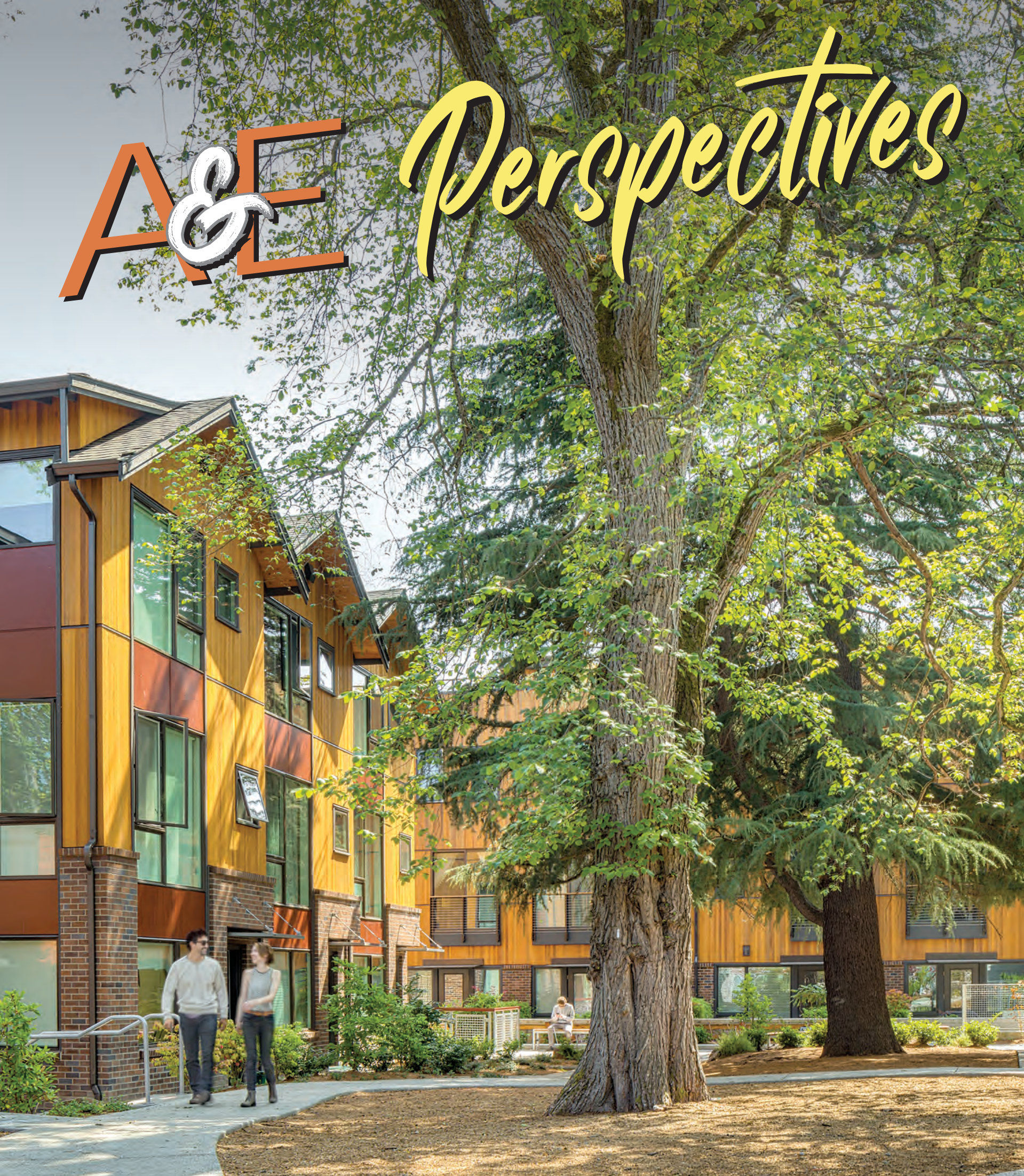


A&E Perspectives



MEET SOLERA: WHERE MIXED-INCOME MEETS MIXED-USE MEETS FAMILY TIME

Big projects with multiple uses have their own challenges and opportunities.

Solera is a master plan community in the Seattle suburb of Renton combining mixed-income housing with commercial into a single complex with a family orientation. As the lead architect for the Tiscareno Associates portion of the project, I have overseen the design of Solera's rental apartments and commercial space and can attest to the challenges that arise from a multi-use project of this scope. But projects like Solera hold opportunities too, for a future in which they will become increasingly relevant. In this piece we'll look at some of those challenges and opportunities, and what we have learned from them.



BY MARK STINE
TISCARENO
ASSOCIATES

With approximately 37,000 square feet of commercial space, 590 rental apartments, and as many as 96 attached townhomes on over 10 acres, Solera is first and foremost a huge development. The city of Renton was

looking to revitalize a neighborhood whose former affordable housing project on the site didn't have the density needed to optimally address the housing crisis that has plagued King County in recent years. To its credit, the city took the long view, seeking a developer with a broader revitalization vision than just replacement of the affordable housing.

After other developers failed to make such a project pencil out, Bellevue-based developer DevCo proposed one that did: a vibrant mix of affordable rental apartments, market-rate housing units, community amenities, a daycare, and flexible commercial space on a site adjacent to planned bus rapid transit, parks and a new public library.

When Tiscareno was hired to design the two buildings that comprise the commercial and rental properties of Solera (the townhomes are being designed independently), we knew that the people who used them would need adequate space both to circulate within their own homes and to navigate throughout the complex. We knew we had

Solera in Renton combines mixed-income housing with commercial into a single complex with a family orientation.



SOLERA — PAGE 6

PHOTO COURTESY OF TISCARENO ASSOCIATES

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REDEFINING OFFICES TO INSPIRE CONFIDENCE

The integration of digital and physical solutions is essential to deliver on today's expectations.

This is an exciting time for innovation in our industry. While we were navigating the restrictions on in-person work and social gatherings, we discovered valuable tools and learned behaviors that enabled us to continue to work, create, collaborate, and engage with others, regardless of where we're sitting. These tools and skills will launch us forward as we work and collaborate with a more inclusive and global perspective.



BY KRISTIN JENSEN
GENSLER

The urban core is slowly coming back to life as workers gradually return to the office. While many organizations are embracing permanent remote work options, surveys show that space does matter and the workplace isn't going anywhere, though the role of the office building, and the workplace inside, will continue to evolve. The office must inspire confidence and provide meaningful experiences that can't be found at home, as well as address the new health and wellness priorities of the occupants. The integration of digital and physical solutions is essential to fully deliver on these expectations.

DESIGN AND TECHNOLOGY

Our firm, like many others, seamlessly transitioned to working from home, literally overnight, due in large part to our ability to think creatively, be flexible, and establish a connected virtual community. Architects and designers had already embraced digital tools to design and document more efficiently and effectively. New technology and software platforms supporting greater collaboration and more sophisticated design solutions helped us work smarter over the past two years and will continue to be used going forward.

We're leveraging computational design software to carry out test fits and yield studies with real-time participation and feedback from clients, conducted in a simulated, data-rich environment where we can envision, implement, and evaluate the implications of design decisions instantly. This rapid iteration with greater accuracy, provides more time for the human-driven creativity needed to achieve a unique, site-specific, sustainable design solution. Building developers and owners are able to launch projects faster where speed to market means greater value.

Teams are also using digitally enhanced visualization and virtual white boards as design and



Digital tools and platforms provide opportunities for employees to continue to interact daily with their colleagues and clients.

PHOTO BY MARK HERBOTH

communication tools, as well as shared models and documents that provide efficient construction documentation — reducing errors and construction time. And now, more important than ever, is the use of digital tools

to track embedded carbon and environmental sustainability.

All these tools can affect positive change and create efficiency in how we collaborate globally to design, construct, and deliver unique, market-driven, sustain-

able buildings.

Because we work so closely as teams — both internally and with our external partners — we adapted very well to a more vir-

REDEFINING OFFICES — PAGE 6

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- 14 Reimagining the middle school experience, even before the pandemic

ON THE COVER

Master planning for Bryant Heights centered around maintaining significant trees and developing walkways through the site. Turn to page 9 to learn more about the evolution of hyper-local community spaces.

IMAGE COURTESY OF JOHNSTON ARCHITECTS

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THE BENEFITS OF IMPLEMENTING BIM COORDINATION

BIM marries an architect's vision with an engineer's calculations to flag any critical constructability issues.

