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March / April 2019
Volume 60, No. 2



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Talking Smart Mobility. A conversation with Daniel Haufschild, leader of Arup Canada's integrated planning practice, on where transportation is headed. **30**

Trading Up

It was over a decade ago that I traded in my Motorola Razr and upgraded to an all-new internet-connected 'smart' phone. I'm onto my third version of iPhone now, but I don't think of it as smart, it's just a phone.

The ubiquity of our handheld computers has made what was once a technology marvel into simply a necessary utility device. Now that connectivity and intelligence is moving into our buildings and on to our streets, the hype cycle is renewing, and the 'smart' tag is again coming along for the ride.

In early March I attended a symposium hosted by the Urban Land Institute in Toronto called Early Adopters: How Digitization & Industrialization are Transforming the Development Industry Today. The half-day event included a series of panel discussions focused on sustainable and smart building. The keynote speaker, Gladstone Grant from Microsoft, peered into the future, sharing thoughts like: "My kids, two and four years old, will never drive a car."

His reasoning is that automated vehicles will make driving obsolete, and because of the risk factor of having people behind the wheel, insurance premiums will be so high people won't be able to afford ownership.

What's interesting about this future-looking thought exercise is trying to determine all of the dominoes that will fall as one major change shakes up our existing paradigm. For example, if all of our vehicles in the near future are electric, then we're going to need a lot of charging stations, everywhere, right?

But wait, in a new report from UK-based research firm IDTechEx, "Smart City Opportunities: Infrastructure, Systems, Materials 2019-2029", it's suggested we may not need charging stations at all, because 'smart' roads will charge vehicles as we're driving, and automakers are already developing energy independent solar vehicles.

The report also suggests that globally, due to the influx of people into cities, "peak car" will be reached in 2030, or maybe even earlier, as cities aim to eliminate congestion and become zero emission. According to the World Health Organization, around 10,000 deaths annually in London, UK, are related to traffic emissions, and in China the count is over 1 million. London wants to ban parking from new apartment builds, while China is converting all buses to electric. Many cities want to eliminate all traffic from downtown areas.

Unlike owning the phones in our pockets, car ownership may become a thing of the past. There are so many variables and implications that come along with new 'smart' technology. But as most of the experts we've enlisted in this issue to share their visions of where the future is going, it becomes clear that the technology is still only a tool used to enhance the human experience.

Making buildings more intelligent should benefit the people who occupy the space and not be a burden on society, and transportation should make our lives better without putting more stress on society and our cities.

It's the value that tech brings to individuals and our communities that makes it smart. Despite the time-sucking addictive nature of my mobile, I wouldn't trade it back for my flip phone. In the end, Smart wins.



Doug Picklyk

FOR PROFESSIONAL ENGINEERS IN PRIVATE PRACTICE

CANADIAN CONSULTING engineer

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Photo courtesy Wood WORKS! BC

The UBC Campus Energy Centre, designed by DIALOG, Vancouver, with structural engineering by Fast + Epp, won a 2019 Wood Design Award in B.C.

AWARDS

BC Wood Design Awards

The 15th annual Wood Design Awards in BC, sponsored by Wood WORKS! BC, were held March 4th at the Vancouver Convention Centre. More than 400 structural engineers, architects, project teams and guests attended.

There were 103 nominations in 14 categories from locations in B.C., the U.S. and Asia.

Darryl Bowers, P.Eng., principal at Weiler Smith Bowers Structural Engineers in Burnaby, received the 2019 Engineer Award, recognized for contributions to the advancement of five- and six-storey mid-rise wood construction.

The Technologist Award was given to Thomas Abbühl, honouring the long-time BCIT civil and structural engineering faculty member.

An Environmental Performance

Award went to Stantec Architecture, Vancouver for the UNBC Wood Innovation Research Laboratory in Prince George, a Passive House-certified building with wood throughout the interior as both structural and cladding material.

The Institutional Wood Design Award for large buildings went to DIALOG, Vancouver, for the UBC Campus Energy Centre. The structural engineers were Fast + Epp.

The complete list of Award winners can be found at wood-works.ca/bc.

COMPANIES

Entuitive acquires Brown & Co. Engineering Ltd.

Entuitive has acquired Toronto-based Brown & Co. Engineering Ltd., a structural engineering firm specializing in bridge and construction engineering.

COMPANIES

Barry joins TMP

The Mitchell Partnership (TMP) in Toronto has announced that Dermot Barry, P.Eng., has joined as a partner.



Dermot Barry

In his new role, Barry will utilize his experience in HVAC, plumbing and life safety design for TMP's office building projects.

Brown & Caldwell Vancouver office

California-based environmental engineering firm Brown and Caldwell has opened a new office in the Vancouver area to serve clients in the region's municipal and private water and wastewater sector.

The firm's history in the Lower Mainland dates back more than 60 years.

KCB expands

Klohn Crippen Berger (KCB) has opened a new office in Fredericton, New Brunswick as well as a new space in York, England (UK).

The Fredericton office supports mining opportunities in the Maritimes and Quebec and provides support to other KCB offices.

The new UK site extends the firm's international presence and positions it to support mining opportunities in Europe, Africa and Asia.

Founded in 2002 by Stephen Brown, Brown & Co. is currently working on the Crosstown and Finch LRT Projects in Toronto.

This announcement follows the recent growth of Entuitive's transportation and infrastructure groups, with the addition of Toronto's Union Station Enhancement Project and Port Lands Bridges Projects.

"With Brown & Company, our combined capabilities, client relationships, and portfolio will allow us to offer services on a broader range of large, complex, transit-integrated projects," said Brock Schroeder, managing director of Entuitive, in a company release.

Brown & Co. principals Stephen Brown, Jason Jelinek, Megan Rhind, and Andrew Au-Yeung will assume leadership roles in their respective fields of expertise. Brown & Co.'s employees will become members of the transportation, special projects, and restoration teams based in Entuitive's Toronto office.

Canadian leads DFI

Matthew Janes, P.Eng., senior engineer with Isherwood Associates in Toronto is serving a term as president of the Deep Foundations Institute.



Art Washuta, P.Eng., receives the Lieutenant Governor's Award at the 2019 Alberta Showcase Awards Gala.

Also, Daniel MacLean, P.Eng., business development manager at Keller Foundations Ltd. based in Acton, Ont., has been elected to the Institute's board of trustees.

AWARDS

23rd Alberta Showcase Awards

Over 400 people were in attendance, and Stantec was a big winner, taking home the most hardware—collecting

four Awards of Excellence and an Award of Merit—at the 23rd Annual Consulting Engineers of Alberta Showcase Awards Gala held February 8 in Calgary.

The theme for this year's awards was "Ignite – Fueling the Next Generation," and in total 11 Awards of Excellence and 11 Awards of Merit were handed out at the event.

The Harold L. Morrison Award honouring a rising young professional was presented to Diana Smith, P.Eng., a mechanical engineer with DIALOG.

The CEA Lieutenant Governor's Award for distinguished service was presented to Art Washuta, P.Eng., a past president of CEA and long-term member of the Board.

From 47 submitted projects there were 16 award-winning companies this year across the 11 categories, including a number of joint submissions.

Along with Stantec, other winning firms included: AECOM, Arrow Engineering, Associated Engineering, DIALOG, Fast + Epp, Hatch, ISL Engineering and Land Service, Jacobs, KFR Engineering, M2 Engineering, MCW Hemisphere, Morrison Hershfield, SMP Engineering, Tetra Tech, and Wood.

See a complete list at cea.ca

Photo courtesy CEA

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LETTER TO THE EDITOR

Re: Next-Gen Leadership

Just read Jeff Lutzak's article entitled 'Next-Gen Leadership' (p. 32, January/February 2019 issue) with which I very much agree.

Having spent several years in train-

ing young professionals in business management skills, I would add two additional issues:

1. Universities have little time to spend on the intricacies of engineering management, having complex technical disciplines and concepts to

cover. Thus, graduates complete their studies unaware of the intricacies of running a practice.

2. ACEC concluded that such training is essential for career development and succession, and has been actively promoting training seminars, of late in the form of Webinars. ACEC has studied training up-take patterns and saw this format being most popular, inexpensive and not disruptive to production.

Now we only need existing senior management to realize that such training is to everyone's advantage and to encourage their young professionals to participate.

*Regards, Ben Novak B.Eng.,
MCP, Dip.BA, Founding Partner,
DFS Design Firm Seminars*

Canadian Consulting Engineer welcomes and encourages letters from our readers to provoke thoughtful discussion and keep the conversations going. If you like something you've read, or have concerns, reach out and share your opinions. Please send your comments to dpicklyk@ccemag.com.

SURVEY

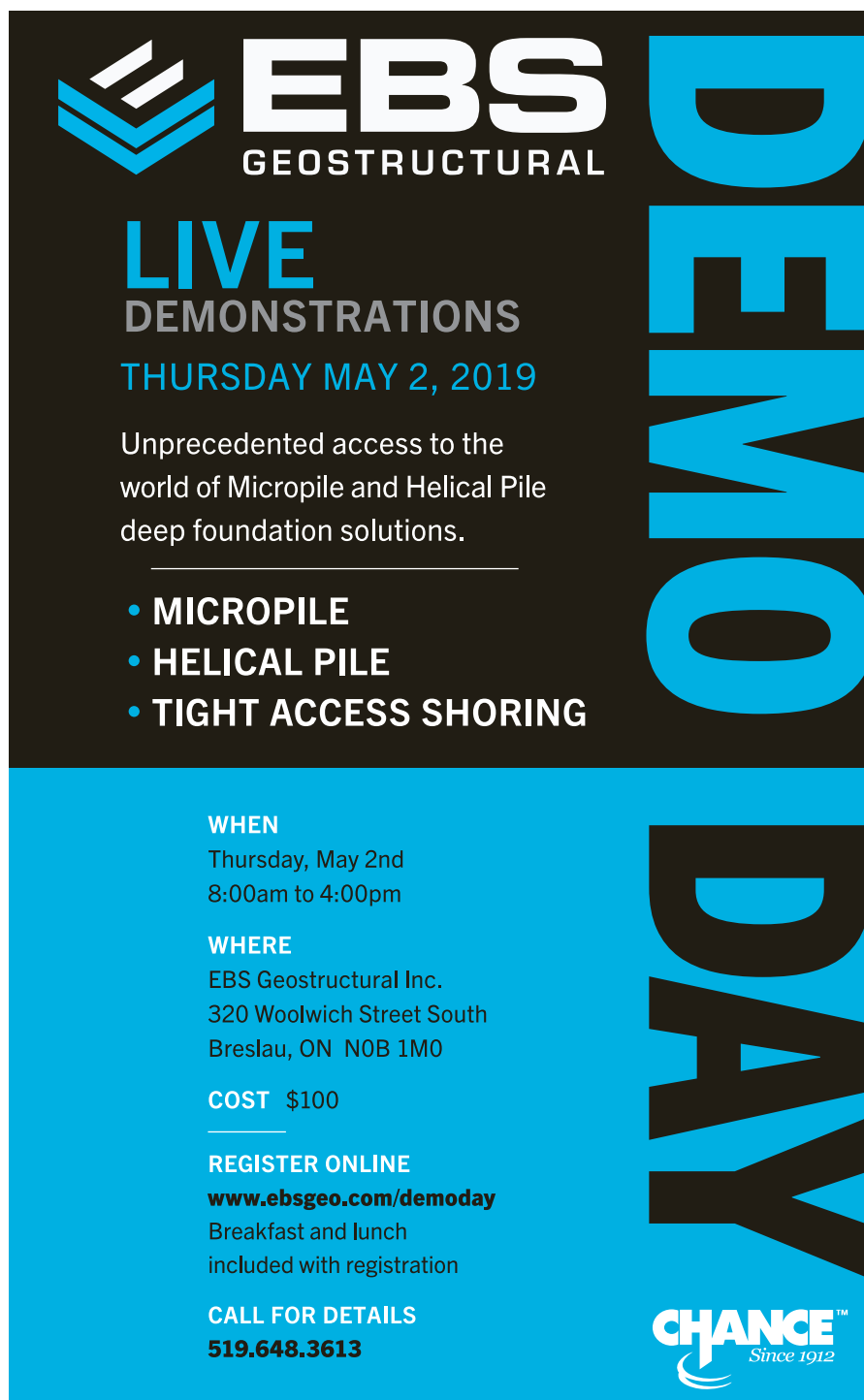
Share your experiences

Research assistants Natalie Mazur and Bronwyn Chorlton, working under Dr. John Gales at the Lassonde School of Engineering at York University in Toronto, are inviting all engineers working in industry to participate in a short 20-minute online survey about lived experiences in their engineering careers.

