



*City of Lawrence*  
UTILITIES

# 2013 UTILITIES FIELD OPERATIONS ANNUAL REPORT

The Lawrence Utilities Department Field Operations work group is responsible for the department's water and wastewater mains, and related infrastructure, including the following:

- 505 miles of water mains
- 12,835 valves
- 3,331 hydrants
- 26 miles of City-maintained sanitary sewer force main
- 413 miles of City-maintained gravity sewers
- 10,447 manholes

To ensure the reliability of the City's water and sanitary sewer transmission systems, the group is responsible for the following:

- Replace water mains, usually 8" and under, based on specific criteria of age, condition, history of breaks, and other indicators.
- Repair water main leaks as they occur, usually within 4 hours of identification.
- Exercise valves to keep them mobile and ensure that they will adequately isolate a leak when needed to limit the number of customers without service during repair.
- Inspect and repair fire hydrants to ensure they are functioning and in good condition.
- Inspect sanitary sewer mains to identify cracks and breaks that may allow inflow and infiltration into the main and wastewater out of the main.
- Clean sanitary sewers to remove grease, rages, and other debris that may cause blockages and sanitary sewer overflows or basement backups.
- Locate and mark water and wastewater mains, as well as storm water and traffic signal buried infrastructure to avoid damage from contractors and residents excavating.
- Inspect construction of water and sanitary sewer mains to ensure they meet the specifications and criteria as required by the department.

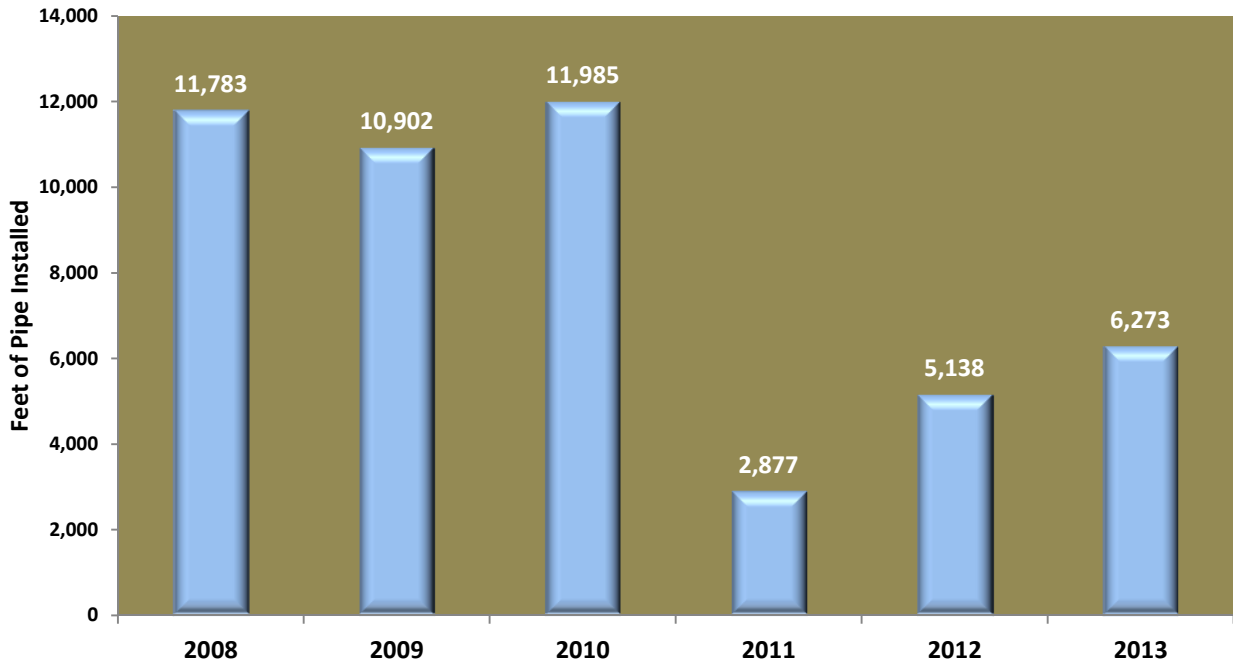
### **Water Distribution Systems**

In 2013, Utilities Field crews installed 6,273 feet of water main with in-house resources. The water main installation replaced existing water main due to excessive leaks, critical location, or meeting specific criteria and based on available resources. In-house water main replacement has increased over the past 2 years due to an increase in available funding and personnel. During 2008-2010, two crews were assigned to in-house water main replacement. Since 2011, one crew has been used. (See Graph 1)

