

# STEEL DESIGN

## THE VERSATILITY OF STEEL

Issue One, Volume 55  
Spring 2023

### Steel as craft in Nova Scotia



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# STEEL DESIGN

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ArcelorMittal is the world’s leading steel and mining company. Guided by a philosophy to produce safe, sustainable steel, it is the leading supplier of quality steel products in all major markets including automotive, construction, energy, household appliances and packaging. ArcelorMittal is present in more than 60 countries and has an industrial footprint in more than 20 countries.

With a strong presence in North America, Europe, South America and South Africa, and an emerging presence in China, ArcelorMittal delivers a large scale of products, solutions and services to customers with the same quality focus in all regions. ArcelorMittal is the leader in steel technology, both in the breadth and depth of our product portfolio, and in our ability to supply a range of grades throughout the world. ArcelorMittal is a supplier of choice for all markets, a testament of our commitment to working collaboratively with our customers to engineer advanced steel grades to meet their needs.

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Growing Green

Clearly, why growing up – not out – is the answer

In the city of Hamilton, ArcelorMittal Dofasco lands are situated upon the traditional territories of the Erie, Neutral, Huron-Wendat, Haudenosaunee and Mississaugas. This land is covered by the Dish With One Spoon Wampum Belt Covenant, which was an agreement between the Haudenosaunee and Anishinaabek to share and care for the resources around the Great Lakes. We further acknowledge that this land is covered by the Between the Lakes Purchase, 1792, between the Crown and the Mississaugas of the Credit First Nation. Today, this area is still the home to many Indigenous peoples and we are grateful to work and live on this land.



# Great Big See

## Gaelic museum provides portal to the past

Story: Julia Preston, Ian VanDuzer  
Photography: Maxime Brouillet

At the turn of the 19<sup>th</sup> century, Donald 'Og' MacNeil and three other family members left their homes on the Isle of Barra and crossed the ocean on a voyage of discovery. Settling in Cape Breton, they were drawn by the promise of “fuel in the forests, water in the ground, and fish in the sea” to a place Donald had first seen while serving in the British Army.

Their home in Iona, overlooking Bras d’Or Lake, served as a foundation for a Gaelic community that exists in Cape Breton to this day, and helped serve as the namesake for Nova Scotia: New Scotland.

It wasn’t long before other settlers joined the MacNeils, building blackhouses on the windswept hills of Iona. These buildings of rock walls and sod roofs could have been lifted straight from the Scottish Highlands where these dwellings were common.

As the community grew, blackhouses were joined by log cabins that are more common across Canada, and then by simple box houses with steep gabled roofs.

It’s this history that is captured, preserved, and shared in the Baile nan Gàidheal Highland Village, an impressive outdoor living history museum and Gaelic cultural centre.

Highland Village immerses visitors in the story, culture, and identity of early Gaelic settlers. Visitors encounter staff in historic costumes, step into period-authentic buildings filled with artifacts, and smell food cooking over open hearths as they roam across the stunning 43-acre grounds of the museum. They are surrounded by the melodic Gaelic language and music.



### Stepping back in time

To visit Highland Village is to step back in time, but architect Jane Abbott knew that there needed to be a transition from modern day to the 1800s – the time captured by the museum. “The museum is this kind of starting and end point of this exploration,” she says. “We like to think of it as through time. You’re going back in time and then coming back around to the present.”

The visitor centre – serving as both the entrance to and exit from the Highland Village – is modeled after the traditional remaining buildings that settlers like the MacNeils would have built centuries before. Even if they are not experts in Gaelic settler architecture, on their approach, visitors can clearly see how the building draws from and is integrated into the traditional village.

Three steep-gabled buildings combine to form the shape of the centre, although the new building is constructed from steel and wood with weathering steel accents, not solely traditional materials.

With historic buildings already on site, Abbott’s intention was that the visitor’s centre would integrate and not stand out. However, “what we’ve done by mixing the materials is to modernize that form. It both references it, and it becomes renewed.”

The new building’s local spruce siding will grey out over time and meld with the grey metal roof—and the historic wood-clad buildings that compose the village. The standing seam roof, supplied by Agway Metals, looks like zinc. Abbott explains, “We chose that colour because it has more of a natural feel to it and it’s not as shiny as some other metal roofs.”

And like the early Nova Scotian settlers, durability was key to the visitor centre’s construction.

“Cape Breton gets snow, gets rain, gets cold, gets windy. It pretty much experiences all the ups and downs of weather,” Abbott chuckles. “When we think about construction and building materials, we take those into consideration so that the building is both beautiful and also durable.”





Abbott and her team knew that the beauty of the building would be in the details. The building appears simple, but to the trained eye it's obvious that complexity and care went into every inch of the design.

In designing the roof, the designers wanted the spacing of the steel panels to harmonize with the siding. To go with the narrow profile of the spruce wood, they specified a relatively small gap between the standing seams of the roof. They also worked closely with Agway to develop the roof eave detail, ensuring the edges were clean and sharp.

"We're a design firm. We're not so much interested in pre-fabricated solutions, but more solutions that speak to the client and speak to the site and those particularities," Abbott asserts. "How can those particularities inform architecture so that it's a very unique building for that exact place and time and could not be replicated anywhere else? That's our philosophy."

### An element of craft

Along with Agway, contractors and fabricators were essential to execute the architects' specific vision. The gable edge where the roof and the eave meet, as well as profiles on the dormers, all needed to be custom cut and detailed on-site with incredible accuracy. In fabricating and installing the steel, the metal took on an element of craft.

