



Supplemental Environmental Project
(SEP)

Engineering/Stormwater Management
Department of Public Works

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Executive Summary

The Supplemental Environmental Project (SEP) was created in response to the Tennessee Department of Environment and Conservation (TDEC) order No. 05-0171; in which the City of Chattanooga (City) agreed to implement a proactive program to improve water quality by focusing on private sanitary sewer laterals. The initial civil penalty associated with the TDEC order was reduced from \$100,000 to \$50,000 but the City agreed to match the reduced penalty to bring the total amount used specifically for repair/replacement of private sanitary sewer laterals to \$100,000. In addition to the \$100,000 allocated to private infrastructure repair/replacement, the City supplemented the project budget with an additional \$20,000 for video inspection; bringing the total SEP budget to \$120,000.

The primary objectives of the SEP were to identify and eliminate sources of domestic sanitary sewage discharging in the City's Municipal Separated Storm Sewer System (MS4) and to reduce stormwater infiltration into the Interceptor Sewer System (ISS). The objectives of the SEP were achieved by conducting smoke testing in target neighborhoods, videotaping detected residential sewer lines/laterals, repairing or replacing defective infrastructure, and removal of illicit connections from residential properties. Funds associated with the SEP were used to repair/replace private residential sewer laterals for homeowners who met eligibility requirements. A total of twenty-six (26) homeowners were funded by this project fund.

Summary Activity Table

Completed	Activity	Status	Comments
✓	Planning	Complete	Project planning complete, the program is in the implementation phase
✓	Program Management	On-Going	Interdepartmental cooperation (smoke testing, application review, bid procurement)
✓	Program Implementation	On-Going	<ul style="list-style-type: none"> • Smoke testing continues in target areas • Anomalies are documented (via picture and GIS) • Database management
✓	Community Involvement/Education	On-Going	<ul style="list-style-type: none"> • Numerous community meetings have been held • Approximately 3,000 door-hangers distributed • Media saturation
✓	Monitoring	On-Going	Grab samples are collected on a quarterly basis to monitor the reduction in pathogen levels
✓	Analysis	On-Going	Data from smoke test, follow-up investigation, and inspections are analyzed for improvements in water quality and infrastructure.
✓	Follow-up Investigation/Enforcement	On-Going	<ul style="list-style-type: none"> • 451 Notification Letters sent to property owners • 214 Written Warning Letters Mandatory Compliance Meeting
✓	Funds Procurement	On-Going	Water Quality staff continue to solicit funds for expansion of a Sewer Lateral Assessment Program (SLAP)

The Supplemental Environmental Project (SEP) was developed as a pro-active program with the ultimate goal of improving water quality within the Citico Creek watershed. The SEP was conducted in accordance with the Tennessee Department of Environment and Conservation (TDEC) order No. 05-0171; which was issued to the City of Chattanooga (City) on April 12, 2005 and amended on May 16, 2005. Throughout the course of the SEP, a total of \$107,409 was spent to replace private sanitary sewer laterals.

The foundation of the SEP was development of a strategic plan which was detailed in the SEP Proposal (June 30, 2005). The goal of the SEP was to improve water quality within the Citico Creek watershed. The Citico Creek area was selected for implementation of the “pilot” program based on a variety of criteria. Parameters used to identify the project area included mean family income levels, age of existing infrastructure, historical number of discharge complaints, and historical water quality data.

Project Objectives

The underlying objectives of the SEP were to identify and eliminate discharges from the domestic sanitary sewage into the Municipal Separated Storm Sewer System (MS4) and to reduce Stormwater inflow and infiltration (I/I) into the Interceptor Sewer System (ISS). The objectives of the project were met by:

- 1) *Conducting smoke testing in target neighborhoods to identify sources of either illicit discharge or I&I.*

The first activity involved injection of “smoke” into the main sanitary trunk line with observation and documentation of where smoke appeared on land surface (Figures 1 and 2).

Figure 1.

Depicts the technique used to inject smoke into the sanitary infrastructure.



Figure 2.

