



Design *Quarterly*

ISSUE 22

Experiences

Rising expectations for the built environment

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ISSUE 22

Thoughts, trends and innovation from Stantec's Buildings practice

The Stantec Design Quarterly tells stories that showcase thoughtful, forward-looking approaches to design that build community.

ISSUE 22

Experiences

Rising expectations for the built environment

Walking into a great building should be a great experience. In this issue, we look at what makes a cultural building special, how branding can enhance our everyday experience of the built environment and design for thermal comfort in industrial spaces.

Seen another way, every aspect of the design experience for buildings—collaboration, tools, funding, and timeline—largely determines the result. And this experience is changing, too. This issue also examines the design experience for buildings, including the influence of P3 funding and tight schedules for schools and AI-assisted hands-on workshops for healthcare.



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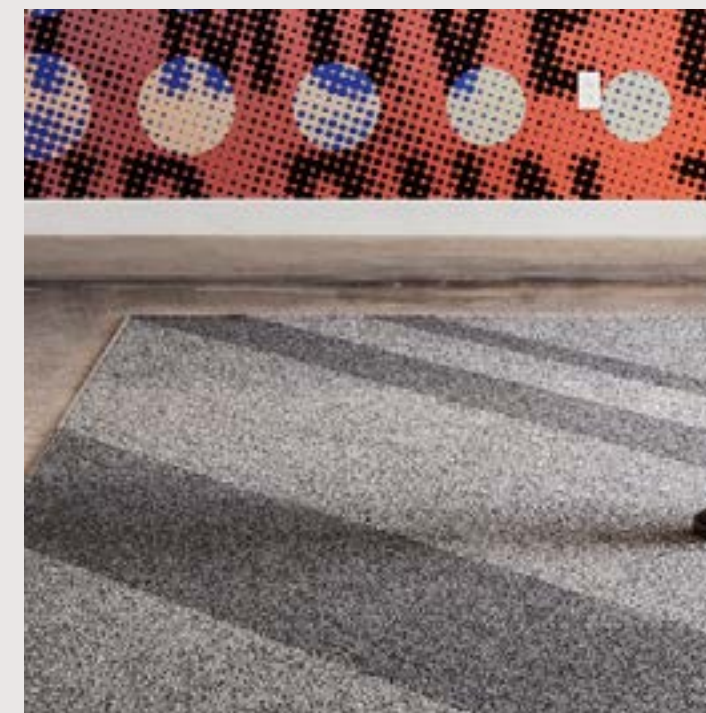
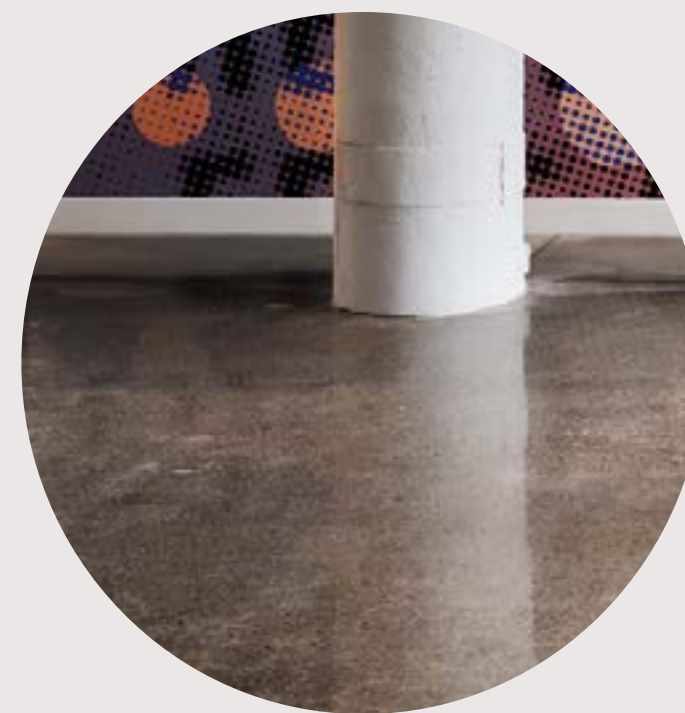
Storytelling for buildings

Why branding matters in the
built environment

By Krista Bourque and Nina Max Daly



Southline
Boston, MA





Emblem 120
Woburn, MA



In today's real estate market, branding is no longer a luxury reserved for high-end properties; it's a necessity for success. The built environment—offices, apartments, retail spaces, schools, and mixed-use neighborhoods—often requires more than just thoughtful design and a prime location to succeed. To create a meaningful connection with the communities they serve and engage users, places need compelling identities, a story that resonates, and a promise that differentiates. That's where branding comes in.

What is effective branding?

Successful branding can come in many different forms.

Thoughtful branding shapes perceptions, drives engagement, and adds lasting value. Successful branding can play out in the built environment in several ways, from increasing presence and position in the marketplace to boosting a feeling of belonging within an organization or community. A compelling brand lays the groundwork for a property to leverage hundreds of touchpoints to appeal to its users and separate itself from the pack. >

Our frequent client and collaborator Noel Carson, Vice President of Marketing, Creative Director at Bozzuto says it best: “The best brands are responsive and they’re able to flex and bow. They have a wide enough kit of parts that can be used to market the asset across a myriad of channels—including web, social, events, and print. When done right, it creates brand love for the property, ultimately bringing value to our clients and an apartment brand that is connected to the consumer.”

As a branding studio specializing in real estate, we often work in tandem with Stantec’s architects, planners, and interior designers to collectively create distinct and memorable places. The resulting projects vary just as broadly as the brand identities themselves.



Landrum Middle School
Houston, TX



“The environmental graphics provide stunning visuals that will stand the passage of time and stimulate the imagination of the people who engage with the spaces in Landrum Middle School.”

JENNIFER HENRIKSON
Principal | Houston K-12 Market Leader

Landrum Middle School

Connecting students with pride and purpose

When Stantec’s team of architects and interior designers was tasked with creating the new Landrum Middle School in Houston, TX, the goal was to reorganize and modernize the campus, while paying homage to the school district’s history, values, and beloved mascot, the Landrum Lion. Our branding team was brought in to develop visuals that would foster pride and encourage learning.

Branding

Our branding team synthesized the interior design concept, the desires of the school district, and the district’s existing branding to create visuals that serve as both artwork and inspiration. The team created two large external graphics for the building’s façade that reimaged the school’s mascot—the Landrum Lion—into iconic art. Inside, our team created large scale art pieces that incorporate geometric patterns, meaningful quotes and references to natural phenomenon that embodies the idea that “wonder is the beginning of wisdom.”

Benefit

The result is an engaging learning environment that reflects Landrum’s pride in its mascot, while also encouraging its students and staff to dream big. The multi-panel, larger-than-life lion mural in the public courtyard has become the school’s iconic epicenter, where students and staff take milestone photos with the mural as the backdrop. >

Southline

Create a transformative destination in an historic setting

Branding can transform properties into places with unique identities offering meaningful experiences. Effective branding elevates a property's appeal, fostering emotional connections and enhancing tenant satisfaction. When Stantec's team of architecture, interior, and experiential designers was enlisted to breathe new life into the former *Boston Globe* headquarters, we envisioned the 16.6-acre site as a modern hub for creative offices, laboratories, and retailers. We aspired to fashion an innovative 'genius factory' infused with vitality, subtly acknowledging its past.

Branding

We employed two primary concepts in a distinct visual identity throughout the property. The first pays homage to the printing presses that once ran here. Prominent graphics use letterforms as art, echoing the halftone textures of newspaper printing. We crafted large-scale floor numbers at elevators from a halftone pattern of CMYK dots. Restroom identifiers feature collages of newspaper clippings and letterforms.

