**BY-LAW NO. \_\_\_\_\_**

**A By-law to amend Building By-law No. 14343**
**regarding Rainwater Management Regulations for New Developments**

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 No. 14343.

2.      In Clause 1.2.1.1.(1)(b) of Book I, Division A and Clause 7.1.5.1.(1)(a) of Book I, Division B, Council strikes out "and Sentence 3.3.1.3.(1) of Division C".

3.      In Subclause 7.1.5.1.(1)(d)(ii) of Book I, Division B, Council strikes out the defined term for "*Vegetated roof assembly*\*".

4.      In Clause 7.1.5.2.(1)(b) of Book I, Division B, Council:

(a)      in the row for "COV / Engineering Design Manual", strikes out the by-law reference and substitutes the following:

"2.4.2.5.(5)
A-2.4.2.5.(5)", and

(b)      adds a new row:

"

| CoV | | Protection of Trees By-law[4] | A-2.4.2.5.(9) |
|-----|-----|-----|-----|

".

5.      Council strikes out Clause 7.1.5.2.(2)(k) of Book I, Division B and substitutes the following:

"k)  adding a new Article 2.4.2.4. and Article 2.4.2.5.:

"**2.4.2.4. Connections to Storm Drainage Systems**

**1)**  Except as provided in Sentence (2), *building* and site drainage shall connect to a *storm drainage system*.

**2)**  *Building* and site drainage need not connect to a *storm drainage system* if
a)  on-site *rainwater* management practices are employed and overflow is connected to a *storm drainage system*, and
b)  *rainwater* does not create a hazardous condition or discharge upon or impact other lands or sites.
(See Note A-2.4.2.4.(2).)

### 2.4.2.5. Rainwater Management

1) Except as provided in Sentence (2), all *buildings* shall manage *rainwater* on-site through one of the applicable compliance pathways in Table 2.4.2.5.-A, in which
   a) "small site pathway" means Sentence (4) applies, and Sentences (5) and (6), (7) and (8) do not apply, and
   b) "engineered pathway" means Sentences (5), (6), (7) and (8) apply, and Sentence (4) does not apply.

**Table 2.4.2.5.-A**
**Compliance Pathways for On-Site Rainwater Management**
Forming Part of Sentence 2.4.2.5.(1)

| Site Area (m$^2$) | Net Floor Space Ratio[(1)] | Compliance Pathway |
|---|---|---|
| No greater than 1000 | No greater than 1.0 | Small site pathway |
| | Greater than 1.0 | Engineered pathway |
| Greater than 1000 | Any | Engineered pathway |

**Notes to Table 2.4.2.5.-A:**
(1) As computed according to the Zoning and Development By-law after any applicable exclusions.

2) The requirements of this Article do not apply to
   a) "laneway houses" or "infill" as defined by the Zoning & Development By-law, when the site area is no greater than 1000 m$^2$,
   b) "accessory buildings" as defined by the Zoning & Development By-law,
   c) *float homes*,
   d) *marinas*,
   e) retaining structures, or
   f) temporary *buildings* approved according to Subsection 1.6.8. of Division C.

3) The *Chief Building Official* shall be provided with a document demonstrating that the *rainwater* management requirements of Sentence (1) have been satisfied, in the form prescribed by the *Chief Building Official*.

4) Except as provided in Sentence (9), a detention tank shall be installed with
   a) the minimum active storage capacity specified in Table 2.4.2.5.-B,
   b) an orifice plate with the diameter specified in Table 2.4.2.5.-B,
   c) overflow protection,
   d) one or more *cleanouts* providing access to the outlet and overflow, and
   e) for subsurface detention tanks, the capability of supporting the design depth of cover and surface loads.

(See Note A-2.4.2.5.(4).)

