

CITY OF VAUGHAN

EXTRACT FROM COUNCIL MEETING MINUTES OF DECEMBER 10, 2013

Item 11, Report No. 52, of the Committee of the Whole, which was adopted without amendment by the Council of the City of Vaughan on December 10, 2013.

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**MEASURING SUSTAINABILITY PERFORMANCE OF
NEW DEVELOPMENT IN BRAMPTON, RICHMOND HILL AND VAUGHAN
FINAL COMPREHENSIVE REPORT AND IMPLEMENTATION RECOMMENDATIONS
FILE NO. 22.24.1**

The Committee of the Whole recommends:

- 1) That the recommendation contained in the following report of the Commissioner of Planning, dated November 26, 2013, be approved;**
- 2) That the deputation of Mr. Aaron Hershoff, TACC Developments, Applewood Crescent, Vaughan, be received; and**
- 3) That Communication C15 from Ms. Mara Samardzic, BILD, Upjohn Road, North York, dated November 25, 2013, be received.**

Recommendation

The Commissioner of Planning, in consultation with the Commissioner of Engineering and Public Works and the Commissioner of Strategic and Corporate Services, recommends:

1. That the Final Comprehensive Report provided by the consulting team, including Sustainability Performance Metrics to be integrated in the development review process for new development set out in Appendix A of the consultants' report, BE APPROVED to mark the completion of the collaborative project with the City of Brampton and Town of Richmond Hill;
2. That staff integrate the Sustainability Performance Metrics into the development review process as part the testing stage for development applications including Official Plan Amendments, Zoning By-law Amendments, Plans of Subdivision and Site Development Applications for the following classes of development:
 - i) Development implemented using a Site Plan Agreement as described in the June 18, 2013 Committee of the Whole report (Report No. 32, Item 8);
 - ii) Draft Plans of Subdivision implemented through a Subdivision Agreement;
 - iii) In some cases, Development Agreements entered into by the benefiting parties and approved by the City of Vaughan as a condition of approval of development applications; and
 - iv) Block Plans.
3. That the Pre-Application Consultation Form BE AMENDED to require the submission of a Sustainable Design Brief demonstrating the sustainability score, using the Sustainability Performance Metrics, for certain classes of new development during the testing stage;
4. That the initial testing stage of the Sustainability Performance Metrics take place from January 1, 2014 to December 31, 2014;

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5. That at the completion of the testing stage staff provide a report to Council outlining the findings of the testing stage with particular attention to:
 - i) Financial considerations regarding staff resources and/or third-party contracts for maintenance and ongoing refinement of the Sustainability Performance Metrics;
 - ii) Any changes to the Sustainability Performance Metrics or development review procedures;
 - iii) Any amendments to policy and implementation documents (e.g. the VOP 2010, the Site Plan Control By-Law, Site Plan Agreement, etc); and
 - iv) Further educational programs to improve stakeholder or staff knowledge.
6. That staff be authorized to: submit a funding request to the Ontario Growth Secretariat (Ministry of Infrastructure) for financial support from the "Places to Grow Implementation Fund", or other available funding source, for the development of training resources to support the implementation of the "Measuring Sustainability Performance of New Development in Brampton, Richmond Hill and Vaughan" program; that such resources be available to City staff, other municipalities and stakeholders; and that specific examples be provided for Urban Growth Centres and Intensification Areas in Vaughan.

Contribution to Sustainability

The project, Measuring Sustainability Performance of New Development in Brampton, Richmond Hill and Vaughan, implements priorities previously set by Council in *Green Directions Vaughan*, the City's Community Sustainability and Environmental Master Plan. Specifically, Objective 2.3 speaks to creating a city with sustainable built form. Action Item 2.3.1 refers to developing criteria to measure the sustainability performance of development, specifically to develop "sustainable development evaluation criteria" with a focus on ecological and social aspects of sustainability. Integrating sustainability guidelines and metrics into the development review process for each development application is an important tool to achieve sustainable communities.

Economic Impact

The City has partnered with the City of Brampton and the Town of Richmond Hill in undertaking this study. The total cost to the City of Vaughan (approved in the 2011 Budget) for the study under the funding arrangement with the municipal partners is \$22,500 (net) of the total project cost of \$180,000. A grant agreement was signed by the City of Brampton with the Federation of Canadian Municipalities (FCM) in January 2011 to reimburse the municipal partners up to \$85,000 from the Green Municipal Fund. Upon receiving the third reimbursement from the Green Municipal Fund, the City of Brampton will reimburse the City of Vaughan in the amount of \$22,500.

No new additional resources are required for the testing stage of the Sustainability Performance Metrics in the development review process. As the sustainability metrics are closely aligned with existing development review responsibilities, it is anticipated that existing staff resources are sufficient to implement the testing phase of the program without diminishing service levels. Following the initial testing stage, it is recommended that staff provide a report to Council with the findings and recommendations for a final implementation, on the basis of a more refined program, including an assessment of financial considerations. No Additional Resource Requests (ARRs) are required for the 2014 fiscal year. ARR for 2015 may be required pending the outcome of the one-year testing stage. It is expected that early indications of any needs may be available by mid-year 2014, which can contribute to the 2015 budget process.

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Communications Plan

The communications plan for the project, Measuring Sustainability Performance of New Development, includes consultation as part of the development of the sustainability guidelines and metrics as well as outreach for the purposes of knowledge transfer. Consultation has included two workshops held in Vaughan for staff of the three partner municipalities. Two forums have been held for the development community, one in Brampton and one in Vaughan.

Outreach as part of the knowledge transfer process will continue into the future once the project has been approved by the respective Councils. The partners will seek to present the results of the project at various venues, such as the annual symposium of the Ontario Professional Planners Institute in September 2013, the annual conference of the Canadian Institute of Planners, the annual conference of the Federation of Canadian Municipalities, the Municipal Leaders Forum (an initiative of the Greater Toronto Chapter of the Canada Green Building Council), and where other opportunities arise.

A communications plan is described in the 'Implementation Strategy' section of this report to initiate the testing phase to implement the Sustainability Performance Metrics in the development review process.

Purpose

The project, Measuring Sustainability Performance of New Development, was the subject of a staff report and presentation to the Priorities and Key Initiatives Committee of Council on March 18, 2013. The presentation by representatives of the consulting team (Dan Leeming), York Region Public Health (Dr. Kurji) and Peel Public Health (Gayle Burse) emphasized the broader linkages between public health and sustainable communities. The incorporation of sustainability guidelines and metrics into the development review process, to improve the sustainability performance of communities, is an important means of delivering the City's sustainability agenda and is aligned with objectives of other government agencies.

Having established the broader context and importance of the project, a further Report to Council (Committee of the Whole, April 30, 2013) presented the draft Sustainability Metrics and accompanying consultants' report for public comment. This report demonstrated the range of policy support provided in Provincial and York Region policy documents, *Green Directions Vaughan*, the VOP 2010, and other City master plans and studies for implementing the sustainability metrics in the development review process.

The purpose of this report is to mark the completion of the collaborative project with the City of Brampton and Town of Richmond Hill by presenting the consultants' Final Comprehensive Report for adoption by Council and to recommend a phased implementation of the Sustainability Performance Metrics in the development review process.

Background - Analysis and Options

History of the Project

Previous reports were brought to the Environment Committee of Council in 2009 and 2010 to update Council on the process to establish the project to identify a green development checklist. It evolved into collaboration with municipal partners, the City of Brampton and Town of Richmond Hill, and environmental partners (TRCA and Clean Air Partnership). A Memorandum of Understanding was signed by the municipal collaborators in January 2011 following confirmation of matching funds of \$85,000 from the Green Municipal Fund of the Federation of Canadian Municipalities.

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Phase 1 of the project was led by the City of Brampton and began in 2011 with a focus on developing the sustainability guidelines. Phase 2 was led by the City of Vaughan with the goal of identifying and testing sustainability metrics within the framework of the guidelines developed in Phase 1. The draft Sustainability Performance Metrics were provided to Council in the consulting team's Draft Comprehensive Report on April 30, 2013. Following the public comment period, changes to the Sustainability Performance Metrics have been provided in the consulting team's Final Comprehensive Report attached to this staff report. These changes are summarized in the following sections of this report.

Economic Benefits

A wide range of studies document the economic benefits of green building and sustainable communities that accrue within a 5 to 20 year time period. Successful holistic sustainable community development design can achieve the maximum social, economic and environmental benefit, which can have a significant impact on economic competitiveness. The main economic benefits often cited include:

- Energy and water use reductions resulting in costs savings to building owners, often with a payback within 5 years;
- Energy and water use reductions providing a cost savings to governments by deferring or eliminating the need for infrastructure upgrades and expansions;
- Increased property values resulting from lower vacancy rates as consumers seek the benefits of multi-year cost savings;
- Improved employee attendance and productivity for commercial developments, as a result of better indoor temperatures, ventilation and attention to natural light;
- Creating opportunities to expand the green economy with respect to products and services;
- At the site design level, integration of ecological protection, use of alternative stormwater management, and encouraging alternatives to automobile use provides a cost savings to governments for capital infrastructure investment; and
- As noted in the discussion at the meeting of the Priorities and Key Initiatives Committee of Council on March 18, 2013, addressing trends in chronic diseases for even a small percentage of the population will have a dramatic savings in health care costs.

Provincial Policy

There is an underlying policy framework that supports the development and application of sustainability metrics. Bill 51, the Planning and Conservation Land Statute Amendment Act, added the following as a matter of provincial interest in Section 2 of the Planning Act: "the promotion of development that is designed to be sustainable, to support public transit and to be oriented to pedestrians".

Section 41 of the Planning Act was amended by Bill 51 to provide new powers related to obtaining sustainable design features for buildings through site plan control. In particular, paragraph 2 of subsection 41 (4) of the Act was amended by adding the following to the list of plans and drawings which the municipality may approve as a condition of development:

- “(d) matters relating to exterior design, including without limitation the character, scale, appearance and design features of buildings, and their sustainable design, but only to the extent that it is a matter of exterior design, if an official plan and a by-law passed under subsection (2) that both contain provisions relating to such matters are in effect in the municipality;

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- (e) the sustainable design elements on any adjoining highway under a municipality's jurisdiction, including without limitation trees, shrubs, hedges, plantings or other ground cover, permeable paving materials, street furniture, curb ramps, waste and recycling containers and bicycle parking facilities, if an official plan and a by-law passed under subsection (2) are in effect in the municipality; and
- (f) facilities designed to have regard for accessibility for persons with disabilities.”

York Region Official Plan

The York Regional Official Plan (ROP 2010), approved by the Minister of Municipal Affairs and Housing on September 7, 2010, is the upper tier planning document that provides the framework for achieving the Region's vision to 2031. The ROP 2010 was subject to over 50 appeals and is now in the hands of the Ontario Municipal Board. The Regional Official Plan has received partial approval and the majority of the document is now in effect. Those portions of the Plan still under appeal will be resolved through further actions of the Board. There are a number of new sustainability policies in the York ROP 2010 that staff will need to take into account as part of City studies and the review of development applications.

Relevant VOP 2010 Policies

Section 9.1.3 of the VOP 2010 directs the City to establish “Green Development Standards” relating to a range of sustainability items. Until such time as Green Development Standards are adopted by Council, applications are required to submit a “Sustainable Development Report” with reference to the policies of the York Region Official Plan regarding sustainable buildings.

Site Plan Control is noted in Section 10.1.2 (Implementation Tools) of the VOP 2010. The amendments of Bill 51 to paragraph 2 of subsection 41 (4) of the Planning Act regarding sustainable design are addressed in Policy 10.1.2.20.

Section 10.1.3 regarding a complete application submission provides that a Sustainable Development Report may be required in support of a complete application submission.

The Study – Phase 1

Phase 1 of the project was led by the City of Brampton and The Planning Partnership, with the goal to develop Sustainable Community Development Guidelines (SCDGs). The Phase 1 SCDGs will be a new chapter in the City of Brampton's municipal-wide urban design guidelines, the Development Design Guidelines, and will assist the City in the review of development applications, technical reports and other documentation. The SCDGs will help describe the qualitative sustainability objectives that proposed developments should aim to achieve, including highlighting examples of how they could be achieved. These guidelines helped to inform the development of the metrics and the target priorities for Phase 2 of the project. The SCDGs can be adapted by the City of Vaughan as a component of the future City-wide urban design study scheduled to be undertaken in 2014 upon approval of the 2014 capital budget. In the meantime, City staff will seek opportunities to implement the SCDGs on a trial basis as part of the development review process.

The Study – Phase 2

Phase 2 is led by the City of Vaughan and the consulting team of Halsall Associates working collaboratively with The Planning Partnership. Building on the principles and guidelines developed under Phase 1, and using the four sustainability themes established in the Phase 1 document, quantitative sustainability metrics were developed for the municipal partners.

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The Phase 2 deliverables to be provided by the consulting team include:

- The Final Comprehensive Report (Attachment A to this staff report), including the Sustainability Performance Metrics in table format (Appendix A) pertinent to (a) Block Plan and Draft Plan scales and (b) Site Plan scales, a rationale for each of the sustainability metrics and the main sources of information for interpretation of the metrics and targets (Appendix B), and a tracking log of comments and changes (Appendix C);
- A decision-support tool (the Dynamic Tool) to assist in calculating the sustainability score prepared in Excel format along with a companion Manual; and,
- A Guidebook to assist in interpreting how to demonstrate that the selected target for the Sustainability Performance Metrics is met in a particular submission.

The Clean Air Partnership (CAP) and the Toronto and Region Conservation Authority (TRCA) are partner agencies in the project and provided peer review of the study deliverables. These are provided under separate cover.

In addition, City of Vaughan staff led the research and writing of a report, the Energy Use Forecasting Report, to test scenarios of energy use and greenhouse gas emissions to 2031 in each of the partner municipalities. The Energy Use Forecasting Report provides information to:

- Inform the sustainability metrics with respect to energy efficiency targets;
- Identify recommendations for energy savings beyond the use of the sustainability metrics in the development review process for new development and re-development; and
- Set the ground work for a municipal-wide Community Energy Plan to meet ROP 2010 policy 5.2.13.

The Sustainability Performance Metrics are detailed in Appendix A as a matrix or checklist with the following structure:

- Core themes (Built Environment, Mobility, Natural Environment & Open Space, and Infrastructure & Buildings);
- Indicators;
- Performance metrics;
- Mandatory, recommended minimum and aspirational targets;
- Precedents; and
- Point allocation.

The metrics can be applied at scales of development ranging from Secondary Plan/Block Plan, Draft Plan of Subdivision and Site Plan.

Attachment 1, the Final Comprehensive Report provided by the consulting team, is a detailed description of the research, consultation process, testing, and eventual selection of indicators and metrics. Key issues can be highlighted here:

- The metrics are not new to the development approvals process, but offer a standardized approach to measure the sustainability performance of proposed developments;
- Recommended minimum and aspirational targets are above thresholds that are required according to pertinent legislation and/or policy;

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- An application does not have to achieve a minimum score for each metric, but an overall score or rating will be evaluated as part of the development approvals process;
- There is general industry acceptance of municipalities using a green development evaluation system, but some form of recognition or more staff attention to work through innovative solutions for high-performing sustainability projects was noted as an incentive;
- The summary of sustainability performance will be provided in the staff report for a development application; and
- The sustainability metrics are aligned with performance indicators identified for Green Directions Vaughan.

Toronto and Region Conservation Authority (TRCA) Peer Review Comments

Peer review comments from the Toronto and Region Conservation Authority (TRCA) are provided in Attachment 2. The TRCA has a regulatory role in the development review process under the Conservation Authorities Act. The TRCA is also articulating various initiatives regarding natural heritage protection, wet weather management, sustainable development and cultural heritage under the Living City paradigm. Comments from the TRCA focus on technical aspects of the Sustainability Performance Metrics related to types of metrics, levels of enhanced performance, and supporting documentation to support metrics and/or target levels.

Clean Air Partnership (CAP) Peer Review Comments

Peer review comments from the Clean Air Partnership (CAP) are provided in Attachment 2. As the CAP convenes monthly meetings of the Clean Air Council, comprised of representatives from municipalities addressing various sustainability issues, the review has a focus on transferability of the project findings and deliverables to other municipalities. Below are comments of note from the CAP peer review submission.

There are significant benefits to ensuring the consistency of information requested of developers by municipalities in the development application process and the dynamic tool being developed by this project may be able to simplify the application for developers and the review of the applications by municipal planning staff.

It was recognized that there is a rationale for green development policies to begin at a voluntary level in order to build support and buy in from the development community. However, in order to see significant market transformation mandatory green development standards are likely required.

The need for flexibility in order to reach the green development levels was highlighted and that the focus should be on achieving environmental goals as opposed to any specific technology.

From the experiences of other jurisdictions that have instituted green development policies/standards, it is essential that all planning staff are trained on the various metrics and their rationale, so that they are able to communicate these metrics to development applicants.

Monitoring and reporting of the implementation and effectiveness of green development standards is a key component of any green development program and is instrumental in ensuring a feedback loop that will enable increased effectiveness of the green development standards to be achieved over time.

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Public Comment Period Feedback

In April 2013, the Draft Sustainability Metrics were released for public comment (Report to the Committee of the Whole, Report No. 19, Item 22). The Draft Sustainability Metrics were posted on the City's website for public comment, and two consultation sessions were held with the Building Industry and Land Development Association (BILD) on April 25, 2013 and May 27, 2013. A written submission was provided by BILD following the two consultation sessions. A combined submission was received from York Region and York Region Public Health. Both submissions were received on June 3, 2013. Below is a summary of the feedback received during the public comment period.

Flexibility

The comments requested that addressing the Sustainability Performance Metrics be voluntary and that the municipalities take a more flexible approach to the implementation of the Metrics. The structure of the Sustainability Performance Metrics allows the applicant to select the sustainable design features suitable to the site. A testing stage of implementation will provide the feedback to determine appropriate threshold sustainability scores for application approval or to award incentives for high-performance development proposals.

Metric Reconciliation

The comments noted that certain metrics shown in the Draft Block Plan/Draft Plan Table do not belong in the Draft Block Plan/Draft Plan Table as they are not considered at this stage of the planning process (e.g. bike parking, on-street parking, surface parking, carpool parking, potable water, material reuse). It was also noted that the Draft Site /Building Table should be revised to deal only with items that can be considered as part of the Site Plan process. These suggestions are reflected in Sustainability Performance Metrics in Appendix A of the Final Comprehensive Report.

Specific Metric Comments

A number of comments were received related to minor language changes, the collapsing of the Parks Metric, and adding points for certain Metrics. By and large, the majority of these suggestions help improve the readability or clarity of the Metrics and have been included in the Final Sustainability Metrics Tables.

Implementation Comments

A number of comments focused on next steps, specifically on tools, education/training and further projects that could help to streamline the implementation of the Sustainability Metrics. Below is a summary of the main suggestions:

Implementation Guidebook

An Implementation Guidebook was suggested to describe how each of the Metrics should be quantified, among other matters. In response to this comment, a Draft Implementation Guidebook has been prepared (under separate cover), which will be used in the testing stage of implementation by the City and by each of the partner municipalities.

Excel-Based Dynamic Implementation Tool

As part of this partnership project, the consultant created an Excel-based "Dynamic Implementation Tool". This Tool helps to streamline which Sustainability Performance Metrics are applicable to a proposed planning application based on information entered by the applicant about the proposed application (e.g. Draft Plan of Subdivision, Site Plan, single-family, multi-residential, commercial, etc.). As part of the comments, BILD expressed an interest in providing comments on the Dynamic Tool.

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The Dynamic Tool will be used by the partner municipalities to streamline the implementation of the Sustainability Performance Metrics. Each municipality may decide to customize the Dynamic Tool based on its local context. In the City of Vaughan, input will be gathered on the customization of the Dynamic Tool as part of the testing stage of the implementation process.

Education/Training

Education/training sessions were suggested to ensure all public agencies and City staff who review planning applications are implementing the Sustainability Metrics consistently. Education/training workshops could focus on how applicants should be filling in the “dynamic tool”, and also how public agencies and City staff should be evaluating the Metrics provided.

Threshold Point Score and Incentives

The comments requested a final “score” expectation for each level of implementation in order to assess the feasibility of achieving the Sustainability Performance Metrics. It is recommended that the issue of a threshold sustainability score for application approval or to incentivize high-performance development proposals be evaluated as part of the testing stage of implementation.

Updating Existing or Creating Alternative Engineering Standards

The comments acknowledge that engineering standards may not always be in line with the Sustainability Performance Metrics. It was suggested that as part of the implementation process, each municipality revisit current regulations and standards to identify which standards need to be updated or for which an alternative engineering standard should be created to further streamline the implementation of the Sustainability Performance Metrics.

City staff recognize that it would be useful to explore the above mentioned implementation-related comments. As a result, a phased implementation of the Sustainability Performance Metrics is described in this report.

Implementation Strategy

Six staff focus sessions were held in June and July 2013 to discuss a range of issues related to implementing the sustainability metrics in the development review process. The discussions in the focus sessions were directed to identifying necessary changes to processes and/or documents for a phased implementation approach. The first phase is described as a testing phase for staff and applicants which requires the applicants to submit sustainability metrics and derive a sustainability score, but the sustainability score does not factor into the ultimate approval of the application. This will allow for feedback from staff and applicants regarding, among other issues:

- refinement of the targets of the Sustainability Performance Metrics;
- refinement of the numerical scores associated with the Minimum Recommended and Aspirational targets;
- amending and/or creating supplementary documents;
- assessing the need for third-party certification of submittal materials and/or inspections;
- assessing new information that will be required for development applications;
- integrating the new information into both City and Region GIS data bases, where applicable;

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- procedures for staff and training; and
- ongoing coordination with the City of Brampton and Town of Richmond Hill on implementation issues and strategies.

The program will be formally implemented following the testing period. At the completion of the testing period, a threshold sustainability score will be identified which must be reached to obtain approval of an application.

The information below summarizes the discussion in the six staff focus sessions. It was determined that the testing phase of implementation can be initiated in the near-term requiring only:

- minor changes to the Pre-Application Consultation (PAC) Form; and
- appropriate communications to internal and external audiences.

It was also apparent that, outside of presenting a summary of the sustainability score in the Sustainable Design Brief, all other submittal materials are standard documents already recognized in the PAC Form. More rigorous implementation will require minor amendments to the VOP 2010 and appropriate amendments to the Site Plan Control By-Law.

Complete Application and Circulation Procedures

For the testing stage of implementation, only minor changes are required to the Pre-Application Consultation (PAC) Form, as prepared by the Development Planning Department, to require that the Sustainability Performance Metrics are addressed in the application. The Sustainability Performance Metrics can be described in existing submittal documents listed on pages 2 to 4 of the "Pre-Application Consultation (PAC) Understanding" section of the PAC Form. The main changes to the PAC Form consist of references to the Sustainable Design Brief and/or Sustainable Development Report and are noted in more detail below:

- include Sustainable Design Brief in the table in Point #4 in the "Guide to Applicants" section as a requirement to schedule a PAC meeting;
- In the table on Submission Requirements, the Sustainable Design Brief shall be required for Official Plan Amendments (OPA), Zoning By-law Amendments (ZBL), Site Development (DA), and Plan of Subdivisions (SUB);
- Modify the definition of Sustainable Design Brief in relation to the Sustainability Performance Metrics and provide a template;
- Create a simplified sustainability matrix for submission at PAC meetings; and
- Add "Context Plan" as a submittal in the table on Submission Requirements, and provide a definition.

The effect of the changes to the PAC Form is essentially to make the submission of the Sustainable Design Brief and sustainability score a requirement of a complete application.

Classes of Development for Application of the Sustainability Performance Metrics

Committee of the Whole received a report on June 18, 2013 recommending the use of Site Plan Agreements to implement certain classes of development. Given that the amendments to the Planning Act to recognize sustainable design elements fall under Section 41 (Site Plan Control), it is appropriate that the initial testing stage to implement the Sustainability Performance Metrics include the following classes of development to be implemented using a Site Plan Agreement:

- i) all classes of new development in an Intensification Area including the Vaughan Metropolitan Centre, a Primary Centre, Local Centre, Primary Intensification Corridors,

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Primary Intensification Corridors within Employment Areas, Regional Intensification Corridors and Regional Intensification Corridors Within Employment Areas as defined by Vaughan Official Plan 2010. Additions, expansions, and alterations to existing development will be implemented as either an amendment to the original implementing document (i.e. Site Plan Agreement or Letter of Undertaking) or as a minor modification to the existing approval(s);

- ii) all Mid and High Rise buildings as defined by the new City of Vaughan Official Plan 2010 (i.e. buildings over 6 storeys in height);
- iii) all classes of development utilizing strata parking and/or park arrangements, and/or Planning Act Section 37 density bonussing;
- iv) all classes of development where the Commissioner of Planning or designate (Director of Development Planning) is of the opinion that a Site Plan Agreement is required to secure specific City interests; and
- v) where a public/private partnership funding for community infrastructure is proposed.

The Sustainability Performance Metrics are designed to recognize scales of development, such that there is a table of Site Plan metrics and a table of Block Plan and Draft Plan metrics. Hence, it is recommended that the initial testing stage of the Sustainability Performance Metrics also apply to Block Plan developments and Draft Plans of Subdivision where a Subdivision Agreement is required.

Amendments to VOP 2010

Appropriate policy support is in place in the VOP 2010 to initiate the testing phase of implementation, including:

- Section 9.1.3.1 directing the City to establish “Green Development Standards” and that applications are required to submit a “Sustainable Development Report”;
- Site Plan Control noted in Section 10.1.2 (Implementation Tools) of the VOP 2010 and including the amendments of Bill 51 to paragraph 2 of subsection 41 (4) of the Planning Act regarding sustainable design noted in Policy 10.1.2.20; and
- Section 10.1.3 regarding a complete application submission provides that a Sustainable Development Report may be required in support of a complete application submission.

Amendments to VOP 2010 were discussed that will be further explored as part of the evaluation during the testing phase of implementation, including:

- Adding a new policy in section 9.1.3 recognizing that, upon adoption by the Council of the City of Vaughan of environmental Sustainability Performance Metrics, then they shall be applied to Block Plans, Draft Plans of Subdivision and Site Plans without further amendment to this Plan; and
- Consolidating references to “Urban Design Brief and Guidelines” and “Sustainable Development Report” in policy 10.1.3.3 from part ‘c’ (Urban Design Reports and Studies) to refer to “Sustainable Design Brief”.

Site Plan Control By-Law and Site Plan Agreement

No immediate changes are required to the Site Plan Control By-Law and Site Plan Agreement to implement the sustainability metrics in the testing stage. Lessons learned in the testing stage will be used to recommend any necessary changes to the Site Plan Control By-law, such as to bring other classes of development under Site Plan Control and to draft conditions of Site Plan approval related to the sustainability metrics for implementation in the Agreement.

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Other City By-Laws and Standards

The following By-Laws will also be reviewed during the testing stage for potential changes required to ensure there are no conflicts with the implementation of the Sustainability Performance Metrics:

- Property Standards (By-Law 231-2011);
- Encroachment By-Law (244-2005); and
- Tree Protection By-Law.

The need to amend other existing by-laws or enact new by-laws may be a finding of the testing phase. Policy Planning staff will lead the review of select by-laws in consultation with the content experts in relevant City departments.

Furthermore, the Engineering Design Criteria and Standard Drawings will also be reviewed with the goal of identifying opportunities for alternative engineering standards which would result in improved sustainability and higher scores. If so, opportunities to identify external funds to carry out this work will be explored.

Financial Incentives for High-Performing (High Sustainability Score) Applications

It was determined in the staff focus sessions that providing a financial incentive is not appropriate for the initial testing stage. Rather, the merits of financial incentive tools will be considered during the post-testing implementation phase and the findings brought back to a future report to Council. The following factors will be considered:

- a grant-based program is more feasible to implement as a defined amount can be earmarked for the granting program and changed from time to time to reflect the change in sustainability performance;
- a grant-based program can also be limited to certain parts of the City, such as employment lands or intensification areas; and
- incentives are not transformational and uptake is limited, such that incentives can be used as an education or promotional tool.

As noted in the consulting team's Final Comprehensive Report, expedited approval is the incentive of most appeal to the development industry. The City is tracking efforts by York Region on an expedited approvals model and will continue to consider this incentive during the initial testing phase.

Communications

Two types of communications products will be developed before launching the first phase of implementation of the sustainability metrics. First, general communications products will report on the completion of the collaborative project and why the City is incorporating sustainability metrics into the development review process. This will be prepared as updates to appropriate City web pages and can be made available for Council newsletters. Such communications products will articulate what the sustainability score represents in common language and will demonstrate alignment with Green Directions Vaughan.

The second type of communications products will be tailored to two particular audiences. An internal audience of staff involved in the development review will receive an update and link to the internal Vaughan Online project web site where the final deliverables of the project will be posted. An external audience of applicants will receive E-mail notifications with links to the appropriate

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supplementary products, such as the Sustainability Performance Metrics tables, the Excel-based tool for scoring the metrics, an outline of the Sustainable Design Brief, and the Guidebook. An attachment to application forms can also be used to direct applicants to the supplementary products. The communications products will be developed within existing City resources.

Staff also discussed the opportunity to identify success stories and significant milestones in the testing phase as content for future communications. Ongoing communications opportunities are provided in the implementation phase through the staff reports for each application and, in particular, the “Contribution to Sustainability” section which can follow a standard structure such as including:

- Highlights and/or innovative aspects of the development directly related to the Sustainability Performance Metrics;
- Sustainability aspects pursued, but not implemented because of City regulations and/or standards;
- Sustainability aspects implemented, but not recognized in the Sustainability Performance Metrics; and
- Sustainability options identified by staff to improve the sustainability score based on site conditions.

Next Steps

Collaborative Project Completion

Adoption by Council of the consulting team’s Final Comprehensive Report effectively marks the completion of the collaborative project with the City of Brampton and the Town of Richmond Hill. The final milestone report to the Federation of Canadian Municipalities was submitted on October 15, 2013 as Councils in both the City of Brampton and the Town of Richmond Hill have approved the consulting team’s Final Comprehensive Report. Once the City of Brampton is reimbursed by FCM, the City will receive reimbursement from the City of Brampton in the amount of \$22,500 as noted in the partner MOU signed in January 2011. The City will seek to coordinate implementation of the Sustainability Performance Metrics with the City of Brampton and Town of Richmond Hill through information sharing and may coordinate resources regarding specific tasks, such as staff training for the Excel-based scoring tool and modifications to the Guidebook to simplify interpretation of select sustainability metrics.

Initiating the Testing Stage to Implement the Sustainability Performance Metrics

The following steps are required to integrate the testing stage into the development review process, including:

- Modifications to the Pre-Application Consultation Form;
- Providing an outline of the Sustainable Design Brief based on the Sustainability Performance Metrics; and
- Preparing communications products.

Evaluation Criteria for the Testing Stage of Implementation

The testing stage of implementation will allow for feedback from staff and applicants to improve the effectiveness of the Sustainability Performance Metrics and to prepare for the formal roll out of the program. Evaluation criteria to guide the testing stage should aim to quantify the following anticipated benefits of the Sustainability Performance Metrics:

- Provide a consistent set of sustainability metrics that will apply across three municipalities;

CITY OF VAUGHAN

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- Guide developers and municipal staff on improving the sustainability performance of proposed development applications at draft plan, block plan and site plan scales;
- Quantify the environmental performance of a development proposal beyond mandatory sustainability requirements;
- Inform the appropriate incentives for projects that achieve enhanced performance standards; and
- Encourage a more efficient and effective review and evaluation of development applications by proactively outlining of the City's environmental sustainability requirements and aspirations.

An interdepartmental team will be established for the testing stage comprised of staff from Budgeting and Financial Planning, Building Standards, Development Planning, Development/Transportation Engineering, Parks Development, and Policy Planning. This team will meet quarterly to assess the following evaluation criteria during the testing period:

- Track sustainability scores by area and development type using a simple monitoring tool towards establishing a threshold score(s);
- Track sustainability scores by applicant in the monitoring tool to determine any trends related to the content of submission materials and overall sustainability scores as an indication of industry uptake;
- Consolidate feedback from applicants and staff on the use of the Sustainability Performance Metrics tables, Guidebook, Dynamic Tool and other supporting documents to identify changes and/or customization for the City of Vaughan in preparation for the formal roll out;
- Provide education and training for City staff as well as for external planning agents and public commenting agencies;
- Determine amendments to the VOP 2010, Site Plan Control By-Law and Site Plan Agreement template;
- Evaluate financial incentives and/or an expedited approval process to recognize high-performance applications, subject to consultation with the Region and industry;
- Describe the scope of work and financial resources required to prepare alternative engineering standards; and
- Seek input from City staff to determine if integration of the Sustainability Performance Metrics in the development review process results in efficiencies or increased time required for review, approvals, and/or inspections.

Seeking External Funding

Additional external funds can be used to enhance training and outreach opportunities as well as refine the supplementary Guidebook. The City will also seek Letters of Reference from the municipal partners on the collaborative project just completed. An application to the "Places to Grow Implementation Fund", for example, will describe two main tasks: (1) training using the Excel-based Dynamic Tool, and; (2) customizing the Guidebook. While City staff are prepared to facilitate required training sessions, contracting the consulting team that delivered the Dynamic Tool to conduct training sessions will improve the City's capacity to implement the Sustainability Performance Metrics. City staff recommend three training sessions: one for City staff; one with a focus on the development community of practice from an applicant's perspective; and a second session for City staff, but opening the invitation to staff in other municipalities. Guidebook customization will include examples of evaluating performance targets for select metrics using development proposals from Vaughan and other southern Ontario municipalities.

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Relationship to Vaughan Vision 2020/Strategic Plan

This report is consistent with the priorities previously set by Council and the necessary resources have been allocated and approved for the project.

Regional Implications

The project, Measuring Sustainability Performance of New Development, intended to implement Action Item 2.3.1 of Green Directions Vaughan, is consistent with numerous action items in the Region of York Sustainability Strategy 2007, particularly Section 2 regarding healthy communities and Section 4 regarding a sustainable natural environment. Support from York Region in coordinating information requirements and through new and updated data sharing agreements, training and support will assist staff to implement the findings of the study. The project is consistent with Section 5.2 (Sustainable Cities, Sustainable Communities) of the York Region Official Plan.

Conclusion

The intended result of the project is a user-friendly checklist of environmental performance standards, to integrate into the development review process and relevant policy plans and infrastructure processes, which are accepted by industry and consistent among the partner municipalities. The consulting team of Halsall Associates and The Planning Partnership has delivered the Final Comprehensive Report according to the RFP requirements.

Applying sustainability metrics to the development review process for targeted types of development applications will be necessary if the City is to achieve the multiple sustainability objectives identified in Green Directions Vaughan, the York Region and City of Vaughan Official Plans and other policy documents adopted by the City and other levels of government and agencies.

A phased approach to implementation has been described which will allow for staff and applicant feedback in the near term to improve the application of the Sustainability Performance Metrics and ensure efficient and effective rigorous implementation at a future date.

Therefore, it is recommended that the report be approved to complete the collaborative project and direct staff to initiate the testing phase of the implementation program.

Attachments

1. Measuring Sustainability Performance of New Development in Brampton, Richmond Hill and Vaughan – Final Comprehensive Report prepared by Halsall Associates and The Planning Partnership (including Appendix A to C).
2. Clean Air Partnership and Toronto and Region Conservation Authority Peer Review Reports, July 2013.
3. Energy Use and Greenhouse Gas Emissions Forecasting Report – Final (August 2013), prepared by the City of Vaughan.

Report prepared by:

Tony Iacobelli, Senior Environmental Planner, ext. 8630
Roy McQuillin, Manager, Policy Planning, ext. 8211
Rob Bayley, Manager of Urban Design, Development Planning, ext. 8254

(A copy of the attachments referred to in the foregoing have been forwarded to each Member of Council and a copy thereof is also on file in the office of the City Clerk.)



