

**THE
DESIGN**

A vibrant, futuristic tunnel with a complex, hexagonal lattice structure. The walls and ceiling are illuminated with a spectrum of colors including purple, pink, orange, and blue, creating a dynamic and high-tech atmosphere. In the distance, several people are walking on a central platform or walkway, providing a sense of scale and human presence within the architectural space.

PER SPE CTI VE

Answering some of the biggest questions
facing our industry in 2025

Imagine a world where the built environment not only adapts to the challenges of climate change, urbanization, and technological disruption but thrives because of them. A world where architecture and engineering are not just reactive disciplines but proactive forces shaping a sustainable, equitable, and innovative future. This is the vision that drives **The Design Perspective**, our inaugural design forecast.

As we stand at the crossroads of unprecedented global change, the Architecture, Engineering, and Construction (AEC) industry faces complex questions: How do we achieve net-zero carbon goals while meeting the demand for affordable housing? How can digital transformation enhance collaboration and efficiency without losing the human touch? How do we design cities that are climate resilient yet sensitive to cultural and social needs? The Design Perspective does more than ask these questions—it provides actionable, forward-thinking solutions.

What sets this forecast apart is its multi-disciplinary approach and the cross-sector perspective, which integrates expertise from architecture, engineering, urban planning, sociology, technology, and sustainability science. As a leading global partner, working on some of the most transformative projects of our time, Arcadis unites these diverse perspectives to deliver a comprehensive framework for addressing interconnected challenges. This is not a one-size-fits-all roadmap; it is a dynamic toolkit designed to empower leaders across industries to create resilient, adaptive and future-ready assets.

Our methodology embraces scenario-based strategies, offering plural visions of the future that allow stakeholders to anticipate and navigate uncertainty with confidence. From leveraging AI and digital twins to designing for circular economies, The Design Perspective bridges cutting-edge research with real-world application. It is as much about foresight as it is about action.

This forecast prioritizes human-centric innovation—ensuring that design solutions are equitable, inclusive, and deeply aligned with end-user needs. Whether it's reimagining urban spaces for climate resilience or integrating biophilic principles to enhance well-being, every insight in this report is grounded in creating a better future for people and the planet.

We invite you to join us on this transformative journey, add to the conversation, and discover how we can build a world that doesn't just respond to change—but thrives because of it.



The Design Perspective is a call to action. It challenges us to think bigger, collaborate deeper, and design smarter. This collection of perspectives embodies our commitment to shaping a future where design leads the way.

Mansoor Kazerouni
Global Director of Architecture and Urbanism

Ecological Park, Chongqing, China
This 417-acre park on a large, sloping hill reinstates the area's connection to nature after rapid urbanization and dense construction.



**We start
by asking
questions.**

How can design solutions be both sustainable and economically viable?

LIVING + WORKPLACE

How Emerging Sustainable Practices Can Decrease Operational Costs and Carbon Emissions

— In an era where the built environment significantly contributes to global carbon emissions, there is an urgent need for innovative design and construction practices that prioritize sustainability.

By focusing on reducing carbon footprints throughout a building's entire life-cycle—from initial design and material selection to daily operations, reuse and eventual demolition—we can create structures that contribute to a healthier planet for future generations. Historically, these design strategies have come at a cost—literally, with a higher price tag than more traditional, if environmentally harmful, construction and operational practices. Today, it is critical that we tip the scales of sustainability versus affordability by designing projects that reduce both the embodied and operational carbon emissions of a building, provide opportunities to compress construction schedules, and decrease costly energy usage of a building over the course of its lifespan.

Embodied carbon refers to the carbon emissions released during the manufacturing process of a building. Certain materials, such as steel and concrete, require more resources to produce than environmentally friendly alternatives like mass timber.

Mass timber has about one-quarter the energy intensity of concrete or steel, making it a less environmentally harmful material choice in construction. Further, because mass timber is a “prefab” product—fabricated off-site in a controlled factory environment—assembly costs are reduced compared to traditional on-site construction, and construction schedules can be compressed as site preparation and prefabrication processes can occur concurrently.

+ Mass Timber has ~25% the energy intensity of concrete or steel.



The CubeHouse, Arcadis Headquarters, Amsterdam, Netherlands
In collaboration with SO-IL, Arcadis provided Landscape Architecture, MEP, Structural Engineering, and Building Physics and Acoustics services. The first hybrid-timber building in the Zuidas district of Amsterdam, The CubeHouse features breathing spaces and rooftop gardens.

Mass timber's benefits go beyond low energy-resource requirements and shorter construction times, having been proven to offer health advantages related to biophilia.



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For example, we have scientific evidence that when humans touch wood, our heart and breathing rates lower and our brains release proteins that reduce stress. This reaction makes wood especially valuable in environments prioritizing psychological and physiological health, such as residential, hospitality, educational, workplace and healthcare projects.

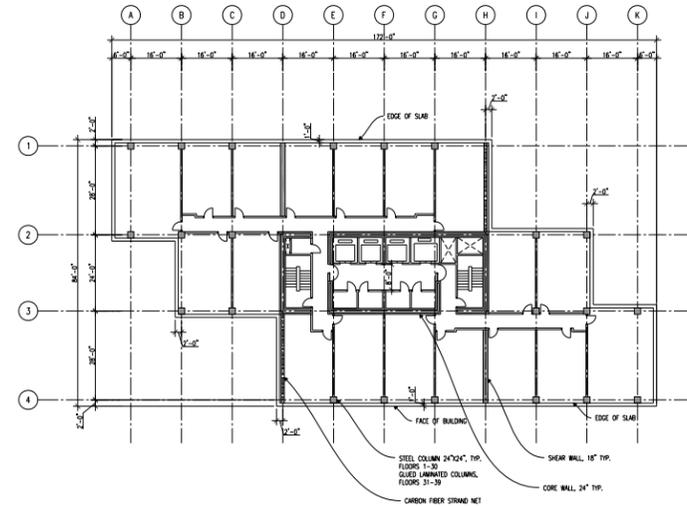
In the workplace sector, Arcadis collaborated on two notable mass-timber buildings in the Netherlands: the Triodos Bank Headquarters in Zeist, earning a BREEAM Outstanding certification with renewable timber materials, extensive solar panels and careful climate regulation, and The CubeHouse, our Arcadis Headquarters in Amsterdam, an energy-neutral, futureproof and low-installation workplace.

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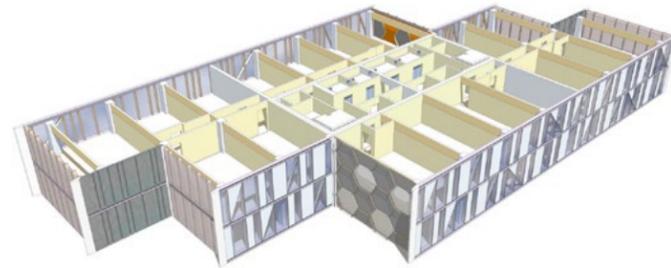
Triodos Bank Headquarters, Zeist, Netherlands
In collaboration with Rau Architects, Arcadis led the landscape architecture advisory, spatial planning, environmental research and green building (BREEAM) certification.

In the United States, we have completed Residential Tower, a groundbreaking feasibility study and design and construction analysis exploring the use of mass timber and wood fiber for a high-rise residential project in Seattle, Washington. The study explores a 40-story, 650-unit building with modular, flat-pack prefabricated components for each unit, enabling rapid construction, lower embodied energy, sequestration of carbon during the building's lifetime and widespread market appeal.

Due to the prefabricated components, units can be combined to create larger one- or two-bedroom typologies, given market demand. The three-story podium below the residences contains commercial, retail and residential amenities in addition to six community sky gardens. The sustainable design and performance elements realize significant cost savings in construction.



Mass timber floor plan 16'-0" grid



Floor enclosure



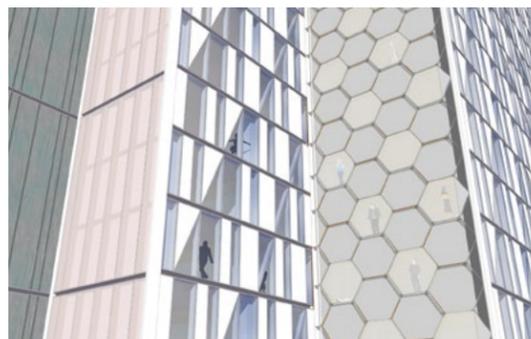
1. Shear Wall Location



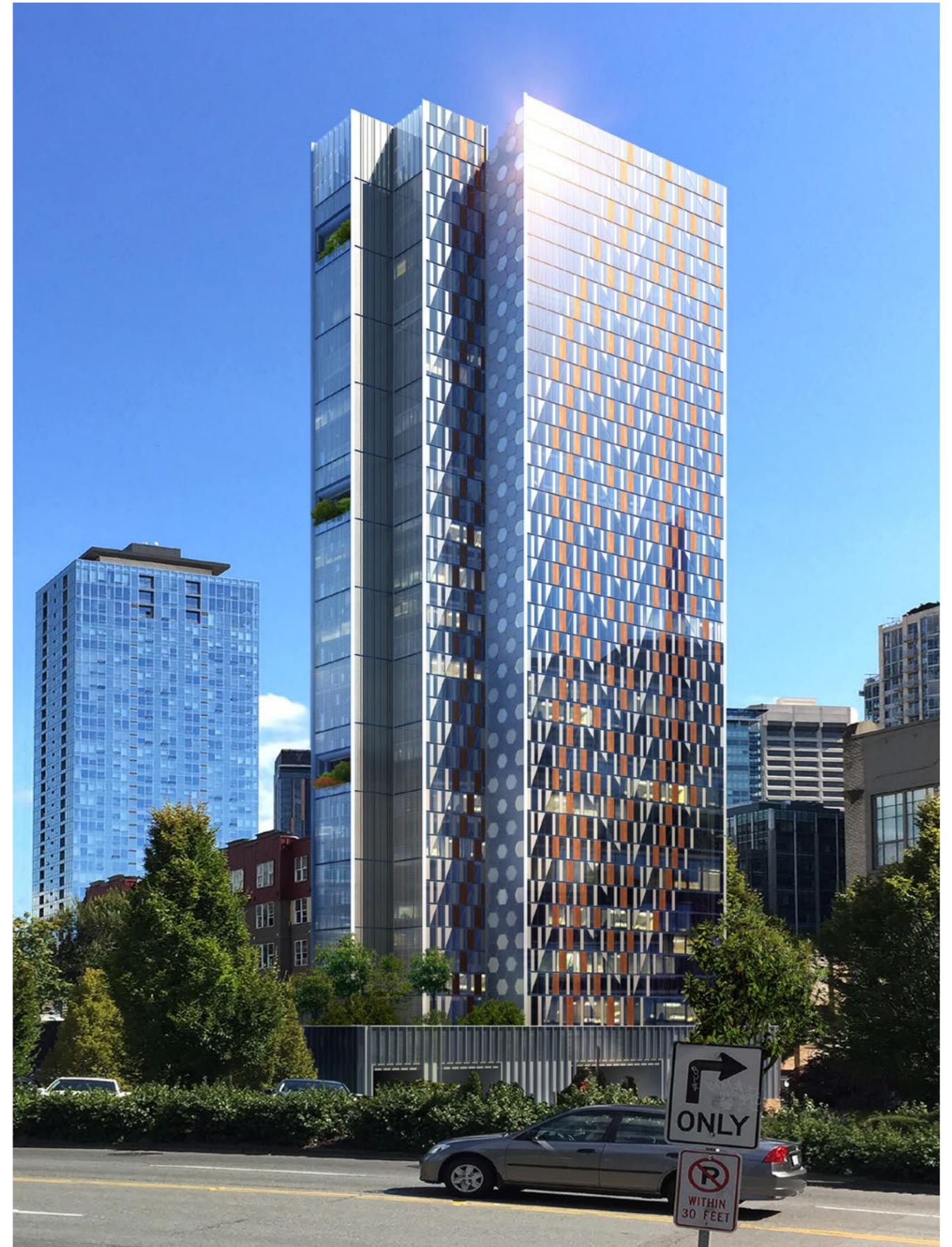
3. Solid Wall Assembly



2. Carbon Fiber Shear Wall Net and Frame



4. Completed Wall and Glass Panels and Rain Screen

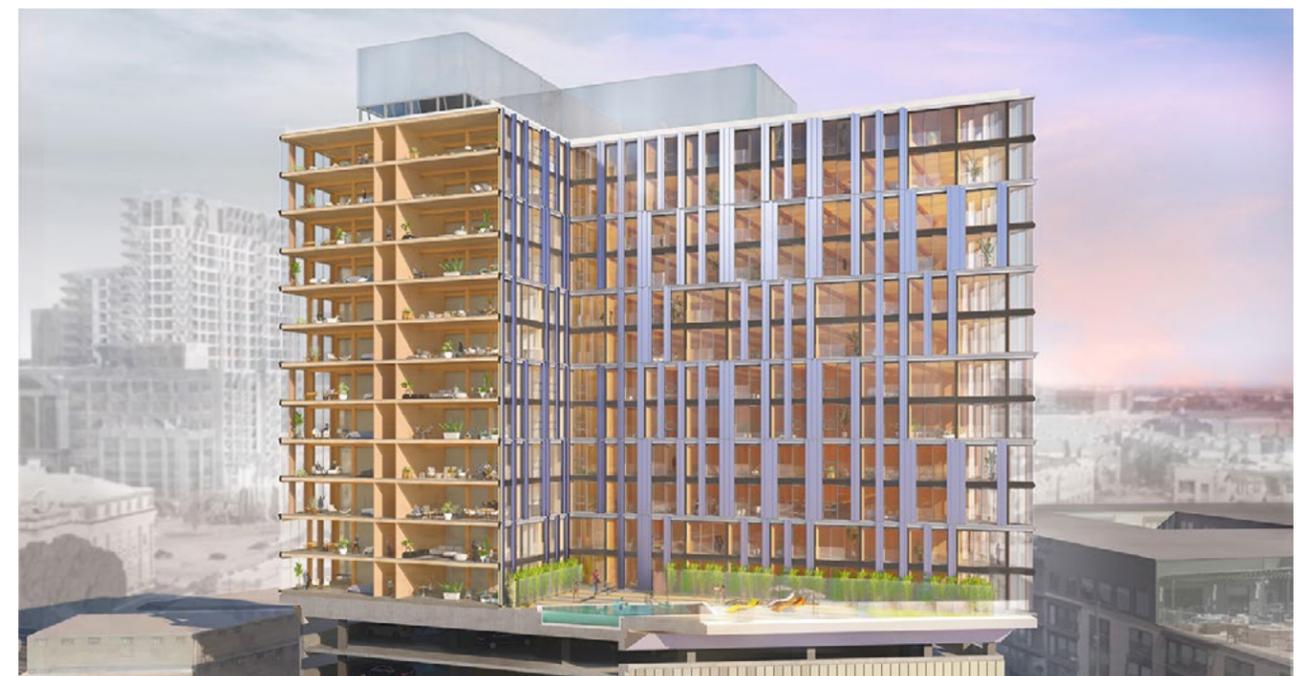


Residential Tower, Seattle, Washington, USA

Further exploring this avenue for environmental and financial benefits through timber is a 17-story, residential mass timber prototype for Re:Treat in Dallas, Texas. Re:Treat aims to connect residents with the beauty of the natural world through an emphasis on biophilic design principles, including floor-to-ceiling windows filling each space with abundant natural light, accentuating the inviting warmth of the exposed mass timber. Compared to traditional post-tension concrete structures, Re:Treat is projected to emit 45% less CO₂ during material extraction, processing transportation and construction. Additionally, the modular assemblies and prefabricated mass timber components enhance durability and unit layout flexibility, and they streamline the construction timeline to enhance cost control.

While Arcadis' use of less energy-exhaustive materials helps lower carbon emissions during the design and construction phases, we also design to lower emissions once the building is fully built and operational. The standard for low operational carbon emissions is called the Passive House Standard, achievable only by buildings using about 90% less energy than typical buildings to achieve thermal comfort, indoor air quality and acoustic insulation. While the necessary implements to achieve Passive House can incur higher initial investment costs, the dramatically lower energy consumption of the building throughout its lifespan reaps rewards both financially and environmentally.

+ Re:Treat is projected to emit 45% less CO₂ during material extraction, processing, transportation and construction.

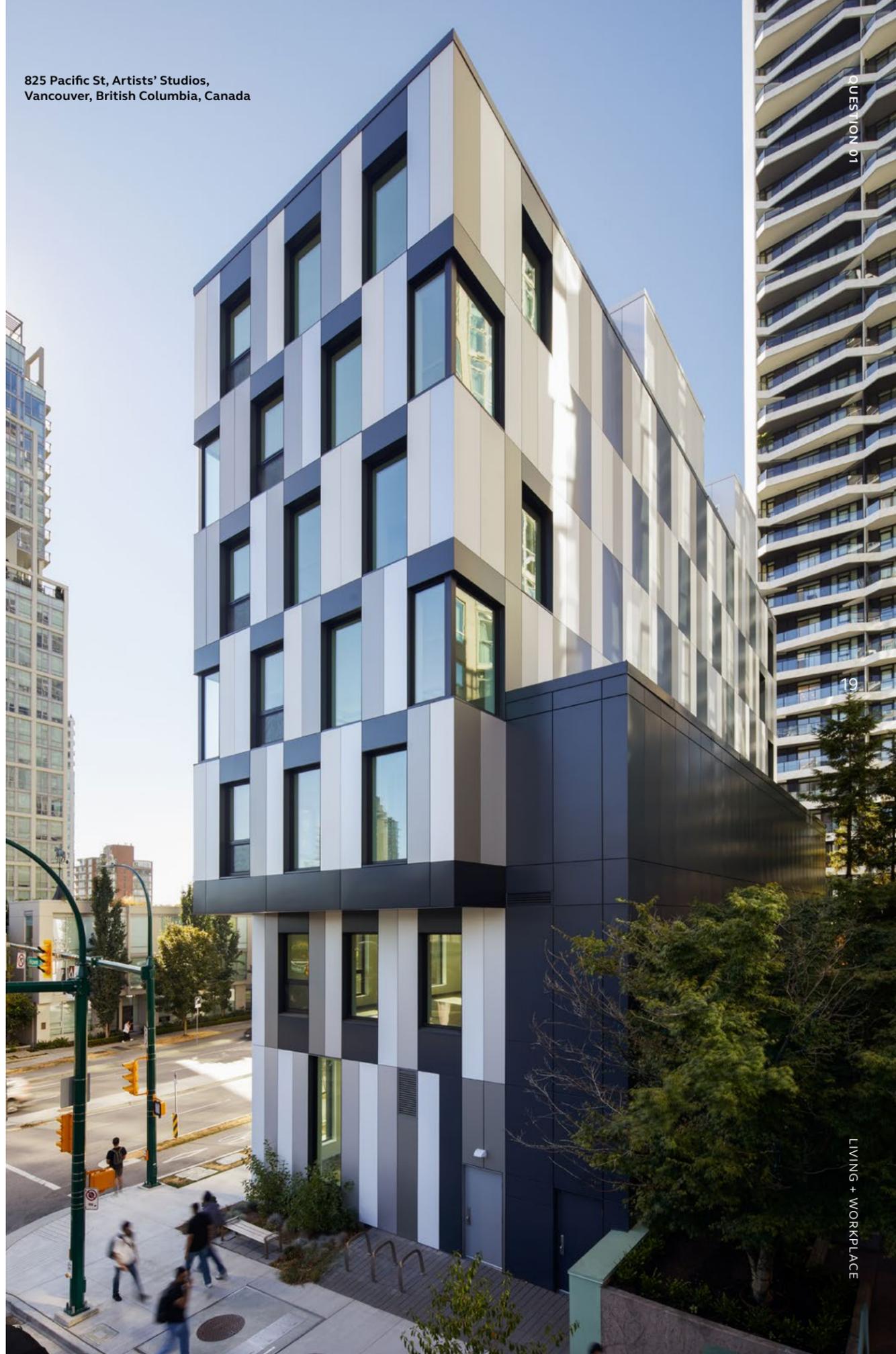


Passive House Projects

One of Arcadis' Passive House projects is the Artist Studios in Vancouver, British Columbia, containing affordable production studio and office space for artists and non-profit organizations based in the city. The seven-story, 21,000-sf building is an all-electric, near-zero-emissions facility, fitted with an electric air source heat pump to efficiently deliver domestic hot water, along with space heating in the winter and cooling in the summer.



