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VRCA Awards of Excellence 2019

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Martin was a “tireless advocate” and VRCA champion: Famulak



FILE PHOTO
Brian Martin, former Journal of Commerce publisher and one of the founders of the VRCA's Awards of Excellence program.

VANCOUVER
Vancouver's local construction industry has lost one of its long-time advocates with the passing of Brian Martin, former Journal of Commerce publisher, says the Vancouver Regional Construction Association (VRCA).

“Brian Martin was a tireless advocate for the construction industry and a great champion of the VRCA,” said Fiona Famulak, VRCA president, in a statement, about Martin who passed away on Aug. 30.

“He is credited as being one of the founders of VRCA's Awards of Excellence program over 30 years ago and was very active in helping it to grow to the celebration of excellence in construction that it is today. As one of VRCA's Life Members, he was a wise elder of the association and will be greatly missed by all who knew him. The Board of Directors and staff at VRCA send their deepest condolences to Brian's family, friends and former colleagues at this sad time.”

In a column he wrote for the 25th anniversary of the awards Martin described how the idea for a general contractor award came about.

The VRCA Awards of Excellence are now in their 31st year.

“The program started as a single award for a general contractor. The late Allen Bennett, who was president of the VRCA, approached me. I was the editor of the construction industry newspaper, the Journal of Commerce. He asked if the paper would financially sponsor the award and we agreed to do so,” explained Martin.

“The first award went to Dominion Construction for a new building constructed for Macdonald Dettwiler in Richmond. Dr John Macdonald, one of the founders of the iconic Canadian company and current chancellor of the University of Northern B.C., was on hand for a modest gathering of around 30 or 40 people when the award was presented.”

Martin said the VRCA's Awards of

Excellence program had “succeeded beyond all expectations.”

“It has grown to be by far the largest construction industry awards program in Canada. The basic premise was always very simple: recognize the work of contractors. Architects and engineers all had an array of awards programs. Contractors went largely unnoticed. Sometimes their work, if it was underground or hidden behind walls, went literally unseen,” he wrote.

The expansion of the award program to better reflect the variety of work being done across British Columbia and the evolution of construction was something that was necessary, added Martin.

“Who knows? Quite possibly when the Awards of Excellence celebrates its 50th anniversary some of the new high-tech projects that are winning awards for sustainable construction today will be up for heritage awards that year.”

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Smith Bros. & Wilson leads TransLink's \$81M SkyTrain station upgrade

JEAN SORENSEN
CORRESPONDENT

TransLink's Commercial Drive-Broadway SkyTrain station is a merging point for two major rapid transit lines yielding 90,000 trips a day by users, a stop for 99 B-Line express buses and a loop for regular transit buses totalling 60,000 daily trips by passengers as well as a street junction for two busy Vancouver street arterials.

“The junction was always full of people,” said Tim Harrington, president of Smith Bros. & Wilson (B.C.) Ltd. (SBW) which served as general contractor on SkyTrain's \$81 million station upgrade, the largest in its history.

“That in itself was a challenge for the project,” said Harrington, but the other major logistic hurdle was access to the congested worksite with a ravine — the Grandview Cut — the only alternative. (The Cut, a narrow gorge running east west on the north side below the station, was created during the First World War, providing fill for the False Creek area where the CN Rail station now sits on Main Street as well as leveling ground for rail tracks, today's CN Rail line). Smith Bros. & Wilson had built a work platform under a bridge over the ravine to serve as access and work area.

But, when trains were running, crews could not work on the platform as a precaution against any materials falling onto the track. “They had two CN Rail trains a day when we started,” Harrington said, and that worked not too badly for the first few years. “They changed the rail volume to 12 a day. That had a huge impact on our work.” On an eight-hour shift, crews often had only achieved a three-hour work day.

The ability of Smith Bros. & Wilson and subcontractor Glastech Glazing Contractors Ltd. to meet the challenges of the access to the site and work in one of TransLink's most congested sites has earned both companies Vancouver Regional Construction Association Silver Awards of Excellence. SBW earned its silver award in the category of general contractor on a contract valued at \$15 million to \$50 million while Glastech received an award in the Founder's category for a trade contract valued at \$2 million to \$4 million.

The Commercial Drive-Broadway SkyTrain station, part of the original Expo 86 line, had an elevated track. When the \$1.2 billion Millennium Line opened in 2002, its station was across Broadway (connected via pedestrian bridge) and ran from Clark Drive to Lougheed Mall, using one slope of the Cut for a portion of the guideway.

The station reflected years of additions; TransLink looked towards better integration of the lines with an eye to the future Broadway addition. The upgrade called for a new platform for westbound Expo Line trains, a new walkway above Broadway and a connecting platform to the Millennium Line, as well as an expanded entrance and concourse area for the Broadway stationhouse. The SBW-led station upgrade also included the Broadway bus stops.

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West Village District Energy Centre & Park an award winning build

JEAN SORENSEN
CORRESPONDENT

Two award-winning construction firms are helping the city of Surrey take a significant stride toward its objective of building Canada's largest district energy heating system with their work on the West Village District Energy Centre and Park project. The new energy centre will serve as the backbone of the city's envisioned system serving thousands of residents in the downtown residential and commercial core.