BUILDING A GREATER GTA
Building Industry and Land
Development Association

c 15
Communication
CW: NOV 26/13
Item: 11

November 25, 2013

Mayor Maurizio Bevilacqua and Members of the Committee of the Whole
City of Vaughan
2141 Major Mackenzie Drive
Vaughan, Ontario
L6A 1T1

Dear Mayor Maurizio Bevilacqua and Members of the Committee of the Whole,

Re: *Measuring Sustainability Performance of New Development in Brampton, Richmond Hill and Vaughan Final Comprehensive Report and Implementation Recommendations File No. 22.24.1*

We thank you for the opportunity to review and provide comment on the recently released staff report titled *Measuring the Sustainability Performance of New Development – Final Comprehensive Report and Implementation Recommendations*.

BILD is committed to promoting the development of sustainable communities. We value the opportunity to be part of the City's consultation regarding the creation and implementation of sustainability guidelines and trust that our industry experiences are being used to help determine best-practices and find value-added opportunities that work well in principle and in practice in the areas of planning, development and building.

That being said, our members have signalled that they feel the robust document you have before you have not been met with adequate input from the industry. In fact we had been under the impression based on our discussions with the joint Brampton/Richmond Hill/Vaughan Committee in May, that further opportunity to consult on the final report and a proposed *Implementation Guide* would occur prior to any of the three municipalities moving to approve the *Final Comprehensive Report*. Our members agree that having the opportunity to review an implementation program ahead of any approval of the metrics is critical to understand the reasonableness of the program. Understanding that the intent is to garner feedback through the testing phase, we are suggesting it would be helpful for our members to have the opportunity to comment on these aspects of the program in advance of any trial application.

Of particular note: It was our understanding based on our stakeholder meeting that any suggestion of a "score" with which to weigh the merit of a development application would not be the intent of the program. This is a much different direction from what is currently presented in the report and we would like further opportunity to discuss this concept.

We are requesting at this time, a *deferral* of your approval of the *Final Comprehensive Report* to allow for our full review of the existing metrics and any implementation guidelines that will roll out of the respective municipalities. As such, we are requesting further meetings of our working group with City staff in the development of implementation guidelines, and indeed the final metrics.

Considering that there continues to be a great degree of uncertainty with the content and intent of the report as presented, BILD feels further consultation with the industry is necessary in order to bring forward a program that once again, works well in principle and in practice.

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BUILDING A GREATER GTA
Building Industry and Land
Development Association

We trust our comments will be taken into consideration and look forward to further dialogue with Committee and staff on this matter.

Sincerely yours,

Mara Samardzic, MCIP, RPP
Planner, Policy and Government Relations
BILD

*Cc: John Mackenzie, Commissioner of Planning, City of Vaughan
Tony Iacobelli, City of Vaughan – Project Lead – Phase 2 Sustainability Performance Metrics, City of Vaughan
Michael Pozzebon, BILD York Chapter Chair
BILD York Chapter members*

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COMMITTEE OF THE WHOLE NOVEMBER 26, 2013

**MEASURING SUSTAINABILITY PERFORMANCE OF
NEW DEVELOPMENT IN BRAMPTON, RICHMOND HILL AND VAUGHAN
FINAL COMPREHENSIVE REPORT AND IMPLEMENTATION RECOMMENDATIONS
FILE NO. 22.24.1**

Recommendation

The Commissioner of Planning, in consultation with the Commissioner of Engineering and Public Works and the Commissioner of Strategic and Corporate Services, recommends:

1. That the Final Comprehensive Report provided by the consulting team, including Sustainability Performance Metrics to be integrated in the development review process for new development set out in Appendix A of the consultants' report, BE APPROVED to mark the completion of the collaborative project with the City of Brampton and Town of Richmond Hill;
2. That staff integrate the Sustainability Performance Metrics into the development review process as part the testing stage for development applications including Official Plan Amendments, Zoning By-law Amendments, Plans of Subdivision and Site Development Applications for the following classes of development:
 - i) Development implemented using a Site Plan Agreement as described in the June 18, 2013 Committee of the Whole report (Report No. 32, Item 8);
 - ii) Draft Plans of Subdivision implemented through a Subdivision Agreement;
 - iii) In some cases, Development Agreements entered into by the benefiting parties and approved by the City of Vaughan as a condition of approval of development applications; and
 - iv) Block Plans.
3. That the Pre-Application Consultation Form BE AMENDED to require the submission of a Sustainable Design Brief demonstrating the sustainability score, using the Sustainability Performance Metrics, for certain classes of new development during the testing stage;
4. That the initial testing stage of the Sustainability Performance Metrics take place from January 1, 2014 to December 31, 2014;
5. That at the completion of the testing stage staff provide a report to Council outlining the findings of the testing stage with particular attention to:
 - i) Financial considerations regarding staff resources and/or third-party contracts for maintenance and ongoing refinement of the Sustainability Performance Metrics;
 - ii) Any changes to the Sustainability Performance Metrics or development review procedures;
 - iii) Any amendments to policy and implementation documents (e.g. the VOP 2010, the Site Plan Control By-Law, Site Plan Agreement, etc); and
 - iv) Further educational programs to improve stakeholder or staff knowledge.

6. That staff be authorized to: submit a funding request to the Ontario Growth Secretariat (Ministry of Infrastructure) for financial support from the "Places to Grow Implementation Fund", or other available funding source, for the development of training resources to support the implementation of the "Measuring Sustainability Performance of New Development in Brampton, Richmond Hill and Vaughan" program; that such resources be available to City staff, other municipalities and stakeholders; and that specific examples be provided for Urban Growth Centres and Intensification Areas in Vaughan.

Contribution to Sustainability

The project, Measuring Sustainability Performance of New Development in Brampton, Richmond Hill and Vaughan, implements priorities previously set by Council in *Green Directions Vaughan*, the City's Community Sustainability and Environmental Master Plan. Specifically, Objective 2.3 speaks to creating a city with sustainable built form. Action Item 2.3.1 refers to developing criteria to measure the sustainability performance of development, specifically to develop "sustainable development evaluation criteria" with a focus on ecological and social aspects of sustainability. Integrating sustainability guidelines and metrics into the development review process for each development application is an important tool to achieve sustainable communities.

Economic Impact

The City has partnered with the City of Brampton and the Town of Richmond Hill in undertaking this study. The total cost to the City of Vaughan (approved in the 2011 Budget) for the study under the funding arrangement with the municipal partners is \$22,500 (net) of the total project cost of \$180,000. A grant agreement was signed by the City of Brampton with the Federation of Canadian Municipalities (FCM) in January 2011 to reimburse the municipal partners up to \$85,000 from the Green Municipal Fund. Upon receiving the third reimbursement from the Green Municipal Fund, the City of Brampton will reimburse the City of Vaughan in the amount of \$22,500.

No new additional resources are required for the testing stage of the Sustainability Performance Metrics in the development review process. As the sustainability metrics are closely aligned with existing development review responsibilities, it is anticipated that existing staff resources are sufficient to implement the testing phase of the program without diminishing service levels. Following the initial testing stage, it is recommended that staff provide a report to Council with the findings and recommendations for a final implementation, on the basis of a more refined program, including an assessment of financial considerations. No Additional Resource Requests (ARRs) are required for the 2014 fiscal year. ARR for 2015 may be required pending the outcome of the one-year testing stage. It is expected that early indications of any needs may be available by mid-year 2014, which can contribute to the 2015 budget process.

Communications Plan

The communications plan for the project, Measuring Sustainability Performance of New Development, includes consultation as part of the development of the sustainability guidelines and metrics as well as outreach for the purposes of knowledge transfer. Consultation has included two workshops held in Vaughan for staff of the three partner municipalities. Two forums have been held for the development community, one in Brampton and one in Vaughan.

Outreach as part of the knowledge transfer process will continue into the future once the project has been approved by the respective Councils. The partners will seek to present the results of the project at various venues, such as the annual symposium of the Ontario Professional Planners Institute in September 2013, the annual conference of the Canadian Institute of Planners, the annual conference of the Federation of Canadian Municipalities, the Municipal Leaders Forum (an initiative of the Greater Toronto Chapter of the Canada Green Building Council), and where other opportunities arise.

A communications plan is described in the 'Implementation Strategy' section of this report to initiate the testing phase to implement the Sustainability Performance Metrics in the development review process.

Purpose

The project, Measuring Sustainability Performance of New Development, was the subject of a staff report and presentation to the Priorities and Key Initiatives Committee of Council on March 18, 2013. The presentation by representatives of the consulting team (Dan Leeming), York Region Public Health (Dr. Kurji) and Peel Public Health (Gayle Bursey) emphasized the broader linkages between public health and sustainable communities. The incorporation of sustainability guidelines and metrics into the development review process, to improve the sustainability performance of communities, is an important means of delivering the City's sustainability agenda and is aligned with objectives of other government agencies.

Having established the broader context and importance of the project, a further Report to Council (Committee of the Whole, April 30, 2013) presented the draft Sustainability Metrics and accompanying consultants' report for public comment. This report demonstrated the range of policy support provided in Provincial and York Region policy documents, *Green Directions Vaughan*, the VOP 2010, and other City master plans and studies for implementing the sustainability metrics in the development review process.

The purpose of this report is to mark the completion of the collaborative project with the City of Brampton and Town of Richmond Hill by presenting the consultants' Final Comprehensive Report for adoption by Council and to recommend a phased implementation of the Sustainability Performance Metrics in the development review process.

Background - Analysis and Options

History of the Project

Previous reports were brought to the Environment Committee of Council in 2009 and 2010 to update Council on the process to establish the project to identify a green development checklist. It evolved into collaboration with municipal partners, the City of Brampton and Town of Richmond Hill, and environmental partners (TRCA and Clean Air Partnership). A Memorandum of Understanding was signed by the municipal collaborators in January 2011 following confirmation of matching funds of \$85,000 from the Green Municipal Fund of the Federation of Canadian Municipalities.

Phase 1 of the project was led by the City of Brampton and began in 2011 with a focus on developing the sustainability guidelines. Phase 2 was led by the City of Vaughan with the goal of identifying and testing sustainability metrics within the framework of the guidelines developed in Phase 1. The draft Sustainability Performance Metrics were provided to Council in the consulting team's Draft Comprehensive Report on April 30, 2013. Following the public comment period, changes to the Sustainability Performance Metrics have been provided in the consulting team's Final Comprehensive Report attached to this staff report. These changes are summarized in the following sections of this report.

Economic Benefits

A wide range of studies document the economic benefits of green building and sustainable communities that accrue within a 5 to 20 year time period. Successful holistic sustainable community development design can achieve the maximum social, economic and environmental benefit, which can have a significant impact on economic competitiveness. The main economic benefits often cited include:

- Energy and water use reductions resulting in costs savings to building owners, often with a payback within 5 years;
- Energy and water use reductions providing a cost savings to governments by deferring or eliminating the need for infrastructure upgrades and expansions;
- Increased property values resulting from lower vacancy rates as consumers seek the benefits of multi-year cost savings;
- Improved employee attendance and productivity for commercial developments, as a result of better indoor temperatures, ventilation and attention to natural light;
- Creating opportunities to expand the green economy with respect to products and services;
- At the site design level, integration of ecological protection, use of alternative stormwater management, and encouraging alternatives to automobile use provides a cost savings to governments for capital infrastructure investment; and
- As noted in the discussion at the meeting of the Priorities and Key Initiatives Committee of Council on March 18, 2013, addressing trends in chronic diseases for even a small percentage of the population will have a dramatic savings in health care costs.

Provincial Policy

There is an underlying policy framework that supports the development and application of sustainability metrics. Bill 51, the Planning and Conservation Land Statute Amendment Act, added the following as a matter of provincial interest in Section 2 of the Planning Act: “the promotion of development that is designed to be sustainable, to support public transit and to be oriented to pedestrians”.

Section 41 of the Planning Act was amended by Bill 51 to provide new powers related to obtaining sustainable design features for buildings through site plan control. In particular, paragraph 2 of subsection 41 (4) of the Act was amended by adding the following to the list of plans and drawings which the municipality may approve as a condition of development:

- “(d) matters relating to exterior design, including without limitation the character, scale, appearance and design features of buildings, and their sustainable design, but only to the extent that it is a matter of exterior design, if an official plan and a by-law passed under subsection (2) that both contain provisions relating to such matters are in effect in the municipality;
- (e) the sustainable design elements on any adjoining highway under a municipality's jurisdiction, including without limitation trees, shrubs, hedges, plantings or other ground cover, permeable paving materials, street furniture, curb ramps, waste and recycling containers and bicycle parking facilities, if an official plan and a by-law passed under subsection (2) are in effect in the municipality; and
- (f) facilities designed to have regard for accessibility for persons with disabilities.”

York Region Official Plan

The York Regional Official Plan (ROP 2010), approved by the Minister of Municipal Affairs and Housing on September 7, 2010, is the upper tier planning document that provides the framework for achieving the Region's vision to 2031. The ROP 2010 was subject to over 50 appeals and is now in the hands of the Ontario Municipal Board. The Regional Official Plan has received partial approval and the majority of the document is now in effect. Those portions of the Plan still under appeal will be resolved through further actions of the Board. There are a number of new sustainability policies in the York ROP 2010 that staff will need to take into account as part of City studies and the review of development applications.

Relevant VOP 2010 Policies

Section 9.1.3 of the VOP 2010 directs the City to establish “Green Development Standards” relating to a range of sustainability items. Until such time as Green Development Standards are adopted by Council, applications are required to submit a “Sustainable Development Report” with reference to the policies of the York Region Official Plan regarding sustainable buildings.

Site Plan Control is noted in Section 10.1.2 (Implementation Tools) of the VOP 2010. The amendments of Bill 51 to paragraph 2 of subsection 41 (4) of the Planning Act regarding sustainable design are addressed in Policy 10.1.2.20.

Section 10.1.3 regarding a complete application submission provides that a Sustainable Development Report may be required in support of a complete application submission.

The Study – Phase 1

Phase 1 of the project was led by the City of Brampton and The Planning Partnership, with the goal to develop Sustainable Community Development Guidelines (SCDGs). The Phase 1 SCDGs will be a new chapter in the City of Brampton’s municipal-wide urban design guidelines, the Development Design Guidelines, and will assist the City in the review of development applications, technical reports and other documentation. The SCDGs will help describe the qualitative sustainability objectives that proposed developments should aim to achieve, including highlighting examples of how they could be achieved. These guidelines helped to inform the development of the metrics and the target priorities for Phase 2 of the project. The SCDGs can be adapted by the City of Vaughan as a component of the future City-wide urban design study scheduled to be undertaken in 2014 upon approval of the 2014 capital budget. In the meantime, City staff will seek opportunities to implement the SCDGs on a trial basis as part of the development review process.

The Study – Phase 2

Phase 2 is led by the City of Vaughan and the consulting team of Halsall Associates working collaboratively with The Planning Partnership. Building on the principles and guidelines developed under Phase 1, and using the four sustainability themes established in the Phase 1 document, quantitative sustainability metrics were developed for the municipal partners.

The Phase 2 deliverables to be provided by the consulting team include:

- The Final Comprehensive Report (Attachment A to this staff report), including the Sustainability Performance Metrics in table format (Appendix A) pertinent to (a) Block Plan and Draft Plan scales and (b) Site Plan scales, a rationale for each of the sustainability metrics and the main sources of information for interpretation of the metrics and targets (Appendix B), and a tracking log of comments and changes (Appendix C);
- A decision-support tool (the Dynamic Tool) to assist in calculating the sustainability score prepared in Excel format along with a companion Manual; and,
- A Guidebook to assist in interpreting how to demonstrate that the selected target for the Sustainability Performance Metrics is met in a particular submission.

The Clean Air Partnership (CAP) and the Toronto and Region Conservation Authority (TRCA) are partner agencies in the project and provided peer review of the study deliverables. These are provided under separate cover.

In addition, City of Vaughan staff led the research and writing of a report, the Energy Use Forecasting Report, to test scenarios of energy use and greenhouse gas emissions to 2031 in each of the partner municipalities. The Energy Use Forecasting Report provides information to:

- Inform the sustainability metrics with respect to energy efficiency targets;
- Identify recommendations for energy savings beyond the use of the sustainability metrics in the development review process for new development and re-development; and
- Set the ground work for a municipal-wide Community Energy Plan to meet ROP 2010 policy 5.2.13.

The Sustainability Performance Metrics are detailed in Appendix A as a matrix or checklist with the following structure:

- Core themes (Built Environment, Mobility, Natural Environment & Open Space, and Infrastructure & Buildings);
- Indicators;
- Performance metrics;
- Mandatory, recommended minimum and aspirational targets;
- Precedents; and
- Point allocation.

The metrics can be applied at scales of development ranging from Secondary Plan/Block Plan, Draft Plan of Subdivision and Site Plan.

Attachment 1, the Final Comprehensive Report provided by the consulting team, is a detailed description of the research, consultation process, testing, and eventual selection of indicators and metrics. Key issues can be highlighted here:

- The metrics are not new to the development approvals process, but offer a standardized approach to measure the sustainability performance of proposed developments;
- Recommended minimum and aspirational targets are above thresholds that are required according to pertinent legislation and/or policy;
- An application does not have to achieve a minimum score for each metric, but an overall score or rating will be evaluated as part of the development approvals process;
- There is general industry acceptance of municipalities using a green development evaluation system, but some form of recognition or more staff attention to work through innovative solutions for high-performing sustainability projects was noted as an incentive;
- The summary of sustainability performance will be provided in the staff report for a development application; and
- The sustainability metrics are aligned with performance indicators identified for Green Directions Vaughan.

Toronto and Region Conservation Authority (TRCA) Peer Review Comments

Peer review comments from the Toronto and Region Conservation Authority (TRCA) are provided in Attachment 2. The TRCA has a regulatory role in the development review process under the Conservation Authorities Act. The TRCA is also articulating various initiatives regarding natural heritage protection, wet weather management, sustainable development and cultural heritage under the Living City paradigm. Comments from the TRCA focus on technical aspects of the Sustainability Performance Metrics related to types of metrics, levels of enhanced performance, and supporting documentation to support metrics and/or target levels.

Clean Air Partnership (CAP) Peer Review Comments

Peer review comments from the Clean Air Partnership (CAP) are provided in Attachment 2. As the CAP convenes monthly meetings of the Clean Air Council, comprised of representatives from municipalities addressing various sustainability issues, the review has a focus on transferability of the project findings and deliverables to other municipalities. Below are comments of note from the CAP peer review submission.

There are significant benefits to ensuring the consistency of information requested of developers by municipalities in the development application process and the dynamic tool being developed by this project may be able to simplify the application for developers and the review of the applications by municipal planning staff.

It was recognized that there is a rationale for green development policies to begin at a voluntary level in order to build support and buy in from the development community. However, in order to see significant market transformation mandatory green development standards are likely required.

The need for flexibility in order to reach the green development levels was highlighted and that the focus should be on achieving environmental goals as opposed to any specific technology.

From the experiences of other jurisdictions that have instituted green development policies/standards, it is essential that all planning staff are trained on the various metrics and their rationale, so that they are able to communicate these metrics to development applicants.

Monitoring and reporting of the implementation and effectiveness of green development standards is a key component of any green development program and is instrumental in ensuring a feedback loop that will enable increased effectiveness of the green development standards to be achieved over time.

Public Comment Period Feedback

In April 2013, the Draft Sustainability Metrics were released for public comment (Report to the Committee of the Whole, Report No. 19, Item 22). The Draft Sustainability Metrics were posted on the City's website for public comment, and two consultation sessions were held with the Building Industry and Land Development Association (BILD) on April 25, 2013 and May 27, 2013. A written submission was provided by BILD following the two consultation sessions. A combined submission was received from York Region and York Region Public Health. Both submissions were received on June 3, 2013. Below is a summary of the feedback received during the public comment period.

Flexibility

The comments requested that addressing the Sustainability Performance Metrics be voluntary and that the municipalities take a more flexible approach to the implementation of the Metrics. The structure of the Sustainability Performance Metrics allows the applicant to select the sustainable design features suitable to the site. A testing stage of implementation will provide the feedback to determine appropriate threshold sustainability scores for application approval or to award incentives for high-performance development proposals.

Metric Reconciliation

The comments noted that certain metrics shown in the Draft Block Plan/Draft Plan Table do not belong in the Draft Block Plan/Draft Plan Table as they are not considered at this stage of the planning process (e.g. bike parking, on-street parking, surface parking, carpool parking, potable water, material reuse). It was also noted that the Draft Site

/Building Table should be revised to deal only with items that can be considered as part of the Site Plan process. These suggestions are reflected in Sustainability Performance Metrics in Appendix A of the Final Comprehensive Report.

Specific Metric Comments

A number of comments were received related to minor language changes, the collapsing of the Parks Metric, and adding points for certain Metrics. By and large, the majority of these suggestions help improve the readability or clarity of the Metrics and have been included in the Final Sustainability Metrics Tables.

Implementation Comments

A number of comments focused on next steps, specifically on tools, education/training and further projects that could help to streamline the implementation of the Sustainability Metrics. Below is a summary of the main suggestions:

Implementation Guidebook

An Implementation Guidebook was suggested to describe how each of the Metrics should be quantified, among other matters. In response to this comment, a Draft Implementation Guidebook has been prepared (under separate cover), which will be used in the testing stage of implementation by the City and by each of the partner municipalities.

Excel-Based Dynamic Implementation Tool

As part of this partnership project, the consultant created an Excel-based "Dynamic Implementation Tool". This Tool helps to streamline which Sustainability Performance Metrics are applicable to a proposed planning application based on information entered by the applicant about the proposed application (e.g. Draft Plan of Subdivision, Site Plan, single-family, multi-residential, commercial, etc.). As part of the comments, BILD expressed an interest in providing comments on the Dynamic Tool.

The Dynamic Tool will be used by the partner municipalities to streamline the implementation of the Sustainability Performance Metrics. Each municipality may decide to customize the Dynamic Tool based on its local context. In the City of Vaughan, input will be gathered on the customization of the Dynamic Tool as part of the testing stage of the implementation process.

Education/Training

Education/training sessions were suggested to ensure all public agencies and City staff who review planning applications are implementing the Sustainability Metrics consistently. Education/training workshops could focus on how applicants should be filling in the "dynamic tool", and also how public agencies and City staff should be evaluating the Metrics provided.

Threshold Point Score and Incentives

The comments requested a final "score" expectation for each level of implementation in order to assess the feasibility of achieving the Sustainability Performance Metrics. It is recommended that the issue of a threshold sustainability score for application approval or to incentivize high-performance development proposals be evaluated as part of the testing stage of implementation.

Updating Existing or Creating Alternative Engineering Standards

The comments acknowledge that engineering standards may not always be in line with the Sustainability Performance Metrics. It was suggested that as part of the implementation process, each municipality revisit current regulations and

standards to identify which standards need to be updated or for which an alternative engineering standard should be created to further streamline the implementation of the Sustainability Performance Metrics.

City staff recognize that it would be useful to explore the above mentioned implementation-related comments. As a result, a phased implementation of the Sustainability Performance Metrics is described in this report.

Implementation Strategy

Six staff focus sessions were held in June and July 2013 to discuss a range of issues related to implementing the sustainability metrics in the development review process. The discussions in the focus sessions were directed to identifying necessary changes to processes and/or documents for a phased implementation approach. The first phase is described as a testing phase for staff and applicants which requires the applicants to submit sustainability metrics and derive a sustainability score, but the sustainability score does not factor into the ultimate approval of the application. This will allow for feedback from staff and applicants regarding, among other issues:

- refinement of the targets of the Sustainability Performance Metrics;
- refinement of the numerical scores associated with the Minimum Recommended and Aspirational targets;
- amending and/or creating supplementary documents;
- assessing the need for third-party certification of submittal materials and/or inspections;
- assessing new information that will be required for development applications;
- integrating the new information into both City and Region GIS data bases, where applicable;
- procedures for staff and training; and
- ongoing coordination with the City of Brampton and Town of Richmond Hill on implementation issues and strategies.

The program will be formally implemented following the testing period. At the completion of the testing period, a threshold sustainability score will be identified which must be reached to obtain approval of an application.

The information below summarizes the discussion in the six staff focus sessions. It was determined that the testing phase of implementation can be initiated in the near-term requiring only:

- minor changes to the Pre-Application Consultation (PAC) Form; and
- appropriate communications to internal and external audiences.

It was also apparent that, outside of presenting a summary of the sustainability score in the Sustainable Design Brief, all other submittal materials are standard documents already recognized in the PAC Form. More rigorous implementation will require minor amendments to the VOP 2010 and appropriate amendments to the Site Plan Control By-Law.

Complete Application and Circulation Procedures

For the testing stage of implementation, only minor changes are required to the Pre-Application Consultation (PAC) Form, as prepared by the Development Planning Department, to require that the Sustainability Performance Metrics are addressed in the application. The Sustainability Performance Metrics can be described in existing submittal documents listed on pages 2 to 4 of the "Pre-Application Consultation (PAC) Understanding" section of the PAC Form. The main changes to the PAC Form consist of references to the Sustainable Design Brief and/or Sustainable Development Report and are noted in more detail below:

- include Sustainable Design Brief in the table in Point #4 in the “Guide to Applicants” section as a requirement to schedule a PAC meeting;
- In the table on Submission Requirements, the Sustainable Design Brief shall be required for Official Plan Amendments (OPA), Zoning By-law Amendments (ZBL), Site Development (DA), and Plan of Subdivisions (SUB);
- Modify the definition of Sustainable Design Brief in relation to the Sustainability Performance Metrics and provide a template;
- Create a simplified sustainability matrix for submission at PAC meetings; and
- Add “Context Plan” as a submittal in the table on Submission Requirements, and provide a definition.

The effect of the changes to the PAC Form is essentially to make the submission of the Sustainable Design Brief and sustainability score a requirement of a complete application.

Classes of Development for Application of the Sustainability Performance Metrics

Committee of the Whole received a report on June 18, 2013 recommending the use of Site Plan Agreements to implement certain classes of development. Given that the amendments to the Planning Act to recognize sustainable design elements fall under Section 41 (Site Plan Control), it is appropriate that the initial testing stage to implement the Sustainability Performance Metrics include the following classes of development to be implemented using a Site Plan Agreement:

- i) all classes of new development in an Intensification Area including the Vaughan Metropolitan Centre, a Primary Centre, Local Centre, Primary Intensification Corridors, Primary Intensification Corridors within Employment Areas, Regional Intensification Corridors and Regional Intensification Corridors Within Employment Areas as defined by Vaughan Official Plan 2010. Additions, expansions, and alterations to existing development will be implemented as either an amendment to the original implementing document (i.e. Site Plan Agreement or Letter of Undertaking) or as a minor modification to the existing approval(s);
- ii) all Mid and High Rise buildings as defined by the new City of Vaughan Official Plan 2010 (i.e. buildings over 6 storeys in height);
- iii) all classes of development utilizing strata parking and/or park arrangements, and/or Planning Act Section 37 density bonussing;
- iv) all classes of development where the Commissioner of Planning or designate (Director of Development Planning) is of the opinion that a Site Plan Agreement is required to secure specific City interests; and
- v) where a public/private partnership funding for community infrastructure is proposed.

The Sustainability Performance Metrics are designed to recognize scales of development, such that there is a table of Site Plan metrics and a table of Block Plan and Draft Plan metrics. Hence, it is recommended that the initial testing stage of the Sustainability Performance Metrics also apply to Block Plan developments and Draft Plans of Subdivision where a Subdivision Agreement is required.

Amendments to VOP 2010

Appropriate policy support is in place in the VOP 2010 to initiate the testing phase of implementation, including:

- Section 9.1.3.1 directing the City to establish “Green Development Standards” and that applications are required to submit a “Sustainable Development Report”;
- Site Plan Control noted in Section 10.1.2 (Implementation Tools) of the VOP 2010 and including the amendments of Bill 51 to paragraph 2 of subsection 41 (4) of the Planning Act regarding sustainable design noted in Policy 10.1.2.20; and

- Section 10.1.3 regarding a complete application submission provides that a Sustainable Development Report may be required in support of a complete application submission.

Amendments to VOP 2010 were discussed that will be further explored as part of the evaluation during the testing phase of implementation, including:

- Adding a new policy in section 9.1.3 recognizing that, upon adoption by the Council of the City of Vaughan of environmental Sustainability Performance Metrics, then they shall be applied to Block Plans, Draft Plans of Subdivision and Site Plans without further amendment to this Plan; and
- Consolidating references to “Urban Design Brief and Guidelines” and “Sustainable Development Report” in policy 10.1.3.3 from part ‘c’ (Urban Design Reports and Studies) to refer to “Sustainable Design Brief”.

Site Plan Control By-Law and Site Plan Agreement

No immediate changes are required to the Site Plan Control By-Law and Site Plan Agreement to implement the sustainability metrics in the testing stage. Lessons learned in the testing stage will be used to recommend any necessary changes to the Site Plan Control By-law, such as to bring other classes of development under Site Plan Control and to draft conditions of Site Plan approval related to the sustainability metrics for implementation in the Agreement.

Other City By-Laws and Standards

The following By-Laws will also be reviewed during the testing stage for potential changes required to ensure there are no conflicts with the implementation of the Sustainability Performance Metrics:

- Property Standards (By-Law 231-2011);
- Encroachment By-Law (244-2005); and
- Tree Protection By-Law.

The need to amend other existing by-laws or enact new by-laws may be a finding of the testing phase. Policy Planning staff will lead the review of select by-laws in consultation with the content experts in relevant City departments.

Furthermore, the Engineering Design Criteria and Standard Drawings will also be reviewed with the goal of identifying opportunities for alternative engineering standards which would result in improved sustainability and higher scores. If so, opportunities to identify external funds to carry out this work will be explored.

Financial Incentives for High-Performing (High Sustainability Score) Applications

It was determined in the staff focus sessions that providing a financial incentive is not appropriate for the initial testing stage. Rather, the merits of financial incentive tools will be considered during the post-testing implementation phase and the findings brought back to a future report to Council. The following factors will be considered:

- a grant-based program is more feasible to implement as a defined amount can be earmarked for the granting program and changed from time to time to reflect the change in sustainability performance;
- a grant-based program can also be limited to certain parts of the City, such as employment lands or intensification areas; and

- incentives are not transformational and uptake is limited, such that incentives can be used as an education or promotional tool.

As noted in the consulting team's Final Comprehensive Report, expedited approval is the incentive of most appeal to the development industry. The City is tracking efforts by York Region on an expedited approvals model and will continue to consider this incentive during the initial testing phase.

Communications

Two types of communications products will be developed before launching the first phase of implementation of the sustainability metrics. First, general communications products will report on the completion of the collaborative project and why the City is incorporating sustainability metrics into the development review process. This will be prepared as updates to appropriate City web pages and can be made available for Council newsletters. Such communications products will articulate what the sustainability score represents in common language and will demonstrate alignment with Green Directions Vaughan.

The second type of communications products will be tailored to two particular audiences. An internal audience of staff involved in the development review will receive an update and link to the internal Vaughan Online project web site where the final deliverables of the project will be posted. An external audience of applicants will receive E-mail notifications with links to the appropriate supplementary products, such as the Sustainability Performance Metrics tables, the Excel-based tool for scoring the metrics, an outline of the Sustainable Design Brief, and the Guidebook. An attachment to application forms can also be used to direct applicants to the supplementary products. The communications products will be developed within existing City resources.

Staff also discussed the opportunity to identify success stories and significant milestones in the testing phase as content for future communications. Ongoing communications opportunities are provided in the implementation phase through the staff reports for each application and, in particular, the "Contribution to Sustainability" section which can follow a standard structure such as including:

- Highlights and/or innovative aspects of the development directly related to the Sustainability Performance Metrics;
- Sustainability aspects pursued, but not implemented because of City regulations and/or standards;
- Sustainability aspects implemented, but not recognized in the Sustainability Performance Metrics; and
- Sustainability options identified by staff to improve the sustainability score based on site conditions.

Next Steps

Collaborative Project Completion

Adoption by Council of the consulting team's Final Comprehensive Report effectively marks the completion of the collaborative project with the City of Brampton and the Town of Richmond Hill. The final milestone report to the Federation of Canadian Municipalities was submitted on October 15, 2013 as Councils in both the City of Brampton and the Town of Richmond Hill have approved the consulting team's Final Comprehensive Report. Once the City of Brampton is reimbursed by FCM, the City will receive reimbursement from the City of Brampton in the amount of \$22,500 as noted in the partner MOU signed in January 2011. The City will seek to coordinate implementation of the Sustainability Performance Metrics with the City of Brampton and Town of Richmond Hill through information sharing and may coordinate resources regarding specific

tasks, such as staff training for the Excel-based scoring tool and modifications to the Guidebook to simplify interpretation of select sustainability metrics.

Initiating the Testing Stage to Implement the Sustainability Performance Metrics

The following steps are required to integrate the testing stage into the development review process, including:

- Modifications to the Pre-Application Consultation Form;
- Providing an outline of the Sustainable Design Brief based on the Sustainability Performance Metrics; and
- Preparing communications products.

Evaluation Criteria for the Testing Stage of Implementation

The testing stage of implementation will allow for feedback from staff and applicants to improve the effectiveness of the Sustainability Performance Metrics and to prepare for the formal roll out of the program. Evaluation criteria to guide the testing stage should aim to quantify the following anticipated benefits of the Sustainability Performance Metrics:

- Provide a consistent set of sustainability metrics that will apply across three municipalities;
- Guide developers and municipal staff on improving the sustainability performance of proposed development applications at draft plan, block plan and site plan scales;
- Quantify the environmental performance of a development proposal beyond mandatory sustainability requirements;
- Inform the appropriate incentives for projects that achieve enhanced performance standards; and
- Encourage a more efficient and effective review and evaluation of development applications by proactively outlining of the City's environmental sustainability requirements and aspirations.

An interdepartmental team will be established for the testing stage comprised of staff from Budgeting and Financial Planning, Building Standards, Development Planning, Development/Transportation Engineering, Parks Development, and Policy Planning. This team will meet quarterly to assess the following evaluation criteria during the testing period:

- Track sustainability scores by area and development type using a simple monitoring tool towards establishing a threshold score(s);
- Track sustainability scores by applicant in the monitoring tool to determine any trends related to the content of submission materials and overall sustainability scores as an indication of industry uptake;
- Consolidate feedback from applicants and staff on the use of the Sustainability Performance Metrics tables, Guidebook, Dynamic Tool and other supporting documents to identify changes and/or customization for the City of Vaughan in preparation for the formal roll out;
- Provide education and training for City staff as well as for external planning agents and public commenting agencies;
- Determine amendments to the VOP 2010, Site Plan Control By-Law and Site Plan Agreement template;
- Evaluate financial incentives and/or an expedited approval process to recognize high-performance applications, subject to consultation with the Region and industry;
- Describe the scope of work and financial resources required to prepare alternative engineering standards; and

- Seek input from City staff to determine if integration of the Sustainability Performance Metrics in the development review process results in efficiencies or increased time required for review, approvals, and/or inspections.

Seeking External Funding

Additional external funds can be used to enhance training and outreach opportunities as well as refine the supplementary Guidebook. The City will also seek Letters of Reference from the municipal partners on the collaborative project just completed. An application to the "Places to Grow Implementation Fund", for example, will describe two main tasks: (1) training using the Excel-based Dynamic Tool, and; (2) customizing the Guidebook. While City staff are prepared to facilitate required training sessions, contracting the consulting team that delivered the Dynamic Tool to conduct training sessions will improve the City's capacity to implement the Sustainability Performance Metrics. City staff recommend three training sessions: one for City staff; one with a focus on the development community of practice from an applicant's perspective; and a second session for City staff, but opening the invitation to staff in other municipalities. Guidebook customization will include examples of evaluating performance targets for select metrics using development proposals from Vaughan and other southern Ontario municipalities.

