# WELL for residential

## HEALTH STARTS AT HOME

WELL for residential empowers you to create healthier, more resilient homes.

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# Introduction

## Health Starts at Home

The WELL for residential certification program is an evidence-based, third-party verified framework for developers, builders, operators, architects and designers to transform the way homes are designed, built and maintained to support health and well-being. From addressing air and water quality to selecting safer materials, the program includes more than 100 impactful strategies that are applicable to new and existing residences, including single-family homes, units in multifamily buildings and communities of homes.

WELL for residential is currently open for pilot enrollment. Participants can demonstrate their leadership and commitment to health within the residential market while providing feedback to shape the evolution of the program.

## Built on a Foundation of Health

WELL for residential is informed by the WELL Building Standard (WELL Standard), the leading global standard for health and well-being, which relies upon cutting-edge science to help deliver people-first places.

The International WELL Building Institute (IWBI) is the author of the WELL Standard and the global authority for transforming health and well-being in buildings, organizations and communities around the world.

## Background & Mission

Individuals spend the majority of their time inside their homes, where environmental and health standards are largely lacking.[1] Although the Universal Declaration of Human Rights states that "everyone has the right to a standard of living adequate for the health and well-being of [oneself] and of [one's] family," nearly all housing standards do not adequately address these basic rights, and many new homes are still constructed with elements that compromise human health and well-being.[2]

Through the WELL for residential program, we seek to transform the global residential market to ensure that everyone, no matter their background, has access to a home that enhances their health and enables them to make healthier decisions.

## Team Roles & Responsibilities

**Enrollee:** Enrollees are responsible for authorizing enrollment of the project owner (typically the builder, developer or asset owner) and the dwelling units that will undergo review. Enrollees will be required to validate various documents used to demonstrate that feature parts are satisfied. The enrollee will accept the agreement to participate in the WELL for residential program. An enrollee can be a representative from the entity that owns or has a right to possess or control the listed properties or a representative who is delegated responsibility by an entity or entities that own, possess or control the properties. Enrollees have the authority to hold and/or control location-relevant property and to authorize decisions pertaining to that property. In circumstances where multiple owners hold rights over an enrolled property or properties, a single enrollee must be identified as the authorized decision-maker for purposes of the WELL program. In such cases, the WELL team must submit a Confirmation of Primary Owner's Authority form, which is available upon request. The enrollee may sell the properties without affecting the status of the WELL Residence.

**Administrator:** Administrators act as project managers and oversee the process for pursuing WELL Residence certification. The administrator is the primary point of contact and must be copied on all correspondence with IWBI and the WELL Reviewer. This individual will also be the recipient of a comprehensive WELL report following documentation review, as well as the WELL Residence certification award package. The administrator is ultimately responsible for the overall quality of the documents submitted and is expected to complete a thorough quality control check of all documentation and forms prior to submission for review. The administrator can be a WELL Accredited Professional (WELL AP), the enrollee or another designated representative of the WELL team.

**WELL Coaching Support:** Upon payment of the enrollment or subscription fee, enrollees and administrators gain access to WELL coaching support and other resources. WELL coaching support is available to answer questions, share helpful tools and provide feedback and direction throughout the engagement with IWBI. Coaching contacts from IWBI do not play a role in approving feature submissions or certification rulings.

**WELL Reviewer:** After an administrator submits documentation, IWBI will assign a WELL Reviewer to the account. The WELL Reviewer is the individual responsible for reviewing submitted documentation to confirm achievement of feature requirements.

 

## Program Rules & Applicability

### Features and Scoring

WELL for residential consists of more than 60 features, each with a distinct intent to improve the health and well-being of residents. All WELL for residential features are optional; there are no mandatory requirements (in other words, no preconditions) other than the minimum eligibility criteria and additional requirements for existing buildings listed below.

Each feature consists of one or more parts, which detail the specific requirements, standards or thresholds that must be met. There are more than 100 parts within the WELL for residential program. Unless otherwise noted in the feature, parts can be achieved independently and in any order (e.g., a team can pursue Part 2 of a feature without pursuing Part 1).

Each part has an associated point value that contributes to the total number of points available for each feature. Point values are based on the potential health and well-being impact of each part. Some parts contain tiered point values with point values increasing for tiers with more stringent requirements.

*Table 1. Points Available for each WELL Concept*

| WELL Concept | Available Points |
|---|---|
| Air | 33 |
| Water | 23 |
| Nourishment | 10 |
| Light | 19 |
| Movement | 13 |
| Thermal Comfort | 19 |
| Sound | 19 |
| Materials | 20 |
| Mind | 13 |
| Community | 22 |
| Innovation | 20 |
| **Total** | **211** |

### WELL Residence Award

 

Each dwelling unit that achieves at least 40 points, as confirmed by the WELL Reviewer, becomes a certified WELL Residence. There is no minimum number of points required in each WELL concept to earn this certification.

Enrollees have the option to resubmit each dwelling unit for subsequent reviews to either increase the unit's point value or update the unit's WELL Residence award to a more recent year.

Enrollees also have the opportunity to submit for precertification. This is an optional preliminary design review that allows enrollees to communicate that the dwelling unit has been precertified under the WELL for residential program before substantial completion of construction. Each dwelling unit must demonstrate a commitment to implementing at least 40 points to become a precertified WELL Residence.

The precertification review requires documentation related to the design and future operation of the unit but does not require substantial completion of the unit (see *Reviews and Verification Method Types*). To certify the precertified unit as a WELL Residence, the enrollee must submit the remaining verification method types once the dwelling unit (and common areas, if applicable) is substantially complete.

For single enrollments wishing to pursue precertification, a portion of the program fee is due at the time of submitting for precertification review. These fees will be credited toward the program fees due at the time of the documentation review for the WELL Residence award. Under subscription pricing, no additional review fees are due as long precertification documentation is submitted as part of the enrollee's twice annual review cycles.

**Minimum Eligibility Criteria**

For enrollments with multiple dwelling units, enrollees are required to enroll all residences in a multifamily building or a community of single-family homes. The WELL for residential program applies to the individual dwelling units within each of these buildings or communities. To be eligible for a WELL for residential subscription, enrollees must enroll five or more locations.

Further, to be eligible for the WELL for residential program, all individual dwelling units must either:

- Offer living facilities for one or more people, including:

 

    - A kitchen that contains at least:
        - Hot and cold running water and a drain to support a sink.
        - A gas line or dedicated outlet with at least 208 V and 30 A service to support a cooktop and/or oven.
    - A separate bathroom that contains at least:
        - Hot and cold running water and a drain to support a sink.
        - Hot and cold running water and a drain to support a shower and/or bath.
        - Cold running water and a drain to support a toilet.
- OR, be zoned for or otherwise designated by a governmental entity as housing, which may include single-family homes, multifamily buildings, student housing, military housing and senior living facilities.

The WELL for residential program seeks to address:

- New construction and existing residences.
- Single-family homes and dwelling units within a multifamily building.
- Affordable and market rate homes.
- Homes for-rent or for-sale.
- Student and senior living accommodations.
- Residences in locations throughout the world.

**Additional Requirements for Existing Dwelling Units**

In addition to the Minimum Eligibility Criteria listed above, dwelling units constructed more than one year prior to enrolling in the WELL for residential program must meet the following criteria:

- Contain no visible peeling, chipping, chalking or cracking paint, stain or varnish.
- Contain no floor covering, insulation, siding and shingles that are friable (easily crumbled), damaged or otherwise not fully operational.

**Project Boundary**

All features must be met within the project boundary unless otherwise noted in the feature requirements. The project boundary includes:

- The interior of the dwelling unit.
- Any private exterior space associated with the dwelling unit (e.g., yards, balconies).
- Shared common spaces (e.g., lobbies, corridors, gyms, clubhouses).

 

In some instances, features indicate that they apply only to the dwelling unit. In these cases, the design of shared common spaces is *not* considered.

## Verification, Review & Award Process

### General Submission Requirements

As a third-party verified framework, the WELL for residential program requires the submission of specific verification documents to demonstrate compliance with feature part requirements.

The requirements within the WELL for residential program are not intended to conflict with local building code(s) or other applicable law(s). If certain feature part requirements are in conflict, the enrollee should submit the code(s)/law(s) with relevant sections highlighted in addition to the verification documentation showing compliance with remaining feature requirements.

When submitting for certification, construction must be substantially complete for all dwelling units and common areas undergoing a review. Submitted documentation must reflect current (as-is) conditions and not include future or planned conditions (e.g., planned amenities, future tree growth).

### Alternative Adherence Path (AAP)

The Alternative Adherence Path (AAP) process allows projects to submit alternate solutions for meeting requirements in the WELL for residential program. Proposals must meet the feature intent and be supported by cited scientific, medical and/or industry research.

Single enrollment receives 10 AAP submissions at no additional cost. Subscription receives 10 AAP submissions per year at no additional cost. Additional AAPs are available for a fee. Innovation proposals may be submitted in advance for review as AAP submissions.

### Verification Method Types

Each feature part outlines the verification documentation required to demonstrate compliance. Where more than one verification method type is listed, the feature language also indicates whether all or some of the verification method types are required.

All verification documentation submitted should include:

 

- A list of the feature parts for which the document is substantiating and the related page or section number of the document that provides substantiation.
- Identification (e.g., highlighting) of the relevant portion(s) of the document that substantiates compliance with the feature part(s).

Each verification method type falls into one of the following categories:

- Location-specific verification method types demonstrate compliance with feature parts that dependably vary based on location, making the documentation unique to a particular community, building or dwelling unit.
- Shareable verification method types demonstrate compliance with feature parts that do not vary based on location, allowing the documentation to be shared among multiple dwelling units.

The following verification method types are specified in the WELL for residential program:

- Location-specific:
    - Drawings.
    - Area maps.
    - Photographs.
    - Calculations and modeling reports.
    - Onsite test results.
- Shareable:
    - Specifications.
    - Proof of purchase (e.g., receipts, invoices).
    - Policy and/or operations schedules.
    - Letters of Assurance (LoAs).
    - Project team documentation.
    - Certificates from third-party programs.

These verification method types are further detailed in the Verification Method Types appendix. If precertification has not been pursued, all relevant verification method types for each feature part being pursued must be submitted with the certification documentation.

When documenting for precertification, the following verification method types may be required to be submitted, based on what is relevant for each feature part being pursued:

 

Location-specific (audited units only)

- Drawings.
- Area maps.
- Calculations and modeling reports.

Shareable (shared across units in the same feature set)

- Specifications.
- Policy and/or operations schedules.
- Letters of Assurance (other than for contractor).
- Professional narrative
- Certificates from third-party programs.
- Project team documentation.

Then, when documenting for certification, all remaining verification method types, as relevant for each feature part being pursued, must be submitted. Additional verification method types that are uniquely relevant when documenting for certification include:

- Photographs.
- Onsite tests.
- Proof of purchase.
- Letters of Assurance (for contractor).

Documentation still in draft may be submitted for precertification review. Drafts must still contain sufficient detail for review but need not reflect final design decisions. For example, draft specification submissions could include several lighting products under consideration, each of which meets the WELL requirements, without needing to identify which of those has been selected for installation. When drafts are submitted, the WELL Reviewer will award the feature as "Achieved – Precertification Only." This review status indicates that the feature part is conditionally verified with intent-stage documentation and requires additional implementation-stage documentation at certification review. This status is also used when design-based documentation is submitted (e.g., drawings, maps)

Otherwise, implementation-stage documentation can be submitted during precertification review. In this case, the WELL Reviewer will award the feature as "Achieved." This review status indicates that the feature part is fully verified with implementation-stage documentation and does not require any additional

 

documentation during the certification review, provided that the previously submitted documentation still represents what was implemented in the project boundary.

Feature parts pursued for precertification must include at least one verification method type eligible for that stage. For example, one documentation pathway for Feature R-A02 Part 1 is to provide specifications and receipts/invoices for air cleaning devices. This feature could be documented for precertification by submitting the specifications for the devices that will later be installed. Then, to demonstrate compliance with the feature part for certification, the receipts/invoices showing that the device(s) had been purchased would need to be submitted.

**Feature Tags**

The achievement of certain feature parts requires that a specific scope of work, which may not be within the control of all project teams, be implemented. We have tagged feature parts according to the following themes to help project teams more easily identify feature parts that may not be within their scope of work. These tags cover the following themes:

***Common Space:*** Requires a dedicated space shared amongst multiple dwelling units (e.g., resident lounge, multipurpose room, clubhouse).

***Construction Practices:*** Requires recent construction activity and/or knowledge of construction processes.

***Services and Policies:*** Requires ongoing property management and/or regulations (e.g., cleaning services, homeowner association policies, covenants).

***Neighborhood Attributes:*** Determined based on conditions of and/or amenities within the project boundary or surrounding community.

***Onsite Testing:*** Requires an onsite test conducted as described in the corresponding verification method type.

**Onsite Testing**

Some feature parts must or can be verified through onsite testing of indoor environmental conditions. The following features reference onsite testing:

- Air
    - R-A01 Ventilation Design
    - R-A03 Pollution Infiltration Management
    - R-A07 Indoor Air Quality
    - R-A08 Radon Risk Mitigation
- Water
    - R-W02 Water Testing
- Thermal Comfort
    - R-T04 Humidity Control
- Sound
    - R-S01 Sound Barriers
    - R-S03 HVAC and Building Service Noise Levels
    - R-S04 Environmental Noise Levels

Some features are structured so that there is an onsite testing option and a prescriptive/design option, while others only include an onsite testing option.

Onsite tests must be conducted by the professionals indicated in the WELL for residential Performance Verification Guidebook. For certain features, enrollees have a choice to engage a WELL Performance Testing Agent from IWBI's network of WELL Performance Testing Providers. Enrollees select and contract directly with their chosen service provider(s).

A WELL Performance Testing Agent is an individual who conducts on-site performance testing to satisfy specific feature requirements. These individuals work for WELL Performance Testing Providers. All WELL Performance Testing Agents undergo training to evaluate on-site environmental parameters according to WELL testing protocols and equipment specifications. A list of approved WELL Performance Testing Providers is available online on IWBI's website at https://www.wellcertified.com/performance-verification. WELL Performance Testing Providers must demonstrate that there is no conflict of interest with the enrollee and administrator.

**Reviews**

During the review process, the WELL Reviewer will examine documentation and onsite testing results to confirm compliance with feature requirements. The

 

number of review cycles depend on whether the enrollment is a single enrollment or a subscription.

Single enrollments receive up to two review cycles, one for precertification review (optional) and one for documentation review, over a three-year term (as selected at the time of enrollment). All dwelling units within a single enrollment must:

- Be in the same building or community
- Pursue the same set of feature parts
- Submit for review at the same time

Subscriptions receive up to two review cycles per subscription year and renew annually. Each review cycle may include dwelling units that are:

- Seeking precertification and/or certification
- Located in multiple buildings or communities
- Pursuing up to five different sets of feature parts

Prior to the commencement of a review, all dwelling units reviewed must be associated with a set of features and meet the following criteria:

- Each dwelling unit pursuing a feature must consistently implement each feature part being reviewed. For example, if a feature part requires a specific design or product specification, the same design and/or product must be utilized in each dwelling unit pursuing that feature part.
- Where the feature part offers multiple options for compliance, all dwelling units must use the same option.
- For tiered features, all dwelling units must target the same tier. If units achieve different tiers, all units will be awarded the lowest tier achieved by that grouping of units.
- If an auditable feature (see Review and Award Process below) is pursued in some, but not all, of the dwelling units, audit selection in excess of the minimum may be required to ensure that each audited feature is represented.

**Review and Award Process**

Each review is performed by a third-party WELL Reviewer who is assigned by IWBI. The WELL Reviewer is the individual responsible for reviewing verification documentation to confirm achievement of the feature part requirements.

 

Each review cycle includes a preliminary review phase and a final review phase, as outlined below. If any additional phases of review are required, additional fees apply.

If any minor questions arise or additional information is needed during either review phase, this is communicated as a Mid-Review Clarification (MRC). MRCs will pause the review and must be responded to within 30 days or they will be included as official comments when the review report is returned.

The review process is as follows:

- **Pre-submission**: The enrollee submits a cover sheet identifying the units included in the review cycle. Under a subscription, if the review cycle includes multiple sets of features, the enrollee indicates which dwelling units are tagged to each set of features. (Each review cycle in a subscription may have no more than five different sets of features pursued amongst the dwelling units being reviewed.)
- **Audit requirement:** Audits streamline the review process for multiple dwelling units that are pursuing the same feature part when the verification method type is location-specific. Units will be randomly selected by IWBI for audit after dwelling units have been identified by the enrollee during pre-submission. The number of audited units is equal to the square root of the number of units submitted and rounded down. Under a subscription, if there are multiple buildings or communities in the same review cycle, the number of audited units is distributed according to the size of the building or community. (Exception: certain features involving onsite tests have different auditing rules. See the WELL for residential Performance Verification Guidebook for more details.) A WELL Reviewer may also audit documentation marked as "shareable" when the feature implementation strategy may vary by location (such as through a customizable operations schedule utilized by different cleaning vendors). For existing residences that are currently occupied, please see the WELL for residential Performance Verification Guidebook for exceptions. If an audited dwelling unit fails to provide passing documentation or otherwise meet the requirements of an audit, all dwelling units pursuing that feature within the review cycle will not be awarded the feature.
- **Preliminary review phase:** The enrollee submits location-specific documentation for the audited dwelling units, as well as all relevant shareable documents for all units in the review cycle. If the verification documentation is identical for multiple audited dwelling units (for

 

example, a floor plan that is repeated over several units), the document can be identified as applying to each relevant audited dwelling unit. No additional location-specific documentation is required for dwelling units not selected for the audit. A WELL Reviewer conducts a preliminary review and responds with comments to indicate whether documentation is satisfactory or what additional information is needed. A WELL Reviewer also indicates whether any documentation is inaccurate, unsatisfactory or missing.

- **Final review phase:** The enrollee submits amended or additional documents as needed based on preliminary review comments from the WELL Reviewer. A WELL Reviewer conducts a final review and responds with a final review report. The final review report indicates the number of points earned by each dwelling unit and awards the WELL Residence certification to all qualifying dwelling units.

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## Glossary

*Glossary terms are identified within the feature language by* **bold, orange text**.

**Active ingredient:** A chemical that causes the intended effect of a product (e.g., deters pests or provides antibacterial properties).

**Acoustic insulation**: A material specifically designed to reduce the transmission of sound through a building's structure (e.g., walls, floors, and ceilings). Additionally, it adds mass, which blocks noise from entering or escaping a space.

**Adhesive**: Any substance that holds materials together (i.e., by surface attachment), thereby resisting separation.

**Aeroponic:** A type of farming system that grows plants without soil, in an air or moist environment. These systems use less energy and water than traditional agriculture.

**Antimicrobials:** Substances that kill or stop the growth of microorganisms, such as bacteria or mold.

**Architectural screen:** Semi-transparent panels attached to the outermost layer of the building that allow air and light to pass. Also known as a façade screening, decorative screening or a tensile façade.

**Available ceiling area:** Sections of the ceiling where surface finishes (e.g., direct mounted or suspended acoustical panels) may be applied. Excludes portions of the ceiling that house skylights, lighting fixtures, exposed HVAC, recessed speakers or other features that are built-out from or around the finished ceiling.

**Available wall area:** Sections of the finished walls where additional surface finishes (e.g., direct mounted or framed acoustical panels) may be applied. Excludes portions of the wall where other features or equipment are installed, such as millwork, cabinetry, furniture, doors, fenestration and switches/outlets.

**Bathroom:** Room containing toilet facilities for resident use. Bathrooms may or may not contain other facilities such as showers or baths.

**Cabinetry**: Non-movable furniture, specifically cabinets, that are used for storage. Cabinetry is considered a type of millwork.

**Carpet**: A textile-based floor covering (typically consisting of an upper layer of pile (usually fabric) attached to a backing) which is permanently installed (i.e., with adhesive coatings or stickers). While it usually extends to cover the entire floor, carpets may cover a section of a room.

**Coatings**: A liquid or liquid-applied substance that forms a protective layer on surfaces, safeguarding them from stains, spills, dust, UV rays, and other damage. This protective layer is used to simplify maintenance and extend the life of the surfaces.

**Common fitness room:** A room separate from dwelling units where moderate- to vigorous-intensity exercise takes place (e.g., rooms with treadmills or free weights, rooms designed to accommodate dancing or jumping).

**Common space:** An area within a residential community or building that is accessible to residents outside of the individual dwelling units (e.g., corridors, lobby, amenity spaces). Excludes areas inaccessible to residents and dedicated to building services.

**Community-supported agriculture:** A system that allows consumers to subscribe to the harvest of a food producer (individual or farm) by providing payment upfront and early in the growing season. Consumers, or subscribers, receive fresh produce and other farmed goods on a defined schedule during the growing season. Also known as a CSA.

**Cooktop:** A surface with a burner for food preparation, typically located in the kitchen. May include a stove, stovetop or range.

**Countertops**: Flat, stationary surfaces that are permanently installed on top of kitchen cabinets or bathroom vanities. They are used as a durable work surface for food preparation, personal washing, or other tasks.

**Cycling network:** Routes of travel that are dedicated to cyclists through some type of demarcation (e.g., sharrow or other type of pavement marking) and allow cyclists to travel on a dedicated or shared path between origins and destinations.

**Dead leg:** A section of a water pipe that is closed at one end so water cannot flow through it.

 

**Deadbolt lock:** A bolt on a lock that engages by turning a knob or key, rather than by spring.

**Dedicated right of way:** A lane reserved for specific modes of transportation (e.g., a subway track, bike path or a bus lane that is separated from automobile traffic).

**Design duty:** The designed and commissioned operating conditions for HVAC equipment.

**Doorset:** A door and its associated frame, locks, fittings and/or glazing as one combined unit.

**Electronic air cleaners:** Air cleaners that utilize electrostatic attraction to remove particles from the air. Particle removal is typically accomplished by imparting an electrical charge to particles or by generating ions and 1) collecting particles on a mechanical filter, an electrically charged plate or other medium (e.g., electrostatic precipitators) or 2) allowing the charged particles to agglomerate or deposit onto surfaces (e.g., ionizers, plasma, corona discharge).

**Elevator:** A platform lift that vertically raises and lowers individuals.

**Engineered wood flooring**: A type of flooring made of multiple layers of wood, typically with a real wood veneer on top and a plywood or high-density fiberboard (HDF) core and can include acrylic impregnated flooring.

**Floor/ceiling assembly:** The composite construction between the top layer of the finished floor and either the finished or exposed ceiling below. May include the structural slab, ceiling plenums, resilient underlayments, isolation hangers and joists.

**Functional building entrance:** A building entry/exit designed to be used by pedestrians (or cyclists, as appropriate) and is open (or unlockable) to residents. It does not include any entry/exit exclusively designated as an emergency exit. May include a garage door if it is designed as a pedestrian (or cyclist) entrance.

**Grout**: A type of mortar, used to fill gaps between tiles or stones. It serves as a protective barrier against moisture and enhances the structural integrity of the surface. Primarily a sealant with adhesive properties, grout fills and seals the gaps between tiles. While it strengthens the bond between tiles, it is primarily

 

used to fill grout joints and safeguard the surfaces behind tiles from moisture and dirt.

**Gypsum board**: A building material widely used to construct interior walls and ceilings. It consists of a plaster core (made from gypsum, water, and additives) which is sandwiched between two layers of heavy paper or paper-like material. Another term for gypsum board is drywall.

**Hallway:** A space between two or more rooms whose primary function is passage.

**Hardy groundcover plants:** Low-growing plants that are tolerant of extreme temperatures and climate conditions, such as direct sunlight and drought, and which provide continuous cover of a surface.

**High-humidity areas:** Spaces specifically designed to operate under and withstand high levels of relative humidity (e.g., spaces containing a shower or pool).

**Hinge pin:** A cylindrical piece that holds together the two arms of a hinge and allows them to pivot freely around the pin.

**Hydroponic:** A type of farming system that grows plants without soil, using a solution of water and nutrients instead. These systems use less energy and water than traditional agriculture over a plant's lifetime.

**Interior paint:** A coating designed for indoor surfaces like walls, ceilings, and other surfaces. It is primarily used to enhance aesthetics and withstand everyday wear and tear, including scuffs and stains.

**Landscape break:** A section of vegetation installed in-between sections of paved areas.

**Limited access highways:** Highways that cannot be accessed directly from adjacent roads and driveways except at specific points such as via exits or on-ramps.

**Long-term bike parking:** Bike parking that is sheltered from weather elements and provides added security to users to allow them to store a bicycle for an extended period of time. Long term parking may include a variety of designs appropriate for different contexts such as individual bike lockers, bike rooms, or valet services, and may be indoors or outdoors. Note that bike rooms designed

 

for long-term bike parking should include bike racks or other infrastructure that allows users to lock their bicycle within the space.

**Main building entrance:** The entry point into a building from the exterior that is most regularly used by residents, visitors and staff. In the case of a single-family home, townhome or other dwelling unit that is directly accessible from the outside, this is the same as the main dwelling unit entrance.

**Main dwelling unit entrance:** The entrance to the dwelling unit that is most regularly used by residents.

**Millwork**: Woodwork that is manufactured offsite in a mill for use in construction/interior finishing (e.g., doors, windows, moldings, shelving, cabinetry). A key benefit of millwork is its potential for custom design and production to meet specific design aesthetics and functional requirements. Millwork can also include stock items that are mass-produced for a more budget-friendly option.

**Noise Reduction Coefficient (NRC):** The single number rating from 0.00 to 1.00 for sound absorption calculated in accordance with ASTM C423 from 250 Hz to 2 kHz. NRC gives equal weighting across all frequencies. A higher NRC denotes a greater ability to reduce sound reflection.

**Occupiable:** Spaces in which people frequently spend time, regardless of task or activity. This includes circulation areas, bathrooms, balconies and garages but excludes spaces which are rarely accessed, such as storage spaces and equipment rooms.

**Party walls:** Partitions that separate dwelling units from other dwelling units or from common spaces.

**Plumbing system:** The arrangement of pipes, pumps, valves, fixtures and water treatment devices that convey water within a building.

**Privacy lockset:** A door lock that can be locked from the inside by a button or turn piece and unlocked from the outside with a generic tool (i.e., without a key).

**Qualified professional:** A person with training and/or demonstrable experience to perform a specific task. May require specific credentials depending on the task.

 

**Regularly occupied:** Spaces in which an individual normally spends at least one continuous hour or at least two hours per day cumulatively. This includes bedrooms and kitchens but excludes bathrooms and corridors.

**Sealant**: A substance that fills gaps and cracks in building materials and on surfaces. Typical applications for interior sealants include gaps around window frames, baseboards, crown molding, and other interior trim elements. They are also used to seal joints in areas like bathrooms and kitchens, where moisture resistance is important.

**Sealers**: Coatings that penetrate and protect wood by forming a protective barrier on its surface and effectively blocking pores. This is used to prevent alterations to the wood through moisture, chemicals, dirt, and sun damage.

**Short-term bike parking:** Bike parking designed to meet the needs of visitors that focuses on ease of use and access. Common rack styles include an inverted U or a post and ring.

**Solar reflectance (SR):** The value of a material's ability to reflect solar energy away from its surface. The value ranges from 0 (absorbs all energy) to 1.0 (reflects all energy).

**Solar reflectance index (SRI):** The value of a material's ability to retain heat when its surface is in contact with solar energy, which factors in a material's solar reflectance (SR) and its ability to release absorbed energy (emissivity). The value ranges from 0 (black) to 100 (white).

**Standalone:** Independently operable and not built-in; typically moveable or demountable.

**Studio:** A dwelling unit consisting of a single room that serves as the bedroom, living room and kitchen/dining room, with a separate bathroom.

**Supermarket:** A food retail establishment selling all major categories of food (i.e., fruits, vegetables, grains, protein foods and dairy) that, when compared to a convenience store, is typically larger in size and offers a greater variety of foods.

**Thermal insulation**: A material specifically designed to create a barrier to reduce the transfer of heat between areas that are expected to have different temperatures (e.g., exterior walls, roofs, foundations). It slows the transfer of heat, thereby improving energy efficiency and comfort.

 

**Walking distance:** The distance between two points measured along a path taken by a person to travel from one point to another (i.e., not the radial distance). In outdoor environments, the route should be measured along a pedestrian-friendly path, such as a sidewalk or all-weather path.

**Wallcovering**: A flexible sheet of paper, fabric, plastic, or other material (typically laminated and printed with a repeating pattern), which is pasted on walls and used as a decorative treatment.

**Windbreaks:** Rows of natural (e.g., trees, shrubs) or artificial structures that protect an area from wind.

**Wood composites:** Composite wood is a manufactured product that combines wood particles, fibers, veneers, or wood byproducts (such as sawdust and chips) with adhesives, resins, and other materials to create a stable and uniform panel or composite material. Common types include hardwood plywood, particleboard, and medium-density fiberboard (MDF).

**Workstation:** A space that is outfitted with the furnishings, accessories and equipment (e.g., desk or work surface, chair, computer) necessary for users to perform tasks ascribed to their job function. Excludes conference rooms or breakout rooms, phone booths and surfaces intended for use temporarily (e.g., high-top tables).

**Zero-step:** Accessible without the use of stairs but may include gentle slopes and small thresholds.

 

# Air

## R-A01 Ventilation Design

**Intent:** Reduce indoor air contaminants by providing access to sufficient outdoor air and exhausting indoor air through mechanical systems.

**Issue:**

- In-home air pollution has been linked to numerous health conditions, including poor birth outcomes, respiratory infection, heart disease, lung disease, cancer and death.[3,4,5]
- Air pollutants can originate within the home from sources such as cleaning, cooking and new furnishings, or infiltrate from outside of the home.[6,7,8]
- Some individuals are more sensitive to indoor air pollutants than others due to pre-existing conditions, age, long-term exposure and other health-affecting factors.[9,10]

**Impact:**

- Mechanical ventilation in homes can enhance indoor air quality and may lead to improved health.[11,12]
- Increasing air exchange rates in homes may result in decreased indoor air pollution.[7,13,14]
- Kitchen and bathroom exhausts have been shown to reduce air pollution and enhance air quality.[11,15,16]
- Cooktop exhausts are an effective strategy for capturing and removing contaminants generated from cooking.[16,17,18]
- Demand-controlled ventilation systems can enhance the air quality in homes by turning on automatically to reduce elevated contaminant build-up.[19,20,21]

**Part 1. Install Mechanical Exhausts (1 point)**

The dwelling unit meets the following requirements:

a. **Bathrooms** and kitchens have localized mechanical exhaust systems that exhaust air to the outdoors at the airflow rates as outlined in the table below:[22]

| Location | Continuous Rate | Intermittent or Demand-controlled Rate |
|---|---|---|
| Kitchens | ≥ 5 ACH, based on room volume | ≥ 170 $m^3$/h [100 CFM] range hood OR ≥ 510 $m^3$/h [300 CFM] / 5 ACH for other kitchen exhausts, based on room volume |
| **Bathrooms** that contain showers or baths | ≥ 34 $m^3$/h [20 CFM] | ≥ 85 $m^3$/h [50 CFM] |

b. If present, clothes dryers meet one of the following:
    i. Are vented to the outdoors.
    ii. Are designed to be ventless through condensing or heat-pump methods.
c. Intermittent (i.e., non-continuous) exhausts are equipped with dampers that automatically close when the system is off.[23]

Verification (meet one):

- Provide Letter of Assurance by an HVAC professional or mechanical engineer and photographs that show the qualifying exhaust system and controls.
- Provide mechanical drawings that show the qualifying exhaust system and controls.
- Provide specifications and purchase orders or invoices for the qualifying exhaust system and controls.

**Part 2. Provide Outdoor Air (1-2 points)**

*Note: This part requires Part 1 of this feature to be achieved.*

The following requirements are met:

a. One or more supply vents are installed to deliver outdoor air through a mechanical ventilation system sized to cover the entire **occupiable** area of the dwelling unit according to one of the tiers in the table below:

| Tier | Points | Supply Vent Distribution |
|---|---|---|
| 1 | 1 | At least one supply vent in the dwelling unit. |
| 2 | 2 | At least one supply vent in each **regularly occupied** room in the dwelling unit. |

b. A mechanical ventilation system supplies outdoor air to the following **common spaces**, as applicable:
    i. Lobbies.
    ii. **Bathrooms**.
    iii. Corridors.
    iv. Kitchens.
    v. Office and coworking areas.
    vi. Entertainment areas.
    vii. Fitness rooms.
c. Outdoor air intakes meet one of the following:
    i. Are located at least 3 m [10 ft] away from exhaust vents, loading zones and combustion sources.[24,25]
    ii. If feature *R-A02 Part 2. Implement Filtration for Outdoor Air Systems* is achieved, are located at least 1.8 m [6 ft] away from exhaust vents, loading zones and combustion sources.
d. Outdoor air intakes and exhausts have dampers that automatically close when the system is off.[23] (Continuously operated exhausts do not require dampers.)

