

THE CASE FOR CONVERSIONS

Guidebook

Based on the findings of CUI's 2022-2023
National Housing Strategy Solutions Lab

March 2024





Contents

Evaluation Guidebook	4
Roadmap of Tools	4
Market Analysis	5
Scenarios	6
Scenarios Overview	6
Flowchart Quiz	7
Regulatory Overview	13
Municipal Plans and Policies	13
Other Policy Mechanisms	16
Technical Analysis	17
Building Inventory	17
Building Typologies	19
Specific Characteristics	29
Building Code	37
Process Overview	37
Fire and Safety Considerations	38
Miscellaneous Considerations	40

Guidebook Introduction

In April 2023, CUI published *The Case for Conversions*, the culmination of a National Housing Strategy Solutions Lab funded by the Canadian Mortgage and Housing Corporation (CMHC).

The *Case for Conversions Guidebook* is a compilation of three briefing documents circulated to interested parties in six Canadian cities: Halifax, Moncton, Ottawa, Winnipeg, Regina, and Victoria. This Guidebook provides a summary of our findings from the Solutions Lab and serves as a collection of resources to support office-to-residential conversions across the country.

The purpose of this document is to supplement *Charting a Path to Office Conversions in Canadian Cities*, a National Housing Strategy Demonstrations Initiative funded by CMHC.

Evaluation Guidebook

Roadmap of Tools



1. Market Analysis

- Find out which market scenario your city belongs in
- Evaluate which strategies make sense in your context
- References to relevant international case studies



2. Regulatory Review

- Review existing planning policy and regulatory environment
- Consider initiatives to remove barriers to conversion



3. Technical Analysis

For office-to-residential building candidates, consider:

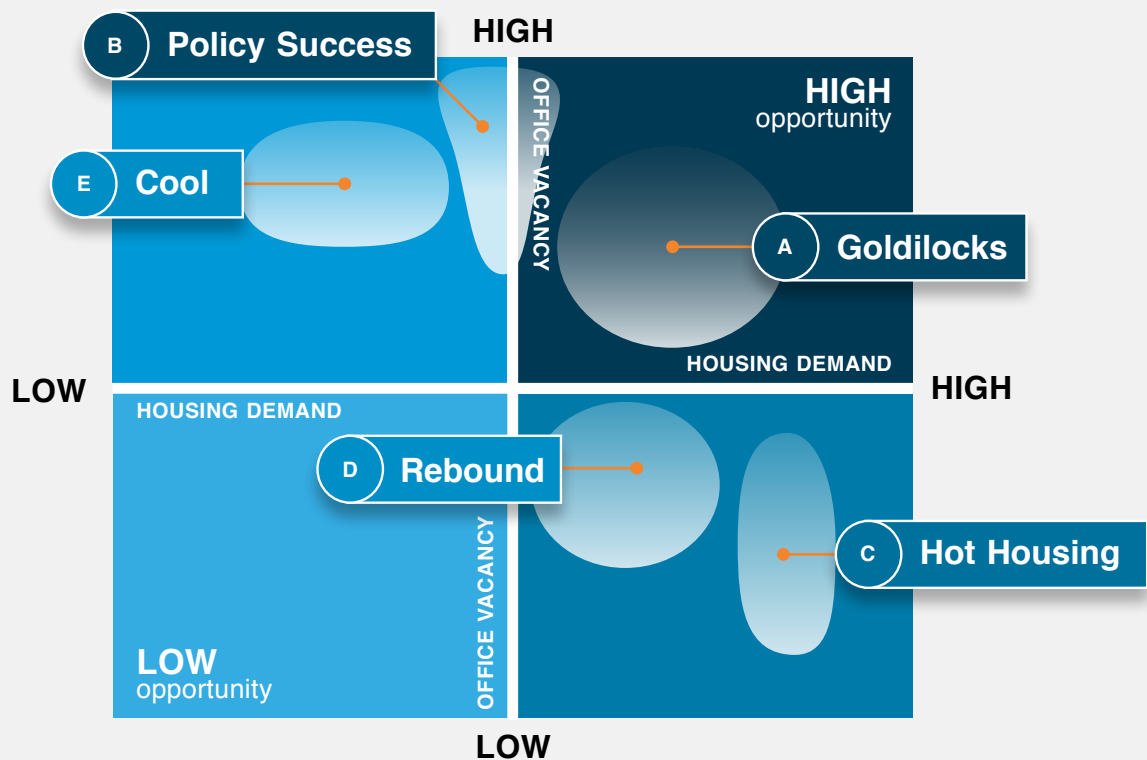
- Developing a building inventory for further evaluation
- Building typology advantages and disadvantages
- Technical building characteristics with graphic examples
- Building Code requirements

Market Analysis

Office conversion policies should be designed based on the conditions of the local office and housing markets. CUI has developed a quadrant analysis framework to evaluate different market scenarios to help municipalities identify their market scenario and tailor their policies.

Based on housing demand, as indicated by city-wide rental vacancy rates, and downtown office vacancy rates, five market scenarios are illustrated in the matrix below. The following section includes a flowchart quiz to help cities determine which scenario they belong to as well as a breakdown of each scenario. Explanations for each scenario include a list of strategies to consider and a relevant international case study to reference. These market scenarios are meant to direct policy to best fit the municipality's specific context.

The following scenarios are not exhaustive nor static, and cities changing over time may move along either axis, eliciting the need to shift to different sets of strategies. For this reason, any financial tools implemented should be temporary and include thresholds to clarify when they are to be applied.

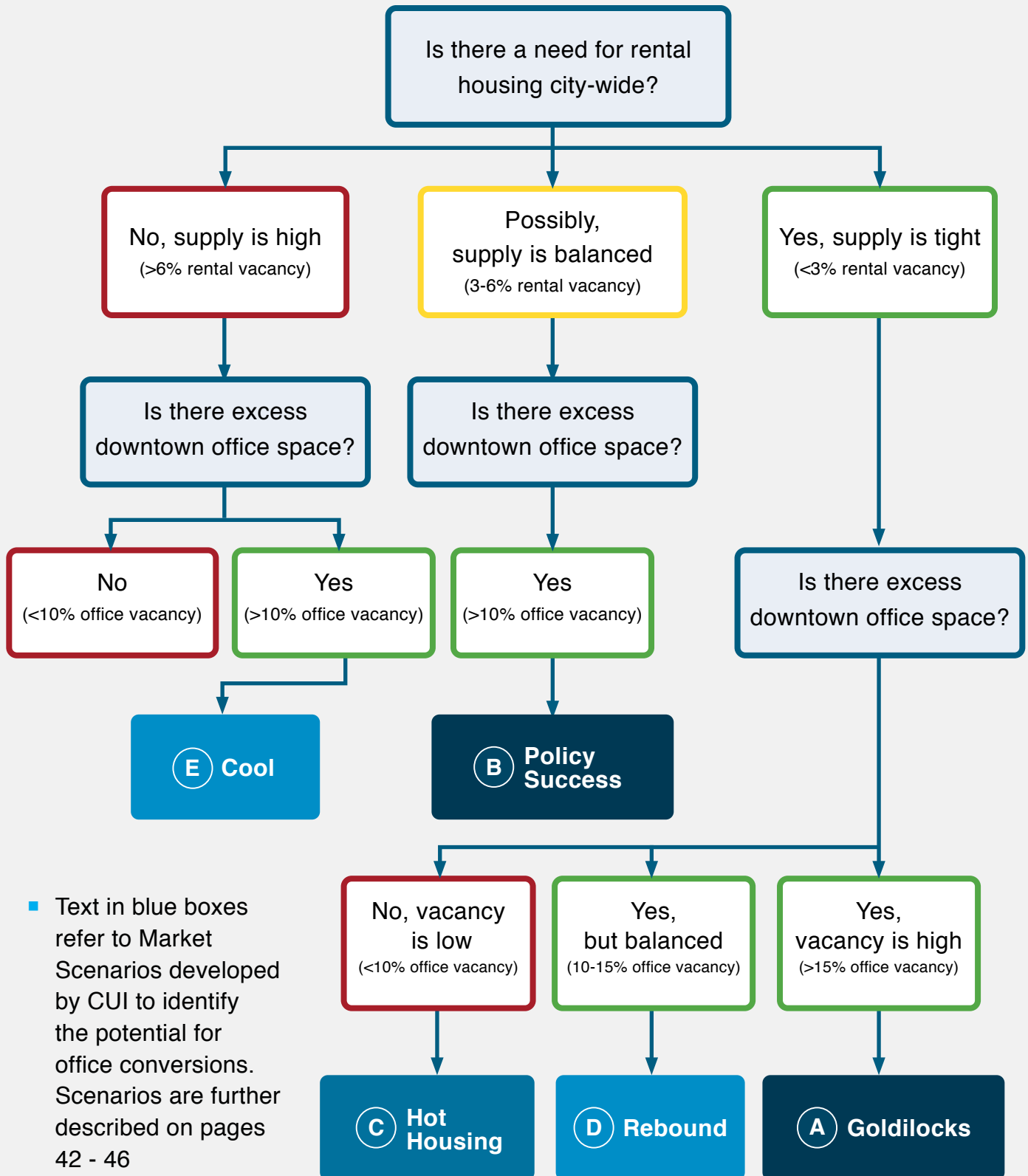


Scenarios

Scenarios Overview



Flowchart Quiz



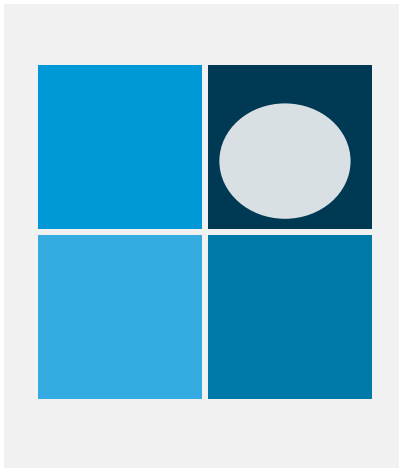
- Text in blue boxes refer to Market Scenarios developed by CUI to identify the potential for office conversions. Scenarios are further described on pages 42 - 46

A

Goldilocks

High office supply, high housing demand

Policy and program options suitable for this scenario include:



- Information sharing to educate developers and building owners about the feasibility, opportunities, and benefits of conversions
- Streamlining planning processes to reduce costly application and approvals timelines
- Permissive downtown zoning to remove regulatory barriers
- “Revenue neutral” financial assistance such as tax abatement and non-interest or low-interest loans.

Due to the Goldilocks Scenario being the one with the highest opportunity, recommended policies prioritize low-cost strategies focused on raising awareness and removing regulatory barriers. The Rotterdam Covenant: Tackling Office Vacancy serves as an example of the impact these strategies can have when employed city-wide.

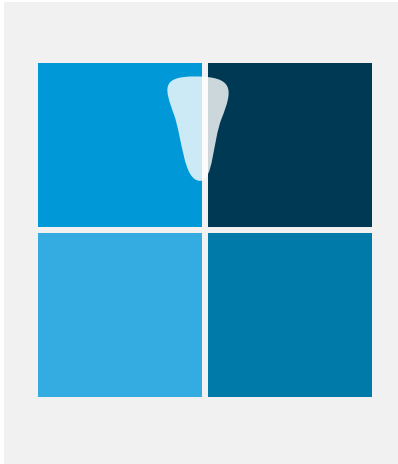
The Covenant established a mutual agreement around office conversions that lasted from 2011 to 2014 between the City of Rotterdam, developers, and building owners. With the City as the Covenant’s knowledge centre, the initiative included a “transformation team” to facilitate dialogue and cooperation, established standards for conversions, a streamlined land use plan, and various online and printed information materials. The Covenant was non-binding and based on the “best efforts obligations concept” which means there were no hard targets nor penalties involved if the targets were not met.

