BRAMPTON
PLAN

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PRIME STRATEGY & PLANNING
innovative planning for sustainable communities

NATURAL ENVIRONMENT
CLIMATE CHANGE & RESILIENCY

BRAMPTON

EXECUTIVE SUMMARY

The City of Brampton is preparing a new Official Plan to guide growth and development over the next 30 years. The new Official Plan, titled "**Brampton Plan",** builds on the extensive work completed through the 2040 Vision.

A component of the Brampton Plan project involves studying issues in more detail, as identified through the work on the 2040 Vision, or identified through engagement with Council, stakeholders, and the public. To ensure these issues are appropriately addressed and considered through the development of policy, seven Discussion Papers are being prepared, which generally align with the themes and findings of the Brampton 2040 Vision. These Discussion Papers are noted below and represent a starting point for generating discussion about general policy issues that will be addressed in subsequent phases of the Brampton Plan Project. Brampton Plan comprises five phases, with multiple opportunities for residents to engage with the City and shape the future of Brampton's growth.

Focus Areas of the Official Plan Review

While there are seven distinct Discussion Papers, the themes within each paper often connect with concepts or ideas discussed in another paper. The Discussion Papers are also written through a lens of accessibility, diversity, sustainability and inclusion to ensure the recommendations consider multiple perspectives and raise awareness related to socio-economical issues impacting City of Brampton residents.

This Discussion Paper examines Natural Environment, Climate Change and Resiliency. While this Paper combines two themes, it should be noted that they are distinct.

The Natural Environment component of this Discussion Paper (Section 2) has been prepared to affirm the importance of Natural Heritage to the City of Brampton, to implement recently updated Provincial and Regional Policies, including the ***Provincial Policy Statement, 2020***, the ***Greenbelt Plan, 2017***, the ***Growth Plan for the Greater Golden Horseshoe, 2020***, the Region of Peel 2041, and incorporate the City's 2040 Vision. This Discussion paper outlines key policy updates to provide enhanced protection of the Natural Heritage System, through implementation of best management practices for natural heritage planning, sustainability, climate change, naturalization, invasive species, road ecology, noise and light pollution, low-impact development, bird friendly development, and mitigation hierarchy.

The Discussion Paper offers policy recommendations to be considered for incorporation into Brampton Plan around the following areas:

- **Natural Heritage System**: Delineate a natural heritage system to include the Growth Plan mapping, Regional Greenlands system updates, and recommendations from Conservation Authority watershed natural heritage system modelling to capture locally significant features.
- **Feature-Based Policies:** Define and protect locally significant woodlands and wetlands, and update buffer/Vegetation Protection Zones for consistency.
- **Restoration and Enhancement:** Develop new policies surrounding management and restoration plans for key natural heritage areas in the City, including the continuum of conservation (Protection, Maintain, Mitigate).
- **Buffers**: Recognize the importance of variable setbacks and enhanced buffers for a variety of natural features, functions and habitat.
- **Ecological Linkages:** Prioritize the establishment of east-west linkages through establishing/ protecting wildlife corridors, implementing road ecology best management practices, green infrastructure, utility corridors, and parks.
- **Urban Forest:** Establish a new subsection of Brampton Plan to address Urban Forests which includes preparation of an Urban Forest management plan, consideration of canopy targets, climate change, and development of mitigation requirements for tree removals.
- **Natural Hazards:** Recognize and protect the ecosystem services of natural hazard lands through remediation and restoration to improve water quality, stormwater management, reduce soil erosion/improve slope stability, etc.
- **Stormwater Management:** Develop policies to facilitate the use of Low Impact Development (LID) techniques in new developments, and to identify full lifecycle costs of stormwater management and develop long term funding options.

The Climate Change & Resiliency component of this Discussion Paper (Section 3) has been prepared to assist in affirming the City of Brampton's commitment to respond to climate change. In alignment with global action on climate change, Brampton City Council declared a climate emergency in June 2019. This represented a significant step towards meeting the City's goal of reducing GHG emissions in Brampton by 80 percent by 2050. This declaration also aligned with unanimous endorsement of the City's first Community Energy and Emissions Reduction Plan (CEERP).

This Discussion Paper highlights the many efforts advanced by the City of Brampton in alignment with regional, provincial, national, and international efforts in response to the climate crisis as well as areas of opportunity to further advance the City's ability to manage the risks associated with climate change. As one of the fastest-growing cities in Canada, Brampton Plan is a crucial document to incorporate climate change policy into municipal decision-making and service delivery.

The policy recommendations provided in this Discussion Paper support a systems approach to the planning and design of transit-oriented, energy efficient communities that support development, quality of life, and social equity while addressing climate change. To support this, climate change should be integrated across policy areas of Brampton Plan. Policy recommendations provided in this Discussion Paper include, but are not limited to, the following areas:

- **Green Communities:** Improving the quality of life for residents by enabling more sustainable living through transit-oriented, mixed-use communities that are safe and accessible for all. Green communities should be designed to respond to future climate change impacts to protect the corporation and community from potential risks (e.g., flooding, major storm events).
- **Energy Supply and Local Energy Systems:** Transition the City towards low or zero carbon energy systems by supporting district energy systems, alternative forms of renewable energy and energy from waste streams and encouraging a range and mix of housing types and compact forms of development.
- **Building Design, Construction, and Efficiency:** Supporting opportunities to reduce significant emissions from the home and building sector in Brampton, and to support the development of safe and resilient spaces for residents that reduce heat island effect and improve air quality. Policy options include retrofitting programs, energy and water conservation, tree planting and preservation opportunities, green infrastructure for stormwater management, and intensified compact forms of development.
- **Implementation:** Methods and means to support implementation of climate change objectives across the corporation include adopting active transportation networks and implementation plans, continued monitoring and evaluation of the Sustainable Community Development Program, and consideration of energy advantages to attract and retain economic investment.

This is a starting point for generating discussion about Natural Environment, Climate Change and Resiliency issues and recommendations. A Policy Directions Report will follow and will outline detailed changes proposed for inclusion in Brampton Plan.

The directions and recommendations presented in this discussion paper will be refined through subsequent consultation with the public. Engagement opportunities for a full range of stakeholders to provide input and perspective on these policy issues will be available in the coming months.

Discussion Papers pertaining to each of the Brampton Plan Focus Areas can be accessed online at the Brampton Plan project website: Brampton.ca/BramptonPlan.

Let's Connect!

Comments and feedback on the Discussion Papers can be provided on the Brampton Plan project website or emailed to opreview@brampton.ca.

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1 INTRODUCTION

1.1 Background

The current City of Brampton Official Plan (the Official Plan) was adopted by Council in 2006 and approved by the Ontario Municipal Board in 2008. In October 2013, City staff received direction from the Planning and Development Committee to initiate a scoped review of the Official Plan. However, in 2017, the scoped review was put on hold pending the outcome of the "Brampton 2040 Vision: Living the Mosaic" (the 2040 Vision) process. Commencing in Fall 2017, the 2040 Vision process broadly engaged residents and stakeholders across the community to foster public discussion about the future of Brampton. Following this extensive engagement, the City's 2040 Vision was endorsed by City Council in June 2018.

The City's Official Plan Review was subsequently re-launched in Fall 2019 to build on the work completed through the 2040 Vision and to prepare a new Official Plan (hereinafter referred to as 'Brampton Plan') to guide growth and development over the next 30 years.

The drivers for undertaking a review of the Official Plan is three-fold:

Driver #1: Provincial Policy Consistency and Conformity

First, the City is required to review its Official Plan in accordance with the requirements of the ***Planning Act*** to ensure consistency with the ***Provincial Policy Statement***, 2020 and to ensure conformity with the ***Growth Plan for the Greater Golden Horseshoe***, including Amendment 1 (2020), applicable Provincial Plans, and the Region of Peel Official Plan.

Driver #2: Region of Peel Official Plan Conformity

Second, the Region of Peel initiated the Peel 2041+ Municipal Comprehensive Review (MCR) to bring the Regional Official Plan (ROP) into conformity with the current Growth Plan and guide the Region's population and employment growth to 2051. Brampton Plan is required to conform to the ROP.

Driver #3: Reflecting the 2040 Vision

Third, the 2040 Vision is intended to re-imagine Brampton to 2040 and proposes a future structure of the community, including areas of growth and intensification that respond to the seven key focus areas of the Vision. The 2040 Vision provides guidance for new Brampton Plan policy and sets overarching objectives for community and stakeholder engagement.

To Learn More

The Regional Official Plan is currently under review! Email Regional Planning and Growth Management to join their stakeholder list, stay up to date on upcoming meetings, and submit comments.

1.2 What is an Official Plan?

Official Plans are developed under a framework established by the Province of Ontario to ensure that short-and long-term growth is coordinated in a manner that meets local social, economic, built and natural environment needs and aspirations. Municipal Official Plans must be consistent with the ***Provincial Policy Statement, 2020*** (PPS, 2020) issued under the ***Planning Act,*** and must conform to, or not conflict with any applicable Provincial and Regional Plans, including the ***A Place to Grow: Growth Plan for the Greater Golden Horseshoe***, ***2020*** including amendment 1(the Growth Plan), the ***Greenbelt Plan***, ***2017*** and the Region of Peel Official Plan, as they relate to the City of Brampton.

These overarching policy documents provide direction to the City on land use planning matters. Overall, Official Plan policies establish:

- How to promote economic development and develop community improvement initiatives;
- How to protect and conserve cultural heritage resources;
- How to protect and enhance the city's environmentally sensitive areas;
- Where new housing, industry, offices and shops will be located;
- What community infrastructure, such as roads, transportation, utilities, parks, trails and schools will be needed to accommodate growth and develop healthy and sustainable communities; and
- Where, and in what order, different parts of the community will grow.

The development of Brampton Plan offers an opportunity to adopt a contemporary and strategic set of policies that will guide growth and development over the planning horizon and direct physical change and its affects on the social, economic, built, and natural environment of the city.

1.3 Brampton Plan Program

The Brampton Plan process will be completed across five phases. An overview of the project timeline, including the purpose of the different phases is presented in Figure 2 and listed below. Each phase of this project is associated with major deliverables and tailored consultation and engagement tactics.

The Brampton Plan work program includes the following phases:

Phase 1 – Background Review & Community Engagement Strategy

To introduce the project to the community and undertake a review of relevant background information.

Phase 2 – Test the Vision & Development Growth Scenarios

To assess and identify growth scenarios to contribute to the development of population and employment forecasts.

Phase 3 – Policy Analysis and Community Structure

To review existing Official Plan policy and confirm conformity with Provincial policy and plans. An updated community structure is proposed, and community and stakeholder meetings are being held to obtain feedback on the draft community structure.

Phase 4 – Discussion Papers and Policy Recommendations (current phase)

To prepare Discussion Papers to organize City priorities regarding emerging planning issues and report back on community feedback. A Policy Directions Report will also be prepared to assess new and emerging planning policy and research on directions for the policies and schedules of Brampton Plan.

Phase 5 – Draft Brampton Plan

To undertake the technical writing, reviewing, testing, and implementation of updates to Brampton Plan based on work completed to-date.

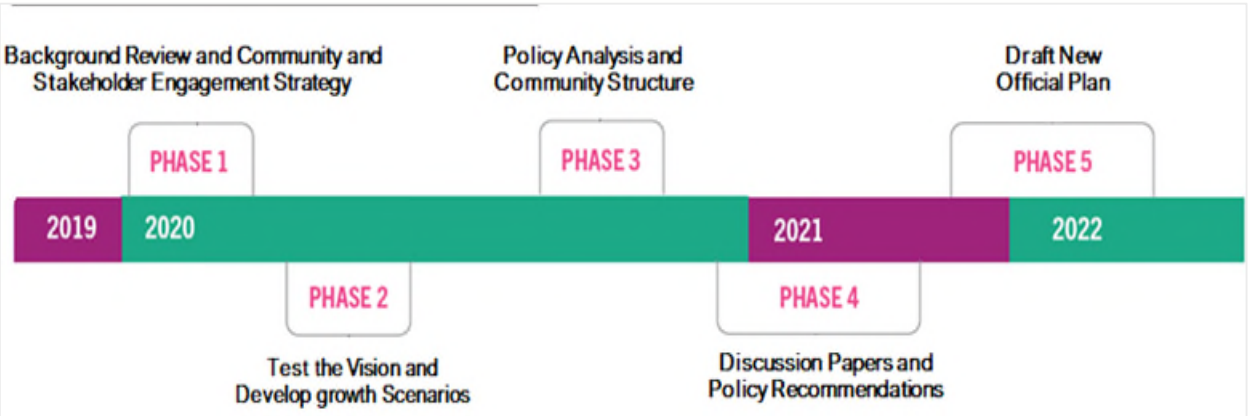

Figure 1: Brampton Plan project timeline

1.4 What is a Discussion Paper?

The current phase of the development of Brampton Plan includes the release of seven topic-based Discussion Papers, which align with the themes and findings of the Brampton 2040 Vision.

The papers are meant to get readers thinking about solutions for solving problems and charting a course for the city's future. The Discussion Papers set the stage for subsequent policy direction.

Some things to consider when reading the papers, include:

- Has the project team accurately captured the issues of importance to the city?
- Given this information, how do you see the city best developing and responding to current and potential future issues over the next 30 years?
- What ideas/solutions come to mind when reading the information?

Let's Connect!

Comments and feedback on the Discussion Papers can be provided on the Brampton Plan Project website or email to opreview@brampton.ca!

1.5 Purpose of this Discussion Paper

Building on the work completed in 2019 and 2020, seven Discussion Papers are being prepared as the first deliverable of Phase 4 of Brampton Plan work program to guide focused subject matter reviews. Deliverables of the first phases of Brampton Plan process included the following:

- **Document Review and Gaps Analysis,** to understand key gaps and topics that need to be addressed in Brampton Plan;
- **Policy Benchmarking Exercise,** to ensure that recent policy changes at the Provincial and Regional levels have been accounted for and their implications understood.
- **Policy Conformity Matrix,** to identify specific policies in the current Official Plan and determine how they meet the requirements of Provincial and Regional Policy;
- **Preliminary City Structure,** which was presented for community input; and,
- **Secondary Plan Consolidation Strategy,** to understand the role of Secondary Plans in Brampton Plan.

Building upon work completed in earlier phases of Brampton Plan process, Discussion Papers are themed according to seven (7) areas are identified in Figure 2.

While there are seven specific Discussion Papers, the themes within each paper are not exclusive and often connect with concepts or ideas discussed in another paper. These papers are also written with accessibility, diversity, sustainability and inclusion lenses to ensure the policy recommendations are prepared considering multiple perspectives and to raise awareness related to socio-economical issues impacting City of Brampton residents.

Figure 2: Focus Areas of the Official Plan Review

This Discussion Paper examines Natural Environment, Climate Change and Resiliency. While this Paper combines two themes, it should be noted that they are distinct.

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2 NATURAL ENVIRONMENT

2.1 What is the Natural Heritage System?

Natural heritage refers to natural landscape features and areas such as wetlands, woodlands, valleylands, lakes, and rivers. A Natural Heritage System is a network of interconnected natural heritage features.

Natural Heritage Systems are identified to help conserve biological diversity, maintain ecological functions (e.g. movement corridors for wildlife, endangered species habitat) and sustain ecosystem services that we all depend on (e.g. pollination, clean water, flood damage reduction)

2.2 Policy Context

This review considered relevant provincial, regional, and municipal policy documents as well as guidelines and best practices to describe the City's existing policy framework and provide an analysis and recommendations for policy direction.

2.2.1 Planning Act

The ***Planning Act*** establishes the legislative framework for planning within Ontario. The purpose of the ***Planning Act*** is to:

- Provide for a land use planning system led by provincial policy;
- Integrate matters of provincial interest into provincial and municipal planning decisions by requiring that all decisions shall be consistent with the ***Provincial Policy Statement*** when decision-makers exercise planning authority or provide advice on planning matters;
- Provide for planning processes that are fair by making them open, accessible, timely and efficient;
- Promote sustainable economic development in a healthy natural environment within a provincial policy framework;
- Encourage co-operation and coordination among various interests; and,
- Recognize the decision-making authority and accountability of municipal councils in planning.

According to Section 3.1 of the ***Planning Act***, the Minister of Municipal Affairs and Housing (MMAH) may issue policy statements on matters relating to municipal planning that, in the opinion of the Minister, are of provincial interest. The Council of a municipality, in carrying out its responsibilities under the ***Planning Act***, is required to have regard for matters of provincial interest, such as the:

a) Protection of ecological systems, including natural areas, features, and functions;
b) Conservation and management of natural resources and the mineral resource base;
c) Conservation of features of significant architectural, cultural, historical, archaeological or scientific interest;
d) Supply, efficient use, and conservation of energy and water;

e) Minimization of waste;
f) Orderly development of safe and healthy communities;
g) Protection of public health and safety;
h) Appropriate location of growth and development; and,
i) Promotion of development that is designed to be sustainable, to support public transit, and to be oriented to pedestrians.

2.2.2 Provincial Policy Statement, 2020

Issued under Section 3 of the ***Planning Act***, the ***Provincial Policy Statement*** (PPS, 2020) provides policy direction on matters of provincial interest related to land use planning and development, while protecting resources of provincial interest, public health and safety, and the quality of the natural and built environment. The PPS supports improved land use planning and management, which contributes to a more effective and efficient land use planning system.

The PPS, 2020 sets the policy foundation for regulating the development and use of land and supports the provincial goal to enhance the quality of life for all Ontarians. In accordance with the ***Planning Act***, all decisions affecting land use planning matters "shall be consistent with" the ***Provincial Policy Statement***.

The current ***Provincial Policy Statement*** came into effect on May 1, 2020. It includes policies on key issues that affect our communities, such as:

- The efficient use and management of land and infrastructure;
- The protection of the environment and resources;
- Ensuring appropriate opportunities for employment and residential development, including support for a mix of uses; and,
- Protecting public health and safety.

Municipalities use the PPS, 2020 to develop their Official Plans, and to guide and inform decisions on other planning matters.

2.2.3 Modernizing Ontario's Municipal Legislation Act, 2017 (Bill 68)

In May of 2017 the ***Modernizing Ontario's Municipal Legislation Act*** was introduced that helps enable municipalities to better protect natural heritage and address climate change. Through ***Bill 68,*** municipalities were given the authority to pass by-laws dealing with climate change, and to engage in long-term energy planning to address the impacts of climate change.

Municipalities were also enabled to pass by-laws mandating green standards respecting the construction of buildings, such as green roofs or alternative roof surfaces, once an appropriate technical standard has been established in the Building Code. Such powers were granted to the City of Toronto under the authority of Section 108 of the ***City of Toronto Act***, and in 2009, the municipality passed the Green Roof By-law.

In addition, ***Bill 68*** allowed municipalities to adopt and maintain policies with respect to the protection and enhancement of the tree canopy and natural vegetation.

2.2.4 A Place to Grow: Growth Plan for the Greater Golden Horseshoe, 2020

The Growth Plan is a long-term plan that works together with the Greenbelt Plan, the Oak Ridges Moraine Conservation Plan, and the Niagara Escarpment Plan to manage growth, build complete communities, curb sprawl, and protect the natural environment in the Greater Golden Horseshoe (GGH).

The Growth Plan recognizes that the identification and protection of a healthy diverse natural heritage system is vital to the long-term economic prosperity, quality of life, and environmental health of the region. Section 4.0 "Protecting What is Valuable" of the Plan contains several policies under the following subsections that will influence the formulation of Brampton's Natural Heritage policies:

- Water Resources Systems;
- Natural Heritage Systems;
- Key Hydrologic Features, Key Hydrologic Areas and Key Natural Heritage Features; and,
- Lands Adjacent to Key Hydrologic Features and Key Natural Heritage Features.

2.2.5 Greenbelt Plan, 2017

The Greenbelt Plan is the legislation that provides permanent protection to lands identified as Protected Countryside across the Golden Horseshoe Area. The Greenbelt Plan includes and builds on the Niagara Escarpment Plan and the Oak Ridges Moraine Conservation Plan, and supports and complements other provincial initiatives, such as the Parkway Belt West Plan. Municipalities are required to implement the direction of the Greenbelt Plan through their Official Plan.

In Brampton, there are approximately 202 ha (500 acres) of designated Protected Countryside adjacent to the Credit River in North West Brampton, which represents only one percent (1%) of Brampton total land base. The natural areas, features, functions, and linkages within the Greenbelt Plan area in northwest Brampton form part of the City's natural heritage system, although policies addressing the protection, conservation, buffering, restoration, and enhancement of these areas will be addressed by the City's Greenbelt Policies of the Official Plan. The Region of Peel has also prepared a Greenbelt Conformity Discussion Paper that is intended to assess and identify policy changes and update the policy framework required to conform to the Greenbelt Plan and the Region of Peel Official Plan.

In 2017, the Province added an Urban River Valley designation to the Greenbelt Plan. In Brampton, the Credit River, Etobicoke Creek, and the West Humber have been designated by the Greenbelt Plan as Urban River Valleys. This designation only applies to publicly owned lands and will be governed by Official Plan policies.

Brampton's current Official Plan policies may need to be updated to address development in or abutting urban river valleys, to strive for planning approaches outlined in Section 3.2.6 of the Greenbelt Plan that:

- Establish or increase the extent or width of vegetation protection zones in natural self-sustaining vegetation, especially in the most ecologically sensitive areas (i.e. near the stream and below the stable top of bank);

- Increase or improve fish habitat in streams and in the adjacent riparian lands;
- Include landscaping and habitat restoration that increase the ability of native plants and animals to use valley systems as both wildlife habitat and movement corridors; and,
- Seek to avoid, or if avoidance is not possible, minimize and mitigate adverse impacts associated with the quality and quantity of urban run-off into the valley systems.

2.2.6 Parkway Belt West Plan, 1978

The Province established the Parkway Belt West Plan in 1978 "[f]or the purposes of creating a multi-purpose utility corridor, urban separator and linked open space system". While the Parkway Belt West Plan identifies a land reserve for provincial infrastructure (i.e. highways, hydro corridors and pipelines), it also expresses a goal to "provide a system of open space and recreational facilities linked with each other, nearby communities and other recreational areas".

In Brampton, the Parkway Belt West Plan Area (PBWPA), as well as the 407 ETR, is bisected by several valleys and watercourse corridors and contains successional areas and forest cover that contribute to Brampton's natural heritage systems. The PBWPA functions as an east/west ecological linkage across Brampton's southern boundary. The PBWPA is also comprised of a variety of existing land uses, such as industrial, commercial, open space (e.g. active parkland) and agriculture.

In 2017, the ministry sought feedback on proposed amendments that would impact lands located within the PBWP and lands covered by related Minister's Zoning Orders in several regional municipalities, including Peel. The consultation is now closed, and the feedback received is being considered.

The PBWPA designation in the Brampton Official Plan is an opportunity to identify and acknowledge the unique environmental and recreational opportunities the PBWPA provides to Brampton's natural heritage system, open space system, and urban forest. Specifically, there is opportunity to depict the PBWPA as a potential restoration and enhancement area that demonstrate linkages to, and within, the natural heritage system, and to foster stewardship and partnerships with the infrastructure / utility providers.

2.2.7 Endangered Species Act, 2007

In 2007, the Province approved Ontario's new ***Endangered Species Act*** (ESA), and in 2019 made significant amendments to this Act. The purposes of the ESA are:

1. To identify species-at-risk based on the best available scientific information, including information obtained from community knowledge and aboriginal traditional knowledge;
2. To protect species that are at risk and their habitats, and to promote the recovery of species that are at risk; and,
3. To promote stewardship activities to assist in the protection and recovery of species that are at-risk.

Any activity that constitutes harm to an endangered or threatened species or damages its habitat must receive approval from the Ministry of Environment, Conservation and Parks (MECP) under the ESA.

Brampton's natural heritage system contains a number of endangered or threatened species and their associated habitats, including but not limited to, Redside Dace, Bobolink, Barn Swallow and Eastern Meadowlark. The ESA impacts Brampton in its role as a land use approval authority, and as a proponent of infrastructure projects and land management. The ESA contains specific direction to influence the:

- Planning and design of new communities;
- Construction of new roads, bridges, trails, and other infrastructure;
- Requirements of stormwater management; and,
- Remediation of watercourses and the naturalization of valley corridors.

