THE RESORT MUNICIPALITY OF WHISTLER
COUNCIL POLICY

POLICY NUMBER: G-23	DATE OF RESOLUTION: MONTH DD, 2022
NAME: GREEN BUILDING POLICY	

1.0 OBJECTIVE

Whistler's Green Building Policy proposes a flexible, performance-based framework for new construction, based on the sustainability and climate action goals established in the Climate Action Big Moves Strategy and the 2018 Official Community Plan. The policy advances implementation of Big Moves #1 and #2 by ensuring that new building address active transportation facilities and electric vehicle infrastructure. The guidelines also support Big Moves #4 and #6 by aligning with the BC Energy Step Code in order to accelerate the transition toward zero emission buildings but also by lowering the carbon consumption associated with building construction and operations.

The Green Building Policy advances key sustainability goals from the OCP, specifically reduction of greenhouse gas (GHG) emissions from buildings and infrastructure, reduction of environmental and energy impacts at a neighborhood level, and promoting land development that minimizes impacts on the natural environment.

2.0 SCOPE OF POLICY

This policy addresses new construction at the scale of individual buildings and sites. It establishes performance targets and guidelines for new construction in buildings under Part 9 (houses and small buildings) and Part 3 (large and complex buildings) of the BC Building Code. The guidelines and requirements are grouped thematically and organized in six sections:

1. Energy and Emissions
2. Building Materials
3. Sustainable Site Design
4. Green Mobility
5. Water Conservation and Rainwater Management
6. Solid Waste

Considering that the RMOW's most significant opportunity to require specific commitments in respect of sustainability features is through its discretionary authority to enact and amend zoning bylaws, the policy focuses on establishing guidelines and requirements to achieve higher sustainability standards as a condition for rezoning applications.

Renovation and expansions to existing buildings that do not trigger a rezoning are encouraged to implement relevant sections of the policy where possible.

3.0 PROCEDURE

3.1 Application Information

3.1.1 Application Checklist

Rezoning applications must include a completed Green Building Checklist and letter of intent summarizing how the project addresses each section of the Green Building Policy.

3.1.2 Green Building Commitment

Green building provisions will be secured by a S.219 covenant, as a condition of the rezoning.

3.2 Application Types

3.2.1 Zoning Amendment

To support its green building goals the RMOW will require the following information for processing and approval of zoning amendments:

- Application Checklist
- Green Building Commitment (in the form of a Section 219 covenant)

3.2.2 Development Permit

Projects should submit a Green Building Checklist and letter of intent with Development Permit applications in the Whistler Village, Whistler Creek, Multi-Family Residential, Intensive Residential, and Industrial Development Permit Areas to demonstrate alignment with the Green Building Policy. Green building provisions will not be secured through covenant at the Development Permit stage.

The application procedures and associated green building information requirements are summarized in Table 1 below:

Table 1 Summary of Green Building Policy Information Requirements

Application Information	Zoning Amendment	Development Permit
Application Checklist Submit a completed Green Building Policy checklist and a narrative for the project.	Required	Recommended
Green Building Commitment S.219 covenant requirement development consistent with the Green Building Policy.		N/A

5.0 ENERGY AND EMISSIONS

5.1 Objective and Intent

This section supports Goal 5.4 of Whistler's Official Community Plan to reduce the environmental and energy impacts of residential neighborhoods, and Goal 10.3 to substantially reduce GHG emissions from buildings and infrastructure. This sections addresses implementation of Big Move #4: Build zero emissions buildings of the Whistler's 2020 Climate Action Big Moves Strategy by advancing BC Energy Step Code implementation in Whistler.

The performance targets in this section encourage strategies to decrease energy requirements and associated GHG emissions, and lower the share of energy supplied by non-renewable sources. This section is aligned with the RMOW *Building and Plumbing Bylaw* and will help Whistler meet the provincial goal for all buildings to be net-zero energy ready by 2032.

5.2 Performance Guidelines

5.2.1 Building Performance and Emissions

5.2.1.1 For new development subject to a rezoning, all new buildings must be built one step higher than the current energy step code requirements in Whistler as prescribed by the RMOW *Building and Plumbing* Bylaw and the BC Energy Step Code.

5.2.1.2 For new development subject to rezoning, new buildings must have no natural gas connections and no on-site combustion, and must use low-carbon energy sources such as electricity district energy or other efficiency/low carbon solutions for all thermal loads.

5.2.2 Passive Design Strategies

5.2.2.1 Passive Design Strategies are strongly encouraged in order to minimize heating and cooling loads while maintaining or even improving occupant comfort. Incorporate as many passive design elements as possible to optimize comfort and minimize overall energy use.

5.2.3 Interior Lighting

5.2.3.1 Maximize the use of high efficiency lamps for light fixtures in new dwelling units, and commercial and industrial space.

6.0 BUILDING MATERIALS

6.1 Objective and Intent

This section outlines solid waste reduction measures during demolition and construction, encourages the use of local materials, and encourages the use of environmentally-friendly building materials. By incentivizing greater diversion and

recycling rates of demolition and construction waste, this section supports Climate Action Big Moves #6 to close the loop and shift toward lower carbon consumption. The guidelines described below will contribute to:

- Reducing the demand for new materials and mitigating their associated environmental impacts through efficient design, engineering, and material reuse.
- Supporting the local economy and reduce the environmental impacts associated with transportation using local materials.
- Reducing construction and demolition waste disposed of in landfills
- Treating recycled and salvaged materials as a resource
- Increasing the application of renewable, recycled and locally-sourced materials.