Verification (meet one):

- Provide Letter of Assurance by an HVAC professional or mechanical engineer and photographs that show the mechanical ventilation system.
- Provide drawings that show the mechanical ventilation system design, location of all ducting, ducting dampers and controls.

**Part 3. Validate Ventilation (2 points)**

*Note: This part requires Part 1 of this feature to be achieved.*

***Tags: Onsite Testing***

The following requirements are met:

a. Ventilation rates are designed to meet +/- 25.5 $m^3/h$ [15 CFM] or +/- 15% of the supply rates (including infiltration, if applicable) and exhaust rates set in at least one of the following guidelines:
    i. Dwelling units: ASHRAE 62.2-2019 or newer; CIBSE Guide B2: Ventilation and Ductwork; NBN D 50-001; DIN 1946 Part 6, UK Building Regulations Document F; Ireland Technical Guidance Document F.[26,27]

 

ii. If present, **common spaces**: ASHRAE 62.1-2019 or newer; EN 16798-3:2017; CIBSE Guide A: Environmental Design (version 2007 or newer); AS/NZS 1668.1:2015 or newer.[26]

b. If the total length of ducting in the dwelling unit exceeds 3 m [10 ft], the duct leakage limits are tested to meet the thresholds specified in the table below:[28]

| Number of Returns | Overall Leakage Limit |
|---|---|
| < 3 | The greater of:<br>● ≤ 14.6 $m^3/h$ per 10 $m^2$ [8 CFM (at 25Pa) per 100 $ft^2$] of conditioned floor area.<br>● ≤ 135.9 $m^3/h$ [80 CFM (at 25Pa)]. |
| ≥ 3 | The greater of:<br>● ≤ 21.9 $m^3/h$ per 10 $m^2$ [12 CFM (at 25Pa) per 100 $ft^2$] of conditioned floor area.<br>● ≤ 203.9 $m^3/h$ [120 CFM (at 25Pa)]. |

Verification:

- Provide the following from a **qualified professional**, as applicable:
  - Mechanical drawings or calculations showing the length of ductwork and demonstrating that the HVAC system has been designed to meet ventilation rate guidelines.
  - Results demonstrating that the ducts have been tested to meet leakage thresholds.

**Part 4. Install Cooking Exhaust Systems (1 point)**

All kitchens meet the following requirement:

a. Include a range hood that meets the following:
   i. Is located directly above all **cooktops** and covers at least 75% of the **cooktop** area.[29]
   ii. Vents exhaust air directly outdoors.[30]
   iii. Utilizes exhaust air outlets that are separated from any air intakes by at least 3 m [10 ft] unless otherwise specified by local code.[31]
   iv. Exhausts air at a minimum operating rate of 150 L/s per linear meter [100 cfm per linear foot] of range hood width or 142 L/s [300 cfm], whichever is greater.[32]

 

Verification (meet all):

- Provide drawings of the kitchen exhaust system, including the location of hood and exhaust ducts.
- Provide specifications and purchase orders or invoices for the kitchen exhaust system.

**Part 5. Provide Demand-Controlled Ventilation (1 point)**

*Note: This part requires Part 1 and Part 2 of this feature to be achieved.*

The following requirements are met:

a. A demand-controlled ventilation system is designed to regulate the outdoor air supply rate to maintain indoor carbon dioxide ($CO_2$) levels below one of the following thresholds:[33]
   i. 1000 ppm.
   ii. No more than 600 ppm above outdoor levels.
b. At least one $CO_2$ monitor is installed per air handling unit.
c. $CO_2$ monitors are located within **regularly occupied** spaces.
d. $CO_2$ measurements are shown continuously on a display screen in the dwelling unit or are accessible on a website or mobile application.[33]

Verification (meet one):

- Provide Letter of Assurance by an HVAC professional or mechanical engineer and photographs that show the qualifying ventilation system.
- Provide drawings that show the design, layout and performance of the ventilation system.

## R-A02 HVAC Filtration and Treatment

**Intent:** Reduce airborne contaminants by providing filtration and other treatments.

**Issue:**

- Indoor air in homes can contain infectious microbes, such as viruses and bacteria, as well as allergens.[34,35,36]
- Prolonged exposure to airborne contaminants may lead to adverse health effects, especially among individuals with pre-existing conditions and sensitivities.[37,38,39]

- Negative health effects associated with exposure to particulate matter include but are not limited to cardiovascular disease, asthma, bronchitis, lung cancer and premature mortality.[39,40]

**Impact:**

- Air filters can enhance indoor air quality by reducing contaminants (such as particulate matter, allergens and microbes) and may lead to improved respiratory and cardiovascular health.[38,41,42]
- Ultraviolet lights installed in air handling equipment can inactivate airborne microbes and improve indoor air quality.[42,43]
- Providing filtered outdoor air into the home can help reduce the health risks associated with poor air quality by diluting indoor contaminants.[44]

**Part 1. Improve Indoor Air Quality (2 points)**

Air filtration or cleaning systems, either in the HVAC system or as **standalone** devices, meet the following requirements:

a. Treat the air in **regularly occupied** rooms within the dwelling unit.
b. Are sized appropriately to the room volume, based on manufacturer specifications.[45]
c. Utilize at least two of the following technologies:
    i. Media filter with an average removal efficiency of greater than or equal to 50% for particles 0.3-1 µm in size (e.g., MERV 13 or F8).
    ii. Activated carbon filter.[46]
    iii. 254 nm ultraviolet lamps designed to treat moving air.[47]
d. Are not designed to release ions, reactants or other molecules into **occupiable** spaces to treat the air.[48]
e. If present, **electronic air cleaners** are validated under UL 2998 Zero Ozone Emissions Validation or Intertek Zero Ozone Verification.[45]

Verification (meet one):

- Provide Letter of Assurance by an HVAC professional or mechanical engineer and photographs that show the air treatment systems.
- Provide specifications and purchase orders or invoices for the qualifying air treatment systems.

**Part 2. Implement Filtration for Outdoor Air Systems (1 point)**

*Note: This part requires Part 2 of feature R-A01 Ventilation Design to be achieved.*

The following requirement is met:

a. Media filters with an average removal efficiency of greater than or equal to 50% for particles 0.3-1 µm in size (e.g., MERV 13 or F8) are used to filter the outdoor air supply.[49]

Verification (meet one):

- Provide Letter of Assurance by an HVAC professional or mechanical engineer and photographs that show the qualifying media filters.
- Provide specifications and purchase orders or invoices for the qualifying media filters.

**Part 3. Implement Surface Ultraviolet Treatment (1 point)**

The following requirement is met:

a. The surfaces of all cooling coils and drain pans are irradiated by 254 nm ultraviolet lamps when the cooling system is operational.[50]

Verification (meet one):

- Provide Letter of Assurance by an HVAC professional or mechanical engineer and photographs that show the qualifying UV equipment.
- Mechanical drawings showing the placement of the qualifying UV equipment.
- Specifications and purchase orders or invoices for the qualifying UV equipment.

**Part 4. Maintain Air Treatment Systems (1-2 points)**

*Note: This part requires Part 1, Part 2 or Part 3 of this feature to be achieved.*

***Tags: Services and Policies***

An air treatment maintenance plan provides the following services to residents at no additional cost:

a. Maintenance activities for all standalone and HVAC-integrated air treatment devices installed/provided by the developer, as described in one of the tiers below:

| Tier | Points | Maintenance Requirements | Interval |
|---|---|---|---|
| 1 | 1 | Provision of replacement components (e.g., filters, lamps) | Manufacturer's recommendation |
| 2 | 2 | General inspection | Annually |
| | | Cleaning (e.g., fans, pre-filters) | |

| | | |
|---|---|---|
| | Maintenance and adjustment (e.g., fans, lubrication, sensors, thermostats, wiring) | Manufacturer's recommendation AND as necessary per inspection |
| | Provision and installation of replacement components (e.g., filters, lamps) | Manufacturer's recommendation |

*Note: Shared HVAC system components with the primary purpose of supporting heating, cooling, de/humidifying or moving air (e.g., coils, condensate equipment, ducts, fans) are not subject to these requirements. Maintenance of these components are addressed in Feature R-T01 Thermal Performance Part 3.*

Verification (meet all):

- Provide a list of all standalone and HVAC-integrated air treatment devices.
- Provide one of the following:
    - A budget that details and incorporates the applicable services being provided or contracted.
    - A contract with a **qualified professional** or service provider for applicable services.
    - A description provided to residents of the maintenance service offering.

## R-A03 Pollution Infiltration Management

**Intent:** Minimize exposure to outdoor air pollution by limiting infiltration through the building envelope, entrances and windows.

**Issue:**

- Outdoor air pollutants can enter the home through openings in the building façade, such as windows, doors and insufficiently sealed gaps throughout the building envelope.[51,52]
- Uncontrolled air infiltration may lead to increased energy consumption and decreased thermal comfort.[53,54]
- Contaminants such as dust and soil can be transferred into the home by footwear.[55]

**Impact:**

 

- The tightness of the building envelope is important for energy efficiency, health and comfort.[56]
- Controlling air leakage and infiltration in homes can help maintain indoor air quality and optimal moisture levels.[57]
- Double-glazed windows may reduce outdoor pollution infiltrating into the home more effectively than single-pane windows.[58]
- Regular vacuuming can reduce the amount of dust on floors and carpets, minimizing potential airborne particles and reducing symptoms associated with asthma and other respiratory illnesses.[59]
- Removing shoes and placing mats at entrances may reduce the number of outdoor contaminants introduced into the home.[55,60,61]

**Part 1. Minimize Door and Window Infiltration (1 point)**

The following requirement is met:

a. Manufactured exterior fenestrations meet the air leakage rates listed in the table below:[62]

| **Fenestration** | **Air Leakage Rate (at 75 Pa [1.57 PSF])** |
|---|---|
| Sliding Door, Skylight and Window | ≤ 5.5 $m^3/h/m^2$ [0.3 $cfm/ft^2$] |
| Swinging Door | ≤ 9.1 $m^3/h/m^2$ [0.5 $cfm/ft^2$] |

Verification:

- Provide specifications and purchase orders or invoices for all manufactured exterior fenestrations.

**Part 2. Design Healthy Entryways (1 point)**

*1. Dwelling Unit Entrance Design*

The **main dwelling unit entrance** meets the following requirements:[63]

a. Includes built-in storage for shoes within 3 m [10 ft] of the door.
b. Does not include permanently installed carpeting between the door and shoe storage.

Verification (meet one):

- Provide Letter of Assurance and photographs that show the qualifying shoe storage and entryway flooring.
- Provide drawings that show the qualifying shoe storage and entryway flooring.

AND

*2. Building Entry Design*

If present, **main building entrances** to **common spaces** at or below grade meet the following requirements:

a. Include an entryway system that meets the following:
    i. Is composed of grilles, grates, slots, rollout mats or removable carpet tiles.
    ii. Is at least the width of the entrance and 3 m [10 ft] long indoors and/or outdoors in the primary direction of travel.[64]
b. Slow airflow from the outdoors through one of the following:
    i. Entry vestibule with two typically closed doorways.
    ii. Revolving entrance doors.
    iii. Air curtains installed and commissioned in accordance with ASHRAE Standard 90.1-2019.
    iv. At least three typically shut doors that separate **regularly occupied** spaces from the outdoors. This pathway is only available for buildings with an entrance lobby that is not **regularly occupied**.

Verification (meet one):

- Provide Letter of Assurance and photographs that show the qualifying building entry design(s).
- Provide drawings that show the qualifying building entry design(s).

AND

*3. Building Entry Maintenance*

The following requirement is met:

a. If present, building entryway systems in **common spaces** are maintained to meet the following:
    i. Wet-cleaned or replaced with clean mats at least once a week or as instructed by the manufacturer.
    ii. Vacuumed at least once a day or as instructed by the manufacturer.

Verification:

- Provide the cleaning policy or contract that addresses the maintenance protocols for entryway systems.

 

**Part 3. Minimize Envelope Air Leakage (1 point)**

***Tags: Onsite Testing***

According to onsite tests, the exterior envelope of the building meets the following requirement:

a. Has an air leakage rate in the table below:[65]

| Air Leakage Rate | IECC Climate Zone | | | |
|---|---|---|---|---|
| | **1-2** | **3-4** | **5-7** | **8** |
| ACH50 | 3.00 | 2.50 | 2.00 | 1.50 |
| CFM50/ft$^2$ | 0.138 | 0.115 | 0.093 | 0.068 |
| CMM50/100m$^2$ | 4.19 | 3.50 | 2.82 | 2.06 |

Verification (meet all):

- Provide the IECC or ASHRAE 90.1 Climate Zone.
- Provide the results of the envelope air leakage test conducted by a **qualified professional**.

## R-A04 Construction Pollution Management

**Intent:** Limit exposure to construction pollution by implementing dust and moisture management strategies or by performing a post-construction air flush-out.

**Issue:**

- Construction sites can generate air pollutants that have been linked to negative health effects.[66]
- Construction procedures, like drilling and grinding, can produce high levels of fine particles that can lead to lung disease when inhaled.[67]
- New building materials can off-gas harmful chemicals into the air at a higher rate than older or existing materials.[68,69]

**Impact:**

- Using filters in air and ventilation systems during construction can help capture construction dust and reduce exposure to harmful particles.[68,70]
- Flushing building air can reduce built-up chemical emissions that have off-gassed from new materials and improve overall indoor air quality.[69]

**Part 1. Mitigate Construction Pollution (1 point)**

***Tags: Construction Practices***

A construction pollution management plan meets the following requirements:

a. Is adhered to throughout construction.
b. Specifies that ducts meet one of the following:
    i. Are sealed and protected from possible contamination.[71]
    ii. Are cleaned prior to installing registers, grills and diffusers.[64]
c. Specifies that permanently installed HVAC systems, if operated during construction, meet the following:
    i. Are equipped with media filters with an average removal efficiency of greater than or equal to 70% for particles 3-10 µm in size (e.g., MERV 8 or M5) to filter return air.[72]
    ii. Are replaced with new filters prior to occupancy.[71]
d. Outlines moisture and dust management procedures that require the following:
    i. Storage of carpets, acoustical ceiling panels, fabric wall coverings, insulation, upholstery and furnishings, and other absorptive materials separately in a designated area protected from moisture damage.[71]
    ii. Isolation of all active areas of work from other spaces not undergoing construction with sealed doorways, windows or temporary barriers.[71]
    iii. Use of walk-off mats at entryways.[71]
    iv. Use of dust guards or collectors on saws and similar tools.[71]

Verification:

- Provide the construction pollution management plan.

**Part 2. Conduct Air Flush-Out (1 point)**

***Tags: Construction Practices***

The dwelling unit meets the following requirement:

a. Undergoes an air flush-out that meets the following:
    i. Is performed after all construction has been completed and prior to occupancy.

ii. Utilizes fans to draw a total air volume of 4,266 $m^3$ of outdoor air per 1 $m^2$ [14,000 $ft^3$ of outdoor air per 1 $ft^2$] of floor area through the dwelling unit.[73]
iii. Keeps operable windows and doors open while fans are operating.[64]

Verification:

- Provide Letter of Assurance by a contractor and photographs that show the air flush-out being performed.

## R-A05 Combustion Minimization

**Intent:** Reduce exposure to combustion pollutants by utilizing low-pollution appliances or by eliminating combustion-based products entirely.

**Issue:**

- Many homes use natural gas to operate appliances used for heating, cooking and drying clothes.[74,75]
- Gas appliances can generate combustion byproducts including carbon monoxide, nitrogen oxides, sulfur oxides, volatile organic compounds and particulate matter.[76,77,78]
- Gas appliances can increase indoor air pollution levels to a level that can exceed enforceable standards set for outdoor air.[18,79]
- Prolonged exposure to combustion pollutants can cause eye, nose and throat irritation, headache, fatigue, cardiovascular and respiratory disease, cancer, and adverse pregnancy outcomes.[80,81]

**Impact:**

- Replacing combustion-based appliances with electric alternatives can help enhance indoor air quality and reduce negative health effects, such as asthma symptoms, attributed to combustion pollutants.[13,82]
- Homes without combustion appliances have lower indoor nitrogen dioxide concentrations than outdoor levels.[83]

**Part 1. Minimize Combustion Sources (1 point)**

The following requirements are met:

a. No combustion sources (e.g., fireplaces, **cooktops**, space heaters, ovens) are installed in the following locations:
   i. Indoors, on floors with **occupiable** space.[84]

 

ii. Outdoors, within 3 m [10 ft] of operable windows, doors and air supply intakes.[85]

b. If present, any garage attached to the dwelling unit meets the following:
   i. No air-handling equipment or ducting is installed.[86]
   ii. A continuous wall separates the garage from the dwelling unit and any openings (e.g., at rim joist, foundation) are sealed.
   iii. Any doors connecting the garage to the dwelling units are equipped with weather stripping and automatic closers.[86]

c. "No idling" signage meets the following, as applicable:
   i. Is present at all parking areas that serve more than one dwelling unit.
   ii. Is present at any pick-up, drop-off and loading zones.
   iii. Prohibits idling for more than 30 seconds within the project boundary.

Verification (meet all, as applicable):

- Provide drawings that show the location and type of fireplaces, **cooktops**, space heaters and ovens.
- Provide drawings that show the locations of garage heating equipment, HVAC, ducting and garage air sealing details.
- Provide drawings or photographs that show the "No Idling" signage and where it is located.

## R-A06 Air Quality Monitoring

**Intent:** Help residents understand and address air quality issues as they change throughout the day by monitoring air quality in real time.

**Issue:**

- Since indoor air pollutants are often colorless and odorless, they are difficult to detect without monitors.[87]
- Exposure to pollutants like carbon monoxide, carbon dioxide, volatile organic compounds, particulate matter and ozone can aggravate asthma and other respiratory problems.[88,89]
- Although carbon monoxide poisoning remains a consistent public health concern globally, many homes do not have carbon monoxide alarms.[90,91,92]
- Most at-home fire-related deaths occur in homes that do not have smoke alarms or that only use battery-powered alarms.[93]

 

- Unignited gas leaks can go undetected by smoke and carbon monoxide detectors, leading to a build-up of hazardous gas levels in the home.[94]
- Outdoor air pollution can negatively impact indoor air quality in homes.[13,95]

**Impact:**

- Air quality monitors can provide indoor air quality information that is essential for identifying, understanding and addressing air quality concerns.[89,96]
- Hardwired smoke detectors, which operate more reliably than battery-only detectors, can provide an early warning for fires in the home.[94,97]
- Homes with carbon monoxide detectors are associated with fewer and less severe instances of carbon monoxide poisoning.[93]
- In-home gas detectors can identify leaks before gasses reach hazardous levels and allow for early emergency response.[98]
- Increasing awareness of outdoor air quality can help individuals reduce exposure to contaminants when outdoor pollution levels are high; when alerted, individuals can take appropriate action, such as staying indoors and keeping windows closed.[99]

**Part 1. Monitor Indoor Air Quality (1 point)**

Indoor air quality monitors meet the following requirements:

a. Are present in the dwelling unit on each **regularly occupied** floor.
b. Take measurements with no longer than 15 minutes between measurement intervals.
c. Measure at least three of the following:
    i. $PM_{2.5}$.
    ii. Carbon dioxide.
    iii. Ozone.
    iv. Nitrogen dioxide.
    v. Total VOCs.
    vi. Formaldehyde.
d. Measure the following:
    i. Temperature.
    ii. Humidity.
e. Make air quality data available in one of the following formats:
    i. Concentrations of each parameter measured.
    ii. Qualitative results of individual metrics or aggregated air quality (e.g., colored-coded levels).

 

f. Display formatted air quality data on at least one of the following:
    i. Screen(s) mounted between 1.1 m [3.6 ft] and 1.7 m [5.6 ft] above the finished floor in an **occupiable** space.
    ii. Website(s) or mobile application(s) accessible to residents.
g. Are not solely reliant on battery power.

Verification (meet all):

- Provide drawings that identify the location of all qualifying air quality monitors and displays.
- Provide specifications and purchase orders or invoices for all qualifying air quality monitors and displays.

**Part 2. Install Smoke, Carbon Monoxide & Gas Detectors (1 point)**

The dwelling unit meets the following requirement:

a. Hardwired detectors with battery backup are installed per the location and placement requirements in the table below:

<table>
<tr><th colspan="2" rowspan="2">Location Requirements</th><th colspan="3">Detector Type</th></tr>
<tr><th>Smoke[100]</th><th>Carbon Monoxide[101]</th><th>Gas (if dwelling unit has gas connections)[99]</th></tr>
<tr><td rowspan="2">On floors with bedrooms</td><td>In each bedroom</td><td>Yes</td><td>Required if a combustion source is present</td><td rowspan="5">Required in each room with a gas appliance</td></tr>
<tr><td>Outside of bedrooms, within 3 m [10 ft] of entrances (e.g., hallway)</td><td>Yes</td><td>Yes</td></tr>
<tr><td rowspan="2">On floors without bedrooms (other than basements)</td><td>In most frequently occupied space (e.g., living room, den)</td><td>Yes</td><td>Yes</td></tr>
<tr><td>Near stairs leading to upper level</td><td>Yes</td><td>Yes</td></tr>
<tr><td colspan="2">Near stairs in basements</td><td>Yes</td><td>Yes</td></tr>
<tr><td colspan="2">In each room with a gas appliance</td><td>N/a</td><td>N/a</td><td>Yes</td></tr>
<tr><th colspan="2">Placement Requirements</th><th>Smoke</th><th>Carbon Monoxide</th><th>Gas (if dwelling unit has gas connections)</th></tr>
<tr><td colspan="2">≥ 3 m [10 ft] from cooking appliances and combustion sources</td><td>Yes</td><td>N/a</td><td>N/a</td></tr>
<tr><td colspan="2">≥ 0.9 m [3 ft] from windows, doorways, ducts or sources of drafts</td><td>Yes</td><td>Yes</td><td>Yes</td></tr>
<tr><td colspan="2">Maximum distance from ceiling, unobstructed by furnishings</td><td>30 cm [1 ft]</td><td>N/a</td><td>15 cm [6 in] (methane detector only)</td></tr>
</table>

| | | | |
|---|---|---|---|
| ≥ 10 cm [4 in] but as low as possible above the floor, unobstructed by furnishings | N/a | N/a | propane detector only |

Verification (meet all):

- Provide drawings showing the location and hardwiring and type of all detectors.
- Provide specifications and purchase orders or invoices for all detectors.

**Part 3. Monitor Outdoor Air Quality (1 point)**

An outdoor air quality monitoring system meets the following requirements:

a. Is located within 4 km [2.5 mi] of the **main building entrance**.
b. Takes measurements with no longer than one hour between measurement intervals.
c. Measures the following:
    i. $PM_{2.5}$.
    ii. Temperature.
    iii. Humidity.
d. Is owned and operated by one of the following:
    i. The owner of the dwelling unit.
    ii. The property management company.
    iii. A municipal entity.
e. Notifies residents by email or phone of the following:
    i. When the outdoor air quality deteriorates.
    ii. When the outdoor air quality improves.
    iii. Recommendations on how to improve indoor air quality (e.g., turn on air purification, operate windows).

Verification (meet all):

- Provide an area map that shows the distance between the outdoor air quality monitoring system and the **main building entrance**.
- Provide a description of how residents can access local outdoor air quality data and notification functions.

## R-A07 Indoor Air Quality Testing

**Intent:** Reduce exposure to indoor contaminants by performing a set of onsite tests to validate good indoor air quality.

**Issue:**

 

- Although individuals spend the majority of their time inside their homes, well-established regulations or standards for indoor air currently do not exist.[102,103,104]
- Exposure to poor indoor quality at an early age may contribute to increased respiratory diseases later in life.[105]
- Indoor air pollution is a complex mixture of outdoor pollutants migrating indoors combined with pollutants generated by indoor sources.[13,38]
- Indoor air pollution is significantly impacted by indoor sources such as smoking, unvented gas appliances, cooking and cleaning, building materials and ventilation rates.[13]

**Impact:**

- Measuring air quality can increase awareness of pollution levels in spaces, which may encourage individuals to implement behavioral changes to reduce pollution and its negative health effects.[106]
- Reducing contaminants like nitrogen dioxide, particulate matter and allergens from indoor air may help reduce symptoms of asthma.[9]
- Lower emissions of particulate matter, specifically $PM_{2.5}$, can reduce negative health impacts and related deaths attributed to particulate matter.[107]
- Improving indoor air quality may benefit respiratory health and reduce asthma morbidity.[13]

**Part 1. Meet Indoor Particulate Matter Thresholds (1-2 points)**

***Tags: Onsite Testing***

The dwelling unit meets the following requirement:

a. According to onsite tests, indoor particulate matter meets the thresholds in one of the tiers in the table below:

| Tier | Points | Concentration Thresholds |
|---|---|---|
| 1 | 1 | • $PM_{2.5}$: 15 µg/m³ or lower.[108]<br>• $PM_{10}$: 50 µg/m³ or lower.[109] |
| 2 | 2 | • $PM_{2.5}$: 10 µg/m³ or lower.[110]<br>• $PM_{10}$: 20 µg/m³ or lower.[110] |

Verification:

- Provide the air quality test results conducted by a WELL Performance Testing Agent or **qualified professional**.

 

**Part 2. Meet Indoor VOC Thresholds (1-2 points)**

***Tags: Onsite Testing***

The dwelling unit meets the following requirement:

a. According to onsite tests, indoor VOCs meet the thresholds in one of the tiers in the table below:

| Tier | Points | Concentration Thresholds |
|---|---|---|
| 1 | 1 | • Benzene (CAS 71-43-2): 10 µg/m³ or lower.[111]<br>• Formaldehyde (CAS 50-00-0): 50 µg/m³ or lower.[112]<br>• Toluene (CAS 108-88-3): 300 µg/m³ or lower.[113] |
| 2 | 2 | • Acetaldehyde (CAS 75-07-0): 140 µg/m³ or lower.[113]<br>• Benzene (CAS 71-43-2): 3 µg/m³ or lower.[113]<br>• Formaldehyde (CAS 50-00-0): 9 µg/m³ or lower.[113]<br>• Naphthalene (CAS 91-20-3): 9 µg/m³ or lower.[113]<br>• Toluene (CAS 108-88-3): 300 µg/m³ or lower.[113]<br>• One of the following:<br>  ○ Acrylonitrile (CAS 107-13-1): 5 µg/m³ or lower.[113]<br>  ○ Caprolactam (CAS 105-60-2): 2.2 µg/m³ or lower.[113] |

Verification:

- Provide the air quality test results conducted by a WELL Performance Testing Agent or **qualified professional**.

**Part 3. Meet Indoor Inorganic Gas Thresholds (1-2 points)**

***Tags: Onsite Testing***

The dwelling unit meets the following requirement:

a. According to onsite tests, indoor inorganic gasses meet the thresholds in one of the tiers in the table below:

| Tier | Points | Concentration Thresholds |
|---|---|---|
| 1 | 1 | • Carbon Monoxide (CAS 630-08-0): 10 mg/m³ or lower.[84]<br>• Ozone (CAS 10028-15-6): 100 µg/m³ or lower.[114] |
| 2 | 2 | • Carbon Monoxide (CAS 630-08-0): 7 mg/m³ or lower.[84]<br>• Ozone (CAS 10028-15-6): 100 µg/m³ or lower.[110]<br>• Nitrogen Dioxide CAS 10102-44-0): 25 µg/m³ or lower.[110]<br>• Sulfur Dioxide (CAS 7446-09-5): 40 µg/m³ or lower.[110] |

Verification:

- Provide the air quality test results conducted by a WELL Performance Testing Agent or **qualified professional**.

## R-A08 Radon Risk Mitigation

**Intent:** Minimize exposure to radon through design and verify radon levels through testing.

**Issue:**

- Radon is a colorless, odorless and radioactive gas that is a leading cause of lung cancer worldwide, second only to smoking.[115,116,117]
- Radon is naturally present in the soil and primarily enters the home through contact with the ground.[116,117,118]
- Many homes have radon concentrations high enough to have a damaging effect on the human body.[116,119]
- There is no known safe level of radon.[119,120]

**Impact:**

- Reducing radon levels in homes may lower the number of deaths from lung cancer and increase quality of life.[121,122]
- Radon mitigation strategies such as radon-resistant construction techniques and active fan systems may be effective at reducing radon levels in homes.[123,124,125]

**Part 1. Reduce Risk of Radon Exposure (1 point)**

*Option 1. Radon-Resistant Construction Techniques*

 

The dwelling unit is located in a building that meets the following requirements:

a. A 10 cm [4 in] layer of clean, coarse gravel is installed below the dwelling unit or building foundation.[126]
b. A minimum 0.15 mm [6 mil] polyethylene vapor barrier is installed on top of the gravel.[126,127]
c. All cracks and openings in the concrete foundation and walls are caulked.[127]
d. A 7.6 cm [3 in] by 7.6 cm [3 in] non-perforated ventilation pipe is installed vertically from the gravel layer through to the roof and is equipped with one of the following:[127]
    i. A mechanical fan for an active mitigation system.
    ii. An electrical box to accommodate a future active mitigation system.[127]

Verification (meet one):

- Provide Letter of Assurance and photographs that show the qualifying radon-resistant construction techniques.
- Provide drawings that detail the radon-resistant construction techniques.

OR

*Option 2. Elevated Dwelling Unit*

The dwelling unit meets one of the following requirements:

a. Is completely located on or above the third floor of the building.[127,128]
b. Is constructed with a raised foundation that meets the following:
    i. Elevates the dwelling unit at least 46 cm [18 in] above grade. [129]
    ii. Has an open perimeter.[129]
    iii. Has supports that are solid or capped by a permanent barrier that does not allow airflow.[129]
    iv. Seals all **occupiable** rooms and rooms containing mechanical equipment at ground level, if present, from the soil with a permanent barrier that does not allow airflow. Area of rooms is less than 5% of the total floor area.[129]

Verification:

- Provide drawings that show the location of the dwelling unit in relation to the ground and all relevant barriers.

OR

 

*Option 3. Radon Standard*
The dwelling unit meets one of the following standards:

a. ANSI/AARST CCAH-2020
b. ANSI/AARST CC-1000

Verification:

- Provide drawings that detail the radon-resistant construction techniques and identify the respective standard followed.

**Part 2. Meet Radon Thresholds (2 points)**
***Tags: Onsite Testing***
According to onsite tests, the dwelling unit meets the following requirement:

a. Radon levels do not exceed 100 Bq/m$^3$ [2.7 pCi/L].[130]

Verification:

- Provide the test results conducted by a **qualified professional** for the following locations:
    - For detached dwelling units: in the lowest **occupiable** floor of the dwelling unit.
    - For buildings with more than one dwelling unit: in the lowest **occupiable** floor of all dwelling units on the lowest floor of the building.

## R-A09 Electric Vehicle Charging

**Intent:** Reduce the exposure to internal combustion engine emissions by providing infrastructure for electric vehicles.

**Issue:**

- Exhaust emissions from internal combustion engines contribute to increased environmental pollution and account for a significant portion of urban air pollution.[131]
- Pollutants emitted from internal combustion engines include carbon monoxide, unburned hydrocarbons, nitrogen oxides, aldehydes, lead components, sulfur dioxide and particulates.[132]
- Electric vehicles are primarily charged at home.[132,133,134]

**Impact:**

 

- Electric vehicles have several environmental benefits, including reduced greenhouse gas emissions and energy use.[135,136]
- Areas with a greater percentage of people who utilize electric vehicles have been associated with lower rates of asthma-induced emergency room visits and better outdoor air quality.[137]

**Part 1. Support Electric Vehicle Charging (1 point)**
Electrical outlets or vehicle chargers connected to electrical conductors, circuit breakers and all other electrical components on a dedicated branch circuit capable of providing ≥ 208 volt, ≥ 30 amp power to an electric vehicle are provided, per the following, as applicable:

a. If the dwelling unit has a dedicated garage or driveway: in the garage or driveway.[138]
b. If the project boundary contains a parking lot or garage that is shared amongst the dwelling units: in at least 10% of all resident and visitor parking spaces.[138]

Verification (meet all):

- Provide one of the following:
    - Drawings that identify the location and type of the qualifying electric vehicle charging provisions.
    - Specifications and purchase orders or invoices for the qualifying electric vehicle charging provisions.
    - Letter of Assurance and photographs that show qualifying vehicle charging provisions.
- Provide the electric vehicle parking calculation, if applicable.

