



SPECIAL FEATURE

May 26, 2017

Green

Daily Commercial News

by ConstructConnect™

www.dailycommercialnews.com

Green Reading

Brampton's Springdale Library strives for LEED Gold



RDH ARCHITECTS

Brampton's new Springdale Library and Community Park will be triangular in shape once construction is completed this fall. The facility will boast a variety of green construction features as it strives to achieve LEED Gold certification.

DAN O'REILLY
CORRESPONDENT

Under construction since 2015 and slated for completion this fall, a new library in Brampton, Ont. is targeted for LEED Gold certification with a comprehensive list of green features.

But it is the somewhat irregular-shaped piece of land the Springdale Library and Community Park sits on which defines its presence in an established residential community and set the design parameters.

Designed by RDH Architects and being built by Brampton-based Aquicon Construction, the 1,850-square-metre (20,000-square-foot) library is triangular in shape.

In explaining the rationale for that configuration, City of Brampton project manager Mike Ferraro says the property comes to a "point" on its west side. It faces Bramalea Road and a major project objective was to provide maximum exposure along that main thoroughfare.

"Orienting the building so that it was highly visible from Bramalea Road meant that we had to consider a building that triangular in shape to achieve that visibility."

The infill property was originally intended to be slated for housing, he says. Other topographic factors also influenced the design of the building and the placement of a community park which will consist of a splash pad, children's play area and contemplation/reflection garden.

On its north and east sides, the library is flanked by a small ravine which could not be impacted and required extensive measures to protect. At the same time the design team and the city capitalized on its presence, he says.

"We were able to take advantage of the ravine by locating the park and the garden adjacent to it, giving the appearance of a continuous larger green space," explains Ferraro, noting that the library's children's section will look on to the ravine.

Those green areas will align or connect — in a symbolic way — with the library's domed green roof, which will be capped with approximately 10 inches of earth and is intended to be clearly visible from the street.

"This area is meant to appear like a natural green berm or hilltop situated on the roof," adds Ferraro.

Green roofs had been considered for the roof's flat areas, but ultimately the city opted for white reflective roofs because of costs. Rain water collected from the flat section will be collected as grey water for flush toilets and urinals, says Ferraro.

Although green roofs are now common in buildings, the unique geometry of this one makes it unique in Canada, says Tyler Sharp, a principal with RDH Architects. The only other one he is aware of is a building in San Francisco.

Describing the library as "architecturally ambitious," the architect cites the use of curved double glazed units with digitally printed solar responsive ceramic frit patterns as an example of the progressive aspects of the design.

"Each vertical bay has a slightly different pattern," says Sharp. Intended to reduce electricity costs, the window units were manufactured in China by a firm which was the only one the design team could find capable of undertaking an entire assembly including the printing of the ceramic patterns.

"There was considerable pre-set up work and we to ensure the shop drawings met our design drawings specification. But once production started there were no delays," explains Sharp.

The utilized curtain wall assembly was undertaken by Mississauga, Ont.-based glazing contractor Noram.

Asked about the potential of glare and heat gain, especially on its western exposure along Bramalea Road, Sharp explains the ceramic frit patterns vary in density, responding to solar orientation.

"The pattern is densest on the south and west facing glass, less dense on the east facades and transparent on the north facing glass."

Glare is also controlled through the integration of motorized blinds on the south, west, and east facing glass, he says.

Apart from the green and white roofs and the glazed units, some of the library's other environmental features include a geothermal heating/cooling system with 38, 121-metre (400 feet)-deep bore holes and eight heat pumps, high-efficient colour changing LED lighting and a system which recycles water from the splash pad to irrigate parkland, says Sharp.

"We are storing the used water in a cistern which then passes through a filtration system before it used for irrigating the park." Although a first for Brampton, the concept for recycling the splash pad water was inspired by a similar use in Mississauga, notes Ferraro.

Close proximity to public transit, electric vehicle plug-in stations and a high percentage of construction waste management are other factors aimed at attaining LEED Gold for the facility.

Only a small handful of Brampton-owned facilities have achieved that benchmark, adds Ferraro.

Economic Snapshot

Update on Canada: the leading economic indicators and the grass are both greener

Midway through the first half of the year, front lawns and the global economy are both sprouting more green shoots.

In its most recent *World Economic Outlook*, the International Monetary Fund (IMF) revised its outlook for world growth in 2017 up from 3.4% to 3.5% and it now projects that global economic activity will expand by a slightly faster 3.6% in 2018.

In the *Summary* of its outlook, the IMF noted that "global economic activity is picking up momentum with a long-awaited cyclical recovery in investment, manufacturing and trade". This more upbeat outlook for the global economy is shared by the Bank of Canada. In its April *Monetary Policy Report* (MPR), the Bank observed that "recent data point to a somewhat stronger pick-up in global economic activity than had been expected at the time of the January MPR".