825 Pacific St, Artists' Studios,
Vancouver, British Columbia, Canada



Also in Vancouver, British Columbia, Arcadis collaborated with Wright Kuruvilla Architects on The Curv residences. At 60 stories, the 501-unit housing tower is designed to become the tallest Passive House building in the world. The building's modular wall elements will be developed to optimize construction efficiencies, reduce construction waste and achieve excellent quality of airtightness, while the building's façade is made up of 40% triple-glazed windows and 60% super-insulated walls.

+ At 60-stories, The Curv is the tallest Passive House building in the world.

The Curv, Vancouver, British Columbia, Canada

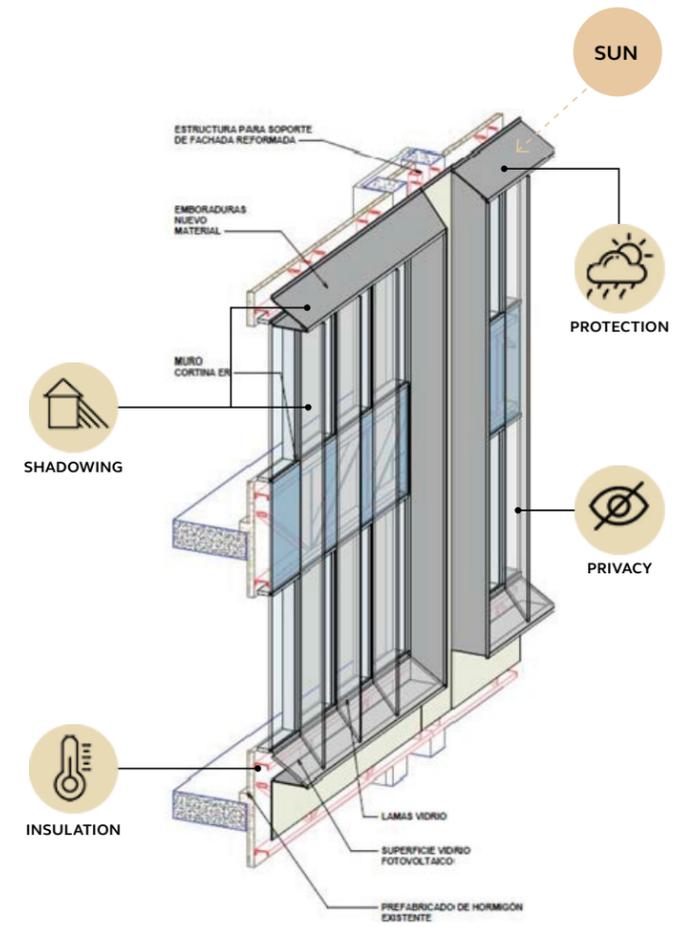
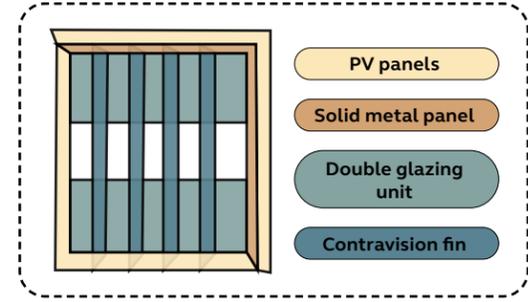




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+ This project will deliver a significant 55% drop in annual energy consumption, saving an impressive 101,151 kgCO₂e in operational carbon.

The impact of a well-insulated building façade to lower a building’s operation carbon emissions can also be seen in Castellana 66, a 30-year-old office building in Madrid, Spain. To bring the building back to current building standards for acoustics, energy efficiency and carbon emissions, we designed a high-performance exterior façade that generates energy through integrated photovoltaics. This saves more than 100 metric tons of carbon dioxide equivalent per year while keeping 9,000 metric tons embodied in the structure—and out of the atmosphere.



Castellana 66, Madrid, Spain



QUESTION 01

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WonderWoods, Utrecht, Netherlands
Sustainability and biophilic design are at the core of Wonderwoods. These twin 90-meter towers aim to provide a balance between nature and the city to its inhabitants.

Between Passive House standards and the use of mass timber to lower both operational and embodied carbon emissions, our firm has been designing examples around the world of how stunning, affordable and durable sustainable design is not only possible—it's already here.



Since the beginning of time, humans have been living in and evolving with nature. In fact, being surrounded by nature is in our DNA. We are wired to respond positively to the natural environment.

Matthias Olt
Associate Principal, Living

Can residential developments reach new heights?

02

LIVING



The Move to High-Rise: More Than Just a Trend

—
Creating successful spaces worldwide through a custom approach to vertical expansion.

It's no secret—the cost of living and the demand for housing are both rising at unprecedented rates worldwide. As urban population densities soar, many cities are moving away from the idea of horizontal expansion via single-family homes and toward modern, spatially economic high-rise residential buildings.

The design of what we know as “skyscrapers” dates back only to the late 19th century, when the idea of a light steel building skeleton designed to withstand harsh winds spread rapidly amongst architects in American cities such as Chicago and New York. Nowadays, you're hard pressed to find a city skyline in the world unpunctured by their angular silhouettes as different cultures have taken the idea and run with it, creating iconic landmarks and offering innovative solutions to housing shortages due to rapid population growth.

A Study of Success

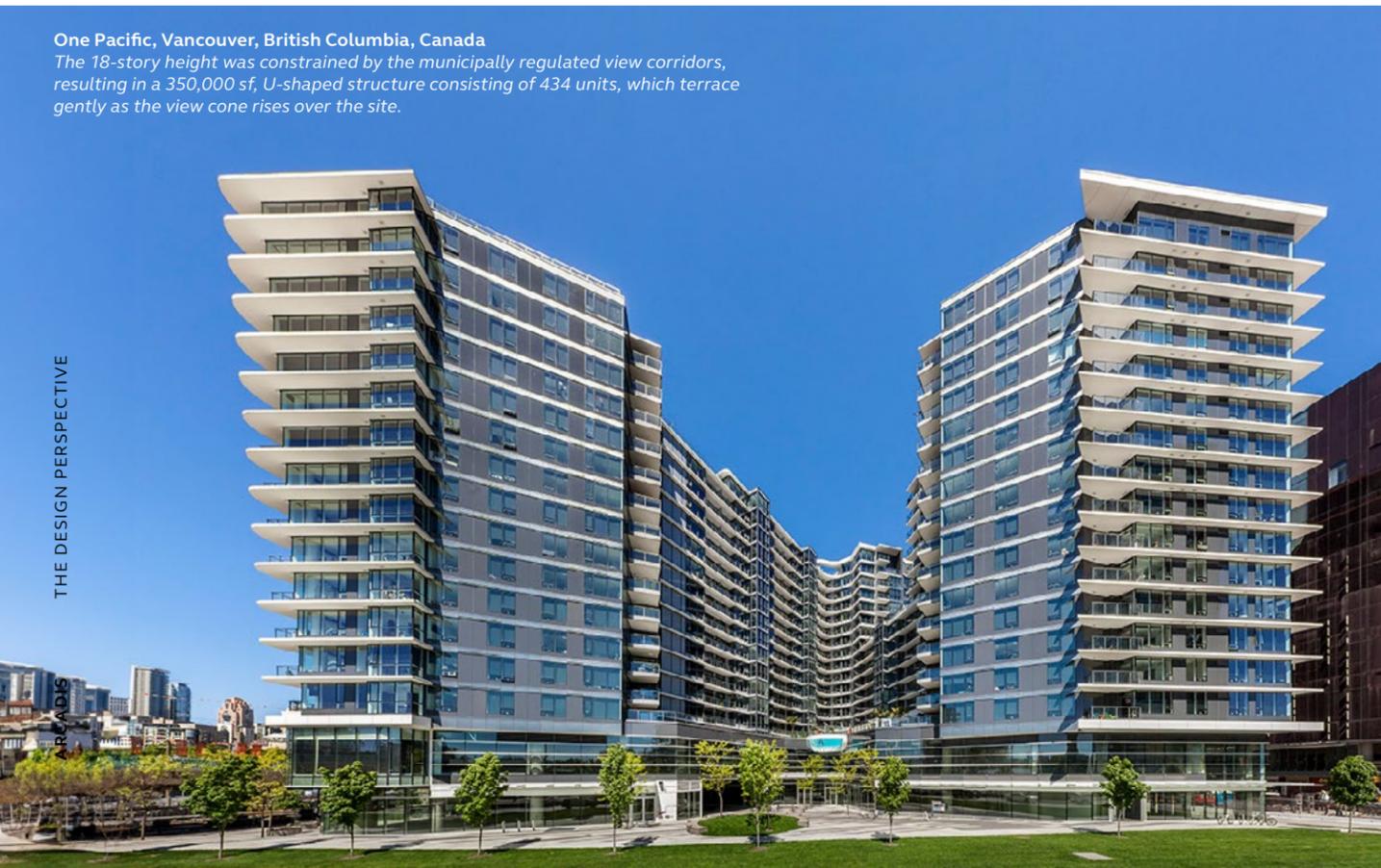
CANADA

The Canadian city of Vancouver is a preeminent example of a place that embraces the idea of residential high-rise buildings. Known as “The City of Glass,” its skyline is packed with gleaming towers, and the city only plans to expand on this urban housing availability in the years to come. The region’s population is predicted to grow by a daunting 50%, or 1.1 million people within the next two decades, meaning space-saving housing options are a must. Rather than expand outward to provide the estimated 550,000 housing units needed to manage this expansion, designers are headed vertically, saving space and keeping communities within a walkable distance to amenities and transit access.



West Pender Place, Vancouver, British Columbia, Canada
A mixed-use development comprised of one high-rise tower, one mid-rise tower, and a 5-story podium.

One Pacific, Vancouver, British Columbia, Canada
The 18-story height was constrained by the municipally regulated view corridors, resulting in a 350,000 sf, U-shaped structure consisting of 434 units, which terrace gently as the view cone rises over the site.



Burrard Place, Vancouver, British Columbia, Canada
The first of three towers to be included on the site, this 55-story tower with seven-story residential and commercial podium includes 444 residential units, a grocery store, car dealership and café along with over 100,000 sf of office space and a full floor amenity level.



+ Arcadis is leading the charge in providing high-rise residential solutions in the Greater Toronto Area, having designed nearly 200 towers that drastically modernize the city's skyline and provide important housing solutions for its increasing number of residents.



CityPlace, Toronto, Ontario, Canada

Axis Condo, Toronto, Ontario, Canada
A distinctive honeycomb motif is carried throughout this 38-story, mixed-use tower.

Rapid population expansion is not just a phenomenon in Western Canada. The eastern side of the country—particularly Toronto—is also experiencing a population boom, with an estimated increase of more than 500,000 residents in the Greater Toronto Area (GTA) by 2030.

One such project located in downtown Toronto is CityPlace, a derelict railroad site turned vibrant urban district. Designed with sustainability in mind, the tower is comprised of different precincts and neighborhoods, creating a walkable, public transport-oriented development that encourages work-life balance and community. The building is home to approximately 5,000 residential units, setting the standard for resident-focused high-rise design.



Victoria Sur Le Parc, Montréal, Québec, Canada



In neighboring Montréal, Arcadis recently completed the largest mixed-use project in the region known as Victoria Sur Le Parc. This angular glass beacon is steps away from the modern downtown core and the historic Old Montréal district, and its design embodies the balance needed to effectively straddle these varying locales. The spaces are designed to open minds and make borders disappear. Fluid and interconnected, Victoria Sur Le Parc reflects Montréal's unique energy.

UNITED KINGDOM

While Europe was relatively reluctant to accept the modernity of skyscrapers—holding out on incorporating them into their cities until well into the 20th century—by 2013, every major European city featured high-rises in their skylines. This skepticism of futuristic design in a continent known for its historic buildings led to a unique implementation of high-rise towers—nearly all instances of this building type are mixed-use developments, containing residential, retail and office spaces to draw in tenants.

Rather than a reaction to an anticipated population boom, these towers are crafted to enhance the lives of established citizens and offer localized amenities.

The Arcadis project of Corkfield Edgbaston is a 375-unit residential high-rise near a popular cricket stadium in Birmingham that boasts a range of creature comforts, such as co-working rooms, a flexible studio, an on-site bicycle store and private balconies.

Corkfield Edgbaston, Birmingham, England, United Kingdom



- + Arcadis carefully crafted Corkfield's design to augment the neighborhood and deliver long-lasting social value, creating numerous job opportunities for residents and achieving a three-star Home Quality Mark rating, a two-star Fitwel rating and a WiredScore technology certification of Platinum.

Lotte Center, Hanoi, Vietnam

This 65-story mixed-use tower includes serviced residences with amenities, a five-star hotel, office space, sky gardens, a roof top observatory and a shopping mall.



Bayview, Guangzhou, Guangzhou, China
Located on the banks of the Pearl River, these five 40-story, glass facade residential towers are surrounded by lush gardens and pools.

CHINA

Known for its thought diversity and emphasis on innovation, the Asian high-rise landscape is a master class in revolutionary design. Towers are often groundbreaking in both form and function, pushing boundaries and re-imagining the possibilities of residential high-rises. They draw in visitors from around the world, sparking innovation in disaster resistance, sustainability and technology while increasing the economic viability of the surrounding area.

Adapting to American Sensibilities

The United States does not lack for high-rise towers in its landscape—New York City is known for its impressive skyline as the third-tallest city in the world, and nearly every major metropolitan city in the nation is home to at least a few towering structures. The difference between the US and its neighbors to the north and across the pond is in the intent behind the design—Americans tend to house hospitality and working spaces in their towers rather than single or multi-family units.

The challenge high-rise residential designers face in bringing the concept to the US is not a lack of need for housing, it's a lack of adaptability. American public transportation is not as robust as its global counterparts', and most citizens rely on personal vehicles rather than public transit. The American home tends to be more nuclear than extended, and a history of individualism in the nation has lent itself to popularizing single-family homes.

Overcoming this major obstacle means finding the right demographic and appealing to their needs, whether that be affordable housing or luxury amenities. Multifamily living is not the norm, meaning a beautiful aesthetic is not enough to draw in American residents and make them stick around; designers must dig deep into a community and find a need to fulfill.

360 Market Square, Indianapolis, Indiana, USA
Providing 300 residential units, retail and outdoor dining space, 360 Market Square serves as a hub to boost economic growth and civic activity.