The second concept was inspired by 'synesthesia,' a condition where people perceive colors when hearing music. We expressed this in bold colors and dynamic patterns to suggest energy and modernity. Branding seamlessly integrates the property's marketing tagline "make some noise" in floor-to-ceiling graphics, while snippets of song lyrics adorn the walls.

Benefit

The reimagined facility, known as Southline, stands out among Boston's office spaces. Beyond its storied history, it offers a range of exceptional amenities, including a food hall, roof deck, indoor basketball court, and a charming newspaper truck-turned-lounge. Distinctive brand graphics enhance the ambiance, giving the building a unique identity, attracting diverse tenants, and providing clear wayfinding throughout the 750,000 SF campus. >



Southline
Boston, MA



Emblem 120

Inspiring residents to embrace the journey

In an industry where first impressions are paramount and competition is fierce, a strong brand can be the decisive factor that sets a property apart. For a multifamily property, this means telling a story through multiple touchpoints—everything from its name to its artwork—to create an emotional connection. Emblem 120, a new apartment community in Woburn, MA, honors the town’s industrial heritage while offering modern residences within a 5-minute walk from the commuter rail.

Branding

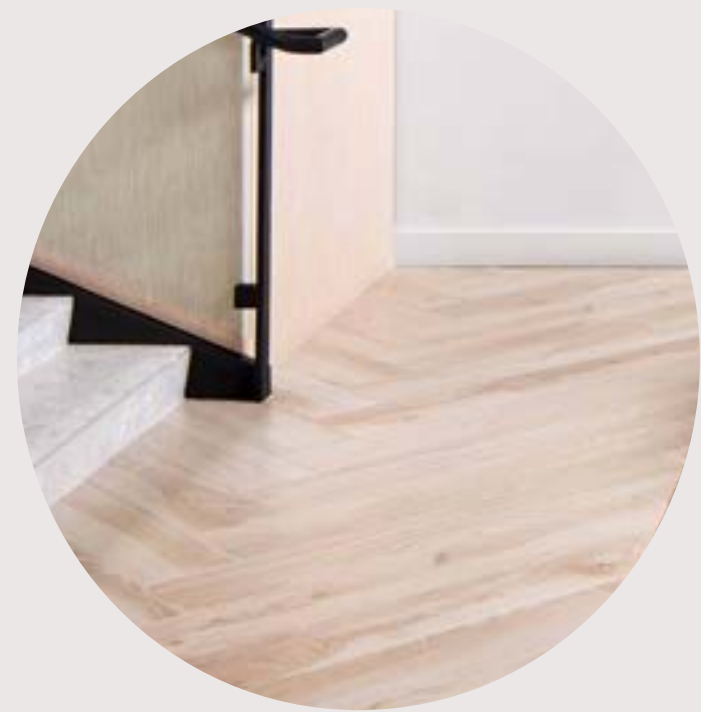
Stantec’s branding and interiors teams developed a concept and tagline, “Made for the Journey,” which references the neighborhood’s manufacturing history and immediate access to public transit. The property brand, interior design, custom artwork, wall coverings, and signage design all work in harmony to reinforce this concept and create a cohesive branded environment.

We vividly brought the concept to life with the “explorer’s wall” spanning the double-height lobby space, showcasing famous journeys—from Voyager 1 to the Boston Marathon—in inspiring images. In the fitness center, motivational custom wall coverings emphasize the property as a launching point for life journeys, featuring graphic patterns that merge directional motifs, GPS coordinates, and emblems showing the number of steps to renowned destinations.

In the co-working pods, custom wall coverings celebrate the town’s history through patterned duotone images. Local history is intricately woven into the property finishes, with elements like thick-stitched leather-wrapped columns, blackened steel beams in the lobby, and die-cut bronze signage in the concierge area.

Benefit

Choosing where to live is emotional. When branding and interiors align to create a unique sense of place and a compelling story, potential residents are more likely to feel a positive connection. Well-branded properties become more memorable and are perceived as more desirable. Emblem 120, with its cohesive and inspirational branding, exemplifies this success by having leased 92% of its available units. >



Giving a new neighborhood its name & identity

A new mixed-use destination is being developed between vibrant Houston and sun-drenched Galveston, TX. Stantec's Urban Places and Branding teams were engaged to craft an authentic and enticing vision for the development, aiming to attract top-tier retailers and the public.

Branding

Our branding team presented the neighborhood committees, government officials, and other stakeholders with more than 20 potential names for this new destination. We sought a name that resonated with local culture and highlighted the area's unique characteristics.

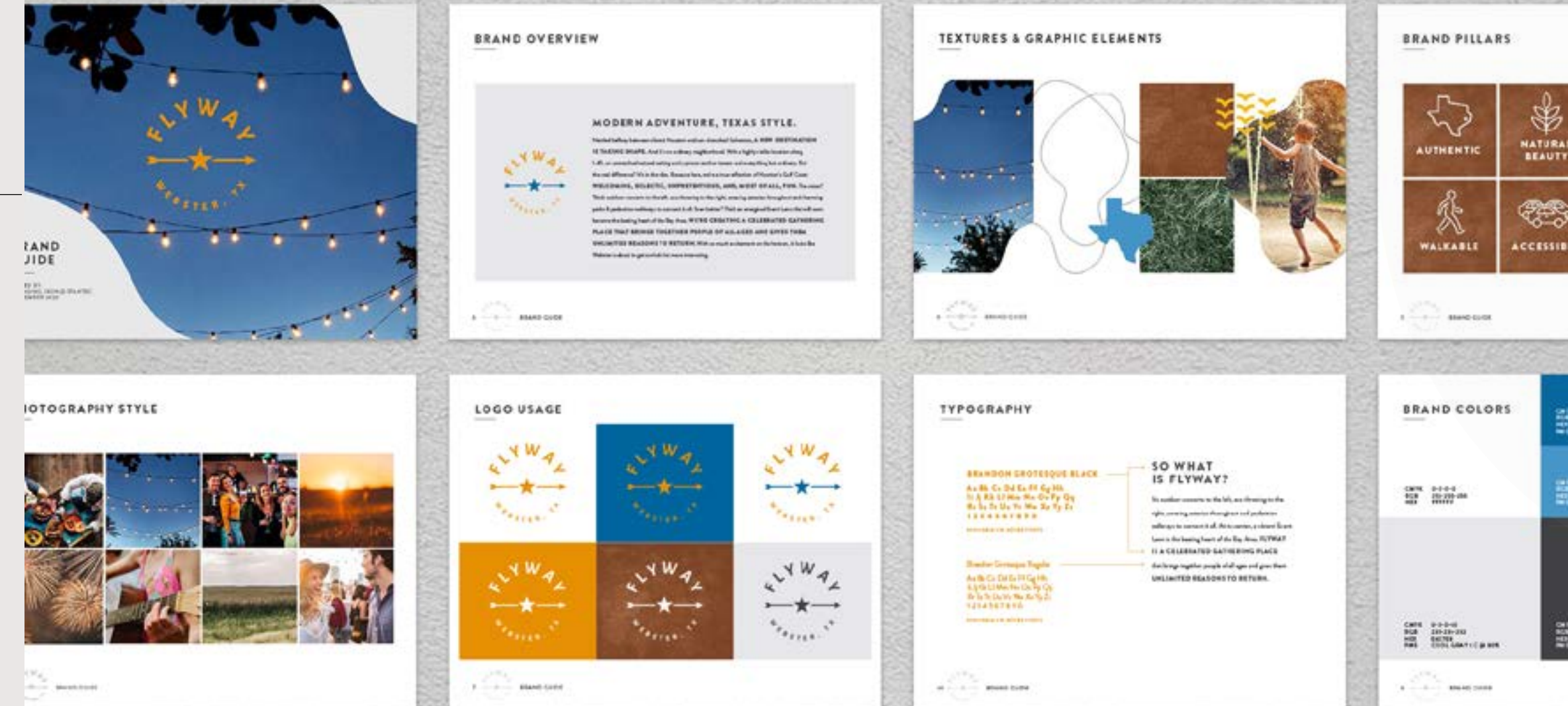
The selected name, "Flyway," draws inspiration from the nearby Lyndon B. Johnson Space Center and the migratory bird route that passes through the community.

