Attachment B

Guidance Document Supporting the Sustainability Policy for City-owned Buildings

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Table of Contents

Executive Summary

This guidance document is intended to support the Sustainable Building Policy for City-owned buildings. The document is envisioned as an accompaniment to the City's Sustainable Building Policy for new buildings owned by and located within the City of Nanaimo.

While the Sustainable Building Policy outlines requirements of new municipal buildings, this accompanying document is intended to provide additional context and suggested considerations for sustainability strategies that align with select City of Nanaimo Integrated Action Plan (IAP) Topic Areas. These may be used by project teams as guidance in the development of Reports to Council relating to how a project intends to achieve the requirements of the Sustainable Building Policy.

To develop this report RJC's work was informed by:

- Nanaimo Integrated Action Plan[1] and draft Sustainable Building Policy as provided by the City.
- Conversations and check-ins with City staff to better understand scope and needs.
- City of Nanaimo General Development Permit Area Design Guidelines[2].
- City of Nanaimo Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density[3].

This document is to work hand-in-hand with the Sustainability Policy, which was in draft form at time of the creation of this document. This document is intended to provide ideas, but not be an exhaustive list of potential strategies, nor a list of requirements each project must employ. Note that City of Nanaimo's Zoning Bylaw 4500 and the principles and mandatory statements of the City of Nanaimo's General Development Permit Area Design Guidelines must be followed, as a minimum.

It should be noted that absent from this document are strategy suggestions regarding City Goals C3 A Healthy Nanaimo: Community Wellbeing & Livability, C4 An Empowered Nanaimo: Reconciliation, Representation, & Inclusion, and C5 A Prosperous Nanaimo: Thriving & Resilient Economy. These are all areas of critical importance in any discussion of community wellness and in the development of new buildings. While addressing these goals is outside the scope of this document, project teams are encouraged to employ Design-Thinking and Systems-Thinking, engineering with empathy and working to ensure projects align with the needs and aspirations of the people it serves.

[1] https://www.nanaimo.ca/your-government/projects/integrated-action-plan
[2] https://www.nanaimo.ca/docs/property-development/development-applications/general-development-permit-area-design-guidelines.pdf
[3] https://www.nanaimo.ca/bylaws/ViewBylaw/4500.pdf Schedule D – Amenity Requirements for Additional Density

1.0 Introduction

Nanaimo's Integrated Action Plan (IAP)[4] is a supporting document to City Plan: Nanaimo ReImagined. The IAP is designed to communicate a range of key actions already underway and prioritized to do over the immediate and long term. The IAP includes The Five City Goals that make up the Nanaimo Framework. City Goals have 35 related City Plan Policy Topic Areas, which include a "library of actions" detailed in the IAP.

Figure 1 Nanaimo Integrated Action Plan – 5 City Goals and 35 City Plan Policy Topic Areas - June 2023 (Ref.: https://www.nanaimo.ca/docs/city-plan-documents/iap---final---2023.06.27-(web).pdf)

[4] https://www.nanaimo.ca/your-government/projects/integrated-action-plan

This Guidance Document Supporting the Sustainability Policy is envisioned as an accompaniment to the City's Sustainable Building Policy. While the Sustainable Building Policy outlines requirements of new municipal buildings, this accompanying document is intended to provide additional context and suggested considerations for sustainability strategies that align with select IAP Topic Areas. These may be used as guidance in the development of Reports to Council relating to how a project intends to achieve the requirements of the Sustainable Building Policy. Note that City of Nanaimo's Zoning Bylaw 4500[5] and the principles and mandatory statements of the City of Nanaimo's General Development Permit Area Design Guidelines[6] must be followed, as a minimum.

This document does not attempt to capture strategies relating to all Topic Areas, nor to all five City Goals. Further, not all strategies for consideration in this document will be appropriate for all projects: it is at the discretion of project teams to determine how best to incorporate these suggestions.

It should be noted that conspicuously absent from this document are strategy suggestions regarding City Goals C3 A Healthy Nanaimo: Community Wellbeing & Livability, C4 An Empowered Nanaimo: Reconciliation, Representation, & Inclusion, and C5 A Prosperous Nanaimo: Thriving & Resilient Economy. These are all areas of critical importance in any discussion of community wellness and in the development of new buildings. While addressing these goals is outside the scope of this document, we encourage project teams to employ Design-Thinking and Systems-Thinking, engineering with empathy and working to ensure projects align with the needs and aspirations of the people it serves.

2.0 General

2.1 Education

Rationale: Many sustainability features and strategies in a project are not readily apparent. City owned projects are excellent opportunities to provide education about sustainability goals and initiatives underway in the City, and how the project contributes.

