



Housing Design and Technical Guidelines

Housing Delivery and Operations
Housing Policy and Projects
Facility Planning and Development
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Background and Summary

The City of Vancouver is committed to building affordable, socially inclusive, environmentally sustainable, healthy, safe and diverse communities. It is with these objectives, as guiding principles, that we have developed the Housing Design and Technical Guidelines (HDTG).

The purpose of the HDTG is to help guide housing partners through the project development process on social housing projects secured by the City. The HDTG outline the minimum standards required by the City of Vancouver for materials, finishes, equipment and technical specifications. Standardization, through the use of the HDTG, is intended to balance immediate environmental, energy and space efficiencies, ensuring an emphasis on long term durability and resilience of the City asset over the life of the building. The intent is to realize City policies and goals that include for example, “The Housing and Homelessness Strategy”, “The Climate Change Adaptation Strategy”, “The Greenest City Action Plan: 2020”, and “The Healthy City Strategy”, within the context of built environment. The desired outcome is to encourage livability and inclusivity, as envisioned in these policies and in accordance with the regulatory framework set out in the Vancouver Building Bylaw (VBBL) and the Zoning and Development Bylaw (VZDBL).

The Housing and Homelessness Strategy

Vancouver is a growing and diverse city with significant housing challenges. Providing more affordable housing choices for all Vancouverites through a range of housing options is critical to the social and economic health of the City. The Housing and Homelessness Strategy describes the City's overall direction for housing, including what we need, and how we will achieve it over the next ten years.

<http://vancouver.ca/people-programs/vancover-housing-strategy.aspx>

This includes housing that is accessible, affordable and suitable for all income levels, seniors, families and residents challenged by disability. Modest market and rental housing is key to the economic well-being of the City. Over 50% of households are renters, with the tightest rental market and one of the lowest vacancy rates in Canada. The need for suitable and affordable housing choices for low to moderate income households has grown dramatically.

Affordability will be achieved through the optimization of unit sizes, standardization, shared common amenities and the consideration of sustainable energy and material efficiencies outlined in the HDTG.

Environmental Sustainability

Adapting to climate change to ensure Vancouver remains a livable and resilient City, while improving the environmental performance of our buildings and reducing operational costs over the life of the asset is a key driver of the HDTG.

For more information on the City of Vancouver Climate Change Adaptation Strategy and the Greenest City Action plan, follow the links below:

<http://vancouver.ca/files/cov/Vancouver-Climate-Change-Adaptation-Strategy-2012-11-07.pdf>
<http://vancouver.ca/green-vancouver/greenest-city-2020-action-plan.aspx>
<http://vancouver.ca/green-vancouver/green-buildings.aspx>

The electricity and natural gas that buildings use generate 55% of Vancouver's greenhouse gas emissions. Sustainable building design, that meet LEED[®] Gold and the recent updates to the Vancouver Building Bylaw (VBBL) are intended to reduce GHG emissions to provide healthy, safe, durable and energy efficient

buildings. An important goal is to improve the environmental performance of residential buildings and reduce lifecycle costs in the process.

Social Sustainability

Vancouver aspires to be a healthy city for all, one in which all of our residents are able to meet their basic needs; to enjoy social connections and engagement; to live in environments that enable them to thrive, not just survive. But Vancouver faces a number of challenges to overcome in order to achieve this goal. Our City has a number of profound inequities, and many Vancouverites struggle with low incomes, affordability of basic needs, social isolation and discrimination. Vancouver's Healthy City Strategy (<http://vancouver.ca/people-programs/healthy-city-goals.aspx>) sets targets in 12 long-term goal areas to ensure social sustainability.

Affordable, flexible, and appropriate housing and unit design that provides a diversity of housing choices and allows for residents to age in place, supports the concept of livability, inclusivity and will increase Vancouver residents' sense of belonging and sense of security for generations to come.

Our goal is to ensure the continued social sustainability and livability of all our neighborhoods in order to meet the needs of all residents. Inclusivity means removing physical barriers as well as reducing social barriers for all citizens by creating housing diversity and equity with opportunities for a range of income groups and social and physical infrastructure for people of all ages.

Building for accessibility, by eliminating barriers to full participation for persons with disabilities is an important part of being a healthy and inclusive City. Over 15% of Vancouver residents have some form of physical disability or mobility restriction. Facilitating aging in place, the ability to live in one's own home and community safely, independently, and comfortably, regardless of age, income, or ability level is encouraged in all housing types.

But accessibility means more than physical accessibility. Inclusive housing design can promote genuine interactions and social connections between people of diverse backgrounds. Design that supports social interaction between market and non-market tenants is encouraged; this may be achieved through the design of common indoor and outdoor amenity spaces, and/or other means proposed by the City's housing partner. Integration, inclusion and equity among individuals of diverse socio-economic backgrounds are aspirations of a healthy society.

Together, these objectives will bring Vancouver closer to being a healthy city for all. By ensuring affordability, inclusion and accessibility while building opportunities for community connections and engagement, the HDTG support the realization of the goals of Vancouver's Healthy City Strategy.

Economic Sustainability

Building affordable housing that is efficient and cost-effective and ensures livability and durability over the life cycle of the development are objectives of the HDTG. The process of developing the HDTG is grounded in evidence-based research, including cost benefit and life cycle analysis. Through the use of materials, finishes and technologies that are reliable and environmentally sustainable, a balanced outcome that meets the City's objectives can be achieved.

SECTION 1 - CITY OF VANCOUVER GENERAL DESIGN GUIDELINES

1 GENERAL

1.1 APPLICATION & INTENT

These guidelines are:

- a. To be read in conjunction with and to be considered as supplemental to the 2014 BC Housing Design and Construction Standards. This document outlines variations to the BCH document including additions and deletions
http://www.bchousing.org/resources/Partner_Resources/Construction_Standards_Procurement/Design_Construction_Standards/BCH_Design_Guidelines_and_Construction_Standards.pdf
- b. To be applied to the design and construction, renovation or conversion of any Housing secured by the City of Vancouver as a capital asset;
- c. The HDTG are the basis for the deliverable for housing provided as in-kind CACs: used for both the negotiation for the value of the CAC and for the legal agreement defining the final deliverable;
- d. To provide an outline of the built form, project scale, building program, as well as the design and technical requirements for all Housing secured by the City of Vancouver;
- e. To provide a minimum standard required by the City of Vancouver for materials, finishes and equipment, that ensures long term efficiencies and durability, minimizing maintenance and operational costs during the life expectancy of the building;
- f. To be used as a tool by consultants in developing their designs and specifications;
- g. To incorporate the fundamental aspects of environmental sustainability; ensuring resource efficiency and energy savings;
- h. To clearly define accountability between the developer and the City;
- i. Ensure consistent standards of livability toward efficiency in space utilization;
- j. Demonstrate value to the Citizens of Vancouver;
- k. Variations from these guidelines may be considered, but are not to proceed without prior discussion and acceptance by the City of Vancouver Housing Policy and Projects and Facilities Planning and Development Staff.

1.2 REGULATIONS AND STANDARDS

Consultants and Developers are to ensure that all applicable building codes, government acts and health regulations are met. These include, but are not limited to:

Regulations

- a. The City of Vancouver Building Bylaw (VBBL) <http://vancouver.ca/your-government/vancouver-building-bylaw.aspx>.
- b. The City of Vancouver Zoning and Development Bylaw (VZDBL): <http://vancouver.ca/your-government/zoning-development-bylaw.aspx>
- c. Occupational Health and Safety Regulation (Work Safe BC)
<http://www2.worksafebc.com/publications/ohsregulation/home.asp>
- d. The City of Vancouver Parking Bylaw: <https://vancouver.ca/your-government/parking-bylaw.aspx>
- e. [The Rezoning Policy for Sustainable Large Developments \(RPSLD\)](http://former.vancouver.ca/commsvcs/BYLAWS/bulletin/R019.pdf)
<http://former.vancouver.ca/commsvcs/BYLAWS/bulletin/R019.pdf>

Note: The RPSLD policy is a condition of rezoning for all development applications over 1.98 acres or new development containing 45,000 sq. m. Developers of smaller sites are encouraged to apply the objectives, intent and deliverables set out in this policy.

Policies and Standards

- f. LEED® Gold Certification is required by the City of Vancouver for all public buildings, tenant improvements and facilities funded by City capital funds that are new construction and over 500 square meters in area, and in all projects requiring a rezoning application. Buildings must be designed to achieve a minimum of 30% reduction in energy consumption compared to the current City of Vancouver Building Bylaw (ASHRAE 90.1 2010 or NECB 2011).
- g. Follow BC Housing’s Design Guidelines and Construction Standards, with the exception of Sections 6 and 7, but do not supersede the VBBL, the VZDBL or the City of Vancouver Housing Design and Technical Guidelines (HDTG)for Social Housing:
- h. Follow The City of Vancouver High Density Housing Guidelines for Family with Children (HDHGFC):
<http://former.vancouver.ca/commsvcs/guidelines/H004.pdf>
- i. Follow the City of Vancouver Urban Agriculture Guidelines for the Private Realm (UAGPR):
<http://vancouver.ca/files/cov/urban-agriculture-guidelines.pdf>
- j. To be read with the City of Vancouver Land use policy and policy development guidelines:
<http://vancouver.ca/home-property-development/design-policies-guidelines.aspx>
- k. Where secured market rental types are provided, follow the City of Vancouver Administrative Bulletin “Rental Incentive Guidelines for the Secured Market Rental Housing Policy” http://vancouver.ca/files/cov/secure_market_rental_policy.pdf
- l. The Consultant is responsible for ensuring all applicable updates or revisions to the code or regulations are addressed and included in the work.

1.3 DISCLAIMERS

- a. Some items that have been noted throughout this document are minimum standards, therefore any changes or proposed alternates must be confirmed with City of Vancouver staff, in conjunction with the Operator and will be reviewed based on appropriateness for each project. The Vancouver Building Bylaw (VBBL) or the Vancouver Zoning and Development Bylaw will govern if there are discrepancies between these and the Housing Design and Technical Guidelines.
- b. Any specific products named in this document are not to be taken as the City of Vancouver’s endorsement of that product, but rather as an example of a standard of quality that has proven successful in the past. Any other products that meet this level of quality will be considered for use, but their use is not to proceed without prior discussion and acceptance by the City of Vancouver.