2.2.8 Provincial Strategies and Technical Guidance

In support of their legislation and plans, the Province and Federal governments have prepared a number of strategies and technical guidelines that provide direction and best practices for protecting, enhancing, and maintaining natural heritage systems, such as:

- Ontario Biodiversity Strategy (2011), Ontario Biodiversity Council[1];
- Made in Ontario Environment Plan, Government of Ontario (2018)[2];
- Ontario's Invasive Species Strategic Plan (2012), Ontario Ministry of Natural Resources[3];
- Wetland Conservation in Ontario: Discussion Paper (2015) Ontario Ministry of Natural Resources[4];
- Significant Wildlife Habitat Mitigation Support Tool (2014), Ontario Ministry of Natural Resources[5];
- How Much Habitat is Enough? (2013), Environment Canada[6];
- Guide to Road Ecology in Ontario (2010), Environment Canada[7];
- Natural Heritage Reference Manual (2010), Ontario Ministry of Natural Resources[8];

[1] Ontario Biodiversity Council. *Ontario's Biodiversity Strategy, 2011*. Ontario: Ontario Biodiversity Council, 2011. Available: http://ontariobiodiversitycouncil.ca/wp-content/uploads/Ontarios-Biodiversity-Strategy-2011-accessible.pdf

[2] Government of Ontario. *Made-in-Ontario Environment Plan*. 2018. Available at: https://www.ontario.ca/page/made-in-ontario-environment-plan

[3] Ministry of Natural Resources. *Ontario Invasive Species: Strategic Plan 2012*. Available: https://www.ontario.ca/document/invasive-species-strategic-plan-2012

[4] Ministry of Natural Resources. *Wetland Conservation in Ontario: A Discussion Paper*. 2015. Available: http://govdocs.ourontario.ca/node/29110

[5] Ministry of Natural Resources and Forestry. Significant Wildlife Habitat Mitigation Support Tool (Version 2014). Available: https://www.ontario.ca/document/significant-wildlife-habitat-mitigation-support-tool

[6] Environment Canada. *How Much Habitat is Enough? (3rd edition)*. Toronto: Environment Canada, 2013. Available: https://www.documentcloud.org/documents/2999368-THUNDER-BAY-How-Much-Habitat-Is-Enough-3rd-Ed-2013.html

[7] Toronto Zoo. *Guide to Road Ecology in Ontario*. Canada, 2010. Available: http://www.rom.on.ca/sites/default/files/imce/oreg_final.pdf

[8] Ministry of Natural Resources. *Natural Heritage Reference Manual for the Natural Heritage Policies of the Provincial Policy Statement, 2005 (Second Edition)*. Available: https://www.ontario.ca/document/natural-heritage-reference-manual

- The Economics of Ecosystem Services and Biodiversity in Ontario (2012), Ontario Ministry of Natural Resources[9];
- Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E, Ontario Ministry of Natural Resources and Forestry[10];
- Greenbelt Plan 2005: Technical Definitions and Criteria for Key Natural Heritage Features in the Natural Heritage System of the Protected Countryside Area, Ontario Ministry of Natural Resources.[11];
- Ontario's Pollinator Health Action Plan (2016), Ontario Ministry of Agriculture, Food and Rural Affairs[12];
- Erosion & Sediment Control Guidelines for Urban Construction (2006), Conservation Authorities[13];
- Seaton Sustainable Urban Community Development Plans[14]; and,
- Urban Forest Best Proactive Guide, Region of Peel (2021)[15].

Federal and Provincial legislation, plans, strategies, and guidelines identify a number of policy directions that Brampton needs to consider as it updates its Official Plan Natural Heritage policies. Current Official Plan policies have addressed some of these directions, however, many policies lack clear direction on the City's expectations to address varied environmental issues. Brampton's Official Plan policies must conform to new direction provided by federal and provincial legislation and plans and can use the above noted federal and provincial strategies and guidelines as examples for new policy.

2.2.9 Region of Peel Official Plan, 2018

The Peel Region Official Plan is Regional Council's long-term policy framework for decision making. It sets the Regional context for detailed planning by protecting the environment, managing resources, directing growth, and setting the basis for providing Regional services in an efficient and effective manner. The Official Plan provides direction for future planning activities and for public and private initiatives aimed at improving the existing physical environment.

The Region Official Plan policies recognize that protecting, restoring, and enhancing Peel's natural systems is a joint effort with area municipalities, conservation authorities, other agencies, and residents.

[9] Miller, E. & P. Lloyd. *The Economics of Ecosystem Services and Biodiversity in Ontario: Assessing the Knowledge and Gaps*. 2012. Available: http://sobr.ca/_biosite/wp-content/uploads/TEEBO_20120501_HighQuality.pdf

[10] Ontario Ministry of Natural Resources and Forestry. *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E*. Available: https://www.ontario.ca/document/significant-wildlife-habitat-ecoregional-criteria-schedules-ecoregion-7e

[11] Ontario Ministry of Natural Resources. *Greenbelt Plan 2005: Technical Definitions and Criteria for Key Natural Heritage Features in the Natural Heritage Features in the Natural Heritage System of the Protected Countryside Area*. December 2012. Available: http://www.mah.gov.on.ca/Page10197.aspx

[12] Government of Ontario. *Ontario's Pollinator Health Action Plan*. 2016. Further information available at: https://news.ontario.ca/en/bulletin/43131/ontario-launches-action-plan-to-protect-pollinators

[13] Credit Valley Conservation Authority. *Erosion & Sediment Control Guidelines for Urban Construction*. 2006. Available: http://www.creditvalleyca.ca/wp-content/uploads/2011/01/010-ESC_Guideline-for-Urban-Construction.pdf

[14] Schollen & Company Inc. *Seaton Natural Heritage System: Management Plan and Master Trails Plan*. 2008. Available: https://www.pickering.ca/en/cityhall/resources/nhs-final.pdf

[15] Region of Peel. *Urban Forest Best Practices Guide*. 2021. Available at:

Chapter 2 of the Region's Official Plan, titled The Natural Environment, promotes an ecosystem approach that highlights the importance of the environment and its integrated systems. Accordingly, the Region's Official Plan recognizes that the natural environment provides a life support system for urban areas and provides social, health and economic benefits for residents and visitors to Peel Region.

Chapter 2 also identifies a tiered Greenlands System that consists of various features and linkages separated into three categories: Core Areas, Natural Areas and Corridors (NACs) and Potential Natural Area Corridors (PNACs). Through the Regional Official Plan Amendment 21 (ROPA 21), the Region defined significant valley and watercourse corridors, woodlands, and wildlife habitat criteria and thresholds that aid in the identification of its Greenland System components. ROPA 21 also contains policies for restoration of the Peel Parkway Belt West Plan Area (PWBPA) natural features and areas, urban forest, invasive species, and Greenland Securement.

The Region of Peel is currently undertaking an Official Plan Review, which includes a policy review of the Greenlands System. A recently released Discussion Paper to inform and engage the Region of Peel's stakeholders, local municipalities and the public. It identifies policy gaps, opportunities, and updates to conform to provincial plans, policies and guidelines. as well as identify what must be updated to ensure conformity with provincial plans, policies and guidelines. The discussion paper outlines the sift towards a Systems Approach to Natural Heritage Planning for the Regional Greenlands and clarifies how all of the provincial, regional, and local policies in the Region work together to provide a complete integrated system.

Regional policies influence Brampton in its role as a land use approval authority, and as a proponent of infrastructure projects and land manager.

2.2.10 Region of Peel Strategies and Studies

The Region of Peel has prepared a number of strategies and studies in partnership with area municipalities and local conservation authorities that help inform municipal policies and management practices. The following Peel strategies and studies provide direction and best practices for the conservation and management of the Brampton's natural heritage system and built environment:

Peel-Caledon Significant Woodlands and Significant Wildlife Habitat Study: provides criteria and thresholds for identifying significant woodlands and wildlife habitat based on ecological and conservation considerations. [16]

Peel Climate Change Strategy (PCCS): recognizes that local actions are critical to mitigate and adapt to climate change. The PCCS builds upon and complements the suite of policies, plans, and programs already being undertaken by the partner organizations in areas of planning and leadership, reducing greenhouse gas emissions, proactive adaptation actions, community awareness and engagement, and research and risk management. [17].

[16] Region of Peel. *Peel – Caledon Significant Woodlands and Significant Wildlife Habitat Study*. 2009. Available: https://www.peelregion.ca/planning/officialplan/woodlands-and-wetlands-discussion-paper.htm

[17] Region of Peel. *Peel Climate Change Strategy: A Strategic Plan for Climate Change for the Geographic Region of Peel*. 2011. Available: https://cvc.ca/wp-content/uploads/2019/09/1rpt_PeelClimateChangeStrategy_2011.pdf

Peel Urban Forestry Strategy: provides a framework and strategic direction for the protection and enhancement of the urban forest which includes trees on public and private lands and within woodlands. [18]

Peel Tree Planting Prioritization Tool: a flexible Geographic Information System (GIS) based mapping tool able to identify and prioritize opportunity areas for tree planting across Peel's urban areas based on environmental, economic, and social benefits that trees provide.

Peel Long Range Transportation Plan: a five-year plan that guides transportation planning and infrastructure needs in the Region and sets out the blueprint to accommodate anticipated growth to 2041.

2.2.11 Brampton 2040 Vision: Living the Mosaic, 2018

The 2040 Vision is intended to reimagine and re-invent Brampton to 2040, and to capitalize on its strategic location in the Greater Toronto Area with existing transportation access, an integrated green network, and international linkages. The Vision reflects Brampton's diversity and outlines seven key focus areas that will be considered during the planning and accommodation of future population and employment growth.

The future structure of the community is outlined in the 2040 Vision at a high-level, including the focused areas for growth and intensification, key transit and transportation nodes and corridors, major transit station areas, as well as key natural heritage, parks and open spaces.

Seven overarching vision statements were developed to address the environmental, socio-economic, transportation, and cultural goals of Brampton. The seven vision statements contained in the 2040 Vision are:

Vision 1: In 2040, Brampton will be a mosaic of sustainable urban places, sitting within an interconnected green park network, with its people as environmental stewards – targeting 'one-planet' living.

Vision 2: In 2040, Brampton will be a mosaic of vibrant centres with quality jobs, a rich range of activities, and integrated living.

Vision 3: In 2040, Brampton will be a mosaic of characterful and complete neighbourhoods.

Vision 4: In 2040, Brampton will be a mosaic of safe, integrated transportation choices and new modes, contributing to civic sustainability, and emphasizing walking, cycling, and transit.

Vision 5: In 2040, Brampton will be a rich mosaic of cultures and lifestyles, coexisting with social responsibility, respect, enjoyment, and justice.

Vision 6: In 2040, Brampton will be a mosaic of healthy citizens enjoying physical and mental wellness, fitness, and sports.

Vision 7: In 2040, Brampton will support a mosaic of artistic expression and production.

[18] Toronto and Region Conservation Authority (TRCA). *Peel Region Urban Forest Strategy*. 2011. Available: https://www.itreetools.org/documents/336/Peel_Urban_Forest_Strategy.pdf

Two catalytic actions noted under Vision 1 have a direct relationship to Brampton's natural heritage system:

- Action #1-2 - Brampton Eco-Park: Constitute the green park network into one grand designated municipal park and nature reserve.
- Action #1-3 - Brampton Trees Project: Plant one million trees in the public and semi-public realm of Brampton, particularly along streets and roads and in parking lots, to enhance the green canopy.

Vision 2040 will provide guidance for new Official Plan policy and set's over-arching objectives for community and stakeholder engagement.

2.2.12 City of Brampton Official Plan, 2006

The City of Brampton comprises an area of approximately 269 square kilometres and is characterized by the numerous river and valley corridors that connect the city to some of Ontario's most significant landscapes and regional ecosystems, including the Greenbelt, Niagara Escarpment, Oak Ridges Moraine, and Lake Ontario.

The City's Official Plan (2006)[19] outlines an ecosystem approach to land use planning in Brampton, which involves:

- Balancing the social, economic, environmental, and cultural needs of the community;
- Making wise use of non-renewable resources; and,
- Protecting, enhancing, and restoring the natural heritage system and environmental resources for future generations.

The Natural Heritage and Environmental Management policies of Section 4.6 of the City's current Official Plan defines the City's responsibilities to identify, conserve, maintain, restore, enhance, and manage its natural heritage systems and natural hazards to ensure a sustainable and healthy community and ecosystem. This section also provides direction for managing environmental impacts to the community and residents from man-made hazards, such as noise and contaminated soils.

Schedule D in the Official Plan, as illustrated in Figure 5, depicts Brampton's natural areas and features, which consist of:

- Valleylands and watercourse corridors;
- Woodlands;
- Wetlands (Provincially Significant and other wetlands);
- Environmentally sensitive/significant areas;
- Areas of Natural and Scientific Interest (ANSI); and,
- Greenbelt Plan Natural System.

There are additional elements not illustrated on Scheduled D that are also taken into consideration when protecting the natural heritage system include, such as fish habitat, significant wildlife habitat, and habitat of endangered and threatened species.

[19] City of Brampton. Official Plan (Office Consolidation September 2020). 2006. Available: https://www.brampton.ca/EN/City-Hall/Official-Plan/Documents/Sept2020_Consolidated_OP_2006.pdf

Brampton's natural heritage system extends into all corners of the city, and influences and is influenced by all of the city's land uses. Developing environmental management and sustainability policies for all land uses is critical to protecting and enhancing the natural heritage system and improving the ecosystem services it provides. As such, there is a need to ensure other Official Plan sections, such as Transportation, Urban Design, Recreational Open Space, Residential, Infrastructure and Utilities consistently address sustainability and environmental management issues, as appropriate, in their planning, design, and implementation of services and operations.

The Official Plan also directs the preparation of master plans and other strategies that are intended to improve Brampton's sustainability, ability to adapt and mitigate climate change, and support community health and well-being. These plans and strategies will be recognized in various discussion papers prepared for the Official Plan review.

2.2.13 Brampton Grow Green Environmental Master Plan, 2020

The Brampton Grow Green Environmental Master Plan (EMP)[20] focuses on providing Brampton with a plan to be a municipal leader in environmental sustainability performance. The original EMP, released in 2014, provided a comprehensive framework to improve Brampton's environmental performance. The 2020 update highlights the successes and challenges of creating a greener Brampton and includes a refreshed action plan, metrics, and targets that will accelerate change.

The EMP champions Brampton as a community that will conserve, enhance, and balance our natural and built environments to create a healthy, resilient, and sustainable city.

Included in the Grow Green framework are 6 six goals, including:

1. Invest in **PEOPLE** to create a healthy, livable and safe community.
2. Reduce impacts on **AIR** quality.
3. Protect and respect **WATER** as a non-renewable, life critical resource.
4. Manage **LAND** to sustain the natural environment.
5. Reduce **ENERGY** consumption and manage the impact of energy usage on our environment.
6. Reduce and manage the material considered **WASTE.**

The EMP identifies a list of items that need to be integrated into the City's Official Plan policies. How this will occur is discussed further is Section D of this discussion paper.

2.2.14 Natural Heritage Environmental Management Strategy, 2014

Brampton's Natural Heritage and Environmental Management Strategy (NHEMS) is a proactive approach to improve the long-term health of the city's natural heritage system. The strategy not only recognizes that a healthy natural heritage system depends on the conservation, restoration, connection, and enhancement of natural heritage features and functions, it is also dependent on

[20] City of Brampton. Brampton Grow Green Environmental Action Plan: Refresh (2020). 2020. Available: www.brampton.ca/emp

a built environment that is planned, designed, and maintained in a manner that seeks to minimize and mitigate negative impacts on the natural heritage system and improve ecosystem services[21].

The NHEMS was prepared in two distinct phases. Phase 1 involved the development of a science-based Natural Heritage System for the City of Brampton that represents a refinement of TRCA's and CVC's watershed-based natural heritage systems[22]. The Conservation Authority Natural Heritage System Mapping for the City of Brampton (CVC and TRCA, 2014)[23] describes the NHS refinement and how it fed into the NHEMS study. This Phase 1 natural heritage system will be used to inform the City's update of its Official Plan Schedule D.

Phase 2 of the NHEMS developed a mission, goals, objectives, targets, and actions to enhance the health and resilience of Brampton's natural and built landscapes and identified policy gaps to be addressed in the Brampton Official Plan update[24].

2.2.15 Stormwater Master Plan

Municipal approaches to stormwater management has changed significantly over the decades, whereby environmental objectives are being integrated with water resource hazard management and the ecological and functional interrelationship of the water, aquatic, and terrestrial systems.

With assistance from the conservation authorities, Brampton has developed an integrated, holistic approach to stormwater management that considers rainwater and stormwater runoff as resources that should be used wisely for urban purposes and managed for ecological functions that support aquatic and terrestrial ecosystems. The 2012 TRCA and CVC guidelines for Stormwater Management are currently being updated for consistency across Peel.

The Master Plan recommends a number of low impact development[25] techniques that more closely mimic the attributes of the hydrologic cycle to retain, utilize, infiltrate and treat rainwater and stormwater runoff. These Low Impact Development (LID) may include but not limited to:

- Bioretention - bioswales and filter swales
- Permeable pavers;
- Green roofs;
- Rain barrels and cisterns;
- Soil amendments;

[21] Ecosystem services are commonly defined as the benefits provided by natural systems. The United Nations categorizes ecosystems services into four main categories: Provisioning Services, Regulating Services, Supporting Services, and Cultural Services.

[22] City of Brampton. *Natural Heritage & Environment Management Strategy: Background Report*. 2015. Credit Valley Conservation and Toronto Region Conservation Authority. Conservation Authority Natural Heritage System mapping for the City of Brampton. 2014. Available at : https://cvc.ca/wp-content/uploads/2016/08/Brampton-NHS-Report-Final-2014-10-27.pdf

[23] Credit Valley Conservation and Toronto & Region Conservation Authority. Conservation Authority Natural Heritage System mapping for the City of Brampton. 2014. Available at : https://cvc.ca/wp-content/uploads/2016/08/Brampton-NHS-Report-Final-2014-10-27.pdf

[24] City of Brampton. *Natural Heritage & Environment Management Strategy: Implementation Report*. 2015. Available: https://www.brampton.ca/EN/residents/GrowGreen/Documents/NHEMS_Implementation_Action_Plan_FINAL.pdf

[25] Comprises a set of site design strategies and distributed, small scale structural practices to mimic the natural hydrology to the greatest extent possible through infiltration, evapotranspiration, harvesting, filtration and detention of stormwater.

- Rain gardens; and,
- Exfiltration systems.

The holistic management of the city's water resources will most easily be implemented in Greenfield development areas, where the preparation of subwatershed studies will identify the functional relationship of the water, aquatic, and terrestrial systems, assess and model the impacts of urbanization, and recommend integrated solutions to maintain and enhance a healthy ecosystem.

The Master Plan also identifies a number of priority stormwater retrofits in existing communities with little or no stormwater management, where streams and rivers that have been realigned, channelized and/or hardened in a significant manner.

Lastly, the Stormwater Master Plan addresses issues relating to the design and construction, operation and maintenance of the overall stormwater management system, which is critical to meet the planning, engineering, and environmental protection objectives of the City of Brampton on a cost-effective basis.

2.2.16 Brampton's Ecosystem Approach Strategies, Programs, and Practices

Since the last Official Plan update, the City and conservation agencies have adopted a number of best practices through development planning and operational programs for natural heritage system planning, protection and management. These best practices reflect Brampton's ecosystem approach to establishing a healthy, diverse natural heritage system and robust urban tree canopy, and restoration of ecosystem services, and include:

Brampton Eco Park Strategy: A catalytic action identified in the Brampton 2040 Vision, the Brampton Eco Park Strategy aims to enhance and maintain natural systems and processes, while integrating opportunities for meaningful social and environmental interactions and experiences. Through seven guiding principles and a detailed action plan, it outlines how to establish an interconnected network of urban and green spaces that allow people and the environment to live and thrive together. The majority of Brampton's 2500 hectares of Natural Heritage System (NHS) forms the backbone of Brampton Eco Park. From this foundation, Brampton Eco Park will expand and evolve into parks, streetscapes, and other city spaces to eventually form a comprehensive green framework overlaying the city. [26]

Brampton One Million Trees Program: The Brampton 2040 Vision calls for the planting of one million trees by 2040 to grow the urban forest, mitigate and adapt to climate change, and foster the delivery of ecosystem services. The One Million Trees Program is a framework for the City and its partners to increase tree planting initiatives and realize the target of one million trees by 2040.

Urban Forest Management Plan: Currently being developed, the Urban Forestry Management Plan (UFMP) will provide strategic guidance intended to sustain and enhance the urban forest in Brampton to maximize the environmental, social, economic and health benefits it provides to the community. The UFMP is part of the Brampton's Grow Green Environmental Master Plan (EMP) and one of the key initiatives to addressing Brampton's 2040 Vision, Community Energy and

[26] City of Brampton. Brampton Eco Park Strategy. 2019. Available: www.brampton.ca/ecopark

Emissions Reduction Plan (CEERP), and the target to plant one million trees in Brampton by 2040.

Natural Heritage Restoration Program[27]: The City of Brampton is establishing a Natural Heritage Restoration Program (NHRP) to restore and naturalize areas within the natural heritage system, parks, and infrastructure to address the historical conditions and current impacts on the NHS. The Natural Heritage Restoration Program focuses on City actions to restore natural areas that have been degraded over time, and improving their ecological function. Its implementation will play an important role in conserving, restoring, and enhancing Brampton's natural heritage system. The NHRP conforms to the goals and objectives set out in several City documents including Brampton's Grow Green Environmental Master Plan (EMP), the Natural Heritage Environmental Management Strategy (NHEMS), the Parks and Recreation Master Plan, the Region of Peel Priority Tree Planting Tool, and the City and Region Official Plans.

Systems Approach to Natural Heritage Planning: All of Brampton's new Secondary Plan and Block Plan areas have been prepared using a systems approach to natural heritage planning. This means identifying a natural system that is made up of natural heritage features and areas, linked by natural corridors to maintain biological and geological diversity, natural functions, viable populations of indigenous species, and ecosystems. These systems include lands that have been restored, areas with the potential to be restored to a natural state, and connections to parks and other green spaces.

No Net Loss of Natural Heritage Features: Current natural heritage planning practice directs no loss of provincially, regionally, and locally significant natural heritage features, including wetlands, woodlands, and valleylands. The goal of this practice is to ensure that the total area of the natural heritage system is protected after development and site alteration are complete. Protection of natural features, functions, and linkages are addressed through comprehensive environmental studies that identify NHS conservation, alteration, mitigation, and compensation requirements.

Achievement of Net Gain: Further to the 'no net loss' of natural features, the Province requires demonstration of 'overall benefit' for development and site alterations impacting the habitat of species at risk. Recent natural heritage planning practice recognizes the value of 'overall benefit' and has identified the need to enhance the features and functions of natural areas disturbed through development and site alteration. Opportunities for restoration and enhancement to demonstrate net ecological gain to the natural heritage system are identified through comprehensive environmental studies.

Compensation for the Loss of Tableland Vegetation: To protect and grow the city's urban forest, development and site alteration projects are required to provide tableland vegetation assessments that demonstrate mitigation measures for the removal of any healthy trees with a 15-centimeter diameter at breast height (dbh) or greater, including compensation plantings.

Integration of Hedgerow and Tableland Vegetation: The City recognizes the ecological function of existing hedgerows and tableland vegetation to protect and link natural heritage features, and to support and enhance the urban forest. Brampton requires Secondary Plans,

[27] City of Brampton. Natural Heritage Restoration Program. 2018. Available at: https://www.brampton.ca/EN/residents/ GrowGreen/Documents/NHRP_Final_April_2018.pdf

Block Plans, Plans of Subdivisions, and Site Plans to identify and protect significant hedgerows and specimen trees.

Adaptive Environment Management: To ensure the long-term health and conservation of the biodiversity of the protected natural heritage system, development must provide an adaptive monitoring plan to assess the health of the NHS pre-, during, and post-development, and as appropriate, undertake actions to address impacts by instituting appropriate management measures.

