

The Homeowner's
Guide to
**Flood
Protection**



MONCTON



Some of the information contained in this Guide was derived from the City of Edmonton's Homeowner's Guide to Flood Prevention. This Guide is provided by the City of Moncton and is intended for information purposes only. It is designed to enhance the reader's knowledge and insight into a house's drainage system. Consult a licensed plumbing contractor if you have specific concerns about your house. While the City of Moncton has made every effort to ensure the accuracy of the information contained in this Guide, it is not responsible for any damages resulting from reliance on these materials for any corrective action taken to remedy any drainage issues on your property.

Table of Contents

Introduction	5	Chapter 6	
Chapter 1		Maintaining your home’s drainage system	26
Understanding drainage	6	Outside:	
Home drainage system	6	Eavestroughs and downspouts	26
Municipal drainage system	8	Splash pads and extensions	26
Chapter 2		Lot grading	26
Why homes flood	10	Inside:	
Five quick, inexpensive ways to get you started	11	Foundation walls	28
Chapter 3		Sump pumps	28
Eavestroughs and downspouts	12	Backwater valve	28
Chapter 4		Chapter 7	
Improving lot grading	16	Protecting Your Home Storm and Sanitary Sewer Lines	29
Window wells	17	I. Combined Sewer Line with Sump Pit	30
Be kind to your neighbours	18	II. Separate Sewer Lines with Sump Pit – Floor Drain on Storm	31
Chapter 5		III. Separate Sewer Lines with Sump Pit – Floor Drain on Sanitary	33
Backwater valves, weeping tiles and sump pumps	19	IV. Separate Sewer Lines – No Sump Pit – Floor Drain on Sanitary	35
Backwater valves	19	Chapter 8	
Foundation Drain (Weeping tile)	20	Helpful resources	37
Sump pumps	21	Glossary	38
Finding and testing your sump pump	21		
What to look for when replacing your sump pump	24		



Introduction

Every year, millions of litres of water flow into the municipal drainage system from surface water, residential rooftops and indoor plumbing. Most people don't think about how the water is collected, or where it goes. It's a different story though when a torrential storm comes, the drainage system falters or there is water in your basement. Fixing water damage from flooding is time consuming, expensive and inconvenient.

Fortunately, there are many things you can do to reduce the likelihood of your home flooding. Prevention and maintenance are key. Looking at your home now and fixing any problem areas before the next major rainstorm can save you a lot of grief.

The City of Moncton's Homeowner's Guide to Flood Protection contains information that can help you identify problem areas and properly upgrade, repair or maintain your home's drainage system. This booklet contains practical drainage tips, and projects that you can do yourself.

Details of various projects, relative costs and degrees of difficulty are provided throughout. Even if you prefer to hire a professional, this booklet offers knowledge and insights that may help you make a more informed choice. It is recommended that you obtain three quotes and ask for references, particularly if you are unfamiliar with the company or individual.

Chapter 1

Understanding drainage

In any city, private and public drainage systems work together to channel and move sanitary and stormwater safely away from homes and streets. The private system (i.e. your sanitary and stormwater sewer lines) is the responsibility of residential and commercial property owners. The public system (including the sanitary and storm sewer pipes, that are under Moncton's roads) is owned and operated by the municipality, in this case the City of Moncton.

Home drainage system

The sanitary line deals with all water disposed of inside the home. Water from showers, toilets, sinks, dishwashers, clothes washers and floor drains is channelled to a line under your basement floor. This line is connected to a larger sanitary sewer pipe located under the street.

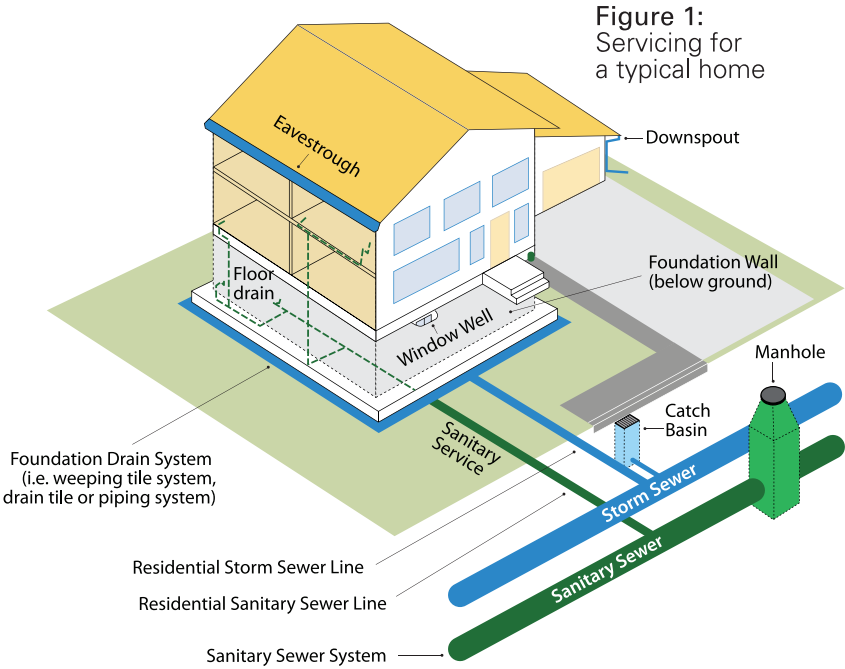


Figure 1:
Servicing for
a typical home

The stormwater service manages roof and surface water that comes from rainfall, snowmelt or your garden hose. Sloped lawns and driveways direct water from the roof and the ground to the street, where catch basins are located. The catch basins are connected to large underground stormwater pipes (See Figure 1). Water that seeps through the ground is collected by a foundation drain (known as weeping tile or drain tile) located at the bottom of your home’s foundation. The foundation drain may enter the sump pit where it drains by gravity to the storm sewer line or may be pumped to the surface by a sump pump (See Figure 1). Note that, because of their improved drainage systems, new houses do not

Figure 2:
Separate storm and sanitary service lines in newer homes

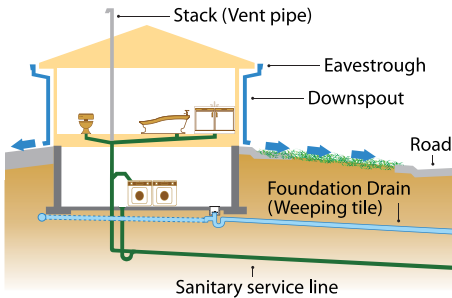
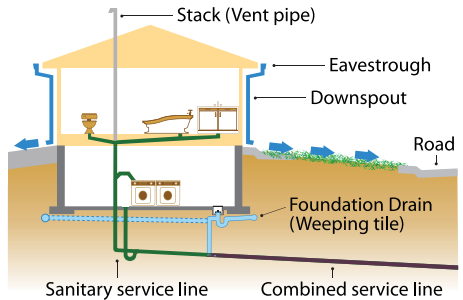


Figure 3:
Stormwater and sanitary system in older homes



have, or need, sump pits. In newer Moncton neighbourhoods, homes have separate sanitary and stormwater lines. In these homes, roof downspouts drain to the surface. The stormwater line sends foundation drain water to Moncton’s stormwater sewer pipe system. The sanitary line sends household waste water to Moncton’s sanitary pipe system.

