



## POLICY REPORT DEVELOPMENT AND BUILDING

Report Date: March 31, 2011  
Contact: Brent Toderian  
Contact No.: 604.873.7698  
RTS No.: 08761  
VanRIMS No.: 08-2000-20  
Meeting Date: April 19, 2011

TO: Vancouver City Council

FROM: Director of Planning in consultation with the Director of the Sustainability Group, the Director of Development Services, and the Director of Legal Services

SUBJECT: By-law Amendments for Passive Design

### ***RECOMMENDATION***

THAT the Director of Planning initiate amendments to help implement passive design approaches to make it easier to build and renovate using energy conservation strategies in Vancouver. Passive design is building design that responds to local climate and site conditions in order to maximize building occupants' health and comfort while minimizing energy consumption. The proposed approaches allow for thicker walls, increased overhangs, accommodation of bay windows, green walls and natural ventilation by making application to amend:

- the Zoning and Development By-law;
- the First Shaughnessy Official Development Plan By-law;
- the Downtown District Official Development Plan By-law;
- the Downtown Eastside Oppenheimer Official Development Plan By-law; and
- the Southeast Granville Slopes Official Development Plan By-law;

generally in accordance with Appendix B, to help implement passive design approaches and that the application be referred to a Public Hearing together with:

- (i) draft by-law provisions, generally as contained in Appendix B; and
- (ii) the recommendation of the Director of Planning to approve;

FURTHER THAT THE Director of Legal Services be instructed to prepare the necessary amending by-laws, generally in accordance with Appendix B, for consideration at the Public Hearing.

***GENERAL MANAGER'S COMMENTS***

The General Manager, Community Services RECOMMENDS approval of the above Recommendation.

***CITY MANAGER'S COMMENTS***

The City Manager RECOMMENDS approval of the above Recommendation.

***COUNCIL POLICY***

In July 2007, Council adopted targets to reduce community greenhouse gas (GHG) emissions to 33% below current levels by 2020 and 80% below current levels by 2050. As well Council adopted the target of all new construction in Vancouver becoming GHG neutral by 2030.

In November 2008, as part of the considerations of the EcoDensity initiative, Council passed a resolution to remove specified barriers to new green building construction and directed staff to report back when other barriers were identified and could be removed.

In May 2009, Council endorsed the Passive Design Toolkit and the Passive Design Toolkit for Homes as official City of Vancouver publications.

In January 2011, Council adopted the revised *Greenest City 2020* targets, which included the following targets related to green building: all buildings constructed from 2020 onward will be carbon neutral in operations; and energy use and greenhouse gas emissions will be reduced in existing buildings by 20% over 2007 levels.

***SUMMARY AND PURPOSE***

This report seeks Council approval to refer amendments to the Zoning and Development By-law and the above-noted Official Development Plans to a Public Hearing. In addition to proposed amendments to the regulations, staff have prepared Administrative Bulletins (Appendices C-G) that will explain how these changes will be administered.

The amendments are related to overhangs, projections and floor space ratio calculations. These amendments will help to resolve conflicts between passive design techniques and the City's land use regulations, and will enable development permit applicants to use passive design techniques more widely. As such, the amendments will help to update and streamline City regulations while also supporting the green building industry. More broadly, the proposed amendments will help to make sustainable design more viable and thus more common, thereby improving the efficiency of new buildings and contributing to a green economy.

***BACKGROUND***

Passive design is building design that responds to local climate and site conditions in order to maximize building occupants' health and comfort while minimizing energy consumption. Examples of passive design strategies include using insulation to mitigate heat loss or gain, and designing overhangs to shade south-facing windows. Passive design strategies are typically common-sense solutions that minimize reliance on heating and ventilation systems. While many jurisdictions have "greened" their building codes, these passive design recommendations take us to the next step in encouraging basic sustainable design.

In 2009, Council endorsed two Passive Design Toolkits. These documents discuss Vancouver-specific design strategies to reduce energy use in both larger buildings and single-family homes. Council directed staff to begin an outreach program, examine current policy, and then bring forward new or amended regulations that would better integrate passive design into the City's land use regulatory framework.

Since then, the Passive Design Toolkits have been shared with design professionals and City staff through a series of meetings and dialogues. Development Services and Planning staff reviewed the practices advocated in the Toolkits and considered what amendments to our current land use regulations would be needed to enable applicants to take better advantage of passive design opportunities. This review identified four initial issues and corresponding amendments.

The following portion of this report looks at these four passive design elements and identifies how conflicts with existing City land use by-laws can effectively be resolved. It is important to note that substantially more detail on these passive design elements and the proposed amendments can be found in Appendices A and B.

## *DISCUSSION*

### **1. Exterior Wall Assembly**

A key passive design technique is to design thicker exterior wall assemblies for better thermal performance. However any extra wall thickness is currently included in floor area calculations, thus there is a disincentive for thicker walls. Creating new allowable wall thickness exclusions will accommodate most wall types and thus respond to current practice while removing the disincentive. (For more detail, see Appendix A)

Proposed amendment/action:

- Amend by-laws to permit greater exclusions for well-insulated exterior walls. (Appendix B)
- Explain the proposed exclusions and illustrate "defined" wall assemblies eligible for exclusion and a process by which "undefined" wall assemblies could also achieve an exclusion. (Appendices C and D)

### **2. Green Walls**

In passive design, green walls are used as a technique to reduce the urban heat island effect, in which urban areas are significantly warmer than surrounding rural areas. This additional warmth is because development has changed the land surface and materials have been used that retain heat. The use of green walls in Vancouver may currently be limited because of restrictions on what features are able to project into required yards. Under our land use regulations, yard and/or setback requirements, especially those related to side yards, are in place to ensure sufficient separation of buildings, improve privacy, and provide adequate fire protection. Allowing opportunities for green walls to project into required yards could increase uptake on these green wall features. Landscape designers were consulted to determine how much projection would be enough to include most green walls, and concluded 254 mm was sufficient. (For more detail, see Appendix A)

Proposed amendment/action:

- Amend by-laws to add green walls to the list of building features that can project into required yards, up to 254 mm (10") into the yard. (Appendix B)
- Define green walls and associated requirements, and describe the purpose and evaluation of the allowable projection. (Appendix E)

### 3. Bay Windows

In passive design, bay windows are discouraged because they increase surface/wall area and thus contribute to heat loss. Bay windows have been popular in Vancouver because current land use regulations allow for generous exclusions from floor area calculations. Therefore some development applications have included multiple bay windows as a means to try to increase perceived floor space for marketing purposes. This issue can be addressed, and efficiencies in the review process created, by taking a standard approach to how exclusions for bay windows are provided. The current RS-6 District Schedule has demonstrated an effective means to define parameters and set limits on bay windows and it is recommended that this approach be used throughout our regulation framework. (For more detail, see Appendix A)

Proposed amendment/action:

- Amend by-laws to define what is to be included in floor space calculation for bay windows or boxed out windows. As per RS-6, limit the floor space exclusion in bay windows to one percent of the total floor area permitted above the basement. (Appendix B)
- Explain this change in floor space calculation. (Appendix F)

### 4. Ventilation/Natural Lighting

Another passive design technique is to add skylights or windows to the top of a room with high ceilings to increase the amount of natural light coming in, which in turn reduces the amount of artificial light required. Making those windows openable improves natural ventilation thereby reducing the amount of mechanical ventilation required. If properly designed, high windows can lower electrical consumption and improve air quality.

Some single-family District Schedules currently include regulations that discourage the use of vaulted or open-to-below areas in an effort to limit building mass. Allowing some of the floor area to be excluded when combined with passive design elements would remove some of that disincentive. (For more detail, see Appendix A)

Proposed amendment/action:

- Amend by-laws to allow up to one per cent of the permitted floor area to be excluded from floor space calculations when it is designed in combination with venting skylights, opening clerestory windows or other similar features, and to include these features in the list of items that may be allowed greater height. (Appendix B)
- Describe the purpose and evaluation of these exemptions. (Appendix G)

The above-noted amendments are being put forward at this time because each one addresses a readily fixable issue that is seen in applications with some regularity. Staff will report back in 2013 on how well these amendments have addressed our goals and whether further revisions are required.

These amendments will not add complexity or time to the permit process. They should enable applicants to better utilize passive design while also helping to educate staff on how and where the techniques may be applied.

#### *FINANCIAL IMPLICATIONS*

There are no financial implications.

#### *ENVIRONMENTAL IMPLICATIONS*

The proposed by-law amendments will help promote the use of passive design techniques in Vancouver. The broader application of passive design presents an opportunity to reduce energy consumption and therefore help the City achieve its GHG reduction targets.

#### *CONCLUSION*

The Director of Planning recommends that the proposed amendments be referred to a Public Hearing, and recommends approval. These amendments will allow for increased opportunities for applicants to take advantage of passive design strategies. As the City continues to promote passive design and better integrates these techniques into regulation and policy, the design community will be better able to respond to this streamlining and apply passive design more readily. We will be supporting the green building industry and helping to develop a green economy, while acting to increase the efficiency of many new homes and buildings. Ultimately, this will help move Vancouver closer to our green building efficiency targets and toward being the greenest city in the world.

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## DETAILED INFORMATION ON PROPOSED AMENDMENTS

This Appendix is structured similarly to the body of the report and is designed to provide more information and the technical details on the four passive design elements discussed and conflicts with existing City land use by-laws, as well as the proposed amendments.

