



COMMUNITY
Solutions Network

SMART CREATIVE MIXED-USE APPROACHES FOR CLIMATE RESILIENCE

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Acknowledgement of Indigenous Lands and Treaties Across Canada

The sacred lands and waterways upon which Evergreen operates, and the built communities and cities across the country, are the traditional territories, homelands and nunangat of the respective First Nations, Métis Nations and Inuit who are the long-time stewards of these land. These lands are occupied lands and subject to inherent rights, covenants, treaties, and self-government agreements to peaceably share and care for the lands and resources across Turtle Island. These regions are still home to diverse Indigenous peoples, who are still fighting for their sovereign rights and tirelessly protecting their traditional territories. As uninvited guests who live and work on these lands, we have a responsibility to know the treaties that tie us together, advocate for Indigenous rights and commit to learning our responsibilities to each other.

Acknowledgements

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Executive Summary

This introductory research brief builds on Evergreen’s research brief *How to Leverage Underutilized Municipality-Controlled Real Estate to Create Vibrant Communities* (March 2023). It is intended for leaders in communities in Canada who are interested in creative mixed-use and how smart, climate resilience can be embedded within creative mixed-use approaches. This brief provides an overview of creative mixed-use approaches and the benefits of co-location. With practical case studies throughout, the brief examines the benefits of proactive co-location development, the funding opportunities with mixed-use projects and key tools and techniques necessary to make such an approach successful. Smart tools and innovations are highlighted that support the planning and monitoring of creative mixed-use projects as well as elements that can be implemented to improve climate resilience.

Preface

A school built into the podium of a high-rise apartment tower. A fire station mixed into a building with a daycare and affordable housing directly up above. A homeless shelter integrated into the side of an upscale condominium project. Do these development designs sound fanciful, perhaps a bit far-fetched? In fact, they are examples of real buildings that have been built and are operating in Canada, part of a growing nationwide trend where large-scale public, private and non-profit land uses are co-located in the same building. We call these developments creative mixed-use buildings because there is creativity rather than a template in the mixing of uses that are brought together in any single building project, and because the processes of realizing projects of this nature depend on creativity and entrepreneurialism rather than a rigid prescribed structure.

The built environment, indoor and outdoor spaces, are essential elements in a community and are vulnerable to the impacts of climate change. Building with climate resilient and adaptive design principles can reduce the vulnerability of the built environment through the building materials used, the structural design and building techniques employed and other climate-resilient considerations.¹ Data and technological tools can help leverage climate-adaptive design principles in the creation of mixed-use buildings to improve the overall climate resilience of a community. Using data and technological innovations can improve the climate resilience of a building and its surrounding community and similar smart tools can track and monitor climate impacts.² Creative mixed-use approaches can, thus, support Canada’s commitment to *the Sustainable Development Goals* (SDGs) including building resilient and sustainable infrastructure (Goal 9), leveraging smart city innovations to support more sustainable cities and communities (Goal 11) and using digital technology and infrastructure to increase resource efficiency (Goal 12). Evergreen’s research brief *Climate Resilience for Municipalities in Canada* (October 2023) explores how municipalities can implement climate resilient strategies within their planning processes.

To date, dozens of creative mixed-use buildings have been built in Canada.³ A recent survey found over 50 creative mixed-use buildings in Toronto, spanning education, arts and culture,

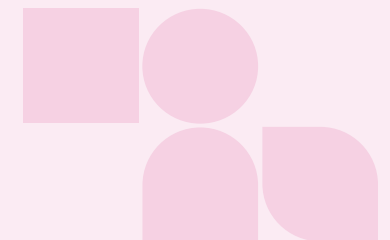
- 1 United Nations Environment Programme. (2021). A Practical Guide to Climate-resilient Buildings & Communities. <https://wedocs.unep.org/xmlui/bitstream/handle/20.500.11822/36405/Adapbuild.pdf>
- 2 Muggah, R., & Ratti, C. (2021, October 20). The data revolution will help the world fight climate change. Foreign Policy. https://foreignpolicy.com/2021/10/20/climate-change-cities-big-data-artificial-intelligence/?utm_campaign=clipping_institucional_dia_a_dia&utm_medium=email&utm_source=RD+Station#cookie_message_anchor
- 3 Infrastructure Institute - School of Cities. (2023, July 11). Creative Mixed-Use Case Studies. Infrastructure Institute. <https://infrastructureinstitute.ca/creative-mixed-use-case-studies/>

recreation and health care sectors, as well as places of worship.⁴ Similarly in Vancouver, schools, recreation centres, daycares, churches and fire stations have all been co-located in buildings with private or non-profit housing. Creative mixed-use is not exclusive to big cities with Canadian examples in small and mid-sized communities such as the mixed-use fire station and supportive housing building in St Thomas, Ontario.⁵ Indeed, Canada has quietly become a global leader in the development of creative mixed-use buildings.

The Community Solutions Network is a program led by Evergreen in partnership with Open North. Our team works with communities to build capacity and improve the lives of residents using data and connected technology approaches. We deliver advisory services, workshops and online resources that focus on key areas such as climate resilience, data governance, inclusive public space, creative mixed-use, technology procurement and public engagement. The Community Solutions Network is supported by funding from the Government of Canada.

4 Geva, Y. and Siemiatycki, M. (2023). Finding Mutual Benefit in Urban Development: Lessons From Toronto's Creative Mixed-Use Real Estate Partnerships. *Journal of the American Planning Association*. Online First.

