SUBJECT: Climate Resilient Burlington: A (draft) plan for adapting to our warmer, wetter and wilder weather

TO: Environment, Infrastructure & Community Services Cttee.

FROM: Environment, Infrastructure and Community Services

Report Number: EICS-02-22

Wards Affected: All

File Numbers: 210-09

Date to Committee: May 5, 2022

Date to Council: May 17, 2022

Recommendation:

Receive and file environment, infrastructure and community services report EICS-02-2022 regarding Climate Resilient Burlington: A plan for adapting to our warmer, wetter and wilder weather (May 2022 draft).

PURPOSE:

Vision to Focus Alignment:

- Increase economic prosperity and community responsive city growth
- Improve integrated city mobility
- Support sustainable infrastructure and a resilient environment
- Building more citizen engagement, community health and culture
- Deliver customer centric services with a focus on efficiency and technology transformation

This report is directly aligned with Focus Area 3 – Supporting sustainable infrastructure and a resilient environment specifically “Develop Burlington’s Climate Change Adaptation Plan.” However, this report identifies risks and vulnerabilities associated with our warmer, wetter and wilder weather and as such will have impacts on all focus areas.

- Focus Area 1- climate impacts on our economy (e.g. supply chain disruptions)
- Focus Area 2 – climate impacts on mobility and traffic flow (e.g. impacts to transportation routes from flooding, and debris on roads and closures on the

Skyway due to high wind events; extreme heat days and increased variable winter precipitation impacting active transportation)

- Focus Area 3 – climate impacts on service areas and assets (e.g. climate risk acknowledged in 2021 Asset Management Plan; higher capital expenses from accelerated deterioration and higher operations and maintenance expenses anticipated according to the Financial Accountability Office of Ontario)
- Focus Area 4 – climate impacts on our green infrastructure (e.g. disease, species migration, drought) which needs to be protected to counter climate change hazards (e.g. absorb stormwater, reduce the urban heat island effect); City and community facilities as resilience hubs for cooling, warming and evacuation centres
- Focus Area 5 – climate impacts on City service delivery and budgets due to increased variable weather and extreme events

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Executive Summary:

Climate Resilient Burlington (CRB): A Plan for Adapting to Our Warmer, Wetter and Wilder Weather is a climate adaptation plan identifying actions to manage the highest projected risks of warmer, wetter and wilder weather (Appendix A). While CRB considered Burlington's climate projections to the years 2051-2080 under a high emissions scenario, the plan outlines actions to focus on for the next 10 years to build resilience and prepare for a changing climate.

The plan was developed using a bottom-up approach. As such, extensive engagement with 49 City staff and community stakeholders representing 12 City departments and 17 community organizations took place through 15 workshops between September 2021 and January 2022 as well as additional follow-up. The community was also engaged through a dedicated CRB page on the Get Involved Burlington portal.

The CRB plan includes 32 actions under five themes, with each theme having one to three related action groups. The 10 action groups each include a goal as well as indicators and targets for monitoring and reporting.

- Theme 1: Resilient Built and Natural Infrastructure - three goals and 13 actions relate to infrastructure design and lifecycle management, flood management, and service disruption.
- Theme 2: Thriving Natural Environment - two goals and five actions relate to tree management and natural area management.
- Theme 3: Health and Well-Being – one goal and five actions relate to extreme heat and health.
- Theme 4: Disaster Resilience – two goals and five actions relate to community capacity building, and citizen and business support programs.

- Theme 5: Strong and Resilient Economy – two goals and four actions relate to agriculture and local economy.

Background and Discussion:

Climate Resilient Burlington Plan

Climate Resilient Burlington (CRB): A Plan for Adapting to Our Warmer, Wetter and Wilder Weather is a climate adaptation plan identifying actions to manage the highest projected risks of warmer, wetter and wilder weather (Appendix A). While CRB considered Burlington's climate projections to the years 2051-2080 under a high emissions scenario, the plan outlines actions to focus on for the next 10 years to build resilience and prepare for a changing climate. Implementing these actions will continue to shift the City from reactive to more proactive measures with the goal of less damaging impacts to the City's infrastructure, services, environment, economy and the health and well-being of residents.