Relationship to Vaughan Vision 2020/Strategic Plan

This report is consistent with the priorities previously set by Council and the necessary resources have been allocated and approved for the project.

Regional Implications

The project, Measuring Sustainability Performance of New Development, intended to implement Action Item 2.3.1 of Green Directions Vaughan, is consistent with numerous action items in the Region of York Sustainability Strategy 2007, particularly Section 2 regarding healthy communities and Section 4 regarding a sustainable natural environment. Support from York Region in coordinating information requirements and through new and updated data sharing agreements, training and support will assist staff to implement the findings of the study. The project is consistent with Section 5.2 (Sustainable Cities, Sustainable Communities) of the York Region Official Plan.

Conclusion

The intended result of the project is a user-friendly checklist of environmental performance standards, to integrate into the development review process and relevant policy plans and infrastructure processes, which are accepted by industry and consistent among the partner municipalities. The consulting team of Halsall Associates and The Planning Partnership has delivered the Final Comprehensive Report according to the RFP requirements.

Applying sustainability metrics to the development review process for targeted types of development applications will be necessary if the City is to achieve the multiple sustainability objectives identified in Green Directions Vaughan, the York Region and City of Vaughan Official Plans and other policy documents adopted by the City and other levels of government and agencies.

A phased approach to implementation has been described which will allow for staff and applicant feedback in the near term to improve the application of the Sustainability Performance Metrics and ensure efficient and effective rigorous implementation at a future date.

Therefore, it is recommended that the report be approved to complete the collaborative project and direct staff to initiate the testing phase of the implementation program.

Attachments

1. Measuring Sustainability Performance of New Development in Brampton, Richmond Hill and Vaughan – Final Comprehensive Report prepared by Halsall Associates and The Planning Partnership (including Appendix A to C).
2. Clean Air Partnership and Toronto and Region Conservation Authority Peer Review Reports, July 2013.
3. Energy Use and Greenhouse Gas Emissions Forecasting Report – Final (August 2013), prepared by the City of Vaughan.

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/lm

**Measuring the Sustainability Performance
of New Development
FINAL COMPREHENSIVE REPORT**

**PREPARED FOR THE CITIES OF BRAMPTON AND VAUGHAN AND TOWN
OF RICHMOND HILL**

Prepared by Halsall Associates
July 2013

ACKNOWLEDGEMENTS

Measuring the Sustainability Performance of New Development was prepared by Halsall Associates and The Planning Partnership.

This report represents a unique collaboration of the City of Brampton, City of Vaughan and Town of Richmond Hill. This project was undertaken in two phases: Phase 1, Sustainable Community Development Guidelines (SCDG) was led by the City of Brampton and integrates the Region of Peel Healthy Development Index; Phase 2, Sustainability Performance Metrics was led by the City of Vaughan with administration support provided by the City of Brampton. Funding support from the Green Municipal Fund of the Federation of Canadian Municipalities and the Region of Peel Public Health Department is greatly appreciated by the partner municipalities.

Many gave generously of their time, energy and insight to make this sustainability document possible. In particular, we would like to thank the municipal teams who contributed to the report's development: the Decision-Making Advisory Team and Technical Advisory Team.

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EXECUTIVE SUMMARY

The project, Measuring Sustainability Performance of New Development in Brampton, Richmond Hill and Vaughan, is a collaboration of municipal partners (City of Brampton, Town of Richmond Hill, and City of Vaughan) and environmental partners (TRCA and Clean Air Partnership). A Memorandum of Understanding was signed by the municipal partners in January 2011 following confirmation of matching funds of \$85,000 from the Green Municipal Fund of the Federation of Canadian Municipalities. This project has been developed in two phases. Phase 1 consisted of developing the *Sustainable Community Development Guidelines (SCDGs)* for the City of Brampton. Phase 2, the primary focus on this report, was informed by Phase 1 to develop sustainability metrics for development applications. A 3rd phase is likely to follow, with the focus by each municipality on project implementation, monitoring and sharing results between the municipalities.

The intended result of this Phase of the project is a user-friendly checklist of sustainability performance metrics to integrate into the planning application review process that are consistent among the partner municipalities. The consulting team of Halsall Associates and The Planning Partnership has delivered the Final Comprehensive Report according to the RFP requirements. The focus of the Final Comprehensive Report is to:

- Describe the engagement and review process followed for the project;
- Explain the structure of the Sustainability Performance Metrics and Tools;
- Identify potential implementation incentives; and
- Communicate opportunities for next steps.

The final list of deliverables for this phase of the project includes:

- This Final Comprehensive Report;
- Sustainability Performance Metrics, Targets and Precedents (Appendix A in the Final Comprehensive Report);
- An excel-based dynamic tool for implementation;
- A manual and user guide to inform the dynamic tool entries;
- A Metrics log that tracks the ongoing feedback and revisions from the public and private sector working sessions (Appendix C in the Final Comprehensive Report); and
- A Guidebook to assist in the calculation of select metrics and overall submission requirements.

The Sustainability Performance Metrics are organized as a matrix, identifying the indicators, metrics, targets, precedents and point allocation for each metric. The Sustainability Performance Metrics can apply to a range of planning application types (e.g. block plans, draft plans of subdivision, site plans) and consists of four categories, twenty eight indicators and up to 45 metrics (depending on the plan type).

It was determined through the evaluation and consultation process to identify mandatory and enhanced performance targets for each metric, where applicable. Mandatory targets represent the “*business as usual*” situation, that is, the target required to be satisfied for an application to be considered for approval by the municipality. Two tiers of enhanced performance targets are identified: the minimum performance targets, which are considered as “*doing better than you need to*”, while the aspirational performance targets are considered as “*best in class*”. Points are awarded when a proposed plan

satisfies the recommended minimum and/or aspirational targets for the various metrics. No points are awarded for metrics in which only the mandatory targets are satisfied.

As a result, the Sustainability Performance Metrics are structured in a manner that allows an applicant to select the appropriate metrics to demonstrate whether an enhanced performance target, either the recommended minimum or aspirational, is met. This allows the applicant to tailor the sustainable design features to the site. It is the intent that each municipality will identify a threshold sustainability score for incentives it wishes to offer applicants to encourage implementation of the recommended minimum or aspirational metrics. While the Sustainability Performance Metrics will be consistent across the partner municipalities, each municipality will elaborate how it intends to encourage the implementation of the Sustainability Performance Metrics as part of the planning application review process based on its own unique context.

1.0 VISION AND SUSTAINABILITY GOALS

Developing policy and measuring progress towards sustainability has become increasingly important in managing growth and improving health and wellbeing within cities. Concerns over public health, climate change, energy, and resource use have brought sustainability to the forefront for those planning, building and managing communities in Ontario. Provincial legislation, plans and policies now speak to this sustainability priority as evident in the Provincial Policy Statement (PPS 2005) and the *Planning Act* (Bill 51), and the *Places to Grow Act, 2005*. A number of municipalities in the GTA, including Toronto, East Gwillimbury and Pickering, have developed Sustainability Guidelines, Standards or Metrics as one set of planning tools to achieve healthy, complete, sustainable communities.

Responding to this growing priority for sustainable development, the Cities of Brampton and Vaughan and the Town of Richmond Hill (the municipal partners) have joined together to produce a consolidated set of sustainability guidelines, including metrics and targets as key planning tools to guide the sustainability performance of new development applications including Secondary Plans, Block Plans, Subdivisions and Site Plans. The Sustainability Guidelines, Sustainability Performance Metrics and companion tools also aim to:

- Provide consistency of sustainability guidelines and metrics across the three municipalities, which will simplify the process and create efficiencies for developers;
- Provide a tool to quantify and rank the intended performance of proposed projects/plans; and
- Improve the submission and review process for the municipal partners and developers.

The guidelines act to complement and support other provincial/municipal requirements, such as the Ontario Building Code, urban design and healthy community guidelines, master environmental servicing plans, environmental impact studies, natural heritage evaluations, and growth management plans. Policy direction for this project is supported in various documents approved or adopted by the three partner municipalities as described below.

1.1 City of Brampton

Brampton is planned as a dynamic, urban, sustainable municipality, where growth is managed that protects the environment, enhances its heritage as a Flower City, contributes to the economy and enhances the quality of life. The City of Brampton has an inventory of over 175 environmental sustainability plans, programs, projects and initiatives. Below is a brief outline of three of the most relevant programs: the Official Plan; Environmental Master Plan; and Development Design Guidelines.

Brampton's Official Plan 2006 "Our Brampton ... Our Future" (OP 2006) provides the overarching policy support for implementing triple-bottom line sustainability in all aspects of City functions. The OP's Sustainable City Concept is further supported by policies provided in Transportation, Natural Heritage and Environmental Management, Recreational Open Space and Urban Design.

Brampton Grow Green will be the City's first Environmental Master Plan and will provide a sustainable environmental framework for the City as both a land use approval authority and a corporation. The EMP is intended to:

- bring cohesion to current environmental initiatives, policies and programs across City departments and services;
- identify new best practices to guide the City's operational, planning and regulatory functions;
- develop community and stakeholder awareness, collaboration and partnerships for environmental sustainability; and
- act in combination with the OP 2006, the Strategic Plan and the Growth Management Program as the City's Integrated Community Sustainability Plan.

City Council approved the *Development Design Guidelines* (DDGs) in 2003 with a focus on new development. The City is now preparing the newest chapter of the DDGs, the *Sustainable Community Development Guidelines* (SCDGs) which is Phase I of the larger collaborative project between Brampton, Vaughan and Richmond Hill. The SCDGs provides the framework to guide the development of specific metrics and targets (i.e. to be determined in Phase II) by providing a comprehensive list of potential sustainability measures, practices and policy strategies. Both phases are intended to guide the planning and design aspects of sustainable communities at a range of scales from Secondary Plan Areas, Block Plan Areas, and Draft Plan of Subdivision and Site Plans.

In support of the SCDGs, other City programs and initiatives include:

- Brampton's Growth Management Program – manages growth through the delivery of services and structures;
- Parks, Culture and Recreation Master Plan – provides a framework to direct the development and delivery of recreation facilities to promote active lifestyles;
- PathWays Master Plan – provides a long term plan to provide infrastructure for alternative and active modes of transportation across the City;
- Transportation and Transit Sustainable Master Plan – provides a framework for the delivery of an integrated multi-modal transportation network.

1.2 City of Vaughan

Building on the Strategic Plan, *Vaughan Vision 2020*, and *Green Directions*, the Vaughan Official Plan (VOP 2010) is the largest single policy document emerging from *Vaughan Tomorrow*. VOP 2010, adopted by Council in September 2010, will help secure the City's green policy transformation. This project addresses section 9.1.3 of the VOP 2010 in referring to the development of “green development standards”.

Green Directions Vaughan is the City's Community Sustainability and Environmental Master Plan (CSEMP). The plan establishes the principles of sustainability to be used in the development of other plans and master plans to achieve a healthy natural environment, vibrant communities and a strong economy. *Green Directions Vaughan* includes a series of recommended actions that span the entire sphere of municipal responsibility, including operational and regulatory functions. A specific action item directs the City to develop sustainability guidelines for use in the development review process.

The City-wide Urban Design Guidelines and Standard, scheduled to be undertaken in 2014 upon approval of the 2014 capital budget, is a complementary document to the City of Vaughan's new Official Plan (VOP) that is critical in implementing the "Plan for Transformation" into an attractive, livable and healthy community with a distinct identity. Whether the Sustainability Metrics document is integrated into the City-wide Urban Design Guidelines and Standard or acts as a companion checklist will be decided by City staff.

1.3 Town of Richmond Hill

The Richmond Hill Official Plan, partially approved by Order of the OMB on April 5, 2012, represents a fundamental shift in the Town's approach to land use planning. The Official Plan establishes a vision for "building a new kind of urban" community through a focus on environment-first/sustainability, city-building, and place-making. In doing so, the Plan aims to harness the process of urbanization as a positive force on the landscape, establishing policies that aim to improve and enhance the environment over the long term. Policies in the Official Plan direct the Town to prepare Town-wide urban design guidelines and sustainable design criteria to ensure the placemaking and sustainable design policies are addressed through individual development applications.

The Final Town-wide Urban Design Guidelines will follow the Sustainability Metrics prepared as part of Phase II of this project. These documents will be used together as two new tools to foster a *new kind of urban* community as part of the development application review process.

2.0 INTRODUCTION

2.1 Purpose of Sustainability Performance Metrics

The Sustainability Performance Metrics will provide a tool to help municipal staff and developers inform, guide, and quantify the sustainability performance of new development. By adopting the proposed sustainability metrics as a lens through which to evaluate future development, communities will become more liveable. Residents will be healthier, more physically active, and more resource conscious.

Sustainability metrics and targets have been defined to help guide and quantify the sustainability performance for various scales of land use planning (i.e. site plans, subdivision/neighbourhood plans, block plans).

2.2 Process and Consultation

This project is a collaboration between the three partner municipalities and is being undertaken in two phases (summarized below). A continued third phase is likely to follow, with the focus on project implementation in each municipality, monitoring and sharing results.

Phase I: Sustainable Community Development Guidelines (SCDGs) for the City of Brampton.

Phase I was led by The Planning Partnership and included the preparation of qualitative urban design principles for the City of Brampton. A high-level summary of the SCDGs are included in Section 4.0. This document was shared with Vaughan and Richmond Hill as part of the FCM partnership. Vaughan and Richmond Hill are using the document to inform their own municipal-wide Urban Design Guideline projects. The four sustainability themes used in the Phase 1 document, namely: 1. Built Environment; 2. Natural Heritage/Open Space; 3. Mobility; and 4. Infrastructure; were used to organize the Sustainability Performance Metrics prepared in Phase II of the project.

Phase II: Sustainability Performance Metrics for the Cities of Brampton and Vaughan and Town of Richmond Hill.

Phase II was led by Halsall Associates, working collaboratively with The Planning Partnership. Building on the principles and guidelines developed under Phase I, and using the four sustainability themes established in the Phase I document, quantitative sustainability metrics were developed for the municipal partners. The final sustainability metrics (see Appendix A) were developed to help inform and measure the sustainability performance of new developments within the three municipalities.

Phase II of the project followed the process below to ensure the final sustainability metrics are realistic from a technical perspective and implementable as part of the planning application review process:

1. Develop draft sustainability metrics and review with the Municipal Partners Technical Advisory Team (TAT);
2. Identify development sites within the partner municipalities upon which to test the practicality and implementability of the draft sustainability metrics;

3. Chair a collaborative workshop with municipal staff and key stakeholders (Workshop 1) to evaluate the draft metrics and apply them to the selected test sites (see section 3.4.1 for Workshop 1 feedback);
4. Chair a collaborative forum with the development industry to inform the industry about the project and gather input on implementation of draft sustainability metrics (see section 3.6 for the Developer Forum feedback);
5. Chair a collaborative workshop with municipal staff and key stakeholders (Workshop 2) to refine certain sustainability metrics and discuss implementation, including a proposed dynamic tool to guide users through the applicable sustainability metrics (see section 3.4.2 for Municipal Workshop 2 feedback);
6. Consolidate feedback and revise draft sustainability metrics;
7. Draft sustainability performance metrics brought to municipal Councils for public input;
8. Individual municipal workshops (Workshop 3) to test the draft sustainability performance metrics;
9. Peer review by the TRCA and the Clean Air Partnership on draft sustainability metrics (provided under separate cover);
10. Two working sessions with BILD members on draft sustainability performance metrics;
11. Finalize Sustainability Performance Metrics; and
12. Develop and deliver an Implementation tool (the dynamic sustainability tool).

Phase III: Implementation and Monitoring of the Sustainability Performance Metrics

Phase III is beyond the scope of this project but will likely include further collaboration among the partners. Municipal specific fine tuning of the Sustainability Performance Metrics and implementation strategies will respond to local conditions. The main components of this phase will likely include:

- Amendment considerations to existing documents (OP, Site Plan, Secondary Plans, etc...);
- Revisions and/or development of municipal standards, such as related to engineering design criteria and urban design;
- Submission requirements;
- Education and communication;
- Internal testing of implementation tool;
- Customizing the point thresholds and associated incentives;
- Pilot projects; and
- Staff resourcing considerations.

2.3 Document Organization

The proposed sustainability performance metrics have been incorporated into both static and dynamic tools. The static tool acts as a checklist for municipal staff and developers to help inform the sustainability performance of the proposed development. The checklist is structured with the headings listed below:

- Categories;
- Indicators;
- Performance metrics;
- Mandatory, minimum and aspirational targets;

- Precedents; and
- Point allocation.

A further description and definition of the categories, indicators, metrics and targets are provided in Sections 3.2 and 5.0. The sustainability performance metrics, precedents and point allocations are included in Appendix A, with further rationale behind each of the metrics presented in Appendix B.

The excel-based Dynamic Tool provides an efficient and effective means for applicants and municipal staff to quantify the sustainability performance of proposed plans. For each of the sustainability performance metrics, strategic questions are posed within the tool and points are awarded depending on user inputs. To cater to a variety of planning scales recognized in the review of development applications (i.e. Block Plan, Draft/Neighbourhood Plan, and Site Plans) and project types (i.e. greenfield, employment land and intensification), the sustainability metrics have been differentiated into the categories listed below. It should be noted that many of the sustainability performance metrics may be applicable at various scales of development and therefore, across multiple plan type applications.

- 1) Block Plan;
- 2) Draft/Neighbourhood Plan; and
- 3) Site Plan.

The static tool is available for reference, while the intent of the dynamic tool is to provide an efficient and effective implementation of the sustainability performance metrics through the development review and approval process.

2.4 Tiers of Guidelines and Performance Metrics

The sustainability performance metrics were identified through review of best-in-class precedents including LEED for Neighbourhood Development (LEED ND) and similar sustainability guidelines implemented by other GTA municipalities, and reviewed through multiple technical stakeholder engagements. Each of the metrics and targets was evaluated against the following criteria:

- Realistic;
- Informative;
- Clear/Transparent;
- Manageable;
- Relevant;
- Measureable; and
- Impactful.

Three performance levels were identified for each of the metric targets:

- Mandatory;
- Recommended Minimum; and
- Aspirational.

All projects must satisfy the mandatory performance requirements to be considered for approval. This is essentially the existing standard or requirement according to relevant legislation and/or policies. The recommended minimum and aspirational target levels vary for each metric, but were informed and defined by the inputs from multiple technical stakeholder engagements. The minimum performance targets are considered as “*doing better than you need to*”, while the aspirational performance targets are considered as “*best in class*”.

Based on input from the Workshops, it became clear that not all metrics should carry the same weighting/point allocation. Metrics that support the municipalities’ priorities and provide multiple sustainability benefits were considered to have a greater weighting/point allocation. The following indicators were considered to align with the municipalities’ sustainability priorities in addition to providing the greatest impact on creating more sustainable built form and healthy communities:

- 1) Energy Management (Energy conservation/district energy);
- 2) Walkability and Mobility;
- 3) Water Management (Conservation, Stormwater);
- 4) Local food production; and
- 5) Natural Systems.

2.5 How to Use the Metrics

The performance metrics form a sustainability checklist organized as a matrix, identifying the indicators, metrics, targets, precedents and point allocation for each metric. This static tool serves as a reference for municipal staff and applicants to follow when preparing certain types of planning applications (e.g. block plans, draft plans of subdivision, site plans). The checklist identifies the key sustainability priorities for the municipalities and the relative importance (point allocation) against the various metrics.

The dynamic tool, based on the static tool checklist, was developed to improve the implementation of the sustainability metrics. The intent of the dynamic tool is to have applicants fill in the relevant inputs. The dynamic tool will generate both an *Application* and *Community* score that reflects the proposed plan’s achievement of the applicable sustainability metrics. An *Application* score will only consider metrics and their associated point tally that the applicant has control over. The *Community* score will reflect the overall score of the proposed plan in relation to all applicable metrics, including those metrics typically under the municipalities’ or region’s influence (i.e. accessibility to schools, public transportation, etc...). The dynamic tool will be supported by a user manual and a reference guide (the draft user manual and reference guide will likely be further refined by each of the partner municipalities as part of the implementation process). Both documents are intended to explain how the tool works, the point structure and how a user enters the appropriate inputs for scoring.

2.5.1 Metric Point Allocation

LEED for Neighbourhood Development (LEED ND), other municipal sustainability performance guidelines and the sustainability priorities for each of the partner municipalities was used to help inform the point allocation for each metric. Points are ONLY awarded when a proposed plan satisfies the recommended minimum and/or aspirational targets for the various metrics. No points are awarded for metrics that satisfy mandatory targets.

Table 1 provides a summary of the draft point breakdown for the various plan types (Site, Draft and Block), broken out by the four categories.

Table 1: Point Total Breakdown

Categories	Point Allocation		
	Site Plan	Draft Plan	Block Plan
Built Environment	82	64	58
Mobility	18	26	26
Natural Environment & Open Space	27	28	28
Infrastructure & Buildings	78	20	11
Total	205	138	123

As shown, the totals for each of the plan types varies, depending on the number of metrics that have been defined for the plan type. To simplify the ranking procedure, each of the plan types will be normalized and evaluated based on a 100% score. Table 2 summarizes the percentage breakdown point allocation for the key sustainability priorities, as defined by the partner municipalities (see section 2.4).

Table 1: Point Total % Breakdown

Municipal Sustainability Priorities	Point Breakdown (%)		
	Site Plan	Draft Plan	Block Plan
Energy Management	26%	13%	9%
Walkability and Mobility	34%	52%	64%
Water Management	14%	8%	9%
Local Food Production	2%	3%	3%
Natural Systems	6%	13%	9%
Other Categories	Point Breakdown (%)		
	Site Plan	Draft Plan	Block Plan
Parking	8%	0%	0%
Materials and Solid Waste	4%	1%	0%
Economy	3%	5%	6%
Certification	3%	4%	0%
Total	100%	100%	100%

As shown, the Draft and Block plan point accumulation and resulting score are heavily influenced by walkability, comprising of over 50% of the overall score. This weighting emphasizes that new community and neighbourhood developments will need to integrate multiple disciplines and stakeholders into the planning efforts to perform well within the ranking.

The impact of walkability is still heavily weighted within the Site Plan metrics, but as expected, the building scale features start to have a greater influence on the overall score of the plan.

2.5.2 Mandatory Metrics and Minimum Point Threshold

In addition to the point allocation identified above, all mandatory metrics need to be satisfied for an application to be considered for approval by the municipality. Mandatory metrics are not assigned point allocations, as shown in Appendix A.

It should be noted that not all plan types will score in every category. Depending on the metric and plan type, the respective points will either be excluded from the total or the plan will be docked points. For example, a plan that only includes single family homes is excluded from Metric 49 (solid waste storage collection areas). As a result, those two points will be excluded from the total. On the other hand, if a plan does not have access to Basic or Lifestyle amenities, the plan will be docked points.

It is recommended that a minimum point threshold be established by each municipality for any incentive programs the municipality wishes to offer. Minimum point thresholds should be advanced as part of the implementation strategy in each municipality.

2.5.3 Point Structure

Appendix A provides a summary of the points allocated to each of the metrics, broken out by the Recommended Minimum and Aspirational Targets. For the most part, the point allocation is fairly straight forward. If a plan satisfies the Recommended Minimum and/or Aspirational targets, the relevant points will be awarded to the plan. In certain examples, a sliding scale has been developed to account for the potential variability within the metric. The following provides a high level summary of the metrics that utilize a sliding scale point structure.

Table 2: Point Structure - Sliding Scale

Applicable Plan Type	Metric	Point Structure
Draft, Block ,Site Plans	Proximity to Basic Amenities	6pts awarded to minimum 6pts awarded to aspirational 2pts awarded per amenity, for a maximum of 3 amenities Maximum pts = 12
Draft, Block, Site Plans	Proximity to Lifestyle Amenities	3pts awarded to minimum 3pts awarded to aspirational 1pt awarded per amenity, for a maximum of 3 amenities Maximum pts = 6

Draft, Block, Site Plans	Design for Life Cycle Housing	<p>A minimum of 10% is required to be considered for a potential point.</p> <p><u>Block/Draft Plan</u></p> <p><i>Accommodation Type – 2pts</i></p> <ul style="list-style-type: none"> - 1pt if 2 of 3 Accommodations are >10% - 2pts if 3 Accommodations are > 10% <p><i>Ownership – 2pts</i></p> <ul style="list-style-type: none"> - 2pts if Affordable/low-income housing > 10% <p><i>Housing Type – 3pts</i></p> <ul style="list-style-type: none"> - 1pt if 2 of the 4 housing types are >10% - 2pts if 3 of 4 housing types are > 10% - 3pts if 4 housing types are > 10% <p><u>Site Plan</u></p> <p><i>Accommodation Type – 3pts</i></p> <ul style="list-style-type: none"> - 1pt if 2 of 5 Accommodations are >10% - 2pts if 5 Accommodations are > 10% - 3pts if 5+ Accommodations are > 10% <p><i>Ownership – 1pt</i></p> <ul style="list-style-type: none"> - 1pt if Affordable/low-income housing > 10% <p><i>Housing Type – 3pts</i></p> <ul style="list-style-type: none"> - 1pt if 2 of the 4 housing types are >10% - 2pts if 3 of 4 housing types are > 10% - 3pts if 4 housing types are > 10%
Site Plans	Building Energy Efficiency	<p><i>Minimum Target (3pts)</i></p> <ul style="list-style-type: none"> - Achieve 35% better than MNECB and/or EnerGuide 83 (if applicable) <p><i>Aspirational Target (14pts)</i></p> <ul style="list-style-type: none"> - Submetering – 3pts - Commissioning – 3pts <ul style="list-style-type: none"> - For every 5% improvement in energy efficiency (over 35%), award an additional point (i.e. 60% improvement would yield 8 total points)
Site Plans	Solar Readiness	<p>1pt awarded for minimum target</p> <p>Up to 7 additional points can be awarded for Aspirational target</p> <p>1pt – 1% renewable energy generation</p> <p>An additional point for every 2% renewable energy generation increment (i.e. 13% generation is 7 points).</p>

3.0 STUDY APPROACH

3.1 Background Research on Sustainability Metrics

The work carried out in Phase I of this project, the *Sustainable Community Development Guidelines* (SCDGs) served to inform the sustainability metrics and targets developed in Phase II. The sustainability metrics and targets were further informed by other municipal Sustainability Guidelines. The following is a list of references that were reviewed during the process of developing the sustainability metrics to be considered for this project:

- Brampton Official Plan 2006 “*Our Future... Our Brampton*”;
- Brampton Grow Green;
- Brampton Development Design Guidelines;
- Brampton Sustainable Community Development Guidelines (SCDGs);
- Vaughan Vision 2020;
- Green Directions (Vaughan OP 2010);
- Richmond Hill Official Plan – Building a New Kind of Urban;
- Richmond Hill Strategic Plan – A Plan for People, A Plan for Change;
- Places to Grow *Better Choices, Brighter Future*. 2006;
- City of Toronto Green Development Standard;
- Seaton Sustainable Place-Making Guidelines, City of Pickering;
- Health Background Study, Region of Peel, City of Toronto, Heart & Stroke Foundation;
- Peel Region Official Plan
- Thinking Green! Development Standard, Town of East Gwillimbury;
- Sustainable Pickering;
- Markham Centre Performance Measures, Town of Markham;
- Markham Greenprint, Town of Markham;
- York Region Sustainability Strategy, Towards a Sustainable Region, Region of York;
- York Region Official Plan;
- Vision 2026 Towards a Sustainable Region, Sustainability Progress Report 2010, Region of York;
and
- LEED for Neighbourhood Development (LEED ND).

3.2 Selecting Performance Metrics and Increments

Prior to identifying the appropriate indicators, metrics and targets, it was important that the team come to a common understanding of the typical language used to help define sustainability metrics. Indicators, metrics and targets are commonly used in the industry and the meaning can be inconsistent if not properly defined during the initial stages of the project. Although the definitions may vary, the following definitions were considered for this project:

- 1) **Indicators:** Key impacts within each sector that the municipality will strive to change and report against to represent its sustainability performance. Specific indicators have been developed for each of the plan types (i.e. Block Plan, Draft/Neighbourhood Plan, and Site Plan). An example of an indicator is “energy consumption”.
2. **Metrics:** The outcome(s) that will be reported to define performance in an indicator. Metrics can be qualitative or quantitative. An example of a metric for the indicator “energy consumption” may be ekWh/m².
3. **Targets:** The desired end-state or goal that a planning application could achieve for a particular metric. Targets are derived from current performance efficiencies, policies and external benchmarks. Targets are typically separated into the following hierarchy:
 - Mandatory;
 - Recommended Minimum; and
 - Aspirational.

The precedent research outlined in Section 3.1 highlighted that there are potentially hundreds of sustainability performance indicators, metrics and targets that could be used to help inform future planning. Given the number of precedents, the consultant and municipal Technical Advisory Team (TAT) agreed that, in order to develop an implementable tool, the number of identified performance metrics needs to be manageable, measurable and clear. On projects as diverse and comprehensive as this one, there is often a desire to “cast a wide net” given how broad the idea of sustainability is, and how substantive the potential impact can be.

Identifying appropriate sustainability performance metrics for this project was initiated with a brainstorming session with the consultant team. Synergies between indicators were identified and performance metrics were drafted that align with municipal priorities. Performance metrics that promoted multiple sustainability benefits (i.e. proximity to amenities generally contributes to reduced Vehicle Kilometres Travelled, improved connections, increased active transportation, and improved health) were also identified to help simplify and consolidate the number of metrics. Upon completion of this brainstorming session and research phase, the key performance metrics were identified and presented to the TAT.

The sustainability performance tool developed for this project consists of four categories, twenty eight indicators and up to 45 metrics (depending on the plan type). Based on background research of other municipal sustainable guidelines and feedback from the workshops, this appears to be a manageable set of performance metrics that capture the sustainability priorities for the municipalities while being clear and concise enough to maintain current service levels for the planning approvals process.




3.3 Test Sites and Evaluation Criteria

The consultant team worked with the municipal Technical Advisory Team (TAT) to select test sites that would be used to test the proposed sustainability metrics. Various test sites were reviewed for appropriateness and were selected based on the following evaluation criteria:

- Variation in scale and plan application;
- Data availability; and
- One test site per municipality.

The three candidate test sites in Table 3 were selected. Key design/planning characteristics are also summarized in the Table.

Table 3: Test Site Selection

MUNICIPALITY	TEST SITE	KEY CHARACTERISTICS
<p>City of Vaughan</p>	<p>Nashville Heights Community – Block 61</p> 	<p>Scale: Draft Block Plan Type: Greenfield Size: 185 ha Population: 8,000 Jobs: 700 Density: 14 units/ha (approximately 2600 residential units) Parks: 6 Neighbourhood parks, linear parks and 2 Public Squares Schools: 2 Elementary Schools</p>
<p>City of Brampton</p>	<p>Queen Street East Redevelopment</p> 	<p>Scale: Site Plan (considered a collection of site plans) Type: Corridor Redevelopment/Intensification Size: 33.37 ha Population: 13,250 Jobs: 2,700</p>
<p>Town of Richmond Hill</p>	<p>Yonge Street and 16th Avenue (NE Corner)</p> 	<p>Scale: Site Plan Type: Urban Node Intensification Size: 9.37 ha Population: 2,500* Jobs: 1,250* Density: 148 units/ha</p>

* Assumes 1.8 ppu and overall resident to employee ratio of 1:2

Evaluating each of the selected sites using a set of proposed sustainability metrics served as a means to test and ensure that the draft metrics are realistic, manageable, impactful, clear and measureable. For each of the test sites selected, information was provided by the TAT and consolidated by the consultant team. Workshop packages were developed for each of the test sites demonstrating how certain sustainability performance metrics would be evaluated for each site.

3.4 Results of the Municipal Workshops

Two full-day municipal workshops were facilitated by the consultant team to review the proposed sustainability tools (sustainability performance checklist and dynamic tool), test the sustainability performance metrics against the test sites and gather feedback on implementation. Municipal staff from the following departments attended:

- Planning – Policy;
- Planning – Development;
- Engineering;
 - Stormwater Management
 - Transportation
 - Infrastructure;
- Planning - Building Standards;
- Natural Environment;
- Parks and Urban Forestry;
- Solid Waste/Public Works;
- Urban/Community Design; and
- Cultural Heritage.

3.4.1 Municipal Workshop 1 – Metrics Testing

Municipal Workshop #1 was held on September 25, 2012 and included approximately 40 municipal staff from Brampton, Richmond Hill and Vaughan, and representatives from the Clean Air Partnership, the Region of Peel, and the Region of York. The workshop was divided into two sessions:

- 1) Presentation - General project introduction and context;
- 2) Break out groups – Review performance metrics and test against the selected sites.

The intent of the workshop was to:

- Introduce the project and describe the key deliverables;
- Introduce the test sites;
- Demonstrate how the draft metrics would be applied to the test sites; and
- Obtain preliminary technical feedback on the draft sustainability metrics and targets.

The workshop also provided an opportunity for the City of Vaughan to present the initial findings and analysis for their Greenhouse Gas (GHG) and Energy forecasting initiative. The purpose of the initiative is to identify the energy conservation opportunities and resulting GHG implications, by considering various energy reduction and efficiency scenarios.

The feedback from the workshop was consolidated and reviewed by the consultant team and with the municipal TAT, and a metrics revision log (included in Appendix C) was developed to track the evolution of the sustainability metrics and targets. The log was updated throughout the course of this project to reflect technical feedback received.

The outcome and key findings from the Municipal Workshop #1 are summarized below:

Metrics applied to test sites

The workshop was used as a testing exercise to check that the draft sustainability performance metrics could be practically applied to typical planning application types at various scales of development including Greenfield, intensification/redevelopment, and infill. Each breakout group was assigned one of the three test sites outlined in Table 4, and were instructed to apply/consider each of the proposed metrics to assess/determine whether the metrics:

- Were understandable, measurable and quantifiable;
- Applied to the test site in question; and
- Had clear, consistent language/terms.

Draft metrics that required more discussion

The breakout groups served as an opportunity to review each of the draft metrics included in the Secondary/Block Plan, Subdivision/Neighbourhood Plan, Site Plan and Building Plan charts. Through this exercise, the groups identified metrics that needed more discussion, and in some cases, additional technical input. Although the discussions varied from group to group, there was generally agreement that the following metrics needed to be refined and in some cases, better quantitative metrics needed to be established:

- Walkability;
- Proximity to amenities and schools;
- Access to local food;
- Housing mix;
- Energy and water conservation;
- Stormwater management; and
- Parking/bike parking.

3.4.2 Municipal Workshop 2

Municipal Workshop 2 was held after the Developer Forum, on November 7, 2012. Workshop 2 included approximately 35 to 40 municipal staff from Brampton, Richmond Hill and Vaughan, and representatives from the TRCA and the Region of Peel. The intent of the workshop was to update municipal staff on the progress of finalizing a list of draft sustainability metrics, highlight the feedback from the developer forum and obtain specific feedback on the following:

- Engineering-related metrics;
- Implementation strategies/considerations;
- Metric point allocation; and
- Dynamic tool functionality.

The outcome and key findings from the Municipal Workshop #2 are summarized below:

Engineering-specific metrics

A primary focus of the Municipal Workshop 2 was to discuss certain engineering-related metrics including the following:

- Building energy efficiency;
- District energy viability;
- Stormwater quantity;
- Stormwater quality;
- Stormwater re-use;
- Speed controls; and
- Walkability.

Most of the discussion focussed on setting the mandatory, minimum and aspirational targets. For metrics regarding stormwater, TRCA agreed to work with the team to provide direction on the quantity and quality (including temperature) metrics and targets. The discussion surrounding walkability raised a number of challenges and opportunities, where the current road/sidewalk design standards may conflict with the proposed minimum and aspirational targets presented in the proposed sustainability metrics. It is recognized that during the implementation phase each municipality will need to revisit its current regulations and standards and consider creating alternative design standards to address sustainability objectives.

