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BC HOUSING

Modular Design Guidelines

Rapid Responses to Homelessness Program

BC HOUSING

BRITISH COLUMBIA

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1.1 OVERVIEW

The BC Housing Modular Design Guidelines are intended to guide the development of plans and specifications for housing projects that use modular, pre-manufactured units that can be built within a reasonably short time frame to meet the housing needs of street and sheltered homeless across the Province of BC.

Depending on the need within a community, housing that will be delivered through this program will consist of self-contained housing units with supports, multi-bed emergency shelter units or a combination of both. The design and functional programme will be defined for each project by BC Housing and other stakeholders involved in the project.

All modular projects will be developed on land permitted for this use. It is expected that the modular building process will result in a shorter, accelerated construction period to deliver housing that is permanent and at least equivalent in-service life to that of conventional stick frame buildings.

For temporary modular projects the building process should allow this form of housing to be demountable and relocatable from one site to another as future requirements dictate. Although temporary in a specific location, these modular structures shall be designed to meet the construction requirements and standards of Authorities Having Jurisdiction and BC Housing, and shall have the resiliency and durability to be moved a minimum of 3 to 4 times during their service life.

Housing delivered under this programme shall be robust and capable of meeting the demanding needs of this client group; refer to BC Housing's Emergency Shelter Design Guidelines. The BC Modular Design Guidelines complement the BC Housing Design Guidelines and Construction Standards, which must be complied with as plans and specifications are developed.

Design requirements may vary depending on available sites, housing needs and climate zone.

1.2 BUILDING DESIGN

.1 BUILDING USERS

These guidelines are intended for the more vulnerable clients on BC Housing's housing continuum. The expected occupants will be street homeless as well as those who are already in existing shelters. This housing model will provide support to those in the self-contained units as they transition into permanent housing as well 24-hour staffing support to the occupants of the shelter, if included as part of the building programme.

Building management and tenant support will be provided through non-profit housing operators. Health care for shelter residents will be provided in coordination with the neighborhood health services programs of the local health authority.

.2 BUILDING FORMS

Acceptable building forms are:

.1 Walk-up apartments up to 3 storeys.

.2 Four to six storey apartments; provision for elevators shall be confirmed by BC Housing on a project specific basis.

.3 TYPICAL BUILDING PROGRAMME

Develop the following minimum requirements. Actual functional requirements for each project will be confirmed by BC Housing:

.1 Project Size: The size of the project will be typically 40 to 50 living units per project. However, this may vary depending on the actual need and existing resources within the community.

.2 Unit Design: The type of living units will consist of either self-contained studios, shelter accommodations or a combination of both.

.a Self-contained Studio Units – 30 - 33 sq.m (320 - 350 sq.ft): intended for single occupant. Provide the following:

.i Kitchen: 2 burner cook top with exhaust hood, single bowl sink with overflow feature, apartment size fridge, microwave shelf and outlet.

.ii Bathroom: a sink with minimum 610 mm (24") wide counter, water closet, with bolt down lid, one price acrylic pre-fabricated shower units with rod and curtain, medicine cabinet with mirror, floor drain, solidly-backed towel bar, paper towel holder, robe hook.

.iii Eating Area: a dining space for a table and two chairs.

.iv Sleeping Area: space for a single bed, and 1 nightstand.

.v Living area: sitting space for an easy chair, 1 heavy duty dresser, and TV/cable/data outlet. Allow clearances at sides when furniture is set up.

.b Emergency Shelter Units: Either single occupant or multi-bed accommodations with shared or common bathrooms. Refer to BC Housing Design Guidelines and Construction Standards for room dimensions. For multi-bed configuration, provide a locker and small side table, and durable wall mounted light fixture, for each bed.

.c Wheelchair Accessible Units: At least 5% of the totoal units/beds shall be accdssible and located on the ground floor. Refer to Article 1.5 Accessibility Requirements.

.3 Common and Amenity Spaces: Provide the following:

.a Secured entrance – Provide with double entrance doors and vestibule. Both doors shall be separately electronically controlled from front office/reception by 24/7 staff. Millwork for a transaction counter and fixed glass in the vestibule area, and fixed glass panel and a dutch door between the reception and entry lobby.

.b Offices

.i Front office/reception with oversight of street, main entry, elevator (if provided) and amenity spaces. Provide millwork for a transaction counter and space for minimum 2 desks and 2 office chairs.

.ii Manager's office with 1 standard office desk, 1 office chair and 2 visitor chairs.

.iii Tenant support worker office/counselling room with 1 standard office desk, 1 office chair, 2 visitor chairs and 1 coffee table.

.iv Staff room with washroom. Provide millwork with sink, bar fridge and microwave shelf. Minimum 1 dining table with 4 chairs and lockers for minimum 4 staffs.

.c Common dining room for tenants – Provide seating for minimum 75% of the residents. Allow a counter with sink and space for microwave and coffee station. Provide set of dining tables (heavy duty, commercial grade steel frame) with chairs of 4 people.

.d Commercial kitchen and storage pantry – Shall be Class 1 cooking operations. Provide with receiving/ loading area. Refer to Appendix 2: Commercial Kitchen for equipment, finishes, commercial kitchen hood, fire suppression and pantry shelving. Provide slip-resistant resilient sheet vinyl flooring with integral flash cove and floor drain with trap primer.

.e Lounge or multi-purpose activity space – This can be used for programmed activities. Provide space for at least 30% of the total unit/bed count. Provide commercial grade, individual lounge chairs, 2 commercial grade wood side tables, electric and cable outlets for wall-mounted TV and data outlets for computer stations. This room can also be used for meeting, training classroom, social services programs, or temporary bed spaces in extreme weather.

.f Common washrooms – Provide two separate gender-neutral washrooms for shelter-supported housing and one gender-neutral washrooms for supported housing; at least one common washroom should be designed as wheelchair accessible. Slip-resistant resilient vinyl flooring with integral flash cove and floor drain with trap primer for all common washrooms.

.g Wheelchair accessible laundry room – Provide one pair of washer and dryer for every 15 residents. In addition, provide mechanical and electrical rough-in only for one pair in future. If space is an issue then stackable pair(s) are acceptable with at least one pair side-by-side for wheelchair accessibility. Provide a counter space for folding, sink, floor drain with trap primer and mechanical ventilation. Floor finish shall be slip-resistant flooring with integral flash cove. Millwork heights, location of outlets and type of laundry equipment must be suitable for use by persons with mobility or visual impairment. If requested by Operator, provide a staff laundry room. One-shot automatic laundry detergent dispenser can be considered in staff laundry for each washer (if requested by Operator).

Common amenities shall be clustered and located on the main floor, preferably grouped around the staff offices and elevator.

.4 Minimum-Barrier Emergency Shelter: Where the project is intended to provide minimum-barrier emergency shelter services, provide the following in addition to the spaces noted above:

.a Medical room – Provide with a sink and lockable cabinet, space for examination bed and small desk.

.b Space for harm reduction supplies and needle disposal that can be easily accessed by the residents.

.c Secure storage facilities for tenant's belongings – including carts, bikes, etc. in the main floor or in a secured exterior storage room.

.5 Security Systems: Provide a comprehensive security system including cameras, access control and exterior lighting. Provide residents with fob or card access to their suites and common areas.

.6 CPTED Requirements: Ensure safety and security in accordance with Crime Prevention Through Environmental Design (CPTED) guidelines. Refer to BC Housing Design Guidelines and Construction Standards.

.4 SERVICES AND UTILITIES

.1 Janitor room: Provide a janitor closet area on the main floor and in every third floor of multi-storey building. Provide floor mounted sink with wall-mounted fixtures, mop bracket, shelving, floor drain, slip resistant vinyl flooring with flash cove, and mechanical ventilation.

.2 **Mechanical and electrical room:** Locate as close as possible to service entry points for efficient distribution. Ensure adequate space for maintenance access. Provide floor drain in mechanical room.

.3 **Garbage and recycling area:** Provide a conveniently located area for collection and storage of garbage and recyclable materials. Provide a floor drain and hose bib for clean-up. Ideally constructed on high impact concrete pad.

.4 **Storage:** Provide rooms for staff storage for linen, furniture, mattresses, or maintenance materials. Provide with shelving or racks appropriate for material being stored.

.5 **Heat treatment room (Optional):** Intended for bed bug treatment of shelter user's belongings. Refer to BC Housing Design Guidelines and Construction Standards. This can be provided within the building or a separate unit outside of the building. Confirm with BC Housing. All regulations required by AHJ including electrical capacity, sprinkler requirements, and size restriction if considered outside the building.

.5 BUILDING CIRCULATION

.1 **Stairs:** Design access or exit stairs with daylighting whenever possible. Maximize glazing areas to enhance security. For fire exit doors, provide heavy duty panic exit device with provision for delayed egress and alarm connection to staff office.

.2 **Corridor:** When design permits, provide windows or glazing areas in corridors to introduce natural lighting.

.3 **Ramps:** Provide ramps, preferable concrete, for wheelchair access to the building main entry and exterior amenity areas.

.6 OUTDOOR SPACES

.1 Provide a smoking area located in accordance with local legislation.

.2 Provide a weather protected area with outdoor seating.

.3 If not provided inside the building, provide a secure outdoor area for storage of carts, buggies or bikes.

.4 Provide solid fencing as required by the Operator or BC Housing.

.7 EFFICIENCY IN DESIGN

.1 Building configuration, orientation, shape and geometry, space planning, and design of systems and components shall be simple, efficient to construct and easy to maintain.

.2 Design building layout according to functional requirements of Owner and Operator, and as efficiently as possible.

.3 Standardize module types and module sizes with minimal variations as possible in unit types, and kitchen and bathroom layouts.

1.3 FINISHES AND MATERIALS

.1 Use of wood is required as the primary construction material in accordance with Wood First Act of BC. Wood products are recommended to have certification according to the requirements of a third-party audited certification system.

.2 The design and choice of materials, building systems and finishes should emphasize durability to meet the

demanding and challenging behaviors of the target residents as well as ease of maintenance to minimize long term operating costs for the non-profit Operator.

.3 Consider the following:

.1 Flooring materials that are durable and easy to maintain.

.2 Wall surfaces that can be easily repaired.

.3 Door and closet hardware that are robust but easily operable by persons with limited strength and dexterity.

.4 Plumbing and electrical fixtures and accessories that are durable, tamper-proof and easily replaceable.

.5 Bathroom fixtures that are securely installed, easily replaceable and will prevent flooding.

.6 Furniture selection that is vandal and abuse resistant and bed-bug proof.

.7 Heating and ventilation systems that will involve minimal access to residents' suites for maintenance and servicing.

.8 Access control systems that are designed for ease of use by residents and operators. For example, card readers, or electric strikes.

.9 Provide protection from rain and snow driven in by the wind with an overhang or a storm door. Overhangs may extend beyond the face of the building or be provided by insetting the door from the face of the modular unit.

.4 For factory finished or other materials that are likely to require replacement rather than repair and refinishing, select from those materials that are a standard finish or pattern, that is more likely to be readily available and a close match with remaining materials when replacement is needed in the future.

1.4 SITE SERVICES AND SITE PLANNING

.1 SITE SERVICING

.1 Verify and coordinate the availability and locations of utilities (water, gas, electric, telephone, and cable) and service connections(storm, waste, and drainage) for the project site with local agencies and jurisdictions prior to building design to ensure each required utility can be routed and installed to the correct location for connection(s) to the building modules.

.2 Arrange the construction and provision of off-site utilities and services to the site at the earliest time possible to avoid delay in utility hook-ups.

.3 Provide on-site drainage and/or storm connection as required by the Authorities Having Jurisdiction. The contractor is to coordinate with all parties.

.2 SITE PLANNING

.1 Design for the safety and mobility of people of all ages and degrees of abilities.

.2 Provide a paved accessible walkway with a minimum width of 1500 mm (5'-0") from the municipal road to the main entrance of new modular building.

.3 Provide on-site parking for staff and visitors as required by the municipality or local By-Laws.

.4 Design site grading to slope away from the building area.

.5 Provide landscaping that is drought-resistant and easy to maintain.

.6 If requested, provide a finished exterior space for maintenance equipment storage.

1.5 ACCESSIBILITY REQUIREMENTS

.1 Comply with the BC Building code and Vancouver Building By-Law accessibility sections, as applicable, for work areas, public spaces, common areas, accessible living units, and steps, stairs and ramps. Refer to BC Building Access Handbook 2014.

.2 Design building access for persons with mobility impairments.

.3 At least 5% of total unit/bed count shall be wheelchair accessible.

.4 Accessibility shall consider the needs of persons using mobility aids (eg: walkers or canes), persons with visual and auditory disabilities, and persons with 'invisible' disabilities (eg: mental and learning disabilities). Design shall include the following:

.1 Exterior and interior common areas intended for resident use (including landscaped open spaces, outdoor recreation areas, walkways and amenity spaces) shall be universally accessible to persons of all ages and degrees of ability.

.2 Stairs and ramps shall be easily usable by persons with reduced mobility and impaired vision; modular and moveable for temporary applications.

.3 Provide rough-in wiring in the building entry lobby for future automatic door opener.

.4 Provide 1500 mm (5'-0") turning circle inside the bathroom, at the suite entry and in the living space for all accessible units and common accessible washrooms and showers.

.5 Accessible washrooms shall have resilient, slip-resistant floors, knee clearance under sinks, ADA-compliant toilets with bolt-down lids, solidly backed grab bars, paper towel holder, robe hook, medicine cabinet with mirror, and door openings with clear dimensions as specified in BC Building Code.

.6 Provide roll-in showers for wheelchair accessible units.

.7 All doors, faucets, and showers shall have lever handles.

.8 Equip shower heads with wall mounted hand control mounted at appropriate height.

.9 Light switches, thermostats, other controls, and storage shall be mounted at a height accessible for a person in a wheelchair.

.10 Outdoor seating area is to be durable, low maintenance, and universally designed.

.11 Install low resistance, delayed action closers for doors on accessible routes, including suite entrance doors in accessible units and public accessible washroom doors.

End of Section

2.1 REGULATORY REQUIREMENTS & REFERENCES

.1 Construct work complying with applicable reference standards, and as defined in CSA A277 Procedure for Certification of Prefabricated Buildings, Modules and Panels. All modules are to be inspected, certified and labelled by CSA A277.

.2 Require transportation and work to comply with the current editions of the following, and other provincial or local codes, regulations or bylaws in force at the time of installation, and as follows:

- British Columbia Building Code (BCBC).
- Vancouver Building Bylaw (VBBL).
- BC Fire Code.
- Canadian Electrical Code.
- British Columbia Plumbing Code.
- Electrical Work and Electrical Materials: CSA certified.
- CSA Z240 MH series of standards, manufactured homes.
- BC Ministry of Transportation and Infrastructure's load sizing guidelines.
- Sprinklers – NFPA 13R.
- Accessibility: BCBC and VBBL's accessibility regulations.
- Canadian Wood Council's "Engineering Guide for Wood Frame Construction", as applicable.
- ANSI Z21.10.1/CSA 4.1 Gas Water Heaters – Volume 1.
- BC Housing Design Guidelines and Construction Standards.
- BC Housing Shelter Design Guidelines.
- HVAC - ASHREA, SMACNA, CSA B149.1–10 Natural Gas & Propane Installation Code.
- CSA A123.21 Standard test method for the dynamic wind uplift resistance of membrane-roofing systems.
- Roofing Contractors Association of BC (RCABC), Roofing Practice Handbook.
- ASTM E 779 – Standard Test Method for Determining Air Leakage Rate by Fan Pressurization.

2.2 BUILDING SYSTEMS DESIGN CRITERIA

.1 For each location and building site identified by BC Housing, provide the following climatic criteria in the specifications which were used to calculate code-compliant design loads: (Note: BC Housing shall confirm whether the structure shall be temporary modular or permanent):

- climate zone and heating degree days
- moisture index
- driving rain wind pressure
- hourly wind pressure
- snow load
- earthquake load

.2 **Design Temperatures (Heating):** Design heating systems to maintain indoor temperature of 21°C (70°F). Design outdoor temperatures shall be based on applicable code climatic data for the 1% January design temperature for the location.

.3 **Design Temperatures (Cooling):** For common areas (excluding corridors), design cooling and ventilation systems to maintain maximum indoor temperature of 24 °C (75.2 °F) when outside air is 30.5°C (87°F). Maintain a difference of 8.5 °C (15 °F), when outside temperature exceeds 30.5 °C (87 °F). For residential suites, design systems to maintain indoor operative temperatures within 80% acceptable limits as per the current edition of ASHRAE Standard 55 "Thermal Environmental Conditions for Human Occupancy". Design outdoor temperatures shall be based on BC Building Code climatic data for the 2.5% July design temperature for the location.

.4 **The HVAC systems in multi-unit residential buildings more than three-storeys** shall be designed to meet all applicable requirements of ASHRAE Standard 90.1-2010 "Energy Standard for Buildings except Low-Rise Residential Buildings" and the applicable code, for Part 3 buildings, including all additional re-zoning and energy by-law requirements of the Municipalities Having Jurisdiction for Part 3 buildings.

