



REPORT

Sustainability Metrics Update- Draft Report

Presented to:

City of Richmond Hill

225 East Beaver Creek Road, Richmond Hill, Ontario,
Canada

Prepared by:

Mark Lucuik, P.Eng. LEED Fellow
Director of Sustainability, Morrison Hershfield

Patricia Escobar, P.Eng. LEED AP BD+C
Sustainability Consultant, Morrison Hershfield

Neel Bavishi, P.Eng., CEM
Building Energy Consultant, Morrison Hershfield

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1. INTRODUCTION

1.1 Background

Morrison Hershfield Limited has been retained by the City of Richmond Hill to update the current Sustainability Metrics on behalf of the Sustainability Metrics program's municipal partnership (The Municipal Partners). The partnership is made up of the cities of Richmond Hill, Brampton and Vaughan. The City of Markham has recently joined the partnership and is taking part in this update.

The current Sustainability Metrics program is a tool used to implement the sustainable design policies and best practices for new development. The metrics were designed to provide aspirational targets beyond the mandatory requirements through municipal standards. The first iteration of the Sustainability Metrics was developed in 2014 by an external consultant to encourage more sustainable development. The Sustainability Metrics Update project is intended to accomplish the following objectives:

1. Update the inter-municipal Sustainability Metrics in response to changes in legislation and Provincial Planning policy since the Sustainability Metrics were developed in 2012;
2. Investigate adding new Sustainability Metrics that help reduce GHG emissions and aid in achieving the goal of becoming a more sustainable, energy efficient community over the long-term; and
3. Develop an appropriate performance indicator target to monitor the success and implementation of the metrics.

Provincial changes to legislation and Provincial Plans have required a number of the Sustainability Metrics to be updated. The Province's Climate Change Mitigation and Low-carbon Economy Act, 2016 (repealed on November 14, 2018) and the Climate Change Action Plan establish Ontario's GHG reduction targets and set out actions designed to modify behaviour to achieve these targets. The energy efficiency updates to the Ontario Building Code (January, 2017) have now increased energy efficiency requirements for new buildings to a level beyond that in the existing Sustainability Metrics, meaning that the energy efficiency Metrics approved by the three partner municipalities in 2013 are redundant and are not advancing energy efficiency in new development beyond the requirements of the Code. Other key factors include the approval of the CTC Source Water Protection Plan (December, 2015), which requires low impact development techniques, the updates to the Growth Plan for the Greater Golden Horseshoe, Oak Ridges Moraine Conservation Plan, and Greenbelt Plan (July, 2017), green infrastructure incorporated into asset management regulation (O. Reg. 588/17), and the initiation of a Regional Climate Change Action Plan by York Region (November, 2017).

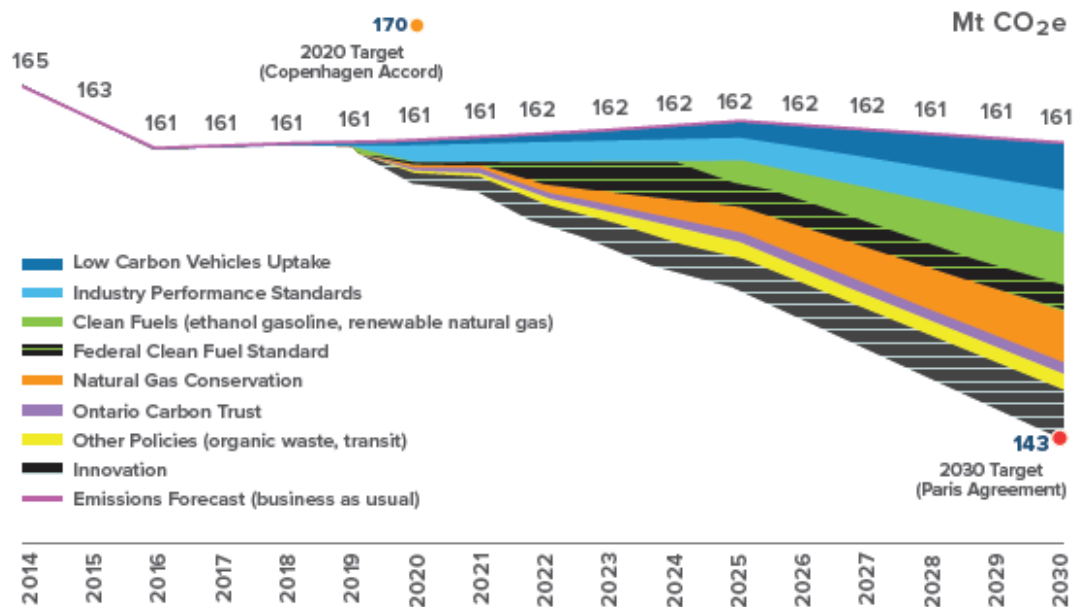


Figure 1: Path to Meeting Ontario's 2030 Emissions Reduction Target (Source: Ontario Environment Plan, 2018)

Since 2018 there have been a number of changes to Ontario's approach to greenhouse gas reductions, including the adoption of the "Made in Ontario Environment Plan". This latest plan has major sections related to air and water protection, climate change, waste, and land conservation. Each of these sections is discussed briefly below:

- **Protecting our Air, Lakes and Rivers:** This brief, 7 page section includes some action items but most of these lack the specificity to be beneficial for this work.
- **Addressing Climate Change:** This 15 page segment includes the comment that Ontario will reduce its emissions by 30% below 2005 levels by 2030, aligning with Canada's 2030 target under the Paris Agreement. Action items in this section include some focus on resiliency and adaptation, including helpful guidance on how to prevent floods such as keeping your eavestroughs clean. It also includes language around reviewing policies and laws, including the building code, that may affect this project, but the level of detail is insufficient at this time. The plan does encourage innovation and energy conservation and includes a section on reducing transportation emissions by supporting public transportation.
- **Reducing Litter and Waste:** This section includes action items including a banning of food waste from landfill, expansion of green bin systems, guidance on reducing plastic waste, and making producers responsible for waste associated with packaging.
- **Land Conservation:** This section is generally vague in recommendations, but it does state they will work with leaders such as Ducks Unlimited to preserve natural areas and will support the creation of new trails across the province.

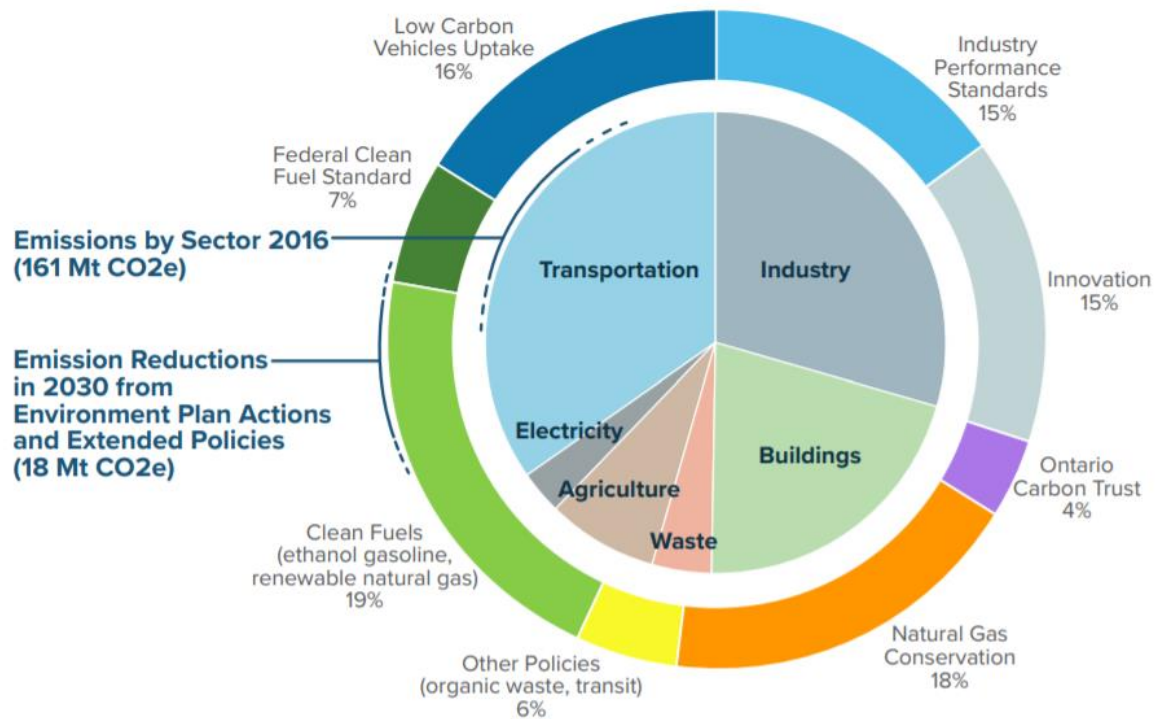


Figure 2: Planned Emission Reductions in 2030 by Sector (Source: Ontario Environment Plan, 2018)

This project is intended to investigate and recommend methods to improve the use of the Sustainability Metrics program and in response to climate change concerns to compel the provision of a lower-carbon built form. By updating the existing Sustainability Metrics and providing additional new Metrics and programs aimed at reducing GHG emissions in new built form, this project will also support economic development in emerging green building sectors.

1.2 Sustainability Defined

The term “Sustainability” can mean different things to different people. It ranges from energy efficiency to organics, transportation to homelessness. The term covers a very broad spectrum. Fundamentally, Sustainability means meeting our own needs without compromising the ability of future generations to meet their own needs. Our needs and future needs include natural, social and economic resources. These are the three pillars of sustainability, each of which must be considered to fully meet our current and future needs.

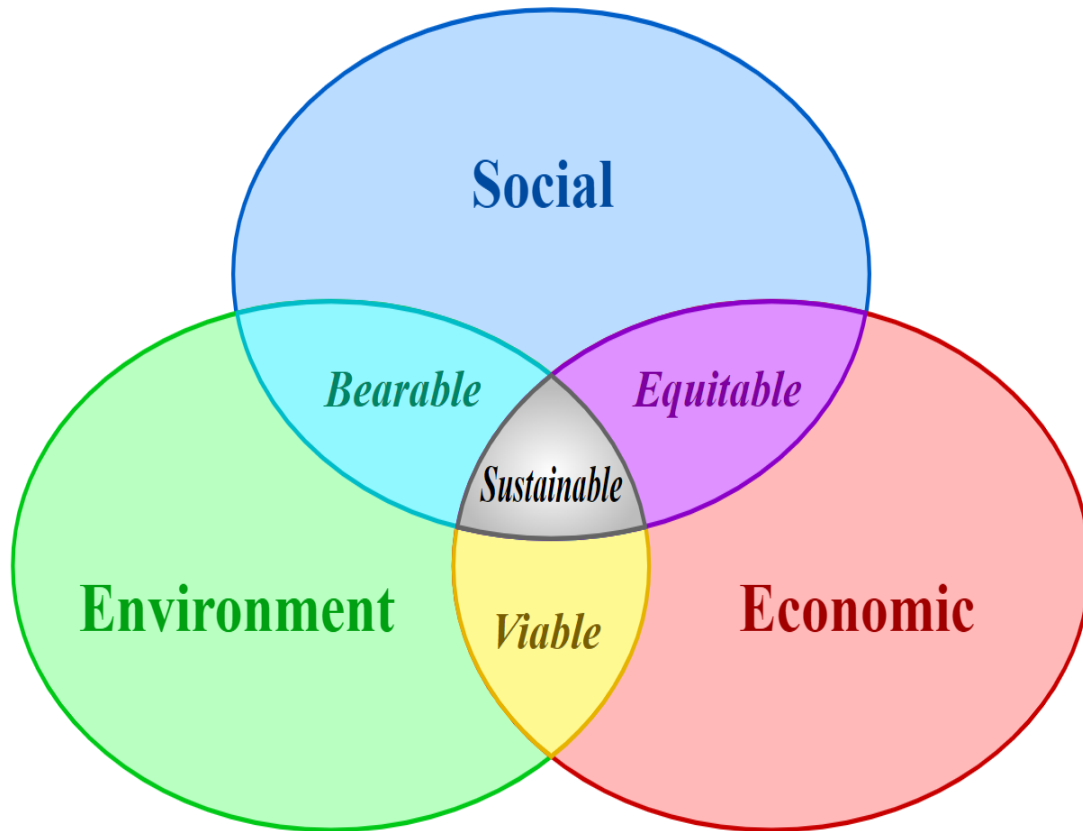


Figure 3: Three Pillars of Sustainability (source: Adam, W.M. IUCN, 2006 retrieved from <https://portals.iucn.org/library/sites/library/files/documents/Rep-2006-002.pdf>)

- Environmental Sustainability: Ecological integrity is maintained and all of earth's environmental systems are kept in balance. Natural resources are consumed by humans at a rate where they are able to replenish themselves.
- Economic Sustainability: Communities have access to the resources that they require, financial and other, to meet their needs. Economic systems are intact and activities are available to everyone, such as secure sources of livelihood.
- Social Sustainability: Universal human rights and basic necessities are attainable by all people.

As indicated in Figure 3 above, the three pillars of sustainability are interrelated. Often specific measures adopted to improve sustainability will affect more than one pillar above. As an example, cycling facilities can lead to a more sustainable community environmentally (lower greenhouse gases), socially (exercise and friendship) and economically (enabling transportation for lower income people).

The metrics presented should be considered related to their impact in all three pillars of sustainability.

1.3 Process

This project is broken into four phases, each of which are described briefly below:

1.3.1 Stage 1: Background Analysis

This project began with background research and evaluation of the current Sustainability Metrics in effect in the City of Richmond Hill, City of Vaughan, City of Brampton, and City of Markham. The goal of the background research was to identify metrics that require updating due to current or anticipated: industry practices, revised reference documents, direction of other jurisdictions. It included a review of over thirty different documents to provide guidance on the current state of the industry with respect to sustainability, including:

1. Ontario Building Code 2012, as amended;
2. USGBC, LEED v4 for Neighborhood Developments, July 2018;
3. USGBC, LEED v4 for Building Design and Construction, 2013;
4. Town of East Gwillimbury, Thinking Green! Development Standards Program, February 2012;
5. The Regional Municipality of York's High Density Residential "Green Building" Incentive Program, November 2015;
6. City of Toronto, Toronto Green Standard Version 3, May 2018;
7. Ontario Climate Change Action Plan 2016, updated to Ontario's Made-in-Ontario Environment Plan, November, 2018;
8. City of Richmond Hill, 2018 Strategic Plan Annual Report, June 2018;
9. City of Richmond Hill, Official Plan, January 2018;
10. City of Richmond Hill, 2017 Energy Consumption and GHG Emissions Report;
11. City of Vaughan Suggested Updates to Sustainability Metrics;
12. City of Vaughan, City of Vaughan Official Plan, September 2010;
13. City of Vaughan, Vaughan Municipal Energy Plan: Plug into a Smart Energy Future, June 2016;
14. City of Vaughan, Urban Design Guidelines;
15. City of Vaughan, Green Directions Vaughan Draft 2019 Community Sustainability Plan, June 2019;
16. City of Brampton, Brampton 2040 Vision, May 2018;
17. City of Brampton, Brampton Grow Green Environmental Master Plan: Implementation Action Plan, May 2014;
18. City of Brampton, 2016-2018 Strategic Plan;
19. Brampton's Sustainable Community Development Guidelines, September 2013;
20. City of Toronto. Toronto Draft Pollinator Protection Strategy. July 2017;

21. Region of Peel, Health Background Study Development of a Health Background Study Framework, May 2011;
22. York Region, Sustainable Development through LEED: A High Density Residential “Green” Building Incentive Program, November 2010;
23. Multiple Toronto Regional Conservation Authority Guidelines;
24. Aquafor Beach Ltd., Earthfx Inc., Runoff Control Volume Targets for Ontario, October 2016;
25. Federation of Canadian Municipalities (FCM), Sustainable Neighbourhood Development: Practical Solutions to Common Challenges, 2016;
26. World Green Building Council, World Green Building Trends 2018 smartMarket Report, 2018;
27. Canadian Alliance for Sustainable Health Care, Community Wellbeing: A Framework for the Design Professions, July 2018;
28. Intergovernmental Panel on Climate Change (IPCC), Global Warming of 1.5C, October 2018;
29. Energystar. Multifamily high-rise (New Construction Program). October 2019;
30. GBCI Canada, Yorkdale Shopping Centre Parkades, 2017;

The background research phase of the project ended with the development of a comprehensive memo summarizing the research and its impact on the existing sustainability metrics.

1.3.2 Stage 2: Draft Metrics Update

This phase began with a full day workshop form with staff from the various municipalities. The purpose of this workshop was to set priorities, identify gaps, anticipate future growth (population, traffic, and resilience), and identify the stakeholders and organizations that should also be included in this process.

Once the needs and issues were identified by City staff and the Technical Advisory Team, we translated these into a draft of suggested updates and revisions to the Metrics and the development of this report.

1.3.1 Stage 3: Consultation

Consultation will be performed with other stakeholders to gain insight into how different external groups may perceive these changes. At the time of this report, Consultation is the next stage. The list of stakeholders includes York & Peel Region, TRCA, The Atmospheric Fund, Clean Air Partnership, BILD Peel and York chapters and local development industry professionals.

1.3.2 Stage 4: Final Updated Sustainability Metrics

Based on the research, workshop, and consultations performed, we will update the draft and provide a final report.

2. UPDATES TO THE METRICS

The purpose of this report is to highlight proposed changes to the Sustainability Metrics. Updates to each metric were proposed by Morrison Hershfield and discussed with the Technical Advisory Team (TAT) or directly from the consensus of the TAT. This section describes which metrics are being carried forward with minimal change, which are being removed and which new metrics are being introduced and along with the rationale for each suggested change. The full document of the proposed Sustainability Metrics Guidebook is provided in Appendix A.

2.1 Metrics Carried Forward with Minor Changes Only

The following metrics were identified by the TAT and Consultants as still relevant with their current targets and only requiring minor changes.

- 1. H.2. Surface Parking Footprint (Renamed from “off-street parking”)
- Community and Neighbourhood Scale (City of Brampton only)
- 1. I.1. Traffic Calming
- 1. I.2. School Proximity to Transit Routes and Bikeways
- 2. B.2. Intersection Density
- 2. C.1. Distance to Public Transit
- 2. D.2. Implementing Trails and Bike Paths
- 3. A.1. Access to Public Parks (Renamed from “Park accessibility”)
- 3. B.2. Stormwater Quality
- 3. B.3. Greywater Reuse (for Interior Functions) (Renamed from “Rainwater Re-use”)
- 3. B.4. Stormwater Management Beautification (Renamed from Stormwater Architecture/ Features)
- 4. A.1. Passive Solar Alignment

The consensus from the TAT for the majority of these metrics was to not combine them with other metrics as the intents were unique and also to keep a large menu of options available to applicants. These minor changes include changes in the metric name, to align more accurately with the metric intent and/or slight adjustments in the point allocation of the minimum and aspirational targets. Changes to the points are proposed based on discussions with the TAT, the uptake of the metrics, and the priority to incentivize certain targets. The point allocations were adjusted for the following metrics; 1.H.2, 1.I.2., Community and Neighbourhood Scale (Brampton Only), 2.B.2., 2.C.1, 2.D.2.and 3.B.2.

2.2 Metrics to Be Removed

Existing metrics that have received little uptake, are redundant or are no longer relevant were removed. The following metrics are proposed for removal with a brief description of the rationale.

1.A.1- Floor Area ratio/Floor Space index	Removed as this is covered by Official Plans and Zoning By-Laws for implementation.
1.A.2- Persons and Jobs per Hectare	Removed as this is covered by Official Plans and Zoning By-Laws for implementation.
1. C.1- Urban Tree Diversity	Removed as the intent of this metric is covered by municipal guidelines.
1.H.3- Surface parking	Removed as this is difficult to implement and enforce.
1.I.3- Proximity to School	Removed because it is redundant to other proximity questions.
1. J.4. Tree Canopy Enhancements	Removed as a standalone metric to streamline metrics with similar intents. Targets from the metric have been revised and incorporated into other metrics.
4. B.2. Water Conserving Fixtures 4. C.1. Parking Garage Lighting 4. C.3. Energy Conserving Lighting	Removed from the metrics as are redundant with the requirements of the Ontario Building Code (OBC) and therefore enforcement of any mandatory requirements will be covered by OBC.
4.E.2 Material Reuse and recycled content 4.E.3 Recycled/ Reclaimed Materials	The industry is moving away from recycled content as a measure of sustainable materials with the updates to the materials credits in LEEDv4 and TGS v3 as an example. We are proposing the metric be concentrated on embodied carbon of materials instead, as described further in section 2.3.

Additionally, it was noted that a number of metrics are related to the planning and design of the community for elements that the applicant would have little control (1. I.2. School Proximity to Transit Routes and Bikeways, 2. C.1. Distance to Public Transit, 2. D.1. Proximity to Cycling Network and 3. C.1. Dedicate Land for Private Green Space). These metrics were considered for removal, but have been identified as important to encourage. Therefore, they remain in this draft update to gather feedback from stakeholders.

2.3 Proposed New Metrics

During the iterative process of exploring updates to the metrics, several new metrics were identified as important to include. It is also suggested that some of the proposed new metrics be included within the targets for existing metrics rather than separately, where the intent was aligned. Proposed new metrics relating to cultural heritage enhancements, invasive plant species, green corridors and the embodied carbon footprint of materials, are discussed in the section below.

Below are the proposed new metrics, with numbering and points to be determined after feedback from stakeholders is received.

