

ENGINEERING REPORT
FOR
WATER LINE IMPROVEMENTS
AT BIG ISLAND
CAMDEN COUNTY, MISSOURI

FILED³

APR 5 2007

Missouri Public
Service Commission

Introduction

The following is an Engineering Report and Technical Specifications for the construction of water line replacement and relocation at Big Island in Camden County, Missouri. This report along with plans and specifications has been prepared for Folsom Ridge, LLC. by Krehbiel Engineering, Inc., May, 2004.

Location of Project

The proposed improvements are located in Section 1, Township 38 North, Range 18 West; Section 6, Township 38 North, Range 17 West and Section 31, Township 39 North, Range 17 West, as shown on the attached USGS Location Map. (Exhibit A)

Purpose and Scope of Report

The purpose of this report is to provide information in regard to the replacement and relocation of an existing 4" waterline with new 4" and 2" waterline in order to establish the proper horizontal and vertical separation between waterline and sewerline.

Description of Existing System

Big Island operates their own water supply, storage and distribution system. The supply capacity is from 1 deep well pumping into 4 pressure tanks and 2 ground storage reservoirs. There are no other pumping units required on the system; and, currently, no water treatment is required. The existing distribution system is comprised of 2" service lines and 4" distribution mains.

2. Pipe. All plastic pipe shall meet the requirements of the National Sanitation Foundation. Each length of pipe must also show the diameter and the commercial standard, which is applicable to the type of pipe specified. Plastic pipe shall be polyvinyl chloride ASTM type 1, grade 1 (normal impact), conforming to the commercial standard, which is, applicable to the type of pipe specified. Plastic pipe shall conform to ASTM D2241, latest edition. Class 200 PVC pipe, shall have a maximum design stress of 2000 pounds per square inch.

3. Certification Requirements. The Contractor shall furnish three copies of a pipe manufacturer's certification that the pipe furnished is in full compliance with the commercial standards applicable to the pipe specified. The Contractor shall furnish Krehbiel Engineering, Inc. three copies of data showing the physical properties of the pipe furnished. Properties should include normal bursting pressure, manufacturer's maximum working pressure, physical dimensions, and tolerances. Pipe shall not be purchased until approved by Krehbiel Engineering, Inc.

The Contractor shall have the manufacturer provide a factory representative skilled in the installation of the type of pipe purchased to instruct the Contractor's personnel in the proper procedures for connecting and laying the pipe.

4. Fittings. All fittings, couplings and adapters shall be manufactured out of materials conforming to the same standards as the pipe and having a design strength equal or better than the adjacent pipe.
5. Mechanical Joint Adapters. It is contemplated that valves two inches and larger may be specified mechanical joint, AWWA, and in such event PVC Mechanical Joint Adapters shall be furnished. They are to be made of Schedule 80 PVC at least twelve (12) inches long. One end shall be built up to an O.D. equal to that required by the MJ fitting.

Male adapters shall be of the heavy duty type, be made of Schedule 80 pipe and have socket depth equal to the coupling. All threads shall be iron pipe size and be sized for a tight fit. Extra heavy-duty adapters shall be used wherever possible. Schedule 80 PVC pipe shall meet all requirements of SDR pipe and shall conform in all respects to the commercial standards CS-207-60.

Contractor's Guarantee - Pipe furnished by Contractor shall be

guaranteed against rot, electrolytic corrosion, and production defects.

Contractor shall maintain the pipe lines for a period of one year from date of acceptance by Krehbiel Engineering, Inc. Such remedial measures as required to correct leaks and similar troubles will be done by the Contractor at his own expense.

- B. Gate Valves - Gate valves shall be iron-body, resilient-seated, tight closure gate valves with nonrising stems, "O" ring type packing, and complying with AWWA C509. The waterway of the valve in the fully open position shall be unobstructed. All exposed gate valves shall have flanged ends conforming to ANSI B16.1, Class 125. All buried gate valves shall be specifically designed for buried use and shall be equipped with mechanical joint ends. The gate valve wedge shall have Buna "N" or SBR rubber bond to both sides to form a double seal when the valve is closed. The operator shall be of the hand wheel type for exposed valves. Buried gate valves shall be equipped with a 2-inch square operating nut. All valves shall open in a counterclockwise direction. The valve interior and exterior shall be coated with epoxy paint standard with the valve manufacturer.
- C. Gate valves Two and One-half Inches and Smaller - Unless otherwise specified, gate valves two and one-half inches smaller in size shall be standard, bronze, solid-wedge, rising stem type gate valves with screwed ends, suitable for 125 pound working stem pressure and conforming to Federal Specification WW-V-54, Amendment 1, Class B, for Valves, Bronze, Gate 125 and 150 pound Screwed and Flanged (for land use).
- D. Service Connections - Service connection shall be ½" Copper pipe shall be rigid cold drawn type. Copper shall be completely deoxidized and conform to Federal Specifications ASTM B88, latest edition, Type K or ¾", SDR 9, 200 psi, PE-3408 Eagle Pure-Core Blue HDPE Tubing.
- E. Valve Boxes - Valve boxes shall be provided for all gate valves on the system. Boxes shall be tough, white, high-strength PVC plastic molded in a ribbed configuration having rolled edges. They shall have suitable bases to fit around the valve bodies without bearing on them. Barrels shall be made telescopic for adjustment and shall have a minimum inside diameter of five inches. They shall be designed for the depth of trench specified. Top section shall have a flange for holding it in position. Covers shall be recessed flush with top, and marked "Water" in raised letters.
- F. Data - For valves, gates and appurtenances the Contractor shall