.5 **Multi-family buildings of three storeys or less** shall be designed to comply with applicable requirements of applicable code, for Part 9 buildings, including additional re-zoning and energy by-law requirements of the Municipalities Having Jurisdiction for Part 9 buildings.

.6 **Design of ventilation systems** shall comply with the requirements of ASHRAE Standard 62-2001 "Ventilation for Acceptable Indoor Air Quality" except Addendum N as referenced in the BC Building Code and Vancouver Building By-law.

.7 **Ventilation of residential suites** shall comply with the requirements of Part 9 "Housing and Small Buildings", Section 9.32 "Ventilation" of the BC Building Code and Vancouver Building By-law. This applies to all Part 9 and Part 3 buildings.

2.3 ENERGY PERFORMANCE AND SUSTAINBILTY

.1 Refer to BC Housing Design Guidelines and Construction Standards, Section 3 – Energy and Environmental Design.

.2 **Energy Performance Targets:** Use the following BCH Step Code energy performance targets, based on geographic location and building type. Following is the minimum energy performance target for the modular projects:

Part 3 Projects:

- Climate zone 4 and 5: Step 3.
- All other zones: Step 2.

Part 9 Projects:

- For all Climate zones: Step 3.

.1 Part 3 Projects

Climate Zone	Step Code Level	Building Envelope – Maximum TEDI (kWh/m²/yr)	Equipment and Systems – Maximum TEUI (kWh/m²/yr)	EALR$_{n75}$ (L/s*m² @75 Pa)	IPALR$_{n50}$ (l/s/m² @50Pa)
4, 5	**Step 3**	**30**	**120**	**2.0**	**1.2**
6, 7, 8	**Step 2**	**45**	**130**		

.2 Part 9 Projects

Climate Zone	Step Code Level	Building Envelope	Equipment and Systems	Airtightness Testing (ACH @ 50pa)
4	**Step 3**	TEDI **≤ 40** kWh/m²/yr OR PTL **≤ 30** W/m²	**20 percent** better than EnerGuide Reference House, OR MEUI – **45** kWh/m²/year	**≤ 2.5**
5		TEDI **≤ 50** kWh/m²/yr OR PTL **≤ 45** W/m²	**20 percent** better than EnerGuide Reference House, OR MEUI – **75** kWh/m²/year	
6, 7, 8		TEDI **≤ 60** kWh/m²/yr OR PTL **≤ 50** W/m²	**20 percent** better than EnerGuide Reference House, OR MEUI – **85** kWh/m²/year	

Verify through a mandatory building and energy modelling at schematic design, and as-built stages. Any changes as the drawings and specifications progress that may impact energy performance shall be included in each stage. As-built energy modelling should include actual airtightness testing result. The whole building airtightness shall be confirmed through a mandatory testing performed in accordance with the requirements of the Provincial Energy Step Code. In addition, at least 10% of total modules are to be tested for suite-level airtightness, and demonstrate compliance as tested to ASTM E 779 or equivalent standard. The modules will be randomly selected by the Owner; at least one per type – shelter units, studio, office/staff room/ medical/lounge; at least one from each floor; at least one middle and one end unit.

Refer to BC Housing Design Guidelines and Construction Standards Appendix B Reducing Air Leakage between Suits for typical air sealing details.

.3 **Passive Strategies:** The design, shape, geometry and space planning of the building shall consider solar orientation and benefits of passive cooling or other approaches to increase energy efficiency, improve thermal comfort and reduce operating costs.

Wherever possible, use passive design strategies and a better performing building envelope in preference to use of complex and difficult-to-operate- and-maintain HVAC systems.

.4 **HVAC Equipment:** Use high-energy efficient types, ENERGY STAR® rated.

.5 **Waste Management:** Waste reduction and diversion from landfills shall comply with requirements of BC Housing Design Guidelines and Construction Standards, Energy and Environmental Design. The Project must achieve a total construction waste diversion (both off-site fabrication and on-site) target of 80% of the total waste generated in the Lower Mainland and on Vancouver Island, and 60% for projects elsewhere in the Province. The completed

Waste Management Tracking Form should be submitted at substantial completion.

.6 Sustainability Requirements: Include low VOC and formaldehyde free, high-recycled content products and materials, low-flow faucets and shower valves, and low flush toilets in the project.

.7 Appliances: ENERGY STAR® rated.

.8 Lighting Fixtures: Energy efficient and low maintenance. Provide surface mounted light fixtures in the suites or shelter sleeping areas.

2.4 MODULAR DESIGN REQUIREMENTS

.1 GENERAL

.1 Structural Design: Modules complexed together side-by-side and/or vertically stacked to form a multi-unit housing structure, for either permanent or temporary use. Ensure exact vertical and horizontal alignment of modules to ensure structural integrity of the building.

Confirm the form of modular construction (permanent or temporary) with BC Housing prior to overall building design, including selection of materials, and types of Mechanical, Electrical and Plumbing (MEP) systems used in the structure.

Design and fabricate with minimal construction and manufacturing waste. Supplier to track waste and recycling separately for the factory/manufacturing process and for the site/assembly process. Refer to BC Housing Waste Management target, BC Housing Design Guidelines.

.2 Fire Resistive Construction: Building modules shall incorporate any required fire resistive construction, smoke barriers and fire stopping. Plans shall include details for how fire related construction is accomplished across module mate lines (vertical and horizontal) with approved fire rated assembly listings.

.2 MECHANICAL, ELECTRICAL AND PLUMBING SYSTEMS

.1 Mechanical, Electrical and Plumbing Systems: Design MEP systems with simplicity, dependability and operating efficiency in mind. Use centralized high efficiency heat recovery units for ventilation. Packaged terminal air conditioner (PTAC) units not permitted. Provide access to MEP components from outside individual dwelling units to allow for repairs and maintenance without entering the units.

.2 Chases: Modules shall incorporate vertical chases to accommodate MEP systems connecting from floor to floor. Align chases vertically to greatest extent possible. Allow sufficient space in floors and ceiling spaces for pipes and ducts.

.3 Module-to-Module Connections: locate and group crossovers in mechanical, closet, or plenum spaces if possible. Minimize system crossover points to greatest extent possible; locate and group crossovers in mechanical areas, closets, or plenum spaces when possible. Conceal MEP items accessible from tenant or occupant areas, locked or tamper-proof to prevent damage or unauthorized access.

.4 Low Voltage Rough-in: Provide back boxes, conduit, and cable management in modular unit factory as needed for site-installed fire alarm, security, data, phone and similar items; these systems are typically wired with no junctions between devices and panels or termination points. Make provisions in unit design at factory for their installation without opening or damaging finishes.

.3 BUILDING ENVELOPE

.1 **Thermal Bridging:** Reduce or eliminate thermal bridging at individual modules and module-to-module joints to greatest extent possible including at additional framing or structural connections. Thermal bridging should be accounted for in the energy model.

.2 **Vapor and Air Barriers:** Provide details indicating continuity of building vapor and air barriers for modules and across module-to-module joints on site. Air barrier shall be continuous and shall be identified as a single unbroken line illustrated on drawings including interfaces between dissimilar materials and parts. All buildings will need to be tested to determine Envelope Air Leakage Rates as airtightness of the building envelope is critical to its performance. Refer to BC Housing Building and Energy Performance.

.4 TEMPORARY STRUCTURE

Design temporary structures to be removed and relocated a minimum of 3 to 4 times over the expected life of the building. Design modules to minimize time and materials needed each time the building is moved.

.1 **Module Design:** Incorporate a planed gap or "growth allowance" between adjacent modules, sufficient to allow for site adjustment to accommodate variances in foundations or module dimensions, and including subsequent installations. Provide appropriately sized wooden sleepers between vertically stacked modules to lifting crane straps between modules for lifting modules during relocating. Use of cutaway areas or components that would prevent or hinder transporting or relocating of modules are not permitted. Do not use site-built components.

.2 **Structural Connections:** Use bolts, removable pins, or screws; permanent or one-time use connections (eg: welding) for securing module to module, or module to foundation not permitted.

.3 **Exterior Trim at Module Joints:** Use removable trim, siding panels and similar items at module joints or intersections designed to allow access to structural connections without disrupting adjacent siding or cladding.

.4 **Interior Trim:** Consider painted wood trim or other architectural feature at interior wall and ceiling joints between modules designed to permit removal and separation of the modules without damage to adjacent materials and finishes.

.5 **Resilient Tile or Strip Flooring:** Where permitted by BC Housing Design Guidelines and Construction Standards, tile or strip flooring may be used at the module joint for disassembly; provide additional matching flooring of same specification as adjacent flooring for one module relocation.

.6 **Roofing:** Design roof system with curbs or other features at the module joints as required to allow for the roof to be cut or otherwise disconnected for relocation. Provide with sufficient slope, crickets and drainage to prevent water from running over curbs. Roof must be capable of keeping water out of structure during the relocation process or with provisions for a temporary roof or cover to be used during transportation.

.7 **Mechanical, Electrical and Plumbing Systems:** Design systems with plug and play features to greatest extent possible, at module joints (eg: quick-connect fittings, access panels and similar items) to minimize labour and materials required when relocating units.

.8 **Foundation and Site:** Consider future building relocation and site restoration when creating a foundation design. Use components that are suited for easy removal and possible re-use when building is to be relocated (eg. screw piles or pre-cast concrete pads and blocks at interior supports). Minimize depth and quantity of soil excavation to reduce waste, trucking costs, and site disruption when building is removed; allow for resulting increase in floor to grade height, and resulting in additional steps and longer access

ramps. Provide on-grade foundation and use manufactured pre-treated wood or metal stair and ramp systems, adjustable, easily re-used and relocated, solid and secure, and be compliant with accessibility requirements.

.5 PERMANENT STRUCTURES

Design permanent structures for one-time installation, to remain at project location for their expected life. Design structure to include concealing the appearance of modular construction to greatest extent possible.

.1 **Module Design:** Modules may contain elements or sections of the structure required for transport that are later cut out or removed after the modules are lifted into place. Panelized wall sections may also be utilized in areas of the building not conducive to standard modules.

.2 **Structural Connections:** Design structural connections to efficiently transfer loads without the need to be conveniently separated for transport and re-use as in temporary structures.

.3 **Exterior Trim:** Provide siding materials and trim at module joints to greatest to create a homogenous appearance to façade and reduce possibility of heat gain/loss thru module joints; where not possible use other acceptable method. Sealing gaps and voids between modules with insulation, expanding foam, or compressible gaskets, and with moisture/vapor/air barrier construction.

.4 **Interior Trim:** consider holdback of interior wall and ceiling cladding with site installed infill after modules are set in place or other means of fully concealing module wall and ceiling joints.

.5 **Roofing:** Roofing system shall be designed with as few seams and joints as possible. Simple slopes with as few curbs, crickets, etc. as possible to create a low maintenance roof.

.6 **Foundation and Site:** For permanent modular projects, use standard concrete stem wall and footing foundation with sufficient crawl space for access and service. Crawl space design shall be insulated, vented and protected from moisture in accordance to code and required energy target for the project. Radon mitigation measures must also be provided where required by code. Interior support and bearing points may be isolated footings with post and beams, or strip footings with wood framed pony walls. Unless otherwise specified, design foundation based on lowest finish floor height to grade possible, while maintaining minimum clearances to wood framing and siding materials. Minimize number of steps and ramp length to enter structure. Steps and ramps may be constructed of poured in place concrete to reduce future maintenance needed.

End of Section

3.1 GENERAL

Refer to BC Housing Design Guidelines and Construction Standards, Section 4: Construction Standards for material and equipment selection and detail specifications. This section is intended to be the reference for the full project-specific specifications prepared by the design consultant. The design consultant is responsible for reviewing this Construction Requirements section, and BC Housing Design Guidelines and Construction Standards Section 4: Construction Standards, all applicable design and regulatory requirements, and incorporating these into the project specifications.

3.2 MODULAR FABRICATION AND INSTALLATION

.1 Factory fabricate modular units in a factory designed for the assembly of modular structures. Complete each module to greatest extent possible, including; interior and exterior finishes, MEP systems, casework and fixtures, prior to shipping.

.2 The following items can be installed or finished on project site:

- **.1** Furnishing and equipment.
- **.2** Chimneys and flues.
- **.3** Foundations and anchors.
- **.4** Connection between units.
- **.5** Connections to existing or temporary utility services.
- **.6** Shared corridors/stairs/circulation paths between units.

.3 Modular manufacturer to maintain and adhere to a documented quality control program. At a minimum, manufacturer shall conduct QC inspections of the individual modules at the following points in construction; framing, rough-in of MEP, and final ready for shipping. Document any discrepancies found and their resolution for each module. Provide a written QC report to the owner along with any third-party inspection agency documentation. Reports to be provided with closing documentation unless requested otherwise.

.4 BC Housing or their authorized representative, shall at their discretion, conduct a factory inspection of the modules in progress to confirm compliance with construction documents, and BC Housing standards.

.5 Deliver each module unit to project site or a secure staging area. Secure loose materials to prevent damage. Protect modules from damage from inclement weather and during transportation, handling and storage. Inspect modules frequently for damage and defects affecting performance. Repair or replace defective items immediately. Store modules off ground on suitable supports with undersides sealed against intrusion by insects and rodents.

.6 Secure all appliances, wall, roof and overhangs during transportation to avoid displacement and movement from vibration and road shock.

.7 Mark units to be craned with lifting strap locations, or provide a lifting manual with locations for lifting straps.

.8 Provide tags, marks, or other means to identify concealed mechanical, electrical, or plumbing connections or crossovers on each module, readily locatable by installers at project site, and to prevent damage due to water leaks from unconnected pipes or damage from exploratory holes cut after modules in place.

.9 At end of each work day during installation of modules, secure building from weather damage or intrusion.

.10 Maintain a clean work site, recycle and dispose of waste properly and leave a clean site, each day.

.11 Materials, Products and Finishes, General:

- **.1** Durable, easy to maintain, and locally available.
- **.2** Use wood as the primary construction material in accordance with Wood First Act of BC. Wood products are recommended to have certification according to the requirements of a third-party audited certification system.
- **.3** Use only new materials and components, except items that are used only for temporary bracing, support, or transport of the modules, and that are removed before building occupancy.
- **.4** Use composite and agrifibre products that do not contain urea-formaldehyde.
- **.5** Provide a list indicating each material and Material Safety Data Sheets (MSDS), to BC Housing for review with building submittal package.

3.3 STRUCTURAL STEEL FRAMING

Structural Steel assemblies must be welded by a welder that is certified to the CSA W47.1 "Certification of companies for fusion welding of steel." The manufacturer must be certified to the CSA A660 "Certification of manufacturers of steel building systems."

3.4 METAL FABRICATIONS

.1 **Stairs/Ramps:** provide pre-engineered, modular stairs and railings which are designed to be easily assembled on site. Stairs may be required to address changes in grade elevation and to allow for circulation between floors of stacked units.

.2 Provide pre-engineered ramps and guard rails as required to allow for a barrier-free path of travel from accessible units, through common areas, to the exterior.

.3 **Metal Flashing:** provide flashings that are minimum 26 gauge and galvanized in accordance with ASTM A653/A 653M-09, Z275 coating prefinished with Stelcolour 8000 series, or equivalent.

.4 **Exterior Guardrails/Handrails:** Aluminum powder coated finish to AAMA 2603/2604/2605.

.5 **Formed Roof-Drainage Sheet Metal Fabrications:** 125 mm (5") gutter, 100 mm (4") downspouts. Provide splash pads.

.6 **Bike Rack:** hot-dip galvanized (or stainless steel) to ASTM A53/A500, powder coating finish with baked enamel top coat for durability.

.7 **Access Panels:** provide lockable access panels for water shut-off valves for each suites in corridor. Prefabricated modules in vertical stacked configuration which will be installed with EPDM transport roof cover in place shall be provided with a lockable access panels in corridor ceiling spaces to allow inspection and/or maintenance in case of flooding.

.8 **Roof Hatch:** ensure easy access to all roof levels from within the building for roof maintenance. Provide a lockable, insulated roof access hatch. Access to small roof areas by an exterior ladder is acceptable if access from the interior is not convenient and not more than 2 storeys from grade. Providing roof access from within suites is not acceptable. Refer to BC Housing Design Guidelines and Construction Standards, Division 07 72 00 – Roof Accessory for product detail.

3.5 ROUGH CARPENTRY

.1 Plywood shall confirm to CSA 0121 Douglas Fir Plywood (DFP), CSA O151 Canadian Softwood Plywood (CSP). Panels shall be of an exterior type.

.2 Provide kiln dried studs, SPF # 2 or better.

.3 Provide exterior wall/roof sheathing DFS/CSP, sheathing grade.

.4 Wall Backing/Blocking shall be DFP/CSP, sheathing grade.

.5 Provide backing for washroom accessories, fixtures and fittings, mounting and anchoring cabinets, grab bars, mechanical and electrical equipment, and hardware.

.6 Plywood for Telephone and Electrical Panel Back Boards: CSA-O121, APA Rated Sheathing; Exposure Durability 1, fire retardant treated

.7 Roof Joists: Kiln dried, SPF #2 or better.