EV Charging Stations	<p>This is proposed based on trends in provincial and municipal sustainability initiative and consumer trends towards Electrical Vehicles. For example, the Toronto Green Standard v3 now mandates all Mid to High Rise Buildings to provide EVSE to 20% of parking spaces, with the remaining spaces to be designed to permit future Electric Vehicle Supply Equipment (EVSE) installation. EV parking spaces was formerly included in metric 1.H.4, but has been separated out to establish new targets more aligned with the Toronto Green Standard (TGS) v3 that was released in 2018.</p>
Embodied Carbon of Building Materials	<p>This is proposed as a new credit in order to update the two materials credits; 4.E.2 Material Reuse and recycled content and 4.E.3 Recycled/ Reclaimed Materials, which are perceived as outdated relative to the most current version of green building assessment tools, such as LEED. There is a growing awareness of the importance of addressing the carbon associated with building materials (embodied carbon) rather than relying on indirect measures such as recycled content. Embodied carbon is the GHG emissions associated with the manufacturing, transport and installation of building components. This revised credit encourages an increase in supplementary cementing material (SCM) content for concrete, conducting a Life Cycle Assessment (LCA) for materials, tall wood buildings, and efficient use of wood in low rise housing.</p> <p>Metric targets for Supplementary Cementitious Materials</p> <p>The use of cement in concrete results in large contributions to GHGs. Supplementary Cementitious Materials (SCMs) can be used to offset some cement used, resulting in significant GHG savings. Typically, concrete manufacturers will include around 10% SCMs but increasing the percent of SCMs can be a simple and effective way to reduce the embodied carbon of concrete materials and in many cases, have no significant impacts to the material cost or project schedule. The proposed minimum target of including a minimum of 20% SCMs for all concrete on site is a slight increase to the typical conditions. Note that high SCMs can increase the strength of concrete, alter the colour and increase the time required for curing. For the aspirational target, we have proposed an increase of 40% SCMs for 40% of the concrete onsite. This is to recognize projects that have reduced their cement content in a major way while also being mindful that it is not realistic for 40% SCM content to be used on all concrete on site. A strategy, for example, could be to use SCMs for the footings only. The intent of this target is to bring awareness to simple adjustments in best practices that would have a dramatic impact on the development's reduction in embodied carbon emissions.</p> <p>Targets for Life Cycle Assessments (LCA)</p> <p>Life Cycle Assessments (LCAs) are used to quantify the embodied carbon of building materials. Currently, it is not best practice to conduct LCAs and as a result, there is a knowledge gap between understanding the amount of carbon emissions (embodied carbon) that are required to be generated to manufacture certain building materials. At this stage, the metrics we are proposing are only suggesting the applicant conduct an LCA and consider opportunities for reducing the embodied emissions. This knowledge will allow</p>

	<p>applicants a better understanding of the actual amount of embodied carbon for certain materials and on what scale it is possible to reduce embodied carbon with the consideration of different materials, building geometry and building design. To conduct LCAs, there are a number softwares available that are free to use and have online tutorials, for example the Athena Impact Estimator for Buildings LCA software: https://calculatelca.com/software/impact-estimator/download-impact-estimator/</p> <p>The intent is to encourage the building industry to increase the capacity for conducting LCAs and to understand and reduce the embodied carbon. This target aligns with the CaGBC's Zero Carbon Building Standard. Aspirational targets have been included for conducting LCAs for buildings and roadways and reducing the embodied carbon. There are different options for the aspirational targets, which awards points for conducting an LCA and identifying carbon reduction strategies, to awarding points for committing to at least one of the identified carbon reduction strategies.</p> <p>Tall Wood Buildings</p> <p>An aspirational target has been added if a tall wood building is included in the development. Wood is a material very low in embodied carbon in comparison to the standard practice of steel and concrete. There is currently an early trend towards building tall wood buildings and mass timber construction, however there remain several barriers. This target is intended to give credit to projects that include tall wood buildings, which are low in embodied carbon.</p> <p>Option of Low Rise Wood Framed Buildings</p> <p>The options above are not applicable to low rise, wood framed buildings. An aspirational target has been added, aligned with LEED for Homes, which prescribes building practices that would result in using less materials resulting in lower embodied carbon.</p>
<p>New Category: Innovation</p> <p>1 to 4 Innovation Metrics</p>	<p>An innovation category has been added to the metrics, and is aligned with the LEEDv4 innovation credit category and has similar requirements and documentation. Although the points will be TBD, our recommendation is that the points for the entire category be capped at 25% of the total applicant's score. Similar to LEED, we suggest that the innovation category accept up to 4 metrics for innovation, with targets defined by applicants.</p> <p>The innovation credit is intended to encourage true innovation resulting in real sustainability benefit. It will include a number of pre-established requirements but should be open to new ideas presented by the applicant.</p>

2.4 Metrics with Proposed Changes

This section describes how the existing metrics to remain will be revised or updated. The table below also includes the rationale for changes. Generally, the rationale for

most of the changes was to update the metrics to reflect the shifts in the building and development industry since the metrics were first written and adjust the targets of metrics that had a high or low uptake. Where metrics demonstrated a high uptake, more challenging targets were proposed and alternatively for metrics that were not targeted as frequently, changes are proposed to align more realistically with today's market with the goal of increasing the uptake of those metrics. Additionally, changes are proposed to take advantage of demonstrating leadership in sustainability. Where minimum or aspirational targets have been updated, changed or replaced, the points allocated to these new targets will be finalized after consultation with stakeholders. All proposed changes to the points allocated for minimum and aspirational targets were suggested through a collaborative discussion which took into account, among other considerations, the innovation of the metric, potential difficulty and sustainability impact. The proposed updates to the Energy Metrics are significant and have been described in detail in section 2.5.

General Changes	<p><u>Guidebook Presentation Structure (Appendix A)</u></p> <p>The structure of the metric guidebook has been changed with the intent of streamlining the presentation and clarifying the points, requirements and documentation for each minimum and aspirational target. The proposed guidebook most closely resembles the Sustainability Metrics used by the City of Brampton, in table format. The strategy for reorganizing the presentation included removing the glossary of terms from the proposed guide. We suggest that these resources be available separately for clarity or as a “hover-over” function for digital guides. Where for documentation purposes further descriptions were necessary, such as exclusions, notes have been added under the documentation compliance instructions.</p> <p>Mandatory Targets, have been removed as a line item as these are required by building code or other requirements. Note that where possible language related to mandatory requirements was incorporated into the metric ‘intent’. The requirements and documentation for minimum and aspirational targets are located to the immediate right of the target description so that it is easier for applicants to relate the targets, requirements and documentation.</p> <p>To streamline the compliance documentation required to confirm the achievement of each metric, the descriptions of “where to demonstrate compliance” and “how to demonstrate compliance” were combined, taking advantage of the many similarities between for each Block Plan, Draft Plan and Site Plan compliance submittals.</p> <p>Most notably, we have proposed changes to the format of the tables for each metric so that the information reads right to left rather than from top to bottom. The goal of this format is for the user of the guidebook to draw clear conclusions as to the points assigned to each metric target, the requirements to achieve these points and the documentation required to confirm compliance.</p> <p><u>Numbering and Category Change for Some Metrics (Appendix B)</u></p> <p>We are proposing that the metrics be re-numbered so that they can be organized effectively for users. We have re-numbered the metrics so that they can be directly associated with one of each of the four categories; Built Environment, Mobility,</p>
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	Natural Environment and Open Space and Infrastructure and Buildings (i.e., BE-1, BE-2, M-1, M-2,,etc.). Based on the experience of working with certain metrics, some of the metrics have been moved to different categories where it was decided that they are more applicable. The list of re-numbered metrics is in Appendix B for review and feedback from stakeholders. Additionally, some of the metrics have been proposed to be re-arranged into a different category with the intention to align metrics more accurately with the category that best reflects the sustainability benefits of each metric.
1.B.1 and 1.B.2- Proximity to Basic Amenities/ Lifestyle Amenities	Metrics will be merged for the purpose of simplifying. Additionally, synergies with the LEED ND v4 prerequisite have been included to align with popular rating system and incorporate existing knowledge and language.
1.C.2- Preserve Existing Healthy Trees	The name has been changed from “Maintain Existing Healthy Trees” to more accurately reflect the sustainability benefits. Trees and tree canopies were identified by the municipalities for which these metrics apply, as important. The minimum target has been simplified and is now an incremental stepping stone towards the aspirational target in percent of trees preserved to streamline the achievement of the metric targets. The aspirational target has increased, reflecting the positive shift in the industry regarding maintaining healthy trees in situ.
1.C.3- Soil Quantity and Quality for New Trees	The name has been changed from “Soil Quantity and Quality” to more accurately reflect the intent of the metric. Where previously, there was no minimum target and one aspirational target with many requirements, parts were separated to a new minimum metric, providing more options to applicants and encouraging the increase in uptake of this metric. Using similar rationale, a second aspirational metric was added that builds on existing mandatory municipal requirements, providing a framework for applicants who exceed municipal standards.
1. C.4. Enhancing Urban Tree Canopy and Shaded Walkways and Sidewalks	To provide clarity towards the intent of this metric, it has been renamed from, “% tree canopy within proximity to building/ pedestrian infrastructure”. An additional aspirational target has been added to include shading for parking areas in addition to sidewalks, as parking lots are another common hardscapes with opportunities to provide shade to pedestrians.
1.D.1- Buildings Designed and/or Certified Under An Accredited ‘Green’ Rating System	The minimum target has been updated by including one of the previous aspirational targets into the new minimum to reflect the growing uptake of building green rating systems. Similarly, language has been updated to include relevant green rating systems. Aspirational target has been updated to award points for green rating systems that are applicable on a neighborhood scale (LEED ND, One Planet Living).
1.E.1- Universal Design	To recognize concerns with the difficulty of reviewing this metric, additional documentation has been added for applicants to provide more evidence of compliance and the allocation of points for the minimum and aspirational targets has increased.
1.E.2 Universally Accessible Points of Entry	To increase uptake for these metrics, the minimum target has been reduced and additional points have been added to the aspirational target.

1.F.1- Design for Life Cycle Housing	The intent of this metric has been updated and its applicability to the Site Plan applications has been removed as it is already captured at the Block Plan or Draft Plan stages. There was discussion to simplify this metric to align with the Brampton Sustainable Community Guidelines (BSCDG) SG71 approach or perhaps assign more points for providing more affordable housing. We look forward to stakeholder consultation for further guidance.
1.H.1- Bicycle Parking	To simplify requirements, bicycle parking space requirements were changed to reference the municipal standards/ guidelines.
1. H.4. Carpool Parking	Carpooling and efficient vehicle parking have been separated into separate metrics to clarify their different intents and benefits to sustainability. The carpooling requirements will remain the same.
1.J.1 Connection to Natural Heritage	The minimum and aspirational targets have been updated for clarity and definitions improved. An additional aspirational target has been added to encourage the public interaction and use of the natural heritage features beyond providing access.
1.J.2.Cultural Heritage Conservation	The summarized changes and rationale are described in Appendix C.
1.J.3- Natural Heritage Enhancements	<p>This metric has been revised to prioritize the habitat and survival of Pollinators, who play an important role in food production. Recent years have seen a sharp decline in pollinator populations due to climate change, habitat loss and pesticide overexposure. This is significant as a decline in pollinator populations could lead to a decline in plant species, impacting ecosystems and our food security. The proposed targets are intended to maintain and increase the habitat of pollinators.</p> <p>The proposed minimum target is to select plant species that provide a habitat for pollinators (i.e., flowering grasses and shrubs) and to include no invasive species who threaten the habitat and survival of pollinators. The original aspirational target has been removed. In its place is an aspirational target for providing continuous corridors of greenspace or “linkages”. Even if these linkages are small, they may reduce fragmented areas that make it difficult for pollinators to access all the resources they need to survive. Providing linkages for pollinators to pollinator corridors increases their ability to forage, thrive and maintain their habitat.</p>
2.A.1 Pedestrian Amenities	The name has been changed from “Connectivity” to more accurately reflect the sustainability benefits. The aspirational target has been moved to the minimum target and one new aspirational target has been added for an additional amenity.
2. B.1. Block Perimeter and Length	Carried forward and added another more stringent aspirational target from the Region of Peel’s Healthy Background Study Framework, Core Element 4: Street Connectivity to provide a framework for applicants that are prioritizing smaller blocks and increased pedestrian walkability.
2. D.1. Proximity to Cycling Network	The existing aspirational target has been made a minimum target and the aspirational target has been removed, based on consensus from TAT. This streamlines the requirements of the metric while remaining true to the intent.

2. E.1. Promote Walkable Streets	The existing aspirational target has been made a minimum target and the aspirational target has been removed, based on consensus from TAT. This streamlines the requirements of the metric while remaining true to the intent.
3.B.1 Stormwater Quantity	Added an additional aspirational metric which aligns with TGSv3 Tier 3. This provides a framework for applicants who want to exceed the existing aspirational targets and intend to incorporate innovative stormwater management techniques.
3.C.1 Dedicate Land for Private Garden Space	Name has been changed from “Dedicate Land for Food Production”. To simplify the requirements and increase uptake, the aspirational target ‘to dedicate 15% of roof space to local food production’ has been included, revised and expanded upon. The metric now awards points for providing a percentage of landscape or roof as garden space in increments of 5 to 10%, 11 to 15% and 16 to 20%.
3.D.1 Solar Readiness	Maintained as its own metric and the minimum and aspirational targets are kept. More guidance and clarity has been provided as to what is meant by “solar readiness”, including references to acceptable measures listed in the TGS v3 and a link to resources that provide a solar readiness checklist.
3. E.1. Healthy Soils	Name has been changed from “Restore and Enhance Soils” to more accurately reflect the intention of the metric. One aspirational target has been removed which related to soil permeability rather than the intention of the credit which is regarding healthy soils.
4.A.2- Building Energy Efficiency and Emissions 4.A.3 Energy Management	Name has been changed for 4.A.2 from “Building Energy Efficiency” to more accurately capture the sustainability benefits. These metrics relating to energy savings and management have been revised significantly. Background, information and rationale for these two metrics has been provided in its own section of this report, Section 2.5.
4.B.1- Reduce Potable Water Use	Name has been changed from Reduce Potable Water Use for Irrigation to more accurately reflect the intention of the metric. Minimum and aspirational targets were carried forward and more explanation has been included (with links to LEED documentation requirements, similar to TGS) to assist in documentation. A new aspirational target was included for projects that do not install any irrigation. There was discussion with the TAT to combine this metric with “rainwater harvesting” however it is our suggestion that these stay separate because rainwater harvesting is not always used as a strategy to reduce potable water for irrigation.
4. C.2. Reduce Light Pollution	Minimum target has been removed for this metric and a new aspirational target has been added that is in line with Tier 1 of the TGS, credit EC 5.1; all exterior fixtures must be Dark Sky Compliant, taking advantage in the synergies between the credits in the TGS and metrics that have similar intents. More detailed guidance language, including links to references, aligned with the TGS credit have been incorporated to provide more direction to applicant and encourage the uptake and achievement of this metric.
4.D.1 Bird Friendly Design	Metrics revised slightly to align with the City of Vaughan’s Urban Design Guidelines, as per consensus from the TAT.

4.E.1 Solid Waste	Minimum target updated and one added. Minimum targets now reflect TGS v3 credit SW 1.1 and SW 1.2 taking advantage in the synergies between the credits in the TGS and metrics that have similar intents. Original aspirational target removed, proposed are two new aspirational measures that align with TGS v3 SW 1.3 Bulky Waste and SW 1.6 Household Hazardous Waste as per consensus with TAT.
4.F.1- Reduce Heat Island– Non Roof	For simplicity, the name has been changed from Reduce Heat Island from Built Environment– Non Roof. The intent and targets remain the same, however language and strategies have been updated for clarity and to align more closely with TGSv3 AQ 4.1 and AQ 4.3.
4. F.2. Reduce Heat Island– Roof	For simplicity, the name has been changed from Reduce Heat Island from Built Environment–Roof. This metric has been simplified to align with TGS v3 AQ 4.2. Definitions from the TGS have been included for clarity.

Please note that the Richmond Hill metrics were the starting point for review. It seems that there is some variability in the number of metrics across the municipalities (for example Brampton has the Community and Neighbourhood Scale credit that does not seem to appear, at least by the same name, in the Richmond Hill metrics).

The Draft Sustainability Metrics have been re-formatted into an updated Sustainability Metrics Guidebook, which is attached in Appendix A.

2.5 Energy and GHG Reduction Metrics

As outlined in the background memo, there have been significant changes to building energy performance and GHG emissions targets since the Sustainability Metrics were first developed in 2012. These include the roll-out of provincial climate change action plans, as well as the development of the City of Toronto's municipal climate action plan (TransformTO), and subsequent implementation of updated Toronto Green Standard Version 3.0. The energy efficiency requirements of the Ontario Building Code SB-10 and SB-12 have also been made more stringent, to the extent that they now exceed the recommended minimum level of performance in the current Sustainability Metrics. It is also understood that the City of Richmond Hill as well as the other partner municipalities have either developed, or are in the process of developing, their community energy and emissions plans, and will likely encourage a significant reduction in energy and GHG emissions associated with the buildings sector to meet their overall GHG emissions reduction targets.

In order to assist with the decision-making process to incorporate more stringent and/or alternative performance metrics associated with energy and GHG reduction, a cost-benefit analysis has been completed for five common building archetypes in order to make recommendations on the most suitable performance targets, based on energy and emissions savings, as well as technical and economic viability. The five archetype buildings that have been analyzed include a medium-sized single family dwelling, a low-rise multi-unit residential building (MURB), a mid to high-rise MURB, office and retail.

The building energy analysis was completed using EnergyPlus modelling software, and costing information is based on Morrison Hershfield's internal costing database and previous energy policy projects. The impact of a variety of parameters including envelope performance, HVAC system performance, building window-to-wall ratio, and lighting was assessed.

The range of conditions analyzed generated a large data set, which was then analyzed using Morrison Hershfield's Interactive Building Energy Performance Map to determine trends in the data and derive conclusions in terms of target recommendations.

2.5.1 Scope of Analysis

The objective of the energy modelling study was to better understand the impact of key design parameters on energy and emissions performance of the identified building archetypes, and to develop performance requirements for identified archetype facilities across three distinct levels that form the structure of the Sustainability Metrics: Mandatory, Recommended Minimum and Aspirational. A parametric modelling study was completed for five of the most common city building types: medium-sized single family dwelling, low-rise MURB, mid-to-high rise MURB, office and retail.

The three levels of targets are established to generally correspond to the following performance levels:

- Level 1: "Mandatory" – Required for all new buildings and facilities as a mandatory minimum level of performance, and is equivalent to that required by the Ontario Building Code.
- Level 2: "Recommended Minimum" – Performance targets that represent a more ambitious level of performance overall, and serve as the recommended base performance level for sustainable development in the community.
- Level 3: "Aspirational" – Performance targets that are considered best in class and should be pursued when project constraints allow. The targets are generally with net zero emissions-ready and net zero energy outcomes, as well as performance levels typically aimed towards Passive House or the Living Building Challenge.

2.5.2 Energy Performance Approaches and Metrics

2.5.2.1 Reference Building Approach

Targeting a performance level relative to an energy code, such as the National Energy Code of Canada for Buildings (NECB), is known as a reference building approach. The key features of a reference building approach are:

- The "reference building" is a fictitious building that the design is compared to for assessing performance.

- The reference building predominantly has the same physical characteristics as the proposed design, such as program type, geometry, and orientation.
- The reference building approach normalizes certain assumptions about the building, thereby eliminating any performance biases related to building characteristics that are not typically under the control of the design team. This typically includes characteristics such as occupancy, hours of operation, receptacle and process loads, among others.
- The reference building approach typically uses a strict ruleset that dictates how performance is to be assessed using energy modeling, and how credit is rewarded for energy efficiency measures. The implications of these modelling rules are further examined in Section 2.5.4 of the report.
- The reference building approach typically results in a moving target, in that the performance of the reference building changes based on certain characteristics of the design (see below for examples in the NECB). This can sometimes result in situations where better relative performance does not equal better absolute performance.
- The reference building approach does not typically reward innovative strategies that minimize absolute energy use, such as night setback of temperature set-points reductions in receptacle and process loads, and other types of measures that would be considered standardized assumptions.
- The reference building approach does not always lead towards absolute reductions in energy and GHG emissions that strive towards net-zero emissions ready scenarios.

The reference building approach is common throughout North America, with most states in the US, British Columbia, and Ontario referencing some version of ASHRAE 90.1 – Energy Standard for Buildings except Low-Rise Residential Buildings. The NECB is currently referenced in British Columbia, Alberta, Manitoba, Ontario and Nova Scotia, the Model National Energy Code for Buildings (MNECB) 1997 is currently referenced in the Sustainability Metrics, and the City of Markham references ASHRAE 90.1 for building retrofits. However, the reference building approach is less common in other parts of the world, such as Europe, where a target based approach is used.

Potential reference building based metrics that could be included in the updated Sustainability Metrics are listed below:

2.5.2.2 Energy Savings over Ontario SB-10 (Ontario Building Code)

This metric looks at the relative energy consumption savings of a particular design over an NECB/NBC 2015 reference building (as modified by SB-10) that is minimally compliant with the energy efficiency requirements of Ontario SB-10, and as such provides a baseline that corresponds to the minimum energy performance required for new construction projects in the province. This metric does not rely on utility cost rates or GHG factors to weigh different fuel types and focuses strictly on percentage energy savings.

This metric has the same opportunities and challenges as discussed above for a reference building approach.

2.5.2.3 Number of LEED v4 Energy Points

This metric is based on the relative energy cost savings of a particular design over an NECB 2011 reference building. This metric relates to the current policy which references LEED (LEED energy points is calculated based on energy cost savings over a baseline).

The current Green Buildings metric requires that municipal buildings greater than 500 m² be designed to LEED Silver or an alternative equivalent as a mandatory requirement, and additional points are available for development plans that include multiple buildings, based on the number of buildings that pursue third-party green building certification.