The two construction companies capturing Vancouver Regional Construction Association Silver Awards of Excellence are ESC Automation in the trade category for projects up to \$1 million (Chairman's Trade Award) and Trotter & Morton Building Technologies Inc. in the category of mechanical contracts on a project valued at \$3 million to \$9 million.

The West Village Energy Centre, located at 13231 Central Ave, is the city's first permanent energy centre and serves a new developing area in the city's downtown core area. The West Village district energy system interfaces indirectly via heat exchangers with new high-rises that are situated in the area and provide building space heating and domestic hot water systems. The West Village project follows the district energy system built under the Surrey City Hall building and plaza. That system utilizes a geothermal source of heat.

"There were challenges but I loved working on this project," said Trotter & Morton's project manager Michael Lee, as mechanical is usually not a project focal point. "Mechanical in this project was in the forefront and so it was a great project to work on."

Lee said these district energy systems are a new direction that municipalities and institutions such as universities are moving toward, but the difference today is that they utilize hot water, rather than steam found in older systems.

This is the third B.C. energy system that Trotter & Morton has installed, with the others at the universities of British Columbia and Victoria, said Lee. (The company is currently working on a fourth at Vancouver International Airport). As a result, the company came into a project that had challenges but with a solid foundation of expertise to mitigate them.

The new energy centre's main challenge was timing; it had to provide service to several residential high rises emerging out of the ground nearby. "The plant had to be ready in time for the buildings," Lee said.

"There were three new buildings under construction at that time," said Jason Owen, the Surrey Energy Centre's district energy manager noting that other existing high-rises were being serviced by a temporary energy centre which had limited capacity. The new centre was needed to accommodate the residential building expansion.

"There are now 12 buildings (using hot water from the centre) and we expect another 10 in five years," Owen said.

The new facility uses high-efficiency boilers that utilize 80 per cent natural gas and 20 per cent renewable biogas obtained from Surrey's bio-fuel facility that converts food scraps and yard waste. Over the next 10 to 15 years, Owen estimates that up to 50 buildings will be integrated into a downtown energy grid which is comprised of the geothermal now used in the city hall and plaza system plus yet-to-be built new centres utilizing biomass, waste-heat recovery from buildings and sewer heat recovery systems.

As well as being pressed with deadline concerns for completion of the \$6.48 million project over an 18-month period, Lee also faced logistics problem. The large components for the boilers and associated large pipes had to be placed inside the building prior to the general contractor's schedule



TROTTER & MORTON BUILDING TECHNOLOGIES INC.

Trotter & Morton prefabricated many of the large components for the mechanical systems off site and then assembled them once they were craned into the energy centre.

to roof in the structure. Three large boilers were below grade along with large sections of pipe (both 14-inch and 18-inch pipe) weighing thousands of pounds. They would all have to be craned in over the construction of the building.

"It involved a high level of coordination. We had to coordinate all our deliveries with Scott," he said, referring to general contractor Scott Construction. "They were great to work with and we could not otherwise have achieved what we did without that level of coordination."

In order to meet the schedule, Trotter & Morton had 20 men working on the project but it had done its homework by using BIM software to model the project and determine what components could be prefabricated and partially assembled off site. "We did approximately 60 to 70 per cent off-site and brought the big pieces in and welded them on site," he said.

Scott was charged with centre's construction while Trotter & Morton took charge of the construction of the boilers, pipes, associated equipment, the mechanical pumps, and heat exchangers as well the assembly of the underground pipe for the district pumping system that involved a main outflow line and return line (to the property line). While the project kicked off in July 2017, the underground work was carried out during the freezing winter months.

Despite the challenges, Trotter & Morton's project came in on budget and through the use of value-engineering and innovations benefits such as silencers for the breeching on the boilers, the use of BIM for clash detection and efficiencies through prefabrication were achieved.

One of the needs of a district heating system supplying a building network is the ability of the highrises to communicate supply and demand needs. ESC Automation was instrumental in providing the control systems on the remote buildings and the central energy plant. The system allows the buildings to communicate the required BTUs metered within the buildings so that the central energy plant can meet those needs.

"We installed the PLCs (programmable logic controllers at the central energy plant), which is something we don't normally do," said Steve Egglestone, project manager for ESC Automation. (PLCs are used to control the heating equipment based upon supply and demand). The company also installed the BACnet system (a communications protocol for building automation control net-

works). The system allows the buildings to communicate their hot water needs to the centre.

What sets the project apart is that normally these two systems would need an interface box to communicate. Egglestone said ESC Automation was able to eliminate that interface box, which is a gateway modifying protocol exchanges between the centre and the buildings. Since ESC Automation installed the PLC systems, the company's programmer was able to go into the PLC system and modify the codes so that the buildings

could communicate directly with the centre. Egglestone said this feature is something he hopes to use in other installations as it is a positive feature for clients.

"It simplifies the process," he said. "When you can simplify the process, there are fewer things to maintain and less to go wrong."

ESC Automation solutions are found in P3 projects like the Royal Jubilee Hospital, the Jim Pattison Outpatient Care and Surgery Centre, and the LEED Gold certified Kwantlen University and U.B.C. Earth and Pharmaceutical Sciences buildings.

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SFU Sustainable Energy Engineering Building receives seven VRCA Awards of Excellence

PETER CAULFIELD
CORRESPONDENT

Seven contractors have won 2019 Silver Awards of Excellence from the Vancouver Regional Construction Association (VRCA) for their parts in the Simon Fraser University (SFU) Sustainable Energy Engineering Building (SE3P).

The winners are:

- **Bird Construction Group** (General Contractors — Over \$50 Million);
- **Alliance Scientific Inc.** (Trade Contractors — \$2 Million to \$4 Million [Founder's Trade Award]);
- **Surespan Structures Ltd.** (Trade Contractors — \$2 Million to \$4 Million [Founder's Trade Award]);
- **Glastech Glazing Contractors Ltd.** (Trade Contractors — Over \$4 Million [Director's Trade Award]);
- **Syber Concrete Forming Ltd.** (Trade Contractors — Over \$4 Million [Director's Trade Award]);
- **Division 15 Mechanical Ltd.** (Mechanical Contractors — Over \$9 Million); and
- **Canem Systems Ltd.** (Electrical Contractors — \$2 to \$8 Million).

SE3P, which was opened to students in September 2019, is located near SFU's Surrey Centre campus. It was designed by noted Vancouver architect Bing Thom, and delivered by Revery Architecture (formerly Bing Thom Architects).

A five-storey, 20,458 square-metre concrete structure, SE3P is home to Western Canada's first accredited undergraduate energy engineering program.

Building features include a light-filled central atrium, research labs, collaboration and study spaces, faculty, graduate and administrative offices, recreational rooms, undergraduate and graduate lounge spaces, student services, plant maintenance facilities and a 400-seat lecture hall and tiered classroom.

The building exterior is made of precast



SFU

The Simon Fraser University Sustainable Energy Engineering Building's exterior is made of precast concrete panels and reflective glass. The panels, resembling circuit boards, are a nod to the school's mechatronics laboratory.

concrete panels and reflective glass. The panels, resembling circuit boards, are a nod to SE3P's mechatronics (mechanics meets electronics engineering) laboratory.

The building, which is targeting LEED Gold, will be heated by Surrey's district energy system.

Bird Construction senior project manager Jerry Woykin says the project presented a number of challenges.

"To meet the project's tight schedule, we had to complete the 400-seat theatre before the building envelope," said Woykin. "And we

needed to put up huge scaffolding so that we could build the atrium ceiling while work continued below."

Syber Concrete CEO Brad Allan says the job was split into two parts, the superstructure and the grand stairs.

"The heart of the design is the four-storey, cast-in-place grand stairs," said Allan. "It connects four of the five floors and took over five months to complete."

The grand stairs were completed in the dead of winter under cover of a temporary roof. "This enabled Syber and the other trades to go on without worrying the weather might compromise our work," said Allan.

Canem Systems construction manager Dustin Christensen says the company used lean construction methods to ensure there was adequate material on-site, that it was easily labelled and quickly accessible.

"Canem used our prefab facility in Delta to prep, build, and ship as much product as possible, to reduce inefficiencies with material handling and allow for more time installing the product on-site," said Christensen.

The wire mold mounted on the carrier channels and walls in the labs was prefabricated.

Each one was custom built to length, pre-wired and tested, then broken down, shipped to site and reassembled.

Alliance Scientific supplied and installed mobile metal casework, table systems, chemical containment fume hoods and custom overhead service carriers.

"During the tender stage we had to look at value engineering options to keep the lab casework on budget," said project management

director Kevin Bot. "The original design was to have all wood lab casework cabinets, but we proposed an option of a metal cabinet box with wood fronts. This was accepted and the consultants were pleased to save money but keep the same intent for the all-wood look."

Surespan Structures supplied 330 curved and straight white architectural precast panels for the cladding of the building.

"Our biggest challenge was to come up with a constructable solution to make the architect's dream a reality," said general manager Matt Delange.

"The building is spectacular. It looks like it's floating off the ground."

The panels were cast using several specialty liners that follow the lines of the panel, creating a wave pattern.

"Surespan had to use several cranes to install the panels, because they needed to be rotated on-site before they were hung from the building," said Delange.

Glastech Glazing Contractors carried out the entire exterior and interior scope of glazing products for the building. There are over 19,000 square feet of exterior glazing.

The exterior also has 600 square feet of skylights and 2,700 square feet of sealed unit structural glass walls with flush-front stainless steel point fittings.

Division 15 Mechanical provided fire protection, controls, and plumbing systems, including a stainless-steel domestic water distribution system and HVAC systems, including AHU VAV (air handling unit variable air volume) fan coils, building perimeter heaters, and radiant floor heating on the ground level.



SFU

A light-filled central atrium and grand stairs of the new SFU building are among the award-winning features of the five-storey, 20,458 square-metre concrete structure.