The municipal workshop also reviewed the key takeaways from the developer forum. The key takeaways and developer concerns included topics surrounding project implementation and tool roll out, developer incentives and transparency/consistency of language. The developer forum feedback is summarized in section 3.6

The metrics feedback was consolidated and revisions were tracked in the sustainability metrics log (Appendix C).

Project implementation and incentives

The workshop was used to help identify the key challenges and opportunities related to the implementation of the proposed sustainability metrics. A priority identified for the implementation of the sustainability metrics was to embed the metrics into existing required documentation and procedures (i.e. address within reports/studies/plans that are already required as part of a complete application). For example, the metrics could be used at the beginning of the planning approvals process (e.g. the pre-submission stage) like a screening tool, clarifying the minimum sustainability performance by setting out what the municipality expects at the outset. The metrics could result in an efficiency improvement by consolidating multiple report requirements into one document

(i.e. transportation plan, urban design guidelines, stormwater management plan, etc...) and by quantifying the sustainability performance each development is achieving.

Key implementation questions that came up during the workshop include:

- 1) How can you avoid having the applicant say they will do something but don't follow through, particularly after an incentive has been awarded?
- 2) When in the process is the score confirmed and when is the incentive granted?
- 3) Will a project need to undertake an evaluation more than once?
- 4) Who within the municipalities would be managing this plan evaluation/process?

Potential incentive strategies were also discussed including reducing the approval time for projects that are pushing the sustainability bar. Although the specific mechanisms were not defined, a specific staff structure to expedite approvals for aspirational projects was discussed as an incentive for leading edge projects. The municipal partners may review this as one of several incentive options.

Point allocation

At the time of Workshop 2, the point allocation had not been defined for each metric relative to Mandatory, Minimum and Aspirational targets. The discussion at the workshop focused on informing municipal staff about how the dynamic tool will be structured on a point based system informed by the municipal priorities relative to development application type.

Points are awarded for a development application based on which Minimum and/or Aspirational targets are achieved. The overall sustainability performance of the development proposal would be quantified and broken out into the four categories (i.e. built environment, mobility, green space/natural environment and infrastructure). The score quickly allows municipal staff to appreciate the overall sustainability performance of the proposed plan, while also identifying key opportunities to further improve the application's performance relative to municipal priorities based on the categories.

Dynamic Tool

A preview of the dynamic tool was presented to the group to highlight the overall layout and general functionality of the tool. This introduction provided municipal staff the opportunity to raise any comments, concerns or opportunities to improve the tool functionality. Generally the group seemed comfortable with the direction and application of the dynamic tool, although prior to releasing the dynamic tool for public use, each municipality will carry out an internal evaluation against existing applications to ensure that the output is reasonable and the sustainability performance score aligns with known project expectations. The roll out plan of the dynamic tool was discussed at a high level and it was agreed that the tool would need to undergo testing during a future phase (Project Implementation) of this project as defined by each of the municipal partners.

3.4.3 Municipal Workshop 3

A third set of half-day municipal workshops was carried out in April 2013 to further test the sustainability metrics and rank the performance of various plan and development types. The workshops consisted of individual sessions in each of three municipalities with a collection of municipal planners, engineers, natural heritage, urban design and building staff. The following types of plans were reviewed and scored within the three half-day sessions:

- Town of Richmond Hill
 - Low-density Draft Plan
 - Mixed Use Site Plan (targeting LEED Silver)
- City of Brampton
 - Mixed Use Block Plan
- City of Vaughan
 - Commercial Plaza Site Plan.

The outcome of the three workshops demonstrated that the plans could effectively be scored within a three hour working session with municipal staff. The workshop also quickly highlighted opportunities for the developer team to consider to help improve the application score. Overall, the score outcome matched the expected performance that was anticipated by the municipal staff.

3.5 Results of the Peer Review

Both the Toronto and Region Conservation Authority (TRCA) and the Clean Air Partnership (CAP) are providing third party review of the sustainability metrics. Both reviews are provided under separate cover.

CAP’s review is primarily focused on the transferability of the metrics and tools outside the three municipalities. TRCA’s review is primarily focused on the natural heritage elements, stormwater, water, biodiversity, and soil and tree quality.

3.6 Results of the Developer Forum

Similar to the municipal Workshop 1, a private sector forum was held October 17, 2012 to introduce the project objectives to the development community, including consultants. Municipal staff identified developers working in their municipalities and also attended the forum. The following table summarizes the private sector representation at the forum:

Table 4: Developer Forum Participation

Greenpark Homes	Brookfield Homes	EMC Group	Tridel
GHD (BILD member)	Amos Environmental + Planning	Savanta Inc (BILD member)	Daniels
Deltera	MMM Group	Starlane Home	Liberty Development
TACC Developments	Metrus Development Inc. (BILD Member)	Stantec	Provident Energy Management
Times Group Corporation	Reliance Comfort	PCL Construction	Clearsphere

The developer forum was held with the intent to:

1. Introduce the project;
2. Introduce the structure of the sustainability metrics;
3. Identify high priority indicators/metrics;

4. Identify and prioritize incentive mechanisms; and
5. Identify current regulatory, policy and industry barriers for sustainable development.

The key takeaways from the developer forum are summarized below.

General Comments

- Language needs to be consistent and transparent;
- Where possible, metrics should be supported by benchmarks and precedents;
- Metric weighting/point allocation should reflect municipal priorities, sustainability impact and potential cost (capital and savings) implications;
- Need to clearly separate Private from Public metric responsibilities;
- How can we actually monitor and measure the performance of a community/plan? We need to ensure that the design and performance intent is supported by a quantifiable result and is monitored over time;
- Need to ensure that metrics align with engineering and regulatory standards. Some standards (i.e. road dimension, sidewalks) are seen as barriers to current development practices; and
- The developer community is accepting of municipalities using this type of evaluation system. The developers want to be more sustainable but they see certain municipal standards as a barrier from a time-perspective.

Review of draft metrics

The forum also provided an opportunity for input on the proposed categories of sustainability metrics. Based on feedback at the Forum, many of the development industry's priorities were already included within the draft categories of sustainability metrics. Additional performance metrics that were proposed include:

- Public Engagement – interest in a metric that incentivizes developers to provide education packages for new residents and signage throughout the community to explain the sustainability features of the project;
- Developer Acknowledgement – interest in an Awards program that recognizes developers that have built sustainable projects.

Incentive Opportunities

The developer forum also provided an opportunity to identify and prioritize potential incentive mechanisms to reward/acknowledge Aspirational projects. The developer group were in agreement that the best incentive is to expedite the approval process for high-performing sustainability projects. Currently, innovative and pioneering initiatives are seen to take longer through the development approvals process, whereas the opposite could occur in order to promote sustainable projects. To provide an accelerated approvals process for innovative and pioneering sustainability projects, the municipalities need to ensure that technical review staff are well informed and engaged in the sustainability metrics, and that a municipal champion is identified, to advance and shepherd the development application through the approvals process.

Development charge rebates and increased density allowances were also discussed. The industry didn't feel that these incentives provide the same emphasis or traction as compared to an expedited approvals process for high-performing sustainability projects.

3.7 BILD Workshops

BILD requested an additional consultation and engagement session for interested BILD members to further engage in a more detailed discussion on the draft sustainability metrics and to better understand how the tool would be used as part of the planning process. Two half-day workshops were held with approximately 30 BILD members. A general overview of the static tool was presented, followed by an explanation of the point based system and how the points would be used to trigger potential incentives.

Some concerns were raised regarding the point-based system, particularly around metrics that the industry considered were outside their control (i.e. location of schools, access to public transit, etc...). The metrics and overall structure of the tool were developed to address this concern by separating the metrics into two categories: *Applicant* and *Community*. Eligibility for incentives offered by the partner municipalities will be evaluated based on the *Applicant* score of the plan. The *Community* score will be used as a monitoring tool by the partner municipalities to understand the overall performance of a plan, along with matters the municipalities or Regions may need to address to create more sustainable communities.

4.0 PHASE I SUSTAINABLE COMMUNITY DEVELOPMENT GUIDELINES SUMMARY

As mentioned in section 2.2, this project is being completed in two phases, with a possible third phase focused on project implementation. Phase I of the project was led by the City of Brampton and The Planning Partnership, with the goal to develop *Sustainable Community Development Guidelines* (SCDGs). The Phase I SCDGs will be a new chapter in the City of Brampton's Development Design Guidelines and will assist the City in the review of development applications and technical reports and documentation. The SCDGs will serve to help describe the qualitative sustainability aspects proposed developments should aim to achieve, including highlighting examples of how they could be achieved.

The focus of the guidelines is on qualitative urban design and community development principles. The guidelines apply to a range of development scales, which include Secondary Plans, Block Plans, and Draft Plans of Subdivision, and Site Plans. These guidelines helped serve to inform the metric and target priorities for Phase II of the project. The section below summarizes the process, principles and key outcomes from Phase I of the project.

Phase I was initiated with precedent research to help inform the SCDGs. Precedent research included a review of policies, municipal guidelines and recognized standards, including but not limited to:

- Seaton Sustainable Place-Making Guidelines, City of Pickering;
- Health Background Study, Region of Peel, City of Toronto, Heart and Stroke Foundation;
- Thinking Green Development Standard, Town of East Gwillimbury;
- Markham Centre Performance Measures, Town of Markham; and
- LEED 2009 for Neighbourhood Development, Canadian Alternative.

Each of the standards and guidelines were reviewed in detail and summarized in order to appreciate and understand the reporting requirements, overall intent and implementation considerations. The background precedent research was used to help develop the format and delivery of the SCDGs.

Phase I also included a study of five, large-scale, City of Brampton sustainability initiatives. This study was used to further reinforce the City's sustainability commitments and ensure these commitments were well established as SCDG priorities. The five precedent initiatives that were evaluated in Phase I include:

- 1) Mount Pleasant Village – Transit-oriented development;
- 2) The Pearson Eco-business Zone – Partners in Project Green;
- 3) The Transportation and Transit Master Plan;
- 4) ZUM – Bus Rapid Transit (BRT) Service; and
- 5) Higher order transit – Hurontario/Main Street Master Plan.

This background research provided a general overview of how the City of Brampton desires to shape its future. The review, while not exhaustive, also identified gaps that need to be further addressed in City policies to assist in the development of the SCDGs.

Based on the City of Brampton's priorities and long term vision, the following guiding principles were developed for the SCDGs:

- 1) Support the mix and diversity of land uses in a compact, transit supportive development form to help balance residential, employment and services and to improve active travel (i.e. walkability, transit use, etc.) between homes, workplaces, schools and amenities;
- 2) Preserve the natural heritage system, urban agricultural and open spaces by directing development to existing communities;
- 3) Provide residents with access to locally grown food;
- 4) Provide for a range and mix of housing opportunities, choices and accessibility for all income levels and needs;
- 5) Create walkable and connected communities with neighbourhood amenities and priority destinations within walking distance of residents. Enhance streetscapes to encourage residents to be physically active and socially engaged;
- 6) Provide a variety of economical, safe and accessible mobility options through the provision of a connected network of streets, sidewalks, bicycle lanes, trails and public transit systems;
- 7) Encourage the responsible use of resources to ensure long-term sustainability, reduce greenhouse gas emissions and demands on energy and water, and improved waste management;
- 8) Create jobs concurrent with residential growth to ensure a long term balanced economy while encouraging live-work opportunities;
- 9) Ensure that growth and development is fiscally sustainable;
- 10) Optimize opportunities for infill, intensification and revitalization;
- 11) Promote place-making that instills a sense of civic pride; and
- 12) Preserve the City's rich cultural heritage through adaptive reuse and restoration.

In order to achieve the sustainability goals of the SCDGs, it is essential that good planning and urban design be prioritized. The form of the built environment influences a person's lifestyle choices, which when considered on a broader scale, can contribute to the success or failure of the sustainability goals. The specifics of achieving the goals of the SCDGs should be set out through performance measures that can be logically and clearly followed, implemented and measured by those who design and build communities, as well as those who administer the review process and manage the community. It should be noted that the onus of achieving these goals falls equally on the public and private sectors.

5.0 SUSTAINABILITY PERFORMANCE METRICS

The guiding principles and performance indicators developed under Phase I of the project served as a basis to help inform the sustainability performance metrics and targets for Phase II of the project. As a result, the overall format, logic and priorities are shared between the two phases.

As identified in section 2.3, the Sustainability Performance Metrics consists of a grouping of themes, indicators, performance metrics, targets, and precedents. The following section provides a summary of the hierarchy and how the themes and indicators were selected.

5.1 Sustainability Categories

The Sustainability Performance Metrics are organized into four categories. The four categories represent the main structuring elements of a community which are required to achieve a sustainable and healthy living environment.

The following provides a description of each theme area and why each is an important component of a sustainable community. Each theme area has a number of corresponding indicators that are listed in the following section.

Built Environment

The indicators for Built Environment speak to how we inform place and connections within the development. The intensity and diversity of land uses influences decisions on where we live, work, and how we move around the community. A mix of housing types and amenities, employment and live-work opportunities located within walking distance, provides the opportunity for residents to meet their day to day needs without reliance on the private automobile. Further provision for life-cycle housing and accessible buildings allows residents to establish and remain in their communities throughout the various periods of their lives.

Mobility

The indicators of Mobility identify how a variety of transportation options must be available to residents to carry out their daily lives within and beyond the community. A sustainable community is one that encourages physical activity, facilitates active transportation, and supports public transit in place of automobile dependence. The most vulnerable population groups (children, elderly, disabled, and low income individuals) are the most affected by choices available to them for mobility and access to services and amenities. Designing a safe, convenient, and accessible environment for walking and cycling encourages these alternative modes of transportation. Emphasis on mobility and active transportation not only reduces energy use and GHG emissions, but contributes directly to improving public health and the quality of life of residents.

Natural Environment and Open Space

The natural environment, urban forest, and the open space system are essential components of a healthy, sustainable community. Firstly, the preservation and enhancement of the natural heritage system ensures the health of the environment and supports recreational and cultural opportunities in a community. Secondly, ensuring residents have convenient access to a connected and diverse range of open spaces, parks, and recreation facilities offers opportunities for improved public health and connections within the community.

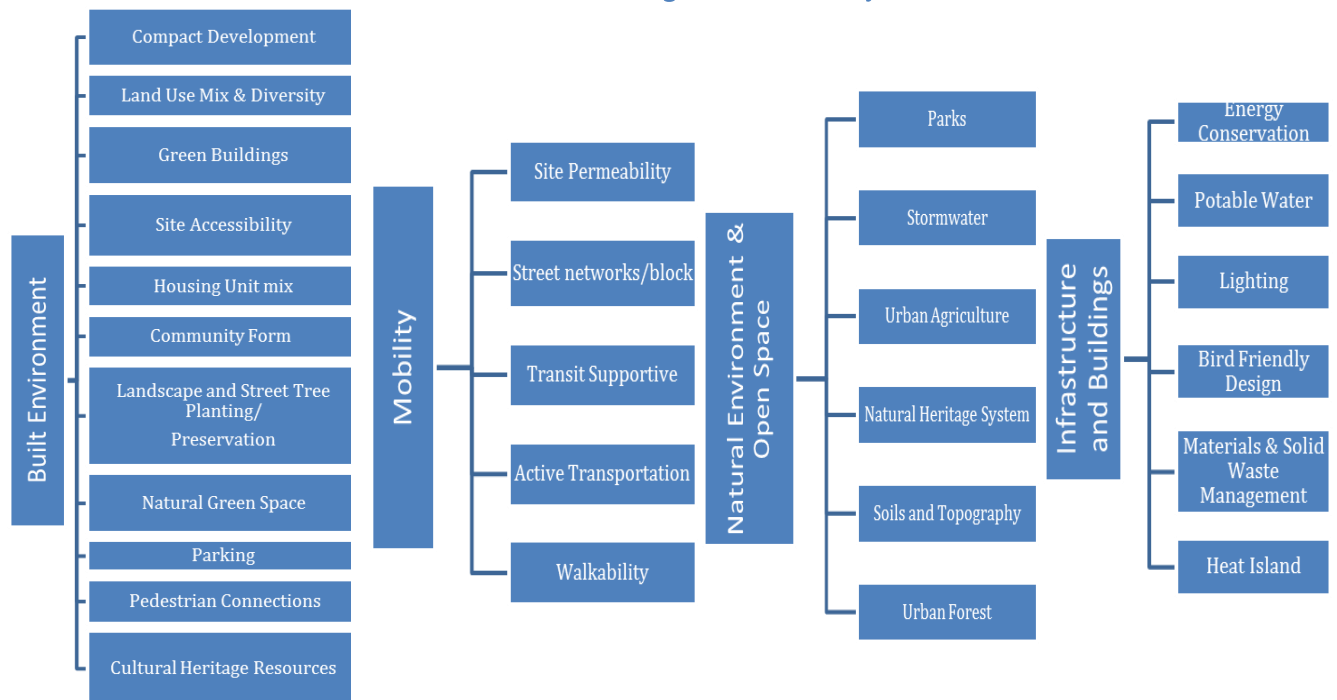
Infrastructure and Buildings

The Infrastructure and Buildings indicators identify the means to maximize energy and water conservation and minimize the consumption of non-renewable resources. New buildings and communities should be designed with a focus on reducing water, waste, and energy use. Since human activity is the principal cause of elevated levels of greenhouse gases and demands on energy, water, and waste systems, the measures focus on means of reducing this impact on both the built and natural environments.

5.2 Indicators

For each of the categories, performance indicators have been selected, informed by background research, including other municipal sustainability guidelines, and private and public sector workshop feedback. Within each of the four categories, the performance indicators identify the characteristics that need to be considered in order to achieve the sustainability goals defined for new developments. Figure 1 summarizes all of the sustainability performance indicators that have been selected for the Cities of Brampton and Vaughan and the Town of Richmond Hill.

Figure 1: Sustainability Indicators



As shown, the list of sustainability indicators covers a wide spectrum of built form, mobility, public realm and design issues, all of which will contribute to the overall health, prosperity and performance of a new development. It should be noted that not all indicators will be applicable to all plan applications. As referenced in section 2.3, the applicability of the various indicators are filtered based on the development application type (i.e. Block plan, draft plan, and site plan) and project type (greenfield, employment land, intensification).

5.3 Sustainability Metrics and Targets

For each of the sustainability performance indicators listed above, specific performance metrics and mandatory, minimum and aspirational targets have been identified. The metrics and targets have been defined based on internal and stakeholder consultations, in addition to referencing supplemental standards (such as LEED ND and other municipal guidelines).

The sustainability metrics and targets have been reviewed through multiple consultation and engagement sessions, and by a third party review provided by the TRCA and CAP.

As is the case with the Toronto Green Standard, the sustainability metrics and targets are expected to evolve and change as market acceptance and implementation of sustainability measures improves with experience. As new priorities are identified, the metrics, targets and dynamic tool can be re-evaluated on a regular basis.

A list of the sustainability performance metrics, targets and point allocation is included in Appendix A.

5.4 Sustainability Metric Precedents

As referenced in section 3.1, background research was carried out to help inform the development of the sustainability performance metrics. As shown in Appendix A, a precedent is referenced for over 80% of the metrics, identifying a recognized standard, municipal policy or guideline or provincial policy that has helped inform the mandatory, recommended minimum and aspirational targets. Highlighting these precedents should help improve the adoption and acceptance of the sustainability performance metrics, in both the private and public sectors, as they have already gained acceptance in other development communities.

6.0 IMPLEMENTATION

While the sustainability metrics themselves will be consistent across the partner municipalities, how they are implemented will vary slightly in each municipality. Each municipality is at a different stage in terms of integrating sustainability thinking into its planning application review process. As a result, a third phase of this project will likely be initiated by each of the partner municipalities to address specific implementation and monitoring issues.

Collaboration amongst the partner municipalities is still expected during the next phase, with each municipality defining how it wishes to implement and incentivize the sustainability metrics based on its unique governance structure and local context. In addition to tailoring or customization of the tools developed as part of Phase 2, components of this next phase will likely include:

- Amendments to existing documents (OP, Site Plan, Secondary Plans etc.);
- Revisions and/or development of municipal sustainability standards;
- Revisions to submission requirements;
- Education and Communication;
- Customizing the tools for local context/conditions;
- Customizing the point thresholds and associated incentives;
- Pilot projects;
- Governance;
- Staff resourcing; and
- Update Terms of Reference of various technical background studies (e.g. Transportation Studies, Servicing Reports, Stormwater Plans, etc.) to reference Sustainability Performance Metrics.

6.1 Submission Requirements

The submission requirements to demonstrate compliance against the Municipalities' sustainability requirements will be identified by each municipality in the implementation phase of the project. The submission requirements will likely include the following supporting documentation:

- Submit a print out of the (application's) plan's sustainability score at pre-application consultation meeting (similar to East Gwillimbury), identifying that all Mandatory targets have been satisfied;
- Municipal receipt and review of technical background reports (in conformance with a complete application package) including draft sustainability checklist;
- Municipality and commenting agencies review reports, plans, sustainability checklist and/or sustainability report. The sustainability checklist, for example, will identify the performance target achieved for each metric and where the data supporting a metric's quantification is located in the reports/plans (i.e Metric 23 is quantified under Section X of the transportation report).

6.2 Recommended Incentive Strategies

The municipal partners may choose to establish incentive programs to support the implementation of the sustainability metrics. Where an incentive is offered, the municipality will establish a threshold point score that the proposed planning application must achieve to be considered for the incentive. Incentives will be based on the *Application* score, while the *Community* score will serve as a monitoring tool to track the overall sustainability performance of the plan. Each of the municipal partners will implement incentive programs at its own pace with additional work likely being completed as part of a future Phase 3.

The following incentive opportunities were identified as part of the background review and consultation and engagement process to further encourage the implementation of the sustainability metrics in new developments. It should be noted that these incentives have been discussed at a high level at the Municipal and Developer workshops. The actual viability of implementing each incentive within the partner municipalities may require additional study:

- Establish municipal cross-department working groups/committees to help implement the sustainability tool and develop alternative municipal design standards;
- Expedited approval process for high performing applications;
- Increased opportunities for density (in urban centres);
- Servicing allocation;
- Stormwater discharge tax;
- Development charge rebates; and
- Awards program to recognize and celebrate high performing projects.

Based on the feedback received at the Developer Forum and BILD workshops, the preferred incentive to encourage higher sustainability performance targets (i.e. Minimum or Aspirational) is an expedited approval process. Feedback at the developers form, and the BILD workshops identified concerns that the current approvals process takes too long, and is too iterative. As a result of this drawn out process, developers are frustrated and unwilling to commit to innovative sustainability projects. Additionally, innovative projects that go beyond standard building practices are often further delayed as current engineering standards are often at odds with engineering standards proposed in “innovative and pioneering” projects.

High level background research was undertaken on expedited approval processes used in other cities/municipalities to encourage and reward higher performing developments. A high level summary of these incentives is provided below. For further details, we recommend each municipality to follow up directly with the program champions.

Table 5: Expedited Approvals Summary

City	Incentive Program	Description and Key Features
Chicago, IL	Green Permit	Eligible projects include green technologies (green roofs, renewables, rainwater harvesting) or LEED certification. Qualifying projects are offered an expedited building approval process (< 30 days) and possible reduction in permit fees. Developers are provided with a single point contact to coordinate submission requirements and meetings and a 7-step process to follow.
San Diego, CA	Sustainable Building Expedite	Eligible projects will certify to LEED Silver or include solar PV to generate a proportion of the building's energy. Qualifying projects are offered expedited building approvals that are expected to reduce the review process time by 25% (compared to a normal approval process). The program is reviewed annually and revised every three years
Seattle, WA	Priority Green Permitting	Eligible projects demonstrate high performance thresholds in energy (>15% better than Seattle's Building Code), water efficiency (WaterSense plumbing fixtures) and waste reduction (75% construction waste diversion). Eligible projects can also include LEED certification (Gold or Platinum) or Built Green (level 4 or 5). Qualifying projects are offered a single point contact, priority in scheduling meeting, faster initial review and construction permitting process. Developers hire an approved verifier or consultant, who documents and verifies compliance.
Santa Monica, CA	Expedited Permitting for Green Buildings	Eligible projects will certify to LEED. Applicants must also highlight key building design features that contribute to the environmental performance of the project.
Ottawa, ON	Green Lane Express	Qualifying projects follow an integrated approval process. Municipal champions have been trained in the process and are LEED accredited. Municipal champions follow the development application from initial concept to final approval.

While most programs implemented elsewhere focus on the building scale, common elements are featured in multiple programs:

- Single point contact within the municipality;
- Trained municipal staff;
- Annual review of design standards and programs; and
- Interdepartmental communication/collaboration.

In December 2012, York Region completed a study which scanned incentive programs across Canada (*Municipal Sustainable Development Incentive Programs*). The intent of the scan was to highlight the successes, challenges, implementation strategies and uptake of various incentive programs. The key conclusions of this report aligned well with the common elements that were featured in the incentive programs listed above. The key conclusions and associated municipalities are listed below:

- **Identify a Local Champion** – Dedicated champions to be trained on the overall value of the program and not just focus on a primary interest area (Guelph and Caledon).
- **Interdepartmental Staff Consultation** – Cross department working groups for staff to share challenges and successes (Caledon and Hamilton).
- **Private Sector Engagement** – Follow up sessions with developers and consultants to gather feedback on the process, value and opportunities for improvement.

- **Post Implementation Performance** – Need to evaluate if the program and measures are demonstrating value. Most programs to date have not considered how to actually monitor, measure and track ongoing performance of the metrics/standards adopted.
- **Private Sector Signoff on Aspiring Projects** – For projects targeting high performance, a private sector consultant could be considered to verify and sign-off on the performance achieved by the plan (Toronto Tier 2 verification).

6.3 Recommendations for Next Steps

Each of the partner municipalities will likely implement the sustainability metrics using a slightly different approach. Below is a high level overview of what should be considered as part of each municipality's implementation phase:

1. Customization of the Dynamic Implementation Tool;
2. Education/Training Workshops for Internal Staff and External Planning Consultants and Commenting Agencies;
3. Creation of a Monitoring Tool;
4. Research and Analysis of Incentives; and
5. Evaluation of Municipal Standards and Specs in relation to the Final Sustainability Performance Metrics.

APPENDIX A - Site Metrics

Site (S) Metrics												
Category	Indicator	Metric #	Metric	Mandatory Target	Recommended Minimum Target			Aspirational Target			Precedent	Total Available Points
			Building Type		Single Family Home	Multi-Fam Buildings (>3 storeys)	Commercial/Retail/Inst	Single Family Homes	Multi-Fam Buildings (>3 storeys)	Commercial/Retail/Inst		
Built Environment	Compact Development	1	Floor area ratio/Floor Space Index (usually applies only to multi-unit medium density and high density)	Satisfy Municipal Official Plan requirements				-			Municipal OP	
	Land use mix and diversity	2	Proximity to Basic Amenities		50% of DU and jobs are within a 800m walking distance to existing or planned Basic Amenities Basic amenities include: 1. Grocery store/farmers market, place to buy fresh produce 2. Community/Recreation Centre 3. Pharmacy 4. Library (UP TO 6 POINTS) If the amenities are not within the distance specified above and the site is designated as mix use, the mix of population and employment uses achieves a 2:1 ratio on the site. (3 POINTS)	75% of DU and jobs are within a 400m walking distance to existing or planned Basic Amenities Basic amenities include: 1. Grocery store/farmers market, place to buy fresh produce 2. Community/Recreation Centre 3. Pharmacy 4. Library (UP TO 6 POINTS) If the amenities are not within the distance specified above and the site is designated as mix use, the mix of population and employment uses includes major office space, an anchor commercial/retail tenant or a minimum of 3 stories of employment uses. (3 POINTS)	Municipal OP Thinking Green Item 1, 2, 9 LEED NC SSc2	12				
		3	Proximity to Lifestyle Amenities		50% of DU and jobs are within a 800m walking distance to existing or planned Lifestyle amenities Lifestyle Amenities include: 1. General retail 2. convenience store 3. Theatre 4. Coffee store 5. Hair salon 6. Bank 7. Place of worship 8. Daycare 9. Restaurant/Pub Other (UP TO 3 POINTS)	75% of DU and jobs are within a 400m walking distance to existing or planned Lifestyle amenities Lifestyle Amenities include: 1. General retail 2. Convenience store 3. Theatre 4. Coffee store 5. Hair salon 6. Bank 7. Place of worship 8. Daycare 9. Restaurant/Pub Other (UP TO 3 POINTS)	Municipal OP Thinking Green Item 1, 2, 9 LEED NC SSc2	6				
	Green Buildings	4	Building(s) designed and/or certified under an accredited "green" rating system	Municipal buildings greater than 500m ² must be designed to LEED Silver or alternative equivalent	Site includes 1 or more green buildings certified under a recognized third party standard (i.e. Energy Star, LEED NC, CS, CI, EB, Homes) (2 POINTS)	Additional aspirational points are available for development plans that include 5 or more buildings. Buildings on site will be certified under a recognized third party standard (i.e. Energy Star, ASHRAE 189, LEED NC, CS, EB, Homes, etc...)			2 points if 50% to 75% of buildings are certified +2 points if 76% to 100% of buildings are certified	Municipal OP Sustainable Design and Construction Policy for Municipal Buildings LEED ND GIBp1	6	

Category	Indicator	Metric #	Metric	Mandatory Target	Recommended Minimum Target		Aspirational Target		Precedent	Total Available Points
Built Environment	Site Accessibility	5	Universal Design	Design 10% of residential units in apartment buildings to provide a barrier-free path of travel from the suite entrance door to the doorway of at least one bedroom at the same level, and at least one bathroom in accordance with OBC.	Design a minimum of 20% of the DU in accordance with ICC/ANSI A117.1 Universal Design Standards (or equivalent) (1 POINT)	N/A	Design a minimum of 30% of the DU in accordance with ICC/ANSI A117.1 Universal Design Standards (or equivalent) (1 POINT)	N/A	Accessibility Act Municipal Accessibility Plan LEED ND NPdC11 OBC Requirement	2
		6	Number of universally accessible points of entry to buildings and sites	100% of primary entrances	100% of emergency exits (1 POINT)		100% of all entries and exits (1 POINT)	Accessibility Act Municipal Accessibility Plan LEED ND NPdC11	2	
	Housing Unit mix	7	Design for life cycle housing		The housing types includes a diversified mix that caters to singles, families, multi-generational, live-work, mixed use, affordable/low income, attached, detached, townhome and med-to-high-rise residential. (POINTS AWARDED BASED ON A SLIDING SCALE)	N/A	The housing mix includes a mix of housing types, catering to singles, families, multi-generational, live-work, mixed use, affordable/low income, attached, detached, townhome and med-to-high-rise residential. (POINTS AWARDED BASED ON A SLIDING SCALE)	N/A	Municipal OP	7
	Landscape and Street Tree Planting / Preservation	8	% Tree canopy within proximity to building/pedestrian infrastructure	Satisfy municipal planting requirements	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. (2 POINT)		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. (2 POINTS)	Municipal OP LEED ND NPdC14	4	
		9	Maintain existing healthy trees	Arborist Report provided that identifies and evaluates where on-site healthy mature trees will be protected (in-situ or moved) or removed.	Where healthy mature trees must be removed, new trees (not including street trees) are provided on site or as determined by the municipality to mitigate the lost canopy coverage of the trees removed. (2 POINTS)		Healthy mature trees greater than 20 cm. DBH preserved in situ on site. (2 POINTS) Smaller healthy trees (less than 20 cm. DBH) transplanted. (1 POINT)	Municipal Precedent	5	
		10	Soil Quantity and Quality		Pits, trenches or planting beds should have a topsoil layer with an organic matter content of 10 to 15 % by dry weight and a pH of 6.0 to 8.0. The topsoil layer should have a minimum depth of 60 cm. The subsoil should have a total uncompacted soil depth of 90 cm. Minimum soil volume of 30 cubic metres per tree (2 POINTS)			TGS TIER I Canadian Cities with Soil Volume Standards TRCA - Preserving and Restoring Healthy Soils: Best Practice Guide for Urban Construction	2	
	Natural Green Space	11	Proximity to accessible natural green space		Visual and physical connections (such as public access blocks, single loaded roads) are provided to the natural heritage system and parks. (1 POINTS)		Visual and physical connections (such as public access blocks, single loaded roads) are provided to 50% of the natural heritage system. (2 POINTS)		2	

Category	Indicator	Metric #	Metric	Mandatory Target	Recommended Minimum Target		Aspirational Target			Precedent	Total Available Points
Built Environment	Parking	12	Bicycle Parking	Satisfy Municipal Standards	Provide a minimum 0.6 bike parking spots per unit	0.13 bike parking spots for permanent employees for every 100m2 GFA.	Provide a minimum of 0.8 bike parking spots per unit	Place bike parking in weather protected areas in close proximity to building entry (1 POINT)	TIER I & TIER II	6	
		13	Off-Street Parking		N/A	Locate all new off-street parking at the side or rear of buildings (1 POINT)	N/A	Less than 20% of the total development area is allocated to new, off-street surface parking facilities. (1 POINT)	LEED ND NDPc5	7	
		14	Surface Parking			Develop and implement a strategy to minimize surface parking for permanent employees and residents. (1 POINT)					1
		15	Carpooling and Efficient Vehicle Parking			3% of the site parking spots (or a minimum of 4 parking spots) to be dedicated to car pooling and/or fuel efficient / hybrid vehicles and/or carshare/zip car (does not apply to compact cars). Dedicated parking spots located in preferred areas close to building entries. (1 POINT)		5% of the site parking spots to be dedicated to car pooling and/or fuel efficient / hybrid vehicles and/or carshare/zip cars (does not apply to compact cars). Dedicated parking spots located in preferred areas close to building entries. (1 POINT)	TGS LEED NC SSC4.3	2	
	Pedestrian Connections	16	Traffic Calming		75% of new residential-only streets designed with traffic calming strategies. (1 POINT) 50% of new non-residential and/or mixed-use streets are designed with traffic calming strategies (1 POINTS)		100% of new residential-only streets designed with traffic calming strategies. (1 POINT) 75% of new non-residential and/or mixed-use streets are designed with traffic calming strategies (1 POINT)		LEED ND NPDC1	4	

Category	Indicator	Metric #	Metric	Mandatory Target	Recommended Minimum Target		Aspirational Target		Precedent	Total Available Points
Built Environment	Pedestrian Connections	17	School Proximity to Transit routes & Bikeways		All schools are located within a 400m walking distance to transit routes and/or dedicated bike network (2 POINTS)		All schools are located within a 200m walking distance to transit routes and/or dedicated bike network (2 POINTS)			4
		18	Proximity to school		50% of dwelling units are within 800 meters walking distance to public/private elementary, montessori, and middle schools (2 POINTS) 50% of dwellings units are within 1600 meters to a high school (1 POINT)	N/A	75% of dwelling units are within 400 meters walking distance to public/private elementary, montessori, and middle schools (2 POINTS) 75% of dwellings units are within 1000 meters to a high school (1 POINT)	N/A	LEED ND NPDC15	6
	Cultural Heritage Resources	19	Cultural Heritage Conservation	Comply with Cultural Heritage Conservation policies under provincial legislation (i.e. the Ontario Heritage Act, Planning Act and PPS, etc), Standards and Guidelines for Historic Places, municipal Official Plan, municipal by-laws, Municipal Register of Cultural Heritage Resources and/or Municipal Heritage Inventory.	100% evaluation of properties included in the Municipal Heritage Inventory and/or Register, and 100% retention and protection of cultural heritage resources that qualify for designation under the Ontario Heritage Act. (2 POINT)		100% conservation of cultural heritage resources identified in the Municipal Heritage Register or Inventory and their associated landscapes and ancillary structures in accordance with the Standards and Guidelines for the Conservation of Historic Places in Canada. (2 POINTS)		Municipal OP policies on Cultural Heritage Ontario Heritage Act Municipal Inventory of Buildings of Architectural and Historical Significance	4
Mobility	Site Permeability	20	Connectivity	Connect buildings on the site to off-site pedestrian paths, surface transit stops, parking areas (car and bike), existing trails or pathways, or other destinations (e.g. schools). Outdoor waiting areas located on the site must offer protection from weather. Where a transit stop is located within a walking distance of the project site boundary, the building main entrance should have a direct pedestrian linkage to that transit stop			Provide amenities and street furniture (benches, additional bike parking, landscaping) along connections provided on the site and between the site and adjacent destinations. (2 POINTS)		TGS TIER II Municipal OP	2
	Transit supportive	21	Distance to public transit		Site is within 800m walking distance to an existing or planned commuter rail, light rail, bus rapid transit or subway with stops or Site is within 400m walking distance to 1 or more bus stops with frequent service. (3 POINTS)		Site is within 400m walking distance to an existing or planned commuter rail, light rail, bus rapid transit, or subway with frequent stops or Site is within 200m walking distance to 1 or more bus stops with frequent service. (3 POINTS)		Regional OP (proximity) Municipal OP (if revised to speak to connectivity) LEED NC 2009 SSc4.1	6
	Active Transportation	22	Proximity to cycling network		75% of residents/jobs are within 400 meters of existing or approved by council path/network		100% of residents/jobs are within 400 meters of existing or approved by council path/network			4