The goal of this research is to understand what contributes to the success of different genders in engineering careers, and to better support employees across all sectors of the industry.

If you are interested, please follow this link to the survey: https://cuhealth.eu.qualtrics.com/jfe/form/SV_9ELGbbbrDNnI91MV.

The deadline for participating is May 31st, 2019.



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Ensuring consulting engineers are heard



ACEC has demonstrated leadership and credibility on a number of issues that are important to our industry and the long-term well-being of Canada, resulting in recognition of ACEC as a trusted stakeholder by national policy influencers and decision makers. With a national election coming this fall, the ACEC Board and staff are developing a strategy that will leverage our reputation to position our key objectives within the platforms of all the parties.

One area that will be featured is the resource sector, which has become politically contentious. Our message on this front will continue to highlight the enormous economic opportunity in accessing Canada's natural resources and transporting them to market, and how consulting engineers can help the resource sector be economically viable as well as socially and environmentally responsible.

This message will further showcase how a national infrastructure corridor would be a catalyst to investments in our natural resource sector, making it easier and more economically viable to move resources to market, while con-

necting northern and remote communities to the vital infrastructure that most Canadians take for granted. This is an initiative in which ACEC has shown leadership and it is an issue that I am personally very excited about.

Finally, we will continue to promote the use of Qualification Based Selection (QBS) as the procurement method of choice for consulting services as engineering is not a cost to be minimized, but rather an investment to be leveraged. We will showcase the Public Services and Procurement Canada pilot, launched this summer as a result of ongoing lobbying by ACEC, that is using true QBS for two major projects with more to follow. Major provincial and federal agencies are hearing this message and looking at QBS as a viable alternative to the procurement of consulting engineering services.

These are just a few examples of ACEC's efforts leading up to the 2019 federal election. We will continue to leverage ACEC's reputation to ensure that all parties and their platforms recognize the important contributions of our industry to Canada's success.

MICHAEL SNOW, PENG., ING., M.A.S.C.
CHAIR, BOARD OF DIRECTORS, ACEC-CANADA

Faire entendre la voix du génie-conseil

L'AFGC a fait preuve de leadership et de crédibilité dans un certain nombre de dossiers importants pour notre industrie, qui contribuent largement au bien-être à long terme du Canada. Ainsi, les influenceurs et décideurs en matière de politiques nationales considèrent l'AFGC comme un intervenant fiable. En prévision des élections qui auront lieu cet automne, le conseil et le personnel de l'AFGC sont en train de préparer une stratégie misant sur notre réputation afin de positionner nos objectifs clés dans le programme de chaque parti.

Cette stratégie mettra notamment en valeur le secteur des ressources naturelles qui est un sujet controversé sur le plan politique. Sur ce front, notre message continuera d'insister sur les débouchés économiques énormes associés à l'accès aux ressources naturelles du Canada et à leur transport vers les marchés. Il mettra aussi en évidence que les ingénieurs-conseils peuvent aider le secteur des ressources à être viable sur le plan économique et responsable sur le plan social et environnemental.

En outre, ce message démontrera en quoi un corridor d'infrastructure nationale permettrait de stimuler les investissements dans notre secteur des ressources naturelles. En effet, ce corridor faciliterait le transport des ressources vers les marchés et le rendrait plus viable sur le plan économique. De plus, il permettrait de relier des collectivités éloignées, notamment dans le Nord, à une infrastructure vitale con-

tribuant largement à la qualité de vie de la plupart des Canadiens et que ces derniers tiennent pour acquise. L'AFGC a fait preuve de leadership dans ce dossier, et c'est une question qui, personnellement, m'intéresse tout particulièrement.

Enfin, nous allons continuer à promouvoir la sélection basée sur les compétences (SBC) comme méthode d'approvisionnement de premier choix dans le domaine du génie-conseil. Nous mettrons notamment en évidence qu'il ne faut pas chercher à économiser sur les frais de services-conseils, mais plutôt les considérer comme un investissement à optimiser. L'été dernier, dans la foulée des pressions exercées par l'AFGC, Services publics et Approvisionnement Canada a lancé deux importants appels d'offres qui mettront à l'essai la SBC. Les principaux organismes provinciaux et fédéraux ont reçu le message et se penchent maintenant sur la viabilité de la SBC dans le cadre de l'acquisition de services de génie-conseil.

Il s'agit là de quelques-uns des efforts déployés par l'AFGC en prévision des élections fédérales de 2019. Nous allons continuer à miser sur la réputation de l'AFGC pour veiller à ce que tous les partis reconnaissent dans leur programme les contributions importantes de notre industrie à la réussite du Canada.

MICHAEL SNOW, PENG., ING., M.S.C.A.
PRÉSIDENT, CONSEIL D'ADMINISTRATION, AFG-CANADA

IN DISCUSSION

with

ACEC

When addressing the delegates of our national leadership conference last October, you stated that the government must remain conscious of the ways it can have a real impact on improving the lives of Canadians, and that the work of engineering professionals are the 'drivers of this,' can you expand on this notion?

Engineers are vital to the conception, construction and completion of infrastructure projects — you help change the face of Canadian communities from coast to coast to coast.

Our Government recognizes not only the contribution you make in executing these projects, but how your expertise has the capacity to help our communities reach their full potential. You bring together technology and infrastructure to push the boundaries of these projects.

The work being done to complete major projects such as the new Samuel De Champlain Bridge in Montreal, Quebec and the Gordie-Howe International Bridge in Windsor, Ontario will



Minister of Infrastructure and Communities, the Honourable François-Philippe Champagne, speaking at the ACEC national leadership conference in Ottawa, October 2018.

In Discussion with ACEC is a series of informal conversations with Federal Government decision makers who have an impact on the consulting engineering sector.

During these interviews, ACEC-Canada President and CEO John Gamble delves into the government's policies and programs to gain a first-hand understanding of its long-term vision on the issues and challenges that touch the sector. The following is a brief Q&A with the Honourable François-Philippe Champagne, Minister of Infrastructure and Communities, with an update on the government's infrastructure plan.

not only strengthen our economy but also create thousands of new jobs for residents of those communities. We're now in the final stages of the new Champlain Bridge, and have broken ground on the Gordie-Howe Bridge.

While these projects are two of the largest in North America, we also know that smaller projects can have big impacts on communities. Since being named Minister, I've travelled to communities across Canada to see the impact of federal funding.

Across the country, thousands of projects are underway every day. That's in no small part to the work of engineers — and the work that we've accomplished so far shows what we can achieve when we work together.

ACEC has long been a strong supporter of a northern right-of-way that would connect remote communities to vital economic and quality-of-life enhancing infrastructure (e.g. power, communications, road and rail). Where does investing in northern infrastructure and enabling access to vital economic opportunities fall within your ministry's mandate?

Investment in Canada's north is a priority for our Government.

Canadians living in rural and

northern communities have unique needs. Access to better roads, faster, more reliable Internet services as well as reduced dependence on diesel fuel can strengthen communities and improve the quality of life of all Canadians living in northern communities. That is why our plan includes \$2 billion in dedicated funding for rural and northern communities.

We've also increased our level of support for projects in these communities, including providing a larger share of federal funding for projects that are cost-shared with the territories and Indigenous communities. As well, to support small communities with populations under 5,000, the share of federal funding for every project that is cost-shared with provinces has increased to 60%.

We also introduced the Arctic Energy Fund, which will invest an additional \$400 million to help address energy security in the territories, including Indigenous communities.

We're committed to working closely with provincial and territorial government to give northern communities the support they need to prosper and thrive.

We were very pleased with the announcement of the funding that was to be invested into Canada's infrastructure and



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the subsequent bilateral agreements that were developed but have been concerned with the delay in the delivery of these funds. What is your ministry doing to ensure the timely delivery of the infrastructure investments that were promised by the government?

Our Government works closely with the provinces, territories, and municipalities, as they own 98% of the core public infrastructure and know best what they need for their communities to be successful and sustainable.

The majority of our programs are cost-shared with other orders of government. Our funds are available to provinces, territories, and municipalities to support the projects that they want for their communities. Once projects are approved our partners can begin to invest immediately.

Our funds are structured in such a way that money flows from Infrastructure Canada based on requests for reimbursements.

We know that across Canada, even though we have not yet received claims for reimbursement of the costs, construction is underway, and people are benefitting from job opportunities.

We have been working to improve our payment processes over the past few years, and the bilateral agreements provided another opportunity to make further improvements.

In October 2018, we launched a pilot project with Alberta, Nova Scotia and Saskatchewan to test the effectiveness of the new progress billing approach.

Progress billing means that we will make payments to provinces and ter-



Minister of Infrastructure and Communities, the Honourable François-Philippe Champagne, engages in a discussion on infrastructure with ACEC President and CEO John Gamble at the ACEC national leadership conference, October 2018.

ritories based on project progress information provided to the department. It will result in payments that better align the flow of funds to construction activities.

Our government recognizes the realities of communities across Canada in delivering on infrastructure projects, and we are responsive to the needs of our partners.

Could provide us with an update in regards to major investments made by your government and ongoing projects across the country affecting the daily lives of Canadians in cities and rural communities?

We have put in place an ambitious and historic plan that will provide more than \$180 billion over 12 years. It's a key element to Canada's economic success.

The Plan is supporting infrastructure in the areas that our partners told us were necessary to the health and sustainability of their communities: public transit; green infrastructure; social infrastructure; trade and transportation infrastructure; and rural and northern communities' infrastructure.

Under the Investing in Canada plan, more than 32,000 projects have been approved across 14 federal

departments, accounting for a total federal investment of \$19.9 billion, and nearly all are underway. Infrastructure Canada alone has approved more than 4,700 projects.

That support has seen almost 1,200 public transit projects funded. With over 6,700 new and refurbished buses are on the roads and over 87,000 new seats for commuters, Canadians can get to their destinations more efficiently, while supporting a low carbon economy.

Our efforts to invest in water and wastewater projects also contribute to cleaner environments and healthier communities. Over 2,300 water management projects have been completed or are underway all over Canada.

Finally, to ensure we're equipping our local and national economies with the tools needed to keep up with global growth, we've invested in over 2,000 kilometers in road upgrades, helping business grow and creating more middle-class jobs.

The Investing in Canada Plan is working to build infrastructure that communities rely on that provide Canadians with new opportunities and enhance our quality of life.

To view more of our In Discussion with ACEC series, please visit www.acec.ca/indiscussion



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By Dan Butler, P. Eng. • Contributors: Kevin Cassidy, P. Eng., & Mark Driscoll, BES, BArch

Building SMARTer

How can we build future-ready SMART buildings while accounting for the human factor?

Intelligent buildings have co-starred in many a science fiction film, for better or for worse. Whether a benign sidekick, an aspirational status symbol, or a villainous, self-sentient threat, we've imagined SMART spaces in myriad roles. But no longer are these high-tech buildings just a figment of our cinema screens.

They're here. And your clients want to build more.

SMART technology has become something of an umbrella term, with a vast array of applications. But in a buildings context, SMART means a structure that integrates intelligent design, infrastructure, multiple data inputs and previously disparate systems, aggregating these into a data-

base of useful information. This data allows owners, occupants and connected systems to create more engaging, more effective built environments—and ideally, to maximize the value and performance of every square metre.

We already have the technology. But while the pace of technological change is rapid, tech adoption is not unfolding at the same pace.

When it comes to SMART tech, the residential market is leading adoption while the commercial market lags. Pulling into the driveway to a home that turns certain lights on, turns down your daughter's music, and shuts off your sprinkler is no longer a hypothetical—it's mass mar-

keted. But most commercial spaces have yet to tap into the boundless applications of SMART technology in the public sphere. Here, we discuss how three pillars of public space are beginning to realize this potential and emerging trends that will become mission-critical in the buildings of the future.

Commercial

In the past, commercial buildings were tasked with a few performance criteria: power, water and sewage. Demand for Information Communication Automation Technology (ICAT)—often aptly termed the “fourth utility”—is a relatively recent development. Effectively meeting that

demand is now a market imperative.

Today, tech infrastructure must be accounted for from the very outset. A well thought-out ICAT foundation is necessary for a modern building's success; gone are the days when these design considerations could be tacked on as an afterthought once the base building is complete. In fact, it's an emerging best practice to include information technology professionals at the very beginning of the planning process.

A SMART building is a high-performance building. It has a central nervous system to make real-time data sharing and analysis available to systems and human operators—the "brain." The systems can automatically make decisions or pass alerts and information to individuals who monitor and control each building function from a single converged network, so energy usage, security, HVAC, communications, lighting, elevators, fire safety and more are now an interactive one-stop shop. The user is now fully aware of how the space is utilized and can make interventions based on data.

In an office building this might translate to energy-saving measures: such as automatically turning off lights in unused spaces; enhanced user comfort, like cranking up the air conditioning in a crowded meeting room; and even enterprise savings on capital expenses such as real estate, since we now know exactly how often each area is occupied.

Those savings can have significant impact when operational costs per employee, per day run an average of \$3 for energy, \$30 for real estate, and \$300 for people. These systems can also allow for preventative maintenance. Based on real-time and historical data, the building systems can diagnose issues the moment they arise avoiding costly shutdown time and emergency service requests.

SMART buildings can also provide business ROI well beyond the basics of lower energy costs and occupant comfort. For one thing, sustainability metrics and LEED certification have become a competitive market differ-



A well thought-out ICAT foundation is necessary for a modern building's success; gone are the days when these design considerations could be tacked on as an afterthought once the base building is complete.

entiator and reputational asset. Premium commercial tenants demand it, and employees line up for it. Research from Deloitte on a landmark SMART office building in Amsterdam found that sick time declined drastically while job applicants increased, suggesting an enhancement to employer brand, talent attraction and wellness. There's also data to suggest SMART buildings increase employee productivity, boost collaboration and innovation, and increase talent retention.

Health care

If you've ever sat in an emergency room at 2 a.m., feeling absolutely rotten and straining to recall some obscure health history for the triage nurse, SMART hospitals may be your salvation.

Imagine a hospital that already has your health data accessible at a moment's notice, at every point of patient care. That is one standard the sector is pursuing, but it's only the beginning.

A truly SMART hospital isn't just about building systems, it's about tak-

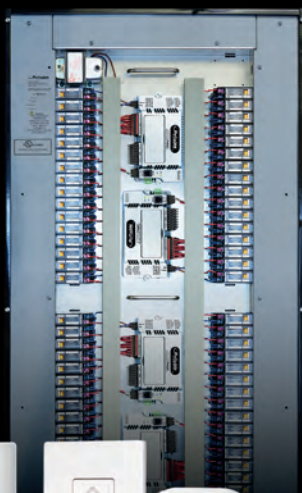
ing the administrative jobs clinicians perform and automating them to free up time to concentrate on patient care and improve accuracy.

In Canada, there is a marked shift toward automation, Internet of Things (IoT) devices, and robotics in the public health-care system. These measures can help optimize patient outcomes and minimize errors; in fact, doctors who used AI to assist with treatment decisions improved patient outcomes by nearly 50%, according to one Indiana University study. Additionally, if health-care professionals can measure and track different patient care metrics, it's easier to learn from mistakes and continually improve treatment.

Many hospitals are also using real-time locating systems (RTLS) to provide tracking and management of medical equipment, staff and patients. These systems usually use sensors, which are attached to the tracked assets and integrate with other IoT devices. Sensor accuracy is continuously improving, with some now able to pinpoint assets to the room, bed or even shelf where they're located. As

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you might imagine, this is very valuable for improving workflow, reducing costs through improved efficiency and improving staff and patient safety.

These tools can certainly help reduce human error, fatigue and miscommunication, among other risks, improving a patient's health outcomes. But they can also greatly enhance patient experience.

For instance, a pediatric patient from a rural area who's facing a long, isolating hospital stay in Toronto may be able to attend classes remotely and connect with friends and family back home. SMART hospital systems could be designed to not only improve care, but also improve connection and normalize the experience as much as possible.

Transportation

If you've taken a flight or public transit in a major city, chances are you've already interfaced with some elements of SMART transportation. SMART transit buildings and connected devices use IoT to communicate travel information like schedules, delays and alerts to users in real time, and these can serve as a critical operational and safety tool as well. SMART displays can also generate revenue via advertising and sponsorship.

Accessing travel info via digital signage or mobile apps is relatively common in large transit centres, but these SMART applications continue to evolve. New projects, such as WSP's Salesforce Transit Centre project in the San Francisco Bay Area, are also incorporating Bluetooth beacon systems to deliver more efficient and personalized services for visitors. The transit hub was also designed to enhance real time way-finding and provide wireless access at ticket gates. Data from the SMART systems can be used to predict staffing needs, send mass security alerts and ease traffic congestion, and integrate airport and airline operational demand loads.

Another WSP project, the Edmonton International Airport, enhanced passenger information systems, the

airport's operational database, Airline Check-in systems and security systems with two fully redundant data centres operating over a converged network to support all IP-enabled airport and building systems.

Future ready

Beyond the novelty factor and the "IT bling," SMART buildings have tangible impacts that, over time, can help us to conserve resources, reduce carbon emissions, adapt to changing environments, and improve wellness and quality of life.

Connected Cities USA. But SMART controls and connected devices could lower building energy consumption by as much as 10% globally by 2040, according to the 2017 United Nations Environment Status Report.

But as with any design, we must account for the human factor. The proliferation of this technology depends on human behaviour—namely, adoption and usage. Widespread adoption in the commercial and public spheres requires buy-in from many stakeholders, a significant upfront investment, allowing artificial



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Those who operate in these SMART spaces will also find increasing utility for their own IoT devices, resulting in enhanced consumer, patient and commuter experiences. On a broad, SMART-cities scale, we likely won't see this lean toward the mainstream until 2028, according to 2018 research by advisory firm Gartner. But individual organizations will evolve these capabilities rapidly from now through 2023.

Specific sectors like commercial, health care and transit are discussed here as early adopters, having a dramatic impact on daily lives well before the 2028 total-city convergence estimate.

Buildings currently account for 70% of energy consumption in major cities, and a full 30% of greenhouse gas emissions globally, according to

intelligence technologies to automatically implement actions, and allaying concerns around data security, cost-benefit analyses, and more.

Reaching critical mass will require a mindset shift from architects, engineers, integrators and builders, to counsel clients about the incredible value this technology provides.

SMART tech truly is a smart investment, both for individual business operations and for our collective future. But it's up to us to be ambassadors of that vision, and to cast SMART buildings in a new role: as pillars of a more sustainable future. **CCE**

Dan Butler, P. Eng., is senior director, telecom & technology, WSP Canada.

Contributors: Kevin Cassidy, P. Eng., head of healthcare, WSP Canada; and Mark Driscoll, BES, BArch., WSP Canada.

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Brilliant Resilience

Building smart cities, now

By Michael Sutherland

The world's greatest challenges—growing inequality, climate change, limited political leadership, and financial constraints—are telling us that we need smart cities. Now like never before.

So, what is a smart city, anyway? It's what you get when you use smart planning and diverse concepts to drive three critical, beneficial kinds of outcomes: commercial; environmental; and those for the broader population as a whole.

The standard (and still very applicable) prosperity-planet-people framework has unleashed our perception of what smart cities can and should be. The focus on health and wellness, including mental health, has expanded our thinking. So as we plan the next phase of our cities' development, we're aware that physical design and technology can be used to support diversity, creativity, intellectual stimulation, and true productivity. The

kind that includes health, happiness, household, and family life, as well as work. Not surprisingly, this wider-ranging, circular-economy thinking is driving more intense solutioning around the production and consumption of energy, water, and goods.

It's going to take the right combination of technology, good planning, and creativity to bring about productive, happy cities for people in the years to come. Technology will continue setting the pace as we incorporate more and better resilience and sustainability into the foundations and structures of our communities. It will be about services and conveniences that people have always wanted: easy and comfortable mobility; modern, safe amenities; and clean air, water, and spaces.

We've learned a lot about desirable living spaces since James Watt and the industrial revolution inspired people to leave their farms and head to the big city. Along the

way, there were some bad ideas, too. (Le Corbusier and Moses might top that list.) Now, digital technology allows us to take what we know about the past, combine what we're learning about our environment today, and use that knowledge to both predict and influence what the world will look like in the near future.

Urban resilience is about cities being able to withstand, or at least survive, future shocks and stresses. Not only earthquakes, but day-to-day wear and tear that strains and changes a city's socioeconomic systems, technical systems, and infrastructure. Planning for resilience can give cities the buffers and backups to manage and withstand climate change, with as good or even better structures and services.

But there's an even-better opportunity. With "brilliant" resilience, we can use smart-city thinking and technology to create benefits that probably wouldn't have a chance otherwise.

What's a city without its people?

Brilliant, resilient cities must be about the people who live, work, and play there. Putting people first goes hand-in-hand with greater productivity for economic success. It makes sense that healthier, happier people have stronger, more vibrant communities and more successful businesses.

Best practices in new, urban design technology—similar to those that my company, Hatch, is developing—are now factoring health and wellness into city design. The success of it will depend on how well we incorporate the principles of social engineering: purpose-built things that work for everyone; that provide the options and services people want and need; and that are supportive, sensitive, and responsive.

Working with our clients, we're envisioning and planning communities for the future. These new "nodes" will act as integrators—host places for work, for consumption,

for gathering, and for living. They will be serviced by effective, connected transportation hubs that are contemporary, efficient, and able to work at local and regional scales. These nodes will be fresh opportunities for city-building at scale; to find better ways to integrate energy, information, water, biology, and other systems to fully

leverage today's planning and technology capabilities.

Urban resilience in action

The platforms for smart cities are big and complex. They require intelligence and the right kind of engineering work to make them happen. One project that is incorporating brilliant,



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resilient, smart-city thinking is East Harbour in Toronto. Private-sector developer First Gulf and its partners are transforming a former industrial area on the edge of the downtown core into a new commercial hub and economic engine for the city. Starting with 10 million sq. ft. of commercial space, East Harbour will leverage smart-city conveniences and elements, a new transportation hub, and a high-density development, creating an opportunity to deploy best thinking for the future.

The East Harbour team is committed to exploring opportunities made possible by the scale of the district, such as weather-protected areas with connections to PATH (an underground pedestrian walkway system that links Toronto's financial core), a district energy system and an underground waste collection system.

Having its own transit hub is part of

a holistic strategy for moving people in, out and throughout the neighbourhood. The new East Harbour Transit Hub, anticipated to support more than 50 million riders a year, will integrate with the existing GO commuter transit line, the soon-to-come SmartTrack, the future Relief Line Subway, the future Broadview LRT and Queens Quay LRT, and multiple bus lines. It will also incorporate infrastructure to support multi modal options for getting to and from the hub, such as cycling, walking, ride share and car drops offs, autonomous cars and shuttles, scooter and e-bike options, etc.

What's really commendable is how First Gulf and its partners are working with all three levels of government to support integration and improve local infrastructure and technologies. As an example, flood-protecting these lands is part of the \$2.5 billion Port Lands

Flood Protection and Don Mouth Naturalization project scheduled for completion in 2023. This will protect 240 acres of Toronto real estate from damaging floods at the same time it integrates the land into a new, local, open-space system, the existing natural heritage, and regional parklands. These new neighbourhoods will soon provide all kinds of options for mobility, open spaces, park systems and amenities for nearby residents and Torontonians to enjoy.

The East Harbour project is adding perspective, knowledge, and evidence to support important decisions and discussions with stakeholders. First Gulf is also "smart phasing" it—doing it in pieces—with a master plan that establishes a vision and the primary network of supportive infrastructure, but allows for finer details to evolve over time. The community will be able to adapt to changing market conditions, needs, and technologies, and respond with agility to future opportunities and challenges.

Small steps, but critical ones

The smart city of tomorrow will include what we, the people who live there, demand. Imagine sensors on street lamps that communicate data on transit needs. Or contact police if they detect signs of crime or distress. How about drones delivering emergency medication? What if digital technology was embedded in roads, informing driverless, sensor-reading vehicles when to slow down, stop, or yield to public emergency vehicles?

Innovative technologies are already evolving in our cities. They're presenting us with endless ideas and opportunities for more brilliant, resilient cities and happier, healthier lives. It's just a matter of inserting ourselves in the process early enough to make the most of them.

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*Michael Sutherland is
Director Urban Solutions,
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SMART SOLUTIONS

Introducing software and hardware systems to connect city operations and empower citizens.

By Bruno Peters, P.Eng.

For decades, cities have been successfully leveraging technology for the benefit of their operations and their residents. With the more recent advancements in analytics and artificial intelligence, cities now have the potential to transform how we understand urban environments, as well as how we build and operate them.

Traditionally, cities—much like large institutions—have established planning and operating departments, such as water, waste water, transportation, and solid waste management, to name a few. Each of these departments has its own clear operational objectives and budgets to operate within. As new technologies have become more readily available, largely delivered by the private sector through a combination of hardware and software systems, departments have begun to leverage these for the benefit of their operations.

Water SCADA (supervisory control and data acquisition) and traffic signal systems are two commonly known examples of technology that improves safety and efficiency in city operations.

The City of Toronto, for example, uses BlueIQ, a large-scale intelligent water transmission control system, to effectively minimize water pumping energy costs while ensuring consistent service delivery standards.

Over a period of six months, 16 million kWh of energy was saved at a projected energy cost savings in the order of \$1.5 million/year. The only limitation has been that these systems often operate independently of, and without the data and information systems from, the other departments.

‘Smart City’ is a very popular term used today to broadly describe the ability of major cities to leverage data and connected technologies for the benefit of their residents. Private sector companies, including IBI Group, are building software systems such as the Smart City Platform that remove the barriers between departments by integrating data from various public sector departments and agencies and leveraging open data, analytics and artificial intelligence (AI) to drive better results.

Three of the top factors for the successful implementation of smart city software systems include:

1. Starting small and growing the capabilities beginning with the best use cases;

2. Breaking down silos through interdepartmental collaboration; and

3. Maintaining the privacy and trust of local residents.

Start small

Starting small means focusing on one or two specific departmental issues that are easy to quantify and explain. System developers must work collaboratively with department operations to ensure they understand the complexities of their function(s). This is typically done by focusing on one or two use cases to better understand how data from existing systems and related operations can influence operational decisions. Understanding the operations will allow for complex data sets to be layered into the platform through the use of analytics.

Operations and development teams might be surprised by what the data is showing at the outset, but through collaboration and an agile approach, a better understanding of the data can be achieved and adjustments can be made or new data be added to drive more value from the system. This typically will require working through some conversations that dig deeper into the operational reasons why “we have always done it this way.”

Starting small also means that existing proven systems are not intended to be replaced, but rather they are to be complemented in order to drive more value for the operation and residents. The key is to build upon the proven systems already in place.

Interdepartmental collaboration

Breaking down silos between departments and agencies seems like a logical thing to do, however changing decades of process and operating budget silos can be challenging. We have found through developing smart city strategies as well as Smart City Platform implementation work, that it is critical to find a champion who can be the bridge between operations and senior leadership. Most departments understand the benefits of the smart city approach but are unable to find a way to make the funding work.

Typically, one department will have to take a larger risk to demonstrate the benefits and through senior leadership

can unlock additional funding that in the long run will reduce costs for the organization while improving outcomes for residents.

Many cities now have smart city departments or departments of innovation who are mandated to help with this process. Starting with one departmental champion who can understand the goals and outcomes that the City is trying to achieve, allows for measured results to be shown. Additional champions from other departments can be brought into the initiative to build on the previous successes and grow the smart city strategy for the City.

In order to move through this continuum, it is important to work with City staff to understand and address the change management required. This means staying close to the operation, helping with change management strategies, maintaining ongoing dialogue, and also being agile enough to address and adapt to new challenges.

Maintaining privacy and trust

In today's smart cities, we have the benefit of being able to leverage data from many new sources that previously have not existed. The Internet of Things is allowing for the rapid deployment of low cost sensors to track environmental data, traffic, and people movement, just to name a few.

Cities have also deployed systems for better engagement with their citizens and to track complaints or operational challenges, such as potholes, safety and graffiti.

While these data sets can be extremely useful for smart city platforms, analytics and city operations, we need to be extremely diligent on how privacy is maintained.

There are federal and regional regulations that govern privacy and confidentiality including data collection, protection, use and disclosure. It is critical that these regulations are followed, starting with initial and ongoing privacy impact assessments as projects evolve, including triggering of assessments as new data sources are brought in.

Cities should have a process established to identify the need for and manage these assessments. It is also important to maintain communication and dialogue with residents to ensure that you are establishing and maintaining trust, in addition to meeting the regulatory obligations.

Realizing the vision

We are now in an age of information and technology that can improve our lives beyond the traditional approach of building large-scale infrastructure projects. Our cities can have smart infrastructure and operations that benefit residents and have a positive impact on our environments.

If we approach the opportunity in a measured way that is collaborative and respectful, our smart city solutions can realize the vision that our residents are setting for cities.

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Bruno Peters, P.Eng., is IBI Group Smart Cities Task Force Lead & Deputy Regional Director, Canada West.



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Throughout 2019 *Canadian Consulting Engineer* explores the topic of diversity in the industry through a series of articles called Point of View; stories designed to get readers thinking about their profession, their day-to-day workplace and maybe seeing their surroundings through a new lens.



TIPPING POINT

A Queen's University graduate with a degree in metallurgical engineering, Annette Bergeron has over 30 years of work experience ranging from industry and academic administration to specializing in executive leadership and governance. She has been involved in the engineering association world since 2002. Following leadership positions with the Ontario Society of Professional Engineers, Bergeron was elected as the sixth female president of Professional Engineers Ontario (2013-2014), and having served on the Engineers Canada board as a director since 2014, Bergeron is now mid-way through her 2018-19 term as president.

Annette Bergeron, MBA, FCAE, FEC, P.Eng., president, Engineers Canada and principal of Bergeron Consulting

Following university, what was your entry into the engineering industry?

I spent the first decade of my career working in steel making as a production engineer. So I was wearing a hard hat and steel toes everyday for 10 years. It was a great education and a great experience. I enjoyed it. But it did have its challenges.

Did you have women mentors in those days?

I did not have a mentor, or a sponsor, and that's probably one of the contributing reasons

why I eventually left and did an MBA. I didn't see my career progressing like my male colleagues who were being hand picked. I could really see how they were being coached and developed in their careers, whereas I wasn't.

Engineers Canada's 30 by 30 initiative, seeking to achieve 30% of newly-licensed engineers in Canada to be women by 2030, has been active for about five years, how has the campaign been developing?

Because Engineers Canada is a support organization for the 12 regulatory bodies across the country, the first thing we did was reach out to the regulators and said, "If you want us to do this with you, then you each need to appoint a Champion within your organization."

And then we extended the reach to higher educational institutions (HEIs) nationally, and now we're starting to get other associations to sign up. Recently ACEC-Canada signed on as an official Champion (and a shout-out to Todd Smith as being ACEC's Champion).

So now we have close to 40 Champions across Canada, and a couple times a year we bring the representatives together, either in

person or by teleconference, to discuss strategy, status, and measure the metrics.

In our next phase we need to begin enlisting more engineering employers to become Champions.

What is the trend of women in engineering?

In the past decade the number of women in the profession has grown. If you go back to 2006 there were between 12- to 13,000 practicing engineers in Canada who were women. That grew to just over 26,000 by 2016.

And if you look at university enrolment, from around 2008 it has grown about 1% per year. But there have also been more men entering engineering as well, so the overall volume has grown, but the percentage hasn't changed.

There are more women graduating. Current undergraduate enrolment at accredited universities across Canada is 22% women—that data is as of end of 2017.

Now, newly-licensed engineers nationally are 17.9% women. So really, the difference when you look at 22% enrolment and 17.9% newly-licensed, it's not that huge of a gap, but it shows there is some leakage in the pipeline.

It's 2019; does it seem possible to reach 30% newly-licensed females in just over 10 years?

A recent task force report indicated that if we did nothing—implementing no strategies and

we just let the numbers continue to rise passively—we might reach 25% by 2030. So we have some work to do.

Our target now is attracting high-school age girls. Considering it takes four years of university and four years to get your license, that's eight years, so really we're looking at girls in grades 9, 10 and 11, those are the women we'll be licensing in 2030.

One of the biggest barriers right now is getting female high school students to take physics, because physics in grades 11 and 12 is a prerequisite for engineering in university. So one of the challenges in our strategy is how do we address this physics problem?

And then we're looking at the regulators to help us with retention after university graduation. How do we get women to become EITs and register with their regulator? How do we make sure they can get engineering jobs and ensure there are no barriers on the road to achieving their license.

Will you be satisfied with 30% by 2030?

At Engineers Canada we have discussed this. Thirty percent is a milestone, but let's bear in mind that we'd like to reach gender parity, much like the law and medical professions.

Those professions are in the high 40s, and they still have their challenges in the work place. But these professions are also more in the public eye. There are a lot of television shows about law and the medical professions with women in high places. We need engineering programming, although I'm not sure anyone would watch it—maybe on Netflix.

What is the vision beyond 2030?

Engineers Canada has launched a new strategic plan with four strategic priorities, and one of them is building on 30 by 30 and expanding it. We're calling it: Recruitment, retention and the professional development of women in the engineering profession.

So we're taking the 30 by 30 work, which is specifically focussed on newly-licensed engineers, and expanding it to women who already have their license, and what can we do to support them in their careers and keep them.

How about getting women into leadership positions in industry?

Absolutely, and that's where the professional development part of our strategic priority

Thirty percent is a milestone, but let's bear in mind that we'd like to reach gender parity, much like the law and medical professions.



We all have unconscious bias, every single human does ... it's something that's maybe ingrained in our childhood, and we have to consciously change our behaviour.

comes in. How do we keep women enjoying their careers, continue practicing, have mentors and sponsors and develop them into leaders and ultimately into role models.

There's the expression, "If you can't see it, you can't be it." So we want visible female role models.

Where do you feel the stumbling block is for women moving up?

