

Bulletin

Zero Emission Buildings in R1, RT and RA Districts Bulletin

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RELEVANT BY-LAWS AND POLICIES

- Zoning and Development By-law
- Zero Emissions Building Plan
- Renewable City Strategy
- Climate Emergency Action Plan

BACKGROUND AND CONTEXT

Removing barriers to zero emission buildings is part of the City's efforts to reduce carbon emissions. The Zero Emissions Building Plan, Renewable City Strategy, and Climate Emergency Action Plan all prioritize removing regulatory barriers to the development of zero emission buildings.

This bulletin explains the administration of variances to Zoning and Development By-law regulations and related processes for residential projects designed to zero emission standards in the R1, RT and RA districts. For other zones and uses, see the *Larger Zero Emission Buildings Bulletin*.

This bulletin is to be used in conjunction with the relevant district schedule of the Zoning and Development By-law, as well as other applicable guidelines and bulletins. Because this bulletin primarily addresses zoning considerations, applicants are encouraged to obtain early advice on meeting the requirements of Vancouver's Building By-law from a registered professional.

DEFINITIONS

The following definitions apply in this bulletin:

- **Air-tightness Declaration:** A written declaration of the air-tightness plan signed and submitted by the Builder. Document to be submitted for review by City staff prior to the start of construction. A copy of the accepted Air-tightness Declaration is to be attached to plans on-site and kept available for City Inspector review.
- **CHBA Net Zero Definitions:**
 - Qualified Net Zero Builder:** A builder who has met the requirements of the qualification as outlined in the Net Zero Administrative Requirements established by the Canadian Home Builders' Association (CHBA), which include: being a CHBA builder member, being a registered EnerGuide builder with NRCan, having successfully completed the CHBA NZ Builder Training, and having completed a Net Zero or Net Zero Ready labelled home.

Qualified Net Zero Energy Advisor (NZEa): A professional who has met the requirements of the qualification as outlined in the CHBA Net Zero Administrative Requirements and registered with the CHBA. The NZEA is eligible to perform energy evaluations for homes pursuing the CHBA's Net Zero Home Label using energy modeling methods in accordance with EnerGuide Rating System (ERS) Technical Procedures.

- **Energy Advisor (EA):** An EA is a licensed professional who conducts home energy evaluations. An EA can evaluate a home, and provide the modeling and testing required for the final certification of a home under EnerGuide. They are trained to use NRCAN's energy simulation software, HOT2000, and to perform blower door air leakage testing. A CPHC who is also an EA can serve both roles in a Passive House project.
- **Heat Recovery Ventilator (HRV) or Energy Recovery Ventilator (ERV):** These terms are equivalent in this bulletin. An HRV is a mechanical device that exchanges indoor air with outdoor air while recovering heat at the same time using a heat exchanger. An ERV performs the same function and also provides humidification or dehumidification.

- **Passive House Definitions:**

Certified Passive House Consultant (CPHC) or Certified Passive House Designer (CPHD):

A CPHC or CPHD is a person certified by the Passive House Institute as an accredited Passive House Consultant or Designer respectively. CPHD and CPHCs are responsible for designing the building to meet the PH standard. The two designations are interchangeable in this guide.

Passive House (PH): An energy efficiency standard for buildings established by the international Passive House Institute.

Passive House Building Certifier (Certifier): In this bulletin, a Passive House Building Certifier is one that meets the definition in the Zoning and Development By-law. A general description is a person accredited by the international Passive House Institute for the purpose of certifying buildings as being designed in accordance with its Passive House standards.

Passive House Planning Package (PHPP): A PHPP is an energy model used to design a Passive House building.

- **Qualified Green Building Consultant:** A professional with knowledge and practical experience in high-performance building design who ideally has worked on International Living Future Institute (ILFI) Zero Energy projects in the past. Training and experience in high-performing building design, energy modeling, efficient building systems, renewable energy assemblies, or comparable is likely necessary for ensuring ILFI Zero Energy targets are achieved.
- **Variances:** For readability, this term refers to various allowances for zero emission buildings in the Zoning and Development By-law, including relaxations and exclusions, as variances.