Despite lingering concerns about the potential impact of changes to the North American Free Trade Agreement on Canada-U.S. trade, the near-term prospects for the U.S. economy, the market for 75% of our exports, also appear "greener" than they were at the beginning of the year. This view is reinforced by the recent stronger-than-expected gains in U.S. employment and the fact that weekly jobless claims hit a 27-year low in the second week of May.

Given the more upbeat global economic outlook and the evidence of stronger-than-expected growth in the U.S., it is not surprising that several forward looking indicators of Canadian economic activity are brighter now than they were just four months ago.

In April, Trading Economics reported that the Markit Canada Manufacturing PMI increased from 55.5 in March to 55.9 in April. This was its seventh consecutive gain



John Clinkard

and its highest value since April of 2011. Also, the Canadian Federation of Independent Business (CFIB) announced that its *Business Barometer* rose by a point-and-a-half in April to 64.4, its highest value since November of 2014.

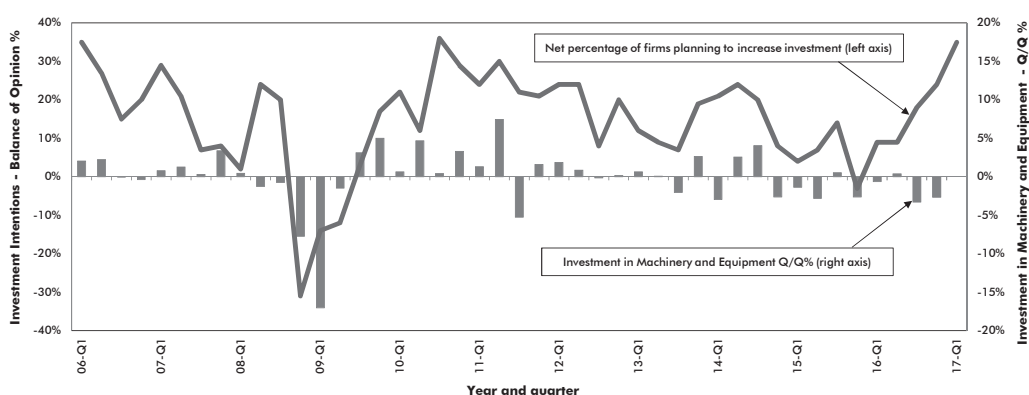
Across the country, small business owners' confidence strengthened in seven of the ten provinces with particularly strong gains recorded in Ontario, Alberta, British Columbia, Prince Edward Island and Newfoundland and Labrador. From an external perspective, although the Organization for Economic Cooperation and Development (OECD) reported that its composite leading indicator of growth in the OECD area of thirty-five countries was little changed in April, it noted that growth is anticipated to gain momentum in just two countries, Germany and Canada.

While the improvement in the near-term outlook for the overall economy is definitely a positive development, signs that the outlook for business investment has taken a long-awaited turn for the better is more significant from a longer-term perspective.

First, the Bank of Canada's April *Business Outlook Survey* reported that investment intentions among the private sector firms it surveyed hit a nine-year high of 35% in the first quarter. This brighter investment picture is reinforced by the Conference Board of Canada's most recent (Q1/2017) *Index of Business Confidence*. Despite the major impediment to investment posed by government policy (specifically impending carbon taxes), the *Index of Business Confidence* increased by 0.7% in the first quarter to a two-year high of 98.5.

John Clinkard has over 35 years' experience as an economist in international, national and regional research and analysis with leading financial institutions and media outlets in Canada.

Investment Intentions vs Capital Spending on Machinery and Equipment



Data Sources: Statistics Canada, Bank of Canada/Chart: ConstructConnect - CanaData.

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Vol. 15, Issue 10

New Finish

Reazzo delivers a green flooring alternative

DON PROCTER
CORRESPONDENT

A Winnipeg contractor developed “a revolutionary decorative concrete topping” reminiscent of terrazzo flooring “quite by accident.”

In 2010 Antex Western was remodelling its head office in Winnipeg and hoping to divert 100 per cent of its construction waste from landfill when the commercial contractor’s hard surfaces manager, Sal Maida, suggested processing waste into aggregates, and then mixing it with cement to create the floor topping for the new office.

“First I thought he (Maida) was crazy... but it turned out stunning,” says president Mike Kolas of the product he calls Reazzo.

“We designed it to be an environmentally positive replacement for terrazzo,” Kolas adds.

Reazzo has gone through a number of modifications since then, gaining credibility in the architectural community along the way and the contractor is about to install its biggest job-ever with Reazzo — 80,000 square feet in the MTS Centre, the home of the National Hockey League’s (NHL) Winnipeg Jets.