Natural Channel Design: Any alteration or realignment of a stream channel or corridor, including protected headwater drainage features, must use natural channel techniques to restore or replicate the form and functions of a self-sustaining natural channel system, including floodplain.

Low Impact Development (LID): To mitigate development and site alteration impacts to natural features, and to protect water quality and minimize stream erosion, LIDs such as bioswales, infiltration galleries, and rain gardens are being integrated into roads, parks, landscape areas, and residential developments.

Water Balance: Urbanization causes fundamental changes to the hydrology of stream catchments, impacting the volume, frequency, duration, timing, and distribution of water flow. Measures to mitigate water balance impacts, such as LIDs, are necessary to address development and site alteration impacts to groundwater and surface water resources, and to natural features such as wetlands.

2.2.17 Watershed Natural Heritage System Modelling

Toronto and Region Conservation Authority (TRCA)[28] and Credit Valley Conservation (CVC)[29], have developed watershed natural heritage systems through science-based models that aim to identify the land base necessary to protect and restore biodiversity and ecosystem function over the long-term in the rapidly developing Greater Toronto and Hamilton Area (GTAH). In collaboration with the City of Brampton, a refinement of the TRCA and CVC NHS was undertaken to produce the Conservation Authority Natural Heritage System Mapping for the City of Brampton (2014)[30].

Current conservation authority (CA) data and analyses indicate that protecting existing natural heritage cover will not be sufficient to sustain long-term ecosystem health. In response, both CAs have developed "targeted systems" comprised of existing natural cover and areas with the potential to be restored and/or managed to increase ecosystem functions and services.

[28] Toronto and Region Conservation Authority. *Terrestrial Natural Heritage System Strategy (TNHSS)*. 2007. Available: https://trca.ca/conservation/lands/terrestrial-natural-heritage//

[29] Credit Valley Conservation. Natural Heritage System Strategy. 2015. Available: http://www.creditvalleyca.ca/watershed-science/our-watershed/natural-heritage-system-strategy/

[30] Credit Valley Conservation. Natural Heritage System Mapping for the City of Brampton. 2014. https://cvc.ca/wp-content/uploads/2016/08/Brampton-NHS-Report-Final-2014-10-27.pdf

2.2.18 Watershed Polices

TRCA and CVC have developed watershed policies, such as the TRCA Living City Policies[31] and CVC Watershed Planning and Regulation Policies[32], to guide the implementation of CA's legislated and delegated roles and responsibilities in the planning and development approvals process.

The watershed policy documents purpose is four-fold:

- To guide CA review of planning applications and environmental assessments;
- To provide the basis for approving permit applications under Section 28 of the ***Conservation Authorities Act***;
- To inform the CA's advocacy role in the planning and development process; and,
- To assist and enable their partners' and stakeholders' contributions to natural heritage management and stewardship, and city-building sustainability.

2.2.19 Conservation Authorities (CAs) Studies and Guidelines

In support of its watershed policies, the TRCA and CVC have prepared studies in partnership and consultation with regional and area municipalities and other conservation agencies. These studies provide direction and best practices for the identification, conservation, and management of the natural and built landscape and include:

Stormwater Management Criteria[33], **TRCA, CVC**[34]: provides water balance criteria to protect groundwater, baseflow, and natural features, such as wetlands and woodlots; the "Wetland Water Balance Monitoring Protocol" provides to guidance to proponents of urban development, infrastructure, or water extraction applications (e.g. water taking, pits, quarries, etc.) that have the potential to impact wetland features.

Low Impact Development (LID) Stormwater Management Planning and Design Guide (LID Guide[35]**,) CVC and TRCA:** outlines significant opportunities to address water balance and climate change adaptation.

[31] Toronto and Region Conservation Authority. The Living City Policies for Planning and Development in the Watershed of the Toronto and Region Conservation Authority. 2014. Available: https://trca.ca/planning-permits/living-city-policies/

[32] Credit Valley Conservation. Watershed Planning and Regulation Policies. Available: http://www.creditvalleyca.ca/planning-permits/policies-guidelines/

[33] Toronto and Region Conservation Authority. Stormwater Management Criteria. 2012. Availability: http://sustainabletechnologies.ca/wp/wp-content/uploads/2013/01/SWM-Criteria-2012.pdf

[34] Credit Valley Conservation. Stormwater Management Criteria. 2012. Available at: https://cvc.ca/wp-content/uploads/2014/09/cvc-swm-criteria-appendices-Aug12-D-july14.pdf

[35] Credit Valley Conservation. *Low Impact Development (LID) Stormwater Management Planning and Design Guide*. 2010. Available: http://www.creditvalleyca.ca/low-impact-development/low-impact-development-support/stormwater-management-lid-guidance-documents/low-impact-development-stormwater-management-planning-and-design-guide/

Guidelines for Valley and Watercourse Crossings, TRCA[36], CVC[37],[38]: the planning and design of road and trail crossings can negatively impact valley and stream corridor including upstream flooding, and natural heritage features and functions.

Compensation Protocols and Guidelines, TRCA[39], CVC[40]: Guidelines and protocols to support watershed and municipal natural heritage feature compensation policies. Although compensation is not the preferred environmental management option, it is useful in limited circumstances when impacts cannot be avoided in the planning and environmental assessment processes.

Conservation Authority watershed regulations, policies, studies and guidelines support a number of policy directions that Brampton needs to undertake as it updates its Official Plan Natural Heritage policies.

2.3 Natural Environment Policy Analysis and Recommendations

This section of the discussion paper focuses on the need for updates to policies and mapping to bring the Brampton Official Plan into conformity with the ***Provincial Policy Statement*** and Region of Peel Official Plan. These updates will strengthen existing policies, implement City and Regional natural heritage strategies, recognize emerging natural heritage planning trends and practices, remove outdated policy references, and incorporate new ecological data as gathered by the City and conservation agencies.

A new schedule is contemplated that will depict the natural heritage system including potential enhancement areas and linkages in the City of Brampton. The current Natural Areas and Features map (Schedule D) will be updated using the latest ecological data collected by the Conservation Authorities, applicable Provincial ministries, and as provided through comprehensive environmental studies prepared in support of new Secondary and Block Plan areas in Brampton.

The Environmental Master Plan, Natural Heritage and Environmental Management Strategy, and the Stormwater Management Master Plan are key municipal documents that contribute to the understanding of opportunities to improve the existing Official Plan policies. As well, since 2006, the City has adopted many best practices in its day-to-day planning for, and management of, the natural heritage system, municipal green spaces, and the built environment that should be recognized in updated policies. Lastly, a review of other municipal policies will inform the proposed policies for the City of Brampton.

[36] Toronto and Region Conservation Authority. *Crossing Guidelines for Valley and Stream Corridors Stream Crossing*. 2015. Available: http://www.trca.on.ca/dotAsset/214493.pdf
[37] Credit Valley Conservation. *Fish and Wildlife Crossing Guidelines*. 2017. Available at https://cvc.ca/wp-content/uploads/2017/05/CVC-Fish-and-Wildlife-Crossing-Guidelines-final-web.pdf
[38] Credit Valley Conservation. *Technical Guidelines for Watercourse Crossings Version 1.0*. 2019. Available at https://cvc.ca/wp-content/uploads/2019/10/CVCCrossingGuidelines_2f_20191025.pdf
[39] Toronto and Region Conservation Authority. *Guideline for Determining Ecosystem Compensation*. 2018. Available at: https://s3-ca-central-1.amazonaws.com/trcaca/app/uploads/2019/11/27105627/TRCA-Guideline-for-Determining-Ecosystem-Compensation-June-2018_v2.pdf
[40] Credit Valley Conservation. *Ecosystem Offsetting Guidelines*. 2019. Available at: https://cvc.ca/wp-content/uploads/2019/10/CVCCrossingGuidelines_2f_20191025.pdf

2.3.1 Outdated Policy Statements

Section 4.6 of the 2006 Official Plan has been updated on a regular basis over the last several years in response to provincial policy and regulation, such as ***Places to Grow Act*** and associated Growth Plan for the Greater Golden Horseshoe. As such, most of this section's outdated policies have been edited to current standards.

One major exception is the PPS's requirement to recognize, protect, restore, and enhance a natural heritage system, which will involve significant changes to section 4.6. These changes will require a reorganization of the section and additional policies to ensure the City utilizes a "systems" approach to its natural heritage planning.

2.3.2 Policy Statement Gaps

Policy focus areas that have been included by other municipalities, ***Ontario Regulation 588/17 (Asset Management Planning for Municipal Infrastructure),*** and/or are relevant to new legislation/practise and not included in Brampton's 2006 OP are listed below, and discussed in further detail in Key Policy Directions (section 2.3.3) and Stormwater Management (section 2.3.11) of this discussion paper.

- Formal recognition of a natural heritage system in the OP schedules;
- Recognition of the NHS as a "natural asset" under the Asset Management Program;
- Undertake Urban Environmental Implementation Studies for significant redevelopment areas;
- Definition and protection of locally significant woodlands and locally significant wetlands;
- Implementation and conformity to new Region of Peel mandates including implementation of a no development and site alteration protection standard for the Core Areas of the Greenlands System;
- Identification of a Water Resource System and appropriate protection policies;
- Requirement for management/restoration plans for natural areas;
- Development of east-west ecological linkages;
- Road ecology for wildlife movement and migration;
- Conservation, management, expansion, and enhancement of the urban tree canopy;
- Natural hazard lands as they relate to ecosystem services;
- Natural hazards as they are included within the Natural Heritage System i.e. associated with Significant Valleylands;
- Stormwater management policies to facilitate green infrastructure, featured-based water budgets, and a "treatment train" approach;
- Management of invasive species on publicly owned lands;
- Recognition of the contribution of parks and other open space to health of natural heritage system; and,
- Recognition of employment and residential lands as opportunities for green infrastructure.

2.3.3 Key Policy Directions

There is also a need for new policies and updated existing policies that address best management practices for natural heritage planning, sustainability, climate change, naturalization, invasive species, road ecology, noise and light pollution, low impact development, bird friendly development guidelines, and mitigation hierarchy.

In addition, natural heritage policies need to be integrated into other sections of the Official Plan to recognize the important role that the built environment has in protecting and enhancing Brampton's natural heritage system.

The following sub-sections provide more detailed discussion and preliminary policy directions on the issues noted above.

2.3.4 Natural Heritage System

The 2006 Official Plan promotes a "systems approach" to NHS planning, although section 4.6 policies and Schedule D generally focus on individual natural heritage features and areas.

The PPS and the Growth Plan direct municipalities to identify and protect a natural heritage system. The 2006 Official Plan schedules designate the City's natural areas and features as 'Open Space', in combination with active municipal parkland. It is appropriate for the OP to delineate and designate a Natural Heritage System distinct from Open Space and Parkland designations to better illustrate an overall land use planning system.

As an urbanizing municipality, Brampton will delineate a natural heritage system that reflects a combination of the city's current natural heritage features and areas (as per Schedule D in the 2006 Official Plan) and local natural heritage system planning (as per approved secondary and block plans) with recommended expansions to the natural heritage system based on current science in landscape ecology and monitoring, as provided in the Conservation Authority watershed natural heritage system (CA NHS) modelling. As noted above, the CA NHS will be used to inform the City's Official Plan Review update of current natural heritage mapping. Updates resulting from the Peel 2041+ Official Plan Review will be incorporated accordingly.

With the proposed delineation and designation of a natural heritage system, the OP policy update can enhance the Natural Heritage Systems policies in section 4.6, while maintaining feature specific policies, where necessary, to ensure conformity with the Regional Official Plan and the PPS.

Proposed Policy Direction:

The City will develop and recommend new and/or updated policies that will:

- Incorporate the Growth Plan NHS as an overlay to the Official Plan Mapping.
- Delineate and designate a Natural Heritage System by removing natural areas and features from the current Open Space designation of Schedule A; and,
- Build on the Region of Peel Core Greenland System by incorporating local features and areas (NAC and PNAC), and recognizing restoration of potential cover.
- Recognize Natural Areas and Linkage / Enhancement Areas.
- Requiring a net gain, and a minimum no net loss of natural heritage features by:

- Recognizing the continuum of conservation which includes:
- Protection - no development or site alteration;
- Maintain - no negative impacts; and,
- Mitigation - mitigate impacts to achieve appropriate ecological benefits:
- Compensation.
- Restoration.
- Enhancement.
- Protect the biodiversity, resilience, connectivity, and ecological and hydrological functions of natural features, areas and systems.
- Educate, manage, and prohibit, and penalize encroachment and site alteration into the natural heritage system.
- Support the conservation of headwater drainage features and functions.
- Protect significant wildlife and endangered species habitat, and continue to protect fish habitat, through development and site alteration, including infrastructure projects.
- Recognize the Province's significant wildlife habitat ecoregion criteria for Ecoregion 7E.
- Direct new development to avoid habitat fragmentation.
- Promote Brampton's NHS in relationship to the regional natural systems including the Greenbelt Plan's Urban River Valleys, Niagara Escarpment, Oak Ridges Moraine and Lake Ontario watershed, and the local natural systems of adjacent municipalities.
- Recognize the ecological services and natural capital provided by Brampton's natural heritage system, and as supported by other green spaces including parkland, infrastructure corridors, the urban forest, and the built environment.

2.3.5 Feature-Based Policies

The 2006 OP policy provides little clarity on how the City defines locally significant woodlands and wetlands. Regional policy and provincial guideline documents provide criteria for the City to define and protect these important local features of Brampton's NHS.

Policy direction can be found in Environment Canada's "How Much Habitat is Enough?[41], Ontario's "Natural Heritage Reference Manual"[42], the "Ontario Invasive Species Strategic Plan"[43], "Ontario's Biodiversity Strategy"[44], and the "Wetland Conservation Strategy for Ontario"[45].

Current City implementation of the Woodlot Conservation By-law and approved comprehensive environmental studies will also help to inform this issue.

[41] How much Habitat is Enough? Third Edition. Environment Canada. 2013. Available at: https://www.documentcloud.org/documents/2999368-THUNDER-BAY-How-Much-Habitat-Is-Enough-3rd-Ed-2013.html
[42] Ontario's Natural Heritage Reference Manual. Ontario Ministry of natural Resources, 2010. Available at: https://docs.ontario.ca/documents/3270/natural-heritage-reference-manual-for-natural.pdf
[43] Ontario Invasive Species Strategic Plan. Ontario Ministry of Natural Resources and Forestry, 2012. Available at: https://www.ontario.ca/page/invasive-species-strategic-plan-2012
[44] Ontario's Biodiversity Strategy. Ontario Biodiversity Council, 2011. Available at: http://ontariobiodiversitycouncil.ca/wp-content/uploads/Ontarios-Biodiversity-Strategy-2011-accessible.pdf
[45] Wetland Conservation Strategy for Ontario. Ontario Ministry of Natural Resources, 2017. Available at: https://files.ontario.ca/mnr_17-075_wetlandstrategy_final_en-accessible.pdf

Proposed Policy Direction:

The City will develop and recommend new and/or updated policies that will:

- Define and protect locally significant woodlands and wetlands.
- Update Buffers/ Vegetation Protection Zones to be consistent with provincial guidance i.e. 30 m minimum for provincially significant wetlands etc.

2.3.6 Schedule D: Natural Heritage Features and Areas

All current OP schedules illustrate natural areas and features under the Open Space designation. As noted above, Schedule D will be updated to identify a natural heritage system and linkage/enhancement areas.

Proposed Policy Direction:

The City will develop and recommend new and/or updated policies that will:

- Replace Schedule D to identify a natural heritage system that is informed by the "Conservation Authority Natural Heritage System Mapping for the City of Brampton – Final Technical Report - 2014 (CA-NHS)" and rename as Schedule D1 (refer to Appendix B).
- Update the existing Schedule D: Natural Heritage Features and Areas map based on current ecological data provided by the CVC, TRCA, Province and municipal comprehensive environmental studies, and rename as Schedule D2 (refer to Appendix C).
- Define a protocol wherein during the duration of an approved OP, this schedule will be maintained and updated as new ecological information becomes available.

2.3.7 Restoration and Enhancement

The 2006 Official Plan encourages the use of best management practices, however, current policies need to be improved regarding the maintenance, restoration, and enhancement of the natural heritage systems, green spaces such as utility corridors, as well as the promotion of partnerships and stewardship initiatives. The City's NHEMS identified a number of these best management practices for inclusion in the Official Plan Review update. These updated restoration and enhancement policies will respond to federal and provincial guideline documents, including Environment Canada's "How Much Habitat is Enough?", Ontario's "Natural Heritage Reference Manual", the "Ontario Invasive Species Strategic Plan", and "Ontario's Biodiversity Strategy".

Key management issues for new policies include the need for management / restoration plans for natural heritage areas, such as woodlands, targets to improve natural heritage features and functions for remediation and biodiversity, guidance for monitoring to evaluate the success of restoration efforts, and a no net-loss approach using ecological offsetting. Management / restoration plans are also necessary for the enhancement of the City's Open Space/Parkland System to support NHS features, functions, and linkages, and to improve the urban tree canopy to provide ecological services for the built environment of the neighbourhood and private properties.

Proposed Policy Direction:

The City will develop and recommend new and/or updated policies that will:

- Direct the City to develop sustainable management plans and practices to address natural heritage system restoration of valleys, woodlands and wetlands, urban forest, and fish and wildlife habitat.
- Support partnerships for the ecological restoration of 'enhancement areas' and 'linkages' as illustrated on an updated Schedule D.
- Support the Province and Conservation Authority efforts to prepare an Endangered Species Strategy to promote the recovery of species at risk found in Brampton.
- Investigate opportunities for the establishment of Conservation Reserves for species at risk strongholds and remnant ecological communities within Brampton's natural heritage system, incorporate these into the definition of Natural Heritage Systems, and develop appropriate conservation policies.
- Recognize the importance of restoring and enhancing grassland/meadow habitats for species of concern, including pollinators.
- Direct the City to prepare an Invasive Species Strategy to promote natural vegetation community health and biodiversity.
- Direct the City to develop reporting metrics and targets for the Natural Heritage System.
- Support the need to restore and enhance the biodiversity, connectivity, and the ecological and hydrological functions of natural features, areas and systems.
- Support the City's partnership with the Region and TRCA to implement a Peel Region Urban Stream Restoration Program.

2.3.8 Buffers

The current Official Plan policies recognize buffers as land contiguous and parallel to natural heritage areas that will assist with alleviating negative impacts of development and site alteration on natural features and functions. The City requires buffers to be planted with native species, and not be stripped, filled, or graded. However, current practice creates conflict with these general policies with regard to development and grading that encroaches into buffers, or site alteration for the construction of trails.

The City needs to clearly differentiate between useable setbacks that support development, and site alteration that impact lands adjacent to natural heritage features and require maintenance and long-term management, versus environmental buffers that support ecological processes and are restored to be a self-sustaining in conjunction with the adjacent natural communities.

Proposed Policy Direction:

The City will develop and recommend new and/or updated policies that will:

- Recognize the need for appropriate variable and enhanced buffers for the variety of natural features, functions, and habitat that comprise Brampton's natural heritage system.
- Recognize the need for additional setbacks to be established in conjunction with environmental buffers to support grading, infrastructure, trails, and water balance mitigation measures, as necessary.

2.3.9 Ecological Linkages

Brampton's valley systems provide significant north-south corridors that link regional natural systems such as the Greenbelt and Niagara Escarpment Commission (NEC) to Lake Ontario, however, the city lacks east-west linkages. The CA NHS identified the Parkway Belt West Plan Area (PBWPA) as an opportunity for a significant east-west linkage that will not only connect Brampton's numerous valley systems, but also connect the city's NHS to other municipal natural systems across the GTA. It is understood that the PBWPA lands are first and foremost identified for provincial infrastructure planning and stewardship efforts.

In addition to the PBWPA lands, there are other infrastructure and open space corridors that offer opportunities to provide local and regional NHS connections, including the TransCanada Pipeline, Hydro One lands, and the Greenway Boulevard initiative, outlined in the Brampton 2040 Vision that would see greening of major East-West roads to provide enhanced ecological connection between North-South valleylands. The OP should encourage the exploration of partnership opportunities with these service providers in cooperation with the conservation agencies to enhance and strengthen the NHS linkages across the city.

Finally, the OP needs to provide policy guidance for the planning, design, construction and management of new and reconstructed/retrofitted road infrastructure related to the science and best management practices of road ecology for wildlife movement and migration. The goal of road ecology is to reduce vehicle and wildlife collisions through better road planning, design, construction, and management options.

Policy guidance for ecological linkages is found in Environment Canada's "How Much Habitat is Enough?", Ontario's "Natural Heritage Reference Manual", the "Ontario Invasive Species Strategic Plan", and "Ontario's Biodiversity Strategy". Policy guidance for road ecology can be found in Environment Canada's "Guide to Road Ecology in Ontario".

Proposed Policy Direction:

The City will develop and recommend new and/or updated policies that will:

- Acknowledge the importance and need for terrestrial east-west linkages.
- Recognize the importance of green infrastructure, utility corridors, and parks uses that can support terrestrial linkages.
- Support the need to identify, protect, maintain, and restore, as feasible, ecological and functional linkages between natural heritage features.
- Direct new development and infrastructure upgrade projects to protect and establish viable wildlife corridors and implement wildlife eco-passages into the design of roads.
- Direct the City to implement best road ecology management practices for new and reconstruction road projects, and to seek opportunities to retrofit existing roads where appropriate.

2.3.10 Urban Forest

The 2006 Official Plan recognizes the Urban Forest under its Woodland section. However, it lacks policy guidance on the conservation, management, expansion, and enhancement of the urban tree canopy. Urban forests are a vital component of healthy, resilient, and sustainable city and natural heritage system.

Brampton's urban forest is comprised of all the trees that grow within city, including those of the natural system. Urban forests provide significant ecological services such as improving air and water quality, cooling neighbourhoods, providing wildlife habitat, and increasing property values.

The Official Plan should include a separate section for urban forestry with policies that include urban forest targets, increasing street and park trees, updating planting standards and soil quality criteria, and mitigation requirements.

Policy guidance for urban forest protection and enhancement is found in the PPS, "Peel Urban Forest Strategy", Brampton's "Urban Forest Study", Peel Tree Planting Prioritization Tool, and Brampton's "Natural Heritage and Environmental Management Strategy", the Brampton Million Trees Strategy, and the Region of Peel Urban Forest Management Plan, Urban Forest Best Practice Guide[46].

- Proposed Policy Direction
- Recognize natural hazards related to slope stability and erosion, including the meander belt width hazard that could pose a threat to public safety and personal property, social disruption, and environmental impacts.
- Recognize ecosystem benefits of remediating and managing natural hazard lands for water quality, stormwater management, reducing soil erosion and improving slope stability, supporting ecological communities, fish and wildlife habitat, and role in providing key linkages for the natural heritage system.

2.3.11 Stormwater Management

The 2006 Official Plan provides Stormwater Management policies recognizes that rainwater and snowmelt are valuable natural resources whose management needs to protect and maintain surface and ground water quality and quantity, the ecological health and diversity of natural areas and fish and wildlife habitat, the integrity of municipal infrastructure and human safety.

OP policies need to develop stronger language to facilitate the use of Low Impact Development (LID) techniques in new developments, as well as opportunities to identify full lifecycle costs of stormwater management and develop options to fund these costs over the long term.

Policy guidance for Stormwater Management is found in the PPS and Growth Plan, the Ontario Stormwater Management Guidelines, Ontario's Interpretation Bulletin regarding its expectations on Stormwater Management, Low Impact Development (LID) Stormwater Management Planning and Design Guide (LID Guide)[47], CVC and TRCA's Stormwater Criteria and guidelines for featured-based water budgets[48].

