

A Sewer System Evaluation Survey (SSES) provides for the investigation of an existing sewer system. Services associated with this work may include televising, surveying and mapping, flow monitoring, system modeling, and smoke and dye testing. Whether the purpose of the SSES is to perform a capacity analysis for expansion of the service area or to perform an Inflow and Infiltration (I/I) study to locate and reduce storm water entering the sanitary sewer system, KEM has the experience to complete the job. Following is a sample of KEM's SSES Services:

CCTV

One of the most critical phases of any sewer evaluation is Closed-Circuit Televising (CCTV) of the system. Televising of the system provides valuable sewer system and maintenance information:

- Identify Sources of Inflow and Infiltration
- Locate Illegal Storm Water Connections
- Locate and Televises Lateral Sewers From the Mainline
- Mapping of the Existing Sanitary Collection System - **KEM Provides GPS Locations for Portions of the Collection System Being Televised as Part of Our Standard CCTV Service**
- Wet Weather Televising to Identify Inflow and Infiltration Sources
- Emergency Blockage Identification



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Mainline/Lateral Inspection Camera

KEM's CCTV Truck

To provide the most complete services possible, KEM's CCTV Truck is equipped with the following:

- OZII mainline camera to televise 6" through 30" mainline sewers
- LAMP II lateral camera to televise 3" through 8" sanitary laterals from the mainline
- MP2020 push camera to televise laterals from a cleanout
- Rigid SR-20 to identify the location and depth of mainline and lateral sewers
- Trimble GeoExplorer 6000 series handheld GPS unit for GPS data collection
- Data supplied on DVD's or thumb drives based on the customers preference

SSES Services

Flow Monitoring

One of the first steps in any successful SSES is to perform flow monitoring. KEM has over 40 flow monitors and 6 rain gauges to meet any size of SSES project. Flow data can be utilized to either determine if there is sufficient capacity for service expansion or to identify areas with high levels of I/I.

For an I/I study the flow data can pinpoint the areas with the highest levels of I/I so that more precise field testing can be performed to locate specific locations. This approach leads to reduced costs and a more effective remediation plan. KEM provides the equipment necessary to perform flow monitoring along with the associated data analysis required to meet the goals of any SSES study.

Smoke and Dye Testing

Smoke and dye testing is utilized to identify specific locations where storm water is entering the sanitary sewer. KEM has the equipment necessary to perform smoke testing to identify locations of inflow into a sanitary sewer such as downspouts, catch basins, and yard drains. Said storm connections are documented for removal during testing. KEM field crews also work in conjunction with CCTV contractors to provide dye testing to locate inflow and infiltration sources.

SewerGEMS Sanitary Sewer Modeling

KEM utilizes SewerGEMS software to model both existing and proposed sanitary sewers to

determine the capacity. Flow monitoring and rainfall data is utilized to develop and calibrate the model prior to input of a design storm. Additionally, proposed sewers can be modeled in the system prior to design and construction to ensure that they have adequate capacity to handle elevated flows.

I/I Rehabilitation Projects

Based on results from the flow monitoring, smoke testing, dye testing, and CCTV data, KEM will develop a plan to remediate the I/I sources found. KEM has extensive experience in designing CIPP lining, mainline joint grouting, manhole rehabilitation, lateral rehabilitation and infrastructure replacement.

Flow Monitoring Equipment



KEM SSES Projects

Olmsted Township I/I Study, Cuyahoga County



CCTV Utilized During Dye Testing

KEM performed an I/I study for the Olmsted Township area in Cuyahoga County to determine where excessive flows are entering the sanitary sewers in this 1,200 home subdivision. It was determined that excessive I/I was entering the sanitary sewers in an area of the subdivision that was built in the 1950's which utilized a common trench for the storm and sanitary sewers. Alternatives for lining or replacing the existing sanitary sewers were developed to determine the best option for remediation. As part of the project, a sanitary sewer model was developed to analyze the effect of remediation efforts on the entire system.

Delaware Flow Monitoring

KEM was hired to perform flow monitoring throughout the entire City of Delaware's sanitary sewer collection system, which was divided into ten flow basins, for a period of six months. The flow data was analyzed to determine the basins within the City with the highest levels of inflow and infiltration for further testing/remediation and provided a baseline for the existing flows within the collection system prior to the implementation of any I/I remediation efforts.