Over the last 20 years, the tools involved in creating a workable building model during preconstruction have shifted from an assortment of multi-colored highlighters, architectural rulers, and a set of paper drawings to BIM software capable of providing a series of precise 3D renderings.

BIM (building information modeling) is a multi-discipline approach in 3D modeling allowing architecture, engineering, and construction teams to draw, collaborate, and extract data. Each team draws their respective discipline and collaborates inside a federated model. Once BIM coordination is complete, each team will have a data rich model from which to build.

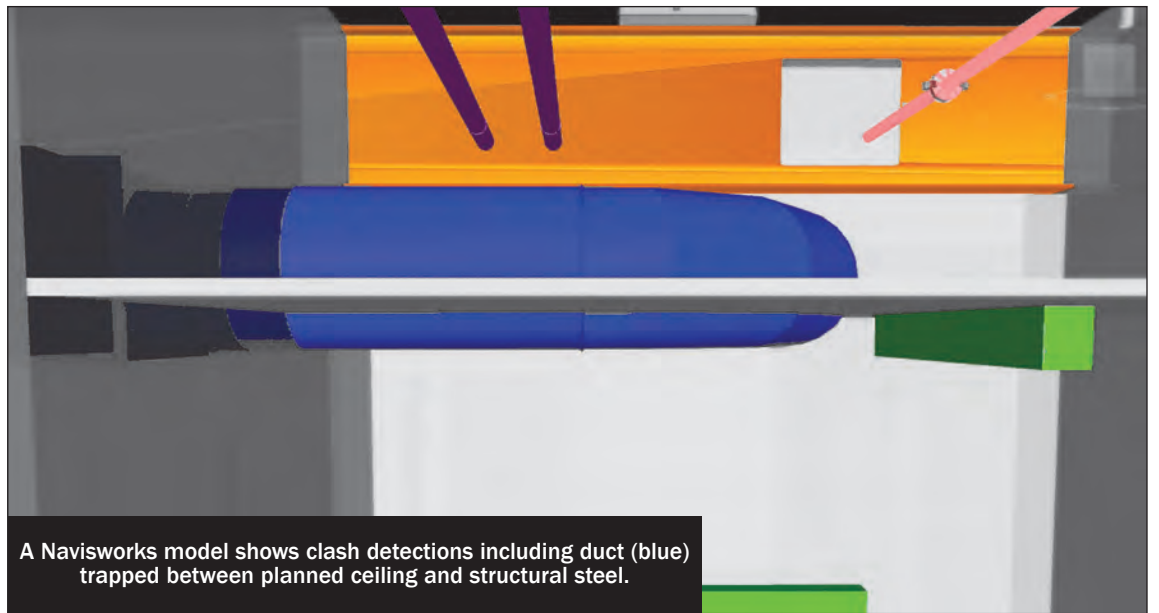
Adoption of BIM technology includes benefits ranging from accurate model coordina-

tion for the firms, clients, and subs through clash detection, improved and automated document management, and streamlined communication with teams in the field. The technology also helps meet sustainability goals by allowing companies to go paperless.

Most of the BIM software available on the market today uses the Autodesk platform and includes titles like Revit, Navisworks, AutoCAD, and BIM360. Hermanson Co., a mechanical design, construction, and service provider working with clients across Washington, Oregon, and southwestern Idaho, began adopting BIM technology in 2001. Implementing, ongoing training, and exploration of new technologies have led to improved innovation, team collaboration, and cost savings.

REMOTE WORK

Cloud-based technology like BIM360 has supported work-from-home options during COVID and teams have been working with equal, if not improved pro-



A Navisworks model shows clash detections including duct (blue) trapped between planned ceiling and structural steel.

IMAGES COURTESY OF HERMANSON CO.

ductivity, while cycling through home-based, then office, then back to home-based workstations. Revit's cloud platform allows access to shared central files by multiple stakeholders while staying connected to field teams through handheld tab-

lets to review contract drawings, shop prints, 3D models, and submittals.

DESIGN COLLABORATION

During the earliest design phase of any project, BIM mar-

ries an architect's vision with an engineer's calculations to flag any critical constructability issues. In a matter of seconds, a BIM lead can determine design issues related to sizing, spatial coordination, and trade versus trade clash detection before

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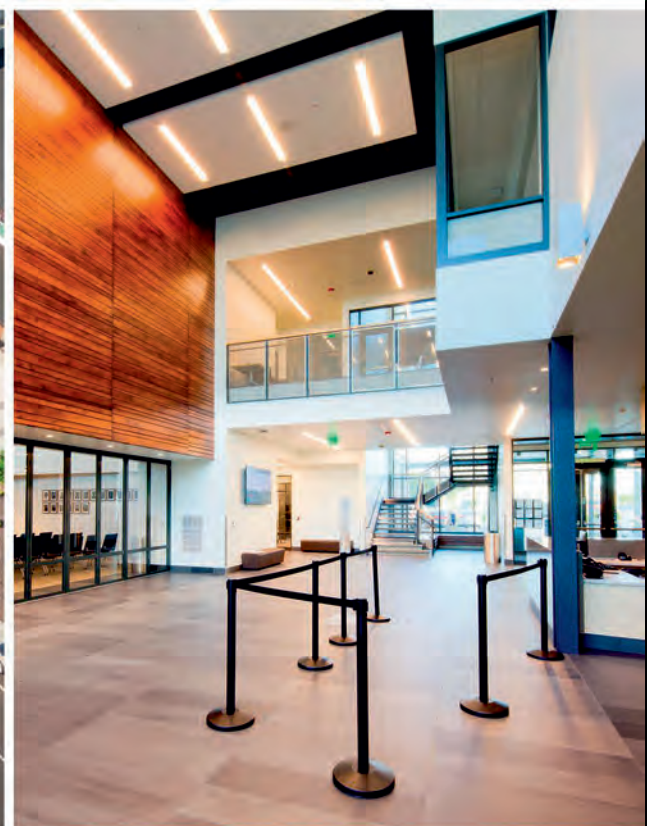
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materials are ordered or construction begins.

PROJECT DELIVERY

On-time project delivery is one of the main goals of any BIM process. Projects are driven by construction schedules and technologies that hasten a design team's progress to produce both schematic and construction drawings, and move a project to the ground-breaking stage sooner. BIM provides an accurate timeline for general contractors to stage jobsites for crane placement, employee parking, and material storage. BIM offers subcontractors an accurate set of plans for material procurement and workforce scheduling.

Throughout a project, construction document management is crucial. Once again, cloud-based platforms allow sharing of submittals, RFIs, shop drawings, and as-builts through secure, credentialed access.

COST SAVING

BIM helps avoid costly design changes during construction thus saving money on manpower and resources by offering a granular materials list by floor or building section. This allows for just-in-time jobsite deliveries of sourced and prefabricated components. Having materials arrive onsite as

needed helps decrease clutter on the jobsite and avoid accidental damage, theft, and vandalism.

With current supply chain issues and raising cost of goods, having access to an accurate materials list aids in bulk purchasing and avoids costly delays due to last minute change order expenses.

PREFABRICATION

Laser scanning can be incorporated into prefabrication by designers and detailers drawing in a real-world environment. It provides a point cloud that can be integrated into BIM models.

During fabrication, BIM allows the generation of QR codes used for status updates, compliance documentation, and maintenance records, and supports the training of staff involved in building upkeep.

In the field, many time-consuming tasks have been streamlined by building model technology. Once constructable drawings are available, equipment like Total Station Layout (i.e., Trimble) use GIS to pinpoint hanger locations. Using this technology, a field crew can mark up to 1,200 hanger locations in a single day versus the manual method of using tape measures to mark no more than 200 daily.

