So then we just have to install the interior insulation, vapour barrier and drywall and lay down flooring. We're also working on bathroom pods that we can slide in to the floor as we go. And I think some of the window portions in the fixed part at the back will also be included down the road."

There's still flexibility to the design, however, Moore notes. "The front will always be more of a site adaptation, because it's intended to be customizable to the neighbourhood character, including different window patterns, balconies, etc. And we've put our plumbing in a 'wet core' so that we can change the configuration of rooms and layouts without changing how our plumbing and heating is run."

With the structural module fashioned into a 3D, BIM Revit computer design by Barker, R-Hauz can churn out 20-, 40- or 60-foot-wide structures, with the same depth and architecture. And while R-Hauz's 26,000 sq. ft. pilot project on Queen St. East at Coxwell Avenue—the first all-wood,

mass-timber, six-storey building in Ontario, right down to its wooden elevator shaft and stairwell—required nine months to compete, Moore expects a seven-month timeline for their next project, and just six months after that.

"By comparison, my old mid-rise projects—one level underground and six to eight storeys above—were 18 months of construction," Moore says.

LAYING THE GROUNDWORK

Although the building codes in B.C. and Quebec already permit an all-CLT structure, the Ontario mandate of non-combustible stairs has thus far required concrete stairwells in similar buildings. "But in the past six years a lot has happened with respect to fire and building code technology regarding wood," notes Moore, who amassed volumes of research and scientific study over the course of two years in satisfying the Province with his methodology. In the end, "Toronto was very comfortable approving an alternate standard" to the code.

The ability to go all-CLT also eliminated a common obstacle with mid-rise wood: meshing concrete and wood together. "They have different properties and shrink or settle at different rates," Moore reminds. "Connecting the two is never an easy task, and it's far better if you don't."

But even more vital groundwork had previously been laid to clear the way for tall wood construction. "If it weren't for OHBA's initial pressing for six-storey wood, we wouldn't even be close to this right now," Moore declares. "(CEO) Joe Vaccaro and Mike Collins-Williams and the team were very much on the front lines." Moore, for his part, was president in 2012-2013 as the OHBA's push began in earnest.

"The Ontario Building Code used to have a four-storey limit on wood-frame buildings, so essentially you got semi-detached, single and stacked townhomes. But it didn't allow for a mid-rise housing typology," explains Mike Collins-Williams, OHBA's Senior Director of Planning and Policy. When B.C. updated its code in 2009 to allow up to six-storey wood-frame buildings, OHBA took a lead role in working with the Ministry of Municipal Affairs and Housing and other politicians to



As the OBC is harmonized with aspects of the national code, OHBA expects clearance for up to 12 storeys within two years.

demonstrate why it was something that should be permitted here. There is all kinds of great rationale for it, from the urban planning perspective on transit-oriented communities and density along avenues, to the fact that it's just a more scaled pedestrian-friendly building.

"OHBA put together a coalition including BILD, RESCON and the Canadian Wood Council and together we pushed an advocacy, information and education campaign at the provincial and municipal level," explains Vaccaro. "We pulled together all the research covering everything from the 'missing middle' housing supply to the important issues of fire risk and climate change innovation.

"It took four years to get the Ontario Building Code changed (effective January 2015)," Vaccaro adds. "And now it's 2021 and we are starting to see more members take this advocacy win and innovate and bring more housing supply to the market."

With Ontario currently going through a process to harmonize aspects of the OBC with the national code, OHBA expects clearance for up to 12 storeys within two years.

TEAMWORK

While Moore may have hatched the design-for-assembly strategy, R-Hauz has quickly grown its partnerships, including a November announcement of \$4.5 million in seed funding from Business Development Canada, R-LABS, corporate investors, as well as several angel investors from the Toronto real estate industry. The architecture for the pilot project was done in conjunction with CMV Architects' Dan Cowling. "And then we have some very reliable trade partners, including Birnie Electric and FitMech mechanical, as well as structural engineer David Moses," Moore says.

"The prototype is built for a very narrow and tall site up to six storeys, which allows us to maximize the use of wood with the latest building code," explains Moses, a noted champion of wood construction in his own right. "But that presents some technical challenges from an engineering point of view, mostly around stability of the building in that narrow direction—for example, if you could picture wind blowing on

A TIMELINE FOR ONTARIO MID-RISE WOOD



APRIL 2009: British Columbia changes its building code to increase the limit on wood-frame construction from four to six storeys.