**Table 2.4.2.5.-B**
**Detention Tank Specifications for the Small Site Pathway**
Forming Part of Sentence 2.4.2.5.(4)

| Site Area (m²) | Minimum Active Storage Capacity (L) | Orifice Plate Diameter (mm) |
|---|---|---|
| No greater than 400 | 3,400 | 30 |
| Greater than 400 to no greater than 500 | 3,900 | 35 |
| Greater than 500 to no greater than 750 | 4,600 | 45 |
| Greater than 750 to no greater than 1000 | 7,200 | 50 |

**5)** Except as provided in Sentences (8) and (9), *rainwater* from the site area shall be detained with controlled discharge to a public *combined sewer,* public *storm sewer* or designated public *storm water* disposal location, and the minimum detention volume shall be calculated with the Modified Rational Method

a) using the following formula:

$$V = Q_p \times D - Q_o \frac{D + t_c}{2}$$

where

$V$ = minimum detention storage volume in L,
$Q_p$ = peak runoff rate for the duration D in L/s,
$D$ = duration of rainfall in s,
$Q_o$ = maximum discharge flow rate in L/s, and
$t_c$ = time of concentration of the drainage catchment, determined according to the City of Vancouver Engineering Design Manual, in s,

b) iterating for a range of values of D in Clause (a)

i. with a maximum of a 15 min increment, and
ii. until the value of V in Clause (a) reaches a maximum value, confirmed by iterating values of D for an additional 60 min, and

c) applying from the City of Vancouver Engineering Design Manual:

i. the post-development, 2100 IDF curve with a 10 year return period,
ii. the minimum inlet time specified, and

         iii.   the applicable runoff coefficients to derive a composite runoff based on the percentages of different surfaces of the site area.

(See Note A-2.4.2.5.(5).)

**6)** Except as provided in Sentences (8) and (9), the detention volume calculated in Sentence (5) shall be held in detention storage

    a) designed to control discharge in 2 stages, at

        i.   no greater than 5 L / s / hectare for the first stage, for a volume of water equivalent to what would be present if water 15 mm deep covered the portion of the site area without landscaping, and

        ii.   no greater than 25 L / s / hectare after the first stage, and

    b) installed with

        i.   no orifice smaller than 25 mm in diameter when an orifice is used,

        ii.  overflow protection, and

        iii. one or more *cleanouts* providing access to the outlets and overflow.

(See Note A-2.4.2.5.(6).)

**7)** An operations and maintenance manual conforming to Article 2.2.1.9. is required for the equipment employed to satisfy the requirements of Sentences (5) and (6).

**8)** When an *existing building* will remain on the same property at the time the occupancy permit is issued, the site area used in Sentences (5) and (6) may be reduced to be proportional to the ratio of the *buildings'* greatest horizontal area within the outside surface of exterior walls.

**9)** The *Chief Building Official* may relax the requirements of Sentences (4), (5) and (6) in accordance with Sentence 1.5.2.10.(2) of Division C if

    a) the *owner* demonstrates to the satisfaction of the *Chief Building Official* by a *subsurface investigation* that excavation is precluded or limited by soil contamination or other factors, and

    b) it is impractical, in the opinion of the *Chief Building Official*, to meet the *rainwater* management requirements of Sentences (4), (5) or (6).

(See Note A-2.4.2.5.(9).)".".

6.     In Subclause 7.1.5.2.(2)(dd)(ii) of Book I, Division B, Council:

    (a)     strikes out Note A-2.4.2.5.(1);

(b)      inserts a new Note A-2.4.2.5.(5):

"**A-2.4.2.5.(5)    Minimum Detention Volume Calculation**.

**Example: Determination of the minimum detention volume**

**Step No. 1: Assemble calculation inputs**

a)  Site characteristics (example)
      Site area                                            =        0.25 hectares
      Post-development runoff coefficient, C      =        0.75

b)  City of Vancouver IDF projections
      Return period                              =      10 years (from Sentence (5))
      Time of concentration, $t_c$               =      5 min
      IDF curve                                  =      2100
                                                        (RCP 8.5 Moderate Projection)
      IDF Coefficient A                          =      26.651
      IDF Coefficient B                          =      -0.482

**Step No. 2: Calculate 10-year unit flow target**
Flow target                                      =      25 L/s/hectare (from Sentence (6))
Maximum discharge flow rate, $Q_O$               =      0.00625 $m^3$/s
                                                        (calculated as =
                                                        Flow target x Site area)

**Step No. 3: Calculate peak post-development flow**
Peak rainfall intensity, i                       =      88 mm/h (calculated as = A x $t_c{}^B$)
Uncontrolled peak flow, $Q_{POST}$               =      0.0460 $m^3$/s
                                                        (calculated as = Site area x C x i)

