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**CANADIAN CODES AND EXISTING BUILDINGS**

A supplementary document to:

**THE CASE FOR CONVERSIONS**

Understanding Opportunities for Conversions of Office Space to Housing

Canadian Urban Institute

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**SUMMARY**

This document accompanies research and analysis conducted by Canadian Urban Institute (CUI) to evaluate the opportunity for office to residential conversions in cities across Canada.

Architect Carl Elefant said, “the greenest building is the one already built.” While this is true, the benefits of adaptive reuse and the Building Code do not always align. Although many individuals perceive the Building Code as a roadblock, we see it as a misunderstood book, doing its best to ensure building safety and accessibility.

Awareness is the first step towards meaningful change. This document provides an understanding of the root of the problem, addresses current shortcomings of the Building Code landscape for existing buildings, and provides recommendations for systemic solutions. It is intended for those who wish to take a proactive approach in identifying potential Building Code challenges that may arise, and transforming these challenges into innovative solutions!

We understand this is a complex problem with no one solution, and have provided the following recommendations specific to the CUI study based on our expertise, experience and community engagement. Further detail on the recommendations is provided on pages 23-25 of this document.

‘Building Code’ is used throughout the document as an umbrella term. Where there are variations between the National Building Code of Canada (NBC) and other provincial/territorial/municipal Building Codes, the information in the NBC is used.

<b>Challenge:</b>	<b>Recommendation:</b>
Confusion and frustration due to unclear responsibilities of various stakeholder groups (owners, design teams, <i>authorities having jurisdiction</i> (AHJs), etc) in applying the Building Code to existing buildings.	Clear and concise guidelines/advisories on responsibilities, developed and issued by the federal government.

<b>Challenge:</b>	<b>Recommendation:</b>
Provincial/territorial/municipal interpretations, best practice guides, and incentive programs are difficult to find.	Develop a Canada-wide online platform to efficiently find all current and relevant information to support office to residential conversions.
Considerable inconsistency in Building Code requirements across Canada for existing and heritage buildings.	Develop guidelines for Building Code upgrades to existing and heritage buildings.
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).	Develop quality Building Code education and tools.
Stakeholder groups are unclear as to next steps after reading this document.	Develop an office to residential conversion tool kit. This tool kit should be tested and evaluated through case studies, and updated as needed.

## 1. WHO WE ARE AND WHY WE CARE (PAGE 7)

We are Building Code specialists with backgrounds in environmental engineering, passive house consulting, and integrated design. We are passionate about existing building reuse and preservation of heritage buildings. Having experience on both the design and Building Code enforcement sides of rehabilitation projects, we have not only encountered diverse challenges, but have also initiated innovative and creative solutions to address those challenges.

## 2. PURPOSE AND USE OF THIS DOCUMENT (PAGE 7)

This document provides a high-level summary of the potential challenges of meeting current requirements of the Building Code in existing buildings when converting office space to residential use. It is a starting point for discussion. For those wishing to continue the conversation and gain a better understanding of the Building Code, Kilo Lima Code provides quality education, resources, tools, and an engaged cross-industry community to problem solve with.

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**3. HOUSEKEEPING & IMPORTANT TERMS (PAGE 8), AND  
4. CODE ENACTMENT AND ADOPTION PROCESS (PAGE 10)**

There is currently considerable inconsistency in Building Code requirements across Canada. This is due to several factors:

- The lengthy development process,
- Different editions of the Building Code being used across the country,
- Various provincial/territorial/municipal amendments, and
- Enforcement and interpretation of the Building Code being the responsibility of each individual *authority having jurisdiction* (AHJ).

**5. CHANGES TO EXISTING BUILDINGS (PAGE 12) , AND  
6. BEST PRACTICE APPROACH TO EXISTING BUILDINGS (PAGE 14)**

As the NBC does not provide guidance or a framework for existing buildings, current requirements must be applied to each project. Three provincial/municipal Building Codes currently provide guidance for change in *major occupancy* (essentially changing the use of a building) and alterations to existing and heritage buildings, however the remaining Canadian municipalities (almost 2 000) must separately determine the best approach. Implementing the recommendations proposed in this document will support the success of office to residential conversion projects across Canada. Our recommendations present opportunities to reduce inconsistencies, cost overruns, and frustrations for all parties involved.

**7. COMPLEXITIES OF BUILDING CLASSIFICATIONS (PAGE 15),  
8. FORESEEABLE FIRE PROTECTION & LIFE SAFETY UPGRADES (PAGE 16), AND  
9. FORESEEABLE MISCELLANEOUS UPGRADES (PAGE 18)**

The Building Code is *occupancy* based, meaning that a change in *major occupancy* entails application of the requirements for the new use. All office to *residential* conversions are a change in *major occupancy* and the current Building Code provisions for *residential* use apply, regardless of the age of the building. Because of this, every building is unique and there is no 'one-size-fits-all' in terms of required upgrades.

