



COUNCIL REPORT

Report Date: May 29, 2024
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Meeting Date: June 11, 2024
[Submit comments to Council](#)

TO: Vancouver City Council

FROM: Chief Building Official, in consultation with the General Manager of Planning, Urban Design, and Sustainability and Vancouver Fire Rescue Services

SUBJECT: Enabling Mass Timber Construction Beyond 12 Storeys

RECOMMENDATIONS

THAT Council approve, in principle, amendments to the Building By-law generally in the form attached as Appendix A, to align with provincial regulation enabling taller encapsulated mass timber construction up to 18 storeys for residential and commercial uses, and to extend encapsulated mass timber construction to low and medium-hazard industrial uses, and care and assembly uses;

FURTHER THAT that the Director of Legal Services be instructed to prepare and bring forward for enactment the necessary amending by-law generally in accordance with Appendix A.

PURPOSE AND EXECUTIVE SUMMARY

This report recommends changes to the Building By-law to enable encapsulated mass timber construction (EMTC) up to 18 storeys in height for residential and commercial uses, an increase from the current height limit of 12 storeys. Further to that, this report recommends changes to the Building By-Law to expand the use of encapsulated mass timber to new building types and uses such as schools, light and medium-industrial buildings, and care facilities, and to allow for more exposed mass timber in buildings. The proposed changes align with recent changes to the BC Building Code and the anticipated changes to the Ontario, Quebec and National Building Code.

The changes recommended in this report are one of the priority actions under the Climate

Emergency Action Plan to reduce carbon pollution from construction materials and designs. Mass timber is a natural low carbon material with good insulating properties, and is pre-manufactured off-site in large, modular pieces.

Building with mass timber can:

- Reduce the carbon pollution of construction by 25-45% or more;
- Improve energy efficiency and insulation effectiveness;
- Reduce construction time, cost, and community impact;
- Provide high levels of fire safety; and,
- Stimulate regional economic development by fostering demand for high value-add forestry products and manufacturing.

Allowing taller mass timber construction and expanding the use of mass timber to new building types and uses within the Building By-law will make it easier to build with low carbon materials, support future housing affordability, and represent an important step in reducing our carbon pollution from construction. These expanded provisions for mass timber will offer the opportunity to pursue high-performance, low-carbon wood construction in a wider range of buildings and will have tremendous potential to strengthen the economy by using local forest products to build much-needed affordable housing. They will also keep Vancouver aligned with the rest of the Province and furthermore, aligned with anticipated federal code changes that ensure that occupants and neighbours remain safe.

COUNCIL AUTHORITY/PREVIOUS DECISIONS

Part IX. Of the Vancouver Charter provides Council with the broad authority to regulate the construction of buildings, including structures of every kind, excavations, and everything so attached to a structure as to constitute real property.

Section 306 of the Charter provides the specific authority for Council to make building regulations in the form of By-laws, of which per Clause 306.(1)(w) specifically allows Council to adopt, by reference in whole or in part and with any change Council considers appropriate, any code relating to fire safety or energy conservation or affecting the construction, alteration, or demolition of buildings.

In 2010, Council amended the Vancouver Building By-law to allow wood-frame construction up to 6 storeys, aligning the By-law with similar changes to the BC Building Code made in July 2009.

In January 2019, Council declared a Climate Emergency and in April 2019, Council approved 54 accelerated actions and 6 Big Moves to address the emergency. Big Move 5 set a target of a 40% reduction by 2030 in embodied emissions associated with construction materials and designs, as compared to 2018.

On November 26, 2019, Council approved the Rental Incentives Review Phase II Report back which directed staff to report back with recommendations to urgently address the climate emergency through the removal of barriers to encourage low carbon rental housing development, including amendments to the Building By-law to allow mass timber construction of up to 12 storeys.

In February 2020, Council amended the Vancouver Building By-law to allow encapsulated mass timber construction up to 12 storeys, aligning the By-law with similar changes to the BC Building Code made in November 2019.

CITY MANAGER'S COMMENTS

The City Manager concurs with the foregoing recommendations.

CONTEXT AND BACKGROUND

International Regulation/ International Building Code

In 2020 the Vancouver Building By-Law adopted Encapsulated Mass Timber Construction (EMTC) as an essentially new construction type. Since then, many EMTC buildings, both in Canada and around the world, have been successfully constructed that exceed the prescriptive boundaries of what the Vancouver Building By-law would permit. With the supporting research and real-world application, these buildings have demonstrated that they are both safe and practical. Construction Codes from other jurisdictions have significantly expanded provisions for the use of EMTC in comparison to the current edition of Vancouver Building By-Law. The proposed code changes in Appendix A intends to adopt the BC provisions that roughly mirror the provisions contained in the 2021 and 2024 International Building Code editions.

Provincial Regulation and National Building Code

The BC Building Code changes for Encapsulated Mass Timber Construction, were implemented earlier this year, were developed by a national joint task group co-chaired by British Columbia and Quebec. The code changes were reviewed by an expert technical advisory group that included representatives from multiple provinces, the fire services community, fire safety engineers, technical building code experts, regulators and industry, including representatives from the City of Vancouver. The Chief Building Official and Vancouver Fire Rescue Services department were an integral part of the technical advisory group, and staff from Sustainability participated in the joint task group. After the public review, based on comments received, the BC Building Code was amended in April this year to include the proposed changes. It is anticipated that Quebec and Ontario will follow shortly, and that the proposed changes will also be adopted into 2025 National Building Code.

DISCUSSION

This report recommends changes to the Building By-law that would accept encapsulated mass timber projects up to 18 storeys for residential and commercial buildings, to expand the use of encapsulated mass timber to new building types and uses, and to allow for more exposed mass timber in buildings. These changes are part of the recent changes to the BC Building Code that will make it easier to build with low carbon materials. This represents an important step in reducing our carbon pollution from construction, and will support investment in local and regional design, manufacturing, and construction of mass timber buildings. This is an important initiative in the City of Vancouver's Climate Emergency Action Plan and is supportive of the broader Provincial response to climate change.

