

# Norton's BIG FIVE (5) Simple Solutions for Sewer Backups, Flooding and I/I

You will be amazed at how simple and cost-effective this is!



Presentation to NWWA  
November 2024

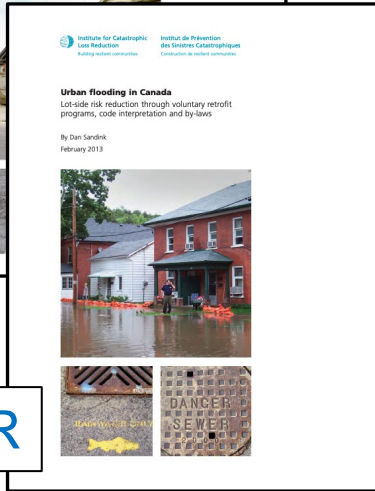
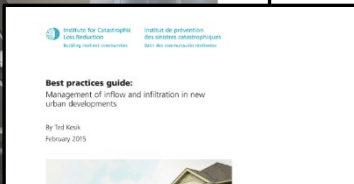
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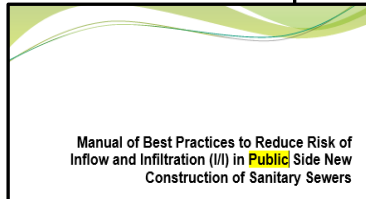
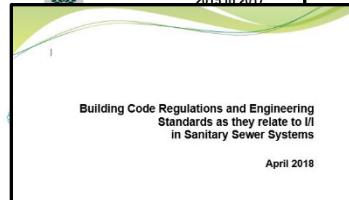
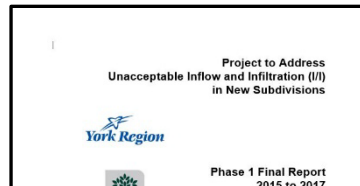
NORTON ENGINEERING

Norton is Canada's national sewer expert.

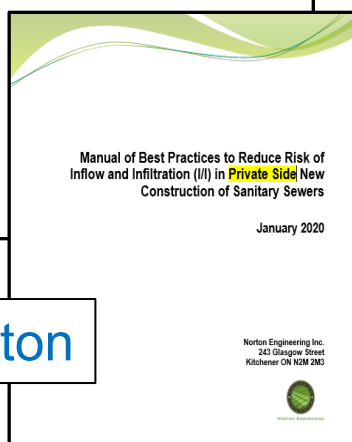
# There is an Enormous Amount of Modern Research on Sewers



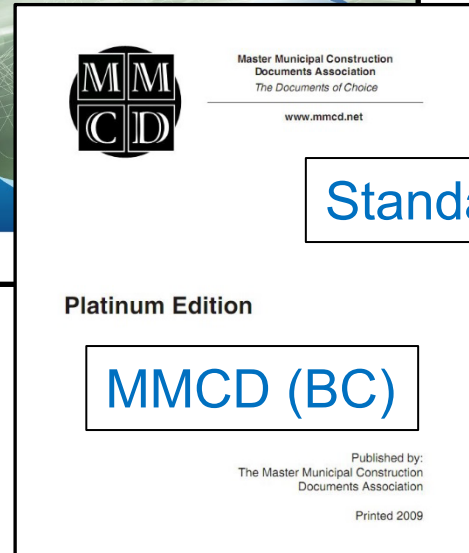
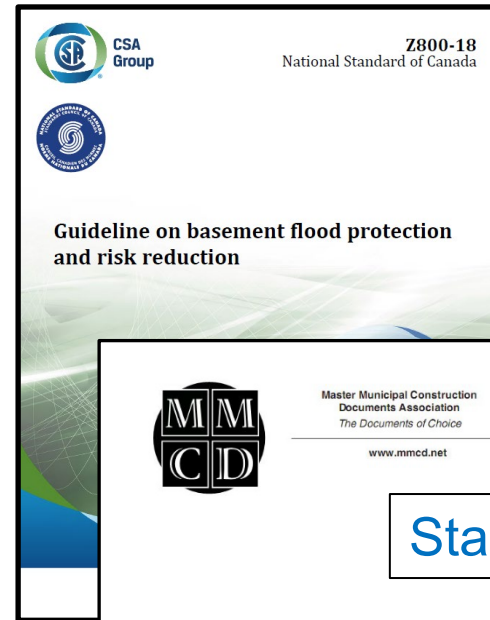
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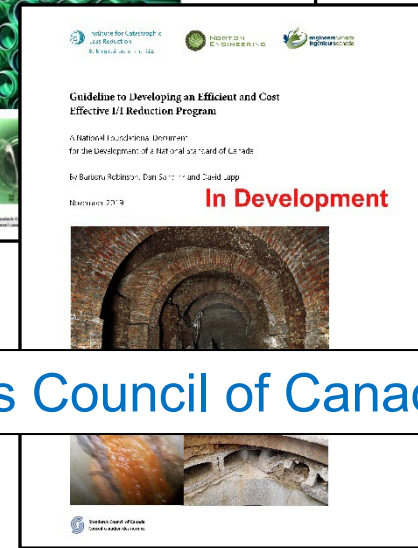
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National Research Canada



