

Town of Nashville Wastewater Collection System Improvements Project

*2011 Indiana Water
Environmental Association
Collection System Award*





2011 - Indiana Water Environmental Association Collection System Award

NASHVILLE WASTEWATER COLLECTION SYSTEM IMPROVEMENTS PROJECT

Project Background

In 1993, the Town of Nashville identified the Orchard Hill and Coffey Hill developments as priority areas in need of wastewater collection service to minimize the existing public health hazard posed by failing septic systems. Furthermore, the Brown County Health Department noted that the soil absorption properties that most often lead to septic system failures are present in developed areas around the Town of Nashville, namely, Orchard Hill and Coffey Hill. Septic system failures normally occur where bedrock is very close to the surface because there is insufficient soil present to absorb the necessary amount of water for a septic system to function properly.

Several options were considered for the elimination of septic systems in Orchard Hill and Coffey Hill, including a gravity sewer system, a grinder pump system, and a septic tank effluent pump system. It was determined that the septic tank effluent pump system would be the most efficient, while minimizing impacts to the existing overall wastewater collection and treatment system. The primary benefits of using the septic tank effluent pumping system are the ability of the septic tank to attenuate peak flows, allowing for smaller force mains, and the ability of the septic tank to capture solids. Both of these would lessen the impact on the downstream collection system and wastewater treatment plant.

The design, construction administration, and construction observation services for the Town of Nashville were carried out by Strand Associates, Inc.[®]. The general contractor involved in the construction of the septic tank effluent pump system was Central Engineering & Construction Associates, Inc.

New Application of Existing Techniques/Originality/Innovation

The Orchard Hill and Coffey Hill septic tank effluent pump system project was a challenge due to varying pressure requirements, the significant increase in flow to the original sewer system, and that different construction techniques were required.

Different Pressure Requirements Throughout the Systems:

- Because of the topography of the land around the Town of Nashville and, specifically, the project areas, great care had to be taken to ensure that each home would be capable of pumping the effluent to the Town's main sewers. The elevation changes required the use of high head pumps and each home that was connected to the collection system had to be considered individually to verify the correct pump for their unique circumstance.



Increase of Flow to the Original Sewer System:

- Due to the addition of more than 150 homes to the Town of Nashville's sewer system, the original sewer system had to be reviewed to ensure that it had the capacity to handle the increased flow. While analysis indicated that the gravity sewers could handle this increased flow, it also indicated that one of the primary lift stations in town could not. New pumps and piping had to be added to increase the capacity of the lift station in order for it to, once again, adequately serve the system.

Different Construction Techniques Used:

- Trenchless Construction
 - All of the effluent sewer mains were installed using directional drilling. Approximately 50,000 feet of 1.5-inch, 2-inch, and 3-inch pipe was installed in this manner. Trenchless construction was used due to the lack of space in many areas around homes and local roads, and to minimize impacts by crossing underneath county and state highways.
- Open Trench Construction
 - The septic tanks, pumping stations, and 4-inch laterals from the home to the septic tank were completed using backhoe's and mini excavators. Due to the shallow bedrock, attachments were used to ensure that each pumping station and septic tank was installed at the proper depth; in excess of 150 septic tanks and pumping stations were installed.

Value to the Collection System Profession

This entry advances a positive public image of engineering excellence since it serves to eliminate failing septic systems and, thus, improve both the quality of life and the environment around the Town of Nashville. *The Brown County Democrat* recently published an article that sites the problems that septic tanks with leach fields have in their county. The completion of this project shows the public that something can be done to fix the problems that are present with failing septic tank systems. This project also shows the value in taking time to consider each available option. Several options existed to convey the effluent from the homes in Orchard Hill and Coffey Hill, but after taking into account the situation and the client's needs, the proper options was chosen.

Social and Environmental Impact

The new septic tank effluent pump systems in both Orchard Hill and Coffey Hill serve to further correct the issue of failing septic systems in areas that are not ideal for their use. Before the project began, health inspectors found that 77 percent of the septic systems in the project area were failing; during construction, it was revealed that closer to 90 percent had failed. These failures could cause an increase in contaminants in local waterways and groundwater supplies. Due to the elimination of these approximate 140 failing septic systems, the E. Coli concentrations in the creeks and streams in the area should be reduced.



Complexity

Coordination and communication. The key aspects of this project were coordination and communication. In the initial design phase, there was coordination of efforts between owner, engineer, and homeowners and free flowing communication between the three entities. It was important to keep the homeowners apprised of the situation in all phases of design. The engineer needed the homeowners aide in locating their current septic tanks. The homeowners needed information from the engineer to set up the required electrical connections for the contractor to use during installation of the septic tank effluent pump system. The owner had to keep communication open between both the engineer and homeowners, since more than 150 easements were obtained for the project. Due to the nature of the project, there was a significant amount of interaction with the public compared to other projects that involve a sewer main, where the owners are responsible for their own lateral.

Coordination and communication continued to be very important in the construction phase. Since the majority of the project occurred on land that was in homeowner's backyards, the contractor and engineer had to work with the homeowners to allow the project to proceed as smoothly as possible.

Meeting and Exceeding Goals

The primary goal of this project was to eliminate the problems that failing septic systems pose to the environment around the Town of Nashville and, specifically, the areas of Orchard Hill and Coffey Hill. This was accomplished by replacing residents' individual septic systems with a septic tank effluent pump system. The primary goal was effectively met on June 10, 2011, when the contractor connected the final home on the project to the sewer system. With this final connection, the Town of Nashville was finally able to complete a project that had been in the works for nearly 20 years.



Primary Team Members and Contractors

Owner

Town of Nashville

Roger Bush, Town Superintendent

P.O. Box 446

Nashville, IN 47448

812.988.5526 phone 812.988.5532 fax

Project Design Engineer

Strand Associates, Inc.®

Anthony J. Akles, P.E., BCCC – Project Manager

629 Washington Street

Columbus, Indiana 47201

812.372.9911 phone 812.372-7190 fax

Contractors

Central Engineering & Construction Associates, Inc.

3862 N. Commercial Parkway

Greenfield, IN 46140

317.894.1990 phone 317.894.1890 fax

Wastewater Collection System Improvements Project

Town of Nashville, Indiana



Brown County Inn Pumping Station Improvements

Wastewater Collection System Improvements Project

Town of Nashville, Indiana



Typical Residential Septic Tank and Pumping Station Installation

Wastewater Collection System Improvements Project

Town of Nashville, Indiana



Parkview Pumping Station Valve Vault