Benefits of Mass Timber Construction

There are many benefits of enabling more mass timber construction in Vancouver, including:

- **Low carbon construction:** Buildings are the largest contributors to greenhouse gas emissions in Vancouver. These emissions result from the space and water heating demands of the building. As we make our buildings more energy efficient and reduce operational emissions, the embodied carbon emissions from the building construction materials have grown in importance. Using mass timber can reduce the embodied carbon pollution of construction by 25-45% or more, especially when sourced from sustainably managed forests.
- **Local and regional jobs:** when sourced from regional forests and manufacturing plants, using mass timber can create jobs and support the local and regional economy in forestry and manufacturing. Vancouver is also becoming a global leader in the design and construction of mass timber buildings, supporting local jobs in architecture, engineering, and construction services.
- **Energy efficiency:** Wood has greater thermal resistance than steel and concrete. This material property is advantageous when designing and constructing a high-performance building enclosure. Building enclosures with superior thermal performance reduce the heating and cooling demands in buildings and ensuing carbon emissions. Nearly all Passive House projects in the city are wood-frame or mass timber, as it is easier to make a wood building achieve the standard.
- **Seismic resilience:** as mass timber is five times lighter than concrete, it can be much easier and more cost-effective to design mass timber buildings to a higher seismic standard, and modular components can make it easier to repair, reducing the time needed to resume occupancy after a large earthquake. In 2007, a joint Italian-Japanese research team tested a seven-story CLT building on a “shake table.” They found that it could withstand the seismic forces of the 1995 earthquake in Kobe, Japan, which destroyed more than 50,000 buildings. Because wood is a lighter material than concrete and steel, soils with reduced bearing capacity can support taller buildings constructed from wood compared to concrete and steel structures. This advantage allows construction on marginal soils.
- **Faster construction:** because mass timber components are pre-fabricated, construction on-site can typically be much faster than other types of construction, reducing total construction time and disruption in neighbourhoods. With reduced overall construction times, mass timber could offer significantly reduced costs compared to alternatives within the next few years and help address the housing crisis by facilitating much-needed market rental and social housing. In 2016, the University of British Columbia completed Brock Commons — an 18-story student housing complex incorporating a hybrid design of CLT with concrete and steel components — in less than 70 days.
- **Renewable, reusable materials:** as wood is a renewable material, and when sourced from sustainably managed forests, it can be used indefinitely as a key part of a truly sustainable construction economy. Mass timber components are durable and modular and can be reused again when a building reaches the end of its service life.

The benefits noted above are mostly those of wood as a material and of pre-fabricated construction, and some of these benefits also apply to pre-fabrication using other materials. The construction industry is beginning to industrialize - a process mostly completed decades ago in other industries - and this will likely see a long-term trend of increasing pre-fabrication, standardization, vertical integration, and consolidation. As has been experienced by other industries in the past, there is a risk of disruption to labour patterns, and it will be important to support the use of local materials and skills where possible. With regional availability of materials and growing local expertise for mass timber construction, Vancouver and the regional economy are well positioned as these trends evolve. This will be of interest to the construction industry, including those seeking low carbon alternatives to traditional construction materials and methods at a time when the regional, national, and international markets continue to struggle through supply chain disruptions and material shortages.

Fire and Life Safety

In recent years, mass timber has received increased attention due to its role in sustainable construction, coupled with the cost and time efficiencies resulting from the increased use of prefabricated mass timber products. As a result, the adoption of mass timber construction continues to rise.

Encapsulated Mass Timber Construction (EMTC) as a new construction type was adopted in the Vancouver Building By-Law in 2020. Since then, many EMTC buildings, that have been designed and constructed both in Canada and around the world, that exceed the current Vancouver Building By-law provisions in height, occupancy, or areas of exposed timber, as mass timber construction has progressed faster than building code changes.

Extensive research and testing by the National Research Council of Canada and its partners, and a growing body of international research has shown that this form of dense wood construction is inherently fire-resistant. Collectively, these tests have demonstrated that exposed mass timber structures are both safe and practical, and leading experts believe the science provides strong evidence that building codes can further evolve to allow for more exposed wood and taller mass timber buildings.

The collaboration between Chief Building Official's Office, Vancouver Fire Rescue Services, Building Review Branch, Inspections, and Sustainability has resulted in one difference from the BC Building Code in the recommended set of by-law changes. The BC Building Code permits only a certain percentage of wall and ceiling areas are allowed to omit the encapsulation protection. In Vancouver, however, it has previously been recognized that allowing partially exposed mass timber within a residential suite could encourage the removal of the encapsulation protection to expose more or all of the mass timber in the suite by an occupant, creating an unacceptable risk to fire safety. Once a residential suite is occupied there is no means for the fire department to inspect and ensure the building fire protection is maintained. In accordance with the Fire Services Act, residential suites are not inspect-able by the fire department without a valid complaint and without consent of the occupier. Therefore, the proposed Vancouver Building By-law provisions for EMTC permit the limited omission of the encapsulation protection within residential suites, and only under certain circumstances.

Consultations

The recommended changes to the Building By-law are the result of the national code

development process led by the Canadian Board for Harmonized Construction Codes (CBHCC). The CBHCC is made up of representatives from provincial, territorial, and federal public services and is responsible for developing the National Model Codes, which are subsequently published by the NRC. The CBHCC promotes the harmonization of codes between provinces and provides a forum for the provinces to provide input with respect to proposed changes to a given model code.

Earlier this year the CBHCC established Joint Task Group for Harmonized Variations for Mass Timber, which included the provinces of British Columbia, Ontario, Quebec and City of Vancouver representatives. The task group developed the proposed changes to the National Building Code in relation to encapsulated mass timber construction. The proposed changes were developed on an expedited basis, and they mirror the provisions in the 2021 and 2024 International Building Code. The Joint Task Group for Harmonized Variations for Mass Timber hosted a public comment period and consultation with provinces. After the public review, based on comments received, the BC Building Code was amended in April this year to include the proposed changes. It is anticipated that Quebec and Ontario will follow shortly, and that the proposed changes will also be adopted into 2025 National Building Code. These provincial changes formed the basis for the recommendations in this report.

Climate Emergency Action Plan

Vancouver is emerging as a global leader in low carbon construction policy and practice. The manufacture, use, and disposal of construction materials represent 11% of global carbon pollution, and these emissions are known as the “embodied carbon” or “Scope 3” emissions of construction. Embodied carbon was highlighted as an important emerging area in the 2016 Zero Emissions Building Plan, with calculation and reporting of embodied emissions required in all rezoning applications since May 2017. This has inspired other cities and programs to explore similar policies and has greatly increased industry awareness of embodied carbon and interest in mass timber construction.

In April 2019, as part of Vancouver’s Climate Emergency Response (Big Move 5), Council set a target of a 40% reduction in carbon pollution from construction by 2030. In September 2020, the World Green Building Council declared a global 40% reduction target, informed in part by Vancouver’s target set earlier that year and with Vancouver highlighted as a leader in their report. This target was included in the November 2020 Climate Emergency Action Plan, and was accompanied by the Embodied Carbon Strategy, which is the City’s plan to achieve the target.

Vancouver is home to some of the tallest mass timber building projects in the world, and mass timber construction is a promising strategy for significant and immediate climate protection action, with studies of tall mass timber buildings estimating 25-45% reductions in embodied carbon.

Implementation Support

The Chief Building Official’s office and the Building Review Branch are already facilitating new mass timber projects designed beyond the prescriptive Vancouver Building By-law provisions in height, occupancy and/or areas of exposed timber through the Alternative Solution process. This is a rigorous process for applicants to prove their specific solutions achieve the same level of performance as the acceptable solutions prescribed in the code, and it can be resource intensive for both applicants and staff. These recommended changes will expand the acceptable

solutions in the Building By-law to include taller buildings, to expand the use of encapsulated mass timber to new building uses and to allow for more exposed mass timber in buildings. This likely reduce the effort required by both applicants and City staff to demonstrate and ensure code compliance for mass timber projects.