Projects are encouraged to incorporate educational information in the form of signage or display(s) on the project site.

2.2 Green building certifications

Rationale: Green building certification systems like LEED are a means of providing context for what are considered current industry best practices and can offer a vigorous third-party certification process. Some

[5] https://www.nanaimo.ca/bylaws/ViewBylaw/4500.pdf Schedule D – Amenity Requirements for Additional Density
[6] https://www.nanaimo.ca/docs/property-development/development-applications/general-development-permit-area-design-guidelines.pdf

project teams may opt to pursue a green building certification to show leadership and demonstrate the level of rigor the project has undergone in achieving sustainability targets. Different rating systems have different areas of focus. Green building certification systems are referenced throughout this document. Regardless of whether a project wishes to pursue certification with one or more systems, these systems may be referred to by project teams for ideas of industry best practice strategies and performance metrics in particular areas of interest (e.g. energy, wellness, material use, etc.).

A few notable standards which might be applicable for certain City of Nanaimo projects are:

1. Leadership in Energy and Environmental Design (LEED®) – likely the most widely recognized, LEED is an internationally used holistic sustainability rating system. More information available through the Canada Green Building Council (CAGBC) here.
2. CAGBC's Zero Carbon Building Standard – a made-in-Canada framework intended to be simple and accessible and specifically focuses on strategies to support decarbonization of buildings. More information available through the Canada Green Building Council (CAGBC) here.
3. Passive House – an international standard for high performance, energy efficient buildings. More information available through Passive House Canada here.
4. Envision – an internationally used holistic sustainability rating system for infrastructure projects. More information available through the Institute for Sustainable Infrastructure here.
5. WELL – an international standard focused on developing buildings that support health and wellness. More information available through the International WELL Building Institute here.
6. Living Building Challenge - an internationally used holistic sustainability rating system that is intended to be the most advanced measure of sustainability in the built environment. More information available through the International Living Future Institute here.
7. Green Globes – an internationally used holistic sustainability rating system for commercial real estate, which champions the theme of "rigor meets accessibility". More information available through the Green Building Initiative (GBI) here.
8. BOMA Best – an internationally used holistic sustainability rating system for assessing environmental performance and management of existing commercial real estate, "designed by industry, for industry". More information available through the Building Owners and Managers Association (BOMA) here.

3.0 Energy and Carbon

Within the City's goal of "A Green Nanaimo: Resilient & Regenerative Ecosystems", the topic area of C1.1 Greenhouse Gas Emissions Reduction stands out as a major focus for building design and construction. Burning fossil fuels for space heating and hot water in buildings currently generates 31% of Nanaimo's emissions, and burning fossil fuels in vehicles currently generates 63% of Nanaimo's emissions.

This section outlines some energy and carbon related strategies and metrics aligned with the City's "A Green Nanaimo: Resilient & Regenerative Ecosystems" goal, specifically relating to greenhouse gas reduction. Additional ideas for best practices in this area may be found within the City of Nanaimo's Zoning Bylaw 4500 Schedule D, the CAGBC's Zero Carbon Building Standard, Passive House standard, and/or the energy related sections within LEED, Envision, and the Living Building Challenge.

3.1 BC Energy Step Code

Rationale: For topic area C1.1 Greenhouse Gas Emissions Reduction, the City requires new buildings to meet higher energy efficiency standards and/or use zero-carbon fuels. Improving energy efficiency will help reduce demand for energy, lower operating cost, and improve comfort. The following are considerations for projects as a means of demonstrating how the project might support this action area:

.1 For Part 3 projects with major occupancies as listed in Subsection 10.2.3 of the BC Energy Step Code, target the most ambitious level of compliance (i.e. Step 3 or Step 4, as applicable).

.2 For Part 3 projects with major occupancies as listed in Subsection 10.2.3 of the BC Energy Step Code which do not have Thermal Energy Demand Intensity (TEDI) and Total Energy Use Intensity (TEUI) targets prescribed, target a 25% improvement over baseline NECB 2020 building [7].

.3 For Part 3 projects with major occupancies not listed in Subsection 10.2.3 of the BC Energy Step Code, target a 25% improvement over baseline NECB 2020 building.[8]

.4 For Part 9 projects, consider targeting the most ambitious Step applicable, or 25% over an NECB 2020 baseline.

3.2 BC Zero Carbon Step Code

Rationale: For topic area C1.1 Greenhouse Gas Emissions Reduction, the City requires new buildings to meet higher energy efficiency standards and/or use zero-carbon fuels, and shifting to zero-carbon energy in all City buildings is required in order to meet Nanaimo's GHG emissions targets. The following are considerations for projects as a means of demonstrating how the project might support this action area:

.1 For projects with major occupancies as listed in Subsection 10.3.1.1 of the BC Zero Carbon Step Code, consider targeting the most ambitious level of compliance (i.e. Emissions Limit EL-4). (Preferred approach.)