The City of Moncton does not permit direct connection of residential roof drains and eavestrough downspouts to the foundation drain (weeping tile), the storm sewer line, the sanitary sewer line, or the combined sewer line. Residential roof drains and eavestrough downspouts must be discharged to the surface (See Figures 2 and 3).

Municipal drainage system

The sanitary service collects solid waste and 'grey' water and sends it to the Greater Moncton Sewerage Commission for processing. Here, the solid waste is removed and the water cleaned before being released into the Petitcodiac River.

The stormwater service collects rainwater and snowmelt and channels it via pipes or overland routes to lakes, creeks, ravines, or directly into the Petitcodiac River or one of its tributaries.

A combined sewer system exists in Moncton neighbourhoods built before the mid-1960s. The combined sewer system collects both sanitary and stormwater in the same pipe and sends it to the Greater Moncton Sewerage Commission for processing.

Today, roughly 43% of all homes in Moncton are serviced by a combined sewer service.

Moncton gets about 43 inches (1223 mm) of precipitation each year. Most of this comes in the form of summer and fall thunderstorms, any one of which can drop a large amount of water in a concentrated area in a short period of time.

When a major rainstorm hits, the huge volume of water that occurs can overwhelm drainage systems and cause flooding. Snow poses a similar threat in the spring if there is a rapid snowmelt.

During a rainstorm, the demands on your home drainage and the municipal drainage systems increases dramatically. The condition and capacity of these systems are equally important in managing wet weather. Blocked or broken pipes, poor lot grading, tree roots and other factors can restrict the flow of water, substantially increasing the risk of flooding.



Chapter 2

Why Homes flood

In Moncton, the current municipal stormwater drainage system design standard is to design for the five-year storm. This means the system can handle any typical rainstorm but could have its capacity exceeded, on average, once every five years. This is based on local historical weather patterns. The municipal sanitary system design standard ratio is more stringent. Its capacity is based on sewage flows, plus a small allowance for water that gets into the system during wet weather.

When the volume of stormwater exceeds the municipal storm system's capacity, surface flooding occurs. Some of this excess storm water finds its way into the sanitary system. This creates added pressure on sanitary sewer pipes, including sanitary lines from homes. To protect homes as much as possible, since 2009 the City of Moncton requires that each new home have a backwater valve to protect against sewer backup on the sanitary line (see City of Moncton by-law P-102.4).

Lot grading should slope down and away from the house by at least 4-6 inches (10-15 centimetres) (see diagram on page 16). Also, downspout extensions or splash pads (to direct water away from a house's foundation), window wells (where required) and foundation drain (i.e. weeping tile) directly connected to the storm sewer line outside the foundation are recommended. Often, homes that flood are missing one or more of these components or the components are found to be in poor working order. The location of a home can also make a difference. For example, homes built in low lying areas or next to creeks, lakes, ponds or marshlands have a greater flood risk, as surface and groundwater will naturally drain to these areas. Other flood risk factors include lot elevation, style of home, servicing elevation, surface conditions and water drainage from neighbouring properties. Homeowner behaviour during a storm can also increase the risk of flooding. For example, washing clothes, taking a shower, running the dishwasher and flushing your toilets adds water to a system that may already be overloaded. The water may have nowhere to go but up your floor drain and into your basement. This is particularly true if you have a backwater valve. The backwater valve is designed to close during extreme conditions and keep outside water from getting in. When this happens, water from the inside also can't get out.

Many people forget to put their downspout extensions down before it rains. A long downspout extension is of no value when it's propped up against the side of the house. If you have a sump pump, double check to see that it is plugged in and the breaker is on during a storm. More than one homeowner has searched for the cause of a flooded basement only to discover the sump pump lacked the power to perform.

Five quick, inexpensive ways to get you started

An assessment of your home drainage system may have pointed out a number of deficiencies. So where do you start? Here are some quick, inexpensive actions you can take that will make a difference in reducing your flood risk.

1 Plug the leaks.

A ladder, silicone, and time are all you need to seal holes or cracks in your eavestroughs, downspouts, extensions, walkways, patio and driveway.

2 Repair or replace downspout extensions.

This might be a matter of simply putting down the extension that's already there or putting back the splash pad. Purchasing and installing extensions or splash pads is inexpensive but very important in getting water away from foundation walls.

3 Clean your eavestroughs and downspouts.

The downspout extensions have little value if leaves, and other debris are preventing water from getting down the downspout. A gloved hand (or garden spade), ladder and garden hose are what you need to get the job done.

4 Backfill under steps and decks.

This is often the weak spot in lot grading. Dirt and some shovel work is all it takes to fill the depression and get the ground sloping downhill away from the house again.

5 Top up sunken areas around the foundation.

Ground around your basement settles over time. Raising that up with some dirt and shovel work will re-establish a positive grade again at little or no cost. You should maintain an 8-inch clearance below exterior siding when adjacent to the foundation wall.

Chapter 3

Eavestroughs and downspouts

On any property, the first point of defence in dealing effectively with rapid snowmelt or a rainstorm is the eavestroughs and downspouts. Just 0.4 inches (10 mm) of rain on the roof of an average sized bungalow generates 1,200 litres (264 imperial gallons) of runoff. Catching water from the roof and directing it away from the foundation walls of the house are critical factors in keeping your basement dry. Eavestroughs, also known as rain gutters, are located directly below the roofline of your home. Eavestroughs catch roof runoff and channel it to downspouts that are normally located at the bottom corners of the roof. Also, using rainbarrels to collect rainwater for watering your plants and lawn can reduce your water bill.