Standards Council of Canada



# Norton's BIG FIVE (5) Simple Solutions for Sewer Backups, Flooding and I/I

You will be amazed at how simple this is!



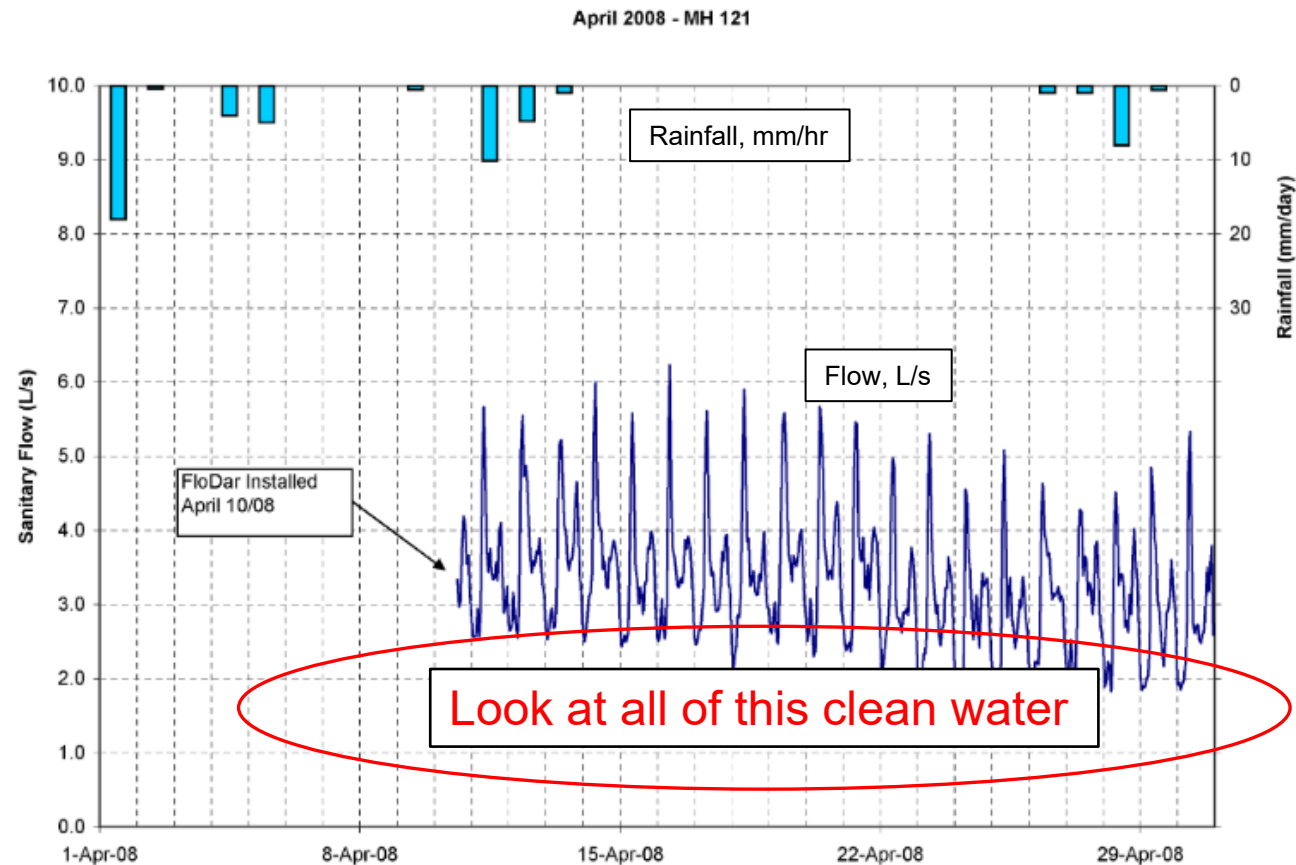
1. ***Flow monitor all new subdivision sewers*** to ensure they meet *allowable leakage values*
2. ***Reduce flushables dramatically*** by change the Building Codes and retrofitting existing buildings
3. ***Enforce your sewer use by-law*** to disconnect illegal downspouts (inflow)
4. ***Proactively inspect basement plumbing*** for illegal diversion of sump water every time a building inspector enters
5. ***Educate engineers and the public*** with training and a public education program

