



**City of Rexburg FY15 Water System Project**  
**SRF Loan #DW 1502 (pop. 26,500)**  
**\$11,100,000**

**Final Green Project Reserve Justification**

**Business Case GPR Documentation**

1. INSTALLS NEW PREMIUM ENERGY- EFFICIENT PUMPING SYSTEMS (Energy Efficiency). Categorically GPR-eligible per 3.2-3: *NEMA premium efficiency motors*; also a Business Case GPR per 3.5-1: *...new pumping systems (includes variable frequency drives)*. (\$612,000).
2. INSTALLS SCADA IMPROVEMENTS TO ENHANCE REMOTE MONITORING (ENERGY Efficiency). GPR Business Case per 3.5-7: *automated and remote control systems (SCADA) that achieve substantial energy savings*. (\$143,830).

**Categorical GPR Documentation**

3. INSTALLS PRESSURE SUSTAINING VALVES (Water Efficiency). Categorical GPR per 2.2-12: *Installing water efficient devices*. (\$37,000).

# 1. NEW PREMIUM PUMPS & VFDs

## Summary<sup>1</sup>

- New premium energy-efficient pumps and VFDs were installed in the system.
- Loan amount = \$11,100,000
- Energy savings (green) portion of loan = 5.6% (\$612,000) (Final Installed Costs)

## Background

- To assist in meeting and maintaining future water demands in the system, the project provided new wells at the North Well Reservoir and at Madison High School. Each well was provided with a premium energy-efficient 100-hp turbine pump.
- A new booster pump station was provided as part of the Madison HS well/tank complex; the pump station contains two premium energy-efