

LANGLEY AIR FORCE BASE WATER MAIN REPLACEMENT PROJECT

Air Force embraces use of Fusible PVC® pipe and horizontal directional drilling

By: Ed Lobello, Underground Solutions, Inc.

Langley Air Force Base (AFB) covers approximately 3,000 acres including 600 acres of wetlands just north of Virginia Beach, Virginia. The base has a rich military history dating back to 1916 and is home to the 633rd Air Base Wing (originally referred to as the 633rd Combat support Group), the 27th Fighter Squadron and the 94th fighter squadron, the last of which included Eddie Rickenbacker, famed WWII ace. Langley AFB has remained a necessary part of the United States military base system. Rehabilitation and maintenance on base is a mission priority due to the stress on its physical infrastructure thanks to the robust training, support, and deployment schedule of the base occupants. This is especially true for the aging water and sewer system.

The base provides a great deal of space for mission activity. The water and sewer system that supports that activity is critical to daily support, however, maintaining operations while addressing critical upgrades is essential to any work being planned. Typically, aging pipes would be dug up and replaced in kind. "Dig and Replace" methods were deemed by planners to be undesirable in multiple locations where environmental concerns as well as disruption of base activity would not allow this approach. To minimize environmental impact and operational disruption, Scott Borges of Kimley Horn Associates, the design engineer for this rehabilitation effort, had to consider modern trenchless solutions.

PROTECTED THE WETLAND AREAS & ALLOWED BASE OPERATIONS TO CONTINUE WITH MINIMAL DISRUPTION.

One of the ductile iron pipelines that crossed a vital runway area was failing and needed attention. Borges reviewed the viable trenchless options to either repair, replace or rehabilitate the pipeline and found that horizontal directional drilling (HDD) used to install a new replacement pipeline would best fit the challenges of the installation. HDD methodology uses steerable drilling equipment and

techniques to create a borehole under an obstruction or an area where excavation is not desired. A new pipeline is then pulled through this borehole and reconnected at either end. The new pipeline is then placed into service. This method limits excavation and surface disturbance because reconnections to the old pipeline are performed at entry and exit pits at either end of the new pipe being installed by HDD. This method drastically reduces land disturbance and any subsequent environmental or operational impacts. With proper planning, HDD installations are performed while roads, parking lots, airstrips, and even rail lines are in use. Depending on conditions, restoration costs are minimized while pipe installation productivity is enhanced.

HDD methods require a pipe material and joint that can handle tensile loading as well as adequate critical buckling pressure to resist stresses created by drill fluids. Kimley-Horn chose Fusible C900 PVC® pipe for use on the project. In consultation with the Langley AFB Civil Engineering office, Fusible C900 PVC® Pipe was offered for both Potable Water and Force Main replacement upgrades. Base personnel were comfortable with the durability and performance of Bell and Spigot C900



Installation by HDD continues during Air Force operations



Birdseye view of the airfield at Langley AFB

generally. Fusible C900 PVC is well known for compatibility with standard waterworks fittings such as MJ connectors, saddle taps, and Ductile Iron valves. Since service on C900 does not require in-field fusion skills and equipment, maintenance and operations personnel were on board with Fusible PVC® pipe because they were familiar with its use and maintenance.



Fusible PVC® pipe is staged through a parking lot for just a few hours before installation begins



Strategic location of pits reduced costs & disruption to base operations

Once all the stakeholders were on board with the choice of HDD pipe, the design could move forward.

Initially, only a small section of pipe installed in the wetland area was planned to be HDD. When Borges and the Air Force considered the ease and economy with which the HDD of Fusible PVC® pipe could be accomplished, they chose to install all the pipe using HDD and Fusible PVC® pipe. This choice not only protected wetland areas, but it also allowed base operations to continue with minimal disruption. Ultimately, given the site conditions, geotech information, potential restoration costs, and operational demands of the base, HDD turned out to be the best option economically as well.

MEB was the General Utility Contractor and Atlantic Boring was the HDD driller for the project. Entrance and exit pits were strategically located to minimize environmental impact and double as necessary excavations for valves, fittings and other appurtenances. Locating these pits strategically further reduced costs



Final reaming and insertion of the Fusible PVC® pipe occurred simultaneously

and client disruption. Wesley Dunks of Atlantic Boring was one of the first Directional Drillers in the country to install FPVC. He has since completed countless miles of installations and well situated to take full advantage of the pull strength in order to ensure an efficient and cost effective installation of both the water and force main pipes.

Fusible PVC® pipe utilizes standard waterworks fittings with restrainer glands so tie-ins were simple with no special fusion equipment or knowledge required. In all, Atlantic Boring installed over 5,000 feet of 8-inch, 10-inch, and 12-inch Fusible PVC® pipe on the project saving, time, risk, operational impact and cost. †

ABOUT THE AUTHOR:



Ed Lobello is responsible for Sales in VA, DC, MD, DE, NJ and Eastern PA. He has 20 years of experience in consultative sales, business development,

and product development in the civil engineering community. Previously Ed served as Business Development Manager for Water Reclamation Solutions. Additionally, he served as Sales Engineer and Plant Manager for Lane Enterprises, Inc. in the Mid Atlantic area. Ed earned a Bachelor of Science Degree from Virginia Tech.