http://www.ci.lakewood.oh.us/

# Frequently Asked Questions

## FAQ Sheet 1 – BASEMENT FLOODING

### *1. Why do basements flood in Lakewood?*

**Public Sewer System History and Types -** Most of the Lakewood sewer system was built between 1900 and 1920 as the City transformed from farms to neighborhoods. Two types of sewers were installed in the city streets at that time: The first was a "combined" or "combination" sewer. It was a single underground pipe that carried sanitary sewage (from toilets, sinks and showers) during dry weather and also storm water from downspouts and catch basins (street inlets) when it rained. The pipe was sized so it could carry the larger storm flows. Approximately ¼ of the City's sewer system is combined.

The second type was an "over/under" sewer system. It consisted of a dedicated sanitary sewer pipe with a larger, separate storm pipe installed directly over it. The over/under system used a common manhole design in which a steel plate (invert plate) was installed to prevent the storm water from mixing with the sanitary flow. The invert plate was removable so the lower sanitary sewer could be maintained. Approximately ¾ of the City's sewer system is over/under.

There was a third type of sewer, called a "separate" system installed more recently. This type used separate pipes for storm and sanitary sewage, but unlike the over/under, they are located some distance apart and have their own manholes. Separate sewers only occur on a few streets in Lakewood. All new sewer replacement projects use the separate system.

**Private Property Sewer Types -** The last component of the sewage collection system were the "laterals", which are the underground pipes that connected the drains in the homes with the public sewers in the streets. Homes on streets with combined sewers generally had a single combined lateral that the downspouts, sanitary drains and floor drains were connected to.

Homes on streets with over/under and separate sewers generally - but not always - had separate storm and sanitary laterals as well. These laterals were installed like the over/under sewers, with the storm lateral on top of the sanitary lateral.

Federal, State and Lakewood laws, as well as the Ohio Building Code, require that all building interior drains, including basement floor drains, are connected to the sanitary (or combined) sewer lateral. All exterior drains, such as downspouts and driveway drains, must be connected to the storm (or combined) sewer lateral.

**Sources of Basement Flooding -** Basement flooding can result from one or more of the following conditions:

**a.** Water can seep into basements through cracked walls, floors and windows. This is caused by structural problems with the house itself such as exterior grading that directs the water toward the house or non-working building drains such as blocked downspout or foundation pipes and laterals. Downspouts incorrectly connected to the foundation drains can also cause seepage.

**b.** Sewage can enter basements through the floor drains during rain storms when there is more water trying to enter the sewers than the sewers can hold. This type of flooding is related to limited capacity in the public sewer. The sewers work properly but can not keep up with the additional flow generated by heavy rain storms.

**c.** Sewage can enter basements through the floor drains during rain storms when there is a blockage in the public sewer system. Blockages and pipe failures can develop during heavy rains when improper foreign materials flushed down toilets or washed into catch basins from the street become lodged in the sewer.

**d.** Sewage can enter basements through the floor drains during rain storms when the lateral between the house and the street is clogged. A large amount of water comes down the downspouts and driveway drains during heavy rains. If the storm lateral is clogged, this water will back up and flow into the sanitary lateral underneath through loose joints and broken pipe. If the sanitary lateral is even partially blocked by roots or improper foreign materials flushed down the toilet, the excess storm water will back up into the basement.

### *2. Where does the sewage go?*

The combined sewers and the sanitary sewers in over/under and separate systems are all connected to the sanitary collector sewers on the main east-west streets. The collector sanitary sewers are connected to a trunk combined sewer called an "interceptor". It starts on Madison Avenue just west of Bunts. From there it flows east to W117th Street, turns north to Edgewater Drive, then turns west. At this point it is called the Edgewater Interceptor. It follows the Lake Erie shoreline, mostly under Edgewater Drive. At Webb Road it turns south to Clifton Boulevard, turns west again to West Clifton Boulevard, then turns south once again and flows all the way to the City-owned waste water treatment plant in the Rocky River valley. The Edgewater Interceptor is sloped so it can flow by gravity. At W117th Street and Edgewater Drive it is 15 feet deep; at Riverside Drive it is 90 feet deep. The interceptor collects roughly 75% of the City's sanitary and combined waste water. The other 25% is collected by the sewer that flows west from Bunts under Madison Avenue. It connects to a sewer under Riverside, which then flows north to West Clifton Boulevard, where it drops down to the Edgewater Interceptor.