Ontario I/I Reduction Program, Phases 1& 2

KEM conducted an I/I study for Ontario which determined that a major source of I/I was from clay private laterals installed in the 1950's. To help alleviate sewer surcharging, KEM prepared design plans to rehab 368 of said laterals in the older parts of the City. Lateral rehabilitation included dig and replace 176 laterals and lining of 78 laterals, installing cleanouts, installing sectional liners for point repairs, and abandoning 114 unused laterals.

Elyria Southeast Interceptor Sewer

KEM prepared a preliminary engineering study to determine the service area and alignment for this 36-inch diameter sanitary sewer extension. The design included over 18,000 linear feet of gravity sewer, two sanitary lift stations and two critical crossings of the Black River.

Lorain County Sanitary Master Plan

The County hired KEM to develop a master plan for its collection and treatment systems for Amherst Township, Brentwood Lake, Eaton Estates, Westview and Columbia West River. Additionally, plans were developed for future sanitary sewer expansions along Dunton Road, Calann Drive and the Rolling Heights Allotment.

Butler I/I Reduction

KEM was hired by the Village of Butler to implement an I/I reduction program. One of the initial efforts was to evaluate manholes in the collection system along with development of plans and specifications for the rehabilitation of 32 manholes. Work included adjusting and sealing manhole castings, sealing manhole walls, sealing pipe entrances, and installing new inner chimney seals and manhole lids and frames. The project also included the installation of three (3) flow meters and analysis of the data to determine future areas to focus I/I removal on.

KEM SSES Projects

Sheffield/Elyria Township SSES

KEM was hired to examine the sanitary sewer system to determine its condition. The investigation included flow monitoring and smoke testing to determine if there were any sources of inflow and infiltration into the system. The flow monitoring pinpointed one area that had high base flows indicating a water main leak into the sanitary sewer system that was repaired. Flow monitoring also indicated that there was inflow into the sanitary sewer. To identify the inflow sources, smoke testing was performed and multiple inflow sources were identified and corrected on private property.

Harpcrest WWTP I/I Reduction

KEM performed an SSES study and administered a rehabilitation plan to reduce excessive Infiltration/Inflow (I/I) within the sanitary collection system tributary to the Harp WWTP. The County's collection system consists of 17 manholes and 3,614 feet of 8-inch diameter clay gravity sewer pipe installed in the 1970's. KEM reviewed the existing plans and reports of the area, conducted flow monitoring at the influent sewer to the wastewater treatment plant, performed a GPS survey of the location, depth and size of the collector sewers and manholes, prepared a schematic of the sewer system, and prepared a report of all findings and recommendations. Rehabilitation work included pressure testing and grouting all joints in the mainline sewers and lateral wye connections and the installation of sectional liners in locations where the mainline had structural deficiencies.

Ontario Inflow and Infiltration Rehabilitation Project, Phase 3

The City of Ontario has undertaken extensive measures to prevent the overflow of sanitary sewerage from the Rock Road Lift Station. These measures have included the installation of a storm overflow tank and multiple phases of I/I rehabilitation. Phase 3 of the I/I rehabilitation efforts included mainline lining, mainline grouting and lateral rehabilitation in a subdivision near the intersection of Park Avenue West and Lexington-Springmill Road. Nearly 5,000 linear feet of sanitary sewer and 64 lateral connection were rehabilitated utilizing a combination of cured-in-place pipe lining and grouting.

City of Mansfield Flow Monitoring

KEM was recently hired to perform flow monitoring throughout the City of Mansfield sanitary sewer collection system. The City has been divided into 28 flow basins with 35 flow meters and 5 rain gauges that have been installed to determine the flows in the basins. The data will be utilized to determine areas with the highest levels of inflow and infiltration for remediation efforts.

KEM's SSES Services

- CCTV of Sewer Systems
- Flow Monitoring
- Rainfall Data Collection
- Smoke Testing
- Dye Testing
- GPS Data Collection
- Sewer System Modeling with SewerGEMS
- Sewer Extension Studies
- Inflow & Infiltration Studies
- Sewer Rehabilitation Design



Brentwood CIPP Lining

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Quality
since 1978

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