2 LOCATION AND SITE PLANNING

2.2.1 LOCATION CONSIDERATIONS (Additional Requirements)

- a. Refer to the applicable local area plan, policies, zoning requirements specific to the project location within the City.
- b. Refer to Section 4 of the Passive Design Toolbox for recommendations on Passive Design site orientation that include landscaping wind and microclimate considerations, to increase thermal comfort and decrease active mechanical system requirements.

2.2.2 PEDESTRIAN APPROACH TO THE BUILDING (Replace with the VBBL)

2.2.3 OUTDOOR RECREATION AREA (Additional Requirements)

- a. Follow the Urban Agriculture Guidelines for the Private Realm (UAGPR) as per Section 1.2.i.
- b. Follow the High Density Housing Guidelines for Families with Children (HDGFC) where family units are included in the development as per Section 1.2.j

2.2.4 PARKING (Additional Requirements)

- c. Parking ratio (including visitor, car share and loading) to be determined according to Vancouver Parking Bylaw, building location, proximity to public transit and unit type. Family units may require additional parking.
- d. Provide handicapped accessible spaces to the minimum Vancouver Parking Bylaw 4.1.1.5 Calculation of Disability Parking Spaces. The needs of the particular building may require more stalls than the minimum required. Location to suit operator and traffic requirements.
- e. Drop off spaces may include a maximum of one handicapped accessible space, location to suit area and traffic requirements.
- f. Consider ease of access to bicycle storage locating at grade and near the lobby entrance where possible.
- g. Parking ramp slope not to exceed 12 percent grade.
- h. Provide “Car Share” requirements and bicycle parking as per VBBL 2.2.5.

2.2.5 SITE DRAINAGE (Additional requirements)

- a. Grades to provide positive drainage of all lawns, paved areas and others. Ponding is not acceptable.
- b. Allow no drainage of surface water towards buildings, across sidewalks or onto neighbouring properties. Drainage must be away from building entrances.

3 BUILDING DESIGN

3.3.1 BUILDING FORM (Additional Requirements)

- a. Replace the term described in the BC Housing Guidelines as “ BC Housing Programs” with “Housing secured by The City of Vancouver” provided as in-kind CAC ‘s”.

3.3.2 CONSTRUCTION METHODS (Follow BCH)

3.3.3 BUILDING DESIGN CONSIDERATIONS (Additional Requirements)

- a. Refer to applicable City of Vancouver Urban Design built-form guideline for the zone or local area.
- b. Simplify and minimize where possible, the number of floor layouts for each unit type.
- c. Standardize kitchen and bathroom layouts, grouping them together on common walls with stacked plumbing and HVAC.
- d. Every habitable room is to have a minimum of one operable window with the exception of bathrooms and kitchens.

- e. Where a window opens into a walkway or occupy-able landscaped area, restrict its swing so as not to create a safety hazard outside.
- f. Mitigate unwanted solar gain with external shading on west face and refer to Section 08500 for low e-coating and window rating.
- g. Avoid numerous small projections recesses in the building form to minimize complexity in the building envelope.
- h. Roof designs should be simplified, well drained and easy to maintain.
- i. Consider enhanced roof overhangs where appropriate to address the high levels of precipitation.
- j. Exterior noise, such as traffic, mechanical equipment or other disruptive noises is to be controlled by appropriate acoustical design of the exterior wall and window systems to meet the allowable noise level for residential living, dining, and recreation rooms as defined in the VBBL.
- k. Where possible, consider balconies. Balconies that could support a variety of outdoor activities are preferred over “Juliet” balconies.

3.3.4 BUILDING SIZE (Follow BCH)

3.3.8 BUILDING DESIGN CONSIDERATIONS ENVELOPE (Additional Requirements)

Building envelope design should take into consideration the principles and recommendations contained in the latest edition of Walls, Windows and Roofs for the Canadian Climate by the National Research Council of Canada (NRCC 13487).

4 BUILDING COMMON AREAS

4.1 GENERAL (Follow BCH)

4.2 INDOOR AMENITY SPACES (Additional Requirements)

- .1 General (Add to BCH Requirements)
 - a. For projects with less than 25 units, provide a minimum amenity space of 37 sq.m. (398 sq.ft.).
 - b. A minimum of 15 square feet of amenity space is required per unit.
 - c. In larger buildings with more than 90 units, consider a second amenity space for other activity uses.
 - d. Access to natural daylight should be provided in all amenity spaces.
 - e. All occupants should have access to an amenity space.
 - f. Indoor amenity space should be directly linked to at-grade, rooftop or podium outdoor amenity space as a priority, where possible. Refer to the High Density Housing for Families with Children Guidelines and Urban Agriculture Design Guidelines for the Private Realm policies.
 - g. It is preferred to cluster the amenity space with other common facilities such as the laundry and project office. Depending upon the operator’s preference, the project office may be situated at the building entrance
- .3 Revise BCH Guidelines requirements for amenity kitchenette to include:
 - 1828 mm (6 feet) minimum length of millwork lower cabinets with drawers and a double bowl stainless steel sink.
 - Refrigerator.

- A microwave outlet and shelf.
- .4 Provide one storage closet for the storage of stacking chairs and folding tables. The amount of storage closet space would conform to the size of the amenity room.
- .5 Provide a furniture layout with table and chairs, drawn to scale
- .6 Housing with common dining and meal preparation, replace BCH Guidelines with:
 - .1 If a larger community style kitchen is provided, confirm cooking types expected. (Class 1 - 5 as per bulletin). Exhaust and equipment to be provided per the City of Vancouver's Kitchen Ventilation Systems bulletin requirements.
<http://former.vancouver.ca/commsvcs/LICANDINSP/bulletins/2007/2007-005.pdf>

4.2.8. IN SUITE AND COMMON LAUNDRY

- .8 In suite and common laundry: (additional and revised requirements)
 Requirements will be determined by the Operator. In lieu of an Operator, the following guidelines shall apply:

In Suite Laundry

- a. The requirement of in-suite washers and dryers maybe be required and will be determined by Housing and the Operator.
- b. Electrical, plumbing and exhaust hook-ups for side by side appliances should be included in every unit that is 2 bedrooms or more and in every accessible unit.
- c. Preference is for the provision of side-by-side appliances. An exception may be granted for the provision of stacking units in 2 bedroom non-wheelchair accessible suites. Hook-ups should be in a 6'0" wide by 3'6" deep minimum dedicated closet for side by side units. Hook-ups should be in a 3'0" wide by 3'6" deep minimum dedicated closet for stacked units.
- d. Confirm hookup requirement for studio and one bedroom units with Housing, Facilities and the Operator.

Common Laundry Rooms

- e. Shared washers and dryers should be provided at one set for every 10 units in common laundry rooms. This may be reviewed by Housing and Facilities when there is a higher ratio of in-suite laundry units provided, and based on unit mix.
- f. The common laundry room(s) shall be wheelchair accessible.
- g. The common laundry room(s) shall be part of a programmed space (i.e., with access to natural daylight, beside amenity room or outdoor space if possible, conducive to meeting others, with a seating area included).
- h. The common laundry room should contain a single bowl stainless steel laundry sink, a minimum of 1500 mm (5'0" long) long sorting table/counter and a central floor drain. The counter shall be installed at accessible height and designed with an open knee space under the sink.
- i. Floor drains required.
- j. Lighting in laundry rooms should also be controlled by an occupancy sensor.
- k. In the laundry room provide leased or owned card-operated appliances, to be determined by the Operator. Fee amount, if any, to be decided by Housing and the Operator.

4.3.1 ADMINISTRATION AND PROGRAM SUPPORT SERVICES (Replace BCH requirements)

- a. For buildings with less than 25 units, a project office should be provided of approximately 9.29 sq. m. (100 sq. ft.). In buildings with more than 25 units, provide an office of a

minimum of 24.52 sq. m. (264 sq. ft.) that will include:

- A 12.28 sq. m. (132.25 sq. ft.) lockable office to accommodate a desk with run off, across desk seating for 2 guests and room for file cabinets;
 - A small area for reception and for accompanying guest and/or children to wait and play. A window may be required to view the reception area.
 - A LAN closet - approximately 610mm x 610 mm (2'-0" x 2'-0") minimum.
- b. An additional minimum 3048 mm x 3048 mm (10'-0" x 10'-0" sq. ft.) office may be required if building maintenance and management is handled on site.
 - c. The project office(s) should be provided with electrical and telephone/ data outlets.
 - d. A common accessible washroom should be located close to the project office (may be shared with amenity space).
 - e. If the office is located at the main lobby, install viewing window from office space to entry area.

4.4 SERVICE AREAS

4.4.3 Garbage / Recycling Rooms (Additional requirements)

- a. As a part of the City's Greenest City Strategy, The City of Vancouver requires all buildings to provide adequate storage for garbage and recycling. These storage areas must meet all building code regulations, and all zoning and development bylaws.
- b. The Garbage and Recycling Storage Facility Design Supplement is a tool for developers on the proper design of garbage and recycling storage facilities for both new and retrofit buildings.
- c. Refer to the City of Vancouver Developer guide to designing garbage and recycling storage facilities.
<http://vancouver.ca/home-property-development/garbage-and-recycling-storage-facilities.aspx>
- d. Ensure that waste facilities align with both the recycling and organic collection programs.
<http://vancouver.ca/home-property-development/what-food-scrap-and-yard-waste-go-in-green-bins.aspx>
- e. Review each building for acceptable garbage and recycling strategies: location and access, container size, type and collection schedule.
- f. Recycling, as part of the City's Green Initiative Strategy, is a requirement for all city facilities, both in individual units and for common collection, as a guideline, the suggested interior space per LEED® under Prerequisite 1, "Materials and Resources" for a commercial building of up to 465 square meters in size is 7.6 square meters.
- g. Confirm expected recycling volume for each building with Operator.

4.4.5 Equipment Storage and Maintenance (Additional requirements)

- a. Operator storage to be provided for seasonal-use items and other large items, like collapsible and stackable tables and chairs, or room dividers. Exclusions to be decided by Housing, Facilities and the Operator.
- b. Approximately 1.858 sq. m. (20 sq. ft.) of space for exterior landscaping supplies must be provided.

