
HALDIMAND COUNTY

Report PDD-26-2020 Haldimand County Lake Erie Hazard Mapping and Risk Assessment



For Consideration by Council in Committee on August 25, 2020

OBJECTIVE:

To present the Haldimand County Lake Erie Hazard Mapping and Risk Assessment report as completed by W.F. Baird & Associates Coastal Engineers on behalf of Haldimand County and its member Conservation Authorities.

RECOMMENDATIONS:

1. THAT Report PDD-26-2020 Haldimand County Lake Erie Hazard Mapping and Risk Assessment be received;
2. AND THAT the Haldimand County Lake Erie Hazard Mapping and Risk Assessment be approved for use in future County projects and initiatives, including Official Plan Update, flood response planning and infrastructure assessments.

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Reviewed by: Shannon VanDalen, MCIP, RPP, CMMI, Manager of Planning and Development

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Approved: Craig Manley, MCIP, RPP, Chief Administrative Officer

EXECUTIVE SUMMARY:

In 2017, Haldimand County Council approved the participation in the joint partnership study funded in part by Public Safety Canada (50%), LPRCA (6.25%) and GRCA (6.25%) to update the hazard risk mapping along the Lake Erie Shoreline. Haldimand budgeted \$90,000 for this work which is intended in part to assist the municipality in assessing risk to municipal infrastructure.

On behalf of Haldimand County and the Conservation Authorities having jurisdiction in Haldimand County (Long Point Region Conservation Authority (LPRCA), Grand River Conservation Authority (GRCA) and Niagara Peninsula Conservation Authority (NPCA)), W.F. Baird & Associates Coastal Engineers has completed a Haldimand County Lake Erie Hazard Mapping and Risk Assessment report. The report was initiated in the spring of 2018 and seeks to update Lake Erie hazard mapping across the County. This mapping update will be used to inform projects and policies, and guide development in a way that safely addresses the Lake Erie hazards in Haldimand County. The risk assessment component will be used to assess vulnerability of County-owned and private infrastructure (roads, buildings, bridges), and predict future risks considering climate change.

BACKGROUND:

Haldimand County has approximately 87 kilometres of Lake Erie Shoreline, and the recently completed Haldimand County Lake Erie Hazard Mapping and Risk Assessment is a technical document that will replace the older shoreline hazard mapping across this area of the County. Previously, this type of mapping was updated by Haldimand County's member Conservation Authorities without a consolidated County-wide approach; this has resulted in shoreline mapping being used across the County with vintages from the 1980s (LPRCA, GRCA) to 2010 (NPCA). The study updates flooding, erosion and dynamic beach hazards across the County's shoreline and low-lying areas that are impacted by Lake Erie Hazards. The updated mapping and processes followed during the completion of this assessment also fulfills the obligations of the Conservation Authorities under their individual regulations, and allows them to use the newly generated mapping to update their Regulation Limits within Haldimand County. The risk assessment component of the study uses a template provided by Public Safety Canada and estimates flood damages and identifies areas that may be inaccessible to Emergency Services during times of flooding. Maps were developed showing buildings and roads that would be inundated during a 100-year event, to support flood preparedness planning.

A full copy of the report and mapping is included as a link in the digital version of the Council in Committee agenda; provided the large size of the document, it was not feasible to attach a hard copy to the packages. The digital report can be found here: <https://www.haldimandcounty.ca/lake-erie-shoreline-hazard-mapping-and-risk-assessment-study/>.

ANALYSIS:

The Haldimand County Lake Erie Hazard Mapping and Risk Assessment was initiated in spring 2018 (April) when W.F. Baird & Associates Coastal Engineers was contracted to complete the technical work and generate the report itself. The study was guided by a Project Team that included County and Conservation Authority staff who began meeting in 2017 prior to hiring Baird and Associates. A Community Liaison Group was also formed, including the Project Team and 6 residents of Haldimand County from the lakeshore area; the Liaison Group met 3 times (August 2018, September 2019, and February 2020), and the intent of this group was for its members to bring more detailed information about the project back to their communities and to give 'on the ground' inputs and experiences to the project.

Mapping of shoreline flood, erosion, and dynamic beach hazards supports municipal and conservation authority land use planning and permitting decisions in at-risk communities (e.g. Dunnville, Port Maitland) and shoreline resort areas. Most previous shoreline hazard mapping for the County was prepared several decades ago; since that time, the provincial technical guidance has been updated (2001), and there have been legislative changes, including an updated Provincial Policy Statement (2020) under the *Planning Act*, and new regulations under the *Conservation Authorities Act*. Current and consistent hazard mapping across conservation authority jurisdictions within the County was needed to assist the County in implementing shoreline-related land use planning policies that conform to current regulations and policies of the Province.

The County has 87 km of Lake Erie shoreline. The Lake Erie flood hazard extends about 9 km upstream of the Dunnville Dam. Dunnville and Port Maitland are the largest population centres within the study area. The rest of the lakeshore area is mostly agricultural, with strip residential developments along the shoreline and residential nodes with a mix of seasonal and year-round developments. There are also seasonal trailer parks, campgrounds, and Provincial Parks within the lakeshore area. Across Haldimand County, the shoreline ranges from rocky nearshore shelves and headlands, to low banks of sand and cobbles, to higher eroding bluffs (approx. 8 m high). All of these areas were assessed as part of this project.

