

BY-LAW NO. _____

**A By-law to amend Building By-law No. 12511
Regarding Reduction in Upgrade Triggers for Certain Uses and Major Occupancies**

THE COUNCIL OF THE CITY OF VANCOUVER, in public meeting, enacts as follows:

1. This By-law amends the indicated provisions of Building By-law 12511.
2. In Book I, Division B, Article 11.2.1.2., Council:
 - (a) In Sentence (8), strikes out the words, “Where there is a change of *major occupancy*” and substitutes “Except as permitted by Sentence (10), where there is a change of *major occupancy*”,
 - (b) In Sentence (9), strikes out all references to Table 11.2.1.2., and substitutes Table 11.2.1.2.-A,
 - (c) In the header to Table 11.2.1.2., strikes out the words “Table 11.2.1.2.” and substitutes “Table 11.2.1.2.-A”, and
 - (d) At the end of the Article, inserts the following new Sentence:

10) Where there is a change of *major occupancy* in a *building*, the upgrade requirements of Flow Chart #2 of the Upgrade Mechanism Model in Division B Appendix A need not be provided where

- a) the change in *major occupancy* is to a single *suite*,
- b) the aggregate *suite* area does not exceed the lesser of 50% of the *building area* or 300 m²,
- c) the major occupancy of the *suite* is Group D or Group E, and
- d) the use and aggregate *suite* area complies with Table 11.2.1.2.-B.

**Table 11.2.1.2.-B
Maximum Aggregate Suite Area
Forming part of sentence 11.2.1.2.(10)**

Major Occupancy	Suite Use	Aggregate Suite Area	
		≤200 m ²	201 to 300 m ²
Group D	Administrative & Business Offices	Y	Y
	Barber and Hairdressing Shop Beauty Salon	Y	Y
	Health Care Offices (non-surgical, non-sedation)	Y	Y ⁽¹⁾
Group E	General Retail (Non-hazardous materials)	Y ⁽¹⁾	N ⁽²⁾

Notes to Table 11.2.1.2.-B.:

(1) Provided the Hazard Index of the space is not increased (see Table A-11.2.1.2.D)

(2) Except as acceptable to the *Chief Building Official*

”.

3. In Book I, Division B, in the notes to Part 11, Council strikes out the note A-11.2.1.2. and substitutes the following:

“

NOTES TO PART 11 EXISTING BUILDINGS

A-11.2.1.2. EXISTING BUILDING UPGRADE MECHANISM

BACKGROUND AND INTENT. When work is carried out to an existing building, the Building By-law requires that the building be upgraded to an “acceptable” level. On April 20, 2004 Council approved a new model for determining the “acceptable” level of Building By-law upgrade for existing buildings undergoing alterations under the City’s building permit process.

Prior to April 20, 2004, the Upgrade Mechanism Model was based primarily on construction values. The new Upgrade Mechanism Model determines the required “acceptable” level of upgrade for an existing building using the concept of “Project Types and Categories of Work”.

The intent of the Upgrade Mechanism Model is to provide a road map for building owners and designers to determine the required level of Building By-law upgrade for the existing portion of a building as a function of the project types and the related categories of work.

The Upgrade Mechanism Model is not generally intended for existing residential buildings containing not more than two principal dwelling units. The general upgrade requirement for these types of buildings is defined in Article 11.2.1.4. of Division B.

VOLUNTARY BUILDING BY-LAW UPGRADES. Where a voluntary upgrade for fire alarm systems, sprinkler systems, exits, accessibility, seismic work, building envelope repair, energy efficiency, or water efficiency is performed, it is not the intent of this By-law to require the owner to further upgrade the building provided no other work is included in the project. If other work is included in the project, the upgrade requirement will only be based on the non-voluntary work proposed.

PROCEDURE FOR USING THE UPGRADE MECHANISM MODEL

The following steps outline a recommended procedure for using the Upgrade Mechanism Model.

STEP 1 – Determine Any Other Requirements that may be Applicable. Other Building By-law requirements may be applicable to the existing building project. Review the Overall Conditions for the Upgrade Mechanism Model to determine if other requirements are applicable.

STEP 2 – Determine the appropriate Project Type(s) and Related Category or Categories of Work as a function of the scope of work for the alteration.

If the renovation includes more than one category of work or project type, then the most restrictive upgrade levels from each project type would be applied.

Table A-11.2.1.2.-A Project Types and Related Categories of Work			
Project Type	Rehabilitation (See Flow Chart No. 1)	Change of Major Occupancy (See Flow Chart No. 2)	Addition (See Flow Chart No. 3)
Categories of Work	Voluntary Upgrade Repair/Small Suite Minor Renovation Major Renovation Reconstruction	Change of Major Occupancy Classification Change of Major Occupancy Classification to a Small Suite	Major Horizontal Addition Minor Horizontal Addition Major Vertical Addition Minor Vertical Addition

STEP 3 – Determine the Required Design Upgrade Level Based on the Category of Work for the Project

The required upgrade levels for fire, life & health safety; structural safety; non-structural safety; accessibility for persons with disabilities; and energy efficiency are to be determined using each of the applicable project type flow charts and the related category of work

For Rehabilitation Type Projects use Flow Chart No. 1.

For Change of Major Occupancy Type Projects use Flow Chart No. 2.

For Addition Type Projects use Flow Chart No. 3.

NOTE: Where a project involves more than one category of work, the most restrictive upgrade level, as determined from each category of work, shall determine the upgrade design level.

STEP 4 – Determine the objective and acceptable solution for the most restrictive upgrade level for fire, life and health safety; structural safety; non-structural safety; accessibility for persons with disabilities; and energy efficiency. The most restrictive upgrade levels are the design upgrade levels that are to be applied to the existing building.

The model is based on incremental upgrade levels for each of the fire, life and health safety (F), structural safety (S); non-structural safety (N); accessibility (A); and energy (E) objectives. For each of the upgrade levels, the model states the objective of the upgrade level as well as the corresponding acceptable solution that is deemed to meet the intended objective of the applicable upgrade level. The objective statement and acceptable solution for each F, S, N and A upgrade level is defined in Table A-11.2.1.2.-B. The objective statement and acceptable solution for each E upgrade level is defined in Table A-11.2.1.2.-C.

The alternative acceptable solution for energy efficiency requires that the determined E design upgrade level from Flow Chart No 1 is used to enter Table A-11.2.1.2.-C to determine the Objective Statement and review the list of options of alternative acceptable solutions. Within Table A-11.2.1.2.-C and the appropriate E Level section, the user selects one alternative acceptable solution from within the Building System chosen by the user to be upgraded. Only one (1) of the solutions in the Alternative acceptable solutions Options column in Table A-11.2.1.2.-C is required to meet the objective. It is up to the user to determine which system in the Building System column and corresponding upgrade solution in the Alternative acceptable

solution Option column shall be chosen to satisfy the objective. Within any 5 year period, when an alternative acceptable solution has been used previously within the project area, then that option is not permitted to be used as an alternative acceptable solution.

PROJECT TYPES AND THEIR RELATED CATEGORIES OF WORK

The Upgrade Mechanism Model is based on the following defined three Project Types and related Categories of Work as illustrated in Table A-11.2.1.2.-A. If the renovation includes more than one category of work or project type, then the most restrictive upgrade levels from all the applicable project types would be applied.