5 94.1 myFM News staff. (2021, October 1). Community spotlight: Developing local solutions to homelessness. 94.1 St.ThomasToday.ca. <https://www.stthomastoday.ca/2021/09/30/community-spotlight-developing-local-solutions-to-homelessness/>



THIS BRIEF PROVIDES AN OVERVIEW OF CREATIVE MIXED-USE APPROACHES AND THE BENEFITS OF CO-LOCATION.

There is a growing nationwide trend where large-scale public, private and non-profit land uses are co-located in the same building. We call these developments creative mixed-use buildings.



What is creative mixed-use development?

Creative mixed-use developments refer to a building or buildings that provide more than one purpose or use in the same structure or development.⁶ Creatively co-locating different uses in the same building is a form of collective problem solving, providing sites for much needed affordable housing, long-term care homes, greenspaces and a wide range of social infrastructure, adding vibrancy and resilience to communities. For example, the Cornerstone Community building in Whitehorse, YT includes rental units to provide vulnerable people and people with disabilities safe and affordable living spaces with accessibility features and also includes market-rate condominiums, a coffee shop, retail space, office space and a space for public use.⁷ Creative mixed-use buildings can also generate financial revenue from private development that can be used by governments and non-profits to offset part of the costs of building public use facilities in a building. Creative mixed-use buildings are spurred by innovation in planning processes, building visualization software (such as *RatioCity*), construction approaches and project financing.

Creative mixed-use projects that adopt climate adaptive and resilient design principles include understanding local hazards and climate risks and opportunities, the use of durable and low-maintenance systems and materials, the promotion of inclusive benefits and accommodations and the adaptation to changing environmental, social and economic conditions.⁸

Mixed-use development can be built to reduce the use of carbon intensive building materials, use green energy solutions⁹ (such as solar powered LEDs) or other energy efficiency innovations, leverage green infrastructure (such as green roofs) or other nature-based solutions and contribute to more walkable cities and minimize the building footprint. Creative mixed-use buildings that employ climate adaptive and resilient design considerations can better withstand the impacts of extreme weather events and other environmental and social impacts of climate change.¹⁰

Yet, creative mixed-use buildings are not the norm nor are they simple to deliver. They require a high level of inter-organization collaboration to make the planning work, strategies to bring

6 What is a Mixed-Use Building. (2023, February 20). Seko Construction. <https://sekoconstruction.com/2023/02/20/what-is-a-mixed-use-building/#0-definition-of-mixed-use-building>

7 Rudyk, M. (2022, July 21). New Whitehorse mixed-use building with affordable rental units opens. CBC. <https://www.cbc.ca/news/canada/north/new-whitehorse-building-includes-45-affordable-rental-units-1.6527997>

8 The Fundamentals of Resilient & Climate Adaptive Design. (n.d.). American Institute of Architects. https://content.aia.org/sites/default/files/2021-11/Fundamentals_of_Resilient_and_Climate_Adaptive_Design_2021-0402_portrait.pdf

9 Reimagining Public Spaces: Green Energy Solutions. (2023). Community Solutions Portal. <https://futurecitiescanada.ca/portal/wp-content/uploads/sites/2/2023/03/reimagining-public-spaces-green-energy-solutions-eng-20230330.pdf>

10 Biro, A. (2023). What is Climate Responsive Architecture? Gb&D Magazine. <https://gbdmagazine.com/climate-responsive-architecture/>

funding to bear from multiple sources and advance planning for long-term operations and maintenance when facilities are shared between multiple owners. As building sites in Canadian communities become tight, resources scarce and the social licence for construction in existing communities harder to obtain, there is growing interest in creative mixed-use developments that can realize a collaborative advantage, where each party achieves an outcome that is better than they could achieve on their own.

Start with strategy: Intentional co-location

If creative mixed-use buildings that co-locate public, private and non-profit uses in the same facility are such a good idea, why are there not more of them around? The answer is that inter-organizational collaboration is hard work. It can be frustrating, slow, unpredictable and risky. To date, if given their choice, most organizations would choose to proceed with a development project on their own, maintaining ownership and control for themselves. But change is taking place for reasons related to rising costs, access to quality development sites and a growing recognition that creatively mixing uses can lead to more vibrant and efficient city building. Organizations from all sectors are increasingly seeking out partners and opportunities to co-develop ambitious creative mixed-use buildings. This section provides tips on how to flip creative mixed-use from a history where collaborations for co-location is typically a last resort to a future where organizations intentionally plan for co-location of uses and collaboration.

- **Be partner ready**

The first step in proactively undertaking a creative mixed-use development project is ensuring the organization is ready for a partnership. Organizations that partner effectively in mixed-use real estate projects have a clear understanding of their mission,



mandate and goals for a project. These organizations have a governance structure that can empower quick and decisive decisions, a solid and realistic understanding of the resources they bring to the table and skilled staff to lead the project. Creative mixed-use projects have often stalled in the past where one party has far greater real estate expertise than their counterpart or where one party has processes that are slow or unpredictable. Organizations can take a variety of paths in delivering a creative-mixed use project – they can develop an in-house team with expertise in real estate project management, they can hire an external real estate development management firm to lead the project or they can partner with a developer who will lead the project and provide space to the non-profit in a finished building. Regardless of the approach followed, no outside consultants or advisors can replace an organization's internal understanding about the purpose of a development project and responsibility for monitoring and oversight.

- **Ensure the project fits within existing infrastructure and partnerships**

Does the proposed project require a standalone space or can it pair effectively in a mixed-use building, especially one that incorporates an adaptive re-use of an existing facility? While the first impulse of most organizations may be to explore a standalone space to maximize simplicity and their own control, with imagination and collective problem solving, multiple uses can be effectively paired in the same building than may be initially thought.