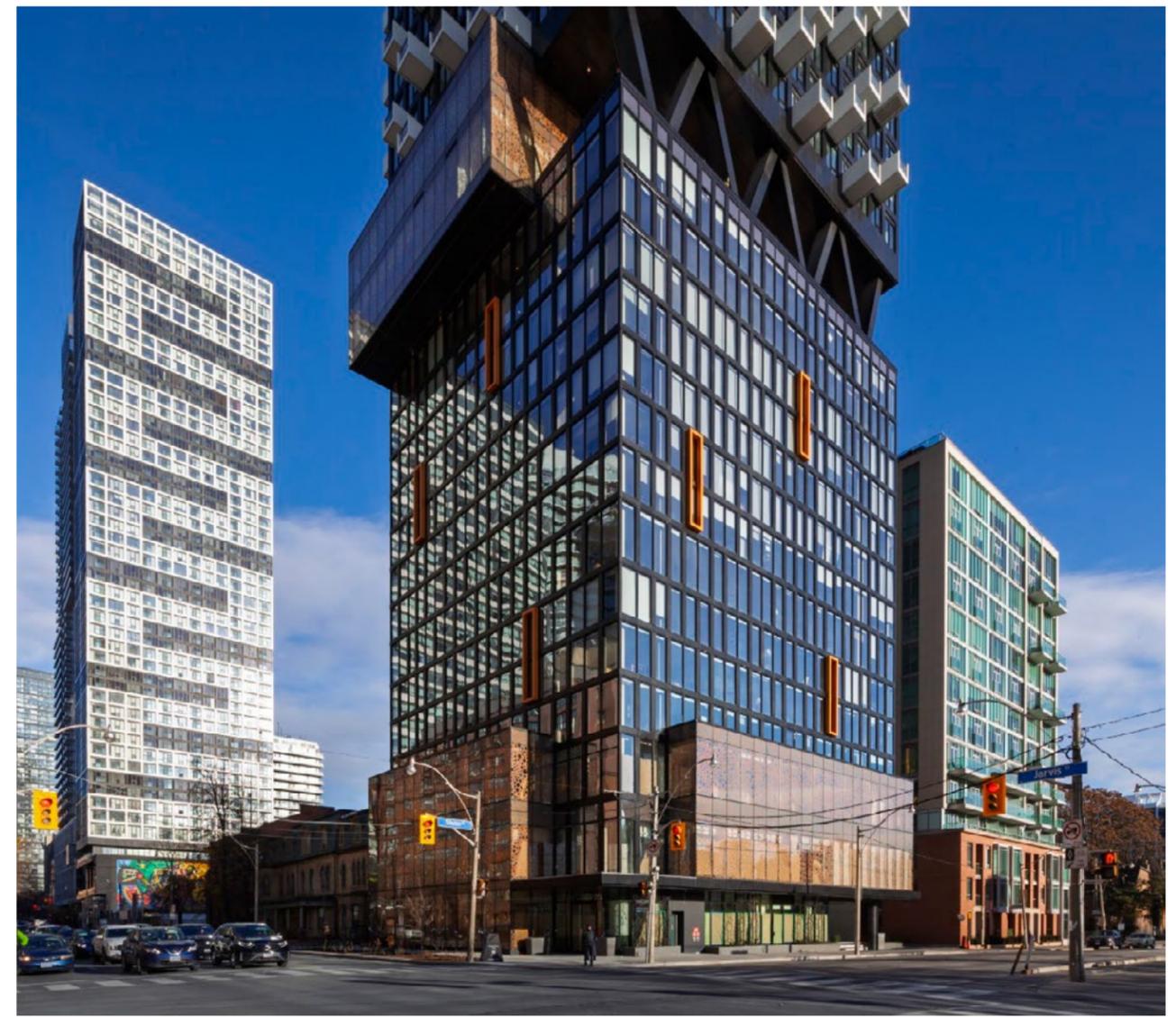


15th Street & Island Avenue, San Diego, California, USA
This mixed-use development has a 5-story podium with commercial and residential amenities at ground level and residential uses above; a 45-story residential "Tower-1" at south; a 45-story residential "Tower-2" at north; a 5-story below grade parking structure, and a public park to the west totalling approximately 1,000,000 sf.





Arcadis leads the multifamily housing design sector for architecture and engineering firms, having completed our fair share of residential high-rises over the years, and we look forward to diving into our communities to find out how we can best serve them with a sustainable, people-first high-rise solution.



203 Jarvis Street, Toronto, Ontario, Canada
The TOOR Hotel at 203 Jarvis Street pairs residential living with a boutique, urban hotel where residents and guests share curated amenities.

What is driving growth and engagement instead of disconnection in mixed-use districts?

RETAIL + TRANSIT + PLACEMAKING + HEALTHCARE

Mixed-Use Anchors: Achieving Dynamic, Year-Round Activation through Next-Generation Programming

—
Crafting an experience
that draws communities
in day after day, year
after year.

In the last five years alone, the world's population has undergone a rapid change in the way we work, socialize and overall inhabit the spaces around us. The disconnected way most suburban cities are planned—homes far from amenities, a 45-minute drive to work, another 25 minutes after work to get groceries and an hour-long round-trip to see friends in the evening—no longer appeals to much of our population. People crave connection now more than ever and seek experiences that delight, serve and excite all in one place—living, shopping, dining, attending community events, catching public transit and even receiving healthcare.

This curated mix of uses is not just about putting the right pieces of the puzzle together; it's about crafting an experience that draws communities in day after day, year after year.

We can achieve a successful blended environment by maintaining thoughtfulness in combining each use into one harmonious vision, taking care to activate every space and choreograph sight lines to enhance the experience of the district more than any one use. These flexible, multi-purpose spaces that wrap around the public realm can function as community hubs to provide much-needed amenities for residents while maintaining visitor engagement year-round.



Wukesong Cultural Sports Plaza, Beijing, China
This experiential destination incorporates culture, shopping and sports activities to create a dynamic, energetic and unique retail destination.

From Mixed to Blended: Orchestrating the Experience



The commercial development landscape is at a pivotal moment, offering the choice to create something more socially inclusive, flexible, adaptive and regenerative. Crafting exceptional mixed-use destinations requires careful orchestration and a deep knowledge of what the end user values. From hotel guests to retail shoppers, full-time residents to sports fans, when people and their needs are taken into consideration above all else, it becomes easier to minimize friction points proactively and allow for organic interactions that enhance quality of life.

The opportunities we see in the next generation of mixed-use is in planning and designing for a new set of mixed-use anchors. Key principles still apply, but a different approach to demographic research, retail diagramming, leasing strategies, open space planning, vehicular access and wayfinding is required to ensure these environments thrive.

The Bend Master Plan, Chattanooga, Tennessee, USA
This project will transform an industrial brownfield site into a new community hub in downtown Chattanooga, creating a retail and entertainment-driven destination with new and active connections to the waterfront of the Tennessee River.

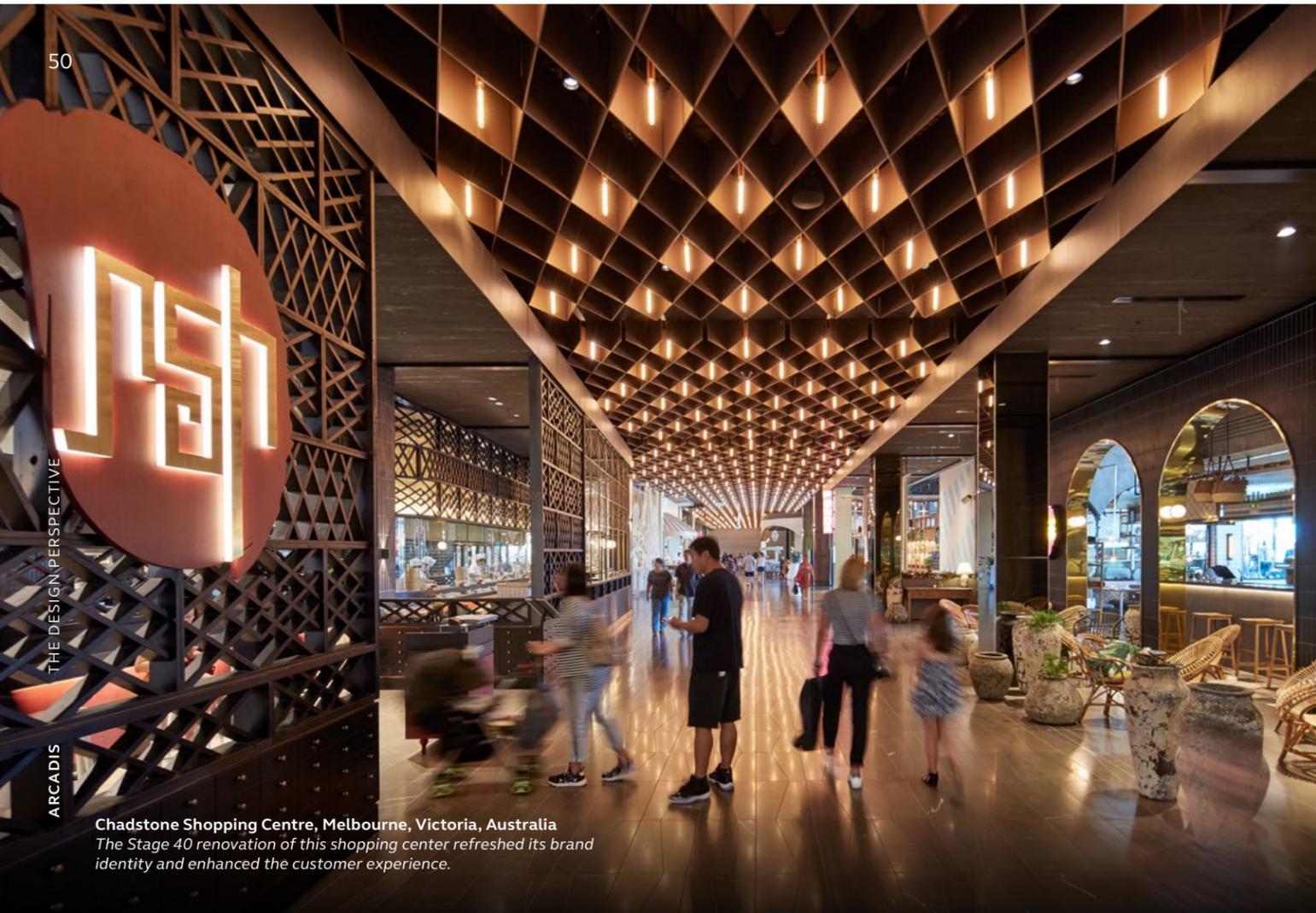
Anchors of Today and Tomorrow

As a fresh set of mixed-use anchors have emerged, the industry has wrestled with how to plan and design for a new mix. How can districts anchored by sports and entertainment venues stay activated on non-game days? How does a healthcare-anchored environment draw community members who aren't patients? The key questions really come down to one: how can mixed-use environments remain active and vibrant year-round when their anchors aren't bustling every day or their users have unique needs?

Sports venues, office spaces, shopping centers, healthcare institutions—no matter the anchor, the key to success lies in activation. Many of these use types historically served as an island of activation surrounded by a sea of parking—effectively serving as a barrier to the communities they were meant to serve. Today, we explore opportunities to plan these environments with community activation in mind, designing the big moment and every space in between with the same thoughtful approach.



JW Marriott Parq, Vancouver, British Columbia, Canada
This hotel-casino sits adjacent to downtown Vancouver's stadium, complementing the city's social and entertainment culture.



Chadstone Shopping Centre, Melbourne, Victoria, Australia
The Stage 40 renovation of this shopping center refreshed its brand identity and enhanced the customer experience.

+ THE SECRET SAUCE

A CONNECTED DESTINATION

Providing clear and intuitive access to the neighboring community while enhancing visibility to the venue to create a clear identity for the district.

A DIVERSE AND FLEXIBLE PROGRAM

Creating the right mix of uses and tenants to attract a diverse consumer group while ensuring adaptability to future market needs.

A WALKABLE ENVIRONMENT

Planning the district to ensure it is at a scale that is comfortable to walk through and activated at the street level.

A COMMUNITY-RESPONSIVE OFFERING

Understanding what the adjacent communities want and need in order to provide relevant and meaningful amenities and services that will keep the district active on game day and every day.

Activating New Anchors:

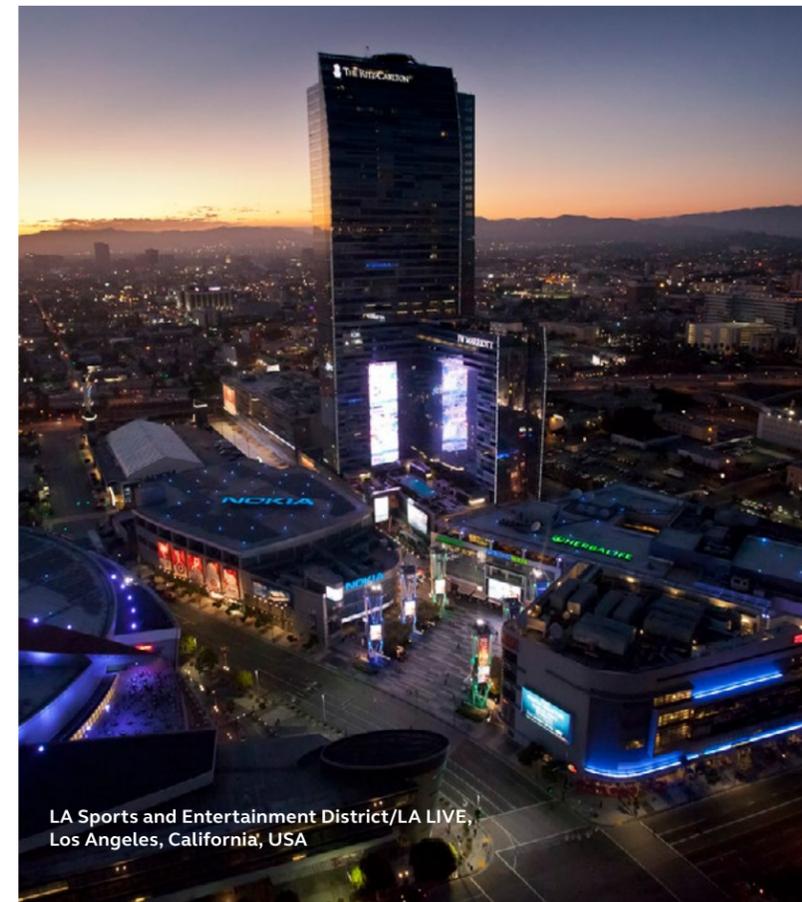
Sports + Entertainment Venues

Sports-driven mixed-use districts can double as community centers, incorporating spaces for local events, educational programs, fitness and recreation, extending the venue's use beyond game days. This keeps the momentum going before and after games, as well as during the 350+ day off-season. Special care has to be taken to account for the massive influx of car and pedestrian traffic on game days that doesn't inhibit access to the rest of the district.

Maple Leaf Square, Toronto, Ontario, Canada
This mixed-use development contains a galleria that connects to an arena for professional sports teams.



Cleveland Lakefront Master Plan, Cleveland, Ohio, USA
This master plan connects Cleveland's green civic spine to Lake Erie.



LA Sports and Entertainment District/LA LIVE, Los Angeles, California, USA

A CATALYST FOR DOWNTOWN REVITALIZATION

L.A. LIVE sparked downtown Los Angeles' urban renaissance, shaping a vital new heart for the entertainment and culture capital of the world. In less than a generation, the project has catalyzed significant growth, with an estimated \$15 billion of investment and 17 development projects following its completion, enabling the city to compete and thrive on a global scale.

The Orbit, Innisfil, Ontario, Canada
The station establishes a well-connected community that activates multimodal connections and encourages the growth of an open-space network respectful of the protected watershed.



Activating New Anchors:

Transit-Oriented Communities (TOC)

We leverage transit hubs as key connectors within mixed-use developments, designing pedestrian-friendly links between entertainment venues, retail, office and residential spaces to enhance accessibility and reduce car dependency. Rather than the transit hub sitting on an island, it should be well-integrated with the surrounding district, with seamless connections to multiple uses and careful planning of walk times to and from the transit station.

The Point Master Plan, Draper, Utah, USA
The Point is a place where the regional mobility network converges to provide a transit-rich, walkable, bike-friendly neighborhood anchored by a main street and public spaces where families create memories and business flourishes.



Activating New Anchors:

Healthcare + Life Sciences

Healthcare and science mixed-use environments require careful attention to drawing a mix of offerings that will serve both the surrounding neighborhood and the employees and patients in the anchor facilities. These districts have a unique opportunity to offer health-focused amenities and services, flexible and active public spaces with year-round programming, housing and hospitality offerings for short-term stays, and sustainable and biophilic design elements.



Nassau Innovation Hub, Uniondale, New York, USA
The project proposed transforming the near 70-acres of barren parking lots surrounding the Nassau Coliseum into a new vibrant, walkable, mixed-use downtown—with a focus on the life sciences—in the heart of Nassau County.

Retail: The Connective Tissue of Mixed-Use Districts



Expert thought around the street level activation of every mixed-use district—regardless of its anchor—is the key to curating an exceptional experience for users and to ensure its commercial success. Every sight line must be choreographed and every retail tenant must be carefully curated for the selected space and targeted for future demographics. Getting this mix right can mean the difference between the space being a ghost town on an off day or a community hub year-round.

How can transit systems be more than just a means of getting from Point A to Point B?

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TRANSIT + PLACEMAKING + COMPUTATIONAL DESIGN



Station Hill, Reading, England, United Kingdom
This regeneration district project provides a well-connected and attractive public realm that integrates with surrounding districts.

Transit-Oriented Communities: Transit as more than a means of getting from Point A to Point B

The way we work, commute and live our day-to-day lives has made a dramatic shift in the last century. Small, tight-knit communities are falling out of style, and sprawling suburbs have become the norm.

While spaces outside large cities provide much-needed space to attract new residents, the desire for connection, sustainability and ease of access—to friends and family, offices, retail centers and so on—has already changed this relatively new suburban landscape.

By its very definition, a transit-oriented community (TOC) is a city planning strategy centered around a transit connection that condenses the spaces where people live, work and play. A successful TOC requires input from all design sectors, including computational design, transit planning/architecture and placemaking.

This integrated approach allows cities around the world to reduce their carbon footprint while providing a livable, desirable and connected destination.

Not all communities are the same, however, and we cannot take a one-size-fits-all approach toward development. Intersectional, cross-collaborative design must be applied from the very beginning to customize our approach toward creating the communities of the future.

Computational Design: Transit-Oriented Design as a Catalyst

Computational design is the foundation upon which we build successful TOCs. Arcadis' Computational Design Team excels at bringing together many perspectives simultaneously to input and make sense of complex, multi-scaled data that we use as design drivers. Leveraging their customizable, algorithmic process allows us to identify opportunity areas where TOCs can revitalize underdeveloped or historically under-resourced areas.

The Arcadis Computational Design Team employs a tailored, equity-adjusted algorithm to ensure that even in areas lacking essential amenities, we can realize significant transformations, particularly through the integration of transit systems. To encourage this development, we incorporate an equity framework into planning discussions and decision-making, which highlights areas along transit lines that might otherwise be overlooked due to socioeconomic barriers.

