

Sanitary Sewer Overflows 101

Sanitary Sewer Overflows (SSOs) are releases of untreated sewage into the environment and have always been illegal under the Clean Water Act. Sewage spills occur when the wastewater being transported via underground pipes overflows through a manhole, cleanout, or broken pipe. A sanitary sewer overflow causes raw sewage to overflow out of manholes onto city streets, playgrounds and into streams, before it can reach a treatment facility. These sewage spills can cause health hazards, damage homes and businesses, threaten the environment, and local waterways.

Sewage spills can be a very noticeable gushing of water from a manhole or a slow water leak that may take time to be noticed. Don't dismiss unaccounted-for wet areas.

Look for:

- Drain backups inside the building.
- Wet ground and water leaking around manhole lids onto your street.
- Leaking water from cleanouts or outside drains.
- Unusual odorous wet areas: sidewalks, external walls, ground/landscape around a building.



If You See a Sewage Spill Occurring,
Notify Your Public Works / Water Utilities Department
IMMEDIATELY.

24Hrs 972.721.2281

What is a Sanitary Sewer Overflow SSO?

Sanitary Sewer System Infrastructure.

How a Sewer System Works.

What is the Difference between "Sanitary Sewers" and "Storm Drains"?

What are the Causes of SSOs?

How Can SSOs Be Reduced or Eliminated ?

What Health Risks do SSOs Present ?

What Other Damage Can SSOs Cause?

You are Responsible for Your Lines.

What to do if you Experience a Sewer Backup.

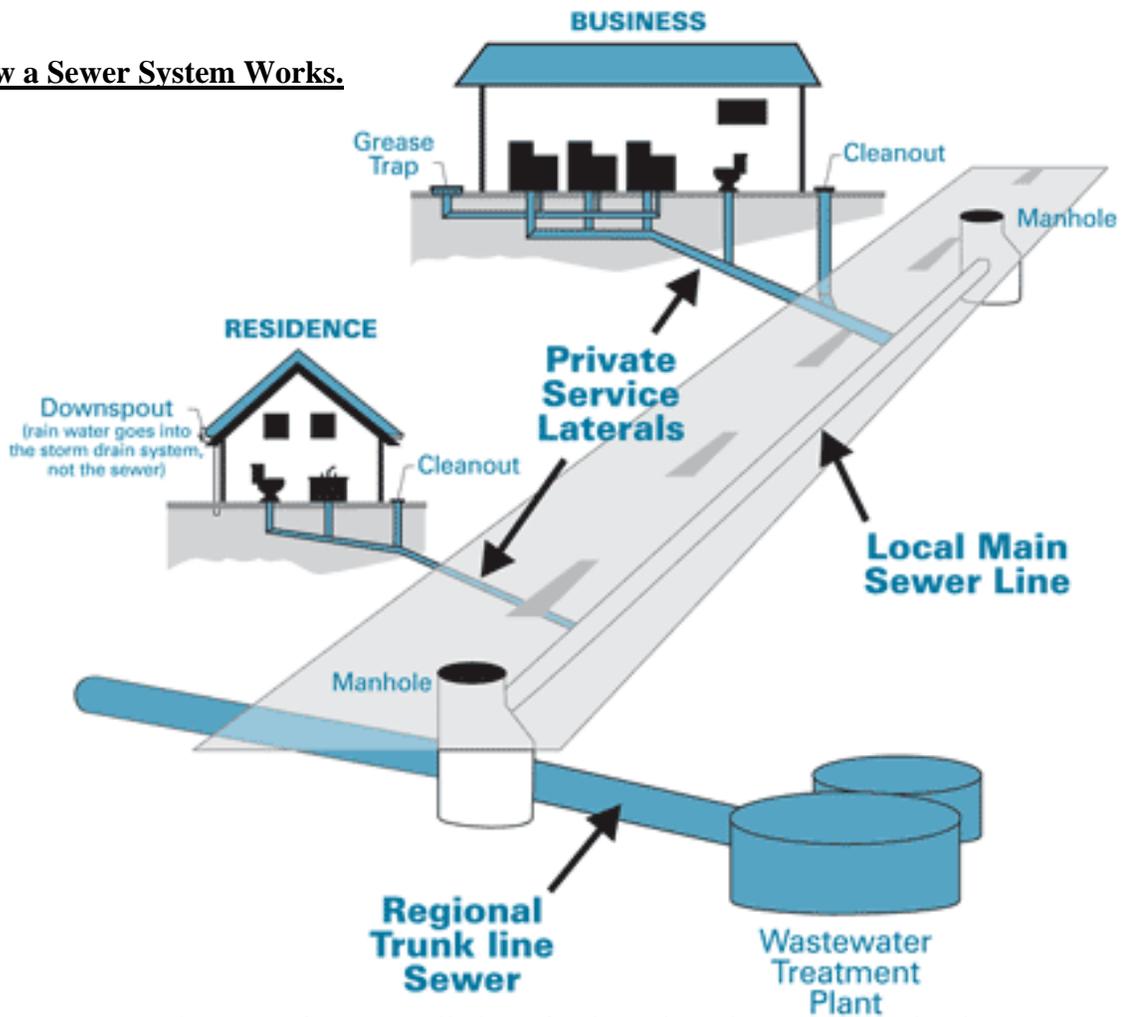
Sanitary Sewer System Infrastructure.