As I mentioned, having an active mentor or sponsor helps, you really need someone. Your engineering education doesn't 100% prepare you for the workplace. The best career advice is to find yourself a mentor; it can be a man or a woman in the workplace.

Also, there is unconscious bias, gender bias, in how companies recruit women and how they promote them.

Employers need to be aware and create enjoyable and welcoming workplaces where discrimination and harassment is not tolerated.

No matter how subtle, it really can change how an employee enjoys their work day to day.

How do you get momentum rolling in this area of upward mobility for women in industry?

I mentioned that we want to get employers signing on as Champions of the 30 by 30 initiative. We really need to get the employers on board for that piece of the pipeline.

And I know, firms are busy, they're focused on the bottom line, and how much time and energy do they have to spend on 'Women in Engineering'? But it's important.

The best example may be remembering safety in industry. Safety was a dirty word 20 years ago. Companies complained they didn't have the time for it, nor the money. And nobody could see the benefits of a safety protocol or system within their companies.

Today it seems obvious to everyone. For some firms safety is one of their number one objectives, and they can see how it impacts their triple bottom line. I think it's going to be the same thing with diversity in the engineering workforce. It's going to follow the same path as safety.

Can you explain how diversity helps improve a company's bottom line?

There's a lot of research that shows that women on boards of directors of Fortune 500

companies have improved the performance of the companies, and the same thing with the overall diversity of the employee mix.

You get more creativity. More ideas and innovations emerge from diverse perspectives than from a homogenous group of individuals.

Women are 50% of the population, and there are more and more in the workforce, so why would you not want a leadership team that represents what society looks like and get views from all of society.

Is having 30% women in the engineering industry going to make a difference?

The reason we chose 30% is because it's a critical mass number. You can see it in chemical reactions—it's a technical research number. It's a tipping point.

So if you have one woman on your board, or one woman on your team, and say, "My job is done, I have a woman." It's not enough. She's going to be isolated; she's viewed as a token, and no one is going to listen to her. But if you have three out of 10, it's a critical mass and change happens.

Have you seen that in action?

Absolutely. When I'm the only woman in the room it can be disheartening, and I think it's the same for minorities—you look around the room and everyone looks the same and you look different. It's only human nature, and it's still happening today.

Sometimes your opinion isn't really heard, but if the person next to you says the same thing it suddenly becomes a good idea (and you think to yourself, 'I just said that').

Just getting people to take you seriously and to really listen is a challenge.

We all have unconscious bias, every single human does. And it's just setting aside those filters in your mind, where you might subconsciously think: "Oh, the woman at the table is talking now, I don't really have to listen." It's something that's maybe ingrained in our childhood, and we have to consciously change our behaviour.

Do you see that change coming?

Yes, and I'm very excited. It's been a lifelong endeavour for me. I always say, I'll be able to rest on my deathbed when we reach 50% women in engineering. Which should see me living beyond 2030.

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www.siemens.com



Pfannenberger's PKS Series air-to-air heat exchangers are designed for indoor, outdoor, remote and washdown applications to protect electronics. It's designed for cooling industrial electrical and IT components that need dust

protection and for keeping rain and dust from sensors and drives on outdoor systems. The system reduces the energy, maintenance and footprint of traditional enclosure cooling units.

www.pfannenbergusa.com

HVAC



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armstrongfluidtechnology.com

Aircuity has enhanced its indoor environmental quality (IEQ) sensing approach including MD100 Tubing, a plenum rated, cost effective, MicroDuct tube for multi-parameter sensing in healthy building applications. It allows for precise capture and measurement of VOCs and particles in addition to CO2 and carbon monoxide levels, as required by a growing number of certifications like WELL.

www.aircuity.com



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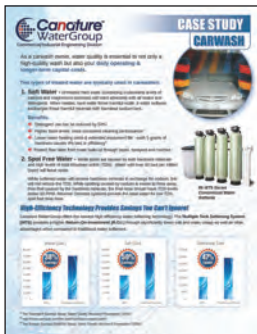
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Talking Smart Mobility

One of the challenges with planning for a smart city is unraveling how transportation systems will evolve. Daniel Haufschild, a principal with Arup, leads the firm's integrated planning practice in Canada. A professional planner with over 20 years experience working in both the public sector and private practice, Haufschild recently posted an article entitled 'The end of the beginning: Transformation in mobility'.

We spoke with him to hear what direction he sees transportation taking in the near and distant future.

You've written: "mobility is in the midst of major period of change—one that will drastically transform cities." What were you referring to?

I refer to it as 'new' mobility, which is the combination of the range of options we currently have with the confluence of new technology (digitization, mobile apps, automation) along with user expectations and new business models.

About three years ago I started to see these changes, where mass transit services were on the cusp of disruption. The early sign of that was with Uber disrupting the taxi. There was nothing really new, it was still a driver and a car, but it was using technology to give a better value proposition.

Yet you note that Uber still isn't profitable, and that's a problem.

Yes, they don't have a sustainable business model yet. Will automated vehicles get them over the hump, maybe? Most tech companies with transportation-related apps are trying to achieve a scale to become sustainable.

They're starting to think about selling data and/or advertising, but nobody's quite there yet. To me, there's going to be a shake out in the next year or so.

My new thought is that the laws of physics still apply. Technology can

lower your costs and make processes more efficient, but it's not fairy dust.

Will connected autonomous vehicles (AVs) be the ultimate disruptor for mobility in cities?

There's a vision where ride-hailing AVs would allow us to have vehicles circulating all of the time. We'd have an optimized system, so you can increase the capacity because everything is in sync.

In the last year or two, we're realizing that Uber is actually adding to traffic, not taking away. The same thing could happen with AVs, if they're not coordinated they're just going to clog up and you'll have more congestion.

Everything comes back to how we're managing and governing the system. So just because you have automation, it doesn't solve your problem.

How far away are we from AVs roaming city streets?

I believe it's going to be a lot slower than the technology companies would like, but a lot faster than the rest of us think.

It will require user acceptance, both for how people react to car ownership and how governments will regulate, but to me the business models that will make them economically viable are the most critical and the ones that are least resolved.

What needs to be resolved about AVs?

One of the big questions is: Are we going to have personal ownership or fleet? Historically, people love their cars. But I think we're actually going to move to a fleet model.

It's partly because AVs are becoming technology platforms, so they'll become too expensive to own. I think we're going towards fleet instead of personal ownership because of the underlying business model.



What is the mobility as a service (MaaS) model?

It's really a user-focused model of mobility. It's using technology to stitch together all of your options and presenting it in a way that's valuable to the user. Whether it's bicycle sharing, car share, Uber, mass transit (buses, trains) etc. You have a full set of options, but then you also have intelligence and pricing services in an app to help you make choices that fit your particular needs.

Are these systems ultimately public services or private?

I think it can be a mix of public and private, the big thing that I've been pushing is a need for government to set a framework and set expectations around types of services, integration, accessibility, and privacy.

Smart cities and smart mobility is really about solving real people's problems. Uber, for example, is elegant in its relative simplicity, but the one piece that isn't fully realized is the knock-on effects on the entire community. It works really well for some individuals, but as a society we haven't quite fully fleshed that out.

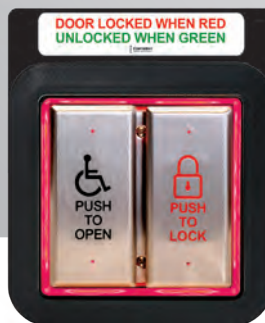
The private sector tends to drive the individual solutions, and it's the city's responsibility to make sure they all work for everyone.

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PROJECT SUBMISSIONS

Do you have a project using sheet steel that you would like to see in *Steel Design*? The editor welcomes submissions of completed buildings – commercial, institutional, industrial, recreational and residential – using components made from steel, including cladding, steel decking, light steel framing, steel roofing, steel doors, steel ceiling systems and steel building systems. Please send a description of the project, including photographs, to:

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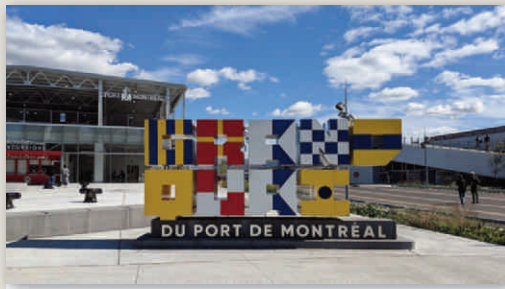
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COVER PHOTO: Grand Quai – Port of Montreal, Montréal, Québec
PHOTOGRAPHER: David Boyer



transforming
tomorrow



thus providing a very favourable impression to arriving cruise passengers. The pier is now named Grand Quai du Port de Montréal.

6 Fox Lake Cree Nation School, Gillam, Manitoba

The building massing utilizes stepped, sloping roofs which avoid valleys and the possibility of water or snow coming down on entry points. The high gymnasium volumes act as a backdrop to the rest of the building and the curved roof edges soften the school's rooflines and add a dynamic sense of movement.



9 Wolfville, Nova Scotia Library

In 2017 it was determined that the original shingles on the railroad station, now the Wolfville Library, had reached the end of their service life. FMB Architecture | Design, the architect chosen for the re-roofing, elected to use a diamond shape roof tile made from ArcelorMittal Dofasco's pre-painted AZM150 Galvalume® steel in the Granite® Deep Mat paint system.



10 Menlo-Atherton Performing Arts Center, Atherton, California

With a mission to bring music and drama to the surrounding community, this performing arts building, located on the campus of an arts-oriented high school, features broad, overhanging eaves designed to complement existing low-slung classroom buildings. A simple standing seam roof, draped over an assemblage of functional elements provides a single reading of these complex functions while diminishing the mass of a 21.3m (70 ft.) tall fly tower.

14 Certification of Canadian Manufacturers of Lightweight Steel Framing (LSF)

As of January 1, 2019, certification is a requirement for membership as a CSSBI Light Steel Framing (LSF) Manufacturer Member. It is also a requirement for a company to use the LSF load tables currently being developed. The CSSBI believes that this initiative will be an advantage for the Canadian construction industry.



18 Green Storage, Hamilton, Ontario

Significant challenges were experienced in turning a structure that was built 100 years ago into a state of the art energy efficient building that will be NET ZERO on electricity and heating/cooling.

IN | THIS | ISSUE

3 Grand Quai du Port de Montréal, Québec

Provencher Roy restored the old Alexandra Pier and transformed it into an exceptional river walk, which was integrated into the existing pedestrian network built up over the past few decades along the side of the Saint Lawrence River. The Iberville Passenger Terminal, built in 1967 on the pier, was also completely renovated with modern facilities,



16 Design Versatility, Ease of Installation and Resilience

Steel is used in everything from industrial to iconic structures and is particularly suited to mid-rise construction, where turnkey framing solutions for virtually any type of residential or commercial building project are available.



Pre-painted Galvanized Steel Insulated Steel Panels complement revitalized Terminal 1

Ideally located on the St. Lawrence River, Montreal's Old Port is renowned for its walking and cycling network, along with free public spaces with spectacular views of the river and of the city skyline. This project, completed in 2018, the Port of Montreal's Grand Quai, adds to this network and showcases an insulated steel panel exterior envelope solution on the buildings.



At the entrance to the Grand Quai is the Port Centre, with a conference room and a permanent History of Ships exhibition.

In 1967 the Iberville Passenger Terminal, or Terminal 1, was constructed on a 305m x 91m (1,000 ft. x 298.5 ft.) pier for receiving cruise ship passengers. Parallel to it was a parking structure, or Terminal 2. They extend nearly the entire length of the pier.

A project to renovate the entire cruise ship terminal was launched in 2014. The parking structure, which covers 7,500m² (80,730 sq. ft.), was renovated. The contractor first removed the second story of Terminal 1, then demolished



a building at the entrance to the pier and sloped the far end of the pier so that both pedestrians and cyclists could easily descend to the water's edge.