Given that the metric is based on energy costs, it provides an inherent incentive for prioritizing electricity load reductions over reductions in natural gas use due to the higher utility rates for electricity, and will not be aligned with a low GHG emissions outcome due to the clean nature of Ontario's electricity grid.

This metric also has the same opportunities and challenges as discussed above for a reference building approach. In addition, this metric depends on the cost rates of different fuel type and may need to be updated periodically to account for fuel cost changes.

2.5.2.4 Target Based Approach

A target based approach sets absolute targets for energy efficiency. A range of metrics have been used in this approach, such as Energy Use Intensity, Heating Demand Intensity, and Greenhouse Gas Emissions Intensity. These are defined in more detail below. The key features of a target based approach are:

- It focuses on absolute values, rather than a comparative value. This tends to lead to more appropriate design solutions for reducing energy and/or carbon rather than solutions selected for the purpose of outperforming a fictitious reference building.
- A target based approach has been used successfully in high performance standards, such as Passive House, and has shown success in reducing actual energy use of operating buildings.
- Targets and metrics can be chosen to achieve the specific outcomes desired by a particular policy (e.g. energy, carbon, etc.)
- Targets often have to be set for different building types that inherently have different energy use characteristics; this can make it challenging to implement in a policy intended to capture all buildings.

Recently, some North American jurisdictions have moved from a reference building approach to a target based approach. One example is the City of Vancouver, where City Council recently adopted a “Zero Emissions Building Plan” that set absolute

targets for buildings city-wide. Another example, as noted by the C40 Cities Climate Leadership Group, is Washington D.C.'s voluntary Appendix Z to their building code which species a net zero energy compliance path, including identifying specific targets for annual heating demand and annual cooling demand (https://www.c40knowledgehub.org/s/article/How-to-set-energy-efficiency-standards-for-new-buildings?language=en_US). The advantage of such a policy is that it identifies a long-term goal, which in the City of Vancouver's case is carbon neutral new buildings by 2025, and then sets incremental improvements towards that goal that are transparent and can be planned for by the industry.

Given the shift towards a target-based approach in some of the more progressive energy policies across Canada, it is recommended to develop a set of absolute performance-based targets for key metrics that help drive towards low energy and carbon outcomes. The following target-based metrics may be considered for the redeveloped Sustainability Metrics:

2.5.2.5 Energy Use Intensity (EUI)

This metric looks at the absolute energy use of the building, and is typically varied depending on building type or climate. The metric focuses on lowering overall energy use without consideration of fuel source to improve building energy efficiency, reduce energy costs and stresses on the electrical grid.

Absolute EUI targets have been incorporated into several energy policies across Canada, such as the B.C. Energy Step Code, City of Vancouver's Zero Emissions Building Plan, and the Toronto Green Standard.

2.5.2.6 GHG Emissions Intensity (GHGI)

This metric is similar to EUI, but instead of focusing on absolute energy use, it focuses on absolute GHG emissions, with the intent of minimizing GHG emissions by prioritizing savings for high GHG fuels, encouraging low carbon fuel choices, and reducing building emissions.

The incorporation of the GHGI metric into the Municipal Green Building Standard will help for better alignment with City-wide environmental policies outlined in the municipal Environmental Master Plans for the City of Richmond Hill, City of Markham, City of Brampton, and Vaughan, as well as alignment with the provincial climate change mitigation mandate outlined in the 'Made in Ontario' Environmental Plan.

2.5.2.7 Thermal Energy Demand Intensity (TEDI)

This metric represents the amount of heating a building needs to offset building envelope losses and temper ventilation air, prior to any mechanical interventions (with the exception of ventilation heat recovery equipment). The intent of this metric is to maximize passive or near passive systems before looking at heating delivery methods and technology. This metric has been made popular by Passive House, an international high performance building standard, which promotes highly insulated

buildings with exceptional ventilation heat recovery and otherwise simple mechanical systems.

This metric is agnostic to fuel source, with the primary intention of imposing efficient building envelope solutions. According to the Pembina Institute's report on "Accelerating Market Transformation for High-Performance Building Enclosures", in addition to providing energy savings, prioritizing building envelope solutions are also important for the following reasons:

- Building envelope solutions "are long lasting and costly to refurbish, unlike other systems that can be more easily replaced as better technologies become available"
- Building envelope solutions are simpler, "their performance does not depend on complex energy management systems and they are more tolerant to delayed maintenance"
- Reducing heating and cooling demand early in the design process allows for reduction of the size of space conditioning systems, reducing construction cost and ongoing energy demand.
- Better building envelopes "also offer significant non-energy benefits, such as thermal comfort, acoustic isolation, durability, and increased resiliency to power outages and extreme temperature events."

TEDI has attracted interest from policy makers in an effort to promote better building envelopes without being overly prescriptive on requirements. Under current energy codes like ASHRAE 90.1 and the NECB, there is substantial room to trade-off mechanical and electrical efficiencies with lower performing envelopes. A metric like TEDI elevates the importance of the building envelope, which is viewed as one of the more robust energy saving measures in a building. Unlike mechanical and electrical systems, the building envelope is typically not prone to user or operator error, thereby more likely to realize its projected energy savings.

Moreover, many components of the building envelope typically last the service life of the building, making its initial make-up and performance critical for the building's long-term performance. Finally, efficient building envelopes can provide additional benefits to energy and greenhouse gas emissions reductions, as shown in the "Zero Emissions Building Framework" (City of Toronto, 2017). The analysis done to support this policy showed how improved building envelopes can perform substantially better in power outages and maintain livable space temperatures, even under extended cold periods.

In view of the benefits outlined above, as well as the potential for improvements in energy efficiency of the building envelope relative to current typical practice in the municipal building stock, it is recommended that the TEDI be adopted as a target metric in the redeveloped Sustainability Metrics.

2.5.3 Archetype Building Descriptions

Morrison Hershfield (MH) modelled the archetype buildings from MH's internal database based on real building floor plans from buildings that best reflected the five

building types that were to be analyzed. The Part 9 single family dwelling archetype was based on the energy modelling data set generated by MH's Pathfinder tool.

2.5.3.1 Single Family Dwelling (Part 9)

The Part 9 low-rise residential archetype is represented by a medium-size single family dwelling (SFD) with a total gross floor area of 237 m², consisting of 2 storeys and a basement. The building would fall under the scope of Part 9 of Division B of the Building Code, and would be subject to the energy efficiency requirements of OBC SB-12 at a minimum.

The following variations in building design parameters and energy conservation measures (ECMs) are considered to determine the impact on higher levels of energy efficiency on the identified key whole-building performance metrics.

- Airtightness ACH: 3.5 ACH, 2.5 ACH, 1.5 ACH, 0.6 ACH
- Wall Effective R-Value: R-16, R-18, R-22, R-30, R-40
- Underslab R-Value: R-0 (uninsulated), R-11.1, R-20
- Roof R-Value: R-40, R-50
- Window U-Value: Double-Glazed (U-0.32), Triple-Glazed (U-0.21), High-Performance Triple-Glazed (U-0.14)
- Domestic Hot Water: Electric tank, Gas-fired instantaneous water heater, heat pump water heater
- Drainwater Heat Recovery: None, 42% effective drainwater heat recovery
- Space Heating: Electric baseboards, forced-air gas-fired heating furnace, cold climate air-source heat pump
- Ventilation Air heat Recovery: None, 62% effective energy recovery ventilator (ERV), 72% effective ERV, 84% effective ERV

2.5.3.2 Low and Mid/High-Rise Multi-Unit Residential (Part 3)

The low-rise residential archetype is represented by a four-storey multi-unit residential building (MURB) with a total gross floor area of 5,290 m², whereas the mid/high-rise is represented by a 30-storey MURB with a total gross floor area of 22,660 m². The buildings would fall under the scope of Part 3 of Division B of the Building Code, and would be subject to the energy efficiency requirements of OBC SB-10 at a minimum.

The energy and emissions performance outcomes of the two archetypes are generally expected to be quite similar, with the primary difference being in costing outcomes due to differing envelope construction (i.e. combustible vs. non-combustible construction).

The following variations in building design parameters and energy conservation measures (ECMs) are considered to determine the impact on higher levels of energy efficiency on the identified key whole-building performance metrics.

- Airtightness: Up to 75% reduction from code (NECB) baseline value
- Wall Effective R-Value: Options between R-10 and R-30
- Roof R-Value: Options between R-20 and R-40
- Window-to-Wall Ratio: Options between 30% and 80%

- Window Performance: Options ranging between U-0.4 (double-glazed) and U-0.14 (high-performance triple glazed)
- Lighting Power Density: Up to 50% reduction in common area lighting from code values through usage of high efficiency LED lighting
- Plug Loads: Option for 20% load reduction from ENERGY STAR rated appliances
- Corridor Ventilation: Options for corridor pressurization between 30 cfm/suite and ASHRAE 62.1-2010 minimum requirements.
- Ventilation Air Heat Recovery: Options – None to 85% suite ERV efficiency
- HVAC System: Option of conventional fan coil units served by condensing boiler/water-cooled chiller, or air/ground source heat pumps
- Domestic Hot Water: Option for up to 50% load savings from low-flow fixtures.

2.5.3.3 Commercial Office

The commercial office archetype will be represented by a ten-storey office building with a total gross floor area of 18,200 m². The building would fall under the scope of Part 3 of Division B of the Building Code, and would be subject to the energy efficiency requirements of OBC SB-10 at a minimum.

The following variations in building design parameters and energy conservation measures (ECMs) are considered to determine the impact on higher levels of energy efficiency on the identified key whole-building performance metrics.

- Wall Effective R-Value: Options between R-5 and R-30
- Roof R-Value: Options between R-20 and R-40
- Window-to-Wall Ratio: Options between 40% and 80%
- Window Performance: Options ranging between U-0.4 (double-glazed) and U-0.2 (high-performance triple glazed)
- Lighting Power Density: Up to 50% reduction in common area lighting from code values through usage of high efficiency LED lighting
- Plug Loads: Option for 25% load reduction through energy-efficient plug loads
- Ventilation Air Heat Recovery: Options – None to 90% energy recovery effectiveness
- HVAC System: Option of conventional variable air volume (VAV) or fan coil units with dedicated outdoor air system (DOAS)
- Central Plant: Option of conventional high efficiency plant (i.e. condensing boiler and magnetic bearing chillers), air-source heat pump with back-up boiler, or ground-source variable refrigerant flow (VRF) systems.

2.5.3.4 Retail

The retail archetype is represented by a single-storey Big Box store configuration with a total gross floor area of 4,500 m² and height of 6.1 m. The building would fall under the scope of Part 3 of Division B of the Building Code, and would be subject to the energy efficiency requirements of OBC SB-10 at a minimum.

The following variations in building design parameters and energy conservation measures (ECMs) are considered to determine the impact on higher levels of energy efficiency on the identified key whole-building performance metrics.

- Wall Effective R-Value: Options between R-5 and R-30
- Roof R-Value: Options between R-20 and R-40
- Window-to-Wall Ratio: Options between 5% and 40%
- Window Performance: Options ranging between U-0.4 (double-glazed) and U-0.2 (high-performance triple glazed)
- Lighting Power Density: Up to 50% reduction in common area lighting from code values through usage of high efficiency LED lighting
- Ventilation Air Heat Recovery: Options – None to 90% energy recovery effectiveness
- HVAC System: Option of conventional gas-fired unitary rooftop units, unitary air-source heat pumps, or fan coil units with a dedicated outdoor air system (DOAS).
- Central Plant: Option of standard efficiency boiler/chiller plant, high-efficiency plant (i.e. condensing boiler and magnetic bearing chillers), or ground-source variable refrigerant flow (VRF) systems.

2.5.4 Parametric Analysis of Energy, Cost and Carbon Outcomes

The archetype energy models described above were run through an optimization process to identify the intersections of critical metrics so that a robust energy performance policy could be developed. The optimization process involves running a large-scale parametric analysis of each archetype, where various combinations of energy efficiency measures are run, with the number of options in the thousands or tens of thousands per building. For each option, energy, carbon and financial metrics are extracted. The variations in inputs vary by building, but typically involve the following:

The metrics that were extracted for each run included:

- Electricity and Gas Use of building (per m² of floor area)
- Total energy use, GHG emissions and thermal energy demand intensities (EUI, GHGI and TEDI) (per m² of floor area)
- Energy and GHG savings over Building Code
- Incremental Capital Cost, expressed as a percentage of total construction cost
- Annual Utilities cost of building (per m² of floor area)
- NPV Savings over typical design– This is the present value of the financial benefit over the 20 year study period.
- Breakdown of energy consumption by end-use and fuel type

The resulting data set was then dynamically visualized using MH's Building Pathfinder tool to better understand the interrelationships between the different metrics, as well to determine which metric would best lead to the intended outcome of GHG emissions reduction.

2.5.4.1 Option 1 – Prescriptive Approach

One option would be to simply adopt prescriptive requirements for the elements of building design that have a significant impact on energy and GHG emissions.

The Figure below illustrates the outcomes for such an approach for a mid-rise Part 3 MURB, where prescriptive requirements have been applied on the window-to-wall ratio (maximum 40%), Wall R-value (minimum effective R-20), and 70% effective heat recovery ventilators for dwelling units.

While imposing these requirements would result in at least 20% energy consumption and cost savings, as well as 10% GHG savings relative to the current OBC SB-10, there is still a wide range of outcomes for energy use intensity (could range between 60 and 180 kWh/m².yr) as well as absolute greenhouse gas emissions intensities ranging from 2.5 to 27 kgCO_{2,eq}/m².yr.

In order to obtain greater certainty on absolute energy and GHG performance outcomes, a greater number and/or more stringent prescriptive requirements could be imposed, however this is generally not preferred as a policy approach due to the greater degree of complexity, restrictiveness in terms of design options, and may not necessarily always result in cost-optimal approaches in achieving the intended reductions.

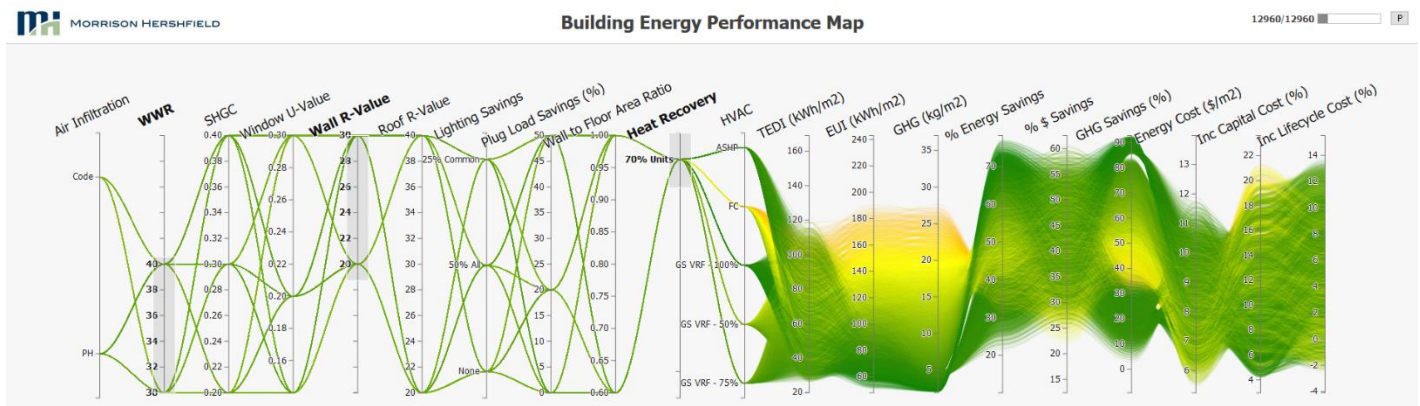


Figure 4: Option 1 - Prescriptive Approach

2.5.4.2 Option 2 – “Percent-Better-Than” Building Code

Option 2 is similar to the current approach adopted by the Sustainability Metrics, in that it involves setting an energy savings target relative to the Building Code minimum. Compliance would be demonstrated by comparing the modelled performance of the proposed building with the modelled performance of the code-minimum reference building.

This approach is illustrated in the Figure below for a Part 3 mid-rise MURB, where a target of 35% improvement in energy efficiency over the OBC SB-10 is applied. In terms of GHG reduction, it can be seen that this would result in at least a 15% reduction

in GHG emissions relative to the OBC baseline model, depending on the measures that are adopted in the design.

However, in terms of absolute GHG emissions, there is still a significant range in expected performance; this is a virtue of the limitations associated with the reference-building based approach, wherein elements of the reference building model mirror those of the proposed model per the modelling requirements in the underlying energy codes. For example, if the proposed building is served by a gas-fired heating system, a gas-fired heating system would also be modelled in the reference building, which would inherently have higher GHG emissions due to the carbon-intensive nature of the fuel source. As such, an improvement in relative performance may not necessarily correlate to an improvement in absolute performance, as is evident in the modelling data.

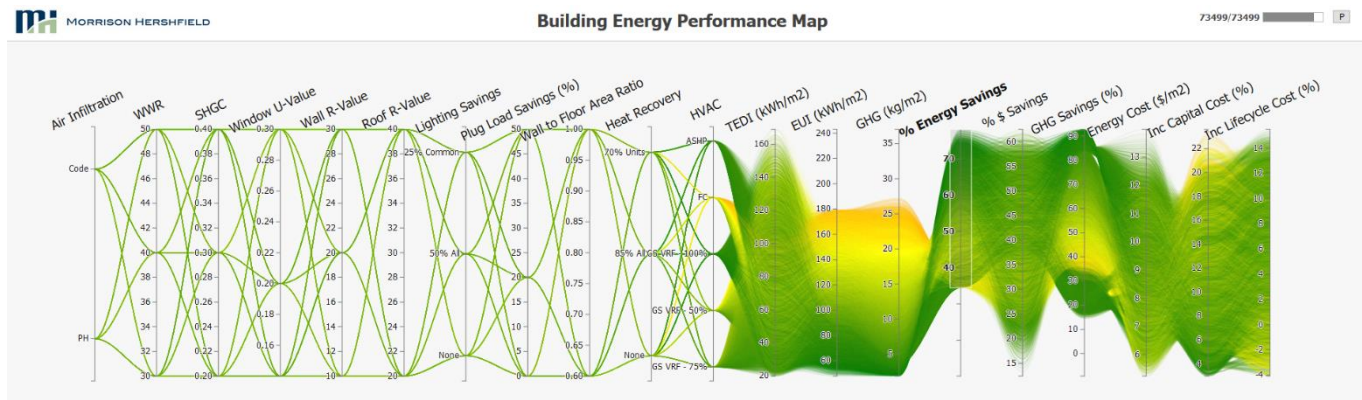


Figure 5: Option 2 – “Percent-Better-Than” Building Code

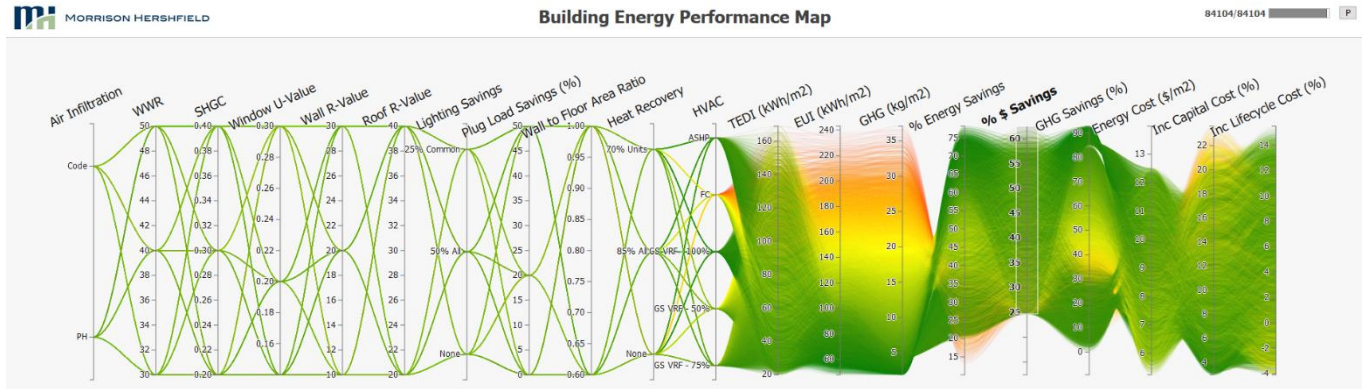
2.5.4.3 Option 3 – Minimum LEED Energy Points (% Cost Savings)

Option 3 would involve tying energy performance requirements with that of a green building certification program such as LEED. In the case of LEED, points for energy performance are awarded on the basis of percentage improvement in *energy costs* relative to an energy standard such as ASHRAE 90.1-2010 or NECB 2011.

This approach is illustrated in the Figure below, wherein a minimum % cost reduction target of 20% relative to the energy code is applied, as an example. It can be seen that imposing this target may not necessarily lead to reductions in absolute GHG emissions intensity; this is partially due to the difference in utility cost rates between electricity and natural gas currently in the province, with the latter typically being about five to six times less expensive than electricity. However, in terms of GHG emissions, electricity is about four times cleaner than natural gas in terms of equivalent carbon emissions per unit of energy. The result is that while electrical load reductions typically tend have a more significant impact on operating costs, the impact on GHG emissions is relatively small compared to natural gas savings. As such, a metric that prioritizes

energy cost reductions may not necessarily result in equivalent GHG emissions reductions.

Figure 6: Option 3 - Minimum LEED Energy Points (% Cost Savings)



2.5.4.4 Option 4 – GHGI Target Only

The Figure below indicates the outcomes associated with imposing a GHGI target of 20 kg/m².yr, which corresponds to the TGS Tier 1 target for a Part 3 MURB as an illustrative example.