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569 Great Northern Way is the road to VRCA honours for two contractors

PETER CAULFIELD
CORRESPONDENT

Two contractors have won 2019 Silver Awards of Excellence from the Vancouver Regional Construction Association for their part in the 569 Great Northern Way project.

Ledcor Construction Limited won in the General Contractors — Over \$50 Million category. Spearhead Inc. won in Trade Contractors — \$1 Million to \$2 Million (President's Trade Award).

The project comprises the seven-storey Great Northern Way building, with 160,000 square feet of office space, at 565 Great Northern Way, and an eye-catching wooden one-storey 3,000 square foot retail pavilion, at 555 Great Northern Way.

The project also has three levels of underground parking with 474 parking stalls.

Designed to LEED Gold standards, the office building includes a public plaza and a future pedestrian connection to the new, adjacent Emily Carr University of Arts and Design and the Centre for Digital Media, and an expected rapid transit station.

565 Great Northern Way, which is located on the busy east-west Central Valley Greenway, has fitness and bicycle end-of-trip facilities.

Green building features of the project include a green roof to capture rainwater, high performance glazing, energy-efficient lighting, irrigation systems, integrated storm water management and solar shading.

Construction of the project began in May 2016. The tower was

completed in May 2018, and the pavilion in December 2018. Ledcor project manager Hendrik Vanderloo says he believes his company won Silver because the project presented many challenges.

Its biggest challenge was that it was constructed at the same time as next-door Emily Carr University.

To enable the university's occupancy in 2017 it was necessary for the public portion of 565 Great Northern Way to be completed early.

The safe and successful execution of both projects required detailed planning, clear communication and careful work coordination between the projects.

"There were tight deadlines, many meetings and lots of work-site innovations," said Vanderloo. "An added wrinkle is that the project is located on a busy Vancouver arterial road and bicycle path, which couldn't be closed."

The pavilion is a unique stand-alone wooden building that was designed to be a retail space. It is a single-storey, doubly-curved, dome-like structure with an open-floor layout.

It is located to the west of the office building on Great Northern Way and is in front of Emily Carr University.

Spearhead Inc. was responsible for the design, engineering, fabrication and installation of the structural system of the pavilion, as well as the fabrication and installation of the interior ceiling and the exterior soffit cladding.

Spearhead senior project manager Geoff Watts says all structural components were manufactured

off-site and pre-assembled into sub-panels containing hardware and sheathing and then shipped to the work site for installation.

Spearhead's scope on the project included 1,350 Simpson brackets; 5,050 pieces of hardware; 875 custom CNC (computer numerical control) structural steel parts; and 6,950 custom CNC wood components, including Glulam (glued laminated timber), sheathing and laminated strand lumber (LSL).

Watts says the ability of wood to sequester carbon made it an ecologically responsible choice as a building material compared to more traditional materials such as concrete and steel.

"Wood's inherent ability to be eas-

ily machined and formed made it particularly well suited to the pavilion," said Watts. "Furthermore, the primary structural curved Glulam were made from FSC-certified [Forest Stewardship Council] wood fibre."

Spearhead and its construction partners discussed every detail of the project, from the structural system to the architectural cladding, says Watts.

"Most of the structural details are unique," he said. "They were resolved collaboratively with the design team through online meetings, where we could vet ideas digitally to determine if they met the structural requirements without compromising the architectural intent."

Watts says 569 Great Northern Way was not an easy project to bring

off, because there were no traditional build elements.

"Typically the greatest complexities, and traditionally the most costly to resolve on-site, are the interface conditions between dissimilar building components," he said. "To resolve these challenges, we worked collaboratively with other sub-trades, such as the roofing and glazing contractors."

For example, Spearhead made a full-scale mock-up of the doubly curved roof to allow the roofing contractor to shop-test its system to flush out potential problems in the field.

"In addition, we provided the glazing fabricator with 1:1 jigs, derived from the digital model, to create the complex glazing shapes," said Watts.



SUBMITTED PHOTO

This eye-catching wooden, one-storey, 3,000 square foot retail pavilion, which is part of the 569 Great Northern Way project, includes 6,950 custom CNC (computer numerical control) wood components.

Capacity of the connection between Commercial and Broadway stations doubled

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The SBW crew's only space in the Cut was a small yard approximately 400 metres away with limited lay-down area. Larger components had to be prefabricated off-site, brought into the small yard, assembled and then craned into place. Materials were brought in via a small rail shuttle along the Cut; the shuttle train also had to coordinate with the 12 trains utilizing Cut track. "At times, it was very frustrating," said Harrington.

A connection existed between the Commercial and Broadway stations through an overhead bridge crossing Broadway. "We doubled it up," said Harrington, allowing the overhead access to accommodate twice the volume of travellers arriving from trains on both sides of Broadway.

One of the major lifts involved placing the new Broadway foot passenger bridge on new piers. The busy street arterial was shut down on a late Saturday night and into Sunday as two large cranes set the new bridge on concrete bases. Electrical bus lines and street light had to be removed to facilitate the lift across five lanes of Broadway. A new access bridge was also placed the same night to the Millennium Line.