## R-A10 Smoke-Free Environment

**Intent:** Minimize secondhand exposure to smoking and vaping by enacting bans.

**Issue:**

- Tobacco and marijuana smoke release significant amounts of toxins and pollutants directly into the environment and are attributed to numerous deaths among both smokers and non-smokers globally.[139,140,141]
- Smoking causes a wide range of diseases, including many types of cancer, chronic obstructive pulmonary disease, coronary heart disease, stroke, peripheral vascular disease and peptic ulcer disease.[142]

 

- Indoor smoking can significantly increase air pollution, adding contaminants like carbon monoxide, particulate matter and other chemicals to the environment.[13,143]
- Secondhand smoke is a mixture of thousands of components, many of which are toxic and have been associated with cancer.[144]

**Impact:**

- Homes where smoking does not occur have been shown to have lower levels of indoor air pollution.[145,146]
- Smoke transfer between multifamily dwelling units can be prevented through smoke-free policies.[146,147]
- Smoking bans in multifamily housing may reduce smoking activities and decrease the number of individuals who smoke overall.[148,149,150]
- Smoke-free housing policies may lead to decreased fire hazards, lowered insurance costs, reduced cleaning costs and lowered health risks.[151]

**Part 1. Prohibit Smoking (1 point)**

***Tags: Services and Policies***

*1. Smoking Ban Policy*

A smoking ban policy meets the following requirements:

a. Bans smoking and vaping of any kind indoors within the project boundary.[152]
b. Bans smoking and vaping of any kind in private outdoor areas (e.g., balconies, gardens, rooftops, yards) within 7.6 m [25 ft] of another dwelling unit.[152]

Verification:

- Provide the smoking and vaping ban policy.

AND

*2. Smoking Ban Signage*

The following requirements are met:

a. Buildings with entrances serving more than one dwelling unit or common space contain permanently mounted signage, per one of the following:
    i. Signs banning smoking and vaping located within 3 m [10 ft] of all entrances and ground-level operable windows and air intakes.

ii. Signs indicating the entire property is smoke-free located within 3 m [10 ft] of each entrance to the property.

 

b. Clear and visible permanent signage describing the hazards of smoking is located in all outdoor areas designated for smoking and vaping.[153]

Verification (meet all):

- Provide drawings showing the location of all smoking and vaping areas, the distance from these areas to all entrances, operable windows and building air intakes, and associated signage.
- Provide photographs of the smoking and vaping signage.

 

# Water

## R-W01 Plumbing Design and Sizing

**Intent:** Protect water quality by properly designing and sizing drinking water systems.

**Issue:**

- Indoor plumbing layout, design and installation may affect the quality of water supplied to a building.[154]
- Poor plumbing design may lead to water stagnation and low flow, which can contribute to bacteria growth and biofilm production and therefore negatively impact drinking water quality.[155,156]
- If not properly selected, materials used for household plumbing systems may leach chemicals and impact drinking water quality.[157,158]

**Impact:**

- Properly designing and sizing water delivery systems in homes helps protect water quality.[154]
- Preventing water stagnation through properly designed plumbing pipes reduces the need for frequent repairs and unscheduled maintenance of plumbing systems.[154]
- Installing backflow prevention systems is a common strategy to prevent contamination of potable water networks.[159,160]

**Part 1. Design and Size Plumbing Systems (4 points)**

*1. Plumbing System Materials*

All **plumbing system** materials for use with water in kitchens, **bathroom** sinks and showers/baths meet one of the following requirements:

a. Are approved for drinking water use by a local government authority or by a government-authorized certification body.
b. Are certified as ANSI/NSF 61-compliant.[161]

Verification (meet all):

- Provide specifications and purchase orders or invoices for the qualifying **plumbing system** materials.
- Provide certifications for the qualifying **plumbing system** materials.

AND

*2. Plumbing System Design*

**Plumbing systems** meet the following requirements:

a. Have no **dead legs**.
b. Have backflow prevention systems that are installed for the following, as applicable:
    i. Fire sprinkler systems.
    ii. Pipe branches that feed fixtures intended for seasonal use (i.e., fixtures not used year-round).
    iii. Any potable water line used to supplement non-potable water systems or storage tanks (i.e., makeup water).

Verification (meet one):

- Provide drawings of the **plumbing system** and highlight the location of backflow devices.
- Provide Letter of Assurance and photographs of the backflow devices.

AND

*3. Plumbing System Sizing*

The following requirements are met:

a. Hot and cold peak water demand is estimated based on one of the following:
    i. Water Demand Calculator (WDC).[162]
    ii. A locally enforceable code or regulation (e.g., a national or local plumbing code); if a range is allowed, the estimate is based on the lowest end of the range.
b. Based on peak water demand calculations, pipes are installed to meet the minimum allowable diameter(s) established in one of the following:
    i. Appendix A of the 2021 Uniform Plumbing Code (UPC).[163]
    ii. The enforceable code or regulation (e.g., a national or local plumbing code).

Verification (meet all):

- Provide the peak water demand calculation.
- Provide the pipe diameter and the code or regulation that supports it.

## R-W02 Water Testing

**Intent:** Support health by providing access to water that meets performance baselines and quality thresholds.

**Issue:**

- Water is crucial for health and well-being; however, many people do not have access to safe drinking water.[164]
- A growing number of individuals do not drink water from faucets because of the perception that tap water is not safe to drink.[165,166,167]
- Water quality can change from when it enters the building to its points of use in the home.[154,168]
- Improper temperature controls can result in scalding injuries when set too high and bacterial growth, including *Legionella,* when set too low.[169,170,171]

**Impact:**

- Drinking enough water has been linked to a variety of health benefits, including enhanced physical performance and cognitive function.[172]
- Water quality testing can detect contaminants that do not have a noticeable smell, taste or color, such as lead.[173,174,175]
- Proper temperature management of hot water plumbing systems can help reduce bacterial growth without increasing the risk of scalding.[176]
- Communicating water quality test results at the point of use may encourage people to drink tap water.[177]

### Part 1. Meet Water Performance Parameters (2 points)

***Tags: Onsite Testing***

According to onsite tests, the following requirements are met:

a. Hot water faucets provide water that meets the following:
    i. Temperatures in showers, **bathroom** sinks and kitchen faucets (other than instant hot water dispensers) rise to the maximum allowed by the applicable building code that addresses scalding or 49 °C [120 °F] if no such code exists.[163,178]
    ii. Water rises to its maximum temperature within 60 seconds.[178]
b. Cold water is supplied at 138 kPa [20 psi] or above.

Verification:

- Provide the following test results conducted by a WELL Performance Testing Agent or **qualified professional**:
    - The maximum temperature and rise-time for hot water.

 

- The water pressure test results for cold water.

**Part 2. Test Kitchen Water Quality Parameters (2 points)**

***Tags: Onsite Testing***

According to onsite tests, water in the kitchen of the dwelling unit meets the following requirements:

a. Water from at least one faucet meets the following thresholds:
   i. Turbidity is 1 NTU or less.[179]
   ii. Lead is 5 ppb or less.[180]
   iii. Copper is 1.3 ppm or less.[179]

b. If the municipal water supply includes either chlorine or chloramine as an added disinfectant, then that added disinfectant is detected in at least one faucet where a point-of-use filter is not installed. Chloraminated systems should detect and report combined chlorine, and chlorinated systems should detect and report free chlorine. Test results and date of testing are made available to residents.

Verification (meet all):

- Provide drawings that identify the faucet(s) tested.
- Provide water quality test results conducted by a WELL Performance Testing Agent or **qualified professional**.
- Describe how test results are communicated to residents.

## R-W03 Non-Potable Water Capture and Use

**Intent**: Reduce the potential for waterborne diseases in non-potable water systems by following proper design and installation guidelines.

**Issue:**

- The rise of extreme droughts and subsequent long-term water scarcity is requiring changes in how individuals think about and use potable water.[181]
- The quality of water in a potable water system may become compromised if the system is cross-contaminated by non-potable water.[182]
- Non-potable water, when sprayed during irrigation or used in cooling towers, may become a source of exposure to pathogenic bacteria.[183]

 

**Impact:**

- Non-potable water systems that are designed and utilized in accordance with health criteria may help encourage public acceptance of these systems and drive more efficient use of potable water.[184,185]
- When dispersing non-potable water for irrigation, drip irrigation produces fewer breathable particles than spray irrigation, making it a lower risk alternative.[183,186]

**Part 1. Design Non-Potable Systems (2 points)**

*1. Non-Potable System Design*

The non-potable system design meets the following requirements:

a. Identifies sources of the non-potable water (e.g., rain, clothes washing, municipal supply) and estimated maximum flows.[187]
b. Specifies intended uses for the non-potable water (e.g., irrigation, toilet flushing).
c. Lists target water quality parameters or contaminant reduction goals unless the non-potable source is rainwater or provided by the municipality.

Verification (meet all):

- Provide a process flow diagram for the non-potable water system.
- Describe the sources, uses and quality or treatment goals of the non-potable water system.

AND

*2. Non-Potable System Installation*

The following requirements are met:

a. If rainwater harvesting, greywater recycling and/or blackwater recycling systems are installed on-site, they are designed and tested to meet one of the following standards:
    i. 2018 CSA B805-18/ICC 805-2018 Rainwater Harvesting Systems.[188]
    ii. ARCSA/ASPE/ANSI 63-2020: Rainwater Catchment Systems.[189]
    iii. WEStand 2020.[190]
    iv. AS/NZS 1547:2012.[191]
b. The non-potable water system includes the following:
    i. Signage and pipe color-coding that distinguishes the non-potable water network from the potable water network.

 

ii. Devices to control odors, pests and stagnation of non-potable water.
iii. Backflow prevention systems in the potable water line where potable and non-potable water may mix.

c. If non-potable water is used for irrigation, one of the following is met:
i. **Windbreaks** are installed around irrigated areas.[192]
ii. The irrigation system does not spray water.

Verification (meet all):

- Provide the name and test results associated with the standard met by the non-potable system.
- Provide drawings of the non-potable water system and (if required) the irrigation system.

## R-W04 Moisture Management Design

**Intent:** Reduce the risk of mold growth by minimizing indoor moisture and installing moisture-resistant surfaces.

**Issue:**

- Excess moisture in homes can result from plumbing leaks, condensation, roof failures, floods, groundwater intrusion and lack of ventilation.[193,194,195]
- More individuals are being impacted by flooding events compared to other disaster types and, due to climate change, historical flooding maps may no longer accurately reflect current risks.[196,197,198]
- Due to climate change, homes may be located in areas that are now more likely to flood and, in some places, development of homes in these flood-prone areas is increasing.[199,200]
- Moisture in homes can contribute to mold growth and pest infestations, which have been linked to negative health outcomes such as asthma, skin irritation, infections and mortality.[193,201]
- When an area is not properly sealed, moisture can enter more easily.[202]

**Impact:**

- Design strategies that address moisture in homes (such as providing capillary breaks, preventing air leakage and minimizing thermal bridges) minimize humidity, reduce sudden temperature changes and may increase individual comfort.[202,203]

- Controlling for the source of excess moisture in the home may lead to health benefits like reductions in asthma symptoms.[204]

**Part 1. Design Envelope to Reduce Liquid Water Intrusion (3 points)**

*1. Building Location*

The following requirement is met:

a. The building is not located in an area designated as flood-prone by a government authority.[205]

Verification:

- Provide a floodplain map showing the location of the dwelling unit.

AND

*2. Building Design*

The following requirements are met:

a. If present, basements and crawl spaces contain the following:
    i. Perimeter walls that are sealed (i.e., made watertight).[206]
    ii. A perimeter drain equipped with a trap seal or sump pump.[206]
b. A continuous drainage plane is installed between the wall cavities and exterior cladding.[207]
c. Walls on the exterior minimize capillary suction (i.e., wicking) through at least one of the following:
    i. Contain free-draining spaces (e.g., gaps between exterior cladding and weather-resistant barriers in wall assemblies).
    ii. Include non-porous materials (e.g., closed-cell foams, waterproofing membranes, metal) between porous materials.
d. Site drainage moves water away from the building.[208]
e. The building incorporates at least one of the following:
    i. Foundation walls or slabs that are raised out of the ground 46 cm [18 in] or more.[208]
    ii. Raised-pier foundations (e.g., without a solid perimeter wall).
    iii. A draining system that consists of a perforated land drain pipe, geotextile and permeable splash strips to channel water to a drainage point away from the walls.
    iv. Gutters and downspouts that drain roof rainwater to a sewer or a rainwater capture system.
    v. For buildings of one or two stories, roof eaves that protrude at least 41 cm [16 in] horizontally from the edge of the foundation.[206]

 

Verification:

- Provide drawings showing all selected moisture management strategies.

**Part 2. Design to Reduce Moisture Impacts (2 points)**

The following requirements are met, as appliable:

a. Moisture resistant materials are used to construct the following:
    i. Floors directly under appliances and water heaters.
    ii. Walls, ceilings and flooring in areas below grade.
b. Moisture resistant finishes are used for the following:
    i. Floors in entryways, **bathrooms**, kitchens and other rooms with sinks or washing machines.
    ii. Wallboards in basements, **bathrooms**.
    iii. Wall finishes around sinks, clothes washers, tubs and showers.
c. Moisture resistant sealants are used around sinks, tubs and showers.

Verification (meet one):

- Provide Letter of Assurance and photographs that show the installed moisture resistant materials and finishes in all required areas, annotated to describe the material or product installed and the extent of the installation.
- Provide the following:
    - Drawings of moisture resistant materials and finishes in all required areas.
    - Specifications and purchase orders or invoices for the installed moisture resistant materials and finishes.

**Part 3. Design to Reduce Risk of Leaks (1 point)**

The following requirements are met:

a. At least one of the following is met:
    i. Toilets, hard-piped appliances and water treatment devices have a readily accessible shut-off valve.
    ii. The main water supply line of the dwelling unit and any building-wide water heaters are equipped with leak detection systems and shut-off valves.
b. If present, water treatment devices (e.g., reverse osmosis systems, water softeners) have a waste or drain line that meets the following:
    i. Is securely affixed to both the device and the drainage pipe.

ii. Is equipped with a backflow prevention system (e.g., air gap, backflow preventer valve).

Verification (meet one):

- Provide drawings that show the leak detection equipment, shut-off valves and waste or drain lines.
- Provide a Letter of Assurance and photographs of the installed leak detection equipment, shut-off valves and waste and drain lines.

## R-W05 Flow and Temperature Sensing

**Intent:** Maintain water quality by detecting leaks, water stagnation and drops in hot water temperature.

**Issue:**

- Leaks in municipal pipes, building pipes and fixtures are estimated to cause significant water loss in homes.[209]
- Stagnant water can lead to corrosion in pipe components.[210,211]
- Untreated leaks can cause significant damage to building structures and accelerate harmful mold growth.[208,212]
- Water age (i.e., the time that water spends inside pipes) is a crucial factor that can affect the concentration of bacteria in drinking water.[213,214]
- Harmful bacteria, including *Legionella*, can thrive in lukewarm water inside a home's pipes and fixtures.[215,216]

**Impact:**

- Individual water metering can provide homes with early leak detection and help reduce water consumption.[217]
- Water metering can alert residents of potential water source contamination.[217,218]
- Smart water metering can positively influence behaviors that lead to reduced water consumption, which may help improve water management in urban areas.[219,220]
- Leak detection systems can effectively minimize water loss and damage due to leaks.[221,222]
- Monitoring water flow and temperature can help individuals identify and address pipe sections where *Legionella* bacteria growth may be more likely.[223,224]

 

**Part 1. Provide Water Metering (1 point)**

The following requirements are met:

a. Hourly water consumption rates for each dwelling unit are monitored and made accessible to residents.
b. For buildings with shared water distribution across multiple dwelling units, hourly water consumption rates for the entire building are monitored and made available to management staff.

Verification (meet all):

- Provide specifications or product literature and purchase orders or invoices for the water meter.
- Describe how water meter data is made available to residents and management staff.

**Part 2. Monitor Water Leaks (2 points)**

A leak detection system is installed in the dwelling unit that meets the following requirements:

a. Is certified under at least one of the following:
    i. ANSI/CAN/IAPMO Z1349-2021 (Devices for Detection, Monitoring or Control of Plumbing Systems) standard.[225]
    ii. A locally enforceable standard(s) for materials, performance testing, environmental characterization and installation of these systems.
b. Is capable of monitoring and displaying water usage information in real time.
c. Issues real-time alerts to residents and/or building managers.
d. If present, leak sensors that are in contact with potable water meet one of the following:
    i. Are approved for use with drinking water by a local government authority or by a government-authorized certification body.
    ii. Have a weighted average of 0.25% of lead or less, as verified by a third party.[226]
    iii. Are labeled as ANSI/NSF 61-compliant.[227]

Verification (meet all):

- Provide specifications and purchase orders or invoices for all components of the leak detection system. Specifications must outline the standards or authorizations met.

 

- Describe how data from the leak detection system is made available to residents and/or building managers.

**Part 3. Monitor Stagnation and Temperature (1 point)**
*Note: This part requires Part 1 or Part 2 of this feature to be achieved.*

The following requirements are met:

a. Flow sensors are installed on the following, as applicable:
    i. Water heaters or boilers.
    ii. Vertical risers.
b. Temperature sensors are placed in the following locations, as applicable:
    i. Delivery point of a boiler or hot water heater.
    ii. At a proximal and distal location (i.e., near both ends) on each riser.
c. Flow and/or temperature sensors meet the following:
    i. Are able to store and display measurement data.
    ii. Include instructions on how to ensure that the device is properly calibrated.
    iii. Where present, flow sensors are able to detect and notify for stagnation and maintenance of water treatment devices.
    iv. Temperature sensors are able to detect drops in hot water temperature.

Verification (meet all):

- Provide drawings that identify the location of all sensors.
- Provide specifications and purchase orders or invoices for the sensors.

## R-W06 Water Quality and Plumbing Maintenance

**Intent:** Support water quality and sewer performance through routine maintenance of plumbing systems and providing timely responses to issues.

 

**Issue:**

- Poorly designed and maintained plumbing systems can lead to corrosion and microbial growth.[168,228,229]
- Improperly maintained hot water tanks may create conditions that foster *Legionella* growth.[230]
- Household water treatment devices may become a niche for bacteria if not regularly maintained.[168,231,232]
- Improperly configured softeners can deplete disinfectants from water and encourage bacterial growth.[233,234,235]

**Impact:**

- Routine maintenance and inspections of plumbing systems can help protect water quality and extend the lifespan of the system.[168,229,236]
- Hot water system maintenance and showerheads and aerators cleaning may minimize *Legionella* growth.[230]
- Regular inspections can help reduce exposures to environmental hazards and aid in early detection of defects before they become a larger concern.[237,238,239]

**Part 1. Maintain Plumbing Infrastructure (1 point)**

***Tags: Services and Policies***

A plumbing infrastructure maintenance plan provides the following services to residents at no additional cost annually for all devices/fixtures installed by the developer:

a. Leakage and integrity assessments of water and sewer plumbing fixtures (e.g., faucets/taps, drains, under-sink traps, bathtubs, toilets, hard-piped appliances) and pipes.
b. Cold water pressure checks at the point of entry of water to the building and to the kitchen.
c. Exercising for all valves (i.e., fully turning valves on and off).
d. Testing and maintenance of backflow prevention devices, if present.
e. Cleaning and maintenance and, as necessary, replacing parts for the following, as applicable:
    i. Showerheads and faucet aerators.
    ii. Hot water heater boiler tanks, including full tank drainage and sediment removal.
    iii. Basement sump pumps.
    iv. Riser pumps.

 

Verification (meet all):

- Provide a list of fixtures, valves, hot water heater / boiler tanks, basement sump pumps and riser pumps installed in the building.
- Provide one of the following for water quality maintenance services:
    - A budget that details the applicable services being provided or contracted.
    - A contract with a **qualified professional** or service provider for applicable services.
    - A description provided to residents of the service offering.

**Part 2. Maintain Building Water Treatment Devices (1 point)**

***Tags: Services and Policies***

A water treatment maintenance plan provides the following services to residents at no additional cost for all devices/fixtures installed by the developer:

a. Maintenance activities for water softeners and point-of-use and point-of-entry water treatment devices (e.g., filters, UV disinfection systems, including those in refrigerators), as described in the table below:

| **Maintenance Requirements** | **Interval** |
|---|---|
| Routine cleaning and maintenance of devices and media, including provision and commissioning of replacement components (e.g., spent softener resins, filter media or cartridges, UV lamps). | Manufacturer's recommendation |
| If water softeners are present, testing to confirm that, for water leaving device(s):<br>● The water hardness meets a target selected by the project team.<br>● If a disinfectant (e.g., chlorine or chloramine) is present in the incoming water, the free (residual) chlorine is detected at the outlet and the concentration drops no more than 0.5 ppm in the water exiting the softener. | After every water softener maintenance (e.g., resin replacement) |
| If reverse osmosis (RO) filter units are present, testing to confirm that water pressure supplying each RO unit is at least 40 psi (2.75 bar). | Annually |

Verification (meet all):

 

- Provide a list of water softeners and treatment devices installed in the building, plus a list of any replacement parts and water tests needed for these devices.
- Provide one of the following for annual water quality maintenance services:
    - A budget that details the applicable services being provided or contracted.
    - A contract with a service provider trained/authorized by the device manufacturer or certified to maintain water treatment equipment.
    - A description provided to residents of the service offering.

**Part 3. Service Building Water Infrastructure (1 point)**

***Tags: Services and Policies***

The following services are provided at no additional cost:

a. Responses to the following residents' concerns:
    i. Water quality issues (e.g., discoloration, presence of particles, foul odors.)
    ii. Water pressure loss.
    iii. Leaks in water pipes, faucets, hard-piped appliances, toilets, sink drains, bathtubs and filters (both point-of-use and point-of-entry).
b. Notifications to residents of upcoming plumbing work and actions to restore water quality upon completion.
c. Education for residents on best practices for maintaining water quality, water devices, plumbing and sewer systems.

Verification (meet all):

- Provide a policy that describes the potential responses how residents' concerns would be addressed and how residents are notified of upcoming work.
- Describe the process for educating residents.

 

# Nourishment

## R-N01 Supportive Cooking Environment

**Intent:** Encourage the preparation of meals and consumption of nutritious foods at home by providing a supportive cooking environment.

**Issue:**

- Consumption of foods away from home has steadily increased since the 1970s.[240]
- Meals consumed away from home are often higher in calories, lower in nutrients and larger in portion size.[241]
- Consuming food prepared away from home is associated with lower fruit and vegetable intake and a higher body mass index.[242]

**Impact:**

- Adequate kitchen equipment supports proper food preparation and storage and helps reduce barriers to healthy eating.[243,244]
- Home-cooked meals are more likely to contain fruits, vegetables and whole grains than meals prepared outside the home.[245]
- Diets characterized by high intakes of fruits, vegetables and dietary fiber (such as whole grains) help protect against diabetes, heart disease, stroke and cancer.[246]

**Part 1. Support Food Preparation (2 points)**

At least one kitchen of the dwelling unit meets the following requirements:

a. Has a sink.[247]
b. Has a refrigerator and a freezer.[247]
c. Includes at least one of the following:
    i. An oven that is not only a microwave or toaster oven.[247]
    ii. A permanently installed **cooktop**.[247]
d. Meets one of the following:
    i. Has separate continuous countertop sections: one that is at least 76 cm [30 in] wide and 60 cm [24 in] deep located directly adjacent to the sink and the other that is at least 38 cm [15 in] wide and 60 cm [24 in] deep located directly adjacent to the oven, **cooktop** or refrigerator.[248]

ii. Has a single continuous countertop section that is at least 1 m [39 in] wide and 60 cm [24 in] deep located between the sink and the oven, **cooktop** or refrigerator.[248]

Verification (meet one):

- Provide specifications and purchase orders or invoices for all qualifying kitchen accommodations.
- Provide drawings that show the kitchen layout including the specification and location of all qualifying kitchen accommodations and the dimensions of the required countertops.
- Provide Letter of Assurance and photographs showing all qualifying kitchen accommodations and the dimensions of the required countertops.

## R-N02 Onsite Food Production

**Intent:** Support fruit and vegetable consumption by providing opportunities for the production of fruit and vegetables at home.

**Issue:**

- Most individuals do not meet the daily recommended intake of fruits and vegetables.[249]
- Low fruit and vegetable consumption is a significant contributor to global death rates, heart disease, stroke, and cancers of the stomach and intestines.[250]

**Impact:**

- Fruits and vegetables are key components of a healthy diet, and their consumption helps prevent chronic disease.[249]
- Individuals who participate in community and home gardening projects consume more fruits and vegetables and are more likely to meet dietary intake recommendations.[250,251,252]
- Communal gardening can provide onsite educational opportunities and may increase social cohesion, community involvement, physical activity and perceptions of community safety.[251,253]
- Gardening may provide mental health benefits by reducing symptoms of anxiety and depression.[254]

 

**Part 1. Provide Space for Food Production (2 points)**

A private or shared space for food production within the project boundary meets the following requirements:

a. Provides a growing area that meets the following:
    i. For private food production space(s): at least 1.4 $m^2$ [15 $ft^2$] dedicated to each dwelling unit.[255]
    ii. For shared food production space(s): one or more growing areas that allocate at least 1.4 $m^2$ [15 $ft^2$] per dwelling unit, with a total area of at least 18.6 $m^2$ [200 $ft^2$] (growing area is not required to exceed 139 $m^2$ [1,500 $ft^2$]).[255]
b. Includes at least one of the following:
    i. A raised garden bed or greenhouse with planting medium suitable for food. Use the area of the garden bed or greenhouse planting medium to calculate contributions.[255]
    ii. Edible landscaping such as fruit trees. Use the current area of each tree or shrub canopy to calculate contributions.[256]
    iii. A **hydroponic** or **aeroponic** farming system suitable for food. Use twice the area of the growing medium to calculate contributions.

Verification (meet one):

- Provide drawings that show the size and location of the food production space(s). Area calculations must reflect the actual growing area used for the production of food-bearing plants and not include the area of retaining walls or sidewalks/footpaths.
- Provide Letter of Assurance and photographs showing the entire food production space and all required dimensions. Area calculations must reflect the actual growing area used for the production of food-bearing plants and not include the area of retaining walls or sidewalks/footpaths.

## R-N03 Food Access and Support

**Intent:** Support equitable access to fresh food through proximity, transportation and delivery support.

**Issue:**

- Variances in healthy food access amongst neighborhoods may contribute to health disparities, including differences in chronic disease levels and obesity rates.[257,258]

 

- While smaller food stores may increase food access, they typically provide snack foods and do not significantly contribute to the availability of fruits and vegetables in nearby neighborhoods.[259]
- Certain neighborhood characteristics, such as not being close to a supermarket, have the potential to influence weight gain and obesity.[260,261]
- As food often travels great distances before reaching its final destination, there are many opportunities for food degradation and bacterial growth throughout the food transportation and storage process.[262,263]

**Impact:**

- Proximity to supermarkets, grocery stores and farmers markets can help individuals improve their dietary and lifestyle behaviors by supporting better food choices.[261,264]
- Residents who have better access to supermarkets and grocery stores tend to have healthier diets and are less likely to be overweight or obese.[257,261]
- Supporting temperature control in the transportation of fresh foods helps maintain food quality and reduce food loss or contamination.[262]

**Part 1. Support Fresh Food Access (2 points)**

***Tags: Neighborhood Attributes***

*Option 1. Fresh Food Proximity*

The following requirement is met:

a. The **main building entrance** is located within an 800 m [0.5 mi] **walking distance** of at least one of the following:
   i. A **supermarket** or grocery store with a fruit and vegetable section.[265]
   ii. A fruit and vegetable stand or mobile cart that is open at least five days a week and operates year round.[266]
   iii. A farmers market that is open at least once a week and operates for at least four months of the year.[267,268]

Verification:

- Provide an area map showing the location and distance from the dwelling unit to the fresh food source(s).

OR

 

*Option 2. Transit to Fresh Food*

A public transit route meets the following requirements:

a. Serves a station/stop located within a 400 m [0.25 mi] **walking distance** of the **main building entrance**.
b. Serves a station/stop located within a 400 m [0.25 mi] **walking distance** of a **supermarket** or grocery store with a fruit and vegetable section.
c. Has a travel time between the applicable stations/stops that is scheduled to be 10 minutes or less.
d. Has a minimum daily transit service of 15 trips in each direction.

Verification (meet all):

- Provide an area map showing the location and distance from the dwelling unit to the fresh food source(s) or public transit station.
- Provide a transit schedule that shows the two stations/stops.

**Part 2. Support Fresh Food Delivery (2 points)**

***Tags: Common Space; Services and Policies***

*Option 1. Community-Supported Agriculture*

**Community-supported agriculture** or a fresh food share program meets the following requirements:

a. Is available to residents and building staff, as applicable.[267,268]
b. Has a delivery and pick-up location within the project boundary.[267,268]
c. Delivers food at least twice a month for at least four months of the year.[267,268]

Verification:

- Provide the delivery schedule and delivery/pick-up location for the qualifying program.

OR

*Option 2. Fresh Food Delivery Support*

Refrigerated storage meets the following requirements:

a. Is located in a **common space** within the project boundary.
b. Can accept deliveries by third parties when residents are not present.
c. Can be accessed by residents during any time.

Verification (meet one):

- Provide drawings that show the location of the refrigerated storage.

 

- Provide Letter of Assurance and photographs showing the refrigerated storage and its location.

## R-N04 Food Hygiene Support

**Intent:** Reduce the risk of foodborne illness by designing a kitchen that supports good hygiene and food-handling practices.

**Issue:**

- Many cases of foodborne illness occur in residential kitchens as a result of improper food handling and preparation.[269]
- Residential kitchens may be contaminated with potentially harmful micro-organisms such as *Salmonella*.[270,271]
- Kitchen faucet systems may be contaminated with germs and bacteria that can cause foodborne illness.[272]

**Impact:**

- The presence of a sink in the kitchen can encourage proper food-handling practices, such as handwashing.[273]
- Kitchen layouts that have the sink, countertop and cooktop in proximity tend to have a lower number of cross-contamination events and may reduce foodborne illness.[273]
- Reducing touch points on kitchen faucet systems helps decrease the area for bacterial build up and helps minimize the risk of cross-contamination during food preparation.[274]

**Part 1. Support Hygiene Practices (1 point)**

At least one kitchen meets the following requirements:

a. Has the primary sink, one countertop and the **cooktop** in a triangular formation with a perimeter no greater than 4 m [13 ft] or in a line with a length no greater than 2 m [6.5 ft].[273]
b. Has the primary sink adjacent to a countertop on at least one side.[273]

Verification (meet one):

- Provide drawings that show the location of and distance between the sink, countertop and **cooktop**, including all measurements required to calculate the perimeter if in a triangular formation.
- Provide Letter of Assurance and photographs showing the location of and distance between the sink, countertop and **cooktop**, including all

 

measurements required to calculate the perimeter if in a triangular formation.

**Part 2. Reduce Touch Points on Kitchen Faucets (1 point)**

At least one faucet within each kitchen of the dwelling unit meets the following requirements:

a. Has adjustable water temperature and flow rate.
b. Water flow can be turned on/off with a touchless sensor (i.e., touchless faucet) or with a single tap (i.e., touch faucet).

Verification:

- Provide specifications and purchase orders or invoices for the qualifying faucet.

 

# Light

## R-L01 Design for Daylight

**Intent:** Support well-being and circadian health by promoting daytime light exposure and managing daylight in bedrooms.

