



# City of Richmond

## Report to Committee

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**To:** General Purposes Committee  
**From:** Peter Russell  
Senior Manager, Sustainability and District Energy  
Victor Wei, P. Eng.  
Acting Director, Building Approvals &  
Director, Transportation  
**Date:** May 5, 2018  
**File:** 10-6125-07-02/2017-  
Vol 01  
**Re:** **BC Energy Step Code**

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### Staff Recommendation

1. That the Building Regulation Bylaw No. 7230, Amendment Bylaw No. 9769, which adds Part 10 Energy Step Code, identified in the report titled “BC Energy Step Code” dated May 5, 2018, from the Senior Manager, Sustainability and District Energy, and Acting Director, Building Approvals, be introduced and given first reading;
2. That Richmond Zoning Bylaw No. 8500, Amendment Bylaw No. 9845, which amends Sections 3.4, 4.2.1, 4.3.3 and 4.4.1, identified in the report titled “BC Energy Step Code” dated May 5, 2018, from the Senior Manager, Sustainability and District Energy, and Acting Director, Building Approvals, be introduced and given first reading;
3. That Richmond Official Community Plan Bylaw No. 9000, Amendment Bylaw No. 9771, which amends Sections 12.4 and 14.2.10.A, identified in the report titled “BC Energy Step Code” dated May 5, 2018, from the Senior Manager, Sustainability and District Energy, and Acting Director, Building Approvals, be introduced and given first reading;
4. That Richmond Official Community Plan Bylaw No. 7100, Amendment Bylaw No. 9770, which amends Sections 2.2.3 and 2.5, identified in the report titled “BC Energy Step Code” dated May 5, 2018, from the Senior Manager, Sustainability and District Energy, and Acting Director, Building Approvals, be introduced and given first reading;
5. That Bylaw 9771 and Bylaw 9770, having been considered in conjunction with:
  - a. The City’s Financial Plan and Capital Program; and
  - b. The Greater Vancouver Regional District Solid Waste and Liquid Waste Management Plans;

are hereby found to be consistent with said programs and plans, in accordance with 477(3)(a) of the *Local Government Act*;

6. That Bylaw 9771 and Bylaw 9770, having been considered in accordance with Official Community Plan Bylaw Preparation Consultation Policy 5043, are hereby found not to require further consultation;
7. That the creation of a two year temporary full time Building Energy Specialist, partially funded by a \$100,000 contribution from BC Hydro, with remaining salary and benefits of \$130,000 fully recovered through building permit fees, be endorsed; and that the Chief Administrative Officer and General Manager, Engineering and Public Works be authorized to enter into a funding agreement with BC Hydro to support the Building Energy Specialist position;
8. That the creation of new Plan Reviewer and Building Inspector 1 positions, with total salary and benefits of \$200,000 fully recovered through building permit fees, be endorsed;
9. That the Consolidated 5 Year Financial Plan (2018-2022) be amended to include the temporary full-time Building Energy Specialist, Plan Reviewer, and Building Inspector 1 positions funded by an increase in grant revenue and building permit fees.
10. That the Energy Step Code training programs identified in the report titled "BC Energy Step Code" dated May 5, 2018, from the Senior Manager, Sustainability and District Energy, and Acting Director, Building Approvals, be approved with \$110,000 from the Carbon Tax Provision, as funded in the 2018 Operating Budget;
11. That for Part 3 and Townhouse developments, notwithstanding the adoption of Building Regulation Bylaw No. 7230, Amendment Bylaw No. 9769:
  - a. If a Development Permit has been issued prior to September 1, 2018, the owner may, while their Development Permit remains valid, apply for a Building Permit in compliance with the energy efficiency requirements applicable prior to the adoption of Bylaw 9769; and
  - b. If an acceptable Development Permit application has been submitted to the City prior to the adoption of Bylaw 9769, the owner may, until December 31, 2019, apply for a Building Permit in compliance with the energy efficiency requirements applicable prior to the adoption of Bylaw 9769.

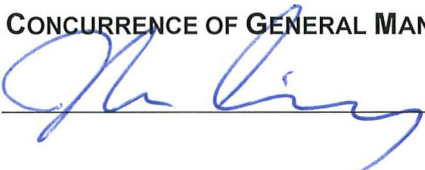

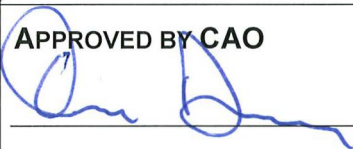


Peter Russell  
Senior Manager, Sustainability and  
District Energy  
(604-276-4130)



Victor Wei, P. Eng.  
Acting Director, Building  
Approvals &  
Director, Transportation  
(604-276-4131)

Att. 7

| REPORT CONCURRENCE   |   |  |
|--|---|--|
| <b>ROUTED TO:</b>  | <b>CONCURRENCE</b>  | <b>CONCURRENCE OF GENERAL MANAGER</b>  |
| Law  | <input checked="" type="checkbox"/>   |                            |
| Building Approvals   | <input checked="" type="checkbox"/>   |  |
| Development Applications   | <input checked="" type="checkbox"/>   |  |
| Policy Planning  | <input checked="" type="checkbox"/>   |  |
| Finance  | <input checked="" type="checkbox"/>   |  |
| <b>REVIEWED BY STAFF REPORT /<br/>AGENDA REVIEW SUBCOMMITTEE</b> | <b>INITIALS:</b><br> | <b>APPROVED BY CAO</b><br> |

## Staff Report

### Origin

In May 2017, Council endorsed a stakeholder consultation program regarding how the BC Energy Step Code can be implemented in Richmond.

This report supports Council's 2014-2018 Term Goal #4 Leadership in Sustainability:

*Continue advancement of the City's sustainability framework and initiatives to improve the short and long term livability of our City, and that maintain Richmond's position as a leader in sustainable programs, practices and innovations.*

*4.1. Continued implementation of the sustainability framework.*

### Analysis

#### Background

In 2010, Council adopted targets included in Richmond's Official Community Plan to reduce community greenhouse gas (GHG) emissions 33% below 2007 levels by 2020, and 80% below 2007 levels by 2050. Richmond's 2014 Community Energy and Emissions Plan (CEEP) outlines strategies and actions for the City to take to reduce community GHG emissions, including:

#### ***Strategy 2:*** Increase Energy Efficiency in New Developments

- **Action 4:** Promote energy efficiency in all rezoning.
- **Action 5:** Develop incentives for new development to exceed the building code energy requirements.

Modeling undertaken as part of the CEEP indicates that in order for Richmond to meet its emissions targets, all new buildings will need to be constructed to achieve zero carbon emissions by 2025. Thus, pursuing Zero Carbon Buildings is one of the "Big Breakthroughs" called for in the CEEP.

Current policies support energy use and emissions reductions in new construction, including:

- The City Centre Area Plan's policy that new developments over 2000m<sup>2</sup> undergoing rezoning achieve LEED Silver, and
- The OCP's Townhouse Energy Efficiency and Renewable Energy policy.

When introduced, staff noted that revisions to these policies would come forward over time, recognizing changes in standards and construction practices.

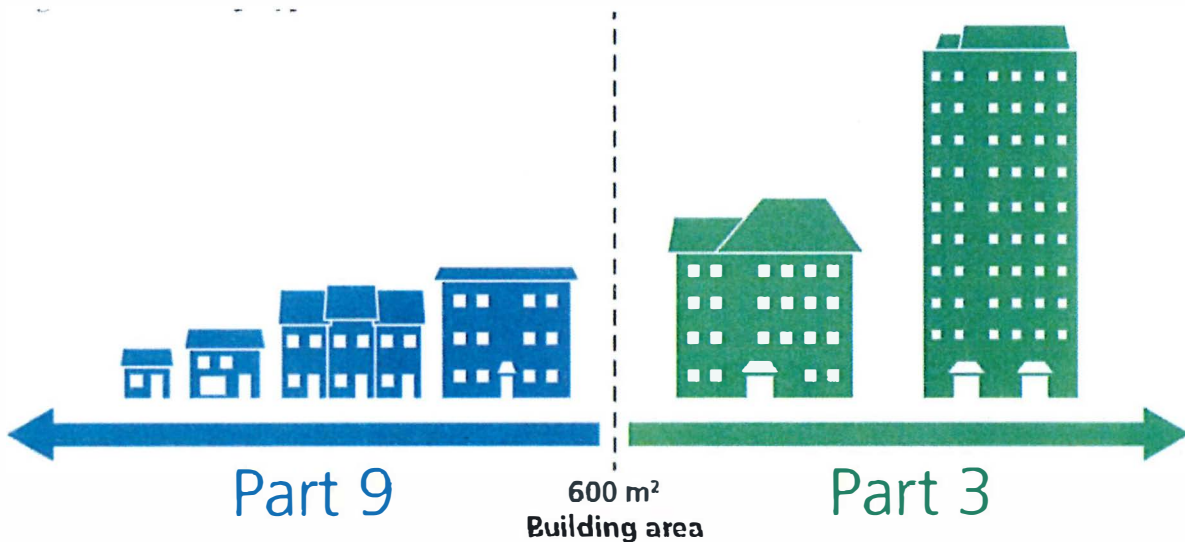
### Purpose and Rationale for the BC Energy Step Code

The BC Energy Step Code is the product of a multi-year collaboration between the Province, industry stakeholders, utilities and local governments. Adopted by the Province in April 2017, the Energy Step Code allows BC local governments to voluntarily reference a series of progressively more stringent energy performance “steps” in regulation. The Province has indicated that future iterations of the base BC Building Code will align with the Energy Step Code, and has committed that the BC Building Code will achieve “net zero energy ready” levels of performance by 2032, equivalent to the highest “step” of the Energy Step Code. Attachment 1 provides further background on the Energy Step Code, and the estimated costs to achieve different steps for different building types.