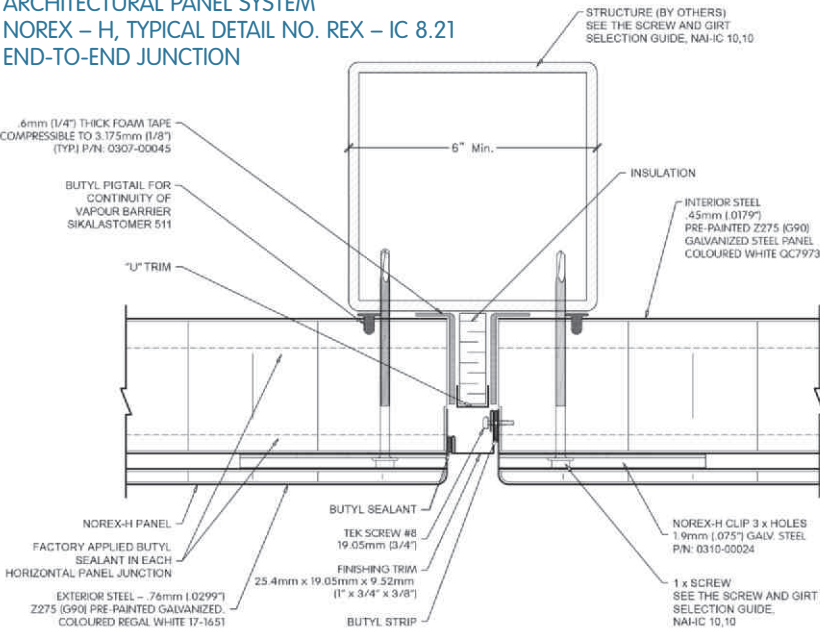
A Port Centre was built on the site of the demolished building and is connected to Terminal 1. Terminal 1 was rebuilt on one level and a Pavilion was built onto the far end of the structure. Provencher_Roy specified Norex-H, 76.2mm (3") thick, insulated steel panels, manufactured and supplied by Norbec, for the exterior of the 8,150m² (86,708 sq. ft.), Terminal 1, Port Centre and Pavilion.

Each panel measures 760mm by 4,825mm (30 in. x 15.8 ft.). The exterior is pre-painted .76mm (.0299") Z275 (G90)

galvanized steel, with a fluoropolymer paint system, coloured Regal White 17-1651. The interior surface is .45mm (.0179") Z275 (G90) galvanized steel, pre-painted with Interior White QC7973. A total of 2,350m² (25,295 sq. ft.) of Norex-H was used.

"The building is very long. This kind of product works well to cover long surfaces without windows and doors. It has a geometry that works well in the context of a maritime station," says Sonia Gagné, Partner and architect with Provencher_Roy. "It is economical, rapid to install and the panels marry well with a simple building volume. The horizontal modules emphasize the linearity of the building."

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PRODUCT USED:
Norbec's Norex-H, pre-painted Z275 (G90) galvanized steel panels. Panel thickness: 76.2mm (3")

INTERIOR STEEL	EXTERIOR STEEL:
• .45mm (.0179")	• .76mm (.0299")
• Colour: White QC7973	• Colour: 17-1651 Regal White
• Profile: Silkline (striated)	• Profile: Silkline (striated)
• Finish: Smooth	• Finish: Smooth

DESIGN AND CONSTRUCTION TEAM

BUILDING OWNER:	Port de Montréal
ARCHITECT:	Provencher_Roy 514-844-3938
INTERIOR DESIGN:	Provencher_Roy Design intérieur 514-844-3938
CONTRACTOR:	Pomerleau 514-789-2728
STEEL WALL PANEL SUPPLIER:	Norbec Inc. 877-667-2321
STEEL WALL PANEL INSTALLERS:	Le Groupe EFC. 418-878-5660 and RHR Revêtement 450-359-4192
STRUCTURAL STEEL SUPPLIER:	Groupe C. & G. Beaulieu Inc. 450-653-9581
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LANDSCAPING:	NIP Paysage 514-272-6626
STRUCTURAL ENGINEERING:	NCK Inc. 514-878-3021
MARITIME INFRASTRUCTURE:	WSP Group 514-340-0046
CIVIL ENGINEERING:	WSP Group 514-340-0046
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Norex, is a polyurethane core panel which offers unparalleled thermal value. It provides fire and rain protection barriers as well as ensuring resistance against wind and tears because of its exclusive anchoring system, when installed. The design of this product is cavity free and has a thermal barrier, reducing the risk of condensation penetration and in return moisture.

Norex H insulated steel panels being installed on the light steel framing of Terminal 1 and on the Pavilion of Grand Quai.

Redesigned and renovated, the Port of Montréal's Grand Quai receives cruise ships and welcomes local pedestrians and cyclists to a waterside park in this beautiful, historic area.



Pre-painted Galvanized Steel – perfect for Wall and Roof Cladding

Number Ten Architectural Group has a long history of working in remote areas of northern Canada. In particular, the Winnipeg-based firm's academic buildings have enriched the educational and recreational quality of life for indigenous communities. Pre-painted Z275 (G90) galvanized steel was chosen for the wall and roof cladding for its durable and non-combustible properties.

The Fox Lake Cree Nation School is located in the town of Gillam, a semi-rural community in Northern Manitoba. The 1,349m² (14,520 sq. ft.) elementary school accommodates a student population of 65 (town population 1,300), as well as a high school re-entry program and adult education. The school's modest scale and low-slung roofs create an intimate setting for students, staff and visitors alike.

The mandate called for a flexible design that would allow for community use of the facility during both school and non-school hours for continuing education programs, recreation and social events. The building's compact plan utilizes a "corridor loop"

around a central core and two sets of lockable, interconnecting doors. Designed as a 'house within a house', the central core comprises washrooms, Principal's office and Administration spaces. Clear sightlines across gathering spaces and through interior windows promotes interaction between students and staff, while fostering a sense of security. The centrally-designed layout and flexible programming allows visitors access to the Library, Computer Room and Gymnasium, while leaving the classrooms undisturbed.

While the interior features warm colours and natural materials, the exterior also features a simple palette.





The high gymnasium volumes act as a backdrop to the rest of the building and the curved roof edges soften the school's rooflines and add a dynamic sense of movement.

Pre-painted steel was selected for the wall cladding and roof for its durable and non-combustible properties, particularly in an area where forest fires are a concern.

Additional benefits include its lightness, range of colour options and ease of transport and installation – especially valuable given the location 1,000km (621 miles) north of Winnipeg and 200km (124 miles) south of Churchill.

Gillam's subarctic climate, with average January lows of -30°C, presented unique challenges, which the architects mitigated through the building's orientation and massing. Windows are located to maximize natural light: diffuse,

northern light in classrooms and warm, direct sunlight in the kindergarten spaces. Entrances are shielded from harsh winds. The tall Gymnasium volume provides protection to the playground from the winter wind. To improve the building systems' serviceability, the mechanical equipment is installed on a mezzanine – a controlled environment rather than the traditionally used roof or grade-level pad configurations. This improves site safety conditions, simplifies routine maintenance procedures (reducing the significant costs of transporting parts and technicians), and allows for a clean, clear roofline.

The standing seam steel roof system was specifically

The building massing utilizes stepped, sloping roofs that avoid valleys and the possibility of water or snow coming down on entry points. Pre-painted steel was selected for the wall cladding as well as the roof for its durable and non-combustible properties.



designed to avoid roof valleys that are susceptible to ice damming and roof leaks. Pre-finished downspouts and steel gutters are utilized at roof edges at entrances and in high traffic areas. The architects designed a 'soft' curved edge profile – mimicking a feather – in contrast to the metal siding.

The architects engaged the community in a competition to

design the stained-glass feature window at the school entry. Like in the building itself, its colours – white, yellow, red and black – were derived from the Nation's four sacred colours and directions. "The Fox Lake school is one of my favourite projects of my career," says Project Architect Greg Hasiuk. He and Number Ten have continued to design and build schools across Saskatchewan and Alberta, further refining model schools that don't feel overly formal and institutional. "Our mission is to get rid of cells and bells."

It was important that the design be flexible in order to allow for community use. The community specifically identified the gymnasium, change rooms, computer room and library as areas that would be extensively utilized by the community both during and after school hours.

DESIGN AND CONSTRUCTION TEAM

OWNER: Fox Lake Cree Nation

PROJECT MANAGER:

P.M. Associates 204-949-5150

ARCHITECT: Number Ten Architectural Group 204-942-0981

STRUCTURAL CONSULTANT:

Crosier Kilgour & Partners Ltd. 204-943-7501

MECHANICAL & ELECTRICAL CONSULTANT:

Cochrane Engineering Inc. 204-477-6650

LANDSCAPE CONSULTANT:

Hilderman Thomas Frank Cram 204-944-9907

GEOTECHNICAL, SURVEY & ENVIRONMENTAL CONSULTANT:

Cochrane Engineering 204-477-6650

CONSTRUCTION MANAGER:

Fox Lake Cree Nation 204-953-2760

GENERAL CONTRACTOR:

T.L. Penner Construction 204-486-556-1400

ROOF & WALL CLADDING MANUFACTURER:

Vicwest 1-800-661-6936

ROOF & WALL CLADDING INSTALLER:

Oakwood Roofing & Sheet Metal Co. 204-0237-836

All material is pre-painted galvanized steel conforming to ASTM A653 Grade 33 and coating to ASTM A924.

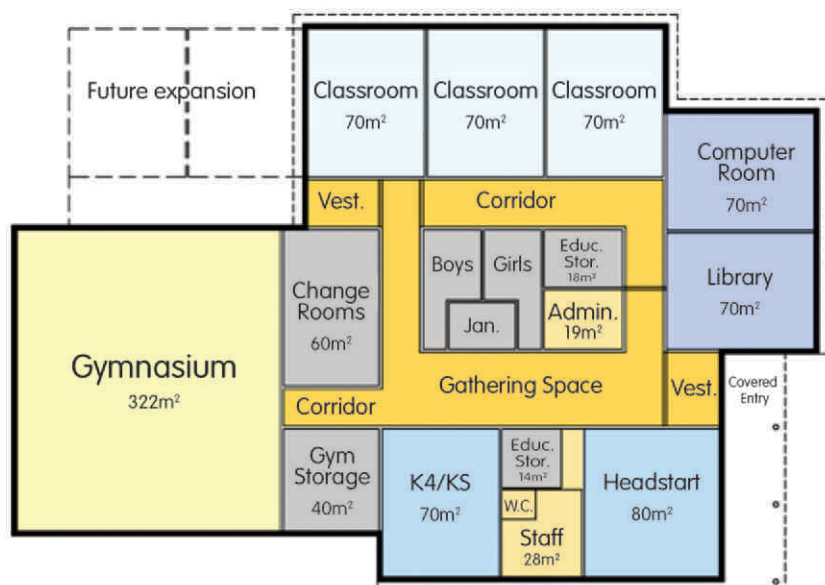
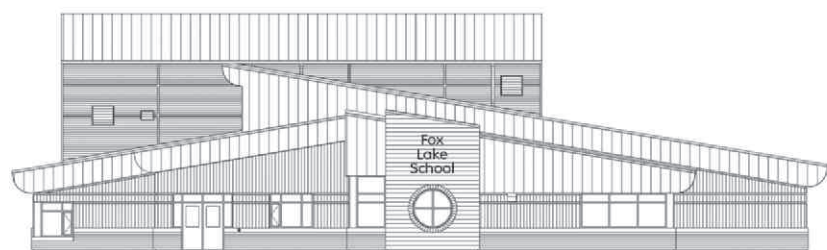
ROOF CLADDING: Pre-painted .76mm (.0299") Z275 (G90) stand seam, 38mm (1-1/2") rib. Colour: Cambridge White 56161.