## In fabricating and installing the steel, the metal took on an element of craft.

"Craft is about things that have to be done on-site," says Abbott. "That idea of the hands and people knowingly putting their hands onto the material and understanding it, and cutting it, and shaping it... Incredible attention to craft is needed when you use steel in this way."

This construction echoes the historic work done by early settlers, who cleared land and built houses all by hand. Wandering through the buildings and over the grounds at Highland Village, people gain an understanding of the love Gaelic settlers felt for their new homes in Iona, and the work and dedication required to make a life in Cape Breton.

### Back to the beginning

The original settlers obviously didn't have access to steel when constructing their community, so Abbott and her team worked to integrate modern materials with the museum aesthetics. Taking inspiration from – not directly copying – the village became the objective.

The visitor centre's entrances and exits are accented with weathering steel. The cladding oxidizes over time in a pattern that's specific to the Highland Village environment, with the patina emphasizing the passage of time that visitors experience as they move through the museum.



## Weathering steel: Because the cladding will oxidize in the years to come, the resulting patina will emphasize the passage of time.

The middle section of the centre is distinct from the other areas. It is rotated and sheathed in articulated spruce siding supported by galvanized steel. From here, visitors step through another weathering steel portal into a special hearth place. This final destination bridges the stories and traditions of generations of Gaels and connects people to the contemporary Gaelic Nova Scotia story.

As people exit the centre through yet another steel portal, they return to present day with a new appreciation for the province's history.

"You will find there more shelter from the north wind," Donald 'Og' MacNeil said of the Iona Peninsula in the 1700s. Three centuries later, the new visitor centre is providing shelter. It's also providing a vital link to ensure the continuing development and representation of the Gaelic community in Nova Scotia.

Needless to say, if you're ever in Cape Breton, the museum is a must see.

### Project Specifications

**Building Owner/Project Commissioner:**  
Highland Village with Province of Nova Scotia // [highlandvillage.novascotia.ca](http://highlandvillage.novascotia.ca)

**Architects:**  
Abbott Brown Architects // [abbottbrown.ca](http://abbottbrown.ca)

**Engineers:**  
Campbell Comeau Engineering // [campbellcomeau.ns.ca](http://campbellcomeau.ns.ca)

**Project Manager:**  
Julia Weir

**General Contractor:**  
Brilun Construction // [brilun.com](http://brilun.com)

**Suppliers, fabricators, installers:**  
Agway Metals Inc. // [agwaymetals.com](http://agwaymetals.com)  
Guildfords // [guildfords.com](http://guildfords.com)  
East Coast Metal Fabrication // [ecmf.ca](http://ecmf.ca)  
Keele Architectural products // [keelarchitectural.com](http://keelarchitectural.com)

**Product Specs:**  
Metal roof: Standing Seam, Agway AR-50 in Natural Zinc  
QC18-1028





# Go Figure

How two ice rinks became community hubs

Story: Julia Preston, Ian VanDuzer  
Photography: Josh LaBeau, Adrien Williams



For cities and communities across the globe, the centre of public life isn't their government halls or schools. No, it's their recreation centres, their sports arenas. Places where people come together to play, to have fun together.

In that sense, the arena is the centre and soul of the community. It embodies what the community can and wants to be: an aspirational vision of the people that surround the site.

## The Skating Club of Boston

The Skating Club of Boston in Norwood, Massachusetts and Place Bell in Laval, Quebec are places of aspiration. These two arenas, similar but different in their functions, represent more than just ice rinks. They represent aspirations for the future of two distinct communities.

For much of its 111-year history, the Skating Club of Boston was based in a "Quonset Hut" style arena constructed in 1938. For ninety years, figure skaters lutzied, salchowied, and axeled across the ice, but it became more and more clear that a new arena was needed as the club grew closer to celebrating its centennial. Finally, in September 2020, the long-held dream for the next one hundred years became a reality when the club opened its new multi-rink home.

"The vision was for a new aspirational centre that would be really the heart and soul of U.S. figure skating in the future," says architect Rob Elfer, partner at studioTROIKA, which designed the arena complex.



## Place Bell

Across the border, a similar vision of the future was being built in Laval, Quebec. Though Laval is officially considered part of the communauté métropolitaine de Montréal (CMM), or "Greater Montréal," the city aspired to have its own gathering space.

"What we were really interested in was... shifting the centre of gravity," says Andrew King, architect with Lemay.

That interest became Place Bell, a venue for cultural and sport events, a centre for community and family programs, and a communal space that brings people together.

The inspiration for Place Bell was the forum. Not the iconic arena in downtown Montreal, former home of the legendary Montreal Canadiens, but the ancient marketplaces of Rome that were at the centre of public life.

To create that sense of togetherness, the design team referenced classic architecture. Drawing from the round shape of the Colosseum in Rome, possibly the world's most famous ancient arena, King topped Place Bell with a tall disc, anchored to the ground by a low plinth.

"Sometimes hockey rinks read as they're just big square boxes and they could be anything," explains King. "It's very clear from the roofs and the steel structure in the roof that this project is a kind of forum... It's a place to gather, a space in which lots of people can come."

Bringing people together was also a goal in Boston.

The inspiration for Place Bell was the forum. Not the iconic arena in downtown Montreal, but the ancient marketplaces of Rome that were at the centre of public life.