.2 For occupancies not covered by the BC Zero Carbon Step Code, consider avoiding use of on-site combustion for space heating and service water heating (except for emergencies). (Preferred approach.)

[7] Per CAGBC Zero Carbon Building Standard – Design v4, Energy Efficiency – Flexible Approach.
[8] Per CAGBC Zero Carbon Building Standard – Design v4, Energy Efficiency – Flexible Approach.

.3 For occupancies not covered by the BC Zero Carbon Step Code, consider targeting a maximum GHGI of 2.0 $kgCO_{2e}/m^2/yr$.[9]

.4 For projects which choose to include on-site combustion, investigate how the project can decarbonize, and include provisions for future changes (e.g. low temperature systems, space to replace combustion systems with electric options).

3.3 Use of on-site renewable energy

Rationale: For topic area C1.1 Greenhouse Gas Emissions Reduction, the City requires new buildings to meet higher energy efficiency standards and/or use zero-carbon fuels. Related to this, Nanaimo wishes to explore opportunities for generating renewable energy production. The following are considerations for projects as a means of demonstrating how the project might support this action area:

.1 Projects are encouraged to consider the viability of onsite renewables.

.2 Projects incorporate on-site renewable energy and report the anticipated %total energy use from renewables. If rooftop PV installation, report the percentage of roof area covered. As a reference, more than 5% of total energy use from renewable energy and/or more than 40% of roof area coverage is considered notable[10].

.3 Projects include an option for future rooftop solar PV installation (i.e. electrical and/or structural design).

3.4 Infrastructure for electric vehicles

Rationale: For topic area C1.1 Greenhouse Gas Emissions Reduction, the City aims to make regular travel in the city zero-carbon; reducing the demand for fossil fuel vehicle travel is the easiest and most affordable way to reduce GHG emissions from transportation. The following are considerations for projects as a means of demonstrating how the project might support this action area:

.1 A minimum of 50% of the parking provided for the project includes access to an electric vehicle charging station. (Preferred option.)[11]

.2 Projects provide electric vehicle supply equipment (EV charging stations) and report the amount of parking that is serviced with chargers. As a reference, 5% of all parking spaces having access to charging (and a minimum of two spaces, whichever is greater) is notable[12].

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[9] Per Zero Carbon Step Code, Table 10.3.1.3 Greenhouse Gas Emissions, based on EL-4 (most ambitious emissions limit) for "Other Business and Personal Service and Mercantile Occupancies".
[10] Per CAGBC Zero Carbon Building Standard – Design v4, Impact and Innovation strategies.
[11] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (2 pts).
[12] Per LEED BD+C v4.1, Electric Vehicles credit.

.3 Projects include parking stalls that are "EV Ready", providing infrastructure for future installation of EV charging stations. EV Ready stalls would include a dedicated electrical circuit with sufficient capacity for each space, each circuit on its own conduit and with wire sufficient for Level 2 charging or greater, and end at an electrical box or enclosure located near each space. As a reference, making 10% of spaces EV Ready is considered notable[13].

3.5 Commissioning and ongoing performance

Rationale: Ultimately a concept is only as good as it performs in reality. For Nanaimo to meet the C1.1 Greenhouse Gas Emissions Reduction targets, it is imperative that buildings function well and operate with low emissions. This is best achieved through a robust commissioning, hand-over, and ongoing measurement & verification process. The following are considerations for projects as a means of demonstrating how the project might support this action area:

.1 From project outset through to post-occupancy and warranty review, project implements strategies to align project design and operations with owner requirements. Refer to LEED Building Design & Construction Fundamental Commissioning (prerequisite) and Enhanced Commissioning (credit) for suggested strategies, and/or ASHRAE Guideline 0-2019 – The Commissioning Process

.2 Plans are in place to ensure project undergoes commissioning of the major building systems upon project completion and recommissioning of all commissioned systems following project completion (e.g. six month, one year, two year).

.3 Consider ways to support City staff in future analysis of the operations and emissions of the building. This may include energy sub-metering of certain systems, as applicable and useful.

4.0 Resilient and Regenerative Ecosystems

Studies indicate summers are becoming hotter and drier which can affect the health of community members and the health of natural areas, cause drought, as well as increase wildfire risk. Climate predictions indicate there will be an increase in the frequency and severity of extreme storms and higher sea levels in the coming years. While we cannot predict specific weather events, planning ahead for climate change allows proactiveness that limits vulnerabilities wherever possible.