While this metric is beneficial in itself for GHG reductions due to its very nature, there are several shortfalls with this approach of solely imposing a GHG reduction target that are evident in the modelling data:

1. It may not necessarily lead to outcomes that are energy-efficient in nature; for example, the TEDI metric, which is primarily measure of the efficiency of the building envelope, could be as high as 160 kWh/m².yr (compared to the TGS Tier 1 target of 70 kWh/m².yr), while still meeting the GHG target. This is primarily associated with pathways that rely on fuel switching from gas to electricity, while doing little to improve building energy efficiency.
2. As a result of fuel switching without improvements in energy efficiency, there could be the potential for significant increases in utility operating costs due to the higher cost of electricity; as indicated in the Figure below, the annual energy cost could exceed \$13/m² in some cases.

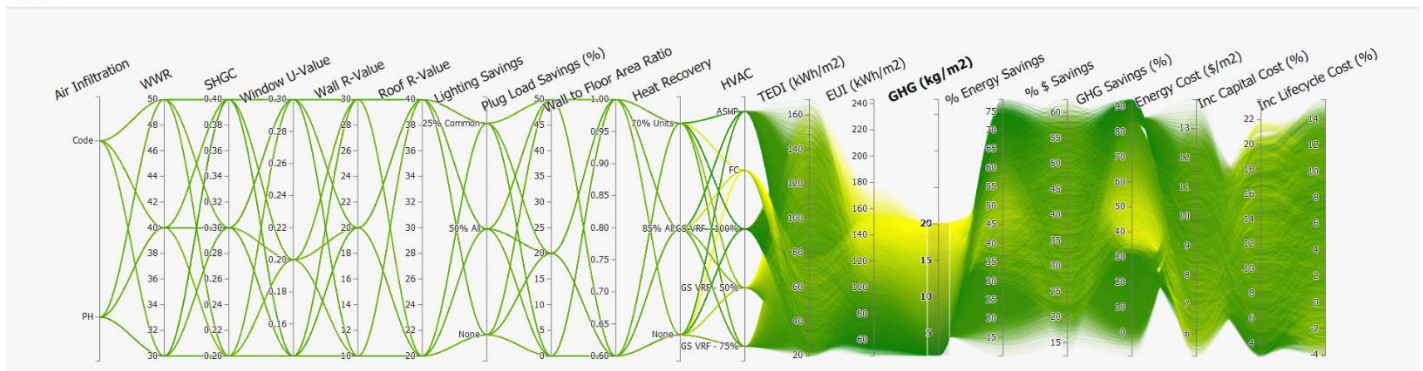


Figure 7: Option 4 – GHGI Target Only

2.5.4.5 Option 5 – EUI, TEDI and GHGI Targets

This option involves setting absolute targets for energy use intensity (EUI), thermal energy demand intensity (TEDI) and greenhouse gas emissions intensity (GHGI), each of which is intended to address a specific policy outcome:

1. EUI – Promotes improvements in building energy efficiency across all building energy end-uses (space heating, cooling, lighting, etc.), while also reducing peak demand and stresses on the local grid.
2. TEDI – Specifically targets improvements in building envelope performance, given the co-benefits associated with durability and thermal resiliency, in addition to energy and GHG emissions reduction.
3. GHGI – Encourages the use of alternative low-carbon fuels and sources of energy to minimize the carbon footprint of the development.

Figure 8 below shows the scenario where the TGS Tier 1 targets for EUI, TEDI and GHGI to the high-rise MURB archetype. The associated outcomes are that the design would achieve at least a 10% improvement over the OBC SB-10 baseline, as well as providing for greater certainty in terms of GHG emissions (i.e. no more than 20 kgCO_{2,eq}/m².yr). Due to the incorporation of EUI and TEDI targets, the energy operating costs are also lower (i.e. more than \$9.5/m².yr) compared to Option 4 above with just a GHGI target. Furthermore, there are a variety of design solutions

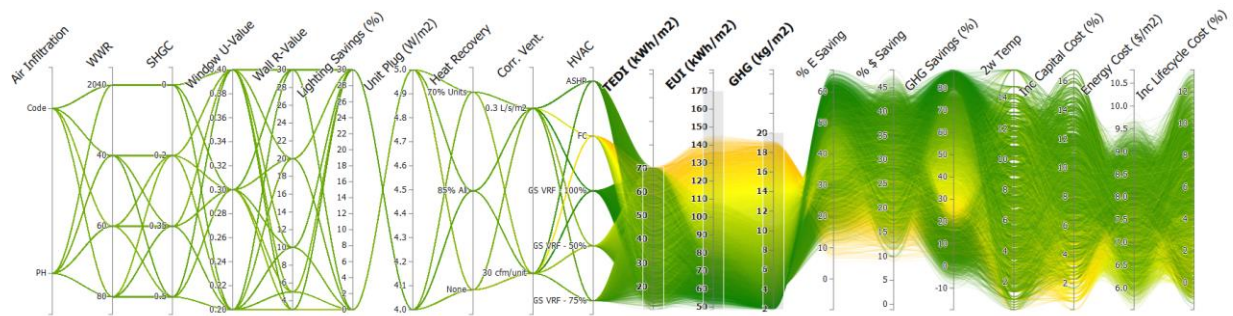


Figure 8: Option 5 - Recommended Minimum Scenario

Figure 9 shows the application of the TGS Tier 4 to the same archetype model, and is generally considered to be equivalent to near-net zero (net-zero ready) level of performance in terms of GHG emissions. To achieve this level, certain design constraints are evident such as usage of high-performance triple glazing (maximum U-0.30), at least an R-10 effective opaque wall assembly, highly effective heat recovery (over 70% effectiveness), and fuel switching from gas-fired boilers to either air-source or ground-source electrically-driven heat pumps. The incremental capital costs could range between 6% and 15% depending on the chosen measures, however the incremental lifecycle costs (i.e. including the benefits of energy savings over a 20-year period) could be as little as 2%.

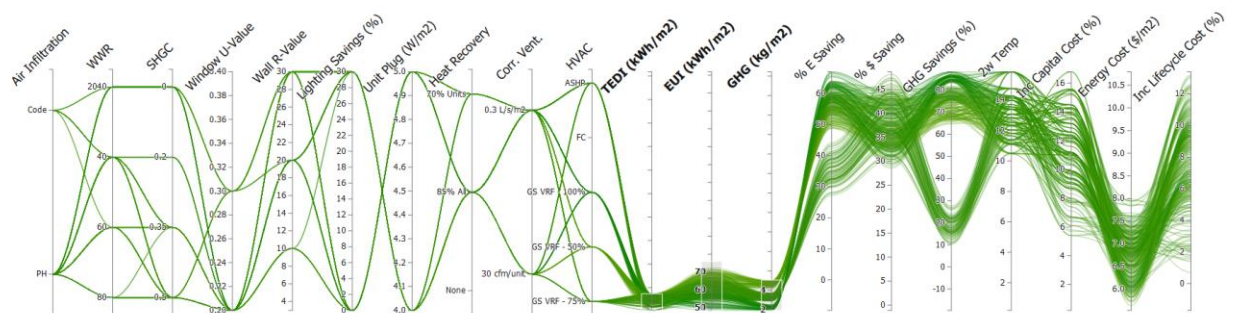


Figure 9: Option 5 - Aspirational Scenario

2.5.5 Proposed Metric Changes

Based on the results of the energy modelling analysis, we recommend the following for the update of metrics associated with the energy and GHG emissions performance of buildings:

1. Adopt absolute performance-based targets for EUI, TEDI and GHGI for the Part 3 building archetypes explored in the energy modelling analysis, i.e., multi-unit residential, office and retail. As evident in the modelling data, incorporating performance targets for all three metrics would result in specific policy outcomes that would contribute to a robust GHG emissions mitigation strategy in the buildings sector.

A target for EUI would promote improvements in building energy efficiency across all building energy end-uses (space heating, cooling, lighting, etc.), a TEDI target would specifically target improvements in building envelope performance, given the co-benefits associated with durability and thermal resiliency, in addition to energy and GHG emissions reduction, and a GHGI metric would encourage the use of alternative low-carbon fuels and sources of energy to minimize the carbon footprint of the development. In addition, improvements in all three metrics would result in lower utility operating cost for the building owner and/or tenant, thereby resulting in lower lifecycle costs (i.e. total cost of ownership), and contributing positively in terms of affordability.

Targets that are aligned with TGS Tier 1 are suggested for the “Minimum”, and those aligned with Tier 4 are suggested for the “Aspirational” performance scenario. A pro-rated points-based system can be implemented to reward intermediate performance between these two levels.

2. For low-rise residential buildings such as single family dwellings that fall under Part 9 of the Building Code, it is generally atypical to perform detailed hourly energy modelling, given the associated costs relative to the overall construction value of the building. Furthermore, there are several energy-focused certification programs available on the market such as Energy STAR for New Homes, R-2000, the CHBA Net Zero Home Labelling Program and Passive House, all of which would lead to high-performance building outcomes. As such, these existing certification programs can be leveraged to set energy and GHG emissions performance requirements for this building typology.
3. For metric 4.A.3. Energy Management, we recommend developing specific terms of reference that outlines the minimum requirements and expectations for the Energy Strategy report that are aligned with the community energy and emissions plans as well as overall municipal objectives, to assist applicants with pursuing this metric. Requirements may include:
 - High-level energy analysis using archetype modelling or benchmarking data to estimate the overall energy consumption and GHG emissions associated with the development.
 - Identify and evaluate opportunities to reduce EUI and GHG emissions intensities down to a net-zero emissions ready level of performance (i.e. the Aspirational building efficiency target) through various measures such as more efficient building form and massing, orientation, improved building envelope performance, highly efficient HVAC systems, heat recovery and lighting solutions.
 - Analysis of low-carbon energy solutions and on-site renewable energy generation potential that can be incorporated to the development, including

rooftop PV, geo-exchange systems, high efficiency CHP, thermal energy stores, and sewer water heat recovery.

- In the case of multi-building development proposals or in intensification areas identified by the municipality, investigate the feasibility of shared energy solutions such as development of low-carbon thermal energy networks or connection to planned or existing district energy systems, and identify the required provisions to be district energy-ready.
- Identify and evaluate opportunities for backup power systems and passive design features that will improve the resilience of buildings to area-wide power outages.

Out of the three points available for this metric, we suggest that one point be awarded for the completion of an Energy Strategy report, and an additional two points be awarded for committing to meet an energy use intensity (kWh/m².yr) and GHG emissions intensity target (kgCO_{2,eq}/m².yr) for the entire development.

4. Consideration might be given for the development of an online parametric analysis tool similar to that developed for this project. The availability of this tool to applicants might better enable them to make informed decisions on building parameters. It would also demonstrate leadership by the municipality. Note a version of the tool is now online for B.C. buildings at <http://www.buildingpathfinder.com/>.

2.5.6 Implementation Considerations

In order to ensure that the proposed performance metrics translate to real GHG emissions reductions and energy efficiency and energy cost savings, consideration should be given to implementation strategies and tools to support the policy. Some items of implementation to consider when rolling out the revised policy include:

- **Commissioning:** Building commissioning is a systematic process of verifying that the various building sub-systems such as building envelope, mechanical (HVAC), plumbing and lighting systems are constructed and operational per the project requirements and design intent. The practice of commissioning has become relatively standard and common for most large new construction Part 3 building projects. In order to reduce the performance gap between modelled performance based on design intent and actual performance during operations, it is essential that requirements for best practices in building commissioning are integrated into the Standard.
- **Sub-metering:** In order to facilitate ongoing energy management, as well as to support post-occupancy calibration of the energy model in cases of significant discrepancy, it is suggested that electricity and/or thermal sub-meters be required to be installed for all energy end-uses that represent more than 10% of the building's total energy consumption. In addition, all major process loads such as pools and ice rinks should be sub-metered separately.
- **Energy modeling guidelines** to clarify standard schedules, assumptions and methodologies around energy models so that projects are meeting the proposed performance criteria as intended.

- **Air tightness testing:** The results of the energy analysis have indicated that improved air tightness over “typical” values can have significant energy savings. This can only be verified using whole building air leakage testing. This is an added expense to a project if mandated, but would likely result in actual air leakage reductions and related energy savings. Airtightness testing is mandatory for projects targeting Tier 2 or higher under the TGS.

APPENDIX A: Draft Update- Sustainability Metrics Guidebook

In this Appendix, the proposed updates to the Sustainability Metrics have been re-formatted and presented into an updated Sustainability Metrics Guidebook.

APPENDIX B: Metrics Re-Numbering

In this Appendix, we have presented the proposed renumbering of the metrics to be more reflective of the categories; Built Environment, Mobility, Natural Environment and Open Space and Infrastructure and Buildings. This Appendix also shows which metrics have been proposed to be moved to other categories, based on the category that most represents the metric's intent.

APPENDIX C: Change Rationale for Metric 1.J.2.

The updates to Metric 1.J.2. Cultural Heritage Conservation were largely drafted by the TAT. Included in this Appendix is the memo describing the rationale behind the changes to this metric.

LEGEND
Metric Category:

Built Environment

Mobility

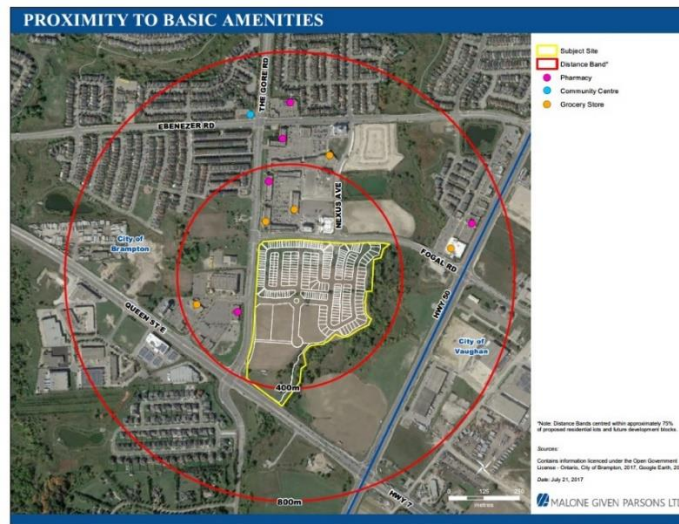
Natural Environment & Open Space

Infrastructure & Buildings

Innovation

Appendix A

Metric	[1.B.1/ 1.B.2] Proximity to Amenities		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To encourage development within and near existing amenities and limiting the development footprint in the region and to satisfy the City’s Official Plan requirements. Close proximity to amenities enables stronger and more desirable homes and work places and less vehicular travel.		
	Points	Requirements	Documentation Compliance
Minimum Target:	3 points	Locate amenities within 800m of 75% of Dwelling Units (DU). 1 point is achieved for each amenity within 800m (up to 3 points).	Submit: In the Community Design Guidelines (Block Plan), Planning Justification Report (Draft Plan) or Site Plan Drawings/ Urban Design Brief (Site Plan): <ul style="list-style-type: none">A satellite map highlighting the development cluster that accounts for 75% of the Dwelling Units (DU) and noting the approximate geographic center.List the amenities within 800m walking distance from the project's geographic center. Notes: <ul style="list-style-type: none">Amenities include: food retail (grocery store, supermarket), Library, Pharmacy, Community or Recreation Centre, General Retail, Bank, Place of Worship, Convenience Store, bank, Restaurant, Licensed Adult/ Senior Care and Child Care, Theatre.Employment lands excluded.One building can be considered multiple amenities (i.e. Pharmacy included in a grocery store.If the amenities are included in the proposed plan, but have yet to be defined, use best judgment (based on size, location and planning allocations) to assume the expected end-use of the planned amenity.
Aspirational Target:	3 additional points	1 point achieved for each additional amenity within 400m (up to 3 more points, in addition to the minimum threshold points).	
References:	City’s Official Plan Thinking Green Item 1,2,9 LEED NC SSc2 LEED NDPc3		



Source: Malone Given Parsons Ltd.

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4

Metric:	1. C.2. Preserve Existing Healthy Trees		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To preserve healthy, mature trees on site. Larger trees are often valued by occupants. Preserving trees can be a cost effective method to improve the overall appearance of a community while providing ecological and climate change benefits.		
	Points	Requirements	Documenting Compliance
Minimum Target:	3 points	Preserve 25% of healthy mature trees in situ on site.	Submit: On an Arborist Report: <ul style="list-style-type: none"> Identify all trees on site as per municipal standards, label all the, healthy mature trees including hedgerows on site, the trees that will be protected, moved or, removed as per municipal standards. Additionally, identify these trees on Landscaping Plan. Quantify the number of new trees (compensation) that will be provided to mitigate removal of healthy tableland trees as per municipal standards. Provide the percent (%) of healthy tableland trees that will be protected (in-situ) on-site on the Landscape Plan.
Aspirational Target:	2 additional points	Preserve 50% of healthy, mature trees in situ on site or preserve 100% of healthy hedgerows in situ on site.	

LEGEND

Metric Category:

Built Environment

Mobility

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			<p>Notes:</p> <ul style="list-style-type: none">○ <i>This metric (and associated points) are excluded if there are no healthy mature trees within the project boundary.</i>○ <i>This metric applies for healthy, mature trees on the developable portion of the site (e.g. not in the protected natural heritage system). Compensation may be used to enhance the Municipal natural heritage system in accordance with the Municipal policies.</i>
References:	TRCA Guideline for Determining the Ecosystem Compensation, Table C-1, page 43. Vaughan Tree Protection Protocol. Markham Trees for Tomorrow Manual.		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

LEGEND
Metric Category:

Built Environment

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Metric	1. C.3. Soil Quantity and Quality for New Trees		
Applicable To:	<input type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	Provide soil quantity and quality that enables new trees to thrive. Higher amounts of good quality soil help ensure thriving long lived plant life.		
	Points	Requirements	Documenting Compliance
Minimum Target:	2 points	Provide a minimum of 30m ³ of soil for each new tree and a minimum of 100 cm of uncompacted soil depth. Where there is a grouping of trees, provide a minimum of 20m ³ of soil for each new tree, and a minimum of 100 cm of uncompacted soil depth, or equivalent municipal standard. .	Submit: On a Landscape Plan and/ Drawings: <ul style="list-style-type: none">• Show the tree planting locations, soil quality and the soil volume provided per tree.
Aspirational Target:	2 additional points	Provide 25% more than the total soil volume required by municipal standards.	
Aspirational Target	2 points	Provide topsoil layer of tree pits, trenches, or planting beds with the following properties: <ul style="list-style-type: none">• Organic matter content of 10 to 15% by dry weight and a PH of 6.0 to 8.0.• A minimum depth of 60 cm, or in accordance with municipal standards, whichever is higher.	
References:	Vaughan’s Tree Protection Protocol Toronto Green Standard v3		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

LEGEND
Metric Category:

Built Environment

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Appendix A

Metric	1. C.4. Enhancing Urban Tree Canopy and Shaded Walkways and Sidewalks		
Applicable To:	<input type="checkbox"/> Block Plan <input type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To provide street trees as a method to promote a more walkable pedestrian environment. Targets are additional to the municipal planting requirements. Street trees provide ecosystem services such as cleaning the air, intercepting rainfall, providing shade and evaporative cooling and wind breaks. They also provide pleasing views and habitats for a number of animals.		
	Points	Requirements	Documenting Compliance
Minimum Target:	2 points	Provide shade within 10 years for at least 50% of the walkways/sidewalk lengths All trees should be selected from the applicable municipal tree list.	Submit: On a Landscape Plan or in the Drawings: <ul style="list-style-type: none">• The total area of existing and planned pedestrian networks within the project boundary, highlighting the area on drawings.• The existing and/ or planned trees along the pedestrian network and the expected canopy after 10 years of growth (e.g. tree growth protection diagram).• Calculate the area of sidewalk that is shaded using the estimated crown diameter (width of the shade if the sun is directly above the tree) and declare the percent (%) area of sidewalk that will be shaded. Shade is expressed in percentage (%) and considers the shaded area provided by the tree canopy, relative to the total pedestrian path. Calculations are to be signed and confirmed by a qualified professional (e.g. arborist, landscape architect) quantifying the total pedestrian path that is shaded by tree canopy after 10 years of growth.• Provide a signed declaration from a qualified professional (e.g. arborist, landscape architect) that the planting details are appropriate to grow healthy trees, taking into account tree species, root medium, soil volume/quality, and the tree species in accordance with municipal standards.
Aspirational Target:	4 points	Provide shade within 10 years for at least 75% of the walkways/sidewalk lengths. All trees should be selected from the applicable municipal tree list.	
Aspirational Target	2 points	Provide street trees on both sides of streets at distance intervals 6-8 metres or less.	
Aspirational Target	3 points	Provide shading within 10 years for at least 50% of parking areas. All tree should be selected from the applicable municipal tree list.	
References:	City's Official Plan LEED ND NPDc14		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

LEGEND
Metric Category:

Built Environment

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Metric	1. D.1. Buildings Designed and/or Certified under an Accredited “Green” Rating System		
Applicable To:	<input type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To recognize appropriate independent third-party certification systems incorporated into proposal. Sustainability certification systems, such as LEED, provide recognizable certifications demonstrating to the public that degrees of sustainability are being achieved. This can result in increased value for the buildings or neighborhood.		
	Points	Requirements	Documenting Compliance
Minimum Target:	1 to 5 points (1 point per building)	The project boundary includes 1 to 5 green buildings enrolled in one or more recognized third party standard.	Submit: <ul style="list-style-type: none">A Letter of Intent signed by an accredited professional (e.g. architect, professional engineer, LEED professional) that includes confirmation that at least one building within the project is to be certified to a recognized third party green rating system.Confirmation of registration for a third party green rating system (i.e., a receipt of the registration fees). Notes: <ul style="list-style-type: none"><i>Buildings that intend to be certified under multiple rating systems may only count for 2 points each.</i><i>This metric applies only to high density residential, high density non-residential, industrial and commercial developments. It does not apply to single-detached homes and ground oriented residential developments.</i> Third Party Accredited Green Rating Systems Include: <ul style="list-style-type: none">ASHRAE 189LEEDv4 (not including LEED for Commercial Interiors)Passive HouseLiving Building ChallengeNet Zero Building Standard (CaGBC)WELL Building StandardFitwel
Aspirational Target:	2 additional points	For projects with more than 5 buildings, additional points are awarded up to 7 points.	
Aspirational Target	1 additional point per building	If a building is registered for more than one green rating system certification.	
Aspirational Target:	2 points	The application includes one of the following green rating systems: <ul style="list-style-type: none">LEED NDOne Planet Living	
References:	City’s Official Plan Sustainable Design and Construction Policy for Municipal Buildings		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