Creative mixed-use developments can be an innovative solution to the adaptive re-use of historic buildings. For example, in Vancouver, BC, the abandoned Woodward's department store was adaptively redeveloped with a mix of housing, retail offerings, a media arts campus space for Simon Fraser University, municipal, federal and non-profit office space and a plaza. The project's renovation of a heritage building included strong efforts towards heritage preservation and fostering a social mix of

spaces through partnership and collaboration.¹¹ Yet, adaptive re-use projects are not without their tensions. In the case of the Woodward's building, there were major concerns about the project serving as a spark for gentrification and displacement of lower income communities in the area.

Importantly, the goal in every project is not necessarily to facilitate the co-mingling of spaces between building occupants. In fact, most creative mixed-use projects look for synergies where the uses are sufficiently compatible, while creating completely separate spaces for each user within the same building. Mixed-use projects are comprised of organizations with distinct mandates that operate within the same physical building envelope in the same way as two owners of a semi-detached house. They may have some shared responsibilities for roof maintenance or snow shoveling and must be cognizant that their activities do not cause a nuisance for their neighbour, but otherwise operate entirely separately.

- **Match with the right partner(s)**

Identifying partners with similar values and needs in a building is critical to carrying out creative mixed-use development projects. This is the classic matching problem. How to find that right partner in a universe of potential opportunities? The key is to cast a wide net to scan for potential partner options, which may be within the municipality itself in the form of a public-public partnership, with Indigenous communities, non-profit organizations or private sector partners. For municipalities, one key opportunity is to defy the silos that have often divided various local service areas into standalone buildings and look inward to see where spaces for public services could benefit from co-location across departmental boundaries. In addition to cost savings, co-location can also bring environmental benefits by contributing to the development of compact, walkable communities.

¹¹ Woodward's Redevelopment. (2021, October 19). Henriquez Partners Architects. <https://henriquezpartners.com/projects/woodwards/>

In finding a matching partner or partners for a creative mixed-use building, a key lesson is to determine whether a partnership has a realistic potential of success. After a few meetings, it should be clear whether organizational values, working styles, vision for the project and decision-making approaches are aligned. Trust is key in developing a long-term partnership that will be much like a marriage, with success closely tied to that of the partner. If a fit is not found, continue the search to reduce the loss of time or money. If initial agreement is found, proceed to more detailed discussions about the project itself and how it should be executed. Note that developing partnerships may take more time for some communities such as those with fewer resources or capacity including historically underrepresented groups.

- **Engage partners and relevant parties early**

Early and consistent engagement with the local community is key to intentionally designing a creative mixed-use building. Meaningful engagement with front-line service providers, local community organizations and local Indigenous communities can generate ideas to inform the project's design and learn about the opportunities and potential pitfalls with co-location. Using in-person and virtual engagement and consultation processes in safe and accessible spaces can help ensure inclusive opportunities for the community to provide feedback on the mixed-use project. Traditional websites for public engagement (such as those used by *Engage Winnipeg* and *Engage Fredericton*), posting QR codes at the site, recording or live-streaming meetings or engagement sessions with close-captioning and other smart solutions can support a more wholistic information sharing and consultation process. Further, in-person consultations should reflect the availability of the community (specifically regarding the time and location of the sessions) with options for virtual attendance to create a more inclusive environment for those with mobility challenges, vision or hearing impairments or other barriers to in-person attendance.

Exploring the idea of co-location with organizations that have a history of operating in their own single use spaces can be daunting at first. In engagement meetings, an effective strategy to garner feedback can be to begin by examining the overall concept for the project followed by understanding what participants hope to get out of the project. It is a good idea to ask what is imperative to making the project a success in their view? Once the parameters of the project are defined, discussion can shift to the type of uses that are compatible and the design elements and program to drive success. Smart tools, such as *CityEngine* and *UrbanistAI*, can be useful in community engagement efforts and co-designing mixed-use buildings and public spaces in real-time.

- **Use technology for rapid prototyping**

Design visualization software can be especially useful in a project's early development to rapidly prototype concept designs for a mixed-use project. The concept study should explore the building height and massing, how it fits within the existing zoning regulations and neighbourhood and which user will be located in which part of the building. The location and architecture of a mixed-use building influences its surrounding area from the people who will use the space to the natural

CREATIVE MIXED-USE DEVELOPMENTS

can be an innovative solution to the adaptive re-use of historic buildings. For example, in Vancouver, BC, the abandoned Woodward's department store was adaptively redeveloped with a mix of housing, retail offerings, a media arts campus space for Simon Fraser University, municipal, federal and non-profit office space and a plaza.

environment around the building. Prototyping can inform broader area questions about how the space may influence the vitality of the streetscape and tree canopy coverage or other shading considerations that relate to the Urban Heat Island Effect. Further, tools such as digital twins, which create virtual replicas of physical assets, can help planners visualize and interpret similar scenarios for better planning, especially when considering regional climate risks. For example, Evergreen's *AI for a Resilient City* project uses machine learning and Artificial Intelligence to help municipalities plan for the impacts of climate change through a data visualization and analytics tool.¹²

Think of the creative mixed-use building like a layered cake that is divided up into separate but stacked sections. When allocating parts of a building in a creative mixed-use project, the key is to assign the part of the building to the organization that gets the most value from it from a programming and financial perspective including the different types of uses and user needs (such as accessibility considerations). It is common for retail uses to go on the main floor where they are accessed by the most foot traffic, public uses on the lower floors of a building where they can have large footprints and are visible and accessible and housing on the highest floors that have the best views and command the greatest sale values. By focusing on allocating space in the building based on program goals and user needs (such as accessibility) rather than just financial capacity, developers of creative mixed-use buildings can avoid the relegation of non-profit uses or facilities for lower income people to the least desirable parts of a mixed-use building.