ADMINISTRATION

1. ZERO EMISSION STANDARDS

In this bulletin, acceptable zero emission standards include Passive House Classic, Premium, or Plus; Passive House EnerPHit in the case of an existing building; the CHBA Net Zero Home Labelling Program with electric equipment; and ILFI Zero Energy. Projects must achieve the standard using on-site, installed equipment. Consideration may be given to equivalent rating systems, but applicants should confirm the suitability of other standards with City staff before making an application.

2. VARIANCES

Achieving a zero emission building usually requires more insulation, advanced air tightness, renewable energy equipment, or other features not found on typical buildings.

Buildings in R1, RT or RA districts can access variances of building height, yard, and building depth regulations, and the exclusion of floor area, if they demonstrate that they will achieve certification under an accepted zero emission standard. Please see the regulations in Section 10.33 of the Zoning and Development By-law for the requirements of typical variances.

Applicants must show how the building has been designed to achieve the relevant standard before seeking related variances, and follow the process and requirements in this document. Projects that apply for variances must meet the standard chosen and achieve final certification or labeling.

Applications for a new multiple dwelling in the R1 district must show that all units on the site will meet an accepted zero emission standard.

2.1 Summary Table

The following table provides a reference of zoning variances that may be available for projects designed to zero emission standards.

Before making an application, please read the current regulations in the Zoning and Development By-law, along with related policies, guidelines, and bulletins. These documents can be found on the City of Vancouver Zoning and Land Use Document Library web page. For example, more information on shading devices located in yards can be found in the *Shading Devices and Yard Projections Bulletin*.

Table 1: Summary of Zoning and Development By-law Variances

Variance	Section
Balcony projections into required yards	10.8.1(c)
Building depth	10.33.1(b)
Building height	10.33.1(a)
External design regulations	10.33.1(f)
Green roof access and infrastructure – height	10.1.1(d)
HRVs and connected shafts	10.33.3
Insulation	10.15.1 and 10.15.2
Mechanical rooms with zero emission equipment	10.18.1
Rear yard depth	10.33.1(c)
Roof-mounted energy equipment – height	10.1.1(d)
Shading devices, eaves, and overhangs – yards	10.8.1(f)
Venting skylights and clerestory window – external height	10.1.1(e)

2.2 Floor Area – Fixed Rate Exclusion

Section 10.33.1 of the Zoning and Development By-law provides an exclusion equal to 19% of the permitted floor area for a zero emission building in the R1-1, RT and RA districts. This fixed exclusion can be used instead of multiple and more complex calculations for insulation and mechanical equipment. Floor area that is excluded from overall FSR may be located where it fits within the permitted development envelope. Where there is more than one FSR limit, calculate and locate each exclusion separately. The potential buildable area based on this regulation may be estimated with the formula:

$$\text{Permitted floor area} * 1.19 = \text{Potential buildable floor area}$$

For example, a house that is permitted to have a net floor area of 3,960 sq. ft. by the FSR limit in zoning would use the figures:

$$3,960 \text{ sq. ft.} \times 1.19 = 4,712 \text{ sq. ft.}$$

The amount of the exclusion is limited to 88 sq. m (947 sq. ft.) in applications for less than three principle dwelling units. Examples that are limited in this way include an application for a laneway house, or a single detached house with or without secondary suites, or a duplex with or without secondary suites. An application for a single detached house and a duplex on the same site would not be limited.

Note that the potential area may not be achievable on all sites and for all designs. Applications under this exclusion cannot use other floor area exclusions in sections 10.15 or 10.33. Laneway houses must use the permitted area of the laneway house to calculate this exclusion, not the permitted area of the site.

2.3 Floor Area – Calculated Exclusions

Section 10.15 of the Zoning and Development By-law allows for the exclusion of floor area for insulation using two different calculations. For applications to exclude increased insulation under clause 10.15.2 in a conventional building, a Building Envelope Professional must be retained to calculate and verify the exclusion. In an application designed to the Passive House standard that provides a PHPP energy model, the Certified Passive House Designer or Certified Passive House Consultant may verify the exclusion instead. For more details on this exclusion, see the *Floor Area Exclusions for Improved Building Performance Bulletin*.