The brand and logo extend throughout the neighborhood, and serve to celebrate local culture, the site's natural beauty and contemporary energy. This cohesive approach ensures that every element of Flyway, from signage to promotional materials, aligns with the overarching brand vision. All consultants adhered to the brand standards in their use of language, graphics, and brand attributes.

Benefit

The comprehensive branding of Flyway established an authentic identity that resonates with the community and visitors. Anchored by Great Wolf Lodge and set to open in August 2024, the development has successfully secured deals with sought-after retailers.

Integrating design and messaging through environmental branding brings special buildings to life.



More Branding

Creative director and brand strategist **Krista Bourque** founded and leads Stantec's Branding Iron studio from Boston, MA.

Nina Max Daly is a senior associate and art director with Stantec's Branding Iron team.

Artificial intelligence meets cardboard

Adding generative AI to our hands-on health workshops democratizes the design process and builds consensus.

By Brendan Mullins,
Stephen Parker, and Jon Sell





Hands-on collaboration is a key phase in developing designs for health projects. Traditionally, this process involves gathering professionals and end users in a room with life-sized design elements—walls, desks, beds, etc.—crafted from cardboard and foam to see how participants interact with space.

These mock-up sessions give health professionals a realistic feel of the layout, allow them to move around in spaces, and deliver feedback on design ideas in real time. It's an invaluable and low-tech approach to design.

As new visualization technology—virtual reality (VR), for example—has become available, design teams are finding opportunities to enhance this process. By increasing the level of realistic detail during mock-ups, project teams can give collaborators more visuals to react to and comment on, resulting in more valuable feedback to help guide the design process forward. Now our health designers are introducing generative artificial intelligence (AI) into their mock-up sessions, taking visualization to the next level.



Nurse's station
Cardboard mock-up
VS AI Virtual mock-up



AI allows a project team to prototype rapidly, comparing design iterations quickly and refining ideas, such as enhancing or adding biophilic elements, in fractions of the time of previous digital methods. For example, if users want more natural light, an AI technician can make the changes, dialing into a certain time of day, climatic condition, or season, and then asking follow-up questions, such as “Is that too much light, or not enough?” or “Should we add a window or additional texture?” All of this is done in real time.

Using AI design workshops

Experts from Stantec's Philadelphia, Washington, D.C., and San Francisco offices hosted a pre-conference workshop at the Healthcare Design Conference + Expo in New Orleans to test this new collaborative approach, combining the typical analog mock-up process with the power of generative AI.

The Stantec team was composed of behavioral health planners, cardboard mockup specialists, and an AI designer.

We were joined by two behavioral health furniture vendors and researchers from Texas A&M > University (College Station, Texas). Participants collaborated on the design concept for two behavioral health spaces. They designed a care desk and a patient room to serve adult patients with an eating disorder diagnosis. Another space was intended to serve higher-acuity pediatric behavioral health patients.

A previous version of this article was published in Healthcare Design Magazine as “AI Meets Analog: Harmonizing Mock-ups With Generative AI.”

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We educated participants on the process for design and prototype creation and approaches to behavioral health environments. Then we split them into two groups, each led by a behavioral health designer, and assigned each person a stakeholder persona, such as patient, family member, nurse, or psychiatric specialists. This step gave collaborators a chance to move out of their day-to-day jobs, leave their personal biases behind, and take on the role of advocating for others.

Each of the physical mock-ups featured real furniture as well as modular cardboard items, such as bathroom fixtures and doors, built-in storage, bench seating, and windows, as well as care desks and enclosed glazing. For example, the patient room on the eating disorder unit is a lower-acuity space so the participants had wider, more hospitality-oriented furniture options and simulated wood grain materials along with the cardboard they could choose to help deinstitutionalize the space.

Participants were invited to move these elements around to find a preferred layout and then photos of the arrangements were taken and sent to the AI designer. Participants were also asked a series of questions about finishes, feel, and aesthetics, such as what kind of materials they preferred and how much light they wanted in a space. Based on their input and using a generative AI engine, the technician created realistic renderings in 3D that participants could experience virtually on monitors.

Designers also suggested different elements, such as lighting, finishes, or biophilic features, to see how they affected the design as they fine-tuned it to stakeholder preferences. For example, collaborators in New Orleans asked for more hospitality-inspired elements such as natural wood and daylight, which they felt would help put behavioral patients at ease. In a few moments, our team rendered a photo-realistic version of the space which could be experienced virtually by the participants.

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Designers and technologists from Stantec’s Philadelphia, Washington, D.C., and San Francisco offices hosted a pre-conference workshop at the 2023 Healthcare Design Conference + Expo in New Orleans to test this new collaborative approach, combining the typical analog mock-up process with the power of generative AI.

Benefits of AI-assisted collaborations

Enhancing the traditional mock-up with generative AI requires infrastructure such as significant computing power, expertise in crafting AI prompts, as well as a clear process to follow.

For example, in the mock-up workshop, Stantec’s AI Designer Brendan Mullins leveraged an open-source generative AI platform as a rapid-prototyping workflow for quickly turning images into renderings, while maintaining the original intent of the source



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Patient’s room
Cardboard
mock-up VS
AI Virtual
mock-up

image. The system requires only a powerful computer like those used for video gaming, so it can be operated from anywhere. This means we can take it to the client, job site, and meetings. >



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Nurse's room
Cardboard mock-up VS
AI Virtual mock-up

While AI-assisted collaborations are still new, several advantages are already emerging, including:

It's fast and realistic. In this process, we can generate realistic renderings of mock-up spaces based on input from the participants, such as suggested lighting, finishes, or biophilic features. The exercise allows participants to see the effects of their design

decisions in real time and adjust as needed. They also get a clearer idea of the finished space.

It's image-prompt agnostic. Cardboard mock-ups are one of many image prompts that we can use in this workflow. The mock-up photos could be replaced with hand sketches, screenshots of digital models, or photographs of existing buildings.

It's fun. This process can make the workshops more interactive and engaging. It's a thrill for participants to suggest different elements and immediately see how they affect the design. At the mental health workshop, participants shouted out requests and expressed their approval as the imagery changed before their eyes.

It deepens engagement. Changes can be reflected in the design right away, allowing users to know they have been heard. Furthermore, using stakeholder personas, they can see how the spaces would look and feel from diverse perspectives and advocate for design elements to address those needs.

It democratizes the design process. As much as designers like to draw, the images we make by hand take time and require interpretation. This process does not rely on the hand or skill of a single designer but on the group's collective input. It's a great way to build buy-in and enthusiasm around a design to move it forward. The design team can take the inspirational images and incorporate those ideas as the design develops further.

Evolving the design process

With the burgeoning use of AI across society—from text-based to generative imagery and rapid video creation—the healthcare design industry is grappling with how best to leverage this technology for the benefit of its clients, colleagues, and communities. Humans are at the heart of health environments, and AI is another great tool to complement existing design approaches.

By democratizing the design process with generative AI, patients, staff, and family can feel greater ownership of the spaces that affect them. Designers can hopefully be freed up to exercise greater empathy in the process while crafting more immersive and experiential sensory environments through rapid rendering.

More AI technology

Brendan Mullins is the Design Computing Discipline Leader in the Buildings practice. He focuses on integrating advanced visualization, computational design, parametric design, generative design, and artificial intelligence tools into our processes.