3.6 ARCHITECTURAL WOOD CASEWORK

.1 **Quality Standard:** Provide Premium grade for construction, finishes, installation, and other requirements indicated, complying with the applicable requirements of Architectural Woodwork Standards (AWS) published by Architectural Woodwork Institute (AWI), Architectural Woodwork Manufacturers Association of Canada and, Woodwork Institute.

.2 **Coordination:** Millwork shop drawings must be coordinated with final selection of ranges, dishwashers, refrigerators, washers, dryers and other appliances.

.3 **Cabinets, Doors, Drawers and Shelves:** Shop fabricated, high pressure decorative laminate on high density particleboard, low VOC plywood or wheatboard core with PVC edge banding.

.1 **Wall Cabinets:** Standard full height hinged doors, minimum 762 mm (30") high.

.2 **Base Cabinets:** Hinged doors, and 1 or 2 drawers.

.3 **Cabinet Backs:** Hardboard, 3 mm (1/8") thick, painted to match inside of cabinet.

.4 **Countertops:** One-piece factory post formed high pressure decorative laminate, type HGS, 1 mm (0.040"), thick bonded to a particleboard core; bullnose edge; 100 mm (4") high backsplash and endsplash.

.1 **Kitchen Countertops:** 648 mm (25.5") wide.

.2 **Bathroom/Vanity Countertops:** 572 mm (22.5") wide.

.3 **Countertop Height:** 865mm (34").

.5 **Microwave Shelf:** Provide a microwave shelf in kitchen for self-contained units, staff room, and provision to have a small countertop area in common dining area for shelter users to heat up food.

.6 **Medicine cabinet:** Provide medicine cabinets in studio unit's bathrooms.

.7 **Commercial Kitchen/Bathroom/Common Laundry:** commercial kitchen, bathroom, and common laundry cabinetry to be installed on legs so wet floors do not degrade the product.

3.7 EXTERIOR WALLS/CLADDING AND SOFFITS

.1 **Design:** Employ rain screen or a drained cavity system, except in geographical locations, exposure conditions and building form where not necessary.

Refer to the BC Housing Building Enclosure Design Guide, Woodframe Multi-unit Residential Buildings for best practice guidelines.

.2 **Thermal Insulation:** In walls, roofs, and floors; compliant with applicable code and specified performance requirements.

.3 **Air and Moisture Barriers:** Provide sealed continuous air and moisture barriers in building envelope. Detail wall assemblies and openings to allow for vapour transmission and prevent air infiltration. Use self–adhering weatherproofing membrane, with transition flashings at openings.

.4 **Metal Siding:** Minimum nominal thickness of 1.1 mm (0.044"). Use nails, staples or lock seams complying with ASTM D 3679 and CAN/CGSB 41.33—M87.

.5 **Fiber Cement Board:** Engineered by the manufacturer, for applicable climate zone.

.6 **Soffits:** Ventilated.

3.8 ROOFING

.1 Roofing design and installation shall meet the requirements of the Five year Guarantee Certificate of the Roofing Contractors Association of BC (RCABC).

.2 **Roofing Felts:** Fibreglass felt core; ASTM D 3462. Organic felts not permitted.

.3 **Wind Uplift:** Design roofs to prevent wind uplift, in accordance with CSA A123.21.

3.9 DOORS AND FRAMES

.1 EXTERIOR DOORS

.1 Provide exterior and suite entry doors, service and common area doors with a minimum clear opening of 914 mm (36").

.2 Provide fire rated doors at locations according to applicable code.

.3 Thermal Resistance: Not less than RSI 0.63 (R-3.55).

.4 Provide weather stripping for all exterior doors.

.5 Design a detail for door framing or forming that will provide a roll-over threshold (flush or beveled) at all exterior and common area doors, and protect against water penetration.

.2 INTERIOR DOORS

.1 **Suite Entry Doors and Wheelchair Accessible Doors:** Minimum clear opening of 914 mm (36").

Latch side clearance minimum 600 mm (24") on pull side and 300 mm (12") on push side of suite entry doors, and suite interior doors for wheelchair accessible units.

.2 **Suite Interior Doors:** Minimum clear opening of 685 mm (30") except wheelchair accessible units. All suite interior doors in accessible unit with clear opening 914 mm (36").

.3 **Bathroom Doors:** Swing out. Sliding pocket doors are acceptable.

Emergency Egress Doors to comply with requirements of NFPA 80 and applicable code for fire-rated door assemblies.

.4 **Exit Doors:** Minimum 914 mm (36") wide.

.3 DOOR AND FRAME MATERIALS

.1 **Solid core interior unit entrance doors and all interior doors in units:** Particle Board or solid wood stave core.

.2 **Aluminum doors at building entrances:** Air leakage, water penetration to comply with applicable code.

.3 **Hollow metal doors and frames at exterior service rooms and exit doors:** Commercial Steel, type B to ASTM A 924; galvanized to ASTM A 653.

3.10 WINDOWS

.1 Refer to BC Housing Building Enclosure Design Guide, Woodframe Multi-unit Residential Buildings (Homeowner Protection Office — HPO, current edition) for guidance on window and door installation detailing.

.2 **Quality Standard:** Provide window products, materials, components and assemblies complying with AAMA/WDMA/CSA 101/I.S.2/A440 and CSA A440S1 for grade indicated.

.1 **Performance Grade:** Not less than PG35

.2 **Water Penetration Resistance:** Not less than 290 Pa, laboratory tested for water penetration resistance with and without screens.

.3 **Air Infiltration/Exfiltration Performance:** A-3 for operable windows; “Fixed” for non-operable windows.

.4 **Insect Screen:** Provide for all windows.

The design of the fenestration products should consider the daily light exposure, building orientation, overheating and passive strategies to meet BC Housing energy target.

Fenestration products shall be labeled to show an overall product U-value of 1.8 W/m2-K or less as required by the BC Energy Efficiency Standards Regulation and depending on BC Housing energy target for that climate zone. U-value labels shall bear the mark of a recognized certification agency.

All windows are to have a SHGC of 0.35 or lower. Windows with high exposure to summer sun can be considered at 0.25 or lower. The consultant shall specify the SHGC in the construction documents for different exposures and elevation of the building.

.3 Use awning or casement sashes.

.4 Provide at least one operable window in each unit. Placement in relation to door should maximize opportunities for cross-ventilation. Provide for window restrictors. Where possible, operable portion of the windows shall be located in the upper portion for security.

.5 Provide vinyl frame, insulating glass units of dual seal construction certified for durability and argon gas retention in accordance with ASTM E 2190.

.6 Design windows to be easily operable by persons with limited strength and dexterity.

.7 Provide window coverings: rod-operated vertical blinds.

.8 Provide restrictors for windows that are located within tenants units or sleeping areas.

.9 Selected installed fenestration products shall be tested for water penetration resistance in accordance with ASTM E 1105. The pass/fail criteria for the test shall be as defined in CSA A440S1Clause 5.4. The minimum number of products shall be tested is in accordance to the table provided in BC Housing Design Guidelines and Construction Standards, Division 08 50 00 – Windows, Side Hinged and Sliding Glass Doors. Include cost of field testing in the contract price. The Contractor will pay for any re-testing required as a result of failures.

3.11 DOOR HARDWARE

.1 LOCKS

Refer to BC Housing Design Guidelines and Construction Standards, Division 087000 – Finish Hardware for approved products. Products to be approved by the Owner prior to installation. Provide electronic locks at main entry doors that can be controlled by office staff. Provide suite access through fobs or card access as required by the Owner. Where locksets are installed, provide master keys. Provide lever handles on locks and latch sets accessible to residents.

.2 EXTERIOR DOORS

.1 **Weather Stripping: all exterior doors**, mechanically fastened, extruded aluminum with neoprene inserts and adjustable sweep at sill.

.2 **Thresholds:** Roll-over threshold (flush or bevelled) at exterior and common area doors, and balcony doors; sealed against water penetration.

.3 **Locksets:** (If lockset is provided for projects in lieu of digital card access) ANSI A156.2 Series 4000 Grade 1 c/w mortised faceplate bolt/latch and 6 pin cylinders type with commercial grade lever handles for all exterior doors, unit entry doors, common areas, offices and service doors.

.4 **Digital Access Control (DCA)/ Radio-frequency identification (RFID) Card Locking System:** Heavy duty electronic lockset with clutch mechanism and built-in contactless card reader (mortise or cylindrical), ADA compliant lever, emergency override or specific staff keycards, and batteries last up to 3 years with low battery indicator alerts staff. Refer to Appendix 3: CCTV and DAC Standards for detail.

.5 **Door stops:** Wall mounted convex/concave dome stop with concealed mounting. Provide backing to prevent damage to finishes.

.3 INTERIOR DOORS

.1 **Sliding Pocket Doors:** D profile pulls.

.2 **Latchset:** Privacy set (without a key) for doors to bathrooms.

.3 **Doorstops:** Wall mounted convex/concave dome stop with concealed mounting. Provide backing to prevent damage to finishes.

.4 **Peep Hole:** At unit entry doors.

.5 **Digital Access Control (DCA)/ Radio-frequency identification (RFID) Card Locking System:** Provide fob or card access for tenants access to the building, inside units and common areas. Refer to Appendix 3: CCTV and DAC Standards for detail.

.4 EMERGENCY EGRESS DOORS

.1 **Exit Devices:** Where required by applicable code, provide exit hardware that releases the locking/latching mechanism upon the application of a force in the egress direction. For all exit stairs at ground level, provide heavy duty panic exit device with delayed egress and security alarm connection to staff office. No entry from any exit doors from outside except main reception area.

.2 **Electromechanical Hardware:** Rough in wiring at building entry for future automatic door opener. Include future automatic door button locations on as-built drawings.

3.12 WALL AND CEILING FINISHES

.1 Finish walls and ceilings within dwelling units and common areas in drywall with washable high performance paint finish. Vinyl coated drywall is not recommended due to issues with future repair.

.2 Ceilings shall be painted gypsum board or other type of hard ceiling material; suspended tile ceilings or T-bars are not permitted.

.3 To prevent insects and bed bugs from getting behind the baseboard and wall, place a continuous full bead of sealant along the joint between the drywall/wall sheathing and the floor finish. After installation of the wood baseboard, install provide a continuous full bead of sealant along the joint between the floor finish and the baseboard and at the top edge of the baseboard.

3.13 FLOORING

.1 Use of a very low maintenance floor product, with a long life expectancy and no wax finishes which maintains an even luster for the life of the product.

.2 Provide minimum 2.0 mm (0.080") thick homogeneous sheet vinyl with 89 mm (3.5") wood base throughout. Provide a slip-resistant sheet vinyl floor with minimum 2.0 mm (0.080") thickness and flash code base in unit bathrooms, common bathrooms, laundry, pantry, janitorial closet and common kitchen areas.

.3 Provide clamping floor drains in all bathrooms in the living/dwelling units, shelter units and common laundry and commercial kitchen.

3.14 BATHROOM ACCESSORIES

.1 Provide vandal resistant, commercial quality materials and accessories in common, shared or individual bathrooms.

.2 Refer to BC Housing Design Guidelines and Construction Standards, Division 10 00 00 Specialties for accessories.

3.15 RESIDENTIAL APPLIANCES

.1 **Appliances:** High-efficiency electric, Energy Star rated, from well-established manufacturers. Provide each self-contained studio unit with apartment-size refrigerator and cooktop with exhaust fan.

.2 **Installation:**

- At factory or at project site.
- Secured to unit floor or wall, free of movement from vibration, and displacement during transportation.

.3 Refer to BC Housing Design Guidelines and Construction Standards, Division 11 30 00, Residential Equipment for studio units. Refer to Appendix 4: Furniture and Appliance List for small wares and small appliances for common kitchen and dining room.

3.16 KITCHEN AND LAUNDRY EQUIPMENT

.1 **Unit Kitchen Exhaust Fans:** Two-speed, maximum sound rating of 7 sones, 180 cfm with a covered light. In accessible units, mount light and fan controls on the front of the kitchen countertop.

.2 **Commercial Kitchen Equipment:** Commercial kitchen shall be designed as per NFPA 96 for class 1 cooking operations unless required otherwise by BC Housing and have the capacity to serve at least one hot meal per tenant per day. Fire suppression system and make up air unit shall be designed in accordance to code and AHJ to operate this space. Refer to Appendix 2: Commercial Kitchen for equipment list, sample layout and basic requirements. Provide a lockable roll-down shutter at the food service counter. The Operator of the facility shall contact with the local Environmental Health Office at early design stage for approval of the operation.

Commercial Laundry Equipment: Commercial grade, front loading, and on raised platform. Owner or Operator to confirm the type of operation required for the laundry equipment (e.g. coin operated, card access). Common laundry shall be provided either through a lease/ maintenance contract or through provision of permanent washers and dryers as part of the building construction contract.

Provide one pair of washer /dryer per 15 residents from which one pair shall be side by side for wheelchair accessible residents. All mechanical and electrical rough-ins, ductwork and connections shall be provided as part of the building construction contract.

If required by Owner, one-Shot automatic laundry detergent dispenser for each washer can be considered in staff laundry and allow space beside the washer for storage of detergent.

3.17 BED BUG ROOM (OPTIONAL)

.1 Refer to BC Housing Design Guidelines and Construction Standards, Division 13 00 00 – Heat Treatment Room, for room construction.

.2 **Light Fixture:** Metal-wired, vandal and high temperature resistant; heat at ceiling between 60 °C (140 °F), and approved for application.

3.18 ELEVATORS

.1 If provided, elevators shall be designed to be located close to the main entrance lobby of the building and visible from the front reception office. Elevator controls and buttons are to be heavy duty and abuse-resistant.

.2 Refer to BC Housing Design Guidelines and Construction Standards, Division 14 20 00 – Elevators

3.19 FIRE PROTECTION

.1 All projects are required to provide fire sprinkler system. Provide recessed sprinkler heads in residential units, hallways, and common washrooms for tenants. Provide regular sprinkler heads for the rest of building.

.2 Provide secure locking plugs for building fire department connections; Knox FDC plugs or equivalent.

.3 Refer to BC Housing Design Guidelines and Construction Standards. Division 21 00 00 – Fire Protection

3.20 PLUMBING

.1 DOMESTIC HOT WATER SYSTEM

.1 For permanent modular projects, it is preferred to have a centralized boiler and storage tank system. For temporary modular projects, an individual hot water tank can be provided on a per module basis provided that access is lockable and maintenance can be performed from the corridor.

.2 Seismic restraints: Provide for mechanical equipment and accessories including attachment to structural members where required by code.

.3 Hot water temperature must not exceed 49°C (120 °F) at points of use by residents. Hot water storage tank shall not be below 60 °C (140 °F) to control the propagation of Legionella bacteria. Provide hot water distribution to common kitchen areas and for janitor sinks at 60 °C (140 °F).

.4 Provide all showers with thermostatic mixing valves. Provide bathroom and kitchen faucets with temperature limit stops. The shower valves and faucets shall be set to maximum hot water temperature of 49 °C (120 °F).

.5 Use type L copper pipe for hot and cold water supply and Type K on hot water recirculation piping. Non-metallic pipe and fitting systems, i.e. cross linked polyethylene (PEX), chlorinated polyvinyl chloride (CPVC), polypropylene (PP-R) shall be accepted as alternates for potable hot and cold water mains and risers applications as per the BC plumbing code 2012 Division B – Appendix A.

.6 Require Contractor to provide a 25-year manufacturer's warranty on piping, in line fittings and domestic water distribution manifolds which includes coverage for consequential damage.

.7 Provide frost free hose bib c/w automatic draining vacuum breakers/backflow preventer at exterior garbage enclosure, main entry and near landscape area.

.8 Place lockable wall access panels in easily accessible locations for maintenance.

.9 Use heat tracing or insulate as necessary to protect piping from freezing.

.10 Protect above-ground piping from damage from vehicles, pedestrians and vandalism

.11 Install drain pipe or piping at a minimum slope of 1 in 50. Where it is impractical due to the modular unit's structure to achieve a greater slope, provide drain piping with a minimum slope of 1 in 100.

.12 Unless noted otherwise by BC Housing, a centralized meter for gas, electricity and water shall be provided. Electrical panels within the residential units shall be lockable.

.13 Provide a shut-off valve for each unit. Provide a prefabricated, keyed metal access panel. Shut offs to be easily accessible.

.2 PLUMBING FIXTURES

.1 Provide fixtures of same make, model and colour throughout project.

.2 Provide CSA approved single lever, aerated low flow faucets for the bathroom, kitchen sink and showerhead.

.3 Provide Vitreous China, ADA compliant water closets with free standing elongated rim, wash-down bowl, china bolt caps, bolted down toilet tank lid, single flush, min. 54 mm (2-1/8") fully glazed trapway and maximum Performance (MaP) testing rated at 1000 gram of waste per flush.