The Energy Step Code measures energy performance in a way that aligns with best practices from leading jurisdictions and standards used in Europe and, increasingly, North America. It is intended to result in better real world building performance. In brief, the BC Energy Step Code focuses on the following performance categories (more details are provided in Attachment 2):

- Building envelope performance – This encourages high quality insulation and window systems, and good passive design practices, to minimize the heating energy required of buildings; and
- Energy efficient systems – This encourages efficient heat delivery, cooling, ventilation, hot water, and lighting systems.

The Energy Step Code includes different sets of targets for both larger “Part 3” and smaller “Part 9” buildings (Figure 1).



**Figure 1:** Building types

### Specifying Greenhouse Gas Performance

The BC Energy Step Code is widely viewed as a critical advancement in the regulation of energy performance in new buildings. It will reduce energy use and emissions, and increase comfort. However, it alone is unlikely to achieve widespread adoption of very low/zero GHG emissions new buildings, which will be necessary to achieve the City's emissions targets. The Energy Step Code does not currently directly measure GHG emissions from buildings. In contrast, some building performance standards do measure GHG emissions, such as the Canada Green Building Council's Zero Carbon Building Framework, and the City of Vancouver's Green Buildings Policy for Rezoning, and the City of Toronto's Zero Emissions Buildings Framework.

Specifying low carbon building energy systems in new developments will better achieve the low/zero carbon outcomes necessary to meet emissions targets, as well as to recognize the beneficial roles that district energy systems can play in delivering low carbon outcomes. Encouraging low carbon building energy systems accounts for the GHG intensity of different fuels, ensuring buildings achieve low levels of emissions. Implementing Step Code and low carbon building energy systems together can decrease energy use, costs, and emissions in a timely manner.

### LEED Rating System

The Leadership in Energy and Environmental Design® (LEED) rating systems are used to measure and certify buildings' performance. LEED scoring involves projects achieving a certain number of credits across a range of different green building categories. First released in 1994, the LEED rating systems have been central to the growth and expansion of green building practices.

As noted above, the City Centre Area Plan established a policy that new developments greater than 2000m<sup>2</sup> achieve a level of performance equivalent to LEED Silver as a consideration of rezoning. This policy demonstrated Richmond's leadership in green buildings. However, there are issues with continuing to reference LEED:

- Staff estimates that approximately 80% of the credits necessary to achieve LEED Silver would now be implemented in new developments even without the existence of City's the LEED Silver policy, by virtue of most Richmond developments' location, applicable regulations, and the evolution of construction practices. This is partly because many best practices pioneered by LEED have spread throughout the industry and have increasingly been incorporated into local and provincial regulations.
- LEED measures energy performance in a way that differs from best practices reflected in the Energy Step Code. Energy Step Code establishes absolute targets for different building types. In contrast, LEED measures relative energy performance compared to baseline code-compliant building. The Energy Step Code means of measuring energy performance better rewards buildings designed to optimize form, orientation, and massing to minimize energy demand.

### Townhouse Energy Efficiency and Renewable Energy Policy

In September 2014, Council adopted the City's Townhouse Energy Efficiency and Renewable Energy policy, requiring all new townhouse units resulting from rezoning applications to achieve an "EnerGuide 82" energy efficiency performance rating or better, and comply with the BC Solar Hot Water ready regulation, or alternatively, to connect to a renewable energy system<sup>1</sup>. In June 2015, this policy was amended to also reference Natural Resources Canada's "Energy Star for New Homes" program as a compliance pathway. As of January 2018, 862 townhouse units have been approved under this policy. In almost every case, applicants have chosen to design and build townhouse units to an EnerGuide 82 performance level or better.

An analysis of reports received to date indicates that townhouses approved under the City's existing policy are designed, on average to consume 14% less energy than equivalent townhouses built to minimum requirements under the existing building code, and would achieve Step 2 of the Energy Step Code (leaving aside the airtightness requirement). A significant number of townhouse units designed under the current policy are modelled as achieving EnerGuide scores of 83 or higher<sup>2</sup>. Many of these units would achieve Step 3 of the Energy Step Code (again, leaving aside the airtightness requirement).

In 2017, Natural Resources Canada introduced a new energy efficiency rating system for new homes, and plans to discontinue the 0-100 rating system on December 31<sup>st</sup> 2018, rendering the City's existing Townhouse Energy Efficiency and Renewable Energy Policy obsolete.

The Energy Step Code is intended to replace the current LEED in City Centre and townhouse energy efficiency requirements at rezoning. Adopting the Energy Step Code, and its broad applicability to all new construction across Richmond, will further the City's leadership on energy-efficient new developments, while also bringing the City's policies in line with stated industry preferences and provincial government policy objectives.

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<sup>1</sup> In July 2015, the policy was revised to allow townhouse units to achieve the Energy Star for New Homes standard and comply with the BC Solar Hot Water ready regulation an alternate compliance option.

<sup>2</sup> Commonly middle units in row house buildings, where every unit receives the same energy efficiency upgrades.

### Stakeholder Consultation

In May 2017, Council endorsed a stakeholder consultation program to inform implementation of the BC Energy Step Code. The City's consultation program consisted of:

- Three workshops with Part 9 (buildings 3 storeys or less and less than 600m<sup>2</sup> footprint) home builders in Richmond's community. Attendees included representatives of the Richmond Home Builders Group, the Greater Vancouver Home Builders Association, multiple builders involved in recent projects in Richmond, and Energy Advisors. 209 people participated in at least one workshop, with good attendance at all events. These sessions successively introduced the BC Energy Step Code and how it works, provided opportunities for feedback on how the City can ensure successful implementation, and provided an opportunity for members of Richmond's home builder community to make comment on Energy Step Code implementation.
- Four workshops with representatives of Richmond's Part 3 larger buildings development community, updates to the Urban Development Institute (UDI) Liaison Committee, and a presentation at a UDI Breakfast Seminar on the Energy Step Code to regional development community members.
- An update to the Advisory Committee on the Environment.
- Direct engagement with energy utilities, including BC Hydro, FortisBC and Lulu Island Energy Company.
- A multi-stakeholder workshop of building industry stakeholders to review draft recommendations and receive feedback.
- A workshop with Energy Advisors, who provide energy modeling and air-tightness testing services to help builders meet the requirements of the BC Energy Step Code.

Attachment 3 summarizes the feedback received during stakeholder consultations.

### Recommended Energy Step Code Regulations and Policies Applicable to New Development

It is recommended that the Building Regulation Bylaw be amended to require new developments to adhere to the BC Energy Step Code. Amendment Bylaw 9769 proposes amendments to the Building Regulation Bylaw to establish requirements that new developments adhere to the Energy Step Code. The requirements apply to building permits received after September 1, 2018. These requirements vary for different building types, reflecting differences in the cost of achieving these steps defined in the code, and industry's readiness to deliver to different steps. Should the recommendations be endorsed, staff will monitor implementation and building performance under the new policies and bylaws. With successful progress it is anticipated that further steps can be advanced for consideration as per the timetable in Table 1 below.



**Table 1: Proposed BC Energy Step Code Requirements**

|   | Approximate Current Performance                           | Building Permit Application  |  |                  |                  |
|---|---|--|--|------------------|------------------|
|   |   | Recommended  | Estimated Timetable for Future Consideration |                  |                  |
| <b>Smaller Part 9 Residential</b>           |   | <b>September 1 2018<sup>3</sup></b>  | <b>Jan 2020</b>                              | <b>Jan 2022</b>  | <b>Jan 2025</b>  |
| Townhomes and apartments                    | ~Step 2 (townhomes)                                       | Step 3   | Same as 2018                                 | Step 4           | Step 4 or Step 5 |
| Single family, duplex and other residential | BC Building Code  | Step 1   | Step 3                                       | Step 3 or Step 4 | Step 4 or Step 5 |
| <b>Larger Part 3 developments</b>           |   |  |  |                  |                  |
| Residential Concrete                        | ~Step 2 (in City Centre)<br>BC Building Code (outside CC) | Step 3, or<br>OR<br>Step 2 for buildings that implement low carbon building energy systems | Same as 2018                                 | Step 3           | Step 4           |
| Residential Woodframe Low/Mid Rise          | ~Step 2 (in City Centre)<br>BC Building Code (outside CC) | Step 3   | Same as 2018                                 | Step 4           | Step 4           |
| Office & Retail Buildings                   | ~Step 2 (in City Centre)<br>BC Building Code (outside CC) | Step 2   | Same as 2018                                 | Step 3           | Step 3           |

Amendment Bylaw 9769 proposes two compliance paths for residential concrete buildings. Such developments must achieve Step 3, or Step 2 if they implement a low carbon building energy system. Such low carbon systems can be achieved through connection to district energy, or through implementation of onsite low carbon energy systems, including air-source heat pumps, geo-exchange, waste heat recovery and solar as approved by the City. Lulu Island Energy Company and the City are working on an additional amendment to support onsite low carbon energy systems.