LEGEND
Metric Category:

Built Environment

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Metric	1. E.1. Universal Design		
Applicable To:	<input type="checkbox"/> Block Plan <input type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To enable a wide spectrum of people to live within and access new buildings (regardless of age or ability). To provide accessibility to occupants beyond the Ontario Building Code (OBC) which mandates a barrier free path of travel is included in 10% of Multi-Residential Units as per OBC. Inclusive buildings and neighborhoods expand the number of potential users, thereby increasing value. They also enable more diversity in age.		
	Points	Requirements	Documenting Compliance
Minimum Target:	2 points	Design a minimum of 20% of the Dwelling Units (DU) in accordance with ICC/ANSI A117.1 Universal Design Standards (or equivalent).	Submit: A Letter of Confirmation or Compliance signed by an accredited professional (e.g architect, engineer, accessibility consultant) which declares that the metric requirements have been achieved. On a Site Plan: <ul style="list-style-type: none">• Confirm that 10% of the units have been designed with barrier-free path of travel (if applicable; Multi-Residential Units are included in the plan).• Quantify the total number of Multi-Residential Units (if applicable) and total dwelling units included within the proposed development• Quantify the number and percent (%) of dwelling units designed to ANSI 117.1 standards or equivalent.
Aspirational Target:	2 additional points	Design a minimum of 30% of the Dwelling Units (DU) in accordance with ICC/ANSI A117.1 Universal Design Standards (or equivalent).	
References:	Accessibility Act City's Municipal Accessibility Plan LEED ND NPDc11 Ontario Building Code requirements		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

LEGEND
Metric Category:

Built Environment

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Metric	1. E.2. Universally Accessible Entry to Buildings and Sites		
Applicable To:	<input type="checkbox"/> Block Plan <input type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To enable a wide spectrum of people to access new buildings, regardless of age or ability. Ontario Building Code (OBC) requires 100% of primary entrances to be designed to universally accessible standards. Inclusive buildings and neighborhoods expand the number of potential users, thereby increasing value. They also enable more diversity in age.		
	Points	Requirements	Documenting Compliance
Minimum Target:	1 point	50% of emergency exits above the OBC requirements are designed to universally accessible standards.	Submit: On a Site Plan drawing: <ul style="list-style-type: none">Clearly identify all primary entries, emergency exits and remaining building entries/exits.Identify the entries/exits that are designed to universally accessible standards and list universal accessible design standard referenced for the design.Quantify the percent (%) of emergency, and remaining entries/exits that are designed to universally accessible standards.
Aspirational Target:	2 additional points	100% of all entries and exits above the OBC requirements are designed to universally accessible standards	
References:	Ontario Accessibility Act City's Municipal Accessibility Plan LEED ND NPDC11		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

LEGEND
Metric Category:

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Metric	1. F.1. Design for Life Cycle Housing		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input type="checkbox"/> Site Plan		
Metric Intent:	To encourage the planning and creation of mixed use areas. Diverse and inclusive buildings and neighborhoods expand the number of potential users. They can also be more visually pleasing.		
	Points	Requirements	Documenting Compliance
Ownership	Minimum Target: 2 points	Proposed project includes at least 10% of affordable/low income or rental housing.	Submit: In the Planning Justification Report declare the following: <ul style="list-style-type: none">The percent (%) of the housing, accommodation and ownership types included in the project. The total percent (%) by category (i.e. ownership, housing type, accommodation) should each add up to 100%. In the Block Plan provide the following: <ul style="list-style-type: none">Housing types within the project (single-detached, semi-detached townhomes/stacked and mid/hi-rise housing).Ownership types within the project (market, rental and affordable/low-income).Accommodation types within the project may include (live work, multi-generational mixed-use, 1 bedroom/studio, larger than 2 bedrooms).Affordable/Low-Income Housing = Refer to Provincial, Regional and City Official Plan for definition.
Housing Type	Minimum Target: 1 point	Proposed project includes 2 of the 4 housing typologies.	
	Aspirational Target: 1 additional point	Proposed project includes 3 of the 4 housing typologies.	
	Aspirational Target: 1 additional point	Proposed project includes 4 of the 4 housing typologies.	
Accommodation	Minimum Target: 1 point	Proposed project includes 2 accommodation types.	
	Aspirational Target: 1 additional point	Proposed project includes more than 2 accommodation types.	
References:	City's Official Plan Thinking Green Item 3 LEED NDPc4		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

Metric	1. H.1. Bicycle Parking		
Applicable To:	<input type="checkbox"/> Block Plan <input type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To encourage active transportation and promote efficient use of developable land. To support on-street retail and pedestrian-oriented built environments by discouraging the location of parking in front of buildings, and minimize the adverse environmental impacts of parking facilities. Promoting bicycle use enables more vibrant and communicative communities and improved health while at the same time reducing dependency on cars.		
	Points	Requirements	Documenting Compliance
Minimum Target:	1 point	Bike parking spaces are provided at a rate 20% higher than municipal standards/guidelines. Bike parking shall be located in close proximity to building entrances.	Submit: On the Site Plan drawing: <ul style="list-style-type: none">• Quantify the total number bike parking spaces provided per building• Quantify the total unit count in each of the multi-family buildings.• Identify the building types that are included in the project (i.e. mixed-use, multi-family, commercial, retail, institutional)• Quantify the ratio of bike parking spaces per residential unit (for multi-family buildings)
Aspirational Target:	1 additional point for bike parking spaces increased; and; 2 additional points for providing weather protection	Bike parking spaces are provided at a rate 50% higher than municipal standards/guidelines. Bike parking shall be located in close proximity to building entrances and shall be weather protected.	
Aspirational Target	1 additional point	1 shower and change room is provided (for men and women) per 30 bike parking spaces associated with non-residential development.	
References:	Municipal Bicycle Parking Requirements City of Brampton By-Law 270-2004 as amended. City of Vaughan By-Law 1-88 Town of Richmond Hill By-law 30-18		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

Metric	1. H.2. Surface Parking Footprint		
Applicable To:	<input type="checkbox"/> Block Plan <input type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	<p>To encourage active transportation and promote efficient use of developable land.</p> <p>To support on-street retail and pedestrian-oriented built environments by discouraging the location of parking in front of buildings and minimize the adverse environmental impacts of parking facilities.</p> <p>Surface parking can block access and visibility to homes and businesses. Minimizing or carefully locating surface parking can result in more pedestrian friendly and valuable streetscapes.</p>		
	Points	Requirements	Documenting Compliance
Minimum Target:	1 point	All surface parking on site is located at the side or rear of buildings.	<p>Submit:</p> <p>On the Site Plan Drawing:</p> <ul style="list-style-type: none"> Identify the building frontage and the surface parking location(s).
Aspirational Target:	1 additional point in addition to minimum	Less than 15% of the total developable area is provided to parking at grade, and is located at the rear or side of buildings.	<ul style="list-style-type: none"> Calculate the total area dedicated to surface parking/parking facilities and the total project site area. Identify the percent (%) of site area allocated to surface/facility parking
Aspirational Target:	5 points	All new on site parking is provided below grade, and no surface parking is provided.	<ul style="list-style-type: none"> In intensification areas, if the project includes a parking structure, quantify the total parking spaces within the structure and on the site Calculate and declare the percent (%) of parking spaces that are provided within the parking structure.
References:	<p>LEED ND NDPc5</p> <p>City of Vaughan Urban Design Guidelines</p>		

Change Rationale: Metric carried forward as-is with minor changes, if any. Please refer to the Sustainability Metrics Update Report, Section 2.1.

LEGEND
Metric Category:

Built Environment

Mobility

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Metric	1. H.4. Carpool Parking		
Applicable To:	<input type="checkbox"/> Block Plan <input type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To encourage carpooling and reducing dependence on single-occupant vehicles. Carpooling can result in carbon savings, less air pollution, less congestion, and improved social connections.		
	Points	Requirements	Documenting Compliance
Minimum Target:	1 point	Satisfy all municipal parking standards and dedicate 3% of parking spaces on site (or a minimum of 4 parking spots) to carpooling and/or car share/zip car (does not apply to compact cars). Provide preferred parking for these vehicles.	Submit: On the Site Plan drawing:
Aspirational Target:	1 additional point	Satisfy all municipal parking standards and dedicate 5% of parking spaces on site (or a minimum of 4 parking spots) to carpooling and/or car share/zip car (does not apply to compact cars). Provide preferred parking for these vehicles.	<ul style="list-style-type: none"> Quantify the total parking spaces included per building on the site. Quantify the total parking spaces that are dedicated to auto share/zip car or carpooling. Identify the dedicated parking spaces and highlight proximity/preferred location relative to building entry.
References:	TGS LEED 2009 NC SSc4.3		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

LEGEND
Metric Category:

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Metric	Community and Neighbourhood Scale		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input type="checkbox"/> Draft Plan <input type="checkbox"/> Site Plan		
Metric Intent:	To focus retail, personal, human and community services within community core areas (neighbourhood centre and mixed-use node) so that people can meet their daily needs within their own communities.		
	Points	Requirements	Documenting Compliance
Minimum Target:	6 points	<p>Show that the community form is based on a hierarchy of the following:</p> <ul style="list-style-type: none"> ▪ Community: formed by a clustering of neighbourhoods, typically 6 to 9 (depending on topography and natural features), to sustain a viable mixed-use node and public transit ▪ Neighbourhood: shape and size defined by 400 m (5 minute walk) from centre to perimeter with a distinct edge or boundary defined by other neighbourhoods or larger open spaces ▪ Neighbourhood centre: acts as a distinct centre or focus with a compatible mix of uses that includes: a neighbourhood park; high or medium residential densities; and retail or community facilities (e.g. school, library) ▪ Mixed-use node: central to the cluster of neighbourhoods the node should include higher residential densities, retail, employment opportunities, be accessible, and served by public transit 	<ul style="list-style-type: none"> • Highlight the community form (typically a cluster of neighbourhoods to sustain a viable mixed-use node and public transit). • Highlight the various neighbourhoods in the community and confirm that each neighbourhood is defined by a 400 m walk from centre to perimeter edge. • On a figure, illustrate the following: <ul style="list-style-type: none"> ○ Identify the neighbourhood centre and list the uses and amenities included in the centre (i.e. transit hub, parkette, village square, community facilities, amenities, etc.) ○ Identify the mixed-use node (could include higher residential densities, transit hub, retail, amenities, etc.)
References:	N/a		

Change Rationale: Metric carried forward as-is with minor changes, if any. Please refer to the Sustainability Metrics Update Report, Section 2.1.

LEGEND
Metric Category:

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Metric	Electric Vehicle Charging Stations		
Applicable To:	<input type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To encourage the use of electric vehicles by providing incentives. Electric vehicle use can result in carbon savings and less air pollution.		
	Points	Requirements	Documenting Compliance
Minimum Target:	3 points	Provide electric vehicle supply equipment (EVSE) to serve 10% of required parking spaces.	Submit: On the Site Plan: <ul style="list-style-type: none">Quantify the number of total parking spaces included per building on the site.Quantify the number of the total parking spaces that will be provided with EVSE. For Draft Plan Applications: <ul style="list-style-type: none">A Letter of Intent from a qualified professional (e.g. electrical engineer, landscape architect, architect) confirming the number of EV charging stations and the percent of parking spaces with EVSE.
Aspirational Target:	2 additional points	Provide electric vehicle supply equipment (EVSE) to serve 20% of required parking spaces.	
Aspirational Target:	2 points	Design 50% or more of required parking spaces to permit future EVSE installation.	
References:	TGSv3 AQ1.3		

Change Rationale: This is a proposed new metric. Please refer to the Sustainability Metrics Update Report, Section 2.3.

Metric	1. I.1. Traffic Calming		
Applicable To:	<input type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To encourage active transportation through provision of walkable streets by reducing operational speeds. Walkable streets and traffic calming measures can provide a more pleasing street scape and better connectivity between occupants.		
	Points	Requirements	Documenting Compliance
Minimum Target:	1 point	75% of new local streets/roads designed with traffic calming strategies.	Submit: In a Transportation Study or Traffic Calming Report: <ul style="list-style-type: none">• Highlight the new residential-only streets and new non-residential/mixed-use streets in the project, as applicable.• Identify the percent (%) of street length (broken out by residential only and non-residential) that includes street calming techniques developed in consultation with municipal transportation planning staff.• Provide a drawing identifying the traffic calming strategies that are included in the project.
	1 point	50% of new non-residential and/or mixed-use streets are designed with traffic calming strategies.	
Aspirational Target:	2 points	100% of new local streets/roads designed with traffic calming strategies.	Notes: Traffic calming strategies include but are not limited to: <ul style="list-style-type: none">○ <i>Neckdowns/centre island narrowing</i>○ <i>Raised crosswalks</i>○ <i>Traffic circles and roundabouts</i>○ <i>Speed display boards/vehicle activated traffic calming signs (VATCS)</i>
	2 points	75% of new non-residential and/or mixed-use streets are designed with traffic calming strategies.	
References:	LEED ND NPDC1		

Change Rationale: Metric carried forward as-is with minor changes, if any. Please refer to the Sustainability Metrics Update Report, Section 2.1.

LEGEND
Metric Category:

Built Environment

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Metric	1. I.2. School Proximity to Transit Routes and Bikeways		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input type="checkbox"/> Site Plan		
Metric Intent:	To encourage children to walk and bike to school in order to reduce traffic congestion at school sites and promote active transportation. Walking, bicycle or transit use results in carbon savings and less air pollution. They also provide health benefits and more connectivity between occupants.		
Minimum Target:	1 point	All public schools are located within a 400 m walking distance to transit routes and/or dedicated bike network.	Submit: On a Draft Plan, Block Plan or Planning Justification Report show the following by using radial circles to show the 400 m and 200 m from each school: <ul style="list-style-type: none">• Location of proposed development• Existing or planned public school(s)• Existing or planned transit stops• Existing or planned dedicated bike network(s) Notes: <ul style="list-style-type: none">○ For all of the existing or planned schools, quantify the radial walking distance (in meters) to existing or planned transit stops and dedicated bike networks
Aspirational Target:	1 additional point	All public schools are located within a 200 m walking distance to transit routes and/or dedicated bike network.	
References:	N/a		

Change Rationale: Metric carried forward as-is with minor changes, if any. Please refer to the Sustainability Metrics Update Report, Section 2.1.

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Metric	1. J.1. Connection to Natural Heritage		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To provide connections to nature and green spaces to benefit human health through proximity or access. Natural spaces are sought after by occupants and can be perceived as a valuable amenity. They can be quiet natural spaces where occupants can connect with nature and exercise.		
	Points	Requirements	Documenting Compliance
Minimum Target:	2 points	Provide physical public connections (such as public access blocks, single loaded roads, parks, sidewalks, etc.) to 25% of the length of the natural heritage system that abuts the proposed development (interface between development and natural heritage systems).	Submit: On a Landscape Plan or Site Plan: <ul style="list-style-type: none">• The location of a natural heritage system within the project boundary. Include any pathways within the natural heritage system) and highlight any associated parking for users of the natural heritage system.• Determine the length of the border of the natural heritage system with potential access to the site.• Highlight the proposed strategies to provide the physical public connection to the natural heritage system.• Determine what percentage (%) of the natural heritage system with potential access to site has been provided with physical public connections. Notes: <ul style="list-style-type: none">○ Percentage (%) of natural heritage system is determined by the length of border.○ Minimize backlotting onto the Natural Heritage System.
Aspirational Target:	2 additional points	Provide physical public connections (such as public access blocks, single loaded roads, parks, sidewalks, etc.) to 55% of the length of the natural heritage system that abuts the proposed development (interface between development and natural heritage systems).	
References:	N/a		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

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Metric:	1.J.2. Cultural Heritage Conservation		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To preserve and maintain cultural heritage resources. Cultural heritage resources include built heritage resources (listed or designated), cultural heritage landscapes (listed or designated), and archaeological resources, as well as other cultural heritage resources that have not been formally identified on the Municipal Register of Cultural Heritage Resources but have been evaluated and determined to be significant.		
	<u>Note:</u> This metric is only applicable to site having existing cultural heritage resources.		
	Points	Requirements	Demonstrating Compliance
Aspirational Target:	3 points	No portion of a cultural heritage resource that contributes to its cultural heritage value is to be demolished or removed (excluding temporary removal for restoration purposes).	Submit: In the Heritage Impact Assessment and Heritage Conservation Plan prepared by an accredited professional (e.g Canadian Association of Heritage Professionals CAHP): <ul style="list-style-type: none"> An outline of how the cultural heritage resource will be conserved and confirm that no portions of the resource that contribute to its cultural heritage value is to be removed.
Minimum Target:	2 points	If a cultural heritage resource will be relocated, it is moved to a visually prominent location nearby and maintains its original orientation.	Submit: In the Heritage Impact Assessment and Heritage Conservation Plan prepared by an accredited professional (e.g Canadian Association of Heritage Professionals CAHP): <ul style="list-style-type: none"> Identification of the proposed location of the cultural heritage resource and clearly demonstrate that it is visually prominent and maintains its original orientation.
Minimum Target:	2 points	Where reusable materials from a cultural heritage resource are being removed, a portion will be salvaged and reused on site.	Submit: In the Heritage Impact Assessment and Heritage Conservation Plan prepared by an accredited professional (e.g Canadian Association of Heritage Professionals CAHP): <ul style="list-style-type: none"> Identification of the portion of materials to be salvaged and explain how they will be reused on site. The reuse of the salvaged materials should be demonstrated in supporting documents (i.e. site plan drawings, landscape plans, interpretation plans).
Aspirational Target:	3 points	Where reusable materials from a cultural heritage resource are being removed, they are all salvaged and reused on site.	Submit: In the Heritage Impact Assessment and Heritage Conservation Plan prepared by an accredited professional (e.g Canadian Association of Heritage Professionals CAHP): <ul style="list-style-type: none"> Identification of the materials to be salvaged and explain how they will be reused on site. The reuse of the salvaged materials should be demonstrated in supporting documents (i.e. site plan drawings, landscape plans, interpretation plans).
Aspirational Target:	3 points	Built cultural heritage resources are conserved in full conformity with the "Standards and Guidelines for the Conservation of Historic Places in Canada"	Submit: In the Heritage Impact Assessment and Heritage Conservation Plan prepared by an accredited professional (e.g Canadian Association of Heritage Professionals CAHP):

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			<ul style="list-style-type: none">• Demonstrate how the cultural heritage resource will be conserved in full conformity with the “Standards and Guidelines for the Conservation of Historic Places in Canada”.
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Change Rationale: Please refer to the Sustainability Metrics Update Report Appendix C which includes a memo that describes the change rationale.