[46] Region of Peel. *Urban Forest Best Practice Guide*. 2021. Available at: This document it is not yet public.
[47] Credit Valley Conservation. *Low Impact Development (LID) Stormwater Management Planning and Design Guide*. 2010. Available: http://www.creditvalleyca.ca/low-impact-development/low-impact-development-support/stormwater-management-lid-guidance-documents/low-impact-development-stormwater-management-planning-and-design-guide/
[48] Credit Valley Conservation and Toronto Region Conservation Authority. *CVC and TRCA Water Balance Guidelines for the Protection of Natural Features*. 2012. Available at: https://cvc.ca/wp-content/uploads/2012/05/7-Water-Balance-Natural-Features-Protection.pdf

Proposed Policy Direction:

The City will develop and recommend new and/or updated policies that will:

- Require the consideration of Low Impact Development techniques to compliment the traditional stormwater infrastructure of roads, parking lots, etc.
- Require the incorporation of a "treatment train" approach to stormwater management (SWM).
- Recognize the importance of mitigating the thermal impacts of stormwater on receiving streams and rivers.
- Encourage best practice in erosion and sediment control effectiveness monitoring for areas undergoing new development.
- Recognize the importance of mitigating impacts to groundwater resources and natural heritage features by requiring new development to maintain site-wide and feature-based water balances.
- Recognize the important role of Green Infrastructure in the managing stormwater.
- Restrict the construction of SWM ponds within the natural heritage system as associated environmental buffers, while recognizing the need for SWM related infrastructure, such as outfall channels within the natural system.
- Encourage ecologically driven SWM interception/ retention mechanisms such as green roofs, increased tree canopy cover, and dry ponds in vegetated public lands.

2.3.12 Natural Heritage - Other OP Policies and Sections

The PPS and the Growth Plan require municipalities to adopt an integrated approach to planning, with specific reference to protecting and enhancing the natural environment. In addition, Brampton's Environmental Master Plan, and Natural Heritage and Environmental Management Strategy recognize the need to consider the health of the City's natural environment in all decisions by the City as a planning authority, land manager, and community leader, to ensure a healthy, diverse and resilient community.

Section 4 of Brampton's Official Plan includes 16 subsections that may impact and/or influence the protection, conservation, and enhancement of Brampton's natural heritage system and urban forest, or the provision of ecosystem services provided by the built environment. New and/or updated policies in the following sections Sustainable City Concept, Central Area, Residential, Commercial, Employment, and Institutional and Parks and Open Space, can assist to improve the functional relationship between the city's built environment and its natural system and services, and improve community health and well-being.

2.3.12.1 Parks and Open Space

The policies of Section 4.7 of the 2006 OP outline the hierarchy of the City's recreational open space, including parklands and the natural heritage system. Brampton is currently preparing a Parks and Recreation Master Plan that will guide the Official Plan Review Recreational Open Space Discussion Paper. While the current policies identify the relationship between the City's recreational open space and parks and the natural heritage system, they have not gone far enough to recognize the potential contribution parks and open space can provide to the health and biodiversity of natural heritage system and urban forest, and provision of ecosystem services

through opportunities such as targeted naturalization projects, tree plantings, and implementation of green space best management practices.

Key issues that should be addressed when updating the Parks and Open Space section include:

- Conserving/integrating treed and meadow areas in parks and open space.
- Enhancing the urban tree canopy.
- Naturalizing parkland were feasible.
- Enhancing buffers and creating/improving natural linkages where parks and open spaces lie adjacent to, or between natural features.
- Guiding the planning, design, construction and long-term use of recreational trails to direct locations outside of the NHS and associated buffers.
- Recognizing increased noise and light pollution associated with recreation facilities adjacent to the natural heritage system.
- Recognizing the role that parks, other "green" spaces, green infrastructure, and the urban forest play in providing linkages and ecosystem services/benefits that support public health and a liveable city and provide opportunities for resident to connect with nature.
- Acknowledging parkland as an opportunity to support pollinators.
- Enhancing lakes and their surrounding parks to ensure they are citywide destinations.

Proposed Policy Direction:

The City will develop and recommend new and/or updated policies that will:

- Recognize the ecosystem benefits and functions that are provided by the City's open space and parkland system, urban forest and green infrastructure features.
- Recognize open space as potential enhancement areas that serve as ecological linkages.
- Direct the City to identify appropriate locations in parks and open spaces to incorporate more trees, meadows, pollinator gardens, and other naturalization efforts.
- Direct the City to reduce the impacts of noise and light pollution on the natural heritage system.
- Adopt Eco Park Principles within Parks and Open Space policies.

2.3.12.2 Transportation

Section 4.5 of the 2006 OP promotes the development of an integrated local and regional transportation and transit network combined with active transportation, to create walkable communities. While the current OP policies promote sustainability and best practices, they should be improved by recognizing that road corridors provide areas for improving urban forest and green space linkages, and reduce the heat island impacts, and by addressing road ecology.

Proposed Policy Direction:

The City will develop and recommend new and/or updated policies that will:

- Recognize that road planning, design, and construction can minimize water pollution and vehicle-wildlife collisions, and improve urban tree canopy.

- Direct development and commit the City to incorporate road ecology best management practices into the planning, design and construction of new roads and reconstruction/retrofitting of existing roads.
- Direct development and commit the City to minimizing light pollution from streetlights.
- Recognize the need to minimize the urban heat island impacts of paved surfaces.
- Encourage the integration of green infrastructure into new road development and reconstruction/retrofit projects.
- Direct development and commit the City to minimum tree planting and soil quality standards for all road classifications.
- Identify which streets have the greatest potential to provide ecological connection (Green Blvd network).

2.3.12.3 Commercial and Employment Lands

Policies within the 2006 OP's Commercial and Employment Lands section should recognize that these land uses provide excellent opportunities for incorporating green infrastructure and stormwater management best practices. These land uses also provide opportunities for the City to enhance is urban forest.

Proposed Policy Direction:

The City will develop and recommend new and/or updated policies that will:

- Recognize the role that commercial and employment lands can provide in achieving ecological services that support the City's natural heritage system, urban forest, and water quality.
- Direct development to minimize light pollution from parking lot lighting.
- Direct development and commit the City to minimize urban heat island impacts of paved surfaces, roofs etc.
- Direct the City to updating criteria and standards for tree planting and soil quality for new commercial and employment areas.
- Direct the City to investigate the opportunity to develop a green roof bylaw for commercial and employment developments.
- Encourage the integration of green infrastructure into new commercial and employment developments.
- Encourage the integration of bird-friendly development guidelines into new commercial and employment developments.

2.3.12.4 Urban and Town Centres

The Central Area section of the 2006 OP should recognize the opportunity to improve the City's natural heritage system and urban forest. New development within the Central Area should be incorporating tree planting, green infrastructure, and stormwater management best practices.

Proposed Policy Direction:

The City will develop and recommend new and/or updated policies that will:

- Recognize the role that the Central Area can provide in achieving ecological services that support the City's natural heritage system, urban forest, and water quality.
- Direct development and commit the City to minimize light pollution from parking lot lighting.
- Direct development and commit the City to minimize urban heat island impacts of paved surfaces, roofs etc.
- Direct the City to updating criteria and standards for tree planting and soil quality for new commercial, residential and employment areas.
- Direct the City to investigate the opportunity to develop a green roof bylaw for the Central Area.
- Direct the City to develop urban green standards for new development.

2.3.12.5 Residential

Policies within the 2006 OP's Residential section should recognize that development and redevelopment of new communities provides excellent opportunities for incorporating energy and water conservation, tree planting, green infrastructure, protection and expansion of the NHS, and stormwater management best practices. Development of new communities also provides an excellent opportunity to reach out to new Brampton residents to engage them in protecting and enhancing the city's natural heritage system.

Proposed Policy Direction:

The City will develop and recommend new and/or updated policies that will:

- Recognize the role that residential lands can provide in achieving ecological services that support the City's natural heritage system, urban forest and water quality.
- Commit the City to minimize light pollution from roads and parks.
- Direct development to minimize urban heat island impacts of paved surfaces, roofs etc.
- Commit the City to updating criteria and standards for tree planting, tree cutting/ offsetting, and soil quality for residential lots.
- Direct development to prepare and distribute Homeowner Guides for new residents that explain the importance of a healthy and diverse NHS and what residents can do to improve the system.
- Commit the City to investigate the opportunity to develop a green roof bylaw for high density residential developments.

2.3.12.6 Infrastructure and Utilities

Policies within the 2006 OP's Infrastructure and Utilities section should recognize that these infrastructure corridors present opportunities to improve and link the City's natural heritage system.

Proposed Policy Direction:

The City will develop and recommend new and/or updated policies that will:

- Recognize the role that infrastructure and utility corridors can provide in achieving ecological services that can support and improve the City's natural heritage system, urban forest, and water quality.

- Partner and encourage stewardship initiatives with Gas and Oil transmission pipelines and Hydro Corridors to undertake natural heritage restoration and urban forest enhancement within their right-of-ways.

2.3.12.7 Institutional and Public Uses

Policies within the 2006 OP's Institutional and Public Uses section should recognize that these land uses provide excellent opportunities for incorporating green infrastructure and stormwater management best practices. These land uses also provide opportunities for the City to enhance its urban forest.

Proposed Policy Direction:

The City will develop and recommend new and/or updated policies that will:

- Recognize the role that institutional and public uses can provide in achieving ecological services that support the City's natural heritage system, urban forest and water quality.
- Direct development away from hazard lands, especially where infill is required.
- Direct development and commit the City to minimize light pollution from parking lot lighting.
- Direct development and commit the City to minimize urban heat island impacts of paved surfaces, roofs etc.
- Direct the City to update criteria and standards for tree planting and soil quality for new institutional and public areas.
- Direct the City to investigate the opportunity to develop a green roof bylaw for institutional and public uses.
- Direct the City to explore opportunities to Green Infrastructure and LIDs for public lands.

2.3.12.8 Parkway Belt West and Highway 413

Currently, Section 4.13 policies provide a basic description of the Parkway Belt West Plan Area (PBWPA) and the designation of land within the Plan Area. It would be appropriate for these policies to recognize that the PBWPA provides a natural east-west corridor across Brampton's southern boundary, and its tapestry of successional areas, forest cover, agriculture lands and active parkland links the City's numerous north-south valley and watercourse corridors that traverse the PBWPA. Likewise, the proposed Highway 413, also known as GTA West, would provide a corridor across the northern boundary of the city, with opportunities to promote natural heritage linkages through implementation of parklands and enhancement areas.

The PBWPA designation in the Brampton Official Plan is an opportunity to identify and acknowledge the unique environmental and recreational opportunities the PBWPA provides to the city's natural heritage system, open space system, and urban forest. Specifically, there is opportunity to depict the PBWPA as a potential restoration and enhancement area that demonstrate linkages to, and within, the natural heritage system and to foster stewardship and partnerships with the infrastructure / utility providers.

Proposed Policy Direction:

The City will develop and recommend new and/or updated policies that will:

- Recognize the role that the Parkway Belt West can provide in achieving ecological services that can support and improve the City's natural heritage system, urban forest, east-west linkages, and water quality.
- Direct the City to partner and encourage stewardship opportunities with the Ministry of Transportation to undertake natural heritage restoration and urban forest enhancement to improve ecological linkage functions of the Parkway Belt West corridor.

3 CLIMATE CHANGE & RESILIENCY

Ontario is already experiencing the effects of climate change, such as more severe precipitation, snow, ice, and wind events, greater temperature fluctuations and extremes, changing species migration patterns, and an increase in the presence of vector-borne diseases (e.g. Lyme disease).

In the next quarter century, the types of impacts and their severity are expected to increase. These impacts all have economic, social, and environmental costs to municipalities and residents. In recognition of this fact, City of Brampton declared a climate emergency in June 2019.

3.1 What is Climate Change?

The Canadian Federal Government describes climate change as a long-term shift in weather conditions identified by changes in temperature, precipitation, winds, and other indicators. Climate change can involve both changes in average conditions and changes in variability, including, for example, extreme events.

The earth's climate is naturally variable on all time scales. However, its long-term state and average temperature are regulated by the balance between incoming and outgoing energy, which determines the Earth's energy balance. Any factor that causes a sustained change to the amount of incoming energy or the amount of outgoing energy can lead to climate change. Different factors operate on different time scales, and not all of those factors that have been responsible for changes in earth's climate in the distant past are relevant to contemporary climate change. Factors that cause climate change can be divided into two categories -- those related to natural processes and those related to human activity.

Ocean currents or atmospheric circulation can also influence the climate for short periods of time. This natural internal climate variability is superimposed on the long-term forced climate change.[49]

[49] https://www.canada.ca/en/environment-climate-change/services/climate-change/causes.html

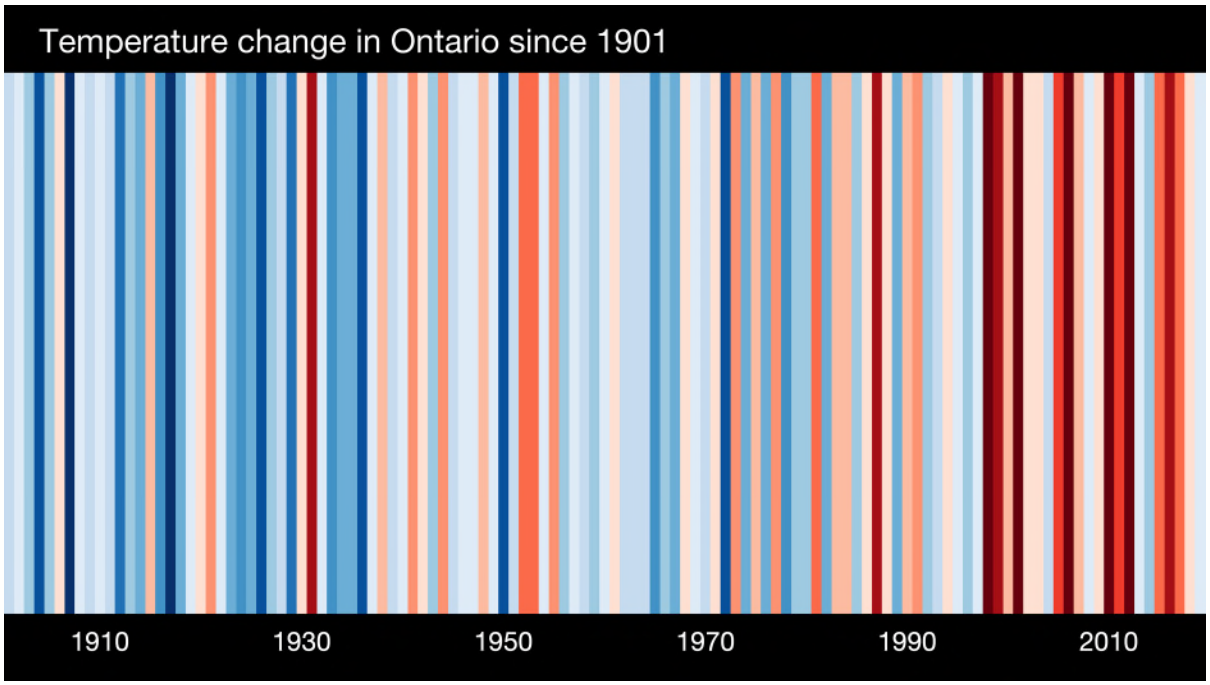

Figure 3: Temperature Change in Ontario. Credit: Ed Hawkins, National Centre for Atmospheric Science, University of Reading

3.2 Policy Context

This review considered relevant global, federal, provincial, regional, and municipal policy documents as well as guidelines and best practices to describe the City's existing policy framework and provide an analysis and recommendations for policy direction.

For each document reviewed, a general statement regarding direction for the City of Brampton's Official Plan policy is clearly outlined in a textbox at the end of each document discussed. These summaries are outlined collectively in Table 5: Climate Change Policy Direction Summary in section 3.4 Broad Policy Directions of this Discussion Paper.

Global

3.2.1 Paris Climate Change Agreement

In 2015, Canada and 194 other countries reached the Paris Agreement, an international treaty on climate change with the goal of limiting global warming to below 2°C compared to pre-industrial levels and to pursue efforts to limit the temperature increase to 1.5°C above pre-industrial levels.

The Paris Agreement is a landmark in the multilateral climate change process as it brings nations together through a legally binding agreement that recognizes the urgent and potentially irreversible threat to all living things on this planet due to climate change. Canada's 2016 Pan-Canadian Framework on Clean Growth and Climate sets Canada on a path toward meeting the Paris Agreement Green House Gas (GHG)-emissions-reduction target of 30 percent below 2005 levels by 2030.

The OP will support Canada's targets by setting science-based targets for integrating climate change mitigation actions that respond to GHG emission sources in the City of Brampton and implementing a plan to achieve targets.

3.2.2 UN Sustainable Development Goals

In 2015, the United Nations (UN) announced the 2030 Agenda for Sustainable Development, which introduced 17 Sustainable Development Goals (SDGs) and 169 targets. The SDGs aim to encourage critical action over a period of 15 years in the three key pillars of sustainable development: economic, social, and environmental.

Figure 4: United Nations Sustainable Development Goals

To make the 2030 Agenda a reality, broad ownership of the SDGs must translate into a strong commitment by all stakeholders to implement the global goals. The SDGs have been set to establish a shared blueprint for a sustainable and prosperous future for people and the planet.

The UN SDGs will provide an overarching context within which to consider all aspects of Official Plan policy and align climate-specific policy recommendations with the SDGs. The final OP should contemplate the areas of emphasis responding to the SDGs.

Federal

3.2.3 2016 Pan-Canadian Framework on Clean Growth and Climate

The Pan-Canadian Framework on Clean Growth and Climate Change was developed with the provinces and territories and in consultation with Indigenous Peoples to meet federal emissions reduction targets, grow the economy, and build resilience to a changing climate. The framework includes a pan-Canadian approach to pricing carbon pollution and measures to achieve reductions across all sectors of the economy.

Canadian municipalities are important partners in developing and implementing climate solutions locally, as well as international collaboration with other municipalities around the world. The following actions identified in the Framework are considered relevant to the City and the OP:

- The federal government is creating the Canada Infrastructure bank, which will work with provinces, territories, and municipalities to further the reach of government funding directed to infrastructure including clean electricity systems.
- Federal and provincial governments for greening government operations and encouraging municipalities to adopt clean technologies to lead by example.
- Continued investment in the Green Municipal Fund to support sustainable municipal projects.

The objectives of the Pan-Canadian Framework provide a lens for implementing climate action in the OP that aligns with anticipated federal and provincial investments in climate change mitigation and adaptation, as well as expectations for the City to lead by example.

3.2.4 Clean Canada – A Healthy Environment and a Healthy Economy

A Healthy Environment and Healthy Economy is Canada's plan to advance economic and environmental goals. The plan builds on the Pan-Canadian Framework on Clean Growth and Climate Change, and the Generation Energy report, which outlines four pathways that could lead Canada to an affordable, sustainable energy future within the next generation, aligned with its climate change goals.

The plan introduces 64 strengthened and new federal policies, programs, and investments to cut pollution and build a more resilient and inclusive economy. These are filtered through five pillars:

- Making the Places Canadians Live and Gather More Affordable by Cutting Energy Waste;
- Making Clean, Affordable Transportation and Power Affordable in Every Community;
- Continuing to Ensure Pollution Isn't Free and Households Get More Money Back;
- Building Canada's Clean Industrial Advantage; and,
- Embracing the Power of Nature to Support Healthier Families and More Resilient Communities.

Municipalities can advance many core priorities, including energy reductions through municipal and community buildings, reducing waste, supporting active transportation, and electrifying public transit networks. Policy recommendations for the OP will consider these priorities.

3.2.5 Canada's Changing Climate Report

Published in 2019, Canada's Changing Climate Report (CCCR) is about how and why Canada's climate has changed and what changes are projected for the future. Led by Environment and Climate Change Canada, this document is the first in a series to be released as part of the current National Assessment, Canada in a Changing Climate: Advancing our Knowledge for Action[50]. Based on the report, Canada can expect:[51]

- Continued warming driven by human influence;

[50] https://www.nrcan.gc.ca/climate-change/impacts-adaptations/canada-changing-climate/19918
[51] https://www.nrcan.gc.ca/sites/www.nrcan.gc.ca/files/energy/Climate-change/pdf/CCCR_ExecSumm-EN-040419-FINAL.pdf

- A shift towards less snowfall and more rainfall, with annual winter precipitation projected to increase;
- Changes in extreme temperatures;
- Decreased snow and ice coverage with a rise in permafrost temperatures;
- Increased risk of water supply shortages in summer;
- Warmed oceans surrounding Canada causing them to become more acidic, and less oxygenated; and,
- Coastal flooding due to local sea-level rise.

Canada's Climate Change Report confirms that there is a strong connection between human behaviour and the magnitude of climate change impacts.

The OP will identify the local impacts of climate change and will implement policy that responds to climate change impacts.

Provincial

3.2.6 Planning Act

Recent amendments to the ***Planning Act*** have added climate change as a matter of provincial interest and have strengthened consideration of climate change matters as part of the land use planning decision making process.

The ***Planning Act*** contains several provisions that support land use practices that reduce GHG emissions and contribute towards sustainable and healthier communities (Table 1).

This includes zoning by-laws (Section 34), height and density bonusing (Section 37), site plan control (Section 41), plans of subdivision (Section 51), and parkland dedication (Section 42). All of these tools provide municipalities with a range of options to bring in requirements and set specific standards to address climate change through the land use planning process.

The OP will conform with climate change mandates within the ***Planning Act*** and will exercise agency granted to the municipality to go beyond minimum standards, where consistent with the Act. The OP will ensure that tools available to the municipality (e.g. zoning by-laws) address climate change through the planning process.

Table 1: *Planning Act* Provisions Related to Climate Change

***Planning Act* Section**	***Planning Act* Policy**
Sections 16-27	Through policies of an Official Plan, municipalities can incorporate climate change policies to identify specific direction, objectives, targets, and actions to be taken to achieve the goal of reducing greenhouse gas emissions and establishing sustainable communities.

Subsections 22(5), 34(10.2), 41(18), 53(3)	Municipalities can require specific information, material, or studies as part of a complete development planning application (e.g. Official Plan amendments, etc.). These supporting documents can address matters related to climate change (e.g., alternative energy feasibility studies, stormwater management plans, or transportation demand management plans addressing the reduction of GHG emissions).
Section 28	Community Improvement Plans (CIPs) can target specific areas for development or redevelopment. Upper-tier municipalities can develop plans related to affordable housing, infrastructure and transit corridors, in addition to providing grant and loan incentives to encourage climate change related features (e.g. building efficiency, district energy systems, water conservation systems, etc.).

3.2.7 Modernizing Ontario's Municipal Legislation Act, 2017 (Bill 68)

Changes to the ***Municipal Act*** in 2017 through ***Bill 68*** were aimed at increasing municipal powers to combat climate change. These include:

- Municipalities can enact bylaws respecting climate change and those relating to the economic, social, and environmental well-being of the municipality. This includes green roof by-laws.
- Municipalities are required to have a policy pertaining to protection and enhancement of tree canopy and natural vegetation.
- Municipalities can provide for, or participate in, long-term energy planning, which may include climate change.

The OP will consider requirements established through ***Bill 68*** and will embed policies that capitalize powers granted to the municipality through the ***Municipal Act***.

3.2.8 Provincial Policy Statement, 2020

Policies in the ***Provincial Policy Statement (PPS)*** support the efficient use of land and resources through appropriate density, a mix of uses, and continued intensification. These planning objectives direct policy to support climate change through transit supportive densities, efficient use of infrastructure and resources, to reduce impacts to air quality, water, land, natural heritage, and improve energy efficiency.

With a greater focus on climate change in 2020, the PPS now includes the following new definition of "impacts of a changing climate", identified in Section 6 as "the present and future consequences from changes in weather patterns at local and regional levels including extreme weather events and increased climate variability."

The term refers to preparing of climate impacts or minimization of negative impacts including:

- managing and directing land use to achieve efficient and resilient development and land use patterns (Section 1.1.1.i);
- land use patterns in settlement areas (Section 1.1.3.2.c-d);

- effective management of infrastructure, including sewage, water, stormwater and green infrastructure (Sections 1.6.1, 1.6.6.1.b.2 and 1.6.6.7.c);
- long-term economic prosperity (Section 1.7.1.l);
- energy conservation and efficiency, improved air quality, and enhanced land use and development patterns (Section 1.8.1);
- protection of natural heritage features (Section 2.1);
- water quality and quantity of water resource systems at the watershed level (Section 2.2.1.c); and,
- protecting public health and safety (Section 3.1.3).

The policies in the PPS provide strong support for several of the principles of climate change action. Part IV clearly states that the province's long-term prosperity and well-being depend on planning for strong, sustainable, and resilient communities for people of all ages.

