



LESSONS LEARNED

Local actions to address extreme rainfall

Local governments are confronting one of the most important issues of our time – the alarming recent increase in damage to homes from extreme rainfall. Communities large and small across Canada are now taking action to reduce the risk of basement flooding and damage to property from sewer backup. This book describes 20 of the many successful local projects underway in communities that are adapting to better address the risks associated with extreme rainfall.

This book recognizes and acknowledges local leadership in addressing the risk of basement flooding. Mini case studies showcase successful local actions that can and should be used by communities across the country to confront the dual challenge of waste and stormwater management. The local policy decisions presented in this report are, in our opinion, scientifically sound, and provide a sustainable foundation for long-term success.

In recent years, severe rainfall has replaced fire to become the leading cause of damage to Canadian homes. Damage to homes from sewer backup and basement flooding now exceeds \$2 billion a year, and has been rising at an unsustainable rate for more than 25 years. Moreover, it is inevitable that the frequency and severity of extreme rainfall events will escalate as a result of climate change, threatening to further increase the damage to homes unless we adapt.

Much of the damage to homes is preventable if local governments and homeowners apply existing knowledge

to the design and maintenance of buildings and infrastructure. Fortunately, local governments, property owners and other stakeholders are starting to take action. Over the next few decades, it is expected that Canadians will experience more frequent and intense rainstorms. Nevertheless, if we adapt, it is possible that we could also experience reduced stormwater damage to homes.

Local governments need to invest in waste and stormwater management infrastructure, designed to cope with historic extreme rainfall events and also the prospect of even more intense events in the future. Vancouver is replacing all of its combined sewers to eliminate the discharge of untreated waste into waterways. Stratford has invested in stormwater systems designed to cope with a 250 year storm, well above the 100 year standard used in most communities. Welland is using PIEVC tools to design and manage its stormwater system based on rainfall intensity, frequency and duration projected under climate change.

Local governments are also working to change the behaviour of property owners. Halifax provides stormwater management guidelines to property owners, developers and other stakeholders to inform them about good practices. Kitchener and Waterloo worked together to implement a new storm water funding system, where property owners that retain an increased volume of stormwater and reduce the demands on the public sewer system are rewarded with tax credits.



Figure 2: *Boucherville won awards for installing wet and dry ponds to retain stormwater in a new development.*

(Source: ICLR)

Quebec City wrote seven times to citizens until 100 percent of the targeted homeowners disconnected their downspouts. About 50 percent of the targeted property owners in Saskatoon purchased a subsidized backwater valve to reduce the risk of wastewater in sanitary sewer pipes backing up into homes. Homeowners choosing to undertake major renovations in Surrey must replace their aging sanitary laterals. London was able to avoid costly upgrades to its sewer infrastructure by encouraging homeowners to sever their weeping tile connections from wastewater systems.

There is also a welcome focus on new developments. Boucherville won awards for installing wet and dry ponds to retain stormwater in a new development. Ottawa requires a normally open valve on the mainline sanitary sewer lateral and a normally closed valve on the stormwater connection for new homes. Markham has prohibited the construction of reverse-sloped driveways. In Edmonton, lot grading for new homes must be pre-approved.

It is possible to significantly reduce the risk of damage to homes from extreme rainfall if more communities and more homeowners take action. Considerable

knowledge exists about the design and management of buildings and infrastructure to reduce the risk of damage from basement flooding and sewer backup. There is a strong consensus about the best practices to reduce the risk of damage. The current challenge is to encourage more governments and more homeowners to take action.

For example, much of the current risk of damage to homes from sewer backup could be eliminated through the installation of a backwater valve. The preventable damage to homes is greater in any recent year than the cost of purchasing a backwater valve for every home in Canada. However, most homes do not yet have a valve. Indeed, thousands of new homes continue to be built each year without a backwater valve. And communities that offer financial incentives to existing homeowners frequently discover that most property owners fail to take action.

Local governments are typically viewed by the public as responsible for ensuring that waste and stormwater does not enter and damage private property. In effect, local governments are seen to 'own' this issue. But many of the actions required to address this risk must take place on private property. A recurring theme in this report is the challenge for local governments to serve the public good through a comprehensive strategy that likely includes regulation of private actions.

In this report, we document some of the ways local governments seek to influence private behaviour. For example,

Ottawa regulates the construction of new homes to ensure that builders install backwater valves. Kitchener and Waterloo have stormwater fees based on usage. London provides incentives for at-risk homeowners to disconnect weeping tiles. Halifax provides public information about the options available to interested stakeholders.

Finally, we observe that the trigger for action by most governments across Canada involved responding to damage from an extreme rainfall event. Nevertheless some communities have been proactive, seeking to take early action before large losses strike. For example, Collingwood has mandated the installation of backwater valves in new homes and Surrey requires the replacement of storm laterals when substantial renovations are planned.

Considerable effort is required to regain control over the risk of damage to homes from extreme rainfall, nevertheless the direction we must follow is becoming clear: All stakeholders are encouraged to share these and other stories of successful efforts by local governments, celebrating the actions of progressive communities that have begun to show the way forward.