Category	Indicator	Metric #	Metric	Mandatory Target	Recommended Minimum Target		Aspirational Target			Precedent	Total Available Points	
Mobility	Walkability	23	Promote walkable streets	Sidewalks must be in accordance with the applicable Municipal Standards. Sidewalk width must be at least 1.5 meters.			On 100% of street, continuous sidewalks or equivalent provisions must be provided on both sides of streets, where not a mandatory requirement. (2 POINTS) Provide pedestrian amenities to further encourage walkable streets. (2 POINTS)			LEED ND NPDC1	4	
Natural Environment & Open Space	Parks	24	Park Accessibility		Provide 2 road frontages for each urban square, parkette, and neighbourhood park provided and 3 road frontages for each community park provided. (3 POINTS)		Provide 3 or more road frontages for all parks provided. (3 POINTS)			LEED ND Cornell Community Mt. Pleasant Village Brampton Development Design Guideline Existing Policies	6	
	Stormwater	25	Stormwater Quantity	Retain runoff volume from the 5mm rainfall event on site. Provide quantity or flood control in accordance with applicable Municipal and conservation authority requirements	Retain runoff volume from the 10mm rainfall event on site. (3 POINTS)		Retain runoff volume from the 15mm rainfall event on site. (3 POINTS)			TRCA's Stormwater Management Criteria TRCA SWM Criteria Document	6	
		26	Stormwater Quality	Remove 80% of Total Suspended Solids (TSS) on an annual loading basis from all runoff leaving the site (based on the post development level of imperviousness). All ponds will be designed with Enhance Level of Protection (Level 1).	N/A	81% to 90% of Total Suspended Solids (TSS) removed from a 10mm rainfall event. (1 POINTS)	N/A	91% to 100% of Total Suspended Solids (TSS) removed from a 15mm rainfall event. (4 POINTS)		TGS TIER II	5	
		27	Rainwater Re-use			Buildings designed for rainwater re-use readiness (i.e. plumbing infrastructure included in building) (1 POINT)		Rainwater captured on-site and used for low-grade functions (i.e. toilet/urinal flushing, irrigation) (3 POINTS)				4
		28	Stormwater Architecture/Features			Introduce stormwater amenities that provide both functional and aesthetic benefit to the site. (2 POINTS)						2
		29	Urban Agriculture	Dedicate land for local food production		Provide 80ft2/DU of garden space (2 POINTS)		N/A		Dedicate 15% of roofspace for local food production (2 POINTS)	N/A	LEED ND NPDC13

Category	Indicator	Metric #	Metric	Mandatory Target	Recommended Minimum Target	Aspirational Target	Precedent	Total Available Points		
Infrastructure and Buildings	Energy conservation	30	Solar Readiness		100% of all new building designed for solar readiness (i.e. electrical conduit/plumbing riser roughed in) (1 POINT)	On-site energy generation from renewable energy source (points awarded based on % of renewable energy generated relative to total building) (SLIDING POINT SCALE)	LEED NC EAc2	8		
		31	Passive solar alignment		Applies to 50% of new buildings: The building(s)'s long axis is within 15degrees of E-W The building(s) E-W lengths are at least as long as the N-S lengths (3 POINTS)	Applies to 75% of new buildings: The building(s)'s long axis is within 15degrees of E-W The building(s) E-W lengths are at least as long as the N-S lengths (3 POINTS)	LEED ND GIBc10	6		
		32	Building energy efficiency	Design all buildings in accordance with OBC.	Single family homes or multiunit residential buildings (3 storey or lower) must be built to EnerGuide 83 (or equivalent) (3 POINTS)	Buildings must be designed to 35% better than MNECB (3 POINTS - MAXIMUM)	Single family homes or multiunit residential buildings (3 storey or lower) must be built to EnerGuide 85 (or equivalent) (1 POINT)	Buildings energy performancne exceeds MNECB by 35% or more (SLIDING POINT SCALE) Building commissioning required for all buildings (multi unit res above 3 storeys, commercial, inst) (3 POINTS) Building electricity sub-metering required for all tenants and per residential suite (3 POINTS)	LEED ND GIBp2 TGS TIER I & TIER II	21
		33	District energy viability		Develop an energy strategy for the development, identifying opportunities for conservation, energy sharing, renewables, etc... (2 POINTS)	In an intensification area, where district energy has been deemed viable by the municipality, carry out a district energy feasibility study. (3 POINTS)			5	
	Potable Water	34	Reduce potable water used for irrigation		Redcue potable water used for irrigation by 50%, compared to a midsummer baseline case. (2 POINTS)	No potable water is used for irrigation. (4POINTS)	LEED NC Wec1 TIER I	6		
		35	Water Conserving Fixtures	Include plumbing fixtures with the following maximum flow rates: Residential: Toilets: 6LPF Faucets: 8.3LPM Showerhead: 9.5LPM CRI Same as Residential with: Urinals 3.8LPF Faucets 8.3LPM (private applications only), 1.9LPM all other Satisfy applicable municipal standards (e.g. York Region Official Plan policy 5.2.22)	Include water fixtures that obtain a 10% to 20% reduction over the baseline fixture (Mandatory target fixture or applicable municipal standard). (3 Points)	Include water fixtures that obtain > 20% reduction over the baseline fixture (Mandatory target fixture). (3 POINTS)	LEED ND GIBp3 TIER I and TIER II TGS	6		

Category	Indicator	Metric #	Metric	Mandatory Target	Recommended Minimum Target	Aspirational Target	Precedent	Total Available Points	
Infrastructure and Buildings	Lighting	36	Parking garage lighting	Minimum level of illumination of 50 lux	Use occupancy sensors (motion and thermal) on 2/3 of parking lighting fixtures, while always maintaining a minimum illumination of at least 10 lux (1 POINT)			1	
		37	Reduce light pollution	Satisfy applicable municipal standards	Shield exterior light fixtures >1000 lumens to provide night sky lighting No uplighting allowed (1 POINT)	Develop lighting controls that reduces night time spillage of light by 50% from 11pm to 5am (non residential) No architectural lighting allowed between 11pm and 5am (1 POINT)	LEED NC SSc8 TIER I and TIER II	2	
		38	Energy Conserving Lighting	Satisfy applicable municipal standards	Use LEDs and photocells on all exterior (exposed) lighting fixtures (2 POINTS)				2
	Bird friendly design	39	Bird Friendly Design		Use a combination of Bird Friendly Design strategies to treat at least 85% of the exterior glazing located within the first 12m of the building above-grade (including interior courtyards). Visual markers on the glass should have a spacing no greater than 10cm x 10cm Where a greenroof is constructed with adjacent glass surfaces, ensure the glass is treated 12m above greenroof surface (2 POINT)			TGS TIER 1 City of Toronto Bird Friendly Design Guidelines	2
	Materials & Solid Waste Management	40	Solid Waste	Satisfy applicable municipal standards	Storage and collection areas for recycling and organic waste are within or attached to the building or deep collection recycling and organic waste storage facilities are provided. (1 POINT)		Three chute system is provided. (1 POINT)	TGS TIER I	2
		41	Recycled / Reclaimed Materials	Satisfy Municipal Standards	Minimum 25% of recycled/reclaimed materials should be used for new infrastructure including roadways, parking lots, sidewalks, unit paving, etc. (1 POINT)	Minimum 30% of recycled/reclaimed materials should be used for new infrastructure including roadways, parking lots, sidewalks, unit paving, etc. (1 POINT)		LEED ND GIBc15	2
		42	Material Re-use and Recycled Content		At least 5% reused content in building materials and/or landscaping materials (hardscaping such as paving or walkways) is provided. (1 POINT) At least 10% recycled content in building materials and/or landscaping materials (hardscaping such as paving or walkways). (1 POINT)	At least 10% reused content in building materials and/or landscaping materials (hardscaping such as paving or walkways) is provided. (1 POINT) At least 15% recycled content in building materials and/or landscaping materials (hardscaping such as paving or walkways). (1 POINT)		TGS TIER II	4

Category	Indicator	Metric #	Metric	Mandatory Target	Recommended Minimum Target		Aspirational Target		Precedent	Total Available Points
Infrastructure and Buildings	Heat Island	43	Reduce heat island effect from the built form - Non Roof			For 50% of the site's hardscape, include any combination of the following: - Underground/covered parking - Hardscape shading - Hardscape material with an SRI > 29 - Open grid pavers (>50% pervious) (2 POINTS)		For 75% of the site's hardscape, include any combination of the following: - Underground/covered parking - Hardscape shading - Hardscape material with an SRI > 29 - Open grid pavers (>50% pervious) (1 POINT)	Municipal OP LEED NC SSC7.1/7.2 TGS TIER I & II	3
		44	Reduce heat island effect from the built form - Roof			<p><i>Cool Roof</i></p> For 75% of the roof area, include roofing materials with solar reflective index (SRI) of: Low-sloped roof: 78 Steep-sloped roof: 29 (2 POINTS)		<p><i>Cool Roof</i></p> For 90% of the roof area, include roofing materials with solar reflective index (SRI) of: Low-sloped roof: 78 Steep-sloped roof: 29 (1 POINT)	<p><i>Vegetated Roof</i></p> Install vegetated roof for 75% of the roof area (2 POINT)	Municipal OP LEED NC SSC7.1/7.2 TGS TIER I & II
						<p><i>Vegetated Roof</i></p> Install vegetated roof for 50% of the roof area (4 POINTS) An additional 2 points is awarded if a <i>Cool</i> roof is installed on the remaining 50%		An additional 2 point is awarded if a <i>Cool</i> roof is installed on the remaining 25%		

APPENDIX A - Block and Draft Plan

Block Plan (B) & Draft Plan (D) Metrics									
Category	Indicator	Applies To	Metric #	Metric	Mandatory Target	Minimum Target	Aspirational Target	Precedents	Available Points
Built Environment	Compact Development	B&D	1	Persons & Jobs per hectare <i>Note:</i> Each municipality defines density ranges by land use types within the Official Plan and the Secondary Plans	Places to Grow - 50 (min) ppl+jobs/ha or as further defined in the municipal Official Plan York Region - 70 (min) ppl+jobs/ha or as further defined in the municipal Official Plan and / or approved Secondary Plan				<i>M</i>
		B	2	Location Efficiency	Height and/or density conforms to the minimum or maximum targets established in the applicable Municipal Official Plan	Achieve a 50% increase in density along existing or planned mid block collectors, planned for transit (1 POINT)	Achieve a 100% increase in density along existing or planned mid block collectors planned for transit (2 POINTS)		3
	Land use Mix and diversity	B&D	3	Proximity to Basic Amenities		50% of DU and jobs are within a 800m walking distance of at least 3 existing or planned Basic Amenities (Amenities listed below) Basic amenities include: 1. Grocery store/farmers market, place to buy fresh produce 2. Community/Recreation Centre 3. Pharmacy 4. Library (UP TO 6 POINTS)	75% of DU and jobs are within a 400m walking distance of at least 3 existing or planned Basic Amenities (Amenities listed below) Basic amenities include: 1. Grocery store/farmers market, place to buy fresh produce 2. Community/Recreation Centre 3. Pharmacy 4. Library (UP TO 6 POINTS)	Thinking Green Item 1, 2, 9 LEED NDPc3	12
		B&D	4	Proximity to Lifestyle Amenities	Satisfy Municipal Official Plan requirements	50% of DU and jobs are within a 800m walking distance of at least 3 existing or planned basic amenities (Amenities listed below) Lifestyle Amenities include: 1. General retail 2. Convenience store 3. Theatre 4. Coffee store 5. Hair salon 6. Bank 7. Place of worship 8. Daycare 9. Restaurant/Pub Other (UP TO 3 POINTS)	75% of DU and jobs are within a 400m walking distance of at least 3 existing or planned basic amenities (Amenities listed below) Lifestyle Amenities include: 1. General retail 2. Convenience store 3. Theatre 4. Coffee store 5. Hair salon 6. Bank 7. Place of worship 8. Daycare Restaurant/Pub Other. (UP TO 3 POINTS)	Thinking Green Item 1, 2, 9 LEED NDPc3	6

Block Plan (B) & Draft Plan (D) Metrics									
Category	Indicator	Applies To	Metric #	Metric	Mandatory Target	Minimum Target	Aspirational Target	Precedents	Available Points
Built Environment	Landscape and Street Tree Planting / Preservation	D	5	Urban Tree Diversity	Where trees are planted in a row in an urban area (e.g. street trees, trees in a parking area, park, etc.), alternate tree species at least every 2 trees or in accordance with approved municipal standards.				
		D	6	Maintain existing healthy trees	Arborist Report provided that identifies and evaluates where on-site healthy mature trees will be protected (in-situ or moved) or removed.	Where healthy mature trees must be removed, new trees (not including street trees) are provided on site or as determined by the municipality to mitigate the lost canopy coverage of the trees removed. (2 POINTS)	75% of healthy mature trees greater than 20 cm. DBH are preserved in situ on site. (3 POINTS)	Municipal Precedent	5
		D	7	Soil Quantity and Quality	Satisfy Municipal Tree Planting Standards	Pits, trenches or planting beds should have a topsoil layer with an organic matter content of 10 to 15 % by dry weight and a pH of 6.0 to 8.0. The topsoil layer should have a minimum depth of 60 cm. The subsoil should have a total uncompacted soil depth of 90 cm. Minimum soil volume of 30 cubic metres per tree (2 POINTS)		TGS TIER I Canadian Cities with Soil Volume Standards TRCA - Preserving and Restoring Healthy Soils: Best Practice Guide for Urban Construction	2
	Green Buidings	D	8	Building(s) designed and/or certified under an accredited "green" rating system	Public Buildings greater than 500m ² must be designed to LEED Silver or alternative equivalent	Site includes 1 or more green buildings certified under a recognized third party standard (i.e. Energy Star, ASHRAE 189, LEED NC, CS, CI, EB, Homes, etc...) (2 POINTS)	Additional aspirational points are available for development plans that include 5 or more buildings. Buildings on site will be certified under a recognized third party standard (i.e. Energy Star, ASHRAE 189, LEED NC, CS, EB, Homes, etc...) 2 points if 50% to 75% of buildings are certified +2 points if 76% to 00% of buildings are certified	Municipal OP Sustainable Design and Construction Policy for Municipal Buildings LEED ND GIBp1	6

Block Plan (B) & Draft Plan (D) Metrics									
Category	Indicator	Applies To	Metric #	Metric	Mandatory Target	Minimum Target	Aspirational Target	Precedents	Available Points
Built Environment	Housing Unit Mix	B&D	9	Design for life cycle housing:		<p>The housing types include a diversified mix that caters to singles, families, multi-generational, live-work, mixed use, affordable/low income, attached, detached, townhome and med-to-high-rise residential.</p> <p>(POINTS AWARDED BASED ON A SLIDING SCALE)</p>	<p>The housing types include a diversified mix that caters to singles, families, multi-generational, live-work, mixed use, affordable/low income, attached, detached, townhome and med-to-high-rise residential.</p> <p>(POINTS AWARDED BASED ON A SLIDING SCALE)</p>	Thinking Green Item 3 LEED NDPC4	7
	Community Form	B	10	Community and Neighbourhood Scale		<p>Community form based on a hierarchy of the following:</p> <p><i>Community</i> - 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.</p> <p><i>Neighbourhood</i> - shape and size defined by 400 metres (5 minute walk) from centre to perimeter with a distinct edge or boundary defined by other neighbourhoods or larger open spaces.</p> <p><i>Neighbourhood centre</i> - acts as a distinct centre or focus with a compatible mix of uses that include medium and high-density, retail or community facilities, and a parkette/village square.</p>	<p>_____</p>		4
						<p><i>Mixed use node</i> - central to the cluster of neighbourhoods the node should include higher residential densities, retail, employment opportunities, be accessible, and served by public transit.</p> <p>(4 POINTS)</p>			

Block Plan (B) & Draft Plan (D) Metrics									
Category	Indicator	Applies To	Metric #	Metric	Mandatory Target	Minimum Target	Aspirational Target	Precedents	Available Points
Built Environment	% of Tree canopy within proximity to building/ pedestrian infrastructure	B&D	11	% canopy coverage	Provide street trees on both sides of streets according to Municipal Standards.	<p>Tree-Lined Streets Provide street trees on both sides of new and existing streets within the project and on the project side of bordering streets, between the vehicle travel lane and walkway, at intervals averaging no more than 9 meters. (1 POINT)</p> <p>Shaded Streets Provide shade within 10 years of planting for at least 50% of sidewalk lengths. All trees should be selected from the applicable Municipal tree list. (1 POINT)</p>	<p>Tree-Lined Streets Provide street trees on both sides of new and existing streets within the project and on the project side of bordering streets, between the vehicle travel lane and walkway, at intervals averaging no more than 6 meters. (1 POINT)</p> <p>Shaded Streets Provide shade within 10 years of planting for at least 75% of sidewalk lengths. All trees should be selected from the applicable Municipal tree list. (1 POINT)</p>	LEED ND NPDc14	4
	Natural Heritage	B&D	12	Connection to Natural Heritage		Visual and physical connections (such as public access blocks, single loaded roads) are provided to 25% of the natural heritage system. (2 POINTS)	Visual and physical connections (such as public access blocks, single loaded roads) are provided to 50% of the natural heritage system. (2 POINTS)		4
	Pedestrian Connections	B&D	13	Traffic Calming		<p>75% of new residential-only streets designed with traffic calming strategies. (1 POINT)</p> <p>50% of new non-residential and/or mixed-use streets are designed with traffic calming strategies (1 POINT)</p>	<p>100% of new residential-only streets designed with traffic calming strategies. (1 POINT)</p> <p>75% of new non-residential and/or mixed-use streets are designed with traffic calming strategies (1 POINT)</p>	LEED ND NPDc1	4
		B&D	14	School Proximity to Transit routes & Bikeways		All schools are located within a 400m walking distance to transit routes and/or bikeways (2 POINTS)	All schools are located within a 200m walking distance to transit routes and/or bikeways (2 POINTS)		4
	Pedestrian Connections	B&D	15	Proximity to school		<p>50% of dwelling units are within 800 meters walking distance to public/private elementary, montessori, and middle schools (2 POINTS)</p> <p>50% of dwellings units are within 1600 meters to a public/private high school (1 POINT)</p>	<p>75% of dwelling units are within 400 meters walking distance to public/private elementary, montessori, and middle schools (2 POINTS)</p> <p>75% of dwellings units are within 1000 meters to a public/private high school (1 POINT)</p>	LEED ND NPDc15	6

Block Plan (B) & Draft Plan (D) Metrics									
Category	Indicator	Applies To	Metric #	Metric	Mandatory Target	Minimum Target	Aspirational Target	Precedents	Available Points
Built Environment	Cultural Heritage Resources	B&D	16	Cultural Heritage Conservation	Comply with Cultural Heritage Conservation policies under provincial legislation (i.e. the Ontario Heritage Act, Planning Act and PPS, etc), Standards and Guidelines for Historic Places, municipal Official Plan, municipal by-laws, Municipal Register of Cultural Heritage Resources and/or Municipal Heritage Inventory.	100% evaluation of properties included in the Municipal Heritage Inventory and/or Register, and 100% retention and protection of cultural heritage resources that qualify for designation under the Ontario Heritage Act. (2 POINT)	100% conservation of cultural heritage resources identified in the Municipal Heritage Register or Inventory and their associated landscapes and ancillary structures in accordance with the Standards and Guidelines for the Conservation of Historic Places in Canada. (2 POINTS)		4
Mobility	Street networks/block	B&D	17	Block perimeter/length		75% of block perimeters do not exceed 550m. 75% of block lengths do not exceed 250m. (2 POINTS)	100% of block perimeters do not exceed 550m. 100% of block lengths do not exceed 250m. (2 POINTS)	Thinking Green Item 3 LEED NPDp1	4
		B&D	18	Intersection density		Street Intersections per sq km = 40 to 50 (2 POINTS)	Street Intersections per sq km =51 to 60 (1 POINT) Street Intersections per sq km >61 (1 POINT)	LEED NPDp3 Neptus Foundation	4
	Transit supportive	B&D	19	Distance to public transit	Satisfy Official Plan Targets	50% of residents/employment is within 800m walking distance to existing or planned commuter rail, light rail or subway with frequent stops or 50% of residents/employment is within 400m walking distance to 1 or more bus stops with frequent service. (3 POINTS)	75% of residents/employment is within 400m walking distance to existing or planned commuter rail, light rail or subway with frequent stops or 75% of residents/employment is within 200m walking distance to 1 or more bus stops with frequent service. (3 POINTS)	LEED NC 2009 SSc4.1 LEED ND SLLc3	6
	Active Transportation	B&D	20	Creation of Trail or Bike Paths	Comply with Master Plan		Advances the objectives of the applicable Pedestrian and Cycling Master Plan (2 POINTS)		2
		B&D	21	Proximity to cycle network		75% of residents/jobs are within 400 meters of existing or approved by council path/network (2 POINTS)	100% of residents/jobs are within 400 meters of existing or approved by council path/network (2 POINTS)		4

Block Plan (B) & Draft Plan (D) Metrics									
Category	Indicator	Applies To	Metric #	Metric	Mandatory Target	Minimum Target	Aspirational Target	Precedents	Available Points
Mobility	Walkability	B&D	22	Promote walkable streets	Sidewalks must be in accordance with the applicable Municipal Standards. Sidewalk width must be at least 1.5 meters.	On 75% of streets, continuous sidewalks or equivalent provisions must be provided on both sides of streets, where not a mandatory requirement. (2 POINTS)	On 100% of street, continuous sidewalks or equivalent provisions must be provided on both sides of streets, where not a mandatory requirement. (2 POINTS) Provide pedestrian amenities to further encourage walkable streets. (2 POINTS)	LEED ND NPDC1	6
Natural Environment & Open Space	Parks	B&D	23	Park Accessibility		Provide 2 or more road frontages for each urban square, parkette, and neighbourhood park provided and 3 road frontages for each community park provided. (3 POINTS)	Provide 3 or more road frontages for all parks provided. (3 POINTS)	LEED ND Cornell Community Mt. Pleasant Village Existing Policies	6
	Stormwater	B&D	24	Stormwater Quantity	Retain runoff volume from the 5mm rainfall event on site or achieve best efforts Provide quantity or flood control in accordance with applicable Municipal and conservation authority requirements	Retain runoff volume from the 10mm rainfall event on site. (3 POINT)	Retain runoff volume from the 15mm rainfall event on site. (3 POINTS)	TGS TIER II TRCA DIRECTION	6
		B&D	25	Stormwater Quality	Remove 80% of Total Suspended Solids (TSS) on an annual loading basis from all runoff leaving the site (based on the post development level of imperviousness). All ponds will be designed with Enhance Level of Protection (Level 1).	Remove 81% to 90% of Total Suspended Solids (TSS) from all runoff leaving the site during a 10mm rainfall event. (Based on the post development level of imperviousness). (1 POINTS)	Remove 91% to 100% of Total Suspended Solids (TSS) from all runoff leaving the site during a 15mm rainfall event. (Based on the post development level of imperviousness). (4 POINTS)	TGS TIER II TRCA DIRECTION	5

Block Plan (B) & Draft Plan (D) Metrics									
Category	Indicator	Applies To	Metric #	Metric	Mandatory Target	Minimum Target	Aspirational Target	Precedents	Available Points
Natural Environment & Open Space	Urban agriculture	B&D	26	Dedicate land for local food production		Provide 80ft ² /DU of garden space (2 POINTS)	Provide the following garden space per site density DU Density Growing Space/DU 17-35DU/ha 200ft ² 36-54DU/ha 100ft ² >54DU/ha 80ft ² (2 POINTS)	LEED ND NPDc13	4
	Natural Heritage System	B&D	27	Natural Heritage System Enhancements	Satisfy Municipal Official Plan requirements		Demonstrate ecological gain above and beyond the municipal natural heritage requirements. (2 POINTS)		2
	Soils and Topography	B&D	28	Restore and enhance soils	Undertake a Topsoil Fertility Test according to Municipal Standards	Undertake a Topsoil Fertility Test for the entire site and implement its recommendations. (1 POINT)	Development on highly permeable soils is avoided following TRCA and CVC Low Impact Development Stormwater Management Planning and Design Guide. (2 POINTS) In addition to implementing the recommendations of the Topsoil Fertility Test, a minimum topsoil depth of 200 mm is provided across the entire site. (2 POINTS)	TRCA DIRECTION	5

Block Plan (B) & Draft Plan (D) Metrics									
Category	Indicator	Applies To	Metric #	Metric	Mandatory Target	Minimum Target	Aspirational Target	Precedents	Available Points
Infrastructure & Buildings	Energy conservation	B&D	29	Passive solar alignment		50% (or more) of the blocks have one axis within 15 degrees of E-W. E-W lengths of those blocks are at least as long as the N-S lengths of blocks (3 POINTS)	75% (or more) of the blocks have one axis within 15degrees of E-W E-W lengths of those blocks are at least as long as the N-S lengths of blocks (3 POINTS)	LEED ND GIBc10	6
		D	30	Building energy efficiency	Single Family Homes: Design all buildings in accordance with OBC.	75% of single family homes or multiunit residential buildings (3 storey or lower) must be built to EnerGuide 83 (or equivalent) (2 POINTS)	90% of single family homes or multiunit residential buildings (3 storey or lower) must be built to EnerGuide 85 (or equivalent) (2 POINT)		4
		B&D	31	Energy Management		Develop an energy strategy for the development, identifying opportunities for conservation, energy sharing, renewables, etc... (2 POINTS)	In an intensification area, where district energy has been deemed viable by the municipality, carry out a district energy feasibility study. (3 POINTS)		5
	Lighting	D	32	Reduce light pollution	Satisfy applicable municipal standards	Shield exterior light fixtures >1000 lumens to prevent night sky lighting No uplighting allowed (1 POINT)		LEED NC SSc8 TIER I and TIER II	1
		D	33	Energy Conserving Lighting	Satisfy applicable municipal standards	Use LEDs and/or photocells on all exterior (exposed) lightng fixtures (applies to street lights, park lights, pedestrian walkways). (2 POINTS)			2
	Material Management	D	34	Recycled / Reclaimed Materials	Satisfy applicable municipal standards	Minimum 25% of recycled/reclaimed materials should be used for new infrastructure including roadways, parking lots, sidewalks, unit paving, etc. (1 POINT)	Minimum 30% of recycled/reclaimed materials should be used for new infrastructure including roadways, parking lots, sidewalks, unit paving, etc. (1 POINT)		2

APPENDIX B – Rationale and Sources Used to Inform Metrics

Built Environment - Compact Development - Persons and jobs per ha

Rationale: To conserve land and promote active transportation, transit efficiency, liveability and improve public health.

Sources: Growth Plan for the Greater Golden Horseshoe; York Region OP 5.6.3 and New Community Guidelines (criterion CC2 refers to 20 residential units per hectare and 70 residents and jobs per hectare as the required target in new greenfield areas); Emerald Hills Performance Assessment.

Built Environment - Compact Development – Floor area ratio/Floor space index

Rationale: Municipal official plans include land use designations and density schedules that apply to existing urban areas to achieve municipal growth management strategies with attention to placemaking, built form and urban design.

Built Environment - Compact Development – Location efficiency

Rationale: Promote multi-modal transportation choices and reduced vehicle use.

Sources: Emerald Hills Performance Assessment; LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – NPD Credit 3.

Built Environment - Land Use Mix and Diversity - Proximity to amenities

Rationale: Recognize sites with good community connections to services and/or promote services to encourage compact communities and multi-modal transportation options. Recognizes a fine grain mix of uses as promoted in municipal official plans. The metric and targets are adapted from the point scoring system used in LEED ND.

Sources: LEED Canada 2009 for New Construction, SS Credit 2; LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) - SLL Credit 3; VOP 2010 Policy 4.2.2.14 (“To encourage the provision of transit service within 500 metres of at least 90% of residences and the majority of jobs, and consistent with approved YRT service standards and guidelines and within 200 metres of at least 50% of residents in the *urban area*.”)

Built Environment – Site Accessibility – Universal design

Rationale: Improve accessibility for people of diverse abilities.

Built Environment – Green Buildings – Third-party certification

Rationale: Recognize appropriate independent third-party certification systems incorporated into development proposals.

Sources: LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – Green Infrastructure and Buildings (GIB) Prerequisite 1.

Built Environment - Housing Mix - Design for life cycle housing

Rationale: Enable residents from a wide range of economic levels, household sizes, and age groups to live in a community.

Sources: LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – NPD Credit 4; VOP 2010 policy 2.1.3.2.j.

Built Environment – Landscape and Street Tree Planting/Preservation

Rationale: As part of the urban forest, street trees provide a range of ecosystem services including: cleaning air; intercepting rainfall that helps to mediate storm flows; evaporative cooling and summer shade to reduce building cooling loads; wind breaks; and carbon sequestration. As community amenities, street trees promote active transportation by providing a more walkable pedestrian environment.

Sources: LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – NPD Credit 14.

Built Environment - Community Form - Community and neighbourhood scale

Rationale: 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.

Sources: York Region OP policy 5.6.5, policy 4.4.1, and York Region New Community Guidelines (criterion CC5).

Built Environment – Natural Heritage/Natural Green Space – Proximity/connection to natural heritage/green space

Rationale: The human health and amenity benefits of proximity to nature and green spaces have been documented in peer-reviewed journals (e.g. Sullivan, Kuo and DePooter, 2004; Faber-Taylor and Kuo, 2001).

Sources: VOP 2010 policy 7.3.1.2 c (Neighbourhood Parks should generally be located within a 10-minute walk of the majority of the community served); Sustainable Sites Initiative: Guidelines and Performance Benchmarks, 2009, Credit 6.7.

Built Environment – Parking

Rationale: Encourage active transportation, promote efficient use of developable land, discourage the location of parking in front of buildings in order to support on-street retail and pedestrianization, and minimize the adverse environmental impacts of parking facilities.

Sources: LEED Canada 2009 for New Construction, SS Credit 4.4; LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) - NPD Credit 5.

Built Environment – Pedestrian Connections – Traffic calming

Rationale: Provide walkable streets to encourage active transportation.

Sources: LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – NPD Credit 1; Gilbert and Obrien. 2009. Child- and Youth-Friendly Land-Use And Transport Planning Guidelines for Ontario, Version 2.

(<http://www.kidsonthemove.ca/uploads/Guidelines%20Ontario%20v2.7.pdf>)

Built Environment – Pedestrian Connections – School proximity to transit routes and bikeways

Rationale: Promote walking and cycling to schools and reduce traffic congestion at school sites.

Sources: LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – NPD Credit 15; Forum: School Siting and School Site Design for a Healthy Community, 2012, City of Hamilton Public Health Services.

Built Environment – Pedestrian Connections - Proximity to schools

Rationale: Promote schools as community hubs and support students' health by encouraging walking and bicycling to school.

Sources: LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – NPD Credit 15; Forum: School Siting and School Site Design for a Healthy Community, 2012.

Built Environment - Cultural Heritage Resources – Cultural Heritage Conservation

Rationale: Support municipal Official Plan policies to recognize and conserve cultural heritage resources, including heritage buildings and structures, Cultural Heritage Landscapes, and other cultural heritage resources.

Sources: Cultural Heritage Conservation policies under provincial legislation (i.e. the Ontario Heritage Act, Planning Act and PPS, etc), Standards and Guidelines for Historic Places, municipal Official Plan, municipal bylaws, Municipal Register of Cultural Heritage Resources and/or Municipal Heritage Inventory.

Built Environment – Tree Canopy

Rationale: Enhance the urban forest and provision ecosystem services including: cleaning air; intercepting rainfall that helps to mediate storm flows; evaporative cooling and summer shade to reduce building cooling loads; wind breaks; and carbon sequestration. As community amenities, street trees promote active transportation by providing a more walkable pedestrian environment.

Sources: LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – NPD Credit 14.

Mobility – Site Permeability - Connectivity

Rationale: Encourage walking and transit use.

Source: Toronto Green Standard Tier 1 requirement (Pedestrian Infrastructure).

Mobility - Street Networks/Blocks - Block perimeter/length

Rationale: Blocks of dwelling units with a perimeter less than 550 metres promote connectivity of neighbourhoods, allows pedestrians to choose between a variety of routes to their destination, and should be flexible to accommodate both residential and commercial lot sizes.

Sources: Pickering Sustainable Development Guidelines (criterion 6.6); East Gwillimbury “Thinking Green” Item 3.

Mobility - Street Networks/Blocks – Intersection density

Rationale: Promote well-connected street networks that allow for multiple active transportation routes through the neighbourhood, and reduces traffic through alternative vehicular routes.

Sources: Pickering Sustainable Development Guidelines (criterion 6.5); Neptis Foundation “Shaping the Toronto Region” report (see Figure 35).

References:

Taylor, Z.T and von Nostrand, J. 2008. Shaping the Toronto region past, present and future: an exploration of potential effectiveness of changes to planning policies governing greenfield land development in the Greater Golden Horseshoe. Neptis Foundation. 198 pp

Mobility – Transit Supportive - Distance to public transit

Rationale: Support alternative transportation modes to vehicle use.

Sources: LEED Canada 2009 for New Construction, SS Credit 4.1; Pickering Sustainable Development Guidelines (criterion 6.10).

Mobility – Active Transportation

Rationale: Promote alternative modes of transportation and support public health.

Sources: LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – SLL Credit 4 (Bicycle Network and Storage).

Mobility – Walkability - Promote walkable streets

Rationale: Promote walking and other forms of active transportation by providing safe and comfortable street environments.

Sources: Pickering Sustainable Development Guidelines criterion 7.2; LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – NPD Credit 1 (Walkable Streets).

Natural Environment and Open Space - Parks

Rationale: Support park design policies in municipal official plans.

Sources: Municipal Official Plans; LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – NPD Credit 9 (Access to Civic and Public Square).

Natural Environment and Open Space – Stormwater – Stormwater quantity

Rationale: Implement a treatment-train approach to stormwater management that emphasizes source controls and conveyance controls to promote infiltration, evaporation, and/or re-use of rainwater. The objective is to maintain stream flows and thermal regimes within natural ranges of variation.

Sources: TRCA Stormwater Management Criteria (2012); MOE Stormwater Management Practices Planning and Design Manual; TGS Tier I and Tier II; LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – Green Infrastructure and Buildings Credit 8 (Stormwater Management).

Natural Environment and Open Space – Stormwater – Stormwater quality

Rationale: Protect receiving water bodies from the water quality degradation that may result from development and urbanization (TRCA 2012).