OP policy will conform with the PPS to ensure that strong, liveable and healthy communities promote and enhance human health and social wellbeing, are economically and environmentally sound, and are resilient to climate change.

3.2.9 A Place to Grow: Growth Plan for the Greater Golden Horseshoe, 2020

The Growth Plan for the Greater Golden Horseshoe (Growth Plan) envisions urban centres within the Greater Golden Horseshoe (GGH) as vibrant places characterized by more compact development patterns that support climate change mitigation and adaptation. Notable changes in the updated Growth Plan include lowered targets for greenfield density (from 80 residents and jobs per hectare to 50), as well as intensification targets in the Region of Peel, from 60 percent to 50 percent growth occurring within delineated built-up areas.

Policies in the Growth Plan are based on guiding principles identified in Section 1.2.1. This includes the following guiding principle "Integrate climate change considerations into planning and managing growth such as planning for more resilient communities and infrastructure – that are adaptive to the impacts of a changing climate – and moving towards environmentally sustainable communities by incorporating approaches to reduce greenhouse gas emissions." This guiding principle is reiterated in Section 2 Where and How to Grow identifying complete communities as a form of development that supports climate change mitigation by increasing modal sharing transportation options and active transportation, and by minimizing land consumption through compact built forms (2.1 Context). The following policies from the Growth Plan should be considered relative to the City's Official Plan update:

- Applying the policies of the Growth Plan will support the achievement of complete communities that mitigate and adapt to the impacts of a changing climate, improve resilience and reduce greenhouse gas emissions, and contribute to environmental sustainability (2.2.1.4 f); and,
- Applying the policies of the Growth Plan will support the achievement of complete communities that integrate green infrastructure and appropriate low impact development (2.2.1.4 g).

The Growth Plan acknowledges that climate change poses a serious challenge for maintain existing infrastructure and planning for new infrastructure in Section 3 Infrastructure to Support

Growth. Policies to support vulnerability assessments can help to identify risks and options for enhancing resilience. This issue can also be addressed through stormwater management planning that includes options for low impact development and green infrastructure. Key policies relative to climate change within Section 3.2.1 Integrated Planning include:

- Planning for new or expanded infrastructure will occur in an integrated manner, including evaluations of long-range scenario-based land use planning, environmental planning and financial planning, and will be supported by relevant studies and should involve: considering the impacts of a changing climate (3.2.1.2 d).
- Municipalities will assess infrastructure risks and vulnerabilities, including those caused by the impacts of a changing climate, and identify actions and investments to address these challenges, which could be identified as part of municipal asset management planning (3.2.1.4).

Further, policies within Section 4.2.10 Climate Change of the Growth Plan that must be addressed include:

1. Upper- and single-tier municipalities will develop policies in their official plans to identify actions that will reduce greenhouse gas emissions and address climate change adaptation goals, […] (4.2.10.2); and,
2. In planning to reduce greenhouse gas emissions and address the impacts of a changing climate, municipalities are encouraged to:
    a. Develop strategies to reduce greenhouse gas emissions and improve resilience through the identification of vulnerabilities to climate change, land-use planning, planning of infrastructure, including transit and energy, green infrastructure, and low impact development, and the conservation objectives in policy 4.2.9.1;
    b. Develop greenhouse gas inventories for transportation, buildings, waste management and municipal operations; and
    c. Establish municipal interim and long-term greenhouse gas emission reduction targets that support provincial targets and reflect consideration of the goal of low-carbon communities and monitor and report on progress made towards the achievement of these targets (4.2.10.2).

Section 4.2.10 outlines specific policies for climate change adaptation and resilience that municipalities will develop in official plans, which include but are not limited to the following:

- Support for complete communities and minimum intensification and density targets outlined in the Growth Plan;
- Reduce dependence on the automobile and support existing and planned transit, and active transportation;
- Assess infrastructure risks and vulnerabilities and identify actions and investments to address these challenges;
- Undertake stormwater management planning in a manner that assesses the impacts of extreme weather events and incorporates appropriate green infrastructure and low impact development;
- Recognize the importance of watershed planning for the protection of the quality and quantity of water and the identification and protection of hydrologic features and areas;
- Protect the Natural Heritage System for the Growth Plan and water resource systems;

- Promoting local food, food security, and soil health, and protecting the agricultural land base; and,
- Providing direction that supports a culture of conservation.

Overall, the 2020 Growth Plan identifies the crucial role that municipalities play in managing and reducing Ontario's greenhouse gas emissions and supporting adaptation to the changing climate to accommodate growth and achieve complete communities.

The OP will support the development of complete communities and will ensure that policies identified in the Growth Plan regarding climate change mitigation, adaptation and resiliency will be developed in OP policy. This will include an overall culture of conservation.

3.2.10 Preserving and Protecting our Environment for Future Generations: A Made-in-Ontario Environment Plan 2018

The Made-in-Ontario Environment Plan guides provincial growth through key focus areas including clean air, clean water, climate adaptation and mitigation, pollution prevention, private sector investment, energy conservation, waste reduction, and land conservation. Proposed actions that have implications for municipal planning processes relative to climate change include:

- Reviewing land use planning policies and laws to update policy direction on climate resilience.
- Modernizing the Building Code to better equip homes and buildings to withstand extreme weather events, and to support the adoption of cost-effective energy efficiency measures.
- Reviewing the Municipal Disaster Recovery Assistance program to encourage municipalities to incorporate climate resilience improvements when repairing or replacing damaged infrastructure after natural disasters.
- Launching a provincial Carbon Trust to encourage private investment in clean technology, committing to funding of $400 million for chosen projects over four years.
- Working with municipalities to better manage wastewater and stormwater impacts, including consultation on draft low-impact development guidance manual to help municipalities, property owners, planners, developers, and others to manage and reduce flooding risks and increase resiliency to climate change.

Various actions and proposals identified in the plan would give municipalities a greater say in various forms of development and initiatives that impact natural resources that exist within the municipality's jurisdictional boundaries.

The OP will support the Made-in-Ontario Environment Plan to ensure that municipal planning processes support climate change mitigation and adaptation and include low carbon climate resiliency solutions.

3.2.11 Ontario Regulation 588/17: Asset Management Planning for Municipal Infrastructure

Asset management planning provides opportunity to address significant infrastructure pressures and new challenges resulting from a changing climate. It is also an opportunity to integrate natural asset solutions through green infrastructure. ***Ontario Regulation 588/17: Asset***

Management Planning for Municipal Infrastructure came into effect January 2018. All municipalities are required to develop and adopt a strategic asset management policy by July 1, 2019. The policy must include a commitment to consider the:

- Actions that may be required to address vulnerabilities that are caused by climate change, with respect to operations (such as increased maintenance, schedules), levels of service, and life cycle management.
- Anticipated costs that could arise from such vulnerabilities.
- Mitigation approaches to climate change, such as greenhouse gas emission reduction goals and targets.
- Disaster planning and contingency funding.

The OP will support infrastructure resiliency to climate change, natural asset and green infrastructure, including through integration with urban design and open space opportunities to support climate change adaptation.

Regional

3.2.12 Region of Peel Official Plan, 2018 consolidation

Through Region of Peel Official Plan (ROP) updates, a new climate change section (2.2.3 – Climate System) has been added that provides a land use planning policy framework to address climate change, as well as policy direction for collaborative climate change planning to reduce GHG emissions, reduce vulnerability, and increase resilience to adapt the Region to a changing climate.

In addition to a new climate change section, updated and new climate change policies have been embedded throughout the Region's OP in theme areas including but not limited to growth management, transportation, energy, waste, water resources, natural hazards, natural heritage, and agriculture.

The ROP will include specific policies that provide direction for the local municipalities to develop model policies and guidance to implement sustainability requirements through local official plan policies and tools.

Table 2 summarizes key policies and objectives that have been considered through the Regional Official Plan update. There is a strong connection between sustainability objectives and climate change. Integrated studies highlight that climate policies as part of well-designed policy packages can contribute to multiple co-benefits and reduce the overall cost of achieving sustainability objectives.

The OP will conform with the Region's Official Plan. The OP should include mitigating and adapting to climate change as part of the overall resiliency framework. Specific policies for housing, air quality, transportation, energy, natural and grey infrastructure, and the built form that build corporate and community resilience and are directly correlated with the potential impacts of climate change should be included.

Table 2: High-Level Summary of Key Draft Policies and Objectives in the ROP

Existing/New/ Revised Section	Purpose/ Objectives of the Policies
1.3.5 Themes of the Plan	Mitigating and adapting to climate change has been strengthened as part of the Regional Official Plan's overall sustainable development framework.
2.1 Introduction	This section recognizes the importance of a resilient natural environment which will better enable natural systems to recover from disturbances and to tolerate and adapt to a changing climate.
2.2.3 Climate System	This section has been developed and added to recognize and address the impacts of climate change. This includes new policies that: • support the development of sustainable, low-carbon, compact, mixed-use, and transit supportive communities, protecting natural systems, features and functions, and promoting renewable energy, energy conservation and efficient design. • assess the potential impacts and associated risks of climate change to infrastructure and incorporate appropriate measures to reduce or mitigate vulnerabilities, impacts and risks. • promote a culture of conservation through energy, water and soil conservation and integrated waste management. • support and promoting local food production and procurement, food security, and protect the region's agricultural land base and rural economy. • collaborate, support and undertake community sector and infrastructure risk and vulnerability assessments. • collaborate to undertake community energy and greenhouse gas emissions reduction planning, including greenhouse gas inventories. • establish Regional corporate greenhouse gas emission reduction targets that support provincial targets and that work towards the goal of creating low-carbon communities.
2.2.4 Air Quality	Policy 2.2.4.3.1 has been updated to develop strategies and tools to assess the air quality implications of development that support the reduction in emissions from municipal, transportation, commercial, industrial and residential sources that cause public health impacts.
2.2.5 Water Resource System	New policies have been included requiring the appropriate use of low impact development to mitigate and adapt to climate change impacts.
2.2.7 Stormwater Management	New policies related to stormwater master planning, including an assessment of how climate change and extreme weather events will intensity impacts and the identification of appropriate adaptation strategies.

2.4 Natural and Human-made Hazards	New and update policies included to ensure that the impacts of a changing climate are considered in the management of risks associated with natural hazards, including undertaking infrastructure and watershed planning studies.
2.3 Greenlands System	Significant updates provide a policy framework that protects, restores, and enhances the Region's natural heritage system.
3.2 The Agricultural System	Significant updates support the Regional food system and improved access to healthy and locally grown food.
3.6 Energy Resources	Policy updates support energy conservation and efficiency through land use and development patterns including: • Promoting compact form and sustainable modes of transportation. • Collaborating to develop sustainable site and building design standards and guidelines for buildings and planned development, including the implementation of alternative and renewable energy systems and district energy. • Supporting the promotion and creation of innovative green spaces such as green roofs, white roofs, and the use of urban tree canopy to mitigate urban heat island effects. • Encouraging the increased use of electric, hybrid and alternative fuel vehicles and associated infrastructure for Regional operations.
5.3 The Urban System	Updated policies include the reduction of greenhouse gas emissions and adapting to a changing climate as part of the achievement of sustainable development in the urban system.
5.9 Housing	Updated policies in Section 5.7.6 Housing and Climate Change promotes energy efficient housing and sustainable residential building design that is environmentally sensitive and resilient to the impacts of climate change.
5.10 The Transportation System in Peel	Policy updates recognize how the transportation system has a direct role in reducing GHG emissions to address the impacts of climate change.
Chapter 6 Regional Services	New and updated policies to several sections within Chapter 6 include: • Minimizing vulnerabilities when locating, designing, and constructing Regional human service facilities. • Assessing and addressing climate change risks and vulnerabilities when developing new and replacing existing infrastructure. • Promoting resource recovery of food and organic waste.

7.5 Sustainability	This section has been developed and added to work collaboratively and coordinate at the municipal, neighbourhood, site, and building scales, local municipal implementation of policy, tools, and guidelines that support Regional interests associated with sustainable development.
7.11 Performance, Management, Reviewing and Updating	A new policy 7.11.2.11 has been added to work jointly with local municipalities, conservation authorities, and other agencies to raise awareness of the local impacts of climate change.

Source: Region of Peel Policy Mapping (2018).

3.2.13 Region of Peel Strategic Plan, 2015 – 2035

The Strategic Plan is fulfilled in stages across multiple Terms of Council. The current Term of Council (2018-2022) has identified areas of focus, priorities, and 20-year outcomes for each focus areas. The 'Thriving' category is focus on communities that are integrated, safe, and complete, which will prioritize expanding community mobility and building environmental resilience. Twenty-year outcomes for the 'Thriving' focus area envision a community:

- that is environmentally friendly;
- that promotes mobility, walkability, and various modes of transportation;
- that embraces diversity and inclusion;
- that promotes economic sustainability and future investments in Peel;
- where growth is well managed; and,
- where the built environment promotes healthy living.

The OP should support Regional Term of Council priorities and should include policies that reflect Regional Council's long-term outcomes, including environmental resilience, expanded community mobility, economic sustainability, and a built environment that supports healthy living.

3.2.14 Peel Climate Change Strategy

The Peel Climate Change Strategy (2011) developed in partnership with the City of Brampton, City of Mississauga, Town of Caledon, Region of Peel, Credit Valley Conservation and the Toronto and Region Conservation Authority, aims to reduce GHG emissions and community vulnerability to impacts, build capacity, and increase awareness. The Strategy was streamlined in 2018 to focus on three priority areas: Green Natural Infrastructure, Flood Resiliency, and Low Carbon Communities.

3.2.15 Peel Climate Change Partnership (PCCP)

The Peel Climate Change Partnership (PCCP) is designed to build and accelerate innovative climate solutions in the Region of Peel. The PCCP is coordinated and administered by planning staff from (Corporate) Region of Peel and follows ICLEI Canada's 5 step Building Adaptive and Resilient Communities Framework (ICLEI BARC) to guide adaptation planning. The PCCP leads, communicates, and works collaboratively with key stakeholders to drive local climate action and secure investment that enables the rapid and equitable transformation of municipalities and

broader community, within the Region of Peel, to become low carbon and resilient. Peel Climate Change Master Plan (2020-2030)

In 2017 Peel Regional Council endorsed a Climate Change Statement of Commitment to address climate change in the Region including the formation of an office of climate change and development of a climate change master plan.

Released in 2019, the (Corporate) Climate Change Master Plan (the CCMP) set out actions to achieve the Region's climate change goals. Figure 4 identifies CCMP outcomes

Outcomes	Description
Primary	
Reduce Emissions	Corporate greenhouse gas emissions are reduced by 45% by 2030, relative to 2010 levels.
Be Prepared	A safe, secure, and connected community is provided by ensuring Regional services and assets are more resilient to extreme weather events and future climate conditions.
Supporting	
Build Capacity	Climate change is considered in all decision-making through organization-wide climate literacy, planning, and accountability.
Invest	Innovative and sustainable approaches are used to finance action on climate change.
Monitor and Report	Progress on addressing Regionally funded climate change work is consistently reported, available, and widely understood.

Figure 5: CCMP Outcomes

Twenty actions and 66 activities structured around the primary outcomes set forth the direction for how the Region will lead by example through the management of Regional assets, infrastructure, and services in a changing climate over the next decade and influence to support the community as it transforms in response to climate change.

The CCMP supports implementation of official plan policy that reduces community vulnerability to impacts and greenhouse gas emissions. Drawing from the Region of Peel 2041 discussion paper on climate change, the City of Brampton's Official Plan may want to:

- Limit or increase planning standards for development in hazard-prone or high-risk areas.
- Design and Build new infrastructure to be more resilient to the effects of climate change.
- Ensure planning decisions consider climate risks and opportunities.
- Foster dialogue about climate resilience.
- Have climate change related Official Plan policy adopted and monitor implementation for continuous improvement.
- Develop and implement a framework for climate change planning and reporting.

To align with the CCMP and Peel Climate Change Partnership Priorities, the OP should include overarching policy to build corporate and community resilience to climate change. A framework

for climate change planning should be developed and implemented to monitor and report progress over time. Policy should enable the integration of climate change priorities into City decision making to ensure that co-benefits are captured and distributed evenly across the community. Actions should include setting science based corporate and community GHG reduction targets and implement actions to achieve them, identifying and managing risks to infrastructure, protecting and increasing green infrastructure, monitoring and evaluating the Sustainable Community Development Program, integrating climate change into financing planning and strategies, supporting sustainable transportation, and enabling a transition towards diversified and decentralized energy systems.

Municipal

3.2.16 Brampton 2040 Vision: Living the Mosaic, 2018

Brampton 2040 Vision is Brampton's bold vision for the next 25 years. The inspirational document provides guidance for the environment, jobs and urban centres, neighbourhoods, transportation, social matters, health, and arts and culture. Leveraging ongoing initiatives, including Brampton's global recognition as a Smart City, the Vision brings ten major transformations to Brampton that will facilitate reduced GHG emissions and more resilient communities.

Vision 1 of the Brampton 2040 Vision positions Brampton as a mosaic of sustainable urban places, sitting within an interconnected green park network, targeting 'one-planet' living. The following contemplates land use planning components directly related to land use planning and climate change:

- Action #1-1 Institute for Sustainable Brampton – This action directs the City to establish a public-private facilitator for local environmental progress to position Brampton in the vanguard of suburban sustainability. The prime mandate will be to achieve 'one-planet' living, a comprehensive standard in which people enjoy happy, healthy, vibrant living within the planet's ecological capacity.
- Action #1-2 Brampton Eco-Park – Brampton will designate an Eco-Park, similar to a national park or reserve fully embedded and used within the urban fabric. The Eco-Park will facilitate ecosystem revival, naturalization, compatible active-use interventions, and connectivity of green infrastructure.
- Action #1-3 Brampton Trees Project – Proposing a City-led "Brampton Trees Project" to regenerate the urban tree canopy. To support this program, tree planting through new development, enhanced brownfield, hazardous sites, and left-over lands are recommended sites for tree planting programs.
- Action #3-1: Complete neighbourhood audits that build on a sustainability evaluation framework already piloted in Brampton (the Sustainable Neighbourhood Retrofit Action Plan), which will incorporate resilience and climate change. The Sustainable Neighbourhood Retrofit Action Plan piloted in the County Court neighbourhood addresses the risks associated with outdated stormwater management systems, including local experience of erosion on public and private land, and poor water quality during intense precipitation. These initiatives promote climate change adaptation and sustainability established neighbourhoods.

- Vision 4 of the Brampton 2040 Vision positions Brampton as mosaic of safe, integrated transportation choices and new modes, contributing to civic sustainability, and emphasizing walking, cycling, and transit.

As demonstrated in SNAP neighbourhoods, official plan policy can help to drive climate change adaptation and sustainability in existing neighbourhoods and at the City-wide level by pursuing and supporting actions identified in the Vision, contributing to sustainability initiatives with elements of social resiliency, such as placemaking, health, and quality of life. The OP will ensure that policy aligns with the 'one-planet living framework' areas.

3.2.17 City of Brampton Official Plan, 2006

The City of Brampton's 2006 Official Plan (September 2020 Consolidation) speaks to the importance of finding sustainable alternatives in order to conserve energy and reduce GHG emissions, including in its corporate operations. It provides support for sustainable development practices such as mixed-use, compact, and transit-oriented development and specifically supports the use of renewable and district energy systems in the city.

In 2010, the Ontario Municipal Board (OMB) granted partial approval of Official Plan Amendment (OPA) 43 (OPA2006-43) to conform with updates to the Growth Plan. This OPA introduced consideration of climate change adaptation and mitigation, which are highlighted in Table 3.

Table 3: High-Level Summary of Climate Change Policies in the Current OP

Section	Purpose/ Objectives of the Policies
2.1 Physical and Environmental Considerations	It is the objective of the OP to foster a culture of conservation to address water and energy conservation, air quality protection and waste management that will assist to mitigate and adapt to climate change.
2.4.3 Protecting Our Environment, Enhancing Our Neighbourhoods	The City will foster a culture of conservation in recognition of climate change as an issue that will affect the entire community and the City's operations and management.
3.1 Sustainable Planning Framework	Protect and enhance environmental and public health, improve the overall quality of life for residents by protecting the natural heritage system through an ecosystems approach, and identify climate change adaptation and mitigation strategies and measures.
4.5 Transportation	Recognizes growing concern with vehicular emissions contributing to GHG emissions and global climate change.
4.6 Natural Heritage and Environmental Management	Public health and safety are fundamentally linked to environmental health, and human activities are being intrinsically linked to climate change. Municipalities can have direct control or influence over many sources of pollution that affect public health and climate change.

4.6.15.2 Culture of Conservation	The City must implement climate change adaptation and mitigation strategies and measures to achieve sustainable development and create a complete community.

Source: City of Brampton. (2020). City of Brampton Official Plan.

For a complete review of Brampton OP policies, refer to section 3.5.3.

3.2.18 Brampton Grow Green Environmental Master Plan, 2020

The Brampton Grow Green Environmental Master Plan (EMP) provides direction for corporate and community action to deliver results and co-benefits. The EMP supports implementation of the Pan-Canadian Framework on Clean Growth and Climate Change by including actions to advance climate change adaptation and build resilience to climate impacts. A climate change adaptation plan can help to enable the City to deal with the impacts, risks, and opportunities posed by a changing climate, directly addressing the Framework's approach to reducing climate-related hazards and disaster risks.

The most recent EMP includes a variety of actions related to climate change resilience and land use planning, including but not limited to:

- Action 15: Establish policies/procedures that ensure new City facilities strive to achieve and maintain net zero carbon emission in their annual operations.
- Action 22: Establish policies and guidelines that require the submission of a Water Conservation Plan as part of development applications, which recommends measures that can facilitate potable water conservation.
- Action 23: Establish policies and incentives to encourage green roofs, blue roofs, and cool roofs on new commercial, institutional, and residential development with a minimum gross floor area.
- Action 27: Develop policies/procedures to evaluate opportunity to incorporate low impact development into major City capital projects.
- Action 28: Develop and commence implementation of an outreach and education strategy regarding stormwater management on private properties.
- Action 30: Develop and commence implementation of a Climate Change Adaptation Plan.
- Action 45: Integrate natural assets into the City's Annual Financial Statement.
- Action 52: Establish policies that require the submission of an Integrated Energy Management Plan as part of development applications, which recommends potential measure to increase energy efficiency and conserve energy, and explores opportunities for district energy.
- Action 57: Develop policies/procedures for lifecycle assessments, including lifecycle GHG emissions, or major capital projects.

The OP will leverage the EMP by incorporating policies that support climate action. This should include policies related to low impact development through green infrastructure to address co-benefits related to climate change and natural heritage, net zero buildings, energy efficiency, water conservation, establishment of a Climate Change Adaptation Plan, natural asset considerations, and lifecycle assessments.

3.2.19 City of Brampton's Community Energy and Emissions Reduction Plan (CEERP)

The City of Brampton's Community Energy and Emissions Reduction Plan (CEERP) provides a roadmap to improve energy efficiency, reduce greenhouse gas emissions, create economic advantage, ensure energy security, and increase Brampton's resilience to climate change.

In support of Brampton's 2040 vision, the CEERP sets three goals, based on an assessment of local energy and emission data relative to global best practices. These goals are identified in Figure 5.

