

## **Glenwood Indiana Water improvements Green Project Business Case**

### **Summary**

The Water Improvement Project for the Town of Glenwood, Indiana, consists of three major areas which will eliminate water loss, improve efficiency in operations, provide for more efficient operations, remove potential lead contamination from the water system and provide other environmental benefits.

The Project consists of replacing an existing 75,000 gallon elevated storage tank with a new 100,000 gallon elevated storage tank and new controls with a dialer, 3,700 feet of 1930's cast Iron pipe containing lead joints with new PVC pipe, and the replacement of 39 manual read water meters that are over 25 years old.

For the purposes of this business case, it is assumed that the SRF loan amount will be prorated as 31% of the overall construction costs.

This translates into the following breakdown for the \$245,500 SRF loan.

Tank and appurtenances:	\$	138,200
Water Main replacement:	\$	66,000
Meter Replacement:	\$	3,384
Non Construction Costs	\$	37,916
<b>Total</b>	<b>\$</b>	<b>245,500</b>

The water savings portion (green) of the SRF loan is estimated to be 91% and is broken down as follows:

Tank and appurtenances: 100%	\$	138,200
Line replacement: 71%	\$	46,860
Meter replacement: 100%	\$	3,384
Non Construction Costs	\$	34,375
<b>Total "green" construction costs</b>	<b>\$</b>	<b>222,819</b>

It is estimated that the improvements will result in an annual water savings of 988,000 gallons out of the approximately 6,000,000 - 8,000,000 gallons which is the range of annual pumpage over the last five years.

### **Background**

(Tank)

The existing elevated tank was constructed during the 1930's and is of riveted construction and likely contains some lead paint. The tank has experienced 2 leaks over the last 5 years. In order to repair the tank it must be drained. In addition it has taken about two weeks from the time when the tank leak is discovered until a tank contractor can be onsite to weld the holes. Due to the age of the tank, it is very likely that the leaks will continue to occur and on a more frequent basis.

The tank controls which are based on a pressure gauge, are very difficult to control, and lose their calibration on a regular basis. This results in the tank overflowing for a period of time before the operator is notified and he can come back to the plant and manually shut off the pumps. This can be 2 or more hours between the time the overflow is discovered and the well pump is shut off.

The project will replace an aging tank that has served the town for many years with a slightly larger one that will provide more fire protection and have more accurate controls.

#### (Water Main)

The water system contains approximately 10,000 feet of water mains of which approximately 9,000 feet is believed to be constructed of lead joint cast iron originally installed when the water system was developed in the 1930's.

The pipe ranges in size from 4-inch to 6-inch with a small amount of 2-inch pipe that is not cast iron. The treatment plant processes approximately 35,000 gallons on an average day.

During the last 10 years, the system has experienced at least 6 major leaks on the section that is to be replaced. It is believed that the cause of these leaks is due to the location of the line adjacent to S.R. 44 and the resulting vibration from the traffic helps to loosen the joints. The portion of the system to be replaced accounts for about 41% of the total system and will reduce the number of leaks and eliminate potential lead exposure.

Water loss data included in the PER shows that Glenwood averages 34.6% for the years 2002 – 2007. Using a conservative 6.6 million gallons per year pumped, results in 2.28 million gallons of water loss per year due to main breaks, joint leaks and meter error.

#### (Water Meters)

The water system serves about 400 people and has about 130 metered services. Total annual water production ranges from 6 to 8 million gallons depending on whether the area experiences dry or wet summers. The town replaced all the water meters in 1983. A 2010 study in Water and Wastes Digest by Dr. Hans D. Allender, P.E., indicated that the 25 year old meters have an accuracy of 96% and 30 year old meters have an accuracy of 82%, showing a significant drop off during the last 5 year period. This indicates that water meters have a useful life of about 25 years. Based on this information, the meters were due to be replaced in 2008.

## **Results**

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### **(Tank)**

Replacing the tank with a new, slightly larger tank will result in water savings and increased fire protection. Using a 10 gpm tank leakage rate, a 14 day leak period and draining the 75,000 gallon tank, each episode loses 276,000 gallons. Prorating this over the 5 year span translates to an estimated loss of about 110,000 gallons per year. Using 100 gpm well pumping rate and a 2 hour period between overflow and manually shutting off the pumps results in the loss of 12,000 gallons for each overflow event. This occurs about 5 times per year for a total of 60,000 gallons lost. The average total loss from the tank each year is estimated to be 170,000 gallons. The new tank will be painted with low VOC paint to reduce emissions. The old tank will be recycled.

### **(Water Main)**

Replacing the old cast iron lead joint pipe will significantly reduce the number of leaks in this section of the system. Approximately 6 pipeline repairs due to leaks and breaks have been made over the last 10 years. Each leak is estimated to have been over 20,000 gallons. Prorating this on a yearly basis results in an average yearly water loss of 12,000 gallons per year.

Other water loss can also be reduced by the installation of new piping. If the estimated 2.28 million gallons per year water loss is broken down and the proposed water savings from the tank replacement and water meter replacement is factored in, approximately 1.6 million gallons per year could be attributed to joint leakage. This project affects approximately 41% of the old pipe in the system resulting in about 650,000 gallons per year of potential water savings.

### **(Water Meters)**

Based on the above mentioned study it is estimated that the existing meters are no more than 90% accurate and will continue to degrade over time. The monthly water loss attributed to these 39 meters based on a 3,000 gallon per month usage is about 333 gallons per month each. This translates to 155,000 gallons per year.

Taking all the water losses into consideration, this project will address about 988,000 gallons of water loss per year or about 15% of the annual production which at a rate of \$6.01/1000 gallons is a savings to the town of \$5,937 yearly.

Payback using 2.5% interest rate and a \$222,819 “green” portion of the loan is 38 years, which is more than the life of the pipe and tank which are estimated to be 50 – 75 years.

It is believed that the water meter replacement falls under the categorical classification and is not included in the payback period.

## **Conclusions**

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The proposed project will provide environmental benefits in the following ways.

1. Reduce pumping from the aquifer (988,000 gallons/ year)
2. Reduction in electrical usage: 9,880 kwh @ \$0.8/kwh = \$790 with the effect of reducing the carbon footprint.
3. Elimination of potential lead contamination to the water system from the lead joints.
4. The old tank will be recycled reducing future energy use from refining iron ore.
5. The paint specified for the new tank contains very low concentrations of VOC's which will reduce organic emissions.
6. Reduction in Operation and Maintenance due to less pumping being required.
7. Improved fire protection capacity allowing firefighters to extinguish fires more rapidly.
8. Increased revenues to the Utility