DEALING WITH BASEMENT SEEPAGE

INTRODUCTION: Recent surveys from Valparaiso residents reveal that around 57% of them experience some type of drainage problem related to seepage. This is the condition where water enters the basement, crawl space, or, in extreme circumstances, the home, through the foundation walls. If you experience this problem, the following information is intended to help you make corrections.

CORRECTIVE EFFORTS: While some sources tell us that “there are no truly waterproof houses” (2) and “over 90% of all basements will leak and suffer damage at one time or another” (3), all is not lost. There are some methods to greatly mitigate problems with basement or crawl space seepage/leakage. They are:

**Gutters:** If your house does not have gutters to catch the runoff from the roof, that runoff will fall against or very near your home’s foundation. From this point it is very easy for it to seep through the soil to reach the basement wall. Don’t give that water a chance. Get it collected and contained in gutters. Keep the gutters clean and free of leaves and other debris.

**Downspouts:** The downspouts that carry the runoff from the gutters must discharge at a reasonable distance from the house. Reasonable might be anywhere from 4’ to 10’ depending on circumstances such as the slope of your yard. The intent is to get the water away from the home’s foundation and basement wall as quickly as possible.

**Ground Slope:** The ground surface on your lot should slope away from the house in all directions, preferably to the lot lines, but for at least a minimum of 10’. The amount of drop in 10’ should be no less than 6 inches; more is better especially closer to the house. This applies to not only your lawn area but also sidewalks, patios, and driveways. If these surfaces slope towards the house it serves to direct runoff towards the house itself or the disturbed soil at the foundation. Again, from this point it is easy for the water to sit against the wall until it soaks into the soil and heads for the basement or crawl space.

Be especially careful around landscape beds and areas between the house and drive or sidewalk. These can be trouble spots where water collects during a rain.

**Foundation Drain:** Many houses in Valpo have a footing drain, especially those with basements. If the house is older the drain may break or become plugged with accumulations of silt or other debris. In this case, or if no drain exists, you may have to construct a new one. This is
quite expensive as it requires excavating around the perimeter of the house down to the level of the footing. On an existing home this work may have to be accomplished manually as equipment might not be able to operate that close to the foundation. If you decide to go to this effort and expense be sure to make sure the moisture barrier (foundation tar) on the basement or foundation wall is in good shape before the excavation is backfilled. Or, you may want to install a commercially available material that acts more like a true waterproofing. You will also require a means to get rid of the accumulated water in the drain. Unless you have a gravity outlet available, this will require a sump pump. Do not connect a foundation drain into the sanitary sewer.

There are commercial systems available to install modified perimeter drains on the interior of a basement. If the leakage/seepage area is localized this may be a cost effective way to address the problem. These systems also require a sump pump to discharge the accumulated water to a suitable location.

**Sump Pump:** While there may be unique circumstances where a sump pump is not required, virtually every home with a basement in Valparaiso, in our opinion, will require one sooner or later.

If your home does not have one and you have seepage/leakage problems, consider having one installed after you’ve completed the remedies listed above. Ideally it should be connected to the foundation drain to be able to relieve the water pressure outside the basement walls, although some are not. Do not connect the discharge from the pump to the sanitary sewer. Instead, run the discharge pipe into the yard at some point where the runoff can drain away.

For additional information, please go to the city website at [www.ci.valparaiso.in.us](http://www.ci.valparaiso.in.us). Go to the City Services window and click on Stormwater.

*This pamphlet was prepared on behalf of the residents of Valparaiso by the staff of the Engineering Department, Tim Burkman, P.E., Director, and Matt Kras, P.E., Storm Water Engineer. Funds for its publication were provided from Storm Water Fees, by the Board of Directors for the Valparaiso City Utilities.*
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Introduction: In September of 2008, the Valparaiso area experienced prolonged, heavy rains resulting in approximately 11 inches over a two day period. The rainfall caused many drainage problems for many of the City’s residents.

In response the heavy rains the City conducted a survey of its residents to determine the extent and types of drainage problems. 57% of those responding with a drainage problem indicated that water coming into their basements or crawl spaces through walls or floors was, at least, part of their problem(s).

This publication is intended as an informational, self-help tool for the residents to mitigate those seepage problems.

Our Soil Characteristics: The majority of Valparaiso is located on the southerly slope of a moraine, a large accumulation of different types of soil pushed ahead of the last advance of a glacier more than 15,000 years ago. The accumulation of material is called glacial till, a mixture of soil particles ranging in size from microscopic clays to boulders.

On the southerly edge of Valparaiso the moraine gives way to an outwash plain, the accumulation of soils washed from the moraine and the retreating glacier.