The standard residential eavestrough or downspout is four or five inches wide. They are made of plastic or aluminium but plastic is more commonly used, as it is sturdier and easier to work with. They come in one standard length but can be easily cut to the desired size. Elbows, end caps, T's and straight connectors are all pre-cast so any roof size or shape can be accommodated.

Eavestroughs and downspouts should be cleaned regularly of leaves and debris so water flow is not blocked. Special hard mesh screens can be purchased to sit on top of eavestroughs to prevent leaves and large objects from entering. You can test the effectiveness of your eavestroughs by pouring water at the end furthest away from the downspout. If water leaks out or pools at any point you need to clean, repair or replace it.

Eavestroughs should direct water on a gentle slope down towards the downspout. Use a level inside the eavestrough to check that the downhill grade is consistent from one end of the eavestrough to the downspout. Sometimes a sagging eavestrough can be repositioned to prevent pooling and re-establish the grade. If this is not possible, replace it.





Eavestrough leaks typically occur at joints. Fortunately, they can be repaired quickly and easily with silicone. Silicone comes in a tube and is usually clear or white. Once dry, it is water resistant and stands up well to extreme temperatures. When repairing a leak, do it from the inside of the eavestrough. Make sure the surface is clean and dry before applying the silicone.

The eavestrough should be replaced if the leak is from a large hole or crack. When replacing an eavestrough or downspout, make sure to seal all connector joints and end caps with silicone.

Downspouts are hollow pipes that take water from the eavestrough and channel it to the ground. Ideally, the downspout should end in an elbow and extension that directs the water 1.8 metres (six feet) away from the house and towards the street or back lane. The extension should be at a 30 degree or more angle in relation to the ground. In Moncton, it must end at least 6 inches (15 centimetres) inside your property line. Be kind to your neighbours—make sure the water is not directed onto your neighbour’s property. Also, you are subject to a fine of up to \$1070 if you cause or permit water to flow over or onto any street.

Professionals use downspout material for extensions. This is preferred because they are durable and very effective in channelling water away quickly. Leave the extension down all of the time or put it down whenever rain is forecast. An alternative to hard downspout



material is a soft plastic extension. This type of extension rolls out when it rains and can be purchased at home improvement stores. Any extension should be checked regularly for leaks and to ensure that it is functioning properly.

Some side yards are too narrow to allow for a long downspout extension. In these cases, splash pads should be used. Standard splash pads are two feet long, are made of concrete or plastic, and are bolted or hung on the side of the house at a 30 degree angle. The downspout ends within a few inches of the splash pad, which in turn directs the water away from the foundation of the house.

Downspout extensions or splash pads should never be removed. They protect you from a number of potential problems. Water along the foundation walls of your house can seep through tiny cracks and cause a damp, clammy basement. Left unchecked, this can eventually damage the foundation of your house.

Water that seeps down your foundation walls and into your foundation drain (i.e. weeping tile) can overload the combined or storm sewer sewer system, causing a sewer backup.

It may create extra work for your sump pump, if you have one, and could cause pump failure under severe conditions.

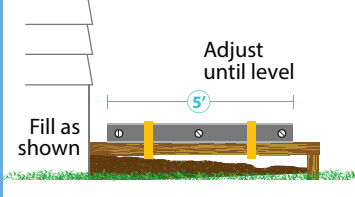
Chapter 4

Improving lot grading

Good eavestroughs, downspouts and extensions help make your outdoor drainage system better but it can't make up for poor lot grading. Proper lot grading is one of the most important things you can do to prevent storm water from getting into your home. Since 2001, the City of Moncton has required every new home to have an approved lot grading plan as well as a drainage agreement.

Lot grading starts at your foundation wall. Walk around your home and measure the slope from the wall. This includes under stairs, steps and decks. The dirt or sod should slope down from the wall at a continuous angle for at least five feet (1.5 metres). If the surface is decorative rock, bark or another porous material that lets water through easily, take the measurement from where the dirt begins.

The soil at your basement wall should be at least 6 inches (15 cm) higher than the ground five feet (1.5 metres) away. Use a slope gauge (see box) to see if the angle of the slope is adequate.




Homemade slope gauge

It's easy to make a slope gauge. Cut a 2 by 4 inch piece of lumber into one five feet in length and one six inches in length. Place the shorter piece vertically on end. Place the longer piece horizontally on top. Nail or screw the end of the horizontal piece onto the end of the shorter piece. Tie or place a level on top of the horizontal piece and you are ready to go!

Place the long end of your slope gauge against the basement wall and the shorter end on the ground. The horizontal board should be level. If it is not, add soil at the basement wall until level is achieved.

Once it is level, fill in the space underneath the slope gauge all the way to the end. Use this as a guide for backfilling all the way around your home. Pack down the soil with a shovel or your foot. Check every 5 to 6 feet (1.5 - 2 metres) with your slope gauge to make sure the angle is still



right. It's important to backfill underneath your stairs, steps and decks as well. Use the same angle as around the rest of the house even if the bottom stair or step is less than five feet from the basement wall.

Window wells

Window wells should be used where the bottom of a basement window is at or near ground level. They not only allow for proper grading but they also prevent dirt from rotting window sills. A window well is a U-shaped ribbed, light metal or plastic product that can be purchased in most hardware stores. They come in various widths and heights so measure your window before buying. Note that basement bedroom windows must meet egress requirements of the National Building Code.

Remember: Ground settles over time particularly near basement walls. You should check your grade every year and add soil where necessary.

The outer edges of the window well should surround the window and be tight against the basement wall. The bottom of the window well should be at least a foot below the bottom of the window sill. The area inside the window well should be cleared of dirt and backfilled with loose gravel or rock. This should be done from the bottom of the well from 3-6 inches (8 to 15 centimetres) below the bottom of the window sill. This will allow water to easily drain and filter down to the foundation weeping tile. The dirt or sod on the outside of the window sill should be graded like the rest of the house. Window wells should be installed according to the manufacturers specifications or good building practices. And, a new window well requires a 4-inch (10-centimetre) vertical drain to be connected to the foundation drain.

In some cases, houses may have existing window wells that don't drain properly. In extreme situations, a pipe may have to be inserted that runs directly from the bottom of your window well towards your foundation drain (weeping tile). Seek the advice of a professional before doing such work.

Be kind to your neighbours

The sloping of your lot must follow the same rules as downspout extensions (see Chapter 3). Water should be directed to the street, and not into your neighbour's yard. This can be tricky when the space between houses is narrow. One solution is for you and your neighbour to create slope along a common property line. This creates a swale that can then channel water towards the alley or the street.