6.2 Performance Guidelines

6.2.1 Demolition Waste Management

6.2.1.1 New rezoning application that includes a demolition must meet the RMOW *Demolition Waste Diversion Bylaw* requirements and target a minimum 80% demolition waste diversion rate.

6.2.1.2 Applicants are encouraged to engage a salvage professional to conduct a salvage assessment of buildings planned for removal.

6.2.2 Construction Waste Management

6.2.2.1 Maximize construction waste recycling and diversion from landfill. Recyclable materials should be separated on site and stored in wildlife-proof containers.

6.2.2.2 Consider developing and implementing a Construction Waste Management Plan in order to increase recycling and diversion rate.

6.2.3 Low-Emitting Materials

6.2.3.1 Projects should use only low- or no-VOC (volatile organic compounds) paints, carpets, adhesives and other low- or no-VOC interior materials/finishes.

6.2.3.2 Minimize or eliminate the use of interior materials containing added urea formaldehyde resins.

6.2.4 Embodied Emissions

6.2.4.1 As we build more energy-efficient buildings with low-carbon fuels, embodied emissions become a larger portion of the total environmental footprint of buildings. In order to assess the environmental impacts of embodied emissions, all projects should assess and report the life-cycle equivalent carbon dioxide emissions (i.e. global warming potential impact, or ‘embodied carbon’) of each building, in kgCO2e/m2, as calculated by a whole-building life-cycle assessment (LCA).

6.2.4.2 To reduce embodied carbon and emissions in building materials, maximize the use of low carbon (e.g. cross-laminated timber, portland-limestone cement) and/or plant-based building materials (e.g. straw, bamboo, cotton, hempcrete).

6.2.5 Certified Wood

6.2.5.1 Maximize the use of certified sustainably harvested wood for wood building components and other wood based materials (e.g. framing, plywood, floors).

6.2.6 Locally Sourced Materials

6.2.6.1 Maximize the use of materials produced in British Columbia for major materials (e.g. exterior walls or floors, windows, doors) and/or systems (e.g. insulated panels, lighting, heating).

7.0 SUSTAINABLE SITE DESIGN

7.1 Objective and Intent

This section outlines performance targets to mitigate the impact of development activities on the natural environment by encouraging landscaping strategies, promoting biodiversity, and enhancing the natural environment. Therefore supporting the following goals of Whistler's Official Community Plan:

- Goal 7.1 Whistler's sensitive ecosystems, wildlife, habitat and biodiversity are protected, managed and restored
- Goal 7.2 natural areas are proactively managed for and resilient to climate change

Principles of sustainable site design should be applied to site land development and management practices. Sustainable site design is also directly linked to rainwater and groundwater management and proposed designs should reflect this by providing integrated solutions. Including nature in the built environment improves the health and wellbeing of the community, provides habitat, enhances ecosystem function and services, creates public open spaces for people to gather and socialize.

7.2 Performance Guidelines

7.2.1 Habitat and Ecosystem

7.2.1.1 In conformance with the RMOW DPA guidelines for the protection of the environment, sites should explore and identify opportunities to maximize ecosystem benefits, biodiversity, and habitat provision through the development.

7.2.1.2 Site and landscape plans should identify existing adjacent natural areas and provide continuous connection between these areas through the project site where possible.

7.2.1.3 New development should be sited on previously-disturbed areas where possible to minimize excavation, grading and soil disturbance.

7.2.1.4 Site design should be compact where possible to minimize site disturbance.

7.2.1.5 Development sites should be planted with native, adapted (non-invasive) and drought tolerant vegetation and pollinator species.

7.2.2 Trees and Landscape Plants

7.2.2.1 Locate new buildings to maximize retention of mature trees, plants, and shrubs.

7.2.2.2 Incorporate opportunities for landscape approaches that mimic natural environments (such as forest succession and habitat) by providing adequate growing conditions to support large species.

7.2.2.3 Use only regionally appropriate and native trees, plants and shrubs for landscaping.

7.2.2.4 All landscaping should be drought resistant that does not require a permanent potable water-based irrigation system.

7.2.2.5 Use drought-tolerant ground-covering plants rather than turf grass.

7.2.2.6 Design landscaping for all seasons to provide year-round opportunities for interaction with nature.

7.2.3 Soils and Fill

7.2.3.1 Retain and maximize reuse of uncontaminated topsoil on-site. Maintain a sufficient depth of quality topsoil in order to absorb runoff and ensure plants survive and thrive.

7.2.4 Outdoor Lighting

7.2.4.1 Minimize light pollution by using high-efficiency outdoor lighting that is full cut-off and/or contains a cut-off shield.

7.2.4.2 Except as required for safety and security, control all outdoor lights with motion detectors.

7.2.5 Setbacks for Underground Parking Structures

7.2.5.1 Reductions to setbacks for underground structures are generally not supported, due to the following benefits that are achieved by maintaining suitable setbacks from property lines:

- Access to continuous soil volumes for rainwater management practices;

- Soil conservation by minimizing site disturbance;
- Significant tree retention;
- Establishing long lived trees, planting and habitat.

7.2.6 Urban Heat Island Mitigation

7.2.6.1 In order to reduce the urban heat island effect, improve human comfort and energy efficiency in the surrounding areas, maximize the use of heat island reduction and mitigation measures for non-roof hardscape. Examples of non-roof heat island reduction measures include:

- Light colored, high-albedo, materials;
- Open-grid pavement to increase perviousness;
- Hardscape shading (e.g. shading from trees, architectural structures).