2011: OHBA files initial reports to Provincial government to advocate for mid-rise six-storey wood in Ontario.

APRIL 4, 2012: Ontario's *Wood First Act* is tabled by MPP Bill Mauro, Thunder Bay-Atikokan. The Private Member's Bill promoted the use of wood as the primary building material in publicly funded buildings. The legislation also proposed that the OBC increase the maximum height of wood-framed buildings from four to six storeys. The Private Member's Bill did not pass.



Bill Mauro

OCTOBER 2012: Vic Fideli, Member of Provincial Parliament for the northern riding of Nipissing, introduces his first Private Member's Bill, entitled the *Ontario Forestry Industry Revitalization Act*. The Act would propose to amend the OBC to allow for wood-frame construction to be used in mid-rise buildings up to six storeys. The bill never passes. The Private Member's Bill did not pass.



Vic Fideli

MAY 2013: OHBA, BILD and RESCON outline strong planning and economic rationales in new report, *Unlocking the Potential for Mid-Rise Buildings: Six Storey Wood Structures*.

SEPTEMBER 23, 2014: OHBA, BILD and RESCON (Residential Construction Council of Ontario) hold press conference at OHBA Annual Conference to welcome the Provincial government's commitment to permit six-storey wood-frame buildings in Ontario as of Jan. 1, 2015. Minister of Municipal Affairs and Housing, Hon. Ted McMeekin, addresses the OHBA President's Gala that evening to announce amendments to the OBC supporting mid-rise wood-frame construction.



Ted McMeekin

MAY 22, 2017: OHBA, BILD, RESCON and the Canadian Wood Council hold a news conference to release a report calling for changes to Ontario's building code to allow for safe, affordable wood-frame housing in the GTHA.



• Planning, building and financial departments must all adapt to take advantage of the prefabrication approach, says Moore (left).

the building or an earthquake shaking it in that weak direction. Not a big problem on a shorter building, but as you get taller, it compounds itself. But that's how using cross-laminated timber helps a lot, because it's a much more rigid material than conventional wood framing.

"I think this particular typology will work really well in a lot of neighbourhoods in the city, especially when the City requires things like stepping back so that you don't create any dark shadows on the street, which is typical around tall buildings," Moses says. "But what this system does require is a lot more coordination in advance. To get to that point where everything is just delivered and ready to be installed puts a higher demand on the consulting team, with the builder having to be at the table right from the beginning."

But when a plan comes together, it can be an amazing thing. "Here's part of the beauty of it," says Mike Yorke, president of the Carpenters District Council of Ontario. "Leith's project is on the west side of Queen St. at Coxwell. On the east side, there's a condo under construction that's not much taller but which has taken a lane of traffic for months and months, whereas Leith's project is all being done by the back laneway."

It has also kept the locals happy, Yorke notes. "Mass timber makes for a very quiet construction site, compared to concrete trucks and rebar slamming into heavy forms. And there's virtually no garbage left at the end of the day, because prefab panels come to the site at the correct size, so there's no cutoffs and wastage."

"The neighbours are remarkably happy with the pilot," Moore agrees. "But we also didn't build out the whole depth of the lot. You need someplace to set down the lumber you're going to tilt up, and to put that hoist/crane to lift things up. So we left the back 40 feet of the lot empty for parking at grade—we don't dig a hole in the ground; we do slab-on-grade construction. And we didn't disrupt the streetcars running past. But that's because we're building a little less density and not filling 100% coverage. And we use that extra space to build

faster for less money per foot, which makes up for not building more units, slower, at more per foot."

MODEL OF EFFICIENCY

From a procedural standpoint, R-Hauz's formulaic approach means increased speed of approvals. "And since it's a patterned build in the factory, the City can approve the projects concurrently," Moore notes. "It's been kind of enjoyable working with them. We're at the point where they're accustomed to the product."

Cost predictability is another advantage. "We provide buyers with a foundation design and a fixed price for their product," Moore says. "We adapt the configuration to what you want. The only change in pricing will be due to whatever environmental or soil issues we find on site. But we can actually tell you how much that building will cost in your contract before we build it!"