Sewer infrastructure represents an enormous public asset that accounts for trillions of dollars worth of local, state, and federal investment over the last century. Most collection system projects were spurred by a strong public demand for relief from unsanitary, unsightly, and smelly sewage problems that plagued many areas of the country, contaminating water and causing deadly disease outbreaks.

Many cities have a sewage collection infrastructure that is between 30 and 100 years old, placing them at increased risk for leaks, blockages and malfunctions due to deterioration. The longer sewer collection system problems go unresolved, the more serious they become, placing vital public assets at risk of further degradation, posing an unacceptable risk to human health and the environment, damaging public and private property, and impacting state and local economies.

Significant investments to replace, repair, or expand parts of the system, along with better operation and maintenance practices help to resolve many of the problems that lead to SSOs.

How a Sewer System Works.



A property owner's sewer pipes are called service laterals and are connected to larger local main and regional trunk lines. Service laterals run from the connection at the home to the connection with the public sewer (including the area under the street). These laterals are the responsibility of the property owner and must be maintained by the property owner.

Operation and maintenance of local and regional sewer lines are the responsibility of the City and local river authorities.

Wastewater Treatment Plants

City of Irving is a subscriber city to the Trinity River Authority (TRA). TRA is responsible for the waste water treatment plant that treats all of the wastewater from Irving and several other mid-size cities in the DFW metroplex.