However, your property may not allow for this. For example, you may have a retaining wall or high ground at the property line. In such cases, you can create an internal swale. This means having a slope from the house and a slope from the high ground meet in the middle of the yard. This swale can then be directed to channel water towards the alley or the street. In some cases, a neighbour's property may have the right grading but be lower than yours. A retaining wall along the property line is a good solution to this problem. This can be done in front of an existing fence or other feature you don't want disturbed. The wall allows you to create an internal swale that can safely channel water away.

It is always best if neighbours can discuss and resolve lot grading issues together. City of Moncton Building Inspection and Engineering Departments can investigate complaints or concerns about surface water drainage. They also will visit your home if you have any doubts about what to do about lot grading.

Chapter 5

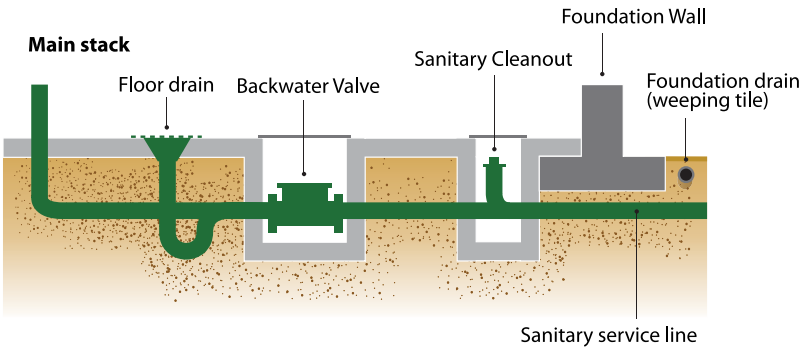
Backwater valves, weeping tile and sump pumps

Flood protection devices like backwater valves and sump pumps can be valuable home drainage assets but not everyone needs one. Consider your entire home drainage system, what type of home you have, where you live, method of servicing and your flooding history before rushing out to buy and install these devices.

Backwater Valves

A backwater valve is located on a home's sanitary sewer line just inside the foundation wall. Its job is to prevent sewage from returning back up a sanitary sewer line and entering the basement. It is an effective last line of defence and is recommended for all homes that are at risk of sewer backup.

BACKWATER VALVE INSTALLATION



Note: Conceptual process only. May vary with each home.

There are two types of backwater valves. Both work well, but it is important to install the right one. The sanitary sewer line entering a home needs a vented or normally-open backwater valve. Branch lines coming off the sanitary line that are in the basement and below street level require a normally closed backwater valve. You may need more than one backwater valve depending on your home's internal plumbing. A licensed plumbing contractor can test your system and recommend the correct installation.

During a rain storm, sanitary wastewater trying to flow back into a home causes the backwater valve to close its flap. This action prevents sewage from re-entering the home, but it also means water from inside your home can't get out until the valve reopens. This is known as "lockout". Backwater valves need be cleaned and maintained to work properly (Chapter 6). Also, older backwater valves have metal flaps. These can corrode over time and begin to stick. Once this occurs, they should be replaced with a valve that has a plastic flap. A qualified plumber can check to see if an existing backwater valve needs repairing or replacing.

Remember: When the valve closes the sanitary sewer line, you should not use the toilet, sink, shower, washer, dishwasher or any other element that discharges wastewater. The wastewater will have nowhere to go except up the floor drain and into your basement.

Foundation Drain (commonly known as weeping tile or drain tile)

Weeping tile is a perforated plastic pipe that surrounds the foundation of a home. It sits on undisturbed soil and is covered with crushed stone. This allows excess groundwater to seep into it. In older homes, this water is channelled to a sump pit. In newer homes, this water is channelled to the storm sewer line outside the foundation wall (refer to National Building Code of Canada, section 9.14.2.1).

Some homes built in Moncton's oldest neighbourhoods do not have weeping tile. This may not be a concern if other drainage elements like eavestroughs, lot grading, etc., are in good condition. Positive drainage away from the home is another factor that can prevent flooding.

Installing or repairing weeping tile is expensive but necessary in some cases. For example, weeping tile that is collapsed or clogged by debris should be repaired to prevent damage to the foundation and basement walls. You should seek professional advice including a video inspection from a licensed plumbing contractor before making any decisions.

Please note: Adding drainage components like a backwater valve and weeping tile requires a plumbing permit from the City of Moncton Building Inspection Department. Call 856-4375 for more information.

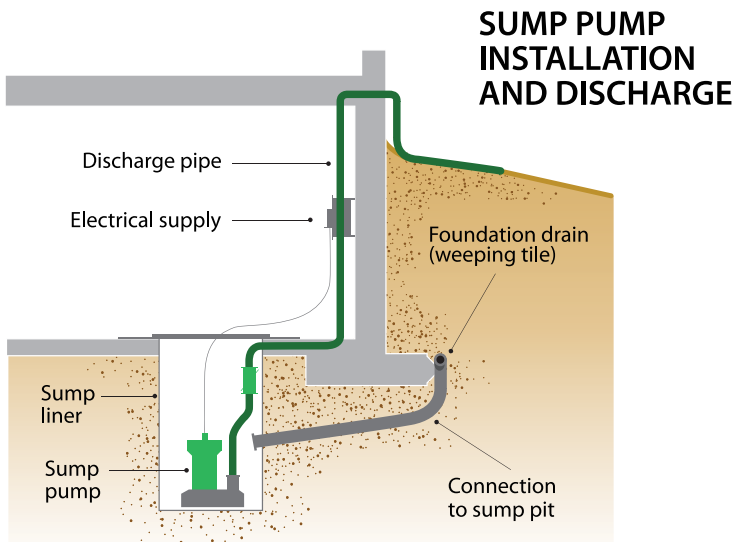
Sump pits and pumps

The majority of homes built before 1988 have a sump pit. A working sump pump can also play an important part in flood prevention, pumping groundwater to the surface and away from the home. *Note that pits in serviced areas have no pump but drain by gravity.* If your home was built before 1988, you should be aware of the condition of your sump pump and whether it needs replacing. A good quality sump pump should last around 10 years, depending on how often it is working and the acidity and dirtiness of the water.

So, how can you find out whether you need a new pump? And, if you need to replace it, what should you look for in a new pump? Check the yellow pages in your phonebook under pump repairs.