**10. ALTERNATIVE SOLUTIONS AND INNOVATIVE DESIGN (PG 20)**

The Building Code can be a barrier to innovation, due to the speed of which new products and design approaches are being developed. *Alternative solutions* can address this, however cost can be a barrier dependent on location, as they are project specific and require niche expertise. Despite challenges that may arise in

office to *residential* conversion projects, there often exists various creative approaches to achieve the minimum level of safety required.

### **11. ENCOURAGED CLIMATE ACTION (PAGE 21)**

Globally, the building and construction industry contributes to almost 40 percent of CO<sub>2</sub> emissions produced annually. Per [The Carbon Almanac](#), “The US National Trust for Historic Preservation found that it takes between 10 and 80 years for a new structure built with the latest energy efficiency measures to negate the carbon emissions resulting from its construction. Therefore, improving the efficiency of existing buildings is a key to lowering emissions.”

### **12. WHERE WE ARE HEADED (PAGE 22)**

There are some encouraging initiatives happening at a federal level to harmonize Building Codes across the country.

### **13. WHAT COULD BE (PAGE 23)**

There exists an incredible opportunity to greatly improve efficiency and consistency throughout the Building Code development, adoption, and implementation systems across Canada. Along with our community, Kilo Lima Code is focused on solutions that connect those involved in Building Code and policy development, to those working at the ground level.

The purpose of Kilo Lima Code is to ‘bridge silos and eliminate the chasm between policy and practice’. We understand this is a complex situation with no one solution, and have provided recommendations specific to this initiative based on our experience and community engagement.

Our philosophy is that anything is possible with collaboration and an open mind. We believe that our recommendations can be achieved through a joint effort between those who develop the Building Codes and those who use them on a daily basis. We look forward to being part of moving solutions forward.

### **14. NEXT STEPS (PAGE 26)**

Sustainability and existing building reuse is an area we are actively researching and developing a training strategy to bring quality education to our community around these topics. Information on new courses and resources are primarily shared out through our newsletter ([www.kilolimacode.com/subscribe](http://www.kilolimacode.com/subscribe)).

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## 1. INTRODUCTION - WHO WE ARE & WHY WE CARE

- 1.1. Kilo Lima Code is Canada's only cross-industry grassroots Building Code community. Through educational blogs, resources, and online training provided by niche experts from across the country, we aim to bring clarity to unclear requirements to help users of every level.
- 1.2. As Building Code specialists with backgrounds in environmental engineering, we are passionate about existing building reuse and preservation of heritage buildings. Having experience on both the design and enforcement sides of projects we have encountered diverse challenges, but have also initiated innovative and creative solutions to address those challenges.
- 1.3. Along with a passion for existing buildings, we are committed to integrating new urbanism and human permaculture principles in all that we do.
- 1.4. We are extremely honoured to have been able to contribute our expertise to a project that aligns so closely with our purpose and values.
  - Company purpose: To bridge silos and eliminate the chasm between policy and practice.
  - Company Values:
    - PEOPLE FIRST. We are all people, out here doing our best in our work and our lives. Let's encourage, enable and empower each other. Community over competition.
    - QUICK & CLEAR. Be precise and establish understanding.
    - SHARE & LEARN. Every one one of us has both something to teach, and something to learn. Sprinkle your knowledge around like confetti, and invite others to do the same.
    - OPEN TO POSSIBILITY. Be curious about new ideas, unexpected connections, and endless opportunities.

## 2. PURPOSE & USE OF THIS DOCUMENT

- 2.1. The purpose of this document 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.
- 2.2. The Building Code is *occupancy* based, meaning that a change in *major occupancy* requires application of the current requirements. All office to *residential* conversions are a change in *major occupancy* and

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the current Building Code requirements for *residential* use apply, regardless of the age of the building.

- 2.3. The Building Code is poorly organized, difficult to navigate, and does not have guidance or a framework for its application to existing buildings. As such, applying requirements for new construction to existing buildings is extremely challenging for both design teams and *authorities having jurisdiction* (AHJ). The AHJ includes (but is not limited to):
  - Building permit plan reviewers,
  - Building inspectors (during construction),
  - Fire inspectors (operation and maintenance of a building throughout its life cycle), and
  - Others involved in the building process, which varies depending on location of the project (gas/electrical/plumbing inspectors).
- 2.4. Provincial/territorial/municipal legislation is typically what gives AHJs their authority to enforce the Building Code requirements.
- 2.5. This document is provided for educational purposes only, and is not meant to constitute professional advice. Each building is unique and project-specific advice will be required. See Appendix A for suggested process to assess an existing building.
- 2.6. This document will highlight:
  - Why upgrade requirements are not 'one-size-fits-all',
  - What is available in Canada for best practice and guidance for Building Code compliance in existing buildings,
  - What items typically require upgrading when converting an office building to a *residential* use in terms of fire protection and life safety, and
  - What other aspects of building design and systems should be considered.

