

OPS# 1 DRAIN

## FLOOD HAZARD MANAGEMENT GUIDELINES

FINAL REPORT

Prepared for:

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## EXECUTIVE SUMMARY

The Ops#1 Drain is a municipal drain, as identified under the Ontario Drainage Act, located in the City of Kawartha Lakes (former Town of Lindsay), see Figure 1. It was originally constructed in 1880 in the former Ops Township as an agricultural drain to enhance cultivation of otherwise poorly drained (swampy) soils within a low relief watershed. Jennings Creek provides the natural channel system outlet for the Ops#1 Drain. To address urban growth and flood hazards as defined by the Conservation Authorities Act, the City of Kawartha Lakes prepared floodline mapping for the entire Ops#1 Drain and Jennings Creek watershed.

The primary goal of this study was to interpret the floodline mapping and develop a set of guidelines to address flood hazards within the entire Ops#1 Drain and Jennings Creek watershed.

At about the same time the floodline mapping was completed, approval for a site specific development proposal was put forth to construct a new building by the Humane Society of Kawartha Lakes located on McLaughlin Road. This property is located within a flood hazard area as identified in the recently prepared floodline mapping.

The second goal of this study was to assess in detail the flood hazards associated with the approved development of the new Humane Society of Kawartha Lakes building on McLaughlin Road.

The City of Kawartha Lakes is growing, and with all growing cities it is essential to understand the policies in place which regulate development within flood hazard areas. It is important for growing communities to resist and control pressures to encroach on flood-prone lands. Infrastructure development on lands that are not flood-prone should be given priority, and land management tools, such as zoning, should be used to supplement infrastructure policies.

Two important acts which regulate development within the flood hazard areas are the Planning Act and the Conservation Authority Act. The Conservation Authority Act gives Kawartha Region Conservation Authority (KRCA) the powers to establish regulations and develop policies for managing land uses in flood prone areas. The KRCA has established Watershed Management Policies to regulate development and other land uses within flood hazard areas (KRCA 2002). Further details of the specific requirements are contained in the KRCA Watershed Management Polices Document.

The Ops#1 Drain and Jennings Creek watershed embody existing and future land uses and development proposed by the City of Kawartha Lakes. These development areas either contain fully residential, commercial, industrial or agricultural zoning. Using a combination of land use,

development boundaries and major highway right of ways within the Ops#1 Drain watershed a set of six flood hazard management areas were defined, see Figure 3. These areas were introduced to provide an organized and tailored approach to address flood management and the nature of flood hazards within each specific area.

Each management area was examined to identify the nature and causes for flood hazards in the area. Area specific recommendations were developed included flood hazard policies to be used and infrastructure improvements.

The recommendations presented for each management area have been summarized in Table 6. The recommendations presented are not intended to address the operation or obligations for maintenance or improvement of the drain as required and defined under the Drainage Act.

To assist with implementation of provincial policies and the management of flood hazard areas by the City of Kawartha Lakes and the KRCA, a set of fact sheets have been prepared. The fact sheets summarize and organize in point form the key elements for flood hazard management in each management area.

This report provides discussion on implementing the recommendations provided including:

- Use of the one and two zone policies in the Ops#1 Drain/Jennings Creek watershed
- The need for suitable regulatory floodline mapping
- Works for the Ops#1 Drain to reduce flood hazard potential
- The need for stormwater management quantity controls
- The filling of Area 3 and construction of a new drain
- Using an adaptive management approach for long term flood hazard management
- Review of the Ontario Drainage Act and abandoning the Ops#1 Drain as defined by the Act.
- Responsibilities and who pays for flood hazard management works on the Ops#1 Drain/Jennings Creek, and
- Listing of other regulations, acts and policies which need to be considered when implementing flood hazard management works.

Key findings of this study include:

1. Review of the existing floodline mapping and supporting analyses suggests a strong need to reassess the hydrology and hydraulics of the Ops#1 Drain/Jennings Creek watershed to ensure the flood hazards are correctly identified for management. As such, references to specific drain capacities, flow rates, storage volumes, flood elevations, culvert improvements etc. are subject to change. At best the floodline

mapping used provides an indication of the approximate elevation, depths and extents of flood hazard areas throughout the Ops#1 Drain/Jennings Creek watershed.