Additional bylaw amendments are proposed to support Energy Step Code implementation. These are summarized in Table 2 below.

<sup>3</sup> Projects with “in-stream” DP applications will have until December 31, 2019, to submit an acceptable Building Permit under previous requirements.

**Table 2: Summary of Bylaw Amendments**

| <b>Purpose</b>  | <b>Description</b>  |
|---|---|
| <b>Adjust calculation of floor area in the Richmond Zoning Bylaw to support more insulated walls and green building systems</b> | <p>Amendment Bylaw 9845 proposes floor area calculation exclusions for projects implementing “beyond-Code” insulation, as well as low carbon green building systems that that can sometimes be larger than conventional mechanical systems. For all building types, exterior wall thickness in excess of 0.16 m (typical to meet the baseline BC Building Code) is excluded from floor area calculations, up to a maximum exclusion of 0.31 m, provided that the wall thickness is utilized for the provision of insulating materials. These amendments ensure those developments that provide greater insulation or green building features are not penalized through reduced living space.</p>  |
| <b>Update existing Official Community Plan policies to reflect implementation of the Energy Step Code</b>                       | <p>Amendment Bylaws 9771 and 9770 comprise of amendments to the Official Community Plan (OCP) and the City Centre Area Plan (CCAP). They introduce relevant context about the importance of low energy and emissions in the built environment in both the OCP and CCAP. They remove reference to the Townhouse Energy Efficiency and Renewable Energy policy, and LEED Silver for building types to which the Energy Step Code applies; the CCAP will continue to reference LEED Silver for buildings over 2000m<sup>2</sup> for which the BC Energy Step Code applies to less than 50% of gross floor area.</p> <p>Amendment Bylaw 9771 (OCP) also augments development permit guidelines to note that projects subject to the Energy Step Code will continue to comply with other development permit guidelines relating to building design and neighbourhood character.</p> <p>As a housekeeping update, amendments to the CCAP will remove reference to particular performance standards for City facilities. The City's Sustainable “High Performance” Building Policy – City Owned Facilities (Policy 2307) continues to reference LEED Gold certification for new City owned buildings.</p> <p>As a housekeeping update, Amendment Bylaw 9770 (CCAP) will clarify requirements for the City Centre Area Plan with regards to the commitment to connect to a district energy system or develop an on-site low carbon energy system.</p> |
| <b>Indicate anticipated future Energy Step Code and low carbon building requirements in the Official Community Plan</b>         | <p>Amendment Bylaw 9771 (OCP) establishes as policy the schedule of future changes to Energy Step Code requirements set out in Table 1. It also includes new policies that all developments be encouraged (but not immediately required) to achieve zero carbon operations.</p>   |

The recommended amendments in this report:

- **Support the attainment of high performance buildings on a timeframe consistent with meeting the City's emissions goals** – The CEEP suggests that for the City to achieve its GHG emissions reduction targets, all new construction would need to achieve near zero carbon emissions by 2025.
- **Represent a cost effective means of achieving building performance** – The BC Housing costing study noted in Appendix 4 suggests that the costs to achieve the BC Energy Step Code are relatively modest. Lowest additional costs for compliance are typically less than 1.5% of the cost of construction for the proposed requirements beginning in 2018, while the proposed 2025 requirements and zero emissions rezoning considerations could be met with no more than a 2-4% increase in construction costs, assuming today's technologies and typical pricing. As such, the overall increase in total capital cost will only be a fraction of the percentages noted above. The incremental cost of construction will not only generate ongoing utility bill savings throughout the life cycle of the building, but result in a higher quality building product characterized by greater comfort for occupants, improved indoor air quality and improved durability against moisture buildup and damage. Future advances in technology and market transformation of low carbon building systems are expected to reduce these additional construction costs over time.
- **Improve consistency** - A key desire expressed by the development and home building industries during consultations carried out for the BC Energy Step Code was consistency in the standards applied by local governments, to improve clarity and transferability of approaches between jurisdictions. Referencing the BC Energy Step Code will help achieve this consistency.
- **“Telegraph” the requirements for new developments into the future** – Establishing BC Energy Step Code requirements for future years will help industry members plan for training and development of innovative building practices. Industry has noted repeatedly that providing this assurance into the future is necessary to plan investments in training and innovation, and to control costs.
- **Support improved health, comfort and durability of new homes and buildings in Richmond** – As noted above, the performance requirements of the BC Energy Step Code will directly result in more airtight, less drafty buildings that provide improved indoor air quality, better thermal comfort, and more durable building envelopes.

### Ensuring Fairness for Smaller Homes

As noted in Attachment 1, the potential increases in incremental costs for small homes (e.g. those approximately 1100 square feet) to meet Steps 2-5 of the BC Energy Step Code are projected to be higher than those anticipated for other building types. This is because these homes use more energy per square foot (though less total energy), and because they have a relatively higher ratio of wall and roof area to total volume than larger buildings, making building envelope performance measures relatively more difficult to achieve. Conversely, the percent increase in

incremental costs for very large homes to meet higher steps of the BC Energy Step Code is projected to be lower than that for an average-sized home. Since Step 1 is currently referenced, the City's initial Step Code standards will not entail any disproportionate impact to homes of smaller or larger size.

The provincial government has acknowledged this issue and is considering revisions to the Energy Step Code to provide a level playing field for smaller homes. If such revisions are not adopted, staff will bring forward recommendations for revisions to the City's requirements, to ensure that the construction of smaller homes is not disproportionately burdened.

### Implementation

Building Regulation Bylaw 7230, Amendment Bylaw 9769 specifies that applicable Building Permit applications filed on or after September 1, 2018, will need to adhere to the BC Energy Step Code. In order to accommodate in-stream applications for Part 3 buildings and townhouse developments that may face greater difficulty adjusting their building systems to be able to achieve these new targets:

- Developments that have been issued Development Permits prior to the effective date, may apply for a Building Permit to construct in compliance with the previous requirements for duration of the time that their Development Permit is valid;
- Developments that have submitted acceptable Development Permit applications before the date of Council's adoption of Bylaw 9769 will have until December 31, 2019, to submit an acceptable Building Permit application in order to build under previous requirements.

Going forward, achieving the higher steps (e.g. Step 4 for Part 3 buildings and Step 4-5 for Part 9 buildings) of the Energy Step Code may impact the form and character of new construction. As such, staff may closely monitor building design trends and bring forward Richmond Zoning Bylaw amendments and design guideline amendments in the Official Community Plan that support implementation of the higher steps in Richmond. These amendments are not required for recommended starting levels applicable in 2018, but will support the widespread adoption of very low energy and emissions buildings in future years.

### Next Steps

Staff are evaluating the viability of referencing low carbon building energy systems as part of the Building Regulation Bylaw and/or OCP for additional building types (i.e. other than residential "Part3" buildings with concrete construction) to achieve zero/low GHG emissions. Such a policy would be consistent with other leading jurisdictions, and with what Richmond's Community Energy and Emissions Plan indicates is necessary to be able to achieve the City's GHG reduction targets. Staff will also evaluate the need to introduce additional rezoning policy relating to health and other green building attributes as part of a more streamlined rezoning approach. Lastly, staff are evaluating updates to the Sustainable "High Performance" Building Policy – City Owned Facilities (Policy No. 2307), to introduce new energy performance options for leadership in corporate facilities.

### Building Energy Specialist Position

BC Hydro offers \$100,000 over a two year term for a new staff position to support the implementation of the Step Code and related efforts to facilitate more energy efficient buildings. As such, it is recommended that a two year temporary full time Building Energy Specialist position be created. Key roles will include implementing BC Energy Step Code approvals processes; training staff; developing education and training opportunities for building industry stakeholders; and tracking results to support continuous improvement. The remaining costs will be fully funded through building permit fees.

### Building Approvals Resources

Richmond is experiencing ongoing high levels of development. Endorsement of the Energy Step Code and its requirements will result in additional workload on Building Approvals staff at both the Plan Review and Inspection stages. Design criteria meeting the advanced energy conservation measures will require additional review of supporting documents as well as verification in constructed form during inspections. Additional efforts will also have to be made in order to integrate the results of performance testing of the buildings as required by the Step Code into the exiting inspection process. To support customer service excellence and reliable, timely building approvals, it is recommended that a new Plan Reviewer position and a new Building Inspector 1 position be created. These positions will be fully funded through building permit fees.

