

## Attachment 2: TRCA's Flood Infrastructure List with Deficiencies

Table 1

<b>Dams</b>						
<b>Dame Name</b>	<b>Dam Height (m)</b>	<b>Region/Municipality</b>	<b>Second Tier Municipality</b>	<b>Hazard Potential Classification*</b>	<b>Date Constructed</b>	<b>Known Deficiencies</b>
G. Ross Lord Dam	19.3	City of Toronto	N/A	Very High	1972	<ul style="list-style-type: none"> <li>• Dam Safety Review due in 2022</li> <li>• Dam foundation drainage system requires maintenance.</li> </ul>
Claireville Dam	15.0	City of Toronto/Peel Region	Brampton	Very High	1963	<ul style="list-style-type: none"> <li>• Spillway capacity is too small, and the dam is at risk of overtopping during extreme events</li> <li>• Right bank wing wall has settled and needs replacement</li> <li>• Gates and hoisting systems require major maintenance</li> <li>• Spillway stilling basin is too short for extreme events</li> </ul>
Stouffville Dam	7.6	York Region	Whitchurch-Stouffville	Very High	1969	<ul style="list-style-type: none"> <li>• Emergency spillway requires erosion protection</li> <li>• Earthen embankment does not meet factor of safety requirements</li> <li>• Concrete requires repairs</li> </ul>
Milne Dam	9.3	York Region	Markham	Very High	1969	<ul style="list-style-type: none"> <li>• Spillway capacity is too small, and the dam is at risk of overtopping during extreme events</li> <li>• Spillway does not meet loading requirements and is at risk of sliding during extreme events</li> <li>• Spillway stilling basin is too short for extreme events</li> </ul>
Palgrave Dam	4.3	Peel Region	Caledon	Very High	1860	<ul style="list-style-type: none"> <li>• Spillway capacity is too small, and the dam is at risk of overtopping during extreme events</li> <li>• Dam requires upgrades to the stop log lifting system</li> <li>• Earthen embankment does not meet factor of safety requirements</li> </ul>
Black Creek Dam	7.3	City of Toronto	N/A	Moderate	1959	<ul style="list-style-type: none"> <li>• Flow control structure is susceptible to debris blockages and requires reconfiguration</li> </ul>
Secord Dam	5.0	Durham Region	Uxbridge	Low	1930	<ul style="list-style-type: none"> <li>• Earthen embankment is in poor condition</li> <li>• Consider decommissioning dam</li> </ul>
Osler Dam	5.0	Durham Region	Uxbridge	Low (Assumed)	1937	<ul style="list-style-type: none"> <li>• Concrete flow control structure is failing</li> <li>• Consider decommissioning dam</li> </ul>
Glen Haffy Dam West	5.5	Peel Region	Caledon	Low (Assumed)	1950's	<ul style="list-style-type: none"> <li>• Requires Dam Safety Review</li> </ul>
Glen Haffy Dam East	5.5	Peel Region	Caledon	Low (Assumed)	1950's	<ul style="list-style-type: none"> <li>• Requires Dam Safety Review</li> </ul>
Glen Haffy Fly Fishing Upper Dam	5.0	Peel Region	Caledon	Low (Assumed)	1950's	<ul style="list-style-type: none"> <li>• Spillway pipe failing</li> <li>• Embankment unstable</li> <li>• Dam is at risk of failing</li> </ul>
Glen Haffy Fly Fishing Lower Dam	5.0	Peel Region	Caledon	Low (Assumed)	1950's	<ul style="list-style-type: none"> <li>• Embankment unstable</li> <li>• Dam is at risk of failing</li> </ul>

\*See Table 4 below for criteria used to determine Hazard Potential Classification for dams