.4 Provide tamper proof toilet tanks with bolt-down lids.Provide supply fittings and individual shower heads which limit the maximum water flow rate to:

Supply Fittings	Max. Flow Rate, L/min
Lavatory (bathroom sink)	2.0
Kitchen Sink	5.7
Shower Head	5.7
Low flush water closets, Single flush	4.8

.5 **Kitchen/Laundry Sink:** Kitchen sink shall be grade 18-8 stainless steel counter mounted, 521 mm x 508 mm x 178 mm (20-1/2" x 20" x 7") deep complete with back ledge, self-rimming, sound deadening, mounting kit, strainer, and 89 mm (3-1/2") crumb cup and 38 mm (1-1/2") tailpieces, with overflow drain. For wheelchair accessible consider 127 mm (5") deep. Laundry sink shall be single compartment 560 mm x 651 mm x 305 mm (22-1/16" x 25-5/8" x 12") deep.

.6 **Janitor Sink:** Provide with precast terrazzo floor mounted, mop sink, 610 mm x 610 mm x 254 mm (24" x 24" x 10") deep, and Integral Cast Brass Drain with stainless steel strainer 75 mm (3") outlet.

.7 **Pre-fabricated Shower Unit:** One piece, acrylic, to minimum 914 mm x 914 mm (36" x 36") for studio unit. Includes wall hook and low curb at floor. Provide single lever, non-scalding thermostatic mixing valve with integral stops set not to exceed 49°C (120°F) hot water temperature. For accessible units provide 914 mm x 1524 mm (36" x 60") with folding seat, and rollover threshold to maximum 13 mm (1/2"). In lieu of acrylic grab bar install 32 mm diameter, 914 mm long stainless steel grab bar (1-1/4" x 36").

.8 Refer to BC Housing Emergency Shelter Guidelines for common washrooms for newly arrived and existing shelter clients.

.9 For common washrooms in the emergency shelters, provide one washbasin, one shower stall and one toilet for each four beds. Urinals for men's common washroom should be provided.

.3 DRAINAGE SYSTEMS

.1 Floor drains shall be provided in all bathrooms in dwelling units and shelter spaces, common and staff laundry, public washrooms, commercial kitchen areas, janitorial rooms, and mechanical rooms.

.2 Floor drains for sheet vinyl flooring shall be dura-coated cast iron body with bottom outlet, combination invertible membrane clamp and adjustable collar with polished nickel bronze strainer and complete with trap primer connection.

3.21 HEATING, VENTILATION AND AIR-CONDITIONING (HVAC)

.1 GENERAL

.1 Consider passive design strategies as outlined in BC Housing Design Guidelines and Construction Standards, Energy and Environmental Design, before considering complex mechanical systems.

.2 The HVAC systems in multi-unit residential buildings more than three-storeys shall be designed to meet applicable requirements of ASHRAE Standard 90.1-2010 "Energy Standard for Buildings except Low-Rise Residential Buildings" and the BC Building Code or Vancouver Building By-law for Part 3 buildings, including additional re-zoning and energy by-law requirements of the Municipalities Having Jurisdiction for Part 3 buildings.

.3 Multi-family buildings of three storeys or less shall be designed to meet applicable requirements of the BC Building Code or Vancouver By-law for Part 9 buildings, including additional re-zoning and energy by-law requirements of the Municipalities Having Jurisdiction for Part 9 buildings.

.4 Refer to BC Housing Design Guidelines and Construction Standards, Division 23 00 00 – HVAC.

.2 HEATING

.1 Heating shall be selected to suit the building construction, Energy Performance Targets, system operation and maintenance with the aim of simplicity.

.2 The units shall preferably be heated using electric baseboard. Provide energy model to ensure energy targets are met. Consult with BC Housing and Owner if alternate heating system is proposed.

.3 For buildings where boilers are considered the main source of heating, the boiler shall be high-efficiency appliances with minimum 94% Annual Fuel Utilization and ENERGY STAR® rated.

.3 VENTILATION

.1 Design of ventilation systems shall comply with the requirements of ASHRAE Standard 62-2001 "Ventilation for Acceptable Indoor Air Quality" except Addendum N as referenced in applicable code.

.2 Ventilation of residential suites shall comply with the requirements of Part 9 "Housing and Small Buildings", Section 9.32 "Ventilation" of the BC Building Code and Vancouver Building By-law. This applies to Part 9 and Part 3 buildings.

.3 Heat Recovery Ventilation system shall be provided to the building with a minimum sensible heat recovery effectiveness of 75% to allow for heat recovery and balanced ventilation in each room, including bathroom exhausts.

.4 HRV shall be centralized or a hybrid floor by floor system. The central heat recovery ventilation air handling units shall include supply and exhaust fans, enthalpy heat recovery energy wheel with variable speed controls, heating coil or a combination heating/cooling coil, filters and motorized dampers on outdoor air and exhaust intakes. Supply and exhaust ducts should be distributed to all units, corridor and common areas, preferably, distributed in the corridor ceiling plenums. Refer to BC Housing Design Guidelines and Construction Standards, Division 23 00 00 – HVAC.

.5 For temporary modular buildings, HRV can be provided per module provided that access is lockable and maintenance can be performed from the corridor.

.4 COOLING

.1 Unless addressed by implementing passive design strategies, provide mechanical cooling for the amenity / office areas in the Lower Mainland, Vancouver Island, Northern Interior and North Regions, and provide mechanical cooling for the amenity / office areas and residential suites in the Southern Interior Region. These regions are as per the climate zones defined in BC Building Code.

.2 Window mounted air conditioning or packaged terminal air conditioners (PTAC) units are not permitted.

3.22 ELECTRICAL

.1 Measures shall be implemented to reduce energy consumption in association with the requirements outlined in BC Housing Design Guidelines and Construction Standards, - Energy and Environmental Section.

.2 Material and/or equipment installed must bear evidence of CSA approval.

.3 Wiring: copper, except for main distribution feeders 100 amps or larger and residential suite panel feeders sized 60 amps or larger where aluminum conductors of the same ampacity may be utilized.

.4 Surge protective devices (spd): as a minimum, must be provided on the service entrance main distribution (category c). Provide a complete system of grounding in accordance with applicable code.

.5 MOUNTING HEIGHTS:

DEVICE DESCRIPTION	HEIGHT ABOVE FLOOR
Light switches — to centre	1067 mm (42 inches)
Duplex receptacles — to centre	455 mm (18 inches)
Thermostats and control devices — to centre; align vertically with light switch	1067 mm (42 inches)

.6 ELECTRICAL SERVICE

.1 Provide one rough-in data jack for telecommunications and one television outlet with a combined cable TV and phone jack in the living area of the studio units. Common lounge shall have outlets for TV and Internet connections. Review electrical requirements with Operator for commercial kitchen, medical room and offices.

.2 Receptacles in residential units shall be tamper proof type.

.3 Provide a ground fault current interrupter (GFCI) electrical outlet at all damp and wet areas. Provide weatherproof GFCI duplex receptacles for exterior building maintenance at common area patios.

.4 Install jacks and receptacles such that the integrity of the fire separation is maintained. (No back to back boxes in same stud bay on fire rated walls)

.5 Provide receptacle for microwave in the kitchen for studio units, staff room and common dining.

.6 Provide vandal resistant thermostats within the unit and multi-bed sleeping areas.

.7 Electrical panel inside the suite shall be lockable.

.8 All exit doors with delayed egress and security alarms shall be connected to the reception.

.7 LIGHTING

.1 Whenever practical utilize lighting controls like occupancy sensors, vacancy sensors, day lighting sensors etc.

.2 Use LED type light sources. Where fluorescent luminaires are specified, use compact fluorescent (CFL) or standard linear fluorescent units (T8 or T5).

.3 Provide exterior light fixtures that are energy efficient, low maintenance controlled by sensors. Do not create shadows, excessive glare, and light pollution.

.4 Surface mounted light fixtures inside the units or shelter sleeping areas.

.5 Lighting Products: Types readily available from well-established manufacturer's and Energy Star labeled (refer to NRCAN), and/or listed in the BC Hydro e-catalogue.

.8 EMERGENCY LIGHTING

.1 Emergency lighting shall be provided in accordance with code.

.2 Emergency battery packs and remote heads shall be utilized where generator is not provided.

.3 Each pack must be sealed lead acid type with a minimum 5 year manufacturer's warranty, wall mounted with approved bracket supports. Remote heads must be 12 Volt seal beam style.

3.23 FIRE ALARM SYSTEM

.1 Provide a complete and operational Fire Alarm system as required by the BC Building Code and Authority Having Jurisdiction.

.2 The building shall be provided with an addressable fire alarm system with the Fire Panel located in close proximity to the main entrance to the building for ease of emergency personnel response.

.3 The fire alarm system shall be designed to automatically transmit separate independent signals for fire alarm, supervisory, sprinkler flow, and trouble signals to the Fire Department via an independent central station (ULC listed central station).

.4 Audible signal devices are required to be installed throughout the project. Visual signaling devices shall be provided through public and service spaces in accordance with good design practice and the requirements of applicable code.

.5 Each living unit (suites and shelter units) shall be provided with a smoke alarm located as per code as well as a smoke detector. The smoke detector shall be connected to a secondary annunciator (LED panel) in the 24/7 reception office and to the main annunciator panel.

Once smoke is generated in a specific suite or if the smoke detector is vandalized or detached, the in-suite smoke detector connected to the fire alarm system will activate and will notify the supervisory staff through the LED panel in the 24/7 reception office. The supervisory staff can then verify the situation and if necessary, activate the fire alarm system. If there is no response for a specific period of time, the system shall automatically send the signal directly to fire department or fire alarm monitoring agency. The system shall be designed so that unnecessary notification or false alarms to the fire department are avoided and safety of the units are maintained.

.6 Installation of the smoke detector shall be tamper-proof to prevent removal. If required by the project and allowed by code, provide a wire mesh or cage to protect the smoke detectors in residential units from abuse.

3.24 SECURITY SYSTEMS

.1 Provide a video surveillance system that addresses the Owner's security requirements. Security Systems include Digital Access Control (i.e. DAC), Intrusion Detection and Video Surveillance (i.e. CCTV) Systems. Consult with Owner at the design development stage for project need and incorporate cost effective security systems.

.2 Connect security systems to an un-interruptible power supply (UPS) which provides at least 30 minutes of continuous power.

.3 Provide at minimum:

.1 Cameras at main entry points into the building, including all exit and entry doors, all common hallways, staircase, elevator, exterior parking area, common rooms, and any exterior storage areas. The camera monitors should be located in the front entry office.

.2 The front entrance will be monitored 24 /7 by staff. The Owner/Operator needs the ability to control opening/closing of both sets of entry doors from the front office for residents and visitors. The residents shall have fobs, card reader (depending on Operator's preference) that will allow them to access their suites, and common areas permitted for residents' access.

.3 DVR (digital video recorder), located in a secured space, with storage capacity at least fourteen and no more than ninety days at 15 fps recording on motion activation for required cameras.

.4 Install cameras at pre-approved camera locations as agreed by Owner and based on the sample drawings attached in Appendix 3.

.5 Back end components shall be stacked on racks that to be either bolted to the floor or strapped in place to prevent tipping over.

.6 Interior cameras are to be mounted at a height of 2.3m (7.5') above floor and cameras above front door intercom panels at 1.7m (5.8') above floor unless otherwise specified.

.7 It is Operator's preference to have network access to the site or have the staff monitor the CCTV and DAC systems locally on the servers themselves.

.8 Training for site staff to be completed at completion of project.

.4 All exterior doors shall have alarm connection to the front reception office.

.5 Refer to Appendix 3: CCTC and DAC Standards for detail specifications for camera, back end equipment and sample layout for camera locations.

3.25 Furnishing

Provide furniture inside the suites, common dining room, common lounge and offices, unless otherwise specified. In-suite and common area furniture shall be built for durability and resistance to bed-bugs and incontinence. Provide furniture list and specifications for Owner's approval. A sample furniture list is provided in Appendix 4: Sample Furniture and Appliance List. The furniture requirements noted above are preliminary and should be confirmed with the Operators and BC Housing. This list should be provided to the Design Builder for pricing.

3.26 SUBMITTALS

.1 DRAWINGS

.1 Provide specifications and drawings at the following stages for approval by BC Housing:

.a Schematic Design documents.

.b Design Development documents.

.c 98% complete Construction documents.

.2 Provide the following as a minimum requirement at each stage:

.a Site plan.

.b Demolition plans when applicable.

.c Typical floor plans.

.d Typical unit plans including furniture layouts.

.e Building sections and details.

.f Interior and exterior elevations.

.g Structural and foundation plans, with details.

.h Mechanical, electrical and plumbing drawings.

.3 **Specifications:** 3-part, CSI/CSC Section Format, current edition; Include outline specifications for both mechanical and electrical systems in schematic and design development. Include the complete package of specifications for all disciplines at 98% construction document stage.

.4 Provide energy modelling report at schematic design stage, and at completion. The modelling shall be performed by an approved energy modeller and meet the energy requirement targets as specified. The report shall be shared with the Owner and BC Housing.

.5 Provide certified copies of pre-installed laboratory testing results for all fenestration products to confirm compliance with the minimum specified AAMA/WDMA/CSA 101/I.S.2/A440 Performance Class and Grade. Also include the field testing results.

.2 CLOSEOUT PROCEDURES

.1 BC Housing Design Guidelines and Construction Standards, Division 01 78 00 – Closeout Submittals, outline the closeout requirements for the Contractor.

.2 Upon completion of project, provide an owner's manual to BC Housing no later than thirty (30) business days after the certificate of completion is issued. Submit one (1) set of final hardcopy maintenance, operating and instruction manuals and two (2) sets in high quality indexed electronic format (e.g. CD, USB) PDF to the Owner. Include at a minimum:

.a As-built drawings showing site construction and modifications that have been made to factory-built units.

.b Fire Safety plan and documentations in accordance with applicable code.

.c Maintenance and Operating manual that outlines the preventative maintenance time scale, warranty information/contact of all systems, equipment and appliances service contact information, and also all construction document, contracts and bonding information.

.d Evidence of certifications and test results.

.e Consultant sign-off for all disciplines.

.f For temporary modular projects, provide a Relocation Manual to BC Housing which includes; detailed instructions for disassembly of modules and re-assembly on new site. Manual shall include the following information at a minimum:

.i Drawings, details and photographs clearly indicating locations of module structural connections, trim and other materials requiring removal to separate modules.

.ii Temporary bracing, straps, or supports to be installed prior to craning or shipping modules.

.iii Location of mechanical, electrical, or plumbing crossovers and connections requiring separating or disconnecting.

.iv Weights of each module and separate components (i.e. HVAC equipment) requiring lifting by crane.

.g Provide training on mechanical and electrical systems.

.h Provide energy modelling report, completed waste diversion form and all 3rd party testing report including air tightness.

.3 SCHEDULE

.1 Provide a schedule for review by BC Housing, indicating the time required for design, approvals by Owner and Authorities Having Jurisdiction, fabrication, transportation, erection on site, site servicing and occupancy.

.2 Provide an estimate of the number of units that can be fabricated and delivered to each site, every week.

.4 COMMISSIONING

Upon completion of each modules at the factory and ready to transport at site ensure the following documents are available:

.1 Signed production checklist by the quality assurance manager/production manager

.2 Signed plumbing, electrical, and gas test forms

.3 All 3rd party balancing reports that includes all HVAC, plumbing and fire protection systems

.4 Signed and approved non-conformance forms (if any)

.5 Signed copy of the CSA A277 certification label and the specification nameplate applied on the module

At completion, ensure the MEP systems and equipment are commissioned and all systems are working properly as part of building handover process. Provide an electronic copy of all 3rd party balancing reports for the whole building that include HVAC, plumbing, fire protection systems, etc. Ensure all site service connections for water, sewer, storm, drainage and landscape; and utility connections for electricity, gas, communication and data are complete and documented.

Within 2 months prior to expiry of warranty, conduct a warranty walkthrough meeting with Owner/Operator to address deficiencies noted after building occupancy. Correct all deficiencies noted in the warranty inspection report prepared by Owner/Operator or their authorized representative and establish a reasonable date for correcting and completing all deficiencies and inform the Owner/Operator in writing.