Impacts from development, human use, invasive species and other activities can affect the quality of natural areas. Environmentally sensitive areas support biodiversity in the city, provide fish and wildlife habitat, and access to nature. Local ecosystems can play a role in climate change mitigation and adaptation, and dedicated efforts to protect and restore them helps preserve these assets for future generations.

[13] Per LEED BD+C v4.1, Electric Vehicles credit.

This section outlines some strategies and metrics aligned with the City's "A Green Nanaimo: Resilient & Regenerative Ecosystems" goal. Additional ideas for best practices in this area may be found within the City of Nanaimo's Zoning Bylaw 4500 Schedule D, and the sustainable sites, water efficiency, and resilience related credits within LEED, Envision, and the Living Building Challenge. As a general comment, it is preferable that where possible, projects be located on brownfield and/or infill sites, so as to minimize encroachment on green and natural areas.

4.1 Climate Risk Assessment

Rationale: For topic area C1.2 Climate Adaptation & Hazard Management, the City aims to take steps to help understand and reduce the City's risk and vulnerability to a changing climate and extreme events. The most thorough approach is through undertaking a climate risk and vulnerability assessment (CRA) as part of the process. Teams may reference the Strategic Climate Risk Assessment Framework for BC, Climate Lens, PIEVC (Public Infrastructure Engineering Vulnerability Committee), BC Housing, Climate Resilience Guidelines for BC Health Facility Planning & Design, and/or City of Vancouver's Resilient Buildings Planning Worksheet for more information on the Climate Risk Assessment process.

It is reasonable to expect that the level of effort of the Climate Risk Assessment be scaled to be in alignment with value, size, and/or criticality of the building (e.g. Post-disaster buildings and those deemed essential to the provision of services in the event of an emergency should undergo a more robust assessment than those which present a low hazard to human life in the event of failure and/or lack of performance). Even small projects can benefit from a review of how to improve resilience to climate change.

In alignment with and/or as an addition to the CRA, the following are considerations for projects as a means of demonstrating how the project might support this action area:

.1 Project teams refer to the Pacific Climate Impacts Consortium's Design Value Explorer tool and review or adjust the design to accommodate future climatic design data. Teams will need to relate the life span of the project and systems to the chosen level of global warming used to inform the design. For example: if a building's mechanical system component is expected to have a lifespan of 20 years, use the global temperature rise indicated for the time period that component will be in operation. (E.g. for a building completing construction in 2027, a component expected to last 20 years might be sized to accommodate 2047 climate data, which on an RCP8.5 pathway, would be based on a global temperature rise of 1.5degC. Design VE provides revised Nanaimo specific climatic data (HDD, summer design temperatures, snow load, etc. based on that global average rise of 1.5degC).

.2 Project teams could perform building performance modelling using future weather files for 2050 and 2080 (RCP8.5) and report resulting energy consumption (TEUI), energy cost, and carbon emissions (GHGI).

.3 Project teams are encouraged to consider strategies for passive resilience; means of the building continuing to operate despite power disruptions (i.e. flushing toilets, "envelope first" heating/cooling strategies, ventilation).

.4 Project teams should describe or report on ability to maintain comfort conditions in future climate. As a reference, design for parts of the building to maintain a maximum temperature of 26degC in the cooling season, or indicate a targeted maximum number of overheating hours (e.g. 20 hours for vulnerable groups, or 200 hours for non-vulnerable groups).

.5 Project teams should consider incorporating strategies to minimize impact of wildfire smoke on indoor air quality of the buildings, such as installing MERV 13 (or better) filtration on all ventilation air intakes and/or having a full recirculating ventilation mode option.

.6 Project teams should comment on use of FireSmart principles in the landscaping and building materials.

.7 Project teams should comment on critical utilities (e.g. electrical service infrastructure, HVAC service infrastructure, communications services infrastructure, wastewater systems, and backup power/generators) ability to withstand flood events. As a reference, flood events up to the 200-year floodplain level might be considered a minimum best practice.

4.2 Urban forest, natural areas, greenways

Rationale: For topic area C1.3 Urban Tree Canopy, Natural Areas, & Greenways, the City aims to maintain the urban tree canopy, and enhance natural and sensitive areas, through the lens of climate change resilience and adaptation. The following are considerations for projects as a means of demonstrating how the project might support this action area:

.1 Project briefs to reference the City of Nanaimo's General Development Permit Area Design Guidelines for guidance regarding site and building design i.e. regarding landscaping and setbacks.

.2 Projects could include the retention of natural vegetation, trees, shrubs, and understorey for a contiguous area that is equal to or greater than 15% of the property area, exclusive of the required watercourse leavestrip or environmentally sensitive area buffer[14].

.3 Projects could include at least 50% retention of natural soils[15].