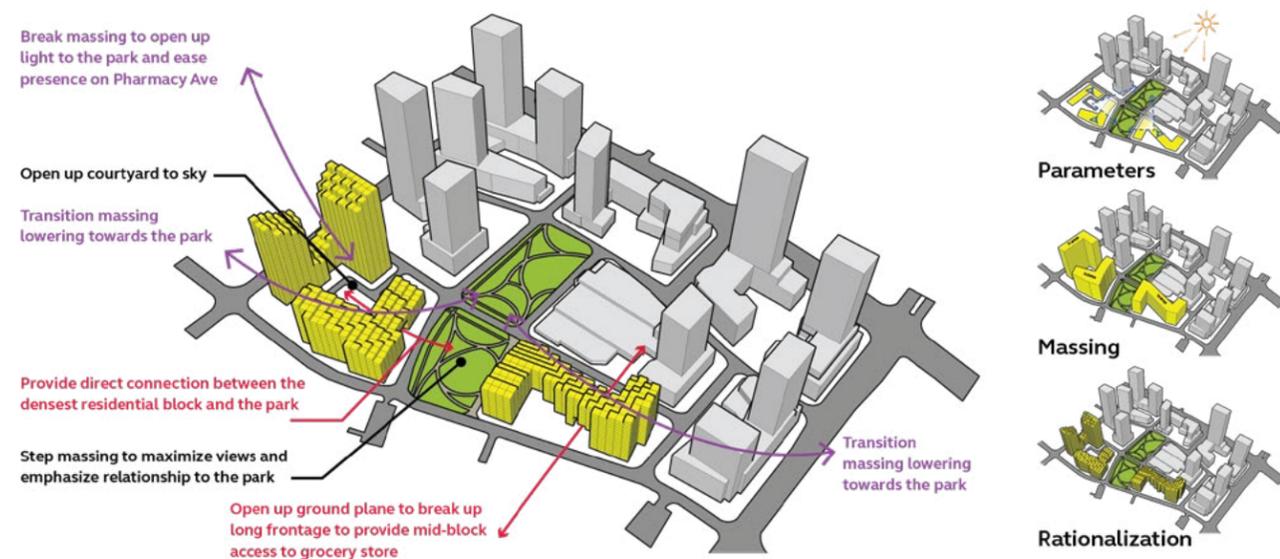
These areas have the potential to drive economic growth when aligned with broader urban development goals, such as improving access to affordable housing, jobs and healthcare. In turn, TOC investments directly benefit these communities by addressing critical challenges, like income disparity and limited access to employment, while ensuring equitable outcomes. This process transforms neglected areas into dynamic, transit-supported hubs that contribute to sustainable, equitable urban growth.

To identify the most impactful areas for Transit-Oriented Communities, the Computational Design Team examines data through multiple lenses, ensuring a holistic view. This approach allows us to uncover areas with conditions that could be remedied and revitalized through the introduction of transit infrastructure.



Vermont Transit Corridor Rail Conversion Feasibility Study, Los Angeles, California, USA

DESIGN STRATEGY



We applied this algorithmic process to an analysis of Vermont Avenue in Los Angeles, which passes through distinct areas of the city with varying levels of socioeconomic circumstances, safety, green space access and overall infrastructure. The purpose of the study was to evaluate two bus rapid transit (BRT) concepts to ensure their implementation did not preclude a potential conversion to rail in the future and to address configuration and operability issues.

We also identified and assessed the feasibility of six potential rail concepts and identified ridership thresholds that inform the conversion of BRT to rail. Overall, our team utilized computational design to simplify and speed up the process of evaluation, quickly identifying opportunities to facilitate and promote favorable transit outcomes for the urban corridor.

Transit Architecture: Planning for a More Sustainable Future



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Mississauga Transitway, Mississauga, Ontario, Canada
Serving Mississauga and integrating with key transit corridors of the Greater Toronto Area, the Mississauga Transitway provides ten stations that follow a context-sensitive design approach.

As with any project, planning is key and must come before nearly any other aspect to ensure overall success. TOCs are no different, and our Transportation Planning team steps in early to determine where connected transit lines live, which areas of growth to target and how to scale up services in a realistic way.



Eglinton Crosstown LRT, Toronto, Ontario, Canada
Spanning 15 stations and 10 stops along almost 20 kilometers, this transit expansion puts the passenger experience first.

From reducing congestion to improving the safety of road and transit networks, our engineers and planners have expertise with integrated transportation and land use planning, transportation master planning, policy development, environmental assessments, demand forecasting, cost estimates, engineering, geometric design, construction staging, multi-user facilities and ITS & revenue collection systems for all types of urban, inter-urban, regional, national and international systems for passenger and freight transportation.

Stakeholder engagement during the planning process ensures the successful integration of transit into a community. The values, culture and priorities of a community are paramount in understanding what will and won't work for a specific area, and we curate our process to maximize benefits for all involved.

QUESTION 04

67



TRANSIT + PLACEMAKING + COMPUTATIONAL DESIGN

Crafting Urban Destinations around Transit Infrastructure

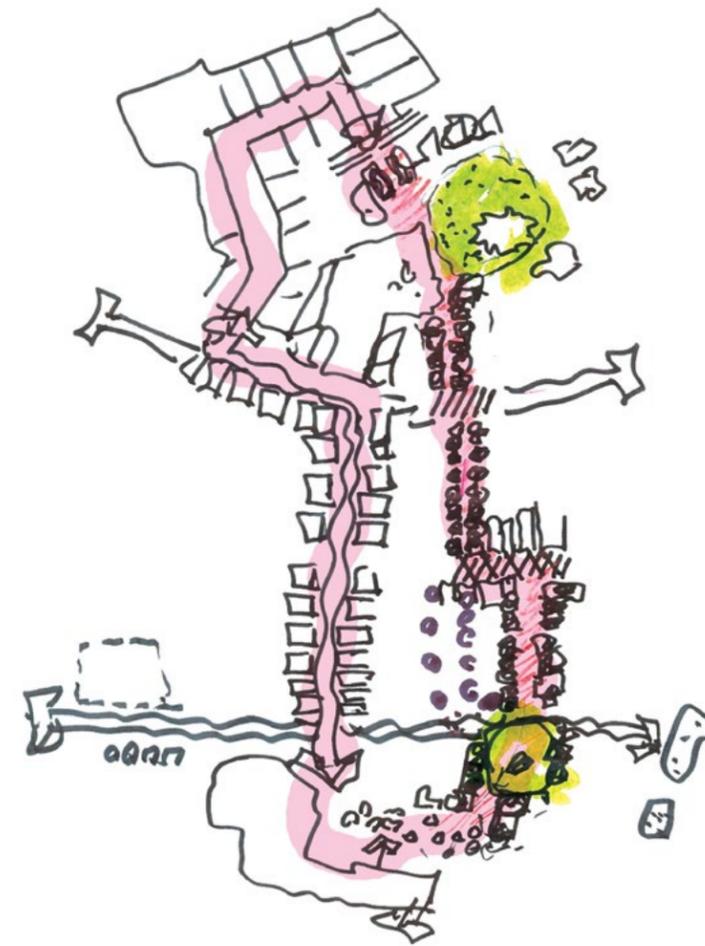
Transit-oriented communities support the creation of vibrant, diverse and livable places all centered around one goal: enhancing the human experience.



As a method of curbing sprawl and reliance on automobile travel in our communities, we recognize the power of place creation alongside linear infrastructure such as rail, BRT and active transportation networks. While transit infrastructure allows for movement from place to place, place creation catalyzes engagement and retention.

TOCs are a critical step toward a more sustainable future, and Arcadis Placemaking advances this goal with a holistic approach to urban planning, which prioritizes the integration of transportation systems with urban landscapes to create animated, inclusive communities.

We draw from local context, future opportunities, voices from the local community and global best practices to craft tailor-made, responsive solutions for tomorrow through a proven, proprietary T+O+C approach. We analyze, envision, strategize and implement complete communities that serve and are served by transit corridors. Our process is unique in that, by utilizing an intensive workshop methodology, we efficiently, effectively and meaningfully collaborate with cities, communities and authorities to gain local input and stakeholder buy-in for three key elements of the plan. By approaching the corridor as a place of transit ("T"), a public open space ("O"), and a community opportunity ("C"), we are able to consider complex and nuanced factors and strategic priorities in a methodical, logical and digestible manner that lends itself well to developing a complete community plan. The result is a TOC plan that is widely supported and future-oriented and incorporates mechanisms for long-term implementation and financial feasibility.



Station Hill, Reading, England, United Kingdom



In essence, the synergy between computational design, transit planning and landscape architecture in transit-oriented communities underscores the importance of creating livable, resilient and sustainable urban areas.

Through thoughtful consideration of design elements, land use allocation and environmental impact, these disciplines work together to shape transit-oriented developments that prioritize the well-being of residents, promote environmental stewardship and enhance the overall urban experience.

Duck Island Master Plan, Richmond, British Columbia, Canada
Both a high-energy hub and a quiet river sanctuary, this site balances the riverfront location with its proximity to the SkyTrain and entertainment facilities.

Can housing motivate students to excel in the classroom and beyond?

EDUCATION + LIVING



The Benefits of Encouraging Students to Live within the University Ecosystem

Colleges and universities have experienced an ongoing problem of high demand for campus housing with limited supply. Students and others who cannot find living arrangements on campus end up off campus where it's hard to embrace everything that college life has to offer. Worse, students—especially those who are new to the area, such as international students—may find themselves in undesirable living scenarios that are unhealthy or put them at risk of exploitation.

As higher education institutions work to meet the demand for student living options, they must also appeal to students through a variety of features from amenities to affordability. While finding that balance will be different for each college because of its goals and culture, each must approach it by considering both quantitative and qualitative factors.

Quantitative refers to the number of beds available in student housing—an issue that a college or university should avoid rushing to solve. Qualitative factors are more wide-ranging. Updated finishes, on-site dining, number of washrooms, room configurations, a sense of community, affordable rates and so on draw students. Meanwhile, institutions must consider sustainability, accessibility, the fit with the campus ecosystem and, of course, cost. Above all, student residences must be safe, healthy spaces, so hastily building dorms to meet demand could easily cause more problems later.

**University Park,
Florida Atlantic University,
Boca Raton, Florida, USA**
This project consists of a 4-story student housing building with 159 units. Amenities include a resort-style pool, a 2-story fitness center, a study lab/lounge, and surface parking.

Higher education institutions can appeal to students through a variety of features from amenities to affordability that enhance the student experience.



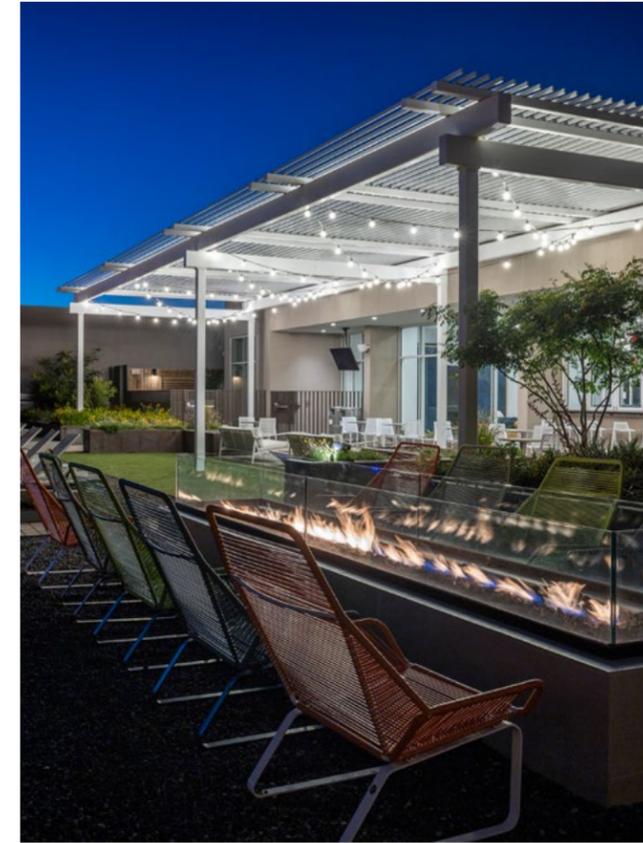
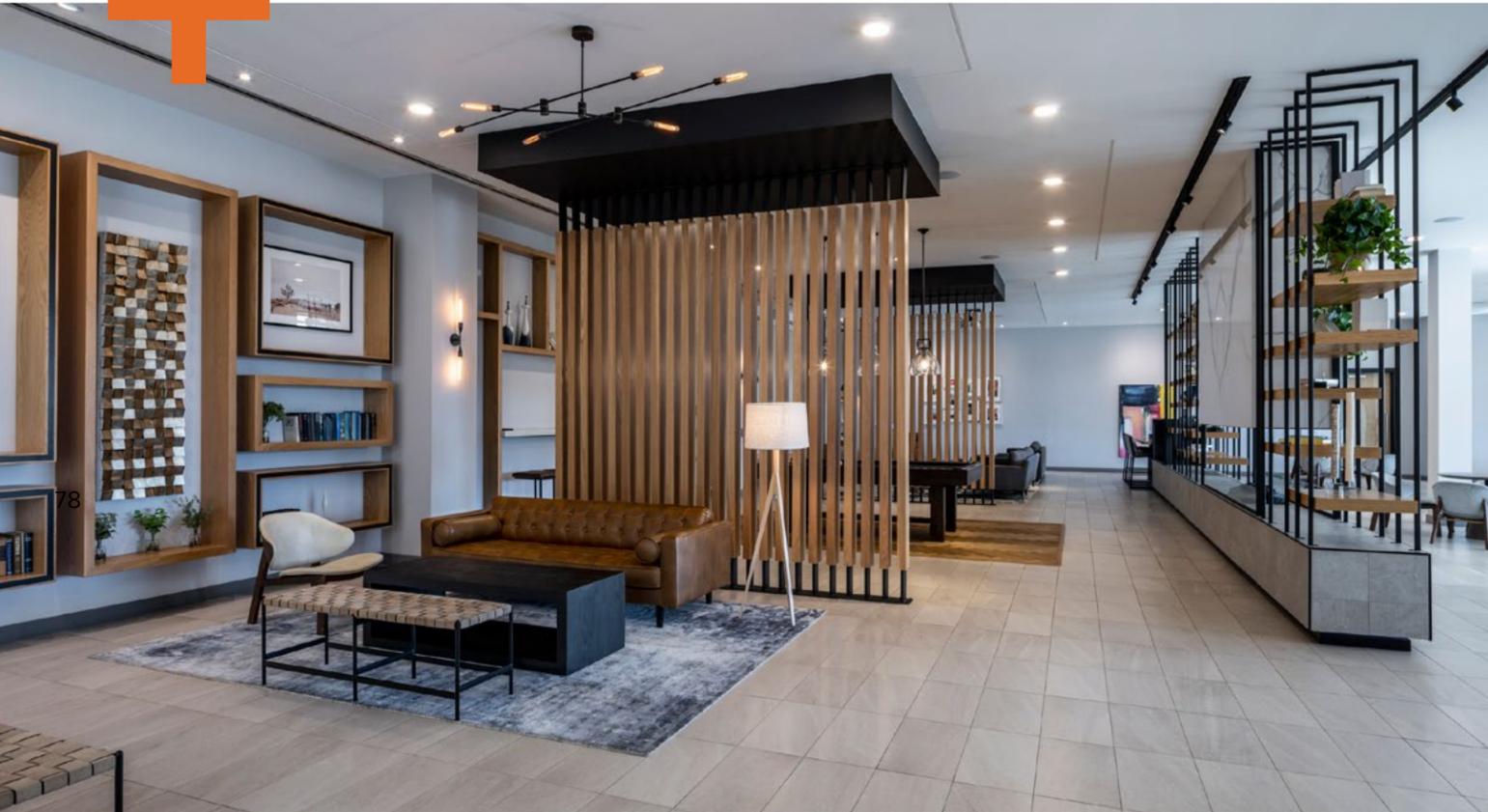
The University of Toronto Scarborough (UTSC) looked at solving myriad societal and institutional challenges with their design of Harmony Commons for first-year students. This sustainable, 750-bed residence aims to be one of the largest Passive House projects in North America. Everything is electric, and zero fossil fuels are used to run the building. That and other sustainability measures, including the improved thermal performance of the building's envelope and the reduced water consumption, mean that the university will expend less on this student housing in the long run. When they use energy-efficient techniques, universities can then pass on what they save, making it more affordable for individuals.

Harmony Commons had a wait list of students wanting to live there, and residents enjoy their dorm's dining hall and other amenities. The building includes conference rooms, retail spaces, and lounges and study areas on each residential floor. Residents report feeling more connected and engaged with campus life because of where they live on campus.

This holistic approach has benefited both students at and the institution of UTSC, but other colleges and universities may have barriers to following suit. To unlock more possibilities in student housing, universities can look beyond university-owned and operated housing to other models, such as public-private partnerships and developer-owned and operated projects.

Harmony Commons, University of Toronto Scarborough, Toronto, Ontario, Canada

By moving slightly off campus and partnering with the private sector, universities can more readily meet housing demand while maintaining quality.



The Piedmont, Tempe, Arizona, USA

The comfort of the residential part of the experience becomes clearer after asking student-centric questions:

- How much daylight is coming into your bedroom?
- Is it easy to open your window?
- Is your bed the right size?
- What's your access to a shared or private washroom?
- How easy is it to make friends or spend time relaxing?
- Do you have access to spaces conducive to studying?

The Piedmont provides luxury, off-campus student housing options near the University of Arizona in Tempe. While the design offers sustainability, residents gain dining and retail amenities along with access to a parking garage, private courtyards, a fitness center, rooftop pool and more.

Regardless of whether the student housing is on campus or off, when it comes to designing these living spaces, starting with the student perspective is critical. That approach is tricky because students are a wildly diverse group, but we want to make time spent within the residence comfortable and enjoyable while making it also feel like a seamless part of the student experience within the campus ecosystem.





When we're talking about the student experience, we don't want students sequestering themselves within the building—not doing anything else. We're finding the right balance of time in class, outside of class, outdoors, and within the student residence, and then once you have that right mix, we're making their time within the residence as comfortable and enjoyable as possible.

Steve Donnelly
Principal, Education



+ At Lenfest Residence Hall, Columbia University Law School combines affordability with the integration of academic and residential life.

Even though students tend to prefer to have their residential spaces be in separate buildings from their classrooms, a collaborative, even co-working style in shared spaces can be a draw for students. At Lenfest Residence Hall, Columbia University Law School combines affordability with the integration of academic and residential life. The expense of housing in New York City was creating a barrier for law students already financially strained by educational costs, which was keeping top students from choosing Columbia Law.

The design of this 19-story apartment building considers what a day in the life of a law student entails and provides the kinds of amenities that these graduate students need to succeed, such as seminar rooms, full-service kitchens, multifunctional common areas and innovative recreational spaces. Lenfest Residence Hall's design makes it central to students' lives at the university.

At the same time, the cost to residents was carefully programmed to be on par with other top-tier law programs' residential options. The hall's design optimizes long-term maintenance and operational costs, and Arcadis assisted with fundraising and financial planning that will continue to make Lenfest a desirable and affordable place to live for future residents.

Lenfest Residence Hall,
Columbia University Law School,
New York, New York, USA



Making students want to live on or near campus in housing that their higher educational institutions have created or vetted for safety has numerous advantages. Students engage with the campus community, avoid poor housing situations, enjoy the convenience of proximity to in-person classes and have access to both necessities and amenities that help them with a school-life balance.