## Attachment 2: TRCA's Flood Infrastructure List with Deficiencies

Table 2

Flood Control Channels					
Channel Name	Channel Length(m)	Region/Municipality	Second Tier Municipality	Date Constructed	Known Deficiencies
Yonge/York Mills Channel	1670m	City of Toronto	City of Toronto	1959	<ul style="list-style-type: none"> <li>• Gabion lining has deteriorated</li> <li>• Some concrete panels are cracked and settling</li> </ul>
Woodbridge Channel	1850m	York Region	City of Vaughan	1962	<ul style="list-style-type: none"> <li>• Two grade-control baffle chute structures are public safety issues and should be removed</li> </ul>
Stouffville Channel	370m	York Region	Whitchurch-Stouffville	1980	<ul style="list-style-type: none"> <li>• Gabion baskets are deteriorated and causing channel walls to fail</li> <li>• Sediment in channel requires removal. Cost for doing so is prohibitive</li> </ul>
Black Creek Channel	2370m	City of Toronto	City of Toronto	1969	<ul style="list-style-type: none"> <li>• Many concrete panels have cracked and settled</li> </ul>
Scarlett Channel	3600m	City of Toronto	City of Toronto	1959	<ul style="list-style-type: none"> <li>• Many concrete panels have cracked and settled</li> </ul>
Brampton Channel	570m	Peel Region	Brampton	1951	<ul style="list-style-type: none"> <li>• Channel outfall is a public safety hazard</li> </ul>
Sheppard Channel	350m	City of Toronto	City of Toronto	1960's	<ul style="list-style-type: none"> <li>• Many concrete panels have cracked and settled</li> <li>• Low flow channel is failing</li> </ul>
Malton Channel	650m	Peel Region	Mississauga	1969	<ul style="list-style-type: none"> <li>• Requires maintenance dredging and clearing</li> </ul>
Oak Ridges Channel	90m	York Region	Kig	1981	<ul style="list-style-type: none"> <li>• Requires maintenance dredging and clearing</li> </ul>

## Attachment 2: TRCA's Flood Infrastructure List with Deficiencies

Table 3

<b>Dykes</b>					
<b>Dyke Name</b>	<b>Dyke Length(m)</b>	<b>Region/Municipality</b>	<b>Second Tier Municipality</b>	<b>Date Constructed</b>	<b>Known Deficiencies</b>
Pickering Dyke	1250m	Durham Region	Pickering	1983	<ul style="list-style-type: none"> <li>• Dyke does not meet current engineering requirements for stability</li> </ul>
Ajax Dyke	350m	Durham Region	Ajax	1983	<ul style="list-style-type: none"> <li>• Dyke does not meet current engineering requirements for stability</li> </ul>
Bolton Berm	800m	Peel Region	Caledon	1983	<ul style="list-style-type: none"> <li>• Berm is too low in several areas to provide the design flood protection of the 500-year storm</li> <li>• Berm requires erosion protection</li> </ul>
Etobicoke Dyke	460m	Peel Region	Brampton	1969	None
West Don Flood Protection Landform	710m	City of Toronto	City of Toronto	2015	None
Tyndall Flood Wall	100m	Peel Region	Mississauga	1991	None

Table 4

<b>Hazard Potential Classification</b>				
<b>Hazard Potential</b>	<b>Life Safety</b>	<b>Property Losses</b>	<b>Environmental Losses</b>	<b>Cultural Losses</b>
<b>Low</b>	No Potential Loss of Life	Minimal damage to property with estimated losses not to exceed \$300,000.	Minimal loss of fish and/or wildlife habitat with high capability of natural restoration resulting in a very low likelihood of negatively affecting the status of the population.	Reversible damage to municipally designated cultural heritage sites under the Ontario Heritage Act.
<b>Moderate</b>	No Potential Loss of Life	<p>Moderate damage with estimated losses not to exceed \$3 million, to agricultural, forestry, mineral aggregate and mining, and petroleum resource operations, other dams or structures not for human habitation, infrastructure and services including local roads and railway lines.</p> <p>The inundation zone is typically undeveloped or predominantly rural or agricultural, or it is managed so that the land usage is for transient activities such as with day-use facilities.</p> <p>Minimal damage to residential, commercial, and industrial areas, or land identified as designated growth areas as shown in official plans.</p>	Moderate loss or deterioration of fish and/or wildlife habitat with moderate capability of natural restoration resulting in a low likelihood of negatively affecting the status of the population.	<p>Irreversible damage to municipal designated cultural heritage sites under the Ontario Heritage Act.</p> <p>Reversible damage to provincially designated cultural heritage sites under the Ontario Heritage Act or nationally recognized heritage sites.</p>