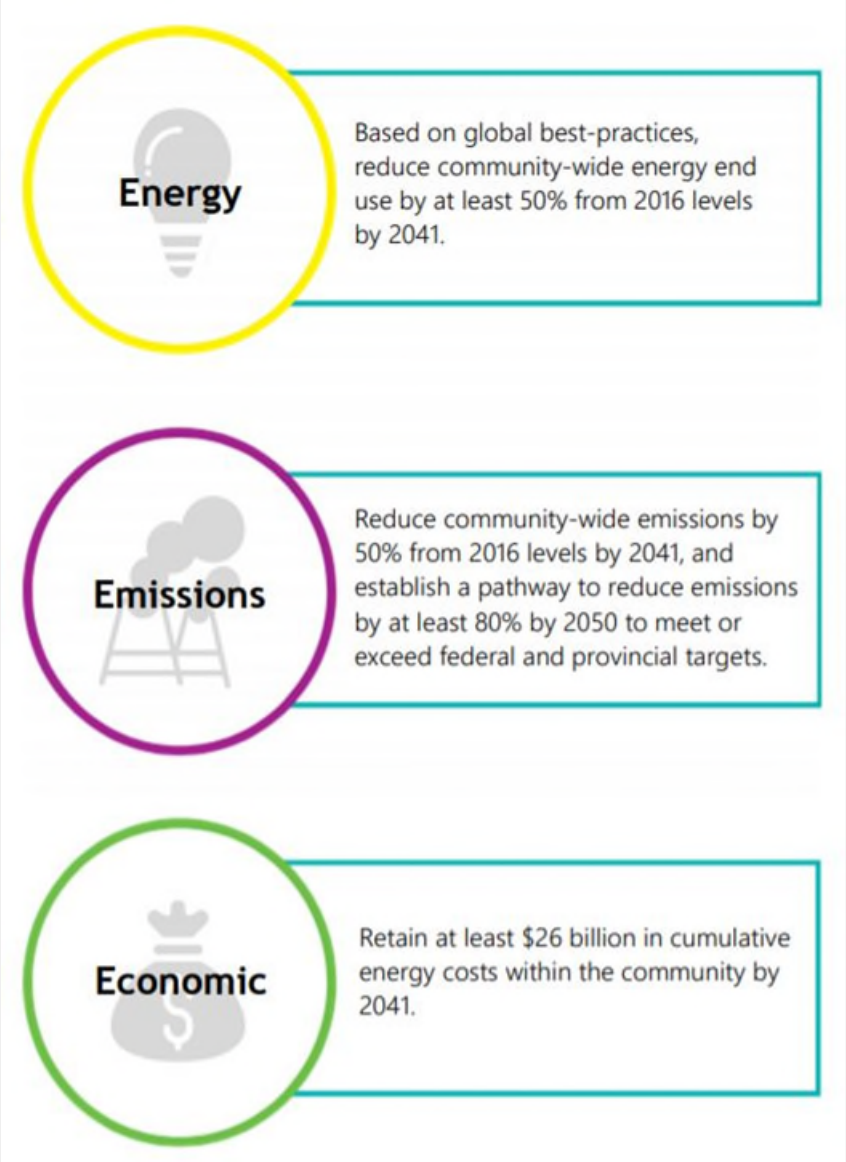

Figure 6: CEERP Goals

To achieve these goals, the CEERP's Strategic Directions include numerous actions related to policy interventions through the Official Plan, including:

Green Communities

2.2.1.1 Update the Official Plan to include Transportation Demand Management requirements for new development.

2.2.1.2 Update the Official Plan to require the establishment of Integrated Energy Master Plans for greenfield and larger redevelopment sites and other specific types of development

2.2.1.3 Ensure City policies and programs are aligned with supporting district energy and low carbon energy systems

2.2.1.5 Update the Official Plan to encourage the planning, design and development of near-net zero buildings and neighbourhoods

2.2.1.6 Update Official Plan, including Secondary Plan, policies to emphasize mixed use, higher density development in Urban Centres, Town Centres, Mobility Hubs, and along intensification corridors to support future district energy options

2.2.8 Identify opportunities to introduce new legislative, policy, and/or programs, including by-laws and incentive programs, to require implementation of climate resilience measures (e.g. green roof by-law) in new buildings

Transportation Efficiency

3.6.2 Update the Official Plan to require new development to be transit friendly by requiring applicant so submit Transit Feasibility Studies.

Home & Building Efficiency

4.3.1 Ensure City policies and programs are aligned with supporting the objectives for Home and Building Efficiency: update Official Plan Policies, update Design Guidelines and Sustainability Metrics, update Secondary Plan policies.

The CEERP recognizes that communities must ensure they are well positioned to manage the risks and opportunities associated with the current global energy transition, one that is moving towards a more distributed energy system. Action on climate change is one central factor towards this transition. Other factors include the:

- decreasing costs for technologies that generate and distribute energy locally;
- convergence of communication and energy technologies, commonly referred to as “smartgrid”;
- growing systemic inefficiencies in our current centralized energy system; and,
- need to increase community resiliency by addressing escalating concerns about energy security, which includes consumer issues of affordability, accessibility and reliability.

The OP shall implement the CEERP. Policy should support the seven strategic directions and related goals of the CEERP to explicitly promote urban development forms and buildings that support reduced energy consumption and increased use of renewable energy. This may include district energy and low carbon and renewable energy systems, as well as near net-zero or net-zero buildings and neighbourhoods and opportunities for employment lands. The OP should also include tracking of key metrics and measuring against targets to measure progress in implementing the CEERP. The OP will support community action as a key tool to implement the CEERP.

3.2.20 Sustainable Neighbourhood Action Program

The Sustainable Neighbourhood Action Program (SNAP) is an innovative, collaborative model for sustainable urban renewal and climate action that focuses on the neighbourhood scale. Guided by a customized Action Plan for the selected neighbourhood, the program aligns municipal sustainability priorities with community needs, identifies integrated retrofit solutions, and fosters partnerships between public agencies, community organizations, businesses, and residents. As a result, SNAPs help deliver program efficiencies, empower residents, and showcase innovation.

A partnership initiative between the City, Region of Peel, TRCA, and CVC, there are currently three SNAPs: County Court SNAP, Fletchers Creek SNAP, and Bramalea SNAP.

The OP should enable the establishment of new neighbourhood SNAP projects. The OP should build community preparedness and resilience to climate change in all neighbourhoods. The SNAP model may be used as a proven example to build preparedness and resilience at a community level through engagement and empowerment and may be applied to leverage action more broadly across the City.

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3.2.21 City of Brampton (Corporate) Energy and Emissions Management Plan 2019-2024: A Zero Carbon Transition, 2019

The City's Corporate Energy and Emissions Management Plan supports Federal and Provincial emission reduction targets and sets out a pathway to minimize energy and emissions intensity and maximize cost recovery for City-owned buildings. Notably, building energy use intensity of City facilities has improved, largely due to guidance of the plan.

The plan establishes a long-term goal to achieve GHG emission reduction targets of 30 percent and 80 percent for 2030 and 2050 respectively. Looking towards a zero-carbon transition in operations for the City's facilities, the City has set an interim target of 20% GHG emissions reduction by 2024.

Actions identified in the plan that work towards these goals and can facilitate climate change resilience through OP policy include but are not limited to:

- Continue to employ innovative energy management practices with the implementation of leading-edge/ emerging energy efficient technologies in city-owned facilities;
- Continue to implement renewable energy projects including geothermal and solar PV projects where feasible;
- Develop a formalized energy management policy;
- Set a point policy for all city-owned facilities for temperature, humidity, outdoor air, etc.

To support the Corporate Energy and Emissions Management Plan, the OP will commit to the continuous improvement of corporate-wide energy performance and emissions reduction and will ensure that recommended activities are implemented. This should include energy management policy such as setting energy performance targets, procuring reliable sources of energy, developing sustainable procurement policies, and integrating energy matters in building design and construction to support the City's zero carbon transition. To expand on the Corporate Energy

and Emissions Management Plan, the OP should direct the City to expand energy and emissions reductions to the fleet by establishing sustainable green fleet procedures.

3.2.22 Transportation Master Plan

The City of Brampton's Transportation Master Plan (TMP) establishes a transportation system to better serve residents, employers, employees and visitors while accommodating all modes of transportation (e.g., public transit, commuter travel, commercial vehicles and active transportation).

Updated in 2015, the TMP affirms the City of Brampton's desire for a more sustainable transportation system, particularly to address the impact that motor vehicles have on air quality and climate change.

The TMP provides the following policy recommendations for inclusion in the Official Plan update:

- Ensure that information is provided to new owners, residents, tenants and leaseholders related to the adjacent sustainable transportation services and infrastructure being implemented within the project and available throughout the City, such as transit stops and schedules, and Active Transportation facilities on and off street;
- Develop a partnership with Peel Public Health to further explore the Health Development Index and further integrate transportation and public health policies and programs;
- Develop a more detailed TDM Plan and Action Plan that has contextual Brampton solutions and that includes the exploration of monitoring and evaluation tools to ensure that there is sufficient support and funding for the duration of the TMP and the TDM Strategy;
- Incorporate TDM policies related to the development and implementation of TDM into the Transportation Master Plan, the Official Plan and all Secondary Plans. The policies should include developing a comprehensive TDM Plan and TDM Action Plan; creating TDM-based development guidelines for development applications including site plans and guidelines for traffic impact study reports; and,
- Develop parking regulations that support TDM programs. This will require a Parking Study to be developed, which should be undertaken within 2 years of the Sustainable Mobility Coordinator being hired.

Motor vehicles produce a variety of emissions that reduce air quality and contribute to climate change. Implementing policies recommended in the TMP into the OP can help to improve air quality by supporting and leveraging strategies that exist to reduce emissions from motor vehicles. The OP should include the policies recommended in the TMP addressing parking, active transportation, electric vehicle infrastructure, transportation demand management, public health, and connectivity and should expand on the TMP by including policies to support additional hybrid and electric vehicle consideration for fleet purchases by the City.

3.2.23 Active Transportation Master Plan, 2019

The City's Active Transportation Master Plan (ATMP) recommends the network plan, policies, and programs to support the 2040 Vision for a mosaic of safe, integrated transportation choices and new modes, contributions to civic sustainability, and emphasizing walking, cycling, and transit.

Active transportation (walking, cycling and other self-propelled mobility options) presents opportunities for reducing single occupant vehicle trips, and for addressing a host of community design and public health issues. While simultaneously reducing GHG emissions and traffic congestion, active transportation can contribute to climate change resilience by increasing levels of physical activity and social interaction.

To support the ATMP, several active transportation supportive policies are recommended for consideration within updates to the Official Plan, including:

- Encourage and promote active transportation as a preferred mode of transportation for recreational and short trips.
- Incorporate considerations for active transportation in the land use planning, development and approval process.
- Protect and develop an active transportation network.
- Adopt the City of Brampton ATMP through an integrated active transportation network plan and implementation strategy.
- Provide safe and comfortable year-round operation of the primary active transportation network.
- Ensure public safety and the integrity of the transportation system.

Active modes of transportation help to improve public health and reduce GHG emissions. The OP will recognize and support active transportation as an important means to help produce a more sustainable transportation system. The OP will incorporate the suggested active transportation supportive policies outlined in the ATMP including a safe and secure active transportation network accessible year-round and incorporation of active transportation into the land use planning, development, and approvals process.

3.2.24 Sustainable Community Program – New Development (Sustainability Metrics and Thresholds)

Sustainable Community Development Guidelines

Between 2013 and 2015, the City of Brampton in partnership with the Cities of Richmond Hill and Vaughan developed Sustainability Metrics and Sustainability Score Thresholds to guide, measure, and evaluate the sustainability performance of new development.

Sustainability Metrics (Metrics):

A set of indicators to evaluate the sustainability performance of new development, organized around the categories of Built Environment, Mobility, Natural Environment and Open Space, and Green Infrastructure and Building. Each of the approximately 50 Sustainability Metrics available are assigned a point value, and the combination of Metrics selected by the development proponent results in a final Sustainability Score. Development proponents can select any combination of Metrics to achieve the minimum required Score. This enables the proponent to choose Metrics that best suit their individual property, project, and level of sustainability aspiration.

Sustainability Score Thresholds (Thresholds):

Performance levels achieved by the Sustainability Score of a development proposal, and categorized as Bronze, Silver, or Gold. As of July 2018, the City of Brampton requires development proposals to achieve a minimum Bronze level Sustainability Score. In 2018, the Cities of Brampton, Vaughan, and Richmond Hill collaboratively started a process to update the existing Sustainability Metrics and Thresholds, and in 2019 the City of Markham also joined the partnership.

The OP should continue to highlight the Sustainability Metrics and Thresholds as an important tool for facilitating provincial and municipal sustainability and climate change objective. It should emphasize the correlation between compact, walkable built forms, environmental protection, climate change mitigation and adaptation, and sustainable building, site, and neighbourhood design practices.

Conservation Authorities

3.2.25 Urban Forest Canopy Study, TRCA

The Toronto and Region Conservation Authority (TRCA) is studying the impacts of climate change on the urban forest in the GTA, using a climate change risk assessment framework. An increase in temperature, precipitation, and atmospheric CO_2 level are identified as the primary drivers of ecological impacts. Two pilot species, red oak and red maple have been examined in detail.

The preliminary findings suggest that climate change will have both positive and negative influence on urban trees. Following additional research and expert consultation, the results will be used to indicate levels and guide urban forest management.

The natural environment and urban forest should not be compromised by growth. The OP should include policies to protect Brampton's natural heritage system for the long-term as they are critical for storing flood waters, including protection for and enhancement of forests, trees, wetlands and valleylands.

3.2.26 Natural Heritage Climate Change Study, TRCA

The Region of Peel commissioned the development of vulnerability assessments to investigate the impacts of climate change on a variety of systems. The information gained through these assessments is presented in the Vulnerability Assessment, completed in 2017, which studies the impacts of climate change on three types of natural systems in the Region:

- Groundwater systems: recharge areas, aquifers and discharge areas.
- Aquatic systems: rivers, streams, lakes, and wetlands.
- Terrestrial systems: natural and urban forests, grasslands, wetlands, bluffs.

The results of the vulnerability assessment provide direct action to be taken in the Region of Peel to address climate change challenges:

- Enhance the urban tree canopy and supporting efforts made through the Peel Climate Change Partnership on Heat Resiliency, especially in areas with little or no ability to effectively regulate summer land and water temperatures, including areas of acute thermal stress to fish.

- Start or continue adaptation and natural heritage planning, incorporating the implementation of new policies contained within the four amended plans that take into account climate change, while leveraging this and other community assessments and system datasets.
- Increase the enhancement and protection of existing wetlands and tablelands and create new wetland features where possible to build resilience and deliver numerous ecosystem services, including increased flood regulation.
- Protect, enhance, and restore regional species diversity by increasing connectivity of natural areas, particularly in high priority areas.
- Incorporate climate change into watershed planning more directly, including identifying and protecting important local connections between shallow groundwater and surface features.
- Promote effective collaboration and information sharing between Conservation Authorities, with adjacent and upstream municipalities through active participation in the renewed Peel Community Climate Change Partnership.

The OP should identify and integrate resilience measures and climate adaptation. This should include policy to identify, maintain, restore, and enhance the diversity and connectivity of natural features for the long-term protection of ecosystems. Further to the OP's requirements for stormwater management plans in settlement areas and for major developments, the OP should require the City to assess infrastructure risks and vulnerabilities caused by the impacts of climate change when planning or replacing infrastructure.

3.3 Climate Change Policy Considerations

3.3.1 Overview Climate Reality

Climate change is already affecting the City of Brampton through increases in local flooding, snow, ice, and wind storms, hotter summers, and a rise of vector-borne diseases.[52] Based on data from Climate Data Canada[53] the City of Brampton's annual average temperature is predicted to rise under a high emissions scenario from 7.7ºC to 9.5 ºC for the 2021-2050period. Continued temperature increases are predicted for the following 30-year periods until the end of this century. Under the same high emissions scenario, average annual precipitation is expected to be 7 percent higher for the 2021-2050 period than the average 809mm for the 1951-1980.These climate values align with the predicted impacts of climate change recognized by the City of Brampton in the Community Energy and Emissions Reduction Plan. A helpful graphic demonstrating these impacts is provided in section 3.3.4 below.

The City of Brampton bolstered their commitment to battling climate change in June of 2019 when Council unanimously voted to declare a climate emergency, acknowledging that to address this crisis, the City must urgently reduce GHG emissions and prepare for the consequences of a warming planet.

[52] https://www.brampton.ca/EN/residents/GrowGreen/Documents/CEERP/CEERP_Ch1_TheClimateReality.pdf
[53] https://climatedata.ca/explore/location/?loc=FALIF&location-select-temperature=tx_max&location-select-precipitation=rx1day&location-select-other=frost_days

3.3.2 Land Use Policy is Climate Policy

Land use planning is identified as one of the most effective processes to facilitate local response to climate change.[54] According to the Federation of Canadian Municipalities, 45 percent of national GHG emissions in Canada are under the direct or indirect control of municipal governments[55]. Table 4 identifies how municipalities can work through land use planning with the goal of climate change mitigation and adaptation.

Table 4: Land Use Planning Themes to Address Climate Change Mitigation and Adaptation

Land Use Planning Theme	Climate Change Action
Growth Management	Allocate population and employment growth to increase intensification and density and develop compact, mixed-use, and transit-supportive communities.
Sustainable Buildings	Continue to address GHG emissions from buildings through standards that require high-performing buildings, such as standards for energy efficiency and resilience measure to improve comfort and resilience to extreme weather events.
Transportation	Improve public health and reduce GHG emissions through sustainable and active modes of transportation, including carpooling, public transit, cycling, and walking.
Energy	Promote energy efficiency and conservation through renewable energy (including district energy), green development standards, and electric vehicles.
Waste	Explore all opportunities before final disposal of waste and excess soil, including waste produced at municipal facilities.
Water Resources	Protect water resources and inform master plans through watershed and sub-watershed planning and consider the risk and vulnerabilities to public infrastructure.
Natural Hazards	Address impacts related to surface water, groundwater, and flooding and increase resilience through low-impact development and green infrastructure stormwater approaches.
Natural Heritage	Maintain, restore, and enhance the diversity and connectivity of natural features such as forests and rivers in urban/rural areas for the long-term protection of ecosystems and public health.

[54] https://www.cip-icu.ca/getattachment/ca4806bb-0c53-4ad6-a4c6-47fe0c9e0d51/Climate-Brief_Land-Use-Planning-bm.pdf.aspx
[55] https://www.ipcc.ch/site/assets/uploads/sites/2/2019/06/SR15_Full_Report_High_Res.pdf

Agriculture	Identify and protect prime agricultural lands and the economic viability of farming through land use planning.

Source: https://www.cip-icu.ca/getattachment/ca4806bb-0c53-4ad6-a4c6-47fe0c9e0d51/Climate-Brief_Land-Use-Planning-bm.pdf.aspx

3.3.3 Municipal Role

Municipalities can play a significant role in realizing the co-benefits and opportunities of climate action. The City of Brampton has direct control over where and how growth will occur and can develop land use policies and tools to both reduce GHG emissions and build climate change resilience. Bringing together multiple agendas through land use planning policies can help to ensure "win-win" outcomes for the corporate and local community.

Case studies by the Clean Air Partnership[56] and Natural Resources Canada[57] emphasize that leadership and interdisciplinary partnerships and collaboration can be particularly useful when addressing the complex challenges of climate change. Notably, the City of Brampton has identified in the Environmental Master Plan (2020) expanded education efforts and capacity building, both in-house and community wide, as necessary to build knowledge and support for environmental initiatives and to foster participation and empower people, businesses, and institutions to act against climate change.

The tools and policies available to municipalities are linked to broader social goals of the municipality, such as aging in place, affordable housing, and mobility hub/intensification studies. For example, the Centre for Community Energy Transformation (CEET), a community organization, addresses a need in Brampton to mobilize massive, community-wide efforts focused on creating a sustainable energy future with a mission to lead an inclusive suburban energy transformation. The CEET and its identified role in implementing the Community Energy and Emissions Reduction Plan is one example of a tool that the City can use to ensure priority projects that advance climate change mitigation and/or adaptation are implemented.

The City could also consider the establishment processes to support opportunities for microgrid and district level energy system implementation, such as approvals coordination for third parties and/or the establishment of a utility.

3.3.4 Brampton's Climate Change Risks and Vulnerabilities

Climate change presents significant risks to the City of Brampton. As a corporation, the municipality's ability to make decisions to manage vulnerabilities posed to people, jobs, and the ecosystem will become significantly more important as the effects of climate change continue to impact Brampton.

Identifying and recognizing possible risks associated with climate change will better help prepare Brampton in its effort to lessen the impact and adapt to future risks. Figure 6 appears in Our 2040 Energy Transition, the City of Brampton's Community Energy and Emissions Reduction Plan, and identifies the potential impacts of climate change in Brampton.

[56] http://www.climateontario.ca/doc/ORAC_Products/CleanAirPartnership/CAP_Municipal_Adaptation_Training_Program.pdf
[57] https://www.nrcan.gc.ca/environment/resources/publications/impacts-adaptation/reports/municipalities/10083

The impacts of climate change will test the resilience of all populations. However, climate change shocks and stressors do not affect all groups in our communities equally. Climate change disproportionately impacts vulnerable and socially and/or economically marginalized populations. Those that have been affected by systemic vulnerabilities and inequalities (including racialized communities, lower income communities, immigrant and refugee communities, people with disabilities and/or older adults) are often at greater risk from the impacts of climate change and have the fewest resources to respond.[58] Through policy that impacts community design, municipalities can ensure access to safe spaces and resource needs for vulnerable populations.

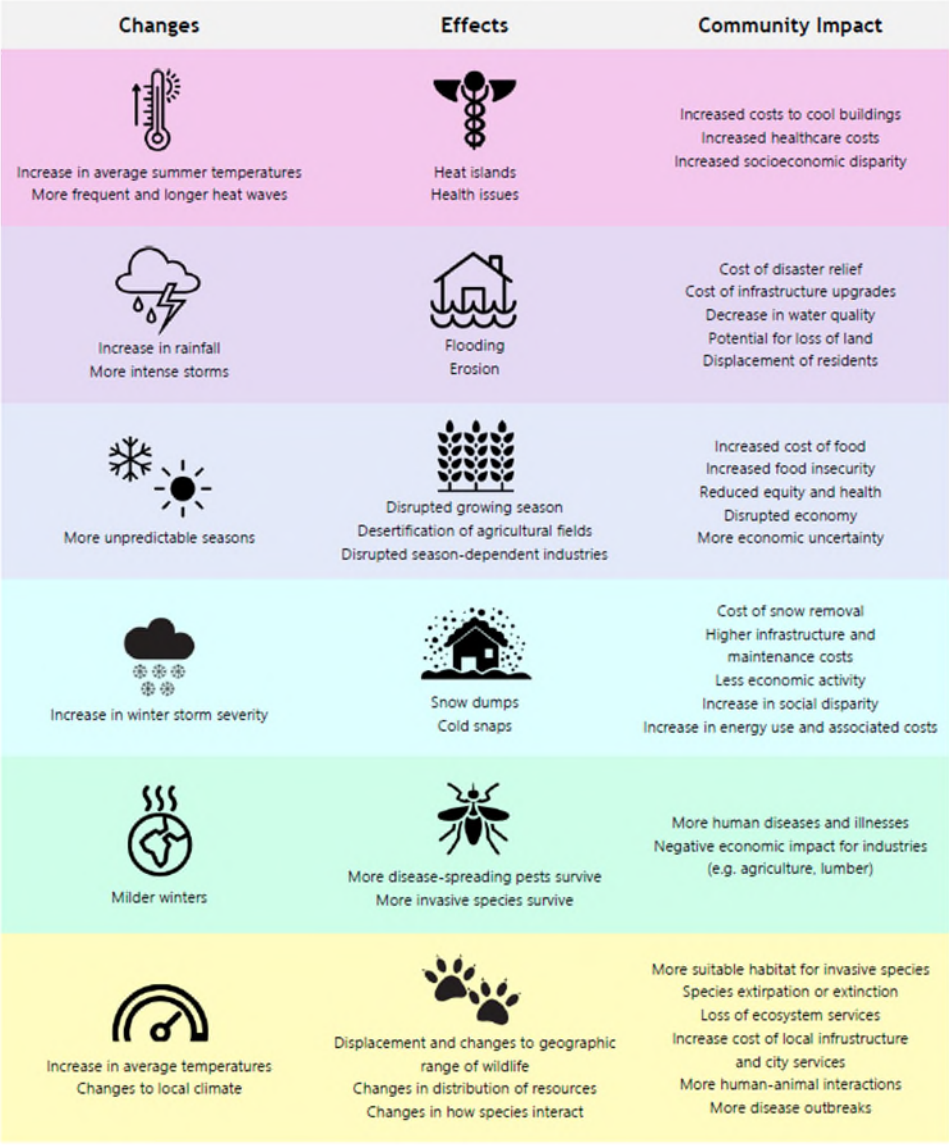

Figure 7: What will climate change look like in Brampton? (CEERP)

[58] https://www.un.org/esa/desa/papers/2017/wp152_2017.pdf

3.3.5 Mitigation and Adaptation

Integrating efforts to mitigate and adapt is the most effective way to manage climate change risks. This approach is an efficient way of making communities more resilient over the long term by building both types of action into strategies, plans and policies.