Finding and testing your sump pump

Different manufacturers have different recommendations for testing and maintaining your pump. Some recommend running the pump every two to three months, others recommend a yearly test. Follow any recommendations provided by the manufacturer. The pump should be located in a shallow pit (or sump) at the lowest point in your basement.





Once you've located the sump pump, you can perform a simple 3-step test to ensure your sump pump is working properly:

- 1** Check to make sure power is running to the pump.
- 2** Pour enough water into the sump pit in order to trigger the ball float that starts the pump.
- 3** Check the pump discharge to ensure that water is flowing from the sump pit to the discharge line outside your home. In some cases, the pump may seem to run but not pump water.

If you test the pump and it is not working properly:

- ✔ Check for debris blocking the pump intake.
- ✔ Listen for strange noises coming from the motor.
- ✔ Check for oil in the sump pit (may indicate a failed pump seal).
- ✔ If the activating switch for the pump works on a ball float, check if this ball float is not restricted.

Depending on the problems you encounter, you may want to consider getting your sump pump serviced or replaced. **Caution: Maintenance should be done by a licensed plumbing contractor.**

Other factors

Freezing: If your pump is operating during freezing weather there is a risk of freezing and line blockage. To prevent problems it is best to disconnect outside hoses prior to winter.

Recycling: If water from your sump hose discharges too close to your foundation, the water may recycle and end up back in your system, possibly endangering your foundation.

What to look for when replacing your sump pump

There are some basic criteria for choosing a pump: size or capacity, pump type and horsepower. There are other factors specific to your home that may also influence your choice of pump, such as the volume of water your drainage system has to handle or the amount of grit in the water. In the end, you have to balance your needs with how much you want to pay. You can buy a cheaper pump but it may not perform as long or as well. A higher quality pump may provide a better level of service.

Horsepower (hp)

- Minimum 1/3 hp recommended.

Size/capacity/performance

- Make sure to size your pump properly to ensure greatest efficiency.
- Get information on the pump capacity (the amount of water pumped in gallons per minute) and the height and distance the water needs to travel (referred to as “head”).
- To avoid clogging, the pump should be able to pass stones of up to 0.4 inches (10 millimetres) through the pipes.
- Pumping head should be a minimum of approximately 10 feet (3 metres).
- Discharge line should be a minimum 1 1/4 inch (3.175 centimetre) pipe and should include a check valve.

Pump type, back-up systems and alarms

- Common types: submersible and pedestal.
- Submersible is most common.
- Pedestal type may be better in highly corrosive areas.
- It is a good idea to have a back-up system (battery) or an alarm to warn you if your pump fails.

Quality

Pumps are tested against general standards and rated accordingly. Before purchasing a pump, check whether the pump meets standards such as the CAN/CSA 22.2 No. 108 “Liquid Pumps”. This information is available on websites such as www.ul.com.

Sump pit requirements

If your sump pit is incorrectly sized, it will affect the operation of the pump. The pump is most efficient when it is working at its optimal flow rate, based on the capacity of the pit. The 2005 National Building Code of Canada (section 9.14.5.2) sets out minimum requirements for sump pit size:

Pit depth: 29.5 inches (750 mm)
 Pit area: 2.69 ft² (0.25 m²)

A sump pit cover is required, and should be child-proof.

Purchasing checklist

(use to compare models you are considering for purchase)

Feature	Minimum requirement	Model	Model	Model
Horsepower (hp)	rated 1/3 hp			
Pump capacity (gallons per minute)	specific to each home			
Pump head (sump level to pipe exit from home)	approx. 10 to 12 ft. (3.04 to 3.65 m)			
Solids handling	allows stones up to 0.4 inches (10 mm) to pass			
Discharge line size	1.25 inch (31.75 mm) pipe			
Check valve	recommended Code A-2.4.6.3			
Back-up system / alarm	recommended			
Warranty	generally 1-2 years			
Approved by Canadian Standards Association	recommended			

Chapter 6

Maintaining your home drainage system

Regular maintenance of your home drainage system can make the difference between staying dry or being flooded. Once a year, it's a good idea to evaluate the condition of your system – inside and out. If you find a problem, make fixing it a priority.

Remember: Most flooding on private property is caused by the failure of one or more home drainage elements.

This chapter provides a maintenance checklist you should review each year. If you are unsure of what to do, call a professional.

Outside

Eavestroughs & downspouts

- Clean leaves and debris from inside eavestroughs and downspouts.
- Tighten elbows and other connections.
- Caulk and seal any leaks.
- Repair or replace sagging, badly dented or cracked sections.

Splash pads & extensions

- Reconnect any loose pads or extensions.
- Replace badly dented extensions.
- Check soft plastic, roll out extensions for leaks and to determine if they work properly.

Lot grading

- Check the slope from the basement wall. Verify backfill is minimum 8 inches (20 centimetres) in depth below the top of the foundation wall.
- Check for settling, particularly under stairs and decks.
- Raise any low spots.
- Look for cracks or spaces on driveways, walkways and patios that are next to the foundation wall. Caulk or waterproof where needed.



Inside

Foundation walls

- Check for moisture along the walls and the floor.
- Fill and seal any visible cracks.

Sump pump

- Check for power.
- Test the pump by pouring water into the pump well.
- Check the outside pipe to confirm water is flowing to the street or back lane.
- Check and repair any leaks in the sump pump pipe.

Backwater valve

- Open the top and clean out any debris.
- Check the flapper. Make sure it is moving freely.



Backwater valve

Chapter 7

Protecting Your Home's Storm and Sanitary Sewer Lines

The City of Moncton has implemented a residential building by-law (P-209.3.1) that requires all new sanitary sewer lines to be fitted with a normally-open backwater valve to protect against sewer backup from the street sanitary pipes into a building. The National Building Code of Canada also requires residential foundation drains (weeping tile) to be connected to the storm sewer line outside of the basement to protect against storm sewer backup and eliminate the need for a sump pit. External foundation drain connections and eliminating the need for a sump pit are relatively new requirements. Some older homes in the city have foundation drains connected to the sump pit and internal storm line connections. These older style connections do not offer a high level of protection against storm sewer backup, or excess of groundwater through the foundation drain.

Homeowners in older homes with these type of connections face some unique challenges in terms of protecting their homes against flooding. However, there are a number of precautions they can take to reduce the likelihood of basement flooding due to sewer backup, or excess of groundwater through the foundation drain. If this is your situation, we recommend you contact an experienced licensed plumbing contractor to assess your home's needs, as there are a number of different connection methods.