Financial Implications

There are no financial implications.

Legal Implications

There are no legal implications.

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APPENDIX A
DRAFT By-law to amend Building By-law No. 12511

Regarding BC Building Code Amendments for Mass Timber Construction

Note: A By-law will be prepared generally in accordance with the provisions listed below, subject to change and refinement prior to posting.

1. This by-law amends the indicated provisions of Building By-law 12511.
2. In Table 1.3.1.2., of Article 1.3.1.2. of Division B of Book I, Council:

(a) strikes out the row:

“

ASTM	C840-13	Application and Finishing of Gypsum Board	3.1.19.2.(2) Table 5.9.1.1.
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”

and substitutes:

“

ASTM	C840-18b	Standard Specification for Application and Finishing of Gypsum Board	3.1.19.2.(6)(c) Table 5.9.1.1.
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”

(b) strikes out the row:

“

ASTM	C1396/C1396M-17	Gypsum Board	3.1.5.14.(6) 3.1.5.15.(4) 3.1.18.13.(1) 3.1.19.2.(2) Table 5.9.1.1. Table 9.23.17.2.-A 9.29.5.2.(1) Table 9.29.5.3.
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”

and substitutes:

“

ASTM	C1396/C1396M-17	Standard Specification for Gypsum Board	3.1.5.14.(6) 3.1.5.15.(4) 3.1.18.13.(1) 3.1.19.2.(2) 3.1.19.2.(3) 3.1.19.2.(4) 3.1.19.2.(5) Table 5.9.1.1. Table 9.23.17.2.-A 9.29.5.2.(1)
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			Table 9.29.5.3.
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(c) strikes out the row:

“

ASTM	D2898-10	Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing	3.1.4.8.(2) 3.1.5.5.(3) 3.1.5.24.(1) 3.1.18.7.(6) 3.2.3.7.(4) 9.10.14.5.(3) 9.10.15.5.(3)
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”

and substitutes:

“

ASTM	D2898-10	Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing	3.1.4.8.(3) 3.1.5.5.(3) 3.1.5.24.(1) 3.1.18.7.(9) 3.2.3.7.(4) 9.10.14.5.(3) 9.10.15.5.(3)
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”

; and

(d) strikes out the row:

“

CSA	CAN/CSA A82.27-M	Gypsum Board	3.1.5.14.(6) 3.1.5.15.(4) 3.1.18.13.(1) 3.1.19.2.(2)
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”

and substitutes:

“

CSA	CAN/CSA A82.27-M	Gypsum Board	3.1.5.14.(6) 3.1.5.15.(4) 3.1.18.13.(1) 3.1.19.2.(2) 3.1.19.2.(3) 3.1.19.2.(4) 3.1.19.2.(5)
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”

3. In Article 3.1.18.4. of Division B of Book I, Council strikes out Sentence (1) and substitutes the following:

“**1**) Except as provided in Sentences (3) to (9), 3.1.18.3.(4), 3.1.18.14.(2) and 3.1.18.15.(2), and Articles 3.1.18.5. and 3.1.18.10., the exposed surfaces of structural mass timber

elements conforming to Article 3.1.18.3. shall be protected from adjacent spaces in the *building*, including adjacent concealed spaces within wall, floor and roof assemblies, by a material or assembly of materials conforming to Sentence (2) that provides an *encapsulation rating* that

- a) is not less than 50 minutes in a building or part of a *building* constructed in conformance with Article 3.2.2.48EMTC. or 3.2.2.57EMTC., or
- b) conforms to the minimum values stated in Table 3.2.2.91. for the applicable *major occupancy and building height.*”.

4. In Article 3.1.18.4. of Division B of Book I, Council strikes out Sentence (3) and substitutes the following:

“3) Except as provided in Sentences (5) and (7), the exposed surfaces of mass timber beam columns and arches within a suite, other than a *residential suite*, or *fire compartment* in a *building* or part of a *building* constructed in conformance with Article 3.2.2.48EMTC. or 3.2.2.57EMTC. or permitted by Article 3.2.2.91. to have a 50 min *encapsulation rating* other than a *residential suite*, need not be protected in accordance with Sentence (1), provided

- a) their aggregate exposed surface area does not exceed 35% of the total wall area of the perimeter of the *suite* or *fire compartment* in which they are located, and
- b) the *flame-spread rating* on any exposed surface is not more than 150.

(See Note A-3.1.18.4.(3) to (8).)”.

5. In Article 3.1.18.4. of Division B of Book I, Council strikes out Sentence (4) and substitutes the following:

“4) Except as provided in Sentences (5) to (7), the exposed surfaces of mass timber walls within a *suite*, other than a *residential suite*, in a *building* or part of a *building* constructed in conformance with Article 3.2.2.48EMTC. or 3.2.2.57EMTC. or permitted by Article 3.2.2.91. to have a 50 min *encapsulation rating*, need not be protected in accordance with Sentence (1), provided

- a) each portion of an exposed surface of a mass timber wall faces
 - i) faces the same direction, or
 - ii) is separated from any other exposing mass timber wall by a horizontal distance of not less than 4.5 m, and
- b) the *flame-spread rating* on any exposed surface is not more than 150.

(See Note A-3.1.18.4.(4) and A-3.1.18.4.(3) to (8).)”.

6. In Article 3.1.18.4. of Division B of Book I, Council strikes out Sentence (5) and substitutes the following:

“5) Expect as provided in Sentence (7), the aggregated exposed surface area of mass timber elements within a *suite* permitted in Sentences (3) and (4) shall not exceed 35% to the total wall area of the perimeter of the *suite*.

(See Note A-3.1.18.4.(4) to (8).)”.

