



Overview of the Kingston Springs Sewer System

2024



About the KS Sewer System

Overview

- The Kingston Springs sewer system was established in 1989. The system is not available throughout all of Kingston Springs but services areas including downtown KS, Hillcrest, Bluffs of the Harpeth, Harpeth Hills, the Woodlands, and Harpeth Meadows.
- The Sewer System is a STEP/STEG system. This type of system essentially has primary treatment in a septic tank before the wastewater is piped to a centralized wastewater treatment facility.
- This means that customers on the sewer system still have septic tanks. In this system the waste comes from the house to the septic tank where the solids are held, and preliminary treatment begins. The water then moves from the tank into the sewer system, through pump stations around town, then to the sewer treatment plant for final processing before being discharged into the Harpeth River.

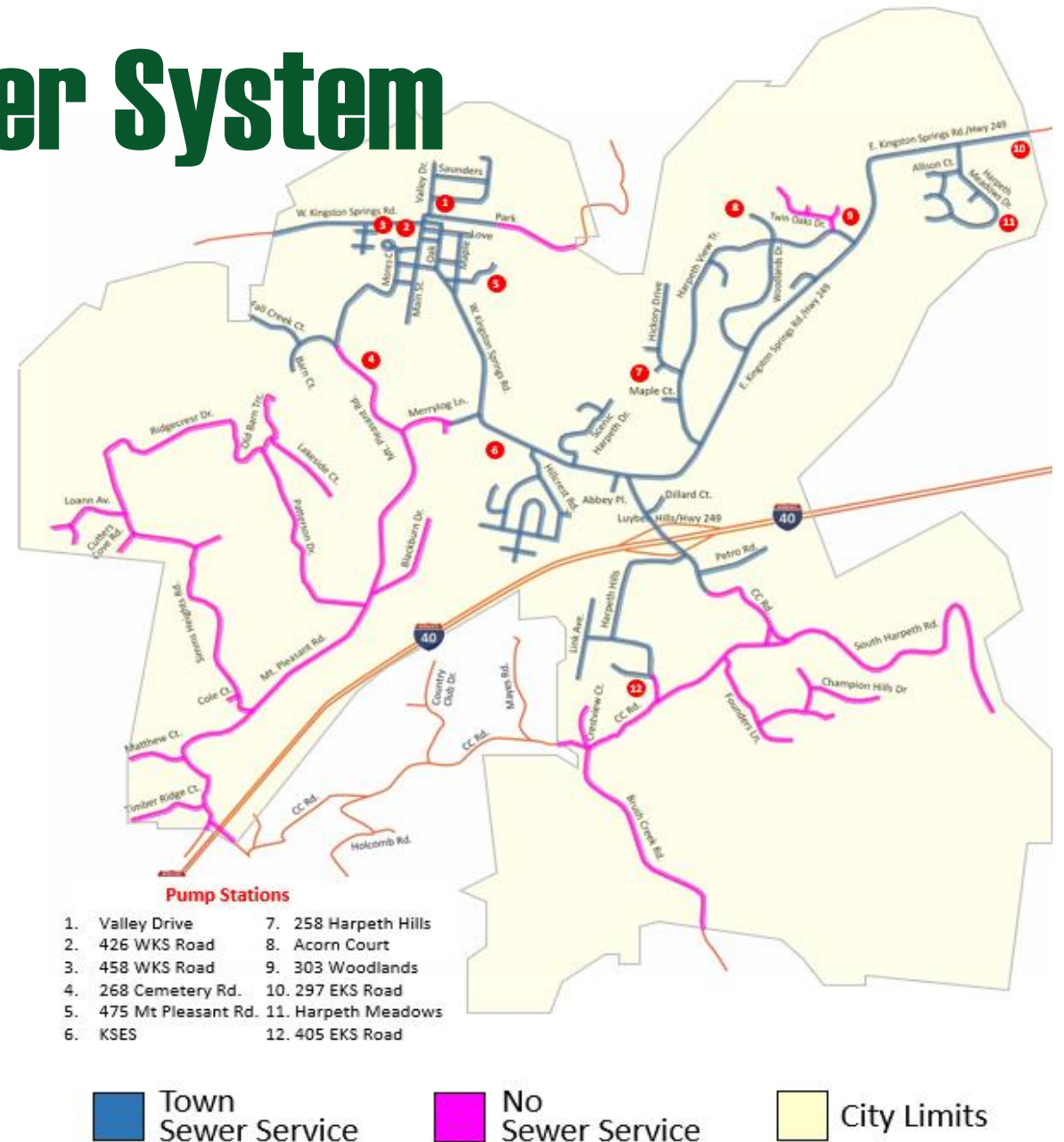




About the KS Sewer System

Overview

- System established in 1989
- Step System – Gravity Fed with 12 Pump Stations
- Treatment Plant with output into the Harpeth River.
- Number of Sewer customers: 750 (+/-).
- Daily, Weekly, Monthly testing and reporting to the Tennessee Department of Environment and Conservation (TDEC).





Who Pays for the Kingston Springs Sewer System

How are the needs of the system funded?

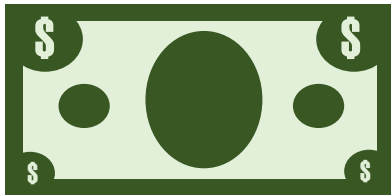


About the KS Sewer System

Who pays for the sewer?

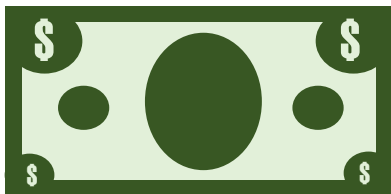
The Town of Kingston Springs operates on two basic monetary accounts. These two accounts are funded in different ways and money from these accounts can only be spent on specific things. Money from these two accounts CANNOT comingle.

General Fund



- Funds from this account serve the needs of the Town as a whole such as roads, parks, police, fire, etc.
- Primarily funded from tax dollars (property tax, sales tax, etc.) and fees.

Enterprise Fund



- Funds from this account are used only for the maintenance and upkeep of town owned utilities, in this case the Town's wastewater system.
- Only funded by fees collected from users of the system (not tax dollars).



About the KS Sewer System

Who pays for the sewer?

- The sewer system is an Enterprise/Utility Fund, which means only the customers on the sewer system pay for the operations, repairs, and maintenance of the system. The sewer system has 750 (+/-) users.
- The sewer system is required by the State to be self-sustaining in covering the annual operating and maintenance costs as well as operate at a minimal profit to cover capital expenses and equipment/infrastructure depreciation costs.
- Laws or regulations require that the sewer system costs of providing services, including capital costs, be recovered with fees and charges instead of taxes or similar revenues.





About the KS Sewer System

How are fees determined?

- Each year the Kingston Springs Board of Commissioners reviews anticipated expenditures related to daily operations and infrastructure needs in the Sewer Department for the next fiscal year (July 1 through June 30).
- Once the projected cost to keep the system repaired and operational is determined then the Board of Commissioners sets the sewer usage rate fee for the fiscal year to assure these system costs can be covered.
- The updated rate is included as part of the Sewer Department budget, is advertised, and is voted on by the Board – usually with first reading in the month of May and second reading in the month of June.





About the KS Sewer System

What do these fees pay for?

- Maintenance of infrastructure. This includes operation of the wastewater treatment facility, maintaining all main and secondary lines, and maintenance of 12 pump stations around town.
- Equipment/machinery needed for daily maintenance and repairs.
- Laboratory testing to assure output falls within TDEC licensing parameters.
- Staffing: 1 part-time licensed operator and 1 full-time maintenance operator.
- Septic tank pumping and maintenance as needed.
- Capital improvement projects for major system repairs and updates.





What are issues with the Kingston Springs Sewer System

What are the biggest problems with the system?



About the KS Sewer System

What are issues with the sewer system that need to be addressed?

- Other than the daily upkeep required in keeping a utility running the biggest issue and biggest expense is dealing with aging infrastructure.
- The sewer system was installed 35 years ago and while most of the above ground infrastructure (pump stations, sewer plant) has been replaced or repaired, most of the underground infrastructure (sewer lines) have not.
- Aging sewer lines can develop cracks and breaks that result in Inflow and Infiltration (I&I). This increased I&I causes our sewer system to operate above various limits of the licensing we have through the **Tennessee Department of Environment and conservation (TDEC).**





About the Tennessee Department of Environment and Conservation



Department of
**Environment &
Conservation**

TDEC monitors the environmental health of the State of Tennessee, collecting information and setting priorities to address opportunities for environmental improvements in a timely manner.

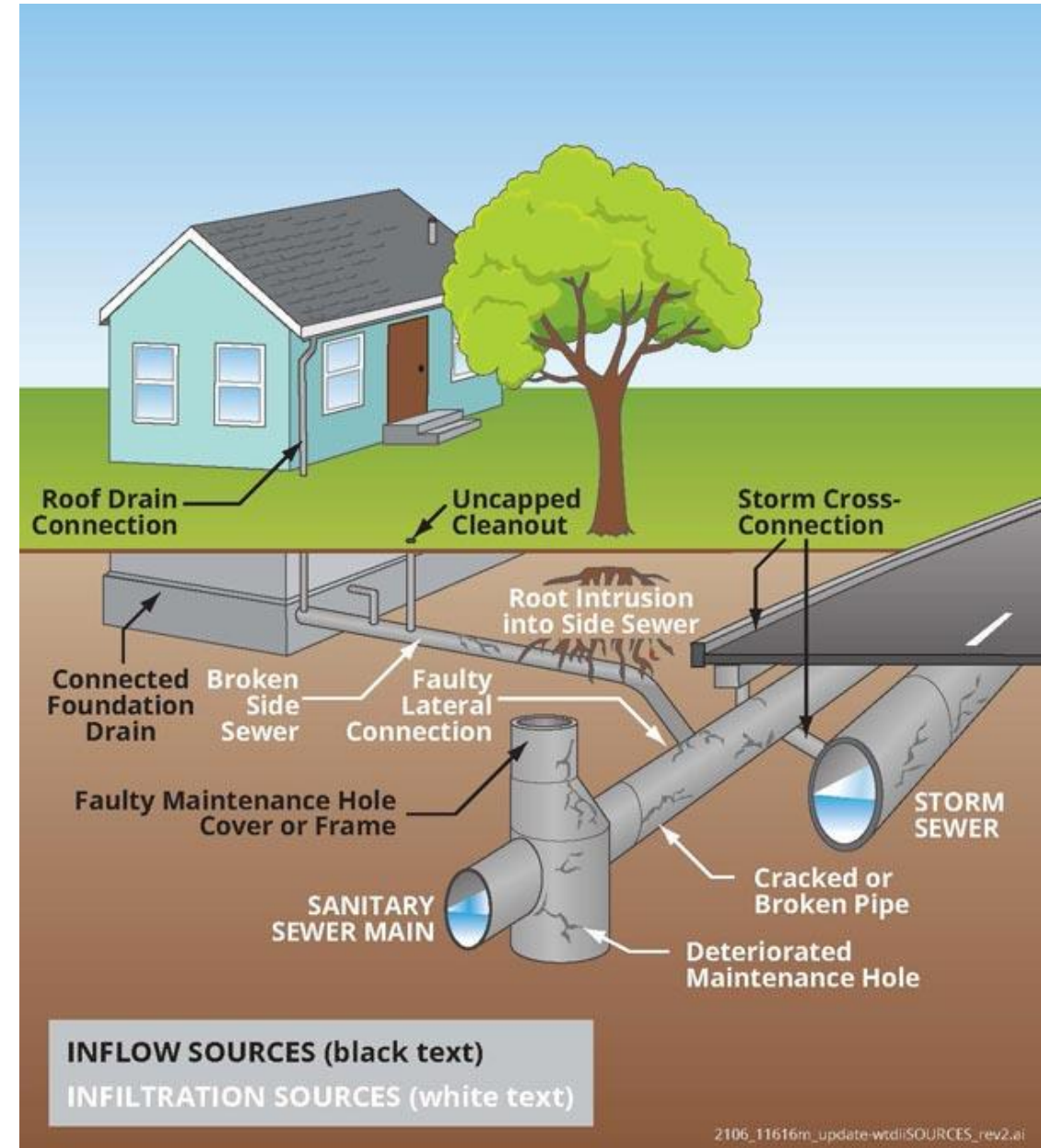
TDEC monitors the output of the Kingston Springs Sewer Department to assure our wastewater plant discharge falls within the parameters of the licensing agreement we have with the State of Tennessee.



About the KS Sewer System

What is Inflow and Infiltration?

- **Inflow** is surface water that enters the wastewater system from yard, roof, and footing drains, and occurs as a result of storm events such as rainfall and contributes to excessive sewer flows.
- **Infiltration** is groundwater that enters sewer pipes through holes, breaks, joint failures, connection failures and other openings.
- *Most I/I is caused by aging infrastructure that needs maintenance or replacement.*

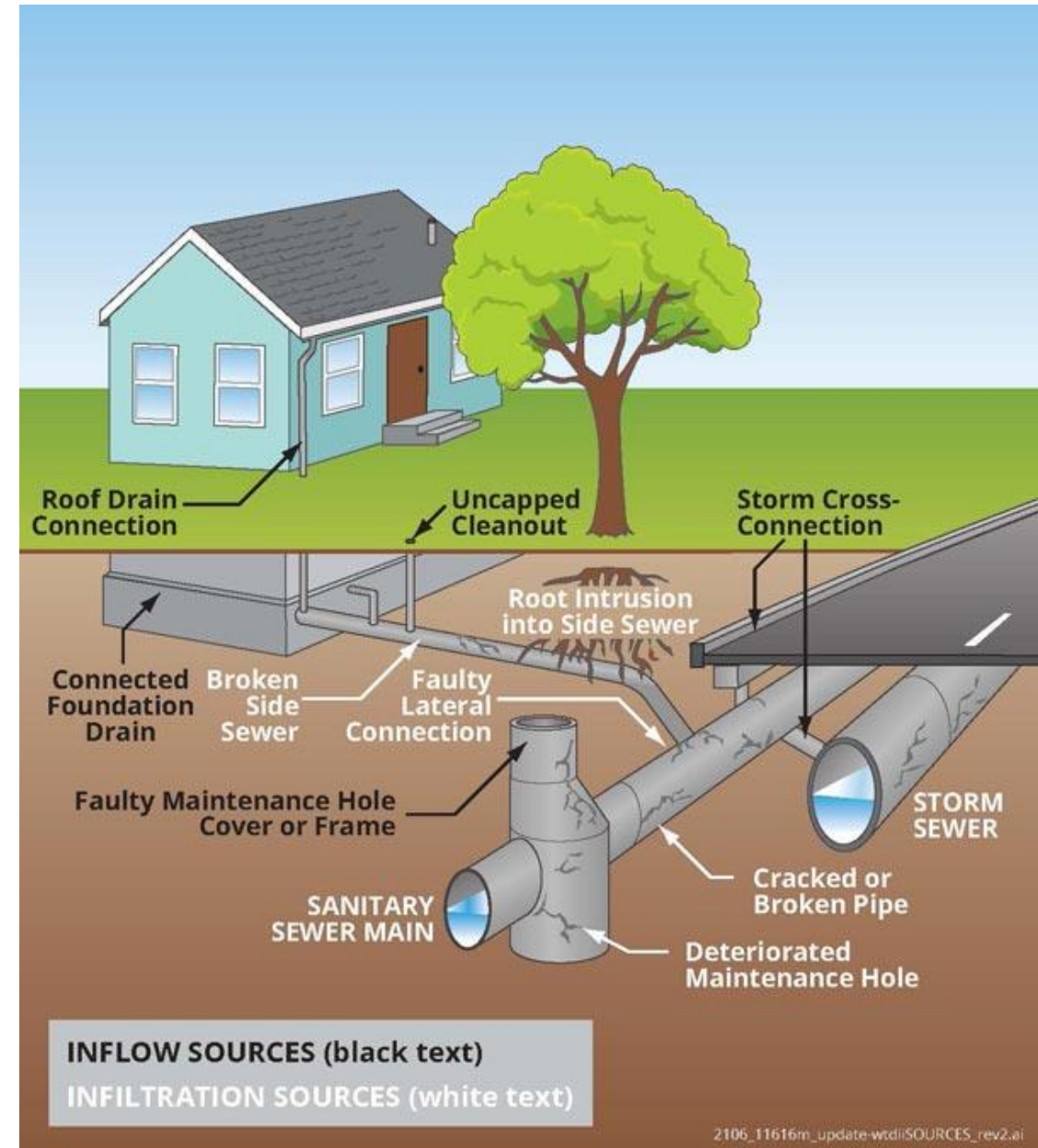




About the KS Sewer System

Why is this Important?

- In 2020 the Town closed a Directors Order from TDEC it had received in 2016 after corrective action were taken.
- Although not part of the initial order, the Town was required to submit a plan of action related to repairing the system to limit violations in I&I.
- The Town continues to receive limit violations on inflow readings to our wastewater treatment plant that are higher than TDEC allows.





About the KS Sewer System

Estimated Cost of Repairing I&I Issues ■ A 2-Step Process

1. Inspection and Mapping of Sewer Lines (estimated)

<u>DESCRIPTION</u>	<u>UNIT COSTS</u>	<u>TOTAL COSTS</u>
SCADA SYSTEM	\$200,000.00	\$200,000.00
SEWER CLEANING, INSPECTION AND MAPPING	\$6.00	\$696,000.00
MANHOLE INSPECTION AND MAPPING	\$500.00	\$58,000.00
CLEANOUT INSPECTION AND MAPPING	\$150.00	\$160,500.00
LATERAL INSPECTION AND MAPPING	\$500.00	\$390,000.00
SEPTIC TANK INSPECTION AND MAPPING	\$750.00	\$585,000.00
TOTAL ESTIMATED CONSTRUCTION COSTS		\$2,089,500.00
ENGINEERING		\$125,370.00
INSPECTION (PART TIME)		\$50,000.00
LEGAL ALLOWANCE		\$25,000.00
CONTINGENCY		\$460,130.00
TOTAL ESTIMATED PROJECT COST		\$2,750,000.00