.4 Projects should not result in the loss of any trees included on the list of significant trees within the City of Nanaimo's Management and Protection of Trees Bylaw, includes street trees, and increases net number of trees by 20% (pre to post development), with no net loss of trees with a caliper greater than 6 cm.[16]

[14] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (3 pts).
[15] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (1 pt).
[16] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (6 pts).

.5 Project brief to comment on alignment with the Urban Tree Canopy Management Strategy.

.6 Project brief could reference https://healthyplan.city/en (selecting the Nanaimo and Built Environment: tree canopy dropdowns) to investigate if project is located in an area deemed as a higher equity priority for increasing tree canopy cover for particular vulnerable people populations, and comment on this statistic. HealthyPlan.City provides heat maps overlaying vulnerable population maps (where vulnerable people live) collated with information about the built environment and identifies whether a particular location is in an "equity priority" area (e.g. if the project is located in an area that shows a high number of low-income older adults but low level of tree canopy).

.7 Limit development and construction activity impact on greenfield areas of the site. If the property includes a Terrestrial Environmentally Sensitive Area (ESA) as designated by the City Plan "Schedule 6 – DPA1 Environmentally Sensitive Areas", include at least a 15m natural area buffer around the ESA.[17]

.8 Restore/cover a minimum of 50% of the site area (excluding the building footprint) by maintaining pervious surface. Permeable surface area may include a green roof.[18]

.9 Restore previously disturbed portions of the site with native or adapted landscaping that provides habitat. For reference, restoring 30% of the site (including the building footprint) is notable.[19]

4.3 Healthy watersheds

Rationale: For the topic area C1.4 Healthy Watersheds, the City aims to protect local lakes, rivers and ocean through management of stormwater. The following are considerations for projects as a means of demonstrating how the project might support this action area:

.1 Projects to meet or exceed the requirements of the City's Manual of Engineering Standards and Specifications, noting Section 7 on Stormwater Management which includes sections on Stormwater Runoff, Storage Facilities, Rainwater Best Practice Management Practices, Water Quality, and Climate Change.

.2 Project teams may wish to learn about Salmon Safe certification (and its strategies), and determine if it is right for the project.

4.4 Water and stormwater

Rationale: For the topic area C1.5 Water, Sewer, & Stormwater Services, the City aims to conserve Nanaimo's finite water resources that will be in increasing demand from population growth and hotter, drier summers due to climate change. Further to this, as storms become more intense, stormwater systems will need to

[17] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (2 pts).
[18] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (5 pts).
[19] Per LEED BD+C v4, Site development – protect or restore habitat credit.

accommodate more rainfall in shorter periods of time in order to reduce flood risk. The following are considerations for projects as a means of demonstrating how the project might support this action area:

.1 Include a rain garden, cistern, bioswale or stormwater retention pond on the property.[20] Projects to meet or exceed the requirements of the City's Manual of Engineering Standards and Specifications, noting Section 7 on Stormwater Management which includes sections on Stormwater Runoff, Storage Facilities, Rainwater Best Practice Management Practices, Water Quality, and Climate Change.

.2 Restore/cover a minimum of 50% of the site area (excluding the building footprint) by maintaining pervious surface. Permeable surface area may include a green roof.[21]

.3 Install green roof for minimum of 30% of roof area.[22]

.4 Install living wall to cover at least 10% of total available wall area.[23]

.5 Consider performing a "water balance" of the site to determine how much of the non-potable water requirements of the site could be provided from rainfall or other non-potable sources.

.6 Install a non-potable irrigation system for all on-site irrigation.[24] Alternatively, describe how potable water use for irrigation on the site has been minimized through use of native and/or drought tolerant landscaping, efficient irrigation practices (e.g. drip irrigation[25]), or by using stored non-potable water from rainwater capture or other non-potable sources.

.7 Projects should incorporate use of low-flow, water efficient fixtures. For reference of what is considered a minimum best practice, achieving a 35% reduction in water usage over a baseline based on BC Building Code standard plumbing fixtures[26], or alternatively, projects could indicate if they plan to use plumbing with the following maximum installed flush or flow rates, or better: toilets (4.8 lpf / 1.28 gpf), urinals (1.9 lpf / 0.5 gpf), residential faucets (5.7 lpm/1.5 gpm), commercial lavatory (restroom) faucets (1.9 lpm / 0.5 gpm), shower heads (7.6 lpm / 2.0 gpm).[27]

.8 Consider ways to support City staff in future analysis of the water usage of the building. This may include water sub-metering of certain systems, as applicable and useful (e.g. indoor plumbing, irrigation, makeup water systems, commercial kitchen, commercial laundry).