When meeting the rising demand for student housing, colleges and universities have opportunities to seek sustainable solutions, attract top students and build a campus culture that brings their vision to life.

**Toronto Metropolitan University,
Jarvis Street Residence,
Toronto, Ontario, Canada**
This modern student residence is located in the heart of downtown Toronto.

Can we transform living spaces to be healing spaces?

LIVING + HEALTHCARE

Healthcare has More to Gain from Hospitality than Aesthetics Alone

We've heard a lot about taking design ideas from hospitality and using them to improve healthcare settings, whether it be a more attractive patient room or better amenities, but can we actually turn living spaces into healthcare spaces? We think so.



Dublin Children's Hospital Design Competition, Dublin, Ireland
Rendering completed as part of a design competition for this world-class facility that provides specialist services for the country.



It's no secret that in nearly every nation, healthcare systems are overly taxed and understaffed. By 2030, the global demand for health workers could rise to 80 million while the number of health workers will only reach 65 million, resulting in a worldwide net shortage of 15 million health workers.*

While we undoubtedly need more people trained as healthcare providers, we also need more facilities in which they can practice. Because building new hospitals may be out of reach, we need to consider innovative solutions to deliver the same outcome while relieving strain in acute care hospitals.

Radius
This breakthrough concept offers 360-degree care to the individual through the creative mashup of emerging technologies, including the Internet of Things (IoT), sensor technology, AI, 5G technology, nanotechnology and more.

**One such solution is the Rehab Hotel—
an urban ‘step-down’ care facility located
near NHS Hospital Trust estates that
accommodates patients discharged from the
hospital who no longer need critical care.**

Roughly 13,000 people in England remain in the hospital each day, even if they are medically well enough to leave. While reasons for delay in discharge are unique to any given patient, transitioning care to the home setting after an acute hospitalization is fraught with potential complications that can lead to readmissions, further exacerbating the hospital capacity crisis.

A rehab hotel stay would include nurses and aides who, rather than providing hourly care, would instead focus on teaching family members necessary skills to help patients recover safely at home while freeing up acute care space. The model is hospitality-led, becoming a critical bridge for the eventual transition to a home setting. The aesthetics, including best practice design and biophilic approaches; hotel-like amenities, including spaces for caregivers to stay over; and targeted transitional care staff would together promote wellness and recovery, aiming for higher quality transitions to home and a reduction in 30-day readmissions.

While some small step-down facilities already exist around the UK, no large-scale platform solution operates on a national basis that would attract others to enter the market. The Rehab Hotel would be a blend of aspirational mid-market urban hotel and specialist healthcare facility. A typical ‘hotel’ could provide 200 patient bedrooms and 20 overnight carer accommodation units, as well as front of house, concierge and resident amenity areas, like restaurants, wellness centers, consultation rooms and rehabilitation spaces.

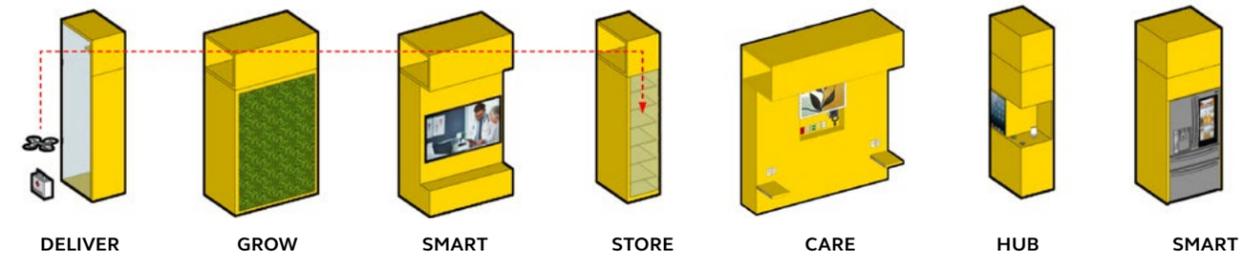
But how would it work? In the UK, a purpose-created development company could acquire land and secure planning near an NHS Hospital Trust estate, based on a forward purchase commitment from an institutional investor such as a pension fund. The fund would link revenues to annuities and feel confident to invest on the basis that the NHS is essentially underwriting the future customer base because the Trust will be incentivized to move people out of hospital beds to overnight accommodation at the rehab hotel for a much lower daily cost. Success with this model in England could lead to a rise in popularity, allowing rehab hotels to spread to new nations and alleviate the strain on healthcare worldwide.



Another concept that merges living and healthcare spaces has recently garnered a lot of attention from innovation programs. Radius, a breakthrough senior care concept, is recognized as a Fast Company's World Changing Ideas and a Healthcare Design Magazine Breaking Through finalist.

Radius offers 360-degree care to seniors through the creative mashup of emerging technologies, all in the privacy and comfort of their own home. Through the seamless implementation of a home health "kit of parts" into an adaptable universal floor plan, Radius allows for dignity and independence within a population traditionally reliant on in-person appointments, bedside nursing and medication management. Radius makes health and memory care safe, convenient, sustainable and accessible for all.

Sometimes, innovation isn't about creating something new from the ground up, but about utilizing and combining existing services in a new way to solve a problem. Radius is the first program of its kind to offer integrated technologies in a single platform that not only streamlines home healthcare, but creates an ecosystem in which the space and technology come together to deliver individualized care plans for each user.



"KIT OF PARTS"
A fully customizable system of parts to build a central smart system adaptable to all types of accommodation from new construction, renovations and ADUs.

Radius is the hub of the connectivity and can digitally order groceries or a food delivery, schedule telehealth/care visits, dispense medications and dosages, and even recommend rehabilitation programs, physical therapies or exercises to keep the mind and body functioning at the highest possible level. This approach solves the affordability and aging-in-place problem for seniors, and it can also be applied to younger families in response to the global housing crisis. Radius provides renters and homeowners with a space that can mature with them over time with a flexible floorplate that can be retrofitted into existing spaces or used in new homes to keep people in them longer. For example, you can be a couple who lives and works from home—the unit’s flexible walls can move so that you have working spaces, expanded living areas and room to exercise. As the couple ages, the space evolves alongside them, and they can age gracefully in place.



+ Radius uniquely integrates cutting-edge technologies and ideas to solve some of the most pressing social, economic and environmental challenges the world is facing today. While it caters to a wide umbrella of patients and consumers, it creates a highly tailored experience, improving health and well-being at every stage of life.



Whether approached through the popularization of intermediary spaces or the inclusion of cutting-edge technology, it's clear a healthcare revolution is not only needed, but in sight. Innovative design will be a key component to bringing this future into the present through a combination of people-focused architecture, progressive technology, and thoughtful planning.

**How do we turn the
rising demand for data
centers from a negative
into a positive?**

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WORKPLACE + INDUSTRIAL

Creating Innovative, Resilient Solutions for Data Center Sustainability

— This largely self-regulating economic system has been troubled by the astronomical surge in global data production—and thus also its need to be stored and managed.

Perhaps one of the most fundamental concepts of the global economy is that of supply and demand: where there is demand, there is an economical opportunity to supply. However, this largely self-regulating economic system has been troubled by the astronomical surge in global data production, and thus also its need to be stored and managed. Put simply, data center supply is failing to keep up with its accelerating demand. Which leaves the question: what is preventing this supply and demand chain from balancing as it has for most other global markets? And what can be done about it?

Between 2023 and 2024, data center inventory has surged 24.4% in North America, nearly 20% in Europe, 15% in Latin America and 22% in the Asia-Pacific region. The surge can be largely attributed to the exponential increase in global data storage usage (think cloud services). Providers of these services need physical sites on which to house equipment to process and store this data, which requires an immense amount of energy usage.

Currently, the global demand for cloud infrastructure requires 50 gigawatts of power, an amount that data centers lack capability or capacity to meet—for context, 50GW is a unit of electric power that could run 500 million 100-watt light bulbs. This energy demand is currently projected to triple or quadruple over the next decade, bringing over \$450 billion in investment by 2030*. With a need established and the demand suppliers ready to invest, what is keeping the market from stabilizing?



Data Centers: Roadblocks

Data centers have been criticized in recent years for their perceived hunger for energy, thirst for water and potentially sizable carbon footprint. As a result, the technology industry is challenged to locate suitable sites.

One of the main roadblocks is the environmental damage viewed as being done by data centers and the resulting tightening of regulations that has been cinched around the data center permitting process. Moratoriums around the globe have stalled the development of these facilities and put in place limits on power supplies and utilities that hold up the few that are given the green light in years of regulatory approval.

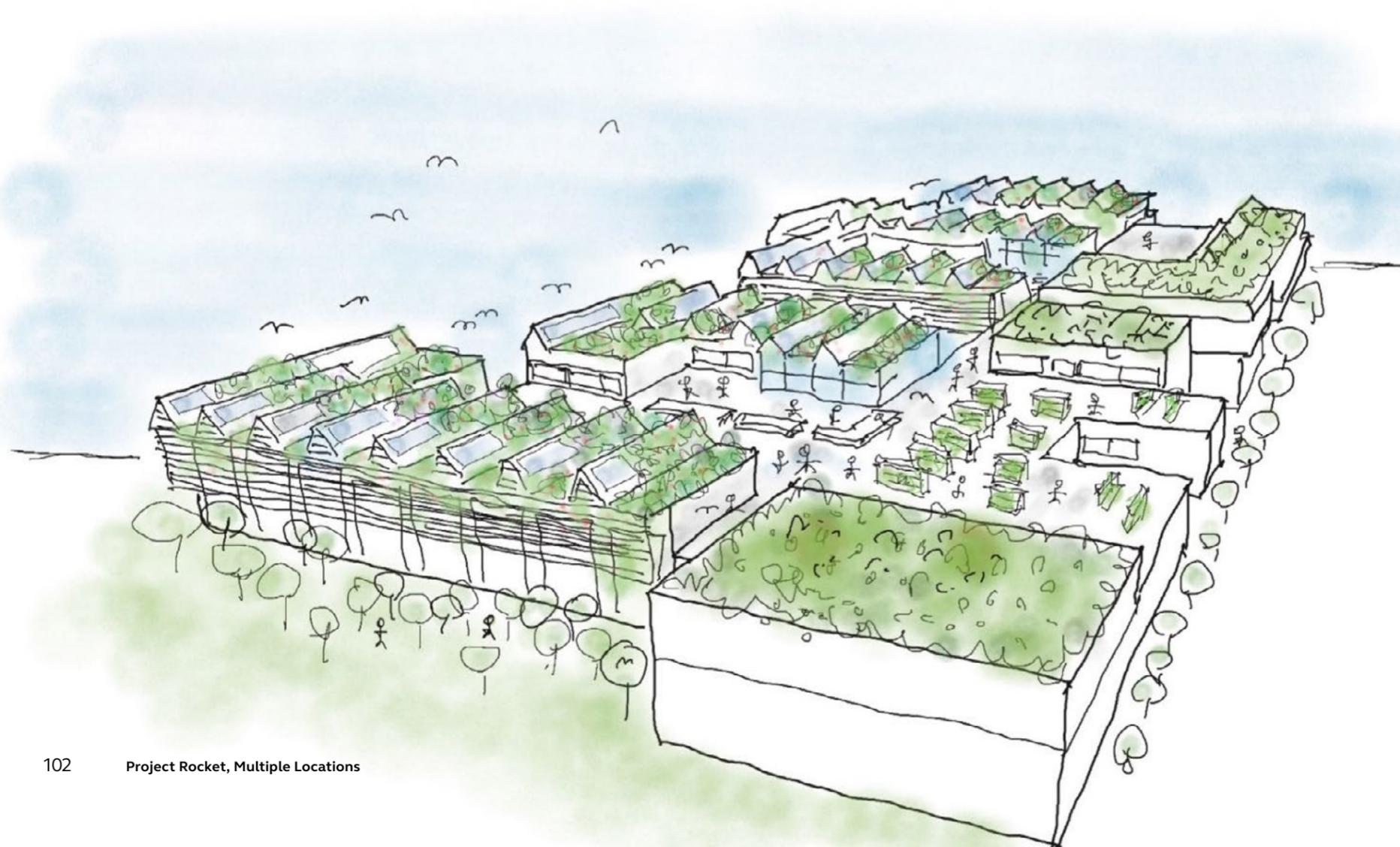


A possible solution to this global data crisis: turning the problematic energy absorption of data center sites into an opportunity for net-zero energy, or even net-positive energy production.



Environmental sustainability means meeting the needs of the present without compromising the ability of future generations to meet their own.

Jeff Gyzen
Principal, Mission Critical & Industrial Facilities

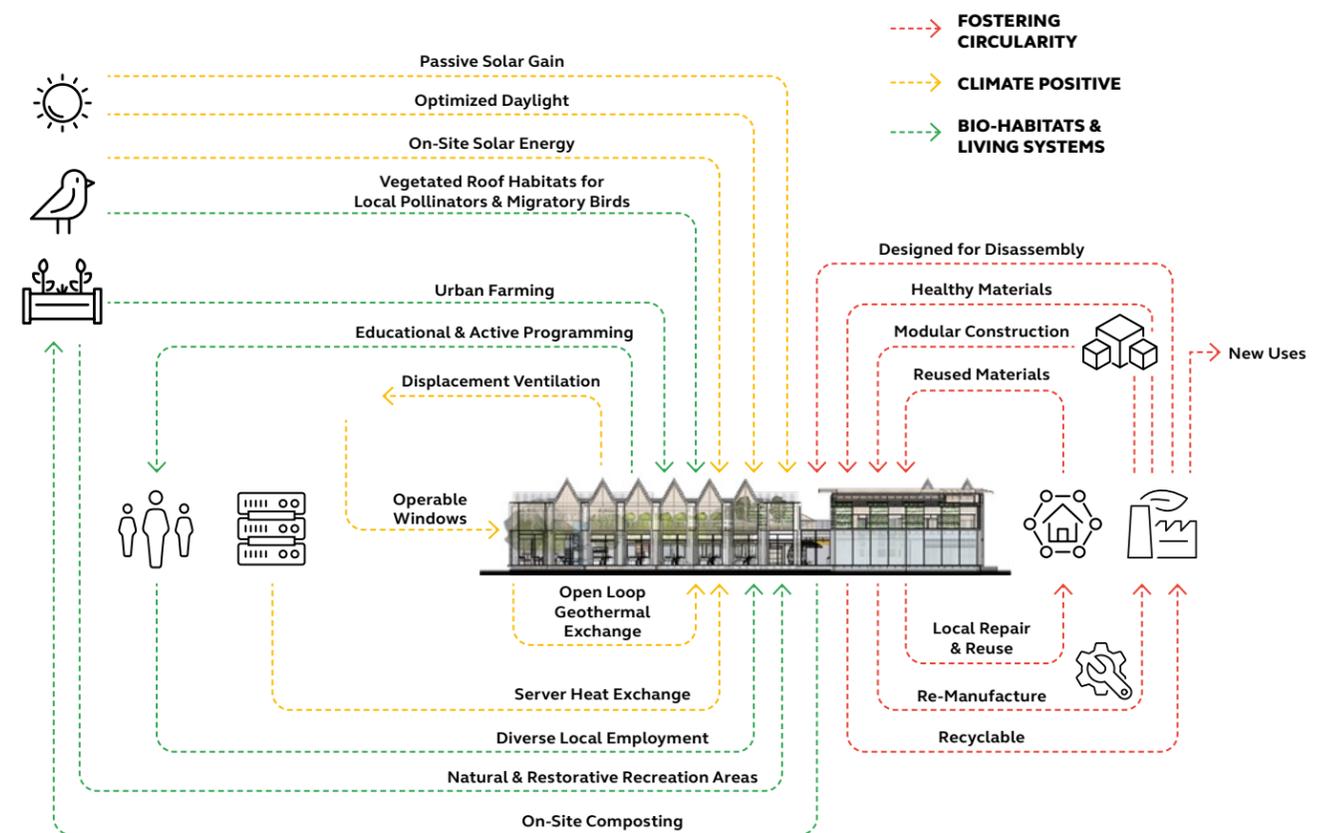


« INTEGRATED SYSTEM FOR SUSTAINABILITY

Urban Farming
 +
 Displacement Ventilation
 +
 Heat Harvesting
 +
 Regenerative Design
 ∇

On-site power generation would offset the energy usage burden of data centers on global natural resources.

Arcadis has been working on a prototype to address this strategy called Project Rocket, which is currently being used for various building typology sites across different locations within Europe and which could also be applied to future data center projects. The prototype, which optimizes cost and sustainability through modularization, prefabrication, design for manufacturing (DFM) and mass timber construction, further promotes regenerative sustainability through four key systems: urban farming, displacement ventilation, heat harvesting and regenerative design.



By using methods including passive solar heating, photovoltaic panels, on-site waste sorting and composting, rainwater harvesting, carbon-sequestering components, design for disassembly and energy converting equipment, the project seeks to achieve net-zero energy and net-zero carbon for operation.

Design teams have performed feasibility studies of its application in various climates, including in Belgium and Finland in Europe, Oregon and Nevada in the United States, and Taiwan, meaning Project Rocket's cost and sustainability optimization strategies could be applied to any data center, anywhere, globally.