Figure skating has a reputation for being elitist and exclusive. However, the Skating Club of Boston wanted to counter that stigma and show how its programs are inclusive. “The whole facility was meant to be open and bright and transparent to allow that to manifest from the physical world versus just an organizational mantra,” says Josh LaBeau, studioTROIKA’s project manager.

The openness comes from windows – the front of the building has a huge expanse of curtain wall glazing that looks right into the centre rink – and from materials – warm tones that welcome people.

“It is a magical quality that when you’re on the ice you have the light coming in,” says Elfer. “We took the façade and we broke it up into these different portions, and we pulled them out and have light coming in the glazing, the side of it. It’s cathedral like.”

Despite its transcendent experience, the building is a fairly simple structure. “It’s an insulated metal panel shed, essentially, in its construction,” says LaBeau. “We really focused on breaking that mold in specific instances. So, for example, the front entry. You don’t know that it’s a shed. You have to go look at it.”

Big dreams, a modest budget and the use of a pre-manufactured metal building allowed the design team to achieve The Skating Club of Boston’s ultimate goals.



The Skating Club of Boston



Place Bell

### The impressiveness of Insulated Metal Panels

Insulated metal panels (IMPs) from Norbec were also important. At 16,720 square metres, the Skating Club is large, and it needed a highly efficient thermal, waterproof envelope to keep the ice cold, solid, and in place. The whole building was clad in IMPs in a mix of white and charcoal. Accents, glazing, or openings were added strategically.

Place Bell also uses IMPs from Norbec. The round disc of the roof clad in white metal is the distinguishing feature of the arena.

King, along with André Marcotte at IBI, wanted the disc to appear as one solid object, not a series of fragments. The smooth white panels give the building weight and help in the mission to “shift the centre of gravity” away from Montreal. Running seams vertically helps to de-emphasize the large horizontal forms of the building.

King and his team also created a “syntax or language of steel cladding” to distinguish various components of the facility, such as the community rink or entrances.

“There’s the big white box [of the roof] and then there’s a grey element that meets the ground. That cracks open and then there’s brownish orange [wood] elements that open up and invite you in... It feels like the steel is being carved open... That was the design strategy of the building. That’s the key corner entrance that tries to break it down and really tries to create a human scale.”

### Creativity, not compromise

Both Place Bell and the Skating Club of Boston had numerous requirements: spaces that brought people together, facilities that could accommodate elite athletics, venues for amazing performances, centres that Laval and the club could build a future around.

On both projects, the design and construction teams found creative solutions, not compromises, to fulfill each groups’ dreams.

“Can one plus one equal three and not equal one and a half?” says Elfer. “It’s not going to be two. We want it to be better.”

This focus on the mission of each building led the design teams to create special centres that are transforming the future for these two unique communities.

As King sums up Place Bell, his words extend to the Skating Club of Boston as well. “The people... have their own place and it’s something that performs beautifully. It’s a great place to gather and has all kinds of really interesting programs. It’s a place where you can go with your community. It’s a place in the centre of the city where you can do many things. It creates a new centre.”

Go figure!



Place Bell

### The Skating Club of Boston

**Building Owner/Project Commissioner:**  
The Skating Club of Boston // [scboston.org](http://scboston.org)

**Owners Project Manager:**  
Northstar // [northstar-pres.com](http://northstar-pres.com)

**Architects:**  
Troika // [studiotroika.com](http://studiotroika.com)

**Engineers:**  
AHA Engineers // [aha-engineers.com](http://aha-engineers.com)

**General Contractor/Construction Management Team:**  
J. Calnan & Associates // [jcalnan.com](http://jcalnan.com)

**Metal Building and Steel Designer:**  
Lainco// [lainco.ca](http://lainco.ca)

**Refrigeration Consultant:**  
Accent Refrigeration // [accent-refrigeration.com](http://accent-refrigeration.com)

**Suppliers & Products:**  
Norbec // [norbec.com](http://norbec.com)  
Panels: Interior Steel: Gauge: 26 ga, Color: Imperial white QC-28154, Profile: Silkline (Striated), Finish: Smooth, Exterior Steel: Gauge: 22 ga, Color: Charcoal 17-1625, Profile: Microrib, Finish: Smooth, Trespa // [trespa.com](http://trespa.com) Panels: Meteon Elegant Oak Finish, Shop routed to give panelized look.

### Place Bell

**Building Owner/Project Commissioner:**  
Evenko // [evenko.ca](http://evenko.ca)  
Government of Quebec // [quebec.ca](http://quebec.ca)  
City of Laval // [laval.ca](http://laval.ca)

**Architects:**  
CannonDesign // [cannondesign.com](http://cannondesign.com) and IBI // [ibigroup.com](http://ibigroup.com) (Lemay // [lemay.com](http://lemay.com))

**Engineers:**  
gbi // [gbi.ca](http://gbi.ca)

**General Contractor:**  
Pomerleau // [pomerleau.ca](http://pomerleau.ca)

**Installer:**  
Styro Distributions Inc. // [styro.ca](http://styro.ca)

**Product Suppliers:**  
Norbec // [norbec.com](http://norbec.com)

**Product Specs:**  
Norex-L, Interior Steel: Gauge: 26ga, Color: White 7973, Profile: Silkline (striated), Finish: Smooth, Exterior Steel: Gauge: 24ga, Color: Bright White, Profile: Silkline (striated), Finish: Smooth

# Moo-ving Milk from Farms to Fridges

IMPs keep things cool in Gay Lea's dairy distribution centre

Story: Julia Preston, Ian VanDuzer

Photography: Kingspan Construction



Have you ever asked yourself where your milk came from? Maybe as you poured it into your tea, or dunked a cookie in it? If you have, you probably thought about the cow that made the milk, the farmer that cared for the cow, and the truck that moved the milk to the grocery store. But that story from cow-to-glass is missing a lot of pieces and in-between steps.