WALL CLADDING: Pre-painted .76mm (.0299") Z275 (G90) 22.2mm (7/8") corrugated. Colours: Slate Blue 56067; Red 56064 & Cambridge White 56161 Fascia.

FASCIA, SOFFIT & TRIM: Pre-painted .76mm (.0299") Z275 (G90) galvanized steel. Colours: Cambridge White 56161 & Tan 56074.

ROOF DECK: Vicwest RD938 – 76mm (.0299") ZF75 Galvaneal (standard and acoustic).

FLOOR DECK: Vicwest HB938 – 76mm (.0299") ZF75 Galvaneal. ZF75 conforms to ASTM A653.



AZM150 Galvalume® Steel Provides Added Protection to this Heritage Trust Structure

Wolfville's Railroad Station is one of Nova Scotia's few remaining brick railway stations. The Station was abandoned in 1990 when Dominion Atlantic Railway ceased passenger service in the Annapolis Valley. However, after months of community fundraising efforts, private donations, and support from the Province and the Town of Wolfville, the station was purchased by the Wolfville Library Foundation.

The station, a two-and-a-half storey brick and stone building, is valued for its historical association to the railway system in the Annapolis Valley and for its renovation in 1993 by Wolfville's citizens. In 1994, the Foundation received the Heritage Trust of Nova Scotia Built Heritage Award for the Station's restoration. The current Wolfville Memorial Library, is one of eleven branches of the Annapolis Valley Regional Library System. In 2017 it was determined that the original shingles on the railroad station, now the Wolfville Library, had reached the end of their service life.

Harvey Freeman, of FMB Architecture I Design, the project architect for the re-roofing, elected to use a diamond shaped roof tile made from ArcelorMittal Dofasco's .38mm (.0149") pre-painted AZM150 Galvalume steel in the Granite Deep Mat paint system, coloured QC60035 Graphite Gray. Granite Deep Mat is a pre-painted Galvalume coated steel that combines excellent formability and corrosion resistance and brings differentiation and originality in roofing and cladding designs for residential and commercial building projects.

According to a community consultation done by the Annapolis Valley Regional Library (AVRL) in late 2017, most agree that a larger library is needed in Wolfville. "The planning is in the early stages," says Ann-Marie Mathieu, chief executive officer of AVRL. "We are looking at all possibilities and how a new library fits in with the aspirations of the Town of Wolfville."

According to the survey results, most people want the library to stay in the current building, but the community has two needs: a traditional library as well as a social gathering space. The current Library space is 269m² (2,900 sq. ft.). The Annapolis Valley Regional Library – Wolfville Library Needs Assessment, 2017, estimated that the design population for the

Wolfville Library to be 13,000, with the total space requirement being 1,382m² (14,880 sq. ft.). A working group of staff and volunteers, with relevant experience, has been composed and is looking at how the library fits with the ongoing review of the town's planning documents.



Original diamond shaped asbestos shingles on the old roof.



South and Northwest elevations of the re-roofed historic Wolfville Railway Station, now the Wolfville Library, showing the new Agway diamond shaped pattern roofing tile made from ArcelorMittal Dofasco's pre-painted .45mm (.0179") AZM150 Galvalume using the Granite Deep Mat paint system coloured QC60036 Graphite Gray, with snow guards.

DESIGN AND CONSTRUCTION TEAM

OWNER: Town of Wolfville, N.S. 902-542-3960

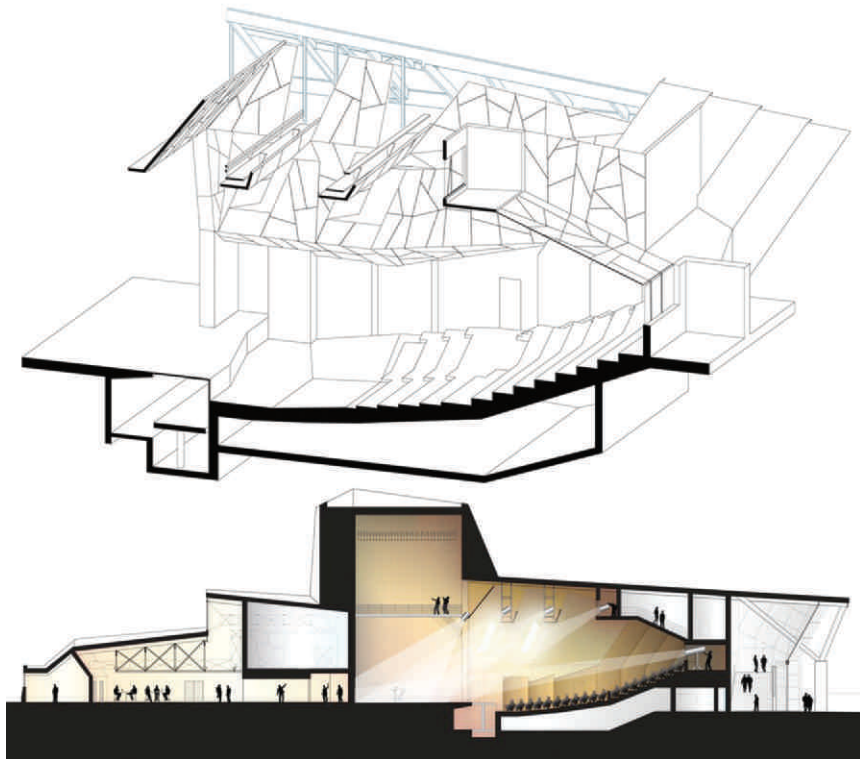
ARCHITECT: FMB Architecture I Design 902-429-4100

STEEL ROOF CLADDING SUPPLIER:
Diamond Steel Roofing Systems 888-810-7663

STEEL ROOFING INSTALLER:
Mid Valley (1997) Ltd. 902-765-6312

STEEL ROOF CLADDING MANUFACTURER:
Agway Metals Inc. 800-268-2083

Innovative design utilizing pre-painted Galvalume Cladding and Hollow Structural Steel framing



This centre is a state-of-the-art, multi-discipline performing arts space designed for community and professional use. Since its opening it has housed dance, theatre and musical performances of all types and skill levels.

It is on the campus of Menlo-Atherton High School, surrounded by the semi-rustic environment of Menlo Park. The project's highly conceptual design was inspired by the surrounding heritage valley and coastal oak groves on campus.

The interior of the centre is dominated by a five-hundred seat auditorium which can be optimized acoustically for either dramatic performances or musical events. It includes a 19.8m (65-foot) high loft, fly gallery, stage house, orchestral lift, practice and academic meeting spaces, a "green" room and a cafeteria/warming kitchen.

With the objective to bring music and drama to its students and the surrounding community, this 2,880m² (31,000 sq. ft.)

"At the heart of Hodgetts + Fung's vivid, tactile architecture is an ability to heighten the way people see and experience space."

Alan Hess



Steel struts surmounting massive concrete columns complement the oaks facing the lobby and support the exposed structure of the roof above the depressed entry courtyard sheltered by a branching structure designed to inspire spontaneous outdoor performances.



performing arts building is located on the campus of Menlo-Atherton High School, an arts-oriented high school. It features broad, over-hanging eaves – designed to complement existing low-slung classroom buildings and monumental structural trees – which echo the entry grove of historic oaks. The building is configured to serve both a formal, regional audience and a more casual group of parents and students. A direct response to the community's revered heritage oak trees established the axial alignment and served as the governing metaphor for the building's structural, volumetric and aesthetic development.

Single, folded roof plane encloses this theater complex for Menlo-Atherton High School.



A simple standing seam roof draped over an assemblage of functional elements provides a single reading of these complex functions while diminishing the mass of the 19.8m (65 ft.) tall fly tower.

Variations in the relationship of the folded planes of the roof to the surrounding landscape provide opportunities for student meeting places and mechanical equipment. To the south, steel struts surmounting massive concrete columns complement the oaks facing the lobby, and support the exposed structure of the roof above the depressed entry courtyard sheltered by a branching structure designed to inspire spontaneous outdoor performances.



Photograph showing hollow structural steel (HSS) used for the light support framing in lobby area.

PROJECT SIZE: 2,900m² (31,209 sq. ft.)

ROOF DECK:

- .91mm (.036") G60 Galvanized ASTM A653 Grade 33.

ROOF CLADDING:

- .61mm (.0239") AZ50 Galvalume (AZM150 in Canada) 22.2mm rib x 457mm (7/8" rib x 18") wide flat panel, standing seam roof, coloured Champagne in the Kynar paint system.

HSS SECTIONS AT PATIO:

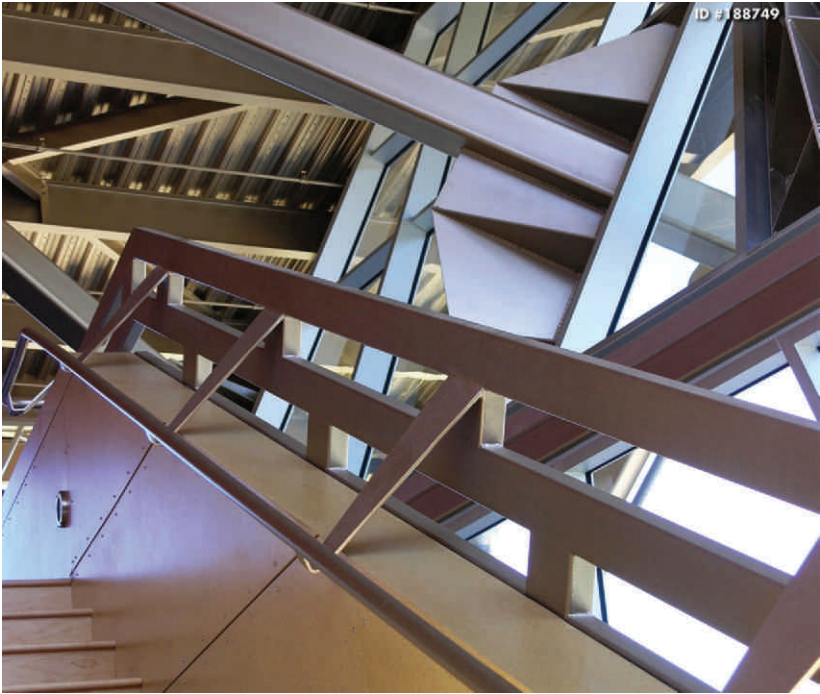
- HSS Diagonal Braces: HSS 304.8mm x 304.8mm x 15.87mm (12" x 12" x 5/8") A500 Grade B (Diagonal bracing at patio).
- HSS Pedestal Base: HSS 457mm x 12.7mm (18" x 1/2") A500 Grade B.

HSS SECTIONS – LOBBY:

- HSS Light Support Framing – Roof framing above: 355.6mm x 558.8mm (14" x 22") beams Grade A992.
- HSS hangers from WF beams above: HSS 152.4mm x 101.6mm x 12.7mm (6" x 4" x 1/2") A500 Grade B.
- HSS horizontal members: HSS 152.4mm x 101.6mm x 6.35mm (6" x 4" x 1/4") A500 Grade B.
- HSS skewed light support beams: HSS 152.4mm x 101.6mm x 6.35mm (6" x 4" x 1/4") A500 Grade B.
- Diagonal angle bracing: 50.8mm x 50.8mm x 7.94mm (2" x 2" x 5/16") A36.
- Roof Framing above: W12 and W16 beams Grade A992.