7.2.6.2 Maximize the use of roof design strategies to reduce urban heat island effect. Treat roofs with high-reflectivity materials with a high Solar Reflectance Index (SRI) or vegetated roofing. Accessible rooftops may target a lower SRI to for rooftop decks and patios.

7.2.6.3 Where possible, treat pitched roofs with light-colored materials to improve the Solar Reflectance Index.

8.0 GREEN MOBILITY

8.1 Objective and Intent

This section aims to support Goal 10.2 of Whistler's Official Community Plan to substantially reduce GHG emissions from vehicles and transportation and the following Big Moves from the Whistler's 2020 Climate Action Big Moves Strategy:

- Big Move #1: Move beyond the car, by ensuring that building and site designs address active transportation facilities and amenities.
- Big Move #2: Decarbonize passenger and commercial transport, by introducing requirements for electric vehicles charging infrastructure

The Green Mobility performance targets will help the RMOW meets its transport related climate target that, by 2030, "50% of all trips in Whistler are by transit and active transportation" and "50% of all vehicle kilometers travelled are from zero-emission vehicles".

Projects should provide active and sustainable transportation infrastructure such as bicycle parking and end of trip facilities and electric vehicle charging infrastructure. The intent behind the guidelines is to encourage sustainable transportation to:

- Make walking and cycling safe, convenient and enjoyable;
- Support access to fast, frequent and reliable transit;
- Reduce reliance on private automobiles;
- Accelerate the transition to electric vehicles;
- Improve air quality and resident health.

8.2 Performance Guidelines

8.2.1 EV Charging Infrastructures

8.2.1.1 New single-family dwellings, two-family dwellings, townhouses, single-family or two-family dwellings with secondary suites or lock-off units subject to a rezoning must be provided with at least one energized electrical outlet capable of providing Level 2 charging or higher to the parking space.

8.2.1.2 All residential parking spaces for new multi-family and mixed-use development, excluding visitor parking spaces, must be provided with an energized electrical outlet capable of providing Level 2 EV charging or higher to the parking space.

8.2.1.3 At least 20% of visitor parking stall in multi-family residential development must include Level 2 electric vehicle charging equipment or greater.

8.2.1.4 In non-residential development, at least 25% of parking spaces must be provided with an energized outlet capable of providing Level 2 charging or higher.

8.2.1.5 The interior rooms provided for electrical equipment must be sufficiently sized to support the equipment needed for provision of Level 2 charging at all required spaces.

8.2.1.6 Where an electric vehicle energy management system is implemented, the RMOW may specify a minimum performance standard to ensure a sufficient rate of electric vehicle charging.

8.2.2 Pedestrian Friendliness

8.2.2.1 Maximize pedestrian and cycling connections to adjacent sidewalks, pedestrian paths, trails, open space, and transit stops.

8.2.2.2 All non-vehicular routes should be fully accessible. Design on-site sidewalks, crosswalks and walkways to be continuous, universally accessible, barrier-free and clearly delineated. Sidewalks and pathways should be wide enough for wheelchair and should include a tactile strip for the visually impaired where appropriate. Curb-cuts and curb let-downs should be provided in appropriate locations to facilitate safe, convenient, and direct access from parking spaces to buildings for people with disabilities.

8.2.2.3 Provide streetscape amenities such as benches and waste receptacles.

8.2.3 Short Term Bicycle Parking

8.2.3.1 New multi-family residential, industrial, commercial and institutional building subject to a rezoning must provide short term bicycle parking spaces near the building entrance in a weather-protected and well-lit area at grade.

8.2.4 Long Term Bicycle Parking

8.2.4.1 Multi-family residential developments subject to a rezoning must provide sufficient long term bicycle parking spaces in a bicycle storage facility or within each residential dwelling units. At least 1 long-term bicycle parking space should be provided for each dwelling unit under 45 m^2 and at least 2 long-term bicycle parking space for each dwelling unit greater than 45 m^2.

8.2.4.2 Non-residential buildings subject to a rezoning must have sufficient long term bicycle parking spaces located either in a bicycle storage facility or in a weather protected and well-lit area near the main entrance with controlled access or secure enclosures. At least 1 long-term bicycle parking space should be provided for each 250 m^2 of gross floor area.

8.2.4.3 Long term bicycle parking spaces must be in a weather protected and well-lit area with controlled access or secure enclosures.

8.2.4.4 All long-term bicycle parking spaces must be equipped with an electric outlets to support electric bicycle charging.

8.2.5 End of Trip Facilities

8.2.5.1 New non-residential developments larger than 250 m^2 subject to a rezoning should provide an end of trip facility in order to facilitate growth in bicycle commute trips and improve commuting conditions.

8.2.6 Active Transportation Amenities

8.2.6.1 In order to facilitate growth in bicycle commute trips and improve commuting conditions, multi-family residential developments subject to a rezoning should provide bicycle wash area.

9.0 WATER CONSERVATION & RAINWATER MANAGEMENT

9.1 Objective and Intent

This section supports Goal 7.3 of the Official Community Plan of protecting water quality and quantity in local water bodies, streams and groundwater. In addition, increased water efficiency can help reduce the burden on municipal water supply and wastewater systems. The guidelines contains in this section are aligned with Whistler's *Outdoor Potable Water Usage Bylaw* and *Comprehensive Water Conservation and Supply Plan*.