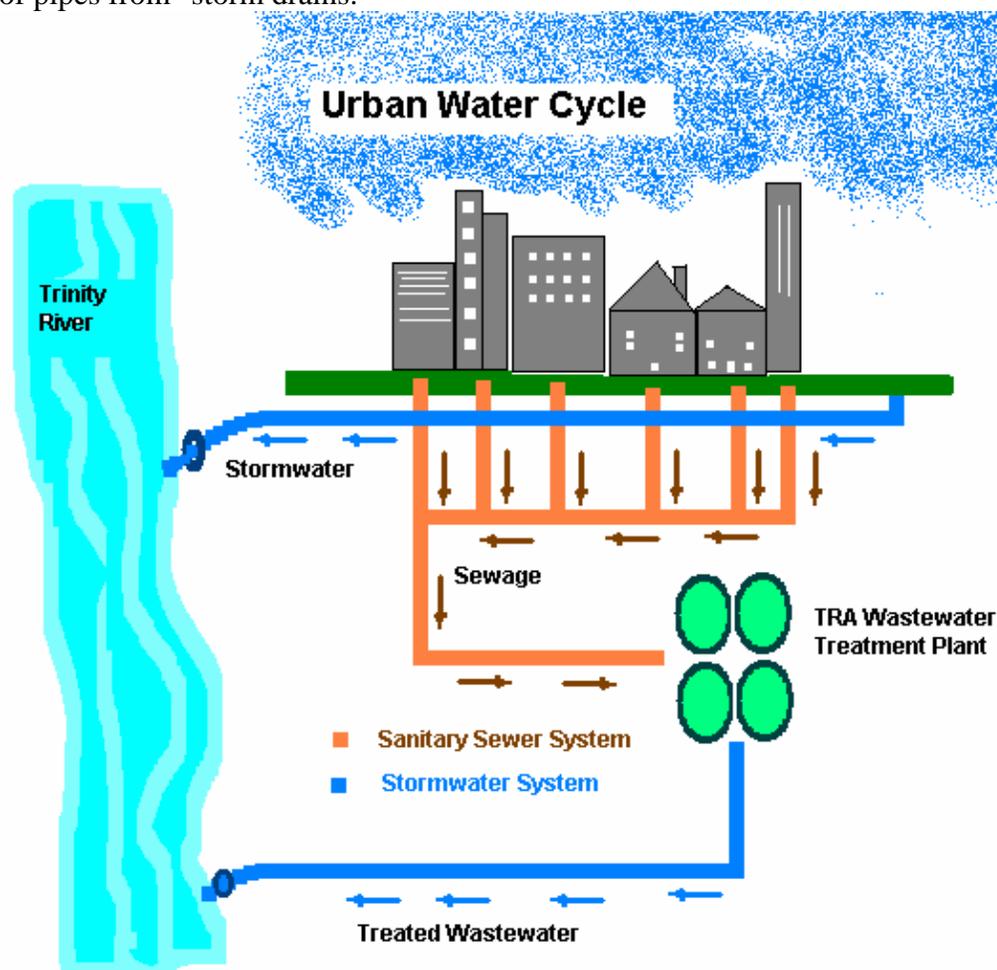
Wastewater Treatment Plants play a significant role in protecting our water supply and our environment. When the wastewater flow reaches the treatment plants, it passes through many processes:

- Physical Treatment: Removal of paper, rags, and sticks.
- Primary Treatment: Settle out solids.
- Secondary Treatment/Nitrification: Microscopic organisms or "bugs" help break down the solids in the water.
- Chlorination: Chlorine is added to the water to kill disease-causing germs before the water is returned to the receiving streams.
- Biosolids Handling: Solids collected throughout the plant are further broken down in the digester system and then sent to the press where chemicals are added to the sludge. Water is then passed out of the sludge, which forms large cakes that are hauled by trucks to farm sites. The health hazards have been removed from the biosolids, allowing farmers to use the by-product to condition the soil and produce better crops.

* Treated wastewater that is returned to the river is actually cleaner than the river itself.*

What is the Difference between "Sanitary Sewers" and "Storm Drains"?

"Sanitary sewers" collect and convey sewage to a treatment plant where the sewage can be treated. It is important to understand that sanitary sewers are a completely different set of pipes from "storm drains."