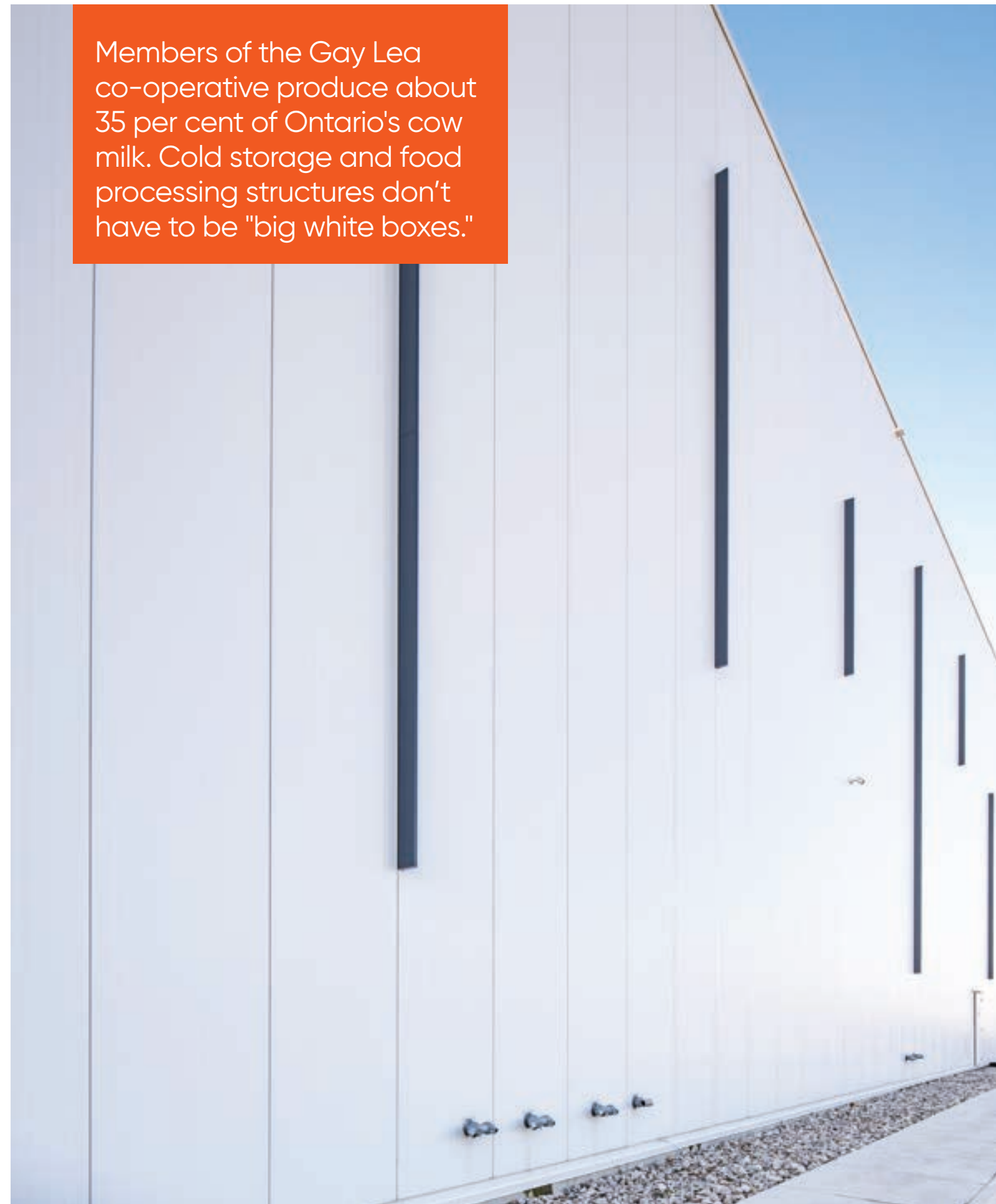
There's a lot you probably don't know about the dairy industry, or about Gay Lea, one of the largest producers of dairy products in Ontario. The co-operative was formed in 1958 when a group of farmers came together with a goal to build a better future for themselves and their communities.

The dairy industry has changed a lot in the 65 years since 1958, and Gay Lea has changed with it.

Innovation has been a significant driver in how Gay Lea has responded to consumers' evolving tastes, even as they remain true to their "Born on the Farm" heritage. Over the last several years, Gay Lea has expanded into Manitoba and even added goat and sheep's milk to its offerings.

Today, Gay Lea includes approximately 1,300 dairy farms in Ontario and Manitoba. The co-op produces butter, cottage cheese, sour cream, whipped cream, cheese and, of course, milk. Members of the Gay Lea co-operative produce about 35 per cent of Ontario's cow milk.

Members of the Gay Lea co-operative produce about 35 per cent of Ontario's cow milk. Cold storage and food processing structures don't have to be "big white boxes."





### From farm to fridge

With all of that milk and dairy, the need to get products from farms to your fridge keeps growing and growing. The centrepiece of Gay Lea’s distribution solution is their whopping 13,000 square metre central distribution centre in Brampton, Ontario. Manufacturing facilities from across Ontario ship their finished goods to the Brampton centre before the products go to final customers in retail, foodservice, industrial and export markets.