Sources: Stormwater Management Criteria (TRCA 2012) (http://www.sustainabletechnologies.ca/Portals/_Rainbow/Documents/72d1cb7b-eea6-4582-8e9e-87e668af62d5.pdf); Toronto Green Standard (Stormwater Quality – Stormwater Run-off).

Natural Environment and Open Space – Stormwater – Rainwater re-use

Rationale: Reduce potable water use.

Sources: Toronto Green Standard (Water Efficiency); York Region Official Plan (policy 5.2.32).

Natural Environment and Open Space – Stormwater – Stormwater architecture/features

Rationale: Naturalize stormwater management facilities to enhance the municipal natural heritage system and integrate into the open space system as visually and physically accessible amenities.

Sources: The Sustainable Sites Initiative: Guidelines and Performance Benchmarks, 2009 (Credit 3.7)

Natural Environment and Open Space – Urban Agriculture – Dedicate land for local food production

Rationale: Promote community-based food production and provide alternative passive recreational uses.

Sources: LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – NPD Credit 13.

Natural Environment and Open Space – Natural Heritage System – Natural heritage system enhancements

Rationale: Improve natural heritage system function with respect to wildlife habitat and/or ecological functions, including ecosystem services.

Sources: Municipal natural heritage system plans.

Explanatory Note: Point allocation has not yet been defined for different types natural heritage system enhancements. This metric will be the subject of ongoing research.

Natural Environment and Open Space – Soils and Topography – Restore and enhance soils

Rationale: Limit disturbance of healthy soil to: protect soil horizons and maintain soil structure; support biological communities (above-ground and below-ground); minimize runoff and maximize water holding capacity; improve biological decomposition of pollutants; and moderate peak stream flows and temperatures.

Sources: The Sustainable Sites Initiative: Guidelines and Performance Benchmarks, 2009; Low Impact Development Stormwater Management Planning and Design Guide (CVC and TRCA 2010); Preserving and Restoring Healthy Soil: Best Practices for Urban Construction (TRCA 2012).

References:

The Sustainable Sites Initiative: Guidelines and Performance Benchmarks, 2009
(http://www.sustainablesites.org/report/Guidelines%20and%20Performance%20Benchmarks_2009.pdf)

Infrastructure and Buildings – Energy Conservation – Solar readiness

Rationale: Encourage on-site renewable energy generation and/or solar thermal strategies.

Sources: LEED NC EA Credit 2; York Region Official Plan (policy 5.2.26).

Infrastructure and Buildings - Energy Conservation – Passive solar alignment

Rationale: Promote energy efficiency by creating the conditions for the use of passive solar design as well as solar photovoltaic and/or solar thermal strategies.

Sources: LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – GIB Credit 10.

Infrastructure and Buildings - Energy Conservation – Building energy efficiency

Rationale: Reduce energy use and greenhouse gas emissions with consequent reductions in air, water, and land pollution and adverse environmental effects from energy production and consumption.

Sources: Toronto Green Standard (Minimum Energy Performance); LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – GIB Prerequisite 2 and Credit 2.

Infrastructure and Buildings - Energy Conservation – District energy viability

Rationale: District energy systems can provide more efficient heating and cooling for residential and commercial customers (providing there is density of development). This aids governments in reaching reduction targets for greenhouse gas emissions while also benefitting customers in reduced ongoing energy expenses and reduced one-time first costs for mechanical equipment.

Sources: Canadian District Energy Association (Web site, <https://www.cdea.ca/faq/what-are-main-advantages-district-energy>); York Region Official Plan (policy 5.6.10 regarding community energy planning); LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – GIB Credit 12.

Infrastructure and Buildings – Potable Water - Reduce Potable Water Used for Irrigation

Rationale: Promote water use efficiency.

Sources: Toronto Green Standard (Water Efficiency); York Region Official Plan (policy 5.2.31); LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – GIB Credit 4; LEED Canada 2009 for New Construction, WE Prerequisite 1.

Infrastructure and Buildings – Potable Water – Water conserving fixtures

Rationale: Promote water use efficiency.

Sources: Toronto Green Standard (Water Efficiency); York Region Official Plan (policy 5.2.21 and 5.2.23); LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – GIB Credit 3; LEED Canada 2009 for New Construction, WE Credit 1.

Infrastructure and Buildings – Lighting - Parking Garage Lighting

Rationale: Reduce energy use while providing safe environments.

Infrastructure and Buildings - Lighting - Reduce light pollution

Rationale: Reduce nighttime glare and light trespass from the building and the site

Sources: Toronto Green Standard (Light Pollution Tier I and Tier II); LEED Canada 2009 for New Construction, SS Credit 8.

Infrastructure and Buildings - Lighting – Energy conserving lighting

Rationale: Reduce energy use while providing safe environments.

Infrastructure and Buildings - Bird-Friendly Design

Rationale: Ensure that design features minimize the risk for migratory bird collisions.

Sources: Toronto Green Standard

Infrastructure and Buildings - Materials and Solid Waste Management - Recycled/Reclaimed Materials

Rationale: Reduce the adverse environmental effects of extracting and processing virgin materials.

Sources: LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – GIB Credit 15 (LEED ND credit 15 refers to a mix of recycled and reclaimed materials exceeding 50% of the mass of new infrastructure); Toronto Green Standard (Use of Recycled Materials); The Sustainable Sites Initiative: Guidelines and Performance Benchmarks – Credit 5.4 and 5.5.

Infrastructure and Buildings - Materials and Solid Waste Management – Solid Waste

Rationale: Promote waste reduction and diversion of materials from landfills.

Sources: LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – GIB Credit 16; Toronto Green Standard (Storage and Collection of Recycling and Organic Waste); City of Vaughan Waste Collection Standards and Waste Collection By-Law 217-210.

Infrastructure and Buildings - Materials and Solid Waste Management- Material re-use and recycled content

Rationale: Reduce demand for new materials and promote diversion of materials from landfills.

Sources: Toronto Green Standard (Reuse of Building Materials); The Sustainable Sites Initiative: Guidelines and Performance Benchmarks – Credit 5.4 and 5.5.

Infrastructure and Buildings - Heat Island – Reduce heat island effects

Rationale: Reduce ambient surface temperatures, and provide shade for human health and comfort.

Sources: Toronto Green Standard (Urban Heat Island Reduction: At Grade and Roof); LEED Canada 2009 for New Construction – SS Credit 7.1 and 7.2; LEED 2009 for Neighbourhood Development with Canadian Alternative Compliance Paths (2011) – GIB Credit 9.

APPENDIX C - Sustainability Metrics Log

The following metrics log attempts to summarize the major revisions to the sustainability metrics based on the private and public sector workshops and feedback.

June 04, 2013 –Revisions from TAT meeting

Log#	Metric	Revisions / Additions / Deletions	Changes applied to:
1	Buildings Design/Certified to Green Standards	Revise Aspirational Target – only applicable to sites with 5 or more buildings	Site Metrics
2	Life Cycle Housing	Revised metric to remove “renters” reference and delete 1 or 2 bedroom reference for Block and Draft metrics	Site, Block and Draft Metrics
3	Connection to Natural Heritage	Revise metric to include a “Visual and physical connection are provided to natural heritage system”	Site, Block and Draft Metrics

May 11, 2013 – Comments and Revisions from BILD Workshop

Log#	Metric	Revisions / Additions / Deletions	Changes applied to:
1	Carpooling and Efficient Vehicle Parking	Minimal and Aspirational metrics to include “and/or”	Site Metrics
2	Park Accessibility	<p>Revise metrics for Recommended Minimum: A minimum of two parks of any type (i.e. urban square, parkette, neighbourhood park, community park, etc...) are included in the development plan. Provide <u>2 or more road frontages for each urban square, parkette, and neighbourhood park provided and 3 road frontages for each community park provided.</u></p> <p><u>Aspirational Metric:</u> More than 2 parks are included in the development plan. Provide 3 or more road frontages for all parks provided.</p>	Site, Block and Draft Metrics
3	Stormwater Quantify	<p>Revise Mandatory Metric: Retain runoff volume from the 5mm rainfall event on site. Provide quantity or flood control <u>control</u> in accordance with applicable Municipal and TRCA <u>TRCA conservation authority</u> requirements.</p>	Site, Block and Draft Metrics
4	Restore and Enhance Soils	<p>Revise Aspirational Metric: Development on highly permeable soils is avoided following TRCA and CVC Low Impact Development Stormwater Management Planning and Design Guide. <u>(2 POINTS)</u> For all areas to be revegetated, restore soils disturbed by previous development and soils disturbed during construction, including restoring micro topography variation. (2 POINTS) <u>In addition to implementing the</u></p>	Site, Block and Draft Metrics

		<u>recommendations of the Topsoil Fertility Test, a minimum topsoil depth of 200m is provided across the entire site.(2 POINTS)</u>	
5	General	Overall structure Decided to separate Private and public sector metrics. Developers will only be evaluated based on private sector score.	Site, Block and Draft Metrics

April 22, 2013 – Revisions from Municipal Working Sessions

Log#	Metric	Revisions / Additions / Deletions	Changes applied to:
1	General	Delete Building Metrics. Considered too specific	
2	Persons and Job per hectare	Delete Aspirational target. Mandatory target reworked to include reference to OP. Only applies to Greenfields	Block and Draft Plan
3	Location Efficiency	Revise Recommended Minimum metric to reference existing or planned transit corridors. Only applies to Greenfields	Block and Draft Plan
4	Proximity to Schools	Revised Minimum and Aspirational metrics to include public/private/montessori schools.	Site, Block and Draft Metrics
5	Parks	Decided that park metrics weren't working. Park metrics should be collapsed into an accessibility metric	Site, Block and Draft Metrics
6	Proximity to Amenities	Language revision. "Principle Amenities" changed to "Basic Amenities" and "Basic Amenities" changed to "Lifestyle Amenities". Metric only applies to Greenfields and Intensification	Site, Block and Draft Plan
7	Jobs/Resident	Delete Metric	Site Plan
8	Materials Management	Delete material management metrics (i.e. recycled / reclaimed materials)	Block and Draft Plan
9	Soils and Topography	Revise metric title to "Soils Quantify and Quality"	Site, Block and Draft Plan

November 8, 2012 – Revisions from Municipal Workshop #2

(highlighted cells are proposed metrics that are still under review but haven't been included in the list of draft sustainable performance metrics)

Log#	Metric	Revisions / Additions / Deletions	Changes applied to:
1	Stormwater Quantity	Revise metric <ul style="list-style-type: none"> • Mandatory target: 5mm event • Minimum target: 15mm event • Aspirational target: 25mm event (to be confirmed/informed by TRCA) 	Community and Site Metric
2	Stormwater Temperature	Add metric <ul style="list-style-type: none"> • To be informed by TRCA 	Community and Site Metrics
3	Energy efficiency	Revise metric <ul style="list-style-type: none"> • Mandatory target: 25% better than MNECB • Minimum target: 35% better than MNECB • Aspirational target: 45% better Additional points awarded up to 75% energy savings	Site/Building metrics
4	Grey water re-use	Add metric <ul style="list-style-type: none"> • Minimum: grey water readiness (same as rainwater readiness metric) • Aspirational: Grey water re-used on site for low grade functions (toilet flushing, irrigation) 	Site/Building Metrics
5	Walkability	<ul style="list-style-type: none"> • Aspirational: provide pedestrian amenities to further encourage walkable streets. "Pedestrian amenities" include: shelter from rain, wind breaks, shade, seating, etc... 	Community and Site Metrics
6	Parking	Add metric <ul style="list-style-type: none"> • Aspirational (CRI only) Paid parking is included for commercial, retail, 	Site/Building metrics

		institutional parking lots	
7	Speed control	<p>Revise metric</p> <ul style="list-style-type: none"> Remove reference to speed bumps Include “ use good road design strategies to reduce vehicular speeds. Supplemental measures can also include the traffic calming strategies listed” 	Community and Site metrics
8	Cycling Infrastructure	<p>Add metric</p> <ul style="list-style-type: none"> Minimum: Adopt dedicated bike lanes on streets with high traffic volume and speeds greater than 40km/hr Aspirational: Adopt dedicated and protected bike lanes on streets with high traffic volumes and speeds that exceed 40km/hr. Protected bike lane strategies include: Buffered lanes and floating parking (recommended by Portland 2030 bicycle plan, adopted in NYC), bollards or posts (used in Montreal), extruded curbs, raised lanes (preferred in Germany), etc... 	Community and Site metrics
9	Speed Control	Renamed metric to traffic calming	Community and Site metrics
10	% Tree canopy	Tree growth extended from 5 years to 10 – based on LEED ND precedent	Community and Site metrics
11	Stormwater re-use	Deleted	Community metrics
12	Existing Building Re-use	Expanded minimum target. Revised thresholds to 5%/10% (min) and 10%/15% Aspirational	Community and Site metrics
13	Passive solar alignment	Revised language	Community metrics
14	Intersection density	Revised targets based on municipal direction	Community metrics
15	Heat Island	Added aspirational metric 90% and 75%	Site metrics
16	Road Design Standard	Add metric: (Min) Municipality to carry out a Municipal Road Design Standard review to identify any potential sustainability opportunities	Community and Site Metrics
17	Public Transit Accessibility	Add metric: (Min) Municipality to carry out a Public	Community and Site metrics

		Transit Study to identify potential integration of public transit opportunities within the site	
18	School Accessibility	Add metric: (Min) Municipality to carry out a School Accessibility Study identify the potential opportunities to improve access to schools and synergies with active and public transit.	Community and Site metrics

Oct 26, 2012 – Revisions from Municipal feedback

Log#	Metric	Revisions / Additions / Deletions	Changes applied to:
1	Compact Development	<ul style="list-style-type: none"> Removed reference to FSI Revised to reflect Municipal OP 	Community and Site Metric
2	Location Efficiency	<p>Minimum target revised to: Greenfield Applications:</p> <ul style="list-style-type: none"> 2x the average density along transit corridors (within 200m from transit) <p>All other Applications:</p> <ul style="list-style-type: none"> Height and/or density conforms to the minimum or maximum targets established in the applicable Municipal Official Plan 	Community Metrics
3	Proximity to amenities	<p>Added site specific metric</p> <ul style="list-style-type: none"> (Minimum) If the amenities are not within the distance specified above and the site is designated as mix use, the mix of population and employment uses achieves 2:1 ratio on the site <p>(Aspirational) If the amenities are not within the distance specified above and the site is designated as mix use, the mix of population and employment uses includes major office space, an anchor commercial/retail tenant or a minimum of 3 stories of employment uses.</p>	Site Metrics
4	Soil Quality	<p>Revised metric</p> <ul style="list-style-type: none"> Provide a minimum soil volume of 30m³ per tree. The soil volumes should be based on a minimum soil depth of 0.8m and a maximum of 1.2m of high quality soil above a well drained sub soil or drainage layer. Ensure that groups of trees planted in hardscape can share soil volume, for 	Site Metrics

Sustainability Metrics Log

		example, through the use of continuous soil planters. The use of soil cells is also encouraged	
5	Proximity to natural green space	Minimum target revised. Aspirational metric maintained. <ul style="list-style-type: none"> Visual connections (such as public access blocks, single loaded roads) are provided to the natural heritage system and parks. 	Site Metrics
6	Bicycle Parking	Revised Metric <ul style="list-style-type: none"> Removed additional visitor parking requirements and provide a minimum of 5%/10 of bike parking at grade for visitors (MURBs) Added reference to shower for CRI 	Site Metrics
7	Parking Allocation	Removed prescriptive parking allocation. Replaced with % of total area	Site Metrics
8	Parking Designation	<ul style="list-style-type: none"> Revised metric to include minimum # of spots and compact cars are exempt from target 	Site Metrics
9	Safe routes to schools	Deleted metric	Community and Site Metrics
10	Proximity to natural green space	Minimum target revised. Aspirational metric maintained. <ul style="list-style-type: none"> Visual connections (such as public access blocks, single loaded roads) are provided to the natural heritage system and parks. 	Site Metrics
11	Connectivity	Revised Metric Minimum: Connect buildings on the site to off-site pedestrian paths, surface transit stops, parking areas (car and bike) or other destinations (schools) Aspirational: Provide amenities and street furniture (benches, additional bike parking, landscaping) along connections provided on the site and between the site and adjacent destinations	Site Metrics

APPENDIX C

Sustainability Metrics Log

12	Stormwater Quantity	Revised based on municipal feedback. 5mm and 15mm retention	Site Metrics
13	Stormwater Quality	Metric revised 80%/100% of Total Suspended Solids (TSS) removed from a 25mm rainfall event. Strategies should include low impact development measures such as: Stormwater ponds, oil-grit separators, bioswales, filters, treatment train approach, etc...	Site Metrics
14	Rainwater Re-use	Does not apply to single family homes	Site Metrics
15	Stormwater Features	Target moved to minimum	Site Metrics
16	Existing building reuse	Added metric At least 5% reused content in building materials and landscaping materials (hardscaping such as paving or walkways) is provided. At least 15% recycled content in building materials and landscaping materials (hardscaping such as paving or walkways).	Site Metrics
17	Solid Waste	Minimum target added. Storage and collection areas for recycling and organic waste are within or attached to the building. Aspirational target under review	Site Metrics
18	Shade/Comfort	Revised indicator to Tree Planting/reservation	Site Metrics

19	Maintain healthy trees	<p>Added metric (Minimum) Arborist Report provided that identifies and evaluates where on-site healthy mature trees will be protected or removed. Where healthy mature trees must be removed, new trees are provided on site to compensate for the lost canopy coverage of the trees removed</p> <p>(Aspirational) Healthy mature trees greater than 20 cm. DBH preserved in situ on site. Smaller healthy trees (less than 20 cm. DBH) transplanted.</p>	Site Metrics
20	Bird friendly	<p>Revised minimum target Treat glass with a density pattern between 10-28cm for the first 12m of the building above grade. Where a greenroof is constructed with adjacent glass surfaces, ensure the glass is treated 12m above greenroof surface</p> <p>Bird friendly design strategies include: window fritt, films, decals, grills, louvers, internal screens, awnings, overhangs, artwork, etc</p>	Site Metrics
21	Reduced Parking Footprint	<p>Removed reference to parking spot allocation. Replaced with: (Minimum) Use no more than 20% of the total development area for all new off-street surface parking facilities, with no surface parking lot greater than 2 acres</p> <p>(Aspirational) Locate all new off-street surface parking at the site or rear of buildings</p>	Site Metrics

Oct 12, 2012 – Revisions from TAT Conference call

Log#	Metric	Revisions / Additions / Deletions	Changes applied to:
1	Building Certification	<ul style="list-style-type: none"> Deleted minimum target as it can't be required at site plan approval. Aspiration target maintained 	Site Metrics
2	Exposure to Second Hand Smoke	<ul style="list-style-type: none"> Moved minimum target to aspirational (as it can't be required at site plan approval) 	Site Metrics
3	Parks	<ul style="list-style-type: none"> Removed reference to "Public" Parks as the indicator should be applied to accessible parks. "Accessible" definition to be included in Glossary "10-15 min" reference revised to "800m to 1200m" 	Community and Site Metrics
4	Rainwater Re-use	<ul style="list-style-type: none"> "Grey water" reference deleted in minimum target 	Community and Site Metrics
5	Stormwater Amenities	<ul style="list-style-type: none"> Indicator name created confusion. Changed to Stormwater Architecture/Features 	Site Metrics
6	Bird Friendly Design	<ul style="list-style-type: none"> Removed City of Toronto reference. Bird Friendly Design Guidelines to be defined in the Glossary 	Site Metrics

Metrics to be added:

- Stormwater Temperature – Aspirational Target. **TRCA** to inform target.
- Maintain/Preserve Healthy & Mature Trees – Minimum Target. **Halsall and Michelle** to inform target.

Metrics to be revised / expanded with Input from Team:

Community and Site Metrics

- Compact Development – FSI may not be the appropriate metric to inform density. **Michelle** to review with Richmond Hill team.
- Proximity to Natural Green Space – **Michelle** to gather additional feedback as metric benefit/applicability was questioned during the workshop.
- Parking Allocation – **Municipal teams** to circulate parking metrics/targets and ensure appropriateness for each development type
- Exposure to Second Hand Smoke – **Tony** to discuss corridor pressurization requirements under current building code
- Safe routes to schools – **Tony** to review and reevaluate metric/targets
- Cultural/Heritage – **Mike** to circulate metrics with appropriate Brampton staff to help inform metrics/targets
- Site Permeability – **Halsall/TPP** to inform appropriate targets (reference LEED/best practices)
- Walkability – Expand metrics to include pedestrian buffers, etc... (LEED ND references). **TPP** to inform
- Stormwater Quality & Quantity – **Tony** to gain feedback from TRCA. Needs to consider the various soil types/capacities
- Energy Efficiency – **Tony** to follow up with building official. What, if anything, can we advocate for the minimum energy performance?
- Solid Waste – Designate area for waste stream separation (Multi-use residential and Commercial). **Halsall** to inform.

Community Specific Metrics

- Intersection Density – **Halsall** to reference Neptus figures
- Restore and Enhance Soils – **Halsall** to include details within targets
- Enhance Biodiversity – **Tony** to help define “Enhance” and minimum/aspirational targets
- Site dedicated to Parking/car infrastructure – **Halsall/TPP** to inform (based on Emmerald Hills metrics)

October 9, 2012 – Revisions from Municipal Workshop #1

Log#	Metric	Revisions / Additions / Deletions	Changes applied to:
1	Proximity to Amenities	<ul style="list-style-type: none"> • Amenities split between basic and principal. • Amenity provided for both categories. • Principal amenities will carry a higher point allocation 	Community and Site Metrics

2	Building Certification	<ul style="list-style-type: none"> • % of buildings (no longer number of buildings) • Minimum target – designed to green standard • Aspirational target – certified to green standard 	Site Metrics
3	Universal Design	<ul style="list-style-type: none"> • “or equivalent” added for Universal Design standard • ANSI A117 Standard to be defined in Glossary • Aspirational target – increased to 30% (previous version, aspirational and minimum target were equal) 	Site Metrics
4	Universal Design – Access	<ul style="list-style-type: none"> • “emergency exits” added to minimum target • Aspirational target – 100% of all entries/exits 	Site Metrics
5	Housing Unit Mix	<ul style="list-style-type: none"> • Metric revised to include all housing mixes • Points will be allocated depending on % and diversity of housing mix (point allocation TBD) 	Community and Site Metrics
6	% Tree Canopy	<ul style="list-style-type: none"> • Minimum and Aspirational target increased from 20% and 40% to 50% and 75% • Time period of 5 years added • Drought tolerant and native added 	Community and Site Metrics
7	Soil Quality	<ul style="list-style-type: none"> • Metric added. Precedent based on LEED ND 	Site Metrics
8	Pesticide Use	<ul style="list-style-type: none"> • Removed metric. Considered a maintenance requirement, not related to design 	Site Metrics

9	Speed Control	<ul style="list-style-type: none"> Removed reference to speed limit Replaced with traffic calming strategies Traffic calming strategies defined in Glossary 	Community and Site Metrics
10	School Proximity to Transit and bikeways	<ul style="list-style-type: none"> Metric added Minimum and Aspirational target set based on workshop #1 feedback 	Community and Site Metrics
11	Safe Routes to Schools	<ul style="list-style-type: none"> Metric added 	Community and Site Metrics
12	Parks	<ul style="list-style-type: none"> Relabeled as “Public Parks” Distance changed to 400m walk (from 5min walk) Parkette distance reduced to 200m “Open Space” added to Urban Square 	Community and Site Metrics
13	Stormwater	<ul style="list-style-type: none"> Metrics simplified to focus on: Quality, Quantity, Re-Use, Amenities (site metrics only) Precedents based on TGS TIER II 	Community and Site Metrics
14	Local Food Production Dedicate Land	<ul style="list-style-type: none"> Garden space moved to Minimum target Aspirational target – Dedicate rooftop space for food production (Site metrics only) 	Community and Site Metrics
15	Local Food Distribution	<ul style="list-style-type: none"> “Non-Permanent” added “Designate land” added 	Community and Site Metrics
16	Solar Readiness	<ul style="list-style-type: none"> “100% of all” added 	Site Metrics
17	District Energy	<ul style="list-style-type: none"> “Consider connecting to a district energy system (if applicable)” added 	Site Metrics
18	Fixture Efficiency	<ul style="list-style-type: none"> Relabeled to “Water Conserving Fixtures” 	Site Metrics
19	Land Use Separation	<ul style="list-style-type: none"> Removed 	Community and Site Metrics
20	Efficient Lighting Fixtures	<ul style="list-style-type: none"> Relabeled “Energy Conserving Lighting” 	Site Metrics

Additional Site Metrics that were requested but haven't been included:

- Preserve / Enhance Wildlife Habitat
- Preserve / Enhance Wildlife Corridors
- Mental Health Amenities
- Design buildings to reflect community character
- Connection/Integration with existing land use/community
- Maintain existing healthy trees
- Bike paths leading to destination

Additional Community Metrics that were requested but haven't been included:

- Embodied Energy

Metrics that require further work/expansion

- Walkability
 - Intersection safety
 - Buffer between pedestrians and vehicles
- Cultural / Heritage Site
- Proximity to Green Space

Measuring Sustainability Performance of New Development

Sustainability Guidelines and
Sustainability Performance Metrics

Summary of the Consultations with Clean Air
Council Members and Clean Air Partnership Review

Report Prepared for the City of Brampton,
Town of Richmond Hill and City of Vaughan

July 2013

Clean Air Council Green Development Background

The Greater Toronto Area (GTA) Clean Air Council (CAC) promotes the reduction of air pollution and greenhouse gas emissions and increased awareness of regional air quality and climate change issues through the collective efforts of all levels of government. The Council identifies and promotes effective initiatives to reduce the occurrence of air pollution and greenhouse gas emissions in the GTA and their associated health risks. The Clean Air Council works on the very simple premise that if one jurisdiction undertakes a clean air/climate change action that it makes sense to share their experience and lessons learned with other jurisdictions. In this way it helps to promote and raise the bar for the implementation of actions that will lead us to lower carbon and more healthy, livable and competitive communities.

There are many benefits to a collaborative approach to addressing air quality and climate change issues. Having multiple jurisdictions at the same table enhances networking and the exchange of resources and information. It ensures that no one group is working in isolation and that efforts are not unnecessarily duplicated. Inter-governmental and inter-regional cooperation also provides an opportunity to leverage scarce resources for research, outreach and other air quality improvement initiatives. Bringing together multiple staff from different departments and municipalities across the airshed also helps break down silos that may exist within and amongst municipalities, and increases cooperation on air quality and climate change issues.

The work plan for the Clean Air Council is determined by each member identifying their highest priority clean air and climate change actions; and where there is general commonality on priorities across the region, those actions are identified for collaboration via the [Inter-governmental Declaration on Clean Air and Climate Change](#).

Corporate and Community Green Development Standards have been consistently identified as a high priority area. In order to facilitate collaboration and information exchange the Clean Air Partnership, as secretariat for the Clean Air Council, undertook a Green Development Scan documenting the various green development incentives, checklists and standards across the region; and coordinated a Green Development Community of Practice to increase sharing of experiences, lessons learned and collaboration on next steps. Through the Community of Practice, representatives identified the setting of green development standards and increasing greater consistency in standards across the region as a priority area of focus. Not only would this simplify the process for municipalities, but it would also serve to address developer's requests for simplification and consistency. In addition, greater consistency across the region would be much more effective at developing and fostering the green development market.

The collaboration between the City of Brampton, City of Vaughan and Town of Richmond Hill is an excellent example of how this goal of regional consistency can move forward. The Clean Air Partnership applauds the efforts of the above jurisdictions in moving towards the goal of increasing the construction of green developments and testing greater regional consistency in order to increase developer uptake and green construction market transformation.

Clean Air Partnership and Clean Air Council Activities in the Measuring Sustainability Performance of New Developments Project

Below is a summary of the activities undertaken by the Clean Air Partnership to provide input on metrics development and facilitate the Clean Air Council peer review of the Sustainability Guidelines and Sustainability Performance Metrics and discuss possible options for implementation.

The Clean Air Partnership attended a number of meetings with the Measuring Sustainable Performance of New Developments Project Team, participated in the municipal consultations undertaken by Vaughan, Brampton and Richmond Hill and provided input into metric development.

Following the development of the draft sustainability metrics, Measuring Sustainability Performance of New Developments Project municipal staff presented on the project and the metrics to Clean Air Council members in January of 2013 and again in April 2013.

Below is a summary of the Clean Air Council feedback and discussions:

- There are a number of municipalities that have developed green development incentives (usually in the form of development fee rebates), but the uptake from developers has not been significant.
- The incentive that has been found to increase interest and uptake of green development measures from developers has been the prioritization of application reviews.
- There has been significant interest expressed on the part of developers to have greater consistency on green development standards across the region.
- There are significant benefits to ensuring the consistency of information requested of developers by municipalities in the development application process and the dynamic tool being developed by this project may be able to simplify the application for developers and the review of the applications by municipal planning staff.
- It was recognized that there is a rationale for green development policies to begin at a voluntary level in order to build support and buy in from the development community. However, in order to see significant market transformation, mandatory green development standards are likely required. Incentives can be used to encourage developers to meet a specified higher green development level and prioritization of application review was recognized as an effective incentive.
- The need for flexibility in order to reach the green development levels was highlighted and that the focus should be on achieving goals as opposed to any specific technology. It is the outcome that is important, not necessarily how the outcome is achieved.
- While a municipality is limited in requiring developers to achieve greater building energy performance than those set out in the Ontario Building Code requirement, the

municipality does however have significant opportunities to set standards for site planning features around the building site that would require the incorporation of green development to a set standard that could achieve sustainability priorities.

- There was some discussion on the possible challenges to providing preferential treatment for certain development applications over others. The discussion centered on the recognition that the preferential treatment is available to all applications and all that is required is for an application to meet a certain green development standard. This opportunity is available to all applications. In addition, all applications are required to be reviewed within a set time frame, and as such, applications that do not meet the green development standard set for priority review are not penalized as the required time frame is being adhered to.
- It was noted that additional staff would likely be required to practically implement the incentive of expedited development application review.
- It is very important that the information developers are required to provide (application forms, support tools, etc) in order to determine their green development level be made available to them well in advance of the application submission.
- From the experiences of other jurisdictions that have instituted green development policies/standards, it is essential that all planning staff are trained on the various metrics and their rationale, so that they are able to communicate these metrics to development applicants. This training has been effective in increasing the number and quality of green development applications.
- Other CAC jurisdictions are keenly interested in the Richmond Hill, Brampton and Vaughan green development process and its associated outcomes and results. The approval of a consistent set of Green Development metrics and standards across these three jurisdictions will increase the likelihood of the transfer of those metrics and standards to other jurisdictions.

Green Development Best Practices

Based on the above consultations and research undertaken by CAP on the lessons learned and best practices from other jurisdictions' implementation of green development standards, CAP would like to provide the Measuring Sustainability Performance of New Developments Project Team with the following suggested best practices:

- Green development standards serve as an effective mechanism to achieve municipal sustainability priorities and the implementation of a variety of environmental, liveability and sustainability goals identified in various municipal official, strategic, sustainability and/or clean air climate change plans.
- Monitoring and reporting of the implementation and effectiveness of green development standards is a key component of any green development program and is instrumental in ensuring a feedback loop that will enable increased effectiveness of the green development standards to be achieved over time.

- A voluntary period for a green development standard is common in order to ensure appropriate time for the development community to become familiar with the expectations and submission requirements. Most effective green development standards, however, move into a mandatory level and then provide the opportunity for an additional level of green development via the provision of an incentive often in the form of development fee rebates or application review prioritization. Green development policies that remain voluntary are often unable to achieve significant developer uptake.
- Training of municipal staff on green development standards is instrumental in ensuring effective communication of the standards to developers. In addition, early communication with development applicants was a key factor in ensuring the likelihood of additional green development features being incorporated into development applications.
- Periodic reviews of the green development standard and stakeholder consultations is invaluable in refining the standard, identifying new market opportunities, documenting lessons learned and achieving greater buy-in and market transformation.
- A municipal inter-departmental green development team made up from a variety of municipal departments is an effective mechanism to ensure the inclusion of identified municipal sustainability drivers into the green development standard. Ongoing reviews of the standard from the inter-departmental team can ensure a more comprehensive identification of emerging sustainability drivers and green development market opportunities.
- Municipal green development standards can serve an effective role in fostering and encouraging green economic opportunities. Municipal economic development departments should be part of the green development inter-departmental team in order to identify opportunities to achieve synergies between green policies and economic development opportunities.
- A green development standard combined with a voluntary green development level can serve as an effective way to move the market in a way that ensures a level playing field, while still providing a mechanism to foster green competition. Developers that have already started to develop green measures expressed interest in being rewarded for their actions and want opportunities to maintain their competitive advantage. The combination of a mandatory standard and an additional higher voluntary level enables the standard to be set at a level that is high enough to push the development industry to improve, while allowing for green competition between developers; as this is what often spurs innovation and continuing improvement in sustainability performance.

Next Steps

While there is an excellent opportunity for municipalities to influence the inclusion of green features into new developments via the development reviews and approvals process, there is also the need to address the green development needs of the retrofit market (by far the vast majority of the building stock in the region). With the recent changes to the Ontario Municipal

Act allowing for local improvement charges (LIC) to be applied to energy efficiency upgrades on private properties, there is now a structure in place that enables municipalities in Ontario to develop community energy efficiency retrofit programs. CAP is working with the Clean Air Council and other Ontario municipalities via the Collaboration on Home Energy Efficiency Retrofits in Ontario (CHEERIO). The overall goal of this project is to collaboratively design a high-quality, multi-municipality pilot that will: a) assess the effectiveness of the LIC financing powers in accelerating deep residential energy retrofits; and b) provide insights and guidance regarding full-scale implementation. The priority focus will be on the residential sector in Ontario, both single-family and multi-unit.

Regional consistency in green development standards is a goal that any region should set for itself. Each municipality in a region should be aware of the standards that are in place within their region, and should identify opportunities to find a balance between alignment and consistency across the region, while ensuring local sustainability drivers are prioritized. As such, CAP would like to congratulate the City of Vaughan, City of Brampton and the Town of Richmond Hill on their efforts towards this goal. CAP commends the effort these jurisdictions are dedicating to reaching out to other regional jurisdictions and sharing their resources, expertise and lessons learned.

The members of the Clean Air Council have indicated that they would like to set up consultations with a number of departments within their jurisdictions and with other municipalities across the region to gather input on the metrics and their transferability across the region. CAP will be coordinating these consultations between September and November 2013.

CAP is pleased to be working with these jurisdictions towards the goal of ensuring greater uptake of green development metrics across the Greater Toronto, Hamilton and Southwestern Ontario area. The ability to transform the market and develop a green development economic base in the region will be greatly enhanced by the regional expansion of green development standards. Increased consistency will ensure a level playing field across markets and will also be more effective at moving the market towards green development opportunities and fostering a green development economic base.

Measuring Sustainability Performance of New Development

Sustainability Performance Metrics

Toronto and Region Conservation Authority
Peer Review Report

Prepared for the City of Brampton,
Town of Richmond Hill and City of Vaughan

July 2013

Toronto and Region Conservation Authority (TRCA) – The Living City

The Living City is TRCA’s vision for a healthy, attractive, sustainable urban region prospering into the next century. Its foundation is the traditional conservation authority mandate, adapted for the distinct needs of an urbanizing city-region. TRCA agrees with the assertion by the United Nations that the future of the planet will be determined in rapidly expanding city-regions, such as our own Greater Toronto Area (GTA). We believe that the future of our region depends on decisive action now to change unsustainable practices, both individual and corporate, and to find creative new ways of city building and of living in our rapidly growing urban region.

