A New Pipe Splitting Technology Comes to Gainesville

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With a small-town personality, big-city opportunities, and its major college atmosphere, Gainesville has just about everything you could possibly be looking for in a place to visit or live. What better place to introduce an innovative trenchless pipeline installation method.

In July 1997, in a joint effort between Gainesville Regional Utilities (GRU) and L. J. Ruffin and Associates, new technology was introduced at Gainesville.

At a residential street close to downtown there were 499 feet of two-inch galvanized potable water line with four 3/4-inch services and another being added at the end of the dead-end street. GRU was experiencing problems with reduced pressure in the line and taste complaints from the customers being served by the line.

The residences along the pipeline route were well landscaped, and there was a desire to minimize the disturbance and subsequent replacement of the landscaping.

Our task was to replace the two-inch water line with two-inch Endot Industries EndoPure Polyethylene pipe, and upgrade the services to one-inch with American Pipeline Accessories Philmac line of glass reinforced plastic fittings and valves. We elected to use the Endot EndoPure pipe because of the additional strength and durability. The Endot EndoPure pipe is blue color-coded for potable water service and also contains UV inhibitors. The Philmac fittings and valves provided the ease of installation, strength and durability, and full 360-degree joint restraint.

To accomplish speedy return of service, quality workmanship and products, and minimal excavation, we elected to use the McElroy Manufacturing technology to insure a successful replacement. To perform pipe bursting, the existing conduit must be of a material that will break upon applied force of the bursting head. Such pipeline materials as clay, cast iron, and asbestos cement are good for this type of trenchless pipeline replacement. Pipeline materials such as ductile iron, PVC, HDPE, and galvanized steel pipe require much more technology than just bursting. We elected to use the Bullet from McElroy Manufacturing with the Pow-r Mole pull equipment. The Bullet is designed to split the existing pipeline material and spread the pipe to create a type of casing for the new pipeline material being pulled in place. The Bullet has a series of four cutters, increasing in size, to allow for a clean and smooth cut/spread in pre-designed increments. The spreader-head is machined in a pattern to file and smooth off the cut pipe eliminating sharp edges that would cut and damage the new EndoPure pipe.

The plan was to excavate 4- by 6-foot "feeder pits" on both ends of the line and locate the Pow-r Mole machine in the middle (4 by 8 feet) at one of the service connections. By doing so we were able to pull the Bullet and EndoPure pipe from both ends to the middle and connect with a Philmac coupling. We also had to excavate the other three services to score-cut the two-inch pipe on both sides of the service saddle, which enables the bullet to travel through the service without interruption. Then a simple blow of a hammer to the galvanized pipe breaks away the cuts and allows for the installation of the new Philmac tee to increase the service to one inch. GRU had located and dug one feeder pit the previous day, exposing the two inch line at the valve location. After careful planning and discussion, we were ready to cut the water off and start the operation at approximately 9:30 a.m. A small three-foot section of the two-inch pipeline was cut out just past the valve to inspect. This would be one of the three sections to be cut out to inspect, and all three were found to be the same — roughly 60-percent of the line was closed due to tuberculation. Once the pull pit was dug and the Pow-r Mole equipment was in place, GRU crews cut the two inch pipe and at 10:15 a.m. we were ready to start the pipe splitting pull.

We attached the nose piece along with three of the four-foot rod sections and began the push through the existing two-inch galvanized pipe. Our first push/pull would be approximately 234 feet to the pull pit, which required the use of about 56 pull rods, on the upper end with two services in place. It took about 30 minutes to push the nose to the end. We then took the nose piece off and attached the Bullet, and then connected our Endot EndoPure blue tubing by drilling two holes to match the male connector on the Bullet and inserting the bolts. A section of the line had been repaired using three galvanized couplings just a few months prior to this, and GRU exposed this five-foot section to view the pull on this area with the couplings. This area was about forty feet up from our feeder pit and was open for excellent viewing. We began our pull at a rate of approximately 5 feet per minute, and it took about 45 minutes to complete. We set the cutter heads on the Bullet at the five o'clock position so the cut would be on the bottom, which would prevent dirt and debris from getting into our operation and would provide a solid casing above and around the new EndoPure pipe being installed. There was no pause at the area with the three couplings, and it would be safe to say that everyone was impressed with what they saw. There was no damage to the EndoPure tubing being pulled through upon inspection. The first pull was completed by 11:49 a.m., requiring just one hour and thirty-four minutes with only four small excavations, resulting in a new two-inch line with two new one-inch upgrade services. During this time, GRU crews dug our second feeder pit on the lower end and exposed the other two services. We then turned the Pow-r Mole machine around to prepare for our second pull.

We returned from lunch about 1:15 p.m. to complete the project. During our first pull we attached the nose piece to the last rod at the Pow-r Mole and as the machine pulled the Bullet, it pushed the nose piece and rods up the second section of pipe to be replaced. This section was approximately 265 feet and required an additional eight pull rods. The Bullet was attached at the second feeder pit with the EndoPure pipe, and we began our second and final pull. The second pull required about one hour and went just as smoothly as the first. We upgraded the two 3/4-inch services to 1-inch with new Philmac fittings and valves and connected the two new pipes in the middle with Philmac couplings, which offer full joint restraint. We then reconnected our existing 2-inch galvanized steel pipe to the new EndoPure pipe with a Philmac Rapid Fix coupling which also provides full restraint. On the lower end, we extended the pipeline an additional 15 feet to allow for the new connection to be installed at a later date. After complete flushing, pressure testing, and bacteriological sampling of the line, it was placed in service. Backfilling the pits and services required very little time and the project was finished about 4:40 p.m.. The entire operation required just 5 hours of actual construction time, resulting in 514 feet of new 2-inch water line and four new upgraded 3/4-inch services to 1-inch with very little water service down time and almost no excavation.

Gainesville Regional Utilities was very pleased with the installation efficiency and cost, and is still pleased with the performance of the products used and the operation. We had several visitors during the day that stayed for the entire operation, including representatives from the city of Tampa, Orange County, Orlando Utility Commission, Florida Water Services, city of Jacksonville, city of Titusville, and CH2M Hill Engineers. Our gracious host, Gainesville Regional Utilities, had several people out for the installation, including Water Distribution Manager Eric Mott and Water Services Supervisor Harold Roland, who, along with the GRU crews that performed a majority of the work,were instrumental in the success of the project.zz

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