### **3. HOUSEKEEPING & IMPORTANT TERMS**

- 3.1. 'Building Code' is used throughout the document as an umbrella term. Where there are variations between the National Building Code of Canada (NBC) and other provincial/territorial/municipal Building Codes, the information in the NBC is used.
- 3.2. This document is based off of the 2020 NBC and references in [square parentheses] are to Division B unless otherwise noted, unless otherwise noted.

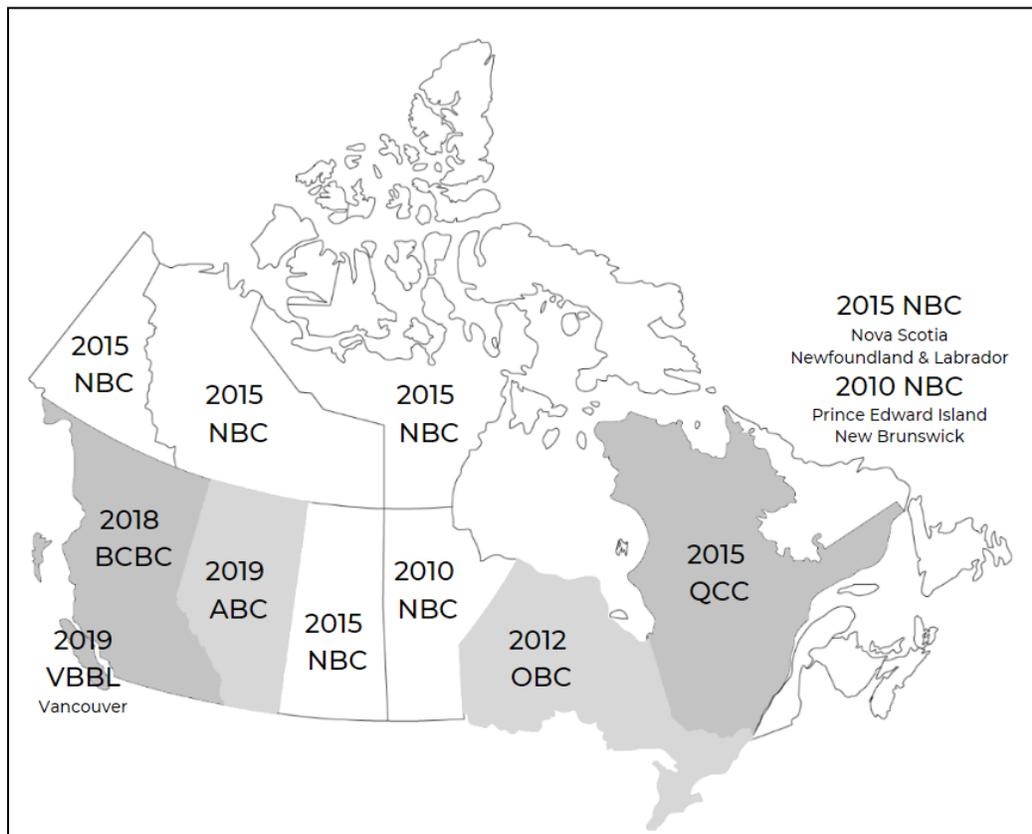
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- 3.3. Any items underlined are hyperlinked to additional information. These are provided as supplementary information only.
- 3.4. Any items *italicized* in this document are defined terms with specific meaning. Unless otherwise noted, the terms carry the definition assigned in the Building Code.
- 3.5. Relevant defined terms are shared in Appendix B, with a select few included within the main document. It is not vital to review all the defined terms in order to use this document.
- 3.6. The following *italicized* terms have been defined for this document, but are not defined in the Building Code:
- **Acceptable solution** is one that meets the prescriptive requirements in the Building Code.
  - **Alternative solution** is a different way to meet the intent of the Building Code, while providing the same level of safety. Developing an *alternative solution* requires specialized knowledge and professional design. More information on *alternative solutions* can be found in [Division A, Section 2.3.].
  - Each **building classification** has different construction requirements (i.e. requirements for sprinklers, *noncombustible construction*, etc), and is a fundamental piece to determining applicable Building Code requirements.
  - An **existing conforming** condition is one that was constructed to the Building Code that was enforceable at the time of construction, but may not be compliant with current Building Code requirements.
  - An **existing non-conforming** condition is one that was not constructed to the Building Code that was enforceable at the time of construction, meaning it was never compliant with Building Code requirements.
- 3.7. The following *italicized* terms have been defined for this document, and are defined in the Building Code:
- **Authority having jurisdiction** means the governmental body responsible for the enforcement of any part of this Code or the official or agency designated by that body to exercise such a function.