End of Section

Outdoor elements to be confirmed including covered entry or patio, smoking area

Separate Module considered for additional storage, Recycling Storage and Refuse Storage

Ground Floor:
3 Accessible Units
16 Shelter Beds
7,702sf (715.5sm)

0 4 8 12 16 20 FT

A. SHELTER-SUPPORTED HOUSING CONCEPT 55 BEDS

BONI•MADDISON Architects 3732 West Broadway, Vancouver, B.C., V6R 2C1 T: 604 688 5894 F: 604 688 5899	**TITLE:** Ground Floor Plan A. Shelter-Supported Housing Concept **PROJECT:** **BCHousing Modular Concepts**	**ISSUES:**	**JOB No:** 17-40 **SCALE:** 1/16"=1'-0" **DRAWN:**	**DATE:** Dec.8,2017 **DRAWING No:** A1

Typical Floor:
18 Standard Units
7,702sf (715.5sm)

0 4 8 12 16 20 FT

A. SHELTER-SUPPORTED HOUSING CONCEPT 55 BEDS

BONI•MADDISON Architects 3732 West Broadway, Vancouver, B.C., V6R 2C1 T: 604 688 5894 F: 604 688 5899	**TITLE:** 2nd & 3rd Floor Plan A. Shelter-Supportive Housing Concept **PROJECT:** **BCHousing Modular Concepts**	**ISSUES:**	**JOB Nº:** 17-40 **SCALE:** 1/16"=1'-0" **DRAWN:**	**DATE:** Dec.8,2017 **DRAWING Nº:** A2

Outdoor elements to be confirmed including covered entry or patio, smoking area

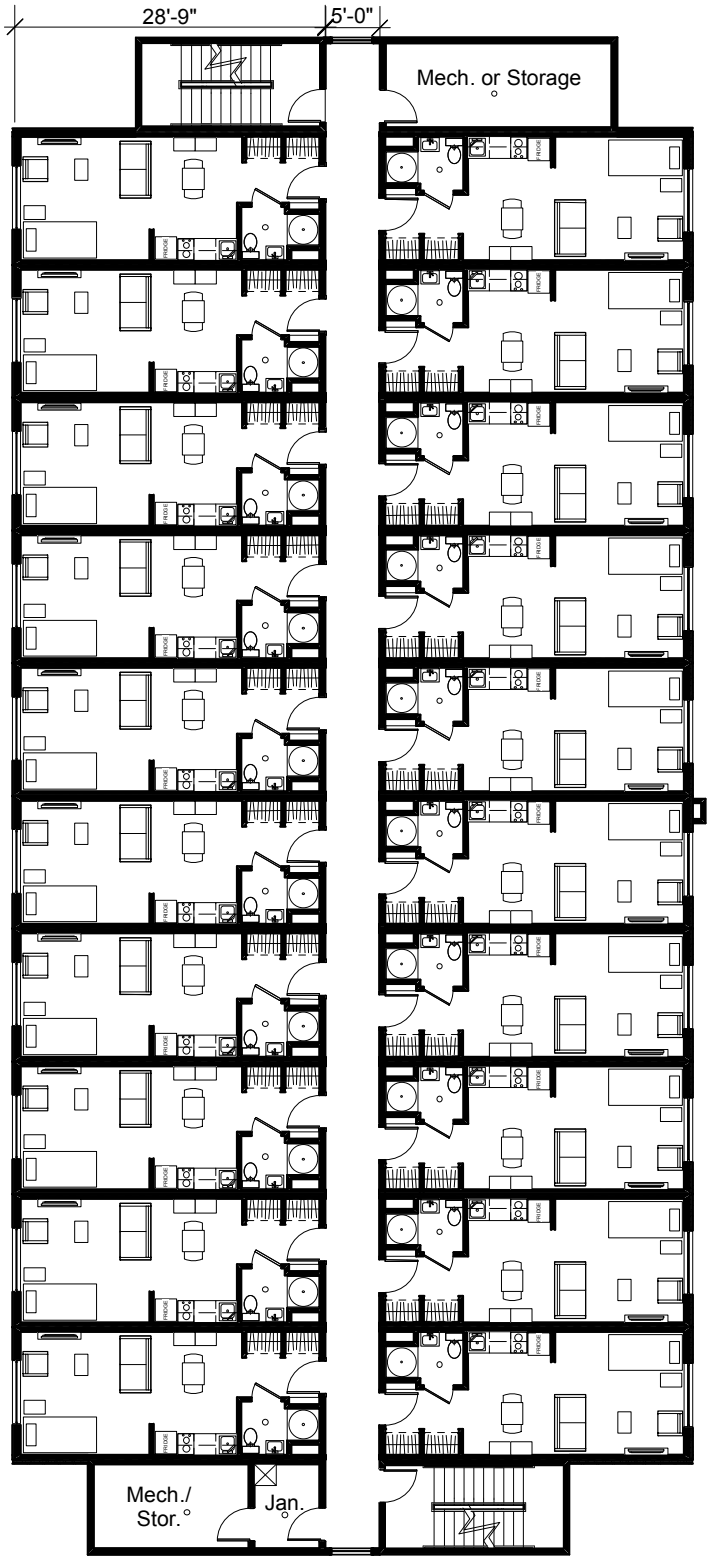
Separate Module considered for additional storage, Recycling Storage and Refuse Storage Heat Treatment

Ground Floor:
4 Accessible Units
8 Standard Units
8,469 sf (786.7sm)

0 4 8 12 16 20 FT

B. SUPPORTED HOUSING CONCEPT 1 - 52 UNITS

BONI•MADDISON Architects 3732 West Broadway, Vancouver, B.C., V6R 2C1 T: 604 688 5894 F: 604 688 5899	**TITLE:** Ground Floor Plan B. Supported Housing Concept 1 **PROJECT:** BCHousing Modular Concepts	**ISSUES:**	**JOB No:** 17-40 **SCALE:** 1/16"=1'-0" **DRAWN:**	**DATE:** Dec.8,2017 **DRAWING No:** B1

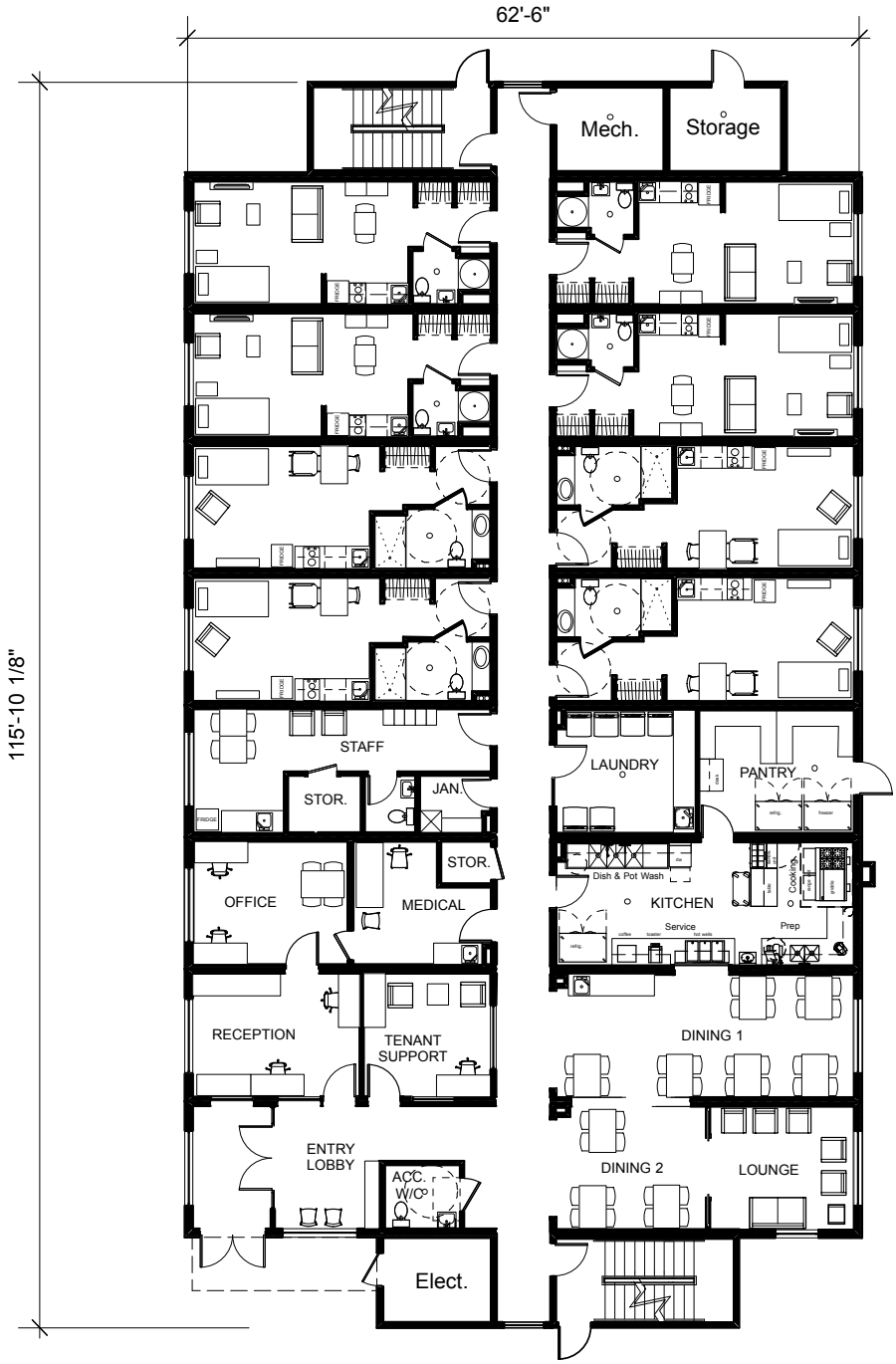


Typical Floor:
20 Standard Units
8,469 sf (786.7 sm)

0 4 8 12 16 20 FT

B. SUPPORTED HOUSING CONCEPT 1 - 52 UNITS

BONI•MADDISON Architects 3732 West Broadway, Vancouver, B.C., V6R 2C1 T: 604 688 5894 F: 604 688 5899	**TITLE:** 2nd & 3rd Floor Plan B. Supportive Housing Concept 1 **PROJECT:** **BCHousing Modular Concepts**	**ISSUES:**	**JOB Nº:** 17-40 **SCALE:** 1/16"=1'-0" **DRAWN:**	**DATE:** Dec.8,2017 **DRAWING Nº:** B2



Outdoor elements to be confirmed including covered entry or patio, smoking area

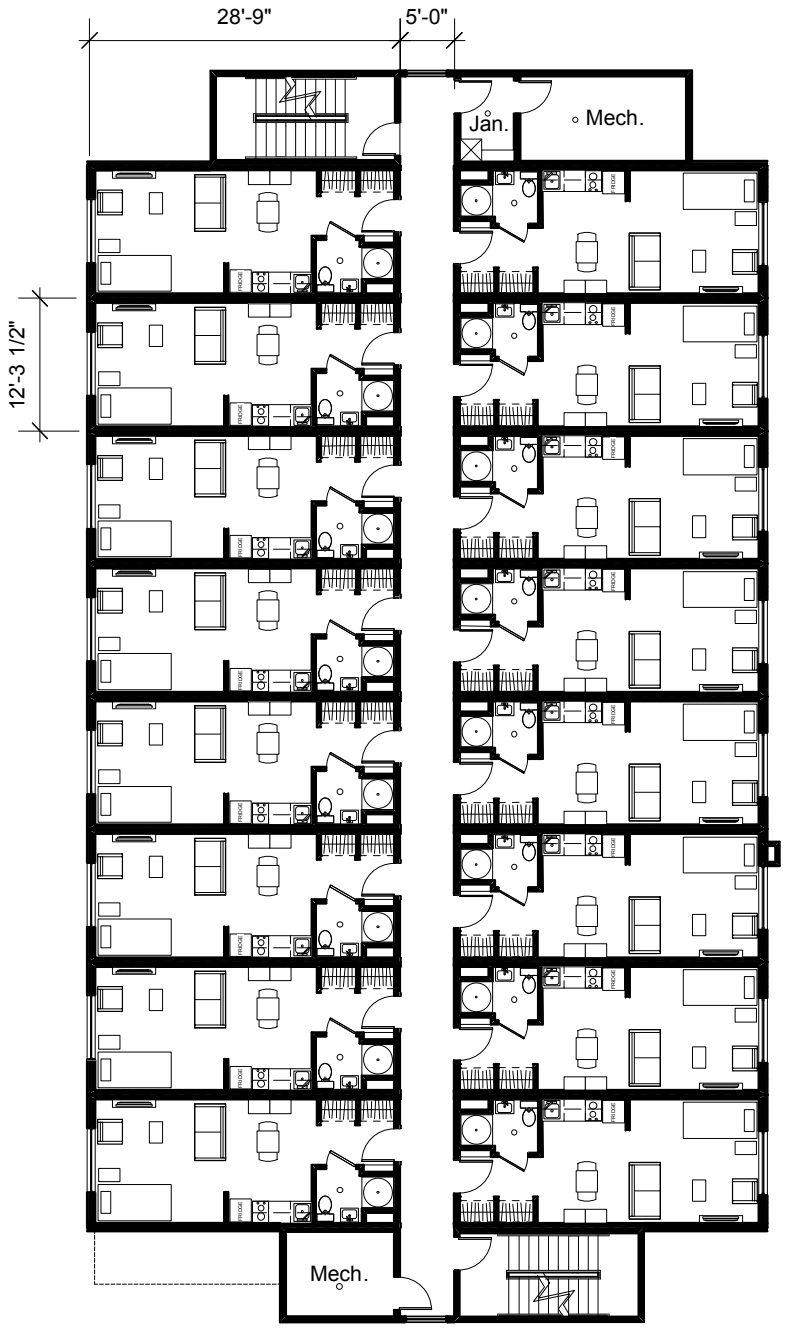
Separate Module considered for additional storage, Recycling Storage and Refuse Storage Heat Treatment

Ground Floor:
4 Accessible Units
4 Standard Units
6,838.5sf (635.3sm)

0 4 8 12 16 20 FT

C. SUPPORTED HOUSING CONCEPT 2 - 40 UNITS

BONI•MADDISON Architects 3732 West Broadway, Vancouver, B.C., V6R 2C1 T: 604 688 5894 F: 604 688 5899	**TITLE:** Ground Floor Plan C. Supported Housing Concept 2 **PROJECT:** BCHousing Modular Concepts	**ISSUES:**	**JOB Nº:** 17-40 **SCALE:** 1/16"=1'-0" **DRAWN:**	**DATE:** Dec.8,2017 **DRAWING Nº:** C1



Typical Floor:
16 Standard Units
6,838.5sf (635.3sm)

0 4 8 12 16 20 FT

C. SUPPORTED HOUSING CONCEPT 2 - 40 UNITS

BONI•MADDISON Architects 3732 West Broadway, Vancouver, B.C., V6R 2C1 T: 604 688 5894 F: 604 688 5899	TITLE: 2nd & 3rd Floor Plan C. Supported Housing Concept 2 PROJECT: BCHousing Modular Concepts	ISSUES:	JOB No: 17-40 SCALE: 1/16"=1'-0" DRAWN:	DATE: Dec.8,2017 DRAWING No: C2

BC Housing - Modular

Kitchen Requirements

KITCHEN REQUIREMENTS

Basic Requirements

Provide a commercial kitchen area with equipment manufactured for the specific purposes intended and installed in strict accordance to the manufacturers' standards and directions.

Performance Criteria

Provide commercial kitchen equipment as required for the kitchen operation of the facility for the residents.

Functional Areas

Provide areas for the following functional requirements; refer to Indicative Design – Dwg K-1:

- Administration
- Dry Storage
- Refrigerated/Frozen Storage
- Preparation
- Cooking
- Washing
- Service

Equipment Criteria

Provide commercial kitchen equipment as set out in the Equipment Schedule – Appendix A.

All kitchen equipment is to be fabricated and installed to the current codes and requirements and the requirements of the Authority Having Jurisdiction at the time of installation including but not limited to SMACNA Guidelines for Seismic Restraint of Commercial Kitchen Equipment; Canadian Hydro Electrical Code, the Electrical Inspection Department Bulletins, the British Columbia Hydro Electric Safety Code; Canadian Gas Association, the Gas Utilization Code of the Department of Energy and Resources Management, British Columbia; BC Plumbing Code; and the Canadian Standards Association.

Equipment is to be in compliance, but not limited to, the current applicable section of NSF/ANSI Standard for Foodservice Equipment and the local Environmental Health Office.

Equipment is to meet or exceed the current energy saving guidelines in effect at the time of installation, including but not limited to EnergyStar certified, EnerGuide rating.

Equipment is to be installed as such to provide for adequate servicing and cleaning per current codes and requirements and the requirements of the Authority Having Jurisdiction at the time of installation.

Materials for fixed surfaces will be impervious to moisture, corrosion resistant, smooth and able to withstand regular cleaning and sanitizing.

All service lines will be concealed within building walls or ceiling wherever possible; exposed lines to be covered with service chases.

Finished work must be perfectly true and plumb with no warping, buckling or open seams. All edges, hidden or exposed, must be ground smooth and rounded. Rivet heads, weld marks, or other imperfections are not acceptable.

Manufactured Equipment:

Equipment is to be from a recognized manufacturer of commercial kitchen equipment with local service representation.

Cabinet type equipment to have locks.

Refrigeration equipment to have integral digital thermometers and alarm systems.

Equipment is to be on casters with brakes where possible.

Gas equipment to have quick disconnects with swivel and integral shut-off valves and restraining cords.

Custom Millwork:

Custom fabricated millwork equipment to be from a company specializing in commercial kitchen millwork cabinetry.

Cabinet type equipment to have commercial grade plastic laminate finish; swing doors, concealed hinges with locks; drawers with locks; internal adjustable plastic laminate or melamine shelves; kickbase's to have stainless steel finish.

Custom Stainless Steel work:

Custom fabricated stainless steel equipment to be from a company specializing in commercial kitchen equipment with local service representation.

Cabinet type equipment and drawers to have locks.

Stainless steel will be ASTM-A167-81A, (18-8 Analysis) type 304 cold rolled and annealed, No. 4 finish one side, 180 grit finish, and free of buckles, pits, warps and imperfections. Ensure the direction of grain matches throughout the units.