Kolas says Antex Western has three weeks to install all of the Reazzo while competing for space with other subtrades at the centre which is undergoing a \$12 million facelift.

By comparison, terrazzo would take about 80 days to place at “a much higher cost.”

The contract includes flooring the lobby and the arena’s two main concourses. A crew of six will prepare the surface and between 8 and 10 more workers will grind

the concrete surface down to expose the face of Reazzo — done in the same fashion that terrazzo is made.

“Reazzo accommodates ridiculously (short) schedules,” Kolas says, noting that Antex could place about 10,000 square feet a day — if only one color was specified.

The MTS Centre floor calls for five shades

of white, blue and gray to match the colors of the NHL team. Recycled blue glass, clear glass and mirrors will be used. A dark blue accent color — only about two percent of the entire floor — will be epoxy-based “because at that time we couldn’t achieve the color density they wanted with Reazzo,” says Kolas.

Prior to installation, each color will be laid out in a pattern. A pump truck stationed in the middle of the events floor of the arena will deliver the material to the Antex crew.

Divider bars, required for terrazzo floors to prevent cracking, are not needed for Reazzo because it employs fibre reinforced concrete technology.

“It can be one monolithic pour,” says Kolas. “It doesn’t shrink, it doesn’t crack.”

Reazzo contains a number of

green-friendly binding agents — industrial waste products such as flyash and slag — that reduce cement content required in terrazzo by 50 per cent.

The installation process — grinding, polishing and then burnishing — is time consuming but he believes that current research will show how to expedite installation. “If we can do away with it, the product will fit (pricewise) squarely into the ceramic and porcelain tile market.”

Kolas says key to the development of Reazzo is Dr. Asia Shvarzman, who heads Antex’s R&D department and sits on the ASTM (American Society for Testing and Materials) board for alternative cementitious materials.

“She not only created it and is looking at improving Reazzo through the use of geopolymers, but she also does research on other products we source for business. This is unheard of in our trade.”

One of the characteristics of Reazzo that has garnered interest from architects across Canada is its durability/performance — it has strengths of 60 to 100 MPa.

The fact Reazzo has been specified for “such an iconic building” in Winnipeg as the MTS Centre has also raised eyebrows in the design community.

“Reazzo is very local at the moment but we are trying to scale production up fast” to meet growing demand, says Kolas.

It is a challenge not normal to a building contractor’s job description. Production could be handled by a number of different types of producers, he says.

“I see a change coming in the industry and I think Reazzo will be a part of that change.”



PHOTOS BY VISIONSLIGHT PRODUCTIONS

Reazzo contains a number of green-friendly binding agents that reduce the cement content required in it by 50 per cent when compared to how terrazzo is made. It also uses fibre reinforced concrete technology which means the use of divider bars is not needed.

Reazzo was created when construction waste was mixed with cement to create the floor topping for the new Antex Western Winnipeg office in 2010.



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Innovation

The next straw: builder takes straw bale construction to school



EVOLVE BUILDERS GROUP

Construction of this private residence is using modular straw bale construction techniques by Harvest Homes. Straw bale construction offers few thermal bridges in a structure.

PETER KENTER
CORRESPONDENT

How did a Guelph, Ont.-based green builder wind up supplying modular straw bale schoolhouses to the Pinoleville Pomo Nation in northern California? By following their market.

The company was founded in 2001 by Ben Polley as Harvest Homes, employing traditional straw bale and plaster construction techniques as a sub-contractor. The system involves stacking straw bales, then placing a cementitious plaster over the interior and exterior to create an ultra-efficient wall. Straw bale construction is rot-resistant, fire-resistant and offers an R40 insulation rating with few thermal bridges.

"Clients asked for traditional, natural or

green building services that were not being provided by the market," says Polley.

"We told those clients that we would undertake the research and training required to complete the work at a discount because our first project would not be as efficient as we would wish to be. The market was telling us what it wanted and effectively paying for our training."

Work ranged from building domestic green roofs to designing and installing artificial wetlands for septic systems, creating adobe structures, using clay veneers in place of paint and building earthen outdoor bread ovens.

As the company's expertise grew, two specialty divisions were co-founded in 2006 by Polley and Chris Vander Hout. Evolve Builders is a full-service general contractor offering green construction for turn-key additions,

renovations and new construction. Fermata offers hand-sculpted earthen construction techniques, including natural plastering, adobe construction and the use of cob—a mixture of clay-rich earth, sand and straw. Today, the combined companies employ 23 workers.

Evolve's first institutional project was completed for Orangeville's Island Lake Public School in the Upper Grand District School Board, which had issued a bid request for a 2800-sq.-ft. standalone school building that included two classrooms, seminar space and two single washrooms.

"The bids from conventional school constructors came in way over budget," says Polley.