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- **Business and personal services occupancy (Group D) (Office use)** means the *occupancy* or use of a *building* or part thereof for the transaction of business or the rendering or receiving of professional or personal services.
  - **Exit** means that part of a *means of egress*, including doorways, that leads from the *floor area* it serves to a separate *building*, an open public thoroughfare, or an exterior open space protected from fire exposure from the *building* and having access to an open public thoroughfare.
  - **Major Occupancy** means the principal *occupancy* for which a *building* or part thereof is used or intended to be used, and shall be deemed to include the subsidiary occupancies that are an integral part of the principal *occupancy*.
  - **Residential occupancy (Group C)** means the *occupancy* or use of a *building* or part thereof by persons for whom sleeping accommodation is provided but who are not harboured for the purpose of receiving *care* or *treatment* and are not involuntarily detained.
  - **Suite** means a single room or series of rooms of complementary use, operated under a single tenancy, and includes *dwelling units*, individual guest rooms in motels, hotels, boarding houses, rooming houses and dormitories as well as individual stores and individual or complementary rooms for *business and personal services occupancies*.

#### 4. CODE ENACTMENT AND ADOPTION PROCESS

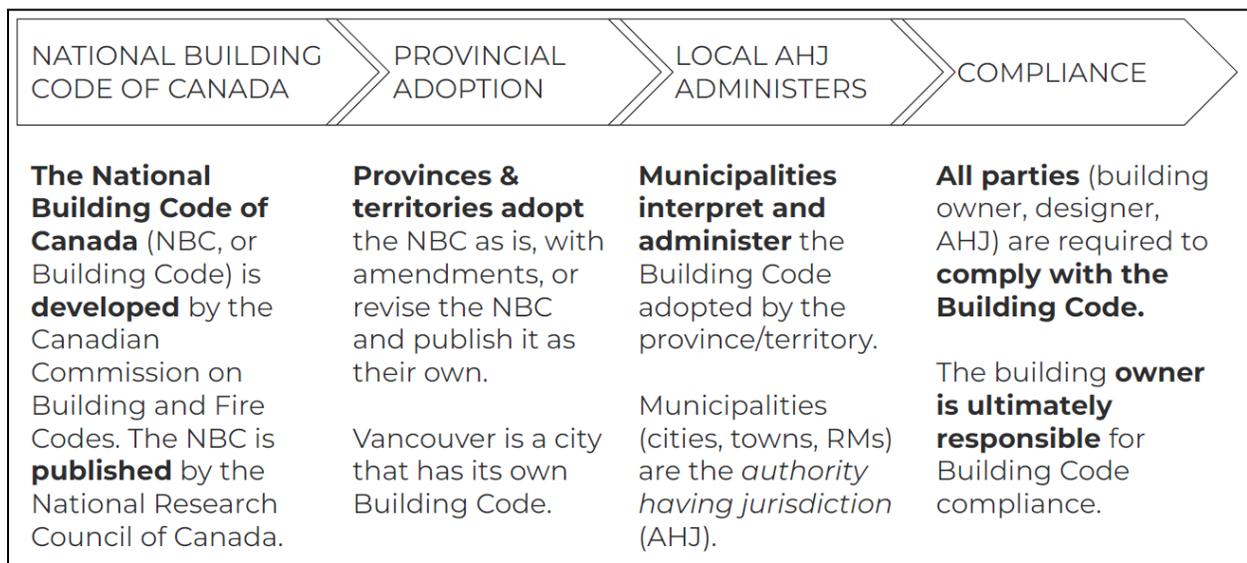
- 4.1. The Canadian Commission on Building and Fire Codes develops five model Codes: National Building Code of Canada (NBC), National Fire Code of Canada (NFC), National Energy Code for Buildings (NECB), National Plumbing Code of Canada (NPC) and National Farm Building Code of Canada (NFBC). These are typically developed on a five year cycle. The National Research Council (NRC) then publishes the model Codes.
- 4.2. The Building Code applies during the construction and alteration of a building, and the Fire Code applies once the building is occupied and operational.

- 4.3. The Building Code becomes law once it is adopted by provinces/territories/municipalities, which is typically a few years after the model Codes are released (ie the 2020 NBC will be adopted by the Province of Saskatchewan January 1, 2024).
- 4.4. The province/territory/municipality may adopt the NBC as is, adopt mostly as is but with some location specific amendments, or develop their own Building Code modeled after the NBC with a large amount of modifications.
- 4.5. The following figure displays which version of the Building Code is used in each province/territory/municipality.



- 4.6. After the province/territory/municipality has adopted a Building Code, it is then up to each AHJ to interpret and administer it.
- 4.7. If there are no guidelines or a framework for how to apply the current Building Code to existing buildings in the project location, it is very important to discuss the project plan early with the AHJ. Most AHJs do not have guidelines or a framework.

- 4.8. It is the responsibility of the design team to assess the building for compliance to the current Building Code, and provide an opinion as to what extent upgrades should be completed (based on professional judgment and best practice). It is then the responsibility of the AHJ to review and provide feedback. A suggested process to assess an existing building is provided in Appendix A.
- 4.9. All parties (owner, designer, contractors, AHJ) are responsible for Building Code compliance; however, the owner is typically the one ultimately responsible under provincial/territorial law.
- 4.10. The following figure summarizes the process.