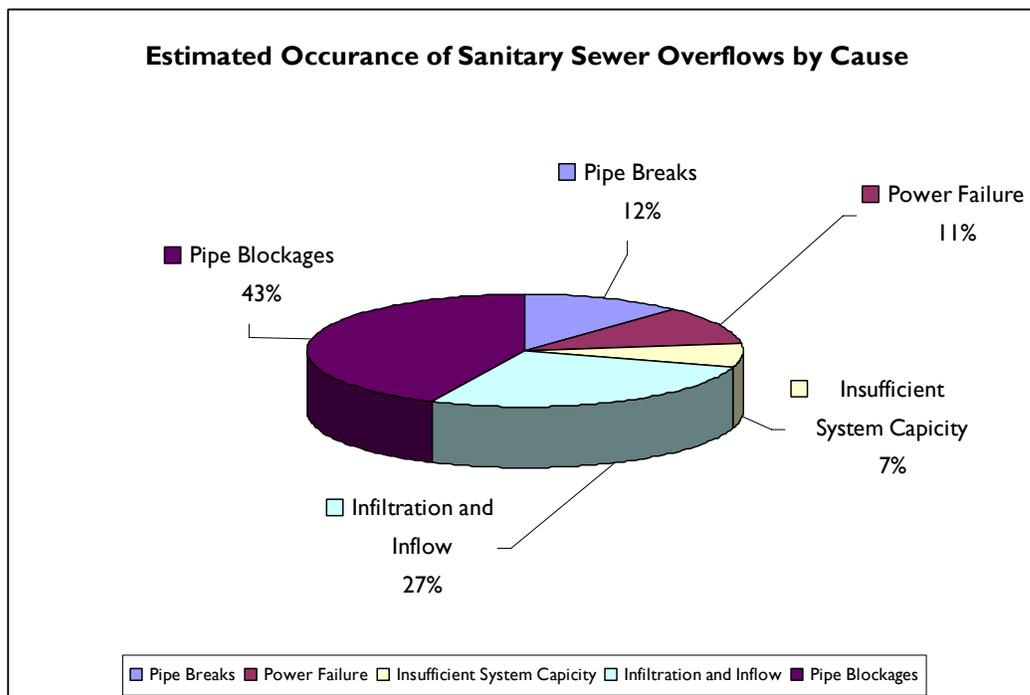


In Irving and most other areas, an independent system of pipes called "storm drains" is used to only transport storm water (i.e., rainwater) to streams, bays and rivers with little or no treatment. The separate "sanitary sewer system" is "sanitary" because it keeps sewage out of the storm drains and sends the sewage to a treatment plant before it is released into the environment.

Some key points to remember are:

- Sanitary sewers have limited capacities and are not designed to dispose of storm water (i.e., rainwater) from your property.
- Storm drainage flows are generally not treated and therefore should not contain any pollutants that could affect our streams and ocean.
- Rubbish should not be thrown down sewers or storm drains. Because sewage is treated, sewers can handle sewage as well as certain types and limited amounts of "toxic" materials such as household cleaners.

What are the Causes of SSOs?



When an SSO occurs, the cause may be listed as a recent, immediately traceable condition, such as a pipe break or pump failure. However, merely repairing the ruptured pipe without understanding the underlying cause of its failure may not protect against

future SSOs. The major causes leading to SSOs include grease build up, aging infrastructure, lack of maintenance, and inadequate flow capacity.

Many sewer system failures are attributable to the following:

- Years of wear and tear on system equipment such as pumps, lift stations, check valves, and other moveable parts that can lead to mechanical or electrical failure;
- Freeze/thaw cycles, ground moisture, and subsurface instability that can result in pipe movement, warping, brittleness, misalignment, and breakage; and
- Deterioration of pipes and joints due to exposure to saltwater or other corrosive substances.
- Structure problems caused by tree roots in the lines, broken/cracked pipes, missing or broken cleanout caps, or undersized sewers can cause blockages.
- Infiltration and inflow (I/I) impacts pipe capacity and is caused when groundwater or rainwater enters the sewer system through pipe defects and illegal connections.
- Systems that are not routinely cleaned and repaired experience more frequent clogged and collapsed lines due to root growth and accumulation of debris, sediment, oil and grease.
- **The # 1 cause of sewage spills** is grease buildup in the sewer system.

The # 1 Cause of Sewage Spills !

Grease buildup exacerbates age-related deterioration. Grease builds up inside our sewer lines and eventually causes blockages throughout the sewer system. Grease gets into the sewer from food establishments, household drains, as well as from poorly maintained commercial grease traps and interceptors. Grease is the most common cause of pipe blockages.

Any of these causes, by itself or in combination, can set the stage for an SSO.

How Can SSOs Be Reduced or Eliminated ?

The vast majority of SSOs can be prevented by disposing of grease properly! Do not pour grease down the drain. Scrape the grease off plates, pans, etc. and into grease cans for recycling. Homeowners may place these small amounts of collected grease into trash bins for disposal.