**Issue:**

- Light exposure affects circadian rhythm, which helps regulate an individual's sleep-wake cycle, immune system and appetite.[275]
- Insufficient access to daylight or equivalent light sources can cause negative effects on mental, physical and sleep health.[276,277]
- A range of short-term health impairments, including memory loss, slowed reflexes and decreased attention, are associated with poor sleep quality and insufficient sleep.[278]

**Impact:**

- Windows can help increase access to light, improving circadian rhythm regulation and leading to positive health effects.[279,280]
- Homes with access to daylight can help improve sleep patterns and decrease falling incidents, infectious diseases and depression.[277]
- Unobstructed window views of nature can increase feelings of calmness, aid in illness recovery, and improve focus, mood and well-being.[280]
- Blackout shades can help provide a cool and dark environment that is optimal for sleep.[281]

**Part 1. Provide Windows (1-4 points)**

The dwelling unit meets the following requirements:

a. Glazing area is distributed according to one of the tiers in the table below:

 

| Tier | Points | Required Glazing Area |
|---|---|---|
| 1 | 1 | • The total glazing area installed throughout the dwelling unit is at least 8% of the **regularly occupied** area of the dwelling unit (i.e., the window-to-floor ratio is at least 8%).[282]<br>• All bedrooms contain at least one window. |
| 2 | 2 | • The total glazing area installed throughout the dwelling unit is at least 10% of the **regularly occupied** area of the dwelling unit (i.e., the window-to-floor ratio is at least 10%).<br>• All **regularly occupied** rooms contain at least one window. |
| 3 | 4 | • The total glazing area installed throughout the dwelling unit is at least 15% of the **regularly occupied** area of the dwelling unit (i.e., the window-to-floor ratio is at least 15%).<br>• All **regularly occupied** rooms contain at least one window. |

b. Window areas that count toward the total required glazing area are located at least 0.9 m [3 ft] from any exterior structures.
c. Skylights that count toward the total required glazing area are accompanied by vertical glazing in the same room.

Verification (meet all):

- Provide calculations for the total **regularly occupied** floor area.
- Provide calculations for the total glazing area.
- Meet one of the following:
    i. Provide drawings that show the windows per room.
    ii. Provide Letter of Assurance and photographs showing the windows per room.

**Part 2. Provide Blackout Shades (1-3 points)**

Shades, blinds, curtains or shutters in bedrooms meet the following requirements:

a. Have a maximum 1% visible light transmittance.
b. Are installed at all windows (including skylights, if present).

 

c. Are controllable by residents according to one of the tiers in the table below:

| Tier | Points | Control Method |
|---|---|---|
| 1 | 1 | Manual control (e.g., drawstring). |
| 2 | 2 | Electrical control, with no automation. |
| 3 | 3 | Electrical control, with option for automation. |

Verification (meet one):

- Provide Letter of Assurance and photographs that show the installed window shades and controls.
- Provide specifications and purchase orders or invoices for the qualifying window shades and controls.

## R-L02 Electric Light Control

**Intent:** Support circadian regulation by providing lighting that can be controlled based on a person's needs and preferences.

**Issue:**

- High levels of light during evening and nighttime hours may disrupt natural sleep-wake cycles and increase the time it takes to fall asleep.[275,283]
- Lighting needs can vary throughout the day and year due to variations in weather and/or seasonal conditions.[284,285]

**Impact:**

- Light patterns that mimic traditional day-to-night lighting, with bright light in the morning and reduced light at night, can have positive impacts on alertness during the day and sleep at night.[286]
- Limiting exposure to blue light in the evening supports natural melatonin production and good sleep.[287]
- Dimmable lights minimize evening and nighttime light exposure to help support circadian rhythm health.[283,288,289]
- Programmable and customizable lighting systems can increase visual comfort and satisfaction in the home.[290,291,292]

**Part 1. Provide Controllable Lighting (1-5 points)**

The dwelling unit meets the following requirements:

a. Contains permanent lighting that is controllable according to one of the tiers in the table below:

 

| Tier | Points | Lighting in bedrooms | Lighting in other regularly occupied rooms other than bathrooms | Lighting in bathrooms |
|---|---|---|---|---|
| 1 | 1 | Is dimmable to 20% or lower. | N/A | Has at least two brightness levels.<br><br>May be achieved with dimming, "high/low" settings, multiple lighting zones (e.g., vanity vs. shower) or an added "night light." |
| 2 | 2 | Is dimmable to 20% or lower. | | |
| 3 | 3 | Is dimmable to 5% or lower. | | |
| 4 | 5 | Is dimmable to 5% or lower.<br><br>Has tunable output where spectrum (spectral power distribution) can be adjusted (e.g., tunable white, dim-to-warm, tuning melanopic content). | | |

b. Has lighting that is independently controllable per room.

Verification (meet all):

- Provide drawings identifying the location of all lighting and controls.
- Provide specifications and purchase orders or invoices for all lighting and controls.

**Part 2. Provide Programmable Lighting (1-2 points)**

*Note: This part requires Part 1 of this feature to be achieved at the Tier 1 level.*

Lighting in the dwelling unit meets the following requirements for the spaces listed in one of the tiers in the table below:

| Tier | Points | Spaces |
|---|---|---|
| 1 | 1 | All regularly occupied spaces except bedrooms |
| 2 | 2 | All regularly occupied spaces |

a. Can be programmed by residents to preset scenes (e.g., specific light levels and color settings).

 

b. Can be programmed by residents to automatically adjust light levels and/or spectrum based on time of day.

Verification (meet all):

- Provide drawings identifying the location of the qualifying lighting and controls.
- Provide specifications and purchase orders or invoices for the qualifying lighting and controls.

## R-L03 Electric Light Quality

**Intent:** Avoid eye strain and improve visual comfort by installing lights with high color quality and low flicker.

**Issue:**

- Most home designs have historically focused on lighting for navigation, aesthetics and energy efficiency without considering how light impacts human health.[293]
- Flicker – defined as rapid, repetitive changes to light brightness – may lead to negative health effects, including eye strain, fatigue, headache, migraine and blurred vision.[294,295,296]
- Lighting with low color rendering (poor color quality) can impact an individual's ability to differentiate between objects and accurately perceive their surroundings.[297]
- Individuals who have reduced or low vision are more sensitive to variations in light quality.[284,298]

**Impact:**

- Flicker can be minimized by using high-frequency drivers and dedicated dimming controls.[293]
- The intensity, uniformity and color rendering of electric lights contribute to an individual's overall satisfaction with lighting in the home.[285,299]

**Part 1. Install Lights with High Color Quality (1 point)**

The following requirements are met:

a. Permanent lighting is installed in at least half of the **occupiable** rooms in the dwelling unit.
b. All permanent lighting installed within **occupiable** spaces meet one of the following:

 

i. CRI ($R_a$) ≥ 90.
ii. CRI ($R_a$) ≥ 80 with R9 ≥ 50.
iii. $R_f$ ≥ 78, $R_g$ ≥ 100, -1% ≤ $R_{cs,h1}$ ≤ 15%, per IES TM-30.

Verification (meet all):
- Provide drawings that show the location of all lighting.
- Provide specifications and purchase orders or invoices for all lighting.

**Part 2. Install Low Flicker Lights (2 points)**
The following requirements are met:
a. Permanent lighting is installed in at least half of the rooms in the dwelling unit.
b. All permanent lighting installed within the project boundary meets one of the following:
   i. Percent amplitude modulation of <30% for frequencies less than 200 Hz, when tested according to the requirements in Joint Appendix JA-10 (equivalent to "reduced flicker operation" classification in California Title 24).[300,301]
   ii. Percent amplitude modulation <5% at frequencies less than 90 Hz (equivalent to Recommended Practices 3 defined in IEEE standard 1789-2015 LED).[302]
   iii. Pst LM ≤ 1.0 and SVM ≤ 0.6 for indoor applications, per NEMA 77-2017.[303]

Verification (meet all):
- Provide drawings that show the location of all lighting.
- Provide specifications and purchase orders or invoices for all lighting.

## R-L04 Visibility at Night

**Intent:** Support wayfinding and movement at night and minimize nighttime circadian disruption by providing appropriate lighting.

**Issue:**
- Falls are the second leading cause of injury-related deaths worldwide.[304]
- The risk of falling increases in homes and neighborhoods with poor lighting, especially among older adults.[305,306,307]
- Fall-related injuries can result in physical limitations, disabilities and decreased quality of life.[308]

 

- People of all ages may experience a greater fear of crime while in dark environments.[309]

**Impact:**

- In homes, well-lit staircases may decrease the risk of falling.[306]
- Lighting built into handrails and steps can increase an individual's perceived stair safety.[308]
- Well-lit exterior footpaths (sidewalks) provide increased visibility and reassurance at night.[310]
- Streetlights can help increase public safety and reduce crime, leading to greater use of outdoor areas.[311,312]

**Part 1. Provide Interior Night Lighting (1 point)**

The following requirements are met:

a. **Hallways** and stairs within the dwelling unit contain light(s) that meet the following:
   i. Are mounted no more than 0.6 m [2 ft] above the finished floor.
   ii. Emit 100% of their light below the horizontal plane.
   iii. Are installed no more than 1.2 m [4 ft] apart on stairs.
   iv. Are installed so that there is at least one per **hallway**.
   v. Can be controlled by the resident independently from any other lights in the **hallways** and stairs.

Verification (meet all):

- Provide drawings that show the location of all lighting.
- Provide specifications and purchase orders or invoices for all lighting.

**Part 2. Provide Exterior Night Lighting (1 point)**

The following requirements are met:

a. Each building entrance utilizes light(s) with a color temperature ≤3000K.
b. If the building entrance is directly outside the dwelling unit, entryway lighting is controllable by the resident or is motion-activated.
c. If present, all common exterior paths and parking lots utilize light(s) with a color temperature ≤3000K.

Verification (meet all):

- Provide drawings that show the location of all lighting.
- Provide specifications and purchase orders or invoices for all lighting.

 

# Movement

## R-V01 Pedestrian-Friendly Places

**Intent:** Promote walking as part of daily life by implementing pedestrian-friendly neighborhood design strategies.

**Issue:**

- Many people around the world do not meet daily recommended physical activity levels.[313,314]
- Physical inactivity, or failing to achieve minimum recommended levels of physical activity, is a leading risk factor for premature death, heart disease, diabetes, breast cancer and colon cancer.[313,315]
- Sedentary behavior, or very-low intensity activities such as sitting, is a rising trend for both adults and children and a risk factor for several chronic health diseases.[315,316,317]
- Bold collaborative action will be required to reverse these trends.313
- Many neighborhoods lack infrastructure that has been shown to support walking, such as footpaths (sidewalks), intersections and destinations.[318,319]

**Impact:**

- In general, physical activity can lead to enhanced physical and mental health.[317]
- Regular physical activity can contribute to numerous health benefits such as lowering the risk of high blood pressure, heart disease, depression, some cancers, diabetes and obesity.[314,315]
- Neighborhoods designed to increase physical activity levels enable more active lifestyles, support human and environmental health and promote social cohesion.[320]
- Communities that focus on pedestrian-friendly design, including proximity, connectivity, density and aesthetics, are associated with increased walking for people of all ages and genders.[321,322]

**Part 1. Design Walkable Neighborhoods (3 points)**

***Tags: Neighborhood Attributes***

*Option 1. Walkable Neighborhood Design*

The **main building entrance** meets the following requirements:

a. Opens onto a street with a sidewalk/footpath.

b. Is connected to at least three other streets with sidewalks/footpaths within a 540 m [0.3 mi] **walking distance**.[323]
c. Has sidewalks/footpaths that incorporate the following design strategies:
    i. Have a width that is at least 1 m [3 ft].[324]
    ii. Have intersections that include curb cuts.[324]
    iii. Are physically separate from the portion of the roadway dedicated to motor vehicles through either a curb edge or landscaped buffer space.[325]
d. Has sidewalks/footpaths that connect residents to at least three unique use types (defined in Appendix V1) within an 800 m [0.5 mi] **walking distance**.

Verification:

- Provide drawings that highlight all qualifying sidewalks/footpaths, roads and amenities or destinations located within an 800 m [0.5 mi] radius of the **main building entrance**.

OR

*Option 2. Third-Party Active Living Index*
The dwelling unit is located in an area (i.e., postal code or address) that meets one of the following:

a. AARP Livability Index (USA): minimum score of 50.[326]
b. National Walkability Index (USA): minimum score of 10.5.[327]
c. Walk Score (USA, Canada): minimum score of 70.[328]
d. State of Place (USA, global): minimum score of 40.[329]

Verification:

- Provide the name of the active living index and the resulting score.

## R-V02 Transit-Friendly Places

**Intent:** Promote walking as a form of physical activity by locating residences near public transit.

**Issue:**

- Historically, community design has given priority to vehicles over more active forms of transportation, such as walking, cycling and public transit.[330]

 

- Personal automobiles produce more greenhouse gasses per passenger mile traveled compared to other modes of transportation, such as buses and trains.[331,332]
- Emissions from transportation are a major source of air pollution and contribute to millions of premature deaths worldwide.[333,334]

**Impact:**

- Public transportation use is associated with greater levels of daily physical activity.[335]
- Public transportation systems with robust service options, times, routes and connections encourage greater levels of transportation-related physical activity.[320]
- Reliable public transportation systems not only help improve physical and mental health but also support health equity through improved access to healthy food options and economic opportunities.[336]

**Part 1. Support Public Transit Use (2 points)**
***Tags: Neighborhood Attributes***

*Option 1. Transit-Friendly Neighborhood Design*
The **main building entrance** meets the following requirements:

a. One of the following:
    i. Is within a 400 m [0.25 mi] **walking distance** of a rail or bus service that does not have a **dedicated right of way**.[337]
    ii. Is within an 800 m [0.5 mi] **walking distance** of a ferry, rail or bus service that has a **dedicated right of way**.[337]
b. Has available transit services that provide a combined total of at least 72 weekday trips and 30 weekend trips.[337] Projects with multiple transit service options available may consider a combined daily total for all compliant transit types.

Verification (meet all):

- Provide an area map showing the distance from the **main building entrance** to public transportation with all rights of way noted.
- Provide a calculation of the combined number of public transportation trips for both weekdays and weekends.

OR

 

*Option 2. Third-Party Transit Index*
The dwelling unit is located in an area (i.e., postal code or address) that meets one of the following:

a. Transit Score (USA, Canada): Minimum score of 70
b. PTAL (United Kingdom): Minimum score of 5.
c. Greater Manchester Accessibility Levels (United Kingdom): Minimum score of 7.

Verification:

- Provide the name of the transit index and the resulting score.

## R-V03 Bike-Friendly Places

**Intent:** Promote cycling as a form of physical activity by locating residences near bike-friendly streets and providing end-of-trip facilities.

**Issue:**

- Historically, community design has given priority to vehicles over more active forms of transportation, such as walking, cycling and public transit.[330,338]
- Common barriers to cycling include a lack of bike lanes, poor connectivity of bike lanes to destinations and limited availability of bike parking at destinations.[339,340]

**Impact:**

- Cycling, whether for leisure or commuting, is associated with increased physical activity levels and lower mortality rates.[341,342,343]
- In addition to health benefits, cycling supports environmental sustainability goals by reducing reliance on modes of travel that emit higher levels of greenhouse gasses.[344]
- Individuals are more likely to cycle when streets have dedicated cycling infrastructure, such as bike lanes, and when destinations have secure bike parking.[345,346]

**Part 1. Support Cycling (2 points)**
***Tags: Neighborhood Attributes***
*1. Cycling Network*
The following requirements are met:

 

a. A **functional building entrance** used by cyclists opens to a **cycling network**.
b. The **cycling network** connects riders to at least three destinations (as defined in Appendix V1) within an 8 km [5 mi] biking distance of a **functional building entrance** used by cyclists.[347]
c. Roads and paths that count toward the **cycling network** include at least one of the following:
    i. A dedicated bike lane.[348]
    ii. A vehicular speed limit of 50 km/h [35 mph] or less.
    iii. A path or trail that is open to cyclists and separate from a vehicular road.

Verification:

- Provide an area map showing the **cycling network**, destinations and their distances from the building.

AND

*2. Bike Parking*

One of the following requirements is met:

a. If the building has five or more dwelling units, the following is met:
    i. Within 30 m [100 ft] of a **functional building entrance**, **short-term bike parking** (e.g., a u-shaped bike rack) is available at no cost for at least 2.5% of expected visitors.[347]
    ii. Within the project boundary, **long-term bike parking** (e.g., a secure bike locker, a secure bike room) is available for at least 15% of bedrooms (with a minimum of five spaces) at no cost.
b. If the building has fewer than five dwelling units (including single-family homes), the following is provided at no cost within the project boundary:
    i. At least one **long-term bike parking** space (e.g., an attached or detached garage, a secure bike room in a **common space**) per dwelling unit.[349]

Verification (meet all):

- Provide bike parking capacity calculations.
- Provide drawings that show all bike storage spaces and distances to **functional building entrances**, as relevant.

 

## R-V04 Outdoor Activity Space

**Intent:** Promote physical activity and exercise outside through public outdoor recreational space.

**Issue:**

- Factors such as traffic, lack of footpaths (sidewalks) and overall lack of outdoor space may decrease overall physical activity levels.[350]
- Access to parks is not equally distributed across communities, and many individuals do not live near a park.[351,352,353]

**Impact:**

- Parks are an important neighborhood asset in promoting physical activity and supporting active living (i.e., a lifestyle that supports physical activity).[354,355]
- Park use and physical activity increase when parks offer a variety of amenities and are located in close proximity to homes.[356,357,358]
- Providing parks in residential communities can contribute to numerous benefits beyond physical activity, including improved mental health, air quality and noise mitigation.[355,359]
- Optimizing outdoor spaces by incorporating amenities, accessibility features and crime prevention strategies can help maximize their use and their potential health and environmental benefits.[354,360,361]

**Part 1. Provide Access to Outdoor Activity Space (2 points)**

***Tags: Common Space; Neighborhood Attributes***

One or more common outdoor activity spaces, collectively or individually, meet the following requirements:

a. Is within an 800 m [0.5 mi] **walking distance** of the **main building entrance**.
b. Is accessible to residents at no additional cost.
c. Has a total area that is at least 0.4 hectare [1 acre] or 10% of the project boundary, whichever is larger.
d. Collectively includes at least two of the following amenities:
    i. A walking path, trail or track.
    ii. Outdoor exercise equipment.
    iii. A playground and/or splash pad.
    iv. A swimming pool or natural swimming area (e.g., beach, lake).
    v. A recreational court, field or permanently installed game (e.g., a bocce ball court, basketball hoop, chess).

 

Verification:

- Provide drawings or an area map of each outdoor physical activity space highlighting the qualifying amenities within it and its distance to the **main building entrance**.

## R-V05 Indoor Activity Space

**Intent:** Promote movement and exercise by providing a dedicated indoor physical activity space that supports use by all people and offers equipment that supports a range of abilities.

**Issue:**

- Indoor fitness facilities are often not readily available, nor are they designed to be accessible to and inclusive of all individuals.[361,362,363]
- Individuals with limited mobility have additional barriers to using fitness facilities, making it more difficult for them to meet physical activity guidelines.[363,364]

**Impact:**

- Enhanced places for physical activity, such as those that are located near residents and those that include robust amenities and programming, are effective at increasing physical activity and exercise.[357,365]
- Clear floor space and accessible routes in fitness centers are key strategies to support fitness center use by people with diverse physical abilities.[366]
- Activity spaces that are designed to be accessible and inclusive support health and well-being for all individuals.[363]

### Part 1. Provide Indoor Activity Space (1 point)

***Tags: Common Space***

A dedicated common indoor physical activity space meets the following requirements:

a. Is located within the project boundary.
b. Is accessible to residents at no additional cost.
c. Has a minimum size of 25 $m^2$ [270 $ft^2$] plus 0.1$m^2$ [1 $ft^2$] per dwelling unit served by the space or 929 $m^2$ [10,000 $ft^2$], whichever is smaller.[367]
d. Contains at least one unit each of cardio (e.g., treadmill) and strength equipment (e.g., set of free weights with at least three different weight

 

options) or a total combined amount of equipment equal to 5% of the total number of dwelling units served by the space, whichever is larger.

Verification (meet all):

- Provide documentation that the indoor activity space is accessible to residents at no additional cost.
- Provide drawings that show the dimensions of the indoor activity space and its location within the project boundary.
- Provide the specifications and purchase orders or invoices for all qualifying equipment.

**Part 2. Provide Accessible Indoor Activity Equipment (1 point)**

***Tags: Common Space***

*Note: This part requires Part 1 of this feature to be achieved.*

A dedicated indoor physical activity space within the project boundary meets the following requirements:

a. Contains at least one unit each of cardio and strength equipment that meets the following:
   i. Is positioned along a route that is at least 0.9 m [3 ft] wide.[366]
   ii. Has a 76 cm [30 in] by 1.2 m [48 in] clearance to approach the equipment on at least one side.[366]

b. Contains at least one unit each of cardio and strength equipment that supports use by people with varying physical abilities (e.g., recumbent bike, arm bike, wrist weights, a multipurpose gym system with pulleys).

Verification (meet one):

- Provide Letter of Assurance and photographs that show the equipment layout for the indoor activity space including dimensions of the route(s) and clearance(s).
- Provide the following:
  - Drawings that show the layout of accessible equipment including dimensions of the route(s) and clearance(s).
  - Specifications and purchase orders or invoices for all qualifying equipment.

 

## R-V06 Adjustable Workstations

**Intent:** Support ergonomic comfort and reduce the risk of physical strain and injury by providing adjustable workstations for residents in common spaces.

**Issue:**

- Many individuals are at risk for work-related injuries to the muscles, nerves and bones that can arise when a task overloads the body.[368]
- Common disorders that arise from body strain include low back and neck pain, which account for a large portion of global disabilities.[369]
- Occupational work patterns have increased the amount of time spent sitting.[370,371,372]
- There has been an increasing trend, especially in response to the COVID-19 pandemic, for individuals to work from home or other non-traditional workspaces that have not been designed to support ergonomic comfort.[373,374]

**Impact:**

- An optimal work environment includes intentional design approaches and furnishings that support a variety of postures and body types.[375]
- The use of height-adjustable workstations and other types of active workstations (e.g., treadmill desks) have been shown to reduce prolonged sitting time and enable individuals to switch between seated and standing work.[376]
- Chairs that enable customized adjustments to fit the needs of the individual promote comfort and reduce the risk of musculoskeletal strain.[377]

### Part 1. Provide Adjustable Workstations in Common Spaces (1 point)

***Tags: Common Space***

**Workstations** are provided to residents in a **common space** (e.g., resident lounge, shared workspace) and meet the following requirements:

a. Are provided in a quantity equal to at least 5% of all dwelling units within the building or development.
b. Are height-adjustable for both sitting and standing through one of the following mechanisms:
    i. Manual or electric height-adjustments.[378,379]
    ii. Supplemental solutions (e.g., stands, risers).[378,379]
c. Each is accompanied by a chair that meets the following:
    i. Includes an adjustable seat height.[378,379]

ii. Includes either an adjustable seat pan or a fixed seat pan that is not more than 43 cm [17 in] deep.[378,379]
iii. Includes one additional adjustability option for lumbar support, backrest angle, or armrest height and distance between armrests.[378,379]

d. If present at any **workstation**, computer monitors and/or supplemental screens allow for users to adjust the monitor's height, viewing angle and horizontal distance.[378,379]
e. Are accompanied by readily accessible (i.e., located in the space) print or digital instructions on how to adjust **workstation** furnishings.

Verification (meet all):

- Provide calculations utilized to determine the number of **workstations**.
- Provide specifications and purchase orders or invoices for the ergonomic **workstation** furnishings.
- Provide the adjustability instructions.

## R-V07 Staircase Design

**Intent:** Promote physical activity by encouraging stair use in multifamily residential buildings by optimizing staircase design, signage and visibility.

**Issue:**

- Many people around the world do not meet daily recommended physical activity levels.[313,314]
- Physical inactivity is a leading risk factor for premature death, heart disease, diabetes, breast cancer and colon cancer.[313,315]
- Building design plays a role in either promoting or discouraging stair use.[380,381,382]

**Impact:**

- Incorporating opportunities for physical activity into daily behaviors, such as regular stair use, is a promising way to increase physical activity and promote general health.[317,383,384]
- Point-of-decision motivational signage has been shown to be an effective strategy in promoting stair use.[385]
- Stair use may be increased when staircases are well-placed, convenient, visible and include features such as artwork and music.[386,387,388]

 

**Part 1. Design Inviting Staircases (1 point)**

***Tags: Common Space***

A staircase accessible by all residents and servicing all **occupiable** floors of the residential building meets at least two of the following requirements:

a. Is at least as prominent when viewed from the **main building entrance**, if **elevators** are present.
b. Is located adjacent to shared building amenities on each floor.
c. Incorporates at least two of the following on each floor:
    i. Biophilic design or artwork.[381]
    ii. Music.[381]
    iii. Light levels designed to produce at least 100 lux at the tread when in use.[389]
    iv. Windows or skylights that provide access to daylight and/or nature views.[381]
    v. Interactive design strategies (e.g., gamification, piano stairs).[381]
d. Includes prominent signage that shows the location of the stairs and includes motivational language to use the stairs at the following locations:
    i. At **elevator** or escalator banks on each floor.[381]
    ii. At staircase entrances on each floor.[381]
    iii. In **common spaces** such as lounges, recreation rooms or other resident amenity spaces.[381]

Verification:

- Provide drawings that show the location of the staircase and how it relates to the building entrance and amenities, the aesthetic elements within the staircase and the motivational signage.

 

## Appendix R-V1

Diverse use types:[390]

| Category | Use Type |
|---|---|
| Food retail | **Supermarket** |
| | Grocery store with fruit and vegetable section |
| Community-serving retail | Convenience store |
| | Farmer's market |
| | Hardware store |
| | Pharmacy |
| | Other retail |
| Services | Bank |
| | Entertainment venue (e.g., theater, stadium) |
| | Gym, health club, exercise studio |
| | Hair care |
| | Laundry, dry cleaning |
| | Restaurant, café or diner (excluding those with only drive-thru service) |
| Civic and community facilities | Adult or senior care (licensed) |
| | Childcare (licensed) |
| | Community or recreation center |
| | Cultural arts facility (e.g., museum, performing arts center) |
| | Education facility (e.g., K–12 school, university, adult education center, vocational school, community college) |
| | Government office that serves public on-site |
| | Medical clinic or office that treats patients |
| | Place of worship |
| | Police or fire station |
| | Post office |
| | Public library |
| | Public park |
| | Social services center |
| Community anchors | Commercial office (100 or more full-time employees) |
| | Housing (100 or more dwelling units) |

 

The following restrictions apply to Appendix R-V1:

- A use may be counted as only one use type (e.g., a single retail space may be counted only once even if it sells products in several use categories).
- No more than two uses in each use type may be counted (e.g., if five restaurants are within the required distance, only two may be counted).

 

# Thermal Comfort

## R-T01 Thermal Performance

**Intent:** Support the health, well-being and productivity of residents by providing comfortable thermal conditions.

**Issue:**

- Extreme temperature events are happening more frequently and can increase population mortality rates.[391,392]
- Fewer homes may be able to rely solely on natural ventilation for heating and cooling in response to climate change.[392,393,394]
- Thermal comfort is influenced by the construction of the home, climate and seasonal changes.[395]

**Impact:**

- Providing a desirable thermal comfort level can improve the physical and mental health of individuals.[396]
- Having control of indoor temperatures can support overall satisfaction with thermal comfort.[395,397,398]
- Homes that are mechanically heated or cooled allow for a greater range of indoor temperatures and can increase overall thermal comfort compared to residences that are naturally conditioned.[399,400]
- Fans may help increase thermal comfort by providing more uniform temperatures in a space.[401,402]

**Part 1. Support Fundamental Thermal Comfort (1 point)**

The following requirements are met:

a. One of the following is met:
    i. Heating is mechanically supplied in all **regularly occupied** rooms and **bathrooms** with showers and baths, except those with no exterior walls. Controls are present within the dwelling unit.
    ii. The building is located in IECC 2018 or ASHRAE 90.1 climate zone 1.[403]
    iii. The daily average outdoor temperature at the building location did not fall below 10 °C [50 °F] for 8 or more days in the previous calendar year.[404]
b. One of the following is met:
    i. Cooling is mechanically supplied in all **regularly occupied** rooms, with controls present within the dwelling unit.

 

ii. The building is located in IECC 2018 or ASHRAE 90.1 climate zone 7 or 8.[403]
iii. The daily average outdoor temperature at the building location did not exceed 33 °C [92 °F] for 8 or more days in the previous calendar year.[404]

Verification (meet one or more, as applicable):

- Provide mechanical drawings or annotated photographs that describe the type and location of all heating and/or cooling equipment (e.g., boiler, radiator, supply vents, heat pump). If mechanical drawings are not provided, also include a list of **regularly occupied** rooms.
- If mechanical heating and/or cooling is not provided, describe the relevant climate conditions.

**Part 2. Design Mechanical Heating and Cooling (2 points)**

The dwelling unit has a mechanical heating and/or cooling system that meets the following requirements:

a. Is designed to meet the load calculation requirements set in one or more of the following guidelines:
   i. ACCA Manual J Residential Load Calculation - 2016.[405]
   ii. CIBSE Guide B1: Heating.[406]
   iii. CIBSE Guide B3: Air Conditioning and Refrigeration.[407]
   iv. GB 50736-2012 Design Code for Heating Ventilation and Air Conditioning of Civil Buildings.[408]
b. Is designed to meet the equipment selection requirements set in one or more of the following guidelines:
   i. ACCA Manual S Residential Equipment Selection - 2014.[409]
   ii. CIBSE Guide B1: Heating.[406]
   iii. CIBSE Guide B3: Air Conditioning and Refrigeration.[408]
   iv. GB 50736-2012 Design Code for Heating Ventilation and Air Conditioning of Civil Buildings.[409]
c. If ducts for heating or cooling are present, they are designed to meet the ductwork requirements set in one or more of the following guidelines:
   i. ACCA Manual D Residential Duct Systems - 2016 (only for heating and/or cooling systems with ductwork exceeding a total length of 3 m [10 ft]).[410]
   ii. CIBSE Guide B2: Ventilation and Ductwork.[411]

 

Verification:

- Provide the load calculations report and equipment list of the mechanical system.

**Part 3. Provide Cooling Fans (1 point)**

The dwelling unit meets the following requirements:

a. Ceiling fans, stand/pedestal fans, or permanently mounted wall fans are provided in all **regularly occupied** rooms.
b. Fan blades are at least 25 cm [10 in] in diameter or, for centrifugal or bladeless fans, the air outlet is at least 46 cm [18 in] in length.
c. Fans are controllable by at least one of the following:
    i. Wall switch with the function clearly labeled.
    ii. Switch on a device.
    iii. Remote control.

Verification (meet one):

- Provide Letter of Assurance and photographs that show the qualifying fans as well as their location, dimensions and controls.
- Provide drawings that show the qualifying fans as well as their location, dimensions and controls.

**Part 4. Maintain HVAC and Dehumidification Equipment (1 point)**

***Tags: Services and Policies***

A thermal systems maintenance plan provides the following services to residents at no additional cost:

a. Maintenance activities for all systems that provide heating, cooling, humidification and dehumidification installed/provided by the developer, as applicable and as described in the table below:

| **Maintenance Requirements** | **Interval** |
|---|---|
| General inspection | Annually |
| Cleaning of components (e.g., coils, condensers, condensate pans, ducts, evaporator, fans, pre-filters) | Manufacturer's recommendation AND as necessary per inspection |
| Maintenance and adjustment (e.g., belts, fans, lubrication, refrigerant charging, sensors, thermostats, valves, wiring) | |
| Provision and installation of consumable components (e.g., filters to prepare air for thermal conditioning) | Manufacturer's recommendation |

Verification (meet all):

- Provide a list of heating, cooling, humidification and dehumidification systems.
- Provide one of the following:
    - A budget that details and incorporates the applicable services being provided or contracted.
    - A contract with a **qualified professional** or service provider for applicable services.
    - A description provided to residents of the maintenance service offering

## R-T02 Thermal Control

**Intent:** Support individual thermal preferences by providing thermal control throughout the residence.

**Issue:**

- The effects of thermal discomfort go beyond dissatisfaction with the temperature of the environment; it can lead to an increased risk of allergies, asthma, colds, headaches, high blood pressure, sore throats and stomach ulcers.[412,413,414]
- Thermal comfort is subjective, making it difficult to create and maintain indoor spaces that are thermally comfortable for all individuals.[415,416]
- Unevenly heated homes can negatively impact individual thermal comfort. [417]

**Impact:**

- Zoned heating and cooling systems in homes allow individuals to set different temperatures in different rooms to accommodate multiple thermal comfort preferences.[418]
- Smart thermostats enable individuals to take control of their thermal comfort and also help save energy.[419,420,421]
- Smart thermostats can control temperature setpoints remotely, adjust heating and cooling through customizable schedules and predict comfort settings through usage data.[422]

**Part 1. Provide Room-by-Room Thermal Adjustability (2 points)**

The dwelling unit meets the following requirement:

a. The heating and/or cooling in each **regularly occupied** room can be independently controlled.