B

Policy Success

High office supply, balanced housing market

Policy and program options suitable for this scenario include:



- Financial incentives for conversions
- Funding or donations to non-profit housing providers to create affordable housing
- Targeted as-of-right zoning downtown to facilitate conversions
- Investments in infrastructure and amenities to promote downtown living

The Policy Success Scenario explores high office vacancies and the need for downtown revitalization. Within the Canadian context, we have seen this in the case of Calgary. The City of Calgary was facing issues of downtown office vacancy years before the pandemic due to declines in the oil and natural gas sectors.

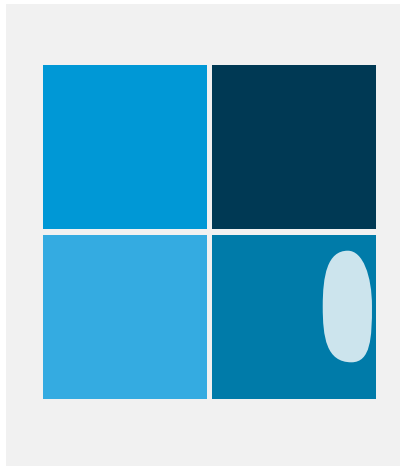
The Downtown Calgary Development Incentive Program is a \$100 million investment by the City of Calgary to help building owners and/or developers reduce the cost of conversions at \$75 per square foot of converted space, subsidizing the cost of construction. As of July 2022, the City had approved funding for five projects that will convert approximately 675,000 square feet of office space into 707 residential units. Some of these units are affordable.



Hot Housing

Moderate to low office vacancy, very high housing demand

Policy and program options suitable for this scenario include:



- Creating a stop-gap method to prevent overcorrection through an office policy or permitting conversions in cases of residential and commercial mixed-use
- Establishing standards for residential unit size and quality and/or guidelines for specific housing types that could be achieved through conversions
- Establishing office vacancy thresholds that would trigger moratoriums on conversions to prevent loss of office space in tight markets

In the Hot Housing Scenario, very high housing demand coupled with a deregulated policy environment for office conversions risks the creation of poor-quality housing while removing office space that may be needed in the future. This overcorrected scenario was seen in the case of London, UK.

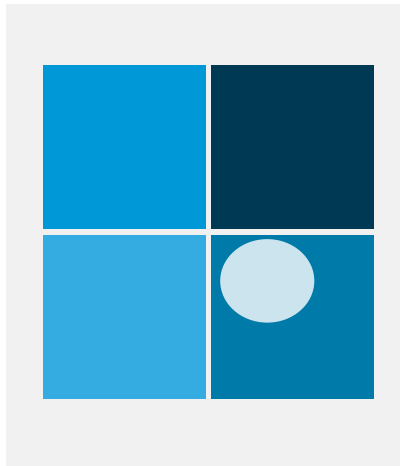
The Permitted Development Rights (PDR) in the UK allowed conversion projects to bypass the normal planning process by providing “prior approval” notification that outlines the projects’ details and their possible impacts. However, the PDR led to the creation of poor quality of housing, loss of office space needed in the local economy, and local economic pressure driven by increase in office rents. Therefore, experts suggest that conversions must go through local planning process and that municipalities must establish minimum standards for office vacancy, and space and quality requirements for residential units produced through office conversions.



Rebound

Average office supply, high/specific housing demand

Policy and program options suitable for this scenario include:



- Financial incentives to reduce conversion costs
- Implement policies for intensification through land use flexibility
- Eliminate zoning obstacles such as single use zones and parking minimums, and allow conversions as-of-right if there's no change to gross floor area
- Streamline planning process to reduce costly application and planning timelines
- Targeted conversion of specific building types

The Rebound Scenario sees office vacancy stabilizing with a higher-than-average return to office rate, but pockets of high office vacancy still exist. Older office space remains underutilized and in need of renovation. This is the case in Washington DC, where the municipality is offering tax breaks for office-to-residential conversions.

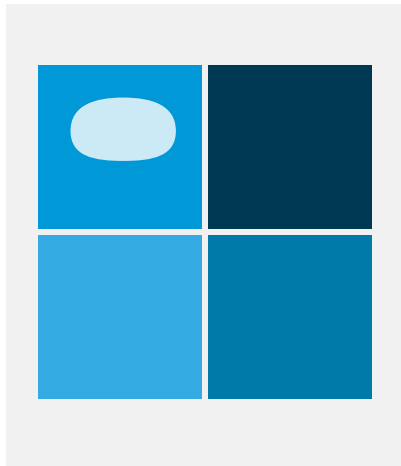
The DC Tax Abatement Program for Housing Downtown is meant to stimulate new residential housing development in specified areas of Washington DC. The program makes commercial property owners eligible for a 20-year real property tax abatement, provided they fulfill certain conditions. Conversion projects will need to add a minimum of 10 residential units with a minimum of 15% established or revamped as affordable housing. The affordable units must be planned and managed in compliance with the Inclusionary Zoning Program's rules. This program was recently launched so there is no data on its impact.



Cool

High office supply, low/specific housing demand

Policy and program options suitable for this scenario include:



- Targeted financial incentives to support affordable housing
- Allow mixed-used buildings to make downtown more attractive and adaptable
- Create overlay plans or policy zones to encourage conversions in areas with the highest concentrations of vacant office space or certain building types
- Invest in downtown amenities and anchor uses to attract residential interest

Even with high office vacancy, a low demand for housing creates a Cool Scenario. Despite overall low housing demand, the need to develop specific types of social and affordable housing persists. An example of this scenario can be seen in Buffalo, NY.

The City of Buffalo's Green Code is a form-based code that allows for mixed-use buildings in the city. Some of the key elements of the Green Code include eliminating minimum parking requirements, increasing the maximum height of buildings to increase density, removing barriers to affordable housing, and removing regulatory barriers to adaptive reuse of vacant buildings and land.

Regulatory Overview

The following section overviews the different layers of policy and regulation that a municipality should consider when supporting office conversions. This work is based on previous policy and zoning by-law reviews of six Canadian cities across six provinces, identifying common themes across planning policy and regulatory environments that either support or hinder office conversions.

Municipal Plans and Policies



Official Plan:

An Official (Community) Plan can create the right conditions for office conversions by including policies that align with downtown intensification, mixed-use, transit-oriented development, and downtown amenities. To encourage office conversions, an Official Plan should consider:

- Investments in infrastructure and amenities, to improve the vibrancy and attractiveness of neighborhoods
- Eliminating development permit requirements for office conversions to streamline office conversion applications
- A strategy for transit-oriented development leverage underutilized office space for housing around existing or planned higher order transit investments
- Reducing parking requirements



Municipal Office Policy:

A comprehensive Office Policy ensures a balanced office market and helps meet the demand for residential units through office conversions. An Office Policy should consider:

- A study and evaluation of the office space market to understand the scale of opportunity and demand of firms with stop-gap measures to prevent overcorrection

- A suite of information tools to help building owners understand opportunities for and how to undertake office conversions
- Alignment with the municipality’s planning objectives and strategy
- Tenant relocation strategy for partially occupied buildings
- Disincentives for building owners who continue keeping their property vacant
- A threshold for office vacancy where conversions would cease



Downtown Plan:

Secondary to an Official Plan, downtown (neighborhood) plans provide more detailed land use that can facilitate or stall office conversions. A Downtown Plan should consider the following:

- Investments in recreational centers and public spaces to facilitate community gathering
- Investments in the revitalization of underutilized and vacant buildings
- Implementation of mixed-use zoning to support a diversity of uses in downtown
- Increasing investments in access to public transportation, biking, and pedestrian infrastructure to make downtown more accessible, convenient, and attractive for potential residents





Zoning By-law:

Permissive zoning can support conversions by allowing a change of use without zoning amendments and by limiting approval challenges intended for new development:

- Eliminating parking minimums for office conversion projects to reduce costs
- Streamline planning approvals process
- Creating a mixed-use zone that enables vertical mixing of uses
- Allow for conversions as-of-right in certain locations when building volume is unchanged



Municipal Housing Plan:

Housing plans with key housing targets and clear livability standards can encourage office conversions by including:

- Affordable housing incentives for non-profit developers
- Establishing design and livability standards for housing created through conversions
- Flexibility to address the adaptive reuse challenges encountered when working with an existing floor plate



Heritage Plan:

A heritage strategy preserving designated heritage office buildings or those with heritage characteristics can facilitate office conversion through:

- Incentives such as grants or tax incentive to reduce costs for seismic upgrades or other structural issues
- Incentives for the preservation, replacement, and restoration of exterior and interior characteristics of heritage buildings
- Financial incentives for adaptive reuse of heritage buildings

Other Policy Mechanisms



Climate Plan:

A Climate Plan, including provincial and federal climate plans, can support office conversions by linking building retention and retrofit with greenhouse gas emission reduction targets as well as:

- Implementing pollution levy on demolition and redevelopment
- Providing climate incentives for office conversions to reward avoided emissions
- Providing incentives for building retrofits to support office conversions that reduce operational and maintenance costs
- Promoting the environmental benefits of adaptive reuse including a tool to estimate GHG savings through embodied carbon in the existing building and increased performance through a building conversion



Provincial Plans, Acts, and Policies:

Policies at the provincial level can also support conversions through various financial and non-financial incentives, such as:

- Enabling office conversion projects to access provincial housing incentives such as investments for rental units and affordable housing
- Revising the provincial Building Code to make it more flexible in ways that reduce the building code requirements for office conversions, such as alternative compliance standards
- Ensuring that conversions are supported by provincial Planning Acts and Statements of Provincial Interest.

Technical Analysis

The following three steps outline a process to identify the quantity and quality of office buildings with the potential to be converted to residential.

Building Inventory



1. Working Group

Create process to bring together building owners and city staff.

Establish a **go-to municipal conversions team** to help a building owner navigate process for building conversion including **potential for affordable housing** or to address other housing needs.

Find ways to **bring together commercial and residential building owners and developers** including universities and non-profit housing providers to benefit from each other's knowledge.



2. Determine Threshold

Create city-specific thresholds for first round of developing a building inventory based on the previous policy overview and:

- Delineate focus areas within the City for targeted incentives
- Prioritize buildings built between 1860 - 2000s
- Prioritize buildings with over 30% vacancy
- Request floorplans from building owners to evaluate buildings' potentials



3. Evaluating Potential

Review CUI's **five building typologies** and **building characteristics** to understand potential of buildings for conversions in chosen buildings.