The gauge of metal and methods of construction will in all cases be adequate for the intended purposes of the equipment or structure. Refer to Equipment Schedule – Appendix A.

Finished equipment will be rigid when assembled and installed.

Faucets are to be low water consumption fixtures and from the same manufacturer.

Exhaust Hood:

Provide ULC listed low air volume hood with demand ventilation (control) system and integral fire suppression system as required by current codes and requirements and the requirements of the Authority Having Jurisdiction at the time of installation, including but not limited to City of Vancouver K2 form requirements.

Provide a hand held fire extinguishing unit(s) as required for area.

Equipment Schedule

Provide commercial equipment as outlined in Equipment Schedule – Appendix A.

Services and space to be allocated for the equipment listed in the Equipment Schedule – Appendix A which is to be supplied by the Owner or Operator.

Small wares and tools-of-the-trade are to be supplied by the successful Operator.

Area Architectural Criteria

All surfaces are to meet the current codes and requirements of a commercial kitchen establishment and the Authority Having Jurisdiction at the time of installation.

Area to be vermin resistant.

Floor: Fully sealed, water-impermeable, acid resistant, slip resistant heavy duty floor material i.e. slip resistant epoxy or sheet vinyl; with integral coved wall base – rated for a commercial kitchen application. Installation as to provide for no pooling of water under equipment.

Walls: smooth, water tight, washable. Fiberglass Reinforced Panels (FRP) at all exposed building walls and stainless steel insulated panels from the underside of the hood to the wall base. Painted wall in dry storage area. All exposed wall corners are to be protected with stainless steel corner guards.

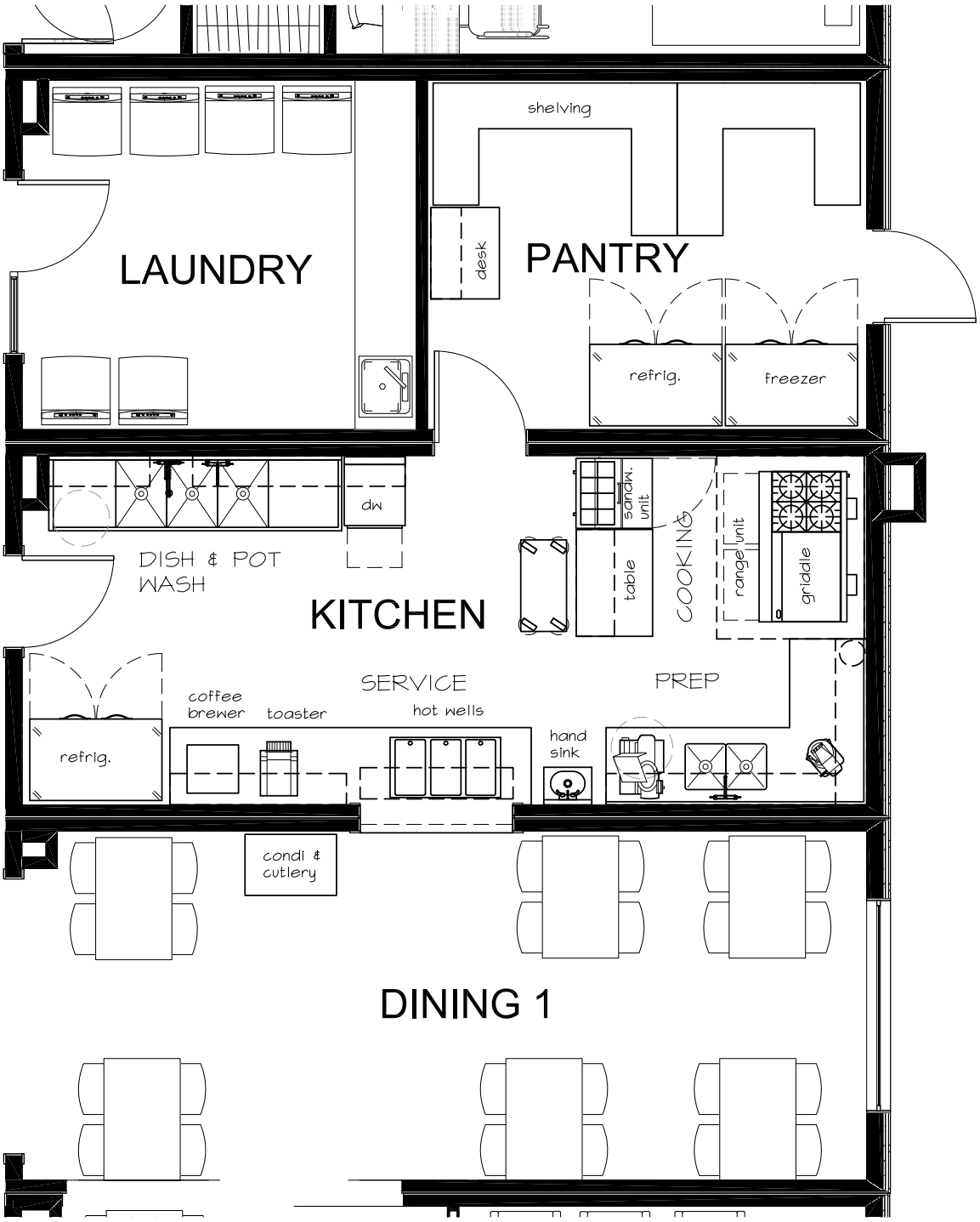
Ceiling: 'T'-bar type as rated for a commercial kitchen application; smooth, washable, acoustic consideration. Provide for access to ceiling area for service to service lines/ducting.

Light levels: to meet all work environment conditions for area.

Room Ventilation: area to have sufficient efficient artificial ventilation / make-up air, air movement, and cooling for use of area and the number of staff working in the area.

Door(s): access doors/doorways are to be adequately sized for the installation and removal of equipment; with locks.

Security: area to be fully secured from adjacent areas.



	TITLE: Ground Floor - Indicative Design Kitchen & Dining Area		**SCALE:** nts	**DATE:** Nov.30,2017
	PROJECT: **BCHousing Modular Concepts Supportive Housing & Shelter**	**ISSUES:**		**DRAWING No:** K-1 commercial

Appendix A **BC Housing - Modular Kitchen (Commercial Kitchen)**

Kitchen Equipment List

November 30, 2017

Equipment Name	Category	QTY	Manufacturer	Model	Specification	Electrical					Plumbing				Gas		Exhaust		Sizing (mm dimension in brackets)			Alternate Manufacturer		
						Load	Volts	Phase	Direct	Plug	Hot Water	Cold Water	Direct Drain	Ind. Drain	Gas size	MBTU load	CFM est.	MUA est.	Length	Width	Height	A	B	C
DESK - STANDING	CSCI	1	Custom Fabricated		Millwork or stainless steel cabinet; top boxed edges, backsplash; 2 drawers with lock; swing doors with locks; solid bottom shelf; adjustable intermediate shelf														36" (915)	27" (685)	42" (1065)			
OVERCUPBOARD	CSCI	1	Custom Fabricated		Millwork or stainless steel cabinet; boxed edges; swing doors with locks; solid bottom shelf; adjustable intermediate shelves; mounted above desk														36" (915)	12" (305)	24" (610)			
HAND SINK	CSCI	1	Eagle Group/Metal Masters	HSA-10-FAW	Standard wall mounted; sealed to wall; Gooseneck faucet; wrist handles, p-trap and tail piece; basket drain; end splashes; antimicrobial protection Obtain approvals as required						1/2" (13)	1/2" (13)	1.5" (38)									EFI	Polar	Custom Fabricated
SOAP & TOWEL DISPENSER	CSCI	1	(refer to other section)		(units to match others in facility)																			
SHELVING - DRY	CSCI	LOT	Metro	Super Erecta Shelf	Standard with Epoxy coated finish; 4 posts, 74P, per unit or common posts permitted where units are end to end, with floor plates; 5 shelves per unit														min. 36" (915)	min. 18" (457)	74" (1879)	Nexel	Olympic	Cambro
REACH-IN REFRIGERATOR	CSCI	2	Beverage Air	HBR49-1	Standard with one additional shelf per door; HD casters, two with brakes	8.8A	120	1		X												True Food Service	Delfield	Continental
REACH-IN FREEZER	CSCI	1	Beverage Air	HBF49-1	Standard with one additional shelf per door; HD casters, two with brakes	11.9A	120	1		X												True Food Service	Delfield	Continental
PREP SINKS	CSCI	1	Custom Fabricated		Stainless steel table construction; backsplash up 8" (200mm) and splayed, closed ends and back; bracing as required; allow space for waste bin; 2 required sinks approximately 16" x 18" x 12" deep (410 x 457 x 305 mm deep), all welded, all coved with lever wastes; solid bottom shelf; backsplash mounted swing faucet						13	13	2 @ 50						to suit design	30" (760)	36" (900)			
OVERSHELVES	CSCI	LOT	Custom Fabricated		Stainless steel construction; boxed edges; table or wall mounted; stainless steel brackets; double shelves where possible, high-shelf over high equipment on counter														to suit design	12" (305)				
SLICER	CSCI	1	Globe	GC512	Standard gear driven	4.8A	120	1		X												Hobart	Berkel	
MIXER - 8QT	CSCI	1	Globe Food Equipment	SP8	Standard gear driven with stainless steel bowl; flat beater; stainless steel wire whip; spiral dough hook; bowl guard	5A	120	1		X												Hobart	Berkel	
STAINLESS STEEL WALL FLASHING	CSCI	1	Custom Fabricated		Stainless steel construction; insulated, from underside of hood to wall base (back and sides at building walls), width to meet NFPA and site requirements for limited combustible coverage, at minimum to be width of exhaust hood; service lines and connections to come through flashing as close as possible to connection location; exposed lines to be covered with stainless steel chase; penetrations through flashing are to be covered with stainless steel cover plates														minimum - to suit hood width (side to side)	1" (25) thick	underside of hood to wall base			
EXHAUST HOOD	CSCI	1	Spring Air	FN-B-MJ series	Unit(s) to be integral with Mechanically designed HVAC system; Box, taper or island type high efficiency low air volume exhaust hood; if required by AHJ with integral make-up air plenum and demand control system, control panels, etc. Sized to suit equipment below (ensure minimum 8"/ 200mm overhang on all sides); ULC listed; Fabricated and installed to meet all governing codes and in compliance with latest ULC & NFPA-96 requirements, Authority Having Jurisdiction and City of Vancouver K-2 compliant; Stainless steel liquid tight construction; Easy access to all components; Fire dampers if required, Fire dampers activated by thermostatic or mechanical detection, Mechanical gas valve; Interconnection to building automation and/or fire systems; Hanging brackets – full length and continuous – seismically restrained	as req'd	120/208	1	X									1200 est.		to suit design	to suit design	to suit design	Halton	Quest	

Appendix A **BC Housing - Modular Kitchen (Commercial Kitchen)**

Kitchen Equipment List

November 30, 2017

Equipment Name	Category	QTY	Manufacturer	Model	Specification	Electrical					Plumbing				Gas		Exhaust		Sizing (mm dimension in brackets)			Alternate Manufacturer		
						Load	Volts	Phase	Direct	Plug	Hot Water	Cold Water	Direct Drain	Ind. Drain	Gas size	MBTU load	CFM est.	MUA est.	Length	Width	Height	A	B	C
FIRE SUPPRESSION SYSTEM	CSCI	1	Kidde	Wet Chemical	Wet chemical; Fabricated and installed to meet all governing codes and in compliance with latest regulations and authority having jurisdiction Standard with Capacity for coverage of all cooking equipment under hoods, plenum and ducts as required by code and authority having jurisdiction; Provide shut-off valves and solenoids, coordinate installation of same with applicable sub-trade; remote fire pull; Conceal all piping where possible, exposed piping to be chrome plated, exposed horizontal piping not acceptable; Activation of system by globe fusible links, mechanical detection; Integral with Exhaust Hood(s); provide all applicable certifications, letters of assurance, letters of compliance and other documents/drawings as requested by AHJ (Authority Having Jurisdiction) for a complete certified operational system; coordinate operation of the system as it relates to the building systems; and requirements of the AHJ; Line work to remote pull to be concealed in wall 1 required hand held 'K' class fire extinguisher	6A	120	1	X														Ansul	
RANGE W/CONVECTION OVEN (Gas site service)	CSCI	1	Garland	GFE60-4G36CC	Standard with 4 burners, 36" (915mm) grill; two convection ovens; heavy duty casters, front casters c/w brakes; standard backguard with removable high shelf; safety shut-off; quick disconnect and restraining cord; positional brackets	10A	120	1		X					19	234						US Range	Quest	Montague
RANGE W/CONVECTION OVEN (Electric site service)	CSCI	1	Garland	SS684-36G-RC2	Standard with 4 elements, 36" (915mm), two convection ovens; heavy duty casters, front casters c/w brakes; standard backguard with removable high shelf; positional brackets	34KW	208	3	X													US Range	Quest	Montague
WORK TABLE with OVERSHELVES	CSCI	1	Custom Fabricated		Stainless steel construction; boxed edges; bracing as required; bottom shelf with boxed edges; stainless steel double overshelf with up and hemmed back														to suit design 42" min (1070mm)	30" (760)	36" (900)			
SANDWICH STATION	CSCI	1	True Food Service	TSSU-27-08	Standard with casters (front with locks); double overshelf; flat lid; pan dividers; door lock	5A	120	1		X												Beverage Air	Delfield	Continental
POT RACK	CSCI	1	Metro	Super Adjustable Super Erecta Shelf	Standard with Metroseal 3 finish or equivalent; 4 posts per unit; 4 HD casters with donut bumpers each unit 2 with brakes; 4 shelves per unit														36" (915)	18" (457)	54" (1370)	Nexel	Olympic	Cambro
SINK UNIT	CSCI	1	Custom Fabricated		Stainless steel construction; edges up and rolled; back/end splash up 10" (250mm) and splayed to wall, closed ends; space for waste bin; bracing as required; drainboards slope to sinks; 3 sinks 20" X 26.5" X 14" deep (510 X 675 x 355mm); all welded, rolled front and back; 1 required backsplash mounted faucet swing spout; lever wastes as specified Stainless steel trim at back of dishwasher to wall to close gap						1/2" (13)	1/2" (13)	3 @ 2" (50)						to suit design	30" (760)	36" (900)			
PRE-RINSE UNIT	CSCI	1	Fisher	34398	Standard with 48" (1220mm) hose length; wall bracket; vacuum breaker; in-line dual check valve; wrist style handles; add-on-faucet; spray valve with designed flow restrictor to meet Energy Star						1/2" (13)	1/2" (13)										T&S	Encore	
OVERSHELF	CSCI	2	Custom Fabricated		Stainless steel construction; boxed edges; table or wall mounted; stainless steel brackets; single high shelves														to suit design	12" (305)				
DISHWASHER W/BOOSTER	CSCI	1	Moyer Diebel	501HT	Standard undercounter high temperature operation unit; with integral 70F rise booster; 17" (432mm) high stand; stainless steel trim from back of unit to wall; 2 racks	43A	120/208	1	X		3/4" (19)		1.5" (38)									Hobart	Jackson	

Appendix A **BC Housing - Modular Kitchen (Commercial Kitchen)**

Kitchen Equipment List

November 30, 2017

Equipment Name	Category	QTY	Manufacturer	Model	Specification	Electrical					Plumbing				Gas		Exhaust		Sizing (mm dimension in brackets)			Alternate Manufacturer		
						Load	Volts	Phase	Direct	Plug	Hot Water	Cold Water	Direct Drain	Ind. Drain	Gas size	MBTU load	CFM est.	MUA est.	Length	Width	Height	A	B	C
SERVICE COUNTER	CSCI	1	Custom Fabricated		Stainless steel cabinet construction; stainless steel top with boxed edges; backsplash up and boxed; stainless steel removable kickplates; openings and recesses as required for equipment; solid bottom shelves with access panels as required to access drain & service lines; solid adjustable intermediate shelves; integral section thru- pass thru with rolled front edging; integral utility chase, with removable access panels as required for access to service line runs, plastic laminate finish on customer side														to suit design	30" (760) min counter kitchen side + pass-thru site dimension to suit design	36" (915) working height			
HOT WELL UNIT (3 Wells)	CSCI	1	Wells	MOD-300-TDM	Standard with drain valve extension kit; drain screens; individual infinite wells controls	3.72KW	208	1	X					1" (25)								Delfield	Vollrath	Hatco
SNEEZEGUARD / OVERSHELF	CSCI	1	Custom Fabricated		Stainless steel construction with sloped front, stainless steel top sized to accommodate heat lamp, tempered glass front and sides sneezeguard edge to be beveled with chrome/stainless steel anchoring brackets, 1" (25mm) square stainless steel support tubing														to suit pass-thru opening	12" (305) top	16" (435)			
HEAT LAMP	CSCI	1	Hatco	GRAH-36	Standard; mounted in sneezeguard/overshelf	800W	120	1	X													Merco	Gann	
OVERSHELF	CSCI	1	Custom Fabricated		Stainless steel construction; boxed edges; table or wall mounted; stainless steel brackets; single high shelves														to suit design	12" (305)				
TOASTER	CSCI	1	Hatco	TQ-10	Standard	8.8A	208	1		X												Toastmaster	Waring	Star
CONDIMENT STATION	CSCI	1	Custom Fabricated		Millwork cabinet construction; top with boxed edges; swing doors with locks; heavy duty casters with locks														36" (900)	24" (610)	36" (900)			
MICROWAVE OVEN	OpSOpI	1			(dedicated outlet)	15A CIRC	120	1		X														
COFFEE BREWER	OpSOpI	1			(Operator Supplied; services allowance - verify)	23A	208	1	X			1/2" (13)												
WASTE CAN	OpSOpI	LOT																						
TELEPHONE	OpSOpI	1	(refer to other section)																					
COMPUTER	OpSOpI	1	(refer to other section)			dedicated circuit	120	1		X														

CATEGORIES

CSCI Contractor Supply Contractor Install

OpSOpI Operator Supply Operator Install

Stainless steel fabrication criteria

16 gauge Utilized for all free-standing sinks, dishtables, countertops, overshelves, single pan doors, stainless steel slides, stainless steel grids and undershelves over 48" (1220 mm) long. Hat sections/channels; unexposed galvanized, exposed stainless steel. Exposed shelf brackets Sheet material for counter tops, tables, shelves and similar forms will be straight lengths in one continuous sheet (unless over 3 meters long)

16 gauge Utilized for all undershelves less than 48" (1220 mm) long, stainless steel bins (fixed or mobile), counter top sinks and vertical surfaces.