### Energy Step Code Training Programs

To complement the introduction of the BC Energy Step Code, it is proposed that the following programs be funded from pre-existing resources in the 2018 Operating Budget:

- \$80,000 to expand the City's existing Air-Tightness Training Programs. Council approved implementation of this program on May 23, 2017. Accordingly, under this program, the City supports local builders, including their sub-trades and labourers, to gain expertise in building airtight homes in advance of regulatory requirements by funding:
  - Attendance at a hands-on one-day Airtightness Techniques Course; and/or
  - Free pre-drywall blower door tests to directly measure the airtightness of new homes under construction in Richmond.
- \$15,000 to expand the very well attended City's Builders Workshop Series, presentations providing information about energy efficiency strategies.
- \$15,000 training for Part 3 (buildings greater than 3 stories or 600m<sup>2</sup> footprint) designers, contractors, and trades in air-tightness testing, energy modeling, and associated programming.

These programs will complement and leverage existing Energy Step Code training being offered by BC Housing, BCIT, the Greater Vancouver and Canadian Home Builders Associations, Architectural Institute of BC, Engineers and Geoscientists of BC, and other providers.

OCP Consultation Summary

Staff have reviewed the proposed 2041 OCP Amendment Bylaws with respect to the *Local Government Act* and the City's OCP Bylaw Preparation Consultation Policy No. 5043 requirements. The table below clarifies this recommendation. Public notification for the public hearing will be provided as per the *Local Government Act*.

| OCP Consultation Summary   |  |
|--|--|
| Stakeholder  | Referral Comment (No Referral necessary)   |
| BC Land Reserve Commission   | No referral necessary.   |
| Richmond School Board  | No referral necessary.   |
| The Board of the Greater Vancouver Regional District (GVRD)                  | No referral necessary.   |
| The Councils of adjacent Municipalities                                      | No referral necessary.   |
| First Nations (e.g., Sto:lo, Tsawwassen, Musqueam)                           | No referral necessary.   |
| TransLink  | No referral necessary.   |
| Port Authorities (Vancouver Port Authority and Steveston Harbour Authority)  | No referral necessary.   |
| Vancouver International Airport Authority (VIAA) (Federal Government Agency) | No referral necessary.   |
| Richmond Coastal Health Authority  | No referral necessary.   |
| Stakeholder  | Referral Comment   |
| Community Groups and Neighbours  | No referral necessary.   |
| Utilities  | The proposed amendments were referred to BC Hydro and FortisBC.  |
| Home builders and developers   | The proposed amendments were referred to the Richmond Home Builders Group, the Greater Vancouver Home Builders Association, and the Urban Development Institute. |
| All relevant Federal and Provincial Government Agencies                      | No referral necessary.   |

Richmond Official Community Plan Bylaw No. 9000, Amendment Bylaw No. 9771, and City Official Community Plan Bylaw No. 7100 (CCAP), Amendment Bylaw No. 9770, having been considered in accordance with OCP Bylaw Preparation Consultation Policy 5043, do not require further consultation.

The public will have an opportunity to comment further on all of the proposed amendments at the Public Hearing.

**Financial Impact**

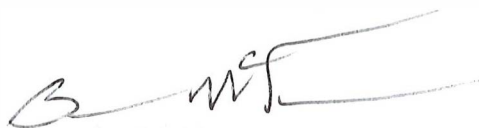
BC Hydro will support the Building Energy Specialist position with \$100,000 funded over two years. The Building Energy Specialist position will result in approximately \$130,000 in total salary and benefits impacts to the operating budget over a two-year period, after support by BC Hydro. These funds will be sourced from building permit revenue.

New Building Approvals department positions will result in approximately \$265,000 in additional salary and benefits annually. These funds will be sourced from building permit revenue. Based on the trend for increasing development as experienced in the past several years and current and projected activity into the foreseeable future, staff anticipate that the revenue derived from building fees will be sufficient to fund the proposed 2 full time and 1 temporary building energy specialist position.

Energy Step Code training programs will cost \$110,000. These funds are approved as part of the 2018 Operating Budget funded by the carbon tax provision.

**Conclusion**

The BC Energy Step Code, and associated policies to support low carbon emissions in new developments, are critical elements to the City pursuing its GHG reduction goals. This report recommends referencing the BC Energy Step Code as requirements in the Building Regulation Bylaw; updating policies in the Official Community Plan to encourage zero emissions development and identify planned future Step Code considerations; creating a Building Energy Specialist position to support BC Energy Step Code implementation; creating a new Plan Reviewer position and Building Inspector 1 position; and implementing training programs to assist the homebuilding and development industry.



Brendan McEwen  
Sustainability Manager  
(604-247-4676)



Nicholas Heap  
Sustainability Project Manager  
(604-276-4267)

BM:bm

- Att. 1: Background on the BC Energy Step Code  
2: Summary of BC Energy Step Code Technical Requirements  
3: Energy Step Code Consultation Feedback  
4: Building Regulation Bylaw No. 7230, Amendment Bylaw No. 9769  
5: Richmond Zoning Bylaw No. 8500, Amendment Bylaw No. 9845  
6: Richmond Official Community Plan Bylaw No. 9000, Amendment Bylaw No. 9771  
7: Richmond Official Community Plan Bylaw No. 7100, Amendment Bylaw No. 9770

## **Attachment 1: Background on the BC Energy Step Code**

### The BC Energy Step Code

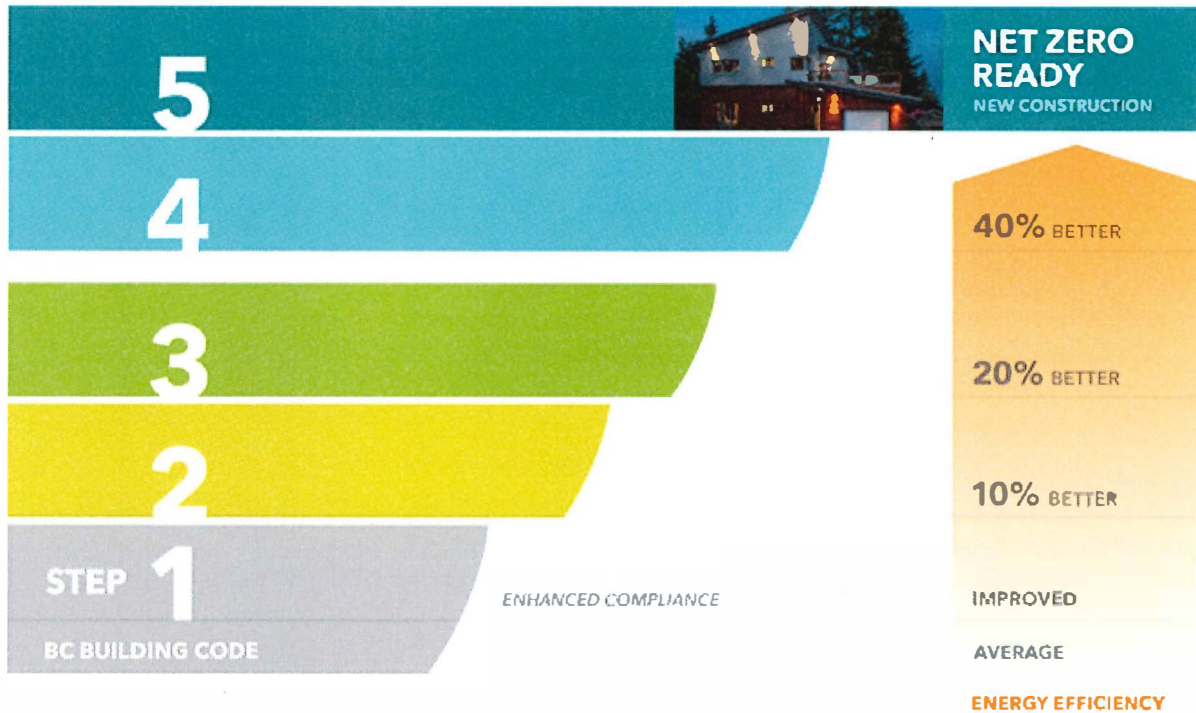
The BC Energy Step Code is a provincial standard that provides a series of incremental steps to achieve progressively more energy-efficient buildings than delivered by the base BC Building Code. The BC Energy Step Code is a provincial building regulation that adds new compliance pathways to the energy sections of the BC Building Code. The Province has added the BC Energy Step Code to the unrestricted matters list in the BC Building Act General Regulation, thereby allowing local governments to establish the Energy Step Code as requirements in bylaws.

The BC Energy Step Code is largely a product of the multi-stakeholder “Stretch Code Implementation Working Group” (SCIWG), which the Province convened in the spring of 2016. A variety of stakeholders were represented in the SCIWG, including the Urban Development Institute, Canadian Home Builders Association, Greater Vancouver Home Builders Association, BC Hydro, FortisBC, Architectural Institute of BC, the Association of Professional Engineers and Geoscientists of BC, BC Housing, the Local Government Management Association, and other local governments. City of Richmond staff participated on the SCIWG. This group deliberated on the development of the BC Energy Step Code, and the Province released the consensus recommendations of the SCIWG in November 2016.