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### 1. Exterior Wall Assembly

The Passive Design Toolkit for Homes recommends thicker exterior wall assemblies for better thermal performance. However this has implications on floor area calculation. Currently a maximum of 51 mm (2") may be excluded from floor space ratio (FSR) calculations for thermal performance in wood-frame construction. An alternative type of insulation/wall assembly may provide better performance, but also result in a thicker exterior wall. At present, a thicker wall assembly cannot receive any more than the 51 mm (2") thickness exclusion from FSR calculations.

A staff review on this topic has resulted in proposed new allowable wall thickness exclusions that will accommodate most wall types. Exclusions up to a maximum of 333 mm (13") have been defined and associated with specific types of wall assemblies that meet specified R-values. More detail is provided in the draft Administrative Bulletins in Appendices C and D. Staff acknowledge that there are other wall assemblies that offer improved thermal performance that are not listed in the Administrative Bulletins. For this reason all other assemblies that are endorsed by a Registered Professional to achieve better than effective R22 (RSI 3.85) can be excluded from floor area calculations, up to a maximum exclusion of 533 mm (21"). While this may seem like a large increase, it is merely being responsive to current practice. There are several builders in Vancouver using walls of this thickness at present, and the intent is that they would be able to do so without disincentive.

Also, it should be noted that currently Part 9 of the Vancouver Building By-law (VBBL) requires exterior walls to have a minimum RSI 3.85 (R-22) of thermal insulation. This prescribed value translates to roughly R-16 of *effective* thermal insulation. In anticipation of upcoming changes to the VBBL, the below-noted amendments have been prepared in accordance with these changes, and refer to effective RSI values.

Proposed amendment/action:

- Amend Section 10 of the Zoning and Development By-law to have a statement that applies to all relevant District Schedules of the Zoning and Development By-law and relevant CD-1 by-laws; the four Official Development Plan By-laws noted in this report's Recommendation; and portions of Section 11 of the Zoning and Development By-law, to permit exclusion of portions of exterior walls which are thicker than the minimum thickness frame walls currently permitted. This would allow exclusion of the wall thickness that is in excess of 152 mm (6") to a maximum exclusion of 533 mm (21") as defined in the related Administrative Bulletin (see Appendix B).
- Provide a revised Administrative Bulletin: *Floor Space Exclusion to Accommodate Improved Building Performance (Envelope and Thermal Insulation)* and associated *Schedule of Wall Assemblies Related to Floor Exclusions* that define the proposed allowable wall thickness exclusions and illustrate related wall assemblies, and to

discuss an acceptable process (using a Registered Professional) by which undefined wall assemblies can achieve an exclusion (see Appendices C and D).

## 2. Green Walls

The Passive Design Toolkit recommends using green walls to reduce the heat island effect (as previously defined in the body of the report). However conflicts may arise in terms of the green wall projecting into required yards. Landscape designers were consulted to determine how much projection would be enough to include most green walls, and concluded that 254 mm was sufficient. This projection was also deemed to be manageable in accommodating other requirements of yards, such as access and separation.

Proposed amendment/action:

- Amend Section 10 of the Zoning and Development By-law to add a green wall, as defined in the proposed Administrative Bulletin *Passive Design: Demountable Green Walls*, as a demountable building feature that shall be permitted in any required yard if it does not project more than 254 mm (10") into a required yard. (see Appendix B).
- Note that while demountable, the features of a green wall must still comply with Vancouver Building Bylaw requirements, specifically requirements for non-combustible cladding.
- Provide an Administrative Bulletin (*Passive Design: Demountable Green Walls*) that defines green walls and associated requirements, and describes the purpose and evaluation of the allowable projection (see Appendix E).

## 3. Bay Windows

The Passive Design Toolkit does not recommend the use of bay windows as they increase surface/wall area and therefore contribute to heat loss. However because of the way bay windows have been treated in residential development applications (the space in the bay has not been counted as floor space), some of these development applications have included multiple bay windows to try to increase perceived floor space for marketing purposes. The proposed by-law amendments below would address this issue by defining what is to be included in floor space calculation for bay windows.

Proposed amendment/actions:

- Amend Section 4.7.2 in RS, RT, and RM District Schedules of the Zoning and Development By-law to define what is to be included in floor space calculation for bay windows or boxed out windows, whether projecting into required yards or not. (see Appendix B).
- In the above-noted proposed amendments, adopt the same wording as in the RS-6 District Schedule of the Zoning and Development By-law, section 4.7.2(e), in which the floor space in a bay window in excess of one per cent of the total floor area permitted above the basement is included in floor space calculations.
- Provide an Administrative Bulletin (*Bay Windows and Floor Space*) that explains this change regarding bay windows and floor space calculation (see Appendix F).

## 4. Ventilation/Natural Lighting

The Passive Design Toolkit for Homes recommends designing skylights or windows at the top of a room with high ceilings, to allow light to penetrate deeper into the building interior. Making those windows openable improves natural ventilation, thereby reducing the amount of mechanical ventilation required.

Some district schedules count the floor area in rooms with high ceilings twice, so the FSR increases. This is a disincentive to the developer. Allowing some of the floor area to be excluded removes some of that disincentive. As well there may be conflicts between these design elements and height limits.

It should be noted that staff have focussed on the residential context and the zoning that represents the primarily residential areas in the city, which is reflected in the proposed by-law amendments below. In the future, after staff review, similar amendments may be extended to relevant Industrial, Commercial, and Historic Area zones, as well as Comprehensive Development by-laws.

Proposed amendments/action:

- Amend those District Schedules of the Zoning and Development By-law which require interior volumes exceeding 3.7 m in height to be included in floor area, in order to allow up to one percent of the permitted floor area to be excluded when it is designed in combination with venting skylights, opening clerestory windows or other similar features that reduce energy consumption and improve natural ventilation and daylight (see Appendix B).
- Amend those District Schedules of the Zoning and Development By-law and those ODP by-laws which permit the exclusion of certain features from floor area to also allow up to one per cent of the permitted floor space to be excluded from floor space calculations, when it is designed in combination with venting skylights, opening clerestory windows or other similar features that reduce energy consumption and improve natural ventilation and daylight (see Appendix B).
- Amend Section 10 of the Zoning and Development By-law to include “venting skylights, opening clerestory windows or other similar features for the purposes of helping to reduce energy consumption, or improving natural light and ventilation” in the list of items that may be allowed greater height (see Appendix B).
- Provide an Administrative Bulletin (*Passive Design: Natural Ventilation and Light*) that describes the purpose and evaluation of these exemptions (see Appendix G).

### Submission Requirements

Once the proposed amendments are in effect, applicants will need to consult the relevant Administrative Bulletin and then submit (in addition to standard submission requirements) a written rationale that addresses the proposed passive design element within the relevant by-laws, policies, and/or guidelines. As well, drawings illustrating design, placement, and impact will be necessary.

### Processing

The proposed by-law amendments discussed above are the result of a detailed review performed by Development Services and Planning staff, in which the practices advocated in



the Passive Design Toolkits were considered in terms of their compatibility with current land use regulations and design guidelines. This review also identified some smaller potential conflicts - particularly in relation to Guidelines - that may be noted, referred to and resolved as development applications come in and are processed.

For example, the Passive Design Toolkit for Homes recommends designing large south-facing windows but placing smaller windows at east/west/north elevations for maximum natural light. However, in the RS-5, RT-7/8, RT-5/6 Design Guidelines, window proportion is based on context and traditional houses may have smaller/fewer windows and be evenly distributed. The solution is to review residential window design in these zones on a case-by-case basis considering both the recommendations of the Passive Design Toolkit for Homes and existing design guidelines, weighing which City objective may be more appropriate in that specific case.

There are other similar examples in which the solution is to consider both the goals of passive design as well as our existing design guidelines, and work with both intents. After extensive review with development permit staff (specifically, the One- and Two-Family Dwellings Group) and intake staff, Development Services has advised that this should not add complexity to the permit process and should not have any significant impact on permit times. Rather this should enable better service provision to applicants using passive design while also helping staff to know how and where the techniques may be applied. As well, it will ease cases in which staff were previously restricted in trying to accommodate better and "greener" solutions.

## DRAFT BY-LAW AMENDMENTS

Amending by-laws will be prepared generally in accordance with the provisions listed below, subject to change and refinement prior to posting. Additions are shown in ***bold italics***

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### 1. Exterior Wall Assembly

The intent of the amendments in this section is to repeal all existing statements on exterior wall exclusions from individual District Schedules, Official Development Plans (ODP) By-laws, and CD-1 By-laws, and to insert replacement wording that refers the reader to a sub-section of Section 10, General Regulations, that will be explicitly dedicated to defining exterior wall exclusions.