"It's all part of that evolution of construction—we like to call what we do 'mass customization,'" Moore says. "Years before when I talked to different companies I worked with about this, they said, 'It's not scalable—it's for the pick-up truck business.' I never loved the answer, but I think they were right at the time."

But there will be a learning curve as the process unfolds, Moore cautions. "Prefabrication is a deposit-based construction program rather than draw-based program. So even the financing institutions have to get used to paying for things before they arrive on site. They're used to saying, 'Thirty days after it's installed, send us the bill.' But on this type of construction, when you're building in a factory, you're prepaying for that. So it's not just about municipal planning and building department approvals, it's financial approvals and cost consultants. It all needs to change so that we can take advantage of a more modern construction approach.

"But the real bottleneck on mass timber right now is the lack of experienced, on-site tilt-up crews," Moore suggests. "The



• OHBA Past Presidents Pierre Dufresne
• (left) and Leith Moore flank Cricket
• Energy's Larry Brydon during OHBA's
• Sweden Housing Tour in 2019.

ones that are out there work around North America, because it's still an evolving market.”

And demand will only increase as the popularity of mass timber construction ramps up. But Yorke says that the trade supply chain will be filled. “Skilled carpenters and those who receive training at our College of Carpenters and Allied Trades have multiple transferable skills that they can use on a variety of projects, mass timber among them,” Yorke notes. “And we have a four-week training program for mass timber, with fully one week devoted to health and safety, and hoisting and rigging.”

Ironically, one impediment for R-Hauz is not the absurd market cost of wood. “While lumber costs have hit many builders hard of late—especially the smaller ones—mass timber wood has been good, because there are more established relationships with forest providers,” Moore explains. “And they’re adopting a more European approach to whole-tree use, from the forest to the site. You’re not just buying 2’x6’s to make CLT. What they don’t use becomes OSB and pellets, so you’re not overpaying for your wood. Plus, there are some very modern robotic plants opening in Canada, including a new Element5 plant in St. Thomas that will give us Ontario-made CLT. When we started, CLT in Canada was expensive and came from afar. My first project was Austrian wood, but it will be Canadian wood moving forward.

“And it’s a lot cheaper to move wood from a plant to a site than precast concrete, and a lot easier to move around smaller sites,” Moore adds. “The two materials will always be complementary, though. Concrete is better for some things and wood is better for some things. I think where we are headed as builders is to have options and innovate, and to use the right material for the right job.”

THE NEXT WAVE

Yorke is understandably excited about future prospects. “The next generation of carpenters love working on mass timber projects. People are lining up to get on Leith and Mike’s

project. It’s quite an innovative approach to mid-rise and the ‘missing middle’ sector. We think the versatility and efficiency of mass timber gives it a competitive advantage, because with economies of scale, concrete or steel are not applicable for a six-storey building. If we’re looking for affordable housing and subsidized housing, we’ll need the versatility and speed of mass timber in the mid-rise sector.”

Vaccaro also highlights how the building innovation coming from the OBC change should create new Ontario economic opportunities. “Part of the change campaign was to connect the innovations and manufacturing required by these buildings back to Ontario’s forestry industry, to the university and college design programs, to new skilled labour pools,” Vaccaro notes. “When you build a home, there is an entire network supporting that construction, and Ontario can be a North American economic leader in this space.”

This year, R-Hauz is planning for 20 new projects, four in the Kipling/Dundas area of Etobicoke alone. And it’s not a hard sell, says Moore. “This approach works great for non-profit groups—they have the land, you have a product. They can build more quickly and cost-effectively, which helps them hit their budgets and targets. And it’s really appealing to a lot of owners with retail. Right now, if you’re in retail, the weakest sector is ‘Main Street.’ And between Covid and subway construction, there are a lot of Main Streets that have had a rough couple of years. Now, if you have a two-storey, 20’-wide site on a lane and a store not doing well and one tenant upstairs, we can come in and build a six-storey rental asset for you and your neighbours. The store can cycle from live-work to retail or office, and you haven’t had to sell it and pay land transfer tax.

“And while it does that, it puts effective rental housing exactly where the planners intended—on Main Street, on transit, and of a type that blends itself into the neighbourhood,” Moore notes. “For the first time we’re delivering a mechanism that can make that happen, on economic terms that make sense.” **OHBA**