.9 Projects could consider using design values referenced from Pacific Climate Impacts Consortium (PCIC)'s Design Value Explorer[28] for projected design values for future annual total precipitation and

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[20] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (2 pts).
[21] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (5 pts).
[22] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (3 pts).
[23] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (2 pts).
[24] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (3 pts).
[25] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (1 pts).
[26] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (2 pts).
[27] Per LEED BD+C v5 (draft for public comment), Minimum Water Efficiency prerequisite.
[28] https://www.pacificclimate.org/analysis-tools/design-value-explorer

annual total rainfall, annual maximum 1-day rain (50-year return period), and/or annual maximum 15-minute rainfall (10-year return period) values.

4.5 Solid Waste Management

Rationale: Recirculating existing resources allows the reduction of waste and pollution, recirculation of products and materials, and allows us to mimic nature by supporting natural processes leaving more room for nature to thrive. For the topic area C1.6 Solid Waste Management, the City aims to be a less wasteful community by aligning with this philosophy. The following are considerations for projects as a means of demonstrating how the project might support this action area:

.1 Projects are to abide by City of Nanaimo's construction recycling, demolition, and demolition bylaw.

.2 Projects to implement a Construction Waste Management plan. For reference, a rate of 75% (by weight) of construction material diverted from landfill is considered good practice. Generating less than 50 kg/m2 of waste materials from all new construction activities is considered best practice.[29]

.3 Include a construction and waste management plan that, at a minimum, identifies the materials to be diverted from disposal and whether the materials will be sorted onsite or comingled.[30]

4.6 Light Pollution

Rationale: For the topic area C1.8 Artificial Lighting & Dark Skies, the City aims to be thoughtful in managing light pollution and make efforts to preserve the night sky through responsible lighting and dark sky stewardship. The following are considerations for projects as a means of demonstrating how the project might support this action area:

.1 Project teams should consider Dark Sky compliance for lighting design, being mindful of applicability due to lighting conditions of surrounding areas[31].

.2 Projects are encouraged to not exceed backlight-uplight-glare (BUG) ratings, based on the specific light source installed in the luminaire, as defined in IES TM-15-11 Addendum A, as appropriate for the site's Model Lighting Ordinance (MLO) lighting zone.[32]

5.0 Equitable Access and Mobility

Nanaimo will continue to grow, and thoughtfully linking development with Nanaimo's mobility network will make it easier to move around in ways that have fewer impacts. Strategies to encourage safe, efficient, low-

[29] Per LEED BD+C v4.1, Construction and Demolition Waste Management credit.
[30] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (2 pts).
[31] Reference priority action C1.8 Artificial Lighting & Dark Skies in Nanaimo's Integrated Action Plan.
[32] Per LEED BD+C v4, Light pollution reduction credit.

impact mobility are the focus of the City's "A Connected Nanaimo: Equitable Access & Mobility" goal. Additional ideas for best practices in this area may be found within the City of Nanaimo's Zoning Bylaw 4500 Schedule D, and the transportation/mobility related credits within LEED-Neighbourhood Development, Living Community (ILFI), and Envision.

5.1 Connected Communities

Rationale: For the topic area C2.1 Connected Communities, the City aims to thoughtfully link development with Nanaimo's mobility network to make it easier to move around in ways that have fewer impacts. The following are considerations for projects as a means of demonstrating how the project might support this action area:

.1 Project briefs are to reference the City of Nanaimo's General Development Permit Area Design Guidelines for guidance regarding site and building design i.e. how layout and design of site and building can encourage pedestrian, bicycle and transit utilization, and support vehicle circulation.

.2 Project teams are encouraged to find ways for the project to be proactive in identifying future mobility needs of the community and determine if there are ways the project can contribute to safer, more efficient mobility in the community. Strategies might include modes in which the site is configured to facilitate access to transit, improve traffic flow, and/or expand walk, roll, and cycle networks.

.3 Projects provide dedicated carshare parking space(s). For reference, best practice might include for at least 5% of total parking spaces (rounded up)[33], and/or one car share or car co-op vehicle parking space[34]. Project could consider gifting a car to a recognized car share provider for inclusion of a car share space on the property[35].

5.2 Integrated Walk, Roll, Cycle & Transit Network

Rationale: For the topic area C2.2 Integrated Walk, Roll, Cycle & Transit Network, the City aims to free up space on City streets and help everyone move more efficiently, through encouragement of transit use and active transportation. The following are considerations for projects as a means of demonstrating how the project might support this action area:

.1 Project teams should consider how the project may support an integrated walk, roll, cycle, & transit network through incorporation of walking, rolling and/or bike trails, and provisions for transit users, through the site. Provide clear signage and wayfinding and identify routes that reduce negative impact on natural surroundings caused by vehicle or pedestrian traffic. Universal design standards are to be used to ensure broad accessibility and safety.