4.4.7 Janitor Closets (Additional requirements)

- a. Provide a separate lockable janitor room with floor sink, space for storing bucket, mops, brooms, vacuum, ladder, supplies for cleaning, shelves for paper products, light bulbs, etc., appropriately size to adequately meet the needs of the building.

4.4.11 Mechanical and Electrical Rooms (Additional requirements)

- a. Provide separate, lockable mechanical and electrical rooms to safely accommodate items such as hot water tanks, electrical panels, data lines, telephone and security equipment panels, gas, water or hydro meters and any other mechanical or electrical equipment that need to be accommodated within the building.

4.4.12 Heat Treatment Room (Additional requirements)

- a. Provide a heat treatment (bedbug treatment) room within the building if required by housing and the Operator. The ideal location is situated in an area where a new occupant would enter the premise with their belongings. The preferred location is within the parking garage or off the main lobby of the facility. The location is to be determined in discussion with the Operator and/or Housing.

Refer to **Section 5 - Construction Standards, Division 13200 Heat Treatment Room**

Retrofit of Existing Buildings:

- b. The heat treatment room located as noted above is preferred.
- c. If space is limited, utilize an existing room (such as a Janitors closet) and retrofit in accordance with the above noted specifications. Location is to be discussed with the Operator and/or Housing.
- d. The portable heaters should only be considered in situations of building retrofits where a heat treatment room or space to retrofit a janitor's closet is not available.

4.5 CIRCULATION AND ACCESS

4.5.1 Entrance Lobby (Additional requirements)

- a. Mailboxes are preferred close to the entry.
- b. Provide a counter-height shelf adjacent to the mailboxes of a suitable depth for hand held articles.
- c. Entrance mats to be provided at all entrances from the outdoors; or provide recessed grille.
- d. Notice boards to be provided as corkboard complete with trim, or pre-approved alternate.

4.5.2.2 Corridors (Additional Requirements)

- a. Maximize glazing in doors in public corridors including doors at fire separations, exit stairs and common areas as permitted by code and per CPTED principles, to enhance personal security of residents.
<http://www.designcentreforcpted.org/Pages/Principles.html>
- b. Provide access to natural light where possible.
- c. Provide wheelchair accessible thresholds for all exterior doors.
- d. Minimum ceiling heights should be 2337 mm, (7'-8") AFF.

5 DWELLING UNIT DESIGN

5.1 GENERAL City-Wide (Additional requirements)

The following are intended for self-contained dwelling units in multi-unit residential buildings.

The unit mix will be determined by the size, location and nature of the building development and the community that it is to be part of and approved through consultation with the Chief Housing Officer .

As a general guide the following should apply;

- 50% should be 1 bedroom and studio units;
- 30% 2 bedroom;
- 20% 3 bedrooms

Fully integrate specialized units, such as those for persons with physical disabilities, into the community structure of the building(s). These units should be integrated into the floor layout.

5.2 GENERAL - Downtown Eastside (Additional requirements)

For unit mixes within the Downtown Eastside Sub -Areas, refer to Chapter 9, Housing of the Downtown Eastside Local Area Plan, for policy objectives within Sub - areas.

<http://vancouver.ca/files/cov/downtown-eastside-plan.pdf>

5.3 DWELLING UNIT FLOOR AREAS (Replace BCH Guidelines with the following :

Minimum finished narrow unit dimension not to be less than 3.66m (12ft).

Net Unit Area, the measurement of the dwelling unit size, shall be calculated using the inside face of the walls. Interior partitions, within the dwelling unit, are to be included in the measurement.

Further, any bulk storage, excluded from FSR Calculations, shall **NOT** be included in the measurement of the dwelling unit floor area.

Minimum net unit size guidelines, *excluding storage* are as follows:

UNIT TYPE	BEDROOMS	SQ. METRES	SQ. FEET
Row/Stacked			
	2	90	970
	3	112	1200
	4	125	1350
Apartment			
	Bachelor/Studio	29.7- 37	320 - 400 *
	1	46	500
	2	66	700
	3	84	900
	4	105-117	1125-1250
	2 bedroom in home family daycare unit	107 - 112	1150-1200
	3 bedroom in-home family daycare unit	130 - 139	1400 -1500

Unit sizes may be revised to respond to Operator preferences or specific programming needs on the recommendation of Housing Policy and Projects.

Net Unit areas may be increased to provide for accessibility.

* The Director of Planning may permit a floor area no less than, 29.7 m² (320 sq. ft.) as per Section 10.2.1. of the Zoning and Development Bylaw.

5.3.1. DOWNTOWN EASTSIDE (Additional Requirement)

New, self-contained, secured rental Micro-dwelling units to a minimum of 23.23 m² (250 square feet), (subject to ensuring the design adheres to guidelines and policies to ensure livability) as per Section 11.27 of the Zoning and Development Bylaw MAY, be considered, in the Downtown Eastside only, as described in the Micro Dwelling Policies and Guidelines:

<http://former.vancouver.ca/commsvcs/guidelines/DO15.pdf>

Also, refer to Polices and Guidelines for the Upgrade of Rooms Designated under the Single Room Accommodation (SRA) By LAW (NO.8733)

<http://former.vancouver.ca/commsvcs/guidelines/DO16.pdf>

Refer to the Rezoning Policy for the Downtown Eastside for development directions as they pertain to the Downtown Eastside:

<http://former.vancouver.ca/commsvcs/guidelines/DO17.pdf>

5.4 LIVING-DINING AREAS

Provide a furniture layout to scale, to ensure functionality and accessibility.

5.4.1 Suite Entrance (Follow BCH Guidelines)

5.4.2 Living Area (Replace BCH Guidelines with the following)

- a. Localized drops for mechanical should be minimized and preferred not to be located in main living space.
- b. Clear ceiling heights to be a minimum of 2438 mm (8'0").
- c. The minimum acceptable ceiling height below a localized mechanical drop is 2134 mm (7'-0)
- d. Sprinkler heads and light fixtures in ceiling drops to be recessed or flush mounted.

5.4.3 Dining Area (Additional requirements)

Studio Units - provide sufficient space for a table to seat a minimum of two

One & Two Bedroom Units - provide sufficient space for a table to seat four.

5.5 BEDROOMS (Follow BCH)

5.6 IN-SUITE STORAGE (Replace BCH Guidelines with the following)

5.6.1 General Storage

- a. Interior: one 3.7 m² (40 sq. ft.) of storage per unit.
- b. Unit storage should be located in the unit.

5.7 TWO AND THREE BEDROOM "IN-HOME" FAMILY CHILDCARE UNIT DESIGN where "In-Home Family Childcare Units are included within the housing development (Additional Requirements)

- a. Provide all "In-Home" family childcare units at ground level with living and kitchen space that is visibly and physically accessible to an outdoor balcony or patio area. If not situated at ground level, consider locating in close proximity to the outdoor amenity space within the building.

- b. The outdoor space should receive a minimum of two hours of sunlight in total during the hours of 9:30 am - 11:30 am and/or 1:30 pm - 4:30 pm at winter solstice.
- c. The suite layout should contain:
 - 1. One 3-piece bathroom with a 914 mm x 1524 mm (30" x 60") tub.
 - 2. One 3-piece bathroom with a shower that includes a hand-held shower unit in three bedroom unit.
 - 3. An expanded countertop for diaper changing in the second bathroom or powder room and larger sink.
 - 4. An open concept kitchen/dining/living area for use by the children.
 - 5. The preferred kitchen layout would have a central island with eating bar and an open view of the play area and outdoor space.
 - 6. A stroller storage at the entrance.
 - 7. A large entry closet for the storage of children's belongings.
- d. Provide adequate short-term drop-off parking for parents on the site. The drop off stall should be provided as close as possible to the In-Home family units and no more than 100 m from the entry.
- e. Refer to Section 3 of this guideline for materials and finishes and technical requirements.
- f. Refer to the City of Vancouver Childcare Design Guidelines for comprehensive details on site orientation, access, design consideration and landscaping with non-toxic plant materials. <http://vancouver.ca/docs/planning/childcare-design-guideline-1993-February-4.pdf>
- g. For more information on licenced family daycare refer to http://www.health.gov.bc.ca/ccf/child_care.html
A revised City report on family childcare will be released in February 2015.

6 KITCHENS AND BATHROOMS

6.1 KITCHENS (Additional requirements)

- a. The two, three and four bedroom units are to have a dishwasher in the kitchen.
- b. Consider dishwashers in studio and one bedroom units, based on cost/benefit lifecycle analysis and operator preference. Dishwashers can be compact 534 mm (21") units in one bedroom and studio units.
- c. The base cabinets or pantries are to have dedicated, enclosed space for recycle bins of approximately 371 mm - 557mm (4-6 sq. ft.) depending on unit size.
- d. Provide a broom closet or pantry in the kitchen.
- e. All units to have the following appliances in the kitchen:
 - 1. Refrigerator: providing a floor space of 762mm (30" wide);
 - 2. Stove with oven and four burners;
Range hood.
 - 3. Combined Microwave and Hood Fans may be considered in small units.

Refer to the **Division 11 - 11300 - Residential Equipment** for appliance specifications.

6.2 BATHROOMS (Follow BCH and include the following replacements and additions)

6.2.1 General (Additional Requirements)

- a. Bathrooms within units shall have ceramic tile.
- b. Floor drains should be provided in bathrooms in supported, transitional, seniors and SRO units.
- c. Floor drains are not required in low income housing bathrooms except as required in

Section 3.8.5 of the VBBL (Adaptability Requirements) and in wheelchair accessible unit.

6.2.2. Fixtures and accessories (Follow BCH)

6.2.3. to 6.2.5. Studios and One Bedroom units (Additional requirement)

- a. Three or more bedroom units should have one, three piece bathroom and one powder room (consisting of a toilet and a lavatory basin with a vanity)
- b. Studio, one and two bedroom units should have one, three piece bathroom with tub/shower combination.