TRCA works from the perspective that natural processes contribute to the physical form of cities and neighbourhoods; and that the development of urban areas influences and affects the health and ecological integrity of natural systems – that cities are part of, not separate from, nature. TRCA’s quest for sustainable development, through building The Living City, seeks to reconnect human and natural environment objectives by working in partnership with the community.

The collaboration between the City of Brampton, Town of Richmond Hill and City of Vaughan, to integrate Sustainability Performance Metrics in the development review process, is consistent with TRCA’s Living City approach to sustainable development. TRCA’s engagement in the project and peer review comments are set within the context of the Living City principles.

TRCA Activities in the Measuring Sustainability Performance of New Developments Project

Below is a summary of the activities undertaken by the TRCA to provide input on metrics development and facilitate the TRCA peer review of the Sustainability Performance Metrics.

The TRCA attended and provided input into metric development at the municipal workshops held on September 25, 2012 and November 7, 2012 led by the Planning Partnership and Halsall Associates as part of the metrics testing and evaluation component of the project. A special half-day working session was organized by TRCA with the municipal partners on January 8, 2013 to review the consulting team’s Interim Report in advance of issuing the Draft Comprehensive Report for public comment. TRCA issued comments on January 31, 2013 following the special working session. TRCA subsequently provided comments during the public comment period in May 2013 and to specifically address comments provided by BILD.

TRCA also recognizes that the municipal partners prepared a companion report to forecast energy use to 2031 based on build-out forecasts in the municipal official plans. TRCA welcomes the use of the “Getting to Carbon Neutral” toolkit in preparing the energy use forecast. This toolkit was prepared by the Sustainable Infrastructure Group and is available at <http://www.trca.on.ca/dotAsset/81361.pdf>.

TRCA Comments – January 31, 2013

TRCA issued the following comments on January 31, 2013. The municipal partners provided the consulting team with an interpretation of the comments below to integrate into the Sustainability Performance Metrics and comments that require further consideration during the implementation of the metrics in the development review process.

- The metrics that are chosen should be applicable at each scale or have surrogates that operate at each scale. There also needs to be an explanation or description of the rationale as to why the metric was chosen, what desirable outcome it relates to, as well as a description of how the metrics (or their surrogates) relate to each other across scales.
- It would be very useful to include examples of the application of the metrics at a variety of scales and how the results are interpreted.
- The metrics presented appear to be at different stages of development and use. It may be worthwhile placing the metrics into groups; those that are well developed and being applied elsewhere (good precedent); those that are relatively new, aren't being widely applied and may need further validation; a third category of metrics that are under development or examination; the fourth category would be more an identification of gaps in the metrics where research is needed to identify and develop an applicable metric.
- It would be useful to have a write up/discussion for each metric or combination of related metrics (one at each scale) that justifies its use, the precedent, what it is meant to measure and why that is important. In addition it should outline the thresholds, the origin and the rationale for each.
- The language around thresholds needs to be clearer. Mandatory needs to be a legislated (regulated or policy) threshold. The term minimum could be substituted with the term Recommended or Recommended Minimum. In implementation you may want to tie this threshold to an incentive. The last threshold should use a term that provides a degree of recognition that the developer could use in marketing, something like platinum, just as an example. This threshold could also be linked to an incentive.
- There was a question of whether FSI is a good measure of compact development at the site plan scale. At the site plan scale it may be more appropriate to look at percent lot coverage metric.
- Natural heritage system needs to be listed as a key amenity where there is proximity metric.
- There needs to be an adaptation of the distances used in the proximity to primary and secondary amenities to make sure they are applicable to our region.
- The Green Building Metric requires more thought. The location of the site plan will have a bearing on the size of the threshold. For example an urban growth centre with only 1 green building would be a failure not an aspirational target. Whereas in a rural setting or an urban setting that is only developing or redeveloping a small site, a single green building (independently certified) should be recognized.
- There are a number of issues with the Tree Planting/Preservation indicator and associated metrics. There needs to be a distinction made between those trees within the developable area versus the natural heritage system. There would need to be a modeling exercise at the site plan

stage to project what the canopy cover would be 10 years after development. We shouldn't be specifying drought tolerant or native but rather trees should be from a pre-approved list. Compensation for lost of existing trees is problematic on site and there would need to be designated sites outside of the development area for this. It may be worthwhile to look at including some form of tree diversity metric for trees within the developable area.

- The Region of York is currently undertaking a project entitled "Innovative and Sustainable Development Approvals Pilot Project ". The project team should contact Tara Clayton (project manager from the Region of York) to ensure coordination of these two initiatives. There is overlap between the two projects related to stormwater management, water efficiency, green buildings, and other sustainability metrics.
- The report mentions mandatory, minimum and aspirational targets to be established. The tables in the appendices do not include the mandatory targets. A separate table of mandatory requirements should be developed. The definition of "minimum" targets is "doing better than you need to". I recommend that the word "minimum" be changed to something different. Minimum implies mandatory and therefore this title is confusing. A number of the targets mentioned in the appendices (summary tables) don't include actual numbers. All targets should include quantitative targets otherwise they should be identified as an objective not a target.
- In reference to the Site Metrics summary table. The Soil Quality metric for the Tree Planting/Preservation indicator should be renamed "Soil Quantity and Quality". The wording for the minimum target should be changed to, "Pits, trenches or planting beds should have a topsoil layer with an organic matter content of 10 to 15 % by dry weight and a pH of 6.0 to 8.0. The topsoil layer should have a minimum depth of 60 cm. The subsoil should have a total uncompacted soil depth of 90 cm. Minimum soil volume of 30 cubic metres per tree."
- In reference to the Stormwater Quantity metric, the 5 mm rainfall runoff criteria should be listed as the mandatory target. TRCA's Stormwater Management Criteria Document, August 2012, should be listed as the precedent document for this criterion. I recommend that the minimum target be set as the 10 mm rainfall runoff criteria. A statement should be added that indicates that "Post to Pre Peak Flow Control for Flood Control is required as per TRCA requirements. See TRCA SWM Criteria Document". As discussed at the workshop on January 8, 2013, the following words should be added to this metric under Minimum Target: "All areas to be landscaped where soil or vegetation has been disturbed should have at least 20 cm of topsoil containing 5 to 15 % organic matter , a total uncompacted soil depth of at least 30 cm and a soil pH of 6.0 to 8.0". The precedent for this criteria is the "Preserving and Restoring Healthy Soils: Best Practices Guide for Urban Construction" document.
- Cultural/Natural Heritage indicator under built environment should be revised to read Cultural Heritage.
- The Proximity to Natural Green Space metric should be related to sight lines to the natural heritage system. The purpose would be to encourage "spurs" of the natural heritage system that extend into the developed area.
- The enhancing biodiversity metric is too narrow. It is a very difficult thing to measure and we need a set of surrogates that together provide a picture of biodiversity. For example, we should

be looking at a point system that would encourage the positioning of parks, stormwater/LID or other compatible land uses next to the natural heritage system. The concept is to use LID, parks and other fingers of green to reduce the matrix impact on the natural heritage system and they act as a transition/continuum from the built environment to the Natural Heritage System. This approach could be part of the aspirational target. In addition, less severing (crossings) of the natural heritage system could also be awarded points. Adding trails to the natural heritage system and the fingers of green and connecting the natural heritage system into the surrounding community could be a metric in the mobility or active transportation section. There may be an opportunity to have a separate meeting of TRCA staff to scope out this type of approach.

- The stormwater facilities should be encouraged to be outside/avoid the natural heritage system and there should be a metric or points system to support this position.
- Water temperature and nutrient loading should be included as part of the stormwater quality metric.
- Rainwater reuse may not need to be done everywhere. This may be more appropriate under an option under stormwater quantity.
- Enhancements to the aquatic system should be identified as a potential enhancement to the Natural Heritage System.
- In terms of urban agriculture there should be some mention of private enterprise utilizing some of the land allocation not just local residents.

TRCA Comments – June 24, 2013

TRCA issued subsequent comments on June 24, 2013 after reviewing the Draft Comprehensive Report made available as an attachment to staff reports brought forward by the municipal partners to their respective Councils. In addition, TRCA was able to address select comments from BILD related to stormwater quantity and quality.

Built Environment

- The Recommended Minimum Target for certified green buildings should be increased. The current target of one or more certified green buildings for the site level might be appropriate for a small in fill development but not for anything larger. This target should be revised to more of a percentage of the development such as is done with the aspirational target. Twenty-five percent or 50% as the recommended minimum would be more appropriate.
- Life cycle housing should include adaptive housing that is renovation ready for accommodation of aging in place and multi-generations.
- Inclusion of charging stations for electric vehicles under the parking indicator could facilitate deployment of charging infrastructure

Mobility

- The aspirational target for walkability might be better as a recommended minimum target.

Natural Environment and Open Space

- The stormwater metrics need to include a statement under mandatory target indicating that these are minimum requirements when a higher level is required under other legislation such as for the Oak Ridges Moraine.

Infrastructure and Buildings

- Aspirational target for water conservation may be too low given that water conservation toilets, faucets and showerheads readily available on the market have 50% less water use than the mandatory maximum flow rates indicated in the chart.

Comments/Questions from BILD and TRCA Response

Stormwater Quantity

BILD: Please provide rationale and supporting information from MNR/MOE with respect to TRCA direction. **TRCA:** We have been working with MOE on developing our criteria and MOE should be releasing a position paper on LID soon.

BILD: The metric should state that the runoff retention criteria can only be shown at a conceptual level at the Block Plan and Draft Plan stages, as it applies more to the Site Plan stage. **TRCA:** We will flag to the project team that the metric applies to several scales and is conceptual at the Secondary and Block Plans and detailed at the Site Plan scale.

BILD: The Mandatory Target should state "Retain runoff volume from the 5mm rainfall event, where feasible" this target should also only apply to site works, not community wide, including road works. **TRCA:** The LID Guide chapter 2 provides reference to related guidance documents for dealing with this type of issue as such, using the term where feasible is not necessary in this report.

BILD: The minimum target should be the 5mm event (which is not currently mandatory across all municipalities and CAs), with aspirational targets being 10-15mm. **TRCA:** The mandatory target is 5mm as developed in conjunction with all municipalities across TRCA and CVC service areas.

BILD: The municipalities will need to incorporate new standards that allow increased topsoil depths and non-standard ROWs that allow for LIDs to achieve the targets. **TRCA:** This would be an implementation item that the project team/individual municipality would need to address.

BILD: The quantity or flood control should be provided "in accordance with applicable municipal and conservation requirements". **TRCA:** We will recommend that the project team modify the text to indicate "Conservation Authority" where the text currently says TRCA.

BILD: The runoff retained on-site should count towards the required quantity or flood control, and therefore the SWM pond sizes and conveyance system sizes should be reduced in size accordingly. **TRCA:** This is an implementation item that will have to be worked out with each municipality as there currently is not one common approach taken.

BILD: Credit quantity must be given when LIDs are implemented, even on private property. **TRCA:** This is an implementation item that will have to be worked out with each municipality as there currently is not one common approach taken.

BILD: How are existing LID requirements or policies being considered as part of this program? **TRCA:** This document is setting indicators, metrics and quantified targets that will then be used to inform implementation in each municipality. Differences in existing LID policies between municipalities would need to be addressed through the implementation process.

BILD: Have the municipalities discussed the opportunity to implement SWM/LID facilities on public lands where the uses can be shared (i.e. parkland)? **TRCA:** Yes, we understand that municipalities are examining the opportunity for multi-use facilities.

Stormwater Quality

BILD: Please provide rationale and supporting information from MNR/MOE with respect to TRCA direction. **TRCA:** We have been working with MOE on developing our criteria.

BILD: The Mandatory Targets for Stormwater Quality are those set out in the MOE SWM Planning and Design Manual and do not necessarily require 80% TSS removal. Infill sites are not required to provide 80% TSS removal if discharging to an existing storm sewer, ditch or low quality stream. **TRCA:** In TRCA and CVC's jurisdiction, Level 1 water quality is required for all sites including infill sites. This criteria was developed in consultation with the MOE.

BILD: 80% TSS removal should be a minimum target with at least 1 point awarded to it. **TRCA:** 80% TSS removal is a mandatory requirement and thus does not warrant points under the current structure of the Sustainability Metrics project.

BILD: If stormwater quality strategies are to include a treatment train approach, then the end-of-pipe facility should not have to also provide 80% TSS removal. For example, if stormwater is conveyed to a SWM pond through swales then 40% TSS is removed in the swales, then the end-of-pipe facility only needs to remove approximately 66.667% TSS from the incoming flows to achieve 80% TSS removal from all runoff. Please remove the statement "All ponds will be designed with Enhanced Level of Protection (Level 1)". **TRCA:** TRCA and CVC are currently working with MOE to develop a methodology to give credit for LID towards end of pipe facilities.

Energy Use and Greenhouse Gas Emissions Forecasting Report

Measuring the Sustainability Performance of New Development in Brampton, Richmond Hill, and
Vaughan

August 2013

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1.0 Overview

1.1 General

Sustainable design is the art of designing physical objects, the built environment and services to comply with the principles of economic, social, and ecological sustainability. It ranges from designing small objects for everyday use, through to designing buildings, cities, and the earth's physical surface.

The issues of sustainability have become increasingly important in the development and wellbeing of cities. Concerns over climate change, energy, public health, resource use and related provincial policies have brought sustainability issues to the forefront of planning and operating cities in Ontario and across Canada. This is evident from recent changes to the Provincial Policy Statement (PPS 2005), the Planning Act (Bill 51), programs such as the Federation of Canadian Municipalities' Green Municipal Fund, and changing mission statements of organizations such as the Canada Green Building Council to emphasize sustainable neighbourhoods in addition to green buildings.

Over half of the world's population lives in cities, and in Canada that proportion is closer to 80% (Statistics Canada, 2009). The homes and buildings we live and work in use over 30% of all energy in the country and consume more than half of all the electricity (Natural Resources Canada [NRCAN], 2006). Quality of life and economic competitiveness of cities will in part be driven by how effectively resources such as energy and water resources are managed.

Improving energy performance in buildings is considered one of the fastest, most accessible and cost-effective opportunities to save energy, create jobs, increase energy security and reduce greenhouse gas emissions (National Energy Board, 2008; NRCAN, 2012). Implementing sustainability guidelines in the development review process is one comprehensive approach to address sustainability issues towards reducing the overall ecological footprint of new development and redevelopment projects. Uptake of independent, third-party certification systems, particularly Leadership in Energy and Environmental Design (LEED™), continues in the retail market. A framework for measuring sustainability performance of development through the municipal planning process can complement independent certification systems by rating all development projects, not just industry leaders. It will be important to incorporate appropriate energy efficiency and CO₂ reduction targets in sustainability guidelines being implemented by Ontario municipalities in order to achieve some of the most urgent sustainability objectives.

1.2 Measuring Sustainability Performance of New Development

In November 2010, the City of Brampton in collaboration with the City of Vaughan and the Town of Richmond Hill (the partner municipalities) received support from the Federation of Canadian Municipalities' Green Municipal Fund to complete a project entitled "Measuring the Sustainability Performance of New Development in Brampton, Richmond Hill, and Vaughan". Once complete, the project will establish sustainability performance metrics as one set of planning tools to achieve healthy, complete sustainable communities in the three neighbouring municipalities.

Implementing sustainability metrics as part of the development review process will aid in reducing the overall ecological footprint of new development and redevelopment projects. The sustainability metrics will complement and support other municipal requirements for development, such as master environment servicing plans, environmental impact studies, natural heritage evaluations, growth management plans, community design guidelines, urban design briefs, and other standard requirements.

The project is being completed in two phases. Phase 1 of the project, currently underway as a separate contract, is being led by the City of Brampton with a goal to develop Sustainable Community Development Guidelines (SCDGs) as part of the City of Brampton's Development

Design Guidelines (DDG). The focus of the SCDGs is on qualitative urban design and community development principles. The SCDGs, in part, provide the framework for Phase 2 of the project. Phase 2 focuses on the preparation of sustainability metrics (i.e., quantitative performance targets that new development applications will be reviewed against as part of the planning process) that quantify, where appropriate, the qualitative principles outlined in the SCDGs prepared as part of Phase 1.

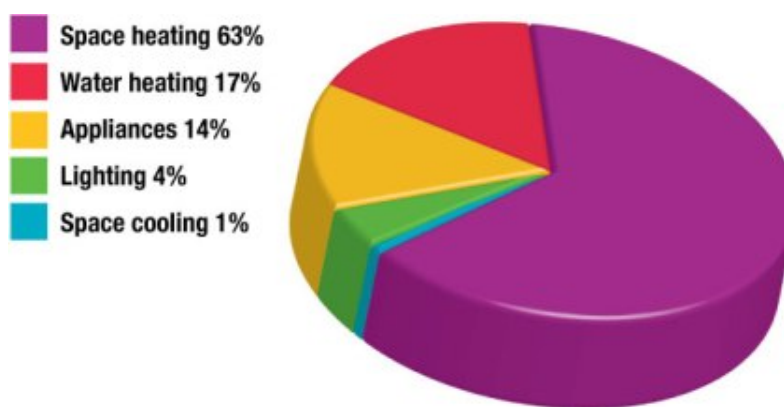
In some municipalities throughout Southern Ontario, such as Guelph and East Gwillimbury, comprehensive Community Energy Planning has taken place to “create a healthy, reliable and sustainable energy future by continually increasing the effectiveness of how we use and manage our energy and water resources” (City of Guelph, 2007, p.13). These plans focus on several sectors affecting sustainability, energy use and greenhouse gas emissions including housing, commercial and industrial practices, transportation and community waste.

While this exercise does not intend to develop a framework for future community-based energy planning, nor does it discuss energy use and GHG emissions from other sectors such as transportation, it is expected that this report will be a component of a broader community energy plan to include an expanded focus beyond the built environment.

1.3 Current Trends in Energy Use and GHG Emissions

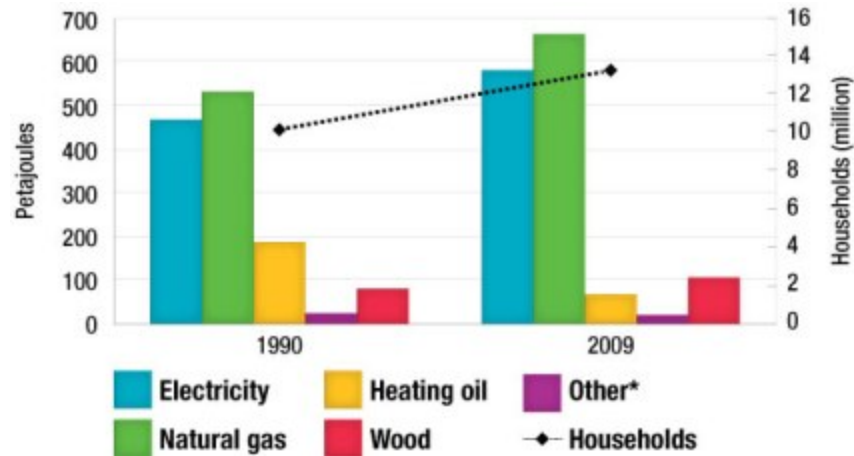
Energy is used in all five sectors of the economy: residential, commercial/institutional, industrial, transportation and agriculture. In 2009, these sectors used a total of 8,542 petajoules (PJ) of energy; an increase of 23% since 1990. Total GHG emissions associated with the energy use of the five sectors was 464 megatonnes (Mt) in 2009. Residential GHG emissions accounted for 68 Mt of that number, or 15% of all secondary energy use-related GHGs emitted in Canada. This reflects an 11% rise in residential energy use since 1990; equal to the increase in the average size of living spaces during that time frame. In 2009, total household energy use was 17% of all energy used (1,422 PJ), costing Canadians \$26.8 billion on household energy needs (NRCan, 2011a). The majority of this energy use can be attributed to space and water heating (Figure 1), and is drawn primarily from natural gas and electricity (Figure 2).

Figure 1: Distribution of residential energy use by end-use, 2009



Source: Natural Resources Canada, 2011

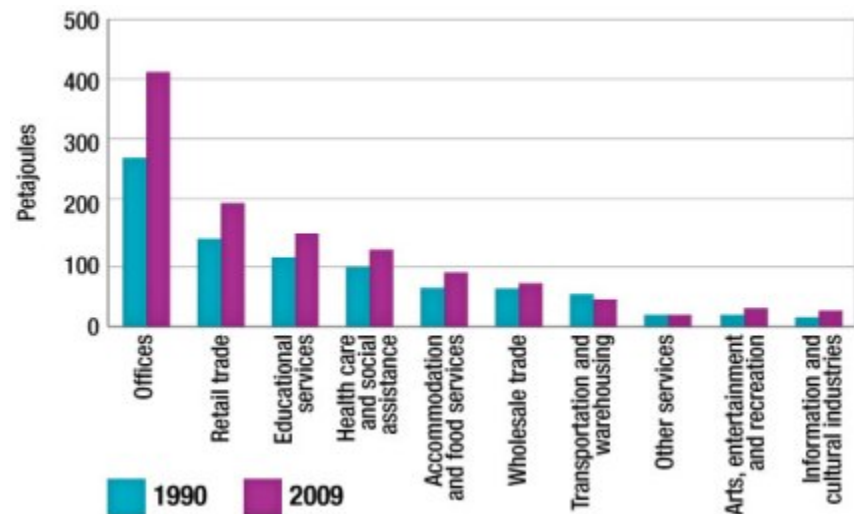
Figure 2: Residential energy use by fuel type and number of households, 1990 and 2009



Source: Natural Resources Canada, 2011

The commercial/institutional sector was responsible for 14% of the total energy use in Canada, an increase of 37% (from 867 PJ to 1,186 PJ) since 1990. 13% of the associated GHG emissions in 2009 were a result of commercial activity (a 29% increase since 1990), stemming primarily from energy use in office buildings (35% of commercial GHGs), retail trade (17%) and education services (13%) (Figure 3). Industrial uses accounted for 37% of the total energy use and 31% of end-use GHG emissions (NRCan, 2011a).

Figure 3: Commercial/institutional energy use by activity type, 1990 and 2009



Source: Natural Resources Canada, 2011

2.0 Energy Use and Greenhouse Gas Emissions Forecasting

2.1 Purpose

The focus of this report is to estimate the energy use and GHG emissions associated with the performance of residential and non-residential buildings in Brampton, Richmond Hill and Vaughan. This study will apply existing and anticipated energy standards for buildings to the current and projected building stock for the three partner municipalities in order to understand the magnitude of savings that can be gained from energy improvements. The report will also explore more aggressive energy conservation and retrofit scenarios to establish a more complete

understanding of how energy efficient buildings contribute to the overall reduction of municipal greenhouse gas emissions.

The analysis resulting from this study will inform the sustainability performance metrics for energy use of buildings in the sustainability guidelines being developed by partner municipalities. It is anticipated that the methodology and findings of this report may be further refined, adapted and applied to other municipalities as the dialogue and technology surrounding energy conservation and greenhouse gas reductions continues to evolve.

2.2 Methodology

In order to develop an accurate, flexible approach to quantifying the energy usage and associated greenhouse gas emissions of the residential and non-residential buildings within the partner municipalities, a series of spreadsheets were constructed to utilize a range of variable inputs and calculate the total energy use and greenhouse gas emissions for both residential buildings – characterized by detached, semi-detached, row and apartment dwellings; and non-residential uses, including commercial and office uses, warehousing, education and health care, and other employment uses. With regards to the latter, an estimate of only the energy use consumed as a result of regular building operations was considered.

The energy use and GHG emissions from the unique industrial processes that occur within the partner municipalities were not included in the calculations. Although large industrial uses account for a major portion of the energy used in the partner municipalities, the analysis of industrial energy use is best evaluated at the level of a specific industrial process type. Therefore, this report does not assess the industrial use of other energy commodities such as fuel oil, propane, oxygen and other combustion gases. In many industrial processes these can be significant components of the energy mix and should not be overlooked in more detailed site-specific assessments.

Two approaches provide a comparison to test assumptions in the analysis. One approach uses the Toronto and Region Conservation Authority's (TRCA) *Getting to Carbon Neutral Toolkit* to compare the more detailed calculations in our approach with a higher-level approach that also considers GHG emissions from transportation, waste and water use. An additional comparison was made with actual electricity and natural gas consumption values for Vaughan in 2006. While the comparisons are not expected to align completely, it provides a method to understand the variability in our approach.

For many variables, provincial averages found in the online *Getting to Carbon Neutral Toolkit* were verified with NRCAN data and applied to the scenarios used. The online tool also provided a way to verify and compare the results of this study with the data provided by the TRCA.

A breakdown of the sources for each of the variables used in the energy use forecasting model is as follows:

- Baseline data regarding unit numbers and floor space of residential dwellings and floor space of employment buildings;
- baseline data for energy intensities of the existing building stock
- GHG emissions intensities;
- Variables that define energy use scenarios considering anticipated and aspirational energy efficiency improvements, retrofitting and the incorporation of renewable energy generation.

2.2.1 Baseline Data

2.2.1.1 Population and Number of Dwelling Units

The Vaughan Official Plan 2010 identifies a 2006 population of 249,300. The estimated growth between 2006 and 2031 is 167,300 new residents for a total estimated population of 416,600. The 2006 population figures for Richmond Hill and Brampton are 169,800 and 453,000 respectively. By 2031, these figures are expected to grow to 242,200 people in Richmond Hill and 738,000 people in the City of Brampton.

For the purposes of forecasting energy use, it was necessary to determine how these population figures are allocated among the different residential dwelling types in order to establish the total gross floor area for each housing category. This information was provided for the City of Vaughan and Town of Richmond Hill through York Region's 2031 Land Budget (2010). Population and dwelling unit estimates for the City of Brampton are provided in their City-Wide Population and Employment Forecasts report (2009). 2006 and 2031 dwelling units and floor space estimates for Brampton, Richmond Hill and Vaughan can be found in Appendix A.

2.2.2 Conversion Factor and Gross Floor Area

2.2.2.1 Residential

To determine the energy use of existing residential buildings, an estimate of the total gross floor area for each housing typology was calculated. As a preliminary analysis, data from the Municipal Property Assessment Corporation (MPAC) for the Town of Richmond Hill was analyzed and used to estimate the size of various dwelling units across the partner municipalities (Table 1). Calculations can be found in Appendix A. Localized data may show that the average sizes of dwelling units in Brampton, Richmond Hill and Vaughan differ substantially from one another. However, using a consistent unit size serves to maintain an approach to energy use and greenhouse gas emissions forecasting that is adaptable to all municipalities across the GTA.

Comprehensive Energy Use Database Tables from Natural Resources Canada (NRCAN) provide total floor space and unit counts for each dwelling type in Ontario. Using this information, the average size of Ontario dwelling units was calculated (NRCAN, 2013a). These figures can be seen in Table 1, below and provide further reference for municipalities across Ontario.

Table 1: Average Sizes of Dwelling Units

Dwelling Type	Average Size (MPAC)	Provincial Average (NRCAN)
Single Detached	241 m ²	170 m ²
Single Attached		126 m ²
<i>Semi-detached</i>	136 m ²	-
<i>Row Houses</i>	148 m ²	-
Apartment	90 m ²	94 m ²

2.2.2.2 Non-residential

To determine the total gross floor area for the non-residential building stock, information from the York Region Development Charge Background Study of April 2010 was used. The Background Study estimates the floor space per employee for three types of employment buildings: Employment Land Employment, Population-Related Employment and Major Office. These numbers were multiplied by the number of jobs in each setting and added together for a total non-residential GFA of 25,141,803 m² across the partner municipalities. Refer to Appendix A for the floor space estimates of the different employment-based building types for Brampton, Richmond Hill and Vaughan.

2.2.2.3 Average Annual Energy Demand and Total Energy Use of Each Building Type

Calculating the total energy use for each building type required the average annual energy demand per unit floor space (GJ/m^2), or energy intensity. The baseline figures used for this study (Table 2, below) were calculated using updated data within the Comprehensive Energy Use Database Tables published by NRCAN (2013a). These numbers are generally consistent with the energy intensities provided by the Carbon Neutral City Planner developed by the Toronto and Region Conservation Authority in consultation with the Sustainable Infrastructure Group and the Department of Civil Engineering at the University of Toronto.

Table 2: Baseline Energy Intensities

Building Type	Average Annual Energy Demand (GJ/m^2)
<i>Residential</i>	
Single Detached	0.82
Single Attached	0.77
Apartment	0.74
<i>Non-Residential¹</i>	1.59

The average annual energy demands are calculated using the total provincial energy use from all sources (electricity, natural gas, heating oil, coal, propane, wood, and other sources) and the total floor space for each housing type, therefore creating an average energy intensity. Hence, all ages and efficiencies of buildings within a particular building type are averaged, rather than establishing age-specific energy demands for each building type. In other words, each building type is assumed to use the same energy load per floor space unit despite the year the building was constructed. It is understood that given the varied building stock in the partner municipalities, not all buildings are operating at 2006 consumption levels. Although a number of buildings will likely be operating at less or more efficient levels, it is assumed that the average of all buildings in a certain category will be comparable to the information provided by NRCAN.

Once the average annual energy demands are determined, they can then be multiplied by the total gross floor area for each building type in order to determine the total energy use for each category of built form.

The City of Vaughan obtained electricity and natural gas usage data from Power Stream and Enbridge which provide the total kilowatt hours of electricity and cubic metres of natural gas consumed for residential, commercial and industrial uses in 2006. Although these totals do not isolate the consumption data specific to the operation of the building, they do provide a reference point to help ensure accurate estimations.

2.2.3 GHG Emissions

2.2.3.1 Residential GHG Emission Intensities

The GHG emission intensity value for electricity generation was calculated based on information provided by Environment Canada in the *National Inventory Report 1990-2010* (2012) and accounts for a 12% loss of energy due to transmission line and other losses. Emission intensities for other residential energy sources including natural gas, heating oil, coal, propane and wood

¹ The "Commercial/Institutional Sector" information published by NRCAN (2013b) was used for the non-residential energy use calculations and includes the following building types: Wholesale trade; retail trade; transportation and warehousing; information and cultural industries; offices; educational services; health care and social assistance; arts, entertainment and recreation; accommodation and food services, and; other services.

were derived from provincial energy use tables published by NRCAN (2013a), and include energy used for appliances and lighting in addition to space heating, space cooling and water heating.

The proportions of demand for the end uses in each type of building are as follows (NRCAN, 2013a):

Single Detached	%	Single Attached	%	Apartment	%
○ Space Heating	65%	○ Space Heating	57%	○ Space Heating	47%
○ Water Heating	16%	○ Water Heating	21%	○ Water Heating	30%
○ Appliances	11%	○ Appliances	13%	○ Appliances	18%
○ Lighting	4%	○ Lighting	4%	○ Lighting	2%
○ Space Cooling	4%	○ Space Cooling	4%	○ Space Cooling	2%

The GHG emission intensities for each building type were calculated using the applicable energy intensities (Table 2), the energy breakdowns for each building type (above), and the GHG intensities of the applicable fuel types as provided by Environment Canada. For all three residential unit types, the GHG intensities were calculated at 0.05 tonnes of CO₂ equivalents per gigajoule of energy produced (t-CO₂e/GJ). Detailed calculations can be found in Appendix B.

2.2.3.2 Non-residential GHG Emission Intensities

The same calculations and references were used to determine the GHG emission intensities for non-residential buildings. In addition to space heating, space cooling and water heating, energy consumption for this building group also includes end uses such as lighting, auxiliary motors and equipment and street lighting (NRCAN, 2013b). The provincial averages for proportions of demand of end uses in these buildings are as follows:

Non-Residential	%
○ Space Heating	47%
○ Water Heating	9%
○ Lighting	8%
○ Space Cooling	11%
○ Auxiliary Motors	7%
○ Auxiliary Equipment	17%
○ Street Lighting	1%

The GHG emission intensity resulting from non-residential energy use in Ontario is 0.05 t-CO₂e/GJ. Detailed calculations can be found in Appendix B.

2.2.3.3 Total GHG Emissions & GHG Emissions per Capita

By multiplying the total energy use for each building type by the respective GHG emission intensities, the total GHG emissions were calculated. The current and future population figures for each of the partner municipalities were then used to calculate per capita emissions figures.

2.2.4 Current Energy Consumption and Greenhouse Gas Emissions

Using the data from the York Region's 2031 Land Budget (2010) and the conversion factors as noted above, over 246,000 residential units accommodating for nearly 47 million square metres of floor space exist in the partner municipalities as of 2006. Combined with more than 25.1 million square metres of commercial floor space, the combined building stock for the study area consumes approximately 78 million GJ of energy each year (Brampton: 34.5 million GJ; Richmond Hill: 13.7 million GJ; Vaughan: 29.4 million GJ). This in turn results in a total GHG emissions output of nearly 4 million tonnes of CO₂ equivalents per annum. Distributed among the

2006 population for each municipality, this results in 3.9 t-CO₂e/capita in Brampton, 4.15 t-CO₂e/capita in Richmond Hill and 6.0 t-CO₂e/capita in Vaughan being emitted each year. To verify these estimates, population and floor space information were entered into the TRCA's Carbon Neutral City Planner for the City of Vaughan. Table 3, below, compares the calculated energy use and GHG emissions estimates used in this report with the outputs of the Carbon Neutral City Planner for the City of Vaughan.

Table 3: Calculations for 2006 energy use and GHG emissions for Vaughan's building sector

	Results from Energy Use and GHG Emissions Forecasting Exercise	Results from Carbon Neutral City Planner
Population	249,300	249,300
Energy Use (TJ)	29,415	29,425
GHG Emissions (MtCO₂e)	1.5	1.6
Energy Use/Capita (GJ)	118.0	118.0
Emissions/Capita (tCO₂e)	6.0	6.4

3.0 Projection Scenarios

3.1 Overview

A total of 188,280 new residential units and 20.4 million m² of non-residential space will be constructed across the partner municipalities to accommodate the total projected population in 2031. In determining the projected energy use and GHG emission scenarios for the year 2031, variable energy improvements were assigned to the existing and projected building stock as a percentage of increased efficiency over the 2006 Baseline.

To appreciate the implications of the current form of development on the energy consumption levels and overall GHG output in the partner municipalities, a scenario was tested using 2006 energy intensity data, which assumed no reduction in average annual energy demands would occur for buildings constructed between 2006 and 2031. In this example, no retrofits were applied to the existing building stock. The resulting outputs are as follows:

Table 4: 2006 Baseline Scenario

		Population	Total Development (m ²)	Annual Energy Use (GJ)	Energy Use (GJ)/Capita	GHG Emissions (t-CO ₂ e)	GHG Emissions (t-CO ₂ e)/Capita
Brampton	2006	453,000	33,050,636	34,546,773	76.3	1,750,589	3.9
	2031	738,000	59,658,279	63,893,061	86.6	3,239,396	4.4
Richmond Hill	2006	169,800	13,564,448	13,750,120	81.0	704,085	4.2
	2031	242,200	20,371,562	20,908,458	86.3		4.4
Vaughan	2006	249,300	25,418,894	29,415,120	118.0	1,495,626	6.0
	2031	416,600	43,350,343	49,884,062	119.7	2,535,925	6.1
TOTALS	2006	872,100	72,033,978	77,712,013	89.1	3,950,301	4.5
	2031	1,396,800	123,380,184	134,685,582	96.4	6,842,167	4.9

The differences in Energy Use and GHG Emissions per Capita between the three municipalities are reflective of the population and development characteristics in each. Despite having a significantly larger population than both Richmond Hill and Vaughan, greater land use densities in Brampton have resulted in lower per capita figures for both energy use and emissions.