The new facility is a sleek, modern representation of today’s dairy industry. More than 100 employees at the centre manage over a million cases of product and ship more than 200,000 cases to customers each week. That’s a lot of cheese!

The centre also stores Gay Lea’s packaging and ingredients for various production facilities across the province.

So, how do you design a large-scale dairy distribution centre?

“The facility has a pallet runner/mole system to maximize the space with deep storage lanes,” says Joel Harris, vice president of supply chain with Gay Lea. “It is also flexible in its design, allowing the different temperature-controlled environments to be adjusted from ambient to cooler, as well as freezer to cooler, to accommodate potential seasonal or business changes.”



### The new facility is a sleek, modern representation of today's dairy industry.

Insulated metal panels (IMPs) were an obvious solution for the distribution centre, where multiple controlled environments with fluctuating temperatures were required. IMPs provide high R-value, perfect for insulating cold storage facilities and food processing plants. IMPs allow for a quick install and are a cost-effective solution for wall systems. Over the long-term, the panels also provide cost and thermal benefits both inside and outside of a building.

At Gay Lea’s distribution centre, clean milky white IMPs from Kingspan cover the exterior of the building. Orlando Design Services, the architect, selected Kingspan’s KS Shadowline and KS Shadowline Interior products as the predominant cladding for the centre.

The panels incorporate a tongue and groove interlocking rainscreen joint, which ensures foam-to-foam contact and enhanced thermal protection.

#### The battle against “big white boxes”

Cold storage and food processing structures tend to be “big white boxes,” describes Karim Muri, vice-president of marketing services and strategy developments with Kingspan. To add visual interest in a cost-effective way, Orlando added Kingspan’s new Accent Fin™ to the exterior walls.

“It’s an architectural addition that can fit between the steel joints that makes a plain steel wall look a bit more interesting,” says Muri.

The fins, made of extruded aluminum, protrude six inches perpendicular from the wall. Varying lengths of fins in dark charcoal were installed vertically along the wall of the distribution centre at seemingly random intervals.

While accent fins are available in all standard Kingspan colours, as well as custom colours, and in spans of up to 12 feet in length, Orlando Design Services chose to use dark charcoal to mimic the black-and-white look of a classic dairy cow.

For Orlando Design Services, the IMPs provided the construction speed and building envelope integrity they needed, while the fins added aesthetically appealing design elements to enhance the appearance of the building.

“The modularity and precision with Kingspan insulated panels provided the aesthetic required of a clean modern look... The new fin product offerings give building design professionals many new opportunities to add visual interest to large walls in a cost-effective way,” the company said in a statement.

Together, the design, construction and function of the distribution centre are helping to position Gay Lea for the future. Yes, they’re always moo-ving forward.



#### Project Specifications

**Building Owner:**  
Orlando Corporation // [orlandocorp.com](http://orlandocorp.com)

**Architects:**  
Orlando Design Services

**Engineers:**  
McIntosh Perry // [mcintoshperry.com](http://mcintoshperry.com)

**General Contractor:**  
Orlando Corporation

**Installer:**  
Thermo Design Insulation Ltd // [thermo-design.com](http://thermo-design.com)

**Product Suppliers:**  
Kingspan // [kingspan.com](http://kingspan.com)

**Product Specs:**  
Insulated Metal Panels: KS Shadowline in Cambridge White 431B900, KS Shadowline Interior in Imperial White P7C733B, Accent Fin™ A-Frame in Charcoal Grey





# Making Magic

Building on ideas to make them even better

Story: Julia Preston, Ian VanDuzer

Photography: Daniel Banko

"I have an idea."

Those are four magical (and sometimes scary) words that serve as the foundation of every innovation that has ever taken place.

And what about four even more magical words?

"We can do better!"

Ideas and even better ideas are magical. They are the catalysts for creativity, ingenuity and innovation. This magic isn't the domain of wizards and sorcerers; today, in the minds of enterprising architects, builders, manufacturers and customers, magical, inspired thinking is accelerating very real advancements in steel fabrication and production.

In southern Alberta, an idea and the drive to "do better" served as the magic that sparked brilliance between Van Roekel Architecture and Forma Steel as they met to discuss the creation of two new buildings.

Frazer Van Roekel was 'the idea man.' He was designing new facilities for Western Solar and the Potato Growers of Alberta. He knew he wanted the buildings to be clad in steel. After all, given that they needed to withstand Alberta's harsh, unforgiving climate, steel was a practical, obvious choice.

Even better, it also proved to be an aesthetic choice.

Both buildings were to be sleek, rectangular structures built in a clean, contemporary style. To reinforce the modern aesthetic, Van Roekel specified a section of large, flat panels to distinguish the front entrances.

To obtain this sharp, clean look, Van Roekel needed to go beyond the standard profiles. He took Forma's existing products and created the alchemy that combined them to get the appearance he imagined.

## An idea was born

And when the Forma team looked at Van Roekel's drawings, that's when they uttered four more magical words: "We can do better."

Using Forma Plank – one of their existing hidden fastener profiles – they stretched it. Forma Planks are usually between six and eight inches wide; the new panels are 20 inches wide. The Forma team didn't stop there: they cut the panels to five-foot lengths and then box-folded the metal and bonded it to a rigid foam.