Design visualization software such as *RatioCity*, *Delve* and *Autodesk Forma* have become increasingly available and easy to use, so that projects can be manipulated to test different design assumptions and layouts. The concept study can be conducted

¹² AI for the Resilient City. (n.d.). Evergreen Canada. <https://www.evergreen.ca/our-projects/ai-for-the-resilient-city/>



in-house by an organization if it has its own planning and design team or outsourced to a consultant for a relatively low-cost concept study. Once a concept design is created, it is used to create a rough projection of the building costs and revenues, which are refined and advanced as the project progresses.

Technology-based prototyping can support climate adaptive and resilient design by considering the structure's location and orientation to optimize the existing climate conditions (such as the direction best for heat gain control, to maximize daylight, the position of windows for ideal natural ventilation, etc.). Prototyping and digital twins can also test climate-resilient designs in how they address climate risks such as flooding (through raising buildings above flood level or integrating better drainage or stormwater management) or extreme heat (through lighter and more reflective surfaces to reduce the heat load and planting vegetation to help cool buildings). Urban ecosystem services have significant value in addressing the environmental impacts of climate change, but also have socio-economic impacts.¹³ Nature-based solutions and other green infrastructure can also be employed to reduce vulnerability from climate risks and improve the overall climate resilience of a community.¹⁴ For example, green roofs, permeable surfaces, shade structures, vegetation and other low-tech solutions can further support the climate adaptability and resilience of a creative mixed-use building.

13 Gómez-Baggethun, E., Gren, Å., Barton, D. N., Langemeyer, J., McPhearson, T., O'Farrell, P. J., Andersson, E., Hamstead, Z. A., & Kremer, P. (2013). Urban Ecosystem Services. In Springer eBooks (pp. 175–251). https://doi.org/10.1007/978-94-007-7088-1_11

14 Kabisch, N., Frantzeskaki, N., Pauleit, S., Naumann, S., Davis, M., Artmann, M., Haase, D., Knapp, S., Korn, H., Stadler, J., Zaunberger, K., & Bonn, A. (2016). Nature-based solutions to climate change mitigation and adaptation in urban areas: perspectives on indicators, knowledge gaps, barriers, and opportunities for action. *Ecology and Society*, 21(2). <http://www.jstor.org/stable/26270403>

- **Championed by individuals, planned for institutions**

Creative mixed-use projects are highly personal. Because of the creativity and entrepreneurialism required to make them a reality, they typically have an identifiable project champion or small group of leaders from multiple organizations who have the vision and fortitude to advance them through the lengthy planning and approval processes. Energetic project champions are critical to getting these projects built. Still, creative mixed-use projects require planning for long-term operations by the institutions. To this end, a project agreement that sets out the roles and responsibilities of each partner is necessary. A project agreement should include the shared use of any mixed spaces and details regarding who receives parking revenue, conflict or bankruptcy resolution plans, as well as other particulars unique to the project. Creative mixed-use buildings are developed based on trust and a project agreement codifies that relationship into a set of protocols that can persist beyond the involvement of the individuals who originally conceived the project.

Creative mixed-use in action

Creative mixed-use projects can be an opportunity to embed climate-resilient features and design elements. Below is a selection of case studies that showcase creative mixed-use projects in Canada with climate resilience at the forefront from prioritizing energy efficiency to nature-based elements (such as a centralized green space). The case studies demonstrate locally led and implemented mixed-use projects that support local climate resilience efforts.



CASE STUDIES



CASE STUDY 1: Squamish's Dogwoods Net-Zero Mixed-Use Building



- **Location:** Squamish, BC
- **Key Partners:** ReGen Homes
- **Phase of Completion:** Planning & Implementation

The Dogwoods housing and office development in Squamish, BC is an innovative, mixed-use building that has climate-resilient features embedded in its development. The building will include 20 apartment units on the top floors (rented at market price) with office space and a public use area on the second floor as well as parking (with electric vehicle chargers and bike parking).¹⁵ An art mural will display along the east wall¹⁶ and the entire building will have a living façade of vines and shrubs to filter air and reduce urban heat gain.¹⁷

The Dogwoods project aims to meet net-zero or equivalent energy efficiency standards with no natural gas being used in any of the units and a rainwater retention and reuse system.¹⁸ The building will include extra insulation and high-quality windows and doors to ensure a highly energy efficient structure. Further, the roof-top solar panels will produce its own power.¹⁹

Integrating green infrastructure into urban designs can support existing infrastructure by improving stormwater runoff and drainage for improved flood management and the replenishment of groundwater reserves (such as through bioswales or permeable surfaces), improving air quality and reducing air pollution (such as through green walls or planting trees and shrubs) and lowering building energy demands and reducing the Urban Heat Island Effect (through improved shade, tree canopy coverage and green roofs).²⁰

NET-ZERO

Countries all over the world have set targets for decreasing greenhouse gas and carbon emissions, but to achieve these targets communities have to significantly reduce their consumption of energy and natural resources. The concept of smart cities can play a role in accomplishing these environmental goals