 

Verification (meet one):

- Provide Letter of Assurance by an HVAC professional or mechanical engineer and photographs that show the qualifying thermostats.
- Provide drawings of the mechanical system that show the location of thermostats.

**Part 2. Utilize Smart Thermostats (1 point)**

Thermostats installed in the dwelling unit meet the following requirements:

a. Can be operated remotely from outside of the dwelling unit.
b. Have programmable temperature setpoints (e.g., based on time of day or location).

Verification (meet one):

- Provide Letter of Assurance by an HVAC professional or mechanical engineer and photographs that show the qualifying thermostats.
- Provide specifications and purchase orders or invoices for the qualifying thermostats.
- Provide drawings of the mechanical system showing the type and location of the qualifying thermostats.

## R-T03 Insulation and Fenestration Efficiency

**Intent:** Maintain comfortable thermal conditions by utilizing energy-efficient materials that limit unwanted heat transfer.

**Issue:**

- Insufficient insulation in homes can lead to decreased thermal comfort, especially in extreme temperatures.[423]
- Windows and skylights can influence the temperature of a space through radiant heat exchange and have the potential to significantly impact individual thermal comfort.[424]

**Impact:**

- Insulated homes maintain higher indoor temperatures and have been linked to improved self-reported health outcomes, including decreased wheezing and hospital admissions for respiratory conditions.[425,426]
- Windows with low-transmittance glazing can help prevent solar heat absorption and improve thermal comfort.[427]

 

**Part 1. Utilize Efficient Insulation and Fenestration Materials (2 points)**

The following requirements are met:

a. Manufactured (i.e., not constructed onsite) doors meet the heat and solar requirements appropriate to the climate zone as outlined in the table below:[428]

| **Requirements for Manufactured Doors** | | | | |
|---|---|---|---|---|
| **Glazing Level** | **Heat Requirements** (meet one) | | **Solar Energy Requirements** (meet one) | |
| | **U Value** W/m²K [Btu/h*ft²*°F] | **RSI/R Value** m²K/W [ft²*°F*h/Btu] | **SHGC / G Value** | **SC** |
| Opaque | ≤ 0.97 [0.17] | ≥ 1.04 [5.88] | No Rating | |
| ≤ ½ Clear Glazing | ≤ 1.42 [0.25] | ≥ 0.70 [4] | ≤ 0.25 | ≤ 0.29 |
| > ½ Clear Glazing (Climate Zones 1, 2 3A, 3B 5C) | ≤ 1.70 [0.30] | ≥ 0.59 [3.33] | ≤ 0.40 | ≤ 0.46 |
| > ½ Clear Glazing (Climate Zones 3C, 4-7) | | ≥ 0.59 [3.33] | ≤ 0.25 | ≤ 0.29 |

b. Manufactured (i.e., not constructed onsite) windows meet the heat and solar requirements appropriate to the climate zone as outlined in the table below:[428]

| **Requirements for Manufactured Windows** | | | | |
|---|---|---|---|---|
| **Climate Zone (IECC 2018 or ASHRAE 90.1)** | **Heat Requirements** (meet one) | | **Solar Energy Requirements** (meet one) | |
| | **U Value** W/m²K [Btu/h*ft²*°F] | **RSI/R Value** m²K/W [ft²*°F*h/Btu] | **SHGC / G Value** | **SC** |
| 5A, 5B, 6, 7 | ≤ 1.53 [0.27] | ≥ 0.65 [3.70] | Any | |
| 3C, 4, 5C | ≤ 1.70 [0.30] | ≥ 0.59 [3.33] | ≤ 0.40 | ≤ 0.46 |
| 3A, 3B | ≤ 1.70 [0.30] | ≥ 0.59 [3.33] | ≤ 0.25 | ≤ 0.29 |
| 1, 2 | ≤ 2.27 [0.40] | ≥ 0.44 [2.5] | ≤ 0.25 | ≤ 0.29 |

c. Manufactured (i.e., not constructed onsite) skylights meet the heat and solar requirements appropriate to the climate zone as outlined in the table below:[428]

 

| Requirements for Manufactured Skylights | | | | |
|---|---|---|---|---|
| **Climate Zone (IECC 2018 or ASHRAE 90.1)** | **Heat Requirements** (meet one) | | **Solar Energy Requirements** (meet one) | |
| | **U Value** W/m²K [Btu/h*ft²*°F] | **RSI/R Value** m²K/W [ft²*°F*h/Btu] | **SHGC / G Value** | **SC** |
| 5A, 5B, 6, 7 | ≤ 2.84 [0.50] | ≥ 0.35 [2] | Any | |
| 3C, 4, 5C | ≤ 3.01 [0.53] | ≥ 0.33 [1.89] | ≤ 0.35 | ≤ 0.40 |
| 3A, 3B | ≤ 3.01 [0.53] | ≥ 0.33 [1.89] | ≤ 0.28 | ≤ 0.32 |
| 1, 2 | ≤ 3.41 [0.6] | ≥ 0.29 [1.67] | ≤ 0.28 | ≤ 0.32 |

d. Insulation for ceilings below an attic space meets the insulation requirements appropriate to the climate zone as outlined in the table below:[429]

| Insulation Requirements for Ceilings Below an Attic Space | | |
|---|---|---|
| **Climate Zone (IECC 2018 or ASHRAE 90.1)** | **General Space** | **Attic Access Panels and Drop-down Stairs** |
| | **RSI/R Value** m²K/W [ft²*°F*h/Btu] | **RSI/R Value** m²K/W [ft²*°F*h/Btu] |
| 1-5 | ≥ 3.70 [21] | ≥ 1.76 [10] |
| 6-8 | ≥ 5.28 [30] | ≥ 1.76 [10] |

e. Exterior wall sheathing and cavity insulation meet the insulation requirements appropriate to the climate zone as outlined in the table below:[430]

 

| Insulation Requirements for Exterior Wall Sheathing and Cavity Insulation | | |
|---|---|---|
| **Climate Zone (IECC 2018 or ASHRAE 90.1)** | **Wall**<br>RSI/R Value m²K/W [ft²*°F*h/Btu] | |
| | **Cavity** | **Insulation Sheathing** |
| 1-3 | ≥ 2.29 [≥ 13] | None |
| 4-5 | ≥ 2.29 [≥ 13] | ≥ 0.44 [≥ 2.5] |
| 6-8 | ≥ 2.29 [≥ 13] | ≥ 0.88 [≥ 5] |

f. Floor insulation meets the insulation requirements appropriate to the climate zone as outlined in the table below:[430]

| Insulation Requirements for Floor Insulation | |
|---|---|
| **Climate Zone (IECC 2018 or ASHRAE 90.1)** | **General Space**<br>RSI/R Value m²K/W [ft²*°F*h/Btu] |
| 1-2 | ≥ 2.29 [≥ 13] |
| 3 | ≥ 4.40 [≥ 25] |
| 4-8 | ≥ 4.40 [≥ 25] |

g. Supply and return ducts meet the insulation requirement of greater than or equal to RSI 1.06 [R6] when routing through unconditioned spaces.[429]

Verification (meet all):

- Provide the IECC or ASHRAE Climate Zone.
- Provide the qualifying ratings for all manufactured fenestrations and insulation materials.

## R-T04 Humidity Control

**Intent:** Support thermal comfort and limit the growth of biological contaminants by maintaining optimal relative humidity levels.

**Issue:**

 

- High relative humidity reduces the ability for sweat to evaporate and cool the body, which can impact individual thermal comfort.[431]
- The incidence of allergies and respiratory infections can be indirectly affected by high relative humidity because moist surfaces are more conducive to mold, bacteria and pathogen growth.[432,433,434]
- High relative humidity can accelerate the rate of off-gassing of chemicals (such as formaldehyde) from building materials, which negatively affects indoor air quality.[433]

**Impact:**

- Dehumidifiers can improve indoor air quality by reducing moisture and controlling mold and microbe growth, all of which can help decrease the risk of asthma and other respiratory illnesses.[435]
- Maintaining indoor relative humidity levels between 40% and 60% can help minimize the majority of negative health effects that are typically caused by low and high concentrations of relative humidity.[433]
- Keeping indoor relative humidity levels as low as 30% can further reduce mold and microbe growth.[436]

**Part 1. Manage Relative Humidity in Living Spaces (2 points)**

*Option 1. Mechanical Humidity Control*

The dwelling unit meets the following requirements:

a. Except for **high-humidity areas** (e.g., **bathrooms** with showers or baths) and subgrade spaces (e.g., basements, crawl spaces), humidity is controlled within **regularly occupied** rooms by at least one of the following:
    i. A refrigerant or desiccant dehumidifier.
    ii. An air conditioning or heat pump system with a condensate line and pump.
b. If provided, mechanically supplied outdoor air is conditioned by at least one of the following within the air supply system:
    i. A refrigerant or desiccant dehumidifier.
    ii. An energy recovery ventilator (ERV).

Verification (meet one):

- Provide specifications and purchase orders or invoices for the qualifying humidity control equipment.
- Provide drawings of the mechanical system that show the qualifying humidity control equipment.

 

OR

*Option 2. Humidity Modeling*
The following requirement is met:

a. Except for **high-humidity areas** (e.g., **bathrooms** with showers or baths) and subgrade spaces (e.g., basements, crawl spaces), all **regularly occupied** rooms of the dwelling unit are modeled to show that relative humidity levels will be maintained between 30% and 60% for at least 98% of **regularly occupied** hours of the year.[432]

Verification:

- Provide the results of the humidity model(s).

**Part 2. Dehumidify Subgrade Spaces (1 point)**
The following requirements are met:

a. Dehumidification equipment is designed and set to maintain relative humidity levels below 60% in all subgrade spaces (e.g., basements, crawl spaces) that are accessible from the interior of the dwelling unit.[437]

Verification:

- Provide specifications and purchase orders or invoices for the humidity control equipment.

**Part 3. Meet Relative Humidity Thresholds (1 point)**
*Note: This part requires Part 1 of this feature to be achieved.*
***Tags: Onsite Testing***

The following requirement is met:

a. According to onsite tests, relative humidity is between 30% and 60% in all **regularly occupied** rooms of the dwelling unit, except **high-humidity areas** (e.g., **bathrooms** with showers or baths) and subgrade spaces.[432]

Verification:

- Provide the humidity test results conducted by a WELL Performance Testing Agent or **qualified professional**.

## R-T05 Radiant Heating Systems

**Intent:** Minimize allergens by utilizing radiant heating systems that limit the spread of airborne contaminants.

**Issue:**

- Traditional (convective) heating systems blow air throughout the home, which can not only be noisy but can also resuspend settled pollutants into the breathing space.[438,439]
- Individuals who are exposed to allergens (like dust mites) in the home can have allergic reactions and develop respiratory diseases.[440]

**Impact:**

- Radiant heating can more effectively provide thermal comfort in homes by reducing air movement, minimizing drafts and maintaining an even distribution of heat.[441]
- Radiant heating systems do not blow air through the home, which can help reduce the spread of dust and improve air quality for individuals who are sensitive to allergens.[442]
- Radiant heating systems reduce the temperature difference between indoor surfaces and the air, decreasing the likelihood of condensation and mold growth.[443]

**Part 1. Implement Radiant Heating (1 point)**

Radiant floor heating and/or heated wall/ceiling panels are installed in the following areas:

a. At least 50% of **regularly occupied** rooms.
b. All **bathrooms** with showers or baths.

Verification (meet one):

- Provide drawings of the mechanical system that show the radiant heating systems.
- Meet all of the following:
    - Provide Letter of Assurance by an HVAC professional or mechanical engineer and photographs of the radiant system.
    - Provide a drawing or description of the areas where the qualifying radiant system is installed.

 

## R-T06 Operable Windows

**Intent:** Help manage temperature indoors by positioning operable windows at the appropriate heights to increase airflow from outdoors.

**Issue:**

- Inadequate access to operable windows – one of the preferred ways to control indoor thermal comfort and air quality within a home – can negatively impact an individual's ability to quickly and effectively maintain a comfortable indoor environment.[444]
- In the largest and most industrialized cities, the air within homes can have significantly higher levels of pollutants than the outdoor air.[445]

**Impact:**

- Individuals often open windows to regulate indoor temperature, humidity, odors and carbon dioxide, as well as to create more comfortable spaces.[444]
- Installing windows at varying heights can help increase natural ventilation due to the tendency for hot air to rise.[446]
- Individuals are more likely to open windows fitted with screens, which also helps prevent pests from entering the home.[447,448]

**Part 1. Install Operable Windows (1 point)**

The dwelling unit meets the following requirements:

a. At least 50% of **regularly occupied** rooms have operable windows.
b. Operable windows where the sill height is less than 0.9 m [3 ft] above the finished floor on the interior and greater than 1.8 m [6 ft] above the ground on the exterior meet one of the following:
    i. Are equipped with a fall prevention device in compliance with ASTM F2090 or, for windows 22.8 m [75 ft] or higher above the ground, ASTM F2006.[449]
    ii. Have openings that open less than 10 cm [4 in].[449]
c. Operable windows are equipped with screens with a spacing of 6 mesh per cm [16 mesh per in] or finer.[450]

Verification (meet one):

- Provide Letter of Assurance and photographs of windows, devices and screens.
- Provide drawings of windows, devices and screens, as well as window specifications.

 

**Part 2. Provide Windows with Multiple Opening Modes (1 point)**
*Note: This part requires Part 1 of this feature to be achieved.*

The dwelling unit meets the following requirements:

a. At least 70% of operable windows meet the following:
    i. At least half of the opening is not more than 1.8 m [5.9 ft] above the finished floor.[403]
    ii. The opening is at least 0.3 m [1 ft] in the smallest dimension (excluding any fall prevention devices).[403]
b. If the dwelling unit is mechanically heated, at least 30% of operable windows have an opening at the top such that the entirety of that opening is at least 1.8 m [5.9 ft] above the finished floor.[446]
c. At least one window which opens as described in requirements (a) and (b), as applicable, is present in each room with operable windows. Windows that meet both opening modes may satisfy both requirements.
d. Windows can be controlled from no more than 1.7 m [5.6 ft] above the finished floor.

Verification (meet one):

- Provide Letter of Assurance and photographs of all windows.
- Provide drawings that include all window specifications.

## R-T07 Outdoor Heat Management

**Intent:** Improve outdoor thermal comfort by managing the solar heat absorbed and retained by buildings and hardscapes.

**Issue:**

- Heat and high temperatures are becoming greater threats to public health around the world.[451]
- There are significant negative health outcomes associated with extreme heat including heat cramps, heat exhaustion, heat stroke, fainting and even death.[451]
- Exposure to high temperatures is especially dangerous for older individuals and other vulnerable populations.[451]
- Outdoor thermal comfort can affect the livability and vitality of neighborhoods and public spaces.[452]

 

- Low-income neighborhoods often have significantly fewer trees than high-income areas, resulting in higher outdoor temperatures.[453]

**Impact:**

- Shading from trees and other vegetation can reduce the amount of solar radiation on the street and help improve the thermal comfort of pedestrians.[452,454]
- Shade can efficiently reduce the risk of heat stress in hot, urban areas.[455]
- Designing landscapes with green spaces and bodies of water can help regulate microclimates by helping cool the surrounding air temperature.[452]
- Roofing materials with high albedo and reflectivity reduce the amount of solar radiation that is absorbed and retained as heat, helping cool the local surroundings.[452,456]

**Part 1. Manage Heat in Outdoor Spaces (1 point)**

*Option 1. Cool or Shaded Surfaces*

At least 90% of the total area of all outdoor spaces listed in the table below meets one or a combination of the following requirements:

a. Is planted with grass or other vegetation.
b. Is comprised of materials that have either an initial **solar reflectance (SR)** value of at least 0.33 or a three-year aged SR value of at least 0.28 (e.g., white coating, light-colored cement).[457]
c. Is shaded for at least 50% of daylight hours on the summer solstice by tree canopies, awnings, gazebos, pergolas or other structures.

| **Outdoor Spaces** |
|---|
| Pedestrian pathways and building entrances |
| Outdoor parking spaces |
| Yards |
| Plazas, seating areas and playgrounds |
| Exercise facilities with a contiguous area of less than 230 $m^2$ [2,500 $ft^2$] |

Verification (meet all):

- Provide a site plan that indicates the cooled or shaded outdoor spaces and the heat management strategy used in each area.
- Provide specifications (that include SR values) and purchase orders or invoices for the qualifying materials, as applicable.

OR

*Option 2. Temperature Modeling*
The following requirements are met:

a. Temperature modeling is completed for the following outdoor areas, as applicable:
    i. Pedestrian pathways and building entrances.
    ii. Outdoor parking spaces.
    iii. Yards.
    iv. Plazas, seating areas and playgrounds.
    v. Exercise facilities with a contiguous area of less than 230 $m^2$ [2,500 $ft^2$].
b. The temperature modeling report provides the highest expected measure of thermal perception (e.g., highest Physiologically Equivalent Temperature, highest Universal Thermal Climate Index) for at least the summer season.
c. If the highest expected measure of thermal perception is associated with "moderate" or more severe heat stress, the temperature modeling report includes a list of countermeasures that were implemented for at least two of the following categories and the expected reduction in heat stress that they provide:[458]
    i. Landscaping and greenery.
    ii. Manufactured shading systems (e.g., canopies, gazebos).
    iii. Reflectance of manufactured surfaces (e.g., sidewalks/footpaths, rooftops).
    iv. Water features (e.g., ponds, fountains).

Verification (meet all):
- Provide the temperature modeling results.
- Describe the countermeasures that were implemented, if applicable, and the expected reduction in heat stress each provides.

 

**Part 2. Install Heat-Resistant Roof Tops (1 point)**

At least 75% of the rooftop area, excluding areas with HVAC or photovoltaic installations, meets at least one of the following requirements:

a. Uses a green roof system that includes at least 5 cm [2 in] of mature **hardy groundcover plants** based on current vegetation conditions.[459]
b. Is a low-sloped roof (i.e., slope height-to-distance ratio is less than or equal to 2:12) that has either an initial **solar reflectance index (SRI)** of at least 82 or a three-year aged SRI of at least 64.[460]
c. Is a steep-sloped roof (i.e., slope height-to-distance ratio is greater than 2:12) that has either an initial **solar reflectance index (SRI)** of at least 39 or a three-year aged SRI of at least 32.[460]

Verification (meet all):

- Provide specifications (that include SR values, as relevant) and purchase orders or invoices for the qualifying roofing.
- Provide area calculation of heat-resistant roofing.

# Sound

## R-S01 Sound Barriers

**Intent:** Reduce unwanted noise by constructing wall and floor/ceiling assemblies that mitigate the transfer of sound.

**Issue:**

- Noise issues frequently top the list of residential complaints and neighbor problems.[461,462]
- In multifamily buildings, noise disturbances among dwelling units are often caused by televisions, sound systems, footsteps and scraping furniture.[463]
- Noise disturbances at home have been linked to negative health effects, including increased headaches, tiredness, difficulty concentrating, anxiety and depression.[463,464]

**Impact:**

- Walls and floor/ceiling assemblies can be constructed to mitigate the transfer of loud noise.[465]
- Enhanced door hardware and specifications (especially when used in common entryways and mechanical equipment rooms) can help reduce noise transfer between rooms.[466]
- When analyzing long-term building operation costs, constructing for acoustical comfort is more cost-effective than constructing for minimum code compliance.[467]

**Part 1. Install High-Performing Wall Assemblies (1-3 points)**

***Tags: Onsite Testing***

*Option 1. Sound Transmission Design and Verification*

The following requirements are met:

a. Interior bedroom walls and **party walls** meet the following:
   i. Extend full height from floor to deck.
   ii. Are sealed at all points of connection with non-hardening caulk.

b. Walls meet the thresholds in one of the tiers in the table below, as applicable:

 

| Tier | Points | Wall Assembly Location | Designed to meet Sound Transmission Class (STC) or Weighted Sound Reduction ($R_w$) | OR | Tested to meet Noise Isolation Class (NIC) or Sound Level Difference ($D_{nTw}$) |
|---|---|---|---|---|---|
| 1 | 1 | Walls that separate bedrooms from spaces with building services, loud equipment or activities (e.g., mechanical rooms, common stairwells, **elevators**, trash chutes, laundry).<br><br>**Party walls**.[468] | 55 | OR | 50 |
| | | Walls that separate bedrooms from other **occupiable** areas within the dwelling unit. | 45 | OR | 40 |
| 2 | 3 | Walls that separate bedrooms from spaces with building services, loud equipment or activities (e.g., mechanical rooms, common stairwells, **elevators**, trash chutes, laundry).<br><br>**Party walls**.[468] | 60 | OR | 55 |
| | | Walls that separate bedrooms from other **occupiable** areas within the dwelling unit. | 50 | OR | 45 |

 

c. Solid core, swing doors are installed in the following locations, as applicable:
    i. Dwelling unit entrances.
    ii. Enclosed spaces with loud equipment or activities (e.g., mechanical rooms, fitness amenities, media rooms) on floors with dwelling units.
    iii. Separations between bedrooms and any other areas within the dwelling unit (except storage areas).
d. Acoustical gaskets and seals are installed at the head, jamb and base of doors in the following locations, as applicable:
    i. Dwelling unit entrances.
    ii. Enclosed spaces with loud equipment or activities (e.g., mechanical rooms, fitness amenities) on floors with dwelling units.
e. Acoustical box backer pads are installed on wall outlet boxes on either side of the walls surrounding bedrooms.
f. If **common fitness rooms** or media rooms with subwoofers are present, a plan is submitted by a professional in acoustics that details the design strategies used to reduce airborne sound transmission from these spaces to the nearest bedroom, including expected STC/Rw or NIC/DnTw values.

Verification (meet all, as applicable):

- Provide drawings that label all rooms and include the wall assembly details, the location of all wall assemblies, door schedules and electrical outlet boxes. Note: Partition STC/Rw performance may be reported using lab-tested data of relevant specimens (e.g., UL rated, accredited lab data per ASTM E 90, ISO 10140-2, or equivalent) or by showing results generated from a sound insulation modeling software (e.g., soundPATHS by National Research Council of Canada, INSUL by Marshall Day Acoustics).
- If partition performance is achieved using NIC/Dw metric, provide a report from a WELL Performance Testing Agent or **qualified professional** that describes the testing methodology and results of sound insulation tests.
- Provide a report from a **qualified professional** that describes the expected sound from any common fitness rooms and/or media rooms with subwoofers to dwelling units and strategies employed to minimize it.

OR

*Option 2. Multifamily Sound Transmission Standards*

 

The following requirement is met:

a. If the building has more than one dwelling unit, the walls of the dwelling unit have been designed, modeled or otherwise adhere to one of the following:
    i. National Building Code of Canada (NBCC).
    ii. New York City Admin Code Article 9 - Noise Control in Multiple Dwellings.
    iii. Chinese Building Code GB 50118-2019.
    iv. Australia Building Code - NCC 2019 Volume One Part F5 Sound transmission and insulation (DtS).

Verification:

- Provide the report from a **qualified professional** that indicates the final design will be constructed to comply with relevant code or regulation.

**Part 2. Install Airborne Sound Reducing Floor/Ceiling Assemblies (2 points)**

***Tags: Onsite Testing***

*Option 1. Sound Transmission Design and Verification*

The following requirements are met:

 

a. **Floor/ceiling assemblies** meet the following thresholds, as applicable:

| **Floor/Ceiling Assembly Location** | **Designed to meet Sound Transmission Class (STC) or Weighted Sound Reduction ($R_W$)** | **OR** | **Tested to meet Noise Isolation Class (NIC) or Sound Level Difference ($D_{nTw}$)** |
|---|---|---|---|
| Above bedrooms that are below a separate dwelling unit.<br><br>Beneath and above loud spaces (e.g., mechanical equipment rooms, media rooms, common fitness, rooftop terraces). | 60 | OR | 55 |
| Above bedrooms within the same dwelling unit.<br><br>Beneath **hallways** and corridors that are located above another dwelling unit. | 55 | OR | 50 |

b. If **common fitness rooms** or media rooms with subwoofers are present, a plan is submitted by a professional in acoustics that details design strategies used to reduce airborne sound transmission from these spaces to the nearest bedroom, including expected STC/Rw or NIC/DnTw values.

Verification (meet all):

- Provide drawings that label all applicable **floor/ceiling assemblies**. Note: Floor/ceiling STC/Rw performance may be reported using lab-tested data of relevant specimens (e.g., UL rated, accredited lab data per ASTM E 90, ISO 10140-2, or equivalent) or by showing results generated from a sound insulation modeling software (e.g., soundPATHS by National Research Council of Canada, INSUL by Marshall Day Acoustics).

 

- If floor/ceiling performance is achieved using NIC/Dw metric, provide a report from a **qualified professional** that describes the testing methodology and results of sound insulation tests.
- Provide a report from a **qualified professional** that describes the expected sound from any **common fitness rooms** and/or media rooms with subwoofers to dwelling units and strategies employed to minimize this.

OR

*Option 2. Multifamily Sound Transmission Standards*
The following requirement is met:

a. If the building has more than one dwelling unit, the walls of the dwelling unit have been designed, modeled or otherwise adhere to one of the following:
    i. National Building Code of Canada (NBCC).
    ii. New York City Admin Code Article 9 - Noise Control in Multiple Dwellings.
    iii. Chinese Building Code GB 50118-2019.
    iv. Australia Building Code - NCC 2019 Volume One Part F5 Sound transmission and insulation (DtS).

Verification:

- Provide a report from a **qualified professional** that indicates the final design will be constructed to comply with relevant codes or regulations.

**Part 3. Install Impact Noise Reducing Floor/Ceiling Assemblies (1-3 points)**
***Tags: Onsite Testing***
The following requirement is met:

a. **Floor/ceiling assemblies** for buildings with dwelling units on multiple floors meet one of the tiers in the table below:

 

| Tier | Points | Floor/Ceiling Assembly Location | Requirement |
|---|---|---|---|
| 1 | 1 | Above bedrooms and home offices that are below a separate dwelling unit.<br><br>Beneath spaces where movement is anticipated (e.g., **common fitness room**, rooftop terrace) that are located above **regularly occupied** areas. | Impact Insulation Class (IIC) ≥55,<br><br>OR<br><br>Weighted Standardized Impact Sound Pressure Level ($L_{nT,w}$) ≤55 |
| | | Above bedrooms within the same dwelling unit.<br><br>Beneath **hallways** and corridors that are located above another dwelling unit. | Impact Insulation Class (IIC) ≥50,<br><br>OR<br><br>Weighted Standardized Impact Sound Pressure Level ($L_{nT,w}$) ≤60 |
| 2 | 2 | Above bedrooms and home offices that are below a separate dwelling unit.<br><br>Beneath spaces where movement is anticipated (e.g., **common fitness room**, rooftop terrace) that are located above **regularly occupied** areas. | Impact Insulation Class (IIC) ≥60,<br><br>OR<br><br>Weighted Standardized Impact Sound Pressure Level ($L_{nT,w}$) ≤50 |
| | | Above bedrooms within the same dwelling unit.<br><br>Beneath **hallways** and corridors that are located above another dwelling unit. | Impact Insulation Class (IIC) ≥55,<br><br>OR<br><br>Weighted Standardized Impact Sound Pressure Level ($L_{nT,w}$) ≤55 |

| Tier | Points | Floor/Ceiling Assembly Location | Requirement |
|---|---|---|---|
| 3 | 3 | Above bedrooms and home offices that are below a separate dwelling unit.<br><br>Beneath spaces where movement is anticipated (e.g., **common fitness room**, rooftop terrace) that are located above **regularly occupied** areas. | Normalized Weighted Impact Sound Index ($L_{n,w}$ + $C_{I,50–2500}$) ≤50 |
| | | Above bedrooms within the same dwelling unit.<br><br>Beneath **hallways** and corridors that are located above another dwelling unit. | Normalized Weighted Impact Sound Index ($L_{n,w}$ + $C_{I,50–2500}$) ≤55 |

Verification:

- Provide drawings that label all rooms and show both the IIC values for the relevant **floor/ceiling assembly** details and the location of all **floor/ceiling assemblies**.
- If impact noise-reducing floor/ceiling performance is achieved using either the Weighted Standardized Impact Sound Pressure Level ($L_{nT,w}$) or the Normalized Weighted Impact Sound Index ($L_{n,w}$ + $C_{I,50–2500}$) metrics, provide a report from a **qualified professional** that describes the testing methodology and results of impact noise tests.

## R-S02 Quiet Products

**Intent:** Support safer noise levels and minimize the transfer of noise at home by installing quiet appliances and noise-reducing surface finishes.

 

**Issue:**

- There are many sources of interior noise in a home, including sound from major appliances such as cooktop hood vents, dishwashers and laundry machines.[469]
- Common home appliances often exceed recommended safe noise levels and have been shown to be a source of disturbance for neighboring households.[470,471,472]
- As remote and hybrid work increases, there has been a growing demand for quiet appliances in the home.[473]
- Individuals are less likely to use key appliances, such as cooking exhausts, when they are loud.[474]

**Impact:**

- Using home appliances that employ noise control measures can help reduce background noise levels.[475,476]
- Acoustically absorptive surface finishes can significantly control sound, especially when used in shared spaces.[477]
- Noise-reducing surfaces and absorptive finishes can help reduce sound levels and improve speech intelligibility.[478]

**Part 1. Specify and Install Quiet Appliances (1 point)**

The dwelling unit meets the following requirements:

a. If present, the following appliances meet the sound levels listed below when operating at the lowest speed as reported by the manufacturer:

| **Appliance** | **dBA, when tested in accordance with IEC 60704** | **OR** | **dB or dBA, with other test methods** |
|---|---|---|---|
| **Standalone** Air Conditioners[479] | 50 | OR | 45 |
| Dishwashers | 55 | OR | 50 |
| **Standalone** Air Purifiers | 30 | OR | 25 |

 

b. If present, the following fans meet the sound levels listed below when operating at the lowest speed as reported by the manufacturer:

| Fan Type | Sound Level (Sones) |
|---|---|
| Range Hoods[480] | 2 |
| Continuous **Bathroom** and Kitchen Exhaust[22] | 1 |
| Intermittent **Bathroom** and Kitchen Exhaust[22] | 3 |

c. If present, laundry equipment or connections for laundry equipment are not located in or adjacent to a bedroom.
d. If present, laundry equipment is not installed in direct contact with millwork, cabinets or walls.

Verification (meet all):

- Provide specifications and either purchase orders, invoices or photographs for the qualifying appliances.
- Provide drawings that identify the location (or absence) of laundry equipment.

**Part 2. Install Noise-Reducing Surface Finishes (1 point)**

The following requirements are met:

a. If present, home offices and **common spaces** include absorptive finishes with a minimum **Noise Reduction Coefficient (NRC)** or Alpha-w of 0.5 in the following areas:
    i. On at least 50% of all **available ceiling area**.
    ii. On at least 25% of all **available wall area**.
b. If present, **common spaces** for fitness and/or media rooms include absorptive finishes with a minimum **Noise Reduction Coefficient (NRC)** or Alpha-w of 0.75 in the following areas:
    i. On at least 80% of all **available ceiling area**.
    ii. On at least 50% of all **available wall area**.

Verification (meet all):

- Provide calculations of the required minimum areas.
- Provide specifications and purchase orders or invoices for the qualifying finishes.

## R-S03 HVAC and Building Service Noise Levels

**Intent:** Foster comfortable background sound levels by controlling noise from mechanical equipment and building services.