Table A-11.2.1.2.-A Project Types and Related Categories of Work			
Project Type	Rehabilitation (See Flow Chart No. 1)	Change of Major Occupancy (See Flow Chart No. 2)	Addition (See Flow Chart No. 3)
Categories of Work	Voluntary Upgrade Repair/Small Suite Minor Renovation Major Renovation Reconstruction	Change of Major Occupancy Classification Change of Major Occupancy Classification to a Small Suite	Major Horizontal Addition Minor Horizontal Addition Major Vertical Addition Minor Vertical Addition

REHABILITATION PROJECT TYPE (Flow Chart No. 1)

Voluntary Building By-law Upgrades – Voluntary Building By-law upgrades are limited to alterations that directly contribute to the improvement of the fire alarm, sprinkler, exit, accessibility, seismic, building envelope, and energy or water efficiency systems in an existing building.

REPAIR – Repair pertains to a limited scope of interior or exterior renovation work to replace existing building components with functionally equivalent components. Repair work may not include work that increases the usable floor area of a building, creates an interconnected floor space, supports an addition or change of use, or the consolidation of more than one existing suite into a single tenant space. For Repairs, an E1 level of energy upgrade shall be applied.

SMALL SUITE – The upgrade trigger for a Small Suite pertains to limited renovation work within a suite separated from adjacent spaces in a building by a fire separation incorporating at least two layers of gypsum wallboard on the suite side, which is

- a small suite as defined in Division A, Article 1.4.1.2., or
- a suite of Group A, Division 2, D, or E major occupancy with an occupancy up to 100 persons as determined by Division B, Article 3.1.17.1.(1)(c) and egress directly to the adjoining ground level.

Small Suite work may include reconfiguration of the interior space of the suite, but may not include work on more than level (storey or mezzanine), interconnected floor spaces, exterior renovations, or the consolidation of more than one existing suite into a single new tenant space. For Small Suite renovations, an E2 level of energy upgrade shall be applied.

MINOR RENOVATION – Minor renovation means a project whose scope of work includes construction limited to the improvement, renovation, reconfiguration, or refurbishment of a single suite contained within a single tenant space and those demising walls shared with the adjoining suites, but which does not include the public or common floor areas of the building. Minor renovation may also include the subdivision of a single suite of not more than one storey into smaller constituent suites.

Minor renovations may include the following:

- Reconfiguration of the interior space of the suite which may occupy multiple levels in a building,
- Retention of existing interconnected floor spaces that do not create new connections to previously unconnected floor areas,
- Retention of existing mezzanines that do not add floor area,
- Subdivision of an existing suite of not more than one storey into one or more suites which do not include floor area outside of the subdivided suite,
- Renovation in adjacent suites to the extent necessary to support the relocation of shared demising walls, and
- Exterior renovations pertaining to the subject suite.

Where the renovation includes a new interconnected floor space, this work would not be considered to be a minor renovation. New mezzanines are considered to be additions.

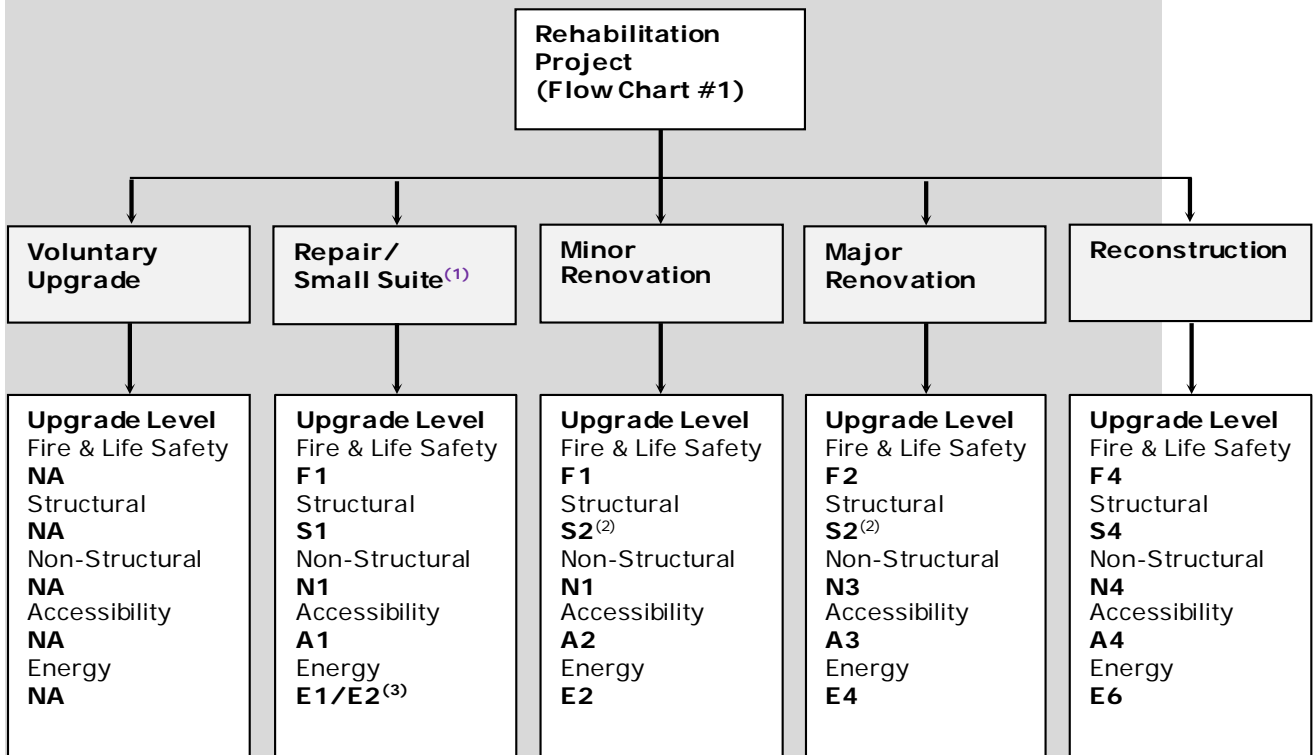
MAJOR RENOVATION – Major renovations means work within multiple tenant spaces that is not otherwise considered a minor renovation. Major renovations may include (singly or in combination): Interior re-configuration of multiple tenant spaces, creation of interconnected floor spaces, exterior alterations, or alterations that create a new tenant space. However, where such renovation includes a change of major occupancy classification or a new mezzanine, this work would not be considered solely as a major renovation. New mezzanines are considered to be additions.

RECONSTRUCTION - Reconstruction means the extensive removal of the majority of construction to expose the building's primary structure on interior and exterior walls, floors and roof with only the primary structural elements remaining in place (building skeleton). Reconstruction also includes substantial reconfiguration of the interior floor space. Where work, which might otherwise be considered as reconstruction, is undertaken solely to facilitate the repair or the abatement of a health hazard of a building, then such work need not be considered a reconstruction and would be considered a repair, minor renovation or a major renovation as defined in this By-law.

Reconstruction project typically include:

- extensive renovations throughout the entire building and the building is gutted.
- the removal of the majority of drywall and plaster from the interior walls.
- the removal of the majority of drywall, plaster, insulation and exterior cladding from the exterior walls,
- the removal of floor and roof membranes and coverings.

FLOW CHART NO. 1



Notes to Flow Chart No. 1:

⁽¹⁾ For small suites, the small suite must be separated on the suite side of the suite separation with at least two layers of gypsum wall board (GWB). Where only one layer exists, then an additional layer of GWB must be added to the suite side only. The additional layer of GWB may be any type of GWB with a minimum thickness of 13 mm.

⁽²⁾ Notwithstanding the upgrade levels in Flow Chart #1, where a minor or major renovation involves an entire building and the renovation includes the removal of the majority interior wall cladding then the structural seismic upgrade level shall be S3.

⁽³⁾ For Small suite renovations, an E2 level of energy upgrade shall be applied.

