

ADDING SANITARY SEWER CAPACITY QUICKLY AND COST EFFECTIVELY

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By Advanced Drainage Systems, Inc.

The overloading of its existing sanitary sewer system by heavy rainfall and increased demands led the city of Grimes, Iowa, USA to add a new sanitary sewer line to its system. Using pipe made from polypropylene reduced project costs and sped up the installation.

“The project had to be done quickly and efficiently,” explained John Gade, P.E. of FOX Engineering, and Grimes city engineer. “The actual work started in January and was completed in March 2012, not usually the ideal time of the year to be installing pipe in Iowa.”

“Fortunately, we had two things going for us - the pipe itself and unusually mild weather.” Founded in 1993, FOX Engineering of Ames, Iowa is an environmental engineering firm that has been working with the city of Grimes since 1998.

In late 2011, Grimes, located just west of Des Moines, experienced three consecutive days of heavy rain that overloaded the city's sanitary existing system. The 24-inch sewer line to the treatment plant backed up to the collection system and gray water entered residential basements. Grimes asked FOX Engineering to develop a plan to immediately address the overflow issue and add capacity to accommodate the increased demands on the system attributed to the significant population that grew 67% from 2000 to 2010.



Figure 1: Grimes Pipe 3

"We looked at the sanitary sewer that runs through a development corridor in Grimes and found that the 24-inch outfall line was near capacity and subject to added inflow and infiltration," said Gade. "Therefore, FOX Engineering recommended a new line be installed."

The existing sewer line was made of clay and had been in the ground for nearly 40 years. Fox Engineering's sanitary sewer improvement plan called for a new line to be installed parallel to the old one. Although the old line would be plugged, it could be temporarily unplugged to accommodate maintenance on the new line.

In selecting the pipe, FOX Engineering considered materials it had worked with in the past, including reinforced concrete, PVC, ductile iron, and fiberglass. Then FOX met with Advanced Drainage Systems, Inc. (ADS) Engineer Jim Merchlewitz and ADS Representative Paul Hutton to review the company's SaniTite® HP polypropylene pipe and learn more about projects in which the product had been used. Based on an analysis of the product, FOX Engineering determined it

was durable enough to stand up to virtually any gas or liquid found in a sanitary sewer. While not part of the original analysis, it also turned out that the ADS pipe had a price advantage over other products evaluated.

A total of 1,857 feet of 48-inch diameter and 3,000 feet of 36-inch diameter SaniTite HP pipe was used for the project, along with A-LOK® connections to the concrete manholes. Manufactured in 30-inch to 60-inch (750-1500mm) diameters, SaniTite HP pipe is available in triple-wall construction that provides a smooth interior and exterior wall design supported by a corrugated structural core for improved stiffness and greater beam strength to minimize deflection and enhance long-term performance. It meets ASTM F2736, ASTM F2764, and also exceeds the requirements of ASTM D3212 for water tightness with dual-gaskets and banded reinforced bell.

Rugged and lightweight, the pipe is easily handled with minimal equipment and crew. Its stick length reduces the number of joints, which also saves

time and labor and makes for a more secure system versus the several-ton weight of each short section of comparable reinforced concrete pipe (RCP).

The sanitary sewer line was installed by Keller Construction Inc. of Boone. Owner Darin Keller said, "I like the product. It's the first time we used triple-wall SaniTite HP, but we have used a lot of the black ADS corrugated HDPE pipe for storm water projects, most recently 5,000 feet.

"Merchlewitz and Hutton also told me about using the A-LOK mount. For the triple wall, SaniTite HP pipe, which is smoother than the corrugated HDPE pipe, it fits really tight and there's no need to grout. The pipe does not need any additional adapters to fit into the precast manhole with A-LOK Premium gaskets, making our installation fast, and still giving us flexibility in the field," Keller explained. "We had no leaks, no problems. The A-LOK units work well with the precast concrete manholes and the polypropylene pipe."

Keller also said installation was aided by the



Figure 2: Grimes Pipe 6 Staging



Figure 3: ADS Grimes ALok 13

convenient pipe length. "We used a 13-foot long pipe instead of a 20-foot pipe because the trench box is 25 feet long. The shorter pipe gave us room on each side for safety. When we're 20 feet deep, it's too much of a reach for our excavator. We used a John Deere 450, 110,000 class machine." Backfill consisted of a bed of rock over the top of the pipe, followed by the native soil.

"The ADS pipe made the job easier. The pipe isn't heavy, and you can drop it from 20 feet in the air and it's not going to break, even in the winter," said Keller. "With concrete, it doesn't really matter whether it's summer time or not, the installers are going to chip the bells and crack the spigots when they lower it down into the trench box. And, we would have had to put in the plastic lock liner and welded it in at every joint. With fiberglass you have issues in the cold weather, and when you cut it there are fibers to contend with. You don't want to breathe them and they can burn the guy doing the cutting," Keller continued.



Figure 5: After Installation, Joints Were Tested to Determine Any Problems.



Figure 4: Installing the New Sanitary Sewer Line

During the installation in Grimes, on-site visits were conducted by representatives from the Iowa DOT and Iowa's Statewide Urban Design and Specifications (SUDAS), the organization responsible for developing common design standards and specifications for public improvements such as sanitary sewers.

"After the job was finished we vacuum and pressure tested," stated Keller. He also put his 10 years of knowledge into a true hands-on effort. "I actually went inside and mandrelled the pipe. I crawled through the run to see if there were any issues with the pipe. Overall the pipe went in good and tested good. We saw very little deflection. We also tested the joints, all of which were fine."

"Growth placed a lot of stress on the capacity of Grime's sanitary sewer system," Gade said. "It is one of the most rapidly growing communities in the state and region. To provide for increasing industrial and residential development, the system was analyzed to determine which trunk mains needed to be replaced. We developed a plan of action that will enable the city to continue to attract more residents and businesses. It is already moving ahead with plans to revitalize Main Street, a project that is scheduled to be completed in 2014. Our sanitary sewer system plan will handle all these and other future demands."

About the Contributor

Advanced Drainage Systems, Inc., (ADS) is the world's largest producer of corrugated HDPE pipe. Founded in 1966, it serves the storm and waste water industry through a global network of 56 domestic and international manufacturing plants and 28 distribution centers. In addition to its flagship N-12® pipe, and HP Sanitary and Storm pipe, the company offers a complete line of fittings and other accessories including StormTech® storm water chambers, Nyloplast® drainage structures, INSERTA TEE®, storm water treatment units and various geo-textiles. www.ads-pipe.com

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