3.0 Changing Climate

3.1 Background

Climate change is a term that is often used to describe the enhanced and accelerated warming of the earth's climate system associated with human activities, namely the burning of fossil fuels and their associated greenhouse gas emissions. These human caused emissions make the blanket of naturally occurring greenhouse gases that surround the planet and regulate its temperature, thicker, trapping heat and making the climate system warmer.

According to the Intergovernmental Panel on Climate Change's (IPCC) *Special Report: Global Warming of 1.5 ^{0}C*, which was prepared as part of the Panel's Sixth Assessment and Reporting cycle, human activities are estimated to have caused 1.0 ^{0}C of global warming above pre-industrial levels. The IPCC also estimates that global warming is likely to reach 1.5^{0}C between 2030 and 2052 if global warming continues at the current rate.

In 2019, the Government of Canada released *Canada's Changing Climate Report,* part of a national assessment of how and why Canada's climate is changing, the impacts of those changes and how the country is adapting to the change. This report concludes, in part, that:

- both past and future warming in Canada is, on average, about double the magnitude of global warming;
- the effects of widespread warming are evident in many parts of Canada and are projected to intensify in the future. This includes more extreme heat, less extreme cold, longer growing seasons, shorter snow and ice cover decisions and early spring peak streamflow;
- precipitation is projected to increase for most of Canada, on average, although summer rainfall may decrease in some areas. Precipitation has increased in many parts of Canada, and there has been a shift toward less snowfall and more rainfall. Annual and winter precipitation is projected to increase everywhere in Canada over the 21st Century.
- the seasonal availability of freshwater is changing, with an increased risk of water supply shortages in summer. Warmer winters and earlier snowmelt will combine to produce higher winter streamflows. Warmer summers will increase evaporation of surface water and contribute to reduced summer water availability in the future despite more precipitation in some places.
- a warmer climate will intensify some weather extremes in the future. Extreme hot temperatures will become more frequent and more intense. This will increase the severity of heatwaves and contribute to the increased drought and wildfire risk. More intense rainfalls will increase urban flood risk.
- the rate and magnitude of climate change under high versus low emission scenarios project two very different futures for Canada. Projections based on the range of emission scenarios are needed to inform impact assessment, climate risk management and policy development.

According to the Government of Canada's Canadian Centre for Climate Services, Gananoque's annual mean temperature and total precipitation are projected to change over the next 40 years. The projected changes is included in Tables 2 and 3 below.

Table 2. Projected Change in Annual Mean Temperature

Projection Period	Low Emission Scenario	Moderate Emission Scenario	High Emission Scenario
2021 – 2040	+ 1.4^{0}C	+ 1.3^{0}C	+ 1.5^{0}C
2041 – 2060	+ 1.6^{0}C	+ 2.2%	+ 2.9^{0}C

Table 3. Projected Change in Total Precipitation

Projection Period	Low Emission Scenario	Moderate Emission Scenario	High Emission Scenario
2021 – 2040	+ 1.9%	+ 1.8%	+ 3.9%
2041 – 2060	+ 1.9%	+ 4.5%	+ 8.0%

Note: The projected change is relative to the 1986-2005 average

Based on the projected change in annual mean temperature and total precipitation, Gananoque can expect to experience many of the effects noted by the Federal Government in their assessment of the nation.

Given the change that Gananoque is expected to experience, it should continue to mitigate and adapt to climate change. It is well established that the transportation and building sectors are key contributors to green house gas emissions. Land use planning can play a role in mitigation and adaptation efforts.

Effective land use planning can support mitigation by promoting a mix of land uses and increased densities to bring more jobs and homes closer together, making it more feasible for residents to use non-automobile modes of travel for their journey to work, shop or recreate. Effective land use planning can also be used to ensure that new development maximizes opportunities for passive solar gain, reducing energy use associated with building heating and cooling.

Similarly, planning can support adaptation efforts through updated flood hazard mapping, the use of low impact development techniques to manage increased and more variable precipitation, promoting infiltration and reducing long term infrastructure asset costs. Planning can also be used to ensure that new developments maximize landscaping, reduce paving and include trees to reduce impervious surfaces, promote water infiltration and “cool” urban areas.

3.2 The Land Use Planning Framework

Since the Official Plan came into effect, the framework that governs land use planning has evolved, including its treatment of climate change mitigation and adaption. The land use planning framework provides specific policy direction on climate change and the role of land use planning in climate change mitigation and adaptation.