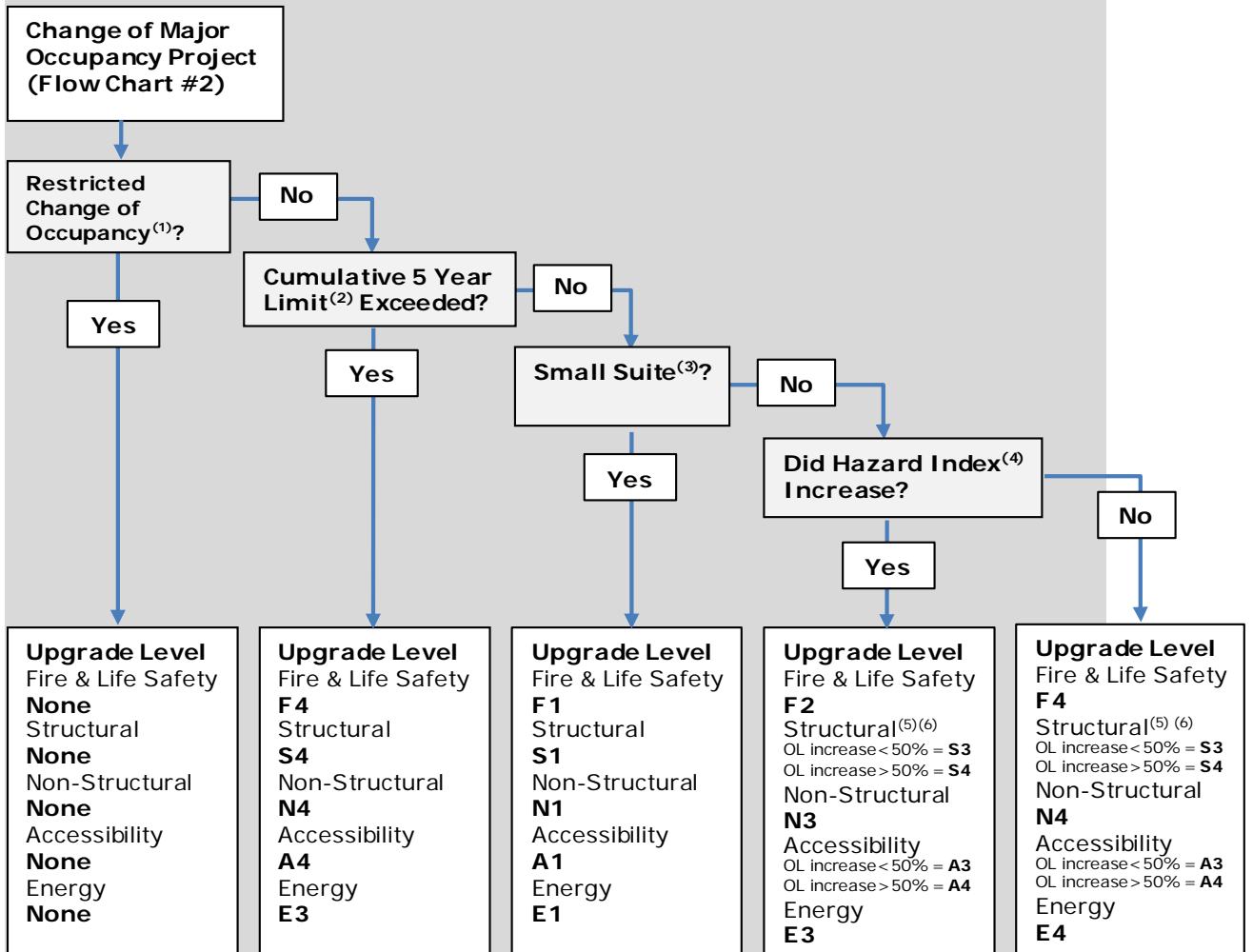
CHANGE OF MAJOR OCCUPANCY CLASSIFICATION PROJECTS (Flow Chart No. 2)

Restricted Change of Occupancy. The term “restricted change of occupancy” refers to a change in major occupancy restricted to a specific set of uses as set out in Article 11.2.1.2.(10) that are limited both in scope and risk such that it does not increase the overall hazard.

Change of Major Occupancy Classification – Change of major occupancy classification means a change of use within a building, a suite, or its constituent floor areas where the proposed use is outside of the currently defined uses of the existing major occupancy classification permitted for the building, the suite, or its constituent floor areas.

Small Suite Change of Major Occupancy Classification – Small suite change of major occupancy classification means a change of use within a small suite, or the constituent floor areas of a small suite, where the occupant load for the entire suite does not exceed 60 persons and the small suite is limited to a Group A, Division 2, Group D, Group E, Group F, Division 2 (wholesale showroom), or Group F, Division 3 major occupancy.

FLOW CHART NO. 2



Notes to Flow Chart No. 2:

(1) Restricted Change of Occupancy (see Article 11.2.1.2.(10) and note A-11.2.1.2.(10))

(2) The cumulative 5 year limit is triggered when there is a change of major occupancy in an existing building and the aggregate area of the change in major occupancy including the current work within any 5 year period is greater than 50% of the building area (as defined in Article 1.4.1.2. of Division A) in a building of not more than one storey, or the aggregate area of the change in major occupancy within any 5 year period is greater than 100% of the building area (as defined in Article 1.4.1.2. of Division A) in a building of more than one storey.

(3) For small suites, the small suite must be separated on the suite side of the suite separation with at least two layers of gypsum wall board (GWB). Where only one layer exists, then an additional layer of GWB must be added to the suite side only. The additional layer of GWB may be any type of GWB with a minimum thickness of 13 mm.

(4) The Hazard Index may be determined by the Hazard Index Table A-11.2.1.2.-D. or other methodology as deemed acceptable to the Chief Building Official.

(5) Occupant load (OL) increase is based on the proposed occupant load for the entire building versus the current occupant load for the entire building. The OL change may be assessed in a comparative manner by considering only those areas undergoing a change of major occupancy, where the occupant load of the remainder of the building cannot otherwise reasonably be assessed. Occupant loads are to be determined by the acceptable solutions in Subsection 3.1.17. of Division B.