Behavioral health planner and mental health design subject matter expert, **Stephen Parker** is a proponent of "architect as advocate" in our Washington, D.C. studio.

Jon Sell is a senior medical planner specializing in behavioral health and is based in Stantec's Philadelphia office.



An earth design concept differentiates Drew-Freeman Middle School. All six new schools feature outdoor classrooms and dining areas.

Delivering great design and equity through P3 schools

Many 20th century school buildings are due for replacement, so school systems are looking at alternative financing and fast-track construction to meet their needs.

By Gwen Morgan and Michael Scarani

It's not every day that one gets a phone call about starting not one, but six new projects simultaneously for one district. With construction starting in a year? On one million square feet of space? This is the new world of alternative financing for education. Design and construction move fast here. It's part of an ambitious effort to build desperately needed new schools on a tight timeline to meet community needs, especially in areas with fast growing populations and aging facilities.

Why? Students' learning outcomes are significantly affected by their learning environments. National Assessment of Educational Progress (NAEP) data shows that students perform better in schools without infrastructure problems. Many American schools, however, are old, outdated, and need replacing. In 2016, the average public school building in the U.S. was 44 years old. In 2020, the U.S. Government Accountability Office (GAO) reported that roughly half of public school districts need to update or replace multiple building systems. >



Drew-Freeman Middle School
Suitland-Silver Hill, MD

Repairs can be costly. So, school systems are looking to replace.

When we were hired on the Prince George's County Public Schools *Blueprint Schools Program*, more than half of the 208 schools in the district were more than 50 years old. Needing to address their aging infrastructure, overcrowding, and deferred maintenance challenges, Prince George's County Public Schools (PGCPS) embarked on the ambitious undertaking to accelerate the delivery of new schools. PGCPS chose to leverage a full-scope alternative financing model to design, build, finance, and maintain a multi-school K-12 construction program, the first public school system in the nation to do so.

Equity needed

One of the goals for PGCPS was equity. To improve learning outcomes, it needed to reverse the declining quality of



Walker Mill Middle School features a media center with interactive display boards, video production studio, music, band, dance rooms and STEAM labs.



\$200M = estimated savings in escalation charges for construction by opting for a fast track method

education facilities from decades of disinvestment. Its ambitious plan was to complete the design and construction for multiple new schools in half of the time of traditionally funded projects. To make an impact in the large system, it planned to open 6 new schools.

The Prince George's County Public Schools *Blueprint Schools Program* was financed through a P3 (public private partnership) delivery model and included a 30-year maintenance contract with Honeywell. In the P3 model, our client on the project was Gilbane Building Company, the design-build contractor for the six schools in Prince George's County. It required the team to design and construct all six schools in two and a half years, which was much faster than the usual seven-year process for the school system. Ideally, the P3 approach enables Prince George's County County to rapidly update its school buildings.

Stantec has been delivering P3 schools in Canada for decades. Our experience poised us for success in translating P3 school design to the US market. Now, with the *Blueprint Schools Program*, we've accumulated further thoughts on successful approaches to P3 education project design in the US. Many schools need replacement and many school systems will look to Prince George's County as a model.

How did we keep the project on the fast track while promoting design excellence?

With such a short timeline for so much space, how could we tackle this most efficiently? Were there ways to leverage technology to help us with repetitive elements to save time? And how could we promote and preserve research-based design while meeting the demands for cost and schedule?

Understanding that the architecture of each building needed to be very similar, could we still give each campus its own character and personality? How did we do it?

Virtual collaboration

We assembled an all-star team of our education designers from five different offices: architects, interior designers, buildings engineers, lighting designers, civil engineers, project managers, graphic designers, and others. We developed virtual collaboration capability prior to the pandemic so we had some tools in place for working remotely. But this was a new type of undertaking. We assigned a leader for each building type and a leader for coordinating each discipline. So, rather than just a vertical team structure, there was a significant horizontal structure too. We leveraged remote work technology to increase our communication and coordination across the large-scale project. >



Colin L. Powell
K-8 Academy
Fort Washington,
MD



Sonia Sotomayor
Middle School
Adelphi, MD



Leveraging technology

With so much design and documentation work to do on a tight timeline we looked for efficiencies and technology applications to accelerate the process. The unique project requirements and the composition of the team required us to seek alternative approaches to information sharing, coordination, and documentation. Some of these approaches have since become more routine across more teams and project types.

We automated the publication of design models and revisions from multiple disciplines to the 3D model in BIM360 on a regular schedule. And we resolved any clash issues, toggling models for each discipline on and off, in weekly cross-discipline coordination meetings. This proved a fast and lean approach to interdisciplinary coordination.

We harnessed the power of Teams with numerous specialty channels reflective of the scale and responsibilities of the various school teams. This allowed all Stantec disciplines or subject matter champions to manage specialized communications within smaller groups while allowing the entire project team access to that information.

We took a unique approach to digital modeling, creating five models in Revit for the design of six school buildings. Our team leveraged one 3D model to draw

two of the four prototype two-story school buildings. We created another “linked” model for the other two prototype schools. Each of the four-story schools got its own model. And we created a fifth model for shared details used across all six schools. The shared details model provided a kit of parts we utilized on all the schools including UL ratings, envelope, ceiling, stair, elevator, expansion joint, partition details, casework, and gymnasium elements. We also adopted one set of specifications for all six schools which ensured equity in materials and content at each location. This approach saved time during documentation.

We also collaborated with the builder’s team on customizing the construction phase management software to handle six different project sites with six different construction teams within a single project environment. >

Keeping design at the forefront

We started with a strong “village” design concept that was efficient, aesthetically pleasing, and supported by the district.

We looked for creative ways to preserve the original design concept while reducing scope or cost when required. With rising materials pricing, we had to find ways to save on costs. For example, where we might have designed with natural materials such as wood, we turned to wall covering materials with a wood-like appearance to create the same effect. Elsewhere, we found alternative durable flooring solutions within the budget that still matched the palette.

We built up trust with our builder over time by bringing ideas to the table and contributing to the conversation on reducing the scope and finding value when necessary. That enabled us to push back and advocate for elements that we

know make a qualitative difference. For example, we advocated for lighting systems that were customized to the space type rather than a more generic one-light-fits-all approach. The builder accepted our proposal, and we chose lighting schemes to enhance various spaces.

Layering storytelling, color, and local flavor

The team needed to deliver multiple building designs at the same time as one project, but when built, each school needed to serve a unique, individual community. Four of the buildings would have nearly identical architecture. How could we make each one feel like a unique building? We used nature as an inspiration for storytelling to give each school a distinct personality through the colors, materials, graphics, and artwork both inside and outside the school buildings. We developed a nature-based color palette for each campus. We used color