The new platform on the Expo Line now allows all doors of the train to open. "There was one platform originally on the west side and now there is another on the east side," said Harrington. SkyTrain users can disembark and load on both sides of the cars, making it easier to either connect street side to buses or cross over to the Millennium line.

Passenger management was integral to separating transit users from work sites.

"We used hoarding all through the project," Harrington said. "We were working with TransLink and they were also helping with signage — which was a big part and helped to keep things going." Where hoarding would not work, SBW crews worked during the night when the station was shut down.

The busy area also meant safety crews had to be ready to respond to any situation. They were occasionally called to deal with outside issues such as when a man jumped into the ravine. Flocks of pigeons, attracted to the station's food concession stands and sheltered areas, left guano on the site.

"They were perching in the stations and we had to deal with their mess daily," said Harrington. Once a project was finished,

crew erected spiked wire to dissuade squatting pigeons.

Originally slated as 2.5 years, the project took four years to complete as the rescheduling of the trains expanded the time frame. Harrington credits SBW foreman Bill Sparks and project manager Michael van Senden with keeping the project moving forward despite challenges and frustrations.

Glotech Glazing's crew, ranging from two men to 18 at project peak, took 18 months to complete the installation of 23,000 square feet of glass throughout the station upgrade.

"Access was really one of the biggest challenges," said Cody Quick, Glotech project manager as over 700 pieces of glass had to arrive on site for installation on both the inside and outside of the station. His crew used custom scaffolding to allow access over the CN Rail area and onto the station roof. But, all materials arrived via the rail shuttle and with little lay-down area, Glotech worked on a just-in-time delivery basis that counted on receiving the right sequence of pre-cut pieces.

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VRCA winners tie-down 10-Mile Slide's moving earth

JEAN SORENSEN
CORRESPONDENT

The 10-Mile Slide area is considered one of the most complex pieces of geography in B.C. as it is the edge of millions of cubic metres of a post-glacial earth flow on a rugged slope of the coastal mountain range and encompasses both a CN Rail line and Highway 99, an arterial link between Kamloops and Lillooet.

While the bulk of the 13 million cubic metres of the Tunnel Earth flow remains inactive, approximately one million cubic metres of earth, known as the 10-Mile Slide area, has been creeping forward for decades at varying rates causing the road to become unstable. The slide area measured 200 metres in width, 300 metres in length and had an average depth of 18 metres. A 50-percent load restriction has been imposed on the highway since a serious destabilization occurred in September 2017 hampering vehicles and impacting the XaXli'p's Fountain Indian Reserve area, near Lillooet.

The Ministry of Transportation and Infrastructure (MOTI) announced a \$60 million fix over two phases which involved stabilizing the bank and road. Two contractors involved in the first phase have received Vancouver Regional Construction Association Silver Awards of Excellence for their work in tying down the mountain of dirt. Being recognized for their work, which started in November 2018, are Peter Kiewit Sons ULC as the general contractor on a project valued at up to \$15 million and Con-Tech Systems Ltd., in the manufacturers and suppliers category, for fabricating and supplying huge anchors. Advanced soil anchor work (Phase 1) was successfully completed in February 2019, and as a result of work on the highway and the anchors, load restrictions on the highway were adjusted, allowing commercial vehicles and tour buses



PETER KIEWIT SONS ULC

To slow the movement of a million cubic metres of earth in the 10-Mile Slide area, companies used large diameter blocks with anchors drilled deep into the ground to transfer loads.

that are 27,000 kilograms gross vehicle weight or less to use the highway.

"One of the main challenges of the project was working on an active moving slide. The slide moved an average of 7 mm per day and at times exceeding 12 mm per day," said Kiewit project manager Tyson Motz. While it may not have seemed much, it amounts to 2.5 metres of movement in a year. "This also meant that the topography at the time of construction had significantly changed since the tender drawings were created."

It was not practical to remove material because of the slide's volume. "The bench

material cuts were to be utilized for highway improvements as no material could leave the site due to environmental permitting restrictions," said Motz.

To mitigate these circumstances, Kiewit collected survey data, developed terrain models and worked with MOTI to redesign cuts and fills to find the best design that could provide construction personnel with accessible benches and provide enough material for the highway work. Twice daily Kiewit continued monitoring the site with data analyzed by the MOTI staff to ensure worker safety.

Another challenge that remained was the

isolation of the area over the winter months when work progressed. There was no cell phone service. Many delivery companies did not want to travel this stretch of highway during winter. "The project required a detailed procurement plan in order to keep the work progressing without delivery delays," he said.

(Prior to starting the project, Kiewit dedicated a team to procurement, but also had the construction team work with modellers and schedulers to create detailed work plans that identified schedule risks and ensured the proper plan was in place prior to crew mobilization to expedite construction).

Con-Tech Systems, which supplied the anchors to keep the creeping mound of dirt in place, termed the project one of the most complex emergency projects that the company had been involved with in its 36-year history.