OREGON

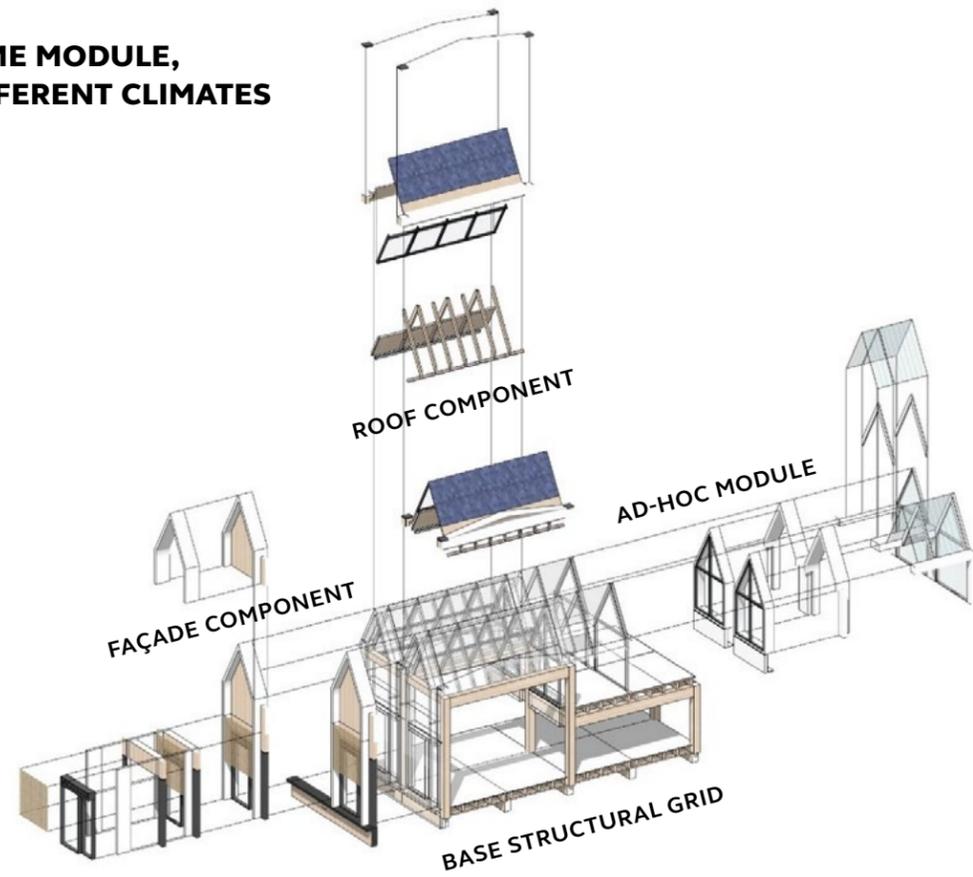


FINLAND



TAIWAN

SAME MODULE, DIFFERENT CLIMATES



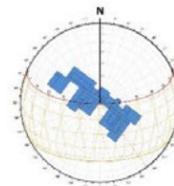
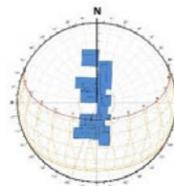
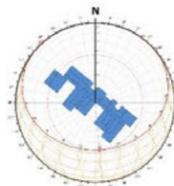
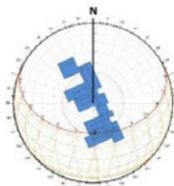
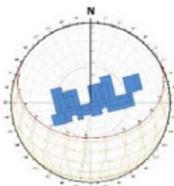
BELGIUM
ASHRAE 5A:
Cool Humid

OREGON
ASHRAE 5B:
Cool Dry

FINLAND
ASHRAE 6A:
Cold Humid

NEVADA
ASHRAE 3B:
Warm Dry

TAIWAN
ASHRAE 2A:
Hot Humid



Appeal to the Community

One such example is the Terra Data Center in San José, California, home to the tech industry's epicenter, Silicon Valley. The client, Terra Ventures, knew when they wanted to build a data center on their acquired site that, due to global moratoriums placed on data center development, the Terra Data Center would have to appeal to the community as much as it did potential tenants. Thus, the design consists of a data center with an attached power structure and a second standalone power structure.



Terra Data Center, San José, California, USA



Our industry needs to make a collective effort to better educate communities, the press, and political leaders about the value data centers offer to local communities in our digital economy.

Jeff Gyzen
Principal, Mission Critical & Industrial Facilities

+ Substantial reduction in CO₂ emissions are achieved by eliminating all backup generators and utilizing waste fuel cell exhaust heat to generate chilled water via absorption chillers.



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THE DESIGN PERSPECTIVE

ARCADIS

Microgrid Benefits

The power design for the Terra Data Center revolves around establishing a self-sufficient microgrid that operates independently of the local utility. Substantial reductions in CO₂ emissions are achieved by eliminating all backup generators and utilizing waste fuel cell exhaust heat to generate chilled water via absorption chillers. This approach supplements data center cooling requirements by as much as 70%. The fuel cells for this site are powered by natural gas and will be used as the campus' primary source of power. As an added benefit, unused redundant power will be pumped back into the utility power grid, so instead of pulling from the grid, the opposite will be true, creating an additional potential revenue stream.

We advocate for and produce projects that improve the carbon footprint of data centers amid the largest data demand surge in history—one showing no signs of slowing down. As data demand surpasses data production and data production surpasses natural resource regeneration, it is more imperative than ever to limit, if not neutralize, the energy consumption of data centers.

QUESTION 07

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WORKPLACE + INDUSTRIAL

Can underutilized building assets be adapted for new uses?

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LIVING + WORKPLACE + CIVIC + RETAIL



Adaptive Reuse: Repurpose with a Purpose

The COVID-19 outbreak and ensuing lockdown caused a global shift—socially, economically and even environmentally. As a combination of government restrictions and health consciousness kept people inside, it also kept people from their day-to-day routines such as going to the office and stopping to shop on the way home. We opted instead to work remotely, to shop online—conveniences that have continued to dominate the global trends long after lockdown was lifted, leaving behind a mass vacancy of office buildings and shopping malls. With a growing global population, we are experiencing an ever-increasing need for more space, and so the question arises: What do we do with all these empty buildings besides tear them down?

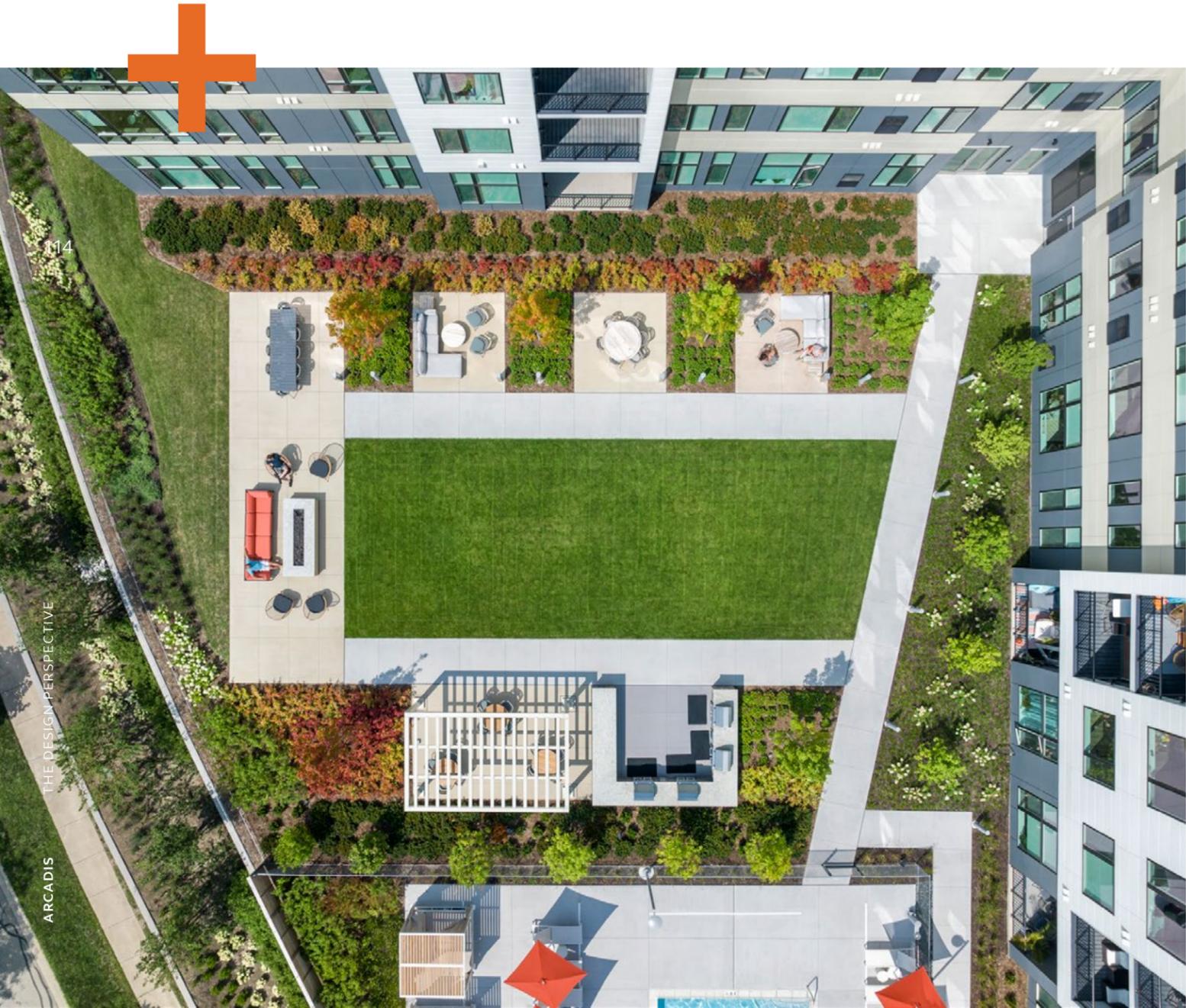
A key sustainability effort in the construction industry is choosing adaptive reuse over new build. Adaptive reuse means taking an existing building and repurposing it for a new function as an alternative to demolishing and rebuilding, which requires significantly more resources to accomplish. However, when left with existing structures designed for specific functions, such as office buildings or shopping malls, the effort to adapt for new functions is significantly easier for the contractor (and easier on the environment) if the basic structure of the building can be mostly retained.

Repurposing these forgotten buildings not only lowers the environmental burden of construction, but also adds value back into the communities they serve. The four main categories of building conversions that we have found to be resoundingly successful include office to residential or research, retail to experiential hubs, single use to mixed-use developments and vertical expansions.

Domain CityGate Apartments,
Naperville, Illinois, USA

Unique Blending

Repurposing underutilized office buildings into housing addresses urban housing shortages, while maximizing existing infrastructure and reducing vacancy rates.



Domain CityGate Apartments, Naperville, Illinois, USA



CityGate Naperville in Naperville, Illinois, is a residential component built into an existing corporate office environment. During the design process, a financial partner in the project added a unique rooftop banquet space that will connect via bridge to an existing hotel, making CityGate the first multifamily-hospitality blended use building in Chicago's affluent western suburbs. Rather than letting an empty office building go to waste, it was transformed into a hub for the community.

Office Space as Labs

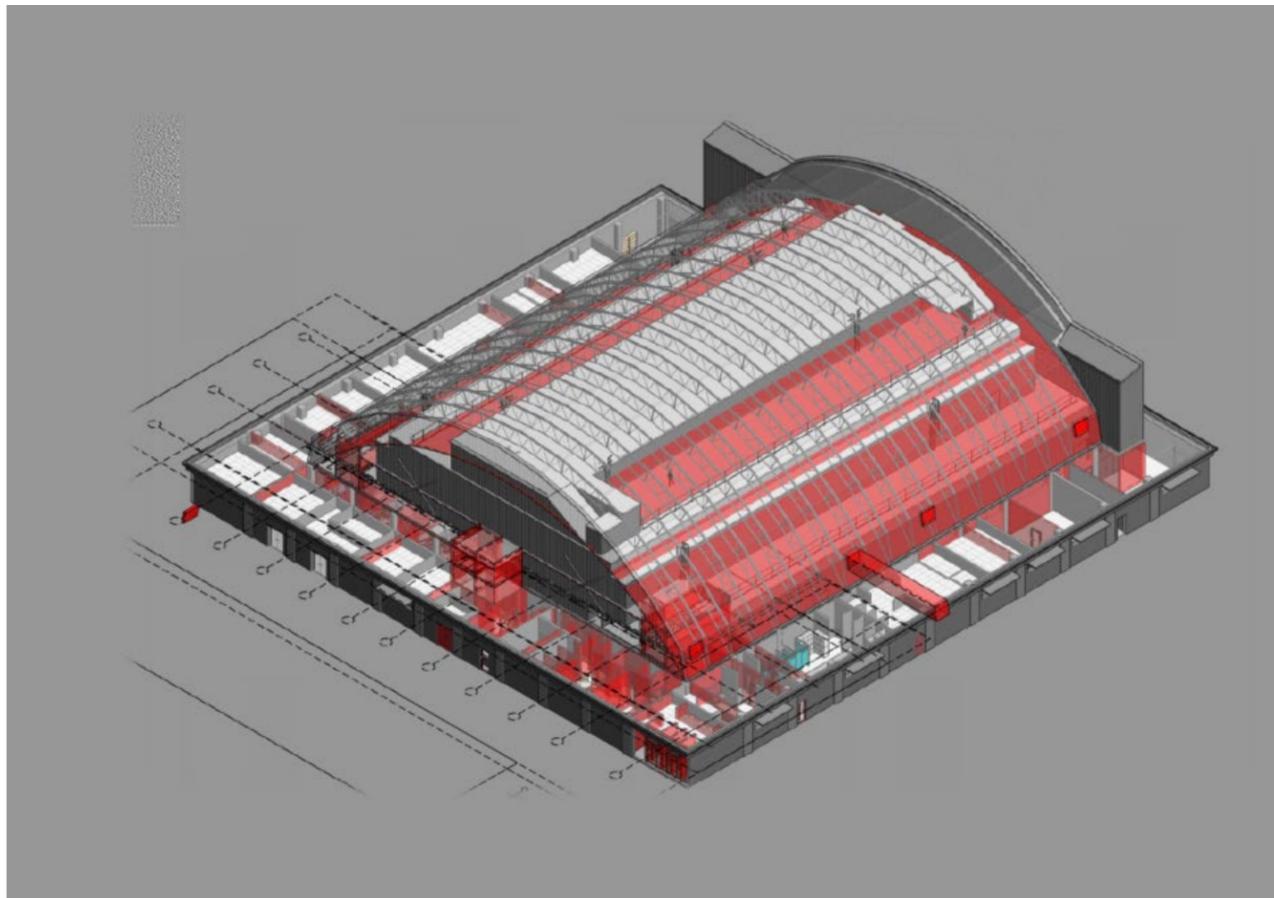
As work from home has impacted most industries and the demand for office space has significantly reduced over the past year, research spaces have remained operational and in high demand, causing real estate owners to harness the opportunity to pivot toward science.



Multiple stories of another underutilized office building in Toronto, Ontario, were transformed into the Temerty Faculty of Medicine Lab, creating research-capable spaces for life sciences that will be leased to institutional and commercial partners. These adapted projects offer real estate owners the opportunity to harness the market by pivoting toward residential or research spaces, and away from office space, without the environmental impact of demolition and rebuilding.

Temerty Faculty of Medicine Lab Conversion at 777 Bay Street, Toronto, Ontario, Canada
With over 40,000 sf of converted space, design excellence on this project has focused on designing a highly intricate arrangement of spaces within the constraints of the structural system and low floor-to-floor heights for a challenging series of spaces with precise technical requirements.

Cyber Repair MX Hangar Bldg 102, Louisville, Kentucky, USA



While many office buildings were rendered obsolete by the shift to remote work, the same cannot be said for the US government. With an increasing need for ultra-modern, high-security workspaces meeting the government's strict security standards, the Mansfield Ohio Air National Guard engaged Arcadis with an opportunity to transform an unused hangar space into a LEED Silver cybersecurity facility and office space.

Our firm accepted the challenge of creating a secure (ICD-705), modern facility within the confines of an existing 75,557-sf, one-story 1950s-era hangar while adhering to stringent regulatory standards and sustainability requirements. We designed a cohesive and tailored solution for the client, housing a range of classified spaces including an auditorium-style briefing room, operations training rooms, breakrooms, lounges, toilets, secure storage and support spaces spanning three floors.

1st Floor, Secure Open Work Area1st Floor, Briefing Room, Front of Room1st Floor, Secure Open Work Area (At Entry)

Additionally, unsecured spaces such as a wellness room, breakroom, and lobby will be situated on the first floor. After close collaboration with the client to ensure meeting government design regulations, Arcadis' Cyber Repair MX Hangar Bldg 102 project provides a state-of-the-art and cyber-secure facility with reduced construction costs and lower environmental impact than new build.

From Retail to Experiential

Arcadis has been part of a movement to transform vacant retail spaces into entertainment centers, food halls and wellness spaces, enhancing community engagement, creating destinations and revitalizing areas impacted by e-commerce.



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THE DESIGN PERSPECTIVE

ARCADIS



Merlata Bloom, Milan, Italy

Another underutilized building type following the societal shift post-lockdown has been the closures of major tenants in traditional malls. Arcadis has been part of a movement to transform vacant retail spaces into entertainment centers, food halls and wellness spaces, enhancing community engagement and creating destinations, which revitalizes areas impacted by e-commerce. Where many shopping centers are downsizing their pure retail footprint, a wave of next-generation shopping environments are looking to pivot to mixed-use and transit-oriented retail districts. One such project is Merlata Bloom in Milan, Italy, which is situated in the fastest growing and developing area of the city, Arexpo.

The mall now operates as a connector and catalyst in between Milan's innovation district MIND, university accommodation, the Milan Fair RHO and the thriving Cascina Merlata neighborhood. Using sustainable design throughout the project, including photovoltaic panels and geothermal wells generating renewable energy, the mall offers a community gathering place promoting biodiversity with its 215,000-sf roof garden and the responsible consumption of its original brands and experimental stores.

QUESTION 08

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LIVING + WORKPLACE + CIVIC + RETAIL



Northgate Mall, Seattle, Washington, USA

In Seattle, Washington, Arcadis transformed the previously underutilized Northgate Mall into a mixed-use destination for the surrounding community. The redevelopment pays close attention to the user experience throughout the site and the interaction between different uses. Green and open public spaces are infused throughout the site to create a lush environment, a nod to the Pacific Northwest's rich landscape. New elements of the overall development incorporate new retail spaces, residential, office and hotel that surround a pedestrian-friendly neighborhood core for easy access and connection to public transportation.

Taking this concept of cohesive commercial and biophilic spaces even further, Arcadis' project, The New, resurrected a barren public open space and deteriorating below-ground mall into a vibrant urban plaza with a thriving subterranean commercial center beneath it.

The original below-ground mall was darkly lit, abandoned and built too close to the surface for the above-ground open space to nurture any plant life. Our re-visioning of the project reduced the floor count from four to three, giving back enough soil to the surface to enable the construction of a vivid and fertile public plaza, which has incorporated architecturally striking skylights into its design that provide natural light to the commercial center below. By providing new ways for the community to utilize the mall and previously abandoned open space, the property is given new life and a new purpose.

+ Another approach to mall conversion is the adaptation of single-use mall spaces into multi-use developments including retail, residential, office and recreational spaces in one location to increase foot traffic, create a sense of community and diversify revenue streams for property owners.