The CRB process included:

- Defining the scope of the assessment
- Developing climate impact statements
- Assessing sensitivity, lack of coping capacity and vulnerability
- Assessing consequences, likelihood and risk
- Determining priorities for action planning

Vision

A meeting with the Burlington Youth Student Council in October 2021 helped inform the visioning exercise with City staff and community stakeholder teams. The draft vision was then posted on the Get Involved Burlington CRB project page to solicit feedback through an online survey (Appendix B) which resulted in the current vision:

- Through collective action, Burlington is a net zero carbon community and is prepared for warmer, wetter and wilder weather.

While the vision incorporates both climate mitigation and adaptation, acknowledging that work on both fronts needs to be undertaken simultaneously, the CRB plan is focused on climate adaptation.

Objectives

The objectives of the CRB plan are to:

- Uphold a set of agreed-upon principles (equitable, proactive, collaborative, accountable, innovative and empowered) to guide the actions in achieving a long-term vision
- Focus City efforts on the highest risks where the City can take the lead or play a significant role in managing the risks
- Align, augment or integrate climate actions into existing City initiatives
- Work collaboratively by identifying synergies, partnerships and opportunities for alignment with key community stakeholders

Vulnerability and Risk Assessment

A vulnerability and risk assessment (VRA) was carried out using a bottom-up, participatory approach that recognized the skills and experiences of City staff and a range of community stakeholders. A 66-page technical document on the VRA process as well as the hazards and opportunities identified and assessed is available in Appendix C.

CRB 10 Year Action Plan

The action plan component of the CRB is broken down as follows:

- There are five themes aligned with Canada's National Adaptation Strategy, expected to be finalized by the end of 2022. This intentional alignment supports potential future monitoring and reporting requirements.
- Within each theme are one to three action groups for a total of 10. Each action group includes a goal and one or more indicators and targets for a total of 10 goals, 13 indicators and 13 targets.
- There are 32 actions in the plan. Each action includes:
    - Action type (assessment, partnership, plan, policy, procedure, program or project)
    - Timeline (ongoing, 1-2 years, 3-5 years, or 5-10 years)
    - Estimated additional cost to implement (low, medium or high)
    - Lead City department(s)
    - Supporting City departments
    - Community connections
    - Related initiatives

Below is a high-level summary by theme including the action group(s), goals and actions.

Theme 1: Resilient Burlington and Natural Environment

Group 1: Infrastructure Design and Life Cycle Management

Goal: Manage infrastructure to prepare for future climate conditions and carbon neutral goals.

Actions in this group relate to expanding and including natural asset data in the Asset Management Plan (AMP); integrating future climate impacts in the AMP; and reviewing and if necessary updating design standards for City infrastructure.

Group 2: Flood Management

Goal: Enhance resilience of infrastructure exposed to high flood risk.

Actions in this group relate to developing a lake shoreline flood management strategy augmenting existing plans to incorporate future climate impacts to protect City assets; enhancing creek flood protection plans; enhancing emergency preparedness plans to communicate flood risk; and enhancing coordination with partner agencies and governments to manage flood risks.

Group 3: Service Disruption

Goal: Invest in proactive measures to prepare for increased extreme events to avoid post-storm reactive costs.

Actions in this group relate to post storm assessment tracking to inform recovery and future adaptation efforts; enhancing risk assessment protocol for trees in areas with above-ground powerlines, near major roads, fire stations, etc.; investing in backup power for City infrastructure; developing wind risk and vulnerability mapping; assessing snow management plan with a climate lens; and assessing the impacts of projected climate conditions on all recreation services.

Theme 2: Thriving Natural Environment

Group 1: Tree Management

Goal: Reduce damage to trees while increasing the value of the services they provide.

Actions in this group relate to investing in full tree life cycle management to improve tree survival outcomes; incorporating a climate lens in the Urban Forest Master Plan and supporting its implementation.