The result was Expand Modular, a panel 20 inches by 60 inches that is perfectly flat—perfect for the smooth, modern look that Van Roekel wanted.

"There's no oil canning because the foam adds this rigidity. It's utilizing our same clips and hidden fasteners that we've used for our other products... It gives you that panelized reveal look," says Dave Jackson, technical product specialist with Forma.

For Forma, their dual-action folder affords them a greater level of creativity. This enables them to develop new products to meet customer's needs.

Indeed, it helps transform ideas into even better ideas. Ideas that, when they take shape, take your breath away!

"We have so much flexibility with the equipment that we have," Jackson adds. "We can be creative."

## Western Solar: A sun-sational solution

At Western Solar, the company's new facility is a combined office and shop. Approximately 930 square metres in size, the massive building is designed primarily as a warehouse and for storage, but that didn't mean the Western Solar team would settle for second best. They wanted to add visual interest and, in keeping with the modern technology they install, they desired a contemporary look.

What they got was sun-sational!

Seeing the completed structure, it's clear that Van Roekel highlighted the building's front and office portion with a sleek white tower that wraps around the entrance. New panels tile the surface of the tower, creating a smooth, modern façade. In the sun, the bright white metal literally reflects the clean power Western Solar helps to generate. Blazing, bright white continues around the building albeit with steel corrugated siding. Dark tinted windows trimmed in black and hits of royal blue – perfectly matching the Alberta sky – beautifully accent the building.

**In the sun, the bright white metal quite literally reflects the clean power they are helping to generate.**







### Potato Growers of Alberta: Not afraid of the dark

Like at Western Solar, Forma’s new Expand Modular panels are used to accent the Potato Growers of Alberta building’s entrance. They cover a large block that projects from the front of the building. The box defines the building’s overall sleek, rectangular structure, not only adding dimension to the façade but shelter to the entrance. Van Roekel then specified a mix of black, white and wood grain steel to add visual interest and to delineate different sections of the rest of the building.

Forma fabricated the panels for the Potato Growers of Alberta in dark graphite. Darker colours are often the litmus test of steel cladding. “If there are any imperfections the darker you go, they’re really going to show,” says Jackson.

However, Forma found that the panels perform very well.

The bonding and foam help to prevent oil canning or bowing. Additionally, before the panels are formed, they run the metal through a flattener to ensure that the blanks are perfectly smooth. This delivers a clean, modern aesthetic.



### Never the same thing twice

Once Forma’s panels arrive on a construction site, they are very flexible and easy to install. Given that the panels can be modified on-site, installers can create a distinctive look with no two projects ever looking the same.

### Steel provides workability, flexibility and sustainability.

“We have the ability to work in the field with this product so that if we’ve got to make alterations on the fly, it doesn’t matter, because it’s being tucked into a trim,” Jackson says excitedly. “It gives you that on-site workability, flexibility.”

Like tile, to keep things symmetrical, the steel can be laid out starting from the middle, from one side, on a joint, on centre, or in each direction. This enables installers to adapt for signage, backing, spacing, and layout as needed.

At Western Solar, it’s not surprising that solar panels will be added to the façade. One day soon, the shiny solar panels will merge seamlessly with the steel cladding for a coordinated, contemporary aesthetic.

As with standard cladding, Forma’s panels are straight-forward and quick to install. On both Western Solar’s and Potato Growers of Alberta’s buildings, the installation crews were relatively small. “They’d get their trim up and start throwing panels up that same day and by the next day they were buttoning everything up,” Jackson adds proudly.

The speed of installation echoes the quick development of Expand Modular – and growing demand for the product from architects and designers who want a modern aesthetic. “It’s filling a niche in the market where people are getting really good value out of our product with the look that they’re after,” Jackson says with a well-deserved smile.

The buildings for Western Solar and Potato Growers of Alberta demonstrate the versatility of Forma’s panels.

Seeing is believing. When a nice idea becomes even better, in Alberta, some call it magic!



#### Western Solar

**Building Owner:**  
Western Solar // [western-solar.ca](http://western-solar.ca)

**Architects:**  
Van Roekel Architecture // [vanroekel.org](http://vanroekel.org)

**Construction Project Manager:**  
Western Solar

**General Contractor:**  
Western Solar

**Installer:**  
Western Solar

**Product Suppliers:**  
Structure D.A. Building Systems // [dabuilding.com](http://dabuilding.com)  
Cladding/Panels Forma Steel // [formasteel.ca](http://formasteel.ca)

**Product Specs:**  
Forma Steel Expand Modular in Arctic White 24ga Textured, FR Panel in Bright White 26ga, Flashings and trims in Black, Royal Blue, Bright White and Arctic White Textured

#### Potato Growers of Alberta

**Building Owner:**  
Potato Growers of Alberta // [albertapotatoes.ca](http://albertapotatoes.ca)

**Architects:**  
Van Roekel Architecture // [vanroekel.org](http://vanroekel.org)

**Engineers:**  
BCB Engineering // [bcbengineering.com](http://bcbengineering.com)

**Construction Project Manager:**  
Peter King

**Installer:**  
Exteriors by Leroy and Darcy // [exteriorsld.com](http://exteriorsld.com)

**Product Suppliers:**  
Forma Steel // [formasteel.ca](http://formasteel.ca)

**Product Specs:**  
Forma Steel Expand Modular 24ga Graphite Textured, Forma Plank – Light Pine Woodgrain 24ga (Not AMD), 7/8" Corrugated 24ga Black, FR 26ga White White, Trims In Black, Graphite Textured, White White and Light Pine Woodgrain



# Growing Green

Clearly, why growing up – not out – is the answer

Story: Julia Preston, Ian VanDuzer

Renderings: mcCallumSather

Which would you rather have: 55 city blocks, or an orchard that can grow 22 million apples?