Section 10.33.3 allows an application for a floor area exclusion of the additional area occupied by heat recovery ventilators and connected shafts in a Passive House. The exclusion is intended only for equipment that is shown to require more floor space than a conventional system. An HRV that is a Passive House “Certified Component” should be specified.

Applications under section 10.15 or 10.33.3 cannot use the floor area exclusion in section 10.33.1.

2.4 Building Height, Yards, Building Depth, and Balconies

The permitted building height and building depth are increased by 0.6 m, and the required rear yard and building separation are decreased by 0.6 m for qualifying buildings in the section 10.33.1 of the Zoning and Development By-law. Zero emission buildings can also access a variance for balconies in section 10.8.1.

3. SUBMISSION REQUIREMENTS

This section describes the submission requirements at each phase for a Passive House or a building under the CHBA Net Zero Home Labelling Program. These requirements are in addition to the material required for a development or building permit for a conventional building.

In this section, a conditional variance refers to regulations that may be approved by the Director of Planning, such as the variance of external design regulations in section 10.33.1(f), or section 10.33.3.

A rationale is not required for the outright variances in sections 10.33.1(a) to (e), and a pre-application meeting is not necessary for a project seeking outright variances only.

For zero emission buildings pursuing other standards, such as ILFI Net Zero, enquiries and applications must include a comparable level of material. In these cases, please contact green.buildings@vancouver.ca before making an enquiry or application.

3.1 Materials Required for a Passive House Project

Pre-Application or Enquiry

Note that a pre-application or enquiry is not necessary for a project that is seeking only the outright variances in section 10.33.

As part of your application, provide:

1. a design strategy that identifies the zoning variances sought, and describes the primary design elements intended to achieve Passive House (PH).
2. Conceptual drawings that label the primary design elements needed to achieve PH.
3. A letter from the CPHC confirming that they have been engaged to do energy modelling and advise on the project.
4. Drawings or diagrams that show how potential effects on neighbouring houses such as privacy, massing, and shadowing have been considered in the design, if the project is seeking a conditional variance.

When requesting a pre-application meeting or making an enquiry, applicants should note that the application will be for a building that meets the Passive House standard, and that the project team will be seeking related variances.

Application for a Development Permit or a Development and Building Permit

As part of your application, provide:

1. An updated design strategy that:

- a. identifies the specific Passive House standard being used,
 - b. identifies the design elements proposed to meet that standard,
 - c. provides the sheet number where these elements can be found,
 - d. specifies the zoning variances being sought, and
 - e. provides a rationale for any conditional variance.
2. A compliant pre-construction PHPP model (electronic copy of the Excel file), along with a memo providing modelling input values for the PHPP. (A HOT2000 model and “P-file” number are not required for Passive House applications.)
3. A PDF of the completed “verification” worksheet of the PHPP with relevant notes, signed by a CPHC.
4. A signed letter of commitment from the owner to certify the building through the Passive House Institute.
5. A letter from the CPHC confirming that they have been engaged to do energy modelling and advise on the project.
6. Application drawings must include a prominent label identifying the project as a PHI Passive House, and identify the design elements proposed to meet the standard.

If applying for the exclusion of floor area occupied by heat recovery ventilators and connected shafts under section 10.33.3, additional materials are required:

7. A signed letter from a CPHC that recommends the proposed mechanical system and notes the dimensions required.
8. Dimensioned drawings in the application set showing the additional floor area required for the Passive House system as compared to a conventional system.
9. A summary table of the proposed exclusion for each building level.

Mid-construction

1. Documentation from the EA verifying the construction details and the ISO 9972 blower door test results as attachments to the “Pre-Drywall Checklist.” The EA will verify that all assemblies, insulation materials, and components (including windows, doors and ventilation equipment) are installed as per the specifications provided in the Certifier’s letter. The EA will conduct a mid-construction blower door test to the ISO 9972 protocol, with modifications as prescribed by the Passive House Institute, in lieu of the HOT2000 protocol.
2. A letter from the CPHC that contains:
 - a. a statement that the CPHC attended and inspected the construction of the building and that the installed assemblies and the doors and windows match those specified in the Certifier’s letter,
 - b. confirmation that there is no kitchen or dryer vent, unless modelled in the PHPP provided,
 - c. confirmation that the bathroom and kitchen exhaust are roughed-in to the mechanical room,

- d. the results of the EA's mid-construction blower door test at or below 0.6 ACH, and
- e. a statement that there are no known barriers to the project achieving Passive House certification.