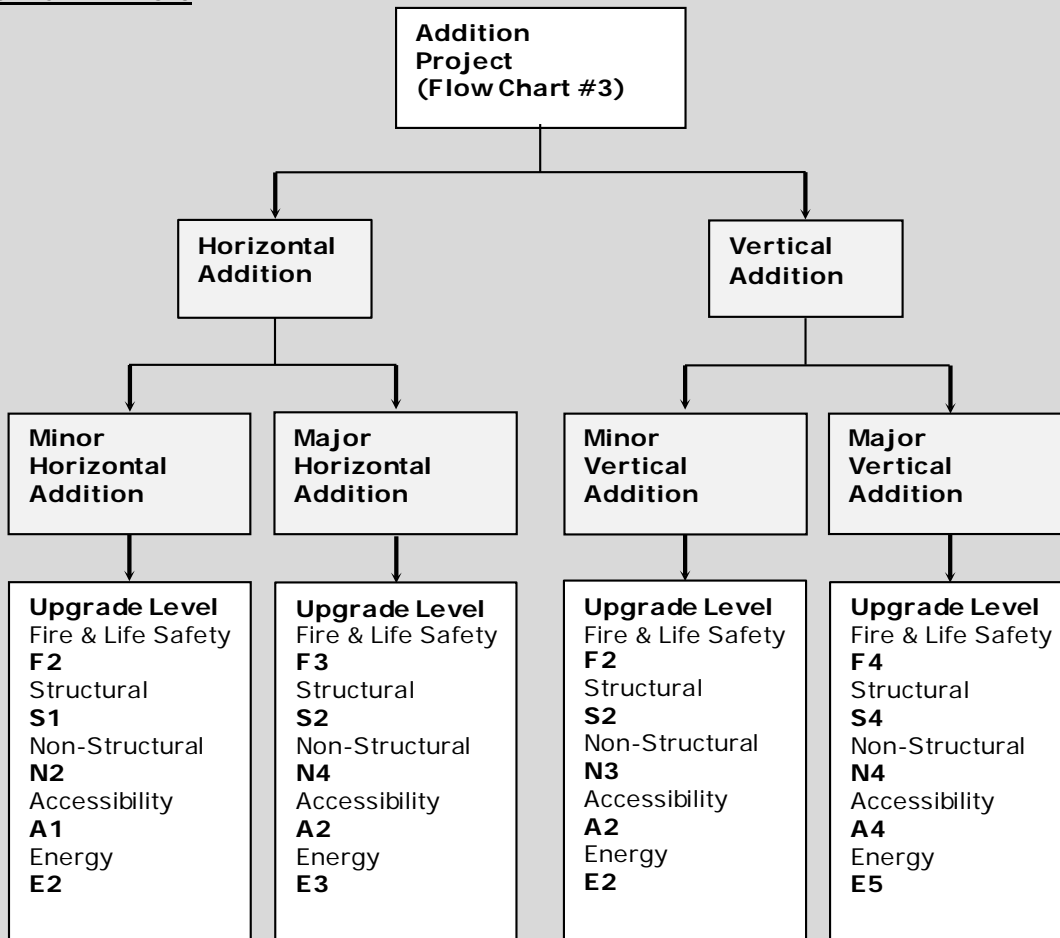
(6) Where there is a change of major occupancy and the structural load paths or structural design criteria are altered then it must be demonstrated that the existing building has the structural capacity to carry the increase in load or the building shall be structurally upgraded to carry the increase in live load.

ADDITION PROJECTS (Flow Chart No. 3)

Horizontal Addition – Horizontal additions include both “minor” and “major” horizontal additions. A minor horizontal addition is any expansion of a floor area beyond the extents of the existing floor area in which it is located by not more than 25 per cent of the existing building area, or by not more than 500 m² in aggregate floor area. A major horizontal addition is any expansion of a floor area beyond the extents of the existing floor area that exceeds the limits permitted by a minor horizontal addition. Any construction that creates new floor area, by in-filling existing roof, or deck areas, or creates new superimposed floor area over existing building structure or floor area is not considered a horizontal addition.

Vertical Addition – Vertical additions include both “minor” and “major” vertical additions. A minor vertical addition is the addition of new floor area (storey, mezzanine, decks or other roof areas intended for occupancy) that in-fills existing unoccupied roof or deck areas, or is superimposed over existing building structure or floor area, with an aggregate floor area increase of not more than 25 per cent of the building area, or by not more than 500 m² in aggregate floor area. A major vertical addition is an addition that increases the aggregate floor areas or mezzanine area increase that exceeds the limits permitted by a minor vertical addition.

FLOW CHART NO. 3



DESIGN UPGRADE LEVEL TABLES

Table A-11.2.1.2.-B DESIGN UPGRADE LEVELS FOR FIRE, LIFE AND HEALTH SAFETY (F), STRUCTURAL SAFETY(S), NON-STRUCTURAL SAFETY (N), and ACCESSIBILITY (A)		
DESIGN LEVEL ⁽¹⁾	OBJECTIVE STATEMENT	ALTERNATIVE ACCEPTABLE SOLUTIONS
F1	Exiting to be reviewed to ensure that the exits do not present an unsafe condition.	Project Area - Exits to be upgraded with respect to number, capacity, and fire separations only.
S1	Proposed work must not have an adverse effect on the structural capacity of the existing structure.	Entire Building - Proposed work must not reduce the structural integrity of the existing building.
N1	Project area to be reviewed to ensure safety from overhead falling hazards.	Project Area - Restrain all ceiling supporting frames, T-bars assemblies, ceiling gypsum wall boards, all overhead mechanical ducts, sprinklers, and equipment, overhead electrical conduits and lights
A1	The proposed work must not adversely affect the existing accessibility level of the building.	Project Area - Existing level of accessibility must be maintained throughout the project area. No additional accessibility enhancements are required.
F2	Existing building to meet the fire & life safety requirements of the Building By-law within the project area and have conforming exits leading from the project area to an acceptable open space.	Project Area - Alarms and detectors (only where existing devices are provided), emergency lights, access to exit, exits, exit signs, and exit lights. Public Area (leading from project area to an acceptable open space) - emergency lights, exit signs, access to exit, exits, and flame spread ratings.
S2	Limited structural upgrade required in order to provide minimum protection to building occupants during a seismic event within the project area.	Project Area - Non-structural elements and falling hazards must be restrained to resist lateral loads due to earthquakes within the project area.
N2	Project area and means of egress to be reviewed to ensure safety from overhead falling hazards.	Project Area Means of Egress - Restrain interior partition walls. Restrain all ceiling supporting frames, T-bars assemblies, ceiling gypsum wall boards, sprinklers, all overhead mechanical ducts, and equipment, overhead electrical conduits and lights. Restrain cladding veneer, parapets, canopies and ornaments over exit and extended to 5 m on either side of exit.
A2	A limited level of upgrade shall be provided within the project area to	Project Area - door clearances, door hardware, and areas of refuge.

	ensure access for persons with disabilities.	
F3	Existing building to meet fire, life and health safety requirements within the project area. Existing building to meet fire, life & health safety requirements within the public areas.	<p>Project Area – Alarms & detectors (only where existing devices are provided), emergency lighting, access to exit, exits, exit signs, exit lights, flame spread ratings, floor assemblies & supports, occupancy separation, standpipes and sprinklers, washrooms.</p> <p>Public Area - Alarms & detectors (only where existing devices are provided), emergency lighting, access to exit, exits, exit signs, exit lights.</p> <p>Entire Building – Fire fighter’s access.</p>
S3	The building structure shall be upgraded to an acceptable level in order to provide a minimum level of property and life safety to unreinforced masonry or other buildings having less than 30 percent of the current required seismic resistance. Falling hazards that may impact adjacent properties and over public ways must be addressed.	<p>Entire Building — Building to be upgraded to resist 50 percent of the current By-law specified lateral force levels, where the building is evaluated as having less than 30 percent of the current required seismic resistance. Restrain falling hazards from major building components such as cantilevered walls, parapets, exterior ornaments, towers, chimneys, or other appendages, which could impact adjacent properties and public ways to resist forces due to a seismic event.</p>
N3	Building exits and to acceptable open space to be reviewed to ensure safety from overhead falling hazards.	<p>Entire Building Exits - Restrain interior partition walls. Restrain ceiling supporting frames, T-bars assemblies, ceiling gypsum wall boards, overhead mechanical equipment, sprinklers, and services, overhead electrical equipment and services. Restrain falling hazards to resist forces due to a seismic event from non-structural elements including cladding, veneer, cornices, canopies, awnings, and ornaments over exit and extended to 5 m on either side of exit.</p>
A3	The existing building shall be upgraded to an acceptable level in order to ensure complete access within the project area as well as access to the remainder of the building.	<p>Project Area — Door clearances, door hardware, accessible washrooms, and areas of refuge.</p> <p>Public Area — Door clearances, door hardware, areas of refuge, washrooms, ramps, and elevators.</p>
F4	Entire building to substantially meet the intent of health, fire and life safety requirements of the VBBL as well as provide protection to adjacent property.	<p>Entire Building — Alarms & detectors, emergency lighting, access to exit, exits, exit signs, exit lights, flame spread ratings, firefighting access & water supply, floor assemblies & support, spatial separation, occupancy separation,</p>