Heritage



Challenging



Brutalist



Steel Frame

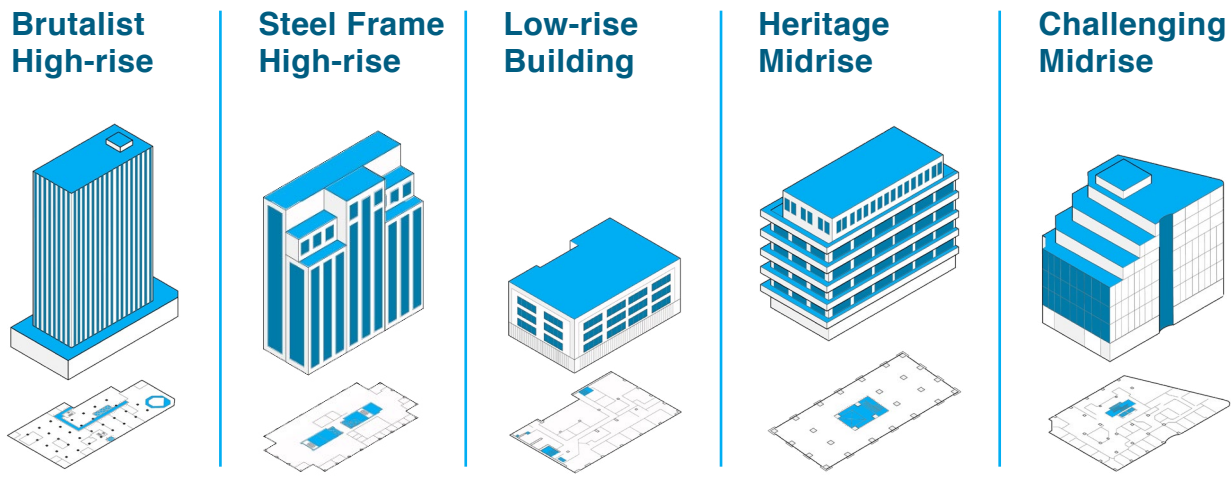


Low-rise



Building Typologies

Once certain buildings are identified, this section provides the technical analysis of characteristics to consider when assessing a building. Five Building Typologies were developed to help illustrate general case studies by categorizing the buildings by height, age, and material. These typologies are organized left to right starting from the highest potential with the least economic risk.

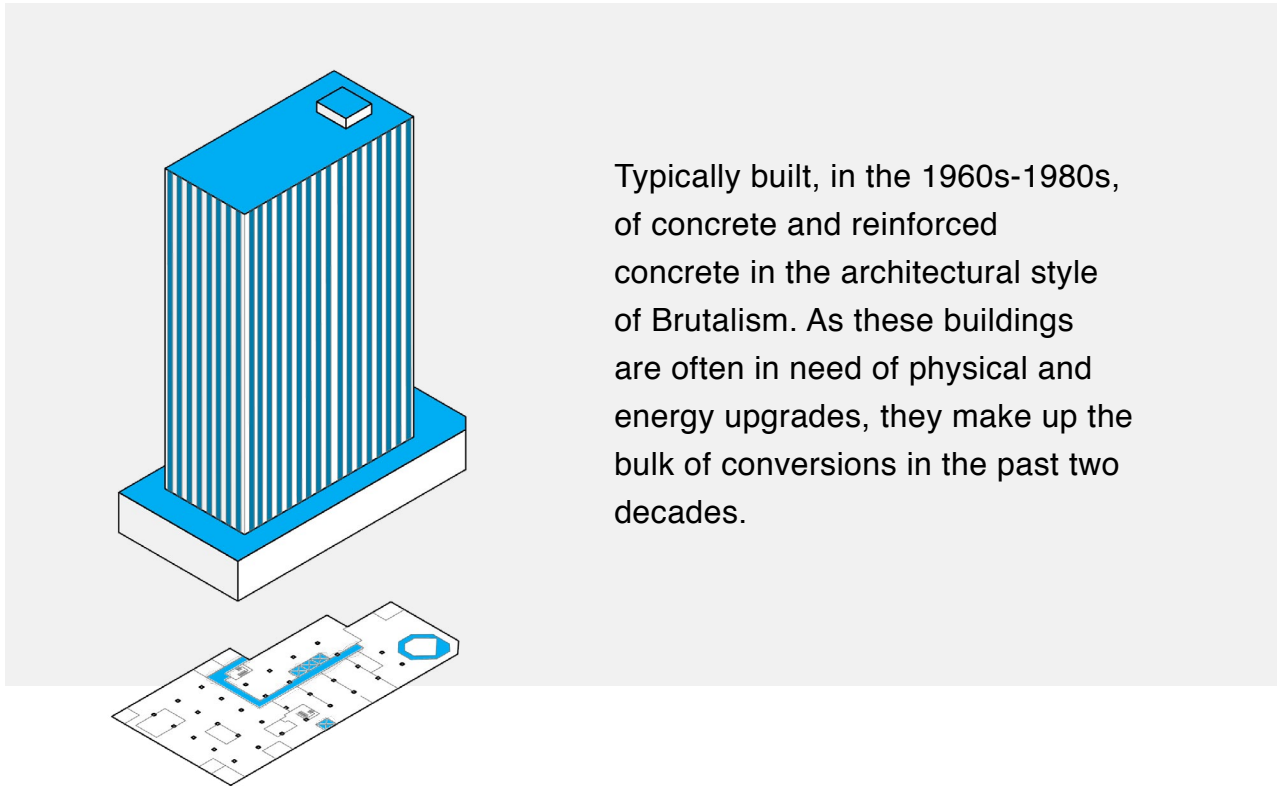


Furthermore, using a modeling technique developed by Gensler Architecture and Design, office buildings were reviewed qualitatively by considering various property characteristics. The following characteristics are classified top to bottom starting from the highest financial impact.

- **Floor Plate**
Window to core distances between 24 to 50 ft, with 40 ft being ideal. One elevator per 100 units.
- **Building Form**
Rectangular floorplates most desirable.
- **Servicing**
Existence of a loading area, parking (requirements vary depending on context), and a centralised mechanical room.
- **Site Context**
Walk and transit scores as well as impact of surrounding properties such as shadowing, view corridors, and direct natural light.
- **Envelope**
Buildings with curtain wall systems are less desirable than those with punched, operable windows

All typologies and characteristics are expanded on in the following pages:

Typologies: Brutalist High-rise



Typically built, in the 1960s-1980s, of concrete and reinforced concrete in the architectural style of Brutalism. As these buildings are often in need of physical and energy upgrades, they make up the bulk of conversions in the past two decades.

Challenges:

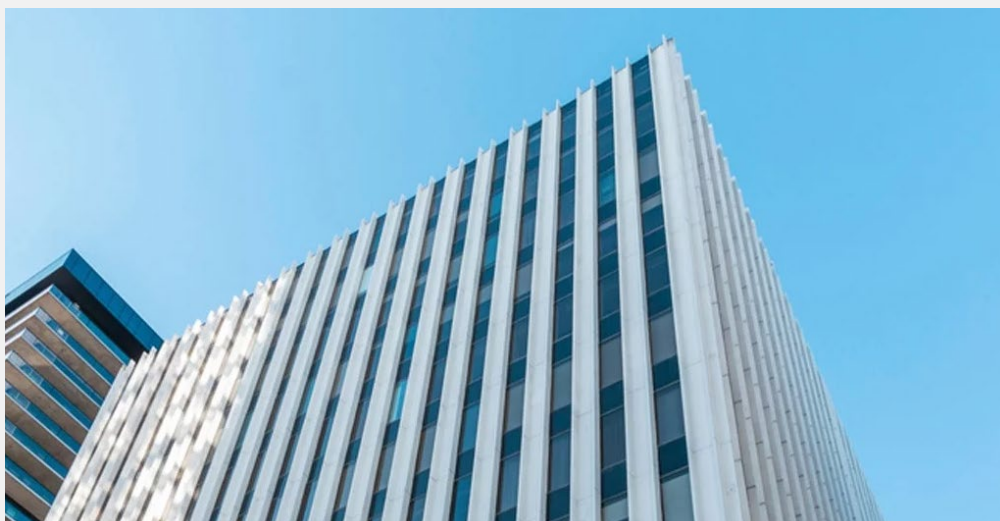
- ✗ These mid-century buildings used the technologies of the time to create austere concrete structures with few operable windows and smaller window-to-wall ratios than earlier heritage buildings.
- ✗ Their internal structural columns obstruct interior layout
- ✗ They tend to be large in floor plate since they did not require natural light for interior spaces.

Advantages:

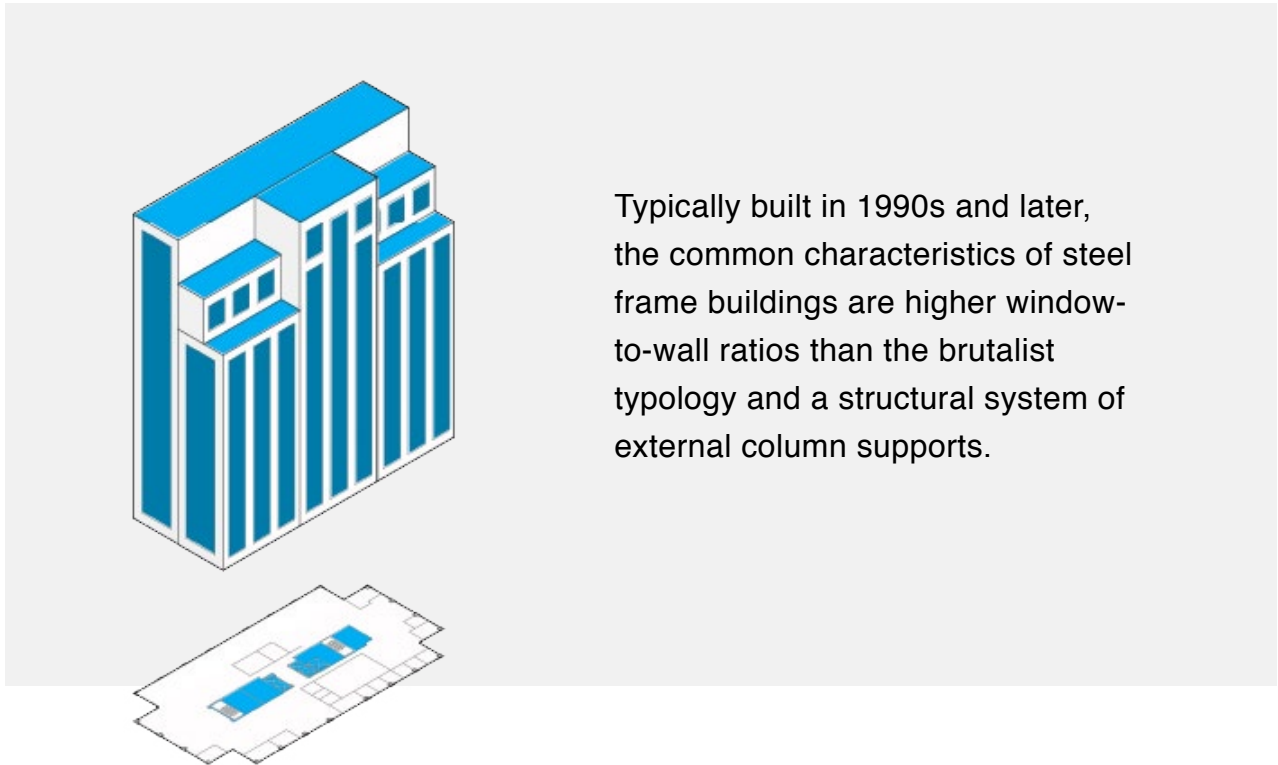
- ✓ Most have a rectangular floorplate, ideal for residential planning
- ✓ The 'podium and tower' format of buildings of this era lend themselves to conversions with natural light on four sides.
- ✓ Necessary physical and energy upgrades provide an opportunity to modernize utilities for better energy performance
- ✓ Reusing concrete material will have a big impact in terms of embodied carbon

Case Study: Centennial Building – 1660 Hollis Street, Halifax, Nova Scotia

The 14-storey Centennial Building at 1660 Hollis Street was built in the 1970s and was one of Halifax’s first high-rise buildings. When acquired by Sidewalk Real Estate Development, the office tower was nearly 40 percent vacant having lost its tenants to newly built Class A office buildings. The mixed-use adaptive reuse project, branded Agency Art Lofts, will introduce 100 new residential units to downtown Halifax, coming in one, two, and three-bedroom configurations with tall ceilings, and will feature 75,000 square feet of retail and maintained office space. Thirty-eight out of the 100 units will be subsidized by the province of Nova Scotia as part of a \$1.9 million deal to rent those units for the first 20 years at 20 percent below the average rate reported by CMHC.