Group 2: Natural Area Management

Goal: Value, conserve and enhance the multiple services that natural areas provide.

Actions in this group relate to investing in green infrastructure and establishing a city-wide biodiversity plan.

Theme 3: Health and Well-Being

Group 1: Extreme Heat and Health

Goal: Provide City services to support the community during extreme heat events.

Actions in this group relate to programs supporting vulnerable populations during extreme heat events such as through access to public space cooling, water play, hydration, shade, feasibility of maximum indoor temperature thresholds, etc. which could be informed through an urban heat island assessment.

Theme 4: Disaster Resilience

Group 1: Community Capacity Building

Goal: Build capacity in the community to prepare for and respond to more extreme events and long-term climate stresses.

Actions in this group relate to enhancing emergency notification and communications; developing a community climate resilience education program; and enhancing funding and supports for community and neighbourhood social resilience programs.

Group 2: Citizen and Business Support Programs

Goal: Encourage climate adaptation actions from citizens and businesses.

Actions in this group relate to promoting and augmenting existing programs for home and business climate resilience retrofits and enhancing existing policies and programs for private stormwater management practices.

Theme 5: Strong and Resilient Economy

Group 1: Agriculture

Goal: Support agricultural community in preparing for climate change.

Actions in this group relate to pursuing the development of a Burlington Agricultural Action Plan and expanding opportunities to support local food production.

Group 2: Local Economy

Goal: Support and develop resilient local supply chains to help withstand impacts associated with extreme climate events outside of Burlington.

Actions in this group relate to assessing the feasibility of sourcing local and developing a business innovation ecosystem to test local products.

Monitoring and Reporting

An initial list of 13 indicators and targets, which were vetted through the City staff and community stakeholder teams, have been identified to track the plan's progress. Staff are flexible to add, remove or modify indicators in the future as necessary. Any changes will be included in the annual update report on the CRB plan to City Council.

Annual CRB plan updates also align with annual reporting requirements through the City's participation in the Global Covenant of Mayors for Climate and Energy (GCoM). Burlington received its commitment badge in 2020 and in 2021 its climate mitigation badges for assessment, goal and plan through the approval of the Climate Action Plan. Staff hope to receive the climate adaptation assessment, goal and plan badges in 2022, pending the approval of the CRB plan by City Council.

In 2021, staff reported Burlington's climate progress through the Climate Disclosure Project (CDP), a non-profit charity providing a global disclosure reporting platform for investors, companies, and governments. The CDP platform is increasingly being aligned with several initiatives and reporting frameworks including the Common Reporting Framework (which is associated with GCoM), the Task Force on Climate-related Financial Disclosures (TCFD), Science-Based Targets, Cities Race to Zero (which the City is also a part of), Cities Race to Resilience, and mapping to the Sustainable Development Goals. In December 2021, the City was awarded an overall "B" rating through the CDP. Staff are optimistic that a higher grade will be awarded by the CDP in 2022 with the completion of the Vulnerability and Risk Assessment (Appendix C) and, pending Council approval in July, the adoption of the Climate Resilient Burlington plan (Appendix A).

Strategy/process

Burlington City Council declared a climate emergency in April 2019 "for the purposes of deepening our commitment to protecting our economy, environment and community from climate change" and "apply a climate lens to the plans and actions of the City of Burlington including the Council strategic workplan and future budgets."

The City has shown leadership on climate mitigation (reducing greenhouse gas emissions) by adopting the Corporate Energy and Emissions Plan: 2014-2024 and the community Climate Action Plan and associated carbon neutral goals of 2040 for corporate emissions (City operations) and 2050 for community emissions. Climate mitigation though is only one half of the climate change story. Climate Resilient Burlington (CRB): A Plan for Adapting to Our Warmer, Wetter and Wilder Weather

(Appendix A) addresses the other half of the climate change equation: climate adaptation.