The Province enacted the BC Energy Step Code in April 2017, and published a “Provincial Policy: Local Government Implementation of the BC Energy Step Code” document, outlining expectations for local governments’ application of the Energy Step Code consistent with the recommendations of the SCIWG. In August 2017, the Province released a more detailed “Best Practices Guide for Local Governments” to support the BC Energy Step Code’s implementation. The SCIWG has now been renamed the “Energy Step Code Council,” and will continue to advise the provincial government on the further development of, and revisions to, the Energy Step Code going forward. A City staff person is on the Energy Step Code Council.

The Energy Step Code comprises of a series of graduate performance Steps. There are five Steps for “Part 9” residential buildings (i.e. buildings less than 4 stories and 600m<sup>2</sup> building footprint); four Steps for larger “Part 3” residential buildings; and three Steps for “Part 3” office, institutional and retail buildings. Attachment 2 summarizes the technical requirements. The Figure below, showing Part 9 Energy Step Code targets, illustrates the BC Energy Step Code’s basic structure of progressively more stringent steps.





In addition to energy and emissions savings, the BC Energy Step Code can deliver other benefits, including:

- **Comfort** – Buildings with high performance building envelopes typically are more comfortable, being less drafty and warmer near exterior windows and walls.
- **Quiet** – Well insulated buildings better attenuate sound, resulting in quieter indoor conditions. This can help achieve the City’s Aircraft Noise policy requirements for achieving CMHC noise standards and ASHRAE internal building thermal comfort levels.
- **Indoor air quality** – Constructing high performance systems requires greater attention to building ventilation. Typically, high performance residential buildings will use either direct to unit ventilation, or suite-by-suite heat recovery ventilation. These systems can better deliver fresh air than is typical of other common ventilation practices, improving indoor air quality.
- **Simple building systems and ease of maintenance** – Low thermal energy demand can allow for relatively simple building heating strategies. This can reduce the operations and maintenance, as well as the potential for expensive repairs, which are often associated with more complicated mechanical systems. Moreover, attention to quality building envelop construction can increase building durability.
- **Regional economic development** – The Step Code encourages high performance building envelopes. Insulation, windows and wood framing components tend to be manufactured locally, supporting local economic development.

- **Climate change adaptation** – The better building envelope design associated with the proposed approach can help ensure that buildings remain comfortable in the warmer climates anticipated in the future.

**BC Energy Step Code Costs**

In August 2017, BC Housing released the results of a study of the costs associated with constructing new buildings to the BC Energy Step Code. The study assessed the costs of achieving different Steps, for a range of different building types and uses. The table below summarizes the study’s findings for select building archetypes in Climate Zone 4, where Richmond is located. It notes that estimated construction cost premium for the lowest cost building strategies to achieve a given Step. These costs represent only the cost of construction, and do not account for the cost of land, developer profit, nor any design fees, which together make up the majority of the cost of housing in Richmond.

**Table 1: Estimated construction cost premiums for different building types to achieve different Steps of the BC Energy Step Code. Sources: BC Housing 2017 & City of Richmond Analysis.**

| <b>Part 3 Buildings</b>          | <b>Step 1</b> | <b>Step 2</b> | <b>Step3</b> | <b>Step 4</b> |
|----------------------------------|---------------|---------------|--------------|---------------|
| High Rise Multifamily (concrete) | <0.1%         | 0.4%          | 0.8%         | 2.4%          |
| Low Rise Multifamily (woodframe) | <0.1%         | 0.5%          | 0.6%         | 2.6%          |
| Office                           | <0.1%         | 0.1%          | 0.1%         | N/A           |
| Retail                           | <0.1%         | 0.9%          | 2.1%         | N/A           |

| <b>Part 9 Buildings</b>        | <b>Step 1</b> | <b>Step 2</b> | <b>Step3</b> | <b>Step 4</b> |
|--------------------------------|---------------|---------------|--------------|---------------|
| 10 unit multifamily apartment  | 0.1%          | 0.3%          | 0.3%         | 0.7%          |
| 6 unit row house               | 0.1%          | 0.4%          | 1.0%         | 1.9%          |
| Quadplex                       | 0.3%          | 1.3%          | 2.2%         | 3.5%          |
| 5500 square foot single family | 0.2%          | 0.6%          | 1.4%         | 1.4%          |
| 2600 square foot single family | 0.2%          | 0.6%          | 1.6%         | 2.7%          |
| 1100 square foot single family | 0.5%          | 4.0%          | 7.4%         | 10.1%         |

For most building types, construction cost premiums are modest at Steps 3 and below, typically about 1.6% or less for the residential building typologies common to Richmond. The exception is for small single family homes, for which it is more costly to achieve the Energy Step Code as currently designed (based on the outcomes of this study, there is a proposal before the Energy Step Code Council to recommend amendments to the Energy Step Code that would relax requirements for small homes to provide a more level playing field. Staff will track the outcomes of this proposal, and recommend any appropriate adjustments to City policy in the future, to ensure a level playing field for smaller homes).

These costing values were derived from data from Natural Resources Canada’s LEEP program which tracked the costs of more efficient projects from real construction projects across the country, and have been extensively vetted with industry. As such, they represent the anticipated costs for builders with a good understanding of energy efficiency strategies. Staff note that

training will be required for some builders to improve understanding of energy efficient construction practices, and reduce the costs associated with learning and capacity development.

The study noted above did not allow for optimization of passive design strategies that can lower energy use such as form, massing, and glazing area. Many projects will be able to optimize for these considerations, and should thus face lower cost premiums.

## Attachment 2: Summary of Energy Step Code Technical Requirements

### Part 3 Construction

The Energy Step Code for large “Part 3” buildings (e.g. buildings that are 4 or more stories and greater than 600m<sup>2</sup>) involves a number of technical requirements, including:

#### **Steps 1 to 4 - Adherence to an “Enhanced Compliance Package”, involving:**

- **Energy modeling for all projects.** All projects will be required to produce an energy model of the building to confirm that it exceeds minimum energy and emissions targets. The Step Code references Energy Modeling Guidelines outlining standardized assumptions, acceptable modeling software, and processes. These Guidelines ensure a fair “apples to apples” evaluation of building performance. Energy models will be professionally signed and sealed. Submission of an energy model to the City is already required as part of district energy connection approvals, and a large percentage of buildings undertake energy modeling for LEED and/or Building Code compliance.
- **Whole building air-tightness testing.** Developments will be required to conduct a test of their air-tightness. At first, testing will be used to baseline performance. Various jurisdictions already have mandatory air tightness testing, including the City of Vancouver, the State of Washington, and many European countries.
- **Building energy reporting.** While not a part of the Energy Step Code, it is proposed that as an administrative procedure, the City specify that developments create an Energy STAR Portfolio Manager account used to track energy performance. This will facilitate future evaluation of buildings’ energy performance. The Portfolio Manager tool is widely used and considered the *de facto* energy reporting and benchmarking system, with over 20% of commercial floor space in Canada using the tool, and over 40% in the USA.

**Steps 2 to 4 - Exceeding minimum energy performance targets.** In addition to the “enhanced compliance package” noted above, developments will be required to exceed minimum energy performance targets. Different performance targets exist for different building types, including residential, office, and retail. Performance targets for mixed use buildings are pro-rated based on floor area. Targets include:

- **Thermal energy demand intensity (kWh/m<sup>2</sup>/year)** – The annual modeled thermal energy required to provide space heating for a development. This target encourages energy efficient building envelope and passive design features, to limit heating requirements.
- **Total energy use intensity (kWh/m<sup>2</sup>/year)** – The total annual modeled energy demand of a development. This target encourages all building systems to be energy efficient.

Energy Step Code performance levels are summarized in the tables below. The specific targets cited in the Energy Step Code may be adjusted over time, as additional information becomes available, notably the BC Housing study now underway.

**Energy Step Code Performance Levels for Residential Occupancies**

|               | Equipment and Systems – Maximum<br>Total Energy Use Intensity<br>(kWh/m <sup>2</sup> /yr) | Building Envelop – Maximum<br>Thermal Energy Demand Intensity<br>(kWh/m <sup>2</sup> /yr) |
|---------------|---|---|
| <b>Step 1</b> |   |   |
| <b>Step 2</b> | 130   | 45  |
| <b>Step 3</b> | 120   | 30  |
| <b>Step 4</b> | 100   | 15  |

**Energy Step Code Performance Levels for Business  
and Personal Services or Mercantile Occupancies**

|               | Equipment and Systems – Maximum<br>Total Energy Use Intensity<br>(kWh/m <sup>2</sup> /yr) | Building Envelop – Maximum<br>Thermal Energy Demand Intensity<br>(kWh/m <sup>2</sup> /yr) |
|---------------|---|---|
| <b>Step 1</b> |   |   |
| <b>Step 2</b> | 170   | 30  |
| <b>Step 3</b> | 120   | 20  |

## Part 9 Construction

All five steps of the Energy Step Code for Part 9 construction require two basic “Enhanced Compliance” measures, which are not required under the BC Building Code:

- **Energy modeling** of the building is required at the design stage, in order to confirm that the structure as designed will achieve the Step Code targets.
- **“Air-tightness” testing** is required once the building has been constructed, in order to measure uncontrolled flows of heat and moisture<sup>4</sup> in and out of the building.