You Can Prevent SSOs.

- Never put grease down garbage disposals, drains, or toilets.
- Perform periodic cleaning to eliminate grease, debris and roots in your service laterals.
- Repair any structural problems in your sewer system and eliminate any rainwater infiltration/inflow leaks into your service laterals.

Businesses Can Prevent SSOs.

Restaurants and large buildings, such as commercial food establishments, may have grease traps or interceptors to keep grease out of sewer pipes. To work correctly, a grease trap or interceptor must be:

- Sized correctly and designed to handle the expected amount of grease.
- Installed properly per local codes.
- Maintained properly, cleaned and serviced regularly.

City of Irving's Remedies for SSOs.

Irving addresses SSO issues through a combination of ongoing preventive maintenance (PM) programs, which monitor and clear lines on a regular schedule, and capital improvement projects, which are designed to provide long-term relief to SSO problems. PM programs use regularly scheduled inspections and cleaning to provide short-term relief for recurring problems. For example:

- **Flushing/Vacuuming:** Using a combination cleaner truck, high-pressure, high-velocity water is flushed through a main to move debris and grease to the next downstream manhole, where it can be vacuumed into the combination cleaner tank.
- **Root trimming:** Using a circular blade, roots are cut by remote control from a vehicle attachment. Cuttings are removed at the downstream manhole by the combination cleaner truck.
- **Chemical treatments:** A foaming chemical is sprayed into the sewer, which kills roots that have infiltrated the sewer. The roots rot over a period of months. Subsequent flushing/vacuuming will remove the remnants. Chemical treatment is effective in slowing the rate of root re-growth and is not harmful to trees or the environment.

There are also several types of capital improvements that can provide long-term relief for different problems in the system.

- **Open-Cut Replacement:** In traditional replacement projects, the existing sewer is excavated and replaced. It is the preferred method in gravity sewer mains that "sag," and therefore reduce the capacity of the collection system. This type of system defect cannot be corrected by other means. It is also more applicable in areas with multiple lateral reconnections, or where the sewer must be increased in size more than the constraints of pipe bursting will allow.
- **Pipe Bursting:** A new main (or pipe) of the same size or larger is attached to a cone-shaped head and inserted into the existing main through a manhole or an excavation pit. As it is pulled through the existing main by pneumatic or hydraulic means, the leading cone shatters the existing pipe in place, leaving a large void where the trailing new main is pulled into place. Laterals are reconnected by excavation, but surface disruption is less than with open-cut construction. The advantage of pipe bursting over other trenchless methods is the ability to enlarge the pipe.
- **Lining:** A flexible resin-soaked felt liner is inserted into an existing main through a manhole, using water pressure. The liner is "cured" using steam or hot water for several hours. The liner hardens, and laterals can be reinstated using a remote cutter, without excavation. The advantage of this method is that, under ideal

conditions, sewers can truly be rehabilitated “trenchlessly.” The disadvantage of that is that the new main diameter is slightly smaller.

A few SSOs may be unavoidable such as those occurring from unpreventable vandalism, some types of blockages, extreme rainstorms, and acts of nature such as floods.

Since overflows come out of manholes, you might think that sealing manholes could stop the problem. Unfortunately, that would create a much worse problem. If the excess water pressure and volume in sewer lines couldn’t escape through manholes, the wastewater would be forced to back up into homes through anything with a drain. Manholes prevent a more serious problem also help maintain the sewer system.

What Health Risks do SSOs Present ?

Sewer overflows contain everything that goes down your drain, including water from washing machines, dishwashers, sinks, showers, and toilets because SSOs contain raw sewage they can carry bacteria, viruses, protozoa (parasitic organisms), helminths (intestinal worms), and borroughs (inhaled molds and fungi). The diseases they may cause are shown in the table below and range in severity from mild gastroenteritis (causing stomach cramps and diarrhea) to life-threatening ailments such as cholera, dysentery, Hepatitis B, cryptosporidiosis, and severe gastroenteritis. Children, the elderly, and people with suppressed immune systems face added risk of contracting serious illnesses. Keep people and pets away from the affected area.