6.2.6 Seniors Units (Follow BCH)

6.2.7 Electrical Items (Additional requirements)

- a. Each room is to have its own light switch/controls - to be designed to be simple and intuitive.
- b. All switches to be easy touch rocker switches
- c. Fixtures in suites to be LED, with easily replaceable LED lamps and ballasts.

7 FINISHES AND MATERIALS

Also refer to Division 9 - Finishes

7.1 GENERAL (Follow BCH and include the following additional requirements)

- a. Ease of maintenance, durability, environmental performance, health and safety, and, cost effectiveness are the prime considerations when choosing materials and finishes.
- b. Choice of material and finishes are to be aligned with the goals of the Greenest City 2020 Action Plan.
- c. Refer to **Section 1.3 - Energy Performance**. LEED Version 4 - Material and Resource Credit is a mandatory credit and must be achieved for all housing projects.
- d. Health Product Declarations (HPD) are encouraged for finishing materials utilized within housing units.
- e. Higher levels of durability may be required for "hard to house" populations - Confirm requirements with the Operator and COV Housing.

7.2 INTERIOR FINISHES

7.2.1 General (Follow BCH)

7.2.2 Interior Walls (Follow BCH)

7.2.3 Interior Ceilings (Additional requirements)

- a. Acoustic panel ceilings are not acceptable.
- b. Provide adequately sized access panels, complete with locks, for ease of maintenance of equipment and services located above the ceiling
- c. Finish ceilings with gypsum wallboard to receive a spray texture finish or paint finish.
- d. Kitchen and bathroom ceilings must be finished to receive a washable finish.

7.2.4 Floor Finishes (Revised requirements)

.1 Dwelling Units

- a. Generally, flooring colours shall be consistent throughout each unit.
- b. Bathrooms within units shall have ceramic tile.
- c. Storage rooms and basements within units shall have resilient flooring or ceramic tile.
- d. Ceramic tile is preferred in kitchen within units, or finish to Operators preference.
- e. Living rooms, dining rooms and bedrooms shall have carpet although resilient flooring may be considered at the approval of Housing, Facilities and the Operator.
- f. Laundry rooms to have continuous sheet-good resilient flooring (no resilient flooring *tiles*), complete with flash cove base or ceramic tile and base.
- g. Polished concrete flooring may be accepted as a flooring finish upon approval of Housing, Facilities and the Operator.

.2 Common Areas

- h. At high wear and tear locations in the facility, such as the main entrance, use a durable material which can include; non-slip ceramic tile, non-slip polished concrete, or other slip resistant material. All surfaces must be non-abrasive and washable.
- i. Common corridors shall have carpet tile, or resilient flooring - confirm preference with Housing, Facilities and the Operator dependent upon housing type.

.3 Common Laundry and Kitchens

- j. Common Laundry rooms and public washrooms to have ceramic or water-resistant resilient flooring.
- k. Common Amenity spaces to have ceramic tile or water-resistant resilient flooring. Carpet tile may be considered in the seating/lounging area in combination with the above materials in high traffic or kitchen areas.
- l. Polished concrete flooring may be accepted as a flooring finish upon approval of Housing, Facilities and the Operator.

.4 Utilities

- m. Storage and service rooms shall be resilient flooring to match other areas.

.5 Baseboards

- n. At carpet and resilient floors, wood base to be hemlock or pine, and minimum 100 mm (4") high with the following exceptions.
- o. Integral cove base at washrooms, laundry rooms and janitor rooms where flooding is a concern.
- p. At ceramic tile flooring, base to be ceramic tile to match flooring.

7.3 DOORS

7.3.1 General (Follow BCH)

7.3.2 Exterior and Suite Entry Doors (Revised and additional requirements)

- a. Door leaf width must be 900mm (35.4") minimum.
- b. Unit doors must have one peep hole except in accessible dwelling units where two peepholes must be provided. One located at 1067mm above the floor and the other located at 1524mm above the floor.

7.3.3 Wheelchair Accessible and Adaptable Units (Follow Section 10 of these Guidelines)

7.3.4 Interior Doors (Revised and additional requirements)

- a. Door leaf widths must be 863mm (33.97") minimum except as noted below. In seniors housing, wheelchair accessible and wheelchair adaptable suites, all doors shall have a minimum leaf width of 900mm (35.4").
- b. Provide bypass doors for all closets 1200mm (4 ft.) or wider.
- c. Bi-fold doors are not acceptable. Provide swing doors on all closets including clothes and washer/dryer closets.
- d. Pocket doors are not acceptable due to durability concerns.
- e. All closets and entries to basement stairs and unfinished areas must have doors.

7.4 WINDOWS

7.4.1 General (Additional requirements)

- a. Consider liveability and access to natural light as per VBBL and urban design requirements.
- b. Consider furniture layouts when locating and sizing windows.
- c. Where design and building by-law permits provide windows in exit stairways, except at ground floor level for security reasons.

7.4.2 Acoustic Considerations (Revised requirement)

- a. Where road, rail or other sources of noise indicate need for acoustical consideration, consider triple pane window systems. This will allow a resident the choice of opening windows and tolerating the noise or relying on mechanical ventilation. Acoustical Consultant may be required to address Bylaw requirements. Acoustical considerations may extend to construction of exterior walls.

7.4.3 Window Cleaning (Revised requirement)

- a. Where windows cannot be cleaned from the inside or from grade level, design provisions are to be made to allow cleaning to occur from roof levels: Anchors to allow above-grade access are to be an engineered system designed to meet WorkSafe BC requirements.
- b. Safety features such as steel eye hooks securely anchored to jambs, or roof-top cradle brackets, may be necessary for higher buildings.

7.4.4 Window Coverings (Revised requirement)

- a. Provide blinds or roller shades for all exterior and interior windows and glazed doors. Drapes are not required.

7.4.5 Exterior Finishes (Follow BCH)

8 BUILDING SYSTEMS

8.1 ELEVATORS

8.1.1 Elevator Design Considerations (Additional requirements)

- a. Minimum of 2 per building.

8.1.2 Seniors Projects (Follow BCH)

8.1.3 Elevator Location (Additional requirements)

- a. The location of the elevator should meet CPTED principles and be visible from the lobby entry.

8.1.4 Elevator Group Arrangements (Follow BCH)

8.1.5 Lobby Sizes (Follow BCH)

8.1.6 Floors Served (Follow BCH)

8.1.7 Machine and Control Room Locations (Follow BCH)

8.1.8 Capacity and Size of Elevator (Additional requirements)

- a. Cab size and layout to accommodate moving.
- b. Equip one elevator cab (the largest and highest capacity elevator if they are not the same) with hooks complete with protective blankets for moving purposes.
- c. Elevators in facilities with roof-top garden areas should be easily accessible from the loading area or at a minimum from the back lane, to facilitate delivery of items for routine maintenance such as sand, soil and engineered wood chips.
- d. Elevators in buildings with roof garden areas to be able to accommodate freight for the purposes of installing and maintaining podium or rooftop landscaped areas (for example to move heavy loads for soil replacement and top-up).
- e. For the Elevator minimum capacity and dimensions, follow the BCH Guidelines.
- f. The second elevator is preferred to follow BCH 9.1.8.8. with a minimum capacity of 1134 kg (2500 lbs.), but 908 kg (2000 lbs.) capacity may be considered and must be reviewed with Housing and Facilities for acceptance. 907 kg (2000 lbs) elevators will only be considered if it is one of at least two elevators where the other elevators has a capacity of either 1600 kg.(3500 lbs.) or 1134 kg (2500 lbs.).
- g. Equip one elevator cab (the largest and highest capacity elevator if they are not the same) with hooks complete with protective blankets for moving purposes.
- h. Ceiling heights are clear dimensions, measured below the suspended light fixture or ceiling, whichever is lower.

8.2 MECHANICAL AND ELECTRICAL

8.2.1 Heating Ventilating and Cooling (Replace BCH Guidelines)

Design Requirements

- a. Electric baseboard heating is not allowed. An HVAC strategy to be discussed with City Staff and the Operator, taking into account on-going operating costs, maintenance needs and environmental impact. Under special circumstances, an exception may be made if baseboard heating is proven to have lesser impact than other systems based on cost to the Operator, the residents and the environment over the course of the lifecycle of the building, and only in areas where neighbourhood energy systems are not anticipated.
- b. Buildings must be designed with low temperature hydronic heating systems and connect to neighbourhood energy systems if available, or be ready to connect if the building is located in an area planned for future neighbourhood energy systems.

8.2.2 Plumbing - (Replace BCH. Follow Division 22 - Plumbing)

8.2.3 Electrical - (Follow BCH. Additional Requirements follow Division 23 - Electrical)

- a. Facilities to have dedicated gas, electricity and water metering and/or sub-metering such that CoV parcels are independently metered and compliance with Energy Performance targets can be monitored.
- b. Any and all substantial building loads for electricity or natural gas should be sub-metered with the meter linked directly to the BMS.
- c. Where a Facility occurs in a mixed-use building, meters and/or sub-meters are to be located in service rooms that are easily accessible to the staff of the Facility.
- d. Provide one electricity meter per unit.
- e. All meters to be connected to DDC and trended for monitoring.

8.2.4 Security Systems (Additional requirements)

Secure access system planning:

- a. Utilize an integrated telephone entry system linking the entrance to each unit, provided with a dedicated telephone line.
- b. Card/fob control to be provided at the parkade entry, the entry to the building and at all common areas.
- c. Card access for individual suites to be considered, based on the Housing type. Operator to provide advice.
- d. Secure access to and from the parking to be addressed to suit the proposed plan for each Building.
 - If the units are accessed by elevator, secure access to the elevator and secure control of the elevator shall be provided through the integrated telephone entry system.

8.3 FIRE AND LIFE SAFETY MEASURES

8.3.2 Security Systems (Additional Requirements)

- a. Coordinate set-up of fire alarm monitoring with the monitoring company of the City's choice - to be confirmed for each Facility.