BIM TECHNOLOGY

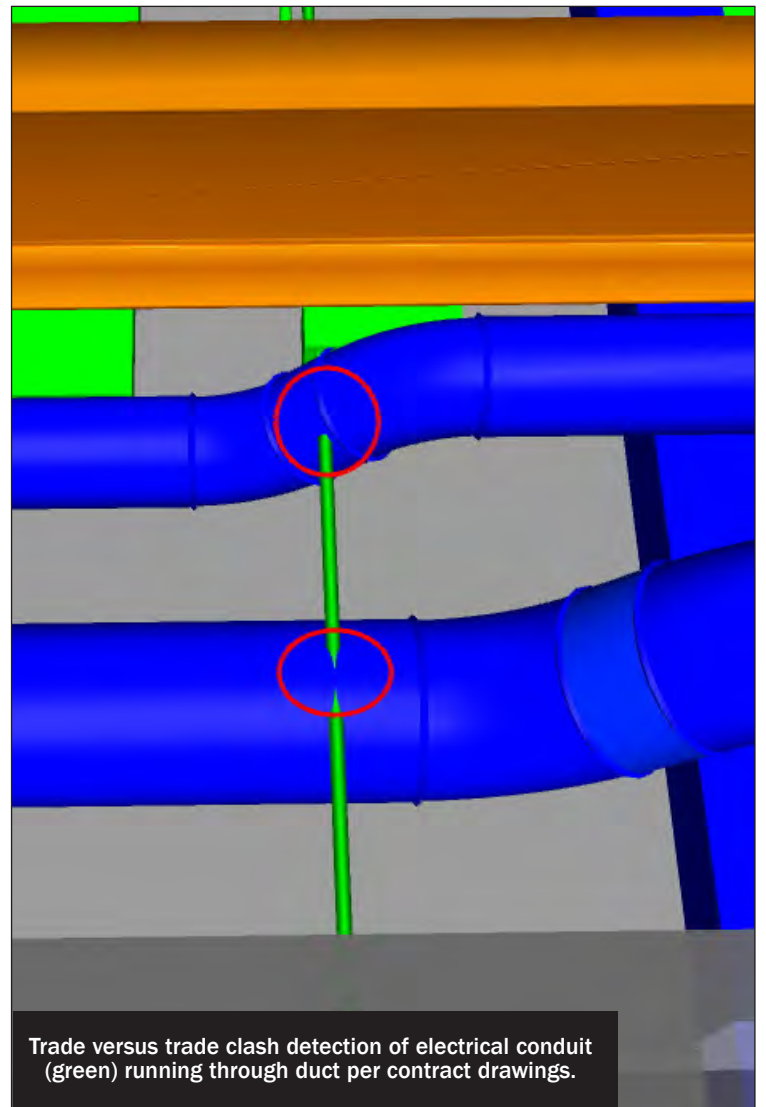
Whether your company is new

to BIM or already looking at the future of augmented reality, keep in mind the following implementation guidelines:

- Ease of use — if it is too difficult to use or no training is offered, it likely will not be utilized.
- Legacy data migration — pick a system that will allow migration of historical data.
- MultiCAD data — pick a system that is compatible with existing tools and systems.
- Prioritize training — determine the impact of training on current workflows and adjust accordingly.
- Control and security — be mindful of version control, edit history, and who has access.

Implementing technology, prioritizing ongoing training, and exploring new technologies will lead the construction industry to improved innovation, team collaboration, and cost savings.

Matt Cordova's interest in construction technology began with an AutoCAD class during his sheet metal apprenticeship with Local 66. After spending time working in service, fabrication, and in the field, he transitioned to detailing and has been in his most recent role as director of construction technology since January 2021.



Trade versus trade clash detection of electrical conduit (green) running through duct per contract drawings.

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SOLERA

CONTINUED FROM PAGE 2

to be both good listeners — to provide what the community wanted; and experienced planners — to provide what we knew they needed. If we forget that such a project needs a giant trash room, for instance, with the traffic circulation needed for garbage truck access, it's very difficult to fit that in later. These are issues that need to be addressed in the very early stages of design.

Another challenge in creating mixed commercial and residential environments is that in the design phase, you don't know who the commercial tenants will be. Different types of businesses require different circulation paths, ventilation, restrooms, parking, and more. Perhaps the most unique aspect of Solera is its dual-identity as a family-oriented housing project and a commercial project. This brings the potential for a symbiotic relationship between residential and commercial, which is being maximized at Solera with a daycare and other possible tenants to serve the "family/community" identity.

Still, the residential and commercial identities of these multi-use projects need to be kept distinct — a tall order when both share both buildings. For privacy, access to residences needs to be kept separate from access to businesses. You want to ensure that home feels like home for the residents, so you wouldn't put the apartment door next to the popular pizza joint, for instance. For this reason we worked with the city to make sure we were permitted to put the residential entryways along the quieter "back side" of the development, with the commercial entryways on the more visible "front side" along the state route. Likewise, both buildings have courtyards that are not public space but private to the residences — all part of a concerted effort to imbue the private portions of the buildings with a more tranquil sense of place while dialing up the accessibility of the public parts.

These dual identities can be signaled with different design features, and we worked hard to make the buildings read "commercial" and "residential" as appropriate. For instance, we clad ground floor commercial space in a regular pattern of high, dark brick masonry columns and glass storefronts for a modern look, then incorporated warm wood-like siding and painted panels in neutrals above with balconies and shed roofs to signal residential areas.

Notably, another area of differentiation was not architecturally signaled: the affordable housing versus the market-rate apartments. The developer originally intended both designations to share space within both buildings, but lenders are still reluctant to fund such projects. As a result, most of Solera's affordable-housing units are in one building and all its market-rate units are in the other. We designed them so that passersby would have no idea which is which. Both have similar amenities spaces and parking spaces. Without making them identical — they have slightly different color palettes and different modulation to accommodate different unit mixes — we gave both buildings tripartite facades and dark neutral colors to reinforce a sense of unified community.

DevCo's niche is affordable housing for a demographic group not typically provided for in multifamily developments: larger families. Thus the "different unit mixes" mentioned above refers to the relative preponderance of multi-bedroom

units in the affordable-housing building — including a whopping 45 four-bedroom units.

Most of the time, multifamily architects are tasked with squeezing as many units as possible onto a given site, a charge we all know can bring headaches of its own. But Solera's even greater challenge required us to take the multi-bedroom units originally spread across both buildings and puzzle-fit them into one. Since the four-bedroom units are most practically situated on corners, this was a thorny challenge, driving the shape of the buildings and dictating more and smaller windows (so that every room could have an outlook) than smaller units require. Here it's worth noting that the affordable-housing building at Solera, which wound up with 275 units, is large enough to fit closer to 375 units of the size that are more typical of these projects. Density limits in Renton do exist, which is one reason other developers were unable to make this project work financially.

That family priority extends to the amenities DevCo has planned for the community, which in addition to the typical meeting rooms, business spaces, fitness centers, and coffee lounges include an indoor half-court basketball gym in each building and play areas on the courtyard level of the affordable housing building.

Finding space for these extra-large facilities was something we knew we had to plan for early on. Adequate parking presented a similar challenge, as DevCo bucks the current fewer-parking-spaces trend in favor of supporting lower-income workers' more frequent use of cars over transit to commute. The goal was 1.5 parking spaces for every apartment, which is more than we're seeing most places — certainly more than we see in Seattle, where no parking is required for apartments. So we designed a large parking garage beneath Solera and constructed the buildings in a "wrap" formation, to conceal much of the rest of the parking behind it in compliance with the city's zoning codes.

Once complete, Solera will be a new kind of multifamily development. With this much parking, a location in a bedroom community with wilderness close at hand, nearby single-family neighborhoods, and a strong family orientation, Solera will present a clear suburban identity. On the other hand, its location on a state route in a recently up-zoned neighborhood, proximity to multiple transit options, walkable shopping, and public library across the street bring a definite urban flavor.

We think projects like Solera are helping to blur the categories "suburban" and "urban" into a new kind of hybrid. Many of Seattle's former bedroom communities are urbanizing with higher density and mass transit, because density and transit promote sustainability. At the same time, Seattle's urban core — amply stocked with multifamily units built for singles or roommates — remains painfully low on affordable units for larger families. It may be that "hybrid" developments like Solera can offer just the kind of crossover template this moment calls for.

Mark Stine is a principal at Tiscareno Associates and has spent more than 25 years as a designer, architect and manager in many different project types.

REDEFINING OFFICES

CONTINUED FROM PAGE 3

tual mode of collaboration, while others still struggle with the shift. I believe this is unique to us as an industry. We've taken these new learned habits, software and work styles, and are translating this into design for the benefit of our clients' real estate, IT and infrastructure, culture, and health and wellness.