15 Hughes, A. (2022, March 18). Squamish's first net-zero, mixed-use residential building moves toward certainty. Squamish Chief. <https://www.squamishchief.com/local-news/squamishs-first-net-zero-mixed-use-residential-building-moves-toward-certainty-5176571>

16 Ibid.

17 The Dogwoods. (n.d.). ReGen Homes. <https://www.regen.homes/the-dogwoods>

18 Hughes, A. (2022, March 18). Squamish's first net-zero, mixed-use residential building moves toward certainty. Squamish Chief. <https://www.squamishchief.com/local-news/squamishs-first-net-zero-mixed-use-residential-building-moves-toward-certainty-5176571>

19 The Dogwoods. (n.d.). ReGen Homes. <https://www.regen.homes/the-dogwoods>

20 Green Infrastructure for Climate resiliency. (2023, July 24). United States Environmental Protection Agency. <https://www.epa.gov/green-infrastructure/green-infrastructure-climate-resiliency>

CASE STUDY 2: māmawēyatitân centre in Regina



- **Location:** Regina, SK
- **Key Partners:** P3Architecture, City of Regina, Regina Public Schools, Regina Public Library, Indigenous Elders
- **Phase of Completion:** Completed & Operational

Opening in 2017 and located in North Central Regina, SK the māmawēyatitân centre prioritizes Indigenous elements within its design, including an opaque sky-blue glass to encapsulate the Prairie’s wide horizons and incorporating an Elders and Ceremony Space.²¹ Indigenous reconciliation was a key focus in the creation of the centre including Indigenous Elders advisors to provide insight on the colours and placement of the Elders and Ceremony Space.²² The centre provides integrated services within a central area, bringing the community together to connect and develop skills through various educational and community-based programming.²³

The māmawēyatitân centre seeks to accommodate diverse needs for multiple audiences. In addition to an Elders and Ceremony Space, the centre includes a daycare, a high school, a library, a community centre, as well as a recreational

complex and a satellite police station.²⁴ Around 70% of the building’s interior space is allocated towards shared space.²⁵

The māmawēyatitân centre houses an outdoor green space called the “Heart of the Site” which opened in 2018,²⁶ and includes a garden, basketball court and soccer pitch.²⁷ The site aims to be a gathering spot for community members,

TECHNOLOGY-BASED PROTOTYPING

can support climate adaptive and resilient design by considering the structure’s location and orientation to optimize the existing climate conditions (such as the direction best for heat gain control, to maximize daylight, the position of windows for ideal natural ventilation, etc.).

- 21 Weder, A. (2019, September 26). All in it Together: māmawēyatitân centre, Regina, Saskatchewan. Canadian Architect. <https://www.canadianarchitect.com/all-in-it-together-mamaweyatitan-centre-regina-saskatchewan/>
- 22 The Shaping & Structuring of Space: māmawēyatitân centre. (2021, July 19). Canada Constructed. <https://canadaconstructed.ca/2021/07/19/the-shaping-structuring-of-space-mamaweyatitan-centre/>
- 23 māmawēyatitân centre. (n.d.). City of Regina. <https://www.regina.ca/parks-recreation-culture/community/mamaweyatitan-centre/>

- 24 Weder, A. (2019, September 26). All in it Together: māmawēyatitân centre, Regina, Saskatchewan. Canadian Architect. <https://www.canadianarchitect.com/all-in-it-together-mamaweyatitan-centre-regina-saskatchewan/>
- 25 The māmawēyatitân centre Officially Opens. (2017, September 12). P3 Architecture Partnership. <https://www.p3arch.com/news/the-mamaweyatitan-centre-officially-opens>
- 26 Youck, J. (2018, June 29). mamaweyatitan centre opens the Heart of the Site. LinkedIn. <https://www.linkedin.com/pulse/mamaweyatitan-centre-opens-heart-site-james-youck>
- 27 māmawēyatitân centre. (n.d.-b). City of Regina. <https://www.regina.ca/parks-recreation-culture/community/mamaweyatitan-centre/>

as well as a traditional space for Indigenous teachings to take place.²⁸ Within the green space is a traditional medicine wheel containing Indigenous herbs and grasses.²⁹ It is important to note that Indigenous knowledge and sustainable land stewardship practices play a major role in climate resilience with Indigenous peoples safeguarding 80% of the world's remaining biodiversity.³⁰ In addition, the incorporation of green space within an infrastructure project, like the presence of the community garden and medicine wheel at the māmawēyatitān centre, can help enhance health and climate resilience by improving air quality and promoting food provision.³¹

28 Youck, J. (2018, June 29). mamaweyatitan centre opens the Heart of the Site. LinkedIn. <https://www.linkedin.com/pulse/mamaweyatitan-centre-opens-heart-site-james-youck>

29 Ibid.

30 Values of Indigenous Peoples Can Be a Key Component of Climate Resilience. (2020, December 16). United Nations Framework Convention on Climate Change. <https://lcipp.unfccc.int/news/values-indigenous-peoples-can-be-key-component-climate-resilience>

31 Kingsley, M. & EcoHealth Ontario. (2019). Commentary – Climate change, health and green space co-benefits. Health Promotion and Chronic Disease Prevention in Canada: Research, Policy, and Practice, 39(4), 131–135. <https://www.canada.ca/en/public-health/services/reports-publications/health-promotion-chronic-disease-prevention-canada-research-policy-practice/vol-39-no-4-2019/climate-change-health-green-space-co-benefits.html>



Paying for community infrastructure and affordable housing is a constant challenge. This section will show how creative mixed-use projects can bring together a mix of funding sources to make a project viable.