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Metric	1. J.3. Natural Heritage System Enhancements		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To improve natural heritage system function with respect to wildlife habitat and/or ecological functions, including ecosystem services and Satisfy City's Official Plan requirements. Local plant species and connected green spaces offer benefits related to longevity, water retention, and disease and pest avoidance. Protecting and encouraging pollinators enables a wide species of plants to thrive.		
	Points	Requirements	Documenting Compliance
Minimum Target	1 point	If the site includes or is adjacent to the Natural Heritage System, provide an Invasive Species Management Plan and implement the Plan.	Submit: On Landscape Plan: <ul style="list-style-type: none"> A declaration that no invasive species will be installed on site and listing the species that will be used. Notes: A list of invasive plants can be found on the TRCA's website .
Minimum Target	1 point	For 25% of non-woody plant species, provide plants that attract pollinators).	<ul style="list-style-type: none"> List the plant species that will be provided on the site and identifying the % of species that provide a habitat for pollinators. Note: A list of approved pollinator plant species can be found, published by the Credit Valley Conservation .
Aspirational Target	2 additional points	Provide pollinator habitat for 50% of the landscaped open space with signage.	<ul style="list-style-type: none"> Identify the area receiving pollinator habitat and plant species to be planted.
Aspirational Target:	5 points	Provide a continuous corridor of green spaces that provides connected greenspace linkages to at least 2 natural heritage features.	<ul style="list-style-type: none"> Identify potential linkages to connect areas of existing pollinator habitat on publicly managed lands through geospatial mapping, and identify "micro" corridor connections where small scale plantings could connect two large green areas in close proximity. Highlight on a drawing and declare the longest length of the development footprint. Highlight on a drawing, the planned continuous greenspace and declare the length of the connected greenspace corridor.
References:	TRCA, Invasive Plant List Credit Valley Conservation, Native Plants for Pollinators Toronto Pollinator Protection Strategy, City of Toronto		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

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Metric	2. A.1. Pedestrian Amenities		
Applicable To:	<input type="checkbox"/> Block Plan <input type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To encourage active transportation through walking and increased use of public transit. Walking, bicycle or transit use results in carbon savings and less air pollution. They also provide health benefits and more connectivity between occupants.		
	Points	Requirements	Documenting Compliance
Minimum Target:	1 point	Provide pedestrian connections between the site and adjacent destinations, and provide 1 type of pedestrian amenity consistently along the site connections.	Submit: On the Site Plan or Landscape Plan: <ul style="list-style-type: none"> Identify existing or proposed transit routes that are within walking distance to the building (i.e. 200 m). If applicable, highlight a linkage that connects a building entry to the transit stop. Identify the connections that link a building entry to pedestrian paths, surface transit stops, parking areas (car and bike), schools, etc. Highlight the amenities and/or street furniture (benches, public art, landscaping etc. that help connect the site to adjacent destinations.
Aspirational Target:	1 additional point	Provide more than 1 type of amenity and/or street furniture consistently along on site connections and between the site and adjacent destinations.	Notes: <ul style="list-style-type: none"> List of amenities includes; benches, additional bike parking, public art, map stands, interpretive/commemorative signage, play equipment, and weather shelters.
References:	Toronto Green Standard Tier II City's Official Plan Toronto Green Standard v3 AQ3.3		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

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Metric	2. B.1. Block Perimeter and Length		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input type="checkbox"/> Site Plan		
Metric Intent:	To develop blocks of dwelling units with increased connectivity offering pedestrians a multiple routes to reach their destination and to allow blocks with the flexibility to accommodate both residential and commercial lot sizes. Walkable blocks improve connectivity and reduce dependence on vehicles.		
	Points	Requirements	Documenting Compliance
Minimum Target:	1 point	75% of block perimeters do not exceed 550 m. 75% of block lengths do not exceed 250 m.	Submit: In the Urban Design Brief, or Draft Plan site statistics: <ul style="list-style-type: none"> • Measurement of the block lengths and the block perimeter lengths for all blocks included in the plan. • Identify and confirm the percentage (%) of block lengths that are less than 250m and the percentage (%) of block perimeters that are less than 550m. • Blocks are determined by roads/streets, and not pathways or trails
Aspirational Target:	2 points	All block perimeters do not exceed 550 m. All block lengths do not exceed 250 m.	<ul style="list-style-type: none"> • Measurement of the block lengths and the block perimeter lengths for all blocks included in the plan. • Confirm that all block lengths are less than 250m and all block perimeters are less than 550m. • Blocks are determined by roads/streets, and not pathways or trails
Aspirational Target:	3 points	All blocks do not exceed 80m x 150m in size.	In the Urban Design Brief, Planning Justification Report or Draft Plan site statistics: <ul style="list-style-type: none"> • Measure the block sizes and confirm there are no blocks greater than 80m x 150m. • Blocks are determined by roads/streets, and not pathways or trails
References:	Thinking Green Item 3 LEED NPDp1 HBS Core Element 4: Street Connectivity		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

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Metric	2.B.2 Intersection Density		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input type="checkbox"/> Site Plan		
Metric Intent:	To develop blocks of dwelling units with increased connectivity offering pedestrians a multiple routes to reach their destination and to allow blocks with the flexibility to accommodate both residential and commercial lot sizes. Walkable blocks improve connectivity and reduce dependence on vehicles.		
	Points	Requirements	Documenting Compliance
Minimum Target:	1 point	Provide for 40-50 streets intersections per square kilometre (sq.km).	Submit: In the Urban Design Brief, Planning Justification Report or Draft Plan site statistics: <ul style="list-style-type: none"> Determine the number of eligible intersections and divide by the net developable area as defined below for "Square Kilometre" Determine the number of eligible intersections included within the plan per sq.km. Notes: <ul style="list-style-type: none"> See LEED ND Reference Guide and Glossary for an explanation of eligible and non-eligible intersections. "Square Kilometre" is similar to net developable area, and its calculation excludes water bodies, parks larger than 0.2 hectares, natural heritage system lands, public facility campuses, airports, existing and proposed 400-series highways, and rail yards.
Aspirational Target:	1 additional point	Provide for 51-60 streets intersections per sq.km.	
Aspirational Target:	2 additional points	Provide for more than 61 street intersections per sq.km.	

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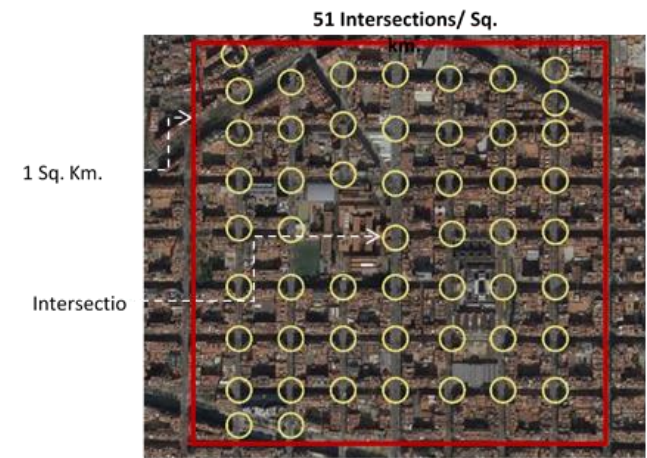
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References:

LEED NPDp3

Nets Foundation

The following diagram is an example for 51 intersections per sq.km.



Change Rationale: Metric carried forward as-is with minor changes, if any. Please refer to the Sustainability Metrics Update Report, Section 2.1.

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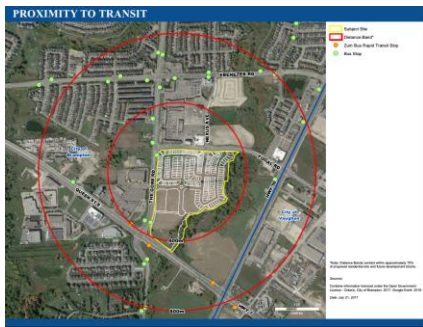
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Metric	2. C.1. Distance to Public Transit		
Applicable To:	<input type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To promote and support alternative transportation modes to vehicle use and to Satisfy City's Official Plan targets. Walking, bicycle or transit use results in carbon savings and less air pollution. They also provide health benefits and more connectivity between occupants.		
	Points	Requirements	Documenting Compliance
Minimum Target:	1 point	Site is within 800 m walking distance to an existing or planned commuter rail, light rail, bus rapid transit or subway with stops, OR Site is within 400 m walking distance to 1 or more bus stops with frequent service.	Submit: In the Urban Design Submission and/or Transportation Study (Draft Plans) and Traffic Impact Study and/or Transportation Demand Management Plan (Site Plan): <ul style="list-style-type: none">• List the Municipal Plan Targets and document if compliance is achieved.• Identify the existing or planned commuter rail, subway, light rail and bus stops with frequent service.• Quantify the expected residential and employment population for the proposed plan.• Determine the % of residents and employees that are within an 800m and 400m walking distance to existing or planned commuter rail, light rail or subways with frequent service.• Determine % of residents and employees that are within a 400m and 200m walking distance to 1 or more bus stops with frequent service. Notes: <ul style="list-style-type: none">○ <i>Frequent Service is defined as transit with trips in intervals no greater than 30 minutes during peak times per line per direction and available during hours of typical building operation.</i>
Aspirational Target:	1 point	Site is within 400 m walking distance to an existing or planned commuter rail, light rail, bus rapid transit, or subway with frequent stops, OR Site is within 200 m walking distance to 1 or more bus stops with frequent service.	
References:	Region of Peel Official Plan City's Official Plan LEED NC 2009 SSc4.1 LEED ND SLLc3		



Source: Malone Given Parsons Ltd.

Change Rationale: Metric carried forward as-is with minor changes, if any. Please refer to the Sustainability Metrics Update Report, Section 2.1.

Metric	2. D.1. Proximity to Cycling Network		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To promote active transportation through provision of enhanced pedestrian walkways and bike trails and satisfy City's Official Plan targets. Cycling results in carbon savings and less air pollution. It also provides health benefits and more connectivity between occupants.		
	Points	Requirements	Documenting Compliance
Minimum Target:	2 points	100% of residents/jobs are within 400 m of existing or Council approved public path/network.	<p>Submit:</p> <p>In the Traffic Impact Study or Transportation Demand Management Plan or Transportation Study:</p> <ul style="list-style-type: none"> An identification if there are any existing or municipally approved cycling networks within the project boundary. A notation of the expected residential and employment population for the proposed plan. Determine the percent (%) of residents and jobs that are within 400 m of existing or planned cycling networks. <p>Notes:</p> <ul style="list-style-type: none"> <i>These points are only awarded if a cycling network is included in the project boundary and the bike parking requirement is satisfied</i>
References:	City's Official Plan		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

Metric	2. D.2. Implementing Trails and Bike Paths		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input type="checkbox"/> Site Plan		
Metric Intent:	To implement pedestrian and cycling trails network to further promote active forms of transportation and comply with City's Transportation Master Plan and/or Pathways Master Plan. Cycling and walking results in carbon savings and less air pollution. It also provides health benefits and more connectivity between occupants		
	Points	Requirements	Documenting Compliance
Minimum Target:	1 point	Advance the objectives of the applicable municipal Active Transportation Master Plan and/or Pathways Master Plan by implementing the objectives of the Plan.	Submit: In the Transportation Study. <ul style="list-style-type: none"> • Identification of any existing or planned trails and bike paths located in the plan. • If applicable, highlight the trails and bike paths comply with Municipal Master Plan. • If applicable, identify the additional features that advance the objectives of the applicable pedestrian and cycling master plan (i.e., Provide trail heads, trail signs, information signage, and/or seating areas).
References:	City's Transportation Master Plan Pathways Master Plan		

Change Rationale: Metric carried forward as-is with minor changes, if any. Please refer to the Sustainability Metrics Update Report, Section 2.1.

Metric	2. E.1. Promote Walkable Streets		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To promote active transportation and encourage walking through the provision of safe and comfortable street environments. Walkable streets improve connectivity and reduce dependence on vehicles.		
	Points	Requirements	Documenting Compliance
Minimum Target:	2 points	Where not a mandatory requirement, provide continuous sidewalks on both sides of public and/or private roads/streets.	Submit: In the Site Plan Drawings (Site Plan) or Transportation Study (Block/ Draft Plans): <ul style="list-style-type: none"> • Verify and document that the sidewalks comply with Municipal Standards and are at a minimum, 1.5 meter in width. • Determine the total length of streets included in the project boundary • Determine the percentage (%) of street lengths where sidewalks are continuous and included on both sides of the street.
References:	LEED ND NPDc1		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

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Metric	3. A.1. Access to Public Parks		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To promote visual and physical access to public parks. Natural and community spaces are sought after by occupants and can be perceived as a valuable amenity. They can be quiet natural spaces where occupants can connect with nature and exercise.		
	Points	Requirements	Documenting Compliance
Minimum Target:	3 points	Provide 2 or more road frontages for each small park (i.e. urban square, parkette, and neighborhood park) and Provide 3 road frontages for each large park (i.e. community park).	Submit: In the Site Plan Drawings (Site Plan), Urban Design Submission and Landscape Plan (Draft Plans) or Community Design Guidelines (Block Plan): <ul style="list-style-type: none">• Highlight the urban squares, parkettes, neighborhood parks and community parks included within the application.• Determine the number of road frontages for each park type.
Aspirational Target:	3 points	Provide 3 or more road frontages for all parks.	
References:	LEED ND Cornell Community (Markham), Mount Pleasant Village (Brampton) City's Development Design Guidelines		

Change Rationale: Metric carried forward as-is with minor changes, if any. Please refer to the Sustainability Metrics Update Report, Section 2.1.

Metric	3. B.1. Stormwater Quantity		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To implement a treatment-train approach to stormwater management practises emphasizing on source and conveyance controls to promote infiltration, evaporation, and/or re-use of runoff and/or rainwater. This will help maintain stream flows and thermal regimes that aims at mimicking predevelopment conditions. Managing stormwater at the early stages of the treatment-train can provide more resilient communities and reduce risks of downstream flooding and erosion.		
	Points	Requirements	Documenting Compliance
Minimum Target:	2 points	Retain runoff volume from the 10 mm rainfall event on public or private site.	Submit: In the Functional Servicing Report, Stormwater Management Plan (Block, Plan, Draft Plan and Site Plan), or Master Environmental Servicing Plan (Block, Plan, Draft Plans): <ul style="list-style-type: none"> • List and describe the design measures used to retain stormwater runoff on site. Measures could include (but not limited to): Low impact development measures; Stormwater ponds.
Aspirational Target:	2 additional points	Retain runoff volume from the 15 mm rainfall event on public or private site.	

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Aspirational Target:	3 additional points	Retain runoff volume from the 25 mm rainfall event on public or private site	<ul style="list-style-type: none"> Highlight the location of design measures (if any) on the applicable plan. Confirm that the quantity and flood controls are in accordance with applicable Municipal and conservation authority requirements. Calculations and signoff by a qualified professional (e.g. engineer) quantifying the amount of runoff that will be retained on site.
References:	Toronto Green Standard Tier II TRCA's Storm water Management Criteria TRCA SWM Criteria Document Vaughan's Urban Design Guidelines		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

Metric	3. B.2. Stormwater Quality		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To protect receiving water bodies from water quality degradation that may result from development and urbanization. Controlling the quality of stormwater can provide for improved quality of receiving water bodies, resulting in fewer algae blooms, longer swimming seasons, and a variety of other ecological benefits.		
	Points	Requirements	Documenting Compliance
Minimum Target:	1 point	Remove 81% to 90% of TSS from all runoff leaving the site during a 25 mm rainfall event (based on the post development level of imperviousness).	Submit: In the Functional Servicing Report, Stormwater Management Plan (for Block Plan, Draft Plan or Site Plan), or Master Environmental Servicing Plan (for Block, Plan, or Draft Plans):
Aspirational Target:	4 additional points	Remove 91% or more TSS from all runoff leaving the site during a 25 mm rainfall event (based on the post development level of imperviousness).	<ul style="list-style-type: none"> A list and description of the filtration measures used to treat the stormwater runoff on site. Strategies could include (but are not limited to): <ul style="list-style-type: none"> Stormwater Ponds Oil-grit separators (ETV certified) Filters Bioswales Highlight the design measures (if any) on a plan. Quantify the percent (%) of TSS removed from a 25 mm rainfall event. Signoff by a qualified professional (e.g. professional engineer) quantifying the amount of runoff that will be retained on site.
References:	Toronto Green Standard Tier II TRCA's Storm water Management Criteria TRCA SWM Criteria Document TRCA (Toronto and Region Conservation Authority) and CVC (Credit Valley Conservation Authority) Low Impact Development Stormwater Management Planning Design		

Change Rationale: Metric carried forward as-is with minor changes, if any. Please refer to the Sustainability Metrics Update Report, Section 2.1.

Metric	3. B.3. Greywater Reuse (for Interior Building Functions)		
Applicable To:	<input type="checkbox"/> Block Plan <input type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To reduce potable water use for interior buiding functions.		
	Points	Requirements	Documenting Compliance
Minimum Target:	1 points	Buildings designed for greywater re-use readiness (i.e. plumbing infrastructure included in the building).	Submit: <ul style="list-style-type: none">A Letter of Intent signed by a qualified professional (e.g. architect, engineer) committing that the project will either be designed for rainwater re-use ready (i.e. plumbing infrastructure rough-in, dedicated location for cistern) or will re-use rainwater on site (for toilet flushing, irrigation, and outdoor uses).Highlight the design measures (i.e. cistern location/size, site drainage) on a site plan. Notes: <ul style="list-style-type: none">Single family developments are excluded.
Aspirational Target:	3 points	Greywater is captured on-site and used for low-grade functions (i.e. toilet/urinal flushing, irrigation).	
References:	N/a		

Change Rationale: Metric carried forward as-is with minor changes, if any. Please refer to the Sustainability Metrics Update Report, Section 2.1.

Metric	3. B.4. Stormwater Management Beautification		
Applicable To:	<input type="checkbox"/> Block Plan <input type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To beautify naturalized stormwater management facilities to enhance the municipal natural heritage system. Stormwater control can be perceived as an opportunity. Ponds can provide an amenity space for occupants to enjoy or water can be viewed as an asset for use.		
	Points	Requirements	Documenting Compliance
Minimum Target:	2 points	Introduce beautification measures/amenities that beautify stormwater management ponds (e.g. public art, interpretive signage).	<ul style="list-style-type: none"> Identify beautification measures (public art, interpretative signage, visible infrastructure, etc.) included within the project that are above and beyond City's landscape specifications and applicable standards Provide a description of how the feature will work to treat or re-direct stormwater and fit within the site/community. Fountains are not acceptable beautification measures. Notes: <ul style="list-style-type: none"> Single family developments are excluded.
References:	N/a		

Change Rationale: Metric carried forward as-is with minor changes, if any. Please refer to the Sustainability Metrics Update Report, Section 2.1.

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Metric	3. C.1. Dedicate Land for Private Garden Space		
Applicable To:	<input type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To promote community-based food production and provide alternative passive recreational uses. Gardens provide a connection to nature, a connection to our past, and a cost effective way to provide healthy food.		
	Points	Requirements	Documenting Compliance
Minimum Target:	Up to 3 points	Provide private communal area for food production/ garden space as follows: <ul style="list-style-type: none"> • 5-10% of landscape area or roof top (1 point). • 11-15% of landscape area or roof top (1 additional point). • 16-20% of landscape area or rooftop (1 additional point). 	Submit: On the Landscape Plan or the Urban Design Submission: <ul style="list-style-type: none"> • Determine the Floor Area Ratio (FAR). • Identify the areas that will be dedicated to local food production for the community. • Determine the total area of the community/ development.
References:	LCC 1.2, Place: Urban Agriculture LEED ND NPDC13		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

Metric	3. D.1. Solar Readiness		
Applicable To:	<input type="checkbox"/> Block Plan <input type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To reduce the negative impacts of fossil fuel based energy and reduce dependence on the electricity grid. Solar energy can provide cost effective methods to reduce energy use and will have strong climate change benefits.		
	Points	Requirements	Documenting Compliance
Minimum Target:	3 points	All buildings in the project are designed for solar readiness	Submit: A Letter of Intent from a qualified professional (energy, structural, electrical or mechanical engineer) to confirm the following: <ul style="list-style-type: none"> • All new buildings will be designed for solar readiness Notes: In alignment with the Toronto Green Standard v3 GHG2.1, designing for solar readiness may include: <ul style="list-style-type: none"> ○ Designate an area of the roof for future solar PV and/or solar thermal ○ Provide adequate structural capacity of the roof structure

			<ul style="list-style-type: none"> ○ Install one or two conduits from the roof to the main electrical or mechanical room (size of conduit to be determined based on maximum potential solar PV or solar thermal system size) ○ Designate a 2m by 2m wall area in the electrical and mechanical rooms for future solar electrical/thermal equipment controls and connections (e.g. meters, monitors) ○ Where possible place the HVAC or other rooftop equipment on the north side of the roof to prevent future shading <p>For more guidance on solar readiness, or to access a Solar Readiness Checklist, consult NREL's Solar Ready Buildings Planning Guide. Applicants are also encouraged to consult the National Renewable Energy Laboratory's Solar Ready Buildings Planning Guide for additional considerations for PV-ready provisions.</p>
Aspirational Target:	1 point	In the project 1% of the total energy is generated on-site by renewable energy sources	<ul style="list-style-type: none"> • Provide a Letter of Intent from a qualified professional (i.e., electrical engineer, mechanical engineer, energy modeler) to confirm that the percent (%) of renewable energy that will be included on-site. The percent (%) of renewable energy generated can be quantified by the following steps: <ul style="list-style-type: none"> ○ List the types of buildings (office, commercial, retail, multi-family and/or single family) ○ Determine the total GFA for each building type and list the expected/approximate energy use intensities (EUIs) for each building type. ○ Determine the total building annual energy use for the site. ○ List the renewable energy technologies being considered for the site ○ Determine the expected annual energy generated from renewable technologies and the percent (%) of annual energy generated on site, relative to the total energy consumed. <p>Notes:</p> <p>Allowable forms of renewable energy systems include the following:</p> <ul style="list-style-type: none"> • Solar photovoltaics (PV) • Solar thermal • Biogas and biofuel • Wind-based systems <p>For greater clarity, it should be noted that geo-exchange systems (i.e. ground-source heat pumps) are considered a building energy efficiency measure, as opposed to a form of renewable energy generation. As such, these systems cannot be used for the purposes of meeting the on-site renewable energy requirement, but can instead be utilized to meet the energy efficiency targets.</p> <p>The renewable energy calculations can be conducted either within the whole-building energy modelling software, or through recognized third-party energy modeling tools such as RETScreen Expert or PVSyst.</p>
Aspirational Target:	1 additional point per percent (%) increase up to 5 points	In the project , more than 1% of the total energy is generated on-site by renewable energy sources, up to 5%.	