		standpipes & sprinklers, washrooms, high building requirements, lighting levels, sound transmission classifications, ventilation, building envelope review, and radio antenna systems.
S4	The entire building structure shall be brought up to an acceptable level in order to meet seismic requirements of the VBBL.	Entire Building — Building to be upgraded to resist 75 percent of the current By-law specified lateral force levels, where the building is evaluated as having less than 60 percent of the current required seismic resistance.
N4	Entire Building and to acceptable open space to be reviewed to ensure safety from overhead falling hazards.	Entire Building — Restrain all interior partition walls. Restrain all ceiling supporting frames, T-bars assemblies, ceiling gypsum wall boards, sprinklers, overhead mechanical equipment and services, overhead electrical equipment and services. Restrain exterior falling hazards to resist forces due to a seismic event from cladding, veneer, cornices, parapets, canopies, awnings, and ornaments attached to the exterior of the building.
A4	The existing building shall be upgraded in order to provide the minimum accessibility requirements of the VBBL.	Entire Building — Building to meet accessibility provisions of the current VBBL.

Notes to Table A-11.2.1.2.-B:

(1) Where there is one or more upgrade level(s) within the same category preceding the design upgrade level in Table A-11.2.1.2.-B, then the design upgrade level shall also include all of the preceding upgrade levels. For example, where the design upgrade level is F3, then all of the upgrade requirements under F2 and F1 also apply.

TABLE A-11.2.1.2.-C

Alternative acceptable solutions for Energy Efficiency

General Objective Statement: Improve the energy and GHG emissions performance of <i>buildings</i> , systems or components.		
Solution Location: E1 through E5 - Project Location. E6 and E7 – Building Location		
E Level	Building System	Alternative Acceptable Solution Options ⁽¹⁾ (Choose one)
E1 Level Objective Statement: Review and maintain, or upgrade, basic efficiency of equipment or components.		
E1	Envelope	1) Reduce air leakage of all Glazing & Doors (per 5.4.3.2 of ASHRAE 90.1-2016) 2) Upgrade all Opaque Doors performance (per 5.5.3.6 of ASHRAE 90.1-2016)
	HVAC ⁽³⁾	1) Upgrade Dead Band settings (per 6.4.3.1.2 of ASHRAE 90.1-2016) 2) Upgrade Set-point Overlap Restrictions (per 6.4.3.2 of ASHRAE 90.1-2016)

		<ul style="list-style-type: none"> 3) Upgrade Off-Hour Controls (per 6.4.3.3 of ASHRAE 90.1-2016) 4) Upgrade Ventilation System Controls (per 6.4.3.4 of ASHRAE 90.1-2016) 5) Upgrade Heat Pump Auxiliary Heat Controls (per 6.4.3.5 of ASHRAE 90.1-2016) 6) Upgrade Freeze Protection and Snow/Ice Melting Systems (per 6.4.3.7 of ASHRAE 90.1-2016) 7) Upgrade Ventilation Controls For High-Occupancy Areas (per 6.4.3.8 of ASHRAE 90.1-2016) 8) Upgrade DDC Controls (per 6.4.3.10 of ASHRAE 90.1-2016) 9) Inspect and remediate HVAC Insulation (per 6.4.4.1 of ASHRAE 90.1-2016) 10) Inspect and remediate Duct and Plenum Leakage (per 6.4.4.2 of ASHRAE 90.1-2016) 11) Upgrade Heat and Cool Limitation (per 6.5.2.1 of ASHRAE 90.1-2016)
	SWH ⁽⁴⁾	1) Upgrade all SWH Piping Insulation (per 7.4.3 of ASHRAE 90.1-2016)
	Lighting	<ul style="list-style-type: none"> 1) Upgrade internal Exit Signs to not exceed 5W per face 2) Functional Testing (per 9.4.3 of ASHRAE 90.1-2016)
E2 Level Objective Statement: Review and maintain, or upgrade, basic efficiency of sub-systems.		
E2⁽²⁾	Envelope	<ul style="list-style-type: none"> 1) Reduce air leakage of all Loading Dock Doors (per 5.4.3.3 of ASHRAE 90.1-2016) 2) Upgrade all Floor Insulation (per 5.5.3.4 of ASHRAE 90.1-2016) 3) Reduce total Skylight Fenestration/Glazing Area to 3% of gross roof area (per 5.5.4.2.2 of ASHRAE 90.1-2016)
	HVAC ⁽³⁾	<ul style="list-style-type: none"> 1) Upgrade Chilled Water Plant Monitoring (per 6.4.3.11 of ASHRAE 90.1-2016) 2) Upgrade Economizer Fault Detection and Diagnostics (per 6.4.3.12 of ASHRAE 90.1-2016) 3) Clean and Balance all Air Systems (per 6.7.2.3.2 of ASHRAE 90.1-2016) 4) Balance all Hydronic Systems (per 6.7.2.3.3 of ASHRAE 90.1-2016) 5) Remove Wood-Burning Fireplace unit 6) Replace gas fireplace pilot light with electronic ignition unit with energy rating over 50 7) Install makeup air supply per code to balance exhaust fan(s) over 300 cfm
	SWH ⁽⁴⁾	<ul style="list-style-type: none"> 1) Upgrade SWH system Temperature Controls (per 7.4.4.1 of ASHRAE 90.1-2016) 2) Upgrade SWH system Temperature Maintenance Controls (per 7.4.4.2 of ASHRAE 90.1-2016) 3) Upgrade SWH system Outlet Temperature Controls (per 7.4.4.3 of ASHRAE 90.1-2016) 4) Upgrade SWH system Circulating Pump Controls (per 7.4.4.4 of ASHRAE 90.1-2016) 5) Upgrade Pool systems (per 7.4.5 of ASHRAE 90.1-2016) 6) Upgrade pipe risers to incorporate Heat Traps (per 7.4.6 of ASHRAE 90.1-2016)
	Lighting	1) Upgrade to Local Control (per 9.4.1.1.(a) of ASHRAE 90.1-2016)