President Horst Aschenbroich said that Phase 1 was really the second part of an emergency response that began when the road was impacted in September, 2017. At that time Kiewit and Con-Tech had worked to stabilize some of the slide and Con-Tech had also supplied anchors to the CN Rail. Approximately 40 anchors had been placed in that early portion of the emergency repair. MOTI then embarked upon a Phase 1 (placing another 44 anchors) with Phase 2 construction (placing a further 200 anchors) to follow.

"We do these projects all the time but this was one of the most challenging projects, mainly because of the logistics and the fact that the project used one of the largest Hot Rolled Threaded Bars. The last job we used this size rebar on was the Wanapum Dam on the Columbia river," said Aschenbroich.

The project included 1,500 metres of one of the largest double corrosion protected (DCP) anchor bars (65mm Grade 150 Hot Rolled Threaded Bars).

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Continued from Pg. V-6

The Phase 1 project utilized 44 precast anchor blocks with the DCP anchors. The anchors were drilled into the bond zone, which was undifferentiated glacial sediment, holding back the slide and transferring the load from the anchor into the ground. The bond length is composed of corrugated high-density polyethylene (HDPE) pipe encapsulating the pre-grout anchor bar, where the corrugation provides bonding between the anchor bar and the soil.

The length of the overburden layer (free length) does not provide anchorage, but serves to facilitate the transfer of the load to the precast anchor blocks to ensure overall stability of the anchor. The free length was larger-diameter, smooth sheathing HDPE to generate the free-stressing zone for the anchor. Once the anchor was installed the hole was grouted. Due to tension cracks in the ground some anchors saw in excess of 2600 litres of grout per hole, far in excess of the neat line quantities.

“Upon completion of a bench of anchors, the slide monitoring program saw significant reduction in slide movement, proof that the design and construction was successful,” said Motz.

The required off-site monitoring, using satellite, caused Con-Tech to propose using RST Instruments Ltd.’s vibrating wire load cells (plus FlexDAQ data logger and GeoViewer software) for real time monitoring. The load cells were seen as a superior alternative system to the project-specified strain gauges, which have to be attached to the bar and grouted into the corrugated sheath before the anchor installation.

“We had used them on a California earthquake site,” said Aschenbroich, after his company had been called to provide anchor material to stabilize an area. The load cells on the bearing plates can be easily reused or replaced and indicate when the anchors are over-stressed and need to be de-tensioned or locked off. (The use of the load cells is now being incorporated into Phase 2, although Con-Tech and Kiewit do not have the Phase 2 contract).

Another project achievement occurred in traffic control on a highway that saw an average of 1,560 vehicles on it daily with 19 per cent heavy vehicles. Traffic control was deemed one of the areas of high risk. Kiewit subcontracted the traffic control to the XaXli’p First Nations, with the contractor’s crew providing training and the integration of the traffic personnel onto the job site. In total, the team completed 4,600 traffic control man-hours without a single incident.

Three contractors receive VRCA excellence awards for Aldergrove community centre

PETER CAULFIELD
CORRESPONDENT

Three contractors have won 2019 Silver Awards of Excellence from the Vancouver Regional Construction Association for their part in the Aldergrove Credit Union Community Centre and Otter Co-op Outdoor Experience project.

The winners are Horizon Landscape Contractors Inc. in the Trade Contractors — \$1 Million to \$2 Million (President’s Trade Award) category; Canstar Mechanical Ltd. (Mechanical Contractors — \$3 to \$9 Million); and Graham Design Builders LP (General Contractors — \$15 Million to \$50 Million).

The Aldergrove Community Centre, which opened in Langley in 2018, comprises a 70,000-square-foot, two-storey building and outdoor water park.

The facility has a NHL-sized ice arena and, on the second level, a running track, fitness centre and multi-purpose flex room.

The 600-seat arena is home to a junior hockey team, as well as minor hockey, figure skating, ringette and lacrosse programs.

The aquatics complex is open year-round. In winter, the 25-metre lanes, lifestyle pool and hot tub remain open under a wood canopy, making it the only all-year outdoor pool in Greater Vancouver.

General contractor Graham Design Builders LP project manager Jasman Cheema says the community centre has an unusual and innovative rain and storm water harvesting system.

The system uses the storm drains from the roof and drains from the pool deck to collect water and store it in the clear stone used as back-fill for construction of the water park.

“The water harvesting system enables the owner to use non-potable water to flush toilets and urinals,” said Cheema. “And any excess water goes into the bioswale (channel that carries storm water runoff) where it can be stored and filtered naturally through the ground before it enters the township’s sewer system.”

The system required a long and extensive network of underground piping and conduits: 70,000 feet of rink piping; 18,000 feet of pool piping; 3,700 feet of sanitary, sewer and water piping; and 90,000 feet of electrical conduit.

The centre has a number of sustainability features:

- The water in the pools is heated, in part, by solar panels, heat recovery ventilation units and excess energy from the ice rink’s refrigeration plant;
- The water park sub-grade was filled with clear stone to provide integrated rainwater management



SUBMITTED PHOTO

The Aldergrove Credit Union Community Centre and Otter Co-op Outdoor Experience project opened in Langley, B.C. in 2018 and consists of a 70,000-square-foot building and an outdoor water park.