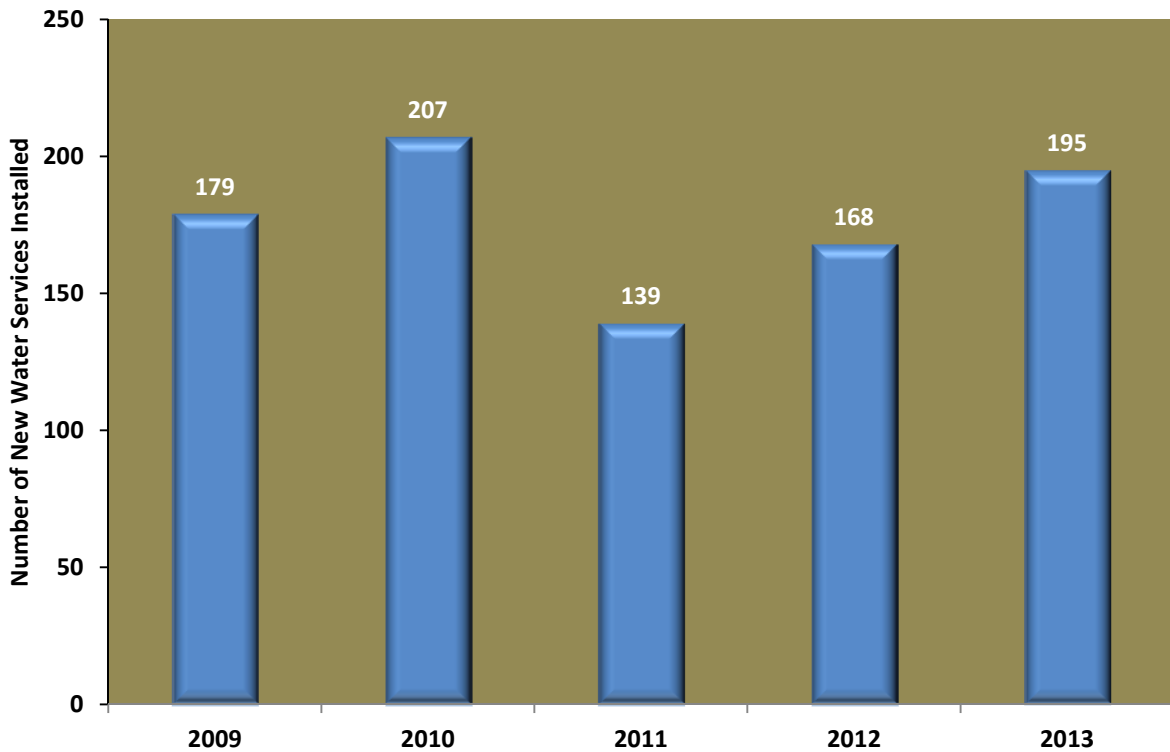
Utilities Field Operations crews currently install new 1" or smaller water services. One inch or smaller services are generally residential. The trend is upwards and mirrors the increase in residential construction. (See Graph 2)

In 2013, the Utilities Field crews responded to 239 customer service calls for the water distribution system. Of those 239 calls, 152 resulted in an identified leak that was repaired and the main put back in service. Crews verified that the remainder did not have a leak in that location. The water distribution system leaks were located in all parts of the City south and west of the Kansas River with the greatest concentration of leaks on the older main and the ductile mains where corrosive soils are present. (See Map 1 for all water distribution system leaks by location.) Water main leaks are attributed to a variety of causes including age of pipe, condition of the main, how the main was installed, type of soil the main is in, and ground movement due to freeze/thaw or drought conditions. Late 2010 is generally considered the beginning of the drought, which lasted into early 2013. The increase of water main leaks in 2011 and 2012 is attributed to the dry soil conditions during that time. (See Graph 3.) The water distribution system leaks that occurred in 2013 cost the City \$360,219 to repair. (See Graph 4 for types of repairs and cost.)