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			It should be noted that off-site solutions such as renewable energy certificates (RECs), carbon offsets, or power purchasing agreements (PPA) with renewable energy generators are not permitted to satisfy this measure, unless otherwise approved by the City.
References:	Toronto Green Standard v3 GHG 2.1		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

Metric	3. E.1. Healthy Soils		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input type="checkbox"/> Site Plan		
Metric Intent:	<p>To limit disturbance of healthy soil to:</p> <ul style="list-style-type: none"> Protect soil horizons and maintain soil structure. Support biological communities (above-ground and below-ground). <p>Ensure that new development contains healthy soil quality and quantity to help restore the natural functions of soils and vegetation and to help ensure the soil is appropriate for the proposed plantings.</p>		
	Points	Requirements	Documenting Compliance
Minimum Target:	1 point	Undertake Topsoil Fertility Test for the entire site and implement its recommendations.	<p>Submit:</p> <p>And perform a Topsoil Fertility Test according to City's Standards.</p> <ul style="list-style-type: none"> List the key soil properties for the site and recommendations included in the study. Identify the soil fertility measures that were implemented on the entire site.
Aspirational Target:	1 additional point	In addition to implementing the recommendations of the Topsoil Fertility Test, a minimum topsoil depth of 200 mm is provided across the entire site.	<p>In addition to the documentation above:</p> <ul style="list-style-type: none"> Identify the minimum topsoil depth (200 mm) that is provided across the entire site.
References:	TRCA Preserving and Restoring Healthy Soils Best Practice Guide for Urban Construction CVC's Healthy Soil Guidelines for Natural Heritage System		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

Metric:	4. A.1. Passive Solar Alignment		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input type="checkbox"/> Site Plan		
Metric Intent:	To promote energy efficiency by creating the conditions for the use of passive solar design as well as solar photovoltaic and/or solar thermal strategies. Solar energy can provide cost effective methods to reduce energy use and will have strong climate change benefits.		
	Points	Requirements	Documenting Compliance
Minimum Target:	3 points	50% (or more) of the blocks have one axis within 15 degrees of East-West (E-W) plane. East-West (E-W) lengths of those blocks are at least as long as the North-South (N-S) lengths of blocks.	Submit: In the Urban Design Brief, or Draft Plan site statistics: <ul style="list-style-type: none">• Highlight the direction of True North.• Measure 15° from the East-West plain for all blocks and buildings (as shown in figure below).• Highlight and determine the buildings/blocks that have one axis within 15° of East-West (E-W) plane.• Highlight and determine the buildings and blocks that have the East-West (E-W) lengths at least as long as the North-South (N-S) lengths.• Declare the percent (%) of buildings and blocks (relative to the total number of buildings and blocks) that have:<ul style="list-style-type: none">○ One axis within the 15° of East-West (E-W) and,○ East-west (E-W) lengths at least as long as the North-South (N-S) lengths.
Aspirational Target:	6 points	75% (or more) of the blocks have one axis within 15 degrees of East-West (E-W) plane. East-West (E-W) lengths of those blocks are at least as long as the North-South (N-S) lengths of blocks.	
References:	<p>LEED ND GIBc10</p> <p>Diagram for Reference (Source: City of Brampton, https://www.brampton.ca/EN/Business/planning-development/Land-Development-Application/Pages/Help-Infrastructure.aspx) :</p> <div></div>		

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Change Rationale: Metric carried forward as-is with minor changes, if any. Please refer to the Sustainability Metrics Update Report, Section 2.1.

Metric	4. A.2. Building Energy Efficiency and Emissions		
Applicable To:	<input type="checkbox"/> Block Plan <input type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To promote buildings that are designed to be energy-efficient with reduced operating costs and greenhouse gas emissions associated with building operations, while improving thermal comfort of occupants and enhancing building resilience. Energy efficient buildings offer very short financial paybacks and carbon reductions.		
	Points	Requirements	Documenting Compliance
	Site Plan		
Minimum Target:	5 points	<p><u>Part 9 Residential Buildings (less than 3 storeys and less than 600 m² in gross floor area)</u></p> <p>Design, construct and certify the building to achieve ENERGY STAR® for New Homes, R-2000® requirements.</p> <p><u>Part 3 Buildings – Multi-Unit Residential, Office and Retail (more than 3 storeys or more than 600 m² in gross floor area)</u></p> <p>Develop a whole-building energy model, and design and construct the building to achieve the following whole-building performance metrics:</p> <ul style="list-style-type: none"> Total Energy Use Intensity (TEUI): 170 kWh/m².yr Thermal Energy Demand Intensity (TEDI): 70 kWh/m².yr Greenhouse Gas Emissions Intensity (GHGI): 20 kgCO₂/m².yr <p><u>All Other Part 3 Buildings</u></p> <p>Develop a whole-building energy model, and design and construct the building to achieve at least a 15% improvement in energy efficiency over the Ontario Building Code (OBC) SB-10 reference building.</p>	<p>Submit:</p> <ul style="list-style-type: none"> At the submission stage, a Letter of Intent signed by an accredited professional that includes confirmation that requirements are met. Upon completion of construction, provide a Letter of Certification signed by an accredited professional that the metric requirements have been implemented and verified. <p>Site Plan Approval (SPA) Energy Model Documentation Requirements:</p> <ul style="list-style-type: none"> Energy Model Report summarizing key modelling inputs, outputs and assumptions, signed by a licensed professional. Working Energy Model Simulation Files. Mechanical and Electrical Design Brief. Related supporting drawings and calculations done external from the energy modelling software (for example, thermal bridging calculations). <p>As-Built Energy Model Documentation Requirements:</p> <ul style="list-style-type: none"> Updated Energy Model Report. Working Energy Model Simulation Files. Mechanical and Electrical Design Brief. Modelling Notes: General, Building Level, Plant Level, System Level, Occupancy and Minimum Outdoor Air Rates, Warnings and Errors. Take-off Calculations (Modeler's external calculations to support the model inputs). If applicable, calculation for model work-arounds, exceptions, process energy savings, renewable energy systems, district energy systems, or other required calculations. Zoning Diagrams. Outdoor Air Calculation Spreadsheets. Architectural Drawings and Specifications (issued for construction/as-built). Mechanical Drawings and Specifications (issued for construction/as-built). Electrical Drawings and Specifications (issued for construction/as-built).

Minimum Target:	3 points	<p><u>Building Commissioning</u></p> <p>Building commissioning is a systematic process of verifying that the various building sub-systems such as building envelope, mechanical (HVAC), plumbing and lighting systems are constructed and operational per the project requirements and design intent.</p> <p>Conduct best practice commissioning, per the requirements referenced in LEED BD+C v4 Fundamental Commissioning and Verification pre-requisite.</p>	<ul style="list-style-type: none"> Letter of Intent at SPA stage confirming that building commissioning will be carried out per the requirements of LEED v4 BD+C Fundamental Commissioning and Verification pre-requisite.
Minimum Target:	3 points	<p><u>Airtightness Testing</u></p> <p>Conduct a whole-building air leakage test to improve the quality and air tightness of the building envelope.</p>	<p>Applicant to provide Letter of Intent at SPA stage to retain an airtightness testing provider to conduct a whole-building air leakage test.</p> <p>It is recommended that applicants follow ASTM WK35913 Standard Test Method for Determining the Air Leakage Rate of Large or Multi-zone Buildings or US Army Corps of Engineers (USACE) Air Leakage Test Protocol.</p> <p>Projects shall conduct an operational envelope air tightness test under negative pressure producing a multi-point regression. However, projects are permitted to pursue negative and positive pressure testing and produce a building envelope test where HVAC-related openings are excluded as in the Passive House standard.</p> <p>Projects shall target a test pressure of 75Pa. Projects unable to achieve 75Pa must follow either ASTM W35913 alternative test methods; Repeated Single-Point Test or a Repeated Two-Point test and demonstrate compliance using projected curves for air tightness at 75Pa.</p> <p>If the whole building cannot be tested as one zone, it is acceptable to test a zone that can be partitioned temporarily with adjacent zones "Guarded" as buffer zones using blower door equipment. Note that the air leakage rate should be normalized to the exterior surface area and not include the guarded surface areas.</p> <p>All materials, assemblies and systems that form the continuous air barriers systems must be installed including any HVAC equipment, ducts and fittings included in the test boundary.</p> <p>Upon completion, applicant shall provide a completed airtightness testing report to City officials.</p>
Minimum Target:	3 points	<p><u>Metering</u></p> <p>Install electricity and/or thermal sub-meters for all energy end-uses that represent more than 10% of the building's total energy consumption, following the requirements laid out in LEED v4 Reference Guide Advanced Energy Metering credit.</p>	<p>Provision of electricity and thermal sub-meters clearly indicated on electrical and mechanical single-line diagrams.</p> <p>A metering plan listing all meters along with type, energy source metered, diagrams, and/or references to design documentation.</p>

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		For buildings with multiple tenants, provide energy sub-metering for each commercial/institutional tenant, and per residential suite.	
Aspiration Target:	5 additional points	<p><u>Part 9 Residential Buildings</u></p> <p>Design, construct and certify the building to achieve CHBA Net Zero Homes program or Passive House requirements.</p> <p><u>Part 3 Buildings – Multi-Unit Residential, Office and Retail</u></p> <p>Develop a whole-building energy model and design the building to achieve the following whole-building performance metrics associated with a near-net zero emissions level of performance:</p> <ul style="list-style-type: none"> • Total Energy Use Intensity (TEUI): 75 kWh/m².yr • Thermal Energy Demand Intensity (TEDI): 15 kWh/m².yr • Greenhouse Gas Emissions Intensity (GHGI): 5 kgCO₂/m².yr <p><u>All Other Part 3 Buildings</u></p> <p>Develop a whole-building energy model and design the building to achieve at least a 50% improvement in energy efficiency over the Ontario Building Code (OBC) SB-10 reference building.</p> <p>For intermediate performance levels between the Recommended Minimum and Aspirational targets, points will be awarded on a pro-rated basis (Up to 8 Points).</p>	<p>Site Plan Approval (SPA) Energy Model Documentation Requirements:</p> <ul style="list-style-type: none"> • Energy Model Report summarizing key modelling inputs, outputs and assumptions, signed by a licensed professional • Working Energy Model Simulation Files • Mechanical and Electrical Design Brief • Related supporting drawings and calculations done external from the energy modelling software (for example, thermal bridging calculations) <p>As-Built Energy Model Documentation Requirements:</p> <ul style="list-style-type: none"> • Updated Energy Model Report • Working Energy Model Simulation Files • Mechanical and Electrical Design Brief • Modelling Notes: General, Building Level, Plant Level, System Level, Occupancy and Minimum Outdoor Air Rates, Warnings and Errors • Take-off Calculations (Modeler's external calculations to support the model inputs). If applicable, calculation for model work-arounds, exceptions, process energy savings, renewable energy systems, district energy systems, or other required calculations. • Zoning Diagrams. • Outdoor Air Calculation Spreadsheets. • Architectural Drawings and Specifications (issued for construction/as-built). • Mechanical Drawings and Specifications (issued for construction/as-built). <p>Electrical Drawings and Specifications (issued for construction/as-built).</p>
References:	Toronto Green Standard Version 3.0		

MH Change Rationale: Refer to Section 2.5 of the Sustainability Metrics Report for a detailed explanation of the rationale behind the change in the energy and GHG emissions performance metrics.

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Metric	4. A.3. Energy Strategy		
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input type="checkbox"/> Site Plan		
Metric Intent:	To encourage the early consideration and incorporation of sustainable design features in the planning process relating to improved building energy efficiency, carbon reduction and resilience, as well as to take advantage of district-scale opportunities in the case of multi-building developments. Energy use is a major contributor to climate change. A good energy strategy can offer short paybacks and improved resiliency.		
	Points	Requirements	Documenting Compliance
	Block Plan / Plan of Subdivision		
Minimum Target:	2 points	<p>Develop an Energy Strategy for the proposed development which includes the following:</p> <ul style="list-style-type: none"> High-level energy analysis using archetype modelling or benchmarking data to estimate the overall energy consumption and GHG emissions associated with the development. Identify and evaluate opportunities to reduce EUI and GHG emissions intensities down to a net-zero ready level of performance (i.e. the Aspirational building efficiency target) through various measures such as more efficient building form and massing, orientation, improved building envelope performance, highly efficient HVAC systems, heat recovery and lighting solutions. Analysis of low-carbon energy solutions and on-site renewable energy generation potential that can be incorporated to the development, including rooftop PV, geo-exchange systems, high efficiency CHP, thermal energy stores, and sewer water heat recovery. In the case of multi-building development proposals or in intensification areas identified by the municipality, investigate the feasibility of shared energy solutions such as development of low-carbon thermal energy networks or connection to planned or existing district energy systems, and identify the required provisions to be district energy-ready. Identify and evaluate opportunities for backup power systems and passive design features that will improve the resilience of buildings to area-wide power outages. 	<p>Submit:</p> <p>An Energy Strategy Report that meets the terms of reference provided by the City, and at a minimum should include the following information:</p> <ul style="list-style-type: none"> Executive Summary Energy calculations, including data and assumptions Graphs of expected energy performance Conclusions / Recommendations Appendices: supporting documentation, references, etc. <p>For Aspirational target, provide Letter of Intent indicating commitment to meet a development-wide energy use intensity and greenhouse gas emissions intensity target, as well as a zero carbon transition plan that lays out specific design measures that will be incorporated to facilitate achievement of carbon neutrality in the future (for example, providing electrical infrastructure provisions to allow for full building electrification).</p>
		In addition to developing an Energy Strategy, commit to meeting an energy use intensity and greenhouse gas emissions	

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Aspirational Target:	6 additional points	intensity target for the site that strives towards a near-net zero emissions level of performance as agreed upon with the City, Develop a zero carbon transition plan that lays out the pathway towards achieving carbon neutrality in the future through a variety of design measures, such as providing the necessary infrastructure for full building electrification and avoidance of on-site combustion of fossil fuels.	
References:	City of Toronto Energy Strategy Report – Terms of Reference		

MH Change Rationale: Refer to Section 2.5 of the Sustainability Metrics Report for a detailed explanation of the rationale behind the change in the energy and GHG emissions performance metrics.

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Metric	4. B.1. Reduce Potable Water Use		
Applicable To:	<input type="checkbox"/> Block Plan <input type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	<p>To promote efficient use of potable water.</p> <p>Promoting efficient use of potable water contributes to water conservation.</p>		
	Points	Requirements	Documenting Compliance
Minimum Target:	2 points	Reduce potable water used for irrigation by 50%, compared to a mid-summer baseline case	<p>Submit:</p> <p>A Letter of Intent from a qualified professional (e.g. mechanical engineer, landscape architect) to confirm:</p> <ul style="list-style-type: none"> The project will be designed to reduce potable water requirements for irrigation. List the plant species intended to be used and highlight which are native/ adaptive/ drought tolerant. Determine the percent (%) reduction in potable water used to irrigate, relative to a mid-summer baseline case. For information on how to achieve this credit refer to LEED v4 BD+C WE Credit: Outdoor Water Use Reduction Option 2 and use the calculation tool to demonstrate. Identify the strategies used to reduce potable water demands (i.e. drought tolerant vegetation, controls, drip irrigation and/or rainwater harvesting/storage). Strategies include: <ul style="list-style-type: none"> Drought tolerant, native/ or adaptive vegetation that require little to no water in the local climate Using high efficiency irrigation such as drip irrigation Using captured rainwater for irrigation If captured rainwater is used, provide a Letter from a Qualified professional (mechanical engineer) confirming the proposed cistern size and the calculations to demonstrate the volume of captured water expected.
Aspirational Target:	4 additional points	No potable water is used for irrigation	<p>For aspirational target, provide the documentation as requested for the minimum target unless target is achieved by not installing any irrigation.</p> <p>In the case where no irrigation is installed, provide a Letter of Intent from qualified professionals (property managers, building owners, site owners) confirming that no irrigation will be installed past the establishment period and that sod will be allowed to go dormant and brown in off-season months.</p>
References:	LEED NC WEc1 LEED NC BD+C WE Credit: Outdoor water use reduction Toronto Green Standard Tier I, WQ 4.3		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

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Metric	4. C.2. Reduce Light Pollution		
Applicable To:	<input type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	<p>To reduce nighttime glare and light trespass from the building and the site.</p> <p>Light pollution can be perceived as an inefficient use of energy in addition to its negative impacts on neighbors and night time animals.</p>		
	Points	Requirements	Documenting Compliance
Aspirational Target	1 point	All exterior fixtures are Dark Sky Compliant	<p>Submit:</p> <p>A Letter of Intent from a qualified professional (e.g. engineer, architect), confirming that:</p> <ul style="list-style-type: none"> The City's applicable standards have been satisfied. All fixtures intended for exterior lighting will be Dark Sky Compliant. <p>Notes:</p> <ul style="list-style-type: none"> In alignment to the TGS v3 EC5.1 credit, the following guidance is provided for Dark Sky Compliant fixtures on the City's TGS website and can be used for this metric: Dark Sky Compliant fixture must have the Dark Sky Fixture Seal of Approval which provides objective, third-party certification for lighting that minimizes glare, reduces light trespass and doesn't pollute the night sky. If a Dark Sky Fixture Seal of Approval is not available fixtures must be full-cutoff and with a colour temperature rating of 3000K or less. All exterior light fixtures should be efficient while providing minimum illumination levels sufficient for personal safety and security. Efficient exterior lighting is defined as 60 Lumens/Watt minimum system efficiency. Safety and security lighting should minimize glare and/or light trespass. For more information see the Best Practices for Effective Lighting.
References:	<p>LEED NC SSc8</p> <p>Toronto Green Standard v3 EC5.1</p> <p>City of Vaughan Urban Design Guidelines</p> <p>City of Markham Bird Friendly Guidelines</p>		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

Metric	4. D.1. Bird Friendly Design		
Applicable To:	<input type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To reduce the incidents of bird collisions and provide an urban environment where birds can thrive. The built environment can have strong negative impacts on birds. Design and system selection can result in fewer bird collisions and deaths.		
	Points	Requirements	Documenting Compliance
Minimum Target	2 points	<p>Apply combination of Bird Friendly Design strategies on at least 85% of contiguous glass area greater than 2 m² within the first 16 m of the building above-grade (including interior courtyards) and above green roofs.</p> <p>The remaining 15% of glazed windows do not need to be treated unless the glazing is larger than 2m² or in close proximity to open spaces, a green roof or natural heritage feature.</p> <p>Bird Friendly Design Strategies may Include:</p> <ul style="list-style-type: none"> • Visual patterns on glass, • Window films, • Fenestration patterns, • Angled glass downwards, • Reduced night sky lighting. <p>Visual markers provided on the glass of proposed buildings with spacing no greater than 10 cm x 10 cm.</p>	<p>Submit:</p> <p>On an Elevation Plan:</p> <ul style="list-style-type: none"> • Highlight and declare the total area of contiguous glass, below 16m above grade that is greater than 2 m². • Indicate the areas treated bird friendly design strategy, noting which strategy has been used. • Quantify the total area of continuous glass that has been treated by bird friendly design strategies and confirm that it is at least 85% • Confirm that the visual markers on the glass have spacing no greater than 10cm x 10cm. <p>Notes:</p> <ul style="list-style-type: none"> ○ The minimum target requirements are only applicable to Site Plan applications.
Minimum Target	2 points	<p>Apply Bird Friendly Design strategies for ground-oriented residential development that is adjacent to natural heritage systems and open spaces.</p>	<p>Submit:</p> <p>Letter of Intent signed by an accredited professional (e.g. architect or professional engineer that includes confirmation that Bird Friendly Design strategies are incorporated for developments adjacent to natural heritage systems and open spaces, listing which acceptable Bird Friendly Design strategies are to be included.</p> <p>Notes:</p> <ul style="list-style-type: none"> ○ This minimum target is only applicable to Draft Plan applications.
References:	<p>City of Vaughan: Urban Design Guidelines.</p> <p>City of Markham Bird Friendly Guidelines</p>		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

Metric	4.E.1 Solid Waste		
Applicable To:	<input type="checkbox"/> Block Plan <input type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To promote waste reduction and diversion of materials from landfills. A reduction in waste can be a very cost effective method for material savings, and results in less contributions to landfill and lower carbon emissions due to savings in materials.		
	Points	Requirements	Documenting Compliance
Minimum Target	1 point	Provide a waste system for garbage, recycling and organics using one or more of the following options: <ul style="list-style-type: none"> three separate chutes for garbage, recycling, and organics collection on all floors. 	Submit: On a Site Plan and/ or Floor Plans: <ul style="list-style-type: none"> Confirm that City's applicable standards have been satisfied. Clearly identify the waste systems for garbage, recycling and organic waste. Notes: <ul style="list-style-type: none"> The requirements apply to residential developments with 31 units or more and building heights greater than 5 storeys
Minimum Target	1 point	<u>Residential:</u> Provide accessible waste storage room with minimum 25m ² floor space for the first 50 units plus an additional 13m ² for each additional 50 Units to accommodate containers and compactor unit. (not applicable in Richmond Hill, requirement already covered in Richmond Hill's waste development standard). <u>Non-residential:</u> Provide a fully enclosed waste storage space to accommodate garbage and materials diversion of recycling and organics. (not applicable in Richmond Hill, requirement already covered in Richmond Hill's waste development standard).	Submit: On a Site Plan and/ or Floor Plans: <ul style="list-style-type: none"> Confirm that City's applicable standards have been satisfied. Clearly identify the waste storage areas. Determine the floor area provided for the waste storage space and identify the separate garbage storage, recycling storage and organics storage, (Residential only): Determine the waste storage area required based on the number of dwelling units and declare on Floor Plans/ Site Plan drawing.
MinimumTarget	1 point	Provide a minimum of 10m ² for bulky items and items eligible for special collection services. (not applicable in Richmond Hill, requirement already covered in Richmond Hill's waste development standard).	Submit: On a Site Plan and/ or Floor Plans: <ul style="list-style-type: none"> Clearly identify the bulky items storage and declare the area. The 10m² may not be shared with other purposes and be solely dedicated to bulky waste to meet this aspirational target, although it may be in the same room as other waste storage. Notes: <ul style="list-style-type: none"> Bulky items are household items greater than 1.2m in any one dimension or weigh more than 20 kg (including furniture).

Aspirational Target	1 point	<u>Residential only</u> : Provide a dedicated collection area or room for the collection of household hazardous waste and/or electronic waste. (not applicable in Richmond Hill, requirement already covered in Richmond Hill's waste development standard).	<p>Submit:</p> <p>On a Site Plan and/ or Floor Plans,</p> <ul style="list-style-type: none"> Clearly identify the dedicated collection area or room for the collection of household hazardous waste and/or electronic waste. <p>Notes:</p> <ul style="list-style-type: none"> Household Hazardous Waste (HHW) includes car products, motor oil, windshield fluid; household cleaning products; paint, glue, primers, stains; pesticides and garden products; cooking oil; batteries; propane tanks; CFLs, syringes, medical sharps; medication; air fresheners, swimming pool chemicals.
References	Toronto Green Standard v3 SW1.1, SW1.2, SW1.3, SW1.6		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

Metric	Embodied Carbon of Building Materials		
Applicable To:	<input type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To increase the growing awareness of the importance of addressing the embodied carbon and other GHG emissions associated with building materials. Materials can account for significant impact from their production, and reductions are available through selection and design. Often, lower impact materials are also more cost effective.		
	Points	Requirements	Documenting Compliance
Minimum Target:	1 point	All concrete on site must have a minimum 20% Supplementary Concrete Materials (SCMs).	<p>Submit:</p> <ul style="list-style-type: none"> A Letter of Intent from the Developer declaring that: Concrete will have an SCM content of 20% or more (minimum)/ 40% or more (aspirational)
Aspirational Target:	2 points	40% of concrete on site must have a minimum 40% Supplementary Concrete Materials (SCMs).	
Aspirational Target	2 points	<p>Report embodied carbon emissions for the structural and envelope materials of 1 Part 3 building or 10 % of Part 3 buildings on site (whichever is greater)</p> <p>To develop the report, use lifecycle assessment software such as Athena Impact Estimator for Buildings Life Cycle Assessment (LCA) software (or equivalent). Consider three methods to reduce the embodied carbon content of each building reviewed.</p>	<p>Submit:</p> <p>On a Site Plan Drawing:</p> <ul style="list-style-type: none"> Identify the building(s) that is being assessed and describe if it is a residential, commercial or institutional buildings, the estimated gross floor area, the number of storeys and the number of dwelling units (If residential). Confirm the number of Part 3 buildings on site and if 1 or 10% are being assessed (whichever is greater).