CONNECTED COMPANY CULTURE

Technology has played a crucial role in bridging the physical gap between us from a social perspective throughout this pandemic. It's not easy to maintain a strong company culture when your employees are scattered across the city, state, or globe. Digital tools and platforms provide opportunities for employees to continue to interact daily with their colleagues and clients. While in-person engagement will always be the most ideal and authentic means of collaboration and connection, we must continue to provide an equitable experience for our teams, whether in-person or virtual.

Investing in improved digital connectivity and increased technological capability within the office makes for seamless experiences for distributed teams that work-from-anywhere. Shared virtual white boards such as Miro provide collaboration in real time for in-person and virtual team members. We'll continue using whatever our favorite modes of connecting are — Zoom, Teams,

etc. — supported by refined video call capabilities, complete with optimal lighting, acoustics, and individual cameras and microphones for all participants. Until we master the use of hologram interactions, we can create an inclusive workplace experience for hybrid work if we have the right tools.

As we continue to perfect our new reality of hybrid environments and work styles, I'm confident that we'll see a positive impact on the strength and health of our downtown core in alignment with a more gradual increase in employees spending time working in the office and engaging in the community.

We've learned how resilient we really are — able to not only weather challenging times but to learn and thrive! Our resilience is anchored by our flexibility. No matter where we are or how we choose to work, the office must bring people, place, and technology together in a way that's more equitable, engaging, and effective than what we've had before.

Kristin Jensen is principal and co-managing director of the Seattle office of Gensler. She has experience managing commercial development projects in the Northwest region — from suburban office parks, to hotels, to urban infill offices and mixed-use.

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by Marriott, at 19608 International Blvd. in SeaTac, sold for a bit over \$51.1 million, according to King County records.
The seller was RI SeaTac Property LP, associated with Texas Western Hospitality of Dallas, which acquired the land in 2016 for about \$4.2 million, then developed it. Jensen Fey was the architect. The buyer was M2 SeaTac LLC, associated with MCR

The new development might start this fall, but owner Retail Opportun' hasn't yet announced a groundbreaking.

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THE EVOLUTION OF HYPER-LOCAL COMMUNITY SPACES

More important than the objective beauty of a work of architecture is how people feel in a space.

For more than 30 years, Johnston Architects has been shaping Seattle's small gathering spaces. Although how community spaces are being used is continually evolving, it hasn't changed our firm's approach or desire to create spaces to gather and enjoy being with other people at all scales. Because JA's portfolio includes diverse typologies from public libraries, private community clubhouses, offices, multifamily, and private homes, the communal aspects of each infuse and inform one another. Great architecture forges connection between people and place in diverse, unique ways, becoming neighborhood treasures embedded into the fabric of their surroundings.



BY MEGAN MCKAY
JOHNSTON ARCHITECTS

be seen. More important than the objective beauty of a work of architecture is how people feel in a space. Places to pause and connect with nature, generate ad hoc run-ins with neighbors, or escape your private home space must be intentionally considered from the outset and nurtured throughout the design process.

Once absorbed more passively, today people are desiring a much more immersive connection with nature. Back in graduate school in the 1970s, JA Founding Partner Mary Johnston, FAIA, was harshly critiqued by her professor for an apartment design over retail space that included an outdoor rooftop entry court and stairs. The professor chose her design as an example of what not to do in Seattle because of the feared rain exposure. Knowing Seattleites are a hardier lot than understood by the errant professor, in the decades since, JA has applied the same outdoor circulation approach at several Seattle multifamily projects to great success.

Bryant Heights, a whole-block community including condominiums, townhomes, and single-family houses in Seattle's Bryant neighborhood,

is a case study not only of the power of a stroll through the outdoors but in the concept of giving open space back both to residents and to the surrounding neighborhood. The site was once planned as part of Children's Hospital's satellite campus, but when the hospital consolidated all services to its Laurelhurst location, the site sat vacant.

It didn't take long for neighbors to reclaim the empty lot for an ad hoc park. Recognizing the value of retaining this urban park-like setting, JA worked with the developer and city of Seattle arborists to retain significant trees and design a meandering pathway through the property that is open to the neighborhood. Design solutions like this are possible when architects and planners look beyond the minimum zoning requirements and instead look for opportunities and possibilities.

The benefits of going outdoors for connection to nature and fresh air — a safer alternative to stale indoor air in our post-COVID world — has awakened a desire for outdoor retail-adjacent gathering spaces. In this way, JA has been a step ahead of its time.

The master planning for Bryant Heights centered around maintaining numerous significant trees and developing walkways through the site to maintain the park-like setting neighbors had come to appreciate.

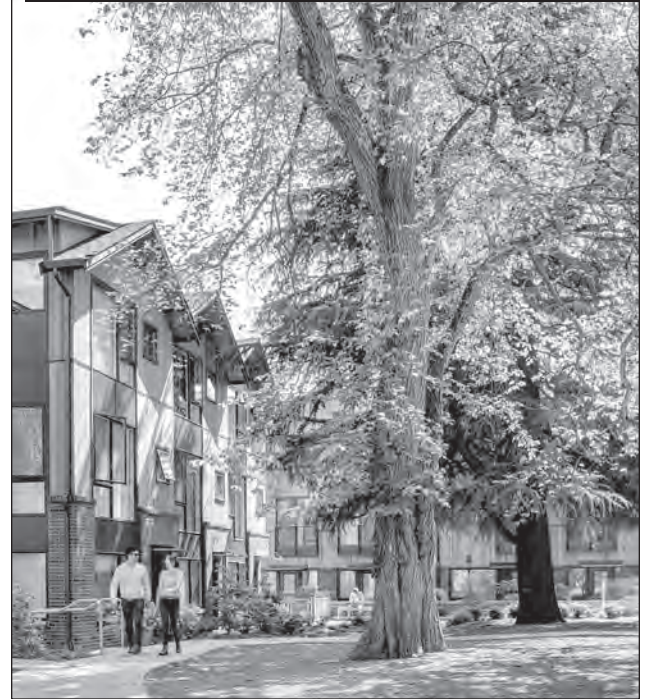


IMAGE COURTESY OF JOHNSTON ARCHITECTS

COMMUNITY SPACES — PAGE 15

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Dessie Evans Elementary School

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HOLISTIC HEROES: LIGHTING DESIGNERS USE EFFICIENCY AND MODELING

When it comes to holistic building design solutions, lighting design is often the best place to implement aggressive energy efficiency measures.



In the adaptive reuse of the Chicago Post Office, the design team was challenged to make interior spaces that lack daylight still feel bright and vibrant. Continuous linear wall-washer highlights feature murals and define “neighborhoods.”

PHOTOGRAPH BY CHRIS BARRETT



BY LAUREN MACLEOD,
RACHEL FITZGERALD AND
VANESSA PEDERSON
STANTEC

We don't think of ourselves as superheroes. But sometimes, that's the underlying job description for a lighting designer.

How so?

When it comes to holistic building design solutions, lighting design is often the best place to implement aggressive energy efficiency measures — it's our chance to be the hero. Code compliance (the villain) frequently limits what the building envelope and HVAC design can offer. Lighting is where to get the most savings. Both the lighting power density and control sequencing factor into the savings.

Traditional energy codes focus on lighting power density and controls in a prescriptive manner. However, more and more jurisdictions are replacing these requirements with performance-based energy modeling simulations.

That's why our lighting design and sustainability teams are like The Avengers of building design. (Independently, we're strong. Together, we're almost unstoppable.)

Our lighting team and sustainability team work together closely. We share insights gained from energy modeling best practices and use them on all projects, whether an energy model is being provided or not. Using those details for each project

results in lower lighting power densities and beautiful design.

Basically, a holistic approach makes us stronger designers and results in less energy use.

In looking at a snapshot of 60-plus projects over the past five years, our lighting design team has produced designs that are on average 35% better than code-mandated performance (2015 codes or newer). These projects perform well from an energy standpoint, and many are award winners for providing lighting-design solutions that focus on occupancy comfort and spatial experience.

SCENE 1: SETTING AN EXAMPLE

Take, for example, our work for Denver Water. A recently completed renovation of its historic 35-acre campus included eight buildings. One was a new 186,000-square-foot administration building.

The complex embodies environmental stewardship at every level, applying sustainable and biophilic design principles. It received multiple LEED certifications, including LEED Platinum for the admin building. The design supports Denver Water should it choose to pursue WELL Building and Net Zero Energy certification. It's clear that Denver Water wants to set an example of sustainability and workplace wellness.