The following tools identified in Figure 7 are potential options to support the development of a land use planning framework that reduces GHG emissions and responds to actual and/or projected climate change impacts to Brampton's built, natural, and social systems.

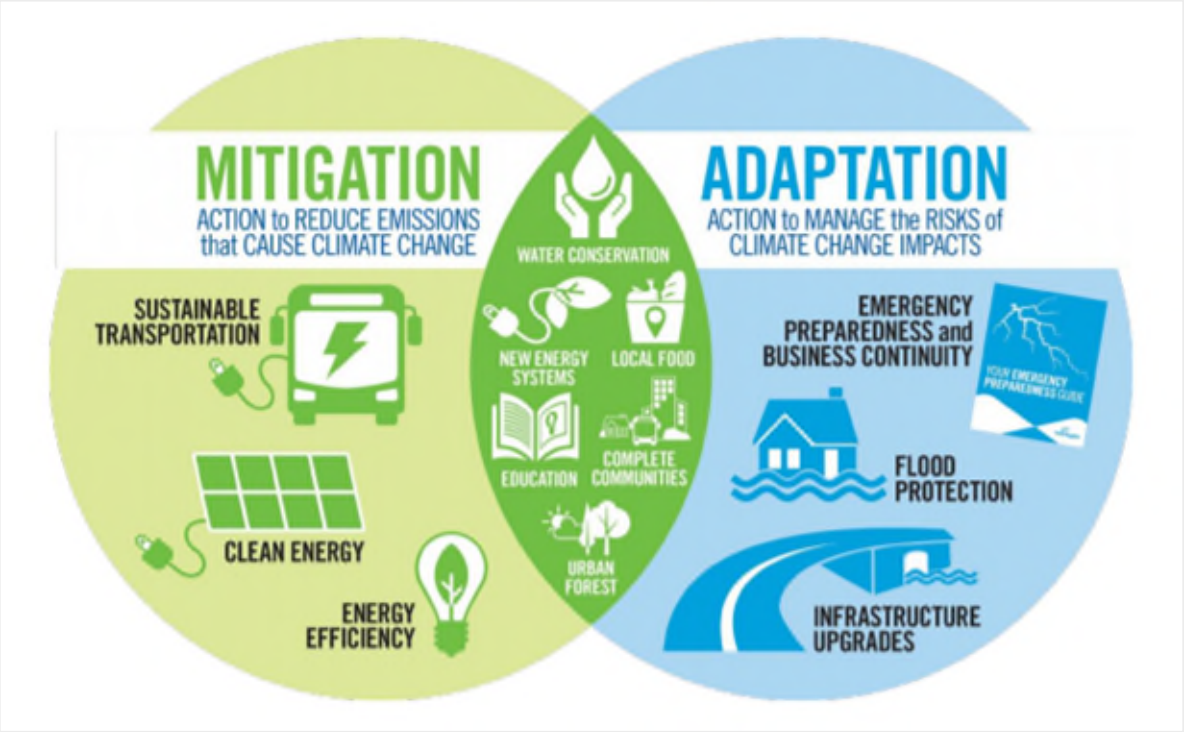

Figure 8: Mitigation and Adaptation Initiatives and Synergies[59]

3.4 Broad Policy Directions

Incorporating sustainability and climate change into the Official Plan will allow the City of Brampton to identify and leverage actions to reduce GHG emissions and to be prepared for climate change impacts. Table 5 provides a summary of policy direction informed by the review of relevant federal, provincial, regional, and local direction that will inform climate change policy for the City's Official Plan update.

[59] Source: https://yorkpublishing.escribemeetings.com/filestream.ashx?DocumentId=10811

Table 5: Climate Change Policy Direction Summary

Federal Direction
• The objectives of the Pan-Canadian Framework provide a lens for implementing climate action in the OP that aligns with anticipated federal and provincial investments in climate change mitigation and adaptation, as well as expectations for the City to lead by example. • The OP will consider priorities identified in Clean Canada including energy reductions through municipal and community buildings, reducing waste, supporting active transportation, and electrifying public transit networks. • Respond to Canada's Changing Climate Report by recognizing the local impacts of climate change and implement policy that responds to climate change impacts.
Provincial Direction
• Conform to climate change mandates within the ***Planning Act*** and exercise agency granted to the municipality to go beyond minimum standards, where consistent with the Act. Ensure that tools available to the municipality (e.g. zoning by-laws) address climate change through the planning process. • Consider requirements established through ***Bill 68*** and embed policies that capitalize powers granted to the municipality through the ***Municipal Act***. • Conform with the PPS to ensure that strong, livable and healthy communities promote and enhance human health and social wellbeing, are economically sound, and are resilient to climate change. • Support the development of complete communities and ensure that policies identified in the PPS for climate change adaptation and resiliency are developed in OP policy, including an overall culture of conservation. • Support the Made-in-Ontario Environment Plan to ensure that municipal planning processes support climate change adaptation and mitigation and include low carbon climate resiliency solutions. • Support infrastructure resiliency to climate change, natural asset, and green infrastructure, including through integration with urban design and open space opportunities to support climate change adaptation and mitigation.
Regional Direction
• Conform with the Region of Peel's Official Plan. Include mitigating and adapting to climate change as part of the overall Regional Resiliency Framework. sustainable development framework. Incorporate specific policies for housing, air quality, transportation, energy, natural and grey infrastructure, and the built form that build corporate and community resilience and are directly correlated with the potential impacts of climate change. • Support Region of Peel priorities and include policies that support long-term outcomes, including community and environmental resilience, expanded community net-zero

emissions mobility options, economic sustainability, and a built environment that supports healthy living.

- Support the CCMP and Peel Climate Change Partnership Priorities by including, including overarching policy to build corporate and community resilience to climate change. A framework for climate change planning should be developed and implemented to monitor and report progress over time.
- Enable the integration of climate change priorities into decision making to ensure that co-benefits are captured distributed evenly across the community. Actions should include setting science based corporate and community GHG reduction targets and implement actions to achieve them, identifying and managing risks to infrastructure, protecting and increasing green and natural infrastructure, monitoring and evaluating the Sustainable Community Development Program, integrating climate change into financing planning and strategies, supporting sustainable transportation, and enabling a transition towards diversified, decentralized, and low carbon energy systems.

Municipal Direction

- Drive climate change adaptation and sustainability at the neighbourhood and City-wide level by pursuing and supporting actions identified in the Vision, contributing to sustainability initiatives with elements of social resiliency, such as placemaking, health, and quality of life. The OP will ensure that policy aligns with the 'one-planet living framework' areas.
- Leverage the City's EMP by implementing policies that support actions related to climate change resilience and land use planning. This should include low impact development, implementation of a Climate Adaptation Plan, natural asset considerations, and policies and procedures for lifecycle assessments.
- Implement and support the seven strategic directions and related goals of the CEERP to explicitly promote urban development forms and buildings that support reduced energy consumption and increased use of renewable energy. This may include district energy and low carbon energy systems, as well as near net-zero or net-zero buildings and neighbourhoods. The OP should also include tracking of key metrics and targets to measure progress in implementing the CEERP in the areas of the strategic directions: Green Communities; Transportation Efficiency; Home and Building Efficiency; Local Energy Supply and Distribution; Industrial Efficiency; Green Infrastructure; and Communications, Engagement, and Monitoring. The OP will support community action as a key tool to implement the CEERP.
- Enable the development of new neighbourhood SNAP projects. The OP should build community preparedness and resilience to climate change in all neighbourhoods. The SNAP model may be used as a proven example to build preparedness and resilience through engagement and empowerment and may be used to leverage action more broadly across the City.
- Commit to the continuous improvement of corporate-wide energy performance and emissions reduction and ensure that recommended activities are implemented. This should include energy management policy such as setting energy performance targets, procuring reliable sources of energy, developing sustainable procurement policies, and integrating energy matters in building design and construction to support the City's zero carbon transition.

- To expand on the Corporate Energy and Emissions Management Plan, the OP should direct the City to expand energy and emissions reductions to the fleet by establishing sustainable green fleet procedures, multi-modal transportation system. Broad policy themes include parking, active transportation, transit, electric vehicle infrastructure, transportation demand management, public health, and connectivity.
- Recognize and support active transportation as an important means to help produce a more sustainable transportation system. The OP will incorporate the suggested active transportation supportive policies outlined in the ATMP, including a safe and secure active transportation network accessible year-round and incorporate of active transportation into the land use planning, development, and approvals process.
- Consider sustainable design elements of buildings and recognize the correlation between compact, walkable built forms, environmental protection, climate change mitigation and adaptation, and sustainable building and site design practices.

Conservation Authority Direction

- Support the CVC Climate Change Strategy and its short- and long-term actions, including manage and restore the natural heritage system to increase resiliency, develop and report on performance measures for climate change action, support flood forecasting and real-time flood monitoring, and work with the Peel Climate Change partners to support ongoing strategies, including SNAPs.
- Protect Brampton's natural heritage system for the long-term, including protection for and enhancement of forests and trees, wetlands and valleylands.
- Identify and integrate resilience measures and climate adaptation. This should include policy to identify, maintain, restore, and enhance the diversity and connectivity of natural features for the long-term protection of ecosystems.
- Require stormwater management plans in settlement areas and for major developments and should require the City to assess infrastructure risks and vulnerabilities caused by the impacts of climate change when planning or replacing infrastructure.

3.5 Climate Change Policy Analysis

This section of the discussion paper focuses on analysing the current policy in the Official Plan and the need for updated policy to bring the Brampton Official Plan into conformity with the ***Provincial Policy Statement*** and Region of Peel Official Plan. These updates will strengthen existing policies, implement City and Regional climate change strategies, recognize emerging planning trends and practices, remove outdated policy references, and incorporate new climate change policy.

3.5.1 Existing/Outdated Policy Statements

The Official Plan has been updated on a regular basis over the last several years in response to provincial policy and regulation, such as the ***Growth Plan for the Greater Golden Horseshoe*** and the ***Places to Grow Act***. Accordingly, the OP does include policies that identify goals, objectives, and actions to mitigate greenhouse gas emissions and to provide for adaptation to a changing climate. A review of these policies is provided in Table 7.

A primary objective of the OP is to foster a culture of conservation to mitigate and adapt to climate change. Policies included within the themes of water and energy conservation, air quality protection, and waste management tie policy direction to climate change strategies. The OP also acknowledges that climate change is an issue that will affect the entire community and the City's corporate operations and risk management, therefore strategies that protect human and environmental health and municipal infrastructure are crucial.

Table 7: High-Level Summary of Climate Change Policies Identified in the OP

Existing Section	Purpose/ Objectives of the Policies
2.1 Physical and Environmental Considerations	It is the objective of the OP to foster a culture of conservation to address water and energy conservation, air quality protection and waste management that will assist to mitigate and adapt to climate change.
2.4.3 Protecting Our Environment, Enhancing Our Neighbourhoods	The City will foster a culture of conservation in recognition of climate change as an issue that will affect the entire community and the City's operations and management.
3.1 Sustainable Planning Framework	Protect and enhance environmental and public health, improve the overall quality of life for residents by protecting the natural heritage system through an ecosystems approach, and identify climate change adaptation and mitigation strategies and measures.
4.5 Transportation	Recognizes growing concern with vehicular emissions contributing to GHG emissions and global climate change.
4.6 Natural Heritage and Environmental Management	Public health and safety are fundamentally linked to environmental health, and human activities are being intrinsically linked to climate change. Municipalities can have direct control or influence over many sources of pollution that affect public health and climate change.
4.6.15.2 Culture of Conservation	This section directly ties together themes of sustainable development, complete communities, and climate change impacts. This section states that the City must implement climate change adaptation and mitigation strategies and measures to achieve sustainable development and create a complete community. The subsections identified below highlights policies that exemplify the connection between climate change and the corporate and local community in Brampton. **Air Quality** This section recognizes the connection between air quality, land use planning, public health, and the long-term sustainability of the ecosystem and the economy. To mitigate against climate change impacts to air quality, this section provides policy direction to develop a

	complete community that is characterized by multi-modal transportation systems, increased density, and mixed land uses. Policies include: • Emphasis on compact City structure. • Integrated land use planning through an ecosystem approach. • Coordination with municipal partners on development strategies and guidelines. • Development applications must be evaluated in accordance with the Ministry of Environment's Provincial guidelines and approval requirements. **Energy** This section recognizes that conventional energy consumption is unsustainable and creates adverse environmental, economic, and social impacts that can be addressed through energy efficiency, energy conservation, and energy management principles of design. Policy directed the City to develop an energy management plan for City-owned and operated facilities, has been complete for the 2019-2024 period. **Water** This section reinforces the City's commitment to protecting, maintaining, and managing the City's water resources, which are intrinsic to creating healthy, complete communities. **Cultural Heritage Resources** This section recognizes that human activity has modified and impacted cultural heritage resources. Accordingly, this section directs the City to adopt a holistic approach to natural and cultural heritage planning to protect and conserve these resources, particularly where intensification is planned.

3.5.2 Policy Statement Gaps

Policies that have been included by other municipalities, and/or are relevant to new legislation/practices and are not included in Brampton's 2006 OP are discussed in further detail in Section 3.6 Climate Change Policy Recommendations of this discussion paper. Generally, best practices support adaptation and mitigation by:

- Providing a rational as to why and how actions contribute to climate change adaptation and/or mitigation.
- Considering equity by assessing and addressing vulnerabilities of populations and areas at higher risk to climate change related hazards.
- Identifying and strengthening policies that support in furthering other municipal priorities (e.g. improved health, growing a low-carbon economy, etc.).
- Including metrics and targets to ensure commitment, and to track on progress.

- Including a timeline for monitoring and reporting on metrics.
- Referencing other relevant plans and strategies that will support the policy (e.g. Environmental Management Plan, Transportation Master Plan, etc.).
- Including directive language (e.g. 'shall' and 'require' rather than 'may' and 'encourage').

3.5.3 Other OP Policies and Sections relevant to Climate Change

3.5.3.1 Context

Current OP policy recognizes that climate change will affect the entire community and the City's corporate operations and management, and that the City must foster a culture of conservation to address water and energy conservation, air quality protection, natural heritage protection, and waste management. Relevant existing policies include:

- Recognition that Brampton will absorb significant growth forecasted for the GTHA and will need to provide appropriate residential and employment growth within the built boundary and designated Greenfield areas.
- Acknowledgement of environmental features, as well as conservation authorities with jurisdiction over lands in the City of Brampton.
- Statement that the Plan promotes the principles of sustainability and an ecosystem approach to planning, which will require long-term management to achieve a sustainable, healthy ecosystem.
- Objectives to conserve and protect the City's natural heritage system through sustainable development and to foster a culture of conservation that will assist to mitigate and adapt to climate change.

3.5.3.2 Sustainable City Concept

Section 3.1 Sustainable City Concept sets out policies that support transit supportive communities that use resources efficiently and are sensitive to the natural environment to ensure the City grows in a sustainable manner.

Official Plan Amendment 2006-74 (OP2006-74) and Official Plan Amendment 2006-43 (OP2006-43) introduced several polices under section 3.1 Sustainable Planning Framework, which provides a holistic approach to planning that integrates economic, social, environmental, and cultural elements. This includes green building design standards, multi-modal transportation systems, conservation of resources, as well as the preparation of an Environmental Master Plan.

Notable inclusion as per Official Plan Amendment 2006-176 (OP2006-176) is section 3.4 Sustainable Community Development Guidelines, which provides policy support for Brampton's Sustainable Community Program.

3.5.3.3 Central Area

The Central Area section of the OP prioritizes several initiatives that support climate change adaptation and mitigation, including:

- Promotion of active transportation, including walking, cycling, and public transportation, notably the City's bust rapid transit (BRT) routes, which forms part of the City's Transportation and Transit Master Plan.
- Re-examine the open space and pathways system, including developing urban public spaces such as rooftop gardens, that should be combined with stormwater management practices.

3.5.3.4 Residential

The residential policies within the OP's Residential section are in accordance with the City's earlier Strategic Plan Pillar Two "Managing Growth" and Pillar Three "Protecting Our Environment, Enhancing Our Community". For example, the City is directed to consider natural heritage planning principles in the design of residential developments, which includes protection of groundwater and surface waters, and protection, maintenance and restoration of trees and woodlots.

3.5.3.5 Commercial

Policies within section 4.3.1 General Commercial Policies includes direction consider, upon review and approval of development applications, the following factors relating to climate change:

- Protect and enhance the natural heritage features and functions by addressing impacts through site planning and design, and sustainable management.
- Encourage best management practices for commercial development in terms of waste reduction, and water, soil, air, and energy conservation and promote green development and the principles of LEED.
- Consider the use of green infrastructure.

3.5.3.6 Employment lands

OP section 4.4 Employment states that Brampton is home to the third largest number of workers among municipalities in the Greater Golden Horseshoe. There is an opportunity to achieve a strong live-work ratio as a means of enhancing the quality of life of the community and contributing to sustainability. The City also recognizes the need for a green economic development strategy.

- Renewable and district energy solutions

3.5.3.7 Transportation

Section 4.5 of the 2006 OP promotes the development of an integrated local and regional transportation and transit network combined with active transportation, to create walkable communities. The City updated its Transportation Master Plan in 2015 to direct transportation planning moving forward. Policies to promote transportation efficiency are identified in Section 3.6.2.

3.5.3.8 Natural Heritage and Environmental Management

Section 2 of this discussion paper responds to the need for continued protection of natural heritage and water systems in the City as a basis for informing land use planning decisions. Recommendations provided in previous sections should be implemented to mitigate and adapt to climate change.

3.5.3.9 Recreational Open Space

The policies of Section 4.7 of the OP outline the hierarchy of the City's recreational open space, including parklands and the natural heritage system. While the current policies identify the relationship between the City's recreational open space and parks and the natural heritage system, they do not recognize the potential contribution parks and open space can provide to climate change adaptation and mitigation.

3.5.3.10 Infrastructure and Utilities

Policies within the OP's Infrastructure and Utilities section are provided to ensure that the City can provide infrastructure and relates services in a coordinated, timely fashion and maintained at a level that is financially sustainable and meets the needs of existing community as well as future growth. This also includes direction to ensure provisions are consistent with the ecosystem planning approach and are environmentally sustainable.

Policies within this section should be updated to reflect the potential impact that climate change will have on existing and future infrastructure. Most existing infrastructure was not designed to withstand future climate conditions and extremes. Stormwater systems, buildings, bridges, roads and pipes, transit infrastructure, and infrastructure that services water supply and wastewater management need to withstand power disruptions, rising temperatures, more frequent and intense rainfall, and higher wind, snow or ice loads.

This section can also recognize that green infrastructure and natural assets have an invaluable role to play in enhancing the quality of life and biodiversity, but also serve as buffers against climate impacts.

Policies to support district and renewable energy at scale making use of right of ways

3.5.3.11 Institutional and Public Uses

Policies within Op section 4.9 Institutional and Public Uses recognizes that services provided within this land use contribute to the creation of complete communities. The forms of "social" or "soft" infrastructure considered under this section contributes directly to the health, social well-being, and the quality of life of the City's residents and must therefore be tied directly to potential services disruptions caused by climate change.

Strategies for providing new social infrastructure and/or improving existing community facilities developed for areas that are inadequately serviced and susceptible to climate change. Understanding of community services and impacts of climate change, including demographic profile of area residents, inventory of existing services, identification of existing capacity and service gaps, identification of local priorities, recommended range of services and co-location opportunities, and identification of funding strategies.

This section should also recognize that these land uses provide excellent opportunities for incorporating green infrastructure and stormwater management best practices. These land uses also provide opportunities for the City to enhance is urban forest.

3.5.3.12 Urban Design

The City's OP recognizes that urban design must achieve and sustain a physical environment that is safe, attractive, efficient, and environmentally responsible. Policy options that can support climate change adaptation and mitigation relative to the sustainable city should support the Sustainable Community Program. Further policy recommendations are provided in subsequent sections.

3.5.3.13 Parkway Belt West

In Brampton, the Parkway Belt West Plan Area (PBWPA), as well as the 407 ETR, is bisected by a number of valleys and watercourse corridors, and contains successional areas and forest cover that contributes to Brampton's natural heritage systems. The PBWPA functions as an east/west ecological linkage across Brampton's southern boundary. The PBWPA is also comprised of a variety of existing land uses, such as industrial, commercial, open space (e.g. active parkland) and agriculture.

The PBWPA designation in the Brampton Official Plan is an opportunity to identify and acknowledge the climate change adaptation and mitigation opportunities the PBWPA provides to Brampton.

3.5.3.14 Implementation

The purpose of section 5.0 Implementation is to indicate the means and methods which will be applied to achieve the objectives and policies of the OP. Implementation of the OP is accomplished through a myriad of tools.

Policy options to support implementation should encourage partnerships with the Region, conservation authorities, and other local municipalities, as well as key stakeholders such as the development community to monitor and implement plans. Further implementation recommendations are provided in the following section.

3.6 Benchmarking and Best Practice

In addition to ensuring the Official Plan is consistent with all applicable federal and provincial policies, plans, legislation, and the Region of Peel Official Plan, there are several existing plans and best practices in other municipal jurisdictions in Canada. Table 6 provides a review of best practices.