**5. CHANGES TO EXISTING BUILDINGS**

5.1. The Building has the following commentary [Division A, Notes to Part 1 Compliance]:

“A-1.1.1.1.(1) Application to Existing Buildings. This Code is most often applied to existing or relocated buildings when an owner wishes to rehabilitate a building, change its use, build an addition, or when an enforcement authority decrees that a building or class of buildings be altered for reasons of public safety. It is not intended that the NBC be used to enforce the retrospective application of new requirements to existing buildings or existing portions of relocated buildings, unless specifically required by local regulations or bylaws. For example,

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although the NFC could be interpreted to require the installation of fire alarm, standpipe and hose, and automatic sprinkler systems in an existing building for which there were no requirements at the time of construction, it is the intent of the CCBFC that the NFC not be applied in this manner to these buildings unless the authority having jurisdiction has determined that there is an inherent threat to occupant safety and has issued an order to eliminate the unsafe condition, or where substantial changes or additions are being made to an existing building or the occupancy has been changed.”

- 5.2. To summarize the previous excerpt, the Building Code is not applied retroactively; however, any changes or alterations to a building are required to be completed in accordance with current requirements.
- 5.3. As noted in 2.2. of this document, the Building Code is *occupancy* based, meaning that a change in *major occupancy* requires application of the current requirements. All office to *residential* conversions are a change in *major occupancy* and the current Building Code requirements for *residential* use apply, regardless of the age of the building.
  - For example: if a building was constructed as an office building under the 1995 NBC and a *residential* conversion project is happening when the 2020 NBC is in force, the design team is required to compare existing construction to the 2020 NBC requirements for *residential*.
- 5.4. There are many different factors included in design that are not observable, and what is permitted in one building may not be permitted in another. Additionally, *alternative solutions* may have been used in the design which may alter the prescriptive requirements.
- 5.5. 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. If the building was not constructed to the Building Code applicable at that time, it is likely that the *existing non-conforming* condition will be required to be upgraded.

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- 5.6. The majority of AHJs acknowledge that bringing all elements of a building up to current Building Code is near impossible. Agreeing on what is acceptable is typically an iterative process between the design team and the AHJ.
- 5.7. The Building Code does not provide guidance for existing buildings, leaving almost 2 000 Canadian municipalities to separately determine the best approach. This current process creates inefficiencies, confusion, frustration, delays, and higher costs for all parties involved.

## 6. BEST PRACTICE APPROACH TO EXISTING BUILDINGS

- 6.1. Although the NBC does not provide guidance for change in *major occupancy* and existing buildings, the Vancouver Building Bylaw (VBBL), the Ontario Building Code (OBC), and the Quebec Construction Code (QCC) do.
- VBBL 2019, Division B, Part 11 - Existing Buildings.
  - VBBL 2019, Division B, Section 11.5. Alternative Compliance Measures for Heritage Buildings.
  - OBC Part 10 - Change of Use.
  - OBC Part 11 - Renovation.
  - QCC, Chapter 1 - Building, and National Building Code of Canada 2015 (amended), Division II, Volume 2, Division B, Part 10 - Existing Buildings under Alteration, Maintenance or Repair.
- 6.2. As the NBC does align with the VBBL and OBC to an extent, *alternative solutions* based on the framework in those documents may be accepted depending on the AHJ. The requirements of an *alternative solution* are provided in the NBC [Division A, Section 2.3.].
- 6.3. 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. The JTG also reviewed the Bylaw 10908 of the City of Vancouver and the International Code Council codes in more detail.”

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- 6.4. The report noted in 6.3. is published by the National Resource Council and the concepts can be considered as a best practice starting point for an AHJ to build upon. There are also a variety of guidance documents that are available, provided in Appendix D.

## **7. COMPLEXITIES OF BUILDING CLASSIFICATIONS**

- 7.1. 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.
- 7.2. Determining the *building classification* is a fundamental step to ensure the major construction requirements (construction type, sprinklering requirements, and structural fire protection) are considered at project onset. When this step is overlooked, or the *building classification* is incorrectly determined, there are often considerable impacts to a project's scope and cost.
- 7.3. The *building classification* is based on a number of factors. These include the *major occupancy* of the building (how the spaces are used, the *building area*, *building height*, the presence of sprinklers, and the type of construction (*combustible construction* or *noncombustible construction*).
- 7.4. The *building classification* determines what is required for *fire separations* and *fire-resistance ratings* for the floor/ceiling, roof, and supporting structural elements.
- 7.5. 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).
- 7.6. 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*.
- 7.7. Various handouts are provided in Appendix C to further demonstrate the complexities of *building classification* and identify common pitfalls.