The necessary amendments are generally as follows:

#### 1.1 Rename Section 10.33, General Regulations, as follows:

##### ***Exterior Wall Exclusions***

#### 1.2 Repeal the existing Section 10.33 and replace generally as follows:

***Despite anything to the contrary in any zoning district schedule or in any CD-1 by-law listed in the CD-1 (Comprehensive Development) District Schedule, computation of floor space ratio or floor area is to exclude the area of such walls that exceeds 152 mm to a maximum exclusion of 152 mm as recommended by a Building Envelope Professional to control building envelope leaks, and:***

***(a) up to 51 mm in walls that fall under Part 9 of the Building By-law which provide RSI 2.88 (R-16) thermal insulation,***

***or***

***(b) up to 333 mm in walls that fall under Part 9 of the Building By-law which provide greater than effective RSI 3.85 (R-22) thermal insulation, or up to 533 mm in walls that fall under Part 9 of the Building By-law which provide greater than effective RSI 3.85 (R-22) of thermal insulation and have been defined and verified by a Registered Professional,***

***or***

***(c) up to 127 mm in walls that fall under the Part 3 requirements of the Vancouver Building By-Law that provide RSI 2.65 (R-15) of thermal insulation in the overall wall surface as verified by a Registered Professional***

***except that this clause is not to apply to walls in existence before (enactment date).***

#### 1.3 Repeal the sections/sub-sections of the Zoning By-law, District Schedules and ODP By-laws listed below, and replace with one statement that is generally as follows:

***portions of exterior walls contributing to thermal and building envelope performance in accordance with the provision of Section 10.33, Exterior Wall Exclusions found in Section 10, General Regulations of the Zoning and Development By-law.***

<u>Sections</u>	
Section 11	11.24.16(d)(e)
<u>Limited Agriculture</u>	
RA-1	4.7.3(g)(h)
<u>One-Family Dwelling</u>	
RS-1	4.7.3(i)(j)
RS-1A	4.7.3(g)(h)
RS-1B	4.7.3(g)(h)
RS-2	4.7.3(g)(h)
RS-3 and RS-3A	4.7.3(i)(j)
RS-4	4.7.3(g)(h)
RS-5	4.7.3(j)(k)
RS-6	4.7.3(j)(k)
RS-7	4.7.4(j)(k)
<u>Two-Family Dwelling</u>	
RT-1	4.7.3(g)(h)
RT-2	4.7.3(g)(h)
RT-3	4.7.3(i)(j)
RT-4, RT-4A, RT-4N and RT-4AN	4.7.3(h)(i)
RT-5, RT-5A, RT-5N and RT-5AN	4.7.3(h)(i)
RT-6	4.7.3(i)(j)
RT-7	4.7.3(h)(i)
RT-8	4.7.3(h)(i)
RT-9	4.7.3(h)(i)
RT-10 and RT-10N	4.7.3(g)(h)
<u>Multiple Dwelling</u>	
RM-1 and RM-1N	4.7.3(g)(h)
RM-2	4.7.3(g)(h)
RM-3	4.7.3(g)(h)
RM-3A	4.7.3(g)(h)
RM-4 and RM-4N	4.7.3(g)(h)
RM-5, RM-5A, RM-5B and RM-5C	4.7.3(i)(j)
RM-6	4.7.3(i)(j)
FM-1	4.7.3(h)(i)
<u>Commercial</u>	
C-1	4.7.3(f)(g)
C-2	4.7.3(f)(g)
C-2B	4.7.3(f)(g)
C-2C	4.7.3(f)(g)
C-2C1	4.7.3(f)(g)
C-3A	4.7.3(e)(f)
C-5 and C-6	4.7.3(e)(f)
C-7 and C-8	4.7.3(f)(g)
FC-1	4.7.3(f)(h)
<u>Industrial</u>	
MC-1 and MC-2	4.7.3(f)(g)
M-1	4.7.3(e)(f)
M-1A	4.7.3(e)(f)
M-1B	4.7.3(e)(f)
M-2	4.7.3(e)(f)
IC-1 and IC-2	4.7.3(f)(g)
IC-3	4.7.3(f)(g)
I-1	4.7.3(f)(g)
I-2	4.7.3(f)(g)
I-3	4.7.3(f)(g)

<u>Historic Areas</u>	
HA-1 and HA-1A	4.7.1
HA-3	4.7.3(f)(h)
<u>ODP By-laws</u>	
Downtown	3.6(e)(f)
Downtown-Eastside/Oppenheimer	4.5.2(e)(f)
First Shaughnessy	4.1.3(f)(g)
Southeast Granville Slopes	6.3.3(g)(i)

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## 2. Green Walls

Amend Section 10, General Regulations, generally as follows:

Add the following wording in sub-section 10.7.1 ("The following features shall be permitted in any required yard"):

- ( ) ***demountable green walls, if:***
- (i) ***they do not project more than 254mm into a required yard;***
  - (ii) ***they comply with Vancouver Building By-law requirements;***
  - (iii) ***they are, in the opinion of the Director of Planning, suitably designed and located to contribute to sustainable design performance.***
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## 3. Bay Windows

Add text, generally as follows, in the sections/sub-sections of the RS, RT, RM and FM District Schedules listed below:

***the floor area of bay windows, regardless of seat height, location on building, or relationship to yard setbacks, in excess of the product of the total floor area permitted above the basement times 0.01.***

<u>One-Family Dwelling</u>	
RS-1	4.7.2(d)
RS-1A	4.7.2(c)
RS-1B	4.7.2(c)
RS-2	4.7.2(c)
RS-3 and RS-3A	4.7.2(d)
RS-4	4.7.2(d)
RS-5	4.7.2(d)
RS-7	4.7.3(d)
<u>Two-Family Dwelling</u>	
RT-1	4.7.2(c)
RT-2	4.7.2(c)
RT-3	4.7.2(c)
RT-4, RT-4A, RT-4N and RT-4AN	4.7.2(c)
RT-5, RT-5A, RT-5N and RT-5AN	4.7.2(c)
RT-6	4.7.2(c)
RT-7	4.7.2(c)
RT-8	4.7.2(c)
RT-9	4.7.2(c)
RT-10 and RT-10N	4.7.2(d)
<u>Multiple Dwelling</u>	

RM-1 and RM-1N	4.7.2(d)
RM-2	4.7.2(c)
RM-3	4.7.2(c)
RM-3A	4.7.2(c)
RM-4 and RM-4N	4.7.2(c)
RM-5, RM-5A, RM-5B and RM-5C	4.7.2(c)
RM-6	4.7.2(c)
FM-1	4.7.2(c)

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#### 4. Ventilation/Natural Lighting

- 4.1 Amend the sections/sub-sections of the District Schedules listed below generally as follows:

where the distance from a floor to the floor above, or where there is no floor above to the top of the roof joists, exceeds 3.7 m, an amount equal to the area of the floor below the excess height, ***except that area which in the opinion of the Director of Planning is designed in combination with venting skylights, opening clerestory windows or other similar features to reduce energy consumption or improve natural light and ventilation may be excluded, provided the area being excluded does not exceed one percent of the permitted floor area.***

One-Family Dwelling

RS-1	4.7.2(c)
RS-3 and RS-3A	4.7.2(c)
RS-5	4.7.2(c)
RS-6	4.7.2(c)
RS-7	4.7.3(c)

Two-Family Dwelling

RT-10 and RT-10N	4.7.2(c)
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Multiple Dwelling

RM-1 and RM-1N	4.7.2(c)
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- 4.2 Add new text to section 4.7.3 of the RS-1 District Schedule generally as follows:

***In cases where 4.7.2(c) does not apply, up to one percent of the permitted floor area may be exempted from floor space calculations when in combination with venting skylights, opening clerestory windows or other similar features which in the opinion of the Director of Planning reduce energy consumption or improve natural light and ventilation.***

- 4.3 Add new text to section 4.7.3 of the RS-3 and RS-3A District Schedules generally as follows:

***In cases where 4.7.2(c) does not apply, up to one percent of the permitted floor area may be exempted from floor space calculations when in combination with venting skylights, opening clerestory windows or other similar features which in the opinion of the Director of Planning reduce energy consumption or improve natural light and ventilation.***

- 4.4 Add new text to section 4.7.3 of the RS-5 District Schedule generally as follows:

***In cases when Sections 4.7.2(c) and 4.7.3(h) do not apply, up to one percent of the permitted floor area may be exempted from floor space calculations when in combination with venting skylights, opening clerestory windows or other similar features which in the opinion of the Director of Planning reduce energy consumption or improve natural light and ventilation.***

- 4.5 Add new text to section 4.7.3 of the RS-6 District Schedule generally as follows:

***In cases when Sections 4.7.2(c) and 4.7.3(i) do not apply, up to one percent of the permitted floor area may be exempted from floor space calculations when in combination with venting skylights, opening clerestory windows or other similar features which in the opinion of the Director of Planning reduce energy consumption or improve natural light and ventilation.***

- 4.6 Add new text to section 4.7.4 of the RS-7 District Schedule generally as follows:

***In cases when Sections 4.7.3(c) and 4.7.4(i) do not apply, up to one percent of the permitted floor area may be exempted from floor space calculations when in combination with venting skylights, opening clerestory windows or other similar features which in the opinion of the Director of Planning reduce energy consumption or improve natural light and ventilation.***

- 4.7 Add new text to section 4.7.3 of the RT-10 and RT-10N District Schedules generally as follows:

***In cases where 4.7.2(c) does not apply, up to one percent of the permitted floor area may be exempted from floor space calculations when in combination with venting skylights, opening clerestory windows or other similar features which in the opinion of the Director of Planning reduce energy consumption or improve natural light and ventilation.***

- 4.8 Add new text to section 4.7.3 of the RM-1 and RM-1N District Schedules generally as follows:

***In cases where 4.7.2(c) does not apply, up to one percent of the permitted floor area may be exempted from floor space calculations when in combination with venting skylights, opening clerestory windows or other similar features which in the opinion of the Director of Planning reduce energy consumption or improve natural light and ventilation.***

- 4.9 Amend section 4.7.2(b) of the C-3A District Schedule generally as follows:

in the case of dwelling uses and artist studios, where the distance from a floor to the floor above or where there is no floor above to the top of the roof rafters or deck exceeds 3.7 m, an additional amount equal to the area of the floor area below the excess height except the additional amount shall not be counted in the case of undeveloped floor areas beneath roof elements which the Director of Planning considers to be for decorative purposes and to which there is no means of access other than a hatch, residential lobbies and mechanical penthouses. ***Also when the additional height is in combination with venting skylights, opening clerestory windows or other similar features which in the opinion of the Director of Planning reduce energy consumption or improve natural light and ventilation, up to one percent of the permitted floor area may be exempted from floor space calculations.***