Disease Causing Organisms and Symptoms

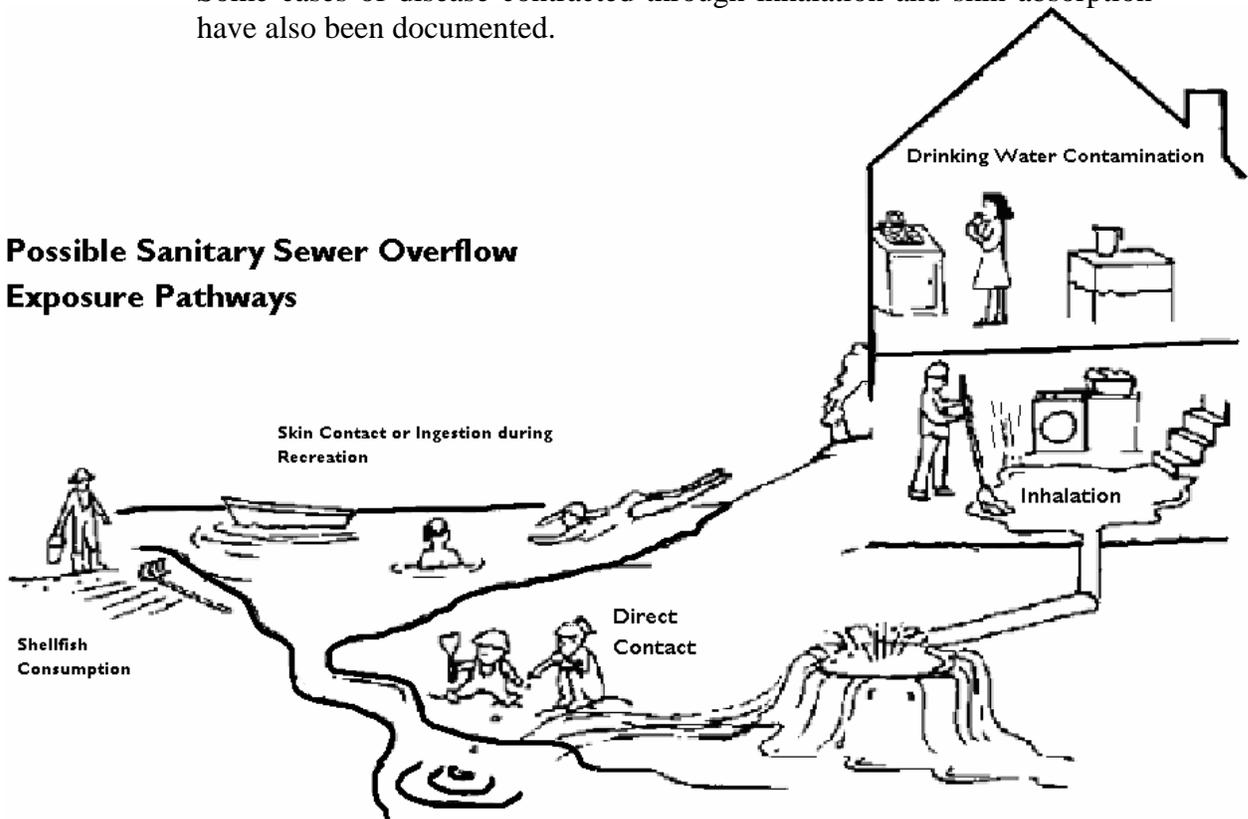
Bacteria	<i>Chlorea, salmonellosis (food poisoning), typhoid fever, bacillary dysentery, gastroenteritis (including diarrhea and abdominal pain)</i>
Viruses	<i>Hepatitis, meningitis, pneumonia, fever, common colds, paralysis, encephalitis, gastroenteritis, diarrhea, respiratory infections</i>
Helminths	<i>Gastroenteritis, acute enteritis, giardiasis (including diarrhea, abdominal cramps, and weight loss), dysentery, toxoplasmosis, cryptosporidiosis</i>
Protozoa	<i>Digestive and nutritional disturbances, abdominal pain, vomiting, restlessness, coughing, chest pain, fever, abdominal pain, diarrhea, anemia, weight loss, fever, muscle aches, nervousness, insomnia, anorexia, hookworm disease, taeniasis</i>
Bioaerosols	<i>Allergic reactions (such as asthma), Legionnaire's disease</i>