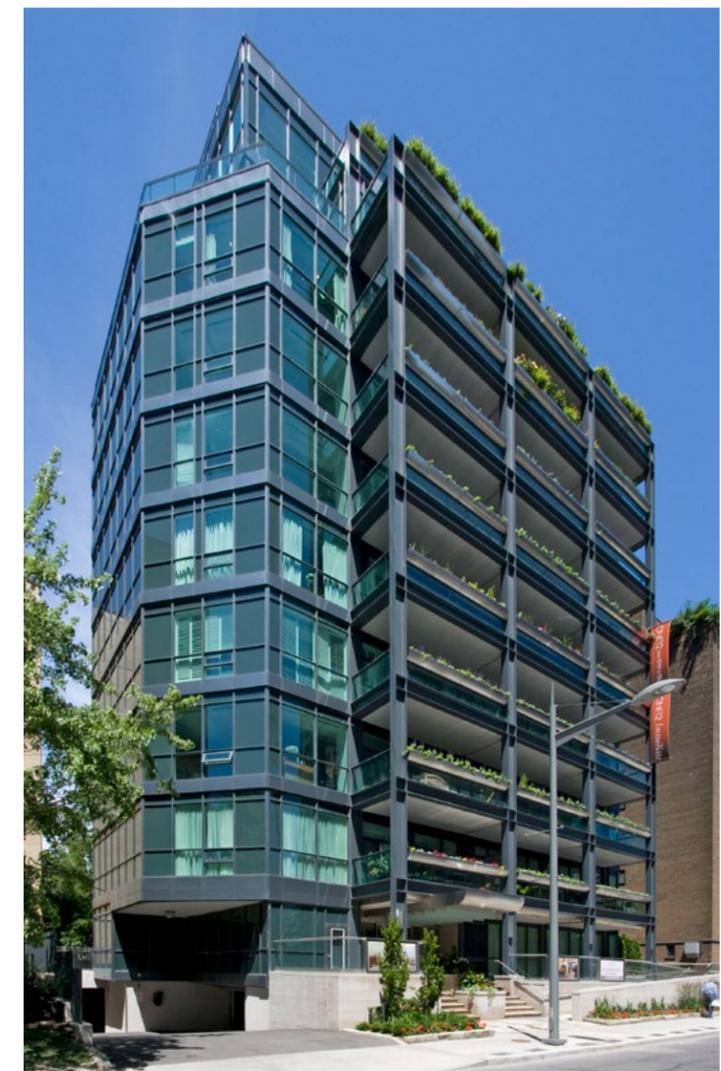
The New, Beijing, China

Urban Renewal in the Heart of the City

This historic site has experienced consistent change over the past several decades, until it was formally settled as an underground shopping center as part of the Xidan Culture Plaza. The rebuilt project is a total transformation of the physical environment and its commercial operation and social impact.



The New, Beijing, China



112 St Clair Avenue West Condominium, Toronto, Ontario, Canada
Another example of urban renewal, this 1960s office building was renovated to support a series of balconies with stainless steel flower boxes.



Revitalization of underutilized buildings has proven to reenergize not only the buildings in question but also the communities they serve. While some projects provide increased housing for students and communities alike, others reanimate underused commercial properties by tailoring them to current community and client needs. Through answering the design challenge of repurposing existing yet underperforming assets, our team has found an opportunity to transform forgotten buildings into multi-use hubs for urban activity and sanctuaries for community wellness. Through these transformations, we have been able to design new and innovative projects within preexisting structures, minimizing environmental impact while maximizing property value.

Class of 2030: What do students want?

EDUCATION + HEALTHCARE + COMPUTATIONAL DESIGN

The Academic Environment Can Deeply Impact Both Well-Being Now and Employability Later

How the Campus of the Future Will Respond to the Needs of Students

Young students who will be graduating in the next five years have had their educational journeys disrupted by a pandemic, and challenges from the rapid advancements in technology to the globalization of the job market and climate change have put a spotlight on what they need, especially in an academic setting. On the one hand, that means looking at paths to employability, but students also want their well-being to stay paramount throughout their educational journeys.

The campus of the future will prioritize how students learn in a digital and physical world. Because Class of 2030 students are learning online and in person, preK-12 schools and higher education institutions are reevaluating their built assets to make the most of physical space while meeting students' expectations for where and when they learn. They may be repurposing or downsizing spaces to increase efficiencies, and they may be looking to partner with off-campus spaces to meet students' needs.



George Brown College's Waterfront School of Design, Toronto, Ontario, Canada



Where education used to be mostly focused on rote learning and memorization, with advancements like AI large language models, the focus has changed. Even though education has been progressing toward developing lifelong learners for about a century, students now need to learn skills that will help them differentiate their contributions in a world where AI can increasingly take on repetitive and analytical tasks.

Employment has always been the obvious outcome of traditional education, so employability greatly impacts design. However, today's students want higher education initiatives like micro-credentialing and industry partnerships. Likewise, they are gravitating toward STEM and CTE (career-technical education) in K-12 schools because these programs support students in finding paths to the workforce.



George Brown College's Waterfront School of Design, Toronto, Ontario, Canada

- + At George Brown College's Waterfront School of Design in Toronto, students are given spaces that evolve with digital disruption. A major focus was placed on developing technology-enabled, flexible spaces that adapt with the school's programs. In turn, students gain more of the experiences needed to be competitive in their planned industries.

Wellness Integrated Sustainable Campuses

The campus of the future will also incorporate agile, tech-advanced design. This approach considers how students use more mobile technology, so smart schools benefit from Arcadis' computational design capabilities, a data-rich modeling approach to building design. Students and educators can join designers in an immersive experience to shape the solutions they need to create the most flexible use of space—solutions that are intuitive to a generation of digital natives.

However, balancing employability with wellness begins long before students understand what careers they want as adults.

In Lake Oswego, Oregon, River Grove Elementary School, which recently opened for the 2024-2025 school year, was designed to offer both sustainability and outdoor learning with the goal of improving student well-being.

This fully electric school uses a micro-grid that is independent from the area electric grid, and the campus has been designed to be resilient to natural disasters, such as earthquakes. River Grove goes beyond complementing the beautiful surroundings by extending students' educational experiences into those surroundings with outdoor classrooms, including a garden area.



River Grove Elementary School, Lake Oswego, Oregon, USA



Most people's trauma is not visible, so we have to pre-load the spaces.

Rebecca Stuecker
Architect and Educational Planner for River Grove Elementary School

- + Nine Elms achieves the 35% CO₂ savings dictated by the London Plan, a strategic plan for developing Greater London, and the school brings the outdoors and indoors together with cascading garden terraces and green/brown roofs.



Nine Elms Primary School, London, England, United Kingdom

Almost 5,000 miles away, Nine Elms Primary School accomplishes similar goals but in a vastly different location, London, England. A cloistered courtyard offers opportunities for year-round outdoor learning. Future campuses will see more blurring of these indoor-outdoor boundaries because students excel when the natural world combines with the academic environment.



Outdoor learning and resilient campuses promote wellness, but while those student-centric efforts look at cohorts of students, trauma-informed design sees the individuals. When it comes to their mental health, Class of 2030 students are looking for empowerment, safety, peer support and sensitivity to cultural, historical and gender issues.

Also in London, the Pears Maudsley Centre supports in-patient and outpatient services for children and young people who are experiencing mental health and learning challenges.

While not a school, this joint venture between SLaM (South London and Maudsley) and Kings College London integrates trauma-informed design. A series of workshops, including one on emotional mapping, further helped incorporate sensitivity to the ways in which people experience neurodiversity. Patients and their families can access the outdoors through the new facility's tiered, landscaped rooftop terraces and enjoy ample natural light—accommodating biophilic design within the limited site.



Pears Maudsley Centre, London, England, United Kingdom



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THE DESIGN PERSPECTIVE

ARCADIS



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Each student in a school is a unique human being. This basic fact means that they experience their school environment through the lens of their lived experience. For many, that may include trauma. We are now aware of a strong correlation between Adverse Childhood Experiences (ACEs) and educational outcomes.

Marta Lilly
Educational Interior Designer

+ At Toledo High School in Washington State, beauty and meaning were infused in the design of the school's update. Colors and materials brought the local Indigenous community's identity into the learning environment, as did tribal art and gathering spaces.



Toledo High School, Toledo, Washington, USA





A trauma-informed approach also considers well-being holistically and contributes to healing. Understandably, any student may have difficulty learning creative, critical thinking or emotional intelligence skills when their needs have not been met. Educational environments, including preK-12 schools and higher education campuses, are becoming responsive to student needs and prioritizing wellness—inside facilities and across campuses—to set students up for future success.

**Josiah Quincy Upper School Roof Garden
Boston, Massachusetts, USA**
Working with HMFH Architects, Arcadis designed a “rooftop campus” for this urban high school in Boston’s Chinatown neighborhood. Located on the 7th floor, this multi-purpose space features classrooms, meadow planting, planter boxes for student use, fitness areas, and a mindful garden—all to promote student well-being.

How can companies futureproof their building investments?

COMPUTATIONAL DESIGN

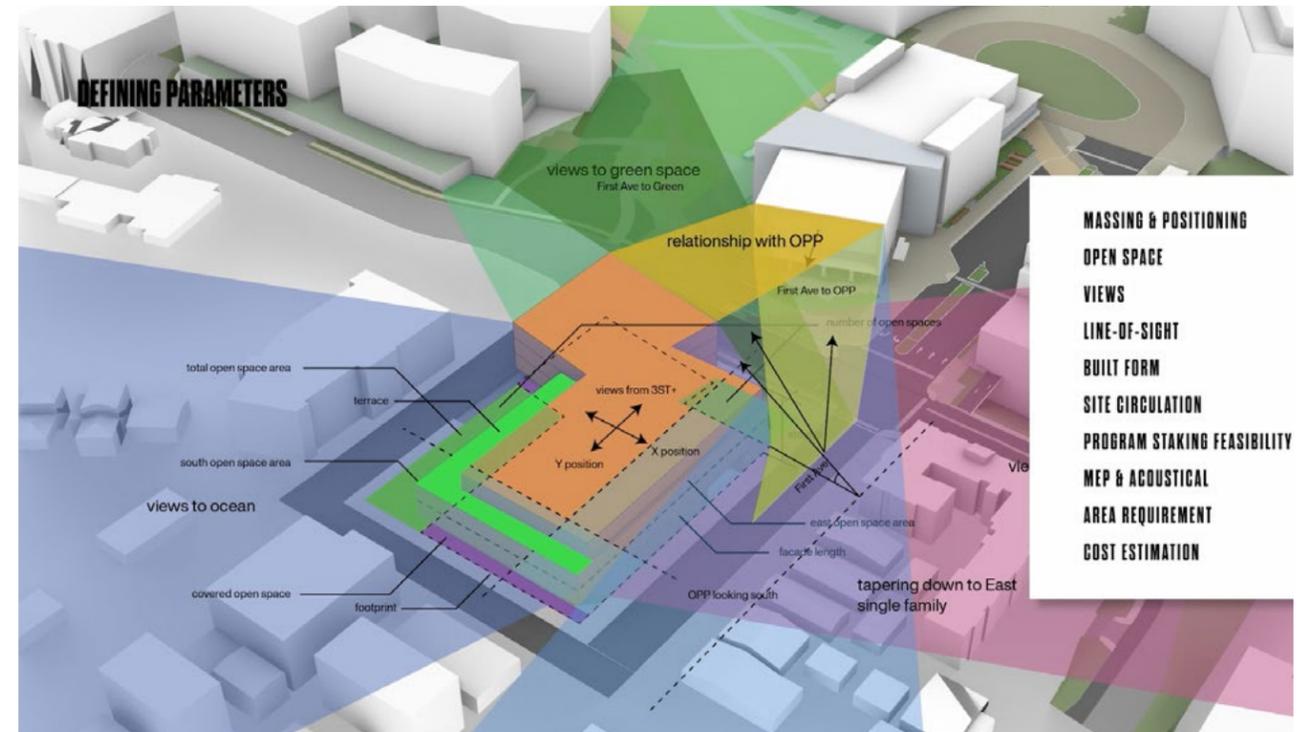
Using Computational Design to Add Flexibility to Spaces and Places

Living through the COVID-19 pandemic has shown us all that life is uncertain. Even our best-laid plans may be tested by the unexpected. Companies that spend millions on their developments want to safeguard their investments, but how can we protect them from the unknown?

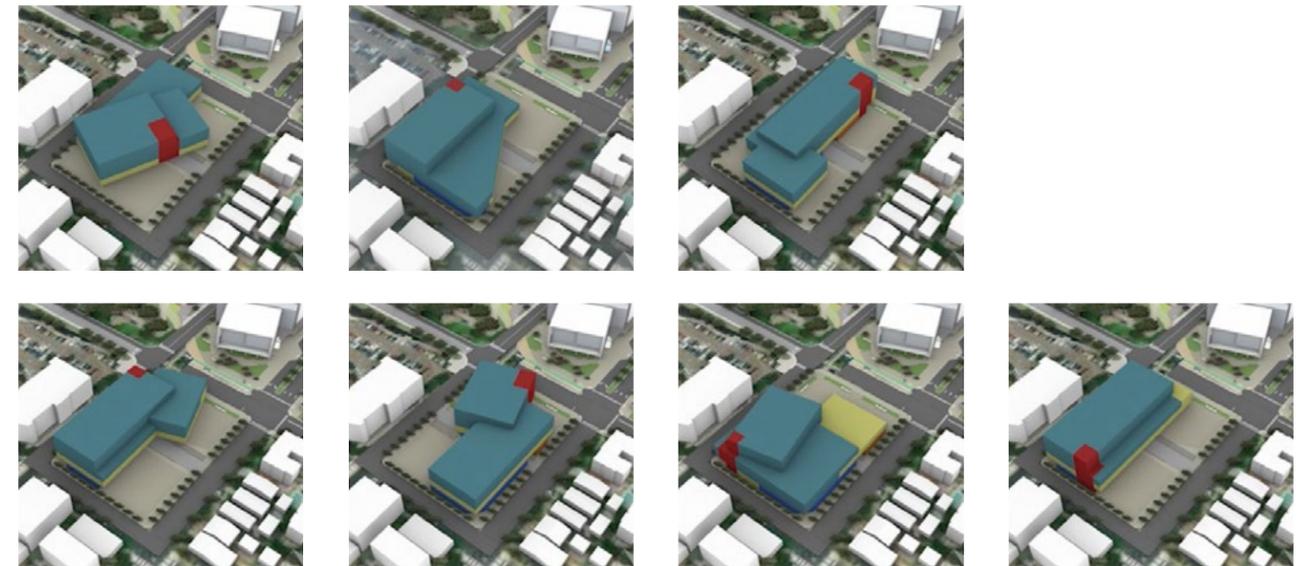
Beyond designing for resilience against extreme weather and natural disasters, using the most advanced space optimization tools can give buildings the possibility of a second life—if not a third, fourth and so on. Computational design models turn factors that were unknown into known quantities and outcomes.

Computational design further turns the old adage of “form follows function” on its head; instead of programmatic needs being the driver, computational design empowers flexibility to drive everything. And with flexibility comes versatility and adaptability. From single buildings to larger developments, such as master plans, computational design brings the flexibility to futureproof designs, allowing them to be program-agnostic and universal.

In the past, futureproofing has meant incorporating the best of common practices to create functional and relevant spaces. We now have the capability to add effective historical data to this mix, preserving an investment’s longevity by determining how to develop places that are more quickly adopted, longer lasting and more readily repurposed—before any physical construction begins. One aspect of computational design takes this historical data to provide a baseline measurement that can then be applied more universally; computational design can also be used to create an infinite number of 3D models of a single structure or an entire city that answer questions that were previously unknowable.



SELECTED OPTIONS

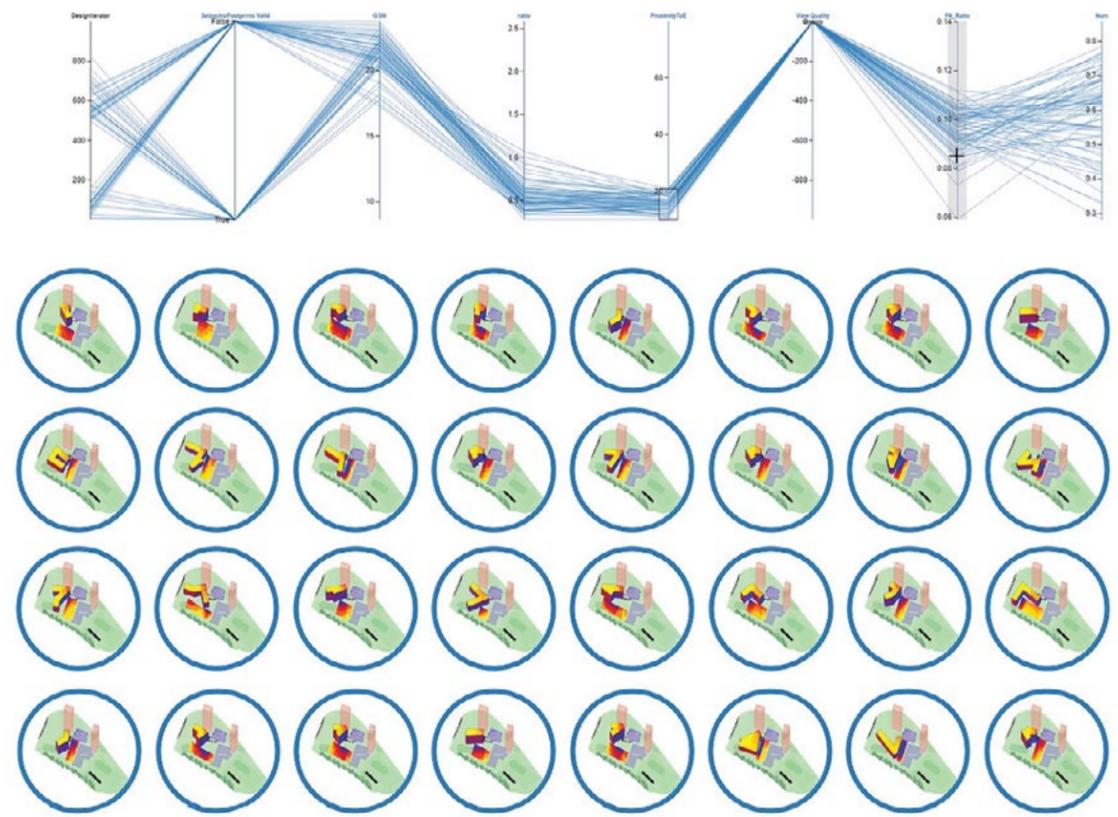


University of California San Diego, Multipurpose Clinical Research Building, San Diego, California, USA
 Arcadis implemented a comprehensive parametric modeling process for the early design phase allowing the design team to consider thousands of alternative massing solutions against a wide variety of performance indicators—including program stacking, massing articulation, scenic views, contextual relationships, line-of-sight obstructions, and open space quality among others—to arrive at a design that most effectively met the design objectives.