		<i>Note: Part 3 – Large and complex buildings, four storeys and taller and greater than 600 square metres in building area.</i>	<ul style="list-style-type: none"> ○ Provide the LCA report declaring the materials that are anticipated to be used and the estimated total embodied carbon emissions of these materials used for the structure and envelope.
	1 additional point	Commit to employing one or more carbon reduction strategies that would result in a 10% reduction in embodied carbon of the design.	<ul style="list-style-type: none"> • In addition to the documentation requirements above, provide a declaration from the developer clearly stating the intent to use one or more of low carbon design strategies to reduce the embodied carbon.
Aspirational Target	2 points	Develop a report for embodied carbon emissions of the two most common roadway types using the Athena Pavement LCA software (or equivalent). Consider three methods to reduce the embodied carbon content of each roadway reviewed.	<ul style="list-style-type: none"> • Provide an Life Cycle Assessment (LCA) report demonstrating the impacts of the different roadway designs and clearly showing three alternative designs resulting in potential carbon reductions.
	1 additional point	Commit to employing one or more carbon reduction strategies that would result in a 10% reduction in embodied carbon of the design.	<ul style="list-style-type: none"> • In addition to the documentation requirements above, provide a declaration from the developer clearly stating the intent to use one or more of low carbon design strategies to reduce the embodied carbon.
Aspirational Target:	3 points	<p>At least 1 tall wood building will be included on the site.</p> <p><i>Note: Tall wood buildings are defined as a building over 6 storeys that uses wood for its structural system and is built using mass timber construction.</i></p>	<p>Submit:</p> <p>On a Site Plan Drawing:</p> <ul style="list-style-type: none"> • Identify the tall wood building and describe if it is a residential, commercial or institutional buildings, the estimated gross floor area, the number of storeys and the number of dwelling units (If residential). • Submit documentation confirming the intent to build a tall wood building.
Aspirational Target:	2 points	<p>Material Efficient Framing for Low Rise Residential wood frame buildings:</p> <p>For all low rise wood framed construction utilize at least 3 of the following measures for 1 point and an additional 2 measures for an additional point.</p> <ul style="list-style-type: none"> • Pre-cut framing packages • Open web floor trusses • Stud spacing greater than 400 mm (16") • Ceiling joist spacing greater than 400 mm (16") • Floor joist spacing greater than 400 mm (16") • All corners have no more than 2 studs. 	<ul style="list-style-type: none"> • Provide a letter of intent from the developer committing to practice material efficient framing and listing the measures that will be employed from the provided eligible measures.
References:	Ontario's Tall Wood Building Reference. October, 2017		

LEGEND

Metric Category:

Built Environment

Mobility

Natural Environment &Open Space

Infrastructure & Buildings

Innovation

CaGBC, Net Zero Carbon Building Standard. May, 2017
LEED For Homes

Change Rationale: This is a proposed new metric. Please refer to the Sustainability Metrics Update Report, Section 2.3.

LEGEND
Metric Category:

Built Environment

Mobility

Natural Environment & Open Space

Infrastructure & Buildings

Innovation

Appendix A

Metric	4.F.1 Reduce Heat Island–Non Roof		
Applicable To:	<input type="checkbox"/> Block Plan <input type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To reduce ambient surface temperatures and provide shade for human health and comfort. Urban areas are typically much warmer than rural or forested areas due to the areas of exposed dark coloured roofing and roadways. Reducing heat gain can provide more comfortable spaces and some cooling savings.		
	Points	Requirements	Documenting Compliance
Minimum Target	2 points	<p><u>For Residential and Non-Residential:</u></p> <p>Use one or more of the following strategies to treat 50% of the site’s non-roof hardscaping:</p> <ul style="list-style-type: none"> • High albedo paving materials with an initial solar reflectance of at least 0.33 or SRI of 29. • Open grid paving with at least 50% perviousness • Shade from existing tree canopy within 10 years of landscape installation. • Shade from architectural structures that are vegetated or have an initial solar reflectance of at least 0.33 at installation or an SRI of 29. • Shade from structures with energy generation. <p>OR</p> <p><u>For Non-Residential:</u></p> <p>Place a minimum of 75% of required parking spaces under cover. Any roof used to shade, or cover parking must have a 3 year aged SRI of at least 29 or be a green roof, or be covered by energy generation systems.</p> <p>Note: Hardscaping includes driveways, walkways, courtyards, surface parking areas, artificial turf and other on-site hard surfaces.</p>	<p>Submit:</p> <p>A Letter of Intent from a qualified professional (e.g. professional engineer, architect) declaring the following:</p> <ul style="list-style-type: none"> • Area of the total hardscape on the site (excluding building footprint) • Highlight on a Site Plan drawing and declare the area for the strategies used to reduce heat island from the hardscape area (i.e. Underground/covered parking, hardscape shading, hardscape materials with an SRI greater than 29, and open grid pavers with pervious greater than 50%). The following products have an SRI greater than 29: <ul style="list-style-type: none"> ○ White-coated gravel on built up roof (SRI 79) ○ White coating on metal roof (SRI 82) ○ White cement tile (SRI 90) ○ New gray concrete (SRI 35) • For unit pavers and open grid/ pervious paving, provide examples of the products that are intended for the design and provide manufacturer’s documentation with the SRI or solar reflectance value to confirm. • Determine the percent (%) of hardscape area that has employed heat island reduction strategies, relative to the total hardscape area. • Upon completion of construction, provide a Letter of Certification signed by an accredited professional that the metric requirements have been implemented and verified.
Aspirational Target	1 additional point	Use one or more of the strategies presented in the Minimum Target to treat 75% of the site’s non-roof hardscaping:	
References	Toronto Green Standard v3 AQ4.1 Toronto Green Standard v3 AQ4.3 LEED NC SSC7.1/7.2		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

LEGEND
Metric Category:

Built Environment

Mobility

Natural Environment & Open Space

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Appendix A

Metric	4. F.2. Reduce Heat Island–Roof		
Applicable To:	<input type="checkbox"/> Block Plan <input type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan		
Metric Intent:	To reduce ambient surface temperatures. Urban areas are typically much warmer than rural or forested areas due to the areas of exposed dark coloured roofing and roadways. Reducing heat gain can provide more comfortable spaces and some cooling savings.		
	Points	Requirements	Documenting Compliance
Minimum Target	2 points	Provide the following: <ul style="list-style-type: none">Cool roof installed for 100% of the available roof space; or	Submit: On a Landscape Plan, Elevation drawings, or Roof Plan demonstrate the following: <ul style="list-style-type: none">Determine the area of Available Roof SpaceFor Cool Roof products, provide examples of the products that are intended for the design and provide manufacturer’s documentation with the SRI or solar reflectance value to confirm.Determine the percent (%) area of roofing surfaces treated with cool roof, green roof and/or solar PV as a percent (%) of the total available roof space. Notes: <ul style="list-style-type: none">Available roof space for cool roof areas consists of the total roof area of the building or building addition excluding private terraces no greater in area than the floor of the abutting residential unit at the roof level.Available Roof Space is defined as the total roof area minus the areas designated for renewable energy, residential private terraces, residential outdoor amenity spaces (to a maximum of 2m²/unit, and a tower roof on a building with a floor plate less than 750m². Definition is from the City of Toronto Green Roof Bylaw.Cool roofing materials have a minimum initial reflectance of 0.65 and minimum emittance of 0.90 or a three-year aged SRI value of 64 for a low-sloped roof and a three-year aged SRI of 15 for a steep-sloped roof. Low sloped roofs have a surface slope of less than 1:6 (9.5 degrees) and steeply sloped roofs have a surface slope greater than 1:6 (9.5 degrees).
Minimum Target	4 points	Provide the following: <ul style="list-style-type: none">Green roof installed for 50% of the available roof space;	
Aspirational Target	2 additional points	Provide the following: <ul style="list-style-type: none">Green roof installed for 75% of the available roof space;	
References	City’s Official Plan LEED NC SSC7.1/7.2 Toronto Green Standard v3, AQ4.2 City of Toronto Green Roof Bylaw		

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

LEGEND
Metric Category:

Built Environment

Mobility

Natural Environment & Open Space

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Innovation

Appendix A

Metric	Innovation	
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan	
Metric Intent:	To encourage applicants to achieve innovative performance. Innovation strategies must demonstrate a comprehensive approach, have significant, measurable environmental Benefits, and be better than standard practice.	
	Points	Requirements & Documenting Compliance
Aspirational Target	Points to be determined based on proposed metric. Points awarded to be no more than 25% of the total applicant score.	<p>Submit:</p> <p>In a strategy or declaration by the Developer:</p> <ul style="list-style-type: none"> The project must demonstrate a quantitative improvement in environmental performance by identifying or establishing a baseline of standard performance and comparing that benchmark with the final design performance. The strategy must be comprehensive. Measures that address a limited portion of a project or are not comprehensive in other ways are not eligible. The project team must demonstrate that the proposed innovation credit applies to the entire project and has at least two components (i.e., it is not limited to use of a single product). The strategy must be significantly better than standard sustainable design practices. <p>The applicant must explain in detail the benefit of the proposed innovation metric and submit the following:</p> <ul style="list-style-type: none"> The intent of the proposed innovation metric The proposed requirements for compliance The proposed submittals to demonstrate compliance The design approach to strategies used to meet the requirements. <p>Innovation points will only be considered for strategies not already identified in the menu of metric options. Innovation points are not awarded for the use of a particular product or design strategy if the technology aids in the achievement of an existing metric, even if the project is not attempting to earn that metric. Corporate strategies are not considered innovative. The innovation strategy must be specific to the project/ application under review.</p>
References	LEEDv4 Innovation Credit	

Change Rationale: Please refer to the Sustainability Metrics Update Report, Section 2.4.

LEGEND
Metric Category:

Built Environment

Mobility

Natural Environment & Open Space

Infrastructure & Buildings

Innovation

Appendix B

Appendix B

	Original Number	Metric Name	Proposed Number
Built Environment	1.B.1/ 1.B.2	Proximity to Amenities	BE-1
	1.C.4	Enhancing Urban Tree Canopy and Shaded Walkways and Sidewalks	BE -2
	1.E.1	Universal Design	BE-3
	1.E.2	Universally Accessible Entry to Buildings and Sites	BE-4
	1.F.1	Design for Life Cycle Housing	BE-5
	1.H.2	Surface Parking Footprint	BE-6
	New	EV Charging Stations	BE-7
	1.J.2	Cultural Heritage conservation	BE-8
Mobility	1.H.1	Bicycle Parking	M-1
	1.H.4	Carpooling Parking	M-2
	1.I.1	Traffic Calming	M-3
	1.I.2	School Proximity to transit routes and bikeways	M-4
	2.A.1	Pedestrian Amenities	M-5
	2.B.1	Block Perimeter/Length	M-6
	2.B.2	Intersection Density	M-7
	2.C.1	Distance to Public Transit	M-8
	2.D.1	Proximity to cycle network	M-9
	2.D.2	Implementing Trail and Bike Paths	M-10
	2.E.1	Promote walkable streets	M-11

LEGEND
Metric Category:

Built Environment

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Appendix A

Natural Environment & Open Space	1.C.2	Preserve Existing Healthy Trees	NE-1
	1.C.3	Soil Quantity and Quality for New Trees	NE -2
	1.J.1	Connection to Natural Heritage	NE-3
	1.J.3	Natural Heritage System Enhancements	NE-4
	3.A.1	Access to Public Parks	NE-5
	3.B.1	Storm water quantity	NE-6
	3.B.2	Storm water quality	NE-7
	3.B.3	Greywater re-use (for interior building functions)	NE-8
	3.B.4	Storm water management beautification	NE-9
	3.C.1	Dedicate land for private garden space	NE-10
	3.E.1	Healthy Soils	NE-11
Infrastructure and Buildings	1.D.1	Buildings Designed and/or Certified under an Accredited “Green” Rating System	IB-1
	3.D.1	Solar Readiness	IB-2
	4.A.1	Passive solar alignment	IB-3
	4.A.2	Building Energy Efficiency and Emissions	IB-4
	4.A.3	Energy Strategy	IB-5
	4.B.1	Reduce potable water use	IB-6
	4.C.2	Reduce light pollution	IB-7
	4.D.1	Bird friendly design	IB-8
	4.E.1	Solid waste	IB-9
	New	Embodied Carbon of Materials	IB-10
	4.F.1	Reduce Heat Island–Non Roof	IB-11
	4.F.2	Reduce Heat Island–Roof	IB-12
Innovation	New	Innovation	I-1

December 5, 2019

Patricia Escobar
Sustainability Consultant
Morrison Hershfield
125 Commerce Valley Dr. W.
Markham, ON L3T 7W4
pescobar@morrisonhershfield.com

Re: Proposed revisions for the Cultural Heritage Conservation metrics

Greetings Patricia,

Please find attached the proposed revisions for the Cultural Heritage Conservation metrics for inclusion in your Sustainability Metric Update Report. The revisions were developed by City of Brampton staff and circulated to the project partner municipalities for their consideration. We look forward to receiving feedback on these proposed revisions as part of the upcoming stakeholder consultation process.

Should you have any questions, please do not hesitate to contact me.

Regards,

Stav Kassaris
Environmental Planner
905-874-2083
stavroula.kassaris@brampton.ca

Original 1.J.2 Cultural Heritage Conservation Metric

Metric	1. J.2. Cultural Heritage Conservation			
Applicable To:	<input checked="" type="checkbox"/> Block Plan <input checked="" type="checkbox"/> Draft Plan <input checked="" type="checkbox"/> Site Plan			
Metric Intent:	To preserve and maintain cultural heritage resources beyond what is mandated locally, provincially, or federally. Maintaining and preserving heritage buildings and spaces brings diversity and history to a neighborhood.			
	Points	Requirements	Documenting Compliance	Change Rationale
Minimum Target:	2 Points	100% evaluation of properties included in the Municipal Heritage Registers (listed and designated), and 100% retention as well as protection of cultural heritage resources that qualify for designation under the <i>Ontario Heritage Act</i>	<ul style="list-style-type: none"> Provide a Heritage Impact Assessment. Identify the cultural heritage resources that are located within the project boundary. If cultural heritage resources are located on the site, verify that the proposed plan complies with the Cultural Heritage Conservation policies under provincial legislation (e.g. <i>Ontario Heritage Act</i>, <i>Planning Act</i>, PPS), City Official Plan, Municipal by-laws, Municipal Register of Cultural Heritage Resources and/or Municipal Heritage Inventory Verify and document that 100% of cultural heritage resources included in the Municipal Heritage Inventory and/or Register have been evaluated Verify and document that 100% of the cultural heritage resources that qualify for designation under the <i>Ontario Heritage Act</i> are retained and protected <p><i>Note: This metric is only applicable to site having existing cultural heritage resources.</i></p>	<p>Proposed Change: Removal; the language regarding the retention and protection of cultural heritage resources incorporated into a new metric.</p> <p>Rationale</p> <p>The evaluation of properties included on Municipal Heritage Registers (listed and designated) is required under municipal policy (e.g. Official Plans), and as such, should not be awarded points.</p> <p>The second portion of this metric, which calls for the complete retention and protection of cultural heritage resources that qualify under the Ontario Heritage Act has been reworded and made into a new standalone aspiration target metric.</p>
Aspiration Target:	2 Points	100% conservation (in situ) of cultural heritage resources identified in the Municipal Heritage Registers (listed and designated) and their associated landscapes and ancillary structures in accordance with "The Standards and Guidelines for the Conservation of Historic Places in Canada"	<p>In addition to the minimum requirements:</p> <ul style="list-style-type: none"> Verify and document that 100% of the cultural heritage resources identified in the Municipal Heritage Register and/or Inventory and their associated landscapes and ancillary structures are conserved in accordance with the Standards and Guidelines for the Conservation of Historic Places in Canada (Found here: http://www.historicplaces.ca/media/18072/81468-parks-s-g-eng-web2.pdf) <p><i>Note: This metric is only applicable to site having existing cultural heritage resources.</i></p>	<p>Proposed Change: Removal</p> <p>Rationale</p> <p>The metric has been revised to focus on the conservation of built cultural heritage resources in recognition of the challenges in retaining landscape features and ancillary structures in full accordance with "The Standards and Guidelines for the Conservation of Historic Places in Canada", particularly those associated with</p>

				agricultural practices, in greenfield areas subject to development.
References:	City's Official Plan Ontario Heritage Act			

TAT Proposed changes to Metric 1.J.2 Cultural Heritage

Metric:	1.J.2. Cultural Heritage Conservation			
Metric Intent:	To preserve and maintain cultural heritage resources.			
	Cultural heritage resources include built heritage resources (listed or designated), cultural heritage landscapes (listed or designated), and archaeological resources, as well as other cultural heritage resources that have not been formally identified on the Municipal Register of Cultural Heritage Resources but have been evaluated and determined to be significant.			
	Note: This metric is only applicable to site having existing cultural heritage resources.			
Applicable To:	<input checked="" type="checkbox"/> Block Plan	<input checked="" type="checkbox"/> Plan of Subdivision	<input checked="" type="checkbox"/> Site Plan	
	Points	Requirements	Demonstrating Compliance	Change Rationale
Aspirational Target:	3 Points	No portion of a cultural heritage resource that contributes to its cultural heritage value is to be demolished or removed (excluding temporary removal for restoration purposes).	Submit: In the Heritage Impact Assessment and Heritage Conservation Plan prepared by an accredited professional (e.g Canadian Association of Heritage Professionals CAHP) <ul style="list-style-type: none"> An outline of how the cultural heritage resource will be conserved and confirm that no portions of the resource that contribute to its cultural heritage value is to be removed. 	This proposed metric is a revision of the original Minimum Target metric, and aims to encourage and reward the complete conservation of a cultural heritage resource.
Minimum Target:	2 Point	If a cultural heritage resource will be relocated, it is moved to a nearby visually prominent location on site and maintains its original orientation.	Submit: In the Heritage Impact Assessment and Heritage Conservation Plan prepared by an accredited professional (e.g Canadian Association of Heritage Professionals CAHP) <ul style="list-style-type: none"> Identification of the proposed location of the cultural heritage resource and clearly demonstrate that it is visually prominent and maintains its original orientation. 	This proposed new metric aims to reduce the negative impacts of relocation through the thoughtful placement and orientation of relocated cultural heritage resource, and ensure the cultural heritage resource is visible to the public and a landmark in the community.
Minimum Target:	2 Point	Where reusable materials from a cultural heritage resource are being removed, a portion will be salvaged and reused on site.	Submit: In the Heritage Impact Assessment and Heritage Conservation Plan prepared by an accredited professional (e.g Canadian Association of Heritage Professionals CAHP) <ul style="list-style-type: none"> Identification of the portion of materials to be salvaged and explain how they will be reused on site. The reuse of the salvaged materials should be demonstrated in supporting documents (i.e. site 	These proposed new metrics encourage and reward the conservation and/or reuse of materials from cultural heritage resources to retain the embodied energy they possess and prevent unnecessary waste in landfill sites. More points are awarded to proposals that salvage and/or reuse

			plan drawings, landscape plans, interpretation plans).	all materials, as well as those proposals that salvage and/or reuse all materials on site.
Aspirational Target:	3 Point	Where reusable materials from a cultural heritage resource are being removed, they are all salvaged and reused on site.	<p>Submit:</p> <p>In the Heritage Impact Assessment and Heritage Conservation Plan prepared by an accredited professional (e.g. Canadian Association of Heritage Professionals CAHP)</p> <ul style="list-style-type: none"> • Identification of the materials to be salvaged and explain how they will be reused on site. The reuse of the salvaged materials should be demonstrated in supporting documents (i.e. site plan drawings, landscape plans, interpretation plans). 	
Aspirational Target:	3 Points	Built cultural heritage resources are conserved in full conformity with the "Standards and Guidelines for the Conservation of Historic Places in Canada"	<p>Submit:</p> <p>In the Heritage Impact Assessment and Heritage Conservation Plan prepared by an accredited professional (e.g. Canadian Association of Heritage Professionals CAHP)</p> <ul style="list-style-type: none"> • Demonstrate how the cultural heritage resource will be conserved in full conformity with the "Standards and Guidelines for the Conservation of Historic Places in Canada". 	<p>The metric has been revised from the original Aspirational Target metric to focus on the conservation of built cultural heritage resources in recognition of the challenges in retaining landscape features and ancillary structures in full accordance with "The Standards and Guidelines for the Conservation of Historic Places in Canada", particularly those associated with agricultural practices, in greenfield areas subject to development.</p> <p>Applicants are encouraged to pursue the conservation of landscape features and ancillary structures in full accordance with "The Standards and Guidelines for the Conservation of Historic Places in Canada" and have this recognized and awarded with points through the Innovation category.</p>