### Graph 1. In-House Water Main Installed



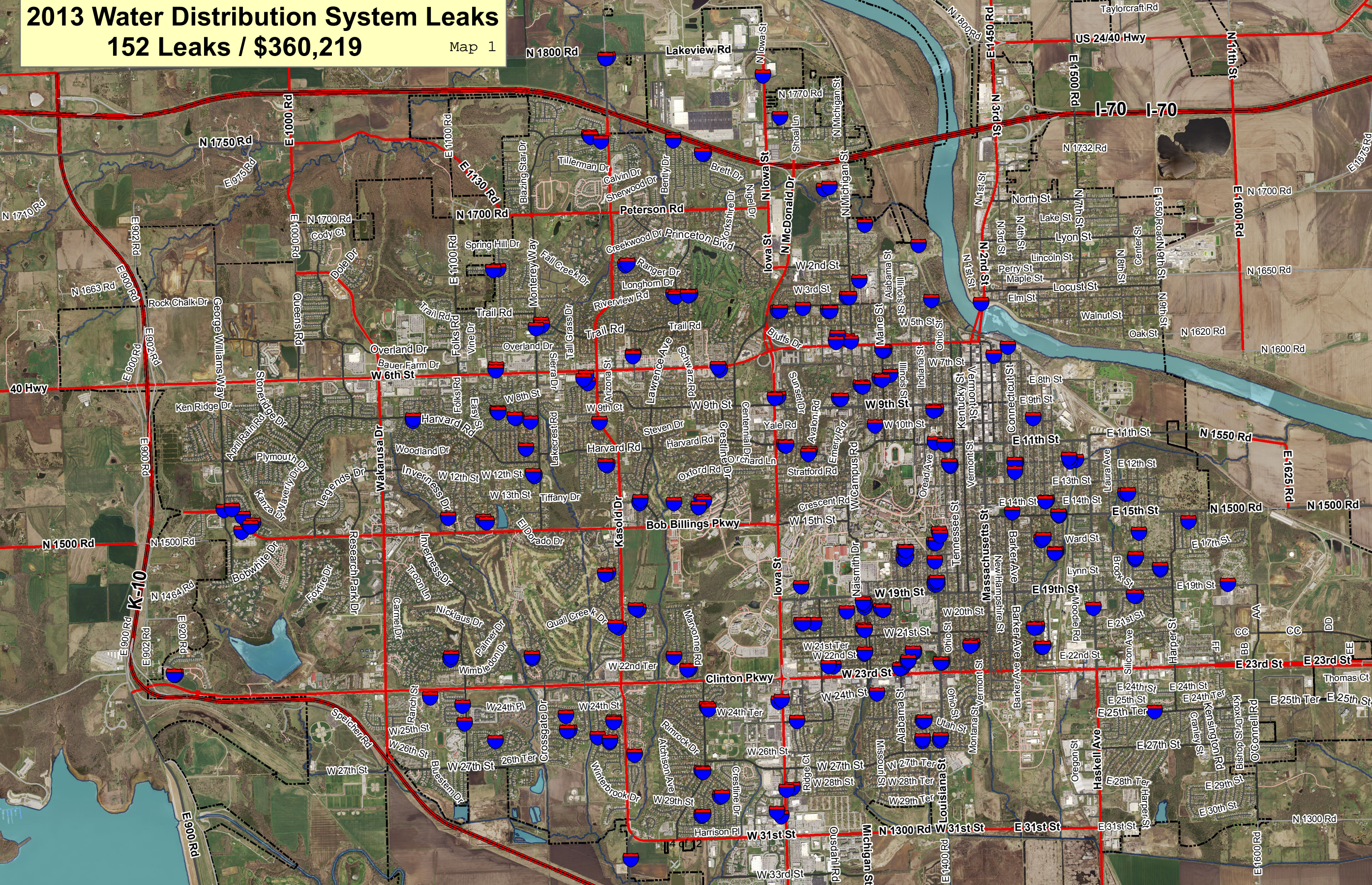
### Graph 2. New Service Installations



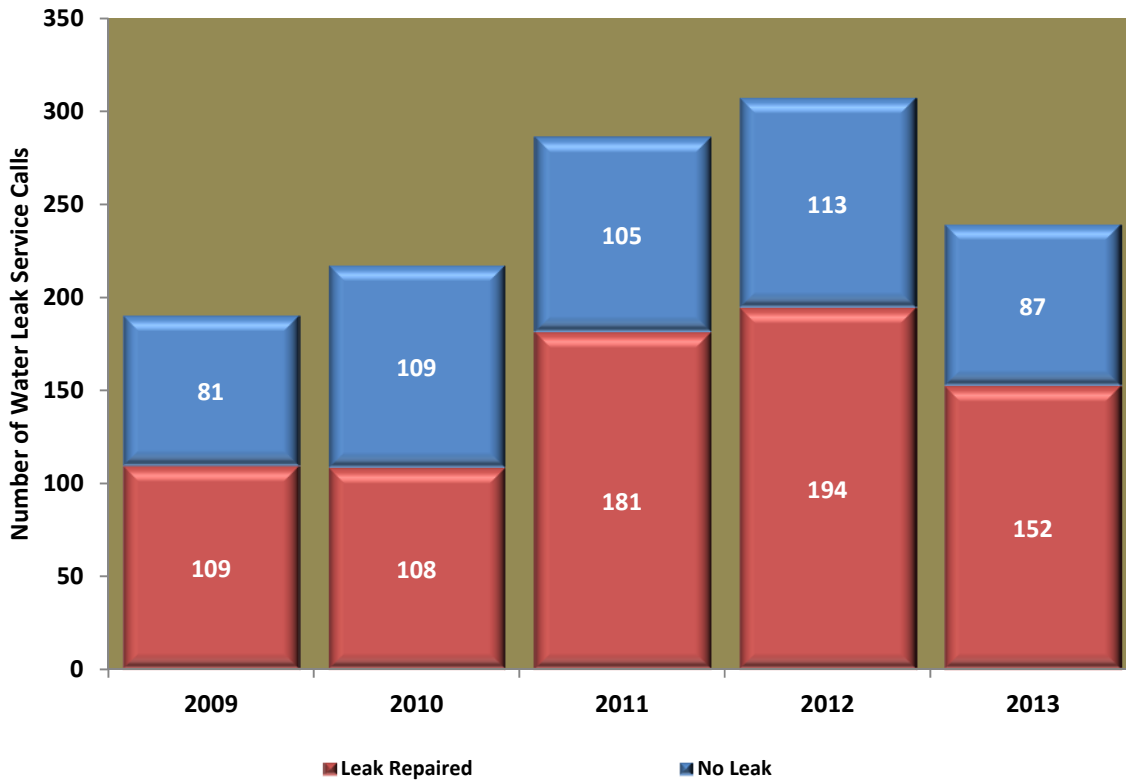
# 2013 Water Distribution System Leaks

## 152 Leaks / \$360,219

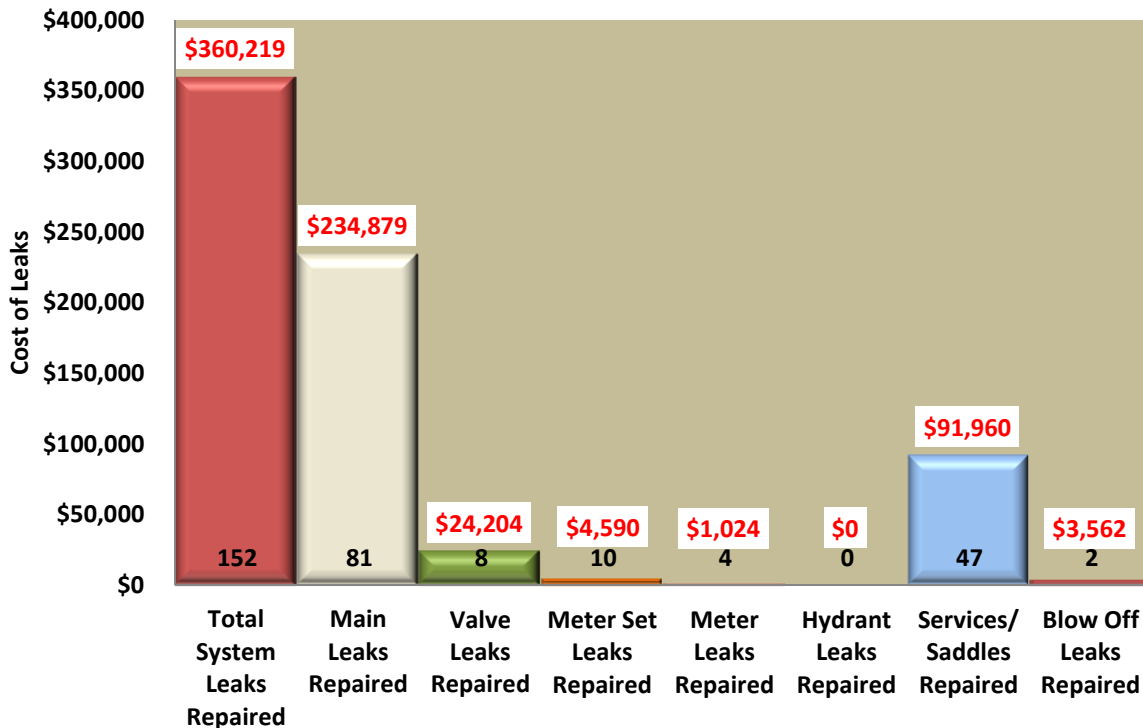
Map 1



**Graph 3. Water Distribution Customer Service Calls / Leaks**

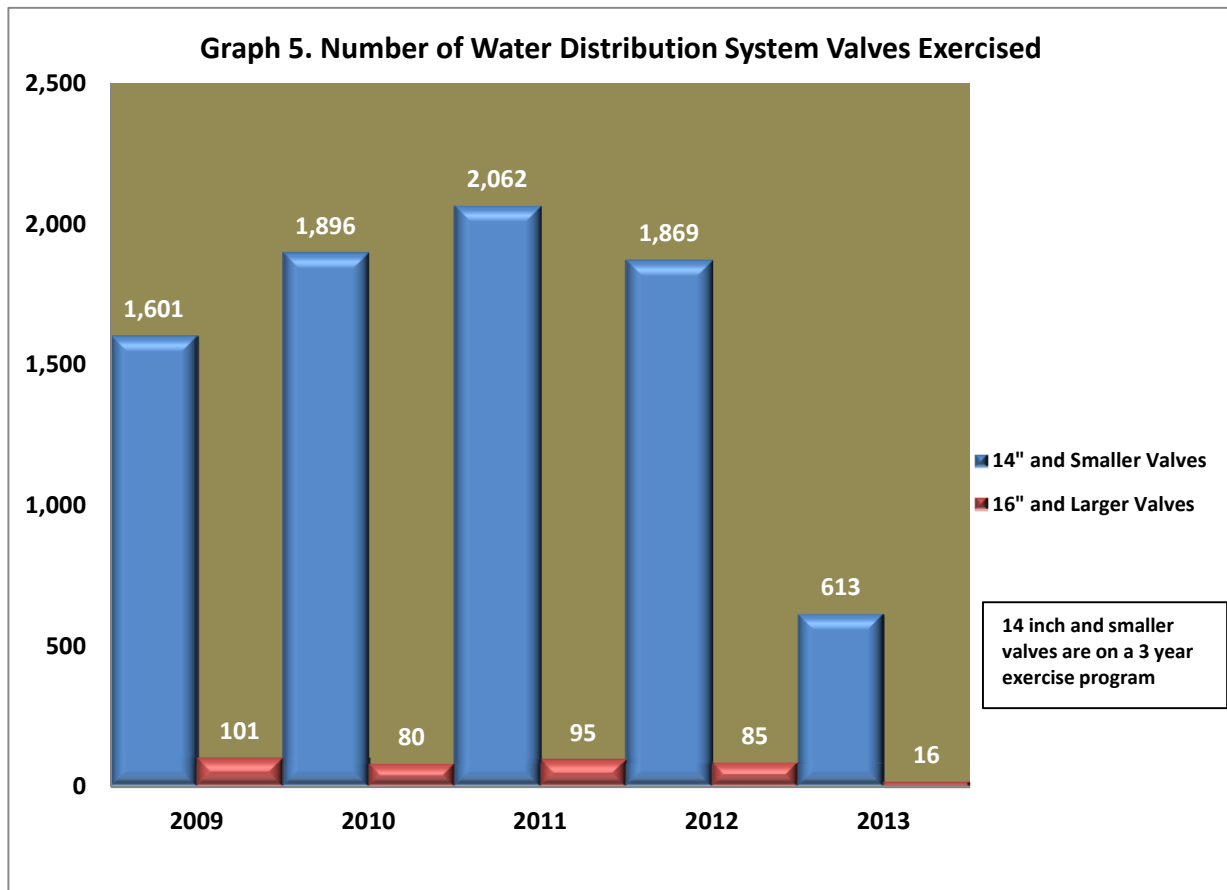


**Graph 4. 2013 Water Distribution System Leak Repair Cost and Types**



The Utilities Field group has a program for exercising valves located within the water distribution system. All 14" and smaller valves are on a 3 year rotational exercise program. All 16" and larger valves are on a 1 year rotational exercise program. The valve exercise programs are important to the reliability of the water distribution system because unused valves can become inoperable and unable to close. This results in additional customers out of service during the repair of the main. In 2013, fewer valves were exercised due to personnel resources. Crews anticipate the program to perform at planned levels in 2014. (See Graph 5).

Other annual programs used by the Utilities Field group are the Fire Hydrant Maintenance Program, Fire Hydrant Flow Testing Program, and Large Water Meter Testing Program. The Fire Hydrant Maintenance Program is used to test and maintain all fire hydrants in good working condition in a 2 year rotation to assure that the Fire Department has access to water at hydrants closest to the location needed. The Fire Hydrant Flow Testing Program tests and records the flow of every hydrant in a 4 year rotation. The Large Water Meter Testing Program tests 6" or larger water meters, which are used for commercial and industrial customers, and wholesale water contracts, to assure that they are functioning properly.



## **Wastewater Collection System**

The Utilities Field crews clean the sanitary sewer mains to remove any debris or items that may become lodged in the main and restrict wastewater flow, resulting in a back-up. Utilities Field crews use preventive maintenance programs to ensure the reliability of the sanitary sewers. (See Graph 6.) These programs include:

- Section Cleaning Program - cleans all city sewer lines 18" or smaller once every 4 years, or 538,941 feet annually.
- Preventive Maintenance Program - scheduled cleaning of sewer mains due to specific targeted problems such as grease, roots, or paper into monthly, 3-month, 6-month, or annual cleaning.