With both LEED and WELL standards to balance, the campus lighting systems were designed for productivity, user comfort, and energy efficiency, adding to the ebb and flow of the architectural elements. The building form maximizes daylight and views. The lighting controls include perimeter and skylight daylight harvesting, occupancy sensors, local dimming, and task

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Lighting throughout Denver Water's campus was designed to support dark skies and limit light pollution with fully shielded fixtures that create a safe environment for after-hours use.



PHOTOGRAPH BY FRANK OOMS

tuning. The admin building's lighting load is 0.53 watts per square foot — 36% better than is required by local code and the entire campus is 39% better. Using task lights to enhance ambient lighting reduce overall usage.

SCENE 2: BIOPHILIC DESIGN

Similarly, during tenant improvement work for Delta Dental's new 55,000-square-foot office space, our team focused on both performance and reinforcing the strong biophilic design.

The daylighting strategy was the driving force on this project. In fact, Delta Dental's system is programmed to give it double its floor plate depth of daylight-harvesting penetration per what code minimum dictates. Welcoming, bright offices and conference rooms feature glass walls that create transparency and allow light to penetrate between spaces. Occupancy controls and manual dimming give Delta's team the flexibility to customize its lighting experience to meet a variety of needs.

To augment the daylight, we used several lighting forms and layers to create warmth and visual interest. Higher wattage doesn't necessarily equate to a bright-feeling space (or a comfortable space, for that matter). We worked closely with the interior design team to optimize the feeling of light in every space.

Our efforts resulted in a lighting load that is 45% better than required, yet the spaces are comfortable. The design flows seamlessly into the overall interior design aesthetic.

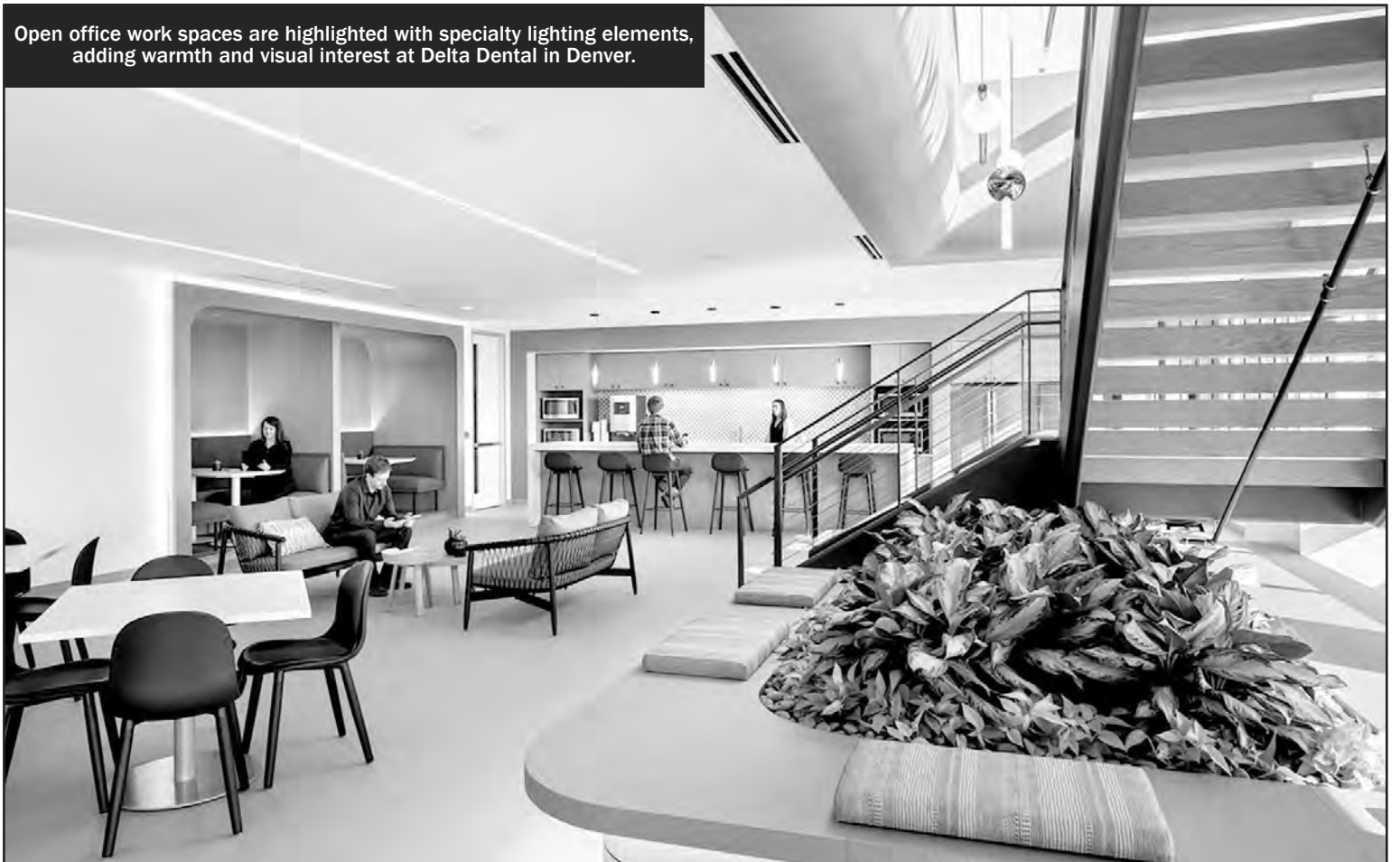
SCENE 3: AN EFFICIENT HQ

One of our biggest lighting design challenges came with the adaptive reuse of Chicago's historic Post Office building. Transforming this massive 130,000-square-foot floorplate into a welcoming, modern corporate office required an incredible level of collaboration with the interior design team and creativity on the part of our lighting designers. Adaptive reuse for energy efficiency is a challenge in even the best of circumstances, but the size and layout of this project took those challenges to a new level. The huge building didn't allow us to add daylight. So instead, we used electric light to enhance the space.

From the start, we knew the walls would be essential to our strategy. We used them to reflect light back into the space and create a sense of brightness that would make the interior spaces feel as light as the daylit perimeter. But continuous linear lighting quickly eats up an energy budget, so we also needed to be strategic about where we used it.

The design team created a concept inspired by Chicago's local neighborhoods. Each area

Open office work spaces are highlighted with specialty lighting elements, adding warmth and visual interest at Delta Dental in Denver.



PHOTOGRAPH BY DAVID LAUER

is defined by wall murals and furnishings, including decorative luminaires, that reflect that area of the city. Linear lighting is focused on the vibrant murals. Where there were no murals or accents, walls were finished white to reflect light back into the space.

Lighting in open office and meeting rooms was thoughtfully placed to provide the highest output on desktops. Lower levels in-between modulated the

light over large areas by reducing light levels in areas without visual tasks, like hallways and circulation areas. By selecting decorative fixtures with screw-base sockets, we found LED lamps that still met the client's strict standards.

Ultimately our efforts resulted in a lighting load of 0.38 watts per square foot, 53% better than required while illuminating the space in an exciting, energetic

way that was perfect for our corporate client's needs.