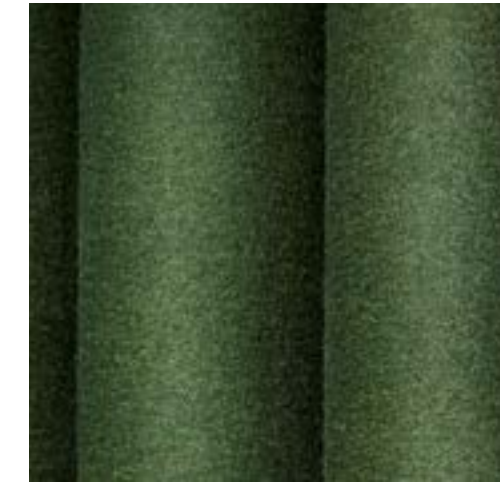
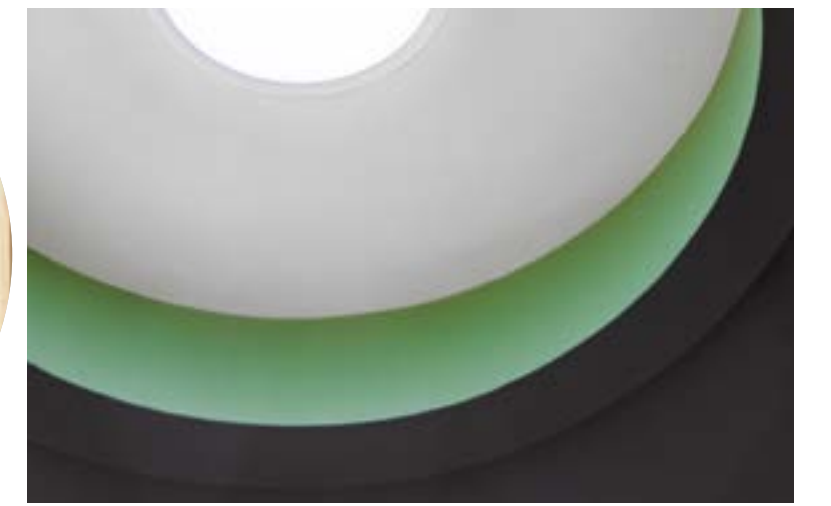
to tell a story around water, forests, the night sky, and the earth at each of the four prototype campuses.

At the Hyattsville Middle School the day sky was our inspiration. The meadow defined the colors at Colin L. Powell Academy. Nature tied all the elements together, but the different themes at each campus gave us a direction to develop unique expression. We carried the themes through the color of materials but also through the signage and graphics used in the main entry and throughout the common areas. Then, we gave each campus some local flavor at its core. We enlisted a local artist to create a mural in each school dining room expressing the theme in their individual style. >



Kenmoor Middle School,
Greater Landover, MD
+ Inspiration imagery from the
designer's concept board

The color palette at Kenmoor Middle School was inspired by the forest.



Delivering value

The Blueprint Schools Program is designed to deliver value. Prince George's County Schools estimates that it will save \$200M in escalation charges for construction by opting for this fast-track process. And it also estimates savings of \$260M in deferred maintenance. Every dollar saved can be invested to support the schools' educational mission.

A fascinating case study

We are anxious to do post-occupancy evaluations with the schools. We are really interested in comparing responses from each community. We're especially curious to track the experience at the four (largely) identical new schools occupied at the same time, a rare situation.



Hyattsville Middle School
Hyattsville, MD

Designing for equity in education

PGCPS faces growing student enrollment, while more than half of its 208 schools are over 50 years old. Some of the oldest PGCPS buildings had issues ranging from structural integrity to aging alarm systems and obsolete heating and cooling systems. The Blueprint Schools Program addresses the County's aging and crowded facilities. We delivered new, highly functional, safe schools for PGCPS. These new schools, designed to LEED Silver-standard, contribute to establishing equity in education in Prince George's County.

The project exceeded local economic and inclusion goals by engaging diverse, local businesses. The result, 34.8% of contracts were awarded to Minority Business Enterprises (MBEs), including \$65 million awarded to MBE businesses in the County.

Now complete, phase one of the Blueprint Schools Program opened 8,000

new seats for students at six new schools. Among many state-of-the-art design features, the new schools feature media labs, black box theatres and maker spaces, expanding the variety of educational and experiential opportunities for students in Prince George's County.

We believe the Prince George's County Public Schools Blueprint Schools Program can be model for American school systems looking to maximize value and design quality on a demanding timeline in their school modernization programs.



More Education

Gwen Morgan leads interior design and technical excellence for the firm globally, guiding the Research and Benchmarking team for furniture and the interior environments.

With 40 years of experience in architectural design and project management, Michael Scarani's career has encompassed a broad range of projects including post-secondary education, K-12, research, and healthcare. Michael is involved with all aspects of design execution and documentation while mentoring staff and providing technical oversight and guidance.



Drew-Freeman Middle School
Suitland-Silver Hill, MD

Eight ways to cool a factory

Industrial facility design can address factory overheating and promote wellness in manufacturing plants.

By Jaimie Handscomb

Typically, the most important element in an industrial factory design is the process of manufacturing goods. In many North American factories, even those that make electric vehicles, this has translated into potentially sweltering, uncomfortable places that make workers unproductive and in some cases, unwell.

Putting people and wellness first in today's industrial facilities is the right thing to do. And there are bottom-line reasons to emphasize worker comfort in the factory. The U.S. manufacturing sector is booming. In a flourishing job market, industrial workers have increasing choices of where to work. The hotter and healthier the factory floor, however, the more likely it is that workers will look to transfer out as soon as they can. Recruiting and training new staff is costly. Manufacturing has one of the highest costs to hire, estimated at \$5100 by **RecruiterBox**.

Whichever way you look at it—from a workplace wellness point of view or from a competing for talent angle—there are good reasons to explore climate control options in the factory workplace. With many years of experience designing high-performance, sustainable, and energy efficient systems for industrial and advanced manufacturing clients, we see numerous opportunities to design for wellness within these spaces.



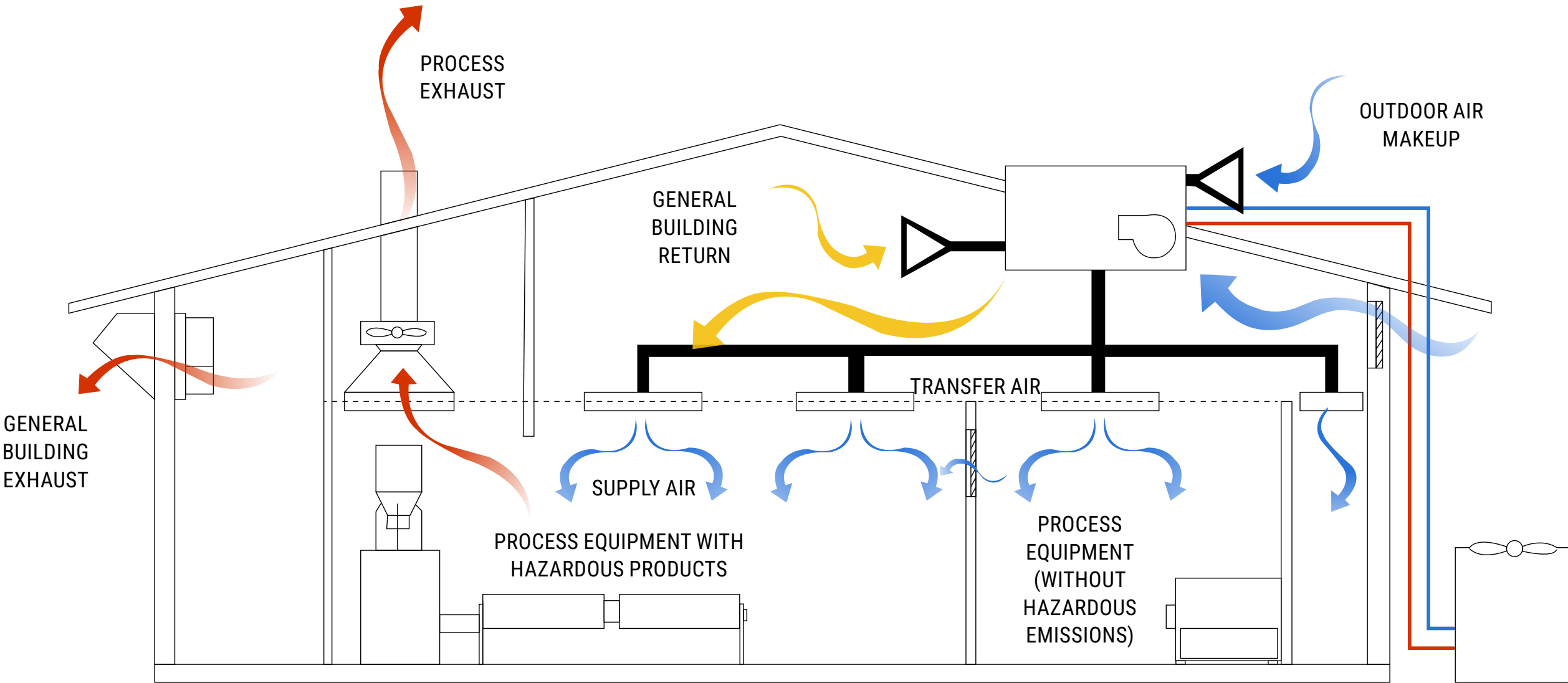
Heat issues in manufacturing plants

Firstly, we need to understand that manufacturing plants and similar facilities, by their nature, can be extremely hot. The industrial activities that take place within them may require melting and forming substances. The heat required to melt material radiates through the space. And factory work is active.