3.2.1 The Planning Act

The Planning Act requires that municipalities have regard to the mitigation of greenhouse gas emissions and adaptation to a changing climate when carrying out their responsibilities under the Act.

3.2.2 The Provincial Policy Statement

The PPS recognizes that efficient development patterns permit better adaptation and response to the impacts of a changing climate, that strong, liveable and healthy communities are resilient to climate change and that it is important to protect the overall health and safety of the population, including preparing for the impacts of a changing climate.

The PPS defines “impacts of a changing climate” as the present and future consequences from changes in weather patterns at local and regional levels including extreme weather events and increased climate variability.

Policy 1.1.1 i) states that healthy, liveable and safe communities are sustained by preparing for the regional and local impacts of a changing climate.

Policy 1.1.3.2 c) states that land use pattens within settlement areas shall be based on densities and a mix of land uses which minimize negative impacts to air quality and climate change, and promote energy efficiency and prepare for the impacts of a changing climate.

Policy 1.6.1 states that infrastructure and public service facilities shall be provided in an efficient manner that prepares for the impacts of a changing climate while accommodating projected needs.

Policy 1.6.6.1 states that planning for sewage and water services shall ensure that these systems are provided in a manner that prepares for the impacts of a changing climate.
Policy 1.6.6.7 states that planning for stormwater management shall minimize erosion and changes in water balance, and prepare the impacts of a changing climate through the effective management of stormwater, including the use of green infrastructure.

Policy 1.7.1 k) states that long term economic prosperity should be supported by minimizing negative impacts from a changing climate and considering the ecological benefits of nature.

Policy 1.8.1 states that planning authorities shall support energy conservation and efficiency, improved air quality, reduced greenhouse gas emissions and preparing for the impacts of a changing climate through land use and development patterns which promote compact form and structure of nodes and corridors; promote the use of active transportation and transit in and between residential, employment (including commercial and industrial) and institutional uses and other areas; focus major employment, commercial and other travel intensive land uses on sites which are well serviced by transit where this exists or is to be developed, or designing these to facilitate the establishment of transit in the future; focus freight-intensive land uses to areas well served by major highways, airports, rail facilities and marine facilities; encourage transit supportive development and intensification to improve the mix of employment and housing uses to shorten commute journeys and decrease transportation congestion; promote design and

orientation which maximizes energy efficiency and conservation, and considers the mitigating effects of vegetation and green infrastructure; and maximize vegetation within settlement areas, where feasible.
Policy 2.2.1 c) states that planning authorities shall protect, improve or restore the quality and quantity of water by evaluating and preparing for the impacts of a changing climate to water resource systems at the watershed level.

Policy 3.1.3 states that planning authorities shall prepare for the impacts of a changing climate that may increase the risk associated with natural hazards.

3.2.3 The Official Plan

The Official Plan does not currently include any policies that directly speak to climate change mitigation and adaptation. However, many policies in the Official Plan align with the policies above and support climate change mitigation and adaptation.

The Town of Gananoque is relatively compact and walkable. The Town's urban fabric is largely characterised by the traditional grid system and regular pattern of streets and blocks.

The Official Plan's Lowertown, General Commercial and Highway Commercial and Employment Area land use designations provide the basis for a nodes and corridors system. Approximately 50 percent of residents live within a 400 metre distance of the Lowertown and General Commercial areas. Approximately 80 percent live within 800 metres of the same areas.

The Lowertown and General Commercial (and to a lesser extent, the Residential) land use designations permit a mix of uses. The Official Plan also encourages infill, intensification and redevelopment. The Employment Lands land use designation protects lands closest to Highway 401 for freight intensive land uses.

The Official Plan encourages the use of innovative water and sewage technologies, encourages walking and cycling, promotes energy efficiency and the use of alternative energy sources, protects and preserves street trees and woodlands.

3.3 **Conclusion**

The Town of Gananoque will continue to mitigate and adapt to climate change. The Official Plan can assist with these efforts. The existing Official Plan policies should be updated and expanded to address climate change mitigation and adaptation. The Official Plan should define an urban settlement area and system of nodes and corridors, continue to permit a mix of land uses (where appropriate), continue to encourage infill, intensification and redevelopment (where appropriate), continue to protect lands along the Highway 401 Corridor for freight intensive uses, provide direction on active transportation, provide updated direction on planning for water, sewage and stormwater management services (e.g. low impact development techniques, provide updated direction on flood hazards and provide updated direction on energy efficiency and conservation, including the use of vegetation.