



# Orange County Installs 36" PVC Force Main

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IPEX, Inc.

## CONWAY EASTERLY FORCE MAIN PROJECT ORANGE COUNTY, FLORIDA

The following is a precis from the Project Summary, by Joe Margio, P.E., Glace & Radcliffe, Inc., Consulting Engineers, Maitland, Florida.

The Conway Easterly force main project was undertaken in early 1997 by the Orange County Utilities Division. The project was necessary to upgrade existing wastewater transmission systems that were operating over capacity and to service future development in east Orange County. The project included the construction of approximately 8.4 miles of PVC force main and improvements to the existing Conway Area Master Pump Station.

A portion of this project consisted of

the largest ever 36" PVC force main in the U.S. The force main was constructed between the Conway Master Pump Station and the Eastern Service Area Wastewater Treatment Facility (ESAWWTF).

The project was bid and constructed in two contracts. Contract 1 included a section of the project where the county already owned the necessary easements or public road right-of-way was available. Also included was approximately 10,000 feet of 20" PVC force main and improvements to the existing Conway Master Pump Station. Contract 2 consisted of a section where the force main was to be constructed within an existing power easement and across private property. Numerous utility easements had to be acquired from private property owners and from the Orlando



Pictured from left to right: Joe Margio, Glace & Radcliffe, Inc.; Stu Stewart, Consultant to Pipeline Inc.; Christopher Brooke, Orange County; Steve Sloan and Sally Stewart, Pipeline Inc.; and Frank Porter, Porter Associates.



Worker preparing 36" DR25 for joint assembly.

Utilities Commission. The construction work under Contract 2 included approximately 6.5 miles of PVC force main and connection to the influent force main at the ESAWWTF. The force main sizes included 20", 24", 30" and 36" diameter pipe.

In September 1992, the Orange County Utilities Division and Glace & Radcliffe project team initiated preliminary design of the proposed force main. Preliminary design consisted of sizing and routing assignment, which addressed service area, flows, alternate routes and hydraulic analysis.

During final design, consideration was given to the pressure rating of the PVC pipe. Criteria considered during selection of the pipe's thickness included predicted system pressure and pipe burial depth. The peak system pressure, which could be experienced under an abnormal event in the system, was estimated to be approximately 125 to 150 psi (operating pressure plus surge pressure). It was decided DR25 PVC pipe conforming to AWWA C905 would be selected since its pressure rating is 165 psi.

Contract 2 was awarded in September 1996 to the low bidder, Pipeline, Inc. (of Pinellas County), from Winter Park, Florida. The total bid amount of \$6,260,392 included \$4,507,800 for the PVC force main portion.

Pipe was delivered from the factory by trucks and railcar. Pipe delivered by

truck was hauled directly to the site. The pipe delivered by railcar was unloaded at a nearby train depot. From the train depot, a local trucking company delivered the pipe to the project site.



The tests were conducted between inline valves along the length of the force main and consisted of maintaining a 100-psi gauge pressure for 2 hours. During this testing, there was no leakage over the entire 35,000 feet of PVC pipe.

Once pipe installation was started, the contractor installed pipe at an average rate of over 500 feet per day for the entire project. Therefore, it was necessary to have enough pipe delivered from the factory to stay ahead of the contractor's installation rate. All pipe was delivered within a four-month period. The total pipe shipped and installed on the project included 18,960 feet of 36" PVC pipe, 4,280 feet of 30" PVC pipe, 9,380 feet of 24" PVC pipe, and 2,280 feet of 20" PVC pipe.

After installation of all the force main, the pipe was subjected to a pressure and leakage test. The tests were conducted between inline valves along the length of the force main and consisted of maintaining a 100-psi gauge pressure for 2 hours. During this testing, there was no leakage over the entire 35,000 feet of PVC pipe. This result is thought to be testimony to the excellent work of Pipeline, Inc. and to the overall high quality of the PVC pipe. The project was a tremendous success for all parties involved.