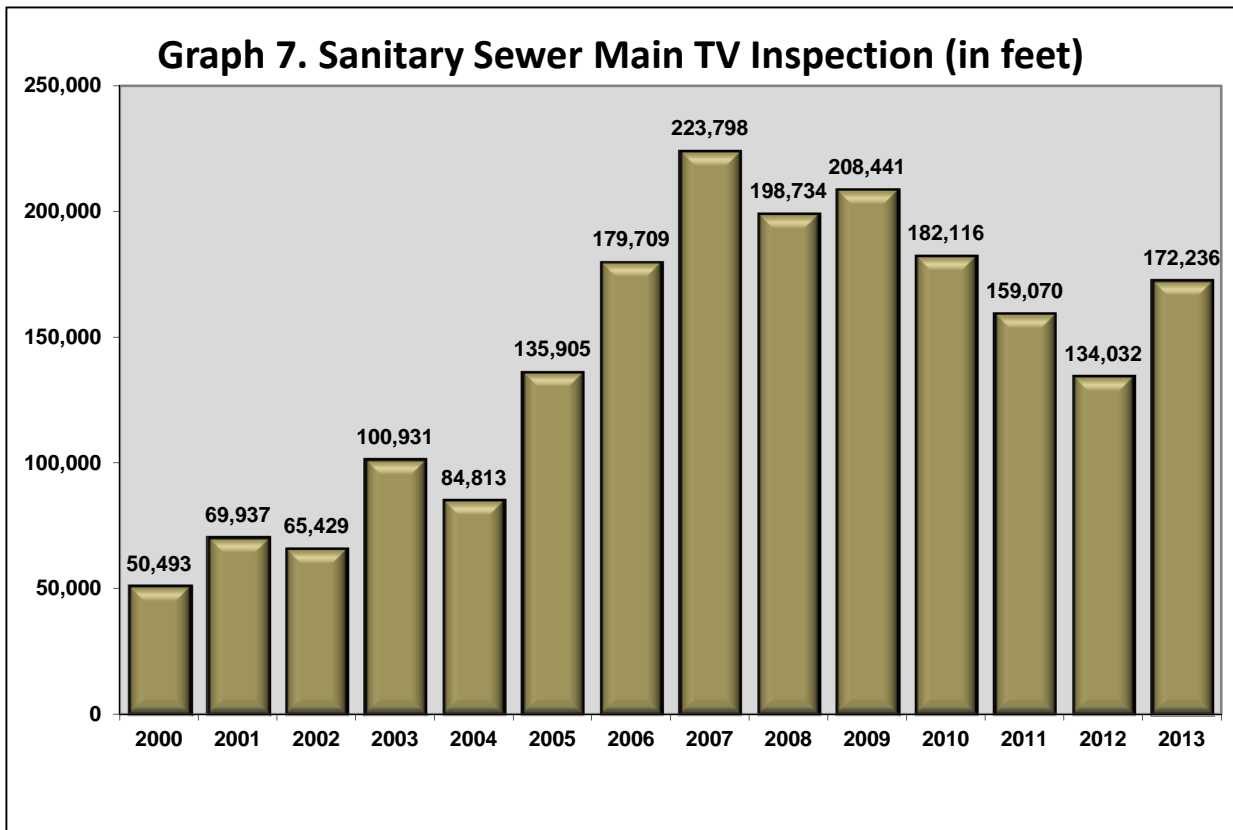
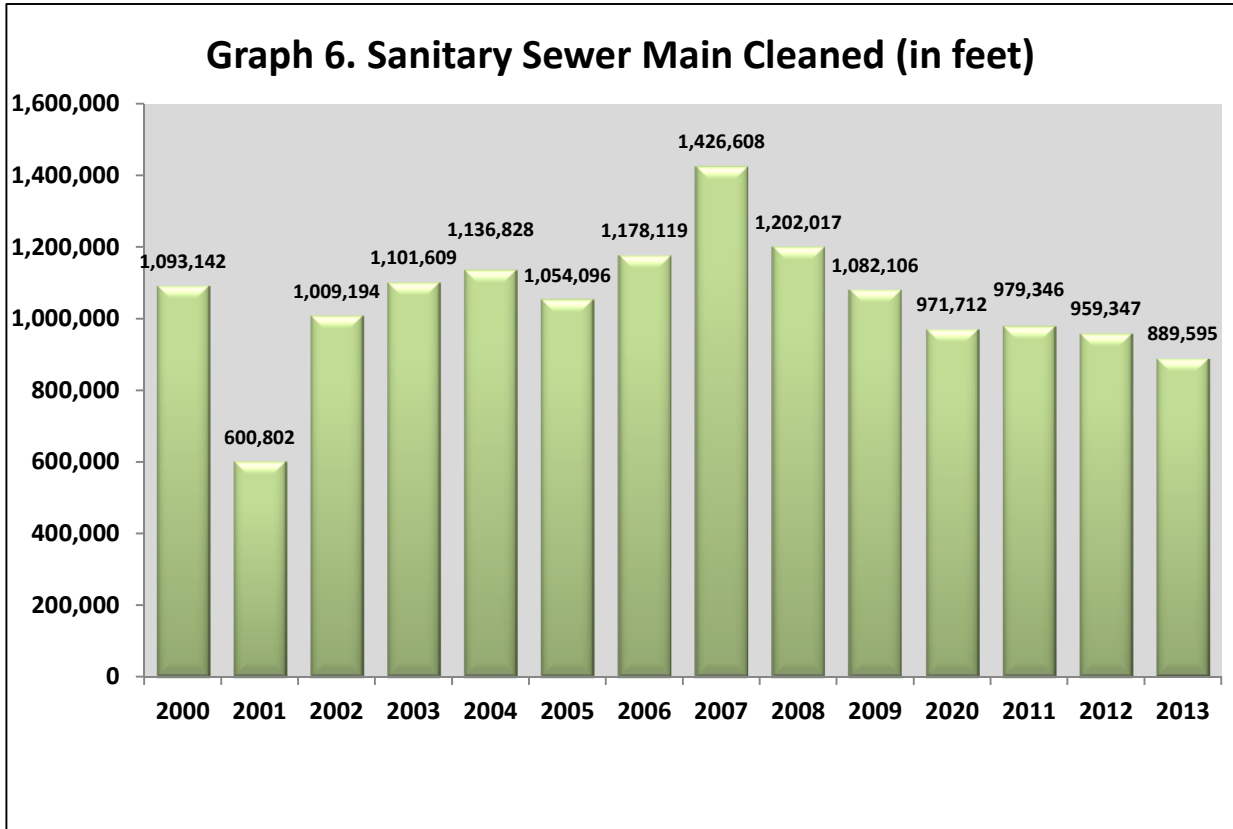
The Utilities Field crews use close circuit cameras (CCTV) to inspect the sanitary sewer lines to locate areas of defects, inflow and infiltration, blockages, and condition. (See Graph 7.) The inspection programs include:

- 10 year Vitrified Clay Pipe TV Inspection Program – inspects and assesses the condition of vitrified clay pipe. This program was started in 2009.
- Sewer Main Backup TV Inspection Program – inspects the sanitary sewer main after a backup to determine the cause.
- CIP/PIP Bond TV Inspection Program – inspect new sewer main construction prior to the end of the warranty period.

The wastewater collection system point repairs were located generally on the east side of the City. (See Map 2 for all wastewater collection system repairs by location.) The repairs for 2013 are generally concentrated in the areas where CCTV inspections were being performed. The wastewater collection system point repairs in 2013 cost the City \$211,793. (See Graph 8.)

In 2013, the Utilities Field crews responded to 109 customer service calls for the wastewater collection system. Of those 109 calls, 27 resulted in an identified blockage of the City main, which crews removed. Crews verified that the remainder of the customer calls had a clear City main. The decrease in customer calls and City main blockages over the past 15 years and ability to maintain the current low level of City main blockages is attributed to the planned Sewer Preventive Maintenance Programs and schedules, which were implemented by the department in 1998. (See Graph 9.)

Sanitary Sewer Overflows (SSO's) are when wastewater leaves the collections system. This can be overflowing manholes, which can lead to environmental degradation by flowing from the manhole into nearby streams or storm sewers, or basement back-ups, which can cause significant property damage. In addition, SSO's also require reporting to the Kansas Department of Health and Environment. It has been a Department goal to reduce SSO's. Preventive maintenance programs have played a major part in reduction of SSO's and the leveling off to the current level, where they will likely remain. In 2013 the department had 8 SSO's. (See Graph 10.)