As might be expected, the interceptor can fill up during heavy rainstorms. There are overflow pipes, called “combined sewer overflows” (CSO's) to Lake Erie that provide partial protection to the sewer system. The City is presently licensed by Ohio EPA to have these CSO's (see 5, below).

### *3. In summary form, what are the laws that govern sewers and sewer use in Lakewood?*

All local regulations in the Codified Ordinances of the City of Lakewood are founded on State and Federal laws resulting from the 1972 Clean Water Act and other sanitary Codes which date back to the founding of the City.

- Every habitable building must be connected to the public sewer system.
- All sources of sanitary sewage (toilets, showers, sinks), including building interior drains, shall be connected to the public sanitary sewer, including drains inside garages.
- All sources of storm water (downspouts, yard drains, pavement inlets) shall be connected to the public storm sewer unless approved for surface discharge, including driveway drains.
- Storm water can not be conveyed to a sanitary sewer and sanitary sewage can not be conveyed to a storm sewer.
- Oils, greases, solids, automotive cooling fluids and any noxious chemicals can not be dumped into any sewer or street catch basin.
- Solid, non-dissolvable objects can not be introduced into any sewer. For example, toilet paper can be flushed down the toilet, but many feminine hygiene products and disposable diapers can not. A good rule of thumb is – "do not put anything into the toilet you haven't eaten first".

The purpose of these laws is to reduce basement flooding and eliminate pollution to Lake Erie. Basement flooding is caused by excess storm water in the sanitary sewer. Solids, oils and grease in the sewers will not only pollute Lake Erie, but can also cause clogs which cause basement flooding.

### *4. How does Lakewood apply these laws?*

Clearly, original Lakewood homes, buildings and the public sewer system were not constructed with modern environmental laws in mind. However, this does not excuse present owners from complying with these laws. Most property owners encounter these regulations when applying for a building permit for projects that include work on downspouts and drains. For example, basement waterproofing or re-siding a home requires the removal of gutters, downspouts and drains. Part of the permit process includes a dye test of the downspouts to see if they are connected to the public storm or sanitary sewer. If the dye shows up in the sanitary sewer, the property owner will be required to re-pipe the downspouts to the public storm sewer at the owner’s expense. Before that is done, however, the City will ask the owner to clean the storm lateral, followed by a new dye check. Many times this will demonstrate that the downspouts were, in fact, correctly connected – they only needed cleaning. In any case, please be assured that the City of Lakewood will never permit a downspout or driveway drain to be re-connected to a sanitary sewer or sanitary lateral.

### *5. Is Lakewood subject to Federal and State mandates regarding sewers?*

YES. Lakewood has a National Pollution Discharge Elimination System (NPDES) permit from the Ohio Environmental Protection Agency that, in part, defines the requirements of the sewage system and allows the City to discharge excess combined sewage into the lake during heavy rainstorms. The NPDES permit is renewed every five years. A series of requirements (mandates) are issued with every renewal. The latest mandates include the elimination of the Combined Sewer Overflows (CSO's, see 2, above) to protect Lake Erie from untreated sewage discharges during rainstorms. The Federal Government provides NO funding to pay for these requirements.

### *6. What has City Government done to reduce basement flooding?*

**History** - Reports of basement flooding in Lakewood have been documented from the early 1930's, only a short time after the system was essentially completed. The City has performed many local sewer improvement projects since that time. The fact that basement flooding still occurs can be attributed to the continued deterioration of the pipes on both the public and private sides, the continued practice of connecting private downspouts and yard drains to sanitary sewers, and the small scope of the older projects dictated by limited available funding.