The first step to developing a climate adaptation plan is to identify local climate projections based on climate science. In March 2021, staff presented City Council with a background report which included Climate Projections for Burlington, concluding that Burlington is going to experience warmer, wetter and wilder weather in the future. A Climate Impacts Story Map was also created to highlight Burlington's climate projections and profile local major events such as the December 2013 ice storm and the August 2014 flood along with other events such as wind storms and extreme heat events which are expected to become more common.

Initial climate impact statements were developed and first vetted through the City staff stakeholder team over three meetings and through surveys between March and May 2021. The statements were then confirmed with the community stakeholder team through two meetings and a survey in June 2021. Both staff and community stakeholders had opportunities to add or remove impact statements based on their professional expertise and lived experience in these early meetings and also in the initial workshops with the consultants.

Associated Engineering and their subconsultant All One Sky Foundation were onboarded in June 2021 and hosted 15 two to three-hour online workshops with staff and community stakeholders between September 2021 and January 2022. The entire engagement process was carried out through MS Teams using Mural online boards. Stakeholders who were unable to attend the workshops were invited to provide their input through Mural. The City's Sustainability Project Coordinator, who was the project manager for this initiative, also followed up with individual stakeholders on numerous occasions via email and online meetings. This bottom-up approach involving staff and community stakeholders throughout the process helped ensure momentum, buy-in and ownership of the actions in this plan.

The community was also invited to learn more about the CRB plan through the project page on Get Involved Burlington, the public launch in October 2021 and the online survey about the vision and principles (Appendix B). Presenting the Climate Resilient Burlington report as a draft provides the community time to review it and provide comments. The draft report will be posted on the Get Involved Burlington project page between April 22 and May 8, 2022 for public feedback through a number of surveys.

The Sustainability Project Coordinator will consolidate all feedback received and make any necessary changes to the draft CRB plan and report back to City Council with the final CRB plan in July 2022.

Leveraging Knowledge Through Partnerships

In Dec. 2019, the City (Report CW-20-19) joined Global Covenant of Mayors for Climate and Energy (GCoM). This coalition of city leaders around the world are tackling climate change by pledging to cut greenhouse gas emissions (mitigation) and preparing for the future impacts of climate change (adaptation). The City of Burlington was one of 25 Canadian municipalities selected to participate in a one-year pilot program under GCoM Canada which offered technical support, training, networking opportunities and access to tools and resources.

Between Sept. 2021 and March 2022, Burlington staff participated in ICLEI Canada's Advancing Adaptation: Train the Trainer – Adaptation Planning project. ICLEI hosted five workshops which Sustainability staff attended along with other Canadian municipal representatives. ICLEI staff also reviewed the draft CRB plan and provided comments.

Options Considered

Doing nothing is not an option. While the City is currently implementing both the Corporate Energy and Emissions Plan and the community Climate Action Plan, that only addresses one half of the climate change issue. The other half is adaptation. While we need to continue to work on reducing our greenhouse gas emissions, we must also recognize that we are already locked into a changing climate. As such we need to simultaneously prepare for warmer, wetter and wilder weather.

As noted by David Phillips, Senior Climatologist at Environment and Climate Change Canada, at the Oct. 27, 2021 public event, "no place in Canada will look the same in 40 years as it does today. We have moved from climate and its averages to weather and its extremes. Weather is changing faster than we can adapt to it and we cannot afford not to factor it in as it's affecting our cost of living, economic indicators, etc. Our motivation to do something about it should be based not on what we've seen but what we're going to see. We need to move from a culture of disaster recovery to one of risk preparedness."

Financial Matters:

Total Financial Impact

Climate Resilient Burlington: A Plan for Adapting to Our Warmer, Wetter and Wilder Weather was completed within the Council approved budget.

Source of Funding

The source of $60,000 was from the Tax Rate Stabilization Reserve Fund, approved in the 2020 operating budget. Additional money was diverted from the approved funds dedicated for the home energy retrofit project as per report EICS-03-21 due to the successful FCM application for that project.