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## 8. FORESEEABLE FIRE PROTECTION AND LIFE SAFETY UPGRADES

- 8.1. As noted in 2.2. of this document, the Building Code is *occupancy* based, meaning that a change in *major occupancy* requires application of the current requirements. All office to *residential* conversions are a change in *major occupancy* and the current Building Code requirements for *residential* use apply, regardless of the age of the building.
- 8.2. *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 not able to respond to an emergency as if they were awake and alert. Additionally, an office use is one of the most relaxed occupancies, as occupants are typically aware of their surroundings and able to respond quickly to an emergency.
- 8.3. Following are some potential upgrades to anticipate when changing from an office use to a *residential* use:
  - **Structural fire protection:** Structural fire protection required by the new *building classification(s)* which may include: floor, roof, and/or load bearing element *fire resistance ratings*.
  - **Firestopping:** *Firestopping* at all floor penetrations (plumbing, water, electrical, etc.) as well as gaps between floor slabs and exterior wall systems (common with curtain walls) will likely require upgrading even if the floor *fire separation* requirements do not change. This is because *firestopping* has not been a well understood Building Code requirement and is often not properly done and overlooked. In addition, the Building Code requirements have continued to evolve over the years.
  - **Sprinklering:** The Building Code does allow some *residential occupancy* buildings to not be sprinklered. Any buildings five *storeys* or more will require the installation of a sprinkler system or upgrades will be required for the new use and floor plan (design densities, residential-type sprinkler heads, updated sprinkler standards, etc). Even if the Building Code does not require it, there is more flexibility in design if the building is sprinklered; benefits to sprinklering a building are discussed in Appendix C: Handout 3 - Sprinkler Relaxations.

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- **Fire alarm system:** A fire alarm system is almost always required for *residential* uses, even if the building is not sprinklered. If existing, a redesign will be required to conform to the new floor plan and new use (*smoke alarms in suites*, smoke detection in *public corridors*, increased audibility, etc.). Some existing fire alarm control panels may not be capable of incorporating new circuits for updating systems. Depending on the AHJ, upgrading to current codes and standards may be required. Even if the AHJ does not require it, we recommend correcting outdated systems as statistically *residential* fires have higher rates of fatalities.
  - **Exit stairwell fire separations:** *Exit stairwell fire separations* will require upgrading. A common problem is that *exit* stairwells are often left 'out of scope' during renovations, leading to compound issues over the years. The *exit* is one of the most important passive fire protection elements in a building, and is fundamental in the event of an emergency. It is an occupants' life-line out of a building, as well as safe access into the building for emergency responders.
  - **Smoke & fire dampers:** Addition of smoke and *fire dampers* throughout the heating, ventilation and air conditioning (HVAC) systems will be required to reflect the updated floor plan and *residential* use. Smoke dampers were introduced in the 2015 NBC, and are required in more locations in *residential* uses than office uses [Article 3.1.8.7].
  - **Openable windows:** Openable windows are required in all bedrooms in a building that is not sprinklered, and all openable windows (even if not required) must meet safety requirements specific to *residential* use.
  - **Facades:** Some building materials may not meet current requirements with respect to flammability, such as foamed plastics in exterior wall assemblies.
  - **High buildings:** The threshold for when high building provisions are required are lower for *residential* uses.
  - **Standpipe:** If the building is not sprinklered, it is possible a *residential* use will require one even if an office use did not.

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- 8.4. For *existing non-conforming* conditions, additional upgrades may be required as construction may never have adhered to the Building Code.
  - 8.5. If the *building classification* requires *noncombustible construction*, this applies to additional elements than just the structure (concrete and steel). This is often overlooked; requirements are found in [Subsection 3.1.5].
  - 8.6. 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.

## 9. FORESEEABLE MISCELLANEOUS UPGRADES

- 9.1. As previously noted in 3.6., the following *italicized* terms have been defined for this document, but are not defined in the Building Code:
  - *Acceptable solution* is one that meets the prescriptive requirements in the Building Code.
  - *Alternative solution* is a different way to meet the intent of the Building Code, while providing the same level of safety. Developing an *alternative solution* requires specialized knowledge and professional design. More information on *alternative solutions* can be found in [Division A, Section 2.3.].
- 9.2. As previously noted in 5.5., 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. If the building was not constructed to the Building Code applicable at that time, it is likely that the *existing non-conforming* condition will be required to be upgraded.
- 9.3. *Existing non-conforming* conditions are quite common across Canada, even if buildings were approved for construction and provided an occupancy permit through the AHJ. There are a number of factors for why this is the case - primarily, a historical lack of education for understanding the Building Codes, and under-resourced AHJs leading to challenges with enforcement.
- 9.4. 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.