# New Subdivisions are LEAKING Badly

I discovered a new subdivision LEAKING in St. Jacobs, 2005

Flow monitoring results downstream alerted me to this excess flow coming from 120 new homes.

**1 L/s costs \$100,000 per year to treat at the WWTP!**



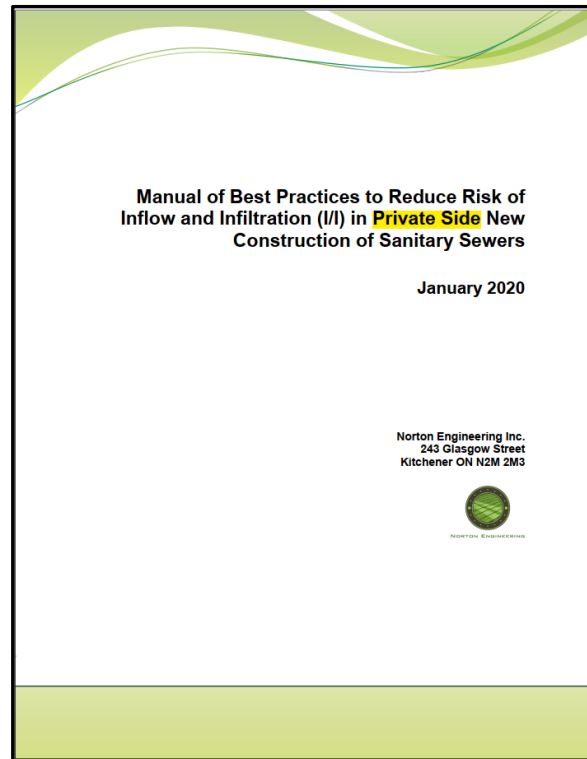
# Norton Engineering Primary Research

*Norton first survey of new subdivision  
sewer performance in Ontario  
2015 to 2017*



# Why are Sanitary Sewers Leaking on the Private Side

Norton findings, 2015 to present



Norton, self published, 2020  
Available n/c on my website

- The Codes was not developed with sewers in mind
- Building staff are not trained in sewer systems
- Installation methodology for PVC pipe
- Building Code interpretation (e.g. BWVs) varies
- Inspection of SBS prior to burial



# Private Side Sewer Laterals are not meaningfully INSPECTED



There is a single inspection that takes place  
**BEFORE THE PIPE IS BURIED,**  
making it pointless.

## Best Practices Public Side: Measure Performance of New Sewers

# Flow Monitor all New Subdivisions



- Public side sewer drawings all refer to standards that specify a **leakage performance specification**
- Allowable leakage for private sewers in the Codes is ZERO
- Flow monitoring takes the pressure off inspection!
- At least **30 municipalities** in Ontario have started flow monitoring of new sewers

### OPS-MUNI

#### 410.07.16.03 Infiltration Test

The rate of flow shall not exceed the maximum allowable infiltration calculated for the test section. Allowable infiltration shall be calculated as 0.075 litres/millimetre diameter/100 metres of pipe sewer/hour.



# It is the **OBLIGATION** of the Professional Engineer To ensure standards and specifications are met in new subdivisions

**O.Reg. 941 (Professional Engineers Act)**  
**Section 72. (1) In this section,**

"**negligence**" means an act or an omission in the carrying out of the work of a practitioner that constitutes a **failure to maintain the standards that a reasonable and prudent practitioner** would maintain in the circumstances.