Movement creates heat and the work may require personal protective equipment which heats up the body. All these things influence

the thermal comfort—or discomfort—of those working in the factory. The U.S. Occupational Safety and Health Administration warns that some conditions have a great danger of heat stroke. But only a few states have heat standards for workers, and those are generally concerned with agriculture. Most existing plants don't have air conditioning. They are built on a budget. They leak air. They occupy huge volumes of space. Some might have some fans, but the truth is that these places get so hot that they open the doors to let the heat out. Even when it's 100 degrees outside. U.S. codes usually require employers to maintain a minimum temperature, not a maximum. Southern states such as Texas, Florida, and Georgia are seeing their manufacturing sectors grow. And heat issues, like climate, are regional. Manufacturers with multiple locations may find that while their factories in northern states rarely have thermal comfort issues, their Nashville, Charlotte, or Oklahoma facilities often do.

The issue is serious. It's not unheard of for workers to faint under these conditions. **Between 1992 and 2017, heat stress injuries**



killed 815 U.S. workers, according to OSHA. More often, however, workers are leaving jobs due to strenuous heat inside the plants during hot spells. Data in some areas shows a correlation between rising outdoor temperatures and worker resignations.

Health and safety are part of our design culture at Stantec. And no one should be investing in a plant that's so uncomfortable it can't hold onto its skilled staff. So, what are manufacturers' options for retrofitting their existing plants? >

This sample factory ventilation scheme shows multiple options for enhancing thermal comfort. These include supplementing existing background ventilation with a dedicated exhaust system close to main heat gain sources, providing minimum cooled makeup air directed to all areas, and treating and cooling mechanical makeup air supply. Other elements of a cooler workplace include eliminating air stratification, controlling heat gain sources, and using air conditioning.

Deloitte says the U.S. manufacturing sector could have a shortage of 2.1 million skilled jobs by 2030. Thus, worker retention is a bottom-line issue for North American manufacturers.

How to cool a factory

Let's look at interventions, from light to heavy, that can promote thermal comfort in factories.

Promote effective ventilation.

We want to make sure the air in the factory is moving so our team designs more effective ventilation for these spaces. When cross ventilation occurs at a high level in factory spaces, it can result in stratification, meaning that little of the ventilated air reaches the occupants at floor level. In our analysis of overheated factory buildings in the south, we often encounter situations such as wall-mounted air louvers that don't have fans to direct air toward areas where the team members are working.

We can direct the incoming air to places that people occupy. We often employ large, slow ceiling mounted fans (such as those made by Big Ass Fans) in our design for industrial spaces to provide additional air circulation which has a cooling effect. Fan placement is critical to effective air circulation.

Exhaust the hot air.

We can locate the exhaust where the heat sources are, use fans to direct the heat out of the building, and avoid mixing it into the main air supply. We can design systems that isolate the hotter areas, say shops where materials are melted down, and direct their hot air away from occupied spaces to exhaust systems.

Spot cool occupied spaces.


We can engineer cooling systems for the places most occupied by people, even devise small cooling stations in contained areas. In this way, the workers can get relief with some conditioned air in certain areas. We have designed spot cooling for individual workstations to provide comfort in hot industrial workplace environments. And in extreme environments where workers are exposed to very high temperatures, such as in a foundry or engine plant, we have created "cooling rooms" where they can get some relief.

Relocate or raise heat-producing equipment.

We can raise the industrial equipment off the floor to keep heat from collecting there and creating hot zones. By locating equipment on the perimeter, we can more easily exhaust heat to the exterior using fans and exhaust vents.

Keep it dry.

If we can avoid bringing moisture into the space, it will be more comfortable. We can dehumidify specific high-occupancy areas if needed. Cooling methods, such as indirect evaporative cooling systems, work for spot cooling factories without increasing the humidity. >


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Shade the windows and use LED lighting.

Make sure occupied spaces are shaded from direct sunlight and mitigate the building's solar gain. Use lower temperature LED lighting throughout the facility rather than heat-producing incandescent lighting. At Sacramento Municipal District's East Campus Operations Center, for example, we used special window shades and louvers to project daylight into the workspaces while keeping the sun's heat out. We can employ similar approaches in manufacturing plants.

Increase insulation and airtightness.

Steel construction and limited insulation on the roof and walls subject industrial structures in warmer regions to solar heat gains. What's worse is that we see this heat gain turns the physical elements of the building into unexpected radiators.

Our analysis of these factories shows fire hydrants, columns, and steel

elements in the interior becoming hot spots within the facility.

In most jurisdictions, when we incorporate cooling to any existing factory, that triggers compliance with the latest energy code. Therefore, installations to provide thermal comfort often require upgrades to the roof and wall with additional insulation to improve the R-value (the resistance the insulation provides). To avoid losing the cooling effect from the newly retrofitted factory, we have recommended the installation of loading dock covers, new vestibules with rapid doors, and air curtains.

Use conditioned air or localized air conditioning.

It may seem that we're forced to choose human comfort over the environment when we choose to install AC in factories. But it might be necessary. In sunny locales we can even power air conditioning with rooftop photovoltaics, mitigating carbon emissions.

Typically, when we design industrial automotive plants for the big North

American automakers, we provide "conditioned air" that is 10 degrees cooler than outdoors. It's not quite air conditioning, but it helps deliver a level of comfort. We sometimes find ways to use AC strategically to cool the spaces people use.

This can make a difference in worker retention. Only a few years ago, we worked with a major auto manufacturer because their workers were finding their plant temperature conditions uncomfortable, quitting, and going to other, cooler, facilities. Our new design provided air conditioning to specific maintenance areas to offer the workers relief which improved retention.

There's no magic trick to making factories more comfortable, but we can combine the approaches above in smart, low-emissions factory designs with an emphasis on well-being and an eye on budget. There's no reason the 21st century manufacturing facility can't be a healthy place to work. >