— storage for harvested rain waters, storm retention and water table infiltration; and

- Wood from the demolished Aldergrove Elementary School, which previously occupied the site of the community centre, was recycled and used to build part of the centre’s frontage, as well as the benches and counters in the facility’s lobby. Bricks from the old school were used on the feature wall at the arena’s main entrance.

Langley-based Horizon Landscape Contractors Inc. did the base preparation, concrete architectural walls and flat work, including exposed washed blue glass concrete.

Its work on the project also included fencing, gates, railings, benches, planting, rain harvesting garden, pavers, irrigation, maintenance and playground surfacing.

“We collaborated really well with the landscape architects and Graham to bring the budget down by over one-third for our original scope without sacrificing the design intent expected by the Township of Langley [owner],” said Horizon V-P construction Brian Dougherty.

The project’s tight scheduling was a challenge.

“Having a large scope to complete in a short period of time, while taking on additional, last-minute work to help Graham complete the scope items in time, doubled our contract to \$2 million,” said Dougherty.

“But we were able to hit the dates we needed to,

and with very little overtime required, thanks to Chad Leyenhorst, our project manager.”

Dougherty says Horizon won a Silver Award because of the last-minute scope increases and the contractor coordination that were required “to deliver a premium product to the public without gouging the general contractor or the Township of Langley for last minute changes.”

“The park is a shining star in the neighbourhood that shows off nearly all aspects of scope contained in our portfolio of services,” he said.

Canstar Mechanical Ltd. of Port Coquitlam had the design-build mechanical contract for the project.

The design of the community centre emphasized energy optimization, says Canstar president John Urquhart.

“The project had many green initiatives, such as the use of solar collectors and a rain harvesting system that collects both rain and pool deck water,” he said.

Urquhart says the work was very demanding and required careful coordination with the forming contractor.

The project presented a number of challenges.

“Because of the chlorine in the pool water, we had to use CPVC [chlorinated polyvinyl chloride] plastic pipes instead of copper pipes,” said Urquhart. “And building an outdoor pool in the winter on a tight schedule for a fixed facility opening date isn’t easy.”



SUBMITTED PHOTO

The sub-grade of the outdoor water park at the Aldergrove community centre was filled with clear stone to help provide integrated rainwater management.

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Salton Road bridge a testament to industry's precision

JEAN SORENSEN
CORRESPONDENT

If there is a structure that demonstrates the exacting preciseness that B.C.'s construction industry can achieve, it is the \$4.3 million Salton Road pedestrian and cycle bridge.

When the 79-metre (260-foot) steel bridge was craned into place over a shutdown section of the Trans-Canada Highway during an October 2018 night, it required shear key ends to line up exactly so the span would seat in the bank abutments.

"The tolerance on the shear key ends was three millimetres (one-eighth of an inch)," said Aidan Connell, Graham Infrastructure LP's project manager during the construction and placement of the bridge. Once the shear key ends were in place, the bridge ends could be locked in place and the final fastening completed.

The design-build contract for the bridge, which connects the University of the Fraser Valley to downtown Abbotsford, has earned both Graham and Marcon Metalfab Vancouver Regional Construction Association silver awards of excellence. Graham received its award in the category of projects valued up to \$15 million by a general contractor. Marcon Metalfab, which fabricated the components of the bridge, received its silver award in the category of suppliers and manufacturers.

"The challenge was the measuring and the measurement checks," said Marcon's project manager Farzan Farzaneh as the work had to be precise to ensure that the assembled bridge components fit perfectly with the drawings.

Adding to the challenge was the fact the drawings were only 30 per cent complete when the project started in January 2018, the contract award date. Marcon delivered the first bridge components April and the last in December.

In order to fast-track the fabrication, Marcon broke this into 19 different sections. Before the project drawings were complete, the company would go through a total of 458 sets of drawings for the combined bridge components and spend a total of 4,298 hours on the fabrication.

The bridge's large arches are steel pipe. When the project was first considered in 2017, there was no problem in sourcing materials. But steel prices soared and suppliers cut their inventories. The needed pipe was nowhere to be found in North America. Marcon only was able to find two replacement pipes; one proved superior. The task became estimating before the final drawings were completed how much of the 24-inch-diameter pipe was needed and how much needed to be factored in as a margin for error. The company took risks. It sent the pipe for rolling (curving) before the shop drawings were complete as rolling can take three to four weeks.

In addition, all the bridge components had to be delivered in a sequence as Graham was assembling the bridge near the site. "All the structural members, the floor beams, the arches, abutment structural boxes, the road hangers and the shear keys were all part of a critical path," Farzaneh said. Any problems would impact the project.

The bridge components were trucked to the Graham assembly site, which was the green space or median between lanes of the Trans-Canada Highway, known as Highway 1 in the western provinces. The long, 24-inch-diameter rolled arches were shipped in five segments for each arch. As bridge pieces arrived,



MARCON METALFAB

The Salton Road cycle and pedestrian bridge, built to exacting standards, is lifted into place by a 550-tonne crane as the Trans-Canada Highway 1 was shut down to accommodate the bridge's placement.

they were propped into place and welded onto the structure.

