

Project Summary

Organization:
Stearns & Wheler GHD

Solution:
Water and Wastewater

Project Objectives:

- Plan improvements to reduce sewer overflows and ensure long-term system reliability
- Reduce the environmental impact of sanitary sewer overflows

Product Used:
SewerGEMS

Stearns & Wheler GHD Deploys SewerGEMS®

Reduces Sanitary Sewer Overflow (SSO) in Allegany County, Md.

Fast Facts

- Addresses overflows due to excessive rainfall-derived inflow and infiltration in collection system
- Uses SewerGEMS to evaluate options to improve system and manage capital cost of recommended improvements
- Reduces sewer overflows, improving quality of life in community and limiting environmental impact on local waterways

When Allegany County, Md., signed a consent order agreement with the Maryland Department of the Environment (MDE) to curtail sanitary sewer overflows (SSOs) in the Jennings Run-Wills Creek and Bedford Road Sanitary Districts, it had two goals: minimize environmental impact and improve the entire sewer system to ensure its long-term reliability. The SSOs were caused by excessive rainfall-derived inflow and infiltration (RDII) in the sanitary collection system. Reducing them would lead to water quality improvements in local waterways, enabling residents to use these areas for recreation, and promote a more sustainable future by providing superior environmental quality for people, animals, and plants.

The county selected environmental engineers Stearns & Wheler GHD to implement key requirements of the consent order agreement. The tasks to be completed included performing an infiltration and inflow analysis, implementing a sewer system evaluation study (SSES), and developing a rehabilitation action plan.

Project Challenges

Among the challenges associated with this project were existing Allegany County agreements with other municipalities that limit its sewer flow discharges into their sewer systems. The county determined that without substantial improvements to its own sewer system, the peak flow rates from a design storm would significantly exceed the agreed-upon discharge limits.

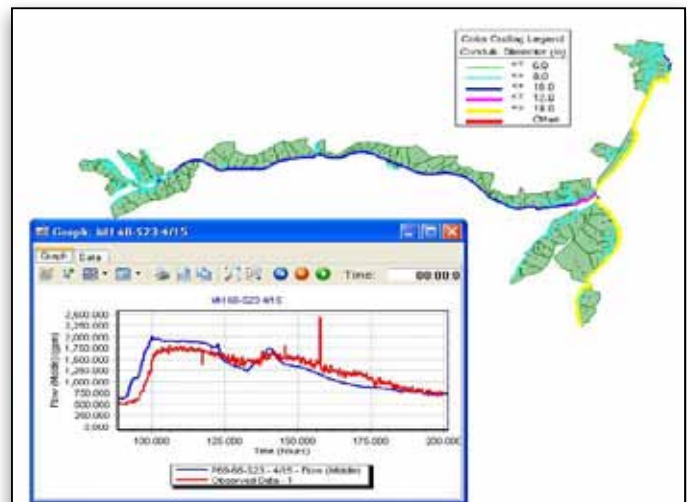
It further found that reducing the flow rate caused by RDII to a level that met downstream limitations would be difficult and costly. However, the alternative – installing very large pipes to temporarily store the peak RDII – would be also be costly and pose great challenges. To achieve the agreed-upon flow-rate limits and manage capital cost, the project team used a combination approach that included:

- Reducing the excess flow in the system by rehabilitating and replacing old piping,
- Incorporating a storage area to temporarily reduce peak flow rates during periods of heavy rainfall.

Sewer System Evaluation Study and SewerGEMS

In completing its SSES, Stearns & Wheler used SewerGEMS – Bentley's multi-platform, sanitary and combined sewer modeling software – to develop a dynamic hydrologic and hydraulic model for each of the district's collection system. The model was integrated into a system-wide approach that included gathering extensive field data to address the collection systems' failings. The modeling results were first used to project flow rates and volumes for a selected design storm. Next, the results allowed the team to perform a detailed alternative evaluation that provided it with options to remove the constructed overflows in the future.

