HUNTINGTON WATER SYSTEM IMPROVEMENTS
CONTRACTS A, B, & C
NEW WATER TREATMENT PLANT AND WELLS, NEW ELEVATED WATER STORAGE TANK, AND WATER TRANSMISSION MAINS

Summary

- The work for **Contract "A"** includes the construction of a new 2.7 million gallon per day (MGD) iron removal water treatment plant (WTP); four supply well pumps and well houses; two Dualator III units; on-site sodium hypochlorite generation and start-up disinfection systems; three (3) high service pumps; one (1) backwash pump; clearwell; residuals holding tank; backwash recycle and residuals dewatering pumping stations; process piping; yard piping and valves; HVAC; motor control centers and electrical equipment; instrumentation and SCADA controls.
- The work for **Contract "B"** includes one (1) 1,000,000-Gallon Composite Elevated Tank (with a forming system utilizing reusable forms).
- The work for **Contract "C"** includes the installation of approximately 1,700 linear feet of 12-inch ductile iron raw water main, approximately 3,000 linear feet of 16-inch ductile iron raw water main, and approximately 6,000 linear feet of 20-inch ductile iron finished water main.
- Loan amount = $10,383,000
- **The energy efficiency (GPR) portion of loan is $3,046,394 based on bids received for the project on May 18, 2011. The estimated planning, design, and utility connections cost for the green portion is $165,520 for a <u>total GPR cost of $3,211,914.</u>**

Background

- The City of Huntington currently supplies potable water to its customers through seven (7) ground water wells and an iron filtration WTP rated at 5.0 MGD. To meet future water demand needs and to supplement the City's existing WTP, a new 2.7 MGD water treatment facility and four (4) new well pumps and well houses are to be constructed on the north side of the City. The following are **<u>Green Project Reserve (GPR) components to be considered by SRF to be eligible for an interest rate reduction:</u>**

    1. WATER EFFICIENCY – a filter backwash system with air assist technology, a filter backwash holding tank, and spent wash water recycle facilities
    2. ENERGY EFFICIENCY - variable frequency drives (VFD) to operate the well pumps and high service pumps
    3. ENERGY EFFICIENCY – Energy efficient outdoor building lighting, including solar powered LED lights
    4. ENERGY EFFICIENCY – Automated and remote control systems (SCADA) will be utilized at the WTP to monitor and remotely control the operation of the wells, WTP, and elevated water storage tank.

Results

1. Filter Backwash System

The new Simul-Wash Filter Backwash System will allow the Utility to backwash the two (2) filters utilized at the new North Water Treatment Plant using an air assist technology to minimize the volume of water required for each backwashing operation. In addition, the Plant will utilize a filter backwash holding tank and spent wash water recycle facilities to enable the City to reclaim 90%-95% of the water that would normally be wasted.

Water Only Backwash (per backwash per filter)
Draindown – 417 gallons
High Rate – 15 gpm/sq. ft. for 15 minutes (Flow Rate @ 1,194 gpm)
Backwash Volume Per Cell – 18,332 gallons
Backwash Volume Per Unit –73,328 gallons
Total Backwash Volume – 146,656 gallons

Simul-Wash Backwash System (per backwash per filter)
Draindown – 417 gallons
Simul-Wash™ Rates – 3 cfm/sq. ft. and 4 gpm/sq. ft. for 10 minutes (Flow Rate @ 319 gpm)
Air Purge Rate – 4 gpm/sq. ft. for 2 minutes (Flow Rate @ 319 gpm)
High Rate/ Restratification – 15 gpm/sq. ft. for 3 minutes (Flow Rate @ 1,194 gpm)
Backwash Volume Per Cell – 7,822 gallons
Backwash Volume Per Unit – 31,288 gallons
Total Backwash Volume – 62,576 gallons

Total System Backwash Water Savings using Simul-Wash:
Savings Per Backwash – 84,080 gallons
Savings Per Week (estimated at 2, 15 minute backwashes per week per filter) – 336,320 gallons
Annual Savings for Two (2) Filters – 17,488,640 gallons of water

Backwash Holding Tank and Spent Wash Water Recycle Facility
Total Backwash Volume Entering Holding Tank – 62,576 gallons per backwash per filter
Range of Backwash Volume Not Reclaimed = 3,129 to 6,258 gallons
Backwash Volume Reclaimed by Recycle Facility – 56,318 to 59,447 gallons
Average Backwash Volume Reclaimed by Recycling – 57,883 gallons per backwash per filter
Average Annual Backwash Volume Recycled (2 Filters) = 12,039,664 gallons

2. Variable Frequency Drive (VFD) Pumps

OPERATION

Based upon the attached worksheets by Peerless Midwest Inc., the total VFD energy savings for the well pumps and high service pumps are summarized below:

Total Energy Savings 49,114 kWh/year
Total Cost Savings $3,683.47/year

Well Pump 9A	Capital Cost	Annual Operation Cost	Expected Life	*Annual Replacement Cost	Present Worth	Differential
Across the Line	$4,542	$7,382.13	15	$431.65	$115,705.60	
VFD	**$5,594**	**$6,537.60**	**15**	**$439.16**	**$104,097.16**	**-$11,608.44**

Well Pump 9B	Capital Cost	Annual Operation Cost	Expected Life	*Annual Replacement Cost	Present Worth	Differential
Across the Line	$7,121	$17,205.69	15	$880.63	$266,086.98	
VFD	**$13,074**	**$16,774.85**	**15**	**$1080.53**	**$265,777.28**	**-$309.70**