"**professional misconduct**" means,

(a) negligence,

(d) failure to make **responsible provision** for complying with applicable statutes, **regulations, standards, codes, by-laws** and rules in connection with work being undertaken by or under the responsibility of the practitioner,

## Reduce Flushables DRAMATICALLY

Oops, the National Building Code forgot to consider user requirements!!!

- Women's toilet stalls do not contain a sink, counter, paper towel or trash can.
- Stalls contain a metal box screwed to the wall, \*sometimes\* with "clean" bags in them.
- Absent a trash can, we have few options but to flush menstrual products



The National Plumbing Code (and therefore Provincial Building Codes) contain no facilities for women to attend to menstruation with dignity, privacy and without flushing crap!

# A Two-Step Solution is Needed NOW!

1. Change the **National Building Code** to require a certain number of women's stalls to have a sink and counter (and by default, paper towel and trash can).
2. Retrofit all existing public washrooms with a trash can and Norton "**Sewers are NOT Trash Cans**" sign.

These changes will save \$\$\$ for utilities, substantially reduce sewer backups, reduce unsightly overflows to receivers, improve the environment, and **finally** introduce *menstrual equity* in Ontario and Canada

## Step 2: Retrofit Existing Buildings with Trash Cans and Public Education

Norton developed this sign after years of research and public education talks. It is unique because:

- Locate the sign *inside* the stall for ongoing reinforcement
- Install signs in *men's stalls* also
- Use "SEWERS" are not trash cans, not just toilets
- The inclusion of other items not to flush (fats, paper towels)
- The explanation as to *why* residents should not flush these items in public *or* at home



Why a "Norton" sign?



# Rainwater from Downspouts

## Directly Connected to the Sanitary Sewer

### 3. Enforce your sewer use by-law

- It is unconscionable that downspouts are still connected to the sanitary sewer.
- Downspouts connected to the sanitary sewer substantially increase YOUR RISK of flood, and YOUR NEIGHBOURS' RISK!
- It is **illegal**, today, per all Sewer Use By-Laws in Ontario, to connect rain water or ground water to the sanitary sewer



shutterstock.com - 2292441891

This is a downspout  
*correctly* discharging to  
surface



# Disconnection of Roof Leaders is Simplicity Itself

## And will reduce peak flows by ~100 to 500%

Connected Roof Leaders (e.g. stormwater connected to the sanitary sewer) uses up substantial capacity in our sewers. This capacity *should* be used for:

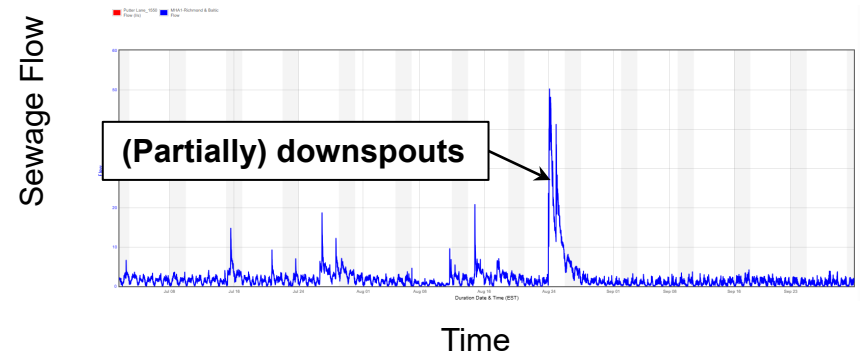
- Additional **housing**
- Substantially reducing routing **flooding**
- Greatly reduce **climate** change-related flooding
- Drastically reduce **overflows**
- Delaying the need for WWTP **expansions**
- Delay the need to upsize **trunk sanitary sewers**

Also:

- Greatly reduce electricity use at WWTPs
- **Monthly sewer bills will decrease for all residents**

3. Enforce your sewer use by-law

Small Town ON sewer graph (Aug 2023)



#ontariodownspoutdisconnectionday  
#nationaldownspoutdisconnectionday  
(Norton, 2023)



# A Mandatory Downspout Disconnection Program

## Will neatly achieve some of the 2022 Auditor General's Recommendations

### 3. Enforce your sewer use by-law

“There is no one government ministry assigned responsibility for coordinating measures to address urban flooding in Ontario. Rather, our audit identified four key provincial ministries—the Ministry of the Environment, Conservation and Parks (Environment Ministry), the Ministry of Natural Resources and Forestry (Natural Resources Ministry), the Ministry of Municipal Affairs and Housing (Municipal Affairs Ministry), and the Ministry of Infrastructure (Infrastructure Ministry)—as having significant responsibilities relating to urban flood management in Ontario

Our audit found that the province does not have effective systems and processes to reduce the risk of urban flooding, nor to provide homeowners, municipalities and other decision-makers the guidance and information they need to reduce their risks of urban floods.”