18 gauge Utilized for the chassis of all fixtures, double pan doors and drawer fronts

20 gauge Utilized for all drawer bodies and door linings, refrigerator linings, drawer pans with 2B finish, dishwasher ducts

Tables and counters over 70" (1800mm) in length will have a minimum of 4 legs

For pot sink or dish tables, work tops to slope toward the sinks or dishwasher as required at a slope of 8mm per metre. The front edge to be level with the floor

Backsplashes to be an integral section of table or counter top turned up on a 3/4" (19mm) radius to the height specified, then boxed or splayed. Enclose, fill and weld all exposed ends and back. Exposed backs at upturns and splash backs to be closed with stainless steel back panel to the bottom of the backsplash. Panels to be removable as required for access to mechanical and electrical work. Backsplashes to be sealed to the wall with food safe clear silicone

Legs and bracing to be industry standard 1-5/8" (41mm) O.D. stainless steel tubular. Leg spacing to be a maximum of 63" (1600mm) apart, 30" (760mm) front to back with adjustable bullet feet

Sink bowls to be 16 gauge stainless steel integrally welded into the table or counter. All welded, all coved, radiused 3/4" (19mm) both vertically and horizontally and polished. Slope sink bottom to drain. Multiple sinks to have 18 gauge stainless steel apron to conceal gap between bowls

1.0 OVERVIEW:

These specifications have been developed to guide the project team about the requirements of close-circuit television (CCTV) and digital access control (DAC) systems for Rapid Response Modular Housing program. As these sites, either will or could be directly managed by BC Housing during their lifespan, the equipment and installation must be compliant with BC Housing's existing specifications for CCTV, except where specified in this document. To that end, 3xLogic equipment and Vigil software will be used to ensure interoperability with existing BC Housing systems.

2.0 STANDARD APPROVED CAMERAS:

Find below the specifications for cameras and examples of suitable cameras currently in use with BC Housing:

Indoor/ Outdoor	Resolution	IP or Analog	Lens	Infrared	Protection	Examples
Outdoor	4mp	IP	2.8-12mm varifocal	Yes	Vandal-proof dome	VX-4PV-B-RI
Indoor	3mp	IP	2.8mm fixed	Yes	Vandal-proof dome	VX-3S28-OD-I-3

3.0 STANDARD APPROVED BACK END EQUIPMENT:

Find below the specifications for backend equipment and examples of suitable equipment currently in use with BC Housing:

CCTV or DAC	Item	Description	Example
CCTV	Digital Video Recorder (DVR)	VIGIL NDVR Series, 16/32 cams, Tower mount case, 2/4TB storage	NDVR-16/32LT-2/4TB
CCTV	Software License	VIGIL Server IP camera license (16)	VGL-SW-SVR-IP16
CCTV/DAC	Monitor	Acer 24" Wide	UM.UV6AA.C02
CCTV/DAC	Power over Ethernet (POE) Switch	DLINK WEB SMART 24-PORT 10/100, POE SWITCH, 2 COMBO	NP-DL-DES1210-28P
CCTV/DAC	Router	ROUTER WIRLS AC1200 DUAL BAND GIG	NP-DL-DIR-850L
CCTV/DAC	Uninterruptible power supply (UPS)	APC BACK-UPS RS, 1000VA/600W	UP-AP-BR1000G
CCTV/DAC	Surge Protector	Surge Protector	
CCTV/DAC	Patch panel	PANDUIT 24 Port Modular Faceplate Patch Panels	CPPL24WBLY
CCTV/DAC	UPS	UPS	SRT1500RMXLA-NC
CCTV/DAC	UPS battery back-up	UPS Battery Backup	SRT48RMBP
CCTV/DAC	Keyboard/Video/ Mouse (KVM) switch	2 Port KVM Switch	CS1732B

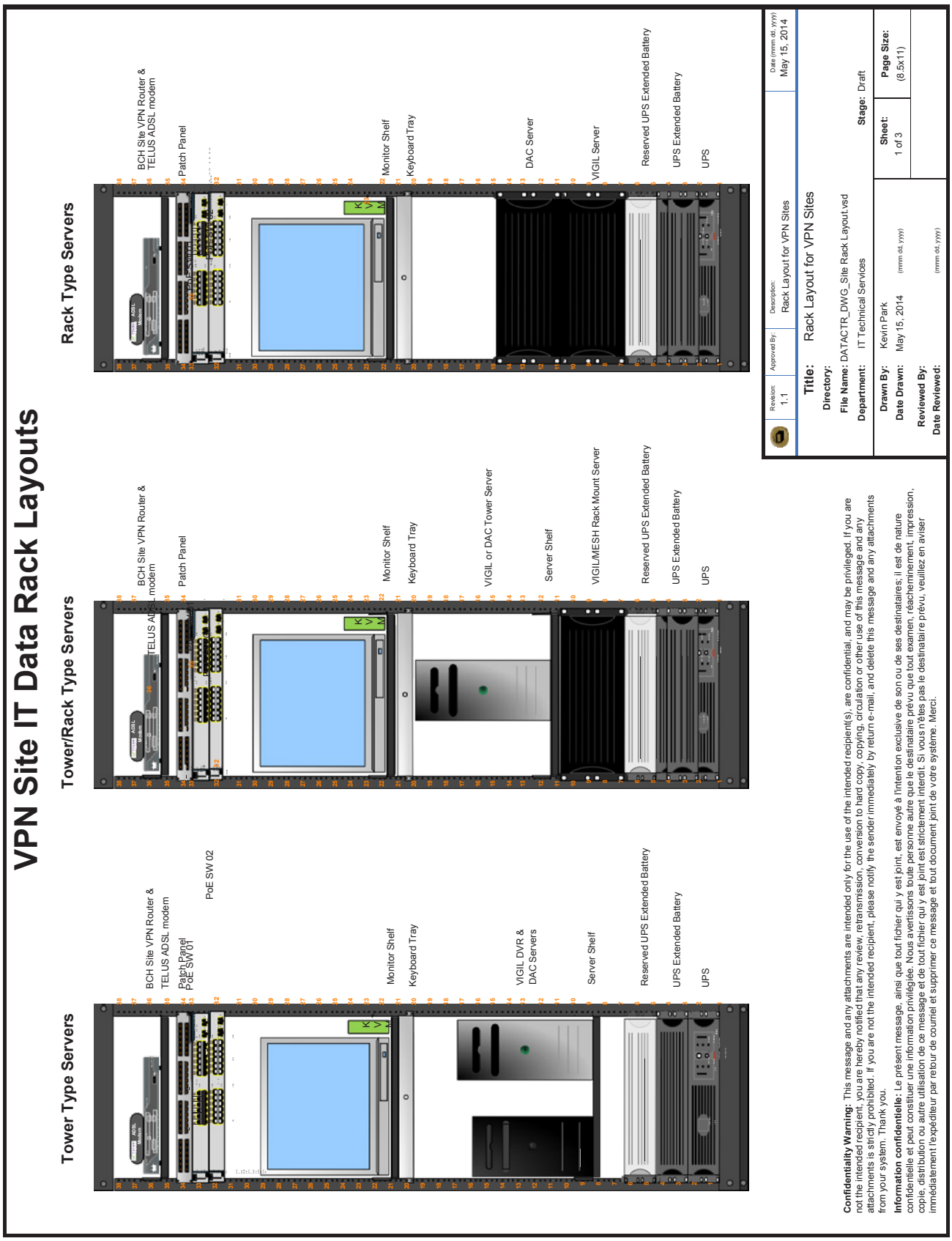
CCTV or DAC	Item	Description	Example
CCTV/DAC	APC network card	APC Network Card	AP9630
CCTV/DAC	APC outlet	APC Power Distribution Outlet	SRTRK3
CCTV/DAC	Component rack	2 Post Server Rack	TO2P42U
CCTV/DAC	Rack keyboard tray	2U Keyboard Tray	TOKTM
CCTV/DAC	Rack shelves	2 post shelf - 3 per server rack	TO1923
CCTV/DAC	Wall mounting bracket	Extendable wall mount bracket	HA4UWB
CCTV/DAC	Lockable server rack	Lockable server rack (alternate to 2 post rack if space is an issue)	RS12UC
DAC	Server	Access control server, IntelliM Essentials, up to 300 doors, 3 year warranty	S-SVR300-R3
DAC	Card Reader	Mini metal surface mount reader Weigand output Charcoal	R-MPW-CHAR-AH
DAC	Door controller	Intelli-M Single Door Add Kit - Wiegand HID prox reader with Strike and Sensors	S-DOOR-KIT-WH-ST
DAC	Prox Cards	HID Compatible 125khz keytag	S-ACC-AKT
DAC	Door organizer		CX-12
DAC	Door opener	Button at reception to unlock the front door	FA200
DAC	Front Door Button	To call reception	CM9080
DAC	Reception Chime	Front door reception chime	OE-1GANGCHIM
Safety	Panic Alarm hardware	Maintained panic button – strobe is silenced when button reset. One for the reception area and one for the medical room	CM4050
Safety	Lamacoid Label above button	PRESS FOR EMERGENCY ASSISTANCE	N/A
Safety	Panic Alarm	Red Strobe for Reception and Staff area. Include lamacoid labels identifying panic button zone	SL401R
DAC	Kitchen Call Button	Doorbell for Kitchen service delivery door	CM9080
DAC	Kitchen Chime	Doorbell for Kitchen service delivery door	OE-1GANGCHIM
DAC	Aiphone	Reception Intercom Call Station	GT-MKB-N
DAC	Intercom	Expanded Bus Controller	GT-BCXB-N
DAC	Intercom	Audio Bus Controller	GT-BC
DAC	Intercom	Audio Voice Tenant Station	GT-1A

4.0 SCOPE OF WORK REQUESTED:

1) Power and ISP requirements by site.
2) Install cameras at pre-approved camera locations as agreed by Owner and based on the sample drawings attached in this Appendix.
3) Back end components shall be stacked on racks that to be either bolted to the floor or strapped in place to prevent tipping over.
4) Interior cameras are to be mounted at a height of 2.3m (7.5') above floor and cameras above front door intercom
5) panels at 1.7m (5.8') above floor unless otherwise specified.
6) It is Owner/Operator's choice to have BC Housing network access to the site or have the staff monitor the CCTV and DAC systems locally on the servers themselves.
7) NO ceiling or sky is to be visible in ANY camera install.
8) NO goose neck or wall-mount style camera mounts to be utilized.
9) 5FPS on all cameras, full resolution, 1000 kbp.
10) DVRs to be configured to retain at least 14 days and no more than 90 days of footage.
11) Cabling at head end to be clearly labelled, (camera labeling to coincide with the camera numbers to the network patch panel, POE switch input and NDVR input) neatly configured and secured in place.
12) Training for site staff to be completed at completion of project.
13) User permission: A sample list of permissions broken down by site appointment is attached in this appendix. It is recognized as most sites will not be networked or will be operated by non-profits, some staff may be occupying more than one of these appointments. It is quite possible that a Building Manager may fulfill all the roles outlined in the form.
14) IP cameras to be configured as per the settings below:

IP CAMERA SETTINGS

VX-3S28-OD-I-3	Res(2048x1536) FPS: 5, Bit Rate: 1000kbps, I Frame: 1, Use Audio NO
VX-4PV-B-RI	Res(1280x1024) FPS: 5, Bit Rate: 1000kbps, I Frame: 1, Use Audio NO



DIGITAL VIDEO RECORDER – VIGIL CLIENT SOFTWARE PERMISSIONS

USER GROUPS	SITE	RECORDING MANAGER	PASSWORD MANAGER	FULL ADMIN
PRIMARY TASKS	Monitor equip and Review images to be recorded	Protect and Export image recordings	Support users; administer user passwords	Set-up sites & Govern equip use, change and processes
POSITION/TITLE	Building Manager or staff	Building Manager	IT Rep (if applicable) Or Building Manager	IT/ Security Manager (if applicable) or Building Manager, CCTV Contractor
RECORDER SETTINGS				
Administrative Settings Dialog				Full
- Camera Setup Settings Tab				Full
- DVR Settings Tab				Full
- Media Drives Settings Tab				Full
- COM Ports Settings Tab				Full
- User Management Tab ***			Full	Full
- Relay/Alarms Settings Tab				Full
- Data Settings Tab				Full
- Audio Settings Tab				Full
CODEC Settings				Full
Recorder Controls	Full	Full	Full	Full
Allow Video Playback	Full	Full	Full	Full
Allow Video Export ***		Full	Full	Full
Allow Live View	Full	Full	Full	Full
Allow Live Feed Speeds Over 1 frame/sec	Full	Full	Full	Full
Socket Actitivity Form				Full
Allow Export File Browsing	Full	Full	Full	Full
Audio Recorder Controls	Full	Full	Full	Full
Allow Audio Live	Full	Full	Full	Full
Allow Audio Playback	Full	Full	Full	Full
Allow Audio Export	Full	Full	Full	Full
Allow Access to Custom Help Application	Full	Full	Full	Full
Exit DVR Application				Full
Shut Down DVR (Kiosk Mode)				Full
Camera (view cameras)	Full	Full	Full	Full
Camera: Build	Full	Full	Full	Full
Allow Camera Control	Full	Full	Full	Full
Auto Reply Chat Audio Request	Full	Full	Full	Full
Allow Update Configuration				Full

Outdoor elements to be confirmed including covered entry or patio, smoking area

Separate Module considered for additional storage, Recycling Storage and Refuse Storage

Ground Floor:
3 Accessible Units
16 Shelter Beds
7,702sf (715.5sm)

0 4 8 12 16 20 FT

A. SHELTER-SUPPORTED HOUSING CONCEPT 55 BEDS

BONI•MADDISON Architects 3732 West Broadway, Vancouver, B.C., V6R 2C1 T: 604 688 5894 F: 604 688 5899	**TITLE:** Ground Floor Plan A. Shelter-Supported Housing Concept **PROJECT:** BCHousing Modular Concepts	**ISSUES:**	**JOB No:** 17-40 **SCALE:** 1/16"=1'-0" **DRAWN:**	**DATE:** Dec.8,2017 **DRAWING No:** A1

Typical Floor:
18 Standard Units
7,702sf (715.5sm)

0 4 8 12 16 20 FT

A. SHELTER-SUPPORTED HOUSING CONCEPT 55 BEDS

BONI•MADDISON Architects 3732 West Broadway, Vancouver, B.C., V6R 2C1 T: 604 688 5894 F: 604 688 5899	**TITLE:** 2nd & 3rd Floor Plan A. Shelter-Supportive Housing Concept **PROJECT:** **BCHousing Modular Concepts**	**ISSUES:**	**JOB Nº:** 17-40 **SCALE:** 1/16"=1'-0" **DRAWN:**	**DATE:** Dec.8,2017 **DRAWING Nº:** A2

