Lake Havasu City
DW-040-2010
Water Service Line Replacement / Water Main Replacement

1. **Identify and describe the problem(s) in terms of water efficiency/conservation:**

Water Main Replacement Program

In 2002 the City made the decision to begin an aggressive water main replacement program with the goal of replacing sections of water main with a history of breaks in conjunction with the sewer construction. Over the last 8 years our water system has experienced approximately 522 main line failures. The total water loss due to the main line failures is estimated at 26.5 million gallons or approximately 3.3 million gallons per year. There may be a need to install Pressure Reducing Valves (PRV's) on some homes to regulate the pressures that the property owners see. Within the system, the City is considering installing a couple mainline PRV's that can inter-tie zones and allow for less pumping.

Water Service Line Replacement Program

The City also continues to replace the old plastic type water service lines with new copper water service lines in conjunction with the sewer projects. The copper lines are more durable and last longer in our corrosive soils. In 2001/2002 the City experienced nearly 1,000 leaky water service lines, which was very time consuming and expensive for our maintenance division. It was decided that all plastic water service lines would be replaced during the sewer construction. In 2009/2010 the number of leaks was lowered to around 400. From 2001 to 2009, the City experienced more than 6,000 leaks total, and the water loss is estimated at 102.4 million gallons or about 12.8 million gallons every year.

Due to the frequency of water main and service line breaks, City staff has become extremely efficient at responding to leaks and breaks. Although the estimated water loss represents 1% of the City's water production, the volume of water lost due to these breaks, 16.1 million gallons per year, is significant.

2. **Identify and describe the problem(s) in terms of energy efficiency:**

Water Booster Station Replacement Program

Our Booster Station Replacement Program will replace many of our aging booster stations. While most of our stations are more than 40 years old and some of the equipment has been replaced, most of the pumps are still 15 years old or older and are operating to the right of the optimum point of their curve. This situation requires additional energy to pump the same amount of flow and head.

3. **Identify and describe the problem(s) in terms of infrastructure, energy consumption, and operational costs:**

With the system needing frequent repairs, manpower and materials are frequently required to shut down sections of pipeline, dig up the break, install new segments of pipelines, and replace with new asphalt since most water lines are in the street. The average break takes a 2-4 person crew, 3-4 hours from start to finish, with a street repair crew that later replaces the cold mix that is placed temporarily with hot mix. This three person crew requires generally 1-2 hours to replace

the cold mix with hot mix.
For main and service lines, the City has five crews of generally two people that spend about 50% of their time repairing leaks and breaks in both service lines and main lines. Asphalt replacement requires disposal of both the original asphalt since it is not reusable in that format and for small areas and then also the temporary cold mix material. While it is recycled, new material is brought in, the typical break requires a repair area of 30-60 SF of asphalt to be dug up and replaced and this has to be replaced again with hot mix at a later time. Each break also requires the installation of new pipeline material on average of 10 ft in length.

Please provide the following data specific to these project components

4.	Estimated current annual water loss	16.1 million gallons
5.	Estimated annual water conservation expected	12.9 million gallons (80% of 16.1 million gallons)
6.	Expected net energy reduction	7%
7.	Expected annual electrical cost savings	$52,900
8.	Expected annual savings due to extended equipment service life (please attach a description of specific savings expected) *With the new pumpstations there will be less expense in parts replacement, specifically many of the electrical components that wear out quickly in the very hot environment of Lake Havasu. This estimate includes staff time for replacement and cost of parts on average.*	$12,000
9.	Expected annual savings due to reduced use of chemicals/ materials (please attach a description of specific savings expected)	$0

10. **Clarify technical benefits of project in terms of <u>water efficiency/conservation</u>:**

This project involves distribution pipe replacement to reduce water loss and prevent water main breaks (EPA guidance 4/21/2010, Part #2, 2.5-2).

By replacing aging water mains and water service lines with new pipelines, the new pipelines have a service life of 50-70 years and that means that no water will be lost due to broken lines and thus the water is conserved as a result.

11. **Clarify technical benefits of project in terms of <u>energy efficiency</u>:**

This project involves energy efficient retrofits, upgrades, or new pumping systems and treatment processes. (EPA guidance 4/21/2010, Part #2, 3.5-1).

The new booster pump stations are National Electric Manufacturers Association (NEMA) premium efficiency motor pumps with soft starts. While the City considered variable frequency drive pumps which are often considered to be most green, in the City's system, the most efficient

operation is to have the pumps run at the optimum point on the curves for the shortest period of time versus ramping up and down based on demands. They are being selected to optimize their energy efficiency and will allow the City to modify their procedures for their tank and pump operations. This means that the City will reduce their needs for pumping during peak energy times.

12. **Clarify technical benefits of project in terms of <u>infrastructure, energy consumption and operational costs</u>:**

13.	Identify the project component costs in dollars and as a percent of the total project cost.	Water main replacement program	$2M
			18%
		Water service line replacement program	$1.9M
			17%
		Water booster station replacement program (pumps and motors)	$200,00
			3%

14.	Divide the project benefits into the following categories (total may be less than 100% if there are components of the larger project which are not green)	Water efficiency/ conservation	50%
		Energy efficiency	30%
		Energy consumption and operational costs	20%

Completed by:

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Signature: J. Greg Froslie Date: 7.7.10