Green infrastructure approaches are to be maximized on site to the greatest extent possible, with onsite infiltration and rainwater re-use being the most preferred approach, and detention being the least preferred.

9.2 Performance Guidelines

9.2.1 Integrated Potable Water Management Approach

9.2.1.1 Reduce the total volume of potable water used for buildings by adopting an integrated approach for potable water management. The reduction should be achieved through a combination of water conservation, efficiency and/or onsite non-potable water re-use.

9.2.2 Indoor Potable Water Use

9.2.2.1 All newly installed toilets, urinals, faucets, and showerheads must be high performance (e.g. low-flush or dual-flush toilets).

9.2.2.2 Provide energy efficient certified products for water-consuming appliances (e.g. Energy Star certified appliances).

9.2.3 Outdoor Potable Water Use

9.2.3.1 New developments subject to rezoning should eliminate outdoor potable water use for irrigation and avoid installing permanent potable water irrigation system.

9.2.4 Water Conservation System

9.2.4.1 New developments subject to rezoning should integrate rainwater collection/reuse systems such as rainwater harvesting systems, cisterns and rain barrels to utilize non-potable water and reduce potable water consumption.

9.2.5 Stormwater Management

9.2.5.1 To reduce pollution and contamination during construction and development, the Green Building Checklist must include:

- A site plan showing the following:
  - Location of the RMOW's storm sewer connection (if applicable);
  - Location of impervious surfaces such as buildings, patios, walkways, decks, and driveways, and impervious areas, such as gardens, lawn areas, and undisturbed forest;
  - Drainage facilities including locations of roof leaders, splash pads, storage tanks, rock pits, overflow locations, lawn basins, etc.

- Upslope interception ditches (if applicable) to protect property from surface runoff potentially draining onto site from upslope.

- Area calculation showing the proposed change in connected impervious area;
- Calculation of volume and rate of runoff from the existing site (excluding natural forested areas);
- Calculation of volume and rate of runoff from the proposed development on the site (excluding natural forested areas);
- Description, drawing, and sizing of the stormwater source controls to be used including any tanks, infiltration systems, rain gardens, and permeable pavements;
- If an infiltration facility is proposed for the site, supporting document must be submitted.

9.2.5.2 Manage stormwater runoff volumes and rate as to no exceed a naturalized (i.e. undeveloped) condition. Development should aim to remove at least 80% of Total Suspended Solids (TSS) from all runoff leaving the site.

9.2.6 Pervious Surfaces

9.2.6.1 Maximize pervious surfaces on the site area not occupied by a building or structure in order to facilitate on-site water retention and infiltration.

9.2.6.2 Maximize the use of Low Impact Development measures such as:

- Permeable pavement;
- Bioswales;
- Infiltration trenches / biorentention areas;
- Rain gardens;
- Draining roofs to pervious areas;
- Other innovative stormwater management strategies.

10.0 SOLID WASTE

10.1 Objective and Intent

RMOW's *Solid Waste Bylaw* requires multi-family residences and industrial, commercial and institutional buildings to separate organics, recyclables and landfill waste. The objective of the Solid Waste section is to encourage new development application to go beyond what is already required. New development applications subject to a rezoning must meet the RMOW *Solid Waste Bylaw* requirements and applicable DPA guidelines, along with following the performance guidelines described under 10.2.

Performance measures described below are intended to encourage ongoing waste reduction and increased diversion of products and materials from the waste stream through avoidance, re-use, composting and recycling by promoting:

- Innovative and leading edge measures to support waste diversion and minimize the environmental impacts of waste collection activities.

- Increased opportunities to properly dispose of different types of waste.
- Convenient access to full range of recycling and garbage services.
- Provision of sufficient space is allocated for collection of materials, including turn radius and height, length and width clearance for collection vehicles.
- Reduce waste operations-related environmental emissions, notably GHG emissions, through strategies such as reduced service-vehicle trips.

10.2 Performance Guidelines

10.2.1 Residential Waste Storage Area

10.2.1.1 For every residential unit, provide a garbage and recycling area no less than 0.3 m^3 located in or adjacent to the kitchen and equipped with at least 3 collection bins (garbage, recycling, organics).

10.2.2 Operational Waste Reduction and Management

10.2.2.1 Multi-family residential and non-residential developments subject to a rezoning must develop and implement a Solid Waste Management Plan demonstrating the proposed operational waste reduction and management strategies.

10.2.2.2 Rezoning must demonstrate adequate access route and turning radius for collection vehicles.

10.2.2.3 Garbage containers in common areas (e.g. lobby and corridors) in multi-family residential, industrial, commercial and institutional building should always be placed with recycling and organics containers.

10.2.2.4 In mixed-use buildings containing a residential use, provide a separate waste, recycling and organics storage/collection space for residential and commercial use.

10.2.3 Additional Zero Waste Initiatives

10.2.3.1 Consider installing a compactor systems to reduce trip frequency and associated GHG emissions related to collection.

10.2.3.2 Consider implementing waste reduction strategies in the design of public washrooms, such as hot-air hand-dryers instead of paper towels.

10.2.3.3 Consider allocating space in the building and outfit a designated area for residents to repair items for re-use.