		<p>2) Upgrade to Restricted to Manual ON (per 9.4.1.1.(b) of ASHRAE 90.1-2016)</p> <p>3) Upgrade to Restricted to Partial Automatic ON (per 9.4.1.1.(c) of ASHRAE 90.1-2016)</p> <p>4) Upgrade to Bilevel Lighting Control (per 9.4.1.1.(d) of ASHRAE 90.1-2016)</p> <p>5) Upgrade all Automatic Daylighting Responsive Controls for Sidelighting (per 9.4.1.1.(e) of ASHRAE 90.1-2016)</p> <p>6) Upgrade all Automatic Daylighting Controls for Toplighting (per 9.4.1.1.(f) of ASHRAE 90.1-2016)</p> <p>7) Upgrade to incorporate Automatic Partial OFF (per 9.4.1.1.(g) of ASHRAE 90.1-2016)</p> <p>8) Upgrade to incorporate Automatic Full OFF (per 9.4.1.1.(h) of ASHRAE 90.1-2016)</p> <p>9) Upgrade to incorporate Scheduled Shutoff (per 9.4.1.1.(i) of ASHRAE 90.1-2016)</p> <p>10) Upgrade to control Parking Garage Lighting (per 9.4.1.3 of ASHRAE 90.1-2016)</p> <p>11) Upgrade to incorporate Additional Controls for Special Applications (per 9.4.1.3 of ASHRAE 90.1-2016)</p> <p>12) Exterior Lighting Control (per 9.4.1.7 of ASHRAE 90.1-2016)</p> <p>13) Reduce total Skylight Fenestration/Glazing Area to 3% of gross roof area (per 5.5.4.2.2. of ASHRAE 90.1-2016)</p>
	Exterior or Patio Heating	<p>1) Remove exterior space heating system</p> <p>2) Upgrade energy intensity (per 10.2.2.22.(3)) and system controls per 10.2.2.22.(4)</p>
E3 Level Objective Statement: Review and improve energy performance of systems.		
E3 ⁽²⁾	Envelope	<p>1) Provide a Building Envelope Assessment Report, to be signed and sealed by a design professional, report to include: effective R-value, blower test, list of upgrades to achieve a compliance rating using COMcheck⁽⁵⁾ software (latest version).</p> <p>2) Reduce air leakage of all Fenestration & Doors (per 5.4.3.2 of ASHRAE 90.1-2016)</p> <p>3) Upgrade all Below-Grade Wall Insulation (per 5.5.3.3 of ASHRAE 90.1-2016)</p> <p>4) Inspect and remediate all ceiling space and floor space equipment and services including ductwork, plumbing, insulation, penetrations, dampers, valves, coils, pans and drains.</p> <p>5) Inspect and remediate all floor/crawl space services (ducts, plumbing, insulation, penetrations, drains etc)</p>
	HVAC ⁽³⁾	<p>1) Provide an HVAC System Assessment Report, to be signed and sealed by a design professional. Report to include: systems reviews, upgrade and re-commissioning options, with estimates for energy savings and cost paybacks.</p> <p>2) Upgrade all ducts, plenums, and insulation (per 6.4.4 of ASHRAE 90.1-2016); inspect and remediate HVAC Insulation (per 6.4.4.1 of ASHRAE 90.1-2016); and inspect and remediate Duct and Plenum Leakage (per 6.4.4.2 of ASHRAE 90.1-2016)</p> <p>3) Incorporate Exhaust Air Recovery systems (per 6.5.6.1 of ASHRAE 90.1-2016)</p>

		<p>4) Incorporate a Service Water Heating Recovery system (per 6.5.6.2 of ASHRAE 90.1-2016)</p> <p>5) Upgrade all Kitchen Exhaust and Replacement Air systems (per 6.5.7.2 of ASHRAE 90.1-2016)</p> <p>6) Upgrade all Laboratory Exhaust and Replacement Air systems (per 6.5.7.3 of ASHRAE 90.1-2016)</p> <p>7) Balance all systems (per 6.7.2.3 of ASHRAE 90.1-2016)</p>
	SWH ⁽⁴⁾	<p>1) Provide an HVAC System Assessment Report, to be signed and sealed by a design professional</p> <ul style="list-style-type: none"> Report to include: systems reviews, upgrade and re-commissioning options, with estimates for energy savings and cost paybacks. <p>2) Upgrade SWH system Controls (per 7.4.4 of ASHRAE 90.1-2016)</p>
	Lighting	<p>1) Provide a comprehensive Lighting System Assessment Report to be signed and sealed by a design professional</p> <ul style="list-style-type: none"> Report to include: systems reviews, upgrade options, with estimates for energy savings and cost paybacks. <p>2) Upgrade total Exterior Lighting Power (per 9.4.2 of ASHRAE 90.1-2016) of the suite.</p> <p>3) Meet the interior lighting power allowance by the Building Area Method (per 9.5 of ASHRAE 90.1-2016)</p> <p>4) Meet the interior lighting power allowance by the Space-by-Space Method (per 9.6 of ASHRAE 90.1-2016)</p>
	Exterior or Patio Heating	<p>1) Remove exterior space heating system</p> <p>2) Upgrade energy intensity, system and unit/zone controls (per 10.2.2.22.(3) and (4)), and circulation fans (per 10.2.2.22.(5))</p>
E4 Level Objective Statement: Review and improve energy performance of larger systems.		
E4 ⁽²⁾	Envelope	<p>1) Reduce air leakage of entire Building Envelope (per 5.4.3 of ASHRAE 90.1-2016)</p> <p>2) For single retail/tenant spaces < 500 m²) Perform an Air Leakage / Blower test and remediate</p> <p>3) Upgrade all Roof Insulation (per 5.5.3.1 of ASHRAE 90.1-2016)</p> <p>4) Upgrade all Above-Grade Wall Insulation (per 5.5.3.2 of ASHRAE 90.1-2016)</p> <p>5) For single retail/tenant spaces < 500 m²) Replace storefront window(s) to meet the By-law.</p> <p>6) Reduce total vertical Fenestration/Glazing Area to 40% of gross wall area (per 5.5.4.2.1 of ASHRAE 90.1-2016)</p> <p>7) Upgrade all Fenestration/Glazing Performance (per 5.5.4.3 and 5.5.4.4 of ASHRAE 90.1-2016)</p> <p>8) Inspect and remediate roof systems including membrane, parapets, scuppers, drains, gutters, downspouts and drains.</p>
	HVAC ⁽³⁾	<p>1) Upgrade all Zone Thermostatic Controls (per 6.4.3.1 of ASHRAE 90.1-2016)</p> <p>2) Upgrade HVAC to incorporate Economizers (per 6.5.1 of ASHRAE 90.1-2016)</p> <p>3) Upgrade Heat Rejection Equipment (per 6.5.5 of ASHRAE 90.1-2016)</p> <p>4) Upgrade to Air and Service Water Heating Heat Recovery systems (per 6.5.6 of ASHRAE 90.1-2016)</p>

		5) Upgrade entire Radiant Heating system (per 6.5.8 of ASHRAE 90.1-2016) 6) (Re-)Commission all systems (per 6.7.2.4 of ASHRAE 90.1-2016)
	SWH ⁽⁴⁾	1) Upgrade all Service Water Heating Equipment Efficiency (per 7.4.2 of ASHRAE 90.1-2016)
	Lighting	1) Lighting Control (per 9.4.1 of ASHRAE 90.1-2016)
	Exterior or Patio Heating	1) Remove exterior space heating system 2) Upgrade exterior space heating system (per 10.2.2.22)
E5 Level Objective Statement: Review and bring to present VBBL energy requirements, entire system(s) affected by vertical addition.		
E5 ⁽²⁾	Envelope	1) Upgrade insulation levels of entire Building Envelope (Opaque Areas) (per 5.5.3 of ASHRAE 90.1-2016) 2) Upgrade all Fenestration/Glazing (per 5.5.4 of ASHRAE 90.1-2016)
	HVAC ⁽³⁾	1) Upgrade all HVAC Controls, Insulation and Leakage (per 6.4 of ASHRAE 90.1-2016)
	SWH ⁽⁴⁾	1) Upgrade Service Water Heating system to meet the Mandatory Provisions (per 7.4 of ASHRAE 90.1-2016)
	Lighting	1) Upgrade Lighting system to meet the Mandatory Provisions (per 9.4 of ASHRAE 90.1-2016)
E6 Level Objective Statement: Reconstruct entire building systems to meet energy efficiency requirements of present Vancouver Building By-Law.		
E6	Envelope	1) Upgrade all aspects of Building Envelope (per Section 5 of ASHRAE 90.1-2016)
	HVAC ⁽³⁾	1) Upgrade all aspects of HVAC (per Section 6 of ASHRAE 90.1-2016)
	SWH ⁽⁴⁾	1) Upgrade all aspects of SWH (per Section 7 of ASHRAE 90.1-2016)
	Lighting	1) Upgrade all aspects of Lighting (per Section 9 of ASHRAE 90.1-2016)
E7 Level Objective Statement: Reconstruct building to meet energy efficiency requirements of present Vancouver Building By-Law.		
E7	Energy	1) Upgrade existing building (per VBBL 1.3.3.7 Energy Use)

Notes to Table A-11.2.1.2.-C:

(1) References to ASHRAE 90.1 in Table A-11.2.1.2.-C can be considered guidance for determining the scope of work when applying the upgrade requirements to low-rise multi-family projects, otherwise these projects may apply the energy upgrade requirements of Table 11.2.1.4, per the options provided within Sentence 11.2.1.2.(9)(d).