The study was completed on February 29, 2020, with funding from the County and the National Disaster Mitigation Program (NDMP), and funds and in-kind support from GRCA and LPRCA.

The updated mapping and associated technical information also supports municipal and conservation authority flood and erosion-related emergency response and mitigation planning.

Shoreline Hazard Mapping Component

In terms of process, the study drew on new sources of elevation data, updated flood levels and erosion rates, and addressed current provincial technical guidelines. The scope of work included:

- Development of a digital terrain model and base mapping using new and existing elevation data (2015-2018), including topographic and bathymetric LiDAR collected by the Ontario Ministry of Agriculture, Food and Rural Affairs, and the federal Department of Fisheries and Oceans, respectively.
- Preparation of shoreline flood, erosion and dynamic beach hazard mapping per the Ministry of Natural Resources (MNR) Technical Guide for the Great Lakes – St. Lawrence River System and Large Inland Lakes (2001).
- A statistical analysis of Lake Erie static levels and surge, using the 30+ years of water level data collected since the 100-year return period event was documented by MNR in the 1989 Great Lakes System Flood Levels and Water Related Hazards report. Since the updated 100-year still-water levels (static + surge) were within 1 cm of the previously documented flood levels, the new hazard mapping used the 100-year flood level from MNR (1989).
- Update of Average Annual Recession Rates (erosion) using imagery from 2015/2017 and historical imagery dating back 42-70 years. The recession rate was determined as the average of the recession rates for transects in each reach of the shoreline, plus one standard deviation.

The result of this process is refined hazard mapping that has not varied significantly from previous mapping in most areas. The new mapping provides more accurate information regarding the extent of each type of Lake Erie Hazard (flooding, erosion, dynamic beach, etc.), allowing residents and first responders to better understand how Lake Erie's hazards impact their locations. Thus, the overall impacts to landowners along the lakeshore will not be significant, and in most cases development rights and opportunities will remain. Where changes will take place, additional hazard mitigation may be required should property development be sought. The new mapping also identifies which County infrastructure is at risk from Lake Erie, and allows various County departments (e.g. Roads, Emergency Services) to plan and prepare for impacts from Lake Erie.

Flood Risk Assessment Component

The study included an update to Haldimand County's flood risk assessment. This included estimating potential flood damages and identifying buildings and roads at risk of flooding over a range of flood event sizes. Using a template provided by Public Safety Canada, risks were identified for the 100-year flood, or the flood with a 1% chance of occurring in any given year. County-wide, about 316 buildings would be impacted by flooding at the 100-year event level, with estimated building (and contents) damages of \$50M, estimated lost productivity of \$35M, and estimated temporary accommodation costs of \$4M. The estimated damages are greatest for Dunnville and Port Maitland, due to the number of impacted structures and potential damages to commercial and industrial properties in Dunnville. Maps were developed showing buildings and roads that would be inundated during a 100-year event, to support flood preparedness planning.

Public Consultation

A Community Liaison Group (CLG) was established to provide a forum for shoreline property owners and residents to be informed about the study. Haldimand County sent letters to local stakeholder groups

requesting participation in the CLG. The CLG met with the Project Team three times (August 2018, September 2019, and February 2020) to receive project updates, share information on local flooding and erosion conditions, and review draft display materials for the Public Education Centres (PEC).

Two PECs were held at the Selkirk Centennial Community Centre. News releases stated that the PECs would fulfill the requirements for public consultation for any resulting amendments to regulated area mapping of Ontario Regulations 150/06, 155/06 and 178/06 made under the *Conservation Authorities Act*. An initial PEC was held in September 2018 to introduce the study, describe hazard mapping and methods, and share resources to help people protect their property from flooding and erosion. Thirty-four people signed in to the PEC and two comment forms were submitted. The second PEC was held in September 2019 when final draft hazard mapping was available for review by property owners via laptops. Forty-six people signed in to the PEC and two comment forms were submitted. The PECs followed an open house format and posters were made available on the County's project web page following the meetings. For both PECs, the feedback forms and general public inputs were property specific – i.e. how will this impact me? Generally speaking, the information that was provided to attendees and commenters satisfied the questions they raised.

Conservation Authority Response to Study

The three participating conservation authorities (LPRCA, GRCA and NPCA) will also be presenting the approved mapping and risk assessment at their Boards. The scope of this study also allows them to update the mapping for their individual regulation mapping. This will take place with each respective board upon Council approving the study.

FINANCIAL/LEGAL IMPLICATIONS:

Total project expenses for the two-year study were \$226,151. Expenses were cost shared 50% by Public Safety Canada (NDMP funding), 37.5% by Haldimand County, 6.25% by LPRCA (cash and in-kind), and 6.25% by GRCA (cash and in-kind). The resulting County expense of \$84,807 represents savings of \$5,193 on the originally budgeted contribution of \$90,000. These savings will be reflected in the overall budget variance.

STAKEHOLDER IMPACTS:

Not applicable.

REPORT IMPACTS:

Agreement: No

By-law: No

Budget Amendment: No

Policy: Yes

ATTACHMENTS:

None.