9 SITE AND LANDSCAPE DESIGN

9.1 LANDSCAPING

9.1.1 General (Revised requirements)

- a. Landscape areas should be designed and built to create a natural and pleasing environment that is sustainable, appropriate to its intended use and easy to maintain
- b. All walking surfaces shall be non-slip.
- c. The use of grass in areas should be considered carefully in high traffic areas.
- d. Plants must be of sufficient size to withstand the use of the area. Plant species should be non-toxic, vigorous and suitable to its site location and climate, and easy to maintain.
- e. At grade, use pervious surfaces wherever possible to minimize storm water run-off.
- f. All growing media to be mushroom-free.
- g. Refer to the Urban Agriculture for the Private Realm Policy.
- h. Edible landscaping is recommended wherever possible.

9.1.2 Landscape Irrigation (Additional requirements)

- a. If irrigation is provided, use high-efficiency irrigation technology.

- b. If irrigation is provided, include irrigation controller as part of DDC system, stand-alone irrigation control system not acceptable.
- c. If irrigation is not provided, hose bibs are to be installed at minimum 15.25 m (50'0") apart.

9.2 WALKWAYS SIDEWALKS AND CURBS (Follow BCH)

9.3 BUILDING SIGNAGE (Follow BCH)

9.4 LIGHTING (Revised requirements)

- a. Exterior lighting is required in outdoor areas, to illuminate entries, exits as required for security.
- b. Exterior lighting to be on timers, with DDC control for oversight and monitoring.
- c. Lighting for common areas and amenity spaces to be on DDC control.
- d. Motion detector lighting is recommended at the entrance, hallways and stairwells and utility spaces within accessibility suites.

9.5 FENCING (Follow BCH)

9.6 RETAINING WALLS (Follow BCH)

10 WHEELCHAIR ACCESSIBLE AND ADAPTABLE DWELLING UNITS

10.1 GENERAL ACCESSIBILITY - Definition and Intent (Replace BCH Guidelines with the following :)

Access or accessible means that a person with disabilities is, without assistance, able to approach, enter, pass to and from, and make use of an area and its facilities.

In addition to the requirements set out in **Section 3.8.of Division B** of the VBBL, **5% of all units must be fully wheelchair accessible.** Depending on a need and demand analysis, the number may increase to accommodate more wheelchair accessible units in the project.

10.2 WHEELCHAIR ACCESSIBLE UNITS

(Follow BCH. Include the Revised and Additional requirements below).

10.2.1 General (Additional and revised requirements)

Reference shall also be made to CSA B651-04 Accessible Design for the Built Environment for design guidelines not covered by the BCH Guidelines or the VBBL.

10.2.2. Circulation (Follow BCH)

10.2.3. Unit Entrance Weather Protection (Follow BCH)

10.2.4. Doors (Revised requirements)

- a. In wheelchair accessible units, all suite interior doors shall have a minimum leaf width of 914 mm (3'-0").
- b. In seniors units, at least one bathroom and one bedroom doors shall have a minimum leaf width of 914 mm (3'-0").
- c. The minimum width of all other interior door leaf and access to common living areas inside the suites must be 914 mm (3'-0").

- d. Follow VBBL for additional requirements in adaptable units.

10.2.5 Windows (Revised requirements)

- e. The normal height is 750mm (29.5”), this may be raised to 900mm (35.4”) in bedrooms.
- f. Note: Opening windows with sills below 1100mm (43”) require a device keeping window openings to less than 100mm (4”).

10.2.6 Kitchen (Additional and revised requirements)

- a. The stove top and sink should be installed on same counter.
- b. Provide a low microwave shelf in all units.
- c. A single sink is acceptable if counter space restriction applies and must be reviewed and approved by the CoV Housing and Facilities staff.
- d. Provide a pull-out sliding shelf with a heat-resistant surface below the wall oven. The shelf could extend over a deep pots and pans drawer below the oven.
- e. Allow for separate stove top and wall oven.
- f. The wall oven should have its controls on the side; the door should be able to be hinged on either side.
- g. Provide a 1828 mm (six-foot) distance between opposing kitchen counters where possible.
- h. Provide pantry space and lower cabinet shelving. Provide a roll out unit with drawers and heat resistant top.
- i. Do not combine microwave and fans in Wheelchair Accessible units.
- j. Locate microwave in base cabinetry or on counter service. To be determined by Operator
- k. Hood fan and light controls to be mounted on side partition or at the back of the counter at 1067 mm or 3-6” AFF.

10.2.7 Bathroom (Additional and revised requirements)

- a. Bathrooms should have plywood backing to four feet behind all walls for the fastening of all grab bars. Grab bars are to be a supplied and installed on a per unit basis according to Section 3.85 of the VBBL.
- b. Roll-in showers are to be provided instead of bathtubs
- c. Provide floor drains in bathrooms.
- d. Where possible, provide clearance on both sides of the toilet.
- e. Where possible, wheelchair accessible units are to be located at grade and face the street or exterior amenity area.
- f. Reduce the number of interior walls where possible.
- g. Ensure there is sufficient clearance around a double bed for mobility.
- l. Provide rough-in at doors for future installation of door operator. Provide separate thumb-turn lock.

10.2.8 Operable Fixtures (Follow BCH)

10.2.9 Storage (Follow BCH)

10.2.10 Clothes Closets (Follow BCH)

10.2.11 Electrical Items (Follow BCH)

10.3 ADAPTABLE UNITS (Replace BCH with the following)

Conform to Section 3.8.of Division B of the VBL: Building Requirements for Persons with Disabilities, Section 3.

Follow the accessibility requirements for multi-family dwellings in Section 3.8.2.27 and 3.8.5 (adaptable housing). <http://former.vancouver.ca/blStorage/10908.PDF>

SECTION 2 - INTEGRATED DESIGN PROCESS

Refer to BC Housing Design Guidelines and Construction Standards

SECTION 3 - ENERGY AND ENVIRONMENTAL DESIGN

Refer to BC Housing Design Guidelines and Construction Standards Section 3 Energy and Environmental Design, plus the following City of Vancouver specific requirements:

LEED® Gold Certification is required by the City of Vancouver for all public buildings, tenant improvements and facilities funded by City capital funds that are new construction and over 500 square meters in area, and in all projects requiring a rezoning application. Refer to the most current LEED® Canada NC, CI, or other appropriate LEED category, Guidebook. As well, the current version of the USGBC LEED® for Homes - Multi-family Midrise for 4 to 12 storey buildings is applicable. Facilities received from other sources should be constructed to the same standard as City-funded facilities. LEED® Gold Certification is mandatory for all housing facilities.

Buildings must be designed to achieve a minimum of 30% reduction in energy consumption compared to the current City of Vancouver Building Bylaw (ASHRAE 90.1 2010 or NECB 2011), and reduce Greenhouse Gas Emissions through the use of low carbon systems.

Provide building forms and design that integrate the concepts and performance standards of the international Passive House standard, including optimized envelope design, optimised building massing and orientation, and the use of low demand equipment to reduce demand on fossil-fuel based energy and reduce greenhouse gas emissions. Mechanical and control systems should be designed to be as simple as possible to reduce maintenance costs and the need for specialized maintenance expertise. Designs should aim to achieve Passive House performance standards, including maximum heating demand of 15 kWh/m²-yr, heat load of 10 W/m², cooling demand of 15kWh/m²-yr and primary energy demand of 120kWh/m²-yr. Refer to the City of Vancouver Passive Design Administrative Bulletins and Toolkits:

<http://vancouver.ca/files/cov/passive-design-large-buildings.pdf>

<http://former.vancouver.ca/commsvcs/BYLAWS/bulletin/P009.pdf>

A preliminary energy modelling exercise must be undertaken during the preliminary design stage to evaluate options for design of the building envelope, mechanical and electrical systems, and energy conservation measures (ECMs) which meet or exceed the City's energy performance target and make the most sense for the project based on energy and GHG savings, financial impact and ease of maintenance.

Environmental and Health Product Declaration

- a. LEED Version 4 - Material and Resource Credit is a mandatory credit and must be achieved for all housing projects.
- b. The Health Product Declaration (HPD), the new industry initiative and standard format for full transparency for human toxicity and eco-toxicity impacts is encouraged for finishing materials utilized within housing units. Refer to the Design Section 1.7. and Construction Standards Section 5, Division 9 within the guidelines. For further information, please refer to; www.hpdcollaborative.org/

SECTION 4 - CRIME PREVENTION THROUGH ENVIRONMENTAL DESIGN

Refer to BC Housing Design Guidelines and Construction Standards

SECTION 5 - CONSTRUCTION STANDARDS

GUARANTEES AND WARRANTIES

- a. In general, guaranties and warranties are to be provided per the industry standard.
- b. Typical warranty to be 24 months for defects in materials and workmanship, 5 years for defects in building envelope, and 10 years for structural defects.
- c. Extended guarantees and warranties required as noted in each section below as applicable.
- d. Where extended guarantees and warranties are provided, the certificates shall be issued to the City of Vancouver.

INTRODUCTION TO CONSTRUCTION STANDARDS

Refer to and follow the BC Housing Design Guidelines and Construction Standards - Sections, subsections and divisions except where noted in the following guideline.

Division 1 - General Requirements

Refer to BC Housing Design Guidelines and Construction Standards

Division 2 - Site Construction

Refer to BC Housing Design Guidelines and Construction Standards

Division 3 - Concrete

Refer to BC Housing Design Guidelines and Construction Standards

Division 4 - Masonry

Refer to BC Housing Design Guidelines and Construction Standards

Division 5 - Metal Fabrications

Refer to BC Housing Design Guidelines and Construction Standards

Division 6 - Wood and Plastics

06100 - Rough Carpentry

Refer to BC Housing Design Guidelines and Construction Standards

06200 - Finish Carpentry

Refer to BC Housing Design Guidelines and Construction Standards

06400 - Millwork

In addition to BC Housing Design Guidelines and Construction Standards:

Construction / Quality for common laundry, kitchens and amenity spaces:

- a. To be in accordance with “Custom Grade” as defined in the latest edition of the “Quality Standards for Architectural Woodwork” as published by AWMAC (Architectural Woodwork Manufacturers Association of Canada), except as noted below.
- b. AWMAC Guarantee to be provided.
- c. Inspection to be provided by an appointed inspector, approved by AWMABC (BC Chapter of AWMAC).
- d. All materials to be formaldehyde free.
- e. Use wood certified in accordance with the Forest Stewardship Council’s (FSC) Principles and Criteria or CSA certified material.
- f. Use marine grade plywood for countertops and cabinetry doors, drawers, fronts, skirts and gables surrounding basins, sinks, and dishwashers.
- g. Use adhesives and sealants that have low VOC levels per the LEED[®] requirements listed under credit 4.1 “Low-Emitting Materials, Adhesives and Sealants”.
- h. Hardware:
 - All hardware to be commercial grade.
 - Hinges: Blum or Mepla, 110° opening, or pre-approved equal.
 - System screw mounting plates required at all hinges.
 - Drawers:
 - Up to 150mm (6") deep - Blum or Mepla 3/4 extension slide or pre-approved equal.
 - Over 150mm (6") - KV or Accuride full extension slides or pre-approved equal.
 - Pulls: Richelieu 33205 Brushed D or similar easy to grab handle that is a pre-approved equal
 - Standards: to be steel, adjustable on 12mm (1/2") centres, flush with cabinet side wall face.
 - Shelf clips: to be compatible with the standards, and to allow for shelves to be mechanically fastened to support bracket.
 - Locks: Corbin 0737 & 0738 with #75 Strike or pre-approved alternate.