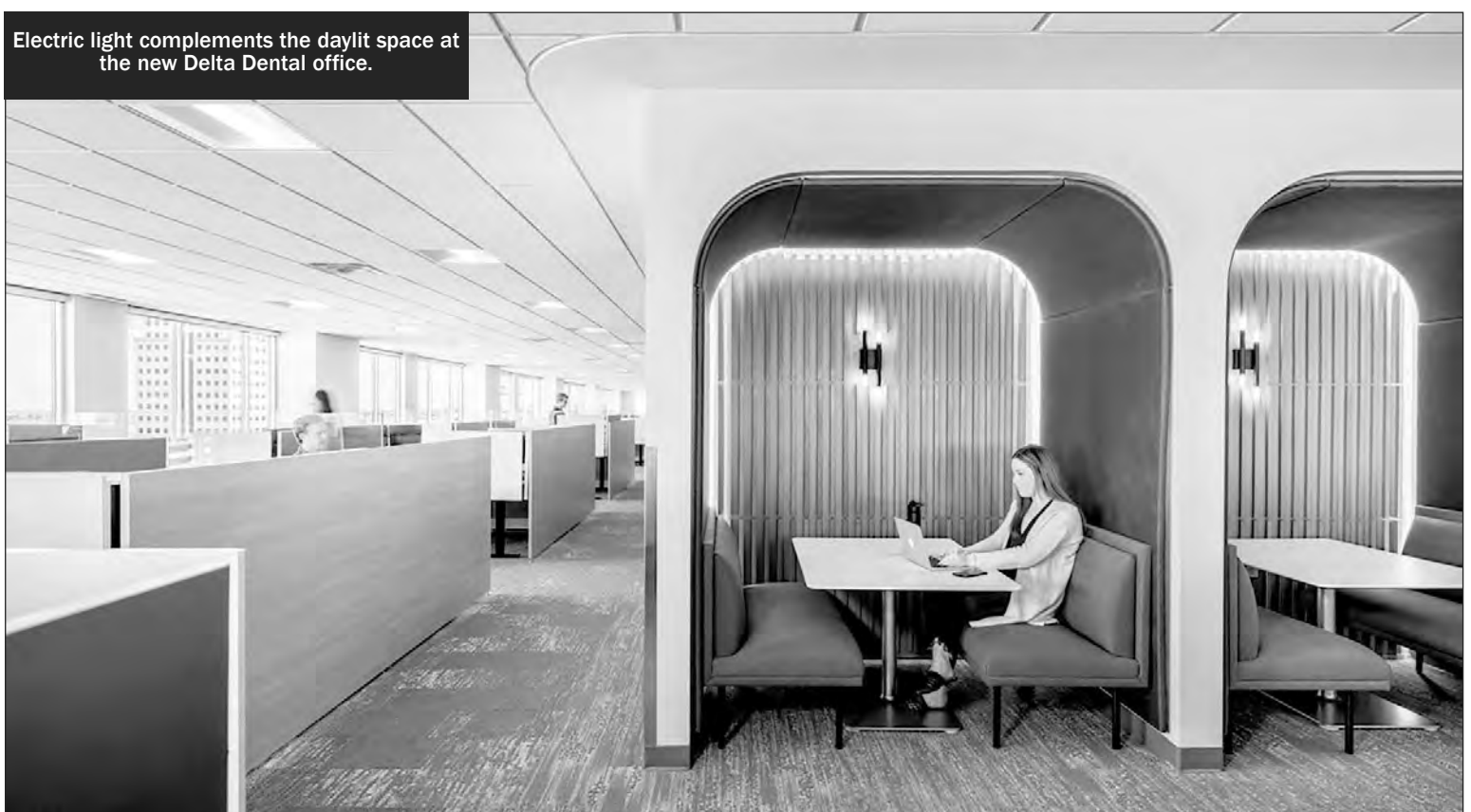
HOLISTIC HEROES

Each of these projects was approached with the performance of the whole space in mind. It was essential that the team consider the unique needs of each client to achieve the perfect balance of sustainability, wellness, and ambiance.

Doing that, we could exceed energy efficiency expectations, create the best-possible work environment, and wear our superhero capes one more time.

Lauren MacLeod is a principal in Stantec's Seattle office; Rachel Fitzgerald is a principal and the lighting discipline lead for Stantec; and Vanessa Pederson is a senior lighting designer at Stantec.

Electric light complements the daylit space at the new Delta Dental office.



PHOTOGRAPH BY DAVID LAUER

A NEW PERSPECTIVE ON STRUCTURAL FIRE SAFETY IS HERE

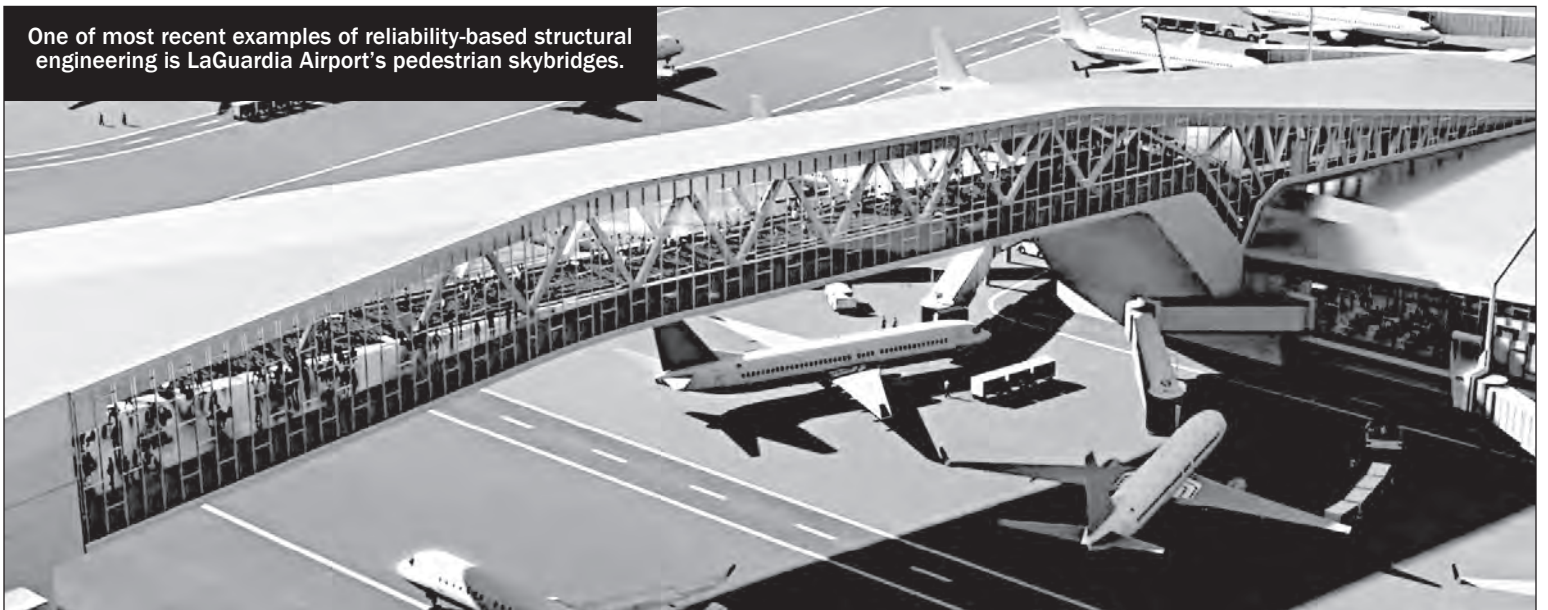
There is a movement toward reliability-based structural design for “earth, wind and fire.”

In a world aiming toward sustainability and risk mitigation, the traditional prescriptive method to structural fire safety is becoming less and less viable. Fortunately, new industry resources can benefit the AEC sector in this respect.



BY KEVIN LAMALVA
CODE UNLIMITED

Structural fire engineering design has the potential to create a building stock that is more resilient and reliable to uncontrolled fire events, while also providing a wide array of opportunities for engineers to add tremendous value to building projects by specifying structural fire safety more intelligently.



One of most recent examples of reliability-based structural engineering is LaGuardia Airport's pedestrian skybridges.

IMAGE COURTESY OF CODE UNLIMITED

HISTORY OF FIRE SAFETY

More than 100 years ago, it

was postulated that if the temperature of individual structural members could be maintained below a specific critical tempera-

ture, then the entire structural system will fulfill its function during fire conditions.

Within this framework, all that

is required from the structural engineer in terms of structural fire safety is consideration of ambient temperature hazards (e.g., hurricanes and earthquakes) if the prescribed level of thermal insulation (fireproofing) is uniformly applied to structural elements. With the purpose of protecting structures from fires, different approaches towards

insulating structural elements were developed throughout this century. These approaches are standardized by means of standard furnace testing (ASTM-E-119) and are presented in building codes (notably the IBC) as required fire resistance ratings.

Simply put, the building code specifies the required fire resis-



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tance rating, and designers primarily use guides and tables to define the product and required insulation thickness for structural elements. In this context, the skills of structural engineers and fire protection engineers do not appreciably come to bear.

Accordingly, structural systems that have been optimized for ambient design loads are later blanketed throughout with fireproofing without consideration of the relation between the two in terms of actual performance. Unfortunately, project stakeholders may be left wondering if the intended structural fire safety is provided and if a rational use of resources (both physical and intellectual) was employed. This differs from almost all other aspects of building design in which these aspects are taken extremely seriously.