Outdoor elements to be confirmed including covered entry or patio, smoking area

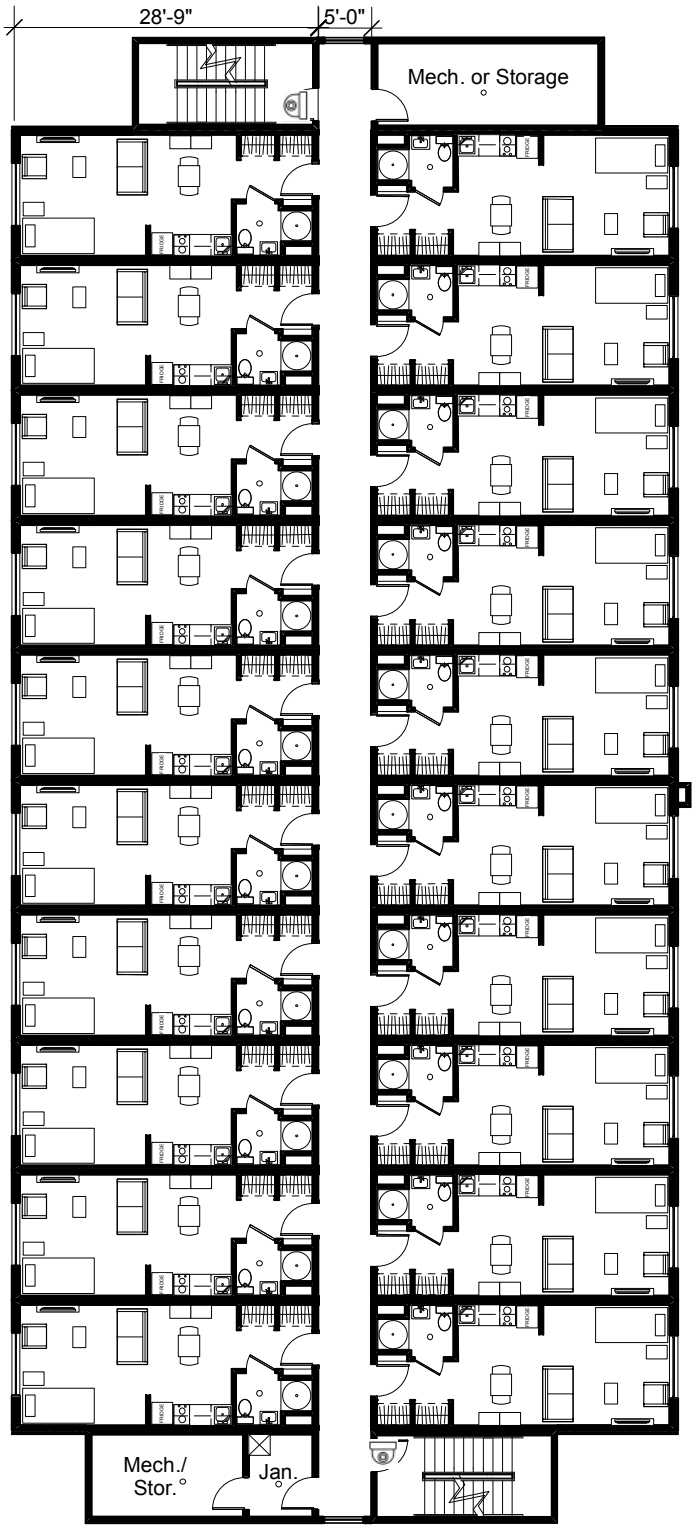
Separate Module considered for additional storage, Recycling Storage and Refuse Storage Heat Treatment

Ground Floor:
4 Accessible Units
8 Standard Units
8,469 sf (786.7sm)

0 4 8 12 16 20 FT

B. SUPPORTED HOUSING CONCEPT 1 - 52 UNITS

BONI•MADDISON Architects 3732 West Broadway, Vancouver, B.C., V6R 2C1 T: 604 688 5894 F: 604 688 5899	**TITLE:** Ground Floor Plan B. Supported Housing Concept 1 **PROJECT:** **BCHousing Modular Concepts**	**ISSUES:**	**JOB N°:** 17-40 **SCALE:** 1/16"=1'-0" **DRAWN:**	**DATE:** Dec.8,2017 **DRAWING N°:** B1

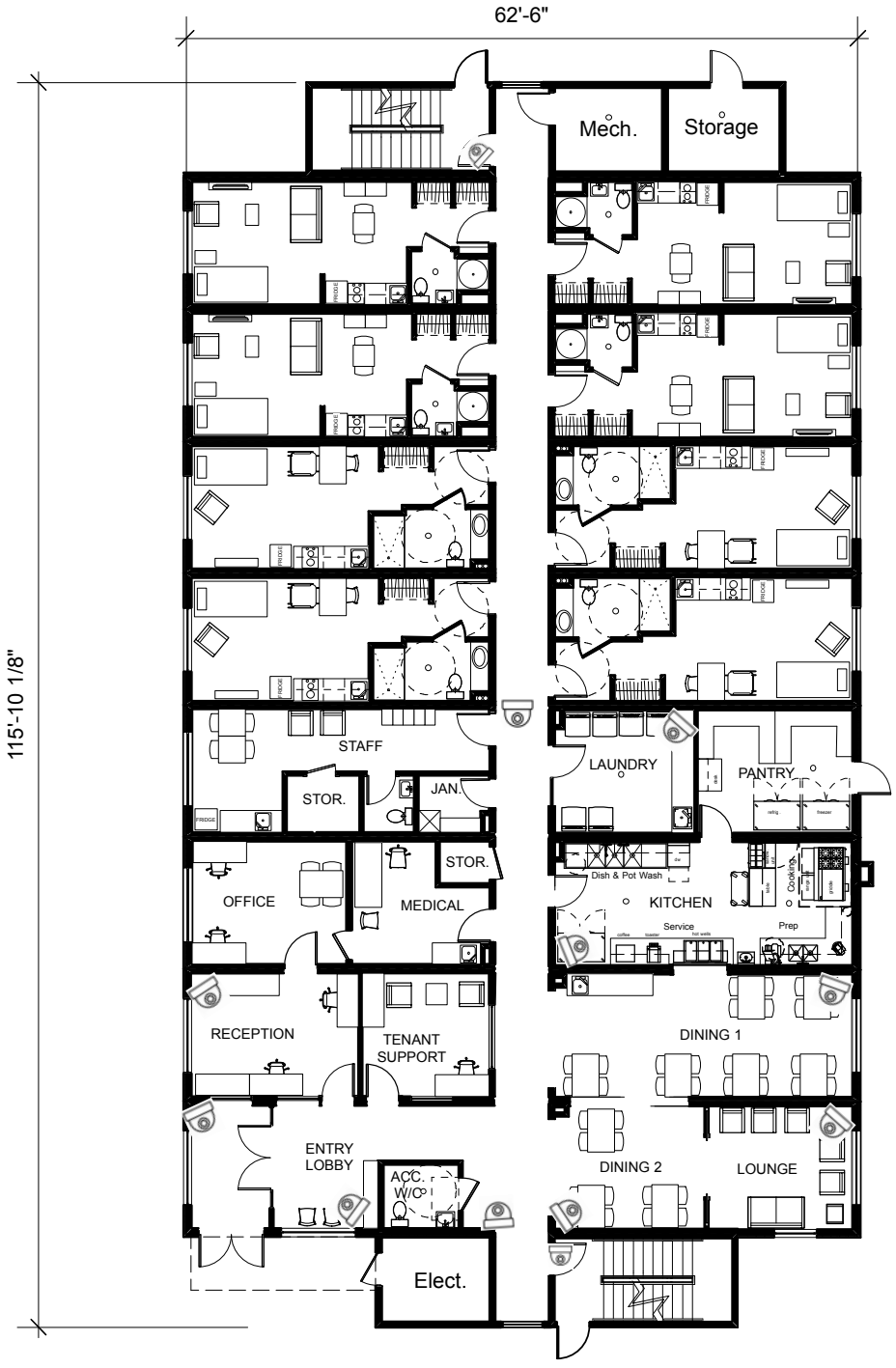


Typical Floor:
20 Standard Units
8,469 sf (786.7 sm)

0 4 8 12 16 20 FT

B. SUPPORTED HOUSING CONCEPT 1 - 52 UNITS

BONI•MADDISON Architects 3732 West Broadway, Vancouver, B.C., V6R 2C1 T: 604 688 5894 F: 604 688 5899	**TITLE:** 2nd & 3rd Floor Plan B. Supportive Housing Concept 1 **PROJECT:** **BCHousing Modular Concepts**	**ISSUES:**	**JOB No:** 17-40 **SCALE:** 1/16"=1'-0" **DRAWN:**	**DATE:** Dec.8,2017 **DRAWING No:** B2



Outdoor elements to be confirmed including covered entry or patio, smoking area

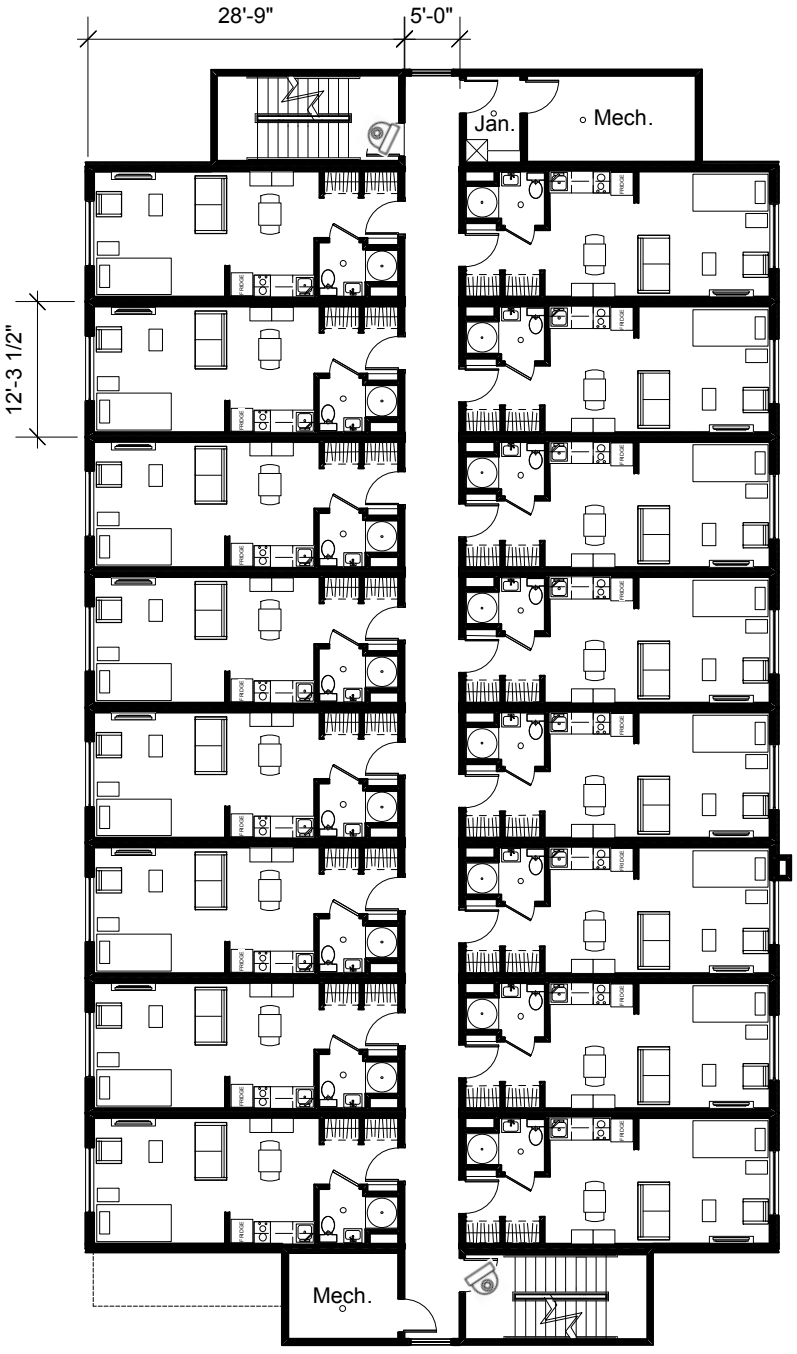
Separate Module considered for additional storage, Recycling Storage and Refuse Storage Heat Treatment

Ground Floor:
4 Accessible Units
4 Standard Units
6,838.5sf (635.3sm)

0 4 8 12 16 20 FT

C. SUPPORTED HOUSING CONCEPT 2 - 40 UNITS

BONI•MADDISON Architects 3732 West Broadway, Vancouver, B.C., V6R 2C1 T: 604 688 5894 F: 604 688 5899	**TITLE:** Ground Floor Plan C. Supported Housing Concept 2 **PROJECT:** BCHousing Modular Concepts	**ISSUES:**	**JOB Nº:** 17-40 **SCALE:** 1/16"=1'-0" **DRAWN:**	**DATE:** Dec.8,2017 **DRAWING Nº:** C1



Typical Floor:
16 Standard Units
6,838.5sf (635.3sm)

0 4 8 12 16 20 FT

C. SUPPORTED HOUSING CONCEPT 2 - 40 UNITS

BONI•MADDISON Architects 3732 West Broadway, Vancouver, B.C., V6R 2C1 T: 604 688 5894 F: 604 688 5899	TITLE: 2nd & 3rd Floor Plan C. Supported Housing Concept 2 PROJECT: BCHousing Modular Concepts	ISSUES:	JOB No: 17-40 SCALE: 1/16"=1'-0" DRAWN:	DATE: Dec.8,2017 DRAWING No: C2

1.0 FURNITURE AND APPLIANCE LIST FOR SUITES, COMMON AREAS AND OFFICES

(to be provided as part of construction contract)

Room / Area	Required	Comments
Resident Suite	1 standard twin 7" high mattress and 9" box spring with 14" high anodized steel platform base frame	Tight top mattress covered with heavy duty, fluid proof, fungal resistant and bed bug resistant fabric cover (5 year warranty). Platform base to be sag free and squeak free; heavy duty anodized steel construction that can support 3,500 lbs (Based on BC Housing procurement specs for bed bug proof beds and mattresses)
	1 dining table and 2 chairs	30" square table, steel frame with high pressure laminate (Arborite or equal) table top finish; chairs to be polypropylene fiberglass reinforced seat and back; stackable; with foot glides or rubber cap
	1 armchair	Wood or steel frame with padded seats covered with fluid proof, fungal resistant and bed bug resistant fabric
	1 dresser	Heavy duty wood construction; high pressure laminate finish; 48" W x 20"D x 30" H; 3 drawers with durable metal slides
	Fridge	Standard top-mount freezer unit, capacity 9.5-13.0 CF, maximum 24"Wx 61"H x 32” D.
	2 burner cooktop	
	Range hood	Match with the size of the cooktop. Remote switch at counter for fan and light for accessible units. CSA approval is required.
	Microwave oven	
Tenant Support Office	1 standard office desk	30" D x 48" to 60" W; laminate finish; provide lockable drawers
	Office chair	
	2 visitor chairs	
	1 coffee table	
Building Manager Office	1 standard office Desk	30" D x 48" to 60" W; laminate finish
	1 office Chair	
	2 visitor chairs	

Room / Area	Required	Comments
Reception Office	Custom reception counter with lockable roll-down aluminum shutter Or Custom open counter with lockable Dutch doors	High pressure plastic laminate millwork finish with pedestal drawers
	2 desks	
	2 office chairs	
Medical Room	Medical Examination bed	
	Stool	
	1 Office desk	
	1 Office chair	
	1 Visitor chair	
Common Dining	36" square dining tables and chairs for 4	Heavy duty, commercial grade steel frame with laminate table top finish; Numbers dependent on site requirement
Common Lounge	Individual lounge chairs	Commercial grade, individual lounge chairs; firm padded seats with fluid proof, fungal resistant and bed bug resistant fabric cover; Numbers dependent on site requirement
	2 Side tables	Wood, commercial grade, laminate finish 24" x 24"
	Wall-mounted flat screen TV	
Shelter Units	1 twin bed and mattress per resident (same specs as resident suite)	Number of residents per room dependent on site
	1 Locker per Resident	12" Wide Single Tier Standard Metal Lockers, 16 gauge steel, 60" H x 18" D
Staff Room	1 dining table 4 chairs	4' x 2.5' table
	Lockers	#s to be confirmed
	Microwave Oven	

- Furniture requirements noted above are preliminary and should be confirmed with the Operators and BC Housing. This list should be provided to the Design Builder for pricing.
- Design Builder shall provide furniture list, specifications and cut sheets for Owner's approval prior to delivery

2.0 LAUNDRY EQUIPMENT

Room/Area	Equipment / Fixtures	Comment
Tenant Laundry Room	Minimum 3 pairs washers and dryers- Commercial grade, front loading on raised platform (1 pair W/D per 15 residents) All mechanical and electrical rough-ins, ductwork and connections shall be provided as part of the building construction contract.	Operator shall confirm the type of laundry operations for each site. Common laundry shall be provided either through a lease/ maintenance contract or through provision of permanent washers and dryers as part of the building construction contract.
	Optional: To be provided only if specifically required by the Operator. One-Shot automatic laundry detergent dispenser for each washer; allow space beside the washer for storage of detergent http://www.knightequip.com/oneshot.html	Shall be arranged as part of a lease / maintenance contract arranged by the Operator.

3.0 COMMERCIAL KITCHEN EQUIPMENT AND APPLIANCES

Items	Equipment / Fixtures	Comment
Commercial Kitchen Equipment including commercial kitchen hood, fire suppression and pantry shelving	As listed in Attachment A (Commercial kitchen equipment list)	Part of construction contract scope
Small wares and small appliances for common kitchen and dining room	Pots and pans Utensils for food prep, cooking and serving Common dining dishes and cutlery Microwave oven Coffee brewer Toaster Blender Waste and recycling receptacles Etc	Shall be arranged as part of a lease / maintenance contract arranged by the Operator.