7. In Article 3.1.18.4. of Division B of Book I, Council strikes out Sentence (6) and substitutes: “**6**) Except as provided in Sentence (7), the exposed surfaces of mass timber ceilings within a *suite*, other than a *residential suite*, or *fire compartment*, other than an *exit*, *public corridor*, in a *building* or part of a *building* constructed in conformance with Article 3.2.2.48EMTC. or 3.2.2.57EMTC. or permitted by Article 3.2.2.91. to have a 50 min *encapsulation rating*, need not be protected in accordance with Sentence (1), provided their aggregated surface area does not exceed
- a) 10% of the total ceiling area of the *suite* or *fire compartment*, where the *flame-spread rating* on any exposed surface is not more than 150, or
 - b) 25% of the total ceiling area of the *suite* or *fire compartment*, where the *flame-spread rating* on any exposed surface of a mass timber wall or ceiling is not more than 75.
- (See Note A-3.1.18.4.(3) to (8).)”.
8. In Article 3.1.18.4 of Division B of Book I, Council adds the following after Sentence (6): “**7**) The exposed surfaces of mass timber ceilings within a *suite*, other than a *residential suite*, in a *building* or part of a *building* constructed in conformance with Article 3.2.2.48EMTC. or 3.2.2.57EMTC. or permitted by Article 3.2.2.91. to have a 50 min *encapsulation rating*, need not be protected in accordance with Sentences (1) or (6), provided
- a) the aggregate surface area of any exposed mass timber beams, columns and arches does not exceed 20% of the total wall area of the perimeter of the *suite* in which they are located,
 - b) all surfaces of mass timber walls are
 - i) protected in accordance with Sentence (1), or
 - ii) mass timber walls that are not otherwise permitted to be exposed in accordance with Sentence (5) are protected by a material or assembly of materials conforming to Sentence (2) that provides an *encapsulation rating* or not less than 80 min, and
 - c) the *flame spread rating* on any exposed surface of a mass timber wall or ceiling is not more than 75.
- (See Note A-3.1.18.4.(3) to (8).)
- 8**) Structural mass timber elements in a *building* or part of a *building* permitted by Article 3.2.2.91. to have a 0 min *encapsulation rating* need not be protected in accordance with Sentence (1), provided
- a) mass timber walls and ceilings within *vertical service spaces*, *public corridors*, and *exits* are protected on the interior side with a material or assembly of materials conforming to Sentence (2) that provides an *encapsulation rating* of not less than 25 min, and
 - b) concealed spaces are protected in conformance with Sentence 3.1.18.3.(4).

(See Note A-3.1.18.4.(3) to (8).)

9) In a *building* or part of a *building* required by Clause 3.1.18.4.(1)(b) to have a minimum *encapsulation rating* of 70 min, the upper surface of a mass timber floor or roof assembly is permitted to be encapsulated by a material or assembly of materials conforming to Sentence 3.1.18.4.(2) that provides an *encapsulation rating* of 50 min.”.

9. In Division B of Book I, Council strikes out Article 3.1.18.7. and substitutes the following:

“3.1.18.7. Exterior Cladding

1) Except as provided in Sentences (2), (3), (4), (6) and (9), cladding on an exterior wall assembly of a *building* or part of a *building* permitted to be of *encapsulated mass timber construction* shall be

- a) *noncombustible*,
- b) a material or combination of materials that satisfy the criteria of Sentence 3.1.5.1.(2),
- c) except as provided in Sentence (7), a wall assembly that satisfies the criteria of Clause 3.1.5.5.(1)(b), or
- d) a combination of the cladding described in Clauses (a) to (c).

(See Note A-3.1.18.7.(1), (2), (4) and (6).)

2) Except as provided in Sentences (3), (4), (6) and (8), cladding on an exterior wall assembly of a *building* or part of a *building* permitted to be of *encapsulated mass timber construction* that is not more than 12 *storeys* in *building height* is permitted to consist of

- a) *combustible* cladding that
 - i) is not contiguous over more than 4 *storeys*,
 - ii) represents not more than 10% of the cladding on each exterior wall of each *storey*,
 - iii) is not more than 1.2 m in width,
 - iv) has a *flame-spread rating* not more than 75 on any exposed surface, or any surface that would be exposed by cutting through the material in any direction,
 - v) is separated from other portions of *combustible* cladding on adjacent *storeys* by a horizontal distance of not less than 2.4 m, and
 - vi) is separated from other portions of *combustible* cladding by a horizontal distance of not less than 1.2 m,
- b) *combustible* cladding that
 - i) is not contiguous across adjacent *storeys*,
 - ii) represents not more than 10% of the cladding on each exterior wall of each *storey*,
 - iii) has a *flame-spread rating* not more than 75 on any exposed surface, or any surface that would be exposed by cutting through the material in any direction, and
 - iv) is separated from other portions of *combustible* cladding on adjacent *storeys* by a horizontal distance of not less than 2.4 m,

c) *combustible* cladding representing up to 100% of the cladding on exterior walls of

the *first storey*, provided all portions of the cladding can be directly accessed and are located not more than 15 m from a *street* or access route conforming to Article 3.2.5.6., measured horizontally from the face of the *building*, or

- d) a combination of cladding described in Sentence (1) and the cladding described in Clauses (a) to (c).

(See Note A-3.1.18.7.(1), (2), (4) and (6).)

3) The permitted area of combustible cladding in Clauses (2)(a) or (b) shall not exceed 5% of the cladding on each exterior wall of each *storey* where the time from receipt of notification of a fire by the fire department until the arrival of the first fire department vehicle at the *building* exceeds 10 min in 10% or more of all fire department calls to the *building*. (See Note A-3.2.3.1.(8).)

4) Except as provided in Sentences (6) and (8), cladding on an exterior wall assembly of a *building* or part of a *building* permitted to be of *encapsulated mass timber construction* that is not more than 6 *storeys* in *building height* is permitted to consist of

- a) *combustible* cladding that
 - ii) represents not more than 10% of the cladding on each exterior wall of each *storey*, and
 - iii) has a *flame-spread rating* not more than 75 on any exposed surface, or any surface that would be exposed by cutting through the material in any direction, or
- b) a combination of the cladding described in Clause (a) and the cladding described in Sentence (1) and Clause (2)(c).

(See Note A-3.1.18.7.(1),(2),(4) and (6).)

5) Where *combustible* cladding conforming to Clauses (2)(a),(b) or (4)(a) on the exterior wall of a *fire compartment* is exposed to *combustible* cladding conforming to Clauses (2)(a),(b) or (4)(a) on an exterior wall of the same *fire compartment* or of another *fire compartment*, and the planes of the two walls are parallel or at an angle less than 135° measured from the exterior of the *building*, the different portions of *combustible* cladding shall

- a) be separated by a horizontal distance of not less than 3 m, and
- b) not be contiguous over more than 2 *storeys*.

6) Except as provided in Sentence (8), cladding on an exterior wall assembly of a *building* or part of a *building* permitted to be of *encapsulated mass timber construction* and not more than 4 *storeys* in *building height* is permitted to consist of *combustible* material with a *flame-spreading rating* not more than 75 on any exposed surface, or any surface that would be exposed by cutting through the material in any direction. (See Note A-3.1.18.7.(1),(2),(4) and (6).)

7) An exterior wall assembly constructed in conformance with Section D-6 of Appendix D is deemed to satisfy the criteria of Clause (1)(c).