Division 7 - Thermal and Moisture Protection

Refer to BC Housing Design Guidelines and Construction Standards except for the following modifications and additions:

07500 - Low Slope Membrane Roofing -

The following requirements are in addition to and/or replace the requirements contained in the roofing sections of BC Housing Design Guidelines and Construction Standards:

- a. Provide a minimum ten (10) year Roofing Contractors Association of British Columbia (RCABC) Guarantee.
- b. Provide roof edge safety barriers, roof anchors, and fall protection in accordance with the VBBL and with Work Safe BC requirements.

Specifically, for fall protection, each project should be assessed for where and how often parts of the roof may be accessed. If all or most servicing of roof areas can occur 13 feet from the edge (control zone plus buffer zone distance) there is less need for roof edge safety barriers. If areas needing servicing are located near roof edges, then we need to consider what method of fall protection is required in consultation with CoV OHS, Environmental, and Maintenance staff.

07555 - Green Roofing

- a. Where an extensive green roof is provided it must:
 - Be easily removable (i.e. modular) to assist with maintenance access to the roof membrane and assembly below.
 - Require minimal maintenance for weeding, fertilizing and plant replacement
 - Not require irrigation. Temporary irrigation may be set up for the first year only (but a permanent hose bib is required at the roof).
 - Be self-sustaining
 - Proposed system to be reviewed with Facilities for quality and suitability
- b. Where an extensive or intensive green roof occurs (including roof top playgrounds), a leak detection system must be provided. This system must:
 - Be reviewed with the City of Vancouver’s Facility Operations and Maintenance staff. All specifications and details of the proposed system are to be provided for review and approval prior to proceeding.
 - Have a non-proprietary monitoring system.
 - Be compatible with, and actively connected to, the City’s central DDC system to allow remote monitoring of any signals or alarms.
- c. Drainage from above-grade landscaped areas:
 - Drains to be bi-level, to drain both surface and roof waterproofing membrane
 - Both surface and waterproofing membrane must be sloped to drains.

Division 8 - Doors and Windows

Refer to BC Housing Design Guidelines and Construction Standards, except for the following modifications and additions:

08500 - Windows

The following requirements are in addition to and/or replace the requirements contained in the window sections of BC Housing Design Guidelines and Construction Standards:

- a. All exterior windows, doors and other openings design and installation to be reviewed by the Building Envelope Consultant for the project. All operable vents to be:
 - Either casement, awning or hopper type, sliders are not acceptable
 - Limited to a maximum opening of 100mm (4”) where accessible by children.
 - To have easy to grip locking mechanisms - lever type.
- b. The requirement for Low-E coatings on glazing will be determined by the overall energy requirements for the buildings. Mitigate unwanted solar gain with external shading.
- c. Use glass systems with good insulating values (low U-value) and thermal breaks.
- d. Screens are not required.

08700 - Finish Hardware

The following requirements are in addition to and/or replace the requirements contained in the window sections of BC Housing Design Guidelines and Construction Standards:

- a. All hardware at exterior doors, common areas, and suite entries to be commercial grade.
- b. All hardware to meet accessibility requirements.
- c. Locks: Key requirements are to be provided by the Operator. In lieu the following is the guideline:
 - Key fobs are preferred for common areas in lieu of mechanical locks.
 - Individual units are to be keyed (no security chain latch).
 - Storage rooms and Laundry rooms may have mechanical locks with storeroom function.
 - Key fobs may be considered for units as per operator’s preference .

Division 9 - Finishes

Refer to BC Housing Design Guidelines and Construction Standards, except for the following modifications and additions:

Refer to **Section 1.3 - Energy Performance**. LEED Version 4 - Material and Resource Credit is a mandatory credit and must be achieved for all housing projects.

Health Product Declarations are encouraged for finishing materials utilized within housing units.

09280- Gypsum Wallboard

The following requirements are in addition to and/or replace the requirements contained in the gypsum wallboard sections of BC Housing Design Guidelines and Construction Standards:

Partitions, acoustic measures:

- a. Acoustical insulating tape and strips, as required by wall assembly to meet required STC ratings.
- b. Acoustical sealant, non-hardening, as required by wall assembly to meet required STC ratings.
- c. Acoustical insulation, as required by wall assembly to meet required STC ratings. At party walls between the Building and any neighbours, an STC rating of 65 is to be achieved.
- d. At party walls between units, an STC rating of 55 is to be achieved.
- e. All interior wall assemblies, including wall sheathing must extend full height to the underside of the above floor assembly.
- f. Any penetrations through wall assemblies for mechanical ducting to be acoustically sealed.
- g. Provide adequate blocking inside walls at all millwork locations, grab-bar locations, and at wall-mounted door stops.
- h. Utilize DensShield backer board behind all tubs to 1524 mm (5'0" AFF).
- i. Shower and bath surrounds to be tile or acrylic.
- j. Abuse resistant wallboard is required in corridors, amenity spaces, up to 1219 mm (4'-0") A.F.F.

Wall assemblies for Heat Treatment rooms: **Refer to Section 5 - Construction standards, Division 13030 - Heat treatment Room, and Technical Bulletin #29**, Heat Treatment Room for Bed Bugs, Design and Construction Standards published in the B.C. Housing website. www.bchousing.org

09650 - Resilient Flooring

The following requirements are in addition to and/or replace the requirements contained in the resilient flooring sections of BC Housing Design Guidelines and Construction Standards:

Resilient (smooth, non-absorbent, non-slip and washable) flooring requirements:

- a. Resilient flooring installation to be in accordance with the recommendations of the National Floor Covering Association as detailed in their "Floor Covering Specification Manual" as issued by the BC Floor Covering Association
- b. Installation to be in accordance with the manufacturers specifications.
- c. Refer to Design Section 8.2.4 for locations where resilient flooring, ceramic tile and carpet is acceptable for use.
- d. Use adhesives and sealants that have low VOC levels per LEED® requirements listed under credit 4.1 "Low-Emitting Materials, Adhesives and Sealants".
- e. Maximize recycled content if applicable .
- f. Maximize natural material content if applicable.
- g. All edges to be sealed.
- h. All seams of sheet goods to be fully welded.
- i. If resilient floor tiles are to be used, they are to be:
 - 0.25% dimensionally stable to minimize joint size.
 - 2mm thick or 0.11" minimum.

- j. Provide an additional 5% of resilient flooring material of the same production run as installed for future maintenance requirements. Provide sheet materials in full roll width by the length required.
- k. Resilient flooring installer to guarantee in writing the installation of the flooring material for two (2) years against loose fitting, breaking of seams, breaking away from the sub-base or any other installation defect.
- l. Provide a minimum five (5) year guarantee that the resilient flooring will provide the specified level of appearance and wear, subject to proper care and maintenance. Follow manufactures specifications for installation and maintenance.
- m. Provide the Operator and Facilities with a maintenance manual with instructions and care of the product as specified by the manufacturer.

Linoleum specification:

- n. Ensure that the linoleum product specified is an occupancy ready “ready to use” product with a built in high performance finish which requires no initial maintenance or polymer application.
- o. Platinum Certified linoleum in accordance with SMarT Sustainable Products Standard is preferred.
- p. Linoleum is to have a renewable topcoat. No Polyurethane (PUR) coating permitted.

Vinyl specification:

- q. Homogeneous sheet vinyl with heat welded seams.

Concrete flooring specification:

Polished and sealed concrete flooring may be accepted as a flooring finish upon approval of Housing and Facilities. A mock-up should be provided prior to the first exposed floor slab being poured. See specifications and requirements below:

The following precautions to protect the slab should be considered;

- r. Ensure the concrete mix is designed to provide the necessary material to withstand minor damage and provide a durable surface for grinding, polishing and sealing.
- s. Enforce strict quality control of the poured slab during the construction phase; including adequate curing procedures; no fired-in bracing supports, no storage of equipment and materials on the slab; temporary heavy-duty polyethylene sheet, protection board or cardboard can be used to off-set any staining from liquid type materials.
- t. Grinding and polishing processes to the required degree without exposing the aggregate (unless some degree of aggregate exposure is desirable).

Concrete Finishing:

- u. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. surface should have a uniform, smooth, granular texture.
- v. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and re-straighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings. Finish surfaces to the following tolerances using the F-number method per CSA A23.1, unless noted otherwise or accepted prior to commencement of Work by Consultants.

Grinding & Polishing:

- w. Finishing of concrete slabs shall comply with CAN3-A23.1-M94, Section 13 and with tolerances indicated for Class A. Lightly sand floors to receive sealer and polish concrete floors where scheduled.
- x. Sealed Floor Finish (Applied Liquid): Apply two (2) coats of liquid sealer as specified to floors and stairs as scheduled; using recommended coverage rate, in strict compliance with the manufacturer's recommendations.

Applied Surface Treatments;

- y. Mock-ups on site should be required before application of any applied finishes to completed floor slabs.