They both take up the same amount of space (121 hectares / 300 acres), but one increases urban sprawl, encourages more cars, and increases pollution, while the other grows food while also sucking CO<sub>2</sub> out of the atmosphere.

It’s an easy answer, right?

That’s what more and more cities are finding as they look for solutions to expanding urban sprawl. People will always gravitate towards cities for the opportunities they provide, and they will need to find places to live as well as work. The challenge becomes how to manage growth in a sustainable manner. For most urban centres, that means growing up – into the sky – instead of sprawling out.

High-rise skyscrapers have become a go-to housing option in most cities, but they’re changing as fast as the places where they’re built. Concrete has long been the dominant construction material for tall buildings, but recent advances in cold formed steel grades and innovative member design mean that sheet steel can be used as an alternative in many aspects of building construction.

“There’s been a big push from a lot of the manufacturing companies in the last 20 years where... the product is becoming more complex because you’re solving greater problems and they’re providing solutions,” explains Greg Parlardg, product manager at Bailey Metal Products. “Steel was always there

but now the design community and the manufacturers are embracing that type of building material and creating new products that can achieve greater values than before.”

### A tale of two buildings

What does steel do that concrete can’t?

A new Steligence® study from ArcelorMittal Dofasco aimed to find out. Steligence brings together teams of independent industry experts along with the latest building information modelling technologies to analyse the impact of different construction methods.

The study compared two design scenarios for a 12-storey residential high-rise constructed in the Greater Toronto and Hamilton Area: concrete and steel.

Each high-rise was 26,655 square metres and had 209 residential units of one- and two-bedrooms spread over 11 floors. The ground floor housed the main entrance, amenities, services, utilities, and access to underground parking in the basement level.

The only differences between the two buildings were the structural elements and materials they used.

Both designs used cast-in-place (CIP) concrete columns and slabs for the basement and lower floors, light steel framing for interior walls, and insulated steel stud walls with metal panels on the exterior.

Steligence® allows building owners, architects, and engineers a fact based approach to view building construction, for collaboration to build sustainable, more cost-effective buildings.



	Steel	Concrete
Foundation & Underground Parking	Cast-in-place (CIP) concrete columns, slabs	
Lower Floors (1 & 2)	CIP concrete columns, slabs	
Upper Floors & Balconies	COMSLAB®, Precast concrete balconies	CIP concrete floors slabs & balconies
Structural System	Light steel framing walls, HSS columns, W-beams	CIP concrete columns & beams
Interior Walls	Light steel framing	
Core, Shear Walls	COMWALL™	CIP concrete
Exterior	Insulated steel stud wall, metal panel, window wall glazing	
Roof	COMSLAB®	CIP concrete slabs



But things changed at the second floor. The steel building used composite decking versus the same CIP columns of the concrete building. Dan Van Gageldonk, technical sales representative with Bailey, explains that with composite decking “you’re using about 50 per cent less concrete and 70 per cent less rebar specifically for the floors.”

Less materials, Van Gageldonk explains, means less transportation, less cost, and less impact on the environment.

The structural system on the steel high-rise used light steel framing walls, hollow structural section (HSS) columns and W-beams, again eliminating the need for CIP concrete. Core and shear walls used Bailey’s prefabricated composite wall, trade named COMWALL™.

COMWALL™ is a stay-in-place forming system that uses light-gauge steel framing members to build concrete walls for shear and core walls. It can also be installed by the steel framing contractor, which increases efficiency in the construction process.

“If we utilize steel throughout the whole building, you reduce the need for certain trades,” says Van Gageldonk. “The people who are installing the walls and the floors can often install your cores. If you don’t... you would need a crew to come in and cast in place just those walls. Steel allows for seamless integration.”

Going green at no added cost

The Steligence study assessed construction time for both designs and found the schedule was similar, with concrete taking 412 days and steel taking 415. They cost almost exactly the same, too: the concrete building cost \$56.1 million, and the steel version totalled \$55.9 million.

The real difference emerged when the buildings were assessed for their environmental impact.

The Steligence team used the Tally® plug-in for Autodesk Revit to compare the two design scenarios from cradle-to-grave for the 60-year lifespan of each structure.



“You can build a building with steel. Twenty years later you can remodel that building, either reuse that product because there will be no degradation in its performance, or you can put that into your blue bin... and it can get melted down and turned into steel studs again for another project. There’s no other building material that has that type of story that I know of,” Parlardg explains excitedly.

The findings are as clear as glass

However, both Parlardg and Van Gageldonk admit that sustainability is only one page of the story.

“The green story is very nice, but it can’t cost anyone more. And it can’t reduce performance in any way,” admits Parlardg.

Telling the full story of steel high-rise construction is one of the goals of the Steligence study. By analysing building designs from multiple factors, the study shows that steel is an alternative that doesn’t forgo quality, cost, or schedule.

While there was limited financial advantage between the two designs, the sustainability of steel construction was clear with a 15 per cent reduction in Global Warming Potential.

Steel construction had GWP reduction of 15%.

This result is consistent with other Steligence case studies, which have shown steel’s superior environmental performance not only in high-rise buildings, but also in office, mid-rise, and Passive House builds.