Photo depicts the types of anomalies discovered during smoke testing. Note: the photo illustrates a situation in which a roof drain is connected into the sanitary sewer system, thereby increasing I&I. In addition to the I&I issue, the clean-out associated with the sanitary sewer service lateral is not in place resulting in a portal for an illicit discharge.

2) ***Documenting anomalies discovered during the smoke test for corrective action***

Subsequent to discovery, all anomalies were documented into an Access[®] database and were geospatially referenced in GIS. *Notification Letters* were generated based on location of properties in which anomalies were discovered. Two separate types of notification letters were generated based on land use. Rental properties received notification letters requiring repairs, whereas owner/occupant properties were issued letters providing information regarding financial assistance through the SEP.

3) ***Conducting follow-up investigation and/or enforcement***

Follow-up investigation was conducted to verify that anomalies had been repaired. Non-compliance with the *Notification Letters* resulted in issuance of *Written Warnings* and subsequent *Notice of Violation* (NOVs) letters. Property owners who failed to properly respond to previous notifications were issued *Compliance Orders* and will be followed by *Court Citations*.

4) ***Summary Repair Statistics***

Since the onset of the SEP program, the City has **discovered** a total of five-hundred and twenty-three (**523**) **distinct anomalies** on four-hundred and eighty-seven (487) properties (*see attached map*). Some properties may have exhibited multiple anomalies on one lot, leading to the increased number of anomalies listed compared with properties. Of the total number of private lateral anomalies discovered (523), three-hundred and sixty-nine (**369**) **anomalies have been corrected so far**, resulting in a repair/**compliance rate** of approximately seventy-one percent (**71%**).

The City has assisted/funded twenty-six (26) qualifying homeowners by replacing/repairing their private sanitary service lateral (*see attached map*). Total expenditure associated with the assistance program is one-hundred and seven thousand, four-hundred and nine dollars (**\$107,409**).

In addition to discoveries associated with private sanitary sewer infrastructure, the City identified and repaired a number of anomalies associated with public sanitary infrastructure. Of the eighty-two (**82**) **anomalies discovered in the City system**, all have been **repaired** resulting in a one-hundred percent (**100%**) **efficacy rate** (*see attached map*).

Table 2 provides an itemized breakdown of the projects measurable activities.

Table 2. Itemized break-down of summary statistics

Total Number of Anomalies Discovered to Date					
<i>Anomaly Type</i>	<i>Count</i>	<i>Repairs</i>	<i>Notification Letters</i>	<i>Written Warning</i>	<i>NOV</i>
Clean-out	205	163			
Ground	268	174			
Foundation	23	17			
Sidewalk	18	11			
Gutters	4	1			
Utilities	5	3			
Total	523	369	451	214	62
City Infrastructure	82	82			

Project Total: 605

Figure 3 depicts anomalies by type.

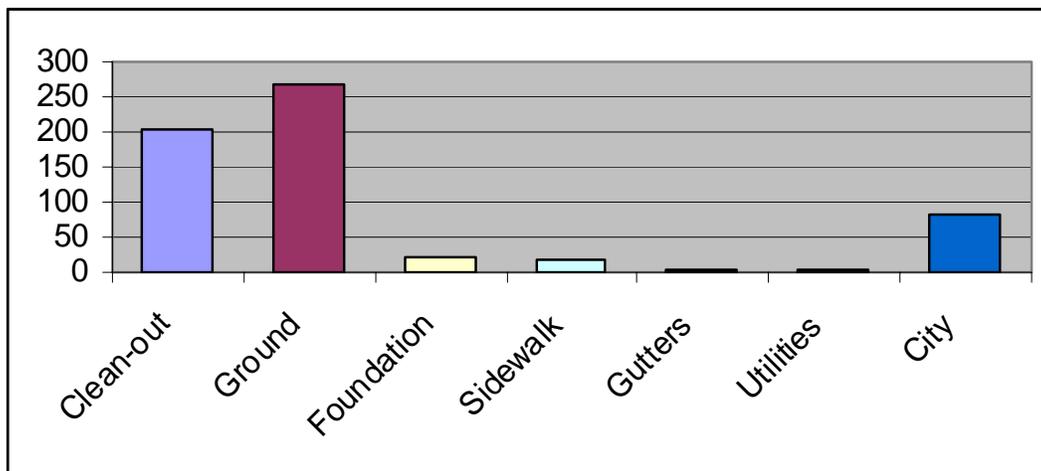


Figure 3. Break-down of anomaly by type

5) *Monitoring*

Grab samples were collected from Citico Creek, within the SEP area, to gauge the efficacy of the project. Water samples were analyzed for the presence and concentrations of *E. coli* bacterium.