- 4.10 Amend section 4.7.2(b) of the I-C3 District Schedule generally as follows:

in the case of dwelling uses and Artist Studios, where the distance from a floor to the floor above or where there is no floor above to the top of the roof rafters or deck exceeds 3.7 m, an additional amount equal to the area of the floor area below the excess height except the additional amount shall not be counted in the case of undeveloped floor areas beneath roof elements which the Director of Planning considers to be for decorative purposes and to which there is no means of access other than a hatch, residential lobbies and mechanical penthouses. ***Also when the***

***additional height is in combination with venting skylights, opening clerestory windows or other similar features which in the opinion of the Director of Planning reduce energy consumption, or improve natural light and ventilation, up to one percent of the permitted floor area may be exempted from floor space calculations.***

- 4.11 Add new text in the sections of the District Schedules and ODP By-laws listed below generally as follows:

***up to one percent of the permitted floor area may be exempted from floor space calculations when in combination with venting skylights, opening clerestory windows or other similar features which in the opinion of the Director of Planning reduce energy consumption or improve natural light and ventilation.***

<u>Limited Agriculture</u>	
RA-1	4.7.3
<u>One-Family Dwelling</u>	
RS-1A	4.7.3
RS-1B	4.7.3
RS-2	4.7.3
RS-4	4.7.3
<u>Two-Family Dwelling</u>	
RT-1	4.7.3
RT-2	4.7.3
RT-3	4.7.3
RT-4, RT-4A, RT-4N and RT-4AN	4.7.3
RT-5, RT-5A, RT-5N and RT-5AN	4.7.3
RT-6	4.7.3
RT-7	4.7.3
RT-8	4.7.3
RT-9	4.7.3
<u>Multiple Dwelling</u>	
RM-2	4.7.3
RM-3	4.7.3
RM-3A	4.7.3
RM-4 and RM-4N	4.7.3
RM-5, RM-5A, RM-5B and RM-5C	4.7.3
RM-6	4.7.3
FM-1	4.7.3
<u>ODP By-laws</u>	
First Shaughnessy	4.1.3

- 4.12 Add new text to Section 10, General Regulations, generally as follows:

***Floor space exclusions for natural ventilation and lighting in CD-1 districts***

***Despite anything to the contrary in any CD-1 by-law listed in the CD-1 (Comprehensive Development) District Schedule, where the distance from a floor to the floor above, or where there is no floor above to the top of the roof joists, exceeds 3.7 m and when the additional height is in combination with venting skylights, opening clerestory windows or other similar features which in the opinion of the Director of Planning reduce energy consumption or improve natural light and ventilation, an amount equal to the area of the floor below the excess height may be exempted from floor space calculations. In cases where there is no stated 3.7 m clause and the above does not apply, up to one percent of the permitted floor area may be exempted from floor space calculations.***

4.13 Amend Section 10, General Regulations, generally as follows:

10.11.1 Height Increases for Buildings

The Director of Planning may, at his discretion, permit a greater height than otherwise permitted for the following items if, except for the items set out in subsection (d), they do not, in total, exceed one-third of the width of the building or buildings as measured on any elevation drawings and do not, in total, cover more than 10 percent of the roof area on which they are located as viewed from directly above:

- (a) architectural appurtenances such as towers, turrets, and cupolas, provided:
  - (i) no additional floor area is created; and
  - (ii) no protrusion extends more than 1.1 m above the height limitation;
- (b) mechanical appurtenances such as elevator machine rooms;
- (c) chimneys;
- (d) access and infrastructure required to maintain green roofs or urban agriculture, or roof-mounted energy technologies including solar panels and wind turbines, provided that the Director of Planning considers:
  - (i) their siting and sizing in relation to views, overlook, shadowing, and noise impacts, and
  - (ii) all applicable policies and guidelines adopted by Council; and
- (e) venting skylights, opening clerestory windows or other similar features designed to reduce energy consumption or improve natural light and ventilation; and**
- (f) items similar to any of the above.**

\* \* \* \* \*





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planning@vancouver.ca

## **FLOOR SPACE EXCLUSION TO ACCOMMODATE IMPROVED BUILDING PERFORMANCE (ENVELOPE AND THERMAL INSULATION)**

*Authority - Director of Planning*

*Effective March 14, 2000*

*Amended December 14, 2004 and January 20, 2009 and Month, 2011*

### **1 Introduction**

On March 14, 2000, City Council enacted amendments to various schedules of the Zoning and Development By-law to allow floor space exclusions to provide construction incentives to control building envelope leaks. On June 10, 2008, Vancouver City Council recommended the removal or mitigation of disincentives to greener building design practices, and on January 20, 2009 City Council enacted amendments to various schedules of the Zoning and Development By-law to allow floor space exclusions to facilitate better thermal performance. On Month, 2011, Council enacted further amendments to allow for increased floor space exclusions for thermal performance in order to accommodate interest in building thicker walls.

These amendments permit exclusion of portions of exterior walls which are thicker than the minimum thickness frame walls currently permitted, which are typically 152 mm thick. This allows exclusion of the wall thickness that is in excess of 152 mm, to a maximum exclusion of:

152 mm as recommended by a Building Envelope Professional to control building envelope leaks, and:

- (a) up to 51 mm in walls that fall under Part 9 of the Building By-law which provide RSI 2.88 (R-16) thermal insulation, *OR*
- (b) up to 333 mm in walls that fall under Part 9 of the Building By-law which provide greater than effective RSI 3.85 (R-22) thermal insulation, or up to 533 mm in walls that fall under Part 9 of the Building By-law which provide greater than effective RSI 3.85 (R-22) of thermal insulation and have been defined and verified by a Registered Professional, *OR*
- (c) up to 127 mm in walls that fall under the Part 3 requirements of the Vancouver Building By-Law that provide RSI 2.65 (R-15) of thermal insulation in the overall wall surface as verified by a Registered Professional

It should be noted that other regulations which are used to control bulk and massing, including height, yards and setbacks, remain unchanged and will not be relaxed to accommodate the aforementioned FSR exclusions for thermal insulation. However, for upgrades to repair leaky walls, required relaxations to setbacks can be considered by the Director of Planning or the Board of Variance.

**2 Exclusion from Floor Area for Insulation in Walls in Buildings that Fall Under the Part 9 Requirements of the Vancouver Building By-Law**

This floor space exclusion is intended to remove the disincentive of loss of usable floor area to construct thicker walls on new buildings.

**2.1** A Registered or Building Envelope Professional is not required where the exclusion sought is only for an increased thickness of wall to provide the required thermal insulation in wood frame walls, provided that the wall assembly is listed in the City of Vancouver's *Schedule of Wall Assemblies Related to Floor Space Exclusions*.

**Submission Requirements**

To apply for an exclusion, the following will be required in addition to standard submission materials:

- A schedule of wall assemblies indicating materials and dimensions, with reference to applicable standards.
- A summary table for each floor indicating the requested floor space exclusion.

**2.2** For walls not appearing in the *Schedule of Wall Assemblies Related to Floor Space Exclusions* (as explained in Section 5 of this bulletin), an exclusion up to the maximum thickness of the wall to a total maximum of 533 mm may be sought.

**Submission Requirements**

- A schedule of wall assemblies indicating materials and dimensions, with reference to applicable standards.
- A summary table for each floor indicating the requested floor space exclusion.
- A sealed and signed letter from a Registered Professional, as defined in the Building By-law, recommending the proposed wall types, as well as an illustration detailing and verifying the RSI factor for the overall wall surface and noting the requested exclusion. For example details, see the above-noted document *Schedule of Wall Assemblies Related to Floor Space Exclusions*.

**3 Exclusion from Floor Area for Insulation in Walls in Buildings that Fall Under the Part 3 Requirements of the Vancouver Building By-Law**

This floor space exclusion is also intended to remove the disincentive of loss of usable floor area to construct thicker walls on new buildings.

The thermal performance of walls other than wood frame shall be calculated as a net R-value for a wall section taken from the floor level to the next floor level immediately above, including glazing, framing components, structure and all other elements that contribute to the overall wall surface. Walls with a thickness up to and including 152 mm will continue to be included in floor space. Only the thickness in excess of 152 mm will be excluded, to a maximum exclusion of 279 mm where both building envelope and thermal insulation criteria are met.

**Submission Requirements**

To apply for an exclusion, the following will be required in addition to standard submission materials:

- Additional information, including a schedule of floor-to-floor wall sections indicating materials, dimensions and reference to applicable standards, identification of the location and extent of each wall section, a summary table for each floor indicating the requested floor

space exclusion by wall type, and a summary total. Applicants must also demonstrate the required RSI factor.

- A letter from a Registered Professional, as defined in the Building By-law, sealed and signed, recommending the proposed wall types, and verifying the RSI factor for the overall wall surface.

#### **4 Exclusion from Floor Area to Control Building Envelope Leaks**

This floor space exclusion is intended to facilitate the repairs and replacement of walls on buildings which have been subject to leaks and water damage.

##### **Submission Requirements**

To apply for an exclusion, the following will be required in addition to standard submission materials:

- Sections indicating materials, dimensions, and reference to applicable standards, identification of the location and extent of each wall section, a summary table for each floor indicating the requested floor space exclusion by wall type, and a summary total.
- A letter from a Building Envelope Professional, as defined in the Building By-law, sealed and signed, recommending the proposed wall types to control building envelope leaks.