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[33] Per LEED BD+C v4, Reduced parking footprint credit.
[34] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (1 pts).
[35] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (4 pts).

.2 Projects should include Bike Parking / End of Trip facilities. For reference, best practices might suggest providing short-term bicycle storage for at least 2.5% of estimated peak visitors, but no fewer than four storage spaces per building, providing long-term bicycle storage for at least 5% of all regular building occupants, but no fewer than four storage spaces per building in addition to the short-term bicycle storage spaces, and providing at least one on-site shower with changing facility for the first 100 regular building occupants and one additional shower for every 150 regular building occupants thereafter.[36]

.3 Locate a minimum of 80% of the total parking area underground or in a parking structure incorporated into the design of the building.[37]

.4 Include covered and designated parking spaces for a motorized or electric scooter, or a designated motorcycle parking space according to: 1 space per 600m2 Gross Floor Area for the first 5000m2 plus one space for 1500m2 of additional Gross Floor Area.[38]

.5 Include a pedestrian network that connects the buildings on site with the public road right-of-way and the pedestrian network from the adjacent site tow which there is access by perpetual easement or right-of-way.[39]

.6 Parking does not exceed minimum parking requirements within the City of Nanaimo "Off-Street Parking Regulations Bylaw 2018 No. 7226" and amendments thereto, and any subsequent bylaw or bylaws which may be enacted in the substitution thereof.[40]

6.0 Occupant Health and Wellbeing

This section outlines some strategies and metrics relating to health and wellbeing, particularly focused on the occupants and users of the project. Additional ideas for best practices in this area may be found within the WELL rating system, and/or indoor environment related credits within LEED and the Living Building Challenge.

6.1 Indoor environment

Rationale: Promoting a quality indoor environment for the occupants of Nanaimo's buildings contributes to overall community wellbeing. This section will vary in its applicability to projects, dependent on the nature of the occupants and the use of the building, or even if the building is simply not an occupied building (i.e. is the project a community centre, a washroom, a pumphouse). The following are considerations for projects as a means of demonstrating how the project might support this action area:

[36] Per LEED BD+C v4, Bicycle facilities credit.
[37] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (4 pts).
[38] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (2 pts).
[39] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (2 pts).
[40] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (2 pts).

.1 Projects afford occupants an increased relationship with nature through incorporating attributes from biophilic design. For ideas and more information, see The Practice of Biophilic Design by Kellert and Calabrese. As just one example, quality of lighting, access to daylight and views of the outside have a significant impact on human health and wellbeing. (Note: control of glare should be considered when designing for daylighting, as should impact of increased glazing on energy performance).[41]

.2 Project teams should consider the thermal comfort of occupants (reference ASHRAE 55). See also section in this document on climate resilience for ideas on how to address future climate conditions when considering thermal comfort conditions.

.3 Project teams should review if occupants would benefit from the ability to customize their environment or choose between various types of environments and provide means to do so. For example, spaces where occupants (i.e. staff) are likely to spend extended time might have provisions for individual occupant lighting control, and thermal control (temperature sensors and/or operable windows). Consider whether this project would benefit from including a variety of space types (e.g. quiet spaces vs. areas with high levels of sensory stimulation).[42]

6.2 Indoor air quality

Rationale: Quality indoor air contributes to the comfort and well-being of occupants. The following are considerations for projects as a means of demonstrating how the project might support this action area:

.1 Projects should incorporate monitoring systems to confirm ventilation systems are operating as intended (i.e. outdoor air monitors, indicators that intake dampers are in the position needed to maintain design airflows, or indication devices on natural ventilation openings)[43].

.2 Provide means to limit ingress of outdoor particulates and contaminates through use of entryway systems at regularly used doors[44].

.3 Installing MERV 13 or higher filtration on each ventilation system supplying outdoor air to occupied spaces[45]. Consider incorporating an automatic filter change notification system by monitoring static pressure differential across the filters on outdoor air and/or recirculated air and alerting the Building Automation System (BAS) when filter change is required[46].

.4 Provide operable windows. Refer to opening size and requirements indicated in ASHRAE 62.1[47].

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[41] Per LEED BD+C v5 (draft for public comment), Connecting with Nature credit.
[42] Per LEED BD+C v5 (draft for public comment), Occupant Experience credit.
[43] Per LEED BD+C v4.1, Minimum Indoor Air Quality Performance prerequisite.
[44] Per LEED BD+C v4.1, Enhanced Indoor Air Quality Strategies credit.
[45] Per LEED BD+C v4.1, Enhanced Indoor Air Quality Strategies credit.
[46] Per LEED BD+C v5 (draft for public comment), Enhanced Air Quality credit.
[47] Per LEED BD+C v4, Thermal Comfort credit.

