

Inspected RCP staged for installation.



36-inch diameter RCP installed to Standards with compaction to spring-line and finished grade.



Limited work space required 12 feet of excavated material to be placed over installed 36-inch diameter RCP.

## Grove Street Outfall Project Improves Drainage Using Concrete Pipe

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Palm Beach County, Florida improved the drainage along Grove Street in the Town of Haverhill by creating a drainage system comprised of various sizes of reinforced concrete pipe and catch basins to channel stormwater to the Lake Worth Drainage District L-4 Canal. [The project](#)<sup>1</sup> relieved flooding in the Briarwood neighborhood and portions of Haverhill. By improving the drainage with a new concrete storm sewer and construction of an outfall into the Mounts Botanical Garden to the south, surface drainage from the roadway pavement was improved, and the quality of the ecosystem of the garden enhanced.

The drainage improvements included installation of over 1,400 feet of 36-inch diameter [ASTM C-76](#)<sup>2</sup> Class III reinforced concrete pipe (RCP), over 650 feet of 30-inch diameter RCP, and over 750 feet of additional 15-inch, 18-inch, 24-inch diameter, and 19-inch x 30-inch catch basins. [The concrete pipe](#)<sup>3</sup> was provided by [Rinker Materials Concrete Pipe Division – CEMEX](#)<sup>4</sup>. Precast concrete manholes and drainage structures were provided by US Precast. The project was funded through the Federal Emergency Management Administration (FEMA) at a cost of \$623,700, including contingency, staff costs, and testing. The FEMA grant covered 75% (\$467,800). [Alan Gerwig & Associates, Inc.](#)<sup>5</sup> provided the design services. Construction testing services were performed for the County by [Radise International](#)<sup>6</sup>, and Centerline Utilities was awarded the Grove Street Outfall.

During construction of the sewer, Evans Street remained open to allow residential property access by restricting the two-lane roadway to a single lane. Limited right-of-way restricted the work space and storage of excavated material. Therefore, excavated fill was piled atop the storm pipe installation as the pipe was installed. Consequently, approximately 10 to 12 feet of temporary embankment was loaded over 36-inch diameter concrete pipe.

The necessity of the temporary staging embankment causes one to question the ability of corrugated HDPE or PVC to withstand the forces of a temporary 12-foot embankment, without significantly deforming or cracking. The potential for damage to a thermoplastic conduit would be exacerbated without an engineer's attention to the installation design or with insufficient compaction and substandard backfill material not in compliance with [ASTM D2321 - 11 Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications](#).<sup>7</sup>

Centerline Utilities performed a "textbook" installation of the RCP by properly compacting the pipe's bedding and backfill up to the haunches. Incidentally, compaction and backfill above the springline has a negligible effect on the structural performance of RCP. While the temporary staging of excavated material over the installed pipeline may have potentially damaged a [flexible pipe](#)<sup>8</sup>, the contractor trusted it would not harm the concrete pipe system. The investment in RCP ensures a long-term value to Palm Beach County, the Town of Haverhill, and the residents and businesses of the community.

### LINKS

Photos: Douglas J. Holdener, P.E.

#### Info Links

1. <http://www.pbcgov.com/pubInf/Agenda/20101116/3c5.pdf>
2. <http://www.astm.org/Standards/C76.htm>
3. <http://www.concrete-pipe.org/pages/why.html>
4. <http://www.rinkerpipe.com/default.shtml>
5. <http://www.aga-engineering.com/>
6. <http://www.radise.net/>
7. <http://www.astm.org/Standards/D2321.htm>
8. <http://www.concrete-pipe.org/pdf/InstallationComparisonInspectorsContractors.pdf>

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(storm, stormwater, flexible, outfall, sewer, RCP)  
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- **Concrete Pipe Design Manual**  
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