Typologies: Steel Frame High-rise



Typically built in 1990s and later, the common characteristics of steel frame buildings are higher window-to-wall ratios than the brutalist typology and a structural system of external column supports.

Challenges:

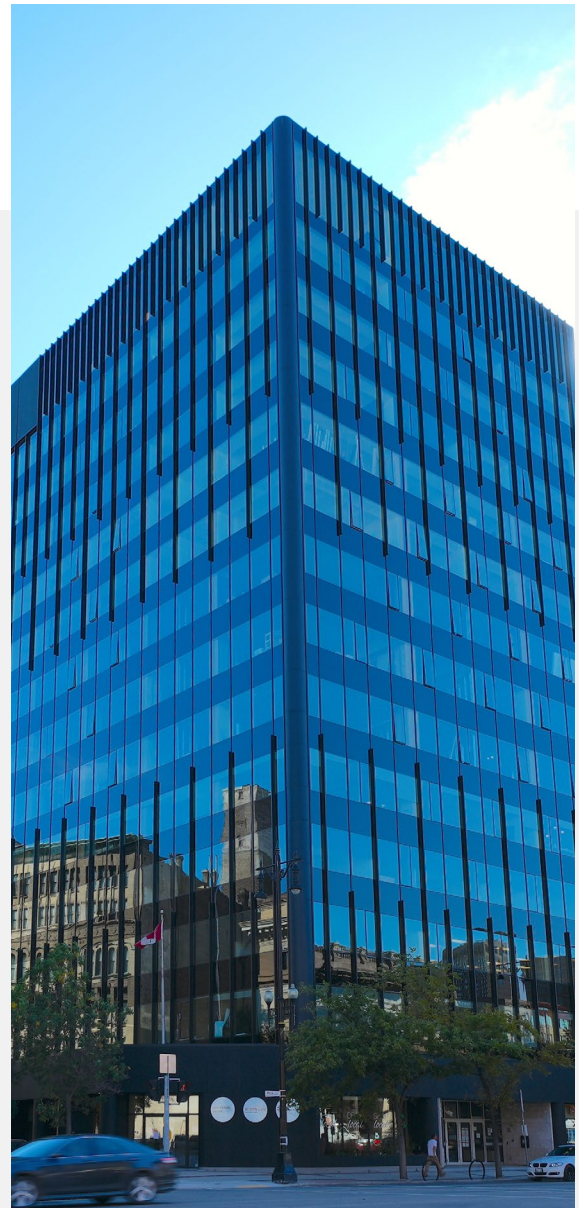
- ✗ Tend to be large in floor plate since they did not require natural light for interior spaces
- ✗ Glazed curtain walls often mean the façade would have to be replaced to install operable windows or build balconies

Advantages:

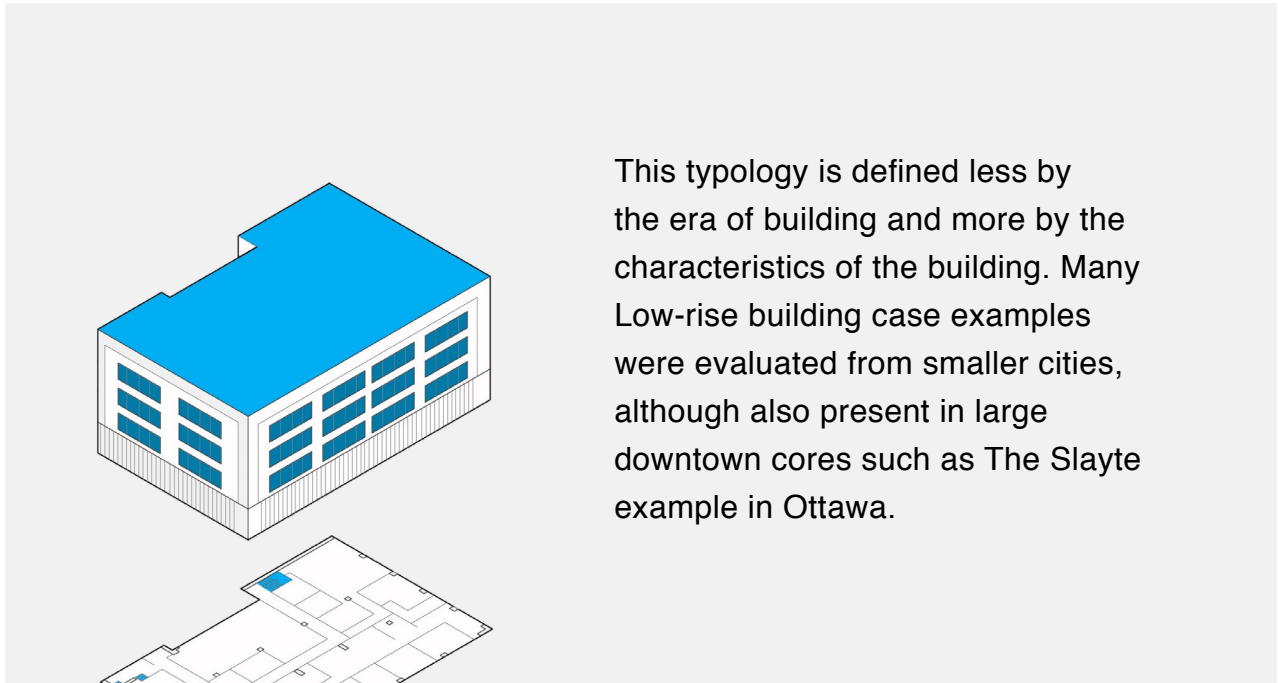
- ✓ These buildings do not have interior columns that interrupt the space, allowing for flexible unit configurations
- ✓ High window-to-wall ratio
- ✓ Tend to be newer buildings so utilities and materials will be of higher quality and easier to bring up to code

Case Study: 433 Main Street, Winnipeg, Manitoba

Located in Winnipeg's Exchange District, a heritage area undergoing significant revitalization, 433 Main Street was converted from a ten-storey office building to mixed-use residential by Alston Properties. The project was completed in 2022. This adaptive reuse features 80 residential units made up of one and two-bedroom units marketed as luxury apartments. The only engineering component substituted out was the mechanical system. The building features three high speed elevators, a fitness center, penthouse lounge, in-suite laundry, and outdoor parking.



Typologies: Low-rise Building



This typology is defined less by the era of building and more by the characteristics of the building. Many Low-rise building case examples were evaluated from smaller cities, although also present in large downtown cores such as The Slayte example in Ottawa.

Challenges:

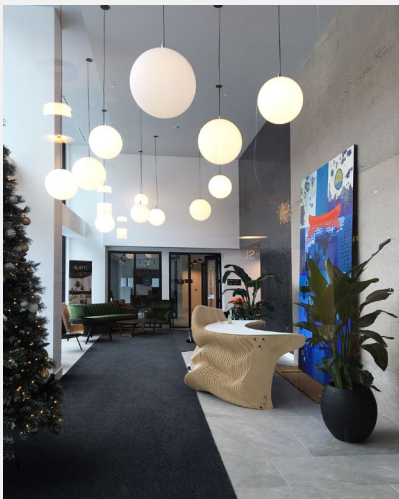
- ✗ Tend to have lower window-to-wall ratios than other typologies
- ✗ Tend to be squat with large floor plates thus requiring more area for circulation (i.e., hallways, elevators, stairs).

Advantages:

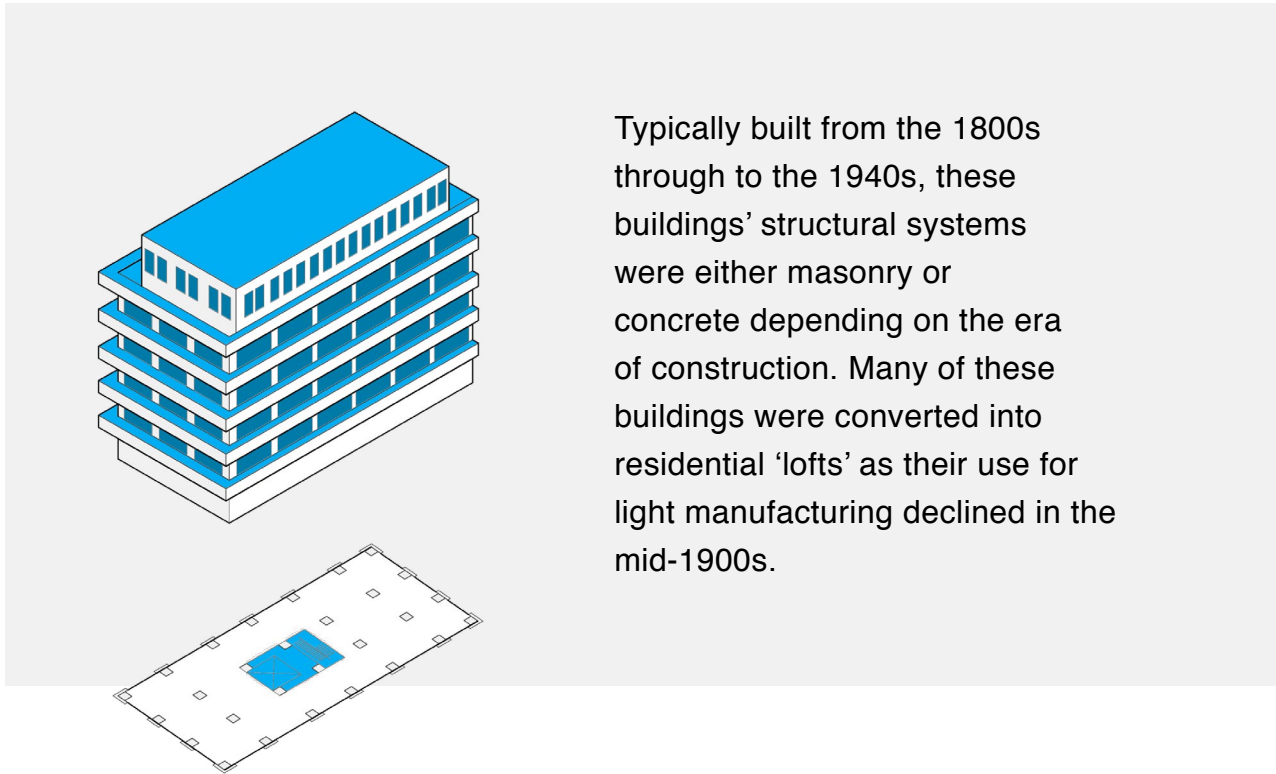
- ✓ When the size of the floor plate is manageable, interior space can be utilized for common amenities
- ✓ Rectangular floor plates are ideal for residential conversion
- ✓ Operable windows are often already in place
- ✓ This typology is prolific in downtowns across Canada so there is a large supply available
- ✓ Reusing concrete material will have a big impact in terms of embodied carbon

Case Study: The Slayte - 473 Albert Street, Ottawa, Ontario

The Slayte, at 473 Albert Street, is an eleven-storey former office building located at the western edge of Ottawa's downtown core. The conversion to residential and commercial mixed-use was carried out by CLV Group Developments, starting in 2019 and completed in 2022. The building features 158 residential units, 6,700 square feet of indoor amenities, and 7,500 square feet of exterior rooftop amenities. The residential unit mix includes studio, one-bedroom plus den, and two-bedroom configurations. The façade was altered slightly to include Juliet balconies to introduce a more residential feel while maintaining the existing structure. High quality amenities include a business centre, gym, and rooftop patio and party lounge.