<b>High</b>	Potential Loss of Life of 1-10 persons	Appreciable damage with estimated losses not to exceed \$30 million, to agricultural, forestry, mineral aggregate and mining, and petroleum resource operations, other dams or residential, commercial, industrial areas, infrastructure and services, or land identified as designated growth areas as shown in official plans. Infrastructure and services includes regional roads, railway lines, or municipal water and wastewater treatment facilities and publicly-owned utilities.	Appreciable loss of fish and/ or wildlife habitat or significant deterioration of critical fish and/ or wildlife habitat with reasonable likelihood of being able to apply natural or assisted recovery activities to promote species recovery to viable population levels. Loss of a portion of the population of a species classified under the Ontario Endangered Species Act as Extirpated, Threatened or Endangered, or reversible damage to the habitat of that species.	Irreversible damage to provincially designated cultural heritage sites under the Ontario Heritage Act or damage to nationally recognized heritage sites.
<b>Very High</b>	Potential Loss of Life of 11 or more persons	Extensive damage, estimated losses in excess of \$30 million, to buildings, agricultural, forestry, mineral aggregate and mining, and petroleum resource operations, infrastructure and services. Typically includes destruction of, or extensive damage to, large residential, institutional, concentrated commercial and industrial areas and major infrastructure and services, or land identified as designated growth areas as shown in official plans. Infrastructure and services include highways, railway lines or municipal water and wastewater treatment facilities and publicly-owned utilities.	Extensive loss of fish and/ or wildlife habitat or significant deterioration of critical fish and/ or wildlife habitat with very little or no feasibility of being able to apply natural or assisted recovery activities to promote species recovery to viable population levels. Loss of a viable portion of the population of a species classified under the Ontario Endangered Species Act as Extirpated, Threatened or Endangered or irreversible damage to the habitat of that species.	

**Notes:**

1. Incremental losses are those losses resulting from dam failure above those which would occur under the same conditions (flood, earthquake or other event) with the dam in place but without failure of the dam.
2. Life safety. Refer to Technical Guide – River and Streams Systems: Flooding Hazard Limits, Ontario Ministry of Natural Resources, 2002, for definition of 2 x 2 rule. The 2 x 2 rule defines that people would be at risk if the product of the velocity and the depth exceeded 0.37 square metres per second or if velocity exceeds 1.7 metres per second or if depth of water exceeds 0.8 metres. For dam failures under flood conditions the potential for loss of life is assessed based on permanent dwellings (including habitable buildings and trailer parks) only. For dam failures under normal (sunny day) conditions the potential for loss of life is assessed based on both permanent dwellings (including habitable dwellings, trailer parks and seasonal campgrounds) and transient persons.
3. Property losses refer to all direct losses to third parties; they do not include losses to the owner, such as loss of the dam, or revenue. The dollar losses, where identified, are indexed to Statistics Canada values Year 2000.
4. An HPC must be developed under both flood and normal (sunny day) conditions.
5. Evaluation of the hazard potential is based on both present land use and on anticipated development as outlined in the pertinent official planning documents (e.g. Official Plan). In the absence of an approved Official Plan the HPC should be based on expected development within the foreseeable future. Under the Provincial Policy Statement, 'designated growth areas' means lands within settlement areas designated in an official plan for growth over the long-term planning horizon (specifies normal time horizon of up to 20 years), but which have not yet been fully developed. Designated growth areas include lands which are designated and available for residential growth in accordance with the policy, as well as lands required for employment and other uses (italicized terms as defined in the PPS, 2005).

6. Where several dams are situated along the same watercourse, consideration must be given to the cascade effect of failures when classifying the structures, such that if failure of an upstream dam could contribute to failure of a downstream dam, then the HPC of the upstream dam must be the same as or greater than that of the downstream structure.
7. The HPC is determined by the highest potential consequences, whether life safety, property losses, environmental losses, or cultural-built heritage losses.