2. Flood hazards in Area 1 are primarily associated with undersized culverts at William Street N., a berm and Victoria Trail which causes backwater and flooding of adjacent lots. Furthermore, spills of flood water occur to undeveloped lands between these crossings.
3. Flood hazards in Area 2 for the regional storm event are primarily defined by backwater conditions caused by the limited capacity of the culvert at Angeline Road North.
4. Potential flood hazards for Area 3 occur as a result of the overtopping of Highway 35 and direct connection of the service culvert for this area. The low lying nature of this land would result in the retention of flood water from the Ops#1 Drain. While filling of Area 3 may remove it from a regulatory flood hazard designation, careful consideration is required to provide minor and major drainage system services for this area.
5. Area 4 and 5 have significant flood prone areas which are attributed to the limited capacity of culverts, design of the Ops#1 Drain, and the natural low lying topography of the flood plain.
6. Area 6 is a very urbanized area with significant potential for flooding. Limited culvert capacity and the natural low lying topography are the primary causes for flooding. However, hydraulic analyses completed in this study suggest flood hazards may not be as severe as suggested by existing floodline mapping. While Flood hazards are lower and place less of risk to the new Humane Society of Kawartha Lakes building, access to and from the building via McLaughlin Road remains.

The following is a list of recommendations prepared from the work completed by this study.

1. Prepare suitable regulatory floodline mapping stamped by a professional engineer for the entire Ops#1 Drain and Jennings Creek Watershed. This will require significant refinements to the latest hydrologic and hydraulic models developed for the entire watershed. The analyses should consider specific development plans and their stormwater management requirements as would be expected in a master drainage study. A number of improvements are particularly required in the routing of flood flows and the hydraulic modeling. The hydraulic model should be georeferenced for integration with other municipal planning documents and for day to day operations and review of development applications and approvals. The completion of this work is

important for the planning and implementation of policy development and related flood hazard management works in the watershed.

2. Future assessment of watershed hydrology, hydraulics and flood hazards should include an integrated assessment of the effects on channel erosion and water quality to ensure the Ops#1 Drain and Jennings Creek function efficiently.
3. The City of Kawartha Lakes should consider placing a priority on implementing drainage improvements at the twin culverts at Moose Lodge. The existing culverts and earth fill providing access to the playfield are a significant restriction to the passage of flood water in the Ops#1 Drain and increase flood risks to McLaughlin Road. Two options should be considered, complete removal of the culverts and fill with an alternative access route, or complete removal with a clear spanning bridge.
4. The City of Kawartha Lakes should coordinate the need for drainage improvements related to managing flood hazard, with the need for culvert improvements required by MTO.
5. The City of Kawartha Lakes, KRCA and proponents for land use changes in management Areas 2 and 3 should work together to develop a detail plan and strategy for the placement of fill and new drainage works to service these lands.
6. The KRCA together with the City of Kawartha Lakes should develop specific policy related to the use of a two zone policy in designated areas. To develop this policy a two zone study is required in management Areas 4, 5 and 6. Specifically this study should include but not be limited to defining the floodway and flood fringe areas, roadways with ingress and egress constraints, allowable areas of encroachment in the flood fringe, and requirements for flood proofing. This work could be completed as part of Recommendation 1 or completed subsequent to the completion of Recommendation 1. Due to the implications to current and future land uses and possible impacts to private and public lands this work should be completed following the spirit of Conservation Authority Class Environmental Assessment process.
7. The City of Kawartha Lakes and the KRCA should develop a strategy for implementing drainage improvement works on the Ops#1 Drain and Jennings Creek. This strategy should consider how to make use of development charges to offset the cost of these works.

8. The City of Kawartha Lakes should carryout maintenance works on the Ops#1 Drain including a drain cleanout and improvements to existing culverts. The drain cleanout should be carried out as required under the Drainage Act. The culvert improvements should be based on the requirements for managing flood hazards. The costs for these improvements should not be limited to those who receive benefits (as defined by the Drainage Act) from the Ops#1 drain.
9. The KRCA should review their current Watershed Management Policy Document and update this document as needed to reflect any of the guidelines adopted from this study.
10. The City of Kawartha Lakes should review the need to maintain the current municipal drain status of the Ops# 1 Drain. Based on the work completed in this study partial or complete abandonment of the drain should be considered.