



OUR FUTURE IN EVERY DRÖP

INFLOW AND INFILTRATION

What is Inflow and Infiltration?

Inflow and infiltration are terms used to describe the ways that clean groundwater and/or storm water flow into the wastewater system, due to cracked sewer lines, leaky manholes or through erroneously connected storm drains. Most inflow comes from storm water and most infiltration comes from groundwater.

Inflow is surface water that enters the wastewater system through improper connections, such as catch basins, yard, roof and footing drains, downspouts, groundwater sump pumps, and through holes in manhole covers. Inflow typically occurs as a result of storm events. Peak inflow occurs during heavy storm events when storm sewer systems are full, resulting in backups and ponding.

Infiltration is groundwater that enters the wastewater system through holes, breaks, joint failures, connection failures and other openings in the pipe. Infiltration amounts often exhibit seasonal variation in response to groundwater levels. Storm events can trigger a rise in groundwater levels and increase infiltration flows. The highest infiltration flows are observed following significant storm events or following prolonged periods of precipitation when the ground is saturated with water.

Why is Inflow and Infiltration a problem?

Inflow and Infiltration belongs in storm sewers or on the surface of the ground, and not in the wastewater system. When it gets into the wastewater system, it must be treated like sanitary waste and this raises costs. Too much often causes sewer backups and overflows when it rains.



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What is an erroneous connection to the wastewater system?

An erroneous connection allows water from sources other than sanitary fixtures to enter the wastewater system. Instead of entering the wastewater system, that water should be going to the storm sewer or allowed to soak into the ground. Some examples of erroneous connections include downspouts, groundwater sump pumps, foundation drains and drains from driveways.

How does the City of Santa Rosa identify Inflow and Infiltration?

There are three major methods for identifying inflow and infiltration: television inspection, smoke testing and flow monitoring.

- *Television Inspection* – Utilities crews guide portable television cameras through the wastewater system pipes to determine any sources of inflow or infiltration.
- **[Smoke Testing \(PDF\)](#)** - Filling the wastewater system lines with smoke and watching where it emerges can identify many sources of inflow. 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, from improper connections such as downspouts, and it may also emerge from holes in the ground that lead to leaks in sewer lines.
- *Flow Monitoring* – The City of Santa Rosa can monitor the amount of water flowing through wastewater system by inserting special measuring devices into the sewer lines. If the flow increases during rainstorms, it's a sure sign of infiltration.

How can Inflow and Infiltration be prevented?

There are many methods and technologies that are available to remove and/or reduce Inflow and Infiltration. When Inflow and Infiltration is identified, the City of Santa Rosa Utilities department works to eliminate it. Utilities crews repair leaking manholes and replace cracked or broken pipes. We also identify problems on private property, such as missing clean out caps and improper connections.