Results of analytical samples collected during the SEP show an interesting trend. Although geometric mean values of *E.coli* have increased throughout the project, individual **samples collected in areas following mitigation have shown a reduction in pathogen levels**. Results were expected due to disturbance of soil during mitigation. The projected trend will include a significant reduction in pathogen levels during the upcoming monitoring events. Figures 4 and 5 provide a location map of the sample points and a graphical presentation comparing pathogen levels before and during the SEP activities.



Figure 4. Area location map depicting sample locations.

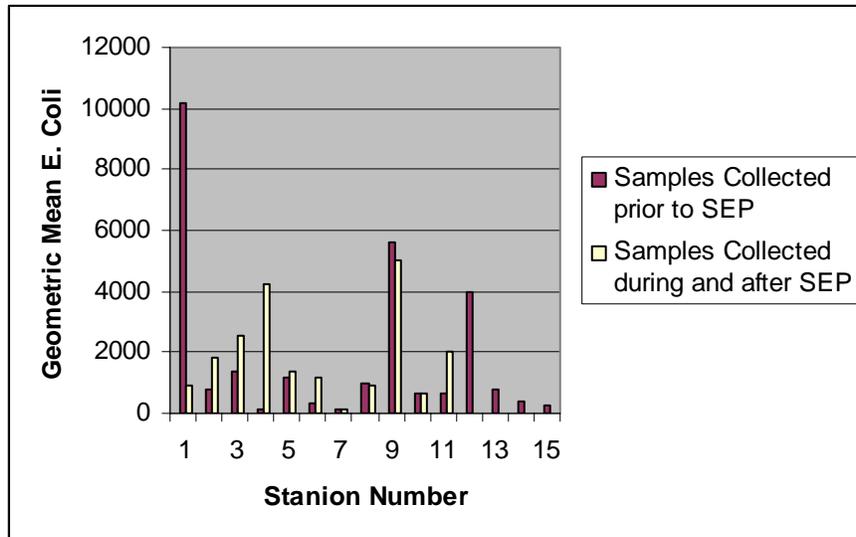


Figure 5. Geometric Mean Values of samples collected prior to and during the SEP implementation

Project Milestones

- ◆ SEP implementation – key milestones associated with program development included development and implementation of an Application Review Committee. Applications were screened based on property ownership and income levels. Thirty-nine (39) families applied for the assistance program. Twenty-six (26) home-owners were approved and assisted by this project. A total of \$107,409 was spent to qualified homeowners throughout the duration of the project (*see attachment*).
- ◆ Community Involvement – the City formed effective partnerships with the Tennessee American Water Company, Norfolk Southern Rail Road, Cannon Properties, and local hospitals to facilitate monitoring and outreach efforts. Neighborhood groups further worked with the City to promote awareness of the issues associated with leaking service laterals and water quality. Numerous neighborhood meetings (about 8/year) were conducted and City personnel met individually with property owners needing additional assistance.
- ◆ Mitigation – of the five-hundred and twenty-three (523) lateral anomalies discovered during the smoke testing events, three-hundred and forty-three (343) violations have been correct by private property owners. Moccasin Bend Waste Water Treatment Authority has conducted video inspection of the main sanitary trunk lines and has provided an itemized listing of eighty-two (82) work orders associated with the discoveries. All eighty-two (82) work orders have been corrected.

- ◆ Smoke testing – the program has been expanded into a City-wide program. The SEP served as a guide for continuing program development. The City has received (and is currently using) funds obtained through a Community Block Grant to expand the project for the amount of one-hundred and twenty thousand (**\$120,000**) additional dollars. In addition, Stormwater Management is requesting \$150,000 for extension of the lateral repair project for the upcoming FY.