#### **5 Schedule of Assemblies**

A separate document entitled *Schedule of Wall Assemblies Related to Floor Space Exclusions* contains 10 drawings that illustrate those typical wall assemblies that are eligible for exclusions, and the exclusion associated with each. This document can be found on-line at [www.vancouver.ca](http://www.vancouver.ca) or at the Enquiry Centre information desk.



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# SCHEDULE OF WALL ASSEMBLIES RELATED TO FLOOR SPACE EXCLUSIONS

Authority - Director of Planning  
Effective Month, 2011

## 1 Introduction

As discussed more fully in the Planning Bulletin called *Floor Space Exclusion To Accommodate Improved Building Performance (Envelope And Thermal Insulation)*, the 10 drawings contained in this document illustrate exclusions of portions of exterior walls that may be permitted, to a maximum of 333 cm. This applies to walls that fall under the Part 9 requirements of the Vancouver Building By-Law which provide greater than effective RSI 3.85 (R-22) of thermal insulation.

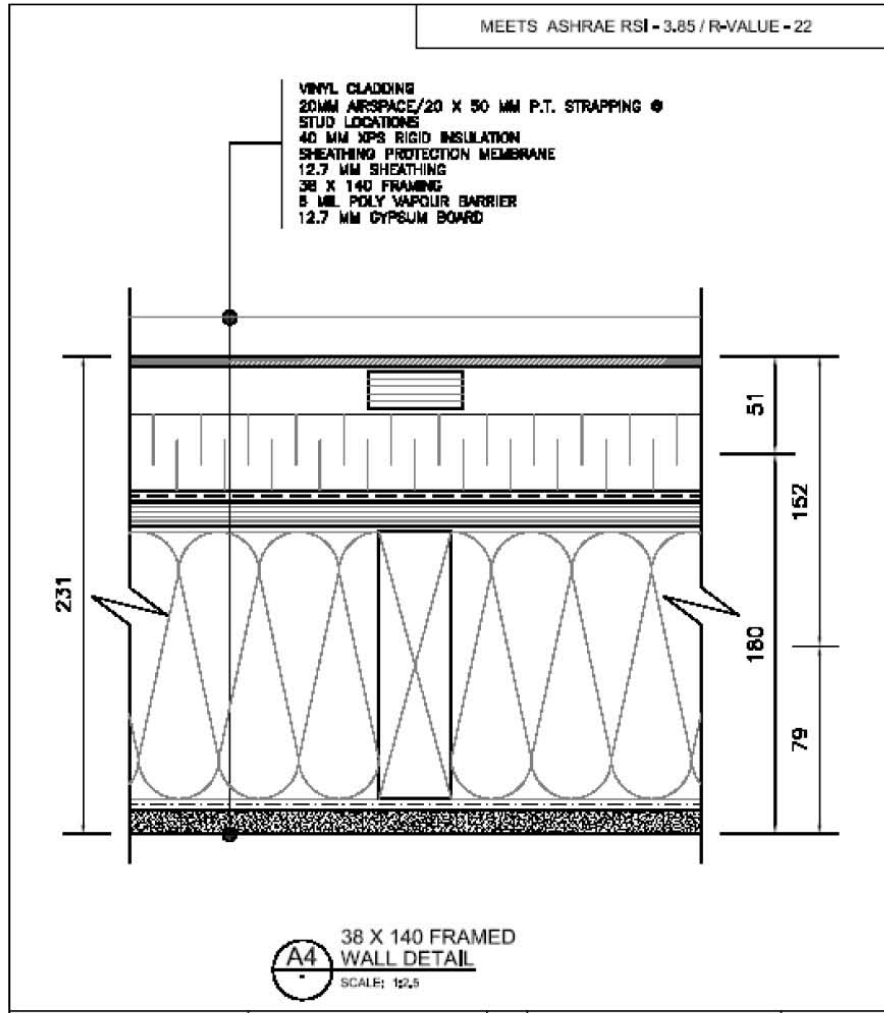
For those seeking greater exclusions for thicker walls, please consult the above-noted Planning Bulletin for submission requirements.

It should be noted that other regulations which are used to control bulk and massing, including height, yards and setbacks, remain unchanged and will not be relaxed.

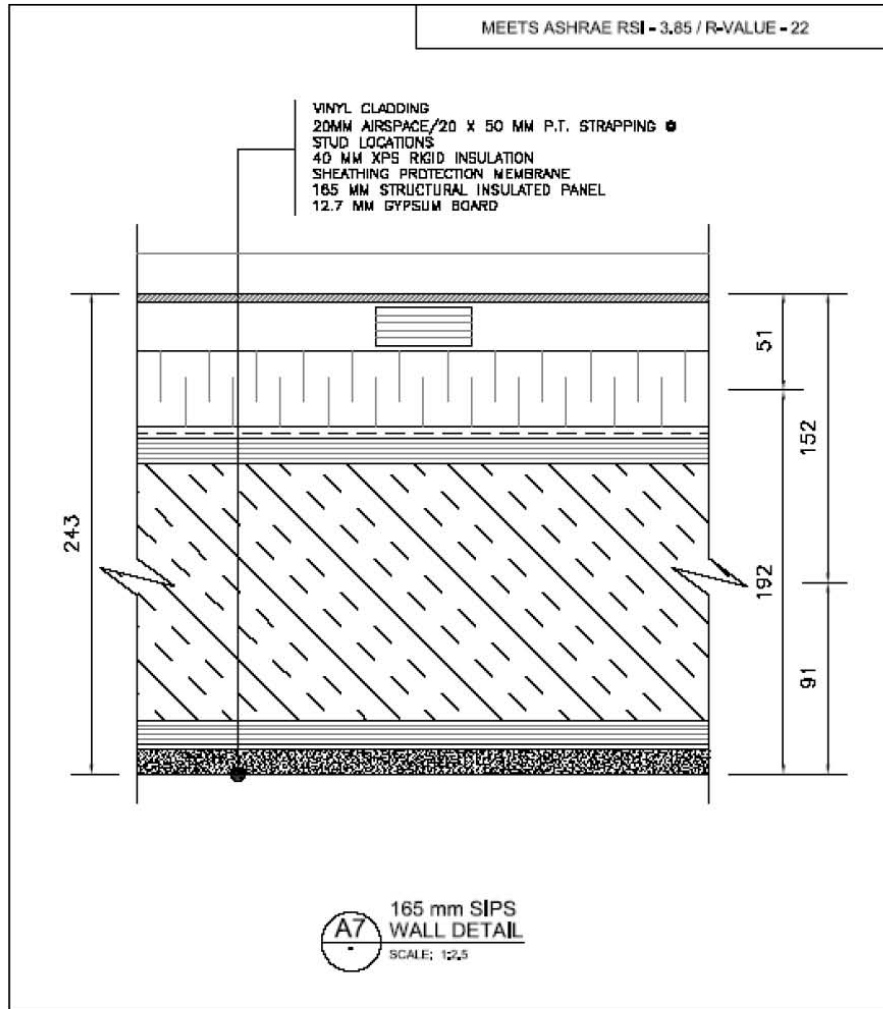
## 2 Schedule of Assemblies

The 10 drawings on the following pages illustrate typical wall assemblies that are eligible for exclusions, as well as the exclusion associated with each.

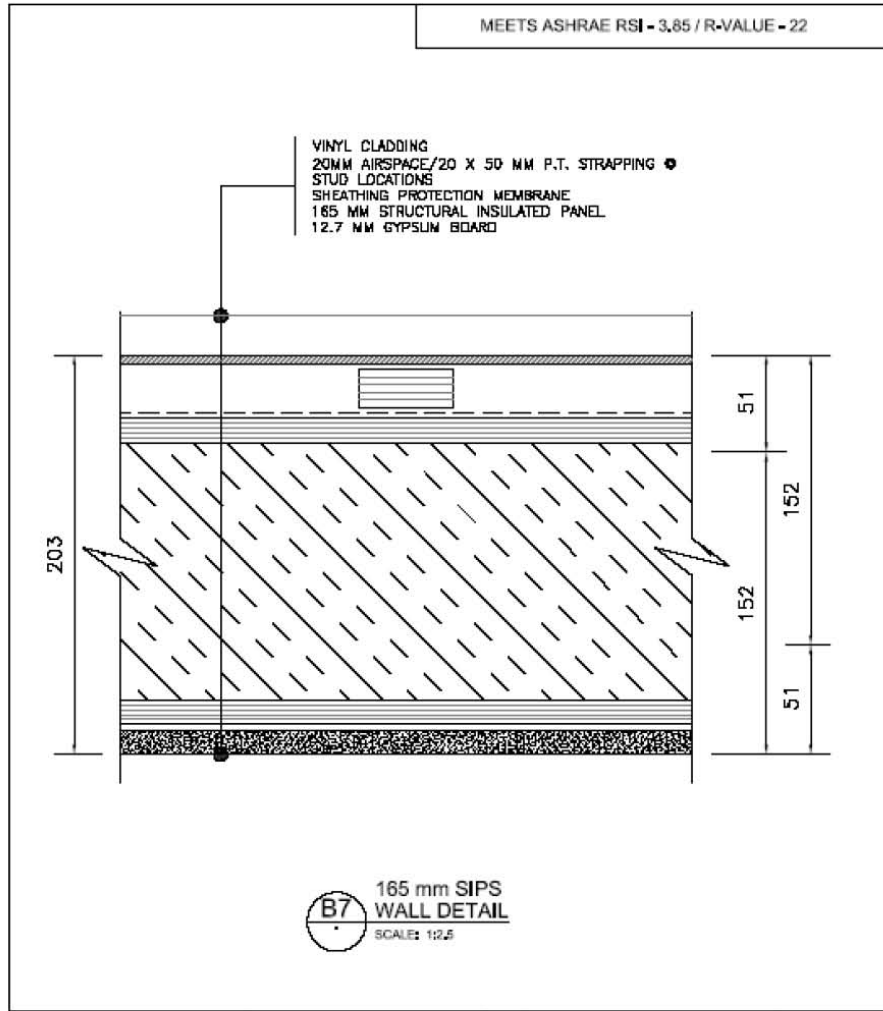
1. For wall assembly A4, the maximum exclusion would be 79 mm.