Overcoming the funding barrier

Funding is a barrier to delivering any social purpose real estate project. Paying for community infrastructure and affordable housing is a constant challenge. This section will show how creative mixed-use projects can bring together a mix of funding sources to make a project viable.

Producing a pro forma is essential to funding a creative mixed-use development project. A pro forma is a detailed estimate of the building costs and revenues that will be generated by the project. It is based on the concept study that is carried out during the initial planning phase and is refined as more details are secured. The pro forma is a moment in the planning process where participants can have a tangible impact on the project, taking a line-by-line analysis that shows where resources are being spent.

As part of the pro forma, building owners can test the financial implications of developing a green, low carbon, energy efficient building. In Canada, there are a few green certifications and standards that mixed-use buildings can implement such as Canada Green Building Council's (CGBC) Leadership in Energy and Environmental Design (LEED)'s internationally recognized rating system for sustainable and green building excellence that focuses on energy conservation, low carbon and other sustainability efforts.³² CGBC also has Zero Carbon Building

Standards that aim to reduce carbon in building design and operations to help meet Canada's climate commitments.³³ Passive House Canada are energy-based standards in the design and construction of a building (or house) with a focus on reducing energy consumption through the use of thermal bridging, insulation, building orientation and air-tightness as well as improved air quality.³⁴

Often, green building choices have higher up-front capital costs for high efficiency windows, extra insulation, heat pumps, green roofs and other building materials, but there is a long-term pay-off of lower operating expenses (through reduced energy and water use and long-term operations and maintenance costs) and having a higher asset value.³⁵

Creative mixed-use buildings are commonly set up using a condominium-type model where each organization owns their own space in the building, versus in an office tower where a single firm owns the entire complex and leases out individual spaces. The condominium model is important for governments and non-profits providing significant community services in a creative mixed-use facility so that they have security of tenure

32 Canadian Green Building Council. (n.d.). Certification. Canada Green Building Council. <https://www.cagbc.org/our-work/certification/>

33 Ibid.

34 Building Certification. (n.d.). Passive House Canada. <https://www.passivehousecanada.com/passive-house-building-certification/>

35 The Business Case for Green Building: A Review of the Costs and Benefits for Developers, Investors and Occupants. (2013). Skanska Group; World Green Building Council. https://group.skanska.com/4af531/siteassets/sustainability/reporting-publications/reports-on-green-building/business_case_for_green_building_report_web_2013-03-13.pdf

in the building. They are not tenants in the building that can be evicted or have the terms of their occupancy changed by a private sector owner, but rather co-owners with all the accompanying rights and responsibilities that come with ownership.

When a creative mixed-use building is structured using the condominium model, each partner in the building is usually responsible for paying for their own space. Developers, non-profits and governments each bring their own resources to a project and have access to different funding streams.

Developers finance the majority of their portion of the construction costs of a project by borrowing against future unit sales or rental revenues. This is a commercial transaction and they will only proceed if they and their lenders are confident in the profitability of the project.

For the public and non-profit spaces in a creative mixed-use building, most projects rely on a diverse 'funding stack' that brings money together from multiple sources to make the project financially viable. Key sources of funding for creative mixed-use projects include:

- **Government grants** from all levels of government that fund public and non-profit social infrastructure like schools, recreation centres, arts and culture facilities, libraries, community health hubs, affordable housing and homeless shelters. As construction costs rise and public budgets tighten, government grants may not be enough to cover the total project capital costs. This has created an interest in augmenting public money with other sources of capital.
- **Philanthropy** through capital campaigns by non-profits and public agencies, boards and commissions that may include building naming rights for high profile buildings like theatres, hospitals or recreation centres. For all but the largest and most high-profile organizations, philanthropy

is likely to make up only a relatively small share of the total capital cost of a building.

- **Borrowing** through banks or other lenders is a common funding option. Organizations that generate stable and predictable revenue through their operations may qualify for a mortgage to cover part of the capital costs of the building project. For instance, a non-profit housing provider may be able to take out a mortgage to be repaid by future rental revenue or a recreation centre could borrow against membership and rental fees. A lender will closely scrutinize the past financial performance and business plans of an organization seeking a loan to ensure that it can repay the borrowed funds. Canadian provincial governments sometimes have lending or loan guarantee programs that can reduce the cost of borrowing for eligible government and non-profit entities. Government agencies and non-profits must be especially prudent when taking out development loans to ensure that they do not become financially overextended. There have been recent examples where non-profits and local governments have struggled to repay their commercial real estate loans, requiring significant asset sales and government bailouts to protect core services.³⁶
- **Private sector contributions** from the developer towards the social purpose spaces in creative mixed-use buildings are secured through a variety of mechanisms. This includes direct contributions, as well as funds raised by a municipality through development charges, community benefit fees and density bonuses where additional height is provided to the developer in exchange for a financial contribution to the project. Given the economics of private building developments, it is likely that

36 For examples of issues related to government and non-profit borrowing for real estate projects, see: <https://www.theguardian.com/politics/2023/jun/07/working-council-declares-bankruptcy-with-12bn-deficit> and <https://futureofgood.co/cash-crunch-forces-torontos-artscape-to-list-newly-built-launchpad-for-22-5-million-as-workers-seek-to-unionize/>

the financial contributions drawn from private market fees will make up only a small portion of the funding necessary to develop the social purpose component of a building.