**Issue:**

- Mechanical equipment, including HVAC systems and building services, can produce disruptive levels of indoor noise.[481]
- Frequent disturbances from sources of intermittent building service noise, such as trash chutes, elevators and mechanical equipment, can be disruptive and annoying to individuals.[482]
- Individuals have varying susceptibility to the negative effects mechanical noise can have on stress and performance.[483]

**Impact:**

- Homes can be designed with quieter or noise-controlling equipment and systems to achieve comfortable levels of interior background noise.[465,484]
- Following regional guidelines and best practices can help control noise and vibration levels caused by emergency generators and heat pumps.[485]

**Part 1. Design Specification for HVAC and Building Service Noise (1-2 points)**

The following requirements are met:

a. HVAC, plumbing, building services and generator systems, as applicable, are designed not to exceed the sound pressure level (dBA) or Noise Criterion (NC) thresholds in one of the tiers in the table below:

| Tier | Points | Space Type | Designed Maximum Background Noise Level (dBA Leq) | OR | Designed Maximum Noise Criterion Level (NC) |
|---|---|---|---|---|---|
| 1 | 1 | Bedroom.[486] | 35 | OR | 40 |
| | | Shared workspaces, and other **regularly occupied** spaces in the dwelling | 40 | OR | 45 |

| | | | | | |
|---|---|---|---|---|---|
| | | unit.[465] | | | |
| | | **Common fitness room**. | 50 | OR | 55 |
| 2 | 2 | Bedroom.[486] | 30 | OR | 35 |
| | | Shared workspaces, and other **regularly occupied** spaces in the dwelling unit.[465] | 35 | OR | 40 |
| | | **Common fitness room**. | 45 | OR | 50 |

b. HVAC ductwork does not directly connect bedrooms to **bathrooms**.
c. For attached dwelling units, HVAC ductwork does not directly connect separate dwelling units.
d. All ductwork downstream of noise-generating HVAC equipment is internally lined with 2.5 cm [1 in] acoustical duct lining for at least the first 4 m [13 ft], measured from the noise-generating equipment.
e. All plumbing and sprinkler system piping located in walls or ceilings above bedrooms is externally covered with sound-attenuating wrapping.
f. All mechanical equipment exceeding a 35 kilowatt [10 ton] capacity meets the following:
    i. Includes vibration isolation and/or rooftop curbs.
    ii. Is installed in accordance with manufacturer guidance.
g. If present, emergency generators meet the following:
    i. Utilize noise control measures (e.g., acoustical enclosures).
    ii. Have a maximum operating noise level of either 65 dB or local noise code levels, whichever is more stringent, when measured at the property line.
h. If present, heat pumps are selected and installed in accordance with vibration isolation and noise control guidance outlined in the Institute of Acoustics and Chartered Institute of Environmental Health's Heat Pumps Professional Advice Note.[485]

Verification (meet one):

 

- Provide a report from a **qualified professional** or a mechanical engineer that indicates the final design complies with MEP noise control requirements.
- Provide acoustical models or calculations that comply with HVAC noise prediction guidelines as outlined in regional noise control guides (e.g., ASHRAE Chapter 49; CIBSE Guide B4 Noise and Vibration for building services systems; AAAC Guideline for Apartment and Townhouse Acoustic Rating).

**Part 2. Achieve Indoor Noise Level Thresholds (1-2 points)**

***Tags: Onsite Testing***

*Option 1. Sound Pressure Level and Tonality*

The following requirements are met:

a. According to onsite tests performed when the mechanical system is commissioned and set to **design duty**, the average 30-second minimum sound pressure levels in relevant space types do not exceed the thresholds in one of the tiers in the table below:

| Tier | Points | Space Type | Maximum Background Noise Level (dBA Leq) |
|---|---|---|---|
| 1 | 1 | Bedroom.[486] | 35 |
| | | Shared workspaces and other **regularly occupied** spaces in the dwelling unit.[465] | 40 |
| | | **Common fitness room**. | 50 |
| 2 | 2 | Bedroom.[486] | 30 |
| | | Shared workspaces and other **regularly occupied** spaces in the dwelling unit.[465] | 35 |
| | | **Common fitness room**. | 45 |

b. According to onsite tests, sound pressure levels between any two neighboring one-third octave band frequencies does not exceed the differences listed in the following table:

 

| Frequency of One-third Octave Band | Maximum Difference to the Lower-frequency Neighboring One-third Octave band |
|---|---|
| 20 - 160 Hz | 15 dB |
| 161 - 400 Hz | 8 dB |
| 401 Hz - 20 kHz | 5 dB |

Verification:

- Provide the following test results conducted by a WELL Performance Testing Agent or **qualified professional** as measured over a 30-second period:
    - In the form of overall dBA values.
    - Raw, 1/3rd octave band, unweighted overall data.

OR

*Option 2. Noise Criterion*

The following requirement is met:

a. According to onsite tests performed when the mechanical system is commissioned and set to **design duty**, the average 30-second Noise Criterion (NC) levels in relevant spaces (as applicable) do not exceed the thresholds in one of the tiers in the table below:

| Tier | Points | Space Type | Maximum Noise Criterion Level (NC) |
|---|---|---|---|
| 1 | 1 | Bedroom. | 40 |
| | | Shared workspaces and other **regularly occupied** spaces in the dwelling unit. | 45 |
| | | **Common fitness room**. | 55 |
| 2 | 2 | Bedroom. | 35 |
| | | Shared workspaces and other **regularly occupied** spaces in the dwelling unit. | 40 |

 

| | | | |
|---|---|---|---|
| | | **Common fitness room**. | 50 |

Verification:

- Provide test results conducted by a WELL Performance Testing Agent or **qualified professional** measured over a 30-second period.

## R-S04 Environmental Noise Levels

**Intent:** Provide comfortable indoor noise levels by meeting performance standards for environmental noise around homes.

**Issue:**

- Environmental noise, also known as noise pollution, is the second largest environmental cause of health problems globally.[487]
- Exposure to prolonged or excessive environmental noise can lead to annoyance and increase the risk of health conditions such as heart disease, hypertension, sleep disturbance, hearing impairment, tinnitus and cognitive impairment.[487,488,489]
- Road traffic is the leading contributor to environmental noise; construction sites, railways, harbors and air transportation also contribute to outdoor noise.[488]

**Impact:**

- Locating homes in areas with natural elements (such as greenery and bodies of water) and away from industrial zones can help reduce noise complaints.[490]
- Environmental noise transfer can be reduced with intentionally designed, sound-insulating building facades and confirmed through on-site testing to ensure effectiveness.[491]
- Windows, doors and building facades designed to limit environmental noise intrusion at night may improve sleep quality and duration with fewer disturbances.[492]

### Part 1. Limit Daytime Community Noise Levels (1-2 points)

*Tags: Onsite Testing*

The following requirement is met:

a. According to onsite tests, community background noise levels do not exceed the thresholds in one of the tiers in the table below, as applicable:

 

| Tier | Points | Measurement Location | A-weighted L90 Sound Level |
|---|---|---|---|
| 1 | 1 | Balcony, terrace, deck or common outdoor amenity (e.g., playground, garden). | 50 |
| | | Outdoors, at least 1 m [3 ft] from the **main building entrance** and (to the extent possible) the property line. | 55 |
| 2 | 2 | Balcony, terrace, deck or common outdoor amenity (e.g., playground, garden). | 45 |
| | | Outdoors, at least 1 m [3 ft] from the **main building entrance** and (to the extent possible) the property line. | 50 |

Verification:

- Provide test results conducted by a **qualified professional** as measured for a minimum period of two hours between the hours of 7 a.m. and 10 p.m. on a weekday.

**Part 2. Limit Nighttime Exterior Noise Intrusion (1-3 points)**

***Tags: Onsite Testing***

The dwelling unit meets the following requirement:

a. According to onsite tests, the bedroom closest to the loudest known exterior noise source meets the thresholds in one of the tiers in the table below:

| Tier | Points | Sound Pressure Level (dBA Leq/LAeq) | Max Sound Pressure Level (LASMax) |
|---|---|---|---|
| 1 | 1 | 40 | – |
| 2 | 2 | 35 | 45 |
| 3 | 3 | 30 | 40 |

Verification:

- Provide test results conducted by a WELL Performance Testing Agent or **qualified professional** as measured over a minimum 12-hour period, including the hours of 10 p.m. to 7 a.m.

 

# Materials

## R-X01 Site Assessment and Remediation

**Intent:** Reduce potential exposure to hazardous chemicals found in soils by assessing and remediating contamination from prior uses of the site.

**Issue:**

- Soil that has been contaminated from industrial activities can release toxic chemicals into nearby groundwater and surface waters.[493,494,495]
- Contaminants trapped in soils (such as heavy metals) can be carried inside a home through dust, impacting indoor air quality.[495,496,497]
- Living near areas contaminated by industrial activities has been linked to negative health effects such as decreased immune response and increased rates of birth defects as well as increased morbidity.[498,499,500]

**Impact:**

- Remediating and redeveloping brownfields can reduce the risk of individual exposure to industrial contaminants and help preserve green spaces.[501,502]
- Residential developments that decontaminate and revitalize brownfields may help alleviate housing supply issues.[503,504,505]
- Using decontaminated brownfields for redevelopment projects may improve neighborhood quality through increased economic opportunities and community revitalization.[503,504,505]

### Part 1. Assess and Remediate Soils (2 points)

***Tags: Neighborhood Attributes***

The following requirements are met:

a. The site was previously developed (i.e., it is not a greenfield).

b. A **qualified professional** assesses the site for potential contamination from past uses in compliance with one of the following:
   i. Local applicable regulation for environmental site assessments.
   ii. Guidelines provided in the standard ASTM E1527-21 Phase I site assessment.

c. If the site assessment establishes the potential presence of contaminants, contaminants are quantified through a sampling strategy that meets one of the following:
   i. Local applicable regulation for sampling.

 

ii. Guidelines provided in the standard ASTM E1903-19 Phase II site assessment.

d. If sampling establishes that remediation is required, a remediation plan is implemented that meets the following:
    i. Is active before, during and after construction.
    ii. Documents decision-making and assessment processes.
    iii. Establishes safe working practices for workers during remediation.
    iv. If applicable, incorporates a protocol for educating current and future residents about any post-remediation monitoring.

Verification**:**

- Provide the site assessment and, if applicable, the remediation plan. Documentation may be submitted in any language if headings and key findings are highlighted and translated to English.

## R-X02 New Materials Selection

**Intent:** Reduce exposure to chemicals known or suspected to trigger harmful effects in people by selecting healthier building materials.

**Issue:**

- Building materials impact the quality of air inside homes.[506,507,508]
- Many building materials contain hazardous chemicals that may cause negative health effects, such as lead poisoning, cancer and asthma.[509,510,511]
- Building materials may contribute to toxic exposures in the home from volatile organic compounds off-gassing, asbestos-containing materials degrading, and lead-based products poisoning individuals.[510,511]
- Individuals exposed to volatile organic compounds from hazardous building materials used in homes may experience negative health effects such as issues with the respiratory tract, eyes and cardiovascular system, challenges with neurological functioning, and higher rates of cancer.[512]

**Impact:**

- Installing lower-emitting building materials in homes may decrease exposure to hazardous chemicals, such as formaldehyde, and reduce the risk of negative health effects.[513,514]

 

- Policies that regulate, ban or disclose the use of potentially hazardous chemicals in products can help individuals choose healthier material options for their homes.[515]

**Part 1. Utilize Integrative Design to Inform Building Product Selection (1-2 points)**
***Tags: Construction Practices***

**Minimum eligibility**: You construct a new building or refinish at least 50% of the interiors AND you are intending to install or apply products that fall within at least three of the following product categories:

- Paints
- Acoustic and Thermal Insulation
- Cabinetry and Millwork
- Countertops
- Gypsum Board (Drywall)
- Flooring

**Applicability:** Applies to all interior product types intended to be installed or applied in the following building product categories: Paints; Acoustic and Thermal Insulation; Cabinetry and Millwork; Countertops; Gypsum Board (Drywall); and Flooring.

Utilize Habitable's Informed™ Project Assessment Form to meet one of the tiers in the table below:

| Tier | Points | Requirements |
|---|---|---|
| 1 | 1 | • List all product types intended to be installed or applied |
| 2 | 2 | • List all product types specified<br>• Specify only product types that are not classified as red or dark red |

Verification:

- Provide the completed Informed™ Project Assessment Form for all product categories pursued.

**Part 2. Restrict Harmful Substances in Wall and Ceiling Products (1-2 points)**
***Tags: Construction Practices***

**Minimum eligibility**: You construct a new building or replace/refinish at least 50% of the total interior wall and ceiling area.

**Applicability:** Applies to at least 90% (by total cost or total area) of newly installed or applied interior products between the following categories:

- Paints and coatings
- Adhesives and sealants
- Wallcoverings
- Ceramic and porcelain wall tiles (Tier 2)
- Grouts (Tier 2)

Install relevant products that meet one of the tiers below, utilizing the guidance in Appendix R-X1 'How to meet WELL Materials restriction requirements': (meet all, per applicable category):

**Baseline Restrictions, Tier 1 (1 point):**

a. **Paints** and coatings (including wood and cement **sealers**): (meet all)
    i. Are **labeled** as: (meet one)
        1. Acrylic-based
        2. Lime-based
        3. Mineral silicate-based
        4. Water based finishes, stains or latex
    ii. Are **not labeled** as: (meet all)
        1. Epoxy-based
        2. Polyurethane-based
        3. Having antimicrobial properties (e.g., marketed as antimicrobial, fungicidal, or anti mold)
    iii. Comply with **VOC content** restrictions (in g VOC per liter of wet product): (meet all, as applicable)
        1. Finishes ≤ 350 g/L
        2. Flat **paints** ≤ 50 g/L
        3. Low-VOC color additives ≤ 50 g/L
        4. Non-flat **paints** ≤ 100 g/L
        5. **Sealers** ≤ 50 g/L
        6. Stains ≤ 250 g/L
b. **Adhesives** and **sealants**: (meet all)
    i. Are **labeled** as: (meet one)
        1. Acrylic-based
        2. Emulsion polymer-based
        3. Latex-based
        4. Polyether-based

5. Solvent-free silicone-based
6. Water-based latex caulks

ii. Comply with **VOC content** restrictions (in g VOC per liter of wet product):
1. ≤ 50 g/L

c. **Wallcoverings**:
i. Are **not labeled** as: (meet all)
1. Having antimicrobial properties (e.g., marketed as antimicrobial, fungicidal, or anti mold)
2. Vinyl or PVC-based

**Enhanced Restrictions, Tier 2 (2 points):**

a. **Paints** and **coatings** (including wood and cement **sealers**): (meet all)
i. Meet Tier 1
ii. Do **not contain**: (meet all)
1. Alkylphenol Ethoxylates (APEs)
2. Lead
3. Per- and Polyfluoroalkyl Substances (PFAS)

iii. Comply with **low-VOC emissions** thresholds set in: (meet one)
1. AgBB
2. CDPH v1.2
3. Emicode Very low VOC denomination
4. EU LCI

b. **Adhesives** and **sealants**: (meet all)
i. Meet Tier 1
ii. Do **not contain**: (meet all)
1. Biocides or mold-resistant compounds
2. Epoxy
3. Formaldehyde
4. Orthophthalates
5. Polyurethane

iii. Comply with **VOC content** restrictions (in g VOC per liter of wet product):
1. ≤ 50 g/L

c. **Wallcoverings**:
i. Meet Tier 1

d. Ceramic and porcelain wall tiles:
i. Do **not contain**:
1. Lead (usually found in glazing)

 

e. Grout:
    i. Is **not labeled as**:
        1. Having antimicrobial properties (e.g., marketed as antimicrobial, fungicidal, or anti mold)
        2. Epoxy-based

Verification (meet all):

- For renovations or expansions of existing buildings, describe the scope of construction and quantify the area of any products in the relevant categories that are out of scope.
- Provide specifications (or other documentation from manufacturers indicating ingredient compliance)and purchase orders or invoices for all building products.

**Part 3. Restrict Harmful Substances in Flooring Products (2 points)**
***Tags: Construction Practices***

**Minimum eligibility:** You construct a new building or replace/refinish at least 50% of the interior floor area.

**Applicability:** Applies to at least 90% (by total cost or total area) of newly installed interior flooring products in the following categories:

- Rubber and plastic flooring
- Carpets
- Wood-based flooring
- Flooring substrates
- Ceramic and porcelain floor tiles
- Grout

Install relevant products that meet the following restrictions, utilizing the guidance in Appendix R-X1 'How to meet WELL Materials restriction requirements': (meet all, per applicable category)

a. Rubber and plastic flooring (i.e., tiles, planks, sheets):
    i. Do **not contain**: (meet all)
        1. Orthophtalates
        2. PVC (commonly known as vinyl)
        3. Post-consumer recycled content, unless its composition is fully known
    ii. Comply with **low-VOC emissions** thresholds set in: (meet one)

 

1. AgBB
2. CDPH v1.2 (California specification 01350)
3. Emicode Very low VOC denomination
4. EU LCI

b. **Carpets** (tile or broadloom):
    i. Are **not labeled** as: (meet all)
        1. Having antimicrobial properties (e.g., marketed as antimicrobial, fungicidal, or anti mold)
        2. Polyurethane-backed
        3. PVC-backed (vinyl-backed)
    ii. Do **not contain**: (meet all)
        1. Per- and Polyfluoroalkyl Substances (PFAS)
        2. Fly ash (in backings)
c. Wood-based flooring:
    i. **Solid wood**, if **treated on-site** with **topcoats**, complies with **low-VOC emissions** thresholds set in: (meet one)
        1. AgBB
        2. CDPH v1.2 (California specification 01350)
        3. Emicode Very low VOC denomination
        4. EU LCI
    ii. **Engineered wood** complies with one of the following **low-formaldehyde emissions** denominations: (meet one)
        1. AgBB
        2. Europe E1
        3. Japan Four-star
        4. No Added Formaldehyde (NAF)
        5. Ultra Low Emitting Formaldehyde (ULEF)
        6. US TSCA Title VI compliant
d. Flooring substrates:
    i. **Wood composites** comply with one of the following **low-formaldehyde emissions** denominations: (meet one)
        1. AgBB
        2. Europe E1
        3. Japan Four-star
        4. No Added Formaldehyde (NAF)
        5. Ultra Low Emitting Formaldehyde (ULEF)
        6. US TSCA Title VI compliant
e. Ceramic and porcelain floor tiles:
    i. Do **not have intentionally added**:

1. Lead (usually found in glazing)

f. Grouts: (meet all)
    i. Are **not labeled as**:
        1. Having antimicrobial properties (e.g., marketed as antimicrobial, fungicidal, or anti mold)
        2. Epoxy-based

Verification (meet all):

- For renovations or expansions of existing buildings, describe the scope of construction and quantify the area of any products in the relevant categories that are out of scope.
- Provide specifications (or other documentation from manufacturers indicating ingredient compliance)and purchase orders or invoices for all building products.

**Part 4. Restrict Harmful Substances in Cabinetry and Millwork (2 points)**
***Tags: Construction Practices***

**Minimum eligibility:** You construct a new building or replace/refinish at least 50% of the existing interior cabinetry and millwork.

**Applicability:** Applies to at least 90% (by total cost or total floor area) of newly installed interior cabinetry and millwork.

Install relevant products that meet the following restrictions, utilizing the guidance in Appendix R-X1 'How to meet WELL Materials restriction requirements':

a. **Cabinetry** and **millwork**: (meet all)
    i. Do **not contain**:
        1. PVC (commonly known as vinyl)
    ii. **Wood composites** comply with one of the following **low-formaldehyde emissions** denominations: (meet one)
        1. AgBB
        2. Europe E1
        3. Japan Four-star
        4. No Added Formaldehyde (NAF)
        5. Ultra Low Emitting Formaldehyde (ULEF), only if the wood composite is hardwood plywood
        6. US TSCA Title VI compliant

 

Verification (meet all):

- For renovations or expansions of existing buildings, describe the scope of construction and quantify the area of any products in the relevant categories that are out of scope.
- Provide specifications (or other documentation from manufacturers indicating ingredient compliance)and purchase orders or invoices for all building products.

**Part 5. Restrict Harmful Substances in Countertops (1 point)**
***Tags: Construction Practices***

**Minimum eligibility:** You construct a new building or replace/refinish at least 50% of the existing interior countertops.

**Applicability:** Applies to at least 90% (by total cost or total floor area) of newly installed interior countertop.

Install relevant products that meet the following restrictions, utilizing the guidance in Appendix R-X1 'How to meet WELL Materials restriction requirements':

a. **Countertops**:
    i. Are **labeled** as made of one or a combination of: (meet one)
        1. Natural stone
        2. Sintered stone
        3. Stainless steel
        4. Copper
        5. Zinc
        6. Pewter
        7. Concrete
        8. Glass

Verification (meet all):

- For renovations or expansions of existing buildings, describe the scope of construction and quantify the area of any products in the relevant categories that are out of scope.
- Provide specifications (or other documentation from manufacturers indicating ingredient compliance)and purchase orders or invoices for all building products.

 

### Part 6. Restrict Harmful Substances in Gypsum Boards (2 points)

*Tags: Construction Practices*

**Minimum eligibility**: You construct a new building or renovate at least 50% of the existing gypsum board.

**Applicability:** Applies to at least 90% (by total cost or total area) of newly installed gypsum board.

Install relevant products that meet the following restrictions, utilizing the guidance in Appendix R-X1 'How to meet WELL Materials restriction requirements':

a. **Gypsum board**
    i. Is **not labeled** as: (meet all)
        1. Synthetic gypsum (recycled gypsum)
        2. Containing biocides or mold-resistant compounds
    ii. Does **not contain**: (meet all)
        1. Fly ash
        2. Asbestos

Verification (meet all):

- For renovations or expansions of existing buildings, describe the scope of construction and quantify the area of any products in the relevant categories that are out of scope.
- Provide specifications (or other documentation from manufacturers indicating ingredient compliance)and purchase orders or invoices for all building products.

### Part 7. Restrict Harmful Substances in Acoustic and Thermal Insulation (1 point)

*Tags: Construction Practices*

**Minimum eligibility:** You construct a new building or renovate at least 50% of existing acoustic and thermal insulation.

**Applicability:** Applies to at least 90% (by total cost or total floor area) of newly installed acoustic and thermal insulation.

Install relevant products that meet the following restrictions, utilizing the guidance in Appendix R-X1 'How to meet WELL Materials restriction requirements':

a. **Acoustic and thermal insulation**:
    i. Are **not labeled** as:
        1. Spray polyurethane foam
    ii. Do **not contain**: (meet all)
        1. Halogenated flame retardants (HFR)
        2. Asbestos
    iii. Comply with **low-VOC emissions** thresholds set in: (meet one)
        1. AgBB
        2. CDPH v1.2
        3. Emicode Very low VOC denomination
        4. EU LCI

Verification (meet all):

- For renovations or expansions of existing buildings, describe the scope of construction and quantify the area of any products in the relevant categories that are out of scope.
- Provide specifications (or other documentation from manufacturers indicating ingredient compliance)and purchase orders or invoices for all building products.

**Part 8. Restrict Harmful Substances in Plumbing Piping (1 point)**
***Tags: Construction Practices***

**Minimum eligibility:** You construct a new building or renovate at least 50% of the existing plumbing.

**Applicability:** Applies to at least 90% (by total cost or total floor area) of newly installed plumbing piping.

Install relevant products that meet the following restrictions, utilizing the guidance in Appendix R-X1 'How to meet WELL Materials restriction requirements':

a. Plumbing piping (i.e., drinking water pipes, faucets, fixtures and solder):
    i. Are labeled as: (meet one)
        1. NSF-61 compliant
        2. Approved for use in drinking water

3. Lead-free

ii. Are not **labeled** as: (meet all)
    1. PVC-based
    2. CPVC-based

Verification (meet all):

- For renovations or expansions of existing buildings, describe the scope of construction and quantify the area or length of relevant piping that is out of scope.
- Provide specifications (or other documentation from manufacturers indicating ingredient compliance)and purchase orders or invoices for all building products.

## R-X03 Pest and Pesticide Minimization

**Intent:** Reduce exposure to pesticides by deploying sustainable pest management strategies.

**Issue:**

- Homes infested with pests are linked to increased allergies and asthma.[516,517]
- Individuals in pest-infested homes have an increased risk of experiencing symptoms of psychological distress and depression.[518,519]
- Applying pesticides in homes has been linked to negative health effects, including skin and eye irritation, headaches, dizziness, nausea, asthma, diabetes, cancer and birth defects.[520,521,522]
- Pests are more likely to infest homes when trash is present or when the building has holes, cracks, leaks or broken windows.[523,524]

**Impact:**

- Integrated pest management strategies can effectively reduce the number of pests and pest-related allergens in homes.[525,526,527]
- Reduced pest infestation has been linked to decreased asthma attacks in children.[528]
- Homes that apply integrated pest management strategies can reduce pest infestations while decreasing the risk of pesticide exposure.[527,529,530]

**Part 1. Design to Discourage Pests (2 points)**

*1. Landscape Design*

 

The following requirements are met:

a. If present, exterior landscaping and **landscape breaks** meet the following:
    i. Plants are native and/or drought-resistant (i.e., low water-using).[531,532]
    ii. Plants are located at least 45 cm [18 in] away from any exterior building wall.[533]
    iii. Mulch is not in contact with any exterior building wall.

AND

*2. Pest Exclusion*

The following requirements are met:

a. Holes, cracks and small crevices are sealed in the following locations:[534]
    i. Walls, baseboards and molding (i.e., coving).
    ii. Ceilings and floors.
    iii. Around pipes, vents and conduits installed throughout ceilings, walls and flooring.[535]
    iv. Around and within cabinets.[536]
b. Corrosion-resistant screens or pest guards are installed in the following locations:
    i. Floor drains.
    ii. Air intakes and exhausts.
    iii. Other building openings that cannot be closed, except for vents for clothes dryers.[537]
c. Waste and recycling containers installed for communal use or located outdoors are fully sealable (i.e., do not allow for the intrusion of pests).

Verification (meet all):

- Provide drawings that show all pest discouragement design strategies.
- Provide the specifications and purchase orders or invoices for the qualifying waste and recycling containers.

**Part 2. Implement an Integrated Pest Management (IPM) Plan (1 point)**

***Tags: Common Space; Services and Policies***

*Option 1. IPM Plan Development and Implementation*

An IPM plan meets the following requirements:

a. Is implemented for all common indoor and outdoor spaces and, if IPM is offered within dwelling units, is also implemented within dwelling units.
b. Includes the following:[538]

i. Roles and responsibilities for the plan development, implementation, maintenance and education.
ii. A list of pests to be managed and protocols for identification, including early signs indicating that pests may be present.
iii. Design and operational measures used to avoid conditions that may attract pests (e.g., access to food, water, harborage and entrance through the building envelope).
iv. Pest tolerance thresholds and related control strategies (including methods and response times) that are used when tolerance thresholds are exceeded.
v. Records of pest monitoring data including highlights of more significant pest events.
vi. Records of pesticide applications, control actions and emergency responses.

c. Describes the conditions when pesticide application is deemed as the sole solution to eradicate a pest.
d. If pesticide use is anticipated, the plan lists all pesticides and includes the following for each:
    i. Commercial name, active substance and any hazard statement (e.g., 'Warning' 'Caution' or 'Danger') as stated in the product's label.
    ii. Safety Data Sheet (SDS).
    iii. Specific locations for its application within the project boundary (e.g., rooms or landscaping features).
    iv. Selection criteria explaining why it was selected over more hazardous options (e.g., less hazardous to applicators, less toxic to the environment, recommended by an organization specialized on IPM, approved for use in organic farming).[539]
e. Includes a communication strategy that meets the following:
    i. Provides paper or digital notifications to all residents on the protocol for periodic and emergency pesticide use.
    ii. Notifies all residents at least 24 hours prior to pesticide application. Notifications include the pesticide name and registration number, treatment location, date of application and name of the individual or organization providing service. If an emergency or unplanned pesticide application is needed, notifications include information on the reason for use.

 

iii. Requires signage to be posted at the site of application at least 24 hours prior to application and until at least 24 hours after application.

f. Requires that the effectiveness of the plan is evaluated on an annual basis and revised as necessary.
g. Requires that the plan, records of its implementation, pest monitoring data and the Safety Data Sheets (SDS) of pesticides used are made available to residents and building managers.

Verification:

- Provide the integrated pest management plan.

OR

*Option 2. Certified Pest Management*
The following requirements are met:

a. Integrated pest management for common indoor and outdoor areas, and if offered and implemented within dwelling units, is provided by a company that is accredited under one of the following:
    i. GreenShield Certification.
    ii. GreenPro Service Certification.
    iii. EcoWise Certification.
    iv. BCPA Servicing Membership.

Verification:

- Provide the contract or agreement with the accredited pest management company.

## R-X04 Cleaning Products and Practices

**Intent:** Maintain surface hygiene while considering the health and safety of service providers by adopting improved cleaning protocols.

**Issue:**

- Regularly cleaning indoor environments is necessary to support health and well-being.[540,541,542]
- Many commercial and household cleaning products contain materials that may increase the risk of asthma attacks and nose, eyes, throat and lungs irritation.[543,544,545]

 

- Using certain household cleaning products can expose individuals to hazardous levels of toxic compounds, including chemicals that can cause cancer and disrupt the endocrine system.[546]

**Impact:**

- Although there is no standard definition of "green" cleaning products, cleaning products that are made without certain chemicals can decrease an individual's risk of exposure to toxic substances.[546]
- Using cleaning products with fewer hazardous ingredients can help reduce negative impacts to an individual's skin and respiratory system.[546]
- Adding filters to cleaning tools, such as vacuums, helps trap harmful particles and reduce the spread of dust and other air contaminants.[547,548,549]

**Part 1. Improve Cleaning Practices (1 point)**

***Tags: Common Space; Services and Policies***

A cleaning plan meets the following requirements:

a. Is implemented for all common indoor and outdoor spaces and, if cleaning is offered within dwelling units, is also implemented within dwelling units.
b. Includes the following general provisions:
    i. Responsibilities of cleaning staff.
    ii. Extent and frequency of cleaning.
    iii. A list of cleaning supplies and where they are stored.
    iv. Precautions to avoid slip hazards during and after floor cleaning.
    v. A process to regularly evaluate and document adherence to the plan.
c. Requires the following documentation procedures:
    i. Record-keeping of cleaning and disinfection activities.
    ii. Process for gathering and logging feedback from building residents and cleaning staff.
d. Specifies the following safety guidelines:
    i. Personal protection equipment (PPE) requirements for general cleaning and specialized tasks (e.g., disinfection or dilution of chemicals).
    ii. Color-coding to distinguish reusable from disposable cleaning cloths.
    iii. Reusable cleaning materials are cleaned separately.

 

iv. Proper use of cleaning and disinfection products, including dilutions (when needed) and ventilation requirements.
v. Onsite availability of Safety Data Sheets (SDS) of cleaning and disinfection products in languages spoken by the cleaning staff.
vi. Safe disposal of waste, including soiled cleaning materials and PPE.

e. Includes the following precautions for storage of cleaning products:
   i. An identifiable, fit-for-purpose storage space in accordance with the manufacturers' directions.
   ii. If used, bleach is stored away from other products.
   iii. If used, bleach- and ammonia-based products are color-coded and labeled indicating they are not to be mixed with one another.
f. Specifies the following equipment requirements:
   i. HEPA-rated filters for vacuum cleaners.
   ii. If carpet and woven upholstery are present, their cleaning methodology follows manufacturer's recommendations and, if technically feasible, favors hot water extraction.
   iii. Protocols for maintaining cleaning equipment.
   iv. Protocols for handling waste accumulated in equipment (e.g., used vacuum cleaner bags).
g. If disinfectants are used, identifies the following:
   i. Surfaces that require the use of disinfectants.
   ii. Frequency and/or other thresholds (e.g., number of hours, number of users in a space, results from a swab test) that require disinfectant use.
   iii. Relevant governmental registration for disinfectants.
   iv. Directions for use (e.g., contact time, dilution rates) of disinfectants.
h. Outlines a training program that meets the following:
   i. Covers cross-contamination prevention to separate clean tools from dirty ones via hand hygiene, PPE, cleaning cloth replacement, cloth handling techniques and carrying systems.
   ii. Is delivered to all relevant personnel (including building management, building operators and contracted cleaning staff) on an annual basis and whenever protocols change.

Verification:

- Provide the cleaning plan.

**Part 2. Select Preferred Cleaning Products (1 point)**

*Note: This part requires Part 1 of this feature to be achieved.*

 

***Tags: Common Space; Services and Policies***

A cleaning plan meets the following requirements:

a. Includes Safety Data Sheets (SDS) and instructions of use for all cleaning and disinfection products.
b. Includes cleaning products that are labeled as 'low-hazard' or 'safer' by an ISO 14024-compliant (Type 1) Ecolabel, or by a third-party certification recognized by the local government where the building is located.[550]
c. If disinfection products are used, includes disinfection products that meet the following:
    i. Have all **antimicrobial** efficacy claims registered by a governmental office and stated on their label.
    ii. Are certified under the US EPA Design for the Environment (DfE) program, or all **active ingredients** meet the DfE certification criteria.[551]

Verification (choose one):

- Provide the third-party certifications for all cleaning products.