Typologies: Heritage Mid-rise



Typically built from the 1800s through to the 1940s, these buildings' structural systems were either masonry or concrete depending on the era of construction. Many of these buildings were converted into residential 'lofts' as their use for light manufacturing declined in the mid-1900s.

Challenges:

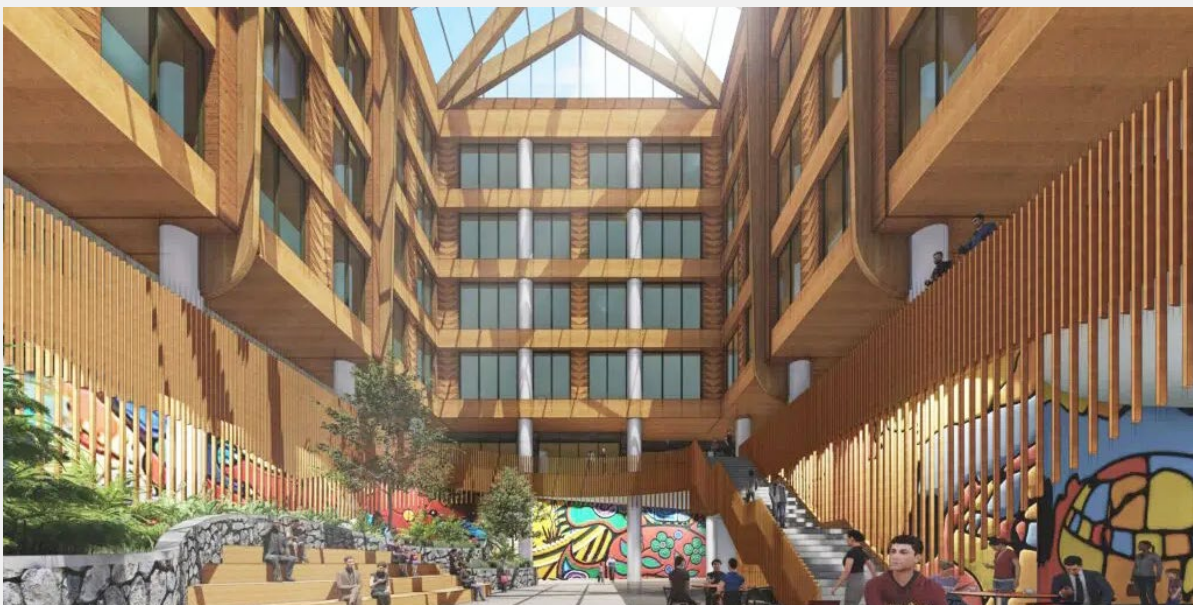
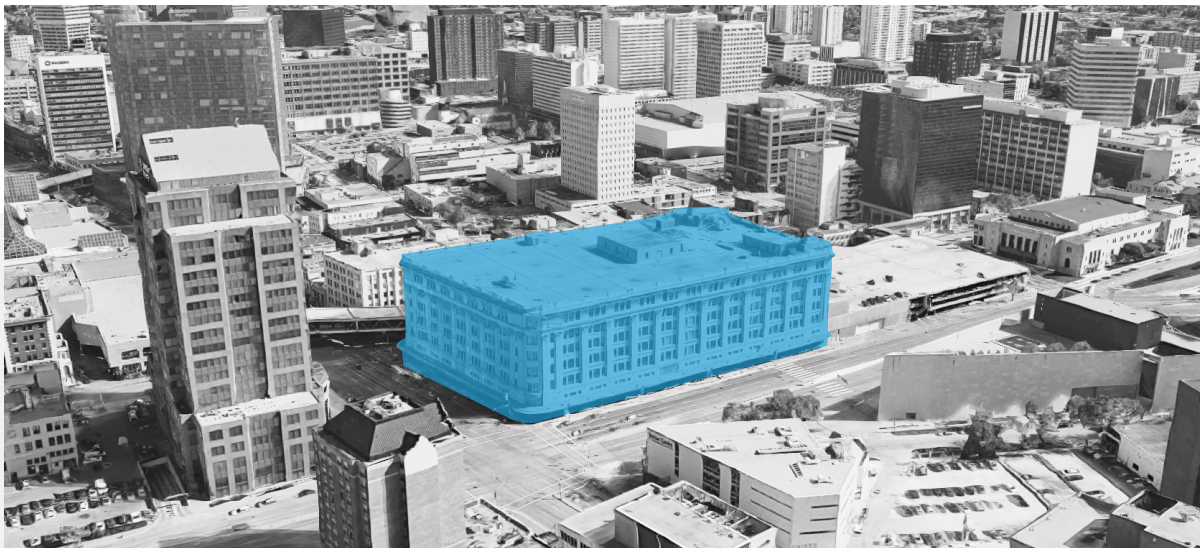
- ✗ Interior columns that provide structure interrupt the design of interior spaces
- ✗ Larger floor plates and challenges of servicing due to differences in Building Code requirements of the time

Advantages:

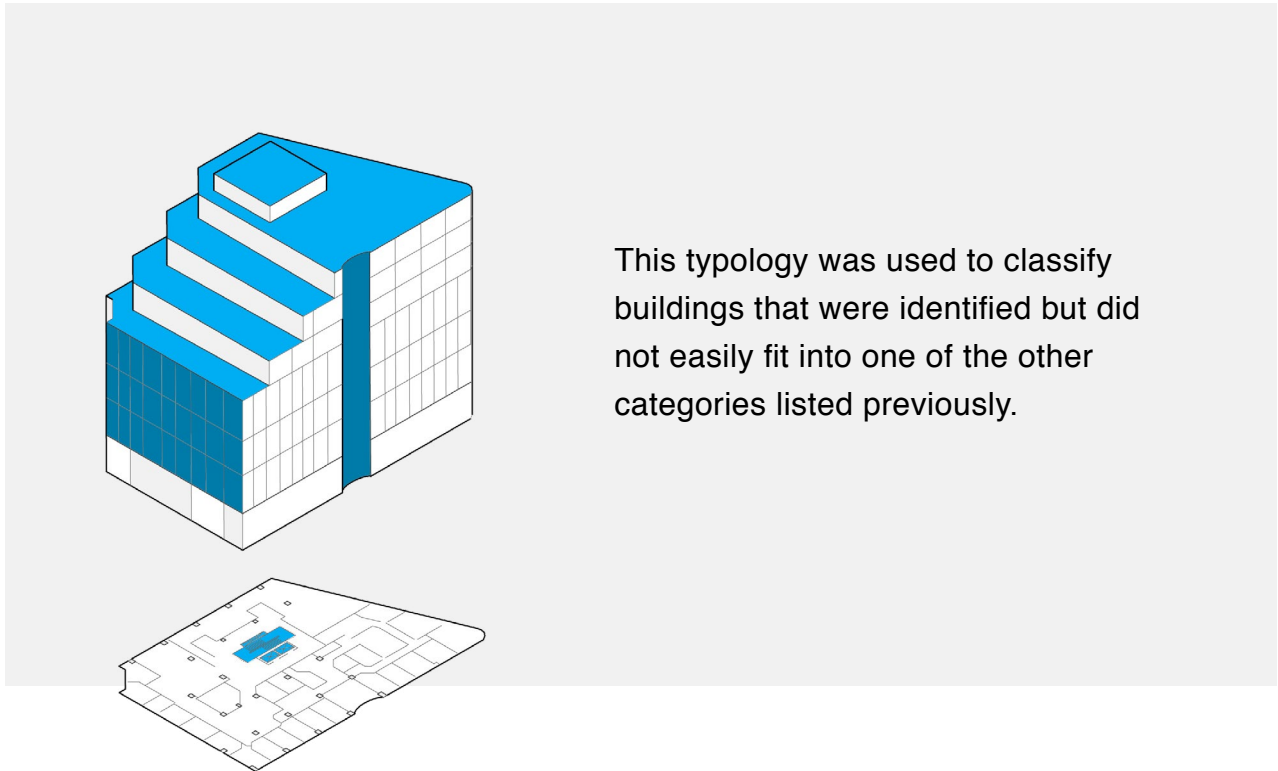
- ✓ Needing to have an abundance of natural light, these buildings typically have high window-to-wall ratios and high ceilings
- ✓ Historic characteristics, and location of heritage buildings lend themselves to housing in core areas of the city
- ✓ With many having heritage designations, demolition is not possible and adaptive reuse must be considered with resources often made available.
- ✓ Heritage buildings have unique architectural qualities that will make them attractive to residents

Case Study: Wehwehneh Bahgahkinahgoohn - 450 Portage Avenue, Winnipeg, Manitoba

The iconic six-storey Hudson's Bay Company (HBC) heritage building in downtown Winnipeg was transferred, in exchange for elk skin and beaver pelts, to the Southern Chiefs' Organization (SCO) in a high-profile act of reconciliation. The First Nations-led, environmentally conscious, adaptive reuse of the former department store is called Wehwehneh Bahgahkinahgoohn, meaning 'it is visible'. Once complete, the century-old limestone building will feature a variety of culturally appropriate commercial, institutional, and residential uses.



Typologies: Challenging Mid-rise



This typology was used to classify buildings that were identified but did not easily fit into one of the other categories listed previously.

Challenges:

- ✗ Irregular floorplates make it harder for residential conversion. Interior column structure, which often follows the irregular shape, leaves odd corners.
- ✗ Glazed curtain walls often mean the façade would have to be replaced to install operable windows or build balconies.

Advantages:

- ✓ Newer construction and services, as well as staggered floor plates offer opportunities to accommodate outdoor amenity space and may lend themselves to conversions on a case-by-case basis.
- ✓ Opportunity for creativity.

Specific Characteristics

Building typologies are meant to provide guidance on overall advantages and challenges to take into account when first considering a building. Nonetheless, each building is unique, and the following characteristics aim to give guidance on the more specific aspects of a single building.

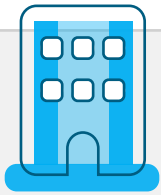
The following characteristics are:



Floor Plate



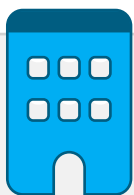
Building Form



Servicing



Site Context



Envelope

Characteristics: Floor Plate

Consider: window-to-core distance; existing number of elevators.