According to the Soil Survey of Porter County (1), the predominant soils on the higher lands in Valparaiso are Morley, Blount and Riddles silt loam. The Survey provides the following comments about those three soils:

Morley Silt Loam: An upland soil -- generally moderately well to well drained -- moderately slow permeability -- has a seasonal high water table of 3 to 6' -- has moderate limitations for dwellings with basements because of wetness and shrink/swell potential -- basements should be structurally designed -- foundation drains required

Blount Silt Loam: Somewhat poorly drained soil -- generally found on glacial till plains in the uplands -- slow or moderately slow permeability -- seasonal high water table of 1 to 3' during winter and spring -- severe limitations for building sites because of wetness -- adequate
drainage system and storm sewers required to lower water table -- water moves slowly to drainage systems because of slow or moderately slow permeability -- “dwellings should be constructed without basements”.

Riddles Silt Loam: Well drained -- moderate permeability -- moderate limitations for building sites because of the shrink/swell potential -- foundations and footing should be designed to prevent structural damage --.

Note that the soils have at least some limitations on basements. The three soils mentioned above do not include those that exist in lower areas having even greater limitations.

(see the following 8 sheets)

**Your Basement:** When the construction on your home was started a hole was excavated for the basement. In most cases the hole was in the native soil that had been in place for many years. Then a concrete foundation was placed on the exposed soil to support the basement walls. After the foundation was cured the walls were constructed and the excavation outside the walls backfilled.

In many instances the soil used for the backfill was the original native soil. As it was placed around the basement walls it typically had a characteristic that was much looser and less compacted than the original soil. Water could infiltrate through the disturbed, less dense soil more quickly than through the original soil.

We’ve learned that our predominant soils have wetness issues at least part of the year. That water tends to move along paths of least resistance and collect in depressions; in this case it may be the excavation for your basement. In simplistic terms, “YOUR BASEMENT BECOMES A BOAT IN A HOLE”.
SOILS OF VALPARAISO

The following photos are taken from the Soil Survey of Porter County, Indiana (see ref 1). The photos encompass most of the immediate Valparaiso area. The soil types are shown in the abbreviations, such as Mr (Morley), Ba (Blount) and Rl (Riddles). The letters after the names indicate the slope of the land and other characteristics. For example, RIB indicates that the Riddles soil in that location has 2% to 6% surface slopes; RIC indicates it has 6% to 12% slopes.

The survey was performed in 1971 to 1977. Since much of the city was already developed by that time the original soils had already been greatly disturbed. The soil in those areas could not be classified and are indicated by, UmB, Uc, UcG and Ue.

It's somewhat difficult to read the map in some areas because familiar landmarks are not shown on the photos. For example, the SR 49 “by-pass” was not constructed when the photos were obtained. The site of the high school was under construction and shows up as a lighter area designated as UcG. Many subdivisions we know were not yet developed. We've attempted to make it easier to find your site by adding the names of roads, etc. in red letters.

If you'd like more information about soil characteristics, a copy of the Survey is available to read at the Engineering Department at City Hall.

The following photos begin on the northwest side of Valpo and proceed to the east through 3 panels. They then continue on the southwest side and proceed to the east through 4 panels.
Virtually all basement walls in our area are some type of masonry. Most common are concrete block units or poured in place concrete. Some older homes may have brick walls or other type of building units. These walls are all pervious to moisture in varying degrees.

At present, builders are required to coat the outside of basement walls with a dampproofing compound. Most compounds are asphalt based and are troweled or sprayed onto the exterior of the wall. Note that this material is called damp-proofing or moisture proofing, not waterproofing. The material does deteriorate over time and can crack with movement of the soil, the wall, or with careless backfilling of the excavation.

If your basement walls have joints or cracks it is very easy for at least small amounts of water to seep through to the inside especially if the waterproofing is damaged. As the cracks enlarge over time greater quantities of water may enter.

**Foundation Drain:** Most, but not all, homes with basements have a foundation or footing drain, of some type. In older homes the drain may have consisted of a clay tile with loose joints. The loose joints allowed water that had collected in the excavation to enter the tile and drain away to some discharge point. These days the drain pipe is usually made of perforated plastic.

For many years footing drains were connected to the sanitary sewer service. Downspouts may also have been connected into the footing drain system. These practices are no longer allowed as the extraneous water in the sanitary collection system can overload the pipes, cause sewer back-ups into basements and cause the treatment plant to by-pass sanitary wastes into Salt Creek.

**Sump Pumps:** Sump pumps are commonly used to collect the water that enters the foundation drain and pump it to an acceptable discharge location. The footing drain is typically connected into a small pit (sump) in the basement. A submersible pump in the pit lifts the
accumulated water in small diameter piping and sends it through the basement wall to the outside of the home.

Sump pump discharges are also prohibited from being connected into the home’s sanitary system for the same reasons as are footing drains.

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Downspouts: The downspouts that carry the runoff from the gutters must discharge at a reasonable distance from the house. Reasonable might be anywhere from 4 feet to 10 feet depending on circumstances such as the slope of your yard. The intent is to get the water away from the home’s foundation and basement wall as quickly as possible.
Downspout extensions can simply be pieces of downspout pipe, corrugated plastic pipe, or commercially available splash plates.