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- 9.5. This document is focused on the fire protection and life safety requirements in the Building Code [Division B, Part 3]. There are many other items that may require upgrading, some of which follow. This is not an inclusive list, and every building and project is unique. It is strongly recommended to engage a building code specialist early on in the process to flag potential challenges (see Appendix A for a suggested process to assess a building).
- 9.6. **NFC, Division B**
- Fire safety plans: Fire safety plans are required for all *residential* buildings that provide sleeping for more than 10 people [NFC, Division B, Section 2.8.].
  - Inspection, testing and maintenance: All fire protection and life safety systems are required to be inspected, tested and maintained [NFC, Division B, Part 6]. [Division B, Part 7] of the NFC identifies the inspection, testing and maintenance requirements for fire emergency systems in high buildings.
  - Integrated systems testing: The Building Code [Sentence 3.2.9.1.(1)] and Fire Code [Division B, Sentence 6.8.1.1.(1)] require systems that are interconnected to undergo initial testing and ongoing testing to ensure that the interconnections function. Although integrated systems testing has been required for several years, unfortunately there is not yet widespread enforcement or application.
- 9.7. **NBC, Division B, Section 3.8. - Accessibility**
- A change in *major occupancy* requires all current accessibility requirements to be addressed for all areas other than within *suites*.
  - Provincial/territory/municipal amendments typically require a certain number of *suites* to be accessible in addition to the public areas of the building.
  - The VBBL requires all *dwelling units* to be adaptable [Division B, Subsection 3.8.5. Adaptable Dwelling Units]. Adaptable design proactively incorporates elements that allow for ease of renovations to a *dwelling unit* to become more accessible. We recommend these requirements are used as best practice everywhere to allow for aging-in-place and more intergenerational communities.

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- 9.8. **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*.
  - 9.9. **NBC, Division B, Part 5 - Environmental Separation**
    - Wind, rain and snow loads require assessment.
    - Sound transmission ratings are required between each residential *suite* and the rest of the building.
  - 9.10. **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.
  - 9.11. **NPC - National Plumbing Code**
    - Materials used will need assessment to the current Code.

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.

## 10. ALTERNATIVE SOLUTIONS AND INNOVATIVE DESIGN

- 10.1. There are two paths to compliance to the Building Code; through compliance with *acceptable solutions*, or using “*alternative solutions* that will achieve at least the minimum level of performance...” [Division A, Subsection 1.2.1].
- 10.2. *Alternative solutions* replaced what was previously known as ‘equivalencies’ in the Building Code, and are a commonly misunderstood concept. There is great variation across the country to whether *alternative solutions* are utilized and meet requirements in [Division C, Section 2.3].
- 10.3. Although there are common *alternative solutions* used (i.e. water curtains, travel distance analysis, etc), an *alternative solution* is project and building specific and never precedent setting.

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- 10.4. The complete requirements for *alternative solutions* are provided in the Building Code [Division C, Section 2.3.], some of which follow. An *alternative solution* must:
- Have a professional with appropriate experience and education related to the *alternative solution* taking responsibility for the design,
  - Include “analytical methods and rationales used to determine that a proposed *alternative solution* will achieve at least the level of performance” of the *acceptable solutions* [Division C, Clause 2.3.1.1.(2)(a)], and
  - Include “information concerning any special maintenance or operational requirements, including any building component commissioning requirements” [Division C, Clause 2.3.1.1.(2)(b)].
- 10.5. If an *alternative solution* is used in a building’s design, it is important for an owner to know that it is then a part of the building for life. Any renovations and alterations going forward require an additional level of analysis and professional input to assess the proposed work against the *alternative solution*. Unfortunately, this is not typically communicated clearly to building owners at the design stage.
- 10.6. Due to the speed at which new products and design approaches are being developed, and the lengthy process of Building Code development, there can be barriers to innovation. *Alternative solutions* are a means to allow for innovation; however, because they are project specific, cost can be a barrier.

## 11. ENCOURAGED CLIMATE ACTION

- 11.1. Globally, the building and construction industry contributes to almost 40 percent of CO<sub>2</sub> emissions produced annually.
- 11.2. Per The Carbon Almanac, “The US National Trust for Historic Preservation found that it takes between 10 and 80 years for a new structure built with the latest energy efficiency measures to negate the carbon emissions resulting from its construction. Therefore, improving the efficiency of existing buildings is a key to lowering emissions.”
- 11.3. While the number of energy-certifying organizations and programs continues to increase, the certification of existing structures is a very small portion of the market. Of these, the most mature and comprehensive is EnerPHit Certification through Passive House Institute.

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- 11.4. Per Passive House Canada, EnerPHit is a standard for “refurbishment of existing buildings using Passive House components or the energy demand method via climate zone. Through the use of Passive House components, EnerPHit certified buildings offer nearly all the advantages of a Passive House building to the residents – while at the same time offering optimum cost-effectiveness.”