VISION FOR FIRE SAFETY

In response to new and rapidly evolving building construction trends, designers have increasingly sought an alternative to the traditional prescriptive approach. Encouragingly, reliability-based structural design for fire effects (referred to as “structural fire engineering design”) is now establishing itself in the U.S. as a distinct engineering discipline which can fill this void.

Notably, newly developed industry consensus guidance contained within ASCE/SEI 7, ASCE/SEI Manual of Practice No. 138, the SFPE International Handbook of Structural Fire Engineering and the freely available ASCE/SEI Structural Fire Design Guide provide designers the framework to legitimately practice SFED in the U.S., as well as provide building officials a potent set of tools to properly evaluate such designs.

The free ASCE/SEI Structural Fire Design Guide explicitly demonstrates the proper execution and potential benefits of SFED as an alternative to the traditional prescriptive method. This project included the analysis of four real, anonymized buildings by 40-plus structural and fire engineers with a review panel of academic advisors.

The scope of each analysis included the characterization of uncontrolled fire exposure within building spaces, the associated thermal response of structural elements, and the resulting structural system response per the provisions of ASCE/SEI 7. Each design team evaluated the demands on the structural systems under fire exposure, considering fire effects such as induced forces at structural connections due to restrained thermal expansion and contraction.

Furthermore, each design team evaluated the capacity of the structural systems under fire exposure, considering many aspects of fire robustness such as the influence of floor slab compressive-tensile membrane action.

The above-described analyses identified key structural system vulnerabilities under fire exposure, which would not have been revealed by the traditional prescriptive method. The analyses also revealed that in situ fire effects (such as restrained thermal expansion) are significantly more consequential to the provided performance levels than the temperature of structural elements, which is a focal point of the traditional prescriptive method. To provide the targeted level of performance, each design team developed designs with rationally allocated fireproofing and modest structural enhancements, where necessary, to provide robust structural performance under fire conditions.

At the same time, SFED was demonstrated to have the potential to enhance project economics, carbon footprint, aesthetics, quality control, site conditions, and life-cycle maintenance — especially when harnessed with performance-specified off-site application of fireproofing, which can reduce construction time. Accordingly, it is envisioned that the emergence of SFED in the U.S. will change the way that project stakeholders view the optimization of a structure.

Kevin LaMalva is principal analyst and director of structural services at Code Unlimited.

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REIMAGINING THE MIDDLE SCHOOL EXPERIENCE, EVEN BEFORE THE PANDEMIC

A unique opportunity to reimagine the middle school experience came to life with the opening of Glover Middle School in the fall of 2021.

Fundamental to the Glover Middle School culture is the importance for staff and administrators to meet students on their level, dedicating space and time to keep students in school, supporting them socially and emotionally while also keeping them on track academically.



BY MELISSA MCFADGEN
NAC

If this culture was realized in a new building how could a new facility further enhance and support this student-centered approach?

How could the built environment continue to elevate each student, allowing them to find opportunities for support and success?

The opportunity to answer these questions came to fruition when Spokane Public Schools planned to replace three outdated middle schools, including Glover, along with adding three new middle schools as part of the successful 2018 bond. One district-wide goal of the bond was to incorporate sixth graders into the historical seventh and eighth grade only middle school model.

This unique opportunity to reimagine the middle school experience came to life with the open-

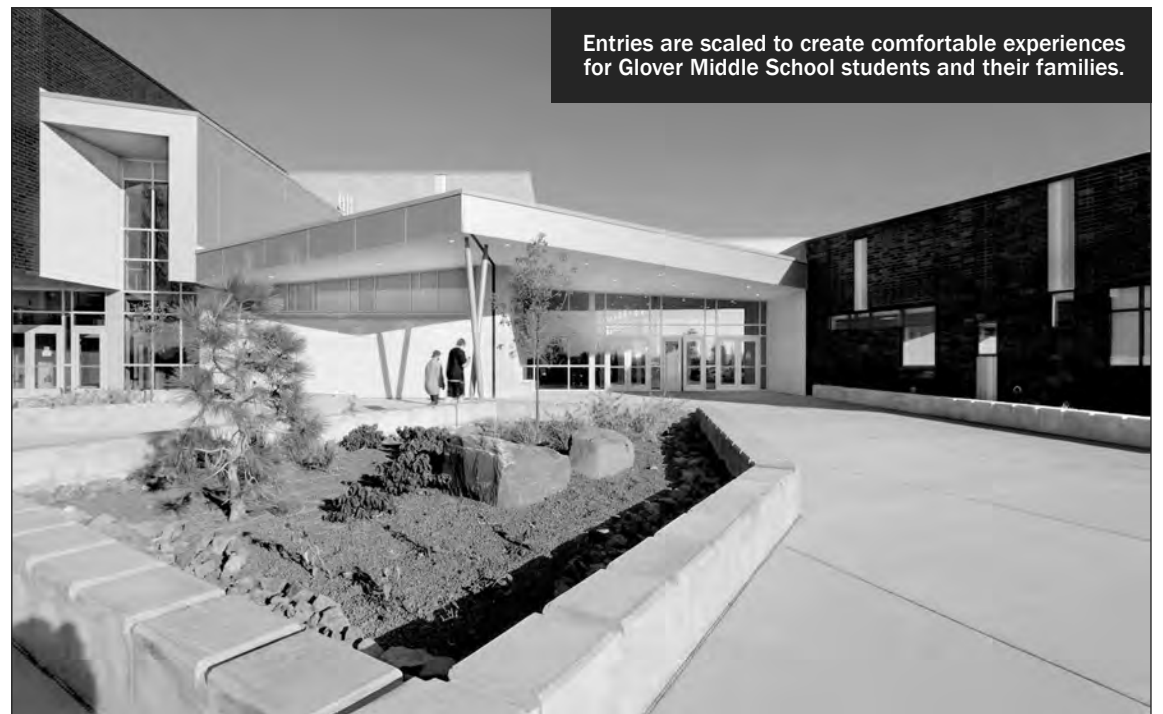
ing of Glover Middle School in the fall of 2021.

A PLACE FOR EVERYONE

A wide variety of spaces offer students the opportunity to find the spaces that are right for them throughout the day. Whether that space is an overlook into the commons, an open, more social learning stair for larger interactions, or outside in the student play areas, there is a place for everyone to find what they need to reflect and recharge. The planning and design of Glover continually reinforce a sense of discovery and inclusion, sparking curiosity and truly reflecting the unique neighborhood and surrounding community.

DISCOVERY

In early planning discussions the concept of discovery resonated with the design committee and became the core planning element. The committee galvanized around the concept that the building needed to spark a sense of exploration for every student. To encourage students to explore and connect with various programs throughout the school, windows are strategically placed to provide glimpses into all academic, student support, and outdoor learning environments. This glimpse may be all that is needed for a student to take the next step in engaging



Entries are scaled to create comfortable experiences for Glover Middle School students and their families.

PHOTOS COURTESY OF NAC ARCHITECTURE

in a new activity or seeking the support that they may not have previously had the courage to take.

The sense of discovery for students begins immediately when they enter the school. Students and visitors move through the student plaza, with large rocks interspersed with seating areas into the main commons. Entries are scaled to create comfortable experiences for middle school students and their fami-

lies — reinforcing the importance that everyone is welcome and encouraged to engage with the Glover students and staff.

The building developed aesthetically from the Bowl and Pitcher within Riverside State Park immediately west of the middle school. Students move through the school on a central path, similar to how the Spokane River meanders through the rock formations at the Bowl and Pitcher. On the path, students navigate around brick volumes that house learning areas with dark textured brick similar to the local basalt boulders, and lighter brick reflecting the warmth and light from the forest utilized to tie the building more closely to the local context and natural features.

Throughout the student commons, specialty classroom spaces, such as art, music, and technology, allow students to observe a variety of activities, possibly even piquing their interest to participate in programs they may not have explored otherwise. As students move through the building, small huddle rooms, and larger open gathering areas are sprinkled throughout the path, encouraging students to connect and gather together, while also allowing staff the ability to passively supervise and observe the students.

Central to the transition from the public areas to the core academic spaces, a ramp integrated with undulating platforms cre-

ates spaces for students to sit, eat lunch, and come together for formal instruction, performances, and assemblies.