### Priority 1 Action (AG):

Increase Public Awareness and Education

“Work with external parties to share best practices and raise awareness about the increasing risk of flooding”

See:

**Value-for-Money Audit:**  
**Climate Change Adaptation: Reducing Urban Flood Risk**  
**Office of the Auditor General of Ontario, November 2022**

# Building Inspectors Proactively Inspect Plumbing

To enforce your Sewer Use By-Laws

- One third of homes in Ontario were built after 1988; e.g. with sump pumps for foundation drain water.
- Plumbers and Building Inspectors *frequently* find sump pumps disconnected and the water discharged to the sanitary sewer
- There is nothing in the Building Code that prevents proactive inspection (we do it for gas, etc.)
- **THE INSPECTOR IS ALREADY THERE!** We just need a database and follow up.



Sump water illegally connected to the sanitary sewer

# Explain to Residents the RISK of Using the Sewer

To illegally discharge sump water

- Plumbers and building inspectors advise that residents often *remove the sewer cleanout cap* to re-route sump water
- If the cleanout cap is off, residents increase the risk of:
  - Flooding their own basement
  - Sewer gases entering the home
  - Vermin
- As engineers, we have the obligation to protect our residents from these hazards!

# Educate Your Residents: Operating and Maintaining YOUR SEWER

- We must explain to homeowners that they own a sewer and watermain
- Sewers and watermains need to be operated and maintained.
- Advise homeowners to get their sewer CCTV inspected NOW and every 5 years (~\$300)
- Talk to residents about RATS



# Best Practices for Residents:

## How to keep Rats out of your House



Rat infestation in Scarborough – getting into basements via the sanitary sewer



- Rats can get into your house through defects in your sewer, or by swimming up through your basement toilet (really). **Keep the basement toilet lid down at all times.**
- If your private sewer lateral is in poor condition (holes are not uncommon) that's an easy way for rats to get in. Get your sewer CCTV inspected NOW and **Maintain your sewer!**

# With Public Education, we won't need much enforcement

- Norton has been widely presenting about sewers to lay audiences and the media for over 5 years.
- Once I explain *why* it is so important to disconnect, and take engage with the audience to explain, most people are more than willing to disconnect.
- A resident with a connected downspout increases the risk of flood at their home, and their neighbours'!
- Climate change is here. Let's let *residents* help mitigate its impact on sewers. They really want to help.

The Sewer Lady (Norton) on How to Avoid Flooding  
TVO's the Agenda, June 2023



Explaining to Steve why having roof leaders connected increase the risk of flooding at our own house, as well of that of our neighbours.

**Please watch “The Sewer Lady”  
on the Agenda (2023)**



# Norton works with Federal and Provincial Politicians to Effect Change

- Norton is working with Bardish Chagger, MP (L) Waterloo, to take a **PETITION** to the floor of the house to demand that we update the National Building Code to accommodate women's human rights (while saving our sewers)
- Norton is working with the provincial government to have them implement mandatory roof leader disconnection (Mike Schreiner, MPP (G))



Waterloo Liberal MP the Honourable Bardish Chagger has been supporting Norton's work for years

# There are now TWO National Sewer Standards

1. Inflow and Infiltration in New Sanitary Sewer Systems
2. Efficient and Cost-Effective I/I Program



**National Standard of Canada**  
 Standard D 3682-320-7: *Mitigation of the Risks of Inflow and Infiltration in New Sanitary Sewer Systems* (BNQ)  
 Developed 2015 to 2023

**National Standard of Canada**  
 SCC Guideline: *Developing an Efficient and Cost-Effective I/I Program* (awarded to BNQ 2023)  
 Developing 2019 to ~2025



# Questions?

“The man who asks a question is a fool for a minute. The man who does not ask is a fool for life.”

~**Confucius** (circa 500 BCE)