Beyond this, each tier of the Part 9 Energy Step Code sets out three performance targets:

- **The air-tightness of the completed building** – air-tightness is typically measured in terms of air changes per hour when the building is pressurized and depressurized by a defined amount (50 Pascals of air pressure).
- **Mechanical energy performance** – The energy model for the building must meet performance thresholds for one of the following two metrics:
  - Mechanical Energy Use Intensity (MEUI) of the building.
  - Percentage reduction in total energy use relative to the same home built to BC Building Code minimum standards, as measured by the EnerGuide Rating System’s reference house.
- **Building envelope performance** – The energy model for the building must meet performance thresholds for one of the following two metrics:
  - Thermal Energy Demand Intensity (TEDI) which measure annual energy demand for heating a space.
  - Peak Thermal Load (PTL) which measure peak heat loss through the building envelope.

The table below summarizes Part 9 Energy Step Code requirements for Climate Zone 4, which includes Metro Vancouver.

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<sup>4</sup> Mostly as water vapour

**Part 9 Step Code Requirements for Climate Zone 4 (Lower Mainland and southern Vancouver Island)**

|               | <b>Airtightness (Air changes per hour at 50 Pa Pressure Differential)</b> | <b>Performance Requirements for Building Equipment and Systems</b>  | <b>Performance Requirements for Building Envelope</b>  |
|---------------|---|---|--|
| <b>Step 1</b> | NA  | EnerGuide Rating % lower than EnerGuide Reference House:<br>not less than 0% lower energy consumption<br>- or -<br>conform to Subsection 9.36.5.  |  |
| <b>Step 2</b> | $\leq 3.0$  | EnerGuide Rating % lower than EnerGuide Reference House: not less than 10% lower energy consumption<br>- or -<br>mechanical energy use intensity<br>$\leq 60 \text{ kWh/m}^2 \cdot \text{year}$ | thermal energy demand intensity<br>$\leq 45 \text{ kWh/m}^2 \cdot \text{year}$<br>- or -<br>peak thermal load<br>$\leq 35 \text{ W/m}^2$ |
| <b>Step 3</b> | $\leq 2.5$  | EnerGuide Rating % lower than EnerGuide Reference House: not less than 20% lower energy consumption<br>- or -<br>mechanical energy use intensity<br>$\leq 45 \text{ kWh/m}^2 \cdot \text{year}$ | thermal energy demand intensity<br>$\leq 40 \text{ kWh/m}^2 \cdot \text{year}$<br>- or -<br>peak thermal load<br>$\leq 30 \text{ W/m}^2$ |
| <b>Step 4</b> | $\leq 1.5$  | EnerGuide Rating % lower than EnerGuide Reference House: not less than 40% lower energy consumption<br>- or -<br>mechanical energy use intensity<br>$\leq 35 \text{ kWh/m}^2 \cdot \text{year}$ | thermal energy demand intensity<br>$\leq 25 \text{ kWh/m}^2 \cdot \text{year}$<br>or<br>peak thermal load $\leq 25 \text{ W/m}^2$        |

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|               |            |   |  |
|---------------|------------|---|--|
| <b>Step 5</b> | $\leq 1.0$ | mechanical energy use<br>intensity<br>$\leq 25 \text{ kWh/m}^2 \cdot \text{year}$ | thermal energy demand intensity<br>$\leq 15 \text{ kWh/m}^2 \cdot \text{year}$<br>or<br>peak thermal load<br>$\leq 10 \text{ W/m}^2$ |
|---------------|------------|---|--|

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Viewed together, the five Steps of the Step Code span the large performance gap between current BC Building Code minimum requirements and the highest levels of building energy performance yet achieved in British Columbia.

- **Step 1** is quite literally intended to be a “first step” on the road to improved building energy efficiency performance, for communities and/or segments of the building market with limited previous requirements for building energy efficiency. Step 1 energy performance targets are modest, requiring only that that building achieve the same energy performance as the intended performance of a building built to minimum BC Building Code requirements. As noted above, however, achieving this target requires builders to do energy modeling, and to install the building’s air-barrier in an effective manner, skills that are essential to achieving success at higher levels of the Step Code.
- **Step 2** calls for homes only 10% more efficient than that expected with Building Code minimum requirements, and a required air-tightness of 3.0 ACH50. Step 2 is best characterized a half-step relative to the larger jumps in performance between higher tiers.
- **Step 3** entails an overall energy performance 20% better than Building Code minimum requirements, and an airtightness of 2.5 ACH. The overall energy target for this Step is a close match to two of the four available options under the City’s existing townhouse energy efficiency policy. Based on modeling information available to date, townhouses in Richmond designed to achieve an EnerGuide 82 rating are, on average, 13% more efficient than those built to code minimum requirements, while homes built to the Energy Star for New Homes standard are expected to be 22% more energy efficient than a minimally code compliant home.
- **Step 4** is comparable to the energy performance of a home to Natural Resources Canada’s R-2000 ® standard. Homes meeting this standard would use 40% less energy than the expected performance of a minimally code compliant home, and have an airtightness of 1.5 ACH50 or better – less than a third of the average new home built to minimum building code requirements
- **Step 5** approaches the performance required by the stringent “Passive House” standard, and broadly matches the level of energy performance that the Climate Leadership Plan has committed to for new construction in 2032. Homes achieving Step 5 would use less than half of the energy of a minimally code compliant home, and an airtightness level of just 1.0 ACH<sub>50</sub>. Homes with this level of performance can achieve “net-zero energy ready,” in if onsite renewable energy such as solar panels are implemented they can be capable of generating as much energy on an annual basis as they consume. At present, achieving this level of energy performance is exceptional.



### Attachment 3: Energy Step Code Consultation Feedback

| What we heard...  | Staff response  |
|---|---|
| <i>Members of the development and homebuilding industries expressed that training pertaining to the BC Energy Step Code, especially regarding air-tightness for contractors and trades, and energy efficient design training, would be valuable.</i>  | Staff have implemented the City's Airtightness Training Program in September 2017 for local Part 9 builders, providing free tuition to a one-day airtightness training course, and free pre-drywall blower door tests for houses and townhouses under construction. The City is also hosting training on building to Step 3 of the BC Energy Step Code. Staff propose to maintain these existing programs and expand the City training programs, to complementing existing training being made available by BC Housing, BCIT, home builders associations, product suppliers, and other providers. |
| <i>Development industry members noted the importance of avoiding impacts to development approvals timelines, and of the need for energy efficient form and character choices to be encouraged.</i>  | In consultation with stakeholders, staff have developed approvals processes for the BC Energy Step Code that complement existing development and building approvals processes.  |
| <i>Development industry stakeholders suggested that developments that have proceeded through a significant process of design iteration anticipating previous requirements (for instance, had a concept endorsed by the Development Permit Panel) would face a hardship if they are required to adhere to the BC Energy Step Code, as building massing and systems design decisions impact the energy efficiency of buildings.</i> | Staff recommend that projects developments that have been issued Development Permits prior to the effective date, may apply for a Building Permit to construct in compliance with the previous requirements for duration of the time that their Development Permit is valid. Furthermore, developments that have submitted acceptable Development Permit applications before the date of Council's adoption of Bylaw 9769 will have until December 31, 2019, to submit a complete Building Permit application in order to build under previous requirements.                                      |
| <i>Members of the development and homebuilding industries expressed a desire for low/zero carbon technologies to be recognized as valuable. They further requested that the City consider implementing a GHG intensity compliance option instead of more aggressive Energy Step Code implementation.</i>  | The BC Energy Step Code currently does not award projects for realizing zero GHG emissions. As part of its engagement with the Energy Step Code Council, staff are pursuing the recognition of onsite renewable energy and GHG reductions, to complement the valuable metrics already referenced in the BC Energy Step Code.  |

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The proposed Building Regulation Bylaw amendments specify a low carbon compliance option for larger concrete building. Staff are evaluating options to implement a similar requirement for other forms of development.

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*It is important that the City “telegraph” future requirements, so that the development industry can plan for future requirements.*

The proposed regime includes future targets, to provide greater certainty for industry.

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*Representatives of the development and homebuilder industries expressed appreciation for the City’s thorough consultation process*

Staff appreciate the productive engagement of the development and homebuilder industry representatives.

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*City’s district energy provider, Lulu Island Energy Company (LIEC), noted that their analysis showed that with the adoption of the BC Energy Step Code, implementation of the low carbon energy sources for the district energy systems could potentially be delayed; however, combined implementation of BC Energy Step Code and low carbon district energy systems is the path to achieving the largest greenhouse gas emissions reductions.*

Staff will continue to work closely with LIEC to explore solutions to best manage impacts created by adopting BC Energy Step Code and implement low carbon energy sources for the district energy systems as soon as possible.