Ground Slope: The ground surface around your home should slope away from the foundation in all directions, preferably to the lot lines, but for at least a minimum of 10 feet. The amount of drop in 10 feet should be no less than 6 inches; more is better especially the closer you are to the house. The slope requirement applies to not only the grassed area but also sidewalks, patios, and driveways. If these surfaces slope towards the house it serves to direct runoff towards the house itself or the disturbed soil at the foundation. Again, at this point it is easy for the water to sit against the wall until it soaks into the soil and heads for the basement or crawl space.

Be especially careful around landscape beds and areas between the house and drive or sidewalk. These can be hidden trouble spots where water sits after a rain.

Foundation Drain: Many houses in Valparaiso have a footing drain, particularly those with basements. If seepage problems occur near the bottom of the basement wall and the house is older, the drain may have broken or become plugged with accumulations of silt or other debris. In this case, or if no drain exists, you may have to construct a new one. This can be quite expensive as it requires excavating around the perimeter of the house down to the level of the drain. On an existing home this work may have to be accomplished manually as equipment might not be able to operate that close to the foundation. If you decide to go to this effort and expense be sure to make sure the dampproofing material on the wall is in good shape before the excavation is backfilled. Or, you may want to install a commercially available material that
acts more like waterproofing. You will also require a means to get rid of the accumulated water in the drain. Unless you have a gravity outlet available, this will require a sump pump.

There are commercial systems available to install modified perimeter drains on the interior of a basement. If the leakage/seepage area is localized this may be a cost effective way to address the problem. These systems also require a sump pump to discharge the accumulated water to an acceptable location.

**Sump Pump:** While there may be unique circumstances where a sump pump is not required, virtually every home with a basement in Valparaiso, in our opinion, will require one sooner or later.

If your home does not have one and you have seepage/leakage problems, consider having one installed after you’ve completed the remedies listed above. Ideally it should be connected to the foundation drain to be able to relieve the water pressure outside the basement walls although some are not.

The extent of protection provided by a sump pump is only as much as it can pump and as long as it operates. Unless the house is very large, most sump pumps available at building outlet or hardware stores are adequate as far as pumping rates. You might also consider a pump with a battery back-up to protect against problems during power outages. These are particularly warranted if the basement is finished and/or is used for storage of valuables that could be damaged by water.

**Other:** On occasion it’s not possible to re-grade the soil to provide proper drainage around the house. In these instances it may be necessary to use other means to facilitate drainage.

**French Drain:** A French drain consists of a trench filled with clean stone around a perforated pipe. It is used to intercept surface runoff and ground water and convey it to a suitable discharge location.

It might be appropriate to use a French drain in side yard or other locations where sufficient room to re-grade the ground surface is not available. The drain captures the runoff before it soaks into the ground and moves towards the basement wall. The pipe conveys the water towards the front or rear yard where it can discharge away from the house.
In some cases it may be wise to use a French drain along with combinations of impermeable liners and filter fabric to maximize the potential of capturing the runoff.

Most of the materials required for a French drain can be obtained at a building supply store. You may want to rent a trenching machine to excavate the trench if the drain is longer than you can accomplish manually, or, most landscape companies can install the drain for you.

**Modified French Drain:** In some instances it may be necessary to add small surface inlets to the pipe to assist in collecting surface runoff. These types of inlets are available at building supply stores.

Care must be exercised with the use of the surface inlets so that they minimize the entrance of any material into the pipe which could cause plugging. The grates on the inlets must be kept clear of debris so that the runoff isn’t prevented from entering the pipe and then floods the very area you are trying to protect.

**Interior Waterproofing:** There are a number of manufacturers who advertise waterproofing paints to seal the inside of your basement walls. While such a material may work to minimize moisture, it is difficult to accept that any product placed on the interior of the wall will be successful in preventing the entry of water especially if is under any pressure. It may work for a limited time but should not be considered a permanent solution for anything other than minor seepage. Be aware that if it does work it keeps moisture in the wall. This moisture can freeze and/or cause deterioration of the wall.

**Crack Sealing:** A number of materials are available to seal cracks in your basement or foundation wall and manufacturers are quick to make claims of success. However, sealing a leaking crack from the inside is similar to trying to stop a garden hose by placing duct tape over the end. It may reduce the flow, it may work for a short time, but rarely can it be considered a permanent solution. Be aware that if it does work, it keeps water in the wall. This moisture can freeze and/or cause deterioration of the wall.

**Commercial Products:** There are many commercial products and contractors available to help you with your basement seepage/leakage problems. A Google search of “basement seepage” will provide you with many options. Some of these systems, in combination with the recommendations provided herein, may provide you with a warm and dry basement. Just beware of people offering quick and easy solutions to your basement water problems.
REFERENCES:

(1) Soil Survey of Porter County, Indiana; United States Department of Agriculture, Soil Conservation Service, in cooperation with Purdue University, Agricultural Experiment Station and Indiana Department of Natural Resources, Soil and Water Conservation Committee.


(3) “Basement Leakage”; http://home.ipoline.com/~house/wet-basement.htm