SCHEDULE A
DEFINITIONS

Energy Step Code	Means the Province of British Columbia's performance-based standard for energy efficiency in new construction requiring energy modeling and on-site testing to demonstrate minimum performance against metrics for building envelope; equipment and systems; and airtightness requirements; and including Step 1, Step 2, Step 3, Step 4 and Step 5, as defined in Sections 9.36.6 and 10.2.3 of the British Columbia Building Code, all as amended or re-enacted from time to time.
EV	Electric Vehicle
Greenhouse Gas Intensity	Means a measure of a building's GHG performance using the definition, calculation, and fuel type emissions factors established in the energy modeling guidelines referenced by the Energy Step Code that is a calculated value determined through energy modeling and reported in kilograms of carbon-dioxide-equivalent per square meter per year (kgCO2e/m2/yr.).
Life Cycle Assessment	Life Cycle Assessment (LCA) is a standardized, science-based tool for quantifying the impact in order to assess lifetime environmental impact. LCA takes into consideration all the steps that lead from raw material through manufacture distribution and usage to final disposal. An LCA can both measure a building's lifetime impacts and, at the same time, quantify the impact of a single material in the building. Calculating greenhouse gas emissions (or a carbon footprint) is just one dimension of an LCA, which can also assess impacts such as ozone depletion, eutrophication, impact on human health and much more. Results obtained via an LCA can be trusted as they are based on international standards, ISOs 14040 and 14044. This helps to ensure consistency, reliability and independence from commercial pressure.
Long Term Bicycle Parking	Means a bicycle parking space for employees or residents of the building. For bicycle parked for longer periods (i.e. more than 4 hours), typically requiring more secure parking.
Low Carbon Energy System	Means a professionally operated and maintained, highly efficient mechanical system that supplies a building's space heating, cooling, and domestic hot water heating demand primarily from renewable energy sources, and meets defined GHG limits**.**
Low Impact Development (LID)	The term *low impact development* (LID) refers to systems and practices that use or mimic natural processes that result in the infiltration, evapotranspiration or use of stormwater in order to protect water quality and associated aquatic habitat. LID practices aim to preserve, restore and create green space using soils, vegetation, and rainwater harvest techniques. LID is an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat stormwater as a resource rather than a waste product.

Short Term Bicycle Parking	Means a bicycle parking space for visitors of the building. For bicycle parked for a short period (i.e. less than 4 hours) in locations that are easily accessible.
Solar Reflectance Index (SRI)	The Solar Reflectance Index (SRI) is a measure of the solar reflectance and emissivity of materials that can be used as an indicator of how hot they are likely to become when solar radiation is incident on their surface. The lower the SRI, the hotter a material is likely to become in the sunshine.
Stormwater Management Plan	Means a comprehensive plan designed to reduce the discharge of pollutants from stormwater during development and construction activities, and after the site has undergone final stabilization following completion of development activities.
Sustainable Site Design	Sustainable Site Design seeks to reduce negative impacts on the environment, and the health and comfort of building occupants, thereby improving building performance. The basic objectives is to create healthy, continuous and productive environments.
RMOW	Resort Municipality of Whistler

SCHEDULE B
Standards, Best Practices and Resources

ENERGY AND EMISSIONS

Building Performance and Emissions

BC Energy Step Code Builder Guide
- Outlines key strategies and approaches used to meet Step Code requirements for houses and low-rise wood-frame residential buildings up to six storeys

BC Energy Step Code Design Guide
- Learn about benefits and impacts of key design strategies necessary to achieve each step of the Step Code, including both mechanical and envelope strategies;
- Provides detailed implementation tactics related to heating, ventilation, and air-conditioning (HVAC) solutions and strategies.

More guides and handbooks for builder are available at:
- https://energystepcode.ca/builder-guides/

Passive Design Strategies

The application of passive design must be carefully considered within the specific constraints and opportunities of each project. The key passive design recommendations for buildings in Whistler are summarized below:
- Design each façade specific to its orientation.
- For better energy performance, attempt to limit windows to 50% on any façade (for best performance, limit windows to 30%), taking into account other aesthetic and livability criteria. If higher window to wall area ratios are desired, incorporate high performance windows or a double façade and optimize shading.
- Use an air-tight envelope to minimize uncontrolled infiltration
- Use heat-recovery ventilation during heating season only, and design for natural ventilation and cooling by natural ventilation throughout the rest of the year.
- For residential buildings, use clear glass with good insulating value (low U-value with low-e coating). Mitigate unwanted solar gains with external shading and allow for passive cooling by natural ventilation.
- For commercial buildings, use either clear glass with effective external shading elements or dark or reflective glass (low shading coefficient) to control unwanted solar gains. Regardless of shading option, the glass should have a good insulating value (low U-value with low-e coating). Remove internal heat gains with other passive elements (e.g. natural ventilation).
- Incorporate operable external shading.
- Use thermal mass that is exposed to the conditioned space and combine it other passive elements to achieve its full energy-savings and comfort potential.
- Incorporate buffer spaces on all exposures whenever possible to optimize comfort and reduce both peak load and overall heating and cooling energy requirements.
- Design for cooling by natural ventilation in all building types.

BUILDING MATERIALS

Demolition Waste Management

If your site has an existing structure that needs to be removed, consider these alternatives to demolition:

- Adaptive Reuse and House Moving
  - Building reuse helps preserve historical architecture, reduce waste, and offset consumption of raw materials required for new construction.
  - An old building can be reused for a different purpose than it was designed. As successful adaptive reuse project requires collaboration and planning between developers and municipalities.
  - Alternatively, if a building is no longer needed at the site it sits on, it could still be structurally sound and used at another location.