7.0 Materials and Resources

This section outlines some strategies and metrics relating to materials and resources used in a project. Additional ideas for best practices in this area may be found within the City of Nanaimo's Zoning Bylaw 4500 Schedule D, and material resources related credits within LEED, WELL, and the Living Building Challenge.

7.1 Embodied Carbon / Life Cycle Assessment (LCA)

Rationale: The GHG emissions from the materials associated with a building (e.g. emissions from extraction, transportation, construction, and demolition of buildings) are a significant component of a building's whole life cycle carbon emissions, and the need to report and track these "embodied" emissions is being required by an increasing number of municipalities. Beyond this, the manufacturing and use of materials has environmental impacts beyond carbon emissions, such as impact on water quality, acid rain, depletion of non-renewable resources, and many others. The following are considerations for projects as a means of demonstrating how the project might support the C1.1 Greenhouse Gas Emissions Reduction topic area through embodied carbon/life cycle assessment:

.1 Project teams should undertake whole building embodied carbon analysis and indicate how embodied carbon emissions compare with recognized embodied carbon targets (e.g. City of Vancouver, CAGBC's Zero Carbon Building Standard, Toronto Green Standard.) (Preferred approach.)

.2 Project teams should undertake a Whole Building Life Cycle Assessment per LEED (includes environmental impact categories beyond carbon emissions).[48] (Preferred approach.)

7.2 Material selection

Rationale: The materials in a building impact the environment, the health of the occupants within the building, and their production may contribute to social health and equity (or not). The following are a list of some certifications and/or attributes for individual products/materials which are an indicator of a product's impact to human health or the environment. Incorporating products which have these attributes or certifications is a means to encourage the production of these products, or products with these attributes. They have been loosely grouped into categories[49]. More information about material selection may be found within the LEED, WELL, and the Living Building Challenge rating systems.

.1 Climate/ecosystem health:

a. Environmental Product Declaration (EPD)

b. Forest Stewardship Council (FSC) Certified Wood, Sustainable Forestry Initiative (SFI), the Canadian Standards Associated – Sustainable Forest Management Standard (CSA-SFM), or

[48] Per LEED BD+C v4.1, Building Life-Cycle Impact Reduction credit.
[49] Per LEED BD+C v5 (draft for public comment), Optimized Building Products credit.

recognized equivalents. Consider targeting at least 50% of all wood products used in construction be certified through one of these systems.[50]

c. Salvaged, refurbished, or reused materials (circular economy). Consider targeting at least 10% of the total value of the materials on the project.[51]

d. Recycled content (circular economy). Consider targeting materials such that the sum of the postconsumer recycled material constitutes at least 25%, based on costs, of the total value of the materials in the project.[52]

e. Material selection such that at least 75% of materials used in construction are renewable resources.[53]

f. Non-wood biobased products (circular economy).

.2 Health of occupants:

a. Health Product Declaration (HPD)

b. Declare (e.g. Red List free)

c. Green Seal Certified

d. Low emitting materials

.3 Both:

a. Cradle-to-Cradle

b. BIFMA e3 / level

c. Living Product Challenge

7.3 Life Cycle Cost Analysis (LCCA)

Rationale: As a building owner and operator, the City is committed to making prudent financial choices about buildings. Sometimes this can mean higher capital costs in order to reduce the overall life cycle cost of a building. This can be noticeable when it comes to selection of high performing, low carbon emitting systems, which may have higher upfront costs but ultimately aim to reduce operational costs and carbon pricing. Project teams are encouraged to make use of Life Cycle Cost Analysis as a process to support long-term financially prudent design choices.

[50] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (3 pts).
[51] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (2 pts).
[52] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (2 pts).
[53] Per City of Nanaimo – Zoning Bylaw 4500, Schedule D – Amenity Requirements for Additional Density (2 pts).

It is suggested that the LCCA use the Whole Building Design Guide - Life-Cycle Cost Analysis (LCCA) as a reference methodology. Residual values will be excluded from the LCCA. The City will provide reference values for maintenance, energy costs, carbon pricing (e.g. $/ton), discount rate, and inflation to be used in the analysis.

8.0 Conclusion

The above list presents an additional "library of strategies" which may be selected from report to Council how a given project proposes to align with select City Goals and topic areas from Nanaimo's Integrated Action Plan. This document is to work hand-in-hand with the Sustainability Policy. It is intended to provide ideas, but not be an exhaustive list of potential strategies, nor a list of requirements each project must employ. Project teams are encouraged to determine for themselves the most appropriate sustainability initiatives that can be incorporated into their project that can best support sustainability and the five City Goals of Nanaimo's Integrated Action Plan.