To help you have an informed conversation with a licensed plumbing contractor, this section provides some guidelines to assessing your home's situation.

Floor Drains
N.P.C. - Section 2.4
Connection 2.4.2.1 (B+C)

I. Combined Sewer Line with Sump Pit

The oldest style of residential service connection is the combined sewer line. In this configuration, groundwater enters the sump pit through the foundation drain (see Figure 1A). When an adequate water depth is reached in the sump pit, the groundwater drains out through the floor drain into the combined sewer line. In the case of sewer backup, the floor drain fills the sump pit due to a flow reversal. In the case of foundation drain flooding, groundwater enters the sump pit faster than it can drain out. Either condition may lead to basement flooding.

Figure 1A

EXISTING COMBINED SEWER LATERAL WITH SUMP PIT

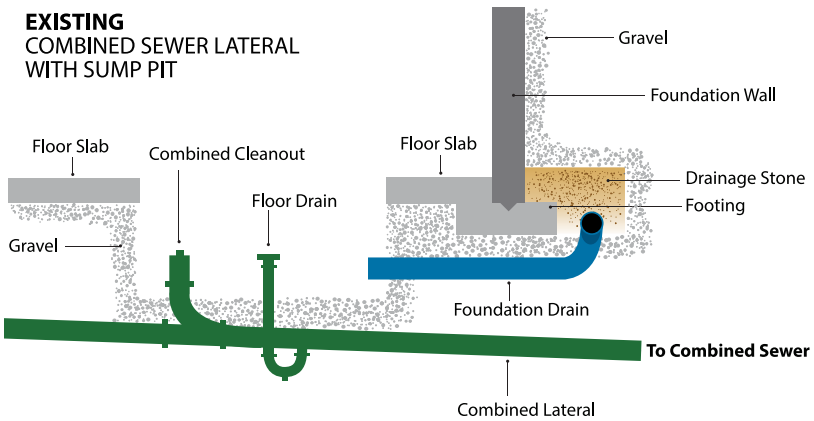
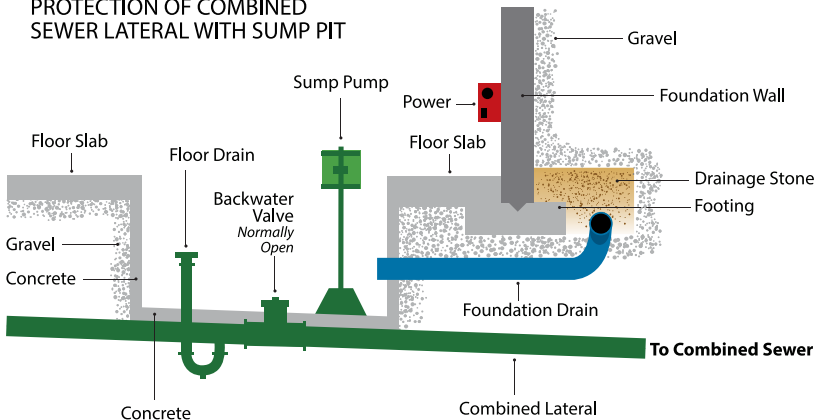


Figure 1B

RECOMMENDED PROTECTION OF COMBINED SEWER LATERAL WITH SUMP PIT



A few simple steps can reduce the likelihood of basement flooding by providing some additional protection to the combined sewer line (see Figure 1B).

1. Install a normally-open backwater valve on the combined sewer line in the sump pit between the foundation wall and the floor drain to protect the floor drain against sewer backup.
2. Relocate the floor drain as necessary to ensure that the backwater valve protects the floor drain.
3. Install a sump pump to ensure that groundwater entering the sump pit can be pumped out when the backwater valve closes.
4. Provide a stand-by power unit to ensure that the sump pump operates in the event of a power service interruption.
5. Pour a concrete floor and sides in the sump pit to prevent radon gas from venting and accumulating in the basement.

II. Separate Sewer Lines in Sump Pit – Floor Drain on Storm

In this configuration, groundwater enters the sump pit through the foundation drain (see Figure 2A). When an adequate water depth is reached in the sump pit, the water drains out through the floor drain into the storm sewer line. In the case of sewer backup, the floor drain fills the sump pit due to a flow reversal. In the case of foundation drain flooding, groundwater enters the sump pit faster than it can drain out. Either condition may lead to basement flooding.

A few simple steps can reduce the likelihood of basement flooding by providing some additional protection to the storm and sanitary sewer laterals (see Figure 2B).

1. Install a normally-closed backwater valve on the storm sewer line in the sump pit. (Coordinate with the backwater valve program.)
2. Install a normally-open backwater valve on the sanitary sewer line in the sump pit between the foundation wall and the floor drain to protect the floor drain against sewer backup.
3. Install a sump pump to ensure that groundwater entering the sump pit can be pumped out when the backwater valve closes.
4. Provide a stand-by power unit to ensure that the sump pump works in the event of a power service interruption.
5. Pour a concrete floor in the sump pit to prevent radon gas from venting and accumulating in the basement.

Figure 2A

EXISTING
SEPARATE LATERALS WITH
SUMP PIT - DRAIN ON STORM

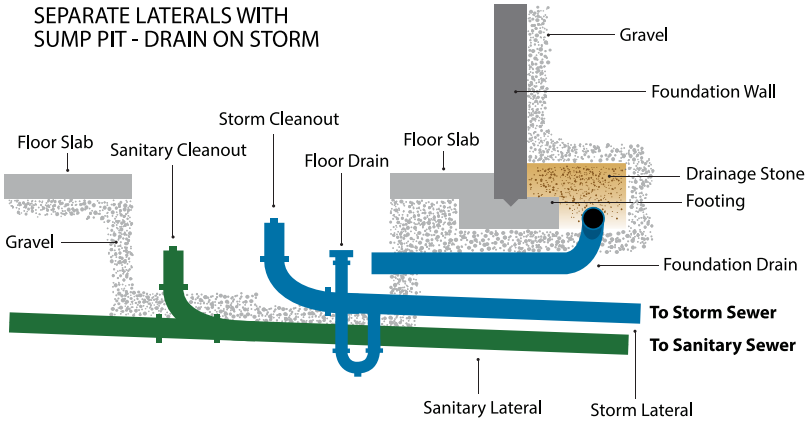
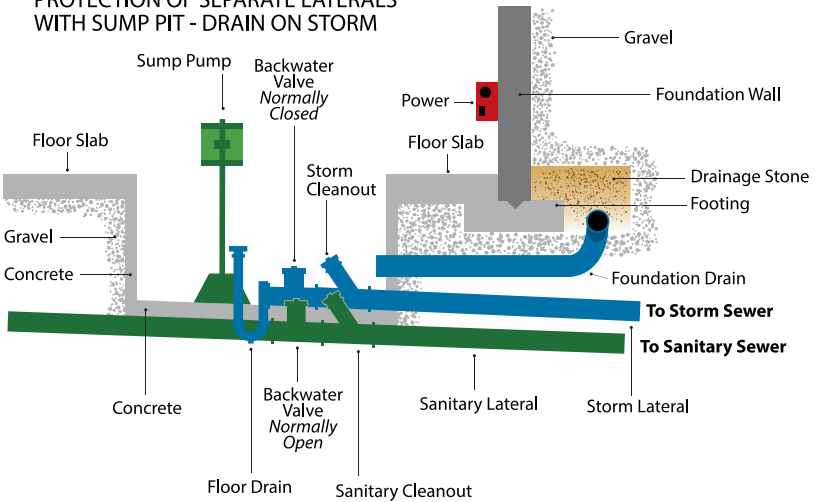