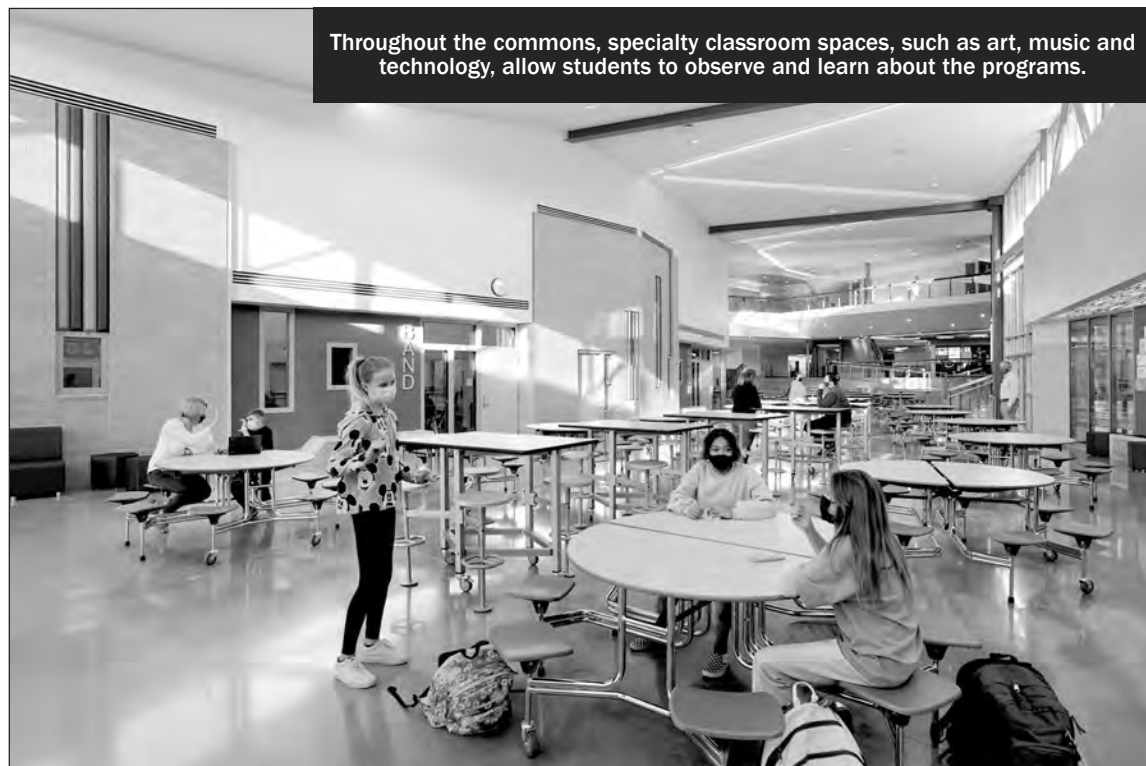
Students can also opt to move beyond the ramp into the open learning commons, designed for a quieter experience with lower ceilings, quickly accessible technology and furniture more conducive to individual or small group activities. At this key transition space within the building, where every student will walk throughout the day is the counseling center — a welcoming space with easy access to encourage students to connect with support services available to them.

Continuing to draw upon nature, natural light is prevalent throughout the building. The shape of the building was deliberate to continually provide views to the outdoors, connecting the students to what's happening beyond the building walls. An internal courtyard brings light into spaces deep within the building and serves as an outdoor learning environment.

ACADEMIC NEIGHBORHOODS

The six academic neighborhoods branch off of the learning commons and house the core academic spaces such as English, history, and math, along with a learning suite outfitted for science. Each room is connected to a central collaboration space with operable walls. Glass allows

Throughout the commons, specialty classroom spaces, such as art, music and technology, allow students to observe and learn about the programs.



the neighborhoods to be connected visually when acoustical separation is needed and allows for a variety of options for teaching and group activities with the classroom spaces not limited to the traditional room size.

Connection and creating a sense of community in a variety of scales are key to the design and were specifically important in the neighborhoods. Creating small communities within the neighborhoods that are unique yet part of the larger Glover school community. Shared space within the neighborhoods allows for more personal one-on-one relationships while also minimizing travel time for students between classes. This translates into more time for learning while fostering opportunities for continued academic, social, and emotional interaction and support.

ACCESSIBLE SERVICES

Throughout the school, counselors and administrators are located within close access and

proximity of students. During the planning and design effort, it was critical to remove all physical or perceived barriers for students to receive their support — this includes aspects such as incorporating middle-school appropriate play structures in the student plaza area. The student plaza, various courtyard spaces near the commons, and learning commons, along with playfield areas, encourage students to engage in physical activity and provide learning environments beyond the building walls. These outdoor spaces also serve as community amenities, which were previously not available within the Glover neighborhood.

An additional feature and critically important component to the Glover culture is the Family and Community Resource Center. Located at the main entrance, the FCRC provides meeting space for families and outside organizations independent of the administrative suite. This space can provide additional support to families and be discreetly used for food and

clothing distribution. The shared room supports the whole child and family to ensure their basic needs are met so the student can truly focus on academics and realizing their full potential.

The reimagined Glover Middle School fully realized the opportunity to discover a new way to deliver middle school education and support communities. The building exemplifies the student-centered culture of the Glover staff and administration, enhancing their ability to strengthen that culture and truly deliver experiences that foster both unconditional belonging

and access for generations to come.

“We want to look at middle schools through the lens of student,” said Greg Forsyth, Spokane Public Schools director of capital projects. “When we look at middle school now, we want to bring up the long-term relationships that the elementary school staff and students have and not push down a feeling of racing to finish high school starting in middle school. We need our students and staff to look at their learning in a new collaborative way.”

Mark Lund, principal of Glover

Middle School, said: “Our focus was to ensure that each space creates a sense of unconditional belonging and access for all students. At every turn we asked ourselves, ‘How do we make sure students feel connected and truly noticed?’”

Melissa McFadgen, a principal at NAC Architecture, has dedicated her 23-year career to designing educational facilities, including nearly 50 Pre-K through grade 12 schools and has presented throughout the U.S. on educational facility design.

COMMUNITY SPACES

CONTINUED FROM PAGE 9

An example of this is Ballard Public, a mixed-use development built around a central courtyard facing the block interior but connected physically to the public sidewalk, presenting a courtyard and walkthrough space for residents and neighbors to enjoy and experience. This reflects an evolution of community space — from being designed just for the community who lives in the building to being for the community at-large. A decade later we are continuing to incorporate these welcoming pedestrian experiences and retail courtyards in projects such as Shared Roof, under construction in Phinney Ridge, and Alta Arlo, nearing completion in Columbia City.

Looking beyond amenities such as rooftop decks and courtyards, the rise of work-from-home is another phenomenon infiltrating common spaces. Skipping the daily commute into the office affords welcome flexibility, but for many there remains a desire to connect with others and perform the ritual of “leaving” your home — shared co-working lounges offer a bridge between these realms allowing work to be hyper-local but still draw from the energy of others.

JA-designed Alta Arlo in Columbia City, the mixed-use Mercer Island Lofts, and the Bay Bowl Apartments in Bremerton all include co-working lounges in their common area lobbies featuring a combination of communal tables and breakout pods for small group discussions or acoustic privacy. In the last two years, COVID has reinforced that

our spaces must be flexible.

Lastly, people are craving immersive, memorable places — the so-called “Instagram-able” moments that are unique and demonstrative of a particular place. Lobbies enhanced with distinctive installations, such as living green walls or the full-ceiling lighting piece JA designed for the recently completed Kirin Apartments in lower Queen Anne, are gaining momentum. The “Digital Sky” installation inside Kirin enlivens the lobby with 1,000 translucent flags fluttering above, glowing with remotely coordinated LEDs to mimic waves or clouds.

Permanent installations like this reflect a new interactive direction that utilizes technology and innovation to create experiential places that have not been seen before and cannot be easily replicated; a rebuke of the placeless sameness of the development boom of the past decade.

Open, welcoming, and flexible community spaces are essential elements of design in our region’s growing cities, where density drives a need for both respite and shared context. They offer places for rest, gathering, and entertainment as a benefit to the surrounding community — even, and especially for, people who do not live within the building. These spaces can be powerful sources of pause and reflection, creating moments for individuals to feel present and connected to others.

Megan McKay is a partner at Johnston Architects.



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