"To the school board's credit, next asked for a design build concept that was out of the ordinary—and we were able to design and build it for less than the budgeted amount."

Conceived as a learning centre, the building's green features are transparent to students and teachers and used as educational tools. The slab-on-grade building features timber frame construction, exposed rafters, straw bale insulation, polished concrete floors and a grey water collection system to flush toilets. The insulation is so efficient that, at times, no supplementary heat is required in winter.

"We were later contacted by the school board to build carbon copies of the building at two other locations," says Polley.

"We were then asked if we could adapt the same technologies to build a relocatable portable. We worked with them to develop a design that any school board can use. These are modular straw-bale buildings delivered to site in two halves for assembly. So far, we've installed two single modular classrooms for Upper Grand and one at the Ottawa-Carleton District School Board."

Built at the company's facility in Durham,

the modular portables are produced under the company's mobEE (Mobile Eco-Enclosure) division, created in 2014.

"Traditional portables are depreciating assets the moment they're set into place," says Polley. "We're building permanent quality construction that happens to sit on a mobile chassis."

The California school project began with a call for bids by the Pinoleville Pomo Nation asking for a relocatable school structure built with straw.

"None of the portable straw bale or portable constructors in California offered what they wanted," says Polley. "I was absent the day the call came. If I'd taken it, I might have dismissed it as implausible that we could affordably put something together that we could ship to California. I called the tribe management back and it was like the anti-sales call. Every time I described constraints that would be really difficult to overcome, they would call back saying they had solved them."

The company produced six modules, complete with walls insulated with straw, floors and ceilings built with structural insulated panels, air source heat pumps and thermoplastic polyolefin reflective roofing membranes. Six flatbeds delivered the modules to California on a five-day journey. The building was assembled by members of the tribe on piers, and configured into two classrooms, a shared performance space and four small bathrooms.

Polley says that the company invested some time and money in the project that could not be fully recovered out of a sense of social dedication...coupled with a sense of achievement.

"We recognized that these will have been the furthest traveled structures of their kind anywhere in the world," says Polley. "That gave us a tinge of pride as well."

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Ontario CLT firm builds housing for Grand Rapids First Nations

DON PROCTER
CORRESPONDENT

A cross-laminated timber (CLT) manufacturer based in St. Mary's, Ont., will build 30 houses for the First Nations in Grand Rapids, Man.

The project is a first for CLT in First Nations housing but the manufacturer suggests there are good reasons to think it won't be the last.

The assembly can save money on building costs and provide a durable product that is mould-resistant, says Nancy Dewar, vice-president, Guardian Structures, the manufacturer awarded the contract to build the houses.

The design consists of horizontal cross-laminated slab/wall roof panels assembled in a plant with insulation, doors, windows, siding, plumbing, electrical and other building materials, says Dewar.

Construction is expected to start mid-June.

Dewar says last year Guardian was approached by the project's developer and architect Douglas Cardinal, who couldn't solve design/budget criteria with conventional CLT.

"Douglas expressed interest in Guardian's history of using mass timber wrapped with fiberglass composite for bridge applications."

Guardian can encapsulate dimensional lumber, Glulam or CLT with a "see through" fibreglass composite which is impermeable to water and immune to brittle failure while it increases the strength and stiffness of the product, she says.

Guardian's design for the project includes the manufacture of 2.46-metre-high by 7.73 metre-long walls as one piece with higher racking loads for handling ease and shipping.

Dewar says Guardian's CLT product has a number of advantages over stick-built con-

struction for the First Nations project. For starters the 105 mm thick CLT is hygroscopic, meaning it expels "large amounts of humidity naturally."

That assembly with the insulation and vapor barrier installed on the outside of the house prevents mould from developing, Dewar points out.

Mould has been a problem in First Nations Housing improperly designed with wood frame and drywall.

Dewar adds that CLT is more durable than drywall.

Furthermore, because the design is done upfront, on site change orders are less likely. "It means faster installation because of technology in people and equipment such as CNC machines that can cut to tolerances with 0.05 mm."

Typically, she says, installation is up to 25 per cent faster than traditional materials.

CLT's structural walls — usually 105 mm thick — offer an R-5 insulation value. "And more importantly the insulation on the exterior CLT panel encapsulates the building seamlessly, greatly reducing thermal loss."

Dewar says CLT better meets the challenge of rising energy costs than stick frame "which has greater thermal loss every 16 inches."

"The biggest difference from dimensional lumber in Guardian's opinion is that CLT is the only material to our knowledge that sequesters large amounts of carbon dioxide, she explains. "The time has arrived for companies to justify their worth to society, with greater emphasis being placed on embodied carbon that is sequestered, operational costs, sustainable, environmental, societal impact, rather than straight economics."