- 8)** Except as provided in Article 3.2.3.10., where the *limiting distance* in Table 3.2.3.1.-D or 3.2.3.1.-E permits an area of *unprotected openings* of not more than 10% of the *exposing building face*, the construction requirements of Table 3.2.3.7. shall be met.
- 9)** A wall assembly conforming to Clause (1)(c) that includes *combustible* cladding made of fire-retardant-treated wood shall be tested for fire exposure after the cladding has been subjected to the accelerated weathering test specified in ASTM D2898, “Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing.”.
10. In Sentence 3.1.18.12.(2) of Division B of Book I, Division B, Council strikes out “Sentences 3.1.18.4.(3) and (4),” and substitutes “Sentences 3.1.18.4.(3),(4),(7) and (8)”.
11. In Sentence 3.1.18.12.(3) of Division B of Book I, Division B, Council strikes out “Sentences (4) and 3.1.18.4.(3), and (6)” and substitutes “Sentences (4) and 3.1.18.4.(3),(6),(7) and (8)”
12. In Article 3.1.19.2. of Division B of Book I, Council strikes out Sentence (2) and substitutes the following:
- 2)** One layer of Type X gypsum board conforming to ASTM C 1396/C 1396M, “Standard Specification for Gypsum Board,” or CAN/CSA-A82.27-M, “Gypsum Board,” not less than 12.7 mm thick, is deemed to have an *encapsulation rating* of 25 min when installed on a mass timber element in accordance with Sentence (6).”
13. In Article 3.1.19.2. of Division B of Book I, Council adds the following Sentences after Sentence (2):
- 3)** Two layers of Type X gypsum board conforming to ASTM C1396/C1396M,” Standard Specification for Gypsum Board,” or CAN/CSA-A82.27-M,”Gypsum Board,” each not less than 12.7 mm thick are deemed to have an *encapsulation rating* of 50 min when installed on a mass timber element accordance to Sentence (6).
- 4)** Two layers of Type X gypsum board conforming to ASTM C1396/C1396M,” Standard Specification for Gypsum Board,” or CAN/CSA-A82.27-M,” Gypsum Board,” each not less than 15.9 mm thick, are deemed to have an *encapsulation rating* of 70 min when installed on a mass timber element in accordance with Sentence (6).
- 5)** Three layers of Type X gypsum board conforming to ASTM C1396/C1396M, “Standard Specification for Gypsum Board,” or CAN/CAS-A82.27-M,” Gypsum Board,” each not less than 12.7 mm thick, are deemed to have an *encapsulation rating* of 80 min when installed on a mass timber element in accordance with Sentence (6).
- 6)** The gypsum board described in Sentences (2) to (5) shall be
- a) fastened with a minimum of two rows of screws in each layer
 - i) directly to the mass timber element with screws of sufficient length to penetrate not less than 20 mm into the mass timber element that are spaced not more than 400 mm o.c. and 20 mm to 38 mm from the boards’ edges, or
 - ii) to wood furring or resilient metal or steel furring channels not more than 25 mm thick spaced not more than 400 mm o.c. on the mass timber element,

- b) for multiple layer systems, installed with the joints in each layer staggered from those in the adjacent layer, and
 - c) installed in conformance with ASTM C840, “Standard Specification for Application and Finishing of Gypsum Board,” except that, for multiple layer systems, their joints need not be taped and finished.
- (See Note A-3.1.19.2.(6).)”.

14. In Article 3.2.1.4. of Division B of Book I, Council strikes out Sentence (1) and substitute the following:

“**1)** Except as permitted by Sentences 3.2.2.47.(3), 3.2.2.48.(3), 3.2.2.48EMTC.(3), 3.2.2.49.(3), 3.2.2.50.(3), 3.2.2.51.(3), 3.2.2.52.(3), 3.2.2.53.(3), or 3.2.2.54.(3), or 3.2.2.91.(3), a floor assembly immediately above a *basement* shall be constructed as a *fire separation* having a *fire-resistance rating* conforming to the requirements of Articles 3.2.2.20. to 3.2.2.91. for a floor assembly, but not less than 45 min.”

15. In Article 3.2.1.6. of Division B of Book I, Council in Sentence (1) strikes out “3.2.2.90.” and substitutes “3.2.2.91.”.

16. In Article 3.2.2.2. of Division B of Book I, Council in Sentence (1) strikes out “3.2.2.90.” and substitutes “3.2.2.91.”.

17. In Article 3.2.2.6. of Division B of Book I, Council strikes out Sentences (1) and Sentence (2) and substitutes the following:

“**1)** Except as permitted by Articles 3.2.2.7. and 3.2.2.8., and Sentences 3.2.2.48EMTC.(4), 3.2.2.50.(5), 3.2.2.57EMTC.(3), 3.2.2.58.(4) and 3.2.2.91.(5) to (7), in a *building* containing more than one *major occupancy*, the requirements of this Subsection for the most restricted *major occupancy* contained shall apply to the whole *building*.

2) In a *building* or part of a *building* constructed in conformance with Articles 3.2.2.48EMTC., 3.2.2.57EMTC. or 3.2.2.91(3). containing more than one *major occupancy*, the most restrictive encapsulation requirements of Article 3.1.18.4. and Table 3.2.2.91. for any *major occupancy* contained within a *storey* shall apply to the encapsulation required on the interior of a *public corridor* or *exit* within that *storey*.”.

18. In Article 3.2.2.7. of Division B of Book I, Council:

- (a) strikes out Sentence (1) and substitutes the following:

“**1)** Except as provided in Article 3.2.2.8. and Sentences 3.2.2.18.(2), 3.2.2.48EMTC.(4), 3.2.2.50.(5), 3.2.2.57EMTC.(3), 3.2.2.58.(4) and 3.2.2.91.(5) to (7), in a *building* in which one *major occupancy* is located entirely above another *major occupancy*, the requirements in this Subsection for each portion of the *building* containing a *major occupancy* shall apply to that portion as if the entire *building* were of that *major occupancy*.”, and

- (b) after Sentence (2), adds the following:

“3) In a *building* or part of a *building* constructed in conformance with Article 3.2.2.48EMTC., 3.2.2.57EMTC., or 3.2.2.91., if one *major occupancy* is located above another *major occupancy*,

- a) the most restrictive encapsulation requirements of Article 3.1.18.4. and Table 3.2.2.91. for any *major occupancy* contained within the *building* shall apply to the encapsulation required on the interior of *vertical service spaces* and *exit* stairs, and
- b) the encapsulation requirements of Article 3.1.18.4. and Table 3.2.2.91. for a mass timber floor assembly between the *major occupancies* shall be determined on the basis of the requirements for
 - i) the upper *major occupancy* for the encapsulation of the upper surface of the mass timber floor assembly, and
 - ii) the lower *major occupancy* for the encapsulation of the underside of the mass timber floor assembly.”.

19. In Article 3.2.2.11. of Division B of Book I, Council:

- a) in Sentence (1) strikes out “3.2.2.90.” and substitutes “3.2.2.91.”, and
- b) in Sentence (2) strikes out “3.2.2.48EMTC. or 3.2.2.57EMTC.” and substitutes “3.2.2.48EMTC., 3.2.2.57EMTC. or 3.2.2.91.”.

20. In Sentence 3.2.2.12.(1) of Division B of Book I, Council strikes out “3.2.2.90.” and substitutes “3.2.2.91”.

21. In Sentence 3.2.2.13.(1) of Division B of Book I, Council strikes out “3.2.2.90.” and substitutes “3.2.2.91.”.

22. In Article 3.2.2.14. of Division B of Book I, Council:

- a) in Sentence (1) strikes out “3.2.2.90.” and substitutes “3.2.2.91.”, and
- b) in Sentence (3) strikes out “3.2.2.90.” and substitutes “3.2.2.91.”.