Laura Siemers, an engineer at Stearns & Wheler GHD, said, "Using SewerGEMS allowed the project team to evaluate several options to determine the best solution for addressing the problems within the sewer systems. SewerGEMS' graph

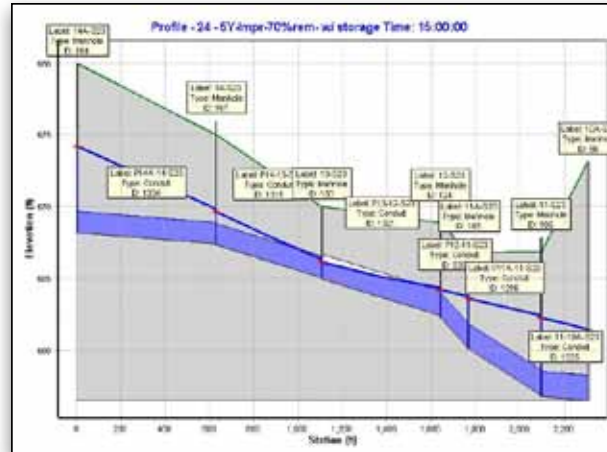


Comparison of the model results and observed data

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capabilities enabled our engineers to easily compare the model results and observe data on the same graph. It also saved time by reducing the importing and exporting of data.

Siemers added, “The capability to have many sets of R, T, K values facilitated many different options for evaluating possible solutions. The management of the R, T, K sets for the catchment allowed values to be adjusted quickly to save time during the calibration process.”



Use the SewerGEMS dynamic profile to monitor the hydraulic grade line variation

SewerGEMS was also used to manage the capital cost of recommended improvements by monitoring the hydraulic grade rather than the pipe capacity. In some cases, designers were able to keep pipe sizes to a minimum by allowing some level of surcharging within the manholes, while maintaining a buffer to prevent overflows.

Stearns & Wheler GHD started the project in late 2006 and submitted the SSES report to the MDE for review in November 2008. The county has since implemented the study’s recommendations and will soon begin the design phase.

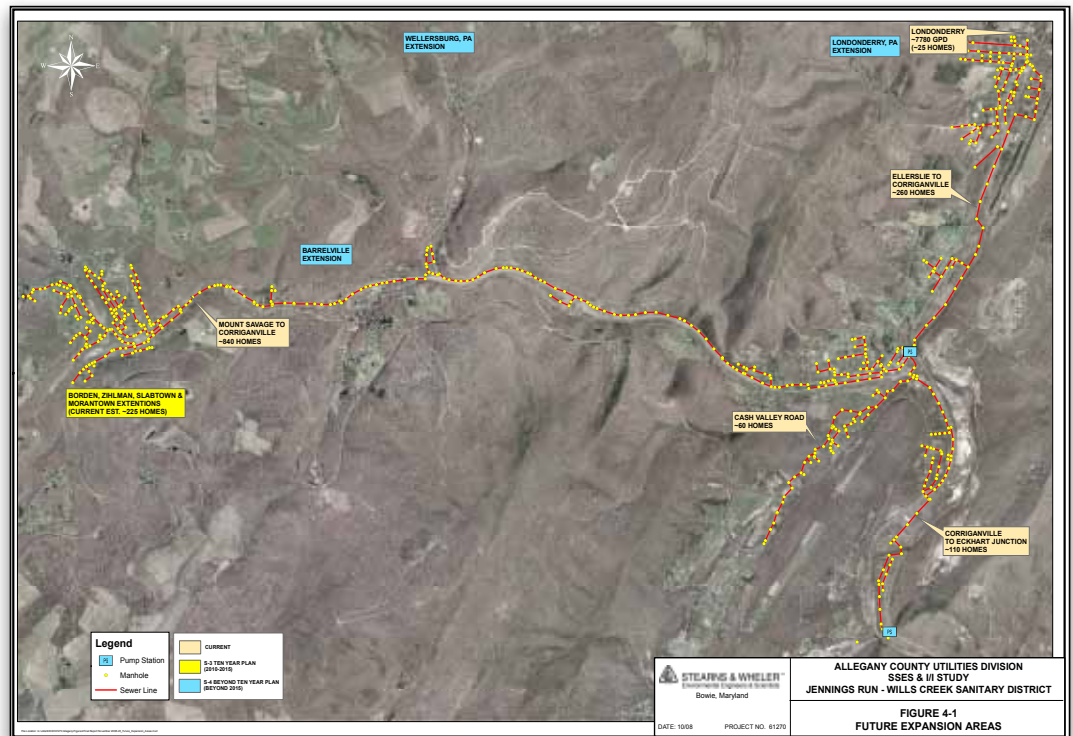
Community Impact of the Project

The model was used to develop an implementation plan for improvements to the two sanitary sewer districts. These will enhance customer service and reduce basement backups and sanitary sewer overflows. Fewer overflows will reduce the negative environmental impact on local waterways and potentially lead to there being used for recreational purposes by residents of the county. Moreover, the construction and repair work recommended by the study will have the added benefit of creating jobs in this community where many residents fall below the median state household income level.

Find out about Bentley at: www.bentley.com

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Current sewer system and future expansion areas