(2) BOMA BEST (Path 1) may be substituted as the solution for upgrade level E2. BOMA BEST (Path 2) may be substituted as the solution for upgrade levels E3, E4 or E5. BOMA BEST is a Canadian industry standard for commercial building sustainability certification. Official certification documentation produced by BOMA would be required for acceptance as an alternative acceptable solution option.

The intent of the inclusion of the BOMA BEST rating system is to recognise the efforts made towards improved building performance. BOMA BEST Path 1 or Path 2 will be accepted provided

a) the BOMA BEST certification is administered by BOMA,

b) BOMA BEST Path 1 - BOMA BEST (Level 1, 2, 3, 4) provides proof of a valid Certification and ongoing commissioning per BOMA's BEST Practice Q.3 (Preventative Maintenance Program), and

c) BOMA BEST Path 2 - BOMA BEST (Level 1-AL2, 2, 3, 4) provides proof of a first-time Certification (to at least Level 1 with an ASHRAE Level 2 audit) within the previous 18 months, or a valid Certification and an increase in BOMA BEST's Energy Performance Benchmark Scale by at least one level within the previous 18 months, or advancing Certification (from one level to another) within the previous 18 months.

Proof means in the form of official certified documentation produced by BOMA, or a single Commissioning/Energy Report developed and provided by a qualified consultant, contractor, or other expert in this specialized field.

(3) HVAC – Heating, Ventilating and Air Conditioning

(4) SWH – Service Water Heating

(5) COMcheck – software developed by the US Department of Energy for use with ASHRAE 90.1-2016 Building Envelope Trade-Off option

HAZARD INDEX TABLE

The hazard index for various building uses are indicated in Table A-11.2.1.2.-D.

The required level of Building By-law upgrade for a Change of Major Occupancy Type projects is dependent on whether or not the Hazard Index has increased for the proposed alteration. Hazard Index ratings are intended to reflect the level of fire and life safety risk to occupants for various building uses and suite sizes. Hazard index ratings range from 1 to 6, such that a hazard index of rating of 6 represents the highest risk to occupants.

For the purposes of a Restricted Change of Occupancy, the Hazard Index may be established based on the aggregate area of the suite, to provided indices that can be compared to establish a relative level of risk between the proposed and current uses of different sizes. Where a suite is subdivided as part of change in major occupancy, the relative risk is established based on the index number of the final aggregate size of the suite as compared to the original size of the suite (see Note A-11.2.1.2.(10)).

Table A-11.2.1.2.-D
Hazard Index Table

Group A Division 1		
Building Use	Hazard Index (<i>Building Area</i> ⁽¹⁾)	
	≤200 m ²	>200 m ²
Dinner Theatres	4	5
Live Theatres	4	5
Motion Picture Theatres	4	5
Opera Houses	4	5
Television Studios (With Audience)	4	5
Group A Division 1		
Building Use	Hazard Index (<i>Building Area</i> ⁽¹⁾)	
	≤200 m ²	>200 m ²
Art Galleries	3	4
Auditoria	3	4
Billiard Halls, Amusement Arcades	3	4
Bowling Alleys	3	4
Churches	3	4
Clubs, Lodges (Non-Residential)	3	4
Community Halls	3	4

Concert Halls	3	4
Court Rooms	3	4
Dance Halls	3	4
Daycare Centres	3	4
Exhibition Halls (Without Sales)	3	4
Exhibition Halls (With Sales)	See Group E	
Gymnasias (Multi-Purpose)	3	4
Gymnasias (Athletic)	3	4
Lecture Halls	3	4
Libraries	3	4
Licensed Beverage Establishments	3	4
Licensed Clubs, Lodges	3	4
Museums	3	4
Passenger Stations/Depots	3	4
Recreational Piers	3	4
Restaurants (Seating Over 17)	3	4
Schools, Colleges	3	4
Undertaking Premises	3	4
Group A Division 3		
Building Use	Hazard Index (<i>Building Area</i>⁽¹⁾)	
	≤200 m²	>200 m²
Arenas (No Occupancy On Activity Surface)	3	4
Armouries (No Occupancy On Activity Surface)	3	4
Enclosed Stadia or Grandstand	3	4
Ice Rinks (No Occupancy On Activity Surface)	3	4
Indoor Swimming Pools	3	4
Group A Division 4		
Building Use	Hazard Index (<i>Building Area</i>⁽¹⁾)	
	≤200 m²	>200 m²
Amusement Park Structures	2	3
Bleachers	1	3
Grandstands (Open)	1	3
Reviewing Stands	1	3
Stadia (Open)	1	3
Group B, Division 1		
Building Use	Hazard Index (<i>Building Area</i>⁽¹⁾)	

	$\leq 200 \text{ m}^2$	$> 200 \text{ m}^2$
Detention Facilities (Minimum Security)	4	5
Detention Facilities (All other types of security)	6	6
Police Station with Detention (not meeting Article 3.1.2.4.)	3	4
Group B, Division 2		
Building Use	Hazard Index (<i>Building Area</i>⁽¹⁾)	
	$\leq 200 \text{ m}^2$	$> 200 \text{ m}^2$
Hospital, Nursing Home, Geriatric, Sanitarium (Ambulatory)	4	5
Hospital, Nursing Home, Geriatric, Sanitarium (Non-Ambulatory)	4	6
Psychiatric Hospitals (Maximum Confinement)	4	5
Psychiatric Hospitals (Minimum Confinement)	3	4
Police Station with Detention (Meeting Article 3.1.2.4.)	3	3
Group B, Division 3		
Building Use	Hazard Index (<i>Building Area</i>⁽¹⁾)	
	$\leq 200 \text{ m}^2$	$> 200 \text{ m}^2$
Residential Care Facilities (Ambulatory)	3	4
Residential Care Facilities (Non-Ambulatory)	4	5
Children Custodial Homes	3	4
Convalescent Homes (Ambulatory)	3	4
Convalescent Homes (Non-Ambulatory)	4	5
Group Homes for Adult Residents with Developmental Disabilities (Minimum Confinement)	3	4
Group Homes for Adult Residents with Developmental Disabilities (Maximum Confinement)	4	5
Group C		
Building Use	Hazard Index (<i>Building Area</i>⁽¹⁾)	
	$\leq 200 \text{ m}^2$	$> 200 \text{ m}^2$
Apartments	3	4
Clubs, Residential	3	4
Colleges Residential	3	4
Congregate Care Housing for Seniors	3	5
Convents	3	4
Dormitories/Hotels	3	4
Hotels	3	5
Detached Houses (up to two principal <i>dwelling units</i>)	2	2
Live/work units	3	5
Monasteries	3	4