23. In Sentence 3.2.2.16.(1) of Division B of Book I, Council strikes out “3.2.2.90.” and substitutes “3.2.2.91.”.

24. In Division B of Book I, Council strikes out Article 3.2.2.18. and substitutes the following:

“1) Except as permitted by Sentence (2), an automatic sprinkler system conforming to the requirements of Articles 3.2.4.7., 3.2.4.8., 3.2.4.9. and 3.2.5.12. shall be installed throughout a *building* regulated by one or more of Articles 3.2.2.20., 3.2.2.21., 3.2.2.22., 3.2.2.23., 3.2.2.24., 3.2.2.26., 3.2.2.27., 3.2.2.29., 3.2.2.31., 3.2.2.33., 3.2.2.36., 3.2.2.37., 3.2.2.38., 3.2.2.39., 3.2.2.40., 3.2.2.41., 3.2.2.42., 3.2.2.43., 3.2.2.44., 3.2.2.45., 3.2.2.46., 3.2.2.47., 3.2.2.48., 3.2.2.48EMTC., 3.2.2.50., 3.2.2.51., 3.2.2.54., 3.2.2.55., 3.2.2.57., 3.2.2.57EMTC, 3.2.2.58., 3.2.2.59., 3.2.2.61., 3.2.2.63., 3.2.2.64., 3.2.2.65., 3.2.2.67., 3.2.2.69., 3.2.2.70., 3.2.2.71., 3.2.2.72., 3.2.2.74., 3.2.2.75., 3.2.2.77., 3.2.2.79., 3.2.2.80., 3.2.2.82., 3.2.2.84., 3.2.2.86., 3.2.2.88., and 3.2.2.91.

2) If a *storey* in a *building* or a *floor area* is required to have an automatic sprinkler system

installed throughout in accordance with one or more of Articles 3.2.2.20. to 3.2.2.91. or Section 3.3., the automatic sprinkler system shall also be installed throughout all lower *storeys* in the *building* notwithstanding permission in Articles 3.2.2.20. to 3.2.2.91. to construct one or more of those *storeys* without installing automatic sprinkler protection. (See Note A-3.2.2.18.(2).)”.

25. In Sentence 3.2.2.19.(1) of Division B of Book I, Council strikes out “3.2.2.90.” and substitutes “3.2.2.91.”.
26. In Sentence 3.2.2.23.(1) of Division B of Book I, Council adds “and 3.2.2.91.” after “3.2.2.28.”.
27. In Sentence 3.2.2.42.(1) of Division B of Book I, Council adds “ and 3.2.2.91.” after “3.2.2.46.”.
28. In Sentence 3.2.2.47.(1) of Division B of Book I, Council adds “and 3.2.2.91.” after “3.2.2.54.”.
29. In Sentence 3.2.2.48EMTC.(4) of Division B of Book I, Council strikes out “See Note A-3.2.2.48EMTC.(4) and 3.2.2.57EMTC.(3)” and substitutes “See Note A-3.2.2.48EMTC.(4), 3.2.2.57EMTC.(3) and 3.2.2.91.(5) to (7)”.
30. In Sentence 3.2.2.55.(1) of Division B of Book I, Council adds “and 3.2.2.91.” after “3.2.2.63.”.
31. In Sentence 3.2.2.57EMTC.(3) of Division B of Book I, Council strikes out “See Note A-3.2.2.48EMTC.(4) and 3.2.2.57EMTC.(3)” and substitutes “See Note A-3.2.2.48EMTC.(4), 3.2.2.57EMTC.(3) and 3.2.2.91.(5) to (7)”.
32. In Sentence 3.2.2.64.(1) of Division B of Book I Council adds “and 3.2.2.91.” after “3.2.2.69.”.
33. In Sentence 3.2.2.74.(1) of Division B of Book I Council adds “and 3.2.2.91.” after “3.2.2.79.”.
34. In Sentence 3.2.2.80.(1) of Division B of Book I, Council strikes out “3.2.2.90.” and substitutes “3.2.2.91.”.
35. In Subsection 3.2.2. of Division B of Book I, after Article 3.2.2.90., Council adds the following:

“3.2.2.91. Encapsulated Mass Timber Construction, Various Occupancies, Heights and Areas, Sprinklered

- 1) A building that is classified as Group A, Division 2, Group B, Division 3, Group C, Group D, Group E, or Group F, Division 2 or 3, is permitted to conform to Sentence (2) provided
 - a) except as permitted by Sentences 3.2.2.7.(1) and 3.2.2.18.(2), the *building* is *sprinklered*,
 - b) the *building* has a *building height* not exceeding the number of *storeys* shown in Table 3.2.2.91. for the applicable *major occupancy* and minimum encapsulation rating,
 - c) the *building* has a maximum height that conforms to the value shown in Table 3.2.2.91. for the applicable *major occupancy* and minimum encapsulation rating that is measured between the floor of the *first storey* and the uppermost floor level that does not serve a rooftop enclosure for elevator machinery, a stairway or a *service room* used only for service to the *building*,
 - d) the *building* has a maximum *building area* that conforms to the value shown in Table 3.2.2.91. for the applicable *major occupancy*, and

e) except as provided in Sentences 3.1.18.3.(4) and 3.1.18.5.(1) and Article 3.1.18.4., the *encapsulation rating* conforms to the value shown in Table 3.2.2.91. for the applicable *major occupancy* and maximum *building height*.
(See Note A-3.2.2.91.(1) and Table 3.2.2.91. See also Articles 3.2.2.48EMTC. and 3.2.2.57EMTC.)

TABLE 3.2.2.91.
Encapsulated Mass Timber Construction Requirements ⁽¹⁾⁽²⁾
 Forming part of Sentence 3.2.2.91.(1)

OCCUPANCY	MAX. BUILDING HEIGHT, STOREYS	MAX. HEIGHT, m	MAX. BUILDING AREA, m2	MINIMUM ENCAPSULATION RATING, min
A-2	18	76	7200	70
	12	51		50
	6	26		0
B-3	10	42	8000	70
	6	26		50
	4	17		0
C	18	76	6000	70
	8	34		0
D	18	76	7200	70
	9	38		0
E	12	51	6000	70
	8	34		50
	6	26		0
F-2	10	42	4500	70
	7	30		50
	5	21		0
F-3	12	51	7200	70
	8	34		50

Notes to Table 3.2.2.91:

(1) See Sentences (5) to (7) and Articles 3.2.2.4. to 3.2.2.8. for information pertaining to multiple *major occupancies*.

(2) Linear interpolation is not permitted in using Table 3.2.2.91.