2. Repair and/or Replace Sewer Lines (estimated)

<u>DESCRIPTION</u>	<u>UNIT COSTS</u>	<u>TOTAL COSTS</u>
PIPE REHABILITATION	\$100.00	\$2,900,000.00
MANHOLE REHABILITATION	\$3,500.00	\$101,500.00
CLEANOUT REPLACEMENT	\$3,000.00	\$802,500.00
SEPTIC TANK EFFLUENT LINE REPLACEMENT	\$35.00	\$887,250.00
PUMP STATION LINE REHABILITATION	\$5,000.00	\$15,000.00
TOTAL ESTIMATED CONSTRUCTION COSTS		\$4,706,250.00
ENGINEERING		\$408,141.00
PRELIMINARY SEWER MAPPING		\$15,000.00
SEWER MAP UPDATES		\$15,000.00
INSPECTION		\$200,000.00
PERMITTING		\$50,000.00
CONTINGENCY		\$1,509,509.00
TOTAL ESTIMATED PROJECT COST		\$6,903,900.00



What's being done with the Kingston Springs Sewer System

How is the system being improved?



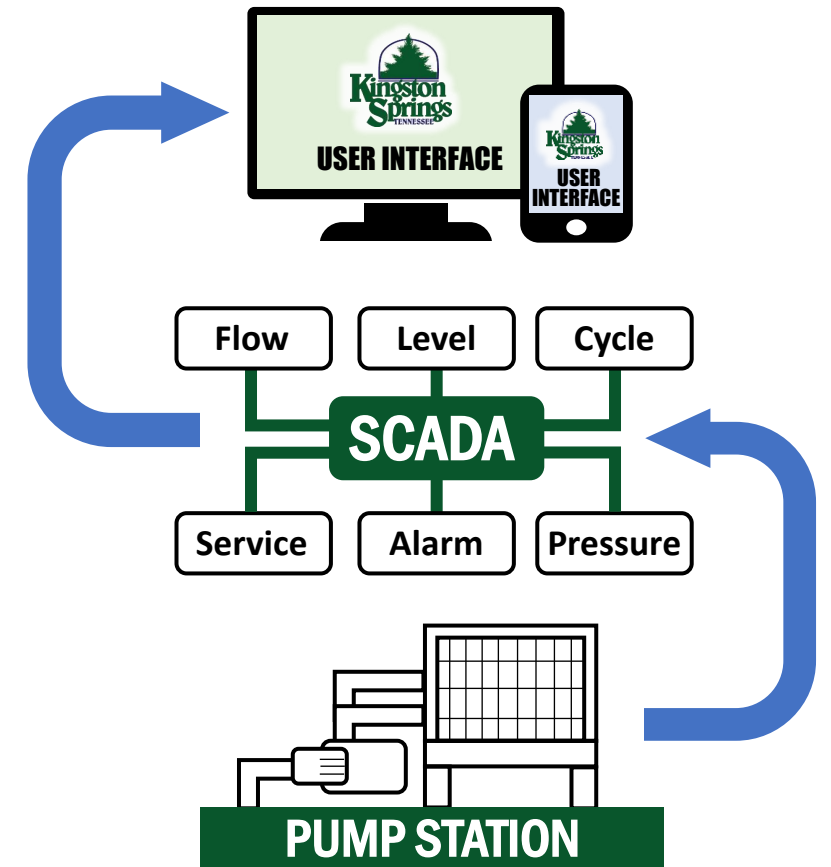
About the KS Sewer System

What we've been working on to repair and update our wastewater infrastructure:

Installation of SCADA systems on all wastewater pump stations.

SCADA stands for **Supervisory Control and Data Acquisition**. These systems are used for controlling, monitoring, and analyzing devices and processes and consists of both software and hardware components and enables remote and on-site gathering of data.

This system allows us to analyze data at each station (flow rate, pump cycles, well levels, etc.) during wet and dry periods to better determine problem areas in our system and isolate sections in most need of repair.