Figure 2B

RECOMMENDED
PROTECTION OF SEPARATE LATERALS
WITH SUMP PIT - DRAIN ON STORM



III. Separate Sewer Lines with Sump Pit – Floor Drain on Sanitary

In this configuration, groundwater enters the sump pit through the foundation drain (see Figure 3A). When an adequate water depth is reached in the sump pit, the water drains out through the floor drain into the sanitary sewer line. In the case of sewer backup, the floor drain fills the sump pit due to a flow reversal. In the case of foundation drain flooding, groundwater enters the sump pit faster than it can drain out. Either condition may lead to basement flooding.

A few simple steps can reduce the likelihood of basement flooding by providing some additional protection to the storm and sanitary sewer laterals. (see Figure 3B).

1. Install a normally-closed backwater valve on the storm sewer line in the sump pit.
2. Install a normally-open backwater valve on the sanitary sewer line in the sump pit between the foundation wall and the floor drain to protect the floor drain against sewer backup.
3. Install a sump pump to ensure that groundwater entering the sump pit can be pumped out when the backwater valve closes.
4. Provide a stand-by power unit to ensure that the sump pump operates in the event of a power service interruption.
5. Pour a concrete floor in the sump pit to prevent radon gas from venting and accumulating in the basement.

Figure 3A

EXISTING
SEPARATE LATERALS WITH
SUMP PIT - DRAIN ON SANITARY

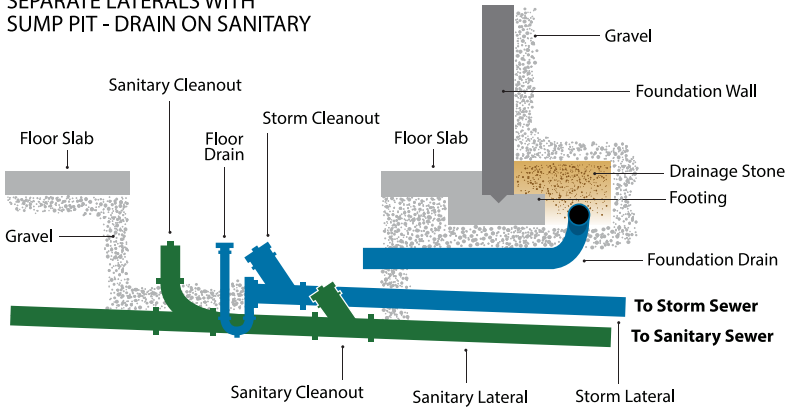
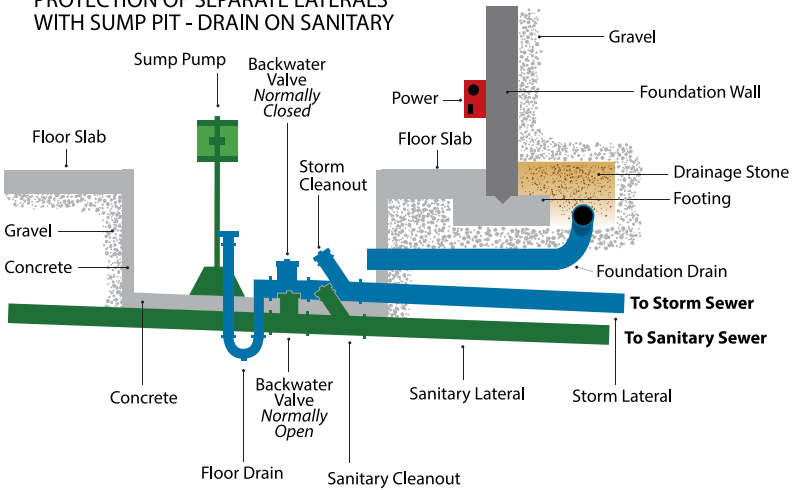


Figure 3B

RECOMMENDED
PROTECTION OF SEPARATE LATERALS
WITH SUMP PIT - DRAIN ON SANITARY



IV. Separate Sewer Lines – No Sump Pit – Floor Drain on Sanitary

This is the current standard of residential service connections in effect since approximately 2000. In this configuration, groundwater enters the foundation drain and is directly connected to the storm sewer lateral outside the foundation (see Figure 4A). In the case of sewer backup, the floor drain actually fills the basement due to a flow reversal. Elimination of the sump pit removed the threat of foundation drain flooding.

A few simple steps may be taken by the homeowner to reduce the likelihood of basement flooding by providing some additional protection to the sanitary sewer lateral (see Figure 4B).

1. Install a normally open backwater valve on the sanitary sewer lateral between the foundation wall and the floor drain to protect the floor drain against sewer backup. A new pit to act as the valve chamber must be cut into the concrete floor.
2. Pour a concrete floor in the valve chamber to prevent radon gas from venting and accumulating in the basement.