Prior to Final Construction

1. Documentation by the EA of the mechanical and other construction details.
2. A report on the results of the final ISO 9972 / PHI blower door test conducted by the EA. This test must be conducted to the ISO 9972 Method 1 protocol, with modifications as prescribed by the Passive House Institute (e.g., both pressurization and depressurization).
3. A letter from a Certifier stating that the final PHPP and relevant documentation have been received and are being reviewed for final certification, including a suggested date by which the City may expect to be notified of final certification to the Passive House Institute standard.

Building Certification

1. When the project is certified by the Passive House Institute, send a copy of the certificate to green.buildings@vancouver.ca

3.2 Materials Required for a CHBA Net Zero Project

Pre-Application / Enquiry

Note that a pre-application meeting is not necessary for a project that is seeking only the outright variances in section 10.33.

1. A design strategy that identifies the zoning variances sought, and describes the primary design elements intended to achieve Net Zero.
2. Conceptual drawings that label the primary design elements needed to achieve Net Zero.
3. A letter from the CHBA of British Columbia confirming that the project has been enrolled to obtain a Net Zero Home Label.
4. A letter from an NZEA confirming that they have been engaged to advise on the project.
5. If the project is seeking a conditional variance, provide drawings or diagrams that show how potential effects on neighbouring houses such as privacy, massing, and shadowing have been considered in the design.

Application for a Development Permit or a Development and Building Permit

1. An updated design strategy that:
 - a. identifies CHBA Net Zero as the chosen zero emission standard,
 - b. identifies the design elements proposed to meet the NZ standard,

- c. provides the sheet number where these elements can be found,
 - d. specifies the zoning variances being sought, and
 - e. provides a rationale for any conditional variance.
2. A letter from the CHBA of British Columbia confirming that the project has been enrolled to obtain a Net Zero Home Label. The CHBA letter must show that the builder holds the Qualified Net Zero Builder accreditation. The CHBA maintains a [list](#) of registered builders. Qualified Net Zero Builders have one or more completed Labels.

For project teams where the builder has not obtained this accreditation from the CHBA, provide a certificate from a CPHC together with a letter from them stating that they will be responsible for the detailed design of the air barrier elements and their continuity, and provide advice during construction to achieve the performance recommended by the Net Zero Energy Advisor to meet the CHBA Net Zero Home program.

3. A signed letter from the NZEA confirming that they have been engaged to advise on the project.
4. A Homeowner Information Sheet prepared by the NZEA showing a 0 (zero) GJ rating using modelling methods and calculation in conformance with the current EnerGuide Rating System using HOT2000. All equipment must be electric.
5. An Air-tightness Declaration signed and submitted by the builder attached to the drawing set. The form is available from the [Net Zero section](#) of the Zero Emissions Buildings web page.
6. A signed letter of commitment from the owner to obtain the CHBA Net Zero Home Label.
7. Application drawings must include a prominent label noting the project as a CHBA Net Zero Home; identify the design elements proposed to meet the standard; and label all equipment and appliances, including space heating and cooling, domestic hot water heating, pool and hot tub heating, snowmelt systems, firepits and fireplaces (whether ornamental or not), and cooking appliances (indoor and outdoor), as electric.

Mid-construction

1. A preliminary report from the NZEA with a predicted EnerGuide Rating based on the results of the mid-construction airtightness test. The applicant must schedule the mid-construction test with City staff, who must be present during the test. The project must meet the air-tightness target in the Air-tightness Declaration.

Building Certification

1. When the project has completed the CHBA Net Zero Labelling Program, send a copy of the Net Zero Label to green.buildings@vancouver.ca.