 

## Appendix R-X1

### How to meet WELL Materials restriction requirements

The list below shows how to document each of the restrictions listed in R-X02, Parts 2-7:

- For **labeled as** restrictions:
    - Read the label or the specification sheets and identify the relevant requirement(s)
- For **not labeled as** restrictions, do **one of** the following per product:
    - Read the product description in the specification sheet and confirm that the physical label or product description sheet doesn't contain the relevant restriction(s) Product/technical specifications sheets are assumed to only list a property or function if the product was explicitly formulated with such property or function
    - If the product has a Declare label, confirm that the Declare label states that the product is Red List-free
    - If the product has a Health Product Declaration (HPD), confirm that the ingredient list on the HPD does not include the relevant restriction(s)
- For **do not contain** restrictions, do **one of** the following per restricted substance:
    - Obtain a manufacturer's publicly stated attestation that the product is 'free' of the relevant restriction(s)
    - Contact the manufacturer and obtain a letter that states that the relevant restriction(s) are not present. The letter must be signed by the manufacturer and must include the name and role/title of the signatory.
    - Use a transparency document with a stated disclosure limit of 1000 ppm or less (e.g., Declare label or an HPD) to confirm that the ingredient list does not include the relevant restriction(s).
        - HPDs containing attestations 'PFAS free' or 'no intentionally added PFAS' **are** acceptable.
        - An SDS **is not** an acceptable transparency document.
    - Products that are labeled as 'Free of CA Prop 65 chemicals' may be assumed not to contain (or be) the following substances:
        - PVC (commonly known as vinyl)
        - CPVC
        - Epoxy
        - Polyurethane

 

        - Asbestos
        - Formaldehyde
        - Lead
    - Ceramic tiles with unknown post-consumer recycled content may contain lead and other heavy metals and thus, based on the precautionary principle, do not comply with R-X02.2, Tier 2.
    - Find an ecolabel that states compliance with the relevant restrictions.
- For compliance with **VOC content** restrictions, do **<u>one of</u>** the following per product:
    - Use the specifications sheet to identify the type of product and then compare the g/l of VOC with the listed thresholds.
    - Find a label stating 'low VOC' or 'no VOC'
    - Find an ecolabel
    - Use the Safety Data Sheet (SDS) to see if the VOC content is listed in Section 9: Physical Data or Section 16: Other Information
- For compliance with **VOC emissions** restrictions, do **<u>one of</u>** the following per product:
    - Find an ecolabel that states compliance with relevant VOC emissions
    - Find a label that states compliance with AgBB, CA01350, CDPH V1.2 (2017) or Emicode
- For compliance with **formaldehyde emissions** restrictions:
    - Use the specifications sheet or transparency label to identify evidence of compliance with one of the listed standards

 

**Understanding Ecolabels**

| **Label** | **Applies to the following product categories** | **Complies with the following Restrictions** |
|---|---|---|
| Green Seal | • **Paints** and **coatings** | • All |
| Green Label Plus | • **Carpets**<br>• **Adhesive** and **sealants** | • VOC content<br>• VOC emissions |
| Greenguard Gold certified | • **Adhesives**, **sealants**, **sealers** and **paints, engineered wood flooring,** insulation | • VOC content<br>• VOC emissions |
| Greenguard low-VOC certification | • **Adhesives**, **sealants**, **sealers** and **paints** | • VOC content<br>• VOC emissions |
| GOTS (Global Organic Textile Standard) | • **Carpets** | • PFAS |
| Oeko-Tex Standard 100 | • **Carpets** | • PFAS |
| Cradle to Cradle Certification and Cradle to Cradle Material Health certification | • Tile | • Lead and other Heavy Metals |
| Cradle to Cradle Gold certification<br><br>and<br><br>Cradle to Cradle Gold Material Health certification | • All products | • Lead and other Heavy Metals<br>• PFAS<br>• Halogenated flame retardants (HFR)<br>• Antimicrobial claims<br>• Orthophtalates |

 

| | | |
|---|---|---|
| Declare Red List Free | • All products | • PFAS<br>• Halogenated flame retardants (HRF)<br>• Antimicrobial claims<br>• Orthophtalates |
| Floorscore | • Flooring products | • VOC content<br>• VOC emissions |

 

# Mind

## R-M01 Nature and Place

**Intent:** Promote positive relationships between people and places by enhancing building façade design and increasing engagement with natural elements.

**Issue:**

- Human connections with nature are on the decline, largely due to urbanization and lifestyle changes.[552,553]
- Access to nature is not equitably distributed, causing insufficient exposure for some individuals.[554]
- Globalization and mass production contribute to uniform architectural styles and "cookie-cutter" developments that threaten regional social values and local identity linked to culture and heritage.[555,556,557]

**Impact:**

- Exposure to natural elements may lead to mental health benefits, such as improved sleep and cognitive functioning, and decreased levels of anxiety and depression.[558,559]
- Window views that include the sky, landscape and ground levels are associated with increased view satisfaction and enhanced psychological well-being.[560,561]
- Visual experience can be enriched by variations in materials, colors, decorative features and other architectural elements.[562,563,564]
- The physical features of a building can support a sense of place, attachment and belonging and contribute to positive psychological functioning for individuals, such as identity, self-efficacy and self-esteem.[560,565,566]
- Aesthetically engaging places encourage the development of positive emotional bonds that support well-being and quality of life.[567,568,569]

**Part 1. Provide Connection to Nature (1 point)**

The dwelling unit meets at least two of the following requirements:

a. Includes a private outdoor space that:
    i. Is directly accessible from a room other than a bedroom (unless the dwelling unit is a **studio**) or a **bathroom**.[570]
    ii. Is at least 10% of the **occupiable** floor area inside the dwelling unit.

b. Includes a view of the outdoors that contains three layers (i.e., ground, landscape and sky) from one **regularly occupied** room other than a bedroom.[564,571]
c. Integrates natural materials, patterns and/or shapes throughout the interior design.[572,573,574]

Verification (meet all):

- Provide drawings that show the outdoor space and views.
- Provide area calculations.
- Meet one of the following:
    - Provide a Letter of Assurance and photographs showing the qualifying biophilic elements (e.g., natural materials, patterns, etc.).
    - Provide specifications and purchase orders or invoices for the qualifying biophilic elements (e.g., natural materials, patterns, etc.).

**Part 2. Provide Connection to Place (1 point)**

Façades within the project boundary meet the following requirements:

a. Incorporate characteristics that reflect the local architecture and culture through at least two of the following:
    i. Colors.[568,574,575]
    ii. Patterns.[568,579,576]
    iii. Materials.[568,579,580]
    iv. Architectural elements (e.g., porches, terraces, courtyards, windows, dormers, pilasters, railings, chimneys).[568,579,580]
    v. Building forms (e.g., shape, size, profile, proportion).[568,579,580]
b. Have individualized designs that vary at least two of the following:
    i. Colors.[577,578]
    ii. Patterns.[581,579]
    iii. Materials.[581,583]
    iv. Architectural elements (e.g., porches, terraces, courtyards, windows, dormers, pilasters, railings, chimneys).[581,583]
    v. Building forms (e.g., shape, size, profile, proportion).[581,583]
c. Individualized designs meet the quantity in the table below:

 

| Number of dwelling units with street-level entrances or number of buildings | Minimum number of individualized façade designs |
|---|---|
| 1-5 | The greater of 100% of dwelling units with street-level entrances or 100% of buildings.[580] |
| 6+ | The greater of 25% of dwelling units with street-level entrances or 25% of buildings and a minimum of 5 individualized designs. |

Verification (meet all):

- Provide drawings or photographs of all unique façades.
- Describe how the façades incorporate the local architecture and culture and reflect individualized designs. Include specific examples of the local architecture and culture and individualized characteristics.

## R-M02 Design for Reassurance

**Intent:** Enhance quality of life and reduce fear of crime by providing security measures.

**Issue:**

- Fear of crime is associated with several negative mental health and well-being outcomes, including emotional stress, depression and social isolation.[580,581,582]
- Fear of crime is also associated with lower rates of physical activity.[585,583]
- Individuals who experience identity theft, which can involve unauthorized access to mail with personal information, may develop increased psychological distress as a result of the experience.[584,585]

**Impact:**

- Design interventions that focus on security can help improve quality of life and decrease fear of crime.[586,587]
- Measures such as locks, security personnel and safe-entry systems have been shown to effectively reduce fear of crime.[588]

 

- Strategic design and positioning of mail and parcel delivery areas have been shown to be effective in reducing unauthorized access to personal information.[591]
- Building orientation that supports social interconnectedness and mutual trust can increase informal surveillance and act as a crime deterrent.[590,589]
- Vehicular traffic-calming measures and well-designed footpaths (sidewalks) have been linked to increased safety and security and decreased stress levels.[591,590,591]

**Part 1. Design Secure Main Entrances (1 point)**

The following requirements are met:

a. All doors with direct access into the dwelling unit are secured through the following:
    i. Include a **deadbolt lock** that extends beyond the strike edge of the door by at least 2 cm [0.79 in].[592]
    ii. Contain a handle or other controls that enable operability from the interior without a key.[591]
    iii. If secured with exterior **hinge pins**, are equipped with bolts that will secure the door if the exterior **hinge pins** are removed.[591]
b. The **main dwelling unit entrance** has viewing access through at least one of the following:
    i. Has a laminated glass panel as part of the **doorset**.[591]
    ii. Is fitted with a wide-angle viewer.[591]
    iii. Is equipped with an audio and video monitoring system.[591]
c. If applicable, exterior doors that lead into **common spaces** in residential buildings meet the following:
    i. Have a self-closing mechanism.[593,594]
    ii. Have a locking device that can be opened from the inside without a key.[597]

Verification:

- Provide specifications and purchase orders or invoices for the qualifying doors, hardware and security devices.

**Part 2. Support Secure Mail and Parcel Delivery (1 point)**

*1. Secure Mail Delivery*

The following requirement is met:

a. A mail delivery system is provided that:
    i. Is wall-mounted, wall-recessed or freestanding.[591]

 

ii. Is located in an area with a direct line of sight from the primary sidewalk/footpath.[591]
iii. Includes an individual lockable door for each dwelling unit.[595,596]

AND

*2. Secure Parcel Delivery*
One of the following requirements is met:

a. Secure parcel delivery accommodations are in place that meet the following:
   i. Are available at each dwelling unit or in a centralized locker bank.
   ii. Include at least one parcel delivery box for every 10 dwelling units.[599]
   iii. Include at least one parcel delivery box that can receive packages as large as 45 cm [18 in] high by 30 cm [12 in] wide by 38 cm [15 in] deep.[599]
   iv. Provide individual access through electronic control or a unique key.[591,597]
b. A package room is provided and monitored by an on-site 24-hour concierge service.

Verification (meet one):

- Provide Letter of Assurance and photographs of the mail and parcel delivery system that show location, dimensions and method of access.
- Provide the following:
  - Specifications and purchase orders or invoices for the qualifying mail and parcel delivery system.
  - Drawings that show the location of the mail and parcel delivery system.

**Part 3. Install Security Systems (1 point)**
The dwelling unit meets the following requirement:

a. Includes an audio and video monitoring system that meets the following:
   i. Is permanently installed.
   ii. Can be controlled remotely by the resident.
   iii. Provides coverage of the **main dwelling unit entrance** or the main exterior door that leads into **common spaces**.[591]

Verification (meet all):

 

- Provide specifications and purchase orders or invoices for the qualifying security systems.
- Provide drawings or photographs showing the location of the qualifying security systems.

**Part 4. Provide Layout and Orientation for Reassurance (2 points)**
The following requirements are met:

a. The **main dwelling unit entrance** is positioned in direct line of sight to at least one of the following:
    i. The **main dwelling unit entrance** of at least one other dwelling unit.[568,591]
    ii. The primary sidewalk/footpath or **hallway** connecting other dwelling units.[568,591]
b. Vehicular access points into the project boundary include one of the following:
    i. Rumble strips, speed bumps or changes of surface color or texture.[591,595,598]
    ii. Permanent signage indicating a designated slow zone or residential area.[594,595]
    iii. Permanent signage limiting use by commercial vehicles.[568]
    iv. Restricted access (e.g., security gate).
c. One of the following is met:
    i. At least one automobile parking space is provided for the dwelling unit on a paved or pervious surface (e.g., brick, stone or cobble stones with porous joints or centers) within the project boundary.[568,599]
    ii. Feature V02 Transit-Friendly Places is achieved.

Verification (meet one):
- Provide Letter of Assurance and photographs that show the layout and orientation requirements.
- Provide drawings that show the layout and orientation requirements.

## R-M03 Digital Connection

**Intent:** Support participation in society and access to educational opportunities by increasing access to internet connectivity.

**Issue:**

 

- Many individuals around the world do not have internet access.[600,601]
- Internet access is crucial for connecting individuals to basic necessities such as food, housing, education and health care.[602,603]
- Lack of access to the internet can cause social isolation as well as the loss of learning and employment opportunities.[607]

**Impact:**

- Internet access increases an individual's ability to navigate systems for employment, education, social connection and health care.[607,604,605]
- Internet access is increasingly important for online learning and information access, as evidenced during a global pandemic, and is an important factor in addressing health equity.[608]

**Part 1. Facilitate Digital Connectivity (1-2 points)**

The following requirements are met:

a. Internet infrastructure meets the following:
   i. Includes at least one hard-wired modem connection in a room other than a bedroom or **bathroom**.[598]
   ii. Has concealed data cables.[598]
   iii. Meets a minimum of 100 megabits per second (mbps) download speed.[598]

b. Internet service is provided according to one of the tiers in the table below:

| Tier | Points | Within the dwelling unit | Within at least one **regularly occupied common space**, if present |
|---|---|---|---|
| 1 | 1 | Internet service is available for purchase (e.g., from an internet service provider) | Internet service is provided at no additional cost |
| 2 | 2 | Internet service is provided at no additional cost | |

Verification (meet all):

- Meet one of the following:
  - Provide drawings that show the qualifying broadband infrastructure.
  - Provide Letter of Assurance and photographs that show the qualifying internet infrastructure.

- Provide one or more of the following, as applicable:
    - The internet service provider available.
    - The agreement or policy stating that the shared internet service is available to residents at no additional cost.

## R-M04 Household Storage

**Intent:** Reduce psychological stress and risk of unintentional injury by providing sufficient storage for belongings and secure storage for medicine and chemicals.

**Issue:**

- Childhood poisonings in the home are a global problem and represent a large portion of disability and mortality rates in children.[606,607,608]
- Improper storage of medicines and cleaning supplies in homes may increase the risk of poisoning events.[610,609,610]
- A lack of sufficient storage in homes has been linked to increased frustration and depression.[611,612]
- Insufficient household storage can contribute to pest infestations as well as psychological distress and injury hazards that may result from clutter.[613,614]

**Impact:**

- Chemical and medicinal storage that is locked and stored out of reach of children may help reduce unintentional poisonings.[614,615,616]
- Providing adequate storage at home can reduce fall hazards and stress associated with clutter.[612,617]

**Part 1. Provide Sufficient Storage (1 point)**

The dwelling unit meets the following requirements:

a. Includes a dedicated closet or cabinet for the storage of cleaning products and other chemicals that meets the following:
    i. Is lockable.[618]
    ii. Contains shelves that have a minimum 1 cm [0.4 in] raised edge.[619]
    iii. Contains at least one shelf mounted between 1.2 m [48 in] and 1.8 m [70 in] above the finished floor.[622]
b. Includes a dedicated closet or cabinet for the storage of medication that meets the following:
    i. Is lockable.[622]

 

ii. Contains at least one shelf mounted between 1.2 m [48 in] and 1.8 m [70 in] above the finished floor.[622]

c. Each bedroom includes a closet that meets the following:
   i. Measures at least 0.6 m [2 ft] deep by 1.2 m [4 ft] wide.[598]
   ii. Contains at least one shelf.[598]
   iii. Contains at least one hanging rod.[598]

d. Includes an additional storage space that contains:
   i. A total of at least 1.8 linear m [6 linear ft] of shelving.598[,620]
   ii. Shelves that are at least 0.5 m [1.6 ft] deep and 0.6 m [2 ft] wide.[624]

Verification (meet one):

- Provide drawings that show the location, dimensions and hardware of all relevant storage.
- Provide a Letter of Assurance and photographs that show the location, dimensions and hardware of all relevant storage.

## R-M05 Space Management

**Intent:** Support flexibility by designing spaces that accommodate lifestyle changes and account for privacy.

**Issue:**

- Residential designs are often inflexible and unaccommodating to common life events such as changes to family size and aging.[621,622,623]
- Individuals who lack privacy in their homes may experience increased stress-related symptoms, anxiety and depression.[624,625,626]
- Prolonged exposure to substandard housing conditions – including household crowding – is linked to an increased risk of infectious diseases and negative impacts on social, emotional and educational development.[627,628]

**Impact:**

- Residential designs that provide flexibility and customization can help support the evolving needs of individuals and families over time.579[,629]
- Rooms separated by internal walls can help enhance individual privacy and provide space for multiple independent activities.[630]
- Increased access to quality and affordable housing may improve health, security, self-esteem and children's development and nutrition.633[,631,632]

 

**Part 1. Provide Flexible Space (1 point)**

The dwelling unit meets the following requirement:

a. Includes a flexible space that meets the following:
    i. Is not a bedroom, **bathroom**, living room or kitchen.
    ii. Is separated from adjacent spaces with floor-to-ceiling dividers.
    iii. Has a door with a **privacy lockset**.
    iv. Has a floor area of at least 6.5 $m^2$ [70 $ft^2$].[598]
    v. Has a minimum ceiling height of 2.4 m [96 in] over at least half of the floor area.[597]

Verification:

- Provide drawings showing the area, wall and ceiling heights, and door and hardware specifications of the flexible space.

**Part 2. Design for Privacy (1 point)**

The dwelling unit meets the following requirements:

a. Bedrooms and **bathrooms** are separated from adjacent spaces with floor-to-ceiling dividers.[633]
b. The minimum ratio of **bathrooms** to bedrooms is 1:2.[598]
c. The **bathroom** is not the only passageway through to any **regularly occupied** space or the exterior of the dwelling unit.[597,598]
d. Bedrooms and **bathrooms** have a door with a **privacy lockset**.[598]
e. Windows in bedrooms and **bathrooms** with a sill below 1.5 m [60 in] above the finished floor meet one of the following:
    i. Have permanently installed operable shades, blinds, curtains or shutters with a transparency of 40% or less (i.e., opacity greater than 60%).[568]
    ii. Have permanently installed louvers, blinds or **architectural screens**.[634]
    iii. Have translucent glass or other glass treatment that achieves a transparency of 40% or less (i.e., opacity greater than 60%).[568,635]

Verification (meet all):

- Provide drawings that show the height of the bedroom and **bathroom** windows, privacy treatments, door hardware and window-shading specifications.
- Provide the **bathroom**-to-bedroom ratio calculation.

**Part 3. Accommodate Various Household Sizes (1 point)**
*Note: This part requires Part 2 of feature R-C02 Housing Equity to be achieved.*

The following requirements are met:

a. At least 50% of the dwelling units have two or more bedrooms and a minimum ratio of **bathrooms** to bedrooms of 1:2.
b. At least 10% of the dwelling units have three or more bedrooms and a minimum ratio of **bathrooms** to bedrooms of 1:2.

Verification:

- List of dwelling units with associated bedroom and **bathroom** counts.

# Community

## R-C01 Universal Design

**Intent:** Promote accessibility, comfort and usability by designing residences for individuals of all ages and abilities.

**Issue:**

- Most residential guidelines for universal or accessible design address accessibility considerations for multifamily residences but do not usually consider individual dwelling units or single-family homes.[636,637]
- Many communities are seeing an increase in demand for accessible housing due to an aging population and increases in the number of people with disabilities.[638,639,640]
- Homes are not commonly designed or required to support the individual needs of people with disabilities and often present barriers, such as inaccessible stairs, bathtubs and storage spaces.[641,642,643]
- Individuals who require and do not receive accessible housing can experience negative health effects including poor mental health, decreased mobility and increased social isolation and anxiety.[643,644]
- Falls are a global health concern, as they are a leading cause of unintentional death and debilitating injury in the home.[645]

**Impact:**

- Universal design is an approach that enables everyone to access spaces with greater ease and without the need for individual adaptation or specialization.[646,647]
- Universal design empowers and enables individuals with diverse ranges of abilities by improving human performance, well-being and social participation.[649,648,649]
- Designing for visitability supports accessible housing by requiring the ground floor of a home to have a zero-step entrance, wide doorways and at least a half bath.[650]
- Accessible housing can increase social inclusion, occupational achievement and quality of life as well as support independent living by reducing the need for at-home caregiving.[651,652,653]
- It is difficult to fully create spaces that are usable by all individuals; therefore, universal design functions as a process to offer a variety of strategies for incremental changes throughout one's lifetime.[654,655]

 

**Part 1. Design for Visitability (1 point)**

The following requirements are met:

a. A route from the exterior to the dwelling unit includes the following:
    i. No thresholds or elevation changes other than ramps, **elevators** or chair lifts.
    ii. Doors with a minimum clearance of 0.8 m [32 in].[656]
    iii. If present, non-power operated hinge doors that meet the following:
        1. Include a clear space on the pull side. The clear space starts at the hinge, goes at least 45 cm [18 in] past the latch and extends at least 1.5 m [5 ft] perpendicular to the doorway.[657]
        2. Include a clear space on the push side. The clear space starts at the hinge, goes at least 30 cm [12 in] past the latch and extends at least 1.5 m [5 ft] perpendicular to the doorway.[661]
    iv. **Hallways** and corridors with a minimum clearance of 0.9 m [36 in].[660,661]
b. At least one **bathroom** within the dwelling unit meets the following:
    i. Can be accessed from the entrance of the dwelling unit via a route that meets the following:
        1. Has no thresholds or elevation changes, other than ramps, **elevators** or chair lifts.
        2. Has a minimum clearance of 0.9 m [36 in].[660,661]
    ii. Can be entered through a door with a minimum clearance of 0.8 m [32 in].[660]
    iii. Includes a clear space with a diameter of 1.7 m [5.6 ft].[658]
    iv. Includes a sink that meets the following:
        1. The sink basin is adjacent to a clear space of at least 0.8 m [30 in] by 1.27 m [50 in].[662]
        2. The sink has an unobstructed opening underneath with covered or insulated hot water pipes that is between 68 cm [27 in] and 76 cm [30 in] above the finished floor and at least 28 cm [11 in] wide. Removable panels that cover this opening may be provided.
    v. Includes a toilet that meets the following:
        1. The toilet bowl rim is between 43 cm [17 in] and 48 cm [19 in] above the finished floor.[659,660]
        2. The toilet basin is adjacent to a minimum clear space of 45 cm [18 in] by 1.2 m [48 in].[660]

 

c. If present, ramps meet the following:
    i. The width clearance is at least 0.9 m [36 in].[661]
    ii. The slope height-to-distance ratio is no greater than 1:12 (8.33%).[665]
    iii. The overall height gain for each section has a maximum of 76 cm [30 in]. There is no limit on the number of sections a ramp may contain.[665]
    iv. There is a level landing of at least 1.5 m [5 ft] at the top and bottom of each section.[665]
    v. There are intermediate landings between sections that are at least 1.5 m [5 ft] wide and at least 1.5 m [5 ft] long where ramps change direction.[665]
d. If present, **elevators** within the project boundary and pre-framed **elevator** shafts within the dwelling unit meet the following:
    i. **Elevators** have a minimum clear space that is at least 152 cm [60 in] wide by 152 cm [60 in] deep.
    ii. Pre-framed shafts where **elevators** can be installed in the future (e.g., stacked closets) include a minimum clear space that is at least 152 cm [60 in] wide by 152 cm [60 in] deep.

Verification:

- Provide drawings that show all relevant visitability requirements.

**Part 2. Design for Livability: Kitchen (1 point)**

*Note: This part requires Part 1 of this feature to be achieved.*

In the dwelling unit, at least one kitchen meets the following requirements:

a. Can be accessed from the entrance of the dwelling unit via a route with no thresholds or elevation changes, other than ramps, **elevators** or chair lifts.
b. No part of the floor includes a clearance less than 102 cm [40 in] wide. When a change in direction (turn) is required, the clearance must be no less than 1.7 m [5.7 ft].[662,663,662]
c. At least one sink has an unobstructed opening underneath with covered or insulated hot water pipes that is between 68 cm [27 in] and 76 cm [30 in] above the finished floor and at least 28 cm [11 in] wide. Removable panels that cover this opening may be provided.[663,663]
d. All lower (i.e., base) cabinet millwork includes a space (e.g., toe kick) that is at least 20 cm [8 in] above the finished floor and at least 15 cm [6 in] deep.[663]

 

e. Includes at least one countertop that is between 71 cm [28 in] and 86 cm [34 in] above the finished floor.[664]
f. All cabinet doors and drawer handles are connected to the door/drawer at two points and have an open space between the handle and the door/drawer.
g. Faucets meet the following:
    i. At least one faucet can be turned on/off with a touchless sensor (i.e., touchless faucet), with a single tap (i.e., touch faucet) or a lever.[667,665]
    ii. Faucets controls are located no higher than 122 cm [48 in] above the finished floor when countertops are up to 51 cm [20 in] deep, and no higher than 112 cm [44 in] when countertops are between 53 cm [21 in] - 64 cm [25 in] deep. The knee and toe space must be as deep as the distance of the faucet controls from the front of the counter.[666]
h. If present, **cooktops** have front controls.[663,667]
i. If oven(s) are present, at least one oven meets the following:
    i. Is wall-mounted.
    ii. Has a heat-resistant pull-out shelf below the oven door.
    iii. Is adjacent to a countertop.[663,667]
j. At least 75% of all shelves within cabinets meet the following:
    i. Have a maximum height of 122 cm [48 in] if the countertop is less than 53 cm [21 in] deep or a maximum height of 112 cm [44 in] if the countertop is between 53 cm [21 in] and 64 cm [25 in] deep.[667,667]
    ii. Have pull-down/pull-out shelving.[667,671]
k. If present, combination refrigerators and freezers meet one of the following:
    i. Are configured with side-by-side doors.[663,667]
    ii. Have the freezer section located on the bottom.[663,667]

Verification:

- Provide drawings that show all relevant kitchen livability requirements.

**Part 3. Design for Livability: Bathroom (1 point)**

*Note: This part requires Part 1 of this feature to be achieved.*

In the dwelling unit, at least one **bathroom** meets the following:

a. Meets the requirements in Part 1b of this feature.

 

b. Includes grab bars, or bracing on walls to support future grab bars, that can support at least 113 kg [250 lb]. Bracing is mounted according to the table below:[666,668]

| Location | Minimum width of grab bar or bracing | Mounting height of grab bar or bracing, as measured above the finished floor |
|---|---|---|
| Directly behind toilet | 1.2 m [4 ft] | 84 cm [33 in] to 92 cm [36 in] |
| Wall adjacent to toilet | 0.9 m [3 ft] | 84 cm [33 in] to 92 cm [36 in] |
| In shower on wall with shower controls | N/a | 84 cm [33 in] to 92 cm [36 in] |
| In shower on wall adjacent shower controls | N/a | 84 cm [33 in] to 92 cm [36 in] |

c. Includes a shower that meets the following:
   i. Has a barrier-free (i.e., roll-in) entrance.[672]
   ii. Includes inside dimensions of at least 76 cm [30 in] wide by 152 cm [60 in] deep.[663,669] Note: clear space for the toilet may overlap with clear space for this shower.
   iii. Includes a built-in, permanently fixed shower bench that is between 38 cm [15 in] and 41 cm [16 in] deep and is mounted between 43 cm [17 in] and 48 cm [19 in] above the finished floor.[663,673]
   iv. Includes a height adjustable and/or hand-held shower head on the wall opposite or adjacent to the shower bench and mounted no lower than 8 cm [3 in] above the grab bar and no higher than 122 cm [48 in] above the finished floor.[663,673]
   v. Includes shower controls mounted between 97 cm [38 in] and 122 cm [48 in] above the finished floor.[663,673]

Verification (meet all):

- Provide drawings that meet all relevant **bathroom** livability requirements.
- Provide drawings that show the location of grab bar bracing.

**Part 4. Design for Livability: Wayfinding, Transitions and Access (1 point)**

*Note: This part requires Part 1 of this feature to be achieved.*

 

The following requirements are met:

a. The following floor and threshold requirements are met within the project boundary:
    i. The **main building entrance** and **main dwelling unit entrance** is accessible through a **zero-step** threshold.
    ii. On each floor, there are no steps or level changes between rooms.
    iii. If present, garages have a **zero-step** path to the dwelling unit.[647,649]
    iv. If present, carpet has a maximum pile height of 1.3 cm [0.5 in], when measured to the backing, cushion or pad.[670]
    v. If present, carpet has a rubber, polyurethane cushion or similar firm backing.[674,671,672]
    vi. If present, hard surface flooring has a coefficient of friction of at least 0.6 on flat surfaces and 0.8 on ramps.[673]
    vii. Transitions between flooring types have a maximum height no higher than 6.3 mm [0.25 in].[674]
b. The following wayfinding requirements are met within the project boundary:
    i. All toilets and transitions to showers and/or tubs are identified with wayfinding strategies (e.g., change of color, contrast, pattern, texture, lights).[663,680,674]
    ii. If present, stairs and ramps are identified with wayfinding strategies (e.g., change of color, contrast, pattern, texture or lights).[673]
    iii. Emergency alert systems (e.g., smoke detectors) have a minimum of two sensory types (i.e., visual, auditory, haptic).[663,680]
c. The following access requirements are met within the project boundary:
    i. All doors have the ability to be operated with one hand without tight grasping or twisting of the wrist (e.g., lever handles, push mechanisms).[675]
    ii. Exterior doors and doors within **common spaces** are self-closing with an opening force no more than 0.5 kg [5 lb].[663,679,676]
    iii. If present, stairs and ramps have handrails on both sides with a minimum clearance of 0.9 m [36 in].[667]
    iv. If present, **hallways** and corridors in **common spaces** include lean rails or handrails that protrude no more than 11 cm [4 in] deep into the circulation path and installed between 84 cm [33 in] to 94 cm [37 in] above the finished floor.[677,678,679]
    v. If present, washers and dryers are front-loading and their doors are adjacent to a minimum clear space of at least 76 cm [30 in] by 132 cm [52 in].[662,680]

vi. If present, objects on walls along exit corridors protrude no more than 11 cm [4 in] deep into the circulation path if they are located between 69 cm [27 in] and 204 cm [80 in] above the finished floor.[680]

d. The following access requirements are met within the dwelling unit:
   i. At least one bedroom is located on the entrance floor or a floor that is accessible by an **elevator** or chair lift.[667]
   ii. If the dwelling unit has multiple levels, all floors are accessible by an **elevator** or chair lift (or a pre-framed shaft for future **elevator** installation).[667,681,682]
   iii. All controls for lights and temperature are located no higher than 122 cm [48 in] above the finished floor (as measured to the center of the control).[666]
   iv. All outlets in each room are located at least 38 cm [15 in] above the finished floor (as measured to the center of the outlet).[666]

Verification (meet all):

- Provide drawings that meet all relevant livability for wayfinding, transitions and access requirements.
- Provide specifications and purchase orders or invoices for emergency alert system devices.
- Provide drawings showing the **elevator**, chair lift or future **elevator** provisions (if applicable).
- Provide drawings showing the location of all handrails including the dimensions to the finished floor.
- Provide specifications and purchase orders or invoices (that include the coefficient of friction) for all hard surface flooring.

## R-C02 Housing Equity

**Intent:** Support health equity and advance environmental justice by providing homes that promote health and well-being for people of all backgrounds and socio-economic statuses.