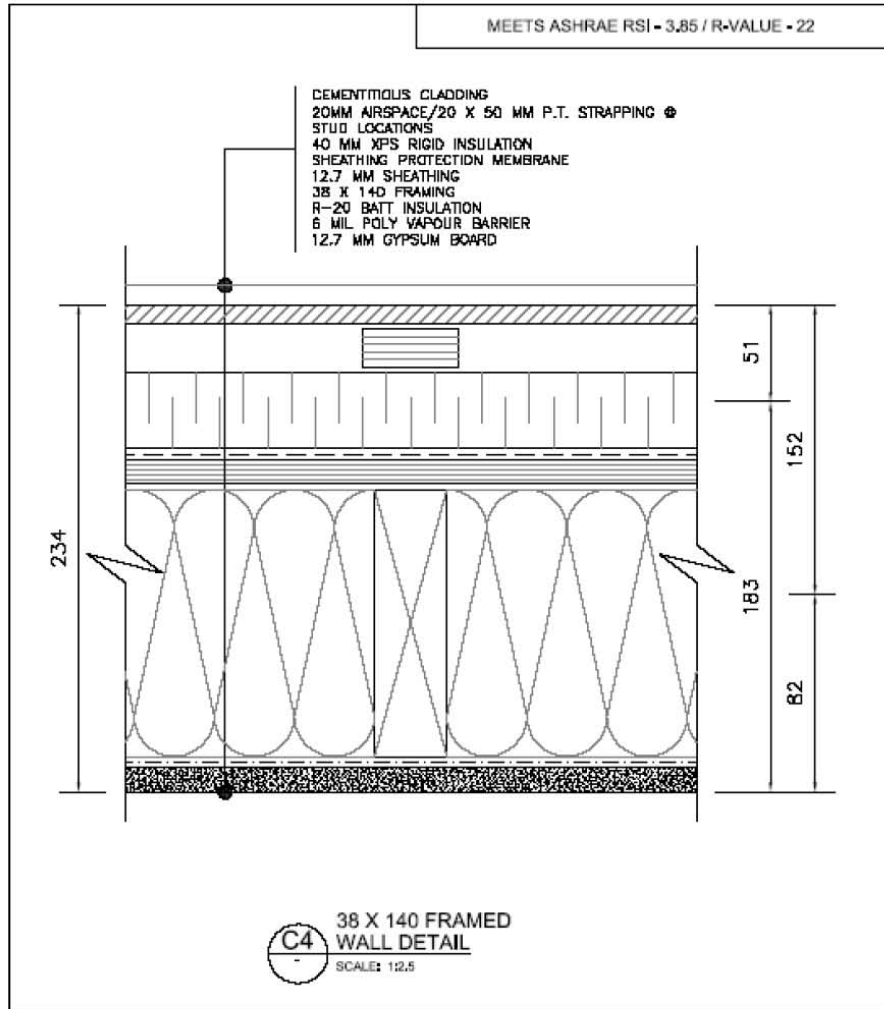
2. For wall assembly A7, the maximum exclusion would be 91 mm.