More Industrial

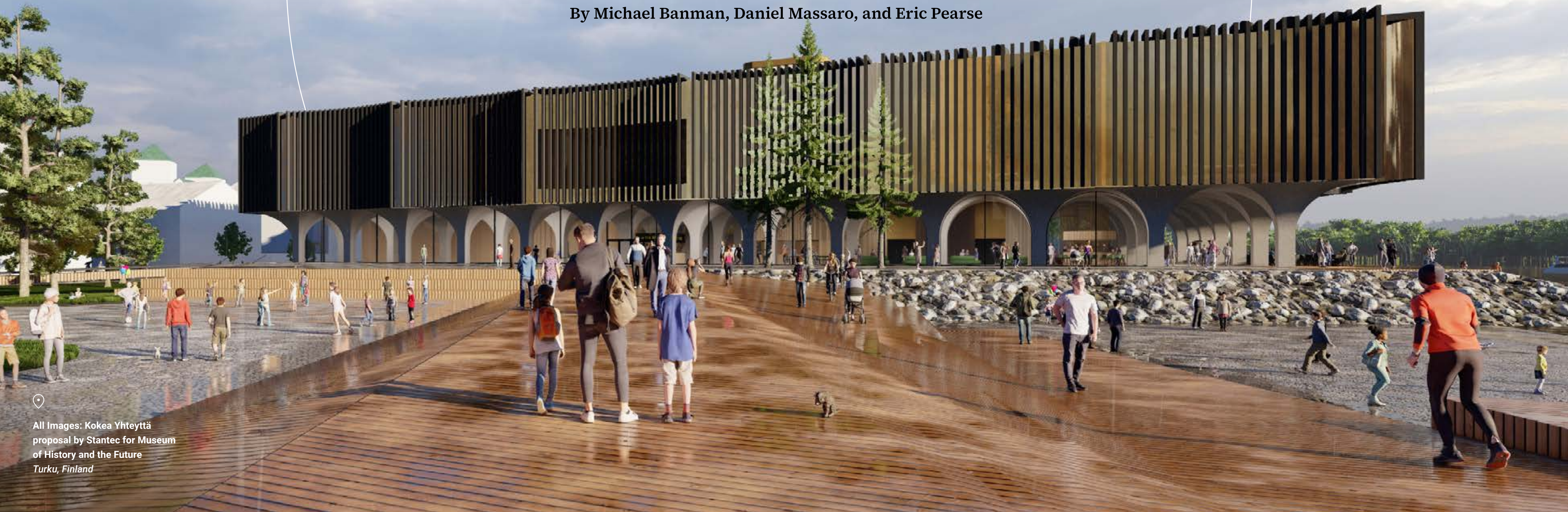
Based in Waterloo, ON, [Jaimie Handscomb](#) is a recognized leader in mechanical engineering, design, analysis, and management of industrial and manufacturing facilities.

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What public cultural buildings need to succeed

Today's museums must be more than exhibition spaces.

By Michael Banman, Daniel Massaro, and Eric Pearse



All Images: Kokea Yhteyttä
proposal by Stantec for Museum
of History and the Future
Turku, Finland



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The rooftop cafe offers unique 360-degree views of Turku, the Turku Castle, and River Aura.

Public cultural buildings have a special significance in our cities. These iconic landmarks are often the must-sees of the world's great urban centers. The opportunity to fund and build a museum and cultural center does not come along often. And the

expectations for them are high. Not only are these buildings often largely financed from the public purse, but in our day and age, they are expected to reknit the city's fabric. Society wants museums to enliven downtowns, excite tourism, engage the population, and tell a story about culture, history, and place. Naturally, cities are looking for special designs for these places.

Recently, we assembled an integrated design team and entered an international architecture competition with a design for the Museum of History and the Future (MHF) sponsored by the City of Turku in Finland.

Today a regional capital at the gateway to the Archipelago Sea, Turku is Finland's oldest city, boasting the historic, medieval Turku Castle. The competition gave us an opportunity to consider what design elements make a successful public cultural building like a museum of history and the future.

Importance

A public cultural building needs to have presence. It needs to communicate a sense of importance. Public cultural buildings need to be of an appropriate scale to their surroundings to radiate that magnetic presence.

The Turku MHF project will occupy a prominent location on the waterfront, connecting the city to the sea and the world to Turku. Presently, this area is an unwelcoming industrial working waterfront bisected by a rail spur with a vast parking lot where ferries and cruise ships arrive. The reimagined museum must capture the spirit of the new, public-facing waterfront and act as a front door to Turku. >

Permanance and cultural relevance

A successful cultural building needs a clear and compelling design concept that reflects the history, culture, and aspirations of the place and the people. The building's materials should convey that it will stand for generations.

For the Turku MHF, we took inspiration from the original stave churches in Scandinavia which have stood for nearly a thousand years. Traditionally, their cladding, their structure, everything is wood, repeatedly treated with pine tar to protect the wood from moisture, ultraviolet light, and rot. We wanted to draw on the past in our materials choices and communicate permanence and resilience. Our competition design was further inspired by the arches in the nearby Turku Castle, the Aura River, and the Archipelago Sea. Our design proposed durable and sustainable materials that are appropriate for the Finnish climate and context.

Our proposal features a scalloped facade of tall vertical wood slats over polished brass panels, lending a dynamic and lenticular effect to the facade and roof line. Depending on the time of day and angle of approach, the building responds differently to the light, appearing solid at times and porous at others.

Functional, flexible, and adaptable

Civic cultural buildings like museums are meant to live long and serve many purposes. Museums must also be great exhibition spaces. Public museums should be optimized to host exhibits, and for ease of installation and removal of them with the necessary offstage areas. They should be pleasing for the public to access and enjoy. They also require a variety of flexible spaces, programs, and amenities that cater to a wide range of needs and interests.

The museum will host exhibitions. Our design features two elevated black box exhibition spaces, protecting the exhibits and artifacts in the event of sea level rise. At the center of the public arcade, the atrium thoroughfare leads to a grand stair to the galleries above. We organized the space to facilitate movement in and out of the galleries, and for engagement, respite, and reflection. And the rooftop terrace offers additional outdoor exhibition space for sculptures. >



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The exterior of Stantec's design for the Turku MHF features pine tar-covered wood slats over polished brass panels.

Welcoming

A cultural building should feel welcoming. Transparency, particularly at the ground level, helps visitors connect with the museum. The public can feel a sense of nervousness when approaching a large public building for the first time. If visitors can see inside past the threshold, it helps them understand what they're going to experience. A preview can comfort them and a pass through can delight them. So, transparency and permeability are important aspects of any public cultural center.

We proposed an elegant solution to make this large-scale building approachable. A series of wide scallops clad in polished brass panels are lightly veiled by an array of blackened vertical wood slats. This provides presence, rhythm, and variety, breaking down the building scale. The museum maintains a level of grandeur with the rhythmic pattern providing continuous visual relief.

For the museum base, we drew inspiration from the shapes of the exterior Roman arches and interior vaults of the nearby Turku Castle to create a public arcade. We took that same shape and flattened it to create a pattern on the ground that reads as a modern, subtle icon for the museum. We extended the pattern across the plaza and arcade floor to establish a common ground connecting the public plaza through the museum. The pattern appears in varying scales along the major East-West axis helping visitors find their way to the entrance. We wanted to encourage people to stroll straight through its center. >





Connection to the public

A public cultural building needs to physically connect to the public on a common plane, without separation.

The common plane symbolizes that in this civic building and as a society we're on common ground. The museum must provide a memorable and distinctive experience that invites curiosity, dialogue, and exploration. A successful cultural building such as a museum connects to the surrounding urban fabric and public spaces. It creates opportunities for interaction and engagement. It brings people together.

The Turku MHF is intended to be a museum of gathering. It needs to connect to the past, look forward, and inspire the community to work together towards a better future for all. This is a museum where you can get a bite to eat and learn about the past. It's a place where you can make something or pull up to a desk, analyze information, and write about the future. There are multiple components to the museum: a living room, gathering and event spaces, auditorium, restaurant, shop and maker-space, an outdoor public market, rooftop café, and more.

On the Turku MHF design, we used the arcade and ground floor to create an open transparent public space that invites visitors to come in, move around, interact, and pass through.

The museum will act as a hub to various Turku destinations. We thought of the museum as a cornerstone to the new public, walkable arts district—that stretches from the town center to what will become a public park at the Turku Castle and the renovated cruise terminal arrival area. For the competition project, we linked

the museum and its public market and event spaces to the riverfront boardwalk, the historic castle, the castle grounds, and the recently rebuilt ferry and cruise line docking areas. The museum acts as a nexus between these various destinations—connecting people, history, transit, and nature. >

i In its materials, our design connects to Finland's historic structures and welcomes the public with transparency at the ground level.






