

INFLOW & INFILTRATION

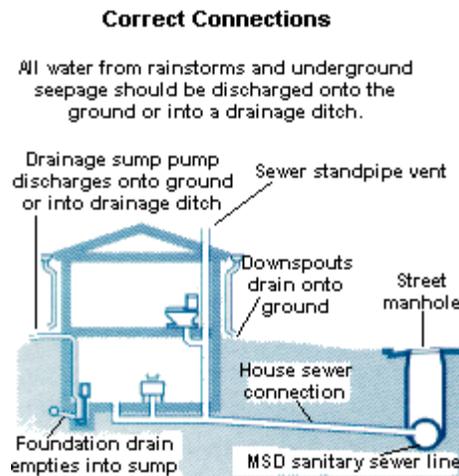
City of Hillsboro Inflow and Infiltration Elimination Program

Because of continuing problems with overloaded sanitary sewers, the City of Hillsboro is inspecting the sewer system in your neighborhood. This inspection will reveal the primary sources of inflow and infiltration that are causing the problems.

What are inflow and infiltration?

Inflow and infiltration are terms used to describe the ways that groundwater and storm water enter the sanitary sewer system.

Inflow is water that is dumped into the sewer system through improper connections, such as downspouts and groundwater sump pumps. (Sump pumps that pump only laundry water or other sanitary wastes are not a problem.)



Infiltration is groundwater that enters the sewer system through leaks in the pipe.

All of this water is called "clear water" (although it may be dirty) to distinguish it from sanitary sewage.

Why is this water a problem?

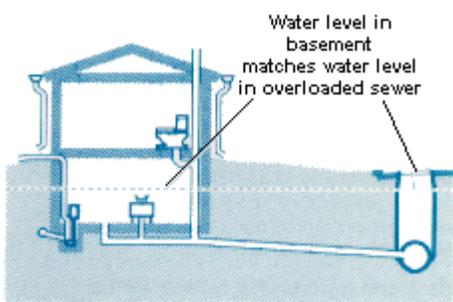
Clear water belongs in storm sewers or on the surface of the ground, and not in the sanitary sewers. When clear water gets into the sanitary sewers, it must be moved and treated like sanitary waste. Too much clear water often causes sewer backups and overflows when it rains.

What is a sanitary sewer?

A sanitary sewer is a pipe located in the street or easement that is designed solely to transport wastewater from sanitary fixtures inside your house or place of business. Sanitary fixtures include toilets, sinks, bathtubs, showers and lavatories.

Basement Flooding

When the sanitary sewers were overloaded, the water level in the manholes and the sewers rises. When it rises above the level of the basement floor, the sewers can back up and flood the basement.



What is a storm sewer?

A storm sewer is a pipe designed to carry rainwater away. Storm sewers are normally much larger than sanitary sewers because they are designed to carry much larger amounts of water.

Drainage ditches and swales perform the same function in many neighborhoods.

What is an improper connection to the sanitary sewer system?

An improper connection permits water from sources other than sanitary fixtures and floor drains to enter the sanitary sewer system. That water should be going to the storm sewer or allowed to soak into the ground without entering the sanitary sewer.

What are different types of improper sanitary sewer connections?

Some examples of improper connections include downspouts, groundwater sump pumps, foundation drains, drains from window wells and outdoor basement stairwells and drains from driveways.

Where should the water from downspouts, groundwater sump pumps, and/or other clear water sources be directed?

Hillsboro's Wastewater Discharge Regulations and the City of Hillsboro ordinance § 50.321 (Use of Public Sewer) Code require this water to be diverted to storm sewers or above-ground drainage ditches.

Why is it important for everyone to remove improper connections?

Removing improper connections will significantly reduce the flow of clear water to the sanitary sewer system. This will reduce the possibility of basement flooding due to overloaded sanitary sewers and lessen the amount of water that has to be treated.

How can overloaded sanitary sewers cause basement flooding?

The water in an overloaded sewer flows at a higher level than normal. If the home has sanitary fixtures or floor drains that are below this higher, overload level, water can flow backward through the sanitary sewer lines into the basement.

Do improper connections really contribute large amounts of clear water to the sanitary sewer system?

Yes, and here's why: An eight-inch sanitary sewer can handle domestic wastewater flow from up to 200 homes, but only eight sump pumps, operating at full capacity, or six homes with downspouts connected to the sewers, will overload this same eight-inch line.

**CITY OF HILLSBORO
REFERENCE PAGE**

City of Hillsboro Ordinances:

§ 50.321 USE OF PUBLIC SEWERS

No person, firm or corporation shall discharge or cause to be discharged any storm water, ground water, roof runoff, subsurface drainage, cooling water or unpolluted industrial process water to any sanitary sewer.