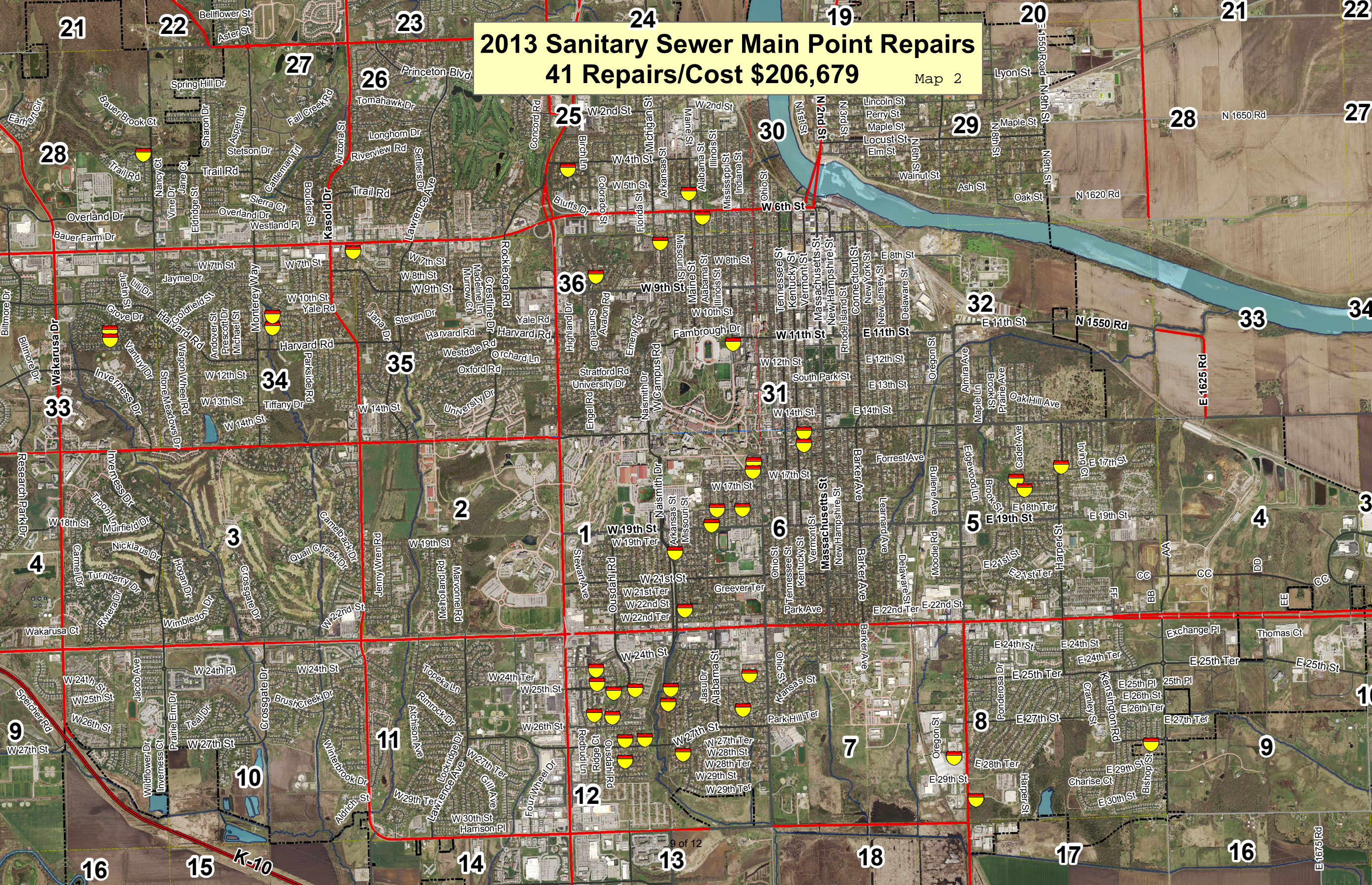




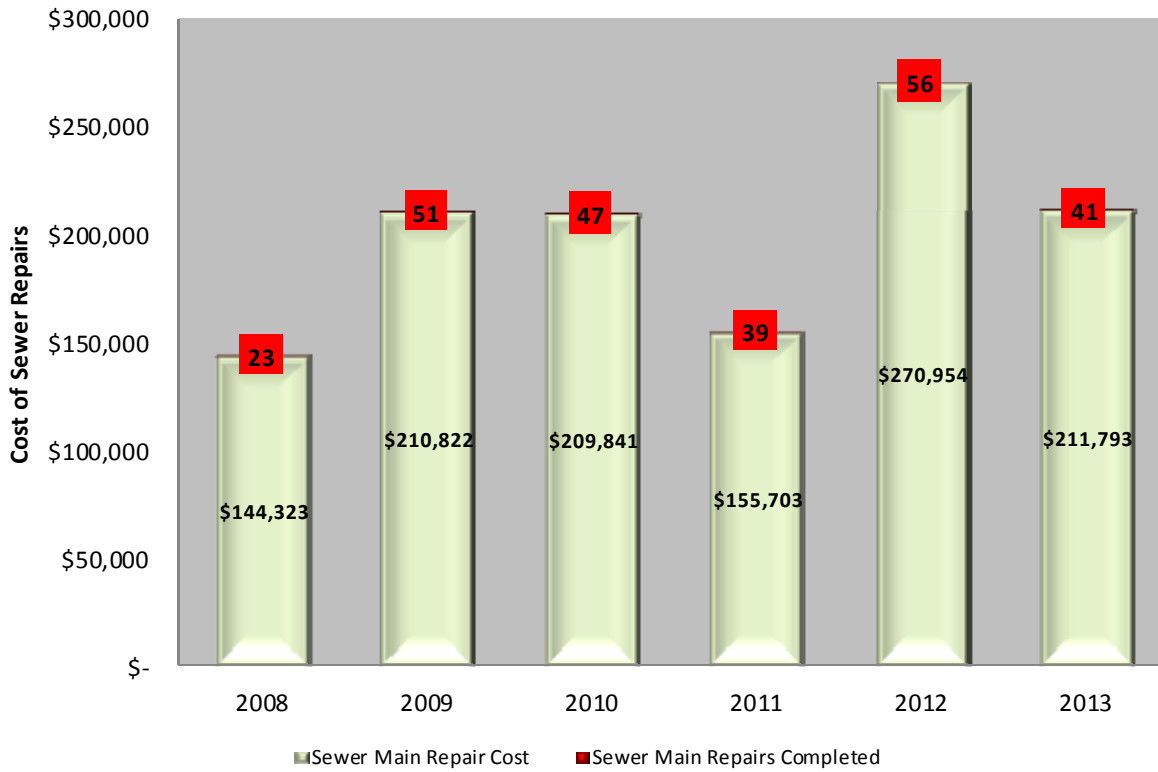
# 2013 Sanitary Sewer Main Point Repairs