- Deconstruction
  - Compared to traditional demolition, deconstruction salvages and redistributes building materials, diverting up to 95% for reuse or recycling. Deconstruction is also quieter and reduces dust generation.
  - If a building can't be restored or relocated, consider deconstructing the structure
  - A deconstruction contractor can help determine if full deconstruction is suitable for your project.

- Salvage
  - Salvaged building materials can be reused onsite, taken to used building materials stores, donated to non-profit organizations, or sold directly to local builders.
  - If full deconstruction is not viable, it is possible to recover architectural pieces before demolition.
  - An appraiser can help identify materials that can be recovered and estimate the value of items that can be donated to charity.

- Reuse of building materials
  - Builder can use reclaimed building materials to add character to a construction through the use of heritage historic materials, support local small businesses, and reduce your project's carbon footprint.
  - Reclaimed lumber is highly valued and can be reused as flooring, wall cladding, or to manufacture furniture.

Hazardous Spills and Environmental Protection

Ensure that adequate containment facilities and clean-up equipment is available and utilized on site where use of such materials is necessary. Construction practices should aim to eliminate potential pollutant inputs (spillage of fuels, toxic construction materials, and other toxic waste) into stormwater runoff, surface waters or public right of way, during construction.

Construction Waste Disposal Station

The following table contains helpful tips when planning storage and transport of recyclable and discarded materials at a site.

Choose a collection option	Choose a hauling option	Organize the recycling program	Monitoring and continuous improvement
Source separation Recyclable materials are separated on site and stored in separate bins or compartments and taken to a recycling facility. Source separated loads are typically charged lower tipping fees **Commingled collection** Waste materials are collected in a single bin and taken to a recycling facility for sorting. Commingled loads are typically charged a higher tipping fee **Collection frequency** For space-constrained sites, consider using smaller bins paired with more frequent collection.	**Hauling Services** Hire a hauler to provide the bins, collection schedule, and services you require. Some haulers also offer live loading and on-site source separation of recyclable materials and reusable items. **Self-haul** Using company staff and trucks to collect and haul recyclables works best for smaller sites.	**Recycling station layout** You can reduce contamination by designating a recycling area next to garbage bins and making sorting recyclables easier. You may also want to consider the bins you need based on the waste generated during each phase. On-site recycling stations will also make tracking waste for your recycling compliance report more efficient. **Signage** Place large, weatherproof signs for all bins to clearly communicate the intended material.	**Monitor Progress** Monitor waste management activities on an ongoing basis to ensure materials are salvaged, recycled and disposed of as specified in the waste management plan. **Evaluate your project** Ask your demolition, deconstruction or salvage contractor to provide you with the following information to track the volumes and cost of your project: ▪ Type and quantity of materials salvaged, recycled and disposed. ▪ The name and location of the recycling and disposal facilities. ▪ Copies of receipts from recycling and disposal facilities and credits from material sales.

Low-Emitting Materials

Meeting the content requirements of Green Seal, Green Label, Green Label Plus, FloorScore, South Coast Air Quality Management District (SCAQMD) Rules, or alternate low VOC criteria as applicable to each material or product can guarantee that emissions from interior materials containing VOCs or added urea formaldehyde are minimized.

Embodied Emissions

For consistency in Life Cycle Assessment calculations, projects that decide to report embodied emissions should use the following standard requirements:

- The LCA must include all envelope and structural elements (including parking structure), including footings and foundations, and complete structural wall assemblies (from cladding to interior finishes, including basement), structural floors and ceilings (not including finishes), roof assemblies, and stairs construction, but exclude excavation and other site development, partitions, building services (electrical, mechanical, fire detection, alarm systems, elevators, etc.), and parking lots.
- The LCA must assume a building lifetime of 60 years.
- The life-cycle boundary must account for cradle-to-grave impacts, including resource extraction, product manufacturing and transportation, building construction, product maintenance and replacement, and building demolition/deconstruction/disposal (EN 15804/15978 modules A1-A5, B2-B4, and C1-C4). Operating energy and water consumption are excluded.
- The Life-Cycle Inventory (LCI) database used must be ISO 14040, 14044, and 21930 compliant, and regionally-specific, if possible.

- The Life-Cycle Impact Assessment (LCIA) method used must be the US EPA's Tool for the Reduction and Assessment of Chemical and Other Environmental Impacts (TRACI).
- The LCA must include all life-cycle indicators and impacts, such as ozone layer depletion, climate change, acidification, eutrophication, smog formation, human health impacts, and eco-toxicity.
- If the service life of a product used in initial construction is greater than the building's assumed service life, the impacts associated with the product may not be discounted to reflect its remaining service life.

In addition to reporting the embodied carbon as detailed above, projects should separately report, where readily available, the impacts and benefits beyond the system boundary (EN 15804/15978 module D). This is a quantification of environmental benefits or loads associated with reuse, recycling and energy recovery from flows exiting the system boundary. Note that these impacts are reported for information only and are not counted towards the embodied carbon of the building.

Projects are also encouraged, but not required, to report:

- The lifecycle impacts associated with other building elements that are excluded from the mandatory Embodied Carbon reporting such as refrigerants, mechanical, and electrical systems.
- Other calculated life-cycle indicators and impacts, such as ozone layer depletion, acidification, eutrophication, photochemical ozone creation, primary renewable energy use, fresh water consumption, human toxicity, respiratory inorganics, eco-toxicity, and other impacts.
- A breakdown of impacts by activity (materials/products, transportation, on-site activities, wastage, etc.), life-cycle stages (extraction, manufacturing, construction, use/maintenance, end of life), product category (structure, foundation, wall, glazing, etc.) and material type (steel, wood, concrete, plastic, etc.).