**Building Regulation Bylaw No. 7230,  
Amendment Bylaw No. 9769  
(BC Energy Step Code Implementation)**

The Council of the City of Richmond, in open meeting assembled, enacts as follows:

1. *Building Regulation Bylaw No. 7230*, as amended, is further amended by adding the following as a new Part Ten and renumbering the remainder of the bylaw:

**“PART TEN: ENERGY STEP CODE**

**10.1 Energy Step Code Requirements**

- 10.1.1 Part 3 and Part 9 **buildings** and **structures** must be designed and **constructed** in compliance with the applicable step of the **energy step code**, as set out in the schedule below:

| Building Type  | Building permit application filed on or after September 1, 2018                          |
|--|--|
| <i>Buildings subject to Part 9 of the Building Code</i>  |  |
| Townhomes and apartments   | Step 3   |
| Single family, duplex and other dwelling units   | Step 1   |
| <i>Buildings subject to Part 3 of the Building Code</i>  |  |
| Group C Residential occupancies greater than 6 stories or non-combustible construction (not including hotel and motel occupancies) | Step 3<br>OR<br>Step 2 for buildings that implement a low carbon building energy system. |
| Group C Residential occupancies 6 stories or less and combustible construction (not including hotel and motel occupancies)         | Step 3   |
| Group D Business and personal services occupancies or Group E mercantile occupancies   | Step 2   |

10.1.2 For a Part 9 **building** or **structure** that is designed in compliance with the applicable step of the **energy step code** but where the **constructed building** or **structure** does not meet the performance requirements of the applicable step of the **energy step code**, after all reasonable mitigation measures are implemented to the satisfaction of the **building inspector**, the **building inspector** may issue an inspection notice for **provisional occupancy**, or final, of the **building** or **structure** if it is constructed in compliance with alternative energy efficiency performance or prescriptive requirements set out in the **building code** for Part 9 construction, as applicable.

## 10.2 Requirement for Energy Advisor

10.2.1 With respect to a **building permit** for a **building** or **structure** that falls within the scope of Part 9 of the **building code**, the **owner** must provide, to the satisfaction of the **building inspector**, the all the materials and documentation required by the **energy step code**, prepared and signed by an **energy advisor**, and such other reports and materials as required by the **building inspector**.

10.2.2 The **energy advisor**, providing the required materials and documentation set out in the **energy step code**, must provide evidence to the **building inspector** that he or she is an energy advisor registered and in good standing with Natural Resources Canada in accordance with the EnerGuide Rating System Administrative Procedures and adheres to the technical standards and procedures of the ERS.

10.2.3 Prior to:

- (a) the issuance of a **building permit**; and
- (b) the **provisional occupancy** of a **building** or **structure**,

in respect of which a **building inspector** has required the materials and documentation set out in the **energy step code**, the **owner** must submit written confirmation of insurance coverage of the **energy advisor** in the form specified by the **City**.

10.2.4 For certainty, and notwithstanding section 10.2.1 above, where a **registered professional** is required under section 5.13.1 of this bylaw, in respect of a **building permit** for a **building** or **structure** that falls within the scope of Part 3 or Part 9 of the **building code**, the **professional design** and **field review** shall include the materials and documentation required by applicable step of the **energy step**

**code**, and such other reports and materials as required by the **building inspector**.

2. *Building Regulation Bylaw No. 7230*, as amended, is further amended at Part Fifteen [Interpretation] by adding the following definitions in alphabetical order:

|  |  |
|--|--|
| <b>“APARTMENT</b>  | means apartment housing as defined in the <b>zoning bylaw</b> .  |
| <b>BUSINESS AND PERSONAL SERVICES OCCUPANCY</b>          | means a business and personal services occupancy as defined in the <b>building code</b> .  |
| <b>COMBUSTIBLE CONSTRUCTION</b>                          | means combustible construction as defined in the <b>building code</b> .  |
| <b>DUPLEX</b>  | means two-unit housing as defined in the <b>zoning bylaw</b> .   |
| <b>DWELLING UNIT</b>                                     | means a dwelling or dwelling unit as defined in the <b>building code</b> .   |
| <b>ENERGY ADVISOR</b>                                    | means a person is registered as an energy advisor, and in good standing, with Natural Resources Canada, and who conducts EnerGuide home evaluations on behalf of service organizations licenced by Natural Resources Canada. |
| <b>ENERGY STEP CODE</b>                                  | means the requirements set out in Sections 10.2.3 and 9.36.6 of the <b>building code</b> , and includes Step 1, Step 2, Step 3, Step 4 and Step 5.   |
| <b>GROUP C RESIDENTIAL OCCUPANCY</b>                     | means a residential occupancy as defined in the <b>building code</b> .   |
| <b>GROUP D BUSINESS AND PERSONAL SERVICE OCCUPANCIES</b> | means business and personal services occupancies as defined in the <b>building code</b>  |
| <b>GROUP E</b>   | means a mercantile occupancy as defined in the <b>building</b>   |

**MERCANTILE  
OCCUPANCY**

**code.**

**LOW CARBON  
BUILDING ENERGY  
SYSTEM**

means a **building**'s space heating, cooling and domestic hot water heating mechanical system that is supplied energy through:

- a) a connection to a **City** owned district energy utility system; or
- b) on-site energy supply equipment designed to meet a minimum 70% of the **building**'s annual heating, cooling and domestic hot water energy demand from a renewable energy source, approved by the **City**'s Director of Engineering. Applicable renewable energy source technologies include, but are not limited to, air and ground source heat pump systems, waste heat recovery systems, solar collectors, or other systems as approved by the **City**'s Director of Engineering. The **building**'s energy system must be designed and constructed such that it is ready to connect to a future **City** owned district energy utility system.

**NON-COMBUSTIBLE  
CONSTRUCTION**

means non-combustible construction as defined in the building code.

**SINGLE FAMILY**

means single detached housing as defined in the **zoning bylaw**.

**TOWNHOUSE**

means town housing as defined in the **zoning bylaw**."

3. This Bylaw may be cited as "**Building Regulation Bylaw No. 7230, Amendment Bylaw No. 9769**".

FIRST READING

SECOND READING

THIRD READING

ADOPTED

JUN 25 2018  
 \_\_\_\_\_  
 JUL 09 2018  
 \_\_\_\_\_  
 JUL 09 2018  
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|---|
| CITY OF RICHMOND                                    |
| APPROVED by <i>[Signature]</i>                      |
| APPROVED by Manager or Solicitor <i>[Signature]</i> |

\_\_\_\_\_  
MAYOR

\_\_\_\_\_  
CORPORATE OFFICER



**Richmond Zoning Bylaw No. 8500,  
Amendment Bylaw No. 9845  
(Floor Area Exclusion for Additional Insulation and  
Green Building Features)**

The Council of the City of Richmond, in open meeting assembled, enacts as follows:

1. Richmond Zoning Bylaw 8500, as amended, is further amended at Section 3.4 [Use and Terms Definitions] by adding the following definition in alphabetical order:

**“Green building system** means:

- a) equipment that converts, stores, or transfers energy from a renewable energy source. This includes equipment used to support solar collectors, small wind energy systems, air or ground source heat pump systems, waste heat recovery systems, and biomass systems; or
- b) equipment that stores and treats rainwater, grey water, or both.”

2. Richmond Zoning Bylaw 8500, as amended, is further amended at Section 4.2 [Calculation of Density in All Zones] by inserting the following as new subsection 4.2.1 (c):

“c) exterior wall thickness in excess of 0.16 m, up to a maximum exclusion of 0.31 m, provided that the wall thickness is utilized for the provision of insulating materials.”

3. Richmond Zoning Bylaw 8500, as amended, is further amended at Section 4.3 [Calculation of Density in Single Detached Housing, Agriculture and Two-Unit Housing Zones] by:

- (i) deleting the words “item is” from section 4.3.3 and replacing them with the words “items are”; and

- (ii) inserting the following as new subsections 4.3.3(b):

“b) up to a maximum of 2.35m<sup>2</sup> per **dwelling unit** for **floor area** occupied by those components of a **green building system** constructed or installed within the **principal building**.”

4. Richmond Zoning Bylaw 8500, as amended, is further amended at Section 4.4 [Calculation of Density in Town Housing Zones] by inserting the following as new subsections 4.4.1(e):

“e) up to a maximum of 2.35m<sup>2</sup> per **dwelling unit** for **floor area** occupied by those components of a **green building system** constructed or installed within the **principal building**.”



5. This Bylaw is cited as “**Richmond Zoning Bylaw No. 8500, Amendment Bylaw No. 9845**”.

FIRST READING

JUN 25 2010

PUBLIC HEARING

\_\_\_\_\_

SECOND READING

\_\_\_\_\_

THIRD READING

\_\_\_\_\_

ADOPTED

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|  |
|--|
| CITY OF<br>RICHMOND  |
| APPROVED<br>by<br><i>[Signature]</i>                         |
| APPROVED<br>by Manager<br>or Solicitor<br><i>[Signature]</i> |

\_\_\_\_\_  
MAYOR

\_\_\_\_\_  
CORPORATE OFFICER



**Richmond Official Community Plan Bylaw No. 9000,  
Amendment Bylaw No. 9771  
(Energy Step Code)**

The Council of the City of Richmond enacts as follows:

1. Richmond Official Community Plan Bylaw 9000, as amended, is further amended at Schedule 1, Section 12.4 by deleting the “Overview” subsection and replacing it with the following:

**“OVERVIEW:**

The City has adopted greenhouse gas reduction targets of 33% below 2007 levels by 2020 and 80% by 2050. On July 26, 2010, Council endorsed the Corporate Sustainability Framework, Energy Strategic Program, which called for the development of a Community Energy and Emissions Plan (CEEP), and included a target “to reduce energy consumption in the Richmond community by at least 10% from 2007 levels by 2020”. On January 27th, 2014, Council approved Richmond’s CEEP.

