Overview

Hillsborough County Public Utilities Department (HCPUD) provides drinking water, wastewater treatment and wastewater disposal service in areas that are primarily located in unincorporated Hillsborough County. In addition to operating four major water treatment plants and seven wastewater treatment plants, HCPUD manages one of the largest water distribution and wastewater collection systems in Florida. This brings continuous challenges to upgrade existing pipelines and add new pipelines to support the steady population growth throughout the county. Design of water distribution and wastewater collection pipelines increasingly requires installation be completed within narrow and/or crowded utility easements. Crossing roads, wetlands, water bodies and existing utilities also typically necessitates trenchless pipe installation methods.

HCPUD has used PVC pipe extensively for open-cut, horizontal directional drill (HDD), and jack & bore (J&B) installations due to its long term corrosion resistance and proven compatibility with all types of potable, reclaim and wastewater conditions. When open-cut is not allowed or is not considered cost effective, HCPUD design consultants often specify Fusible PVC® pipe. Advantages compared with other restrained joint PVC pipe products include a continuous OD across the pipe barrel and fusion joint, a joint strength equivalent to the pipe barrel and bending forces displaced across the bend radius of the pipe rather than concentrated at a deflected mechanical joint.

The following five HCPUD projects demonstrate a variety of challenging pipeline installations where designers chose to utilize Fusible PVC® pipe.

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<th>Pipeline Details and Project Summary</th>
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<td><strong>Project:</strong> Sun City MHP WTP Bypass and Transmission Main Project</td>
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<td><strong>Length and Pipe Size:</strong> 2,200 LF 8-inch DR14 Fusible C-900® pipe</td>
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<td><strong>Installation:</strong> Horizontal directional drill, bundled pull of two pipes under Little Manatee River</td>
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<td><strong>Engineer:</strong> Metzger &amp; Willard, Inc.</td>
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<td><strong>Contractor/Driller:</strong> Andrew Sitework LLC/Centerline Directional Drilling Service, Inc.</td>
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TRENCHLESS METHODS USED SUCCESSFULLY IN HILLSBOROUGH COUNTY FLORIDA

Fusible PVC® pipe provides solutions for numerous water resource projects

Sun City MHP WTP Bypass/Transmission Main

After extensive evaluation of options to upgrade water service in an area of southern Hillsborough County supplied by an aging satellite water plant, a new water transmission line connection to HCPUD’s regional water distribution system was determined to be the answer. The route for the new line required crossing the Little Manatee River. With no bridges to connect a transmission main and environmental permitting which precluded laying pipe along the river bottom, HDD was deemed the only viable approach to extending central water service from the north to the south side of the river. HCPUD engineering manager, Richard Kirby, and project design consultant, Metzger & Willard, determined the best option was to directionally drill two, eight-inch Fusible PVC® pipelines under the river. This approach provided redundancy and operational flexibility to meet a variety of seasonal and long term requirements. Susan Martelli, Metzger & Willard EOR, noted: "Available space on both sides was tight. Underground Solutions personnel provided outstanding support throughout the design and construction phases. Their fusion service and layout coordination with the driller went flawlessly."
Williams Road Transmission Main Extension/ Old Hillsborough Avenue Water Main Replacement

Two water main projects connecting at the intersection of Williams Road and US 92 (Old Hillsborough Avenue) both utilized 12-inch Fusible PVC® pipe extensively for a variety of HDD elements. Project factors that contributed to using HDD construction: 1) storm water utility crossings; 2) side road/business entrance crossings; 3) Interstate 4 crossing; and 4) narrow right-of-way corridors with extensive existing utilities.

Williams Road project design engineer Allen Dethloff of Black & Veatch explained: “Limited shoulder space, extensive trees and the presence of various existing utilities along this heavily traveled road led to directional drilling the majority of the total alignment. Fusible PVC® pipe enabled us to maximize the HDD lengths and limit the HDD casing size to only 16-inches. It definitely provided the trenchless design flexibility needed, which ultimately contributed to a very successful project.”