"One of the primary challenges was working on the busy highway's median," said Connell. The chosen site was close to where a crane would eventually lift the bridge into place connecting the structure to the south and north sides of the highway. The 30-metre-wide and 46-metre-long site provided space for storage containers, crews, lay-down area, and a 120-tonne crane. The area between the freeway lanes is a V-shaped gully and the work space had to be raised to a flat surface before any work could begin.

There was also the consideration for traffic. The site of a bridge, with a high point of 10 metres that was under construction on the median was a curiosity to drivers creating a safety issue for both the work crews and motorists.

"We put up a privacy screen and large roadside barriers on the edge of the median to prevent traffic from veering onto the median and also to protect workers," said Connell, but as the bridge progressed it became more difficult to hide.

On the evening and morning of October 20 and 21, the built-out bridge was ready to lift.

"We got the green light to shut down the highway and the crane was in position," he said as it had lifted the structure a foot off the ground preparing for the final heft. The bridge would turn from an east-west position to a north-south position and then come to rest on the abutments.

The lift followed a thorough engineered lift plan. "When you lift something off the ground it behaves differently," said Connell. Two factors had to be reconciled. The first was the hanger rods. The lifting tension could compress and break the hanger rods. The crew identified which of the hanger rods were susceptible, and then, loosened them to reduce tension. The second factor was that any mid-point lift caused a shortening of the bridge, a

critical point as it had to land exactly on the shear key points for final fastening.

"We dropped it down on one side first," said Connell. As the weight of the bridge was lowered onto the abutment, the sag in the bridge relaxed and it was able to drop down into the other bank abutment hitting the second set of shear keys.

Associated Engineering's Nik Cuperlovic, the engineer of record, said the bridge is unusual as it is removed from the normal straight utility bridge. "We wanted to build a beautiful bridge," he said. The design of the four-metre-wide, painted steel bridge features graceful carved arches, LED lighting, platforms and benches at the top of the 218-metre approach ramps and at switchbacks. The main span's fence has trapezoidal panels and fence post aligned with the bridge hangers for a visual effect. The art of Brent Bukowski, a collage of rolling bicycle wheels, entitled *The Hop Across*, was installed on the bridge.

Cuperlovic said the bridge was designed to accommodate the lift. The arch ribs were able to be lifted with hangers, tie beams and deck using four lifting lines attached at quarter-points of the arch. The total weight of the steel structure to be lifted was just under 80 tonnes. The concrete deck was later cast on galvanized steel, stay-in-place forms, which involved no traffic closures.

Throughout the project, cost was a consideration. Cuperlovic said the original plans called for a span supported by a pier in the highway median but the design team felt that a free-standing single span was more appealing and would require less maintenance. The higher cost of providing the superstructure was offset by the need for the construction of a mid-span pier.

When Connell looks back at the project, he maintains it took a strong team effort to achieve the exacting standards required. "It was really a lot of people coming together to make it happen and a successful endeavour," he said.

Contractors rise up for Silver on Vancouver Library Rooftop Garden

PETER CAULFIELD
CORRESPONDENT

Three contractors have won 2019 Silver Awards of Excellence from the Vancouver Regional Construction Association for their part in the Vancouver Central Library — Level 8 and 9 construction project.

(Vancouver Central Library is the main branch of the Vancouver Public Library [VPL] system.)

Smith Bros. & Wilson (B.C.) Ltd. won in the General Contractors — Tenant Improvement category. Westcoast Cutting and Coring Group Ltd. won for Trade Contractors — Up to \$1 Million (Chairman's Trade Award). Black & McDonald Ltd. won for Mechanical Contractors — Up to \$3 Million.

VPL spokesman Scott Fraser says post-construction levels eight and nine are a mix of library offices, meeting rooms, a public reading room, theatre and exhibit space, "but primarily the new floors are

dedicated to free open public space."

"What is out of the ordinary with these new spaces is there are no books or other library collections," said Fraser. "The expectation the public has for library uses in the 21st century goes beyond shelving."

Planning of the project started in 2016. Construction took place in 2017-18 and the new space opened to the public in September 2018.

"When the central library opened in 1995, the top two floors were occupied by the provincial government on a 20-year lease, with the expectation that the library would someday require the space," said Fraser. "As the lease came due, the library undertook planning to expand central library to provide much needed community spaces."

There are over 42,000 square feet of interior space and an additional 16,800 square feet of publicly accessible exterior space.

The rooftop garden, which is open to the public during library hours, is on level nine.

West Coast Cutting and Coring (WCC) was given the task of removing a large portion of the existing green roof material and demolishing the Roman Coliseum-like arched roof slab, beams and support columns.

It did all of that with limited access to the work site, while keeping a watchful eye on the breakable glass covering the library concourse below. Vice-president Spencer Reid says WCC saw-cut new escalator openings on levels eight and nine that were directly above the library's operating escalators, active library space and library visitors.

"The location and limited access of the project required a great deal of coordination and cooperation between the trades and general contractor," said Reid.

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