

Memorandum



Date: April 30, 2010

To: Donna Dettling, Village Manager
Village of Dexter

From: Christine Phillips, PE
Orchard, Hiltz & McCliment, Inc.

Re: Village of Dexter – Project No. 7294-01
Qualification for Green Project Reserve Funding
Business Case

This memo provides a basis for determining that the Village of Dexter, DWRF Project No. 7294-01, qualifies for Green Project Reserve funding. DWRF Project No. 7294-01 involves replacing the last 7,200 ft of 4-inch unlined cast iron water main in the Village. Having been constructed in the 1930's, this water main is nearly 80 years old. The following information was used to make the determination.

In the 2005 Water System Reliability Study, various improvements to the distribution system were recommended. These improvements included replacing the 4-inch cast iron water main in the Village. This project involves replacing the last 7,200 ft of 4-inch cast iron water main in the Village of Dexter, located on Fourth, Fifth, Dover, Edison and Hudson Streets. Many of these mains are corroded and contain deposition that has significantly reduced the carrying capacity while at the same time, increasing the friction losses and energy necessary to deliver water through them.

Over the last 10 years, the Village experienced 10 water main breaks in the 7,200 ft of 4-inch water main to be replaced, for an average of 0.73 breaks per mile per year. In comparison, the Village only experienced an average of 0.04 breaks per mile per year in the remainder of the water main system (1 water main break per year over approximately 24 miles). The Village estimates that each break results in an average water loss of 5 million gallons for a total water loss of 5 million gallons per year in the piping to be replaced. Dexter expects a 50% reduction in breaks system-wide by replacing these mains.

In 2005, the Village reported an average daily usage of 673,000 gallons per day with unaccounted water at 17% of the total annual pumpage. That water loss equates to more than 40,000,000 gallons per year. Just eliminating the breaks occurring in the remaining 4-inch piping should reduce the annual water losses by almost 12.5%.

System losses in excess of 15% are generally considered unacceptable in the waterworks industry. Although Dexter is only planning to replace 5% of their total pipe inventory, they are

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replacing 80-year old, antiquated piping that is likely experiencing the highest percentage of leaks. Therefore, it is expected that the replacement of these targeted mains will decrease the Village's lost water to a much greater extent than the percentage of the Village's total pipe inventory they represent, further enhancing the Village's water conservation and efficiency.

The new mains will also have an improved C factor as compared to the existing pipes. The current, unlined, sand cast iron piping is estimated to have a C factor equal to 65, while the new, cement-lined, ductile iron piping will have a C factor equal to 120. Dexter anticipates energy savings of 165 Kwh/year from pumping water through the new mains versus the old ones.

This water main replacement project does qualify for the green project reserve funding. The water main replacements will improve water conservation/efficiency by reducing water losses experienced from frequent water main breaks and on-going leaks, as well as provide for reduced energy use.

**Drinking Water Revolving Fund
Green Project Reserve Qualification Template**

Applicant: Village of Dexter
Project Name: 2011 DWRP Water Main Upgrades

Project No: 7294-01

Identify by page number from the project plan, or attach excerpts, where water efficiency or energy efficiency improvement justification is provided or discussed to support the need for the recommended green reserve project component: Pages 11 and 20

Please ensure all requested information, in one or more of the 3 sections below, is provided to enable an assessment by the MDEQ/USEPA of whether the project or project component can qualify for funding from the green reserve established/required in the ARRA.

Water Main Replacement

1. Over the last ten years, 10 water main breaks have occurred on the water mains that are proposed for replacement, an average of 0.73 breaks/mile/year.
2. Identify the length, diameter, age and type of pipe to be replaced:

7,200 lf of 80-yr old (constructed in 1930's) 4-inch cast iron water main
3. Each break is estimated to result in the average loss of 5 million gallons of water, calculated to total 5 million gallons/year of water lost for those water mains.
4. Present the data indicating how this is a significant source of water loss in the system and how the pipes proposed for replacement are likely to generate the greatest return in leak reduction.

The Village's water system has approximately 134,500 lf of water main, or approximately 25 miles. Due to the Dexter 2010 DWRP Water System Improvements Project when 4,050 lf of 4-inch water main was replaced with 8-inch water main, 7,200 lf of water main in the Village's system is the 4-inch cast iron water main that is proposed for replacement. This is the last of the old 4-inch water main to be replaced within the Village.

Within the 7,200 lf of water main, the Village experiences approximately 1 water main breaks/year. Within, the remaining 127,300 lf, the Village only experiences 1 water main break/year. By replacing the 4-inch water main, it

is estimated that the Village will experience a reduction of 50% in the number of water main breaks that they experience.

5. The energy savings from pumping/delivering water through the new water mains versus the old ones is estimated at 165 Kwh/year.
6. Describe the condition of the replaced mains with respect to friction/head loss etc from tuberculation or other deterioration issues. As appropriate, identify if the soils are corrosive and contributing to the deterioration/breaks or leaks in the mains, and how the replacement mains are designed to address future corrosion:

Because of the age and material of the water main, it is expected that the current C factor is equal to 65. Once replaced, the new 8-inch ductile iron water main will have a C factor equal to 120. This will significantly decrease the friction loss in the pipe.

7. Total projects costs for the water main replacement component of the project are \$1,300,000.
8. Identify the total water loss in the community: 10 million gallons
9. Identify the source of data used for these calculations: DPW Records

Submitted by:

Christine Phillips, PE

04/30/10

Name

Date

Project Engineer

Title