3. For wall assembly B7, the maximum exclusion would be 51 mm.

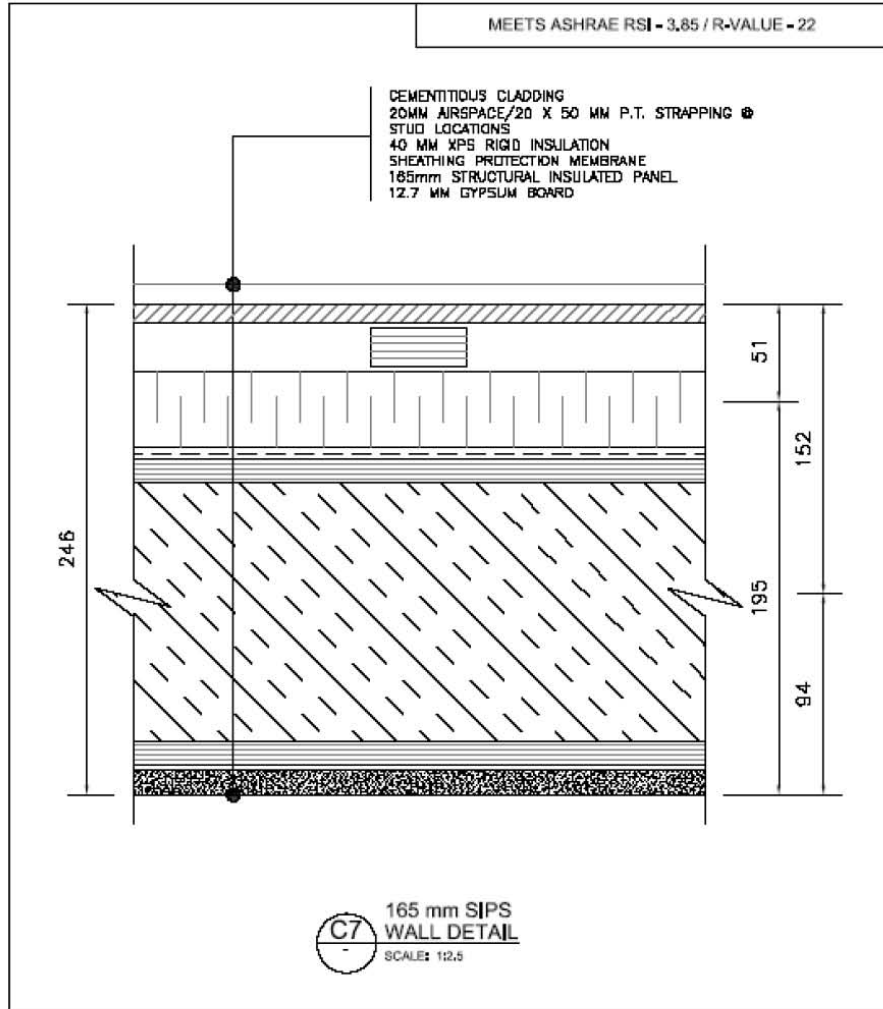


4. For wall assembly C4, the maximum exclusion would be 82 mm.

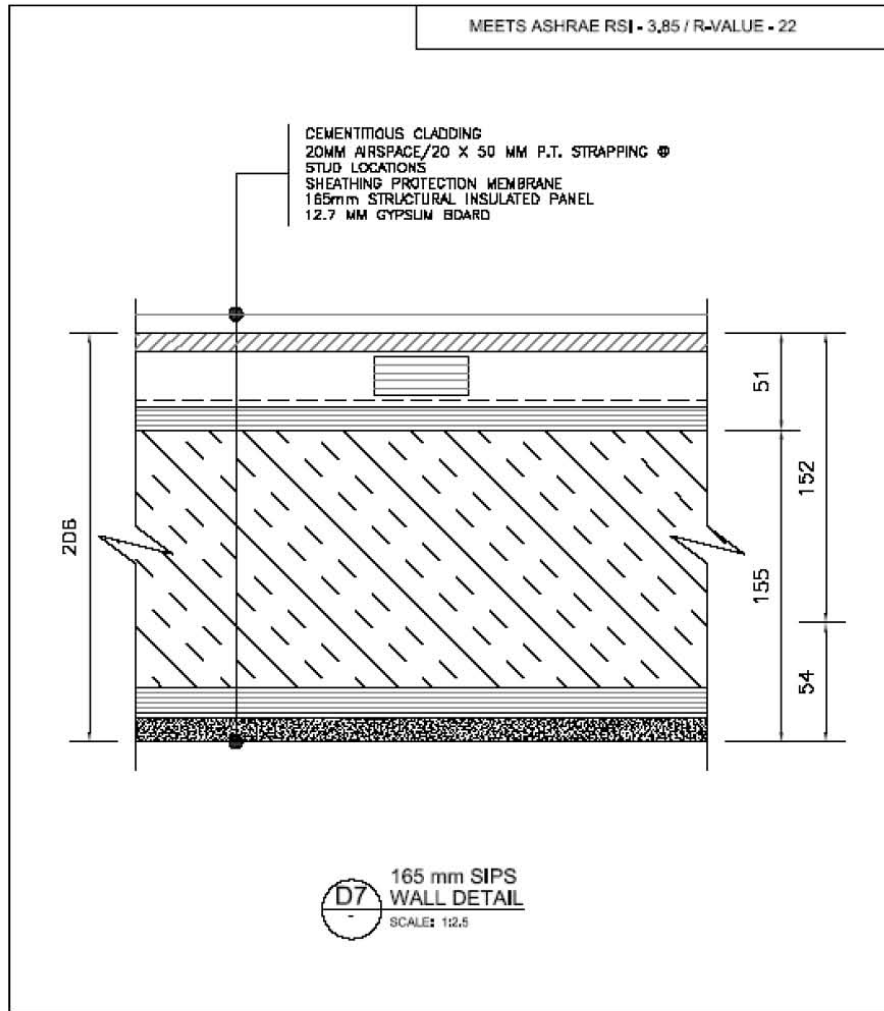




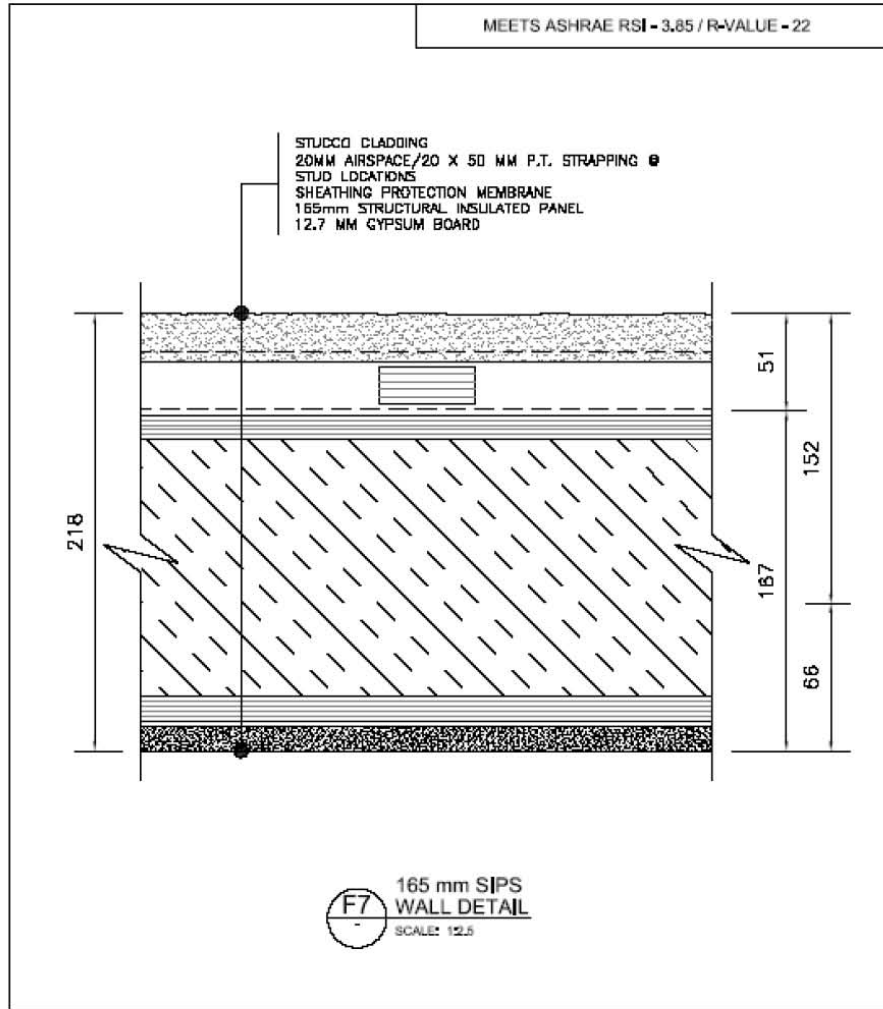
5. For wall assembly C7, the maximum exclusion would be 94 mm.



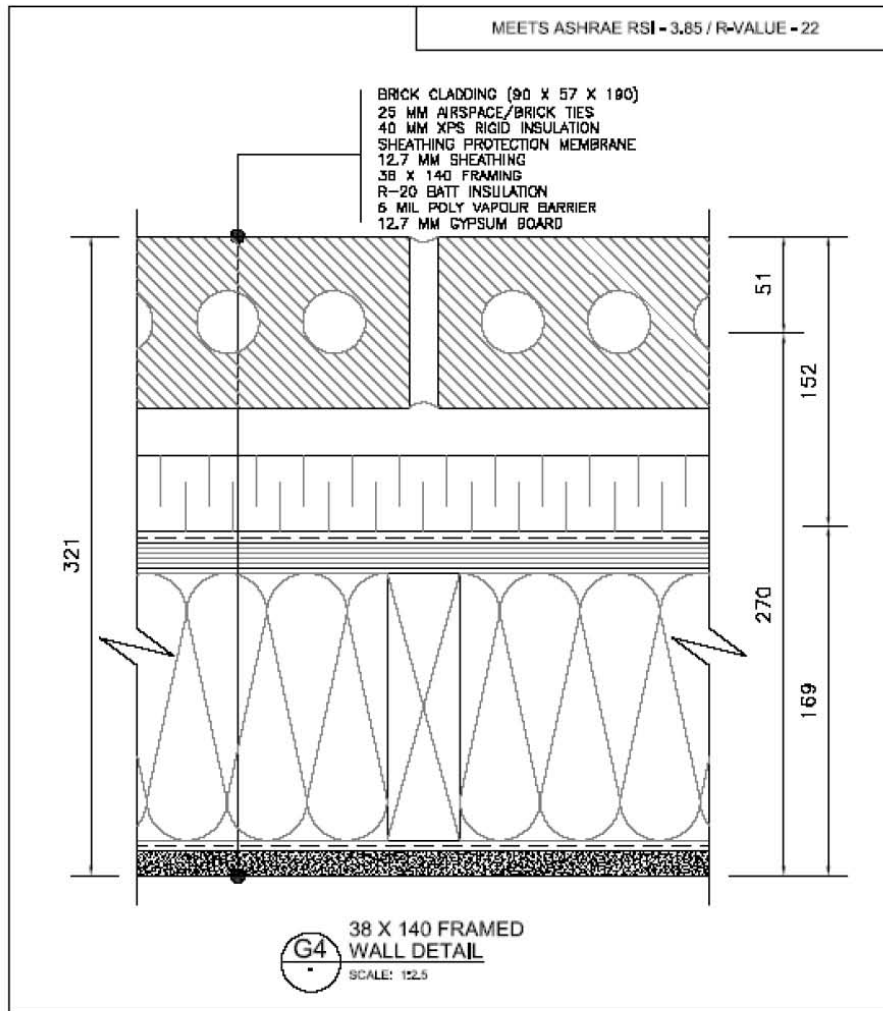
6. For wall assembly D7, the maximum exclusion would be 54 mm.



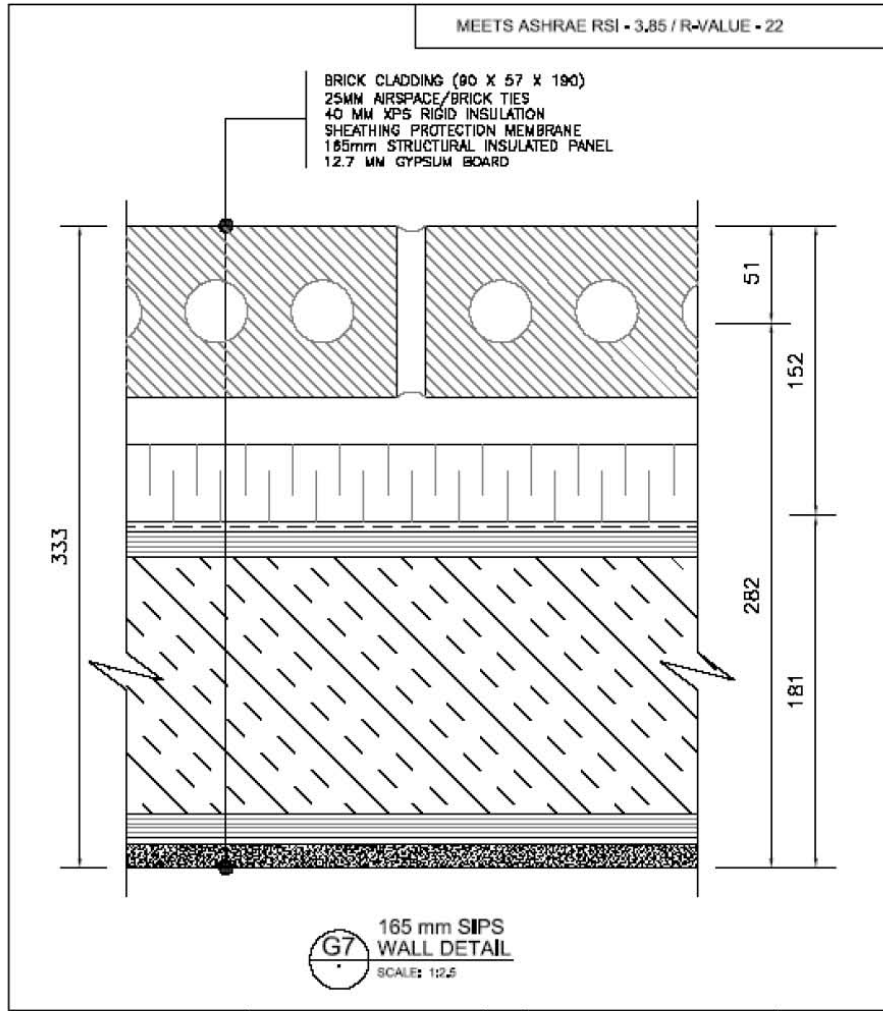
7. For wall assembly F7, the maximum exclusion would be 66 mm.