09680- Carpet

The following requirements are in addition to and/or replace the requirements contained in the carpet sections of BC Housing Design Guidelines and Construction Standards:

- a. Use adhesives and sealants that have low VOC levels per LEED® requirements listed under credit 4.1 “Low-Emitting Materials, Adhesives and Sealants”.
- b. Maximize recycled content and end-of-life recyclability.
- c. Carpet systems must meet or exceed the Carpet and Rug Institute’s Green Label Plus testing and product requirements per LEED® requirements listed under credit 4.3 “Low-Emitting Materials, Carpet Systems”.
- d. Underpad, if required, acceptable product: 9mm (1/4”) Duracushion, or pre-approved alternate.
- e. The carpet pattern must be integrated, not applied.
- f. Carpet may be broadloom or carpet tile.
- g. Carpet to be solution dyed nylon, level loop construction, pile weight 882g/m2 (26 oz./yd2) minimum if broadloom), or 610g/m2 (18 oz./yd2) minimum if carpet tile.
- h. All edges to be sealed.
- i. Provide 5% extra of carpet of the same dye lot as installed for future maintenance requirements.
- j. Carpet installer to guarantee in writing the installation of the carpet for one (1) year against loose fitting, breaking of seams, breaking away from the sub-base or any other installation defect.
- k. Carpet manufacturer to provide a ten (10) year guarantee that the carpet shall retain 90% or more of its pile fibre. The guarantee shall also cover against defects of zippering, unravelling, colour fading, deterioration and delamination of backing materials, pulls, piling, matting, shedding or any other manufacturing defect.
- l. Polypropylene Olefin is not acceptable.

09720- Wall Coverings

Common corridors and amenity spaces may have wall protection to a minimum of 800mm (3’0”) AFF. To be determined by Housing and the operator. Top edges and corners of wall protection material to be in turn protected (details to be provided for review). Acceptable materials:

- a. Vinyl-acrylic sheet material (PVC-free) such as Acrovyn or pre-approved alternate.
- b. Sheet Flooring.
- c. Pre-approved alternate.

09910- Painting

The following requirements are in addition to and/or replace the requirements contained in the

painting sections of BC Housing Design Guidelines and Construction Standards:

Paint: painting and finishing to be to the “Premium Grade” Master Painter and Decoration Association Recommendations and Standards; products to be MPI approved Institutional Low Odour VOC quality paint.

- a. Provide a two (2) year MPI Guarantee or 100% two (2) year Maintenance bond both in accordance with MPI Painting Specification Manual requirements.
- b. All painting work to be inspected by a Paint Agency Inspector acceptable to the specifying authority and the operator.
- c. Provide documentation that the MPI approved Institutional Low Odour VOC quality paint is being used.
- d. All surfaces, including those to be covered with wall vinyl, to have one coat of Hi-hide sealer primer to suit surface.
- e. Apply three finish coats and additional coats to cover as required.
- f. Paint to be sprayed or rolled on, completely dried and sanded between coats and finished to a smooth surface without streaks or marks.
- g. Gloss levels:
 - Kitchens, washrooms, laundry and janitor’s room walls and ceilings to be G5 (semi-gloss).
 - Painted doors and door frames to be G5 (semi-gloss).
 - All other surfaces to be either G5 (semi-gloss), G4 (satin), or G3 (eggshell) as required for the particular Facility.
 - G1 and G2 (matte) finishes are not acceptable.

Division 10 - Specialties

Refer to BC Housing Design Guidelines and Construction Standards, except for the following modifications and additions:

102819 - Plastic Laminate Tub Enclosure

Refer to BC Housing Design Guidelines and Construction Standards

10400 - Identification Devices

- a. To conform to requirements for disabled persons.
- b. For amenity spaces, follow the recommendations in the report “Building a Path to Parks & Recreation for All”, prepared by the Trans* and Gender Variant Inclusion (TGVI) Working
- c. Group. http://former.vancouver.ca/parks/board/2014/140428/documents/SUMMARY_TGVI-Working-Group_report_Building-a-Path-or-All_2014-04-28.pdf
- d. Ensure signage is provided for the following:
 - Building identification
 - To indicate the building entrance.
 - At dedicated parking stalls.
 - For all necessary way-finding.
 - At common amenity rooms, washrooms, laundry rooms and service rooms.
 - Numbering of individual units
 - Provide any signage required for the Building, including fire and life safety plans.

Division 11 - Equipment

Refer to BC Housing Design Guidelines and Construction Standards, except for the following modifications and additions:

11300 - Residential Equipment

- a. All appliances to be “Energy Star” where “Energy Star” has that appliance category;
- b. Provide minimum one (1) year warranty on all appliances;
- c. Refrigerator: 21.5 cubic feet frost-free, with freezer compartment in all one, two and three bedroom units ;
- d. While the above is also recommended for a studio, flexibility will be permitted to allow for a 12 cubic foot, frost-free, with freezer compartment in studio units;
- e. Stove with oven: 760mm (30”) wide, with 4 burners;
- f. While a 30” wide range is recommended , flexibility is permitted to allow for a 24”wide, 675mm stove with oven: with 4 burners in studio units;
- g. Front-loading, stainless steel interior, , dishwashers should be included in every unit that is 2 bedrooms or more, minimum 24” wide - built- in under counter. Provide the lowest price unit by any manufacturer as per EPA standard or better: Annual Energy use per year (kWh/yr): 275 or better, Water use gallons per cycle: 4 or better.
<http://www.energystar.gov/productfinder/product/certified-residential-dishwashers>
- h. In studio and one bedroom apartments where dishwashers are provided, units can be compact 18” units.
- i. Washer/dryer in common laundry rooms to be commercial grade.
- j. Hood fans - refer to BCH for specifications.

Division 12 - Furnishings

Refer to BC Housing Design Guidelines and Construction Standards, except for the following modifications and additions:

12320 - Manufactured Wood Casework

Refer to BC Housing Design Guidelines and Construction Standards expect as follows.

Construction / Quality standards for unit kitchens bathrooms and vanities:

- a. Use wood certified in accordance with the Forest Stewardship Council’s (FSC) Principles and Criteria or CSA certified material.
- b. All materials to be formaldehyde free.
- c. Use adhesives and sealants that have low VOC levels per the LEED® requirements listed under credit 4.1 “Low-Emitting Materials, Adhesives and Sealants”.
- d. Use marine grade plywood for countertops and cabinetry doors, drawers, fronts, skirts and gables surrounding basins, sinks, and dishwashers.
- e. Hardware:
 - All hardware to be commercial grade.
 - Hinges: Blum or Mepla, 110° opening, or pre-approved equal.
 - System screw mounting plates required at all hinges.
 - Drawers:
 - Up to 150mm (6”) deep - Blum or Mepla 3/4 extension slide or pre-approved equal.
 - Over 150mm (6”) - KV or Accuride full extension slides or pre-approved equal.
 - Pulls: Richelieu 33205 Brushed D or similar easy to grab handle that is a pre-approved equal.
 - Standards: to be steel, adjustable on 12mm (1/2”) centres, surface mounted or drilled pin supports.
 - Locks: Corbin 0737 & 0738 with #75 Strike or pre-approved alternate.

Countertops:

- f. 19mm high density particle board post-formed with backer under unsupported spans over 914mm, except, all counters with sinks shall be water-resistant plywood core.
- g. Acceptable materials: plastic laminate (post-formed edges) or pre-approved alternate.
- h. On island counters full wrap plastic laminate front and back.
- i. Use T-mold banding on side edges of counter.

Backsplashes:

- j. Follow BCH standards.
- k. Gypsum board with paint finish or vinyl wall covering not acceptable.
- l. Acceptable materials: plastic laminate (post-formed), ceramic tile, glass or other pre-approved alternate.

12200 - Window Treatment

Refer to BC Housing Design Guidelines and Construction Standards expect as follows.

- a. Roller shades may also be considered as a window treatment. Shades to be chain-operated, chains to be metal.
- b. All chains and chords for blinds in amenity areas where children may have access to be secured either out of children's reach or such that they do not hang free.

Division 13 - Special Construction

13200 Heat Treatment Room

Refer to BC Housing Design Guidelines and Construction Standards.

Division 14 - Conveying Systems

Refer to BC Housing Design Guidelines and Construction Standards, except for the following modifications and additions:

14200 Elevators

- a. The elevator controllers shall be non-proprietary allowing 3rd party maintenance to adjust or troubleshoot fault codes and be designed so that it can be included in the City of Vancouver elevator maintenance program.
- b. The suitability of the proposed controller products will be determined based on the proprietary nature of the equipment, degree of site programmability, track record on previous installations and the experience of local personnel with the product proposed.
- c. Pre-approved controller products: Motion Control Engineering (MCE) Model PTC-AC, or pre-approved alternate.

Division 21 - Fire Protection

Refer to BC Housing Design Guidelines and Construction Standards, except for the following modifications and additions:

Division 22- Plumbing

1 General

.4 POTABLE WATER SYSTEMS

.5 Irrigation Systems:

- a. If irrigation is provided, use high-efficiency irrigation technology
- b. If irrigation is provided, include irrigation controller as part of DDC system, stand-alone irrigation control system is not acceptable.

.12 Hose bibs:

- a. Hose bibs to be provided:
 - in each outdoor area
 - if the building has a dedicated garbage room, a hose bib (and floor drain) is to be provided there as well
 - at any condensing units
 - at any green roofs
- b. Hose bibs also to be vandal proof when they occur at grade or at any location that is accessible to the public.
- c. Hose bibs are to be recessed if they occur in children's outdoor play areas.
- d. If irrigation is not provided for landscaped areas, provide hose bibs at minimum 15.25m (50'0") apart.

.6 DRAINAGE SYSTEMS

- a. All drains in outdoor areas where children's play areas and/or urban agriculture are located, especially if they are also roof drains, to have sediment traps. Type and style of trap to be confirmed with the City of Vancouver for each Building.
 - Traps to be accessible for clean-out.
 - If there is not sufficient head room in the space below for a sediment trap, then at minimum provide a wye 45 degree elbow complete with clean-out access. Review with the City of Vancouver for each Building.
- b. All drains at hard-scaped out door areas to be bi-level.

2 Products

.2 FIXTURES

- a. All faucets to have aerators for water conservation.
- b. Each plumbing fixture to have its own shut-off valve.