COVID was a perfect example of something that nobody saw coming that's changed the way we behaved and how we used space and buildings—outside space, inside space, large scale, small scale, how we moved, how we interacted, etc. We look at events like that and think of how to design assets that are resilient, adaptable, flexible to withstand stresses that are not the normal ones. How do you design a building that can actually stand the test of time?

Oliver Hartleben
Urban Planner



Faculty of Health Sciences at River Campus, University of Ottawa, Ontario, Canada
Arcadis leveraged computational design to develop master planning options with key parameters for open space, pedestrian movement and circulation.

Rethinking the Future of Parking Garages

A great example of a kind of structure that has been influenced by both uncertainty and fixed thinking is the parking garage. At times when the future of vehicles was in doubt, designers thought to add flexibility. When purpose-built, a parking structure will use inclined levels and low floor-to-floor height that only considers the cars temporarily residing there and the transient nature of the people who park those vehicles.

At times though, developers and designers had reason to question whether cars were going to be permanent fixtures of a place or society in general (for example, when they first began replacing horses or when autonomous

vehicles were invented), thereby leaving the future demand for parking structures unclear. Today, you can find structures from apartment buildings to warehouses that served as parking garages in prewar times.

To accomplish this regeneration, architects increased the height of each floor and flattened the levels, moving the vehicular ramps to become side structures. Without these adjustments, these parking structures may have become unused and potentially dangerous. They also may have been razed and replaced, their original resources becoming collateral damage.



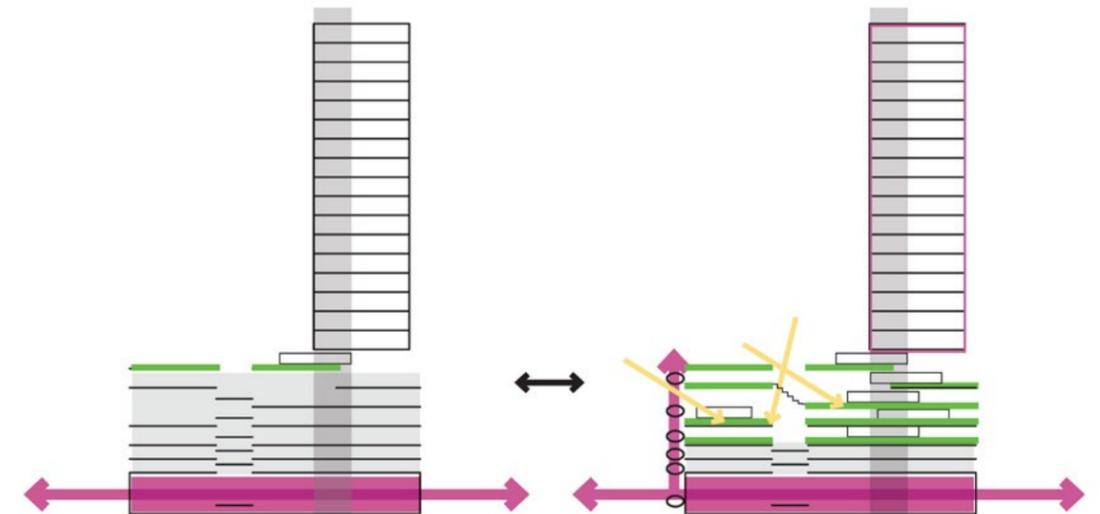
Universal Building Concept

- + **Universal Building:** Ground-level parking spaces could convert into retail store fronts and mid-level parking floors could readily transition into office, residential or hotel spaces. Parking structures can even be reconfigured to include parks and green spaces to encourage wellness.



Purpose-built facilities do not stand the test of time, and many people who are sitting on empty buildings are thinking, 'We should have built this to be more flexible.'

Jason King
Principal, Computational Design



Flexibility in Design

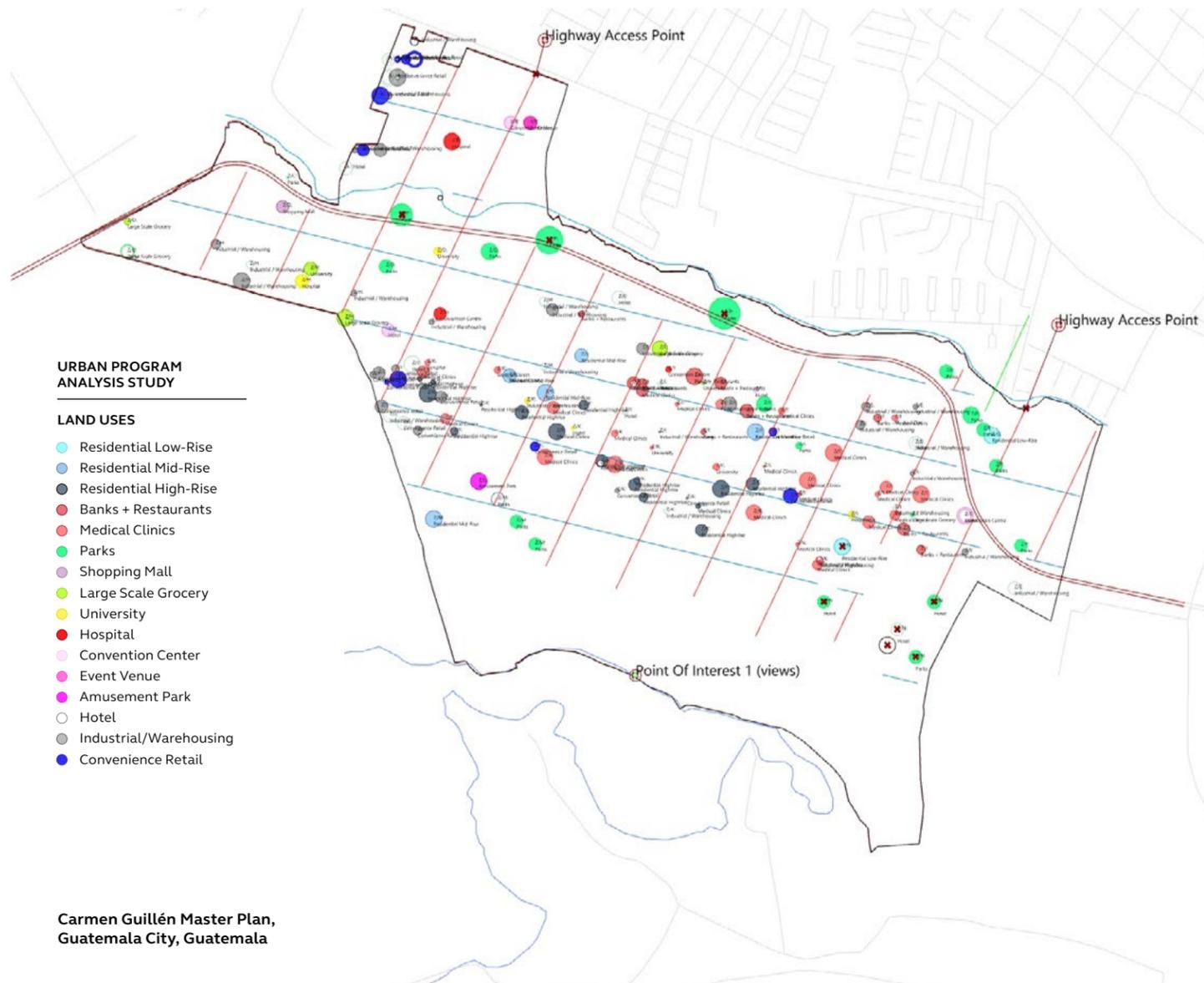
Moving into the future, Arcadis is significantly expanding on this kind of flexible design approach to meet a wider range of needs instead of focusing on a single specialty.

In Latin America, for example, the inherent volatility of land-use planning has made futureproofing a necessary starting point. The 250-acre Carmen Guillén development in Guatemala City commenced with master planning. Including computational design at that early phase allowed the design to make the most of the site's distinctive 360-degree views,

connect with existing roadways, maximize land value accretion and strategically balance the mix of land use and building typology.

While large sites and metro areas can be tricky to master plan, they often have the advantage of providing an in-depth data set. Our Computational Design Team has compiled data from a thousand cities. While each city has its own character and nuances, the data set provides starting averages to show what mix is economically advantageous and how to arrive at a walkable, complete community.

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QUESTION 10

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RESIDENTIAL SCENARIO

USE	AREA (m ²)	USAGE %	PARKING
Residential	68,425	65.75%	1,466
Commercial	19,315	18.56%	781
Services	6,930	6.66%	354
Offices	0	0%	0
Hotel	6,500	6.25%	260
Events	2,000	1.92%	80
Church	900	0.86%	
TOTALS	104,070	100%	2,941

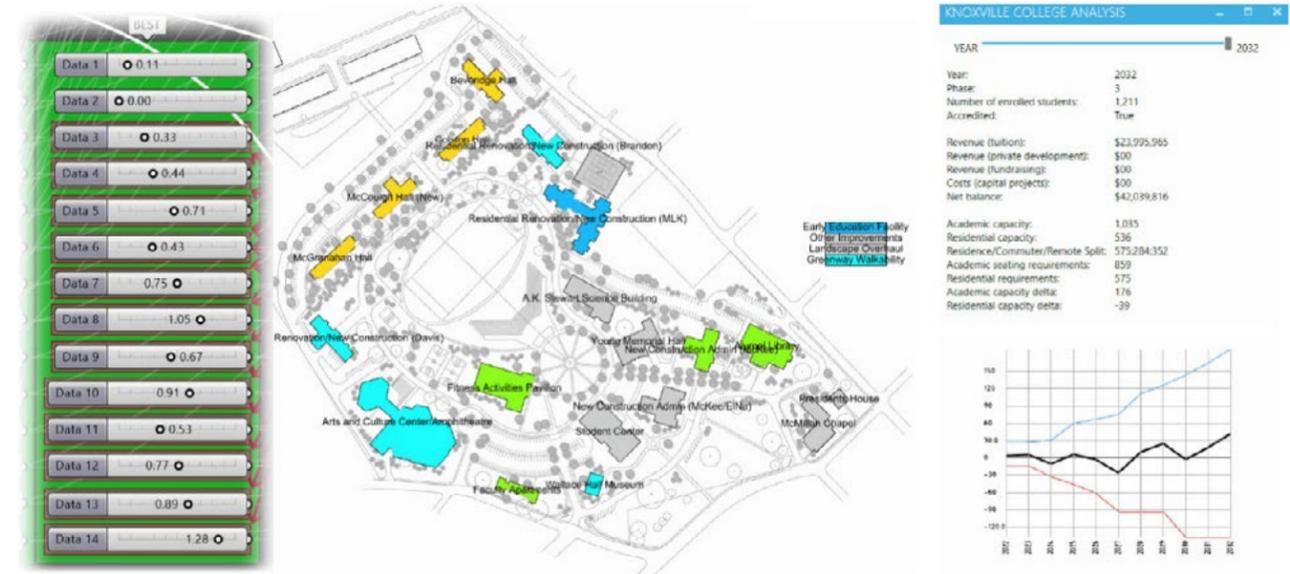
+ The flexibility that computational design provides can be game-changing, especially as projects grow from individual structures to huge sites.

COMPUTATIONAL DESIGN

Testing to Find the Best Solution

At Knoxville College, a Historically Black College and University (HBCU) in Tennessee that was founded in 1875, Arcadis conducted pro-bono master planning after the college's offerings had shrunk to online education only. The Computational Design Team tested thousands of multiphased permutations until one was determined to be the most optimized for transitioning the 58-acre campus into an economic engine for the revitalization of the school and betterment of the surrounding community.

The modeling accounted for the best sequencing for reopening dormant buildings across campus and aligning them with academic capacity and expected revenue influx over a five- and ten-year timeline. The modeling further explored funding scenarios, including quantifying the value of parcels of the campus for private development. We projected revenue that informed a feasible redevelopment plan for Knoxville College as it slowly opened to offer hybrid and in-person classes in addition to its online platform.



Knoxville College, Knoxville, Tennessee, USA



The risk of approaching a physical investment with a fixed, specialized mindset is the potential to silo the project so that all is lost when user requirements change. Beyond minimizing waste and maximizing sustainability, futureproofed projects protect investors by empowering the inevitable evolution of a space or place. Accommodating vague, potential needs and trends can be easier with a flexible approach, and computational design increases market resilience as it provides flexibility from a scientific, data-backed foundation.

Faculty of Health Sciences at River Campus, University of Ottawa, Ontario, Canada
Recognizing the site's dual context—its transitional urban context and riverfront location—our indicative design reoriented the built environment toward the Rideau River through a series of strategies that will build an intrinsic relationship with its natural setting and make it a defining characteristic of the spatial experience of River Campus.



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The CubeHouse, page 11
In collaboration with SO-IL

Triodos Bank Headquarters, pages 12-13
In collaboration with Rau Architects

825 Pacific St, Artists' Studios; Pages 18-19
In collaboration with ACDF Architecture

The Curv; Pages 20-21
Wright Kuruvilla Architects served as the Design Architect; Arcadis served as the Architect of Record

Lotte Center; page 38
DOUL International served as the Architect of Record

JW Marriott Parq, page 51
ACDF Architecture served as the Design Architect; Arcadis served as the Architect of Record

Maple Leaf Square, page 52
In collaboration with KPMB Architects

Cleveland Lakefront Master Plan, page 53
In collaboration with Crawford (collaborator on the stadium design), and AoDK (renderings)

Station Hill, page 62, 68-69
Arcadis provided master planning and architecture for Ebb & Flow (residential component), and interior design services for Ebb. Sheppard Robson provided interior design for Flow. Gensler provided architecture for ONE Station Hill (office component).

Eglinton Crosstown LRT, page 67
Design and engineering joint venture with Atkins Realis

Harmony Commons, University of Toronto Scarborough, pages 76-77
The project was completed in collaboration with Handel and Core Architects. Arcadis served as the Architect of Record on the Design-Build Team.

Dublin Children's Hospital Design Competition, pages 87, 94-95
In collaboration with Poltronieri & Tang Associates

Nine Elms Primary School, pages 136-137
ATPA is the delivery architect

Josiah Quincy Upper School Roof Garden, page 143
Arcadis provided landscape architecture in collaboration with HMFH Architects

Faculty of Health Sciences at River Campus, University of Ottawa, pages 148-149, 156-157
Architecture49 served as the Architect of Record

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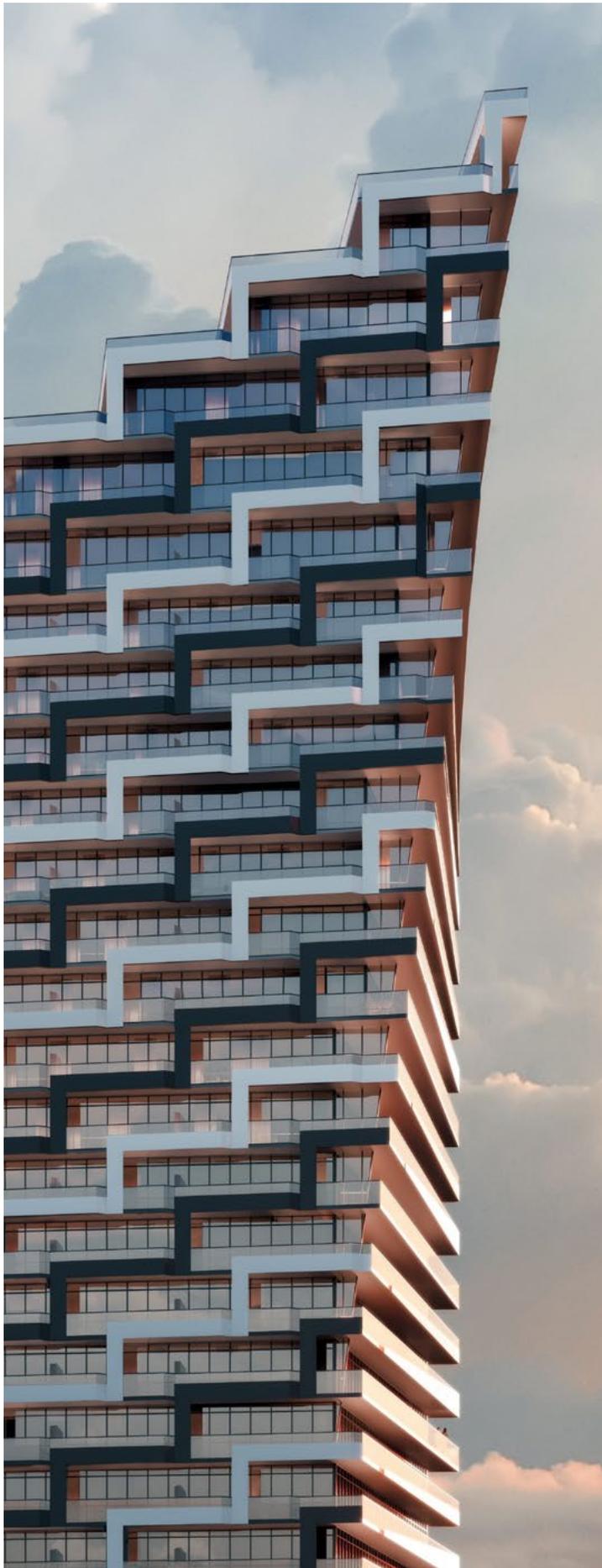
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About Arcadis

Arcadis is the world's leading company delivering sustainable design, engineering, digital and consultancy solutions for natural and built assets. We are more than 36,000 architects, data analysts, designers, engineers, project planners, water management and sustainability experts, all driven by our passion for improving quality of life.

We exist to find solutions to today's most pressing challenges, from the impact of climate change to increasing urbanization and digital transformation—all with the goal of improving quality of life for people around the world. You can see this in the work we do for our clients, the opportunities we create for our people, and in our efforts to enhance the communities in which we live and work. We bring together world-class resources and the latest innovative technologies to help define the cities and experiences of tomorrow.

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