### Pipeline Details and Project Summary

**Williams Road Transmission Main Extension Project**

- **Length and Pipe Size:** 6,700 LF of 12-inch DR18 water main pipe, 2,500 LF of 16-inch DR25 casing pipe
- **Installation:** Horizontal directional drill, 11 water main bores and two casing bores of 1,200 LF each
- **Engineer:** Black & Veatch, Inc
- **Contractor/Driller:** Harris-McBurney Company/Equibore of America, Inc.

**Old Hillsborough Avenue Water Main Replacement Project**

- **Length and Pipe Size:** 1,700 LF of 12-inch DR18
- **Installation:** Horizontal directional drill, four water main bores
- **Engineer:** Parsons Corporation
- **Contractor/Driller:** Harris-McBurney Company
Memorial Highway Force Main Replacement/ U.S. 41 Force Main Joelson-Taylor to Big Bend

These two wastewater force main projects included unique elements that demonstrate the versatility of Fusible PVC® pipe.

The Memorial Highway Force Main project involved replacing existing ductile iron wastewater force mains with 4-inch to 16-inch PVC pipe by open-cut and HDD installation. Fusible PVC® pipe was utilized for six HDD elements and for several open-cut restrained pipe sections. A portion of the existing ductile iron force main traversed a narrow utility easement overgrown with trees and brush. Due to extensive corrosion and past failures, the contractor had to lay a temporary bypass line for this section while installing the 16-inch PVC line parallel to the existing main.

Underground Solutions and Kimmins Contracting personnel worked together to utilize 16-inch Fusible PVC® pipe for the bypass and then reused it for HDD elements and open-cut restrained sections. Dario Munoz, Kimmins Project Manager, commented, “This approach saved considerable cost and demonstrated the flexibility of being able to connect to Fusible PVC® pipe with standard mechanical fittings.”

The U.S. 41 Force Main project involved installation of a mile of 8-inch PVC force main by open-cut, HDD, and J&B. Fusible PVC® pipe was specified as the carrier pipe inside numerous steel casings. Carrier pipe installations were completed through an existing 10-inch casing under U.S. 41 [a divided four lane road], and through an existing 12-inch casing under a railroad. The fully restrained fusion joint allowed 8-inch carrier pipe to fit inside these existing casings, avoiding the significant cost and permitting that would have been required for new casings.

Underground Solutions, Inc. provides infrastructure technologies for water, wastewater and power cable conduit applications. Underground Solutions’ Fusible PVC® pipe products, including Fusible C-900® pipe and FPVC® pipe, utilize patented technology to produce a fused monolithic, fully-restrained, gasket-free, leak-free piping system ideal for trenchless (horizontal directional drilling, pipe bursting and slippinig) or conventional “open-cut” installations and are available in 4-inch to 36-inch diameters. The combination of standard fittings and lower weight with higher flow for a given pressure class versus other thermoplastic pipes ensures that Fusible PVC® pipe brings greater economy to most pipeline projects.

**Pipeline Details and Project Summary**

**Project:** Memorial Highway Force Main Replacement Project

**Length and Pipe Size:** 1,800 LF
16-inch DR18 and 1,800 LF, 6-inch DR18

**Installation:** 16-inch: Temporary Bypass, three horizontal directional drill bores and open-cut
6-inch: three horizontal directional drill bores

**Engineer:** Greeley and Hansen, Inc.

**Contractor/Driller:** Kimmins Contracting Corporation/ Equibore of America, Inc.

**Pipeline Details and Project Summary**

**Project:** U.S. 41 Force Main Joelson-Taylor to Big Bend Project

**Length and Pipe Size:** 2,300 LF
8-inch DR18

**Installation:** Carrier pipe inside five steel casings (10-inch to 14-inch) totaling 800 LF; five horizontal directional drill bores

**Engineer:** Hillsborough County Public Utilities Engineering

**Contractor/Driller:** Dallas 1 Corporation/ Equibore of America, Inc.

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