The findings are clear: steel should be the top design choice as the building industry aims to reduce its carbon footprint.

Less materials = Less transportation, less cost and less environmental impact.

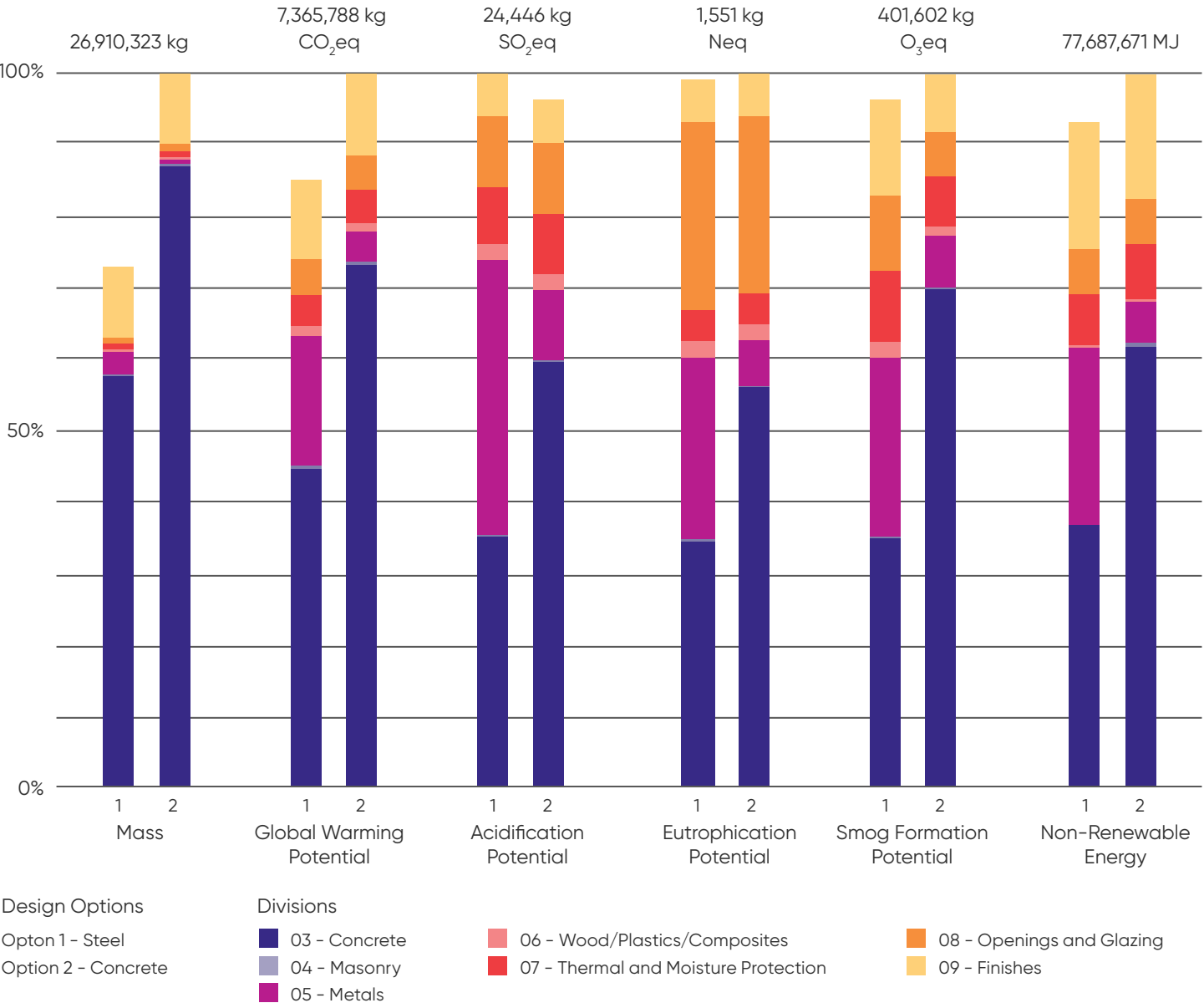
The assessment used the bill of materials and North American environmental product declarations (EPDs) from GaBi life cycle inventory and looked at global warming, acidification, eutrophication, smog formation, and non-renewable energy.

Results showed both designs were comparable across four of the five impact indicators, but the steel-based design showed a significant advantage in global warming potential. Steel saved approximately 1.1 million kg of CO<sub>2</sub> eq when compared to the concrete design.

This is equivalent to a single building taking 220 cars off the road.

The decrease was primarily due to the 27 per cent weight savings in the steel-based design. Concrete in both designs was the largest material contributor across the five environmental impact indicators.

Parlardg sees steel as a clear choice to advance more sustainable building practices. Steel used in construction today is fabricated from overwhelmingly recycled content, even as manufacturing methods are becoming more efficient and greener.



**Case Study Team**

**Design:**  
mcCallumSather // mccallumsather.com

**Structural Engineering:**  
WSP (concrete) // wsp.com  
Atkins + Van Groll (steel) // atkinsvangroll.com  
Bailey Metal Products (steel) // bmp-group.com

**Energy Modelling:**  
mcCallumSather // mccallumsather.com

**Mechanical Engineering:**  
mcCallumSather // mccallumsather.com

**Electrical Engineering:**  
Seguin Engineering // sei-ee.com

**Cost Consulting:**  
Altus Group // altusgroup.com

**Schedule Consulting:**  
MPa Consulting



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