For projects pursuing LEED v4, calculations created to demonstrate achievement of the Life-cycle Impact reduction credit, Option 4, and reporting of the proposed building results, are acceptable to meet the intent of this requirements.

<u>Certified Wood</u>

Project should aim to use certified sustainably harvested wood for a minimum of 25% of wood building components or at least one major structural or finishing application (e.g. framing, plywood, floors).

<u>Locally Sourced Materials</u>

Project should aim to incorporate at least 5 major materials (e.g. exterior walls or floors, windows, doors) and/or systems (e.g. insulated panels, lighting, heating) produced in British Columbia.

SUSTAINABLE SITE DESIGN

Habitat and Ecosystem

Restoration and enhancement of this site following development activities could include removal of invasive species and replacement with appropriate noninvasive species, creating connections between adjacent existing parks or biodiversity hotspots in order to minimize habitat fragmentation, while focusing on maintaining the interconnected components, functions and processes of local ecosystems within and surrounding the site.

Refer to provincial guidelines, Develop with care: Environmental Guidelines for Urban and Rural Land Development in British Columbia for best management and construction practices.

Trees and Landscape Plants

Ensure all natural areas are free of invasive plant species. Invasive plant species must be eradicated at the time of construction. Noninvasive vegetation and soils must be left undisturbed to the greatest extent operationally feasible. Mechanical removal of invasive plants must be chosen over chemical treatment to the greatest extent operationally feasible. Depending on the extent, type and density of invasive plant cover, pre-planting treatments shall be undertaken and may include removal, repeated mowing during the growing season, and regulated herbicide treatment.

Refer to “Plant Materials Suitable for the Whistler Climate” and “Bear Attractants Overview” for bear attractant plants and non-native species that will not be approved.

Soils and Fill

In order to absorb runoff and ensure plants survive and thrive, maintain a minimum 15cm/6” quality topsoil.

Outdoor Lighting

For guidance on outdoor lighting, see resources provided by the International Dark-Sky Association: https://www.darksky.org/our-work/lighting/

Urban Heat Island Mitigation

Many communities are taking action to reduce urban heat islands using the following strategies:

- Using trees and vegetation to reduce heat islands
  - Trees and other plants help col the environment, making vegetation a simple and effective way to reduce urban heaty islands.
  - Trees and vegetation lower surface and air temperatures by providing shade and through evapotranspiration. Shaded surfaces, for example, may be 11 to 25°C cooler than the peak temperatures of unshaded materials. Evapotranspiration, alone or in combination with shading, can reduce peak summer temperatures by 1 to 5° C.
  - Trees and vegetation are most useful as a mitigation strategy when planted in strategic locations around buildings or to shade pavement in parking lots and on streets. Researchers have found that planting deciduous trees or vines to the west is typically most effective for cooling a building, especially if they shade windows and part of the building’s roof.

- Using green roofs to reduce heat islands
    - A green roof, or rooftop garden, is a vegetative layer grown on a rooftop. Green roofs provide shade, remove heat from the air, and reduce temperatures of the roof surface and surrounding air. Using green roofs in built environments 5can moderate the heat island effect, particularly during the day. Green roof temperatures can be 1 to 5°C lower than those of conventional roofs and can reduce city-wide ambient temperatures. In addition, green roofs can reduce building energy use compared to conventional roofs, reducing peak electricity demand and leading to annual savings on operation costs.

- Using cool roofs to reduce heat islands
    - A high solar reflectance, or albedo, is the most important characteristic of a cool roof as it helps to reflect sunlight and heat away from a building, reducing roof temperatures. A high thermal emittance also plays a role, particularly in climates that are warm and sunny. Together, these properties help roofs to absorb less heat and stay up to 28 to 33°C cooler than conventional materials during peak summer weather.
    - Building owners and roofing contractors have used cool roofing products for more than 20 years on commercial, industrial, and residential buildings. They may be installed on low-slope roofs (such as the flat or gently sloping roofs typically found on commercial, industrial, and office buildings) or the steep-sloped roofs used in many residences and retail buildings.

- Using cool pavements to reduce heat islands
    - Cool pavements include a range of established and emerging technologies that communities are exploring as part of their heat island reduction efforts. The term currently refers to paving materials that reflect more solar energy, enhance water evaporation, or have been otherwise modified to remain cooler than conventional pavements.
    - Conventional paving materials can reach peak summertime temperatures of 48 to 67°C, transferring excess heat to the air above them and heating stormwater as it runs off the pavement into local waterways. Due to the large area covered by pavements in urban areas, they are an important element to consider in heat island mitigation.
    - Cool pavements can be created with existing paving technologies (such as asphalt and concrete) as well as newer approaches such as the use of coatings or grass paving. Cool pavement technologies are not as advanced as other heat island mitigation strategies, and there is no official standard or labeling program to designate cool paving materials.

GREEN MOBILITY

EV Charging Infrastructures

Government rebates are available for EV charging infrastructures which can substantially reduce the costs of planning and deployment. The Province of British Columbia's CleanBC program offers three rebate streams to support EV charging infrastructures:

1. EV-ready plans rebates – fund the planning and design of an EV charging system;
2. EV-ready infrastructure rebates – assist the installation of electrical equipment required for charging (e.g. electrical panels, breakers, conduit, wiring, etc.);
3. Charging stations rebates – support acquisition and installation of networked Level 2 EV chargers.