41 Repairs/Cost \$206,679

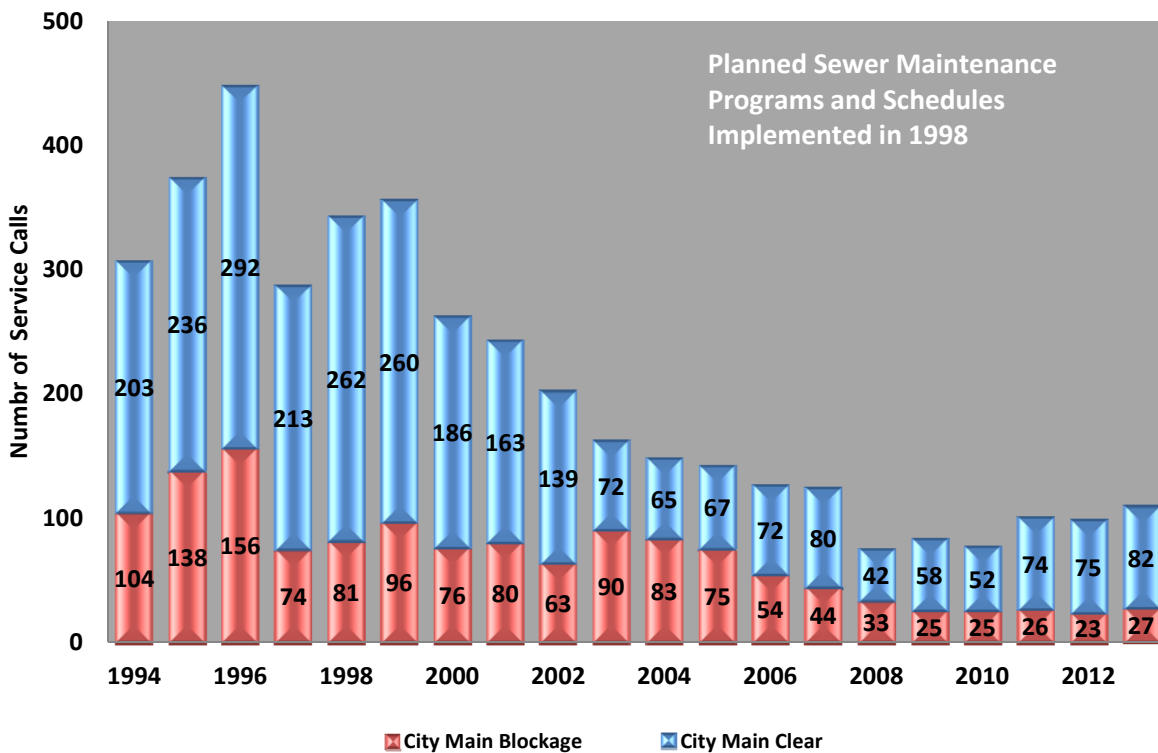
Map 2

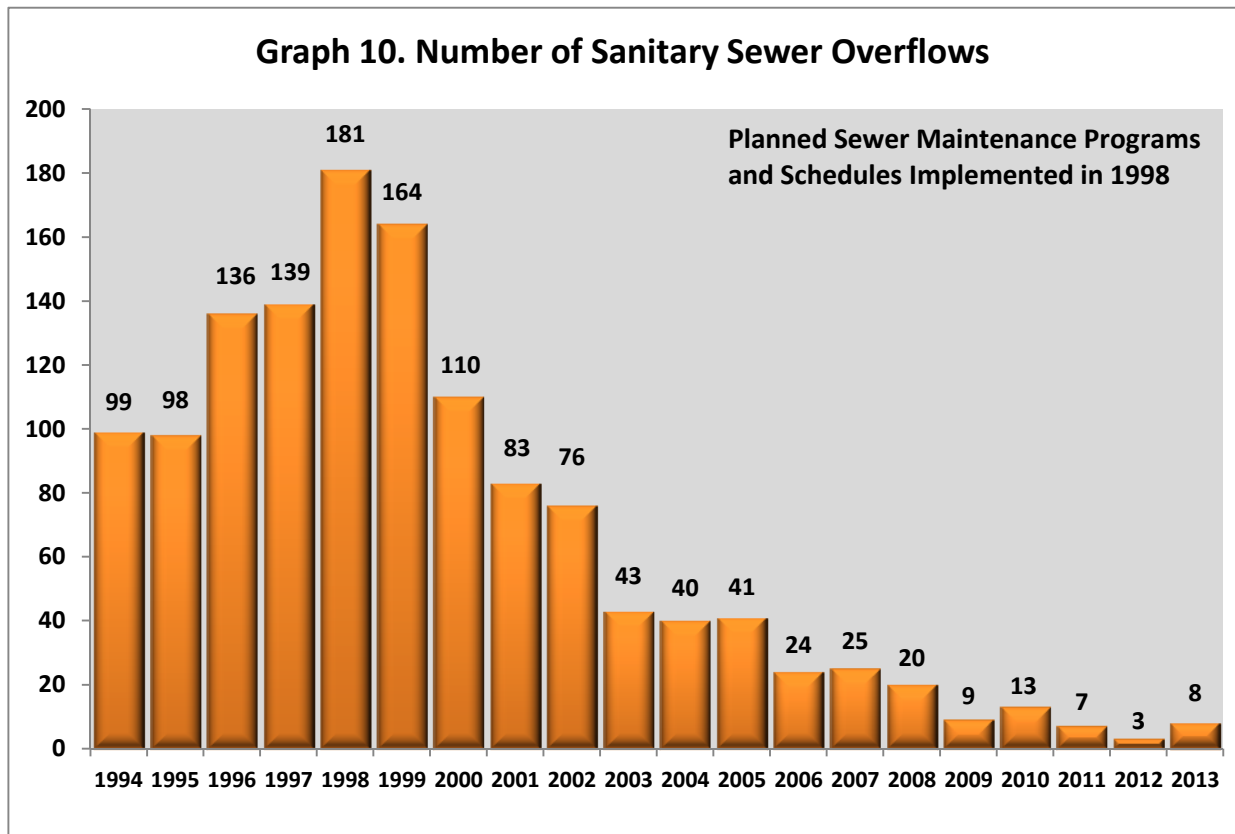


### Graph 8. Sanitary Sewer Main Repairs



### Graph 9. Sanitary Sewer Service Calls





**Field Operations Support**

The Utilities inspectors, which are part of the Field Operations group, are on site for capital and public improvement projects that are installing new water or sewer mains. In these projects, utilities inspectors observe, inspect, and test these new lines to make sure the lines meet all specifications, criteria, and requirements for materials and installation methods. The increase in 2013 is attributable to additional CIP and benefit district funding and private development projects. (See Graph 11)

Two full time Utilities Field staff provide locates for all of the department’s underground infrastructure, as well as provide the service for Public Work’s storm sewers and first call for traffic signals. These locates are provided whenever residents or contractors call 1-800-DIG-SAFE to request these locates before excavation can occur. The accurate location of City infrastructure is critical to avoid excavators from hitting and damaging our water and sewer mains, as well as other underground infrastructure. Staff are allowed up to 3 days to complete routine locate requests. Emergency locates must be completed within 2 hours. Increases in buried infrastructure locates are due to communications projects such as laying of fiber lines and a general increase of projects. (See Graph 12).