People can be exposed through:

- Sewage contaminating drinking water sources.
- Direct contact in areas of high public access such as basements, lawns or streets, or to waters used for recreation. Some studies have estimated a direct relationship between gastrointestinal illness contracted while swimming and bacteria levels in the water.

- Shellfish harvested from areas contaminated by raw sewage. Hundreds of cases are reported for illness after eating shellfish contaminated by sewage and other sources.
- Some cases of disease contracted through inhalation and skin absorption have also been documented.

Possible Sanitary Sewer Overflow Exposure Pathways



According to the Centers for Disease Control (CDC), skin contact may not pose a serious health risk, but there is some risk of disease from swallowing bacteria. The CDC stresses that you should always wash your hands before preparing or eating food, after using the bathroom, and after handling articles that have been exposed to floodwater or sewage.

What Other Damage Can SSOs Cause?

Natural Resource Impacts

In rivers, streams, and estuaries, the major contaminants contributing to impairment are pathogens, nutrients, and metals - all contaminants typically found in sewage. Although it is hard to gauge the importance of SSOs in the overall problem, they are suspected as a major contributing factor. The environmental impacts of sewage include hypoxia, harmful algal blooms, habitat degradation, floating debris, and impacts to threatened or endangered species dependent on those aquatic habitats.

Recreation

A key concern with SSOs which enter rivers, lakes, streams, or brackish waters is their effect on water quality. When bodies of water cannot be used for drinking water, fishing,

or recreation, society experiences an economic loss. Tourism and water front home values may fall. Fishing and shellfish harvesting may be restricted or halted.

Every year, vacationers take trips to a public waterfront and go boating, swimming, or fishing - activities that can include primary and secondary contact with the water. Each year, tourism dollars are lost because hundreds of coastal beaches are closed due to SSO contamination, often repeatedly or for extended periods.

Public and Private Property Damage

An untold number of private backups occur each year. In addition to the problem of human exposure, these spills can cause structural damage to building frames and foundations as well as water damage to appliances. When sewer lines back up or overflow, the damaged area must be thoroughly cleaned and disinfected to reduce the risk of disease. Cleanup can be expensive for homeowners, and municipalities. Rugs, curtains, flooring, wallboard panels, and upholstered furniture usually must be replaced, if it is damaged by sewage. The cost of cleaning up a sewage spill can turn out to be far more expensive than it would have been to do preventative maintenance. SSOs frequently spill into homeowner yards, damaging landscaping, driveways, and outside possessions.

Municipal property damage from a major SSO can be severe. Communities pay millions per year to clean up and repair overflow damage to sewer infrastructure, roads and other transportation assets, and park recreation areas.

You are Responsible for Your Lines.