Retirement Homes	3	4
Schools, Residential	3	4
Group D		
Building Use	Hazard Index (<i>Building Area</i> ⁽¹⁾)	
	≤200 m ²	>200 m ²
Advertising and Sales Offices	3	3
Automatic Bank Deposit	3	4
Barber/Hairdresser Shops	3	4
Beauty Parlours	3	4
Branch Banks	3	4
Car Rental Premises	3	3
Chiropractic Offices	3	4
Communications Offices (Telephone Exchange)	3	4
Communications Offices (Telex)	3	4
Communications Offices (Courier)	3	3
Computes Centres	3	4
Construction Offices	3	3
Costume Rental Premises	3	4
Dental Offices (Denture Clinic)	3	4
Dental Offices (General)	3	4
Dental Offices (Surgical/Anaesthesia)	4	5
Dry Cleaning Depots	3	4
Dry Cleaning Premises (Self-Serve)	4	4
Health/Fitness Clubs	3	4
Laundries (Self-Serve)	4	4
Massage Parlours	3	4
Medical Offices (Examination)	3	4
Medical Offices (Surgical Anaesthesia)	4	5
Offices (Business)	3	3
Offices (Charitable)	3	3
Offices (Legal/Accounting)	3	3
Offices (Design)	3	4
Pharmacy Offices	3	4
Photographic Studios	3	4
Physiotherapy Offices	3	4
Police Stations (No Detention)	3	4

Printing and Duplicating	4	5
Public Saunas	3	4
Radio Stations (No Audience)	3	4
Small Tool Rental Premises	3	4
Suntan Parlours	3	4
Veterinary Offices	3	4
Group E		
Building Use	Hazard Index (<i>Building Area</i>⁽¹⁾)	
	≤200 m²	>200 m²
Automotive/Hardware Department Store	4	5
China Shops	3	4
Department Stores	4	5
Electrical Stores (Fixtures)	3	3
Exhibition Halls (With Sales)	4	5
"Fast Food" Outlets	3	4
Feed and Seed Stores	4	5
Flea Markets	4	5
Flower Shops	3	4
"Food" and Vegetable Markets	3	4
Garden Shops	3	4
"Gas" Bars	4	5
Gift Shops (without liquor sales)	3	4
Home Improvement Stores	4	5
Kitchen/Bathroom Cupboards Stores	3	4
Plumbing Stores (Fixtures/Accessories)	3	3
"Pop" Shops	3	4
Restaurants (Not More Than 30 Persons)	3	4
Shopping Malls	4	5
Stationery/Office Supply Stores	3	4
Stores (Art)	3	4
Stores (Baked Goods)	3	4
Stores (Beer)	3	4
Stores (Book)	3	4
Stores (Camera)	3	4
Stores (Candy)	3	4
Stores (Clothing)	3	4

Stores (Drugs)	4	4
Stores (Electronic)	3	4
Stores (Floor Coverings)	4	5
Stores (Food)	3	3
Stores (Furniture/Appliances)	3	4
Stores (Hardware)	4	5
Stores (Health)	4	4
Stores (Hobby)	3	4
Stores (Jewellery)	3	3
Stores (Paint/Wallpaper)	4	5
Stores (Pet)	3	4
Stores (Records/Tapes)	3	4
Stores (Spirits)	4	5
Stores (Toys)	4	5
Stores (Variety)	4	4
Stores (Video Sales/Rental)	3	4
Supermarket	3	4
<i>Group F, Division 1</i>		
Building Use	Hazard Index (<i>Building Area</i>⁽¹⁾)	
	≤200 m²	>200 m²
All Uses	6	6
<i>Group F, Division 2</i>		
Building Use	Hazard Index (<i>Building Area</i>⁽¹⁾)	
	≤200 m²	>200 m²
Aircraft Hangars	3	5
Abattoirs	3	4
Bakeries	3	5
Body Shop	3	5
Candy Plants	3	4
Cold Storage Plants with Flammable Refrigerant	3	5
Cold Storage Plants with Non-flammable Refrigerant	3	4
Dry Cleaning Establishments (non-flammable or non-explosive)	3	4
Electrical Substations	3	4
Factories (High Fire Load)	3	5
Freight Depots (High Fire Load)	3	5
Laboratories (High Fire Load)	3	5

Laundries (not self-serve)	3	4
Manufacturer Sales (High Fire Load)	3	5
Mattress Factories	3	4
Meat Packing Plants	3	4
Packaging Manufacturers (Cellulose)	3	4
Packaging Manufacturers (Noncombustible)	3	3
Packaging Manufacturers (Plastics)	3	5
Paper Processing Plants (Wet)	3	5
Planing Mills	3	5
Printing Plants	3	4
Public Heritage Buildings	3	3
Repair Garages	3	5
Sample Display Rooms (High Fire Load)	3	5
Self Service Storage Buildings	3	4
Service Stations (no spray painting)	3	5
Storage Rooms (High Fire Load)	3	5
Television Studios (no audience)	3	4
Tire Storage	3	5
Warehouse (High Fire Load)	3	5
Welding Shops	3	5
Wholesale Rooms (High Fire Load)	3	5
Wood Working Factories	3	5
Workshops (High Fire Load)	3	5
Group F, Division 3		
Building Use	Hazard Index (<i>Building Area</i>⁽¹⁾)	
	≤200 m²	>200 m²
Creameries	2	2
Factories (Low Fire Load)	2	3
Freight Depots (Low Fire Load)	2	3
Laboratories (Low Fire Load)	2	3
Manufacturers Sales (Low Fire Load)	2	3
Power Plants	2	4
Public Heritage Buildings	2	3
Sample Display Rooms (Low Fire Load)	2	3
Storage Garages	2	3
Storage Rooms (Low Fire Load)	2	3

Warehouse (Low Fire Load)	2	3
Wholesale Rooms (Low Fire Load)	2	3
Workshops (Low Fire Load)	2	3
Notes to Table A-11.2.1.2-B: ⁽¹⁾ For the purposes of a Restricted Change of Occupancy, the Hazard Index may be established based on the aggregate area of the <i>suite</i> provided the <i>suite</i> changing occupancy is fully contained in the original <i>suite</i> area.		

4. In Book I, Division B, in the notes to Part 11, following the note A-11.2.1.2., Council inserts the following new note:

A-11.2.1.2.(10) Restricted Change of Occupancy. The term “restricted change of occupancy” refers to a change in major occupancy restricted to a specific set of uses as set out in Article 11.2.1.2.(10) that are limited both in scope and risk such that it does not increase the overall hazard.

While it is intended that designers and owners seeking to apply this requirement refer to the hazard index table A-11.2.1.2.-B, for the purposes of this Article – they may substitute the aggregate suite area of the suite in lieu of the building area where the change of major occupancy is wholly contained within the original suite.

For example: a suite of 300 m² is being repartitioned and converted from a “business office” use (Group D) to a suite of “retail toystore” use (Group E) of 150 m² and second suite of “health care office” use which are fully contained within the original 300 m² suite area. The aggregate suite area is therefore permitted to be used for the purposes of determining the appropriate hazard index which is then established as follows:

- Business Office (300 m²) – 4 (original)
- Retail Toystore (150 m²) – 4 (new)
- Health Care Office (150 m²) – 3 (new)

By comparison, a larger toystore, such as the conversion of the original 300 m² suite area into a toystore, would result in a hazard index of ‘5’ which would not meet the requirements of Article 11.2.1.2. for a “restricted change of occupancy” as it represents an increase in hazard.

While the hazard index table is a useful tool for assessment, it is also important to understand that no table can address all possible combinations of uses. Designers and owners should exercise caution when making judgments of relative hazards in this regard.

5. 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.

6. This By-law is to come into force and take effect on January 1, 2022.

ENACTED by Council this _____ day of _____, 2021

Mayor

City Clerk