## Step No. 4: Iterate for a range of storm durations to determine the peak storage requirement

| Event duration, D (min) | Post-development rainfall intensity, i (mm/hr) | Post-development peak flow, $Q_{POST}$ (m³/s) | Required detention volume, V (m³) |
|---|---|---|---|
| 5 | 88 | 0.046 | 11.9 |
| 20 | 45 | 0.024 | 23.6 |
| 35 | 35 | 0.018 | 30.3 |
| 50 | 29 | 0.015 | 35.2 |
| 65 | 26 | 0.013 | 39.0 |
| 80 | 23 | 0.012 | 42.1 |
| 95 | 21 | 0.011 | 44.7 |
| 110 | 20 | 0.010 | 46.9 |
| 125 | 19 | 0.010 | 48.8 |
| 140 | 18 | 0.009 | 50.4 |
| 155 | 17 | 0.009 | 51.8 |
| 170 | 16 | 0.008 | 53.0 |
| 185 | 15 | 0.008 | 54.0 |
| 200 | 15 | 0.008 | 54.9 |
| 215 | 14 | 0.008 | 55.6 |
| 230 | 14 | 0.007 | 56.2 |
| 245 | 14 | 0.007 | 56.8 |
| 260 | 13 | 0.007 | 57.2 |
| 275 | 13 | 0.007 | 57.5 |
| 290 | 12 | 0.007 | 57.8 |
| 305 | 12 | 0.006 | 58.0 |
| 320 | 12 | 0.006 | 58.1 |
| 335 | 12 | 0.006 | 58.1 |
| 350 | 11 | 0.006 | 58.1 |
| 365 | 11 | 0.006 | 58.0 |
| 380 | 11 | 0.006 | 57.9 |
| 395 | 11 | 0.006 | 57.7 |

The minimum detention volume required to satisfy Sentences (5) and (6) is therefore 58.1 m$^3$.

More advanced modelling software may be used in place of the Modified Rational Method, applying the storm distributions and durations defined in the City of Vancouver Engineering Design Manual.";

(c)    strikes out Note A-2.4.2.5.(6) and substitutes:

"**A-2.4.2.5.(6)   Detention Storage Calculations and Considerations**.

**Example: Determination of the first stage detention volume**

**Step No. 1: Assemble calculation inputs**

Site characteristics (example)

| | | |
|---|---|---|
| Site area | = | 0.25 hectares |
| Ground-level landscaped area | = | 0.05 hectares |
| Vegetated roof assembly | = | 0.02 hectares |
| Portion of site area without landscaping | = | 0.18 hectares (calculated) |

**Step No. 2: Calculate "first stage" volume**

First stage volume    =    27 m$^3$
(calculated as = 15 mm x Portion of site area without landscaping)

This is the volume to be released at no greater than 5 L / s / hectare.

**Considerations for detention storage and flow control**

Detention storage can be provided by detention tanks, roof-based detention methods, or other vegetated or non-vegetated detention or retention systems designed to meet the criteria.

The overflow must bypass the outlet flow control mechanism(s). An orifice or other flow control device may be used. An orifice must meet the minimum diameter requirement. The outlet flow control mechanism(s) should have appropriate debris protection to prevent blockages. The equipment or structure used for detention storage should be inspected and cleaned regularly following the operations and maintenance manual instructions."; and

(d)     in Table 2.4.2.5.(9) of Note A-2.4.2.5.(9), adds a new row:

"

| Moderate retention value tree or high retention value tree, as defined in the *Protection of Trees By-law* | Certification by an arborist. |
|---|---|

".

7.      In Clause 2.3.1.1.(1)(a) of Book I, Division C, Council strikes out "except as permitted by Sentence 3.3.1.3.(1),".

8.      In Sentence 2.3.1.2.(1) of Book I, Division C, Council strikes out "Except as permitted by Sentence 3.3.1.3.(2), the" and substitutes "The".

9.      Council strikes out Article 3.3.1.3. of Book I, Division C and substitutes:

"3.3.1.3. Reserved.".

10.     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.

11.     This by-law is to come into force and take effect on January 1, 2026.

ENACTED by Council this          day of          , 2025

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Mayor

_____
City Clerk