Low carbon

Today's museums can exemplify design for low or net zero carbon. They should be both beautiful and energy efficient.

By optimizing the building orientation, structure, and external shading to create an efficient, insulated building envelope we reduced its energy appetite significantly. A ground source heat exchange system and energy recovery ventilator provide efficient heating and cooling to the museum.

Our plan minimizes embodied carbon by using carbon capture concrete, mass timber construction, and an efficient building module that reduces construction waste. The result is a beautiful testament to the possibilities for low carbon design.

 The museum design connects to the surrounding urban fabric and brings people together.

Connection to nature and views

Sometimes, civic buildings can seem cold, disconnected, and isolated. Designs that invite a connection or provide elements of nature can soften the presence of these large institutions. A cultural building should showcase views of the surrounding landscape or cityscape. We need to find a balanced approach to nature, building, city, and views.

We wanted to celebrate the landscape of the islands of the Archipelago Sea. We also wanted to reintroduce a “wild” forest to this former industrialized site. The stillness of the forest is important in Finnish culture. Our design creates two public green spaces on either side of the museum. The wild side echoes a natural pine forest, presenting the building in a natural setting and creating a sense of drama. Bisected by walkways it acts as a natural play area for children. The future park-like greenspace of Turku Castle on the other side is set against the outdoor event space designed to host markets,

festivals, and concerts. Our Turku MHF design connects to nature through its public green spaces, but its most powerful natural connection is to the waterways that connect Turku and the Archipelago Sea and world beyond.

How do you anticipate sea level rise in a place like Turku? Rather than follow the sea wall that runs along the Aura River, we designed a temporary harbor/rocky beach landscape that allows surging water to flow safely into the site. In our design, the sea wall passes in front of the museum's plaza. Our proposal blurs the boundary between constructed and natural environments, bringing together land, sea, forest, and culture. The design acknowledges calamitous effects of climate change balancing beauty and pragmatism. It also acts as a play area for kids, and a kayak launch or a place to welcome small boats. It gives the museum flexibility to incorporate a proposed permanent harbor.

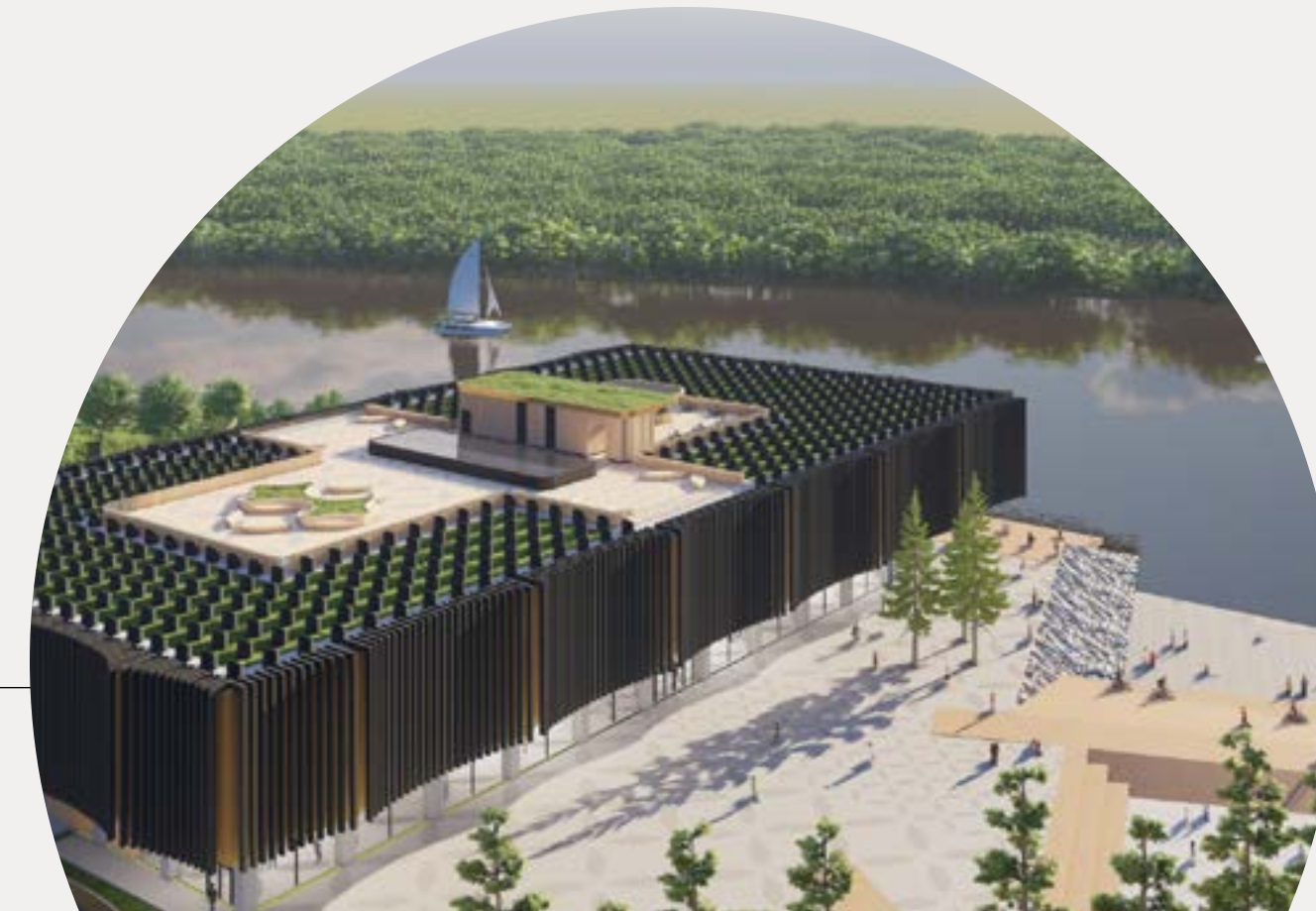


Stantec's design for the Turku MHF blends outdoor and indoor features. The boardwalk and colonnade lead inside and the restaurant and bar sits by the water's edge.



We created two important views from the galleries. Two glass corners peel open, expose exhibitions to passersby and offer amazing views of Turku Castle, the waterway, and surrounding landscape. While two opposing enclosed corners provide solidity to the facade and reinforce the idea of strength at its edges. There are additional views—to the castle and future park, or to the wharf—once one ascends the grand stair to the gallery level.

In designing the rooftop, serendipity struck. We envisioned 531 solar “trumpets” as indirect light wells for the black box exhibition spaces below. To enhance the roof’s appeal, we transformed this field of solar trumpets into a green meadow roofscape referencing Finland’s natural beauty. From above, visitors could sit amidst playful forms that pop out from the tall grasses. And the rooftop includes a café and sculpture garden, offering unparalleled panoramic 360-degree views of Turku and the waterway. >



The landscape design for the Turku MHF brings the natural elements of river, rock beach, and forest up to the museum plaza.





We designed the museum circulation to connect to stairs which lead to the main black box exhibition spaces on the second floor.

Integrated design

The best civic cultural buildings integrate urban planning, architecture, landscape, structure and systems in a harmonious whole.

We assembled an internal team of visionary designers and engineers from across disciplines to take an integrated approach to the competition design. Together, we imagined a new museum. We collaborated on a design that reaches out to Turku, connecting its historic assets with its rejuvenated waterfront and planned arts district. We carefully interweave architecture, nature, history, sustainability, recreation, and resiliency in our vision for a new museum complex in Turku.

The competition project is already paying dividends in inspiring new collaborations. We're looking for opportunities to apply our design approach to our next cultural building.

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More Civic and Cultural

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Design *Quarterly* ISSUE 22

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