GUARDRAIL FRAME – ALONG MAIN STAIR ASCENDING TO 2nd FLOOR

- Top, intermediate & bottom rails: HSS 101.6mm x 50.8mm x 3.175mm (4" x 2" x 1/8") A500 grade B.
- Stub pieces between rails: HSS 152.4mm x 50.8mm (6" x 2").
- Steel Deck above brace assembly/roof framing: .91mm (.036"). G60 Galv.
- Grab rail: 38.1mm (1-1/2") standard pipe.
- Grab rail brackets: 38.1mm (1-1/2") thick shaped/bent plate A36.
- Pictured above: HSS 304.8mm x 304.8mm x 15.875mm (12" x 12" x 5/8").
- Roof support w/plate assembly (penetrating glass): A500 Grade B 609mm x 1,397mm (24" x 55") and assorted size WF roof beams Grade A992.



SUSTAINABILITY OBJECTIVES

An energy saving H-Vac system, which distinguishes between the rarely occupied auditorium and the heavily used support facilities – scenic shop, rehearsal room, and community space – is programmed to harvest cool or warm air and direct it to the occupied portions of the facility. Operable windows allow for heating and cooling, while occupancy sensors keep lighting needs regulated indoors and out.

An under floor plenum delivers conditioned air directly to seated theater patrons by means of registers under each seat. This technique avoids the waste associated with conventional systems by providing tempered air at the occupied zone.

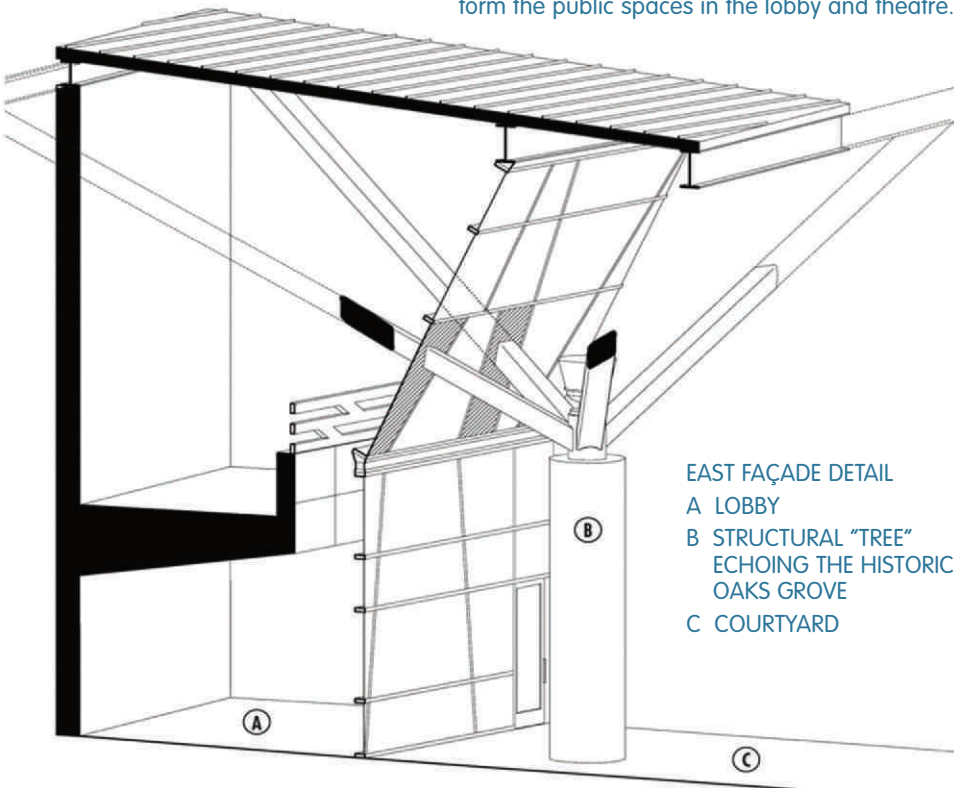
Sustainable, yet visually rich materials such as exposed steel – have been carefully detailed with laser cut precision to form the public spaces in the lobby and theatre.

Main Stair ascending to 2nd floor. See sidebar on page 11.



Broad, overhanging eaves designed to complement the surrounding low-slung classroom buildings and monumental structural “trees” which echo the entry grove of historic oaks.

Exemplified by the structural “trees” sustainable, yet visually rich materials – such as exposed steel, have been carefully detailed with laser cut precision to form the public spaces in the lobby and theatre.



- EAST FAÇADE DETAIL
- A LOBBY
 - B STRUCTURAL “TREE” ECHOING THE HISTORIC OAKS GROVE
 - C COURTYARD

DESIGN AND CONSTRUCTION TEAM

CLIENT: Sequoia Union School Board

ARCHITECT:
Hodgetts + Fung Design and Architecture 323-937-2150

GENERAL CONTRACTOR:
Blach Construction Co. 408-244-7100

STRUCTURAL ENGINEER:
Englekirk Structural Engineers 323-733-6673 or 714-557-8551

MECHANICAL ENGINEER:
IBE Consulting Engineers Inc. 818-377-8220

CIVIL ENGINEER:
BKF Engineers Surveyors Planners 650-482-6300

ACOUSTICAL: Akustiks 203-299-1904

THEATRE: Fisher Dachs Associates 212-691-3020

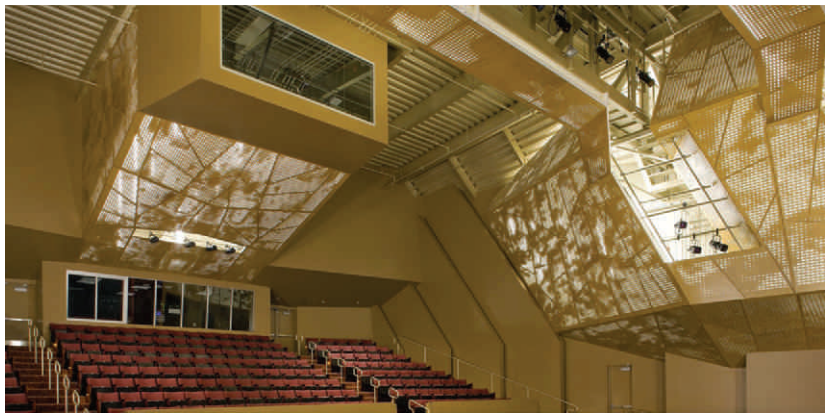
LANDSCAPE: Tanaka Design Group 415-863-7800

FABRICATOR/ERECTOR:
Concord Iron Works, Inc. 925-432-0136

STEEL DECK SUPPLIER: Verco Decking Inc. 916-488-8180

STEEL DECK INSTALLER: B.T. Mancini Co. Inc. 408-942-7900

PHOTOGRAPHS:
Courtesy: Hodgetts + Fung Design and Architecture



The interior of the centre is dominated by a five-hundred seat auditorium which can be optimized acoustically for either dramatic performances or musical events.



Certification of Canadian Manufacturers of Lightweight Steel Framing (LSF)

The CSSBI has developed a new standard CSSBI 61-18 *Manufacturer Certification Requirements for Cold Formed Steel Framing Members*. Under the CSSBI certification program, a participating Manufacturer certifies that the designated structural and non-structural cold formed steel (CFS) framing members it produces meet or exceed the applicable ASTM International (ASTM), Canadian Standards Association (CSA) and American Iron and Steel Institute (AISI) requirements.

The product certification is validated by independent 3rd-party testing and inspection. This certification program is designed so that products qualifying for certification meet

the requirements of the National Building Code of Canada.

As of January 1, 2019, certification is a requirement for membership as a CSSBI Light Steel Framing (LSF) Manufacturer Member. It is also a requirement for a company to use the LSF load tables currently being developed. The CSSBI believes that this initiative will be an advantage for the Canadian construction industry.

The CSSBI represents the Canadian manufacturers of sheet steel building products. The list of current members and resource material can be obtained from the web site www.cssbi.ca

A steel building, characterized by the absence of load bearing walls, is intrinsically more versatile and flexible than other types of structures.





Dimensional Stability
 + Fire Resistance
 + Ductility
 = Durability

Steel is durable, safe, and strong. It is not susceptible to rot, termites, or mold. Steel structures require less material (both reduced weight and reduced volume) to carry the same loads as concrete or masonry or wood structures.



Design Versatility, Ease of Installation and Resilience

The versatility of steel gives architects and engineers the freedom to achieve their most ambitious visions, and provides contractors with a highly engineered, high-quality building material. Steel is used in everything from industrial to iconic structures, and is particularly suited to mid-rise construction, where turnkey framing solutions for virtually any type of residential or commercial building project are available.

Steel offers consistently high-quality standards, precision products and guaranteed strength and durability in the most challenging environments. Steel is produced to the most exacting specifications under highly controlled conditions, eliminating the risks of on-site variability, which is an inherent disadvantage with other building materials.

- Steel is dimensionally stable and can be manufactured to very tight tolerances, making it easier for engineers to use in building design, unlike softwood products which are susceptible to shrinkage due to varying moisture content and structural design properties that have recently been downgraded by up to 30%¹ due to changes in wood resource mix.

- Steel lends itself well to prefabrication, where the assembly of the individual steel elements takes place offsite under controlled, highly regulated and safe factory conditions where leading-edge technology delivers precision engineered components.



- Steel structures can be erected speedily. The predictability and accuracy of steel components, in addition to just-in-time site delivery, speeds up the process and allows follow on trades to get to work sooner, resulting in quicker building completion and earlier occupancy.



- Steel design benefits include longer spans, larger bays and wider frame spacing than wood or concrete construction. This allows for maximized usable floor space and large interior spaces that can be constantly adapted to cope with changing requirements of occupants.





- Steel framed structures are inherently ductile. Structures are designed to absorb energy produced by earthquake ground movement and wind by “flexing” or “deflecting” in varying degrees, depending upon the construction materials, design of the structure, quality of construction, level of engineering, and the applicable building code requirements.



- With consistent chemical and mechanical properties, steel behaves in a predictable manner when subjected to the structural loads imposed by high wind and seismic events. Bella Concert Hall and Taylor Centre for the Performing Arts.

¹ SFIA fact sheet “Downgrade of Southern Pine Values Increase Cost of Building with Wood”. November 2013.



Pre-painted Z275 (G90) galvanized steel, clads environmentally conscious self storage structure

The renovation of this 100-year-old 18,580m² (200,000 sq. ft.) Yarn Mill into an energy efficient storage facility, occurred over several phases. PHASE 1: Demolition started January 5, 2018 and occupancy on the first floor was July 25, 2018.

PHASE 2 begins this summer. Significant challenges were experienced in turning a structure which was built 100 years

ago into a state-of-the-art energy efficient building that would be NET ZERO on electricity and heating/cooling.

Consistent with the owners sustainability goals a geothermal energy system was installed that provides heating/cooling and in turn controls the humidity.

This Summer a Net Metering System will be installed that will produce electricity for their own consumption. To help keep the size and cost of these systems feasible, they had to look all the loads that would be created and try to reduce consumption of watts per square foot. Research was conducted to determine

cost effective ways to find the balance of costs between LED lighting, insulation, solar, geothermal, domestic water consumption and controls. The result, is an energy efficient, spacious and attractive facility. Objective achieved.

Green Storage Facilities are located across Ontario – Ajax, Bolton, Aurora, Keswick, Newmarket, Orillia, Toronto and now Hamilton.

DESIGN AND CONSTRUCTION TEAM

OWNER: Green Storage Solutions Inc. 905-424-2947

ARCHITECT & ENGINEER: Adkins + Van Groll 416-489-7888

CLADDING MANUFACTURER: Agway Metals 1- 866-631-3239

CLADDING INSTALLER: Chais Sheet Metal 519-954-0936

PHOTOGRAPHS: Green Storage Staff and Google

WALL CLADDING:
Agway Metals 7-175 and
HF12 siding coloured
QC28262 Black

TRIM: Agway QC10581
coloured Storage Green.







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Designing and building with ArcelorMittal Dofasco steel makes sense in today's world. Consider the bottom line. Consider the environment. And consider quality.

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