Other Resource Impacts

As noted in the engagement matters section below, the CRB plan involved significant time to develop, due to the bottom up approach to ensure buy-in throughout the process, culminating in the proposed 10-year action plan.

While Sustainability staff in the EICS department will be reporting back annually on progress, the actions within the plan involve multiple City departments and service areas as the lead as well as many supporting City departments and community connections. Where additional funding is required to implement actions, requests will be brought forward through the budget process both within service areas and as separate business cases and capital initiatives. In addition, to keep up with the changing climate science and associated risks and vulnerabilities, the City will revisit and renew the CRB plan every five years, pending budget approval.

Cost and benefits of investing in climate change adaptation

In February 2020, the Insurance Bureau of Canada and the Federation of Canadian Municipalities released a report titled “Investing in Canada’s Future: The Cost of Climate Adaptation at the Local Level.” This report highlighted that the benefits of investing in climate change adaptation and resilience outweigh the costs of investment by 6:1. It further stated that an annual investment of $5.3 billion (0.26% of Gross Domestic Product (GDP)) in municipal infrastructure and local adaptation actions is needed to adapt to climate change. International studies have shown an average of 0.60 to 1.25% of GDP is needed to minimize the worst impacts of climate change across sectors of the economy.

Cost of climate change

Our weather is becoming warmer, wetter and wilder and Burlington is not immune to the impacts of a changing climate. A few local examples are listed below:

- December 2013 ice storm - assistance program claim was over $2 million
- August 4, 2014 flood - over 3,000 homes were flooded with $90 million in insured claims; $20.4 million was added to capital budget for stormwater management updates
- April 4, 2018 wind storm – $82,000 in initial forestry related clean-up costs for the roads, parks and forestry (RPF) department; 8.5% of Burlington Hydro customers lost power

- April 15, 2018 ice storm - $25,000 in initial forestry clean-up costs for RPF; 9% of Burlington Hydro customers lost power
- May 4, 2018 wind storm – $234,000 in initial forestry clean-up costs for RPF; 43% of Burlington Hydro customers lost power

In December 2021, the Financial Accountability Office (FAO) of Ontario released a report on public buildings in Ontario called “Costing climate change impacts to public infrastructure: Assessing the financial impacts of extreme rainfall, extreme heat and freeze-thaw cycles on public buildings in Ontario.” The FAO estimate a cost increase of 8.2–14.5% over current costs to maintain assets in a state of good repair when accounting for future climate conditions.

Weather related insurance claims in Canada averaged $405 million between 1983 and 2008 and $1.8 billion between 2009 and 2017. The Insurance Bureau of Canada’s (IB-C) top 11 highest payout years on record include every year since 2016. In 2020, the IBC reported that severe weather caused $2.4 billion in insured damage and global losses from natural disasters hit $270 billion while in 2021, the costs were $2.1 billion and $355 billion respectively.

In addition to insured losses, there are also uninsured losses incurred by government, businesses and individuals. It has been reported that for every $1 of insured losses, there are $3 to $4 of uninsured losses.

Climate Implications

A community survey was posted on the Get Involved Burlington CRB project page between Oct. 27 and Nov. 14, 2021 and 152 responses were received. When asked about the level of concern about our changing climate, 111 respondents were very concerned and 14 were moderately concerned. When asked how soon the effects of our changing climate will be felt, 125 respondents said we’re already feeling the effects of a changing climate. When provided a list of impacts that have already been felt, the top five responses were:

- Stress on trees or plants in my neighbourhood due to weather
- Reduced outdoor recreation activities
- Uncomfortably hot temperatures in my home during summer months
- Flooding/seepage of water on my property or in my home from extreme rainfall
- Property damage from high winds

Local impacts already experienced in Burlington include:

- Damage to creek infrastructure due to erosion from extreme storms

- Damage to roads and other infrastructure due to freeze-thaw patterns, extreme precipitation, intense heat, etc.
- Impacts to transportation network and economy due to flooding and high wind events closing roads
- Increasing demand for services such as splash pads and water fountains due to increased extreme heat events
- Use of facilities as warming, cooling or evacuation centres
- Flooded roads, parks, paths and basements
- Damaged and diseased trees due to ice storms, high wind events, drought, etc.
- Health impacts from extreme heat and vectors such as infected blacklegged ticks which carry Lyme disease
- Impacts to mental health due to extreme events

When David Phillips, Senior Climatologist from Environment and Climate Change Canada presented "Weather and Climate: It's Not What Our Grandparents Knew" he stated that "climate change is not about slushy winters and earlier springs. It's about greater extremes and greater variability. Those are going to beat us up when our climate changes even more dramatically than now. If recent years have taught us anything is to expect the unexpected!"

Engagement Matters:

Due to COVID, all consultation to develop the CRB plan was online. The plan was developed using a bottom up approach primarily with two teams comprised of City staff and community stakeholders.

City Staff and Community Stakeholder Teams

Both staff and community stakeholder teams were formed in early 2021. Several meetings were held (four with staff and two with community) prior to hiring the consultant Associated Engineering and subconsultant All One Sky Foundation in June 2021. The initial meetings were to introduce staff and community stakeholders to the Climate Projections Report, highlight and discuss initiatives already taking place in Burlington related to our changing climate, and to develop a set of climate impact statements which would be refined and finalized with the consultant.

A total of 15 workshops were held with 49 staff and community stakeholders to develop the plan. Stakeholders dedicated a total of 660 hours attending the workshops, providing 2,650 comments, and scoring/voting on 690 items. These hours do not

capture the initial meetings or the multiple follow-up conversations that took place outside the workshops.

Community Engagement

A public facing project page was set up at getinvolvedburlington.ca/crb. Documents presented to City Council in March 2021 were posted along with documents prepared by the consultant including the Engagement Plan (Appendix D) which highlighted the planned engagement approach and the Climate Change Vulnerability and Risk Assessment (Appendix C).

The public were encouraged to participate in a survey posted between Oct. 27 and Nov. 14, 2021 to help develop CRB's vision and principles as well as answer questions related to climate change impacts and actions for climate resiliency. A total of 152 people responded to the survey (Appendix B).

Sustainability staff met with the Burlington Youth Student Council in February 2021 to present the Climate Projections Report and in October 2021 to request input to CRB's vision. Staff also co-presented with the Town of Oakville "Climate Adaptation in Burlington and Oakville" at the Generation Green youth conference in 2021.

A summary of all engagement initiatives is presented in Appendix E.

Public Project Launch

On Oct. 27, 2021, the City publicly launched the CRB project with 65 participants in attendance, not including the organizers. Keynote speaker David Phillips, Senior Climatologist, Environment and Climate Change Canada, presented "Weather and Climate: It's Not What Our Grandparents Knew." City staff also provided participants with the opportunity to learn more about the CRB project and also notified them of the launch of the public survey.

Conclusion:

Recognizing that even if carbon neutrality is achieved today, greenhouse gases already emitted will remain in the atmosphere and continue to impact our climate for the foreseeable future. As such, it is imperative that we plan for the weather we are going to see and continue to transition from disaster response to risk preparedness if we want Burlington to remain a desirable, liveable, healthy and safe community. City staff are currently gathering additional feedback on the draft CRB plan and will return with the final plan in July 2022 for approval.

Respectfully submitted,

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Sustainability Project Coordinator

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Appendices:

A. Climate Resilient Burlington (CRB): A Plan for Adapting to Our Warmer, Wetter and Wilder Weather, Draft May 2022
B. CRB Survey Results on Vision, Principles, Climate Impacts and Actions, Oct. 27 to Nov. 14, 2021
C. CRB Climate Change Vulnerability and Risk Assessment Technical Report, December 2021
D. CRB Engagement Plan, October 2021
E. CRB Engagement Report, March 2022

Report Approval:

All reports are reviewed and/or approved by Department Director, the Chief Financial Officer and the Executive Director of Legal Services & Corporation Counsel.