The CEEP includes a range of strategies and actions to reduce emissions from Richmond’s community’s buildings, transportation, and waste sectors. The CEEP also identifies “Breakthrough Opportunities”, which can drive the deeper emissions reductions needed to achieve the City’s 2050 emissions reduction goal. These “Breakthroughs” include a wide-spread switch to zero emissions vehicles by the 2040s; all new buildings achieving zero carbon emissions by 2025; and deep energy upgrades to most of Richmond’s existing building stock. Richmond cannot achieve these breakthroughs alone. All levels of government, the private sector, and members of Richmond’s community will need to act together to realize these reductions.

The objectives and policies below focus on reducing energy use and emissions from buildings, while those relating to transportation and waste management are located in other sections of the Official Community Plan.

The City of Richmond is a leader in corporate energy management of its own facilities. The City has been recognized by BC Hydro as a Municipal Power Smart Leader (the highest recognition BC Hydro gives to organizations) several years in a row due to its outstanding efforts to incorporate new and alternative technologies into its energy system, and improve its corporate energy management program. The experience and knowledge which the City has gained through its energy

management initiatives informs its community-wide energy use and emissions reduction efforts.

Nearly two-thirds of energy consumed in Richmond occurs in commercial buildings and residences. The BC Energy Step Code was established in 2017 by the province of British Columbia; it is a standard that local governments can choose to reference that requires improved energy performance from new construction over and above what is required by the BC Building Code. There is a need to improve the performance of new buildings using tools such as the BC Energy Step Code, as well as speed the adoption of energy upgrades and renovations to existing buildings. Doing so will not only help the City achieve its emissions goals, but can also improve indoor environmental quality, health, productivity, and foster economic opportunity and jobs.”.

2. Richmond Official Community Plan Bylaw 9000, as amended, is further amended at Schedule 1, Section 12.4 by deleting “Objective 3” and replacing it with the following:

**“OBJECTIVE 3:**

**Improve the energy efficiency and greenhouse gas emissions performance of new construction.**

**POLICIES:**

- a) incrementally increase energy efficiency and greenhouse gas emissions performance requirements for new construction over time.
- b) use the BC Energy Step Code, district energy utility connection, and other tools, to demonstrate Richmond’s leadership on construction of energy-efficient, low-carbon buildings. The BC Energy Step Code is anticipated to be implemented according to the schedule in the table below:

| Building Type                               | Building Permit Application                                  |   |                  |                  |
|---|--|---|------------------|------------------|
|   |  | <i>Estimated Timetable for Future Consideration</i> |                  |                  |
| Smaller Part 9 Residential                  | September 1, 2018  | Jan 2020  | Jan 2022         | Jan 2025         |
| Townhomes and apartments                    | Step 3   | Same as 2018  | Step 4           | Step 4 or Step 5 |
| Single family, duplex and other residential | Step 1   | Step 3  | Step 3 or Step 4 | Step 4 or Step 5 |
| <b>Larger Part 3 developments</b>           |  |   |                  |                  |
| Residential Concrete Towers                 | Step 3 or Step 2 for buildings with low carbon energy system | Same as 2018  | Step 3           | Step 4           |
| Residential Woodframe Low/Mid Rise          | Step 3   | Same as 2018  | Step 4           | Step 4           |
| Office & Retail Buildings                   | Step 2   | Same as 2018  | Step 3           | Step 3           |

- c) all new construction is encouraged to achieve zero GHG emissions from operations.
  - d) the City will explore strategies to enable development of energy efficient, zero GHG new buildings, including low carbon district energy utility system development.”.
3. Richmond Official Community Plan Bylaw 9000, as amended, is further amended at Schedule 1, by deleting Section 14.2.10.A [Energy Efficiency] and replacing it with the following:

**“14.2.10.A Low Carbon, Energy Efficient Buildings**

- a) As required in the Building Regulation Bylaw, applicable new developments will be designed and constructed to meet the BC Energy Step Code to support more energy efficient development.
    - Compliance with a given Step of the BC Energy Step Code shall not compromise any of the other Development Permit guidelines contained in Schedule 1 or Schedule 2 of the OCP.
    - In the event that a new building must take remedial actions to achieve compliance with the applicable Step of the BC Energy Step Code and therefore change building systems or components included in the original design of the building, these changes shall not compromise the intent of other development permit guidelines applicable to the development.
  - b) New construction encouraged to be designed to achieve low or zero greenhouse gas emissions in their operations.”.
4. This Bylaw is cited as **“Richmond Official Community Plan Bylaw No. 9000, Amendment Bylaw No. 9771”**.

FIRST READING  
PUBLIC HEARING  
SECOND READING  
THIRD READING  
ADOPTED

JUN 25 2018

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MAYOR

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CORPORATE OFFICER



**Richmond Official Community Plan Bylaw No. 7100,  
Amendment Bylaw No. 9770  
(Energy Step Code)**

The Council of the City of Richmond enacts as follows:

1. Richmond Official Community Plan Bylaw 7100, as amended, is further amended at Schedule 2.10 (City Centre Area Plan), Section 2.2.3(a) “Office Friendly Checklist” by deleting item “7. Green Building Design” and replacing it with the following:

**“7. Green Building Design**

BC Energy Step Code required typically.”.

2. Richmond Official Community Plan Bylaw 7100, as amended, is further amended at Schedule 2.10, Section 2.5 (Ecology & Adaptability) by:

- (a) deleting the final paragraph in the “VISION MANDATE” section and replacing it with the following:

“The City has established sustainability as a corporate priority. As well, it has established a Sustainability Office to lead the City in establishing policies to address the many complex issues. These issues include improved eco-regeneration; connectivity; improved ecological services and functions; green, energy efficient buildings and built environment; a triple bottom line; a multi-objective development approach and adapting to climate change. Policies and actions regarding these issues continue to be developed, and the City, developers and community stakeholders are encouraged to address these issues innovatively.”;

- (b) deleting the policies listed in section 2.5.2 [Greening the Built Environment] of the “POLICIES” table, and replacing them with the following:

**“2.5.2 Greening the Built Environment**

**a) Reduce per Capita Resource Demands & Strengthen Ecological Base**

- Optimize the use of existing infrastructure through compact land use and transit-oriented development policies.
- Private developments:
  - as specified in the *Building Regulation Bylaw*, new developments are subject to the BC Energy Step Code;

- new developments are encouraged to achieve zero GHG emissions from operations;
- for new developments to which the BC Energy Step Code applies to less than 50% of gross floor area, LEED Silver will be required for all rezonings of private developments over 2,000 m<sup>2</sup>;
- new developments are subject to commitment to connect to the district energy system or have on-site low carbon energy system.
- City of Richmond development:
  - City facilities will be developed and operated in accordance with the City’s High Performance Building policy;
  - demand-side management and an *Eco-Plus+* (see below) approach will be adopted for all City servicing (e.g., park management, transportation planning, engineering servicing.).

**b) Reduce Greenhouse Gas Emissions**

- Transportation need and automobile reliance will be reduced through compact land use and transit-orientated development practices.
- Corporate and community-wide greenhouse gas emissions reduction targets and strategies are included in the City’s 2014 Community Energy and Emissions Plan.
- Economic policies which support the transition to a low carbon economy continue to be explored and implemented.”;

- (c) deleting the “Proposed Strategy” subsection in section 2.5.2 [Greening the Built Environment” and replacing it with the following:

**“Strategy**

To:

- encourage zero carbon new buildings, a “breakthrough” strategy identified in the Community Energy and Emissions Plan as necessary to achieving the City’s greenhouse gas emissions reduction targets;
- require adherence to *High Performance building standards* (BC Energy Step Code, LEED, Passive House, or other equivalent) for all City facilities and larger developments;
- continue advancement of district energy systems;
- encourage an “*Eco-Plus+*” approach aimed at maximizing environmental returns during development.”; and

- (d) deleting the “High Performance Building Standards – About LEED” subsection in section 2.5.2 and replacing it with the following:

**“High Performance Building Standards**

The BC Energy Step Code is a consistent, provincially-endorsed tool that BC local governments can use to support healthier, comfortable, energy efficient, lower emissions buildings. It is the product of a multi-year collaboration between local governments, industry stakeholders, the provincial government, and utilities.

Projects not covered by the BC Energy Step Code, are expected to adhere to the Leadership in Energy and Environmental Design (LEED) rating system. LEED was developed by the US Green Building Council as a means to evaluate the degree to which buildings meet high performance standards. Buildings are evaluated based on factors pertaining to site selection, water and energy efficiency, material use and indoor air quality. To achieve a specific level of certification, buildings must meet certain requirements (prerequisites) and gain a certain number of credits.”

- 3. This Bylaw is cited as **“Richmond Official Community Plan Bylaw No. 7100, Amendment Bylaw No. 9770.”**

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