2) Except as provided in Article 3.2.2.16., the building referred to in Sentence (1) is permitted to be of *encapsulated mass timber construction* or *noncombustible construction*, used singly or in combination, and

- a) except as provided in Sentence (3), floor assemblies shall be *fire separations* with a *fire-resistance rating* not less than 2 hours,
- b) *mezzanines* shall have a *fire-resistance rating* not less than 1 hour, and
- c) *loadbearing walls*, columns and arches shall have a *fire-resistance rating* not less than that required for the supported assembly.

3) In a *building* classified as a Group C *major occupancy* that contains *dwelling units* that have more than one *storey*, subject to the requirements of Sentence 3.3.4.2.(3), the floor assemblies, including floors over *basements*, that are entirely contained within these *dwelling units* shall have a *fire-resistance rating* not less than 1 h, but need not be constructed as *fire separations*.

4) In *buildings* referred to in Sentence (1) where the roof assembly of an *exit* stairway or *vertical service space* used as an elevator hoistway has a height greater than 55 m measured from *grade* to the highest point of the roof assembly, the enclosure for the stairway or hoistway shall be of *encapsulated mass timber construction* or constructed of concrete.

5) Group E *major occupancies* and *storage garages* located in a *building* or part of a *building* classified as a Group A, Division 2, Group C, or Group D *major occupancy* within the scope of this Article are permitted to be constructed in accordance with this Article and the corresponding Group A, Division 2, Group C, or Group D *major occupancy* requirements contained in Table 3.2.2.91., provided

- a) the Group E *major occupancy* is located below the third *storey*, and
- b) the *storage garage* is located below the fifth *storey* (see also Article 4.4.2.1.).
(See Note A-3.2.2.48EMTC.(4), 3.2.2.57EMTC.(3) and 3.2.2.91.(5) to (7).)

6) Group A, Division 2 *major occupancies* located in a *building* or part of a *building* classified as a Group C or Group D *major occupancy* within the scope of this Article are permitted to be constructed in accordance with this Article and the corresponding Group C or Group D *major occupancy* requirements contained in Table 3.2.2.91., provided they are located below the fourth *storey*. (See Note A-3.2.2.48EMTC.(4), 3.2.2.57EMTC.(3) and 3.2.2.91.(5) to (7).)

7) Group F, Division 2 and 3 *major occupancies* located in a *building* or part of a *building* classified as a Group D *major occupancy* within the scope of this Article are permitted to be constructed in accordance with this Article and the corresponding Group D *major occupancy* requirements contained in Table 3.2.2.91., provided they are located below the third *storey*. (See Note A-3.2.2.48EMTC.(4), 3.2.2.57EMTC.(3) and 3.2.2.91.(5) to (7).)”.)

36. In Article 3.2.3.7. of Division B of Book I, Council strikes out Table 3.2.3.7. and substitutes the following:

Table 3.2.3.7.
 Minimum Construction Requirements for Exposing Building Faces
 Forming Part of Sentences 3.1.6.9.(5) and 3.2.3.7.(1) to (4)

<i>Occupancy Classification of Building or Fire Compartment</i>	Maximum Area of Unprotected Openings Permitted, % of Exposing Building Face Area	Minimum Required Fire-Resistance Rating	Type of Construction Required	Type of Cladding Required
<i>Group A, B, C, D, or Group F, Division 3</i>	0 to 10	1 h	Noncombustible	Noncombustible
	> 10 to 25	1 h	Combustible, Encapsulated mass timber, or Noncombustible	Noncombustible
	> 25 to 50	45 min	Combustible, Encapsulated mass timber, or Noncombustible	Noncombustible
	> 50 to < 100	45 min	Combustible, Encapsulated mass timber, or Noncombustible	Combustible or Noncombustible ⁽¹⁾⁽²⁾
<i>Group E, or Group F, Division 1 or 2</i>	0 to 10	2 h	Noncombustible	Noncombustible
	> 10 to 25	2 h	Combustible, Encapsulated mass timber, or Noncombustible	Noncombustible
	> 25 to 50	1 h	Combustible, Encapsulated mass timber, or Noncombustible	Noncombustible
	> 50 to < 100	1 h	Combustible, Encapsulated mass timber, or Noncombustible	Combustible or Noncombustible ⁽³²⁾

Notes to Table 3.2.3.7.:

(1) The cladding on Group C *buildings* conforming to Article 3.2.2.50. and on Group D *buildings* conforming to Article 3.2.2.58. shall be *noncombustible* or consist of a wall that satisfies the requirements of Article 3.1.4.8.

(2) The cladding on *buildings* or parts thereof conforming to Articles 3.2.2.48EMTC., 3.2.2.57EMTC. or 3.2.2.91. shall conform to Article 3.1.18.7. or be *noncombustible*.

(3) See also Article 3.1.4.8. for additional requirements for exterior cladding on *buildings* or parts thereof conforming to Articles 3.2.2.50. and 3.2.2.58.”.

37. In Sentence 3.2.3.9.(1) of Division B of Book I, Council strikes out “3.2.2.90.” and substitutes “3.2.2.91.”.

38. In Article 3.2.5.12. of Division B of Book I, Council strikes out Sentence 3.2.5.12.(8) and substitutes the following:

“**8)** Notwithstanding the requirements of the standards referenced in Sentences (1) and (2) regarding the installation of automatic sprinkler systems, in *buildings* conforming to Article 3.2.2.48EMTC., 3.2.2.50., 3.2.2.57EMTC., 3.2.2.58., or 3.2.2.91., sprinklers shall be provided for balconies and decks exceeding 610 mm in depth measured perpendicular to the exterior wall. (See Note A-3.2.5.12.(8).)”

39. In Sentence 3.3.3.7.(4) of Division B of Book I, Council strikes out “3.2.2.90.” and substitutes “3.2.2.91.”.

40. In Sentence 3.10.1.1.(1) of Division B of Book I, Council amends Table 3.10.1.1. by adding the following after the rows associated with 3.2.2.90.:

“

3.2.2.91. Encapsulated Mas Timber Construction, Various Heights and Occupancies, Sprinklered	
(2)	(b),(c) [F04 – OS1.3]
	(b),(c) [F04 – OP1.3]
	(a),(c) [F03 – OS1.2][F04 – OS1.2, OS1.3]
	(a),(c) [F03 – OP1.2][F04 – OP1.2, OP1.3]

”

41. In Division B of Book I, Council strikes out Note A-3.1.18.4.(1) and substitutes the following:

“**A-3.1.18.4.(1) Encapsulation of Mass Timber Elements.** The general intent of Sentence 3.1.18.4.(1), which generally applies for any building where a 50- or 70-minute encapsulation rating is otherwise required, is that all exposed surfaces of the mass timber elements be encapsulated, including the upper surface of a mass timber floor assembly. However, for some buildings, depending on the building height and occupancy, portions of mass timber elements are permitted to be exposed to varying degrees in accordance with the permissions stated in Sentences 3.1.18.4.(3) to (8). Also, the exposed surfaces in certain concealed spaces formed by or contained within mass timber elements are exempted from complying with this Sentence (see Sentences 3.1.18.3.(4), 3.1.18.14.(2), 3.1.18.15.(2), and Articles 3.1.18.5. and 3.1.18.10.). Moreover, the upper surface of a mass timber roof assembly need not be encapsulated where there is no concealed space above it. As well, the exterior side of a mass timber exterior wall assembly need not be encapsulated; however, the provisions of Article 3.1.18.7. and Subsection 3.2.3. for exterior walls still need to be considered.”.