Engineering studies from the 1970's through the 1990's attributed basement flooding to:

- Storm water entering the sanitary system by leakage and deliberate connection on private property.
- Clogged laterals on both public and private property.
- Leakage from the storm sewers to the sanitary sewers on the public over/under systems due to damage and deterioration.
- Repairs and modifications to the sewer system on individual streets that did not consider possible increased flooding impacts elsewhere in the City.

**Present efforts** – All major sewer improvement projects on the public side must have a permit from Ohio EPA. They review each project for compliance with pollution-control regulations and engineering standards before issuing the permit. The projects all have two goals: Reduction of basement flooding and reduction of pollution to Lake Erie. Recent projects include:

- Replacing combined sewers with separate storm and sanitary sewers.
- Replacing over/under manholes with two separate storm and sanitary manholes as well as public lateral repairs and installations on street repaving projects.
- Replaced crushed and broken sewer pipe wherever it is discovered.
- Adding underground storage pipes to accommodate excess water from rainstorms.
- Initiating private property projects to install separate storm and sanitary lateral sewers.
- Continue to encourage the disconnection of downspouts from the storm sewer system where possible.

In addition to the noted construction projects, the City is also engaged in a "long term control plan" (LTCP), mandated by Ohio EPA, to eliminated both sewage discharges to Lake Erie and basement flooding. Fortunately, the solution to both can be accommodated by a single overall construction program. The goal of the LTCP is to produce the conceptual plans for that program along with its costs.

Even after all the improvement projects are completed, the City - in fact, no municipality - can ever guarantee that basement flooding will never occur again. Extreme weather conditions or clogs from improper materials can overwhelm the best designed sewer system. The goal is to provide the community with the most prudent and practical sewage collection and treatment system that will make basement flooding a very infrequent and unusual event.

***7. What can property owners do to reduce basement flooding in their buildings and their community?***

To summarize, their good housekeeping practices should include the following:

**a.** Regularly inspect (at least once a year) and clean out gutters, downspouts and the underground storm laterals. These fill up with debris much faster than the sanitary lateral due to leaves and other material brought in with the rain. If clean-out opening plugs were not installed on the downspout drains, have them put in. If the inspection tee's are damaged or missing, have them replaced.

**b.** Do not flush oil, grease or solid materials down sinks or toilets.

**c.** If the sanitary lateral regularly clogs with roots, the storm lateral will also be clogged. After cleaning, have the laterals televised to check for damaged pipe and repair as necessary. Remove the source of the roots (the tree) or install new laterals that bypass the tree location. If the tree is on the tree lawn, have the City remove it. If a lateral has an underground trap, have it removed.

**d.** If an inspection discovers downspouts, driveway drains or yard drains connected to the sanitary sewer, re-connect them to the storm sewer or eliminated them. The Lakewood Building Department can help with advice and a list of registered plumbers.

**Residential back flow prevention devices** - As stated in 6, above, no one can ever guarantee that basement flooding will never happen again, even after public system improvements and private property corrections have been made. Or, property owners may not wish to wait for the overall system to be upgraded and restored. One solution some owners have used is to install a residential "back flow preventer". This is an automatic valve device that can be installed on the sanitary lateral below the floor where it exits the basement (downstream of the floor drains) which allows water to flow out of the building, but closes when water tries to flow backwards. There can be problems:

- The unit must be cleaned frequently to ensure that the valve closes tightly when needed.
- If the sanitary lateral outside the building is old, loose or cracked, the back flow preventer will cause flood water to flow out of the lateral, through the ground and into the basement through cracks in the floor or walls or even the floor drains.
- Buildings with downspouts connected to the sanitary lateral under the basement floor will still flood.
- Residents can not use toilets, sinks, laundry or showers while the backflow preventer is in operation.