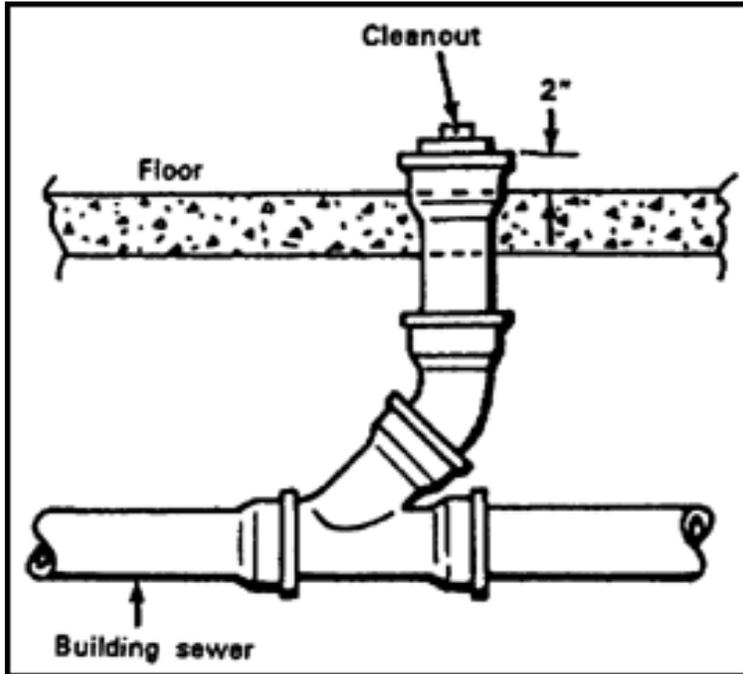
You are responsible for a sewage spill caused by a blockage or break in your sewer lines. Time is of the essence in dealing with sewage spills. If a sewage overflow occurs due to a problem in your lines you are required to immediately:

- Control and minimize the spill. Keep spills contained on private property and out of gutters, storm drains, and public waterways by shutting off or not using the water.
- Use sandbags, dirt and/or plastic sheeting to prevent sewage from entering the storm drain system.
- Clear the sewer blockage. Always wear gloves and wash your hands. It is recommended that a plumbing professional be called for clearing blockages and making necessary repairs.
- Always notify your public works/ water utilities department of a sewage spill occurring or if the spill enters the storm drain. 24hrs Water Utilities 972.721.2281

You Could Be Liable

Allowing sewage from your home, business or property to discharge to a gutter or storm drain may subject you to penalties and fines issued by the City of Irving for clean-up and enforcement efforts. If you own a home or business, you also own the service lateral connecting it to the sewer main. Because you, your plumber, or the City of Irving may need access to clear a blockage and prevent or stop messy, costly sewage backups, you

may need a cleanout on your lateral at the property line.



A cleanout is a vertical pipe that extends from a lateral to the surface of the ground and has a removable cap. You should know where your sewer cleanout is for quick access if you have a sewer backup. Keep the cap on and in good condition to prevent debris from getting in, blocking the pipe, and causing a backup. Keeping the cap on helps protect our environment from sewer overflows by keeping out rain and surface water that can overload the sewer system.

What to do if you Experience a Sewer Backup.

The City is committed to building and maintaining a safe, efficient sewer system. We encourage citizens to report any SSOs they see and inform your Water Utility if you are also experiencing one.

When a sewer line from your home to the City sewer line in the street becomes plugged or causes backups in your home, it's best to call a plumber first to investigate the cause of the backup. If the plumber finds a problem in the line from your home to the street, the repair is your responsibility. If the plumber determines the problem is in the City sewer line between the curb lines, call the Irving Water Utilities Department 24hrs 972.721.2281.

Start the Cleanup Process.

For professional help to clean up after a backup indoor, look in the yellow pages under carpet cleaning and related services. If you begin the cleanup yourself remember to take some basic precautions because bacteria is present in sewage and poses a health hazard.

- Wear gloves, boots, rain gear and other protective clothing.

- If you hose down the contaminated area, wear goggles or safety glasses.
- Avoid coming into contact with sewage or material contaminated by sewage. Be especially careful to not let sewage come into contact with your face or eyes.
- Protect cuts and scrapes. Immediately wash any wound that comes into contact with sewage.

Cleaning Up

- Hose down the contaminated area if possible, and minimize the amount of runoff that may reach any storm drains
- Wash all surfaces with hot, soapy water.
- For overflows indoors, disinfect all surfaces with a solution of one part household bleach to ten parts water. For overflows outdoors, spread a bacterial disinfectant powder on the ground.
- Wash hands thoroughly after cleaning up.
- Wash and disinfect clothing and supplies used in cleaning up.