3.2 Introduction of the 2012 Ontario Building Code

The 2012 Ontario Building Code (OBC 2012) was filed as Ontario Regulation 332/12 in November 2012 and comes into effect starting January 1, 2014. To develop the projection scenarios for energy use and GHG emissions modelling, this standard was used as a base level of improvement. As such, it was necessary to estimate the energy intensities of buildings complying with the new Ontario Building Code for each of the different building typologies. The new building code states that all houses must meet the performance level that is equal to a rating of 80 or more when evaluated in accordance with the EnerGuide Rating System (Ministry of Municipal Affairs and Housing [MMAH], 2012a). This standard brings the energy performance level of new homes in Ontario in line with the R-2000 energy standard:

The R-2000 standard is a national initiative that outlines requirements to build environmentally friendly homes. [...] R-2000 Standard homes are about 30 percent more energy efficient than conventional new homes and must achieve a minimum energy efficiency rating of 80 on the EnerGuide rating scale.

-NRCAN, 2011b

The OBC 2012 further states that buildings other than residential must conform to Supplementary Standard SB-10 of the Building Code which indicates that the energy efficiency levels of non-residential buildings can be achieved by exceeding the energy efficiency level of the 1997 Model National Energy Code for Buildings (MNECB) by 25 per cent (MMAH, 2012a).

The following table demonstrates these improvements using average annual consumption data for MNECB 1997 buildings in the City of Toronto, as well as average energy consumption for R-2000 certified homes, published by NRCAN (2007; 2011c).

Table 5: OBC 2012 energy intensities

	MNECB 1997 Baseline (GJ/m ²)	OBC 2012 (GJ/m ²)	2006 Baseline (GJ/m ²)	Improvement of OBC 2012 over 2006 Baseline
Single Detached	--	0.63 ²	0.82	23.2%
Single Attached	--	0.59 ³	0.77	23.2%
Apartment (Multi Unit Residential Building)	0.83	0.62	0.74	15.9%
Non-residential	1.13 ⁴	0.85	1.59	46.7%

NOTE: Numbers may differ slightly due to rounding

3.3 Energy Use and GHG Forecasting Scenarios

3.3.1 Scenario Parameters

Five scenarios were tested for the projected growth in the partner municipalities, ranging from a “status quo” baseline to aggressive energy efficiency improvements. While the more aggressive energy improvement scenarios may not be feasible at this time, they provide important information about the rate of change required to significantly reduce the energy demand and GHG emissions from anticipated growth.

For the projected building stock, two levels of improvements were considered; a “base level” of improvement reflective of the 2012 Ontario Building Code and a higher level of improvement

² National average of total consumption for R-2000 home (107.05 GJ) divided by average size of Ontario single detached home (170 m²).

³ It is assumed that the same percentage improvement over the 2006 baseline for single detached homes will be achieved for single attached homes constructed under OBC 2012

⁴ Average consumption of large and small office buildings, big box retail, warehouses, schools and extended care facilities

reflective of varying aspirational targets. All buildings constructed prior to January 1, 2012 were assumed to be built with 2006 energy intensities.

In order to model these changes, it was assumed that the projected growth in the partner municipalities would be distributed evenly from 2006 to 2031. As such, the first 6 years of development from the beginning of 2006 to the end of 2011 are assumed to be constructed with the average energy intensities calculated for the existing building stock (Table 2). This equates to 24% of the projected development.

For those scenarios that include retrofitting, it was assumed that all buildings being retrofit would be brought up to OBC 2012 energy intensity levels.

Table 6 outlines the parameters of the five energy use forecasting scenarios tested in this report, identifying the percentage of new and existing buildings that will achieve each improvement level. Detailed tables containing precise figures for all variables can be found in Appendix C.

Table 6: Scenario Parameters

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5
	Percentage of Buildings Constructed after 2006				
No change	24%	24%	24%	24%	24%
OBC 2012	76%	20%	20%	20%	20%
OBC 2017	--	56%	56%	--	--
75% Improvement	--	--	--	56%	--
Net Zero	--	--	--	--	56%
	Percentage of Buildings Constructed prior to 2006				
Retrofitting	--	--	50%	100%	100%

3.3.2 Scenario 1

This scenario assumes that the energy efficiency improvements introduced in the 2012 Ontario Building Code will apply to all buildings constructed as of January 1, 2012 and remain in effect until the end of the projection period. Using the same population and floor space estimates from the 2006 Baseline, the improvements to average annual energy demands from Table 5 (above) were applied to all buildings constructed from 2012 to 2031. No retrofits were applied to the existing building stock.

Figure 4 below compares the energy use and GHG emissions resulting from this scenario for each municipality.

Figure 4: Scenario 1: Energy Use and GHG Emissions

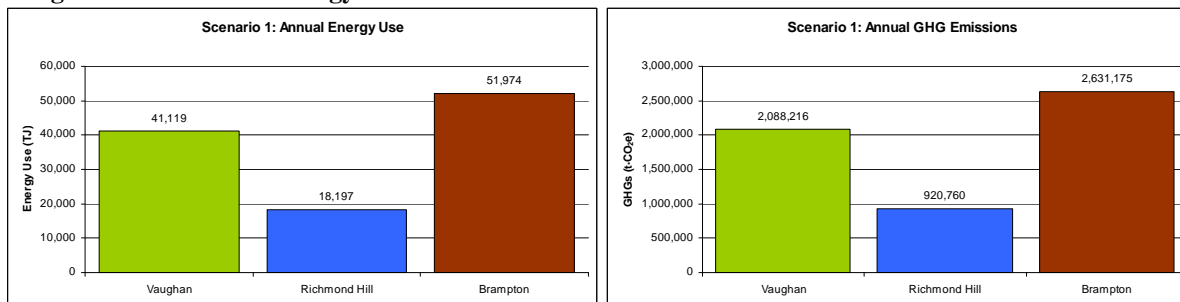


Table 7 compares the energy use and GHG emissions resulting from this scenario with the results of the 2006 Baseline Scenario developed above.

Table 7: Projected Energy Use and GHGs for the Partner Municipalities

Year/Scenario	Annual Energy Use by 2031 (GJ)	Annual GHG Emissions by 2031 (t-CO ₂ e)	2031 Energy Use (GJ)/Capita	2031 GHG Emissions (t-CO ₂ e)/Capita
2006 Baseline	134,685,582	6,842,167	96.4	4.9
Scenario 1	111,289,771	5,640,151	79.7	4.0

3.3.3 Scenarios 2 & 3

These scenarios build upon Scenario 1 by introducing energy efficiency improvements for all buildings constructed as of January 1, 2017, using estimated energy intensities to reflect the anticipated 2017 Ontario Building Code (OBC 2017).

In November of 2012, the Ministry of Municipal Affairs and housing issued a news release stating that “all new houses constructed in 2017 will consume 50 per cent less energy than homes built before 2006, and large buildings will only consume 65 per cent of what they did before 2006” (MMAH, 2012b). This information was used to calculate the energy intensities for low-rise dwelling units and apartment buildings (50% and 35% improvement over 2006 energy intensity values, respectively) in Scenarios 2 and 3.

The non-residential component of the building stock contains a range of building types that use varying amounts of energy. For this reason, information provided by the Ontario Power Authority and MMAH was used to determine the OBC 2017 energy intensities for non-residential buildings.

Figure 5 demonstrates the forecasted trajectory of energy intensity performance improvements for new commercial buildings compared to those built circa 2005. Assuming commercial buildings constructed in 2005 were built to MNECB 1997 standards, a 45% improvement over MNECB 1997 for buildings constructed to the 2017 OBC would equate to a 60.9% improvement over the entire 2006 building stock for the partner municipalities. This assumption was used to estimate the OBC 2017 energy improvement for non-residential buildings in the forecasting scenarios.

Figure 5: Roadmap for Energy Performance in Ontario

Year	Roadmap for Energy Performance for New Commercial Buildings	
	% Improvement in Overall Building Energy Use	% Improvement in Electricity End-Use Intensity
2012	25% - 30%	30% - 35%
2017	40% - 50%	35% - 40%
2022	60% - 70%	40% - 45%
2025	70% - 80%	45% - 50%

Note: Estimated improvement relative to new buildings circa 2005
Source: Raffaele, n.d.

Table 8 identifies the differences in energy consumption and GHG emissions between the first three scenarios. In each scenario, all buildings constructed between 2006 and 2017 were assigned the OBC 2012 energy intensities developed in Scenario 1. No retrofits were applied to

the existing building stock for Scenario 2. In Scenario 3, 50% of the existing building stock was retrofit to conform to OBC 2012 energy intensities.

Table 8: Comparison of Results for Scenarios 1-3 across the Partner Municipalities

	Annual Energy Use by 2031 (GJ)	Annual GHG Emissions by 2031 (t-CO ₂ e)	2031 Energy Use (GJ)/Capita	2031 GHG Emissions (t-CO ₂ e)/Capita
Scenario 1	111,289,771	5,640,151	79.7	4.0
Scenario 2	105,192,362	5,331,721	75.3	3.8
Scenario 3	93,894,376	4,754,695	67.2	3.4

3.3.4 Scenarios 4 and 5

In the final two scenarios, more ambitious energy reduction targets were applied to establish a more complete understanding of the impacts of future development and population growth in the partner municipalities.

Scenario 4 applies a 75% reduction in energy intensities from the 2006 baseline for all building typologies. It also reflects more aggressive retrofitting, with 100% of the pre-2012 building stock being retrofit to OBC 2012 standards.

Scenario 5 assumes that all buildings constructed as of January 1, 2017 will be Net Zero, achieving very low energy intensities offset by renewable energy sources at the building, site or community scale. This scenario assumes the same retrofitting targets as Scenario 4.

Table 9 compares the total annual energy consumption and annual GHG emissions for the partner municipalities across all five scenarios. The breakdown of each scenario by municipality can be seen in Figure 5 Figure 6, below. Scenarios 4 and 5 each reflect a future decrease in annual GHG emissions from levels currently present with the 2006 population.

Table 9: Comparison of Results for Scenarios 1-5 across the Partner Municipalities

	Annual Energy Use by 2031 (GJ)	Annual GHG Emissions by 2031 (t-CO ₂ e)	2031 Energy Use (GJ)/Capita	2031 GHG Emissions (t-CO ₂ e)/Capita
Scenario 1	111,289,771	5,640,151	79.7	4.0
Scenario 2	105,192,362	5,331,721	75.3	3.8
Scenario 3	93,894,376	4,754,695	67.2	3.4
Scenario 4	76,273,360	3,857,793	54.6	2.8
Scenario 5	68,297,061	3,452,931	48.9	2.5

Figure 6: Energy Consumption resulting from each Scenario

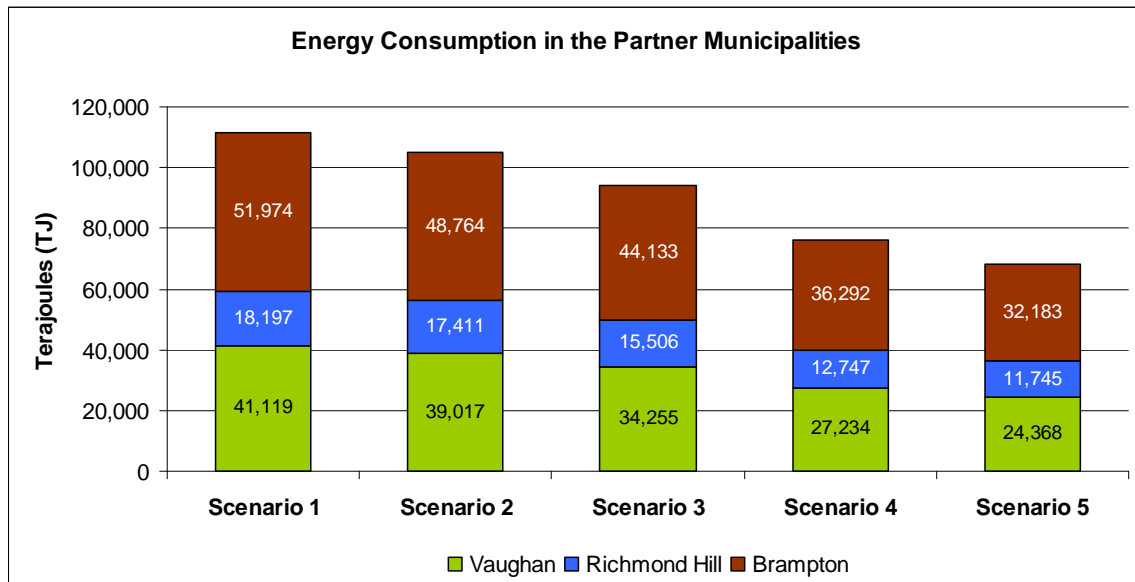
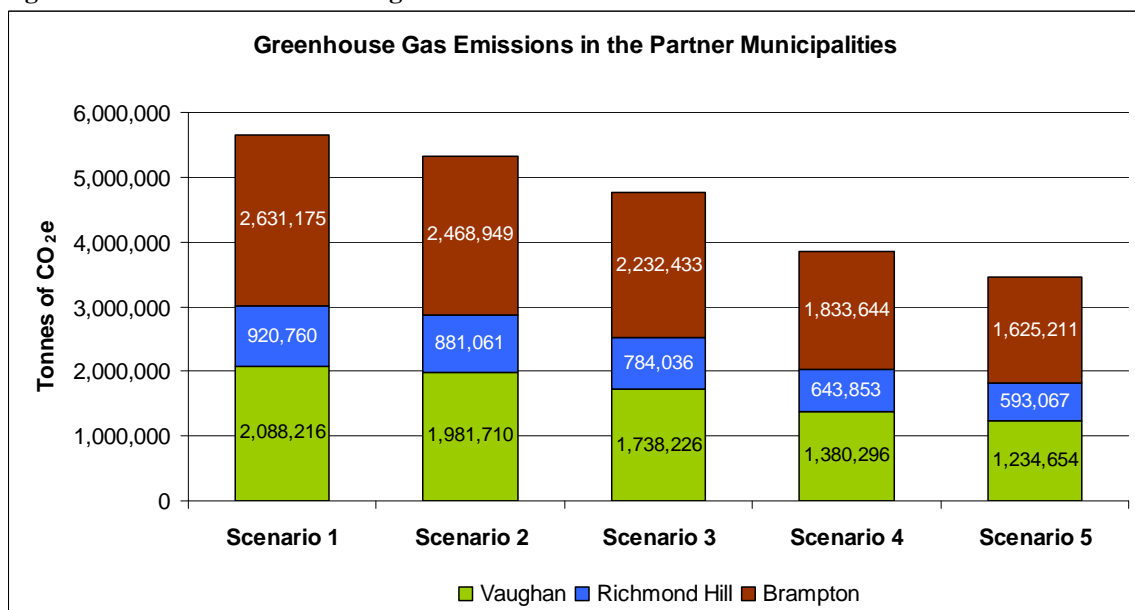


Figure 7: GHG Emissions resulting from each Scenario



4.0 Conclusions

This report provides a preliminary look into the potential energy use and greenhouse gas emissions resulting from the increases in development across the partner municipalities to the year 2031. Through five scenarios, each reflecting more ambitious energy conservation targets than the last, future greenhouse gas emissions ranged from an average annual rate of 5.6 million tonnes of carbon dioxide emissions in the first scenario to 3.5 million tonnes in the fifth scenario. Though aggressive, the final scenario reflects a decrease in annual emissions from present day levels by approximately half a million tonnes, despite a population growth of 1.4 million people and the addition of over 51 million square metres of development. Conversely, the minimum building requirements of the 2012 and 2017 Ontario Building Code presented in the first two

scenarios resulted in minor incremental change in both annual energy consumption and GHG emissions, with expected increases in overall energy use and emissions corresponding to the growth in population.

It is important to note that this report covers only one sector of the local contributors to energy use and greenhouse gas emissions. Other sectors such as transportation and municipal services will need to be examined to develop a full picture of the energy demands in the partner municipalities. In doing so, additional opportunities for energy conservation and reducing GHG emissions may become present.

The findings of this report can be used in conjunction with future studies to create a comprehensive community energy plan. On its own, the findings of this report provide a foundation for the sustainability performance metrics being developed by the partner municipalities. Moreover, they help to make clear the current and projected energy demands being faced by municipalities in the Greater Toronto Area, with insight into the magnitude of change needed to accommodate growth without drastically increasing the emissions associated with existing development trends.

4.1 Limitations of the Study

Certain limitations, including the availability and access to certain data sets, technological barriers and the ability to accurately segregate building typologies and their energy demands have resulted in final figures that may not be precise representations of the consumption patterns in each municipality. However, this should not deter from the general trends presented in this report.

Data from MPAC provides information relating to the size, age and supply of all building typologies in each municipality. This report used information from MPAC for Richmond Hill to estimate the sizes of dwelling units in each of the three partner municipalities. Further examination of this data will allow for a more detailed analysis which may provide a more accurate picture of the existing building stock in Brampton and Vaughan, and help determine the potential retrofitting rates based on the age of dwelling units.

The analysis of Richmond Hill's MPAC data revealed that 74% of the GFA in the Town is residential, 14% is employment-land employment, 8% is population-related employment and 2% is major office. The remaining 2% is institutional. Although not all of these categories may have been captured in their entirety, the majority of the GFA in the Town has been accounted for in the analyses conducted for this report.

With respect to industrial, office and institutional buildings that may fall within the employment-land, population-related employment and major office categories, further analysis may provide a clearer makeup of the non-residential component of the building stock. This will largely be dependent on the availability of data to identify both the number and type of buildings in the partner municipalities, as well as the energy intensities for the unique commercial, industrial and institutional processes that occur within each.

Further error analysis can be found in Appendix D to this report.

4.2 Retrofitting

Although retrofit programs were not the focus of this report, the analysis does show strong support for further study of the potential impacts retrofitting can have in each of the partner municipalities. The scenarios modelled in this study showed that even aggressive changes to future development, though significant contributors to the reduction of energy use and emissions, do not provide the same degree of positive impact as aggressive retrofitting can.

Other municipalities have already begun to consider this potential. In the Region of Durham, a key component of their climate change action plan includes a comprehensive residential retrofit program (Baldassi, 2013). According to an article recently published in the journal *Novae Res Urbis*, the retrofit program is capable of delivering 40% of the greenhouse gas reductions in the Region and will be a significant contributor to positive economic impacts. The program will be implemented by building upon local improvement charges, a financial tool found in the *Municipal Act* and the *City of Toronto Act* (Baldassi, 2013).

Locally, the 2011 MPAC data for Richmond Hill shows similar potential for retrofit programs in the partner municipalities. The Town currently has more than 25,000 dwelling units built prior to 1991, which represents 46% of the Town's total dwelling units as of 2011. With nearly half of the Town's buildings stock being more than 20 years old, widespread retrofitting programs could have a major impact in reducing GHGs and energy consumption.

4.3 Next Steps

Recently, the Ontario Environmental Commissioner released the second volume of his *2011 Annual Energy Conservation Progress Report*, which reviews energy usage, increases in energy efficiency and barriers to conservation. The report found that the province is lagging behind a culture of conservation and that governments "need to make conservation the new normal" (Novae Res Urbis [NRU], 2013, p.3).

The findings of this study strongly support the Ontario Environmental Commissioner report, emphasizing the importance of energy conservation. With aggressive action in the building sector, large increases in development do not necessarily have to result in large increases in energy use and associated emissions.

In May 2013, it was reported that the concentration of carbon dioxide in the atmosphere exceeded 400 parts per million (ppm). As noted in the online publication *National Geographic Daily News*, the last time CO₂, the Earth's main greenhouse gas, reached such concentrations, the planet was about 2 to 3 degrees Celsius warmer, but "the Earth then was in the final stage of a prolonged greenhouse epoch, and CO₂ concentrations were on their way down. This time, 400 ppm is a milepost on a far more rapid uphill climb toward an uncertain climate future" (Kunzig, 2013). The trend in CO₂ concentrations must be reversed. The World Wildlife Fund report, *The Energy Report*, summarizes the goal that to avoid the worst effects of climate change, we must keep eventual global warming below 1.5°C. To have a chance of doing so, we need to reduce greenhouse gas emissions globally by 80 per cent below 1990 levels by 2050, and even further beyond that date (Jefferies, 2011). While this requires a program of activities, the building sector and municipal influence of community development can play an important part in achieving such a goal through aggressive energy efficiency targets for new buildings and retrofitting the existing building stock.

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APPENDIX A:
2006 & 2031 Dwelling Unit and Floor Space Estimates for Brampton, Richmond Hill and Vaughan

Floor Space Estimates for Employment Built Form

City of Brampton 2006 Baseline Year

	Employment Land	Major Office	Population Related	Totals
No. of Jobs	79,200	9,300	67,400	155,900
Conversion Factor (square metres per job)	78.97	23.23	55.74	
Estimated GFA (Millions of square metres)	6.25	0.22	3.76	10.23

City of Brampton 2031 Growth Forecast

	Employment Land	Major Office	Population Related	Totals
No. of Jobs	167,900	37,400	113,500	318,800
Conversion Factor (square metres per job)	78.97	23.23	55.74	
Estimated GFA (Millions of square metres)	13.26	0.87	6.33	20.45

Town of Richmond Hill 2006 Baseline Year

	Employment Land	Major Office	Population Related	Totals
No. of Jobs	26,031	13,063	21,996	61,090
Conversion Factor (square metres per job)	78.97	23.23	55.74	
Estimated GFA (Millions of square metres)	2.06	0.23*	1.23	3.51

Town of Richmond Hill 2031 Growth Forecast

	Employment Land	Major Office	Population Related	Totals
No. of Jobs	42,351	21,253	35,786	99,390
Conversion Factor (square metres per job)	78.97	23.23	55.74	
Estimated GFA (Millions of square metres)	3.34	0.44*	1.99	5.78

City of Vaughan 2006 Baseline Year

	Employment Land	Major Office	Population Related	Totals
No. of Jobs	111,080	8,919	42,162	162,160
Conversion Factor (square metres per job)	78.97	23.23	55.74	
Estimated GFA (Millions of square metres)	8.77	0.21*	2.35	11.33

City of Vaughan 2031 Growth Forecast

	Employment Land	Major Office	Population Related	Totals
No. of Jobs	189,000	15,179	70,992	275,170

Conversion Factor (square metres per job)	78.97	23.23	55.74	
Estimated GFA (Millions of square metres)	14.13	0.35	3.96	19.23

* Value not calculated, but provided in Table 13 of the of the York Region 2031 Land Budget (March 2010)

Floor Space Estimates for Residential Built Form

BRAMPTON		Single	Semi	Row	Apt	TOTAL
2006	Unit Count	65565	17000	14125	29240	125930
2006	Est. Prop of Total	52.1%	13.5%	11.2%	23.2%	100.0%
2006	Conversion Factor (sq m)	241.0	136.0	148.0	90.0	
2006	Est. GFA (M sq m)	15.80	2.31	2.09	2.63	

2031	Unit Count	108500	33800	29300	46000	217600
2031	Est. Prop of Total	49.9%	15.5%	13.5%	21.1%	100.0%
2031	Conversion Factor (sq m)	241.0	136.0	148.0	90.0	
2031	Est. GFA (M sq m)	26.15	4.60	4.34	4.14	

RICHMOND HILL		Single	Semi	Row	Apt⁵	TOTAL
2006	Unit Count	32440	2080	7030	9375	51000
2006	Est. Prop of Total	63.6%	4.1%	13.8%	18.4%	99.9%
2006	Conversion Factor (sq m)	241.0	136.0	148.0	90.0	
2006	Est. GFA (M sq m)	7.82	0.28	1.04	0.84	

2031	Unit Count	41380	5140	12820	22015	81355
2031	Est. Prop of Total	50.9%	6.3%	15.8%	27.1%	100.0%
2031	Conversion Factor (sq m)	241.0	136.0	148.0	90.0	
2031	Est. GFA (M sq m)	9.97	0.70	1.90	1.98	

VAUGHAN		Single	Semi	Row	Apt⁵	TOTAL
2006	Unit Count	47910	5702	6397	9179	69535
2006	Est. Prop of Total	68.9%	8.2%	9.2%	13.2%	99.5%
2006	Conversion Factor (sq m)	241.0	136.0	148.0	90.0	
2006	Est. GFA (M sq m)	11.55	0.78	0.95	0.83	

2031	Unit Count	69220	10632	17407	38109	135367
2031	Est. Prop of Total	51.1%	7.9%	12.9%	28.2%	100.0%
2031	Conversion Factor (sq m)	241.0	136.0	148.0	90.0	
2031	Est. GFA (M sq m)	16.68	1.45	2.58	3.43	

Note: Totals may not add due to rounding.

⁵ The York Region March 2012 Land Budget assumes that the duplex forecast of 9,065 units was to locate within the Designated Greenfield Area and is included with the apartment category.

Calculation of Average Gross Floor Area (GFA) using MPAC Data of Richmond Hill's Residential Building Stock

The average GFA of the Town's residential building stock was obtained using Municipal Property Assessment Corporation (MPAC) data. The MPAC data used to calculate the GFA was from the latest available year (2011), as 2006 data could not retroactively be obtained.

The first step in this process was to determine the MPAC data that accurately represented each of the housing categories of single detached, semi-detached, townhouse and apartment dwelling units. MPAC assigns a 3-digit property code (a SAS Code) to each property in Ontario. The property code is based on both the physical characteristics and the predominate use of the overall property. Additional considerations include zoning and the number of units for each property type.

Using the same methodology the Planning Department uses to prepare Richmond Hill's *Housing Supply Update* (2010), the following SAS Codes provide an accurate representation of the Town's residential built stock:

Property SAS Codes for Residential Buildings

Single Detached	Semi-detached	Townhouse	Apartment
211	311	127	333
221	322	309	334
231		350	335
244		352	336
261		370 ⁶	340
301		374	341
302			370 ⁶
303			471
304			626
305			
313			
332			
365			
391			

Note: These SAS Codes provide an accurate representation of Richmond Hill's residential built stock. They may not give an accurate representation of the residential built stock of every municipality, as they omit property codes of some residential uses.

It was also necessary to filter and refine the residential data based on MPAC's property description using the 'Structure_1' category. The property descriptor was used to filter out entries such as garages, pools, sheds, etc. that were captured as separate entities to the main residential structure. Likewise, entries described as a 'virtual structure for roll numbers without any physical structure' were also excluded. Once the data was filtered, the total GFA and the average GFA by unit type was calculated. In addition, the data was organized by 'year built', to capture the changes made from the base year (2006) to the present. This raw data was then organized geographically by concession block to understand the average GFA by geographic area.

Average Residential GFA by Housing Typology (2006)

	Single Detached	Semi-Detached	Townhouse	Apartment
Total Number of Units	35,153	2,249	7,020	6,363

⁶ SAS Code 370 can represent either a Town or Apartment dwelling unit; entries were filtered into the Townhouse or Apartment category based on their property description (provided by the 'Structure_1' category).

Total GFA of Units (sqm)	8,470,518.65	306,629.76	1,037,852.66	569,890.40
Average GFA of Unit Type (sqm)	240.96	136.34	147.84	89.56
Number of Units Built before 1985	9,709	913	538	2,682
Percentage of Units Built before 1985	27.6%	40.6%	7.7%	42.1%

Average Residential GFA by Housing Typology (2011)

	Single Detached	Semi-Detached	Townhouse	Apartment
Total Number of Units	36,949	2,407	7,523	7,425
Total GFA of Units (sqm)	8,954,044.36	334,590.55	1,119,359.61	651,805.11
Average GFA of Unit Type (sqm)	242.34	139.01	148.79	87.79
Number of Units Built before 1991	17,765	913	1,057	5,307
Percentage of Units Built before 1991	48.1%	37.9%	14.1%	71.5%

Average Residential GFA by Concession Block (2011)

	Single Detached	Semi-Detached	Townhouse	Apartment
Block #	Square Metres	Square Metres	Square Metres	Square Metres
1	221.74	165.42	140.53	103.55
2	227.94	150.45	170.78	100.32
3	158.00	-	-	55.77
4	195.33	-	-	-
5	199.98	-	-	-
6	221.85	173.67	-	-
7	206.77	166.59	171.57	59.50
8	231.46	161.71	152.00	-
9	259.96	251.79	182.23	-
10	278.72	-	126.98	-
11	430.02	-	-	196.92
12	208.56	-	-	55.64
13	183.45	-	-	-
14	200.64	-	-	-
15	240.73	-	145.33	91.41
16	248.11	170.25	167.21	-
17	228.56	171.30	155.71	74.22
18	122.05	98.67	93.76	79.29
19	231.46	160.84	151.48	-
20	210.58	-	-	-
21	210.04	-	-	-
22	391.70	-	-	-
23	185.12	93.96	128.24	91.60
24	192.93	-	136.03	110.38
25	261.48	195.81	160.59	122.06
26	274.73	162.31	145.46	69.88
27	287.22	-	159.91	102.50
28	-	-	-	97.29

Dwelling Unit Summary by Concession Block (2011)

	Single Detached	Semi-Detached	Townhouse	Apartment
Block #	# of Units	# of Units	# of Units	# of Units
1	2,200	106	327	11
2	1,707	124	197	7
3	5	-	-	6
4	16	-	-	-
5	17	-	-	-
6	116	48	-	-
7	1,080	344	286	20
8	2,249	106	577	-
9	1,567	3	150	-
10	634	-	66	-
11	214	-	-	1
12	50	-	-	2
13	9	-	-	-
14	16	-	-	-
15	2,369	-	149	158
16	3,090	148	697	-
17	2,887	6	169	697
18	1,794	851	9	1,092
19	3,447	237	1,434	-
20	3	-	-	-
21	7	-	-	-
22	2,707	-	-	-
23	2,091	58	737	2,717
24	2,947	-	1,048	1,178
25	2,004	2	20	6
26	1,294	374	1,423	1,214
27	2,429	-	234	28
28	-	-	-	288
TOTALS	36,949	2,407	7,523	7,425

APPENDIX B: GHG Emission Intensities Calculations

RESIDENTIAL - SINGLE DETACHED

End Use	Fuel Type	Energy % Breakdown	Building Energy Intensity (GJ/m ²)	GHG Intensity by Fuel Type (tCO ₂ e/GJ)	% GHG Emissions (tCO ₂ e/GJ)	GHG Emissions (tCO ₂ e/m ²)
Space Heating	Natural Gas	65.3%	0.82	0.04955	0.03236	0.02653
Water Heating	Natural Gas	15.9%	0.82	0.04955	0.00788	0.00646
Appliances	Electricity	10.7%	0.82	0.05326	0.00570	0.00467
Lighting	Electricity	4.3%	0.82	0.05326	0.00229	0.00188
Space Cooling	Electricity	3.9%	0.82	0.05326	0.00208	0.00170
					0.05030	0.04125

RESIDENTIAL - SINGLE ATTACHED

End Use	Fuel Type	Energy % Breakdown	Building Energy Intensity (GJ/m ²)	GHG Intensity by Fuel Type (tCO ₂ e/GJ)	% GHG Emissions (tCO ₂ e/GJ)	GHG Emissions (tCO ₂ e/m ²)
Space Heating	Natural Gas	57.5%	0.77	0.04843	0.02785	0.02144
Water Heating	Natural Gas	20.7%	0.77	0.04843	0.01003	0.00772
Appliances	Electricity	13.4%	0.77	0.05326	0.00714	0.00550
Lighting	Electricity	4.1%	0.77	0.05326	0.00218	0.00168
Space Cooling	Electricity	4.3%	0.77	0.05326	0.00229	0.00176
					0.04948	0.03810

RESIDENTIAL - APARTMENT

End Use	Fuel Type	Energy % Breakdown	Building Energy Intensity (GJ/m ²)	GHG Intensity by Fuel Type (tCO ₂ e/GJ)	% GHG Emissions (tCO ₂ e/GJ)	GHG Emissions (tCO ₂ e/m ²)
Space Heating	Natural Gas	47.3%	0.74	0.04960	0.02346	0.01736
Water Heating	Natural Gas	29.8%	0.74	0.04960	0.01478	0.01094
Appliances	Electricity	18.2%	0.74	0.05326	0.00969	0.00717
Lighting	Electricity	2.4%	0.74	0.05326	0.00128	0.00095
Space Cooling	Electricity	2.3%	0.74	0.05326	0.00122	0.00091
					0.05044	0.03732

NON-RESIDENTIAL

End Use	Fuel Type	Energy % Breakdown	Building Energy Intensity (GJ/m ²)	GHG Intensity by Fuel Type (tCO ₂ e/GJ)	% GHG Emissions (tCO ₂ e/GJ)	GHG Emissions (tCO ₂ e/m ²)
Space Heating	Natural Gas	47.0%	1.59	0.04950	0.02327	0.03699
Water Heating	Natural Gas	9.4%	1.59	0.04950	0.00465	0.00740
Lighting	Electricity	8.2%	1.59	0.05326	0.00437	0.00694
Space Cooling	Electricity	11.3%	1.59	0.05326	0.00602	0.00957
Auxiliary Motors	Electricity	6.9%	1.59	0.05326	0.00367	0.00584
Auxiliary Equipment	Electricity	16.6%	1.59	0.05326	0.00884	0.01406
Street Lighting	Electricity	0.8%	1.59	0.05326	0.00043	0.00068
					0.05125	0.08148

APPENDIX C: Scenario Calculations

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APPENDIX D: Error Analysis

Commercial Energy Intensity

As part of the peer review for this report conducted by Halsall Associates Limited, it was noted that the provincial average energy intensity published by NRCAN for commercial buildings (1.59 GJ/m²), though not unreasonable for the purposes of this study, was slightly higher than the information in their database. Halsall has noted that their database of over 1000 commercial buildings in the Greater Toronto Area indicates that 1.15 GJ/m² is a more representative average energy intensity for local commercial buildings. In order to keep the sourcing of data consistent, however, the national averages published by NRCAN were used in the calculations for this report. This difference accounts for 20 million GJ of total energy use and 1 million tonnes of CO₂e across the partner municipalities in the 2006 Baseline Scenario to 2031.

Apartment Energy Intensity

A comparison is provided by Kesic and Miller (2008) who model a baseline condominium building to meet MNECB requirements. Appendix A of the Kesic and Miller report describes a 20 storey building with a conditioned area of 250,000 square feet and using 22,641 GJ per year. The energy intensity is calculated to be 0.97 GJ/m² and is noted in the report as 270 kWhe/m², which is much higher than the value provided by NRCAN for multi unit residential buildings (0.74 GJ/m²). A 25% improvement to the Kesic and Miller model would yield an energy intensity of 0.72 GJ/m². This difference results in an additional 1.7 million GJ of total energy use and minimal variation from the overall GHG emissions across the partner municipalities for Scenario 1, which adjusts for OBC 2012 requirements from 2012 to 2031. It is important to note that apartment buildings in Vaughan range from low- and mid-rise units to high-rise developments; hence, a lower energy intensity may be more representative of Vaughan's building typologies.

Energy Use Breakdowns

The peer review for this report also identified differences with industry experience and the NRCAN provincial average data for the breakdowns of both apartment and commercial energy end uses. The following tables compare the numbers used in this report with those of Halsall Associates Limited database:

Apartment				Commercial Buildings			
NRCAN Data		Peer Reviewer's Data		NRCAN Data		Peer Reviewer's Data	
Space Heating	47%	Space Heating	37%	Space Heating	47%	Space Heating	31%
Water Heating	30%	Water Heating	18%	Water Heating	9%	Water Heating	1%
Appliances	18%	Equipment	16%	Lighting	8%	Lighting	22%
Lighting	2%	Lighting	10%	Space Cooling	11%	Space Cooling	8%
Space Cooling	2%	Space Cooling	8%	Auxiliary Motors	7%	Pumps/Fans	18%
		Fans/Pumps	11%	Auxiliary Equipment	17%	Equipment	20%
				Street Lighting	1%		

The differences in these allocations will not affect the outcome since both natural gas and electricity have a GHG emission intensity of 0.05 t-CO₂e/GJ at this time. As new data becomes available on Ontario's changing electricity generation sources (i.e., less coal and more renewables), distinguishing the end use breakdown of energy will become increasingly important as the energy intensity for electricity generation may change significantly.