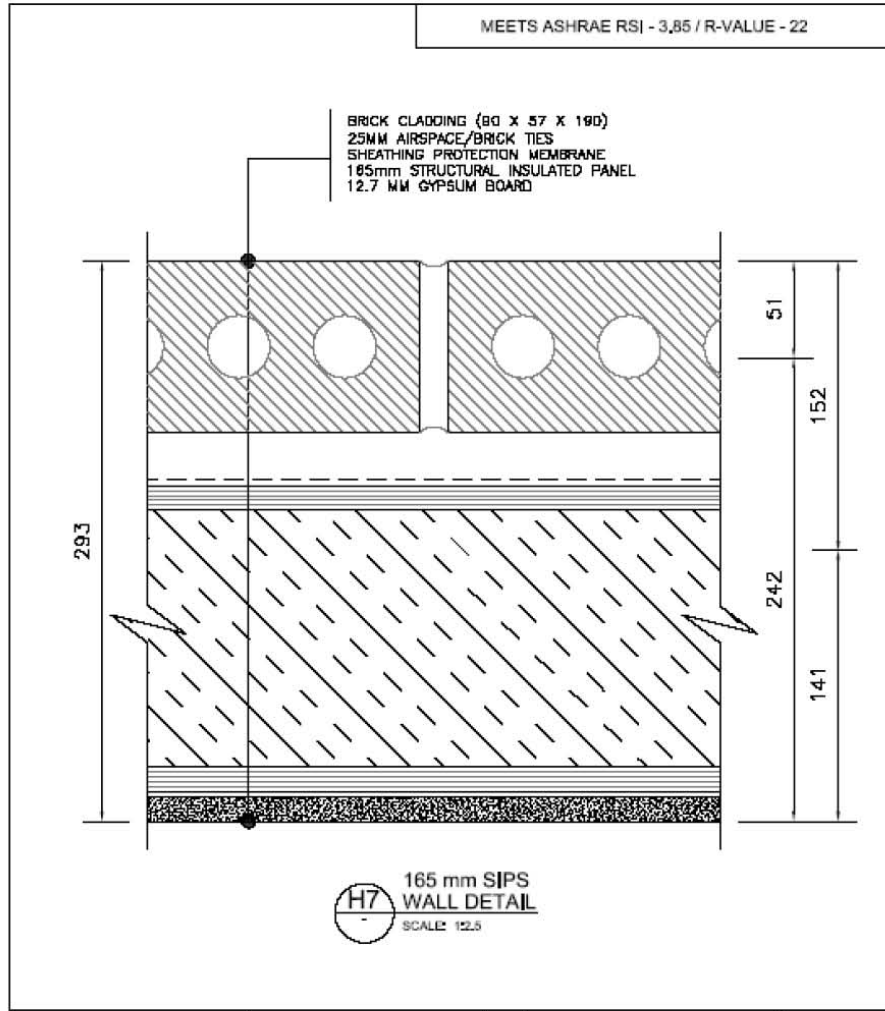
8. For wall assembly G4, the maximum exclusion would be 169 mm.



9. For wall assembly G7, the maximum exclusion would be 181 mm.



10. For wall assembly H7, the maximum exclusion would be 141 mm.





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# PASSIVE DESIGN: DEMOUNTABLE GREEN WALLS

*Authority - City Council Resolution  
Effective Month, 2011*

## 1 Introduction

On May 7, 2009 Vancouver City Council endorsed the *Passive Design Toolkits*. On Month, 2011, Council amended the Zoning and Development By-law to introduce discretion to the Director of Planning to consider, under certain conditions, projections into required yards and setbacks for demountable green walls.

The purpose of this bulletin is to provide clarification to staff and applicants on what may be considered, and the criteria that will apply in evaluation.

## 2 Passive Design and Green Walls

Passive design aims to maximize occupant health and comfort while minimizing energy use by relying less on mechanical and electrical systems. Vancouver's two *Passive Design Toolkits* (one looks at homes and the other at larger buildings) detail ways to reduce energy use - and associated greenhouse gases - in new buildings in Vancouver.

One element of passive design is incorporating green or "living" walls - walls that are covered with vegetation. A green wall typically takes the form of a lightweight structural framework affixed to an exterior wall to support plant growth, and may include a growing medium and/or irrigation system. Green walls reduce glare, noise, and the heat island effect (in which urban areas are warmer than rural ones because of heat-absorbing city surfaces).

## 3 Discretionary Criteria

When designing a green wall, conflicts may arise in terms of projections into required yards and setbacks. Green walls may be considered for projections into required yards and setbacks, provided that:

- the wall is demountable and not permanently affixed to the building,
- the structure and vegetation do not extend more than 254mm (10") measured horizontally from the face of the building,
- the Director of Planning has considered whether the wall is appropriately sited, oriented and sized to contribute to sustainable design performance such as reducing glare and noise, and
- the wall complies with the Vancouver Building By-law.

The design of a green wall should also be considered in terms of any relevant Council policies and guidelines, and Vancouver's *Water Wise Guidelines* are a related resource. As well, CPTED principles should be considered.

#### **4 Submission Requirements**

To apply for a projection for a green wall, the following will be required in addition to standard submission materials:

- A written rationale for the green wall(s) which addresses relevant sections of the by-laws, policies, guidelines as well as the criteria noted above.
- Drawings that illustrate the design and placement of the green wall(s), and specify the plant material and long term maintenance plan (integral irrigation system, hose bibs, etc.)

Depending on the extent of the projection and the design proposed, the Director of Planning may also require additional information or approvals from other City departments. Further review from Planning, Landscape Review, and/or Engineering Services may be required.





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## **PASSIVE DESIGN: BAY WINDOWS AND FLOOR SPACE**

*Authority - City Council Resolution  
Effective Month, 2011*

### **1 Introduction**

On May 7, 2009 Vancouver City Council endorsed the *Passive Design Toolkits*. On Month, 2011, Council amended the Zoning and Development By-law to define what is to be included in floor space calculation for bay windows or boxed out windows.

The purpose of this bulletin is to provide clarification to staff and applicants on the change related to bay windows and floor space.

### **2 Passive Design and Bay Windows**

Passive design aims to maximize occupant health and comfort while minimizing energy use by relying less on mechanical and electrical systems. Vancouver's two *Passive Design Toolkits* (one looks at homes and the other at larger buildings) detail ways to reduce energy use - and associated greenhouse gases - in new buildings. The *Toolkits* are a Vancouver-specific resource for passive design techniques.

A key element of passive design is to avoid heat loss. Bay windows increase surface/wall area and thermal bridging and therefore contribute to heat loss.

### **3 Bay Windows and Floor Space**

Because of the way bay windows had been treated in development applications (the space in the bay had not been counted as floor space), some applications included multiple bay windows to try and increase effective floor space. This issue has been addressed by adopting the same limitations set out in RS-6 zoning, section 4.7.2(e) in all relevant residential district schedules: any floor space in excess of one per cent of the total floor area permitted above the basement will be included in the computation of floor space. Thus while the effective incentive has been limited, a bay window can still be employed as part of a design.

### **4 Submission Requirements**

Regular submission requirements apply, and the floor space in bay windows will be calculated as noted above.



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planning@vancouver.ca

## **PASSIVE DESIGN: NATURAL VENTILATION AND LIGHT**

*Authority - City Council Resolution  
Effective Month, 2011*

### **1 Introduction**

On May 7, 2009 Vancouver City Council endorsed the Passive Design Toolkits, which describe building features that reduce energy consumption, increase natural light or improve natural ventilation. Because these features may have implications for building height or floor area, Council also amended the Zoning and Development By-law to allow the Director of Planning to consider certain exclusions to accommodate them.

This bulletin is intended to provide an introduction to passive design, the changes to the By-law, the discretionary criteria that will be considered by the Director of Planning, and the requirements to apply for exemptions.

### **2 Passive Design**

Passive design aims to maximize occupant health and comfort while minimizing energy use by relying less on mechanical and electrical systems. A key part of passive design is to allow for natural light and ventilation.

Natural daylight provides a quality of illumination that contributes to occupant comfort and lowers energy consumption by reducing the need for artificial lighting. For example, natural daylight can be improved by providing clerestory windows, set high in a space, to allow light to penetrate deeper into the building interior.

Natural ventilation reduces the demand for mechanical heating and cooling. For example, a vertical open space can be designed to improve natural ventilation by placing opening windows or skylights at the top of the space and similar openings at lower levels so that warmer, lighter, air can be released and replaced by cooler, heavier air. This replacement provides ventilation without mechanical equipment.

Vancouver's two Passive Design Toolkits (one for homes and one for larger buildings) provide more details and other methods of reducing energy use.

### **3 Zoning and Development By-law**

Section 10 has been amended to allow specific passive design features to be excluded from height.

District Schedules that contain a clause requiring open, interior volumes above 3.7m to be counted as floor area have been amended to allow a portion of this volume to be excluded for

certain passive design features. In zones that do not contain the clause, the Director of Planning may permit open to below spaces to be exempted from floor area when designed in combination with venting skylights, opening clerestory windows or similar features. This exclusion is limited to a maximum of one per cent of permitted floor area.

#### **4 Discretionary Criteria and Submission Requirements**

In reviewing applications for exclusion, the Director of Planning will consider how well the proposed design serves a passive design goal; what amount of exemption is reasonably required to meet the goal; the size, orientation and siting of the feature; and any relevant Council policies and guidelines. Compliance with the Vancouver Building By-law should also be considered in advance.

To apply for an exemption, the following material will be required:

- A written rationale for the design elements that addresses the above criteria along with any relevant by-laws, policies, or guidelines, including design guidelines
- Drawings and dimensions illustrating the design and placement of the proposed elements

This information may be incorporated into the standard submission material for a permit application, as long as the passive design features are clearly identified.

Depending on the design, the Director of Planning may also require additional information demonstrating that the proposed features help to reduce energy consumption and improve natural ventilation and daylight.