More information on these rebates is available at:

- https://goelectricbc.gov.bc.ca/
- https://pluginbc.ca/incentives/

Short and Long Term Bicycle Parking

Increased uptake in cycling as a viable travel mode may not reach its full potential if bicycle parking security is not considered at the planning and design stages. Bicycle parking should consider all types of bicycles and be designed to meet the needs of All Ages and Abilities (AAA). To that end, there are several fundamental guiding principles that influence how both bicycle parking is located and accessed:

Well-located	Convenient, accessible, as close as possible to the destination, and weather protected. Ideally within 15 m of pedestrian building access points.
Stair-free Access	Provision of ramps or elevators large enough to accommodates all types of bicycles. Slopes should be limited to 6%.
Minimum Widths	Appropriate widths should be provided along all routes required to access bicycle parking facilities, including along ramp accesses, at doorways, and aisle widths in bicycle parking rooms. A minimum clear width of 2 m should be targeted.
Signage	Integrated, high-quality, and simple bicycle parking signage should be provided to indicate the availability and location of an off-street bicycle parking area.
Visibility	The location selected for bicycle parking shall be easily identifiable by cyclists as they are riding. It will also help to reduce theft and vandalism
Barrier-free	Access to bicycle parking facilities should be direct and free from obstacle to accommodate all users. Provide breaks in long lengths or span of bicycle racks to allow users a more convenient path for access and egress.
Detectability	Design should take into consideration users with physical, sensory, or cognitive impairments and should ensure the facilities are both easily detectable for these users and do not create obstacles.

Lighting	Quality lighting shall be provided to ensure facilities are well-lit to improve the overall security of all bicycle parking facilities. Tamper-proof features should be considered to prevent vandalism
Security	Racks in visible, well-lit places that have high levels of natural surveillance.

End of Trip Facility

Providing showers and change rooms is a common amenity to encourage bicycle use, particularly for commuter trips. End of trip facilities typically contain a changing room equipped with lockers for the storage of personal items and shower rooms. Shower rooms should include:

- Mirrors, electrical outlets, first-aid kits, hooks and/or bench
- Location for a clothes dryer for wet gear in a well ventilated area
- Non-slip surfaces, heating, privacy, security, adequate lighting and ventilation

Active Transportation Amenities

Bicycle repair station can support both short and long-term bicycle parking by making it more convenient to cycle. This type of amenity help to address challenges or concerns that bicycle users experience such as needing a place to inflate tires and make minor repairs. For adequate clearance to maneuver and make bicycle repairs, recommended clear area of a bicycle repair stand is 2.4 meters by 1.2 meters, with the back of the repair stand placed at least 0.3 meters from the wall. A basic bicycle repair stand is recommended to have:

- Supporting arm to hold a bicycle without causing damage
- Basic tools attached to the stand with tamper-proof hardware
- An air pump attached to the stand with tamper-proof hardware

For design guidelines, refer to the British Columbia Active Transportation Design Guide (2019 Edition)

WATER CONSERVATION & RAINWATER MANAGEMENT

Integrated Potable Water Management Approach

Integrated approach to water management at the site and building scale should be used and be demonstrated through the production of a Water Balance for the building(s) and parcel that quantifies water inputs, uses, and outputs. The Water Balance should include input water sources including potable water, and rainwater, and outflows to the sanitary, combined, and storm sewers. The Water Balance should be produced for the 'baseline' and 'proposed' scenarios and demonstrate compliance with the minimum potable water use reductions over baseline specified in this policy, achieved by taking an integrated approach to water management at the site scale.

Indoor Potable Water Use

Whenever possible, new water fixtures that are eligible for labeling should be WaterSense® labeled. For guidance on WaterSense labeling, visit the EPA Watersense website: https://www.epa.gov/watersense/watersense-label

SOLID WASTE

Design Considerations for Waste Management Facility

In order to ensure sufficient space is allocated for collection of materials and to create efficient centralized collection areas the following considerations should be implemented:

- Install a roll-up door to ensure there is enough space to move and collect/empty containers
- The facility must be able to accommodate an appropriate number of containers that will not overflow between collection days
- Total area of the facility should be about 2.0 to 2.25 times the physical footprint of the containers to allow for adequate space for maneuvering
- Must be configured to allow each garbage and recycling container to be individually accessed, removed and replaced without having to take out other containers.
- Must have adequate ventilation for reduced smell and odor, and be in compliance with the BC Building Code requirements for ventilation
- Must be equipped with locked doors or the containers should also be locked if they are accessible from outside the building to avoid illegal dumping
- Must be at grade and accessible to all occupants, including those with restricted mobility. If an auxiliary area is designated for the facility outside the building, the area must be located adjacent to an entry point into the building for easy access by users, including those with restricted mobility

In order to provide appropriate access route and turning radius for collection vehicles, the following design elements should be implemented:

- The driveway access must have a minimum width of 6 metres at the points of entrance and exit for the site
- The slope of access must not exceed 6%
- The vehicle access route must have a minimum width of 4.5 metres and a minimum vehicle clearance of 4.5 metres must be maintain throughout the entire access route
- Provide the collection vehicle a minimum turning radius of 12.5 metres throughout the entire access route
- Building structure, such as an overhang, cannot extend pass the turning radius to prevent damage to the building