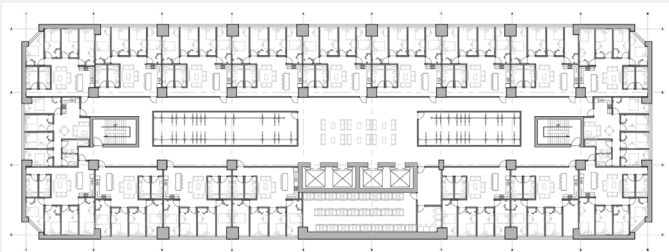
The ideal window to core distance is 40 feet but buildings can be organized within the range of 24-50 feet. Regarding elevators, residential buildings require one elevator per 100 units, which often already exists since offices are subject to higher requirements for elevators.

Illustrated floorplans were developed by students and have not been checked for Building Code compliance.



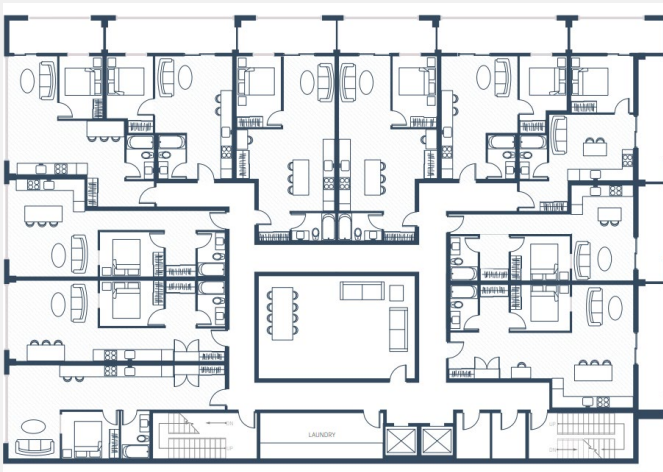
Thinner floor plates allow all units to have better access to natural light.

*Graphic from University of Calgary Students:
Abira Mirza + Teegan Heinrichs
Proposed Floorplans*



Floor plate is bigger than ideal, with common storage and shared utilities placed behind elevator core.

*Graphic from University of Calgary Students:
Amélie Boucher-Duplain + Connor Glass
Proposed Floorplans*



Large floor plates leave “left over space” near the core which can serve as common amenities to be enjoyed by the building’s community.

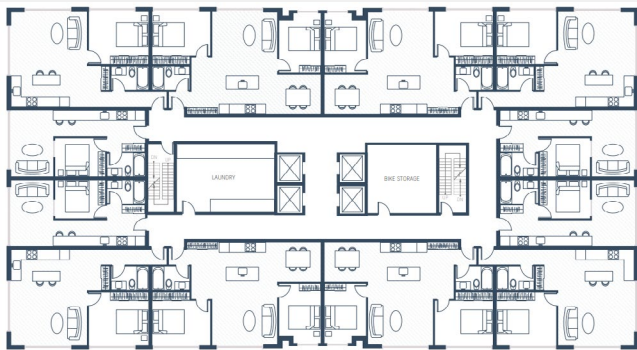
The two elevators shown in the floorplan, with this specific room distribution, could serve up to 18 floors (200 units).

*Graphic from University of Calgary Students:
Louise Barraza + Samara Schneider
Proposed Floorplans*

Characteristics: Building Form

Consider: shape of the building

Rectangular floorplates are preferable to ease the residential configuration across all floors of the building. For this reason, buildings with irregular floorplates will score lowest.



Rectangular floorplates make residential unit planning easier, organizing units around the central service core.

Graphic from University of Calgary Students: Louise Barraza + Samara Schneider Proposed Floorplans



Irregular shapes encourage different unit mixes to accommodate existing geometries. In this case, accommodating units up to three-bedrooms to take advantage of the large window-to-core spaces on the left side of the floorplan.

Graphic from University of Calgary Students: Abira Mirza + Teegan Heinrichs Proposed Floorplans



This floorplan illustrates how an interior set of columns can impact an irregular building floorplate.

Furthermore, in the case of this building, the floorplate changes across floors which makes design more complex, encouraging creative solutions.

Graphic from University of Calgary Students: Abira Mirza + Teegan Heinrichs Proposed Floorplans

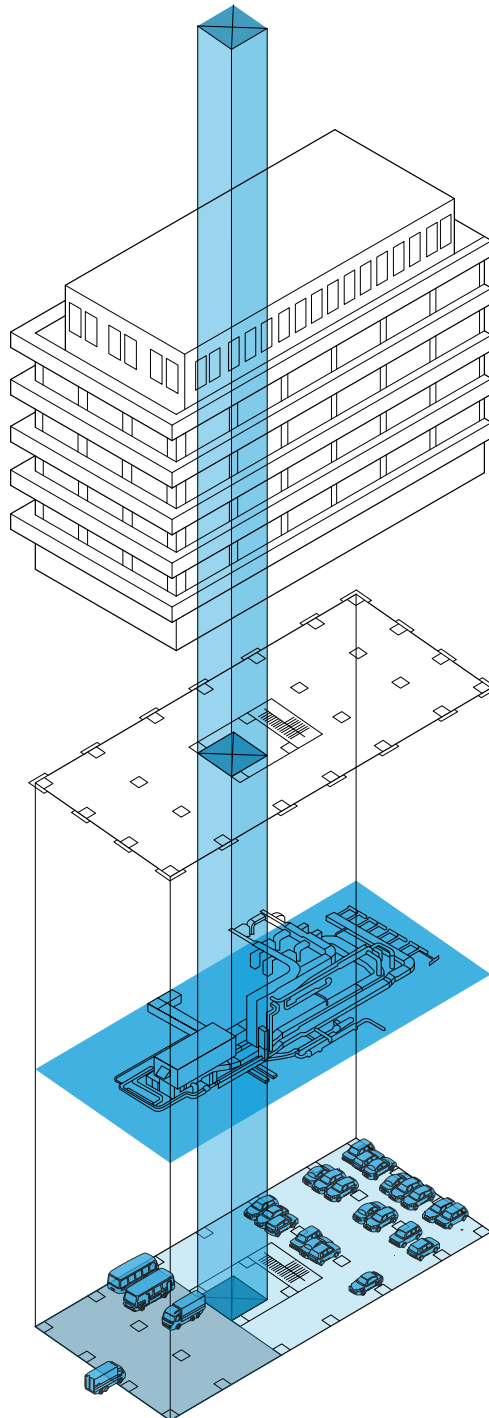
Characteristics: Servicing

Consider: loading; parking; structure; MEP (Mechanical, Electrical and Plumbing)

The potential for conversions is aided by having a loading area, adequate parking, and a central mechanical room. Ensuring a building has good quality servicing equipment will greatly reduce the economic impact of a conversion since the infrastructure will also serve the residential use.

Although downtown buildings tend to score low due to their lack of parking, we must note that some cities such as Halifax are changing their parking minimums for downtown properties. Furthermore, offsite parking or visitor parking are also options

A loading dock provides the opportunity for large vehicles to deliver goods or take out trash. Loading docks tend to already exist in most commercial buildings and make the process of construction easier.



The mechanical room of a building will be proportional to the building size. Larger high-rises will need multiple rooms (about 1 every 10 floors) to distribute the necessary utilities.

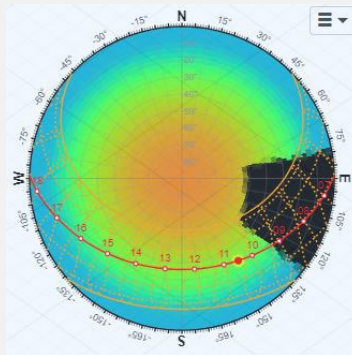
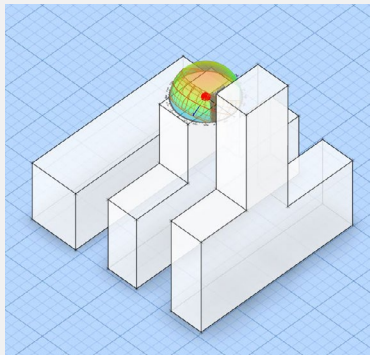
Parking spaces are sometimes required for residents.

Characteristics: Site Context

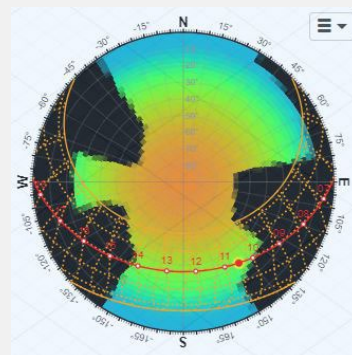
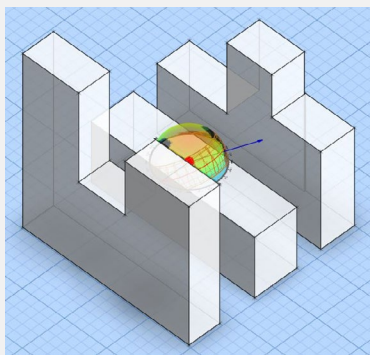
Consider: walkability; transit access; natural light; view obstruction; south facing windows

The Walk Score (<https://www.walkscore.com/>) is used in combination with the relationship with surrounding properties. Amenity access, no overshadowing, clear views, and access to southern light will score highest in this category.

The following graphics were developed using the Andrew Marsh Dynamic Overshadowing App. The two models of buildings illustrate a podium tower and a mid-rise surrounded by taller buildings, each with their accompanying shading mask. A shading mask is a map of which parts of the sky dome are visible from a particular point, and which are obstructed by opaque objects in and around a site.



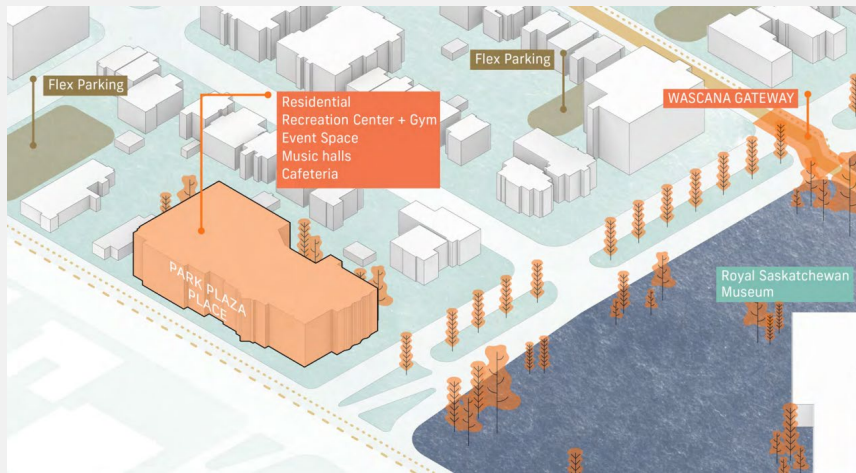
Podium tower example, illustrating an almost unobstructed sky view even with a taller tower standing next to it.



Midrise building surrounded by taller buildings on both sides will be restricted in terms of access to light.

These graphics aim to illustrate the importance of the surrounding context around a building, rather than just the building's height.