Table 6: Best Practice Scan for Climate Change Policy Direction

Municipality	Climate Change Policy Direction	Relevance to City of Brampton
City of Toronto (Official Plan)	The City of Toronto Official Plan is an example of a municipality that goes beyond ***Planning Act*** requirements for climate change standards.[60] At its core,	While the Brampton OP does recognize that climate change is an issue that will affect the entire community and the

[60] https://cleanairpartnership.org/cac/wp-content/uploads/2019/03/Bringing-Climate-Change-into-Official-Plans_V3.pdf

	the OP recognizes that climate change is one of the biggest challenges facing the planet. Toronto commits itself to addressing this challenge through leadership. The OP includes recognition of predicted climate change impacts and how these might impact the city. The vision of the OP includes a city with infrastructure and socio-economic systems that are resilient to disruptions and climate change. Notable policies in Toronto's OP include: • The public realm will contribute to the city's climate resilience (3.1.1.2 h); and, • The impacts of changing climate need to be fully considered in new development and redevelopment activities, in stewardship of the natural environment, and in infrastructure planning and watercourse management (3.4); • To support strong communities, a competitive economy, and a high quality of life, public and private-city building activities and changes to the build environment, including public works, will be environmentally friendly, based on sustaining, restoring, and enhancing the health and integrity of the natural ecosystem, supporting biodiversity in the City and targeting ecological improvements, paying particular attention to the potential impacts of a changing climate on biodiversity and ecosystem health (3.4.1 b viii) and by reducing the risks to life, health, safety, property, and ecosystem health that are associated with flooding, unstable slopes, erosion and contaminated lands and considering the potential impacts of climate change that they may	City's corporate operations and management (2.4.3) the OP could be strengthened to demonstrate that the City is committed to leading action on addressing climate change. This type of action does appear throughout the OP, but taking a stance similar to the City of Toronto that demonstrates leadership across the corporation (rather than in particular sections of OP policy) can help to leverage the importance of addressing climate change through a systems approach. Section 4.6.15.2 Culture of Conservation in Brampton's current OP does provide similar direction that appears in Toronto's OP. It is recommended that this appear earlier in the OP as a means to guide all policy.

	increase the risks associated with natural hazards (3.4.1 e).	
City of Toronto (Resilience Strategy)	The community-led vision for a resilient Toronto is channelled through three focus areas, each with their own goals and actions. Notable priority actions directing the City of Toronto include: • Enhance the capacity of neighbourhoods to prepare for and recover from shocks through grassroots action and network building (A2.2.1). • Incorporate climate resilience into the City's asset management framework and plans (B2.2.3). • Integrate equity into the City's strategic planning process (C2.2.1).	The City of Toronto Resilience Strategy is included as a best practice because it specifically addresses climate change and growing urban inequities. Actions identified in Toronto's Resilience Strategy are similar to those reviewed in the policy context of this Discussion Paper. For example, A2.2.1 from the Resilience Strategy is similar to actions identified in Brampton's SNAPs. Policy direction should recognize resilience through neighbourhood scale, community design, and access to facilities and interior/exterior spaces for respite and shelter relative to vulnerable systems and populations.
City of Ottawa	The City of Ottawa's OP is currently being updated to facilitate local action and to prepare the corporate and local community for the impacts of climate change. Current OP policies in relative to climate change include but are not limited to: • The City will take measure to adapt to the effects of climate change by: completing a climate change adaptation strategy, considering the potential impact of climate change and adaptation management and sub-watershed plans; ensuring that development avoids potential natural hazards resulting in slope failure; and, reducing the urban heat island effect through landscaping, tree planting, and encouragement of innovative green spaces with	The City of Brampton has identified the need to develop a climate change adaptation plan in the CEERP and the EMP. Like the City of Ottawa, the City of Brampton should reinforce the need for this plan in OP policy. Further, policies for permeable surfaces and landscaping do appear in the Brampton OP (for example, policy 4.11.8.8.1 regarding parking). Modes of sustainable development that adapt and mitigate against climate change should be applied more broadly to all aspects of community development. The City's OP does encourage innovative, diverse and high-

	permeable surfaces and trees and of green building measures such as the use of green roofs, living walls and light coloured building materials (2.4.1.3). • Greenspaces in rural and urban areas provide several co-benefits, including climate moderation. Section 2.4.5 identifies several policies to improve the quantity, quality, and connectivity of greenspaces.	quality urban design committed to sustainable management practices, and this should continue to remain a focal point to guide new and re-development in the City. Lastly, identifying and leveraging the co-beneficial nature of protecting and enhancing greenspaces with climate change adaptation and mitigation should be included in the OP.
City of Guelph	The City of Guelph's Official Plan provides significant policy direction for energy, green infrastructure, and sustainable buildings. Specifically, section 4.6 Climate Change of the City of Guelph's OP is intended to increase community resiliency to climate change. This section directly acknowledges the negative impacts of climate change on human health and safety, property, the natural and cultural environment, and the economy, and recognizes that climate change requires both mitigation and adaptation strategies. Policies include: • The City will establish policies and undertake programs to target reductions in annual greenhouse gas emissions by 60% from 2007 levels to 7 tonnes of carbon dioxide (equivalent) per capita by 2031 (4.6.1); • The City shall work with partners in the community and other levels of government to prepare a comprehensive climate change adaptation strategy (4.6.2); and, • The City will implement and develop standards to reduce climate change impacts on public works and infrastructure, including roads, bridges, water and	Considering the City of Brampton has advanced energy plans for the community and the corporation, the City of Guelph's OP provides good direction for policies related to energy and climate change. Several policies in the City of Brampton's current OP address the need for best management practices and leadership for energy efficiency and conservation. Policies in the Guelph OP categorized based on corporate leadership (4.7.1), local renewable and alternative energy generation (4.7.2), district energy (4.7.3), and building end-use energy efficiency (4.7.4) can be reflected in the Brampton OP to help create an overarching systems approach to transition the City towards a low carbon future.

	wastewater systems and energy distribution systems (4.6.3). Additional policies in section 4.7 Community Energy respond to climate change, referring to the City's Community Energy Plan and the Official Plan as working together using an integrated systems approach to create an overarching vision and structure that demonstrates low carbon energy opportunities, viable sustainable transportation routes to address many long-term goals of climate change mitigation, including several targets in the CEP for energy conservation and reduction in GHG emissions.	
City of Kingston	Section 2.10 Climate Change Resiliency of the City of Kingston's Official Plan addresses the role of policy in building climate change resiliency. This section is part of a broader response to climate change that includes mitigation and adaptation strategies through policies in Section 2.1, Section 5, and Section 6.2. Policies include: • Consider the potential impacts of climate change when assessing the risks associated with natural hazards. • Consider the potential impacts of climate change and extreme weather events when planning for infrastructure, including green infrastructure, and assessing new development. • Support climate-resilient architectural design. • Explore opportunities to achieve climate positive development.	The City of Brampton's current OP does acknowledge that an important aspect of environmental planning and management is protecting public health and safety through eliminating, minimizing and mitigating the potential risks associated with natural and manmade hazards (4.6.15.5). Policy in Brampton's OP can be strengthened to include similar policy in Kingston's OP that requires the potential impacts of climate change be included in risk assessments. Further to this, design of the built form, infrastructure, communities, and other elements identified in the OP should be designed to withstand future impacts of climate change. Further, the City of Brampton might consider the Climate Positive Development Program as the City of Kingston has identified in their OP. In short, the Climate

		Positive Development Program under C40 Cities supports large-scale urban communities that reduce GHGs and serve as models for cities to grow in environmentally sustainable and economically viable ways.
City of Peterborough	The City of Peterborough OP establishes Natural Areas (Section 3.3) wherein natural ecological processes are allowed to dominate over other types of land uses. This includes woodlands, wetlands, valleylands, watercourses, or fish habitats. A noted objective of this land use is to reduce the risk of damage to property due to flooding. Methods of protection identified in the OP include: • Retain or acquire ownership or partial rights to preserve and rehabilitate all or strategically significant portions of identified areas. • Regulate the destruction or removal of trees through permitting. • Prohibit development within boundaries near to Provincially Significant Natural Areas.	The Cities of Peterborough and Brampton experience similar issues in downtown urban communities with flooding. As a likely impact of climate change in Ontario[61], flooding and efforts to reduce floods and potential damage to municipal and community infrastructure should be included in OP policy. The current OP does acknowledge flooding hazards in section 5.6.15.5.1. Policies to address flooding hazards include restrictions on development and site alterations within floodplains. While Section 5.25 Conservation Authorities of the OP states that Conservation Authorities have been delegated the responsibility for the regulation of floodplains, the City can link policies to reduce flooding with climate change adaptation and mitigation efforts. For example, regulating the destruction of trees and promoting other forms of green infrastructure that reduce flood risks can help to protect valuable community and municipal infrastructure.

[61] https://www.ontario.ca/document/independent-review-2019-flood-events-ontario/background-and-2019-flooding-ontario#:~:text=Although%20one%20cannot%20unequivocally%20say,inputs%20that%20affect%20changes%20in

Town of Ajax	The Town of Ajax's OP contains a dedicated section on climate change and other general environmental policies (Section 2.1). This section recognizes that the Town must plan to address climate change mitigation and adaptation strategies in order to enhance its adaptive capacity to moderate potential damages, take advantage of opportunities, and better cope with consequences. Notable policy includes: • Policy to implement actions for improved air quality and reduced heat island effect. • Policies to protect, maintain, and enhance the existing tree canopy. • Policies to reduce energy consumption required to support everyday activities through community and site planning, building design, and use of energy-efficient materials, appliances, and landscaping. • Policies to promote agriculture activities within urban areas in order to enhance access to locally grown produce, lower energy consumption, and reduce transportation costs and GHG emissions associated with food production.	At a minimum, the City of Brampton's OP should implement policies that link the urban heat island effect with air quality and the impacts of a changing climate. At present, the urban heat island effect is only referred to within the context of cultural heritage practices. Additionally, the OP should include targets for urban tree canopies as well as policies that support meeting these targets. The City may consider expanding on policy 4.6.6.11 in the current OP regarding urban agricultural opportunities within the Open Space system and adjacent lands to encourage and support urban agriculture as a means to address several co-benefits, including climate change mitigation and adaptation.
Town of Whitby	In 2020, the Town of Whitby approved the Whitby Green Standard to promote the integration of sustainable site and building design to increase community resiliency and support the reduction in GHG emissions to mitigate effects of climate change by providing a one access point for navigating multiple sustainability policy, plans, and strategies in new development. Green development standards are a critical implementation and policy tool for municipalities to achieve GHG reduction targets, Official Plan goals, and goals in many areas of sustainability. The Whitby	The City's Sustainable Community Development Guidelines are identified in section 3.4 of the current OP. Policies that support, and guide Brampton's Sustainable Community Development Guidelines can be strengthened to tie together the relationship between a sustainable built environment and achieving the City's broader climate-related targets.

	Official Plan has identified the ability to leverage Green Development Standards through OP Policy 3.2.4.6 which states that the checklists will be used "in the development review process to assess the level at which new development and redevelopment achieve the sustainable development standards and other sustainability objectives.	The City might consider establishing specific performance expectations for the Sustainable Community Development Guidelines to ensure that the program is meeting the City's climate change objectives and goals. OP policy might also include updated expectations for what should be included in the program, such as use of renewable energy and/or energy recovery systems, minimum standards for water and/or energy conservation, or use of specific building materials.
City of Vancouver	The City of Vancouver Climate Change Adaptation Strategy addresses how the City can better offer services, build and maintain infrastructure, and design programs and policies that take advantage of, or prepare for the anticipated high risk to climate change impacts. The Strategy focuses on better integration with other city plans and policies by prioritizing earlier identification of overlap and co-benefits. It recognizes that climate change is in a non-equilibrium state that requires adaptive plans and frameworks as additional information and conditions arise.[62] The purpose and benefit to embedding climate change adaptation as a foundational consideration across plans is to demonstrate governance support to help to institutionalize climate change adaptation.	

Policies that have been included by other municipalities, and are relevant to new legislation/practices and are to be included in Brampton's 2006 OP are discussed in further detail in Section 3.7 Climate Change Policy Recommendations.

[62] https://www.iclr.org/wp-content/uploads/2018/04/cca-climate-change-report-2018.pdf

3.7 Climate Change Policy Analysis and Recommendations

There is a need for new policies and updates to existing policies that address best practices for climate change and sustainability, since climate change considerations should be taken into account when planning for growth and infrastructure.

In addition, climate change policies need to be integrated into other sections of the Official Plan to recognize the important connection between climate change and planning for our communities and municipal decision making.

The following sub-sections provide more detailed discussion and preliminary policy directions.

3.7.1 Green Communities

A green community focuses on improving the quality of life for residents and enabling more sustainable living through the application of environmentally friendly strategies in every way feasible. Green communities incorporate features such as buildings constructed and insulated with recycled and/or biodegradable materials, transit-oriented development, mixed-use design, more housing choice, design that promotes active-living, circular economies, community gardens, and composting. They also provide general attention to using earth-friendly materials, products, and energy efficient appliances. There are several co-benefits that may result from green communities, supporting the 2040 Vision.

Proposed Policy Direction:

The City will develop and recommend new and/or updated policies for inclusion into Brampton Plan around the following areas:

- Implement the Brampton 2040 Vision.
- Champion transit-oriented, mixed-use, complete communities, nurturing local identify.
- Implement Brampton's Community Energy and Emissions Reduction Plan and empower residents in alignment with the One Planet Living Framework.
- Ensure minimum (30%) urban forest tree cover is maintained or established with resilient tree species when planning and developing new communities.
- Require Transportation Demand Management requirements and design for new development.
- Require Integrated Energy Master Plans for greenfield and larger redevelopment sites (Town Centres, Urban Centres, corridors), and other specific types of development (public, institutional, employment, and mixed-use large scale residential).
- Emphasizes the expansion of the SNAP program into existing neighbourhoods to implement green communities.
- Require net zero resilient buildings and communities, including support for renewable energy generation and electric vehicle infrastructure.
- Encourage new development and Secondary Plans to target near net zero community. Update the Sustainable Community Program: New Development to align with the goals and targets of the CEERP.
- Establish the Heritage Heights Secondary Plan as a near net zero community.

3.7.2 Transportation Efficiency

Transportation in Brampton accounts for about 60 percent of community wide GHG emissions and 50 percent of the total dollars spent on energy in the community, reflecting how

Brampton is largely an automobile-dependent community. Increasing transportation efficiency can lead to cost savings for Brampton residents and healthier and more equitable communities. OP policy should enhance efficiency and usage of the existing transportation system and increase the safety and accessibility of alternative modes of transportation.

Proposed Policy Direction

While the current OP policies promote sustainability and best practices, they should be improved by recognizing and providing strong support for the relationship between transportation and climate change impacts.

- Shift automobile dependency to more sustainable modes of transportation including carpooling, public transit, cycling, and walking.
- Consider setting a 50%-50% mode share target by 2041 for sustainable transportation and single auto occupancy trips in alignment with the Region of Peel's targets.
- Clearly describe how the City's transportation system, including transit, active transportation and good movement, can support growth management objectives, decrease congestion and contribute to lowering GHG emissions.
- Reduce the need to travel and facilitate complete communities by co-locating public services that are accessible by active transportation and transportation to support the One Living Planet Framework.
- Develop requirements for electric vehicle charging infrastructure in new and existing developments to support the use of zero or low emission vehicles to reduce GHG emissions to accelerate EV uptake.
- Consider hybrid and electric vehicle fleet purchase requirements for City vehicles, including the transit fleet which already contains some hybrid vehicles.
- Plan for infrastructure to support a sustainable active transportation network and transit in and between residential, employment (including commercial and industrial) and institutional uses and other areas and to improve air quality.
- Improve the mix of employment and housing uses to shorten commutes;
- Increasing resilience to anticipated climate hazards through robust, redundant communications and energy systems, and storm and flood-resistant transportation networks.
- Review minimum parking requirements for new developments and consider parking management policies and programs that result in more efficient use of parking resources.
- Recognize and identify the potential impacts of climate change on transportation infrastructure (e.g., extreme heat, flooding events, and ice storms can damage road, transit, and parks infrastructure and lead to service interruptions).

3.7.3 Industrial Efficiency

Brampton's industrial sector consumes 21 percent of total source energy, although it only contributes 13 percent of emissions. While industrial activity is most often regulated and guided by broader global best practices and standards, there is an opportunity for the City to play a role in assisting and supporting industries in exploring and pursuing opportunities to reduce energy use and emissions.

Proposed Policy Direction

- Encourage eco-industrial and innovation district developments through secondary plans and an eco-zoning by-law, which includes carbon neutral objectives.
- Require minimum bicycle parking and EV infrastructure in conjunction with all industrial developments.
- Require parkland dedication as a condition of development.

3.7.4 Local Energy Supply and Distribution

The use of natural gas to heat buildings contributes 38 percent of Brampton's GHG emissions, which underscores the need to identify measures that address the heating, cooling, and hot water needs of buildings. Opportunities are available to incorporate district heating and cooling in major growth and intensification areas, such as the Urban Centres and Town Centres described in the Brampton 2040 Vision.

Using waste heat from large facilities (e.g. manufacturing, industrial facilities, waste facilities) is another opportunity to supply heating and cooling to buildings through waste heat power or combined heat and power district systems.

Proposed Policy Direction:

Policies to support local energy supply and distribution include:

- Make all buildings and manufacturing energy efficient and supply all energy with renewables, in alignment with the One Planet Living Framework.
- Incorporating consideration for renewable energy and locally produced or district energy in design guidelines.
- Conduct feasibility studies, and permit district energy facilities within identified areas, that prioritize renewable and alternative energy systems.
- Require district energy-ready new development in areas identified for district energy and include policy for enabling third party infrastructure in right-of-ways and public space areas.
- Require community energy plans and implementation of the CEERP for new developments.
- Foster stewardship and partnerships with the infrastructure/utility providers to explore alternative energy systems.
- Develop and support energy related policy through new Site Plans and future revisions to existing Site Plans.

3.7.5 Home and Building Efficiency

Homes and buildings are the third-largest emitting sector in both Brampton and Canada, and most existing buildings will still be in operation in 30 years' time. The City of Brampton CEERP sheds light on the significant role buildings play in Brampton's energy use and on the many opportunities available to significantly improve energy efficiency at the community level.

Proposed Policy Direction:

- Encourage a built environment that is focused on low carbon, smart, healthy and efficient buildings built for resilience.
- Establish programming for retrofitting and deep retrofits of existing homes and buildings.
- Collaborate with construction, trades, and the development industry to address building energy efficiency.
- Consider large scale community energy projects, such as home retrofit programs to create a framework where community sectors can collaborate.

3.7.6 Air Quality

The current OP does recognize that climate change is an issue that will affect the entire community and the City's corporate operations and management. Accordingly, the City has committed to foster a culture of conservation to address water and energy conservation, air quality protection and waste management through strengthening and coordinating the City's land use planning, natural heritage and environmental management, and recreational and cultural heritage practices.

There are significant impacts to human health due to poor air quality that may be exacerbated due to climate change.

Proposed Policy Direction:

- Collaborate with the province and/or Region of Peel to establish air quality monitoring stations in Brampton.
- Encourage compact, walkable communities to assist in decreasing GHG and air quality emissions as well as improved public health.
- Support the corporate and community GHG emission reduction targets as established in existing plans to improve air quality and address climate change.
- Promote the protection of water resources and the natural heritage system to improve local air quality and mitigate GHG emissions.
- Improve public health through the promotion of active transportation and improved air quality.

3.7.7 Waste

Waste management has a significant role to play in reducing GHG emissions in several ways, including landfill gas capture, recycling and organic waste diversion. It is important to recognize that the Region of Peel provides waste management services. Waste Management's Roadmap

to a Circular Economy in the Region of Peel identified an organics recovery program for Peel's long-term care facilities and a textile recovery program as key components in achieving the Region's 75 percent waste diversion goal by 2034.

There are policy options that the City of Brampton can leverage to facilitate climate change mitigation, in addition to the current OP recognizing that waste management can assist to mitigate and adapt to climate change.

Proposed Policy Direction

- Support full range of opportunities for the reduction, reuse, recycling, composting, diversion, and final disposal of waste.
- Require lifecycle assessments for City major capital projects and purchases.
- Require lifecycles assessment for the new development to evaluate the embodied carbon and other GHGs emissions associated with building materials.
- Encourage the identification and implementation of energy from waste technologies.
- Support the adaptive reuse of existing building stock and encourage the reuse/recycling of building materials in development processes.
- Consider supporting the Region of Peel energy from waste initiatives, including thermal treatment and other technologies as options for recovering resources from residual waste generated within the City prior to landfill.
- Work with the Region to require that new developments provide infrastructure to facilitate participation in waste diversion programs and convenient source separation of blue box, food and organic waste, and other divertible materials.
- Promote zero waste and zero GHG emissions from waste management by integrating circular economy principles into decision making of residents, including consumers, businesses, and governments in support of the One Planet Living Framework's zero waste objective.

3.7.8 Energy Systems

The CEERP has identified that a major and long-term structural change in energy systems towards low or zero carbon systems is needed to address the climate emergency. This transformation will see changes across several land use themes, including neighbourhood development, transportation of goods and people, the supply and distribution of energy, waste management, and the built form.

A clean energy and urban transition is already underway in the City of Brampton. OP policy can accelerate and support this transition.

Proposed Policy Direction:

- Require renewable energy systems and EV charging stations at City facilities and for City fleet vehicles.
- Provide for an appropriate range and mix of housing types while promoting energy conservation and energy efficient housing in existing and new residential development.

- Promote intensified and compact forms of development with a mix of land uses that efficiently use land, services, infrastructure and densities.
- Support local generation and operation of energy (e.g. solar panels on buildings, micro generators, heat waste power, district energy systems, etc.) close or next to point of use to increase security, resiliency, and flexibility of energy supply.

3.7.9 Building Design and Construction

Buildings and the construction industry will need to adapt to the increasing demands attributed to climate change.

Proposed Policy Direction:

- Recognize that development and redevelopment of new communities provides excellent opportunities for incorporating energy and water conservation, tree planting, green infrastructure, and stormwater management best practices
- Provide for an appropriate range and mix of housing types while promoting energy conservation and energy efficient housing in existing and new residential development.
- Promote intensified and compact forms of development with a mix of land uses that efficiently use land, services, infrastructure and densities.
- Encourage energy efficient housing and sustainable residential building design that is environmentally sensitive and resilient to the impacts of climate change through the Sustainable Community Program: New Development.
- Promote the use of embodied carbon solutions in buildings and infrastructure.

3.7.10 Gray Infrastructure

Infrastructure developments are a key area for adaptation. Typically, infrastructure assets have long life spans in which they are likely to be exposed to future climate conditions. Infrastructure in Canada is vulnerable to climate change due to age and overuse from population growth. At the same time, reinvestment efforts have not been sufficient to maintain infrastructure.[63]

Proposed Policy Direction:

- Require risk and vulnerability assessments to identify opportunities to enhance infrastructure resilience, and risks posed by climate change impacts.
- Apply a climate lens to all maintenance and new development of transportation, energy and technology systems, and infrastructure.
- Identify areas at risk from climate change impacts such as fire and flooding and restrict development within them. Identify and implement strategies to reduce vulnerability of existing infrastructure in at-risk areas.
- Integrate grey infrastructure into public infrastructure systems to leverage cost efficiency, functionality, and sustainability.

[63] https://www.edmonton.ca/city_government/documents/Climate_Resilient_Edmonton.pdf

- To support efficiencies in planning new and expanded infrastructure, identify the full lifecycle cost of infrastructure through asset management planning.

3.7.11 Health and Safety

Protecting the natural environment is seen as a first response to safeguard the services that underpin healthy resilient communities. While the OP includes measure to protect natural heritage, the City's natural assets will face considerable added pressure as the City continues to grow and develop. These pressures will intensify under future climate conditions. Trees are vulnerable to high winds and freezing rain. Shifting temperatures and more variable precipitation affect the composition and range of plants and animals and create opportunities for invasive species and vector-borne diseases to spread. Linkages between natural areas are critical to enable species to adapt to changing conditions.

Provincial and regional policies provide general direction to reduce risks from climate change impacts, and to promote healthy communities, however, there is little direction to consider impacts of climate change on community health and that of vulnerable populations, which should be considered in the OP update.

Proposed Policy Direction:

- Direction to collaborate with Peel Public Health to conduct a study and implement strategies to identify and reduce the impacts from climate change on residents' health and well-being, prioritizing vulnerable populations.
- Support the One Planet Living Framework by encouraging active, social, meaningful lives to promote good health and wellbeing.
- Establish an emergency response plan including facilities for resilience planning.
- Policy direction for Health Assessments for municipal buildings and lands as well as development applications. Require consideration of potential impacts from climate change in health impact assessments.
- Include policy for biodiversity monitoring, disease prevention measures, testing and vaccination programs, air quality initiatives, and other measures to protect community health against mass movement, vector-borne, air-borne, water-borne diseases and insect infestation.

3.7.12 Implementation

The implementation section of the OP should leverage a variety of tools that the City can use to implement policies.

The purpose of an implementation section is to indicate the means and methods which will be applied to achieve the objectives and policies of the OP. Implementation of the OP is accomplished through a myriad of tools.

Policy options to support implementation should encourage partnerships with the Region, conservation authorities, and other local municipalities, as well as key stakeholders such as the development community to monitor and implement plans. Further implementation recommendations are provided in the following section.

- Update the complete submission requirements for development applications to align with the goals and targets of the CEERP, including the submission of Transportation Demand Management studies, Integrated Energy Plans, etc.
- Adopt the City of Brampton ATMP through an integrated active transportation network plan and implementation strategy.
- Monitor and evaluate the Sustainable Community Development Program.
- Develop climate change decision-support tools, including collaborating further with Regional partners to build information and predict likely impacts for Brampton.
- Consider integrating incentives into Community Improvement Plans for landowners to undertake activities that address climate change mitigation and adaptation (e.g. building retrofits for energy efficiency, renewable and district energy, water conservation and efficiency, green roofs, etc.)

4 NEXT STEPS

This Discussion Paper is one of seven Papers that are being completed as part of Phase 4 of the Brampton Plan project. The seven Discussion Papers align with the key focus areas of Brampton Plan and build on the work completed in Phases 1-3 to establish a foundation from which to develop policy directions. The focus areas have been informed by the work completed through the 2040 Vision, policy review and research and through consultation with City staff. The directions and recommendations presented in Section 3 of this paper will be refined through subsequent consultation with the public.

This is a starting point for generating discussion about the protection and enhancement of the natural environment and climate change issues and recommendations that will evolve through the development of the Policy Directions Report that will outline the detailed changes proposed for Brampton Plan.

Discussion Papers pertaining to each of the Brampton Plan Focus Areas can be accessed online at the Brampton Plan Project Website: Brampton.ca/BramptonPlan.

Let's Connect!

Comments and feedback on the Discussion Papers can be provided on the Brampton Plan project website or emailed to opreview@brampton.ca.