.5 DOMESTIC HOT WATER SYSTEMS

- a. All hot water tanks to:
 - Be seismically secured
 - Have drain/leak pans installed and piped to drain.

Division 23 - Heating Ventilation and Air Conditioning

2 Products

.5 SUITE VENTILATION

- a. All rooms to be adequately ventilated to remove odours, especially common areas and washroom areas. Follow BC Housing: Section 5 - Construction standards, Division 15500-5 Suite Ventilation.
 - Central ventilation supply and central exhaust system with heat recovery for suites is required. Where floor space is extremely tight for vertical shaft placement, consider one

vertical shaft in a central location with horizontal branches. Horizontal branches to be considered carefully so not to reduce the ceiling height below 8'0" clear unless absolutely necessary.

- As per the LEED prerequisite EQp1 for Minimum Air Quality Performance, the project must meet the requirements of ASHRAE 62.1-2007, which requires that outdoor air must be supplied or distributed to the breathing zone in the occupiable space or spaces within a ventilation zone. This means that each individual occupiable space requires the supply or delivery of outdoor air. The use of suite door undercuts for supply of ventilation air to suites is not preferred.
- The use of individual bathroom exhaust fans for general building exhaust is not accepted.

VENTILATION - GENERAL

- b. All air intakes to be located away from sources of fumes or dust.
- c. Equipment to be easily accessible for maintenance. For example, filters and remote condensing units shall be accessible without the use of temporary scaffolding or Genie Lift type equipment. Install permanent cat walks for access and utilize best practices for fall arrest if required for service access. Units shall not be located over parking stalls. Wherever possible, equipment should be installed in a location that does not require fall arrest.
- d. If a shared kitchen is provided as an amenity, kitchen ventilation to be provided to suit Class 1, Class 2, Class 3, Class 4, or Class 5 type cooking, as applicable. Refer to per the City of Vancouver's Kitchen Ventilation Systems bulletin.
<http://former.vancouver.ca/commsvcs/LICANDINSP/bulletins/2007/2007-005.pdf>

CONTROLS

- a. Controls to be DDC and to have internet access. Manufactures to be:
 - Delta Controls (installed by ESC Automation) or
 - Reliable Controls (installed by Control Solutions, Houle Controls or Fraser Valley Controls).
- b. Each major room (e.g. amenity space) is to be controlled individually.
- c. Perimeter to be on separate zones if the layout of spaces / windows creates problem areas.
- d. The requirement for thermostats is specific to the space and how the space is used. If thermostats are not required, sensors should be installed.
- e. Refer also to Landscape (irrigation controls), Roofing (leak detections system monitoring), Metering and Lighting Controls sections for other items to be on DDC.
- f. Refer to Section 5.0 Appendix 1 "Guideline for DDC Specifications for New Projects for the City of Vancouver Rev. 1" for more details.

3 Execution

- a. Any rooftop units to be on sound isolation pads.

.7 Submittals and close out:

- b. Provide equipment demonstrations to City staff and /or the Operator prior to turn-over.
- c. Provide operations and maintenance manuals complete with maintenance schedules.

Division 26 - Electrical

Refer to BC Housing Design Guidelines and Construction Standards, except for the following modifications and additions:

26000 - General Electrical Provisions

2 Products & Installation

.4 WIRING METHODS

- a. Wiring to be copper. Aluminum alloy may be considered if the specification is pre-approved by CoV Facilities.

.6 LIGHTING

- b. Minimize bulb types for each facility: no more than six (6) different types of interior bulbs will be allowed and no more than three (3) different types of exterior bulbs will be allowed
- a. Halogens and compact fluorescent are not acceptable
- b. In common areas, LED is preferred, fluorescent types T5 or T8 are acceptable.
- c. Fixtures in suites to be LED, with easily replaceable LED lamps and ballasts.
- d. Controls - Refer to Design section and Appendix A for DDC section.

Division 27 - Communications

27000 - Communications

1 General

.1 TELECOMMUNICATIONS CABLE PLANT

.7 Telecommunications Cabling

- a. Resident Suites: Provide a minimum of one jack in each living room and each bedroom room.
- b. Minimum data outlets required: three (3) per unit, two (2) in the Operator's office.
Provide one (1) with fixed IP address for DDC controls. This may be located in the office, or in the mechanical room where the controls are located provided there is sufficient space for a person to work in a lap-top in the room.

3 Security System

Confirm if access equipment must be compatible with the City of Vancouver standards. If it does, acceptable product:

- Keyscan System Vantage

SECTION 6 - DRAWING AND DOCUMENT REQUIREMENTS

Refer to BC Housing Design Guidelines and Construction Standards

SECTION 7 - INSPECTION STANDARDS

Refer to BC Housing Design Guidelines and Construction Standards. (Sample reports are not required)

Appendix A - DDC SPECIFICATIONS

Guideline for DDC Specifications for New Projects for the City of Vancouver

General:

- DDC System must be Reliable or Delta Controls
- Every building is to have an outdoor air sensor on the North side of the building. The effects of the sun warming the other 3 sides of the building can produce unacceptable temperature errors. If the North side is not available, the sensor can be mounted on the North side of a unit with a sun shield. Depending on the size and layout of the building more than one sensor may be required. Sensors to be mounted away from exhaust fans, doors and anything else that can affect the temperature readings.
- CO2 sensor required for each air handling/roof top unit. CO2 sensors will regulate the amount of fresh air entering the space (set the minimum position for outdoor/mixed/return air dampers). Wall mounted sensors are recommended because duct mounted sensors provide more of an average rather than CO2 levels in individual areas.
- All controllers to be networked together unless otherwise specified. All controllers to be clearly labelled and easy to locate in the space.
- Detailed network layout with panel locations, network/circuit numbers to be provided by the controls contractor
- Night setback/setup to be used for energy conservation during unoccupied hours.

Programming:

- All equipment with status to be placed in a runtime log
 - E.g. - RTU1_Status = switch(RTU1_Status , RTU1_Amps , 0.5 , 1)
 - Heating / cooling should not be able to run if there is no fan status
- All analog points to be trended.
- All digital points to have runtime trends
- All outputs to have individual program
 - Only turn the output on once in a program - use local variables if necessary

Graphics:

- All graphics are to show the outdoor air temperature
- Navigation around the site should be clear.
- Summarizes all the units and gives a quick overview of any problems in the space. Hotlinks from this page will take the end-user to any mechanical unit.
- A summary page for easy identification of problems is required i.e. a table showing useful information regarding mechanical equipment.
- Floor plans to show thermostat/CO2 locations. Color code zones for easy identification of zoning. Show ductwork if available. Hotlinks to access any mechanical equipment.

Graphic to indicate:

- Room temperature and set point
- CO2 levels and set point
- Runtime for all mechanical equipment. Runtime to be based on actual status and not the output
- Link for trend logs for all analog equipment
- Set points/trend logs to be in different colour
- Information table on bottom left hand corner

- Any other useful information to help the end user.
- Fans, pumps and any other equipment with status should indicate with color the status;
- Green = on
 - grey = off
 - red = alarm
- Any global variables used should be shown on a separate graphic

Commissioning

- Report from controls contractor
- Full sequence of operations and operations of unit verified by COV
- Any deficiencies dealt with in a timely manor
- Panels labelled- controller addresses and name
- Network/power layout
- Circuit, panel numbers and locations
- Locations of all DDC controllers
- As-built documentation from controls contractor
- IP information for controllers clearly identified

Rooftop Unit (RTU)

Inputs:

- Analog current sensor for fan - supply and return
- Analog current sensor for condensing unit
- Supply, return and mixed air temperature sensor. Mixed sensor to be an averaging style. Mixed air sensor is not mandatory.
- If VFD's are present - Feedback and alarm
- CO2 sensor - as indicated above.
- Room Sensor - with set point adjustment and override capability - depending on location set point adjustment may not be required on all space sensors

Outputs:

- Start/Stop for fan - supply and return
- Cooling enable - could be condensing unit or cooling valve
- Heating enable - could be gas, heating valve or electric duct heater
- Outdoor air dampers - exhaust, mixed and outdoor can be all on one output
- If VFD's are present - enable and speed control

Heat Pump

Inputs:

- Analog current sensor for fan
- Analog current sensor for condensing unit
- Supply air sensor
- Room Sensor - with set point adjustment and override capability - depending on location set point adjustment may not be required on all space sensors

Outputs:

- Start/Stop for fan
- Condensing unit
- Heating enable -electric duct heater - first stage heating provided by the condensing unit
- Reversing valve if condensing unit to be used for heating and cooling

Fan Coil

Inputs:

- Analog current sensor for fan
- Supply air sensor
- Room Sensor - with set point adjustment and override capability - depending on location set point adjustment may not be required on all space sensors

Outputs:

- Start/Stop for fan
- Heating enable -heating valve, electric duct heater or condensing unit
- Cooling enable - cooling valve or condensing unit

Heating System

Inputs:

- Hot water supply/return
- Analog current sensor for pumps
- Boiler status -temperature sensor for each boiler if more than one and feedback from boiler
- Outdoor air sensor
- If VFD's present - feedback and alarm

Outputs:

- Boiler enable
- Boiler pump enable
- Supply pump enable
- Boiler reset - based on demand and outdoor air
- Heating valves - if present

Chiller - Evaporator side

Inputs:

- Chilled water supply/return
- Status
- Alarm
- Analog current sensor for pumps

Outputs:

- Enable
- Reset
- Pump control
- Valve Control

Chiller - Condenser side

Inputs:

- Condenser water supply/return
- Cooling tower fan status
- Analog current sensor for pumps
- Feedback and alarm if VFD present

Outputs:

- Pump control
- Cooling tower fan - speed control if present
- Spray pump/damper if present

- Valve Control

Exhaust Fans:

Inputs:

- Analog current sensor for fan

Outputs:

- Fan start/stop

BACnet:

- All components must be native BACnet and must supply protocol implementation conformance statements. BACnet must connect to the BMS (Reliable or Delta Controls), communicate on 47806 and/or 47808 (port must be interchangeable) and have BACnet over IP integration.

VRF System:

- Must be native BACnet.

Appendix B - REDUCING AIR LEAKAGE BETWEEN SUITES

Refer to BC Housing Design Guidelines and Construction Standards