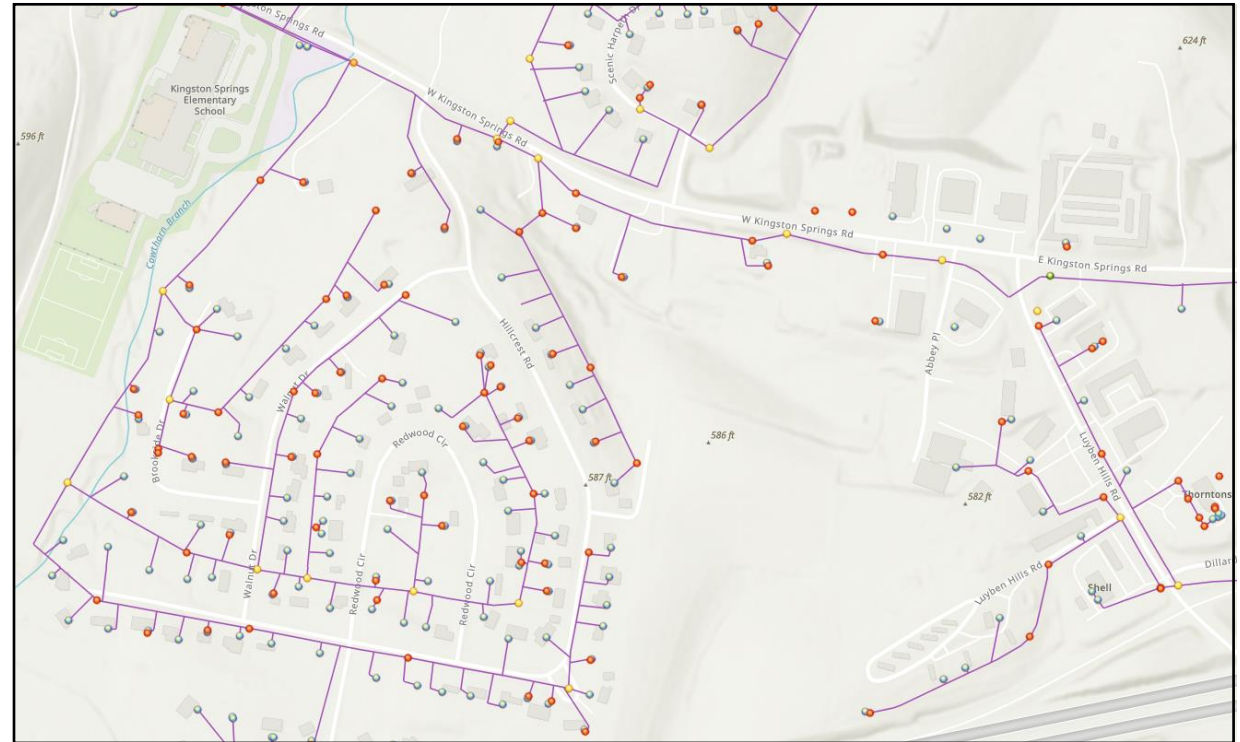
About the KS Sewer System

What we've been working on to repair and update our wastewater infrastructure:

Digital Mapping of Wastewater Infrastructure

The Town has recently worked with the Austin Peay GIS Center to digitally map our wastewater infrastructure that includes sewer lines and individual septic tanks. These are “living” maps and can be updated as additional information is gathered.

This tool allows us to better understand our system as a whole as well as allowing us to more easily locate problem areas and see how these areas might impact the bigger picture.