42. In Division B of Book I, Council strikes out Note A-3.1.18.4.(3) to (6) and substitutes the following:

“**A-3.1.18.4.(3) to (8) Fire-Resistance Rating of Mass Timber with Exposed Surfaces.** Portions of mass timber elements required to have a fire-resistance rating are permitted to be exposed in accordance with the permissions stated in Sentences 3.1.18.4.(3) to (8); however, it is important to note that applying those permissions does not waive the requirement for these elements to have a fire-resistance rating.

In the calculation of the total wall area of the perimeter of a suite or fire compartment in Sentences 3.1.18.4.(3), (5) and (7), the area of any wall openings, such as doors or windows, is included.”.

43. In Division B of Book I, Council strikes out Note A-3.1.18.4.(4) and substitutes the following:

“A-3.1.18.4.(4) Exposed Surfaces of Mass Timber Walls The primary objective of encapsulating mass timber elements is to limit the probability that these elements will significantly contribute to fire spread and fire duration in the event of a fire. Since thick wood members require a source of imposed heat flux to burn, Clause 3.1.18.4.(4)(a) stipulates that any portions of the exposed surfaces of different mass timber walls within a suite either face the same direction or have a minimum horizontal distance between one another. If the sprinkler system fails to operate or to control the fire, this directional orientation or minimum distance is intended to avoid or reduce the potential for re-radiation between portions of burning mass timber surfaces on different walls, and particularly those that either face or are in close proximity to one another, which could sustain flaming combustion into the decay phase of a fire. Additionally, if the sprinkler system fails to operate or to control the fire, the maximum percentages of exposed surface areas and maximum flame-spread ratings stated in Article 3.1.18.4. are intended to be insufficient to sustain a ventilation-controlled fire that might provide the radiation required to sustain flaming combustion into the decay phase of a fire.”.

44. In Division B of Book I, Council strikes out Note A-3.1.18.7.(1) and (2) and substitutes the following:

“A-3.1.18.7.(1), (2), (4) and (6) Exterior Cladding. The requirements in Sentences 3.1.18.7.(1), (2), (4) and (6) are intended to reduce the potential for fire spread on the exterior cladding of buildings of encapsulated mass timber construction through the use of noncombustible finishes on the exterior of the wall assembly or the use of a cladding/wall assembly that has been proven to resist flame propagation as a function of increasing building height, including provisions to allow 100% combustible cladding where the height does not exceed 4 storeys. These cladding/wall assembly combinations can be used as infill or panel-type walls between structural elements, or attached directly to a loadbearing structural system. Note that the requirements in Article 3.1.18.7. do not supersede the provisions in Subsection 3.2.3. regarding spatial separation and exposure protection.”.

45. In Division B of Book I, Council strikes out Note A-3.1.19. and substitutes the following:

“A-3.1.19.2. Encapsulation Materials. Research has been conducted on different types of encapsulation materials, such as gypsum board, gypsum concrete and cement board. The results of tests using an intermediate-scale furnace and of cone calorimeter tests indicate that a combustible timber element protected with a 38 mm thick layer of gypsum-concrete topping or with one (25 min), two (50 min) or three (80 min) layers of 12.7 mm Type X gypsum board or two layers (70 min) of 15.9 mm Type X gypsum board will not ignite or contribute significant heat to a fire until the time at which average temperatures of 325°C to 380°C are attained at the interface between the encapsulation material or assembly of materials and the combustible substrate. These temperatures are consistent with the ignition temperatures of wood-based materials.”.

46. In Division B of Book I, Council amends Note A-3.1.19.2. by striking out “A-3.1.19.2.(2)” and substituting “A-3.1.19.2.(6)”.

47. In Division B of Book I, Council amends Note A-3.1.11.5.(3) by striking out:

“A 5- or 6-storey building constructed in accordance with Article 3.2.2.48EMTC., 3.2.2.57EMTC., or 3.2.2.50. and buildings constructed in accordance with Article 3.2.2.58.”,

and substituting the following:

“A 5- or 6-storey building constructed in accordance with Article 3.2.2.48EMTC, 3.2.2.57EMTC, 3.2.2.50., 3.2.2.58. or 3.2.2.91.”.

48. In Division B of Book I, Council strikes out Note A-3.2.2.48EMTC.(4) and 3.2.2.57EMTC.(3) and substitutes the following:

“A-3.2.2.48EMTC.(4), 3.2.2.57EMTC.(3) and 3.2.2.91.(5) to (7) Occupancy Combinations in Buildings of Mixed Construction. Buildings conforming to the building height and area limits and the other fire protection requirements of Article 3.2.2.48EMTC., 3.2.2.57EMTC. or 3.2.2.91. may be entirely constructed of encapsulated mass timber construction and incorporate the occupancies specifically permitted by Sentence 3.2.2.48EMTC.(4), 3.2.2.57EMTC.(3) or 3.2.2.91.(5) to (7): e.g., Group A, Division 2 major occupancies on the first to third storeys, Group E major occupancies on the first and second storeys, and a parking garage on the first to fourth storeys.

Alternatively, the requirements of Articles 3.2.2.4. to 3.2.2.8. for superimposed major occupancies can be applied, resulting in buildings of mixed construction conforming to the building height and area limits for encapsulated mass timber construction and in which the lower storeys are of noncombustible construction and the upper storeys are of encapsulated mass timber construction. For example, a Group A, Division 2 or Group B, Division 3 major occupancy could be located on the first 4 storeys of a 12-storey Group C building constructed in accordance with Article 3.2.2.48EMTC., as long as these first 4 storeys were constructed of noncombustible construction in accordance with Article 3.2.2.23. or 3.2.2.42., as applicable. (See also Articles 3.2.2.6. and 3.2.2.7.)”.

49. In Division B of Book I, after Note A-3.2.2.50.(5) and 3.2.2.58.(4), Council adds the following:

“A-3.2.2.91.(1) and Table 3.2.2.91. Occupancy Combinations in Buildings of Mixed Encapsulation Ratings. Buildings conforming to the building height and minimum encapsulation rating requirements and the other fire protection requirements of Article 3.2.2.91. may be entirely constructed of encapsulated mass timber construction and incorporate the multiple major occupancies otherwise permitted by Articles 3.2.2.4. to 3.2.2.6. This would also include permitting mixing of major occupancies that require different levels of encapsulation for structural mass timber elements in accordance with Table 3.2.2.91.”.

50. A decision by a court that any part of this by-law is illegal, void, or unenforceable severs that part from this by-law, and is not to affect the balance of this by-law.

51. This by-law is to come into force and take effect on the date of its enactment.

