CITY OF ST. CHARLES
SMOKE TESTING

CASE STUDY



Overview:

In 2025, the City of St. Charles partnered with Gewalt Hamilton Associates (GHA) to perform smoke testing in the North Central and Second Place sanitary basins. The goal was to identify sources of inflow and infiltration (I/I) that put unnecessary stress on the sanitary system and wastewater treatment facilities.

Over the course of the program, GHA conducted smoke testing basin by basin, documenting areas where stormwater or groundwater was entering the sanitary system. The results provided the City with clear, actionable data to guide repairs, reduce costs, and strengthen long-term planning.

Learn More:

https://www.gha-engineers.com/services/public-works-operations/

Purpose:

The City of St. Charles initiated smoke testing in the North Central and Second Place sanitary basins to gain clear, actionable insight into where clear water was entering its sanitary system. The objective was not only to locate defects but to create a prioritized plan for addressing them.

> This isn't just about finding problems. It's about giving communities better insight into what's happening underground.
>
> -Matthew Bartlett, Engineering Technician

Key Metrics:

A snapshot of the 2025 smoke testing effort in St. Charles:

283
Structures Assessed

69
Smoke Tests Performed

133
Defects Identified

By focusing on these objectives, smoke testing gave the City a direct path to reduce inflow and infiltration, extend the life of its infrastructure, and make better use of utility resources.

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RESULTS:

The 2025 smoke testing program in the North Central and Second Place basins gave St. Charles a clear snapshot of its sanitary system. GHA performed 69 smoke tests, documenting 133 defects across the two basins.

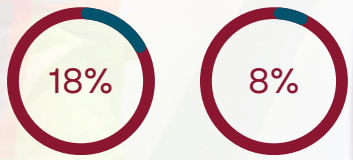
The process produced GPS-located, photo-documented observations that were logged in real time. Findings were categorized by severity, with 11 severe defects, 24 medium, 81 light, and 17 with little or no infiltration potential. This ensured that the City could distinguish between high-priority inflow sources and minor maintenance items.



Defects by Infiltration Severity (133 Total)



- Little/None (17)
- Light(81)
- Medium(24)
- Severe(11)





BENEFITS:

Reduced Costs: Targeting clear water inflow will lower wastewater treatment expenses.

Actionable Plan: Results are categorized by severity and tied to GIS mapping, allowing phased budgeting and tracking.

System Resilience: Repairs will extend the life of existing infrastructure and help prevent larger failures.

Planning Support: The data provides a stronger foundation for regulatory compliance and future funding opportunities.



Proper venting observed from a plumbing vent stack, indicating normal system function.

$265,500
total estimated repair recommendations

10%
of structures required no repairs

Recommended Repairs