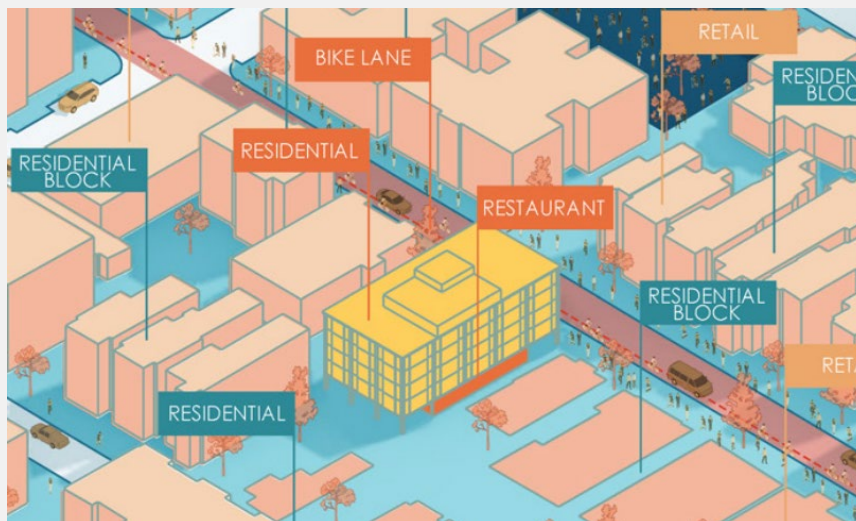
The drawings below were produced by the University of Calgary students to illustrate how they evaluated buildings in relation to their surrounding context.



*Programmatic Analysis Graphic from University of Calgary Students:
Louise Barraza + Samara Schneider*

Low Score

Among the buildings evaluated by Gensler, this example in Regina got a low score due to the lack of access to downtown amenities and public transit. Context aims to draw attention towards the needs of residents living in downtown.



*Programmatic Analysis Graphic from University of Calgary Students:
Amélie Boucher-Duplain + Connor Glass*

High Score

This example in Ottawa earned a high score in the category of Context. As illustrated in the diagrams developed by University of Calgary students, this Ottawa building is surrounded by retail, restaurants, and other residential homes.

Characteristics: Adjacencies Worksheet

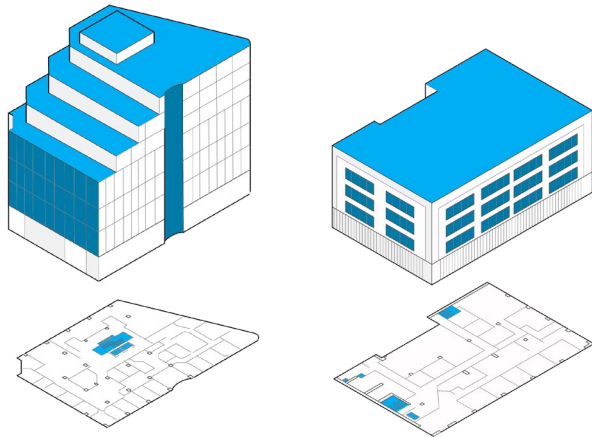
Residential buildings require certain amenities and functions to be located within walking distance for the convenience of residents living within them. The following is non-exhaustive list of assets a municipality should map around a building to assess how its surroundings support residential intensification.

Transportation	Amenities within Walking Distance	Civic and Social Services
<ul style="list-style-type: none">■ Public Transit■ Bike Lanes and Facilities■ Pedestrianized Infrastructure	<ul style="list-style-type: none">■ Grocery Stores■ Entertainment■ Green Spaces■ Communal Spaces■ Parking Space	<ul style="list-style-type: none">■ Libraries■ Elementary, Secondary, and Post-Secondary Education■ Community Centres■ Child Care■ Healthcare■ Social Services

Characteristics: Building Envelope

Consider: existing window-to-wall ratio; ease of window replacement

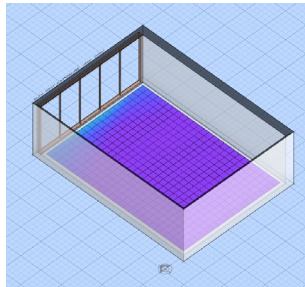
Façade replacement can increase the cost of projects making them no longer viable. Therefore, punched operable windows will score highest with minimum façade replacement being the ideal option.



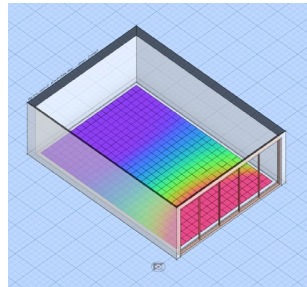
While uninterrupted curtain windows allow lots of light in, meeting building code requirements would likely mean the whole façade would have to be rebuilt in the process of retrofit. When buildings have operable windows in all bedrooms, aspects of the façade can be maintained, making the project more economically feasible.

The drawings below, taken from the Andrew Marsh Daylighting App illustrate the effect different window-to-wall ratios (WWR) can have on a room.

A: North facing windows

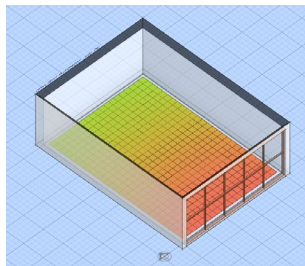


B: South facing windows

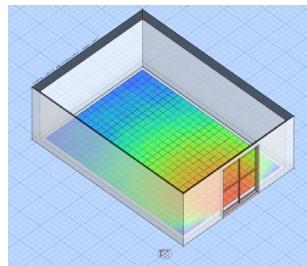


South facing windows are preferred in buildings because they receive the largest amount of sunlight in the winter and least in the summer. This characteristic helps warm the rooms in the winter and cool them in the summer, maximizing the amount of useful yearly sunlight exposure.

C: 90% WWR



D: 30% WWR



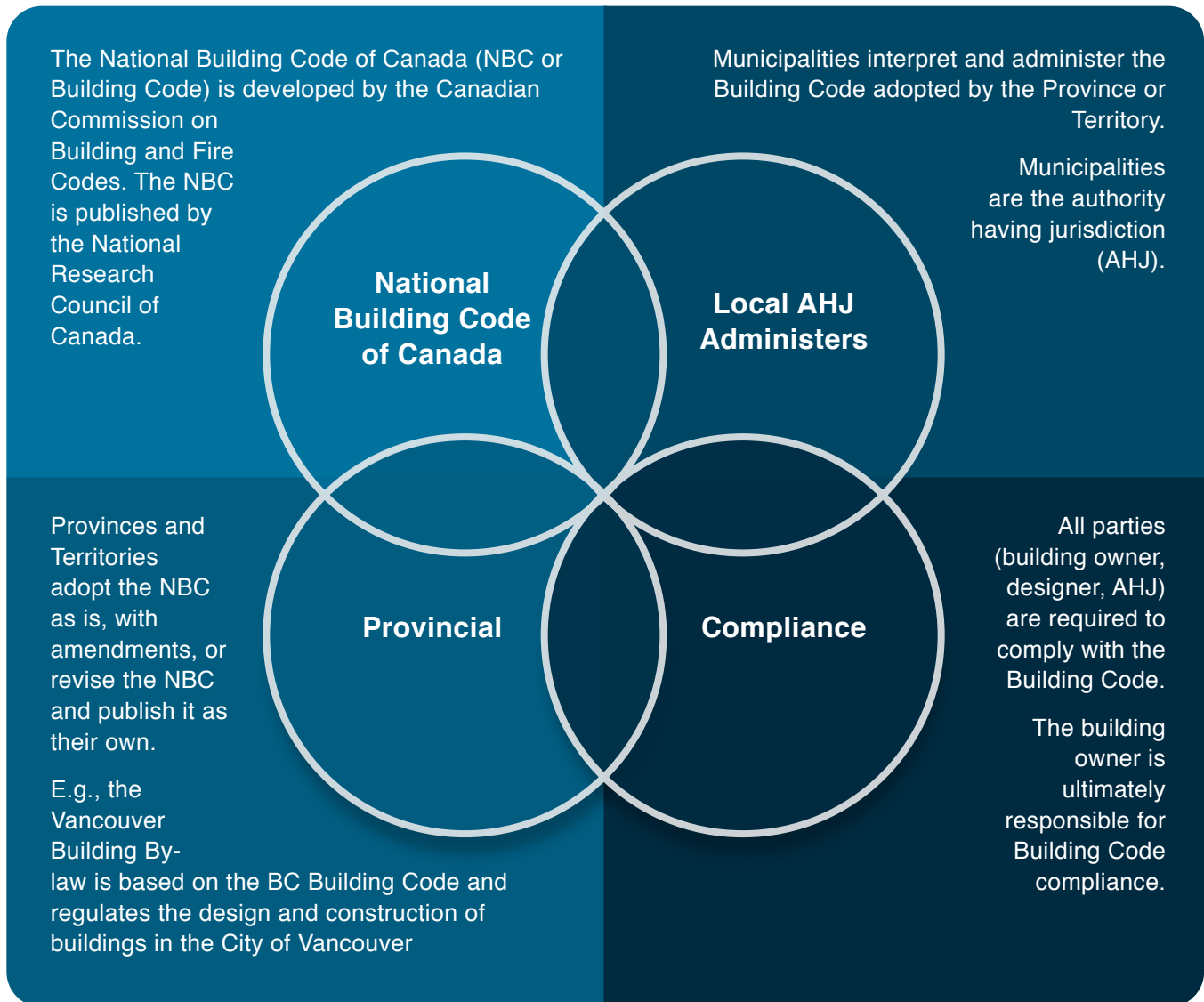
In regard to daily exposure to light, a larger WWR is preferred so the least amount of artificial lighting can be used. Nonetheless, WWR should be considered in combination with the need for operable windows in all legal bedrooms.

Building Code

Process Overview

This Building Code section was developed by Kilo Lima Code under the leadership of Kelsey Longmore. The purpose of the next section is to provide a high-level summary of the potential challenges of conforming to the current edition of the Building Code when considering converting an existing office building to a residential use. A change in major occupancy (in this case from office to residential) requires the application of current requirements.

The following figure illustrates the code enactment and adoption process in Canada.



The Building Code is not written in a linear order and must be read holistically by a specialist to ensure the correct requirements are considered and applied. The building classifications for all uses in the building need to be considered. It is possible that a change in major occupancy from office use will not be permitted through an acceptable solution, however there is typically an opportunity for alternative solutions. The building classification will change when the major occupancy changes from office to residential, and if the building contains other uses (i.e., coffee shop, retail, assisted living, etc.).

Although the NBC does not provide guidance for change in major occupancy and existing buildings, recommendations are available from the Vancouver Building By-law (VBBL), the Ontario Building Code (OBC), and the Quebec Construction Code (QCC). The Canadian Commission on Building and Fire Codes released Final Report - Alterations to Existing Buildings in April 2020. The Joint Task Group (JTG) who developed the report “recommends a concept very comparable to the concepts used in Ontario’s building code (Ontario Building Code Part 11) and Quebec’s building code (Quebec Construction Code Part 10) on existing buildings.” Additionally, “the JTG also reviewed the Bylaw 10908 of the City of Vancouver and the International Code Council codes in more detail.”

The following sections will illustrate an overview of Fire and Safety requirements and Miscellaneous requirements to raise awareness on the scope and complexity of building code considerations.

Fire and Safety Considerations

Residential uses require a higher level of fire protection and life safety than most other uses as occupants may be sleeping or have impaired judgment and are unable to respond to an emergency as if they were awake and alert. Additionally, an office use has one of the most relaxed set of requirements as occupants are typically aware of their surroundings and are able to respond quickly.

Following are some potential upgrades to anticipate.