Figure 4A

EXISTING
SEPARATE LATERALS WITHOUT
SUMP PIT - DRAIN ON SANITARY

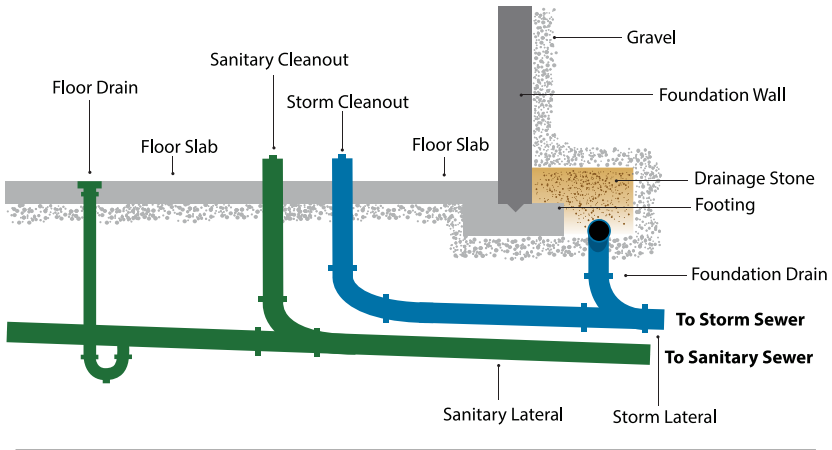
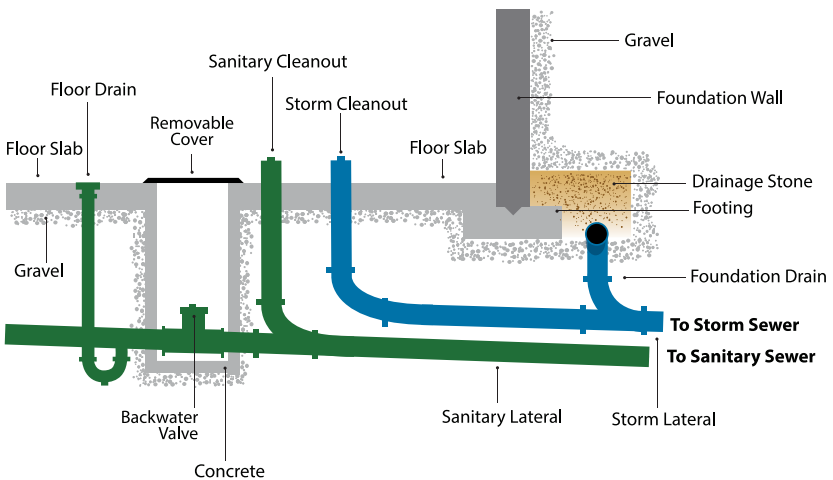


Figure 4B

RECOMMENDED
PROTECTION OF SEPARATE LATERALS
WITHOUT SUMP PIT - DRAIN ON SANITARY



Chapter 8

Helpful resources

City of Moncton

moncton.ca

City of Moncton Building Inspection Department

Tel: 506-856-4375

Email: info.inspection@moncton.ca

City of Moncton Engineering and Environmental Services Department

Tel: 506-853-3525

Email: info.engineering@moncton.ca

Hiring a Professional

Look up 'plumbing' in the Yellow Pages. It is recommended you obtain several quotes and ask for references.

Glossary

Backwater Valve

A backwater valve is located in a house's sanitary sewer line. The valve closes under pressure, preventing sewage from flowing back up the line and back into the home.

Catch Basin

A catch basin collects stormwater from the street through an open metal grate and channels it to an underground stormwater pipe. Below street level is a trap where sand, gravel and other material is captured for removal.

Combined Sewer Line

A combined sewer collects both stormwater and wastewater in the same pipe. Combined sewers are no longer built in Moncton.

Downspout

A downspout is a length of pipe that is connected to an eavestrough and runs vertically from the roof to the ground.

Downspout Extension

A downspout extension is a length of pipe that is connected to the bottom of the downspout and runs at a downward angle away from a building.

Dry Pond

A dry pond is a man-made depression developed in parkland or recreation areas to capture surface runoff during major rainstorms.

Eavestrough

An eavestrough is attached directly below the roofline. It collects stormwater from the roof and channels it to a downspout.

Grey Water

Grey water is liquid wastewater.

Internal Swale

A swale is a shallow channel designed to direct water off a property.

Line

For the purposes of this Guide, 'line' refers to a house's sanitary, storm or combined service laterals (or pipes).

Lot Grading

Lot grading refers to the way in which the surface of a property is sloped, particularly from the walls of a building to the property line.

Manhole

A manhole is the top opening to an underground utility vault used to house an access point for making connections or performing maintenance on underground and buried public utility services including sewers etc.,

Pipe

For the purposes of this Guide, 'pipe' refers to the City of Moncton owned water and storm, and sanitary or combined pipe system.

Rain Gutter

A rain gutter is another name for eavestrough.

Sanitary Sewer Line

The sanitary sewer line collects solid waste and grey water from homes and businesses and directs it to a sewage treatment plant for treatment.

Slope

A slope is any inclined portion of ground or earth that directs water in a specific direction.

Splash Pad

A splash pad is a concrete or plastic channel that can be attached to the side of a building and sits at an angle under a downspout. It channels stormwater from the downspout away from the building.

Stormwater

Stormwater means any surface runoff that is the result of natural precipitation or snowmelt.

Stormwater Retention Pond

A stormwater retention pond is a man-made body of water that is designed to collect and contain stormwater from a surrounding area.

Stormwater Sewer Line

The stormwater sewer line collects groundwater from the foundation drain (weeping tile) via pipes to creeks, ravines, dry ponds, stormwater retention ponds or the Petibodioc River.

Sump Pit

A basement sump is a hole in the ground under the basement floor that collects excess groundwater from the foundation drain (weeping tile) or surrounding soil.

Sump Pump

A sump pump is a motorized mechanical device that pumps excess water from a sump pit to the surface.

Swale

A swale is a shallow, sloped indentation in the ground that channels water in a specific direction.

Drain Tile or Pipe / Foundation Drain / Weeping Tile

Weeping tile is a perforated pipe that surrounds the foundation of a home and collects excess groundwater. In some homes, this excess water is released to a sump pit.

Window Well

A window well is a corrugated metal or plastic U-shaped product that surrounds a basement window at or below ground level. Installation allows for proper lot grading around the basement window.

Flooding caused by heavy precipitation, melting snow, or runoff may pose problems for all kinds of properties. Older and newer houses may be at risk for flooding if proper precautions are not taken. The City encourages all builders and homeowners to take preventive measures to avoid flooding. This booklet contains information on:

- Why homes flood
- Protecting your home from flooding
- Eavestroughs, downspouts and weeping tile
- Pipes, sump pumps and backwater valves
- Improving lot grading
- Maintaining your home drainage system
- Protecting your home's sewer lines