§ 50.221 BACKFLOW PREVENTION; LIABILITY

**No person shall construct, improve or repair a sewerage connection, or lateral line, to the city sanitary wastewater collection service lines unless such person shall install a backflow preventer or flap valve in line with the lateral or connection such that flows from the wastewater collection system cannot flow from the collection system into any structure or building. Any person operating a new or existing wastewater collection line from a structure without a backflow prevention system approved by the city shall be deemed to have expressly waived any claim of liability on the part of the city, its officers, agents and employees, in the event wastewater flows from the wastewater collection lines of the city into or on the property serviced by city sanitary wastewater collection lines. The city shall provide existing customers serviced by city wastewater collection, not otherwise prevention device without charge upon application to the Safety and Service Director.
(Ord. 2002-7, passed 4-1-2002) Penalty, see §50.99**

City of Hillsboro Contacts:

Randy Barr Water Sewer Maintenance Department (937) 393-2233

Brandon Leeth Wastewater Treatment Plant (937) 393-4831

INFLOW & INFILTRATION



How does City of Hillsboro identify the sources of clear water entering the sanitary sewer system?

There are four major methods: dye testing, television inspection, smoke testing and flow monitoring.

By flushing water and clothing dye into a suspicious downspout or sump pump, the City of Hillsboro can determine sources of clear water entering the sewers by the color of the water as it flows through the pipes.

By guiding portable television cameras through the sewer pipes, the city can detect many of the sources of clear water entering the sewers.

By filling the sanitary sewer line with smoke and watching where it emerges, Hillsboro can detect many more sources of clear water. The smoke is kept from entering buildings by the drain traps required on all sanitary fixtures and drains. It will emerge from the sewer stand-pipe vents on the roof of buildings — and from improper connections such as downspouts. It may also emerge from holes in the ground that lead to leaks in sewer lines.

By inserting special measuring devices into the sewer lines, crews can monitor the water flowing through them. If the flow increases during rainstorms, it's a sure sign of inflow and/or infiltration.

What happens when you detect a leak or an improper connection?

If the leak is in the public sewer line, the City of Hillsboro will repair it.

If the source of the clear water is in a private line entering the public sewer, the city will notify the property owner. The property owner should consult with a licensed plumber to determine the source of the inflow or infiltration and to have the problem corrected.

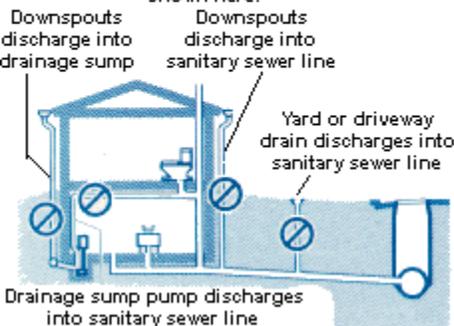
Hillsboro will conduct a follow-up inspection. If the problem has not been corrected, the property owner and the state plumbing inspector will be notified by the City. This could result in further investigation as a violation of the City of Hillsboro Ordinance #50.321 Code and Hillsboro Wastewater Discharge Regulations.

What can a property owner do to minimize basement sewer backups?

- Consult with a licensed plumber to review your particular plumbing system.
- Consider the installation of a backwater check valve in the basement sewer line.
- Consider the installation of a removable standpipe in the basement floor drain.
- Consider the installation of a standpipe extension or a removable pipe cap on the washing machine drain pipe.

Improper Connections

All water from rainstorms and underground seepage should be discharged onto the ground or into a drainage ditch. Some of the common improper connections are shown here.



Hillsboro does not recommend the use of blow-up or expansion type pipe plugs for drains. The pressure in the sewer pipe can blow them out.

I've never had basement flooding due to a sewer backup. Why should I remove my improper connections?

If your plumbing pumps or drains clear water into the sanitary sewer, it may well be the cause of flooding in your neighbor's basement. It may also cause the sewer to overflow, polluting the storm drains and streams.

Does the requirement to remove improper connections pertain only to certain sewer service areas?

No. U.S. Environmental Protection Agency regulations require Hillsboro, as well as other local governments and independent authorities, to stop the intrusion of clear water into all sanitary sewers.

Some old neighborhoods, however, have "combined" sewers, where sanitary sewage and storm water are handled together and are considered an illegal sanitary sewer connection. These systems were built in the days before U.S. Environmental regulatory discharge mandates. The overflow of sewer cannot be handled, therefore causing pollution of streams and waterways, and tremendous pollution problems. Today, all the sanitary sewers flow into sewage treatment plants, where they still create problems during heavy rains. Under new

Environmental Protection Agency regulations, these problems also must be solved. Hillsboro is now implementing a plan to correct the problems associated with sanitary sewers in our older neighborhoods.