

The City of Columbia, Missouri is conducting a sanitary sewer evaluation study (SSES) in your neighborhood. This study is an inspection of the sanitary sewer system to locate the problems you may have experienced with the sewer system. This sheet "is intended to" answer some of the questions you may have.

What types of problems are there in my neighborhood?

A wide range of problems have occurred within the area including:

- Back-ups into people's homes and businesses
- Sanitary Sewer Overflows (SSOs) into yards, streets, and streams
- Lack of wet weather sewer capacity

Why are these problems happening?

Separated sanitary sewers are designed to convey only wastewater. However, many of these "separated" sewers also convey groundwater and storm water that enter through leaky pipes, improper storm drain connections, and other means. This excess water, called inflow and infiltration (I&I), takes up capacity that could otherwise be used for wastewater alone and generates the need to build added capacity in pipelines, treatment plants, and other wastewater facilities.

What is inflow and infiltration?

Inflow and Infiltration: (I&I) are terms used to describe the ways groundwater and storm water ("clear water") enters the sanitary sewer system.

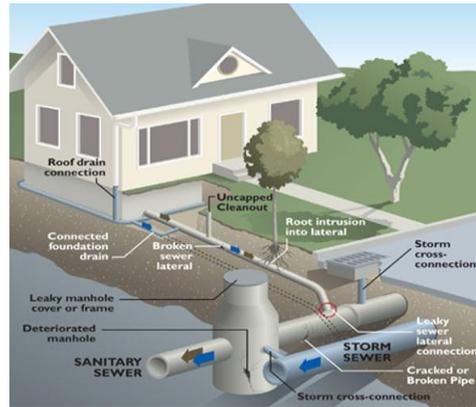
Inflow: Inflow is surface water that enters the wastewater system from yard, roof and footing drains, from cross-connections with storm drains, downspouts, and through holes in manhole covers. Inflow occurs as a result of storm events such as rainfall, snowfall, springs or snow melt that contribute to excessive sewer flows. Peak inflow can occur during heavy storm events when storm sewer systems are surcharged, resulting in hydraulic backups and local ponding.

Infiltration: Infiltration is groundwater, or groundwater that is influenced by surface water that enters sewer pipes (interceptors, collectors, manholes (MH), or side sewers through holes, breaks, joint failures, connection failures and other openings. Infiltration quantities 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.

Why is inflow and infiltration a problem?

Public Health and Environment: I&I is the major cause of the SSOs and basement backups in Columbia, Mo. Additional flow caused by I&I often makes the sewer system reach or exceed capacity, resulting in basement backups and overflows to the environment, and is harmful to public health.

Additional Costs: Extra water in the sewer takes up capacity in the sewer pipes and ends up at the City's wastewater treatment plant where it must be treated like sewage, resulting in higher treatment costs. Also, when this extra water makes it into the sewer system, it requires new and larger wastewater facilities to convey and treat larger volumes of flow, resulting in higher capital expenditures.



Various Sources of Inflow and Infiltration

How does this SSES affect me?

The City is performing inspections and testing in an effort to locate, identify, and correct improper connections and defects that cause I&I so that system capacity improves and overflows and backups are eliminated. The following inspection methods will be used in your area:

- Flow Monitoring
- Smoke Testing
- Manhole Inspections
- Internal/External Building Surveys
- Television Inspection (CCTV) of Sewer Mains
- Television Inspection (CCTV) of Service Laterals
- Dyed Water Testing
- Surveying
- Wet Weather Inspections

Inspection activities will occur in existing public right-of-ways, sanitary sewer easements, and on private property.

Flow Monitoring is conducted to determine the amount of wet weather and dry weather flows within the system.

Smoke Testing is conducted to identify defects or improper connections in sewers. The testing is done by blowing an odorless and nontoxic smoke into the sewer. Defects and improper connections are identified by smoke leaking out from these locations. The visible smoke will last only a few minutes with proper ventilation. If there are no issues with the sewer system, then smoke will only be seen from the roof vents of each building.



Again, the smoke used in smoke testing is odorless, nontoxic and is not harmful. The contractors will place door hangers at least 48 hours prior to smoke testing and will place signs in the vicinity of the work area to notify residents. Daily notices will be sent to the local Fire Department and Police Department informing them of the project boundaries. Please follow the instructions you receive with the smoke testing notification.

Manhole Inspections allow information to be gathered on the direction of the sewer pipes and also identifies I&I into the sewer system. Manholes are usually located in streets or in yards. The manholes in your neighborhood will be inspected in the coming months. This may require that you allow an inspection crew into your yard and the sewer easement to locate and inspect a manhole.

Internal/External Building Surveys include identifying and evaluating area drains, downspouts, and sump pumps at each home. The survey will help locate improper connections to the sewer system. In some cases, dye testing will be done in accordance with City practices to trace the outlets of sump pumps and area drains. These surveys will require entry into the home to locate sump pumps and area drains, usually in the basement. You will be contacted in order to schedule a convenient time for the private property surveys to be conducted.

Closed Circuit Television Inspections (CCTV) of Sewer

Mains is a technology used to inspect pipes in the sewer system. A small robotic device with a television camera is run through the sewer main to locate and identify sources of I&I such as leaks, cracks, and broken pipe.

Closed Circuit Television Inspections (CCTV) of Service Laterals

is similar to the sewer main CCTV. A small camera is either launched from the sewer main camera toward the building or access is gained through a building cleanout and pushed from the building to the sewer main. Service lateral CCTV is utilized to identify leaks, cracks, and identify sources of I&I such as broken pipe.



Dyed Water Testing will be conducted in some areas. A rainfall like test using biodegradable and nontoxic fluorescent dyes will help detect inflow and infiltration into the sewer system. The dyed water is placed in downspouts, area drains, and low lying lawn areas to identify sources that are deteriorated, broken, or incorrectly connected to the sewer system.

Surveying crews will collect elevation data for various sewer components, as well as basement elevations, throughout the project area. This information will be utilized to assist with the development of a hydraulic model and verify proper construction of the sewer system.

Wet Weather Inspections are very important to identify back-ups and overflows in the sewer system. These inspections are conducted during heavy rainfall (wet weather) to determine areas that are prone to overflows or flooding and observe how the sewer system reacts during wet weather. In other words, these inspections help the City determine how well the sewer system is working during wet weather.

Project Study Areas

As part of the City's 2004 Sewer Master Plan, the sanitary sewer collection system was divided into drainage basins. Basins are comprised of a series of pipes and manholes that convey sewer to a single point before being conveyed to a major trunk sewer, pump station or wastewater treatment plant. Topography typically governs the size and shape of the basin. One or more basins are scheduled to be studied each year and are selected based upon information provided in the 2004 Sewer Master Plan, the number of sanitary sewer overflows (SSOs) and the number of basement backups within each basin.

Inflow & Infiltration Reimbursement Program

The City of Columbia has developed a program to reimburse homeowners to remove certain I & I sources that are connected to the sanitary sewer on private property. The source will be identified during the study and evaluated for repair method. Letters will then be sent to the homeowner with a step by step pamphlet to help understand the disconnection, bid and reimbursement process. The goal is to ease the burdens on the homeowner while removing storm water from the sanitary sewer.

What can I do to help?

- Notify The Sewer Utility Department if sewer overflows are observed in your area at 573-445-9426
- Be aware of City contractors conducting work in your area and ask for proper identification if you have questions
- Follow recommendations during smoke testing activities
- **Call TREKK Design Group if you have any questions or concerns regarding this program at 573-445-4275**



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**INFLOW AND
INFILTRATION STUDY**