Façade

Some building materials may not meet current requirements with respect to flammability (e.g: foamed plastics in exteriors)

Exit stairwell fire separations

The exit is one of the most important passive fire protection elements. Residential buildings need two points of egress

Operable windows

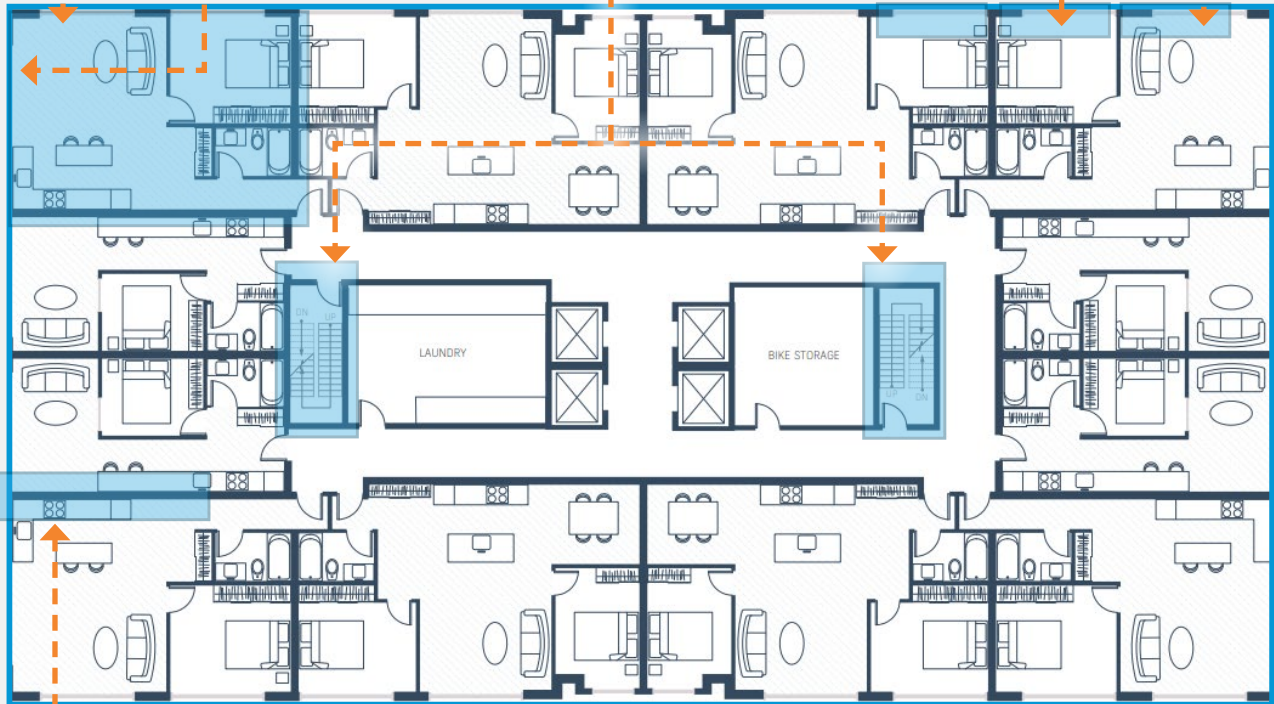
Operable windows are required in all bedrooms

Firestopping

At all floor penetrations, as well as gaps between floor slabs and exterior wall systems

Structural fire protection

may include: floor, roof, and/or load bearing element fire resistance ratings



Sprinklers

Any buildings five-storeys or more will require the installation of a sprinkler system and/or upgrades will be required for the new use and floor plan



Fire alarm system

Redesign is required to include smoke alarms in suites, smoke detection in public corridors, increased audibility, etc.



Smoke & fire dampers

Required throughout the heating, ventilation, and air conditioning (HVAC) systems


Miscellaneous Considerations

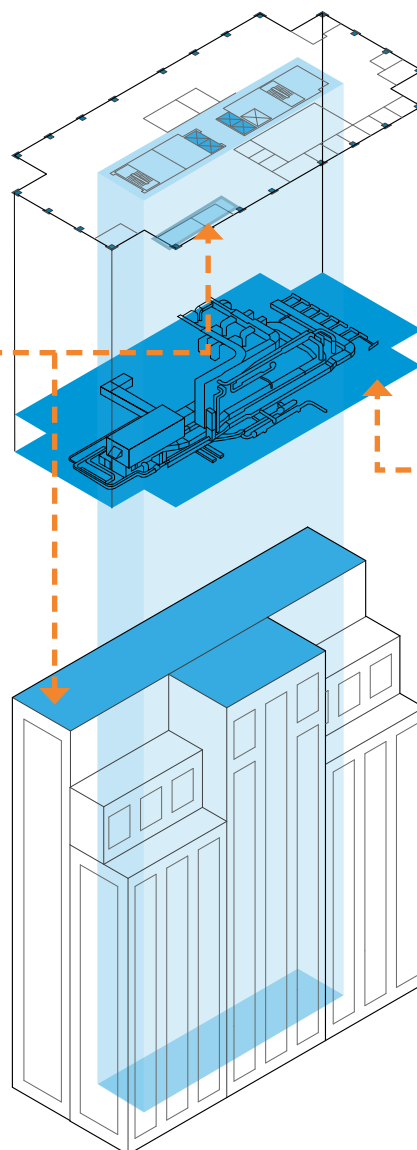
As previously noted, some provisions for residential use are more restrictive than office use. However, others are not. When there is no increase in requirements between the two (residential and office) based on current Building Code, the authority having jurisdiction may allow an existing conforming condition to remain.

Due to many buildings having existing non-conforming conditions, it is recommended that a full building compliance assessment be completed early on, and not solely focusing on additional requirements for residential use. Although there are many potential upgrades, the intent is not to discourage conversion, but to provide awareness to developers and owners so they can ensure they have qualified professionals on their team.

NBC, Division B, Section 3.8:
A change in major occupancy requires all current accessibility requirements to be addressed for all areas other than within suites.


NBC, Division B, Part 5: Environmental Separation
Sound transmission ratings are required between each residential suite and the rest of the building.
Wind, rain and snow loads require assessment.


NFC, Division B
Fire safety plans, including inspection, testing and maintenance.

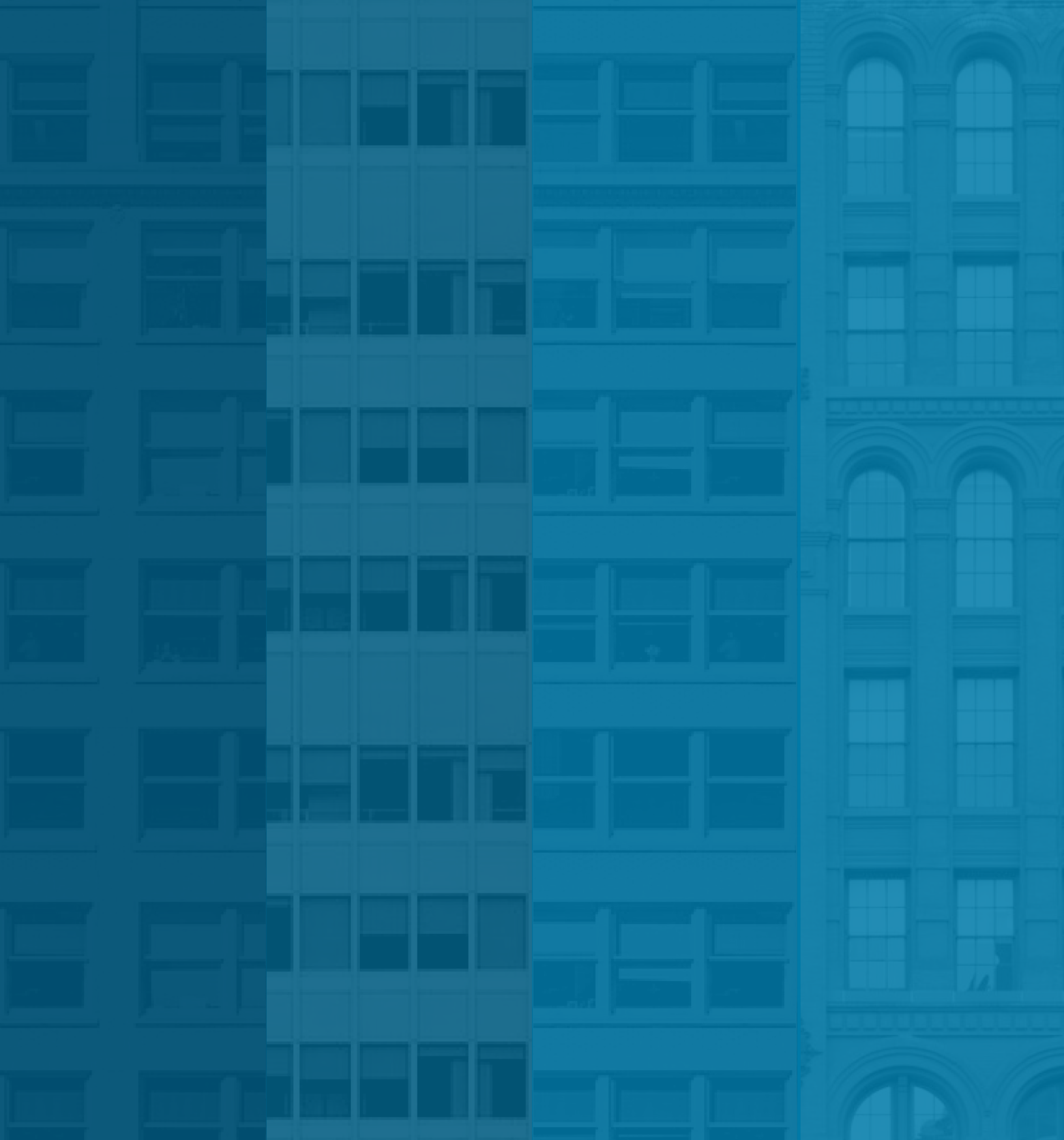


NBC, Division B, Part 4: Structural Design
Structural upgrades may be required due to increase in loading in public corridors, increased seismic requirements, and addition of balconies and stairs within suites.

NBC, Division B, Part 6: Heating, Ventilating and Air Conditioning (HVAC)
Many existing buildings do not meet current Building Code for HVAC requirements. Air quality is extremely important for residential uses and is likely to require upgrades.


NPC - National Plumbing Code
Materials used will need assessment to comply with the current code.

Recommendation	Challenge being addressed
<p>Advocate for clear and concise guidelines/advisories on responsibilities, developed and issued by the federal government.</p>	<p>Confusion and frustration due to unclear responsibilities of various stakeholder groups (owners, design teams, authorities having jurisdiction (AHJs), etc) in applying the Building Code to existing buildings.</p>
<p>Develop a Canada-wide online platform to efficiently find all current and relevant information to support office to residential conversions.</p>	<p>Provincial/territorial/municipal interpretations, best practice guides, and incentive programs are difficult to find.</p>
<p>Develop guidelines for Building Code upgrades to existing and heritage buildings.</p>	<p>Considerable inconsistency in Building Code requirements across Canada for existing and heritage buildings.</p>
<p>Develop quality Building Code education and tools.</p>	<p>Lack of education and tools tailored to various stakeholder groups (owners, design teams, AHJs, etc.) for the Building Code and referenced standards involved in the life cycle of a building (building design, construction, operation, rehabilitation, etc.).</p>
<p>Develop an office to residential conversion toolkit. This toolkit should be tested and evaluated through case studies and updated as needed.</p>	<p>Stakeholder groups may be unclear as to next steps after reading this document.</p>



Gensler



Turner