**Issue:**

- People in underrepresented and marginalized communities experience inequitable access to affordable housing that supports health, well-being and dignity.[683,684]
- Without access to quality affordable housing, individuals may be forced

 

to live in substandard conditions.[685,686]

- Prolonged exposure to substandard housing conditions is linked to negative health effects such as asthma, lead poisoning and infectious disease.[689]
- Globally, people continue to experience discrimination when trying to obtain adequate housing.[687,688]
- Negative health conditions (such as increased rates of adverse pregnancy outcomes, childhood cancers, heart complications and respiratory diseases) are associated with a person's living proximity to hazardous waste sites and pollution from roads, railways and airplanes.[689,690,691]

**Impact:**

- Access to affordable housing can help prevent the spread of infectious disease and improve overall health.[692,693,694]
- Individuals with access to affordable housing are more likely to have the resources needed to cover additional living costs such as food, clothing, utilities and healthcare.[697,695]
- Increased access to quality, affordable and safe housing may improve children's health, security, self-esteem, development and nutrition.[697,696]
- Restricting the development of neighborhoods near areas with high levels of environmental pollution (such as airports, busy roads and hazardous waste sites) can help support environmental justice and health equity.[694,697]
- Housing policies and laws that are explicitly anti-discriminatory can increase access to adequate housing and help reshape segregated neighborhoods.[692]

**Part 1. Select Equitable Sites (2 points)**

*Note: This part requires Part 1 of feature R-V02 Transit-Friendly Places to be achieved.*

***Tags: Neighborhood Attributes***

The project boundary meets the following requirements:

a. **Limited access highways**, roads with five or more travel lanes, and non-electric rail services are more than 150 m [500 ft] away.[695,698]
b. Toxic waste sites and zoned industrial areas are more than 3 km [1.8 mi] away.[701]
c. Airports are more than 10 km [6 mi] away.[695]

Verification:

- Provide an area map showing that none of the pollution sources are within the distances listed.

**Part 2. Allocate Affordable Units (1-3 points)**

***Tags: Services and Policies***

The following requirements are met:

a. A percentage of dwelling units within the project development are allocated for residents with incomes at thresholds as outlined in one of the tiers in the table below:[699]

| Tier | Points | Units Allocated as Affordable | Household Income Limit (adjusted for family size) |
|---|---|---|---|
| 1 | 1 | 10% - 39% | 80% of local median or less |
| 2 | 2 | 40% - 99% | 80% of local median or less |
| 3 | 3 | 100% | 80% of local median or less |

b. Total annual housing costs (i.e., rent and utilities) for residents in units allocated as affordable are less than 30% of the income limit selected in the table above.[700]

c. If present, market-rate dwelling units within the building or development are comparable to affordable dwelling units according to the following criteria:

   i. Are visually or functionally similar.[701]
   ii. Have the same access point into the building.[705]
   iii. Have the same distribution of unit size, accounting for number of bedrooms and **bathrooms** per dwelling unit.[696,702]

Verification (meet all):

- Provide the calculation of affordable units.
- Provide the calculation for local median annual housing costs.
- Provide the distribution of unit size for the affordable- and market-rate units.
- Provide drawings that show the dwelling units are visually/functionally similar.

 

**Part 3. Implement Fair Housing (1 point)**

***Tags: Services and Policies***

The following requirement is met:

a. A fair housing policy is in place for the building or development to prevent the ability to deny housing based on the following:
    i. Ethnicity.[703]
    ii. Race.[707]
    iii. Disability.[707]
    iv. Age.[707]
    v. Religious beliefs.[707]
    vi. Gender (assigned, identity and/or expression).[707]
    vii. Sexual orientation.[707]
    viii. Familial status.[707]

Verification:

- Provide the fair housing policy.

## R-C03 Integrative Design

**Intent:** Facilitate an inclusive and collaborative planning process by centering all stakeholders around a health-oriented and equitable mission.

**Issue:**

- Consulting stakeholders during the planning and development process is crucial to addressing their needs and ensuring a positive impact on health and well-being while serving specific communities.[704,705]
- Excluding low-income and minority populations from planning and decision-making may limit their access to certain opportunities and services and lead to disproportionate increases in negative health conditions, displacement, pollution and crime.[708,709]

**Impact:**

- An integrative design process requires a diverse and balanced group of representatives for decision-making and should include representative users, building staff and the project owner or architect.[706]
- Integrative design practices increase transparency among stakeholders to streamline the planning, design and goal-setting processes.[710]

 

- Integrative design practices empower residents who may have been previously excluded in decision-making processes to help advance equity and reshape their neighborhoods.[707]
- Stakeholder input helps project teams address essential health promotion goals, create spaces in consideration of all stakeholders and enrich the well-being of residents and visitors.[708,708]

**Part 1. Facilitate Stakeholder Engagement (1 point)**

The stakeholder charrette meets the following requirements:

a. Is hosted early in the WELL planning process.
b. Includes efforts to involve representatives from the following stakeholders, as applicable:
    i. Owners.
    ii. Facility managers.
    iii. Designers, architects and engineers.
    iv. Health and well-being professionals.
    v. Equity professionals.
    vi. Contractors.
    vii. Residents.
    viii. Community members or neighbors.
c. Accommodates participation from all relevant stakeholders by addressing barriers (e.g., cultural norms or values, literacy levels, language, disabilities, work schedules, childcare) through timing, location, format and communication strategies.
d. Addresses stakeholder feedback on the project plan and how it will be addressed.
e. Establishes a health-oriented mission that meets the following:
    i. Outlines the project's objectives for health promotion.
    ii. Outlines how the project contributes to the health of the community.[708]
    iii. Includes a statement about supporting the health of all residents.
    iv. Is informed by relevant goals or strategies established earlier in the stakeholder charrette.[709]
    v. Is made available to all stakeholders during the project's design and development process.[710]
    vi. Is publicly available after the project is complete.
f. Establishes a process for continued engagement of stakeholders throughout the project's design and development process.[714]

 

Verification (meet all):

- Describe the efforts taken to engage stakeholder groups.
- Provide the charrette meeting notes as well as a list of all attendees and their roles on the project.
- Provide the health-oriented mission statement including a description of how it is made available to all stakeholders.
- Describe the project's process for continued engagement of stakeholders.

## R-C04 Healthy and Inclusive Construction Sites

**Intent:** Support the health and well-being of construction workers by promoting safer and more inclusive worksites and by contracting with diverse businesses.

**Issue:**

- The global construction industry is known for its high number of work-related injuries and deaths.[711]
- People of color and women are significantly underrepresented in the construction industry.[712,713]

**Impact:**

- A growing number of construction companies are committed to increasing the representation of minority- and women-owned businesses.[714,715]
- Preventative design practices can help eliminate work-related injuries, hazards, illnesses and deaths.[716]
- Diversity, equity and inclusion strategies can improve productivity and organizational performance for construction companies.[717]
- Construction companies can address diversity, equity and inclusion by hiring individuals from underrepresented populations, supporting advancement to leadership positions for workers in minority groups and ensuring fair and equal pay.[717]

### Part 1. Address Construction Hazards Through Design (1 point)

*Tags: Construction Practices*

A construction design review process (e.g., Design for Safety process, Prevention through Design program) meets the following requirements:

a. Is overseen by a designated project team member.[717,718]

 

b. Engages representatives from the following stakeholders, as applicable:[721,722,719]
    i. Designers, architects and engineers.
    ii. Owner.
    iii. Contractors.
    iv. Facilities manager.
    v. Health and well-being professional.
    vi. Equity professional.
    vii. Current residents.
    viii. Community members.
c. Requires meetings that meet the following:
    i. Occur before construction begins and at least two separate times before project completion.[720]
    ii. Include representatives from all relevant stakeholders.
    iii. Include reviews of all design materials (e.g., blueprints, specifications, drawings, calculations).[721,722]
    iv. Include a risk identification assessment for the construction process performed newly for each meeting.[721,722,723]
    v. Include feedback loops to alter designs based on risk identification assessment.[721,722,723]
    vi. Record all design iterations to show construction hazards identified and how risk mitigation is implemented.[721]

Verification:

- Provide the hazard identification and mitigation design program for construction.

**Part 2. Support Health and Well-Being in Construction (1 point)**

***Tags: Construction Practices***

The following requirement is met:

a. The general contractor has a worksite health and well-being policy that meets the following:
    i. Provides education on the danger of long-term exposure to severe weather (i.e., extreme heat or cold).[721]
    ii. Provides cooling and/or warming provisions (e.g., fans, shades, warming stations) on the construction worksite during extreme temperatures.[725]
    iii. Implements a policy for managing inclement weather on the construction worksite.[722]

 

iv. Prohibits smoking on the construction worksite.[725]
v. Provides drinking water at the construction worksite.[725]
vi. Provides sunscreen at the construction worksite.[725]
vii. Provides sanitation facilities for all genders and non-binary individuals (e.g., an all-gender lockable toilet room) at the construction worksite.[725,723,724]
viii. Allows for paid breaks.[725]

Verification:

- Provide the general contractor's worksite health and well-being policy.

**Part 3. Promote Diversity, Equity and Inclusion in Construction (1 point)**

***Tags: Construction Practices***

The following requirement is met:

a. The general contractor includes a comprehensive diversity, equity and inclusion (DEI) policy that meets the following:
   i. Pertains to the entire organization associated with the general contractor.
   ii. Provides regularly scheduled DEI training to all employees on an annual basis, at minimum.[725,726]
   iii. Specifies DEI goals and detailed strategies for achievement and monitoring of goals.[730,727]
   iv. Provides opportunities for training and job advancement for all employees.[729,730]
   v. Establishes equal pay for equal work.[729,730]
   vi. Provides paid time off for all employees.[729,730]

Verification:

- Provide the general contractor's diversity, equity and inclusion (DEI) policy.

**Part 4. Hire Diverse Construction Businesses (1 point)**

***Tags: Construction Practices***

At least one of the following requirements is met:

a. The general contractor for the project is recognized by a third-party organization or governmental authority as a business owned and operated by a marginalized group (e.g., women, minorities, disabled, LGBTQ+, veterans).

b. At least 20% of the subcontractors for the project are recognized by a third-party organization or governmental authority as a business owned and operated by a marginalized group (e.g., women, minorities, disabled, LGBTQ+, veterans).

Verification:

- Provide the diverse business certificate(s) or documentation for all qualifying contractors and the relevant calculations.

## R-C05 Resident Education

**Intent:** Help residents engage with the WELL strategies by educating them about their presence and providing instructions for use and maintenance.

**Issue:**

- Health literacy is an essential part of increasing awareness to promote healthy living and preventative healthcare, but certain social and cultural factors may serve as barriers to receiving these educational services, such as age, socioeconomic status, culture, language and communication abilities.[728,729]
- It is not common for people to have access to information about healthy housing strategies from trustworthy sources that is easy to understand.[730]

**Impact:**

- Accessible education, effective communication and accurate information can help improve health literacy.[731]
- Supporting health literacy across all socioeconomic groups can help reduce inequities in accessing healthcare.[732]
- Health literacy can help provide individuals with a better understanding of their health status and empower them to make positive behavioral changes.[735]
- People who are educated about the performance of their building show greater satisfaction in their building's environment.[733]

**Part 1. Provide an Educational Guide (1 point)**

The following requirement is met:

a. Residents are provided with an educational guide that meets the following:
    i. Covers all implemented WELL features within the project boundary.

 

ii. Includes the intent of each feature.
iii. Provides instructions for use for each feature, as applicable.
iv. Outlines maintenance requirements for each feature, as applicable.

Verification:

- Provide the educational guide.

## R-C06 Disaster Resilience

**Intent:** Enable individuals to maintain health and well-being during natural disasters and emergencies by designing for resilience.

**Issue:**

- Natural disasters have a widespread impact on many people every year and significantly contribute to the number of global deaths.[734,735]
- Power outages can have significant negative health impacts (including carbon monoxide poisoning and temperature-related illness) and have been linked to increased healthcare visits and mortality rates.[736]
- Maintaining a consistent electric power supply is crucial to comfort and safety in homes, especially for individuals who are dependent on electric assistive technology and medical devices.[737,738]
- Preparing for natural disasters before they occur can help protect human health.[739]

**Impact:**

- A comprehensive emergency response plan can help improve how individuals respond to emergency situations and potentially limit the number of casualties and the negative impacts of a disaster.[740]
- Maintaining an uninterrupted power supply during disasters can help regulate indoor temperatures during extreme weather events and also help maintain pathways for safer evacuation.[740]
- Providing access to residential backup power sources is critical for the growing number of individuals who rely on home medical devices.[741,742]
- Access to automated external defibrillators (AEDs) can help improve response time and rates of survival for cardiac arrest events.[741]

 

**Part 1. Design for Resilience (1 point)**

A hazard assessment and action plan is conducted that meets the following requirements:

a. Includes the likelihood and severity of a hazard event occurring among the following natural disaster groups:
    i. Geophysical.[742]
    ii. Meteorological.[746]
    iii. Hydrological.[746]
    iv. Climatological.[746]
    v. Biological.[746]
b. Ranks the hazard event(s) based on the likelihood of occurring and severity of the potential event.[743]
c. Identifies areas most vulnerable to the hazard event(s).[747]
d. Describes the resilient design solutions implemented in the dwelling unit that address, at minimum, the top three identified hazard event(s).[747]

Verification (meet all):

- Provide the hazard assessment and action plan.
- Provide the resilient design solutions implemented.

**Part 2. Provide Backup Power (1 point)**

A backup power system meets the following requirements:

a. Is sufficient to power at least three of the following functions for a minimum of 96 consecutive hours:
    i. Heating and/or cooling systems in the dwelling unit.[744,745]
    ii. Running water in the dwelling unit.[748,749]
    iii. At least one electrical outlet per 23.2 $m^2$ [250 $ft^2$] in the dwelling unit.[748,749]
    iv. At least one light source inside and at least one light source outside the dwelling unit.[748,749]
    v. Lighting for egress with at least one light source illuminating an exit door and pathways to the outside.[748,749]
    vi. Drainage systems (e.g., sump pump, ejector pumps).[746]
    vii. Operation of electrified locksets and/or doors.[748,749]
    viii. At least one **elevator** or chair lift servicing the entire building.[748,749]

Verification (meet all):

- Provide the backup power generation calculation.

 

- Meet one of the following:
    - Provide drawings including the electrical plan that identifies the qualifying backup power system.
    - Provide specifications and purchase orders or invoices for the qualifying backup power system.

**Part 3. Provide Emergency Response Support (1 point)**

***Tags: Common Space***

The following requirements are met:

a. Emergency routes and areas of refuge are clearly marked.
b. A **common space** that functions as a designated disaster shelter is identified.
c. At least one automated external defibrillator (AED) is available within a **common space** and undergoes regularly scheduled maintenance and testing.
d. A first aid kit that meets the requirements in WELL v2 Appendix C3 is available in a **common space**.

Verification (meet all):

- Provide photographs of clearly marked emergency evacuation routes, shelter areas and the defibrillator and first aid kit.
- Provide the maintenance and testing schedule of the defibrillator.

## R-C07 Fire Mitigation

**Intent:** Decrease the risk of injury, death and property damage from fires in the home by implementing fire prevention and suppression strategies.

**Issue:**

- The majority of all fire injuries and fire-related deaths occur in residential buildings.[747]
- Most home fires originate in the kitchen from cooking activities.[748,749,750]
- A home's location can have an impact on the probability of experiencing a fire-related event and affect its ability to receive emergency fire response services.[751,752,753]
- Homes located in wildland-urban interface zones and similar areas have an increased risk of experiencing a wildfire.[757]

**Impact:**

 

- Homes that are located closer to fire stations and fire hydrants are more likely to have reduced emergency fire response times and fewer fire-related injuries.[755,756,754]
- Interventions for cooking activities, such as temperature sensors on cooktops and induction heating, can help prevent kitchen fires.[752,753,754]
- Sprinklers in residential areas significantly decrease fire-related injuries, deaths and property loss.[755,756,757]

**Part 1. Prioritize Low Fire Risk Locations (1 point)**

***Tags: Neighborhood Attributes***

The building meets the following requirements:

a. Is not located within a designated wildland-urban interface or other area designated as being at an increased risk for wildfires.[758,759]
b. Is located within 8 km [5 mi] of a fire station.[756]
c. Meets one of the following:
    i. If the building has one or two dwelling units, it is located within 183 m [600 ft] of a fire hydrant.[756]
    ii. If the building has three or more dwelling units, it is located within 122 m [400 ft] of a fire hydrant.[756]

Verification:

- Provide an area map that shows any qualifying risk areas, the distance from the building(s) to the nearest fire station(s) and the distance to the nearest fire hydrant(s).

**Part 2. Install Fire Risk Mitigation Measures (1 point)**

All kitchens in the dwelling unit meet one of the following:

a. Have an induction **cooktop**.[754]
b. Have a **cooktop** with automatic switch-off functionality in response to one of the following:
    i. Motion detectors or timers.[754]
    ii. Temperature sensors.[754]
    iii. Smoke detectors.[754,760]
c. Have an independent fire suppression system that covers the **cooktop** (e.g., **cooktop** isolation system, **cooktop** suppression mechanism).[754]

Verification (meet all):

- Provide drawings that identify the location of all qualifying risk mitigation equipment or devices.

 

- Provide specifications and purchase orders or invoices for the qualifying risk mitigation equipment or devices.

**Part 3. Install Sprinkler Systems in Dwelling Units (1 point)**

The following requirement is met:

a. The dwelling unit has an automatic sprinkler system that covers the following areas:
    i. All **occupiable** areas of the dwelling unit (other than the exceptions listed in NFPA 13R 6.6).[761]
    ii. Any space that contains HVAC equipment or water heaters.[765]

Verification:

- Provide drawings with room labels showing the sprinkler system coverage.

 

# Innovation

## R-I01 WELL Innovations

**Intent:** Support health and well-being through the implementation of evidence-based strategies that do not currently exist as WELL for residential features.

**Issue:**

- As the scientific understanding of health promotion continues to evolve, so does the ability to address the complex issue of promoting health and well-being through residential design and operations.

**Impact:**

- Innovation features embrace and acknowledge novel approaches to supporting health and well-being through evidence-based strategies.

**Part 1. Propose Innovation (1 point)**

Implement a strategy that:

a. Positively and significantly impacts health and well-being.
b. Goes above and beyond best practices and standard operations.
c. Is not covered in an existing WELL for residential feature.
d. Is substantiated by scientific, medical and/or industry research.
e. Does not contradict applicable laws, regulations and leading practices in building design and operations.
f. Is distinct and independent from other Innovation proposals submitted by the project team.

Verification:

- Provide the completed Innovation Proposal template.

**Part 2. Propose Innovation (1 point)**

Implement a strategy that:

a. Positively and significantly impacts health and well-being.
b. Goes above and beyond best practices and standard operations.
c. Is not covered in an existing WELL for residential feature.
d. Is substantiated by scientific, medical and/or industry research.
e. Does not contradict applicable laws, regulations and leading practices in building design and operations.

 

f. Is distinct and independent from other Innovation proposals submitted by the project team.

Verification:

- Provide the completed Innovation Proposal template.

**Part 3. Propose Innovation (1 point)**

Implement a strategy that:

a. Positively and significantly impacts health and well-being.
b. Goes above and beyond best practices and standard operations.
c. Is not covered in an existing WELL for residential feature.
d. Is substantiated by scientific, medical and/or industry research.
e. Does not contradict applicable laws, regulations and leading practices in building design and operations.
f. Is distinct and independent from other Innovation proposals submitted by the project team.

Verification:

- Provide the completed Innovation Proposal template.

**Part 4. Propose Innovation (1 point)**

Implement a strategy that:

a. Positively and significantly impacts health and well-being.
b. Goes above and beyond best practices and standard operations.
c. Is not covered in an existing WELL for residential feature.
d. Is substantiated by scientific, medical and/or industry research.
e. Does not contradict applicable laws, regulations and leading practices in building design and operations.
f. Is distinct and independent from other Innovation proposals submitted by the project team.

Verification:

- Provide the completed Innovation Proposal template.

**Part 5. Propose Innovation (1 point)**

Implement a strategy that:

a. Positively and significantly impacts health and well-being.
b. Goes above and beyond best practices and standard operations.
c. Is not covered in an existing WELL for residential feature.

 

d. Is substantiated by scientific, medical and/or industry research.
e. Does not contradict applicable laws, regulations and leading practices in building design and operations.
f. Is distinct and independent from other Innovation proposals submitted by the project team.

Verification:

- Provide the completed Innovation Proposal template.

**Part 6. Propose Innovation (1 point)**

Implement a strategy that:

a. Positively and significantly impacts health and well-being.
b. Goes above and beyond best practices and standard operations.
c. Is not covered in an existing WELL for residential feature.
d. Is substantiated by scientific, medical and/or industry research.
e. Does not contradict applicable laws, regulations and leading practices in building design and operations.
f. Is distinct and independent from other Innovation proposals submitted by the project team.

Verification:

- Provide the completed Innovation Proposal template.

**Part 7. Propose Innovation (1 point)**

Implement a strategy that:

a. Positively and significantly impacts health and well-being.
b. Goes above and beyond best practices and standard operations.
c. Is not covered in an existing WELL for residential feature.
d. Is substantiated by scientific, medical and/or industry research.
e. Does not contradict applicable laws, regulations and leading practices in building design and operations.
f. Is distinct and independent from other Innovation proposals submitted by the project team.

Verification:

- Provide the completed Innovation Proposal template.

**Part 8. Propose Innovation (1 point)**

Implement a strategy that:

 

a. Positively and significantly impacts health and well-being.
b. Goes above and beyond best practices and standard operations.
c. Is not covered in an existing WELL for residential feature.
d. Is substantiated by scientific, medical and/or industry research.
e. Does not contradict applicable laws, regulations and leading practices in building design and operations.
f. Is distinct and independent from other Innovation proposals submitted by the project team.

Verification:

- Provide the completed Innovation Proposal template.

**Part 9. Propose Innovation (1 point)**

Implement a strategy that:

a. Positively and significantly impacts health and well-being.
b. Goes above and beyond best practices and standard operations.
c. Is not covered in an existing WELL for residential feature.
d. Is substantiated by scientific, medical and/or industry research.
e. Does not contradict applicable laws, regulations and leading practices in building design and operations.
f. Is distinct and independent from other Innovation proposals submitted by the project team.

Verification:

- Provide the completed Innovation Proposal template.

**Part 10. Propose Innovation (1 point)**

Implement a strategy that:

a. Positively and significantly impacts health and well-being.
b. Goes above and beyond best practices and standard operations.
c. Is not covered in an existing WELL for residential feature.
d. Is substantiated by scientific, medical and/or industry research.
e. Does not contradict applicable laws, regulations and leading practices in building design and operations.
f. Is distinct and independent from other Innovation proposals submitted by the project team.

Verification:

- Provide the completed Innovation Proposal template.

 

## R-I02 WELL Accredited Professional (WELL AP)

**Intent:** Support WELL project teams by rewarding those that work with a WELL AP to implement health and well-being strategies.

**Issue:**

- WELL requires a variety of stakeholders to unite around a shared vision for health and well-being.

**Impact:**

- The WELL AP credential denotes that a person has expertise in the WELL Standard and has a commitment to advancing human health and well-being.
- By engaging a WELL AP who has proven experience bridging the gap between commitment to and implementation of the WELL Standard, project teams may benefit from a more streamlined and impactful process.

**Part 1. Engage WELL AP (1 point)**

The following requirement is met:

a. At least one project team member has a valid WELL Accredited Professional (WELL AP) credential at the point of document submission.

Verification (meet all):

- Submit the WELL AP certificate of the project team member.
- Describe the WELL AP's role on the project team.

## R-I03 Residential Green Programs

**Intent:** Acknowledge the link between human and planetary health by rewarding residences that also achieve recognition from leading third-party validated residential "green" (environmental) building programs.

**Issue:**

- Human health is linked to environmental risk factors such as air, water and soil pollution, land-use patterns, road infrastructure, and man-made climate and ecosystem change.[762]

 

- A large fraction of greenhouse gas emissions is attributed to residential energy use.[763,764]

**Impact:**

- "Green" building programs that reduce the environmental impact of buildings can help contribute to the advancement of human health, such as through efforts that address outdoor air pollution.[765]
- By balancing sustainability and human health considerations – through better air quality, access to drinking water and opportunities for physical activity and social connection – both people and the planet can thrive.[766,767,768]

**Part 1. Achieve Residential Green Program (3 points)**

The dwelling unit has achieved or is within a building that has achieved one of the following third-party certifications or awards:

a. BRE: BREEAM, Home Quality Mark ONE.
b. Building and Construction Authority: Green Mark.
c. Canadian Home Builders' Association (CHBA): Net Zero.
d. Enterprise Community Partners: Enterprise Green Communities.
e. GBCA: Green Star.
f. Green Building Initiative: Green Globes.
g. ILFI: Zero Carbon Certification, Zero Energy Certification, Living Building Challenge Petal Certification, Living Certification, or Core Green Building Certification.
h. International Finance Corporation: Excellence in Design for Greater Efficiency (EDGE).
i. IGBC: Home Performance Index.
j. National Association of Home Builders: National Green Building Standard.
k. NZGBC: Homestar or Green Star NZ.
l. Passive House Institute: Passivhaus/Passive House.
m. Phius: Phius Project Certification.
n. Pearl Home Certification, Inc.: Pearl Certification.
o. PLGBC: GREEN HOME / ZIELONY DOM.
p. SGBC: Miljöbyggnad.
q. US DOE / US EPA: ENERGY STAR Certification or an ENERGY STAR score of 75 or better.
r. USGBC: LEED.

Verification:

 

- Submit proof of award from a qualifying third-party green residential program.

## R-I04 Carbon Accounting, Disclosure & Reduction

**Intent:** Support human and planetary health by assessing and reducing carbon emissions.

**Issue:**

- Climate change, as a result of human-caused changes to the environment, represents the most existential threat to public health in the next half-century.[769,770]
- Health determinants like air quality, water quality, food access and housing are impacted by climate change.[766,771]
- For most organizations, Scope 3 emissions – including all upstream emissions from the supply chain, downstream emissions from the use of products and other indirect emissions (e.g., employee commutes, business travel) – account for most of their carbon footprint.[772,773]

**Impact:**

- Addressing climate change can lead to a number of positive outcomes, including reduced air pollution, healthier ecosystems, increased food security, and improved resilience after conflicts and disasters.[775,774]
- Reduced greenhouse gas emissions are linked to decreased child mortality and adult heart disease.[775]
- Carbon disclosure policies can help reduce carbon emissions.[776]

**Part 1. Assess Carbon Emissions (1-2 points)**

A carbon emissions assessment meets the following requirements:

a. Is conducted for the entire organization associated with the property owner, builder, developer or management company.
b. Is undertaken in accordance with one of the following:
    i. GHG Corporate Standard.[777]
    ii. ISO14064-1:2018.[778]
    iii. Another program based on the above.
c. Addresses scopes of emissions according to one of the tiers in the table below:

| Tier | Points | Scope |
|---|---|---|

 

| | | |
|---|---|---|
| 1 | 1 | All emissions in Scope 1 and Scope 2. |
| 2 | 2 | All of the above, plus all emissions from at least the top three categories in Scope 3, including justification for why those categories were ranked as top priority. |

d. Is reviewed and audited at least at the level of a Limited Assurance engagement (e.g., ISAE 3410, AA1000AS).
e. Is updated annually.
f. Is prominently and publicly available (e.g., on company website, in annual report).

Verification:

- Submit the organization's carbon emissions assessment, and, if applicable, describe the justification for prioritizing the relevant emissions categories in Scope 3.

**Part 2. Set Carbon Goals (2 points)**

*Note: This part requires Part 1 of this feature to be achieved at the Tier 2 level.*

The property owner, builder, developer or management organization sets a carbon reduction goal that meets the following requirements:

a. Is prominently and publicly available (e.g., on company website, in annual report).
b. Is recognized as "Committed" or "Targets Set" by the Science-Based Targets Initiative for their goal.[779]

Verification:

- Submit the publicly available carbon reduction goal.
- Submit evidence of recognition from the Science-based Targets Initiative.

**Part 3. Meet Carbon Goals (2 points)**

*Note: This part requires Parts 1 (at the Tier 2 level) and 2 of this feature to be achieved.*

The property owner, builder, developer or management organization meets the following:

 

a. Has had a carbon reduction goal that complies with Part 2 of this feature in place for at least one year prior to documentation submission.
b. Has met that carbon reduction goal, as calculated by one of the following:
    i. Emissions reduced between the most recent reporting year and the previous reporting year.
    ii. Average emissions reduced year-over-year for multiple consecutive years.

Verification (meet all):

- Submit evidence showing when the carbon reduction goal was originally stated and/or how long it has been in place.
- Submit carbon reduction calculations.

 

## Verification Method Types

*Location-specific Verification Method Types:*

**Drawings:** Drawings generally include dimensioned floor plans and elevations. Feature requirements may specify that drawings show materials, appliances or other architectural elements. Drawings are considered location-specific but may be tagged to multiple dwelling units that share the same configuration.

**Area Maps:** Area maps show the dwelling unit in the context of its surroundings. The dwelling unit and any community or neighborhood elements that satisfy feature requirements should be labeled. The distance from the main building entrance to the community or neighborhood element should be specified. The drawing scale and cardinal directions should be included. Because the distances related to the dwelling unit depend on the unit's exact address, area maps are considered location-specific but may be tagged to multiple dwelling units that share the same address.

**Photographs:** Photographs visually demonstrate that compliant products or designs have been installed. Photographs must show the complying product or design in the context of its surroundings. The photograph's location and date must be indicated (e.g., through embedded metadata or annotations). Photographs are considered location-specific.

**Calculations & Modeling Reports:** Calculations and modeling reports provide mathematical evidence of feature compliance. In addition to the calculations, the name and contact information of the person who completed the calculations, any software used and any interpretations or recommendations should also be included. Assumptions made (with justifications) must be disclosed. Calculations and modeling reports are considered location-specific.

**Performance Test Results:** Performance test results consist of onsite measurements of environmental conditions (e.g., air quality, sound levels) that are conducted by a WELL Performance Testing Agent. In addition to the performance test results, notes specifying where the measurement was taken, model and serial numbers of testing equipment, proof of calibration and testing date must also be included. Unless otherwise indicated in the feature language, performance test results are considered location-specific.

 

*Shared Verification Method Types:*

**Specifications:** Specifications include product cut sheets, manufacturer literature and similar documents that contain details that demonstrate that the product complies with the feature being addressed. If multiple dwelling units share the same product specifications, the documentation may be shared.

**Receipts & Invoices:** Receipts and invoices provide evidence that a product was purchased. They should include date of purchase and/or delivery, supplier name, customer (i.e., builder, developer or enrollee) name, and an itemized list of products purchased. Sensitive information (e.g., price paid) may be redacted. If a receipt or invoice documents products purchased for multiple dwelling units, the documentation may be shared.

**Policy and/or Operations Schedules:** Policy documents and operations schedules outline responsibilities that must be upheld on an ongoing basis by residents, visitors, staff and/or or other personnel residing in or involved with managing the dwelling units and/or common spaces.

- A policy document describes an enacted policy or initiative. Examples include leases, contracts, owner covenants and hiring protocols. Policies and laws enacted by a government that apply to a location may also be submitted.
- An operations schedule is a document outlining a schedule or cadence of events or activities that relate to the requirements of a feature (e.g., cleaning schedule).

If multiple dwelling units share the same policy and/or operations schedules, the documentation may be shared.

**Letters of Assurance (LoAs):** Letters of Assurance are documents that affirm that the feature requirements have been met. LoAs are signed by the person responsible for overseeing the implementation of the feature requirements. In some cases, the feature requirements may specify that the LoA be signed by a designated professional with expertise in a specific subject area. LoAs are always accompanied by a second verification method type, such as a photograph. LoA templates will be available for each feature that is verified by an LoA. If multiple dwelling units meet the same feature requirements, the documentation may be shared.

 

**Project Team Documentation:** Project team documentation includes meeting minutes, email communications or other documents that address project team communications, or coordination and planning efforts with residents, community members or staff (e.g., stakeholder charrette meetings). Documentation must list all participating project team members and the organization for which they work, as well as include the date on which the meeting was held or communication was sent. If multiple dwelling units share the same project team and meetings/communications are distributed jointly, project team documentation can be shared.

**Certificates from Third-Party Programs:** Certificates from third-party programs reflect proof-of-award of a third-party verified designation or score. They include certificates and ratings for products used within the project, professional credentials for project team members (e.g., WELL AP), scores related to a project's location (e.g., Walk Score) and green building certifications that have been earned by the project. Unless otherwise indicated in the feature language, if multiple dwelling units share the same third-party certificates and programs, documentation may be shared.

 

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