## **12. WHERE WE ARE HEADED**

- 12.1. Per the Government of Canada website:  
“As part of the Canadian Free Trade Agreement's Regulatory Reconciliation and Cooperation Table, the Government of Canada announced a new governance model for the National Model Code development system effective November 22, 2022. It replaces the Canadian Commission on Building and Fire Codes (CCBFC), the committee responsible for code development in Canada since 1991. The new model integrates the provinces and territories into the national process to better respond to code priorities from jurisdictions and harmonize construction codes across Canada.”
- 12.2. To summarize the previous excerpt, there is work happening at a national level to harmonize provincial/territorial/municipal Building Codes to provide for consistency across the country.

## **13. WHAT COULD BE**

- 13.1. Our team has drafted recommendations based on our diverse experience. We have been the boots on the ground administering the Building Code, sat on various advisory boards and expert panels, instructed post-secondary architectural technology courses, led fire inspections and observed the devastating effects when fire protection requirements are overlooked, and contributed to the development of the Building Code at the national level. We have worked alongside architects, engineers, owners and interior designers across the country and supported them in achieving Building Code compliance. We combine our Building Code expertise with a passion for adaptive reuse, and have received certifications through the Passive House Institute, the Congress of New Urbanism, and the International Living Future Institute. We are extremely excited to be part of creating innovative solutions to support the industry in meeting ambitious climate targets.

- 13.2. We understand this is a complex problem with no one solution, and provide the following five recommendations specific to office to *residential* conversions.

<b>Recommendation 1: Clear and concise guidelines/advisories on responsibilities, developed and issued by the federal government.</b>	
	<ul style="list-style-type: none"><li>■ To clarify the roles and responsibilities of various stakeholder groups (owners, design teams, authorities having jurisdiction, etc) in applying the Building Code to existing buildings.</li></ul>
<b>Recommendation 2: Develop a Canada-wide online platform to efficiently find all current and relevant information to support office to residential conversions.</b>	
	<ul style="list-style-type: none"><li>■ Develop an online platform that provides all reference information that is available for alterations to existing and heritage buildings, as well as office to <i>residential</i> conversions. This information should include at a minimum:<ul style="list-style-type: none"><li>● Framework, upgrade mechanisms, and alternative compliance measures,</li><li>● Available reference reports and best practice guides,</li><li>● Documented interpretations and advisories provided by AHJs, provincial/territorial/municipal governments, and various committees across Canada,</li><li>● <i>Alternative solution</i> summaries that have assisted office to <i>residential</i> conversions and existing and heritage building rehabilitation (acknowledging that <i>alternative solutions</i> do not set precedent and are only applicable to the specific project), and</li><li>● Federal/provincial/territorial/municipal and other incentive programs.</li></ul></li></ul>

**Recommendation 3: Develop guidelines for Building Code upgrades to existing and heritage buildings.**

- Develop a framework for upgrade for existing buildings based on project scope, accompanied by training and tools for all stakeholders, which municipalities can adopt through policy. A framework for existing buildings is anticipated to be included in a future edition of the NBC, however the timeline is not clear.
- Develop alternative compliance measures for heritage buildings, accompanied by training and tools for all stakeholders, which municipalities can adopt through policy.

**Recommendation 4: Develop quality Building Code education and tools.**

- Develop accessible, quality education, resources and tools tailored to each stakeholder group (owners, design teams, *authorities having jurisdiction*, etc) to increase the understandability of all codes and standards involved in the life cycle of a building (building design, construction, operation, rehabilitation, etc).
- Existing quality education of related codes and standards may be available through their organizations. A study should be completed to evaluate all existing education and training available, and compile credible resources in a single location.

**Recommendation 5: Develop an office to residential conversion tool kit. This tool kit should be tested and evaluated through case studies, and updated as needed.**

- Develop a toolkit and resources to further understand the challenges of conversions from a Code perspective. This document is solely Step 1.
  - Step 2: Develop a tool-kit for conversions for the six studied cities. The tool-kit should be a living document and available to municipalities to use as a template and include location-specific requirements, or use as is. The tool-kit should include collaboration with all stakeholders (ie. all levels of government, local intensification, revitalization, and economical development groups, local developers who focus on existing buildings, post-secondary education institutes who are researching various aspects of building reuse, etc.).
  - Step 3: Test and evaluate the tool-kit through case studies on a number of projects to document lessons learned, and update the toolkit on an ongoing basis.

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**14. NEXT STEPS**

- 14.1. The challenges with applying the Building Code to existing buildings are not new, however there is more interest and incentive now than ever before to find better solutions to what are currently available.
- 14.2. Sustainability and existing building reuse is an area we are actively researching and developing a training strategy to bring quality education to our community around these topics. Information on new courses and resources are primarily shared out through our newsletter ([www.kilolimacode.com/subscribe](http://www.kilolimacode.com/subscribe)).
- 14.3. Never hesitate to reach out to us at [hello@kilolimacode.com](mailto:hello@kilolimacode.com). Although we focus on education and do not consult on projects, we are always happy to help where we can and point you in the right direction if needed.

Respectfully submitted,



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