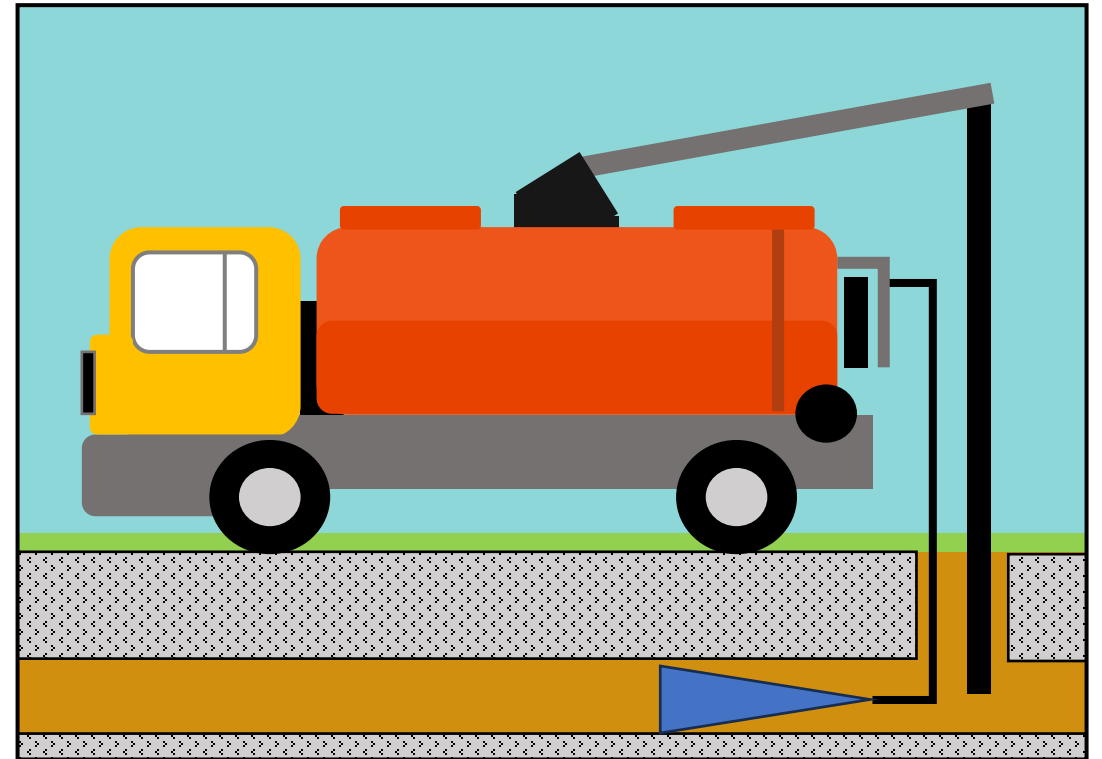
About the KS Sewer System

What we've been working on to repair and update our wastewater infrastructure:

Infrastructure Cleaning and Scoping

Using both data from the SCADA system and location gathering from our GIS mapping project the Wastewater Department has been able to determine potential problem areas in our system and isolate sections we feel may need to be repaired.

Once areas of interest are determined the lines are then thoroughly cleaned and a CCTV camera run through the lines to scope for any issues. The type of repair then needed depends on the severity of the issues found.





What's next for the Kingston Springs Sewer System

What's going to be required over the next several years?



About the KS Sewer System

Additional Upcoming Capital Improvement Costs

In addition to the long-term repair of the Wastewater System I&I issues there are also Capital Expenses that need to be funded over the next several years that include:

PROJECT	FY24-25	FY 25-26	FY 26-27
Replacement of Large Pump station at 405 East Kingston Springs Road (instalment 1 of 2)	\$350,000	\$350,000	
Replacement of Sewer Truck		\$60,000	
Relining Pump Station Wet Wells (25,000 x8)			\$200,000
Replace/Refurbish KSES Pump Station			\$600,000
TOTAL	\$350,000	\$410,000	\$800,000



About the KS Sewer System

Additional Funding Opportunities

The Town continues to look for grant opportunities to assist with funding the projects needed to maintain our wastewater system. Some recently awarded grants are:

- **\$800,000.00 received in federal grant funding from the American Rescue Plan.**
 - This funding was received in 2022 and used to replace and upgrade a pump station that was damaged and taken offline from a flooding event in 2021. The cost for replacing this pump station was \$941,378.00.

- **Qualified for \$700,000.00 in grant funding from the Tennessee Department of Environment and Conservation.**
 - This grant has been awarded but funding has not yet been received. Funding will be used to pay for the recently installed Supervisory Control and Data Acquisition (SCADA) system at our pump stations (\$200,000.00), rehabilitation of another pump station (approx. \$300,000.00) and cleaning/scoping/repair of identified problem areas in existing sewer lines (approx. \$200,000.00).



About the KS Sewer System

What about Expanding the Sewer System?

In 2023 an analysis was done on potentially expanding the sewer system and increasing the customer base. The most reasonable path would be to expand along Mt. Pleasant Road to Simms Heights or the town limits. Below is a rough calculation of costs for this expansion:

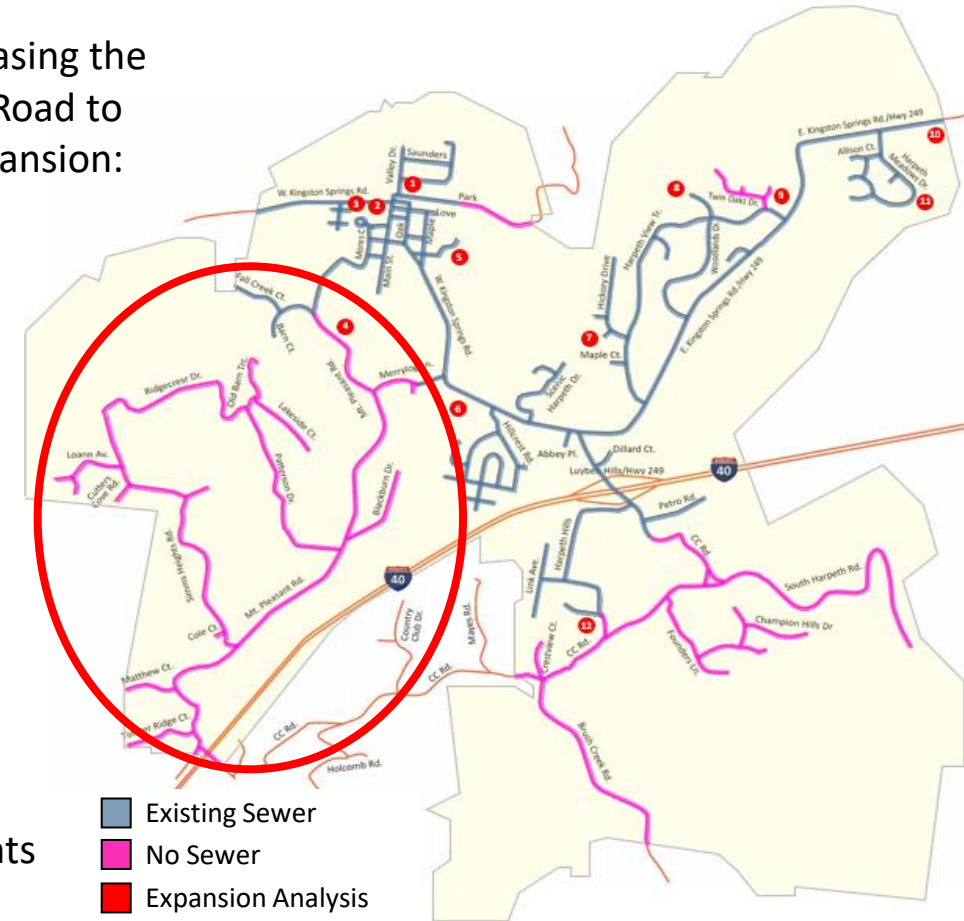
Expansion along Mt. Pleasant from existing sewer to Simms Heights (approx. 1.7 miles)

- Trenching and laying line (approx. 1.7 miles) would be approx. \$750,000.
- Pump Stations – 2 at \$300,000 each = \$600,000.
- Engineering, acquiring right-of-way, and the legal fees in acquiring the ROW \$250,000
- TOTAL - \$1,600,000.
- This would add 55-60 new customers at a cost of approx. \$26,600 per new customer.

Additional expansion on Simms Heights, Ridgecrest, Patterson (approx. 3 miles)

- Trenching and laying line (approx. 3 miles) \$1,500,000.
- Additional Pump Stations – 2 at \$300,000 each = \$600,000.
- Engineering, acquiring right-of-way, and the legal fees in acquiring the ROW \$450,000
- Total - \$2,550,000.
- This would add approximately 170-180 new customers at a cost of approx. \$14,100 per new customer.

Costs for these potential expansions would be paid by acquiring loans, and payments for these loans would be made by increased rates for existing customers.





About the KS Sewer System

In summary...

- The Town's sewer system is funded by fees charged to the users of the system. The Town also actively searches for additional grant funding to offset costs for repairs and improvements.
- The Town works to keep operations of the system lean by employing 1 part-time licensed operator and 1 full-time maintenance operator, with engineering services used on an as-needed basis. The work needed to update and repair the sewer system is expensive, and every effort is taken to use available funds efficiently.
- The sewer infrastructure is aging and has issues with Inflow and Infiltration (I&I) that need to be addressed as these issues impact various outflow limits of the licensing the system holds with the State of Tennessee.
- The Town has made great strides in addressing the I&I issues by installing SCADA monitoring systems, digitizing system maps, and conducting CCTV camera scopes to determine conditions of lines and manholes.
- Analyzing and repairing the Town's wastewater infrastructure will be a long and expensive process. This work will primarily be funded by fees charged to the users of the system so rates will increase as this work continues. However, every effort is taken to use available funds efficiently, and the Town will continue to look for grant opportunities to assist with funding projects needed to maintain our wastewater system.



Questions:

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VISIT: Kingston Springs City Hall - 396 Spring Street