Well Pump 8A	Capital Cost	Annual Operation Cost	Expected Life	*Annual Replacement Cost	Present Worth	Differential
Across the Line	$4,542	$8,105.38	15	$457.84	$126,580.54	
VFD	**$5,594**	**$6,716.37**	**15**	**$445.64**	**$106,785.19**	**-$19,795.35**

Well Pump 8B	Capital Cost	Annual Operation Cost	Expected Life	*Annual Replacement Cost	Present Worth	Differential
Across the Line	$4,542	$7,028.16	15	$418.84	$110,383.24	
VFD	**$5,594**	**$6,708.36**	**15**	**$445.35**	**$106,664.75**	**-$3,718.49**

HS Pumps 1, 2, and 3 (each)	Capital Cost	Annual Operation Cost	Expected Life	*Annual Replacement Cost	Present Worth	Differential
Across the Line	$4,995	$15,119.49	15	$728.14	$232,515.49	
VFD	**$6,720**	**$14,431.51**	**15**	**$765.68**	**$223,958.33**	**-$8,557.16**

*SRF Interest Rate = 3.62%, based upon Tier II MHI and user rates under $30/month.

MAINTENANCE

The maintenance on the above pumps is assumed to be equivalent for both the constant speed across-the-line pumps and VFD pumps.

- Total estimated cost savings over the life of the VFD Pumps will be $43,989.14.

3. Energy Efficient Building Lighting

OPERATION

• Seventeen (17) total outdoor light fixtures for the water treatment plant building, well houses, residuals building, and the elevated water storage tank.

• 175 watt Metal Halide wallpack fixture uses approximately 200 watts per fixture. ($200 each)

• 42 watt LED wallpack uses approximately 50 watts per fixture. ($300 each)

Power Costs at $0.08 cents/kW-hour:

Metal Halide 17 x 200 watts x (1kW / 1000 watts) x 12 hours/day x 365 days/year x .08 cents/kW-hour = $1200 / year

LED **17 x 50 watts x (1kW / 1000 watts) x 12 hours/day x 365 days/year x .08 cents/kW-h = $300 / year**

MAINTENANCE

• Metal Halide Bulb Life 6.67 years ($100 each)

• LED Bulb Life **20 years**

	Capital Cost	Annual O&M Cost	Expected Life	*Annual Replacement Cost	Present Worth	Differential
Metal Halide	$3,400	$1,500	20	$177.38	$33,577.38	
LED	**$5,100**	**$300**	**20**	**$195.48**	**$11,295.48**	**-$22,281.90**

*SRF Interest Rate = 3.62%, based upon Tier II MHI and user rates under $30/month.

- Estimated cost savings over the life of the LED light fixtures will be $22,281.90.

4. Automated and Remote Control System (SCADA)

• The new SCADA System with high speed data radios will allow the Utility to monitor and operate the following linked sites:

- o New Water Treatment Plant Building
- o New Elevated Water Storage Tank
- o New Well House #8A
- o New Well House #8B
- o New Well House #9A
- o New Well House #9B
- o Existing Water Distribution System

• The SCADA System will allow the Utility to operate and monitor the New Water Treatment Plant, Wells, and Elevated Water Storage Tank from their existing South Water Treatment Plant seven (7) days a week and twenty-four (24) hours a day without having to send someone to the plant on a regular basis for process changes or when an alarm is activated.

• The SCADA System will allow the Utility to operate the new treatment plant, wells, and elevated tank with the entire system from a remote location (Utility office, South Water Treatment Plant or from a remote computer) and will save time and mileage resulting in labor and energy savings. It is estimated that a labor savings of 6.0 hours a day and 15 miles round trip will result from using the SCADA system to monitor and check the new water treatment plant equipment, wells, and elevated storage tank. Based on the hourly wages for a weekday, 6.0 hours @ $18.00 per hour the cost of labor is $108 per day or about $39,420 per year.

• Mileage savings are based on assuming one round trip is avoided per day (15 miles per day) and company vehicles get 15 miles per gallon, then approximately 5,475 gallons of gasoline are saved annually. Assuming a gasoline cost of $4.00/gallon, the estimated savings will be $21,900 per year. This reduces the overall operation and maintenance costs for the Utility, reduces the carbon footprint of the water system, and maximizes the Utility personnel's time.

• The SCADA System will also save energy when the tanks overflow there will be an alarm letting the Utility know and will save on the cost of electricity and water.

Conclusion

1. Filter Backwash System

Based upon a monthly charge of $29.95 for 5,000 gallons, the Simul-Wash Backwash System and Spent Wash Recycle Facility will save approximately $176,874.54 in operating costs and 29,528,304 gallons of water annually.

2. Variable Frequency Drive (VFD) Pumps

Total estimated cost savings over the life of the VFD Pumps will be $43,989.14.

Total Energy Usage Savings	49,114 kWh/year
Total Energy Cost Savings	$3,683.47/year

3. Energy Efficient Building Lighting

Estimated cost savings over the life of the seventeen (17) LED light fixtures will be $22,281.90.

4. Automated and Remote Control System (SCADA)

By installing a SCADA system, the Utility will be able to save approximately 5,475 gallons of fuel per year, reduce wear and tear on Utility vehicles, and reduce the required labor by approximately 2,190 hours per year.

The estimated total cost savings of the project $61,320 per year is based on $21,900 per year in gasoline savings and $39,420 per year in labor savings.

Referenced Materials –
Water System Improvements Contracts “A, B, and C” – New Water Treatment Plant and Wells, New Elevated Water Storage Tank, and Water Transmission Mains, City of Huntington, Indiana, Wessler Engineering, Dated April 2011