Taken together, creative mixed-use development projects draw on a capital stack of funding from various sources to make them a reality. For example, Victoria, BC's fire hall development combines affordable housing and fire department operations through funding from BC Housing, Pacific Housing, and the City of Victoria.³⁷ A downside is that cobbling together funding from multiple sources is a lengthy, complex and unpredictable undertaking. However, by not being dependent on a single source of funds, social purpose real estate projects are resilient to struggles by any individual funder. They are customized for policy entrepreneurs who have a capacity for dealmaking, with all the positive elements of creative problem solving and risks of hubris, overselling and diverted priorities that comes along with such an approach. Raising funds for a creative mixed-use building project more closely resembles a fund-raising campaign than a traditional submission of an application for government funding grants. Projects benefit from marketing that raises the profile of the initiative, builds broad public support, high profile endorsements and a charismatic leader who can communicate the vision of the project to diverse audiences.

Managing facility operations and maintenance

This section examines the key factors that determine the success of a creative mixed-use project and explores the monitoring approaches and collaboration mechanisms to make sure that the projects are delivering on their environmental

³⁷ New Victoria Fire Department headquarters officially opens. (2023, April 26). <https://www.victoria.ca>. <https://www.firefightingincanada.com/new-victoria-fire-department-headquarters-officially-opens/>



resilience and community goals. Creative mixed-use developments are long-term undertakings that will operate for decades, often stretching beyond the involvement of the individuals who originally conceived and championed the project. Today, there are Canadian mixed-use school buildings, libraries, transit hubs and arts and culture centres with housing or offices located above that have been operating for over a quarter of a century. Efficient and effective long-term operations and maintenance are instrumental to the success of this model of city building, which depends on creating detailed plans and fostering smooth relationships.

- **Ensure meaningful collaboration and cooperation in the design and planning**

Much of the success of a creative mixed-use development is baked into the project during its design and planning phase, ensuring that potential risks from the co-location and potential conflicts with the surrounding community can be effectively managed. This entails designing the building to avoid frictions and clearly structuring the relationship between the building occupants. It is critical to ensure that the needs of each organization that will occupy the building are carefully understood and planned for in the design of the building. Despite being in the same physical facility, making design choices to physically separate the uses programmatically has been an important measure so that each organization has as much control as possible over the operations of their own space and program in a shared facility. Likewise, external consultations with neighbours, community organizations and Indigenous rights holders at the onset of the project and throughout the implementation and ongoing maintenance (as outlined earlier in this brief) can ensure that potential concerns are identified and proactive steps are taken in the facility design and program plans to minimize conflicts and ensure the project reflects the needs and interests of the parties and surrounding communities.

- **Establish long-term relationships and financial management structures**

Beyond the physical design of the building (as noted above) the terms and conditions of the relationship between the various building occupants will be detailed in a project agreement. The project agreement is meant to outlive the involvement of the original planners of the project and structure the relationship as staff inevitably turn over and the project is operated over the long-term. In most cases, once the creative mixed-use project becomes operational, the different occupants of the building tend to relate to each other instrumentally as co-owners of a shared building, rather than as deeply intertwined partners who have frequent interactions about mutual programming. Conversely, engaging meaningfully on a regular basis with neighbours and the wider community is especially important for social or public service providers in mixed-use buildings, to ensure that they are aware and can respond to any challenges that arise outside the walls of their facility and to create trust that they are responsive to local needs.

A building operations committee is commonly set up with membership from all the occupants to share information and resolve conflicts collectively. It is in these venues where trust can be developed, complaints shared and tensions resolved before more formal interventions are required. Issues may be escalated to be resolved by higher level management of each organization if they relate to more serious conflicts that

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is baked into the project during its design and planning phase, ensuring that potential risks from the co-location and potential conflicts with the surrounding community can be effectively managed.

impact the programming of the building occupants, such as traffic management and parking, crowds on sidewalks from one occupant blocking access to other parts of the building, late night noise complaints or issues related to safety. To date, while there are some examples of creative mixed-use projects that have struggled due to financial difficulties of one of the occupants after the project was operational, the model of shared usage is very stable over time. There are few instances of creative mixed-use buildings that have been running for a long time where the project has fallen apart and one occupant has left due to irreconcilable conflicts between the parties.³⁸

● **Prioritize climate resilience**

Managing the environmental performance of a creative mixed-use building is another key area to consider. While a building may be designed with environmental sustainability, net-zero and resilience in mind, the proof of success is achieved during the actual operations of the facility. Climate resilience focuses on the processes and outcomes achieved to determine whether climate change impacts have been taken into consideration and managed as necessary.³⁹ The frequency of extreme weather events will have a major effect on all kinds of infrastructure and, therefore, it is important for infrastructure to be created and operated in a way that is prepared for changing weather conditions.⁴⁰ Ecosystem-based techniques, including natural or green infrastructure, can be an effective alternative to traditional “grey” infrastructure as these innovations can be cost-effective and provide environmental benefits.⁴¹

38 Infrastructure Institute - School of Cities. (2023, July 11). Creative Mixed-Use Case Studies. Infrastructure Institute. <https://infrastructureinstitute.ca/creative-mixed-use-case-studies/>

39 Climate-resilient Infrastructure: Policy Perspectives. (2018). OECD; OECD. <https://www.oecd.org/environment/cc/policy-perspectives-climate-resilient-infrastructure.pdf>

40 Ibid.

41 Ibid.

An example of a simple and effective green infrastructure solution is bioswales which are shallow, vegetated landscapes often installed along curbs and parking lots that treat and infiltrate stormwater runoff supporting flood management and removing stormwater pollutants.⁴²

While a building may be designed with environmental sustainability, net-zero and resilience in mind, the proof of success is achieved during the actual operations of the facility. Increasingly there are software platforms, like *BuildingMinds*, that can be used to compile all the data on a building’s performance and provide real-time information about environmental sustainability such as net energy demand, water usage, solid waste produced, recycling rates, carbon emissions and operating costs. Other sophisticated software models can create a digital twin representation of the building so that the performance and state of good repair of each building component can be monitored and directed for maintenance using systematic evidence. As an example, a digital twin was constructed of the Daphne Cockwell Health Science Complex at Toronto Metropolitan University, which has a student housing tower up above, to provide real time information and scenario testing on the performance of the internal building systems.⁴³ These software packages can be useful to pinpoint a building’s environmental and repair performance and highlight areas for improvement alongside cost savings.

Taken together, the operational success of a creative mixed-use building is forged at the outset of the project, embodied through trust and mutual problem solving practiced between

42 Bioswales. (n.d.). City of Calgary. <https://www.calgary.ca/water/stormwater/bioswales.html>

43 FuseForward. (2023, August 3). Toronto Metropolitan University (Ryerson) Smart Campus Urban Data Platform | FuseForward. <https://fuseforward.com/case-studies/tmu-toronto-smart-campus>

the parties and that can be accelerated by software taking a data driven approach to performance management for environmental and maintenance conditions.

Creative mixed-use approaches provide an opportunity for public, private and non-profit organizations to collaborate and deliver social infrastructure. Using smart data and technological innovations, creative mixed-use projects can support community-based climate resilience. The use of climate-resilient infrastructure and nature-based solutions can help mixed-use developments be better prepared for the impacts of climate change. Further, climate-resilient systems in the design of a building, such as green roofs and rainwater harvesting, can also help reduce energy consumption and promote water conservation.⁴⁴ Creative mixed-use projects are best leveraged through proactive co-location and funding opportunities that meet the needs and interests of the organizations involved and surrounding communities.



44 United Nations Environment Programme. (n.d.). 5 ways to make buildings climate change resilient. UNEP. <https://www.unep.org/news-and-stories/story/5-ways-make-buildings-climate-change-resilient>

Glossary

Adaptive re-use is the reuse of an existing building to reflect and respond to current needs increasing the life cycle of the building.⁴⁵

Climate resilience describes the capacity to respond to and adapt to or cope with climate change impacts and is “the capacity of social, economic and environmental systems to cope with a hazardous event or trend or disturbance, responding or reorganizing in ways that maintain their essential function, identity and structure, while also maintaining the capacity for adaptation, and learning and transformation.”⁴⁶

Digital twin is a virtual replica of physical assets, processes and systems in a community.

Green energy is a broad term used here to describe a range of approaches and solutions used to reduce emissions and mitigate climate change. These may include various renewable energy applications, increase efficiency and conservation, and moves away from fossil fuel energy production, often towards electrification. (reducing energy usage)

Green infrastructure is infrastructure that manages and controls elements of the natural vegetative systems and green technologies that collectively provide society with a multitude of economic, environmental, health, and social benefits.⁴⁷

Green space refers to green infrastructure, natural spaces, open space or engineered green spaces that promote health and climate change mitigation.⁴⁸

Nature based solutions are “actions to protect, sustainably manage and restore natural and modified ecosystems that address societal challenges effectively and adaptively, simultaneously benefitting people and nature.”⁴⁹

Net-zero is used to describe strategies and targets aimed at eliminating the emissions of greenhouse gases (zero carbon) in various regions around the world.

Smart city refers to “a resilient, inclusive and collaboratively-built city that uses technology and data to better the quality of life for all people.”⁵⁰

Urban Heat Island are urbanized areas that experience higher temperatures than outlying areas. Structures such as buildings, roads and other infrastructure absorb and re-emit the sun’s heat more than natural landscapes such as forests and water bodies. Urban areas, where these structures are highly concentrated and greenery is limited, become “islands” of higher temperatures relative to outlying areas.⁵¹

45 Abdulameer, Z. A., & Abbas, S. S. (2020). Adaptive reuse as an approach to sustainability. IOP Conference Series, 881(1), 012010. <https://doi.org/10.1088/1757-899x/881/1/012010>

46 Intergovernmental Panel on Climate Change. 2022. “Annex II - Glossary - Climate Change 2022: Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.” https://archive.ipcc.ch/pdf/assessment-report/ar5/wg2/WGIIAR5-AnnexII_FINAL.pdf.

47 What is Green Infrastructure? (n.d.). Green Infrastructure Ontario. <https://greeninfrastructureontario.org/what-is-green-infrastructure/>

48 Kingsley, M. & EcoHealth Ontario. (2019). Commentary – Climate change, health and green space co-benefits. Health Promotion and Chronic Disease Prevention in Canada: Research, Policy, and Practice, 39(4), 131–135. <https://www.canada.ca/en/public-health/services/reports-publications/health-promotion-chronic-disease-prevention-canada-research-policy-practice/vol-39-no-4-2019/climate-change-health-green-space-co-benefits.html>

49 Nature-based solutions. (n.d.). IUCN. <https://www.iucn.org/our-work/nature-based-solutions#:~:text=Nature%2Dbased%20Solutions%20address%20societal,biodiversity%20and%20human%20well%2Dbeing>.

50 Smart Cities Glossary. (2023, February 3). Community Solutions Portal. <https://futurecitiescanada.ca/portal/resources/smart-cities-glossary/>

51 “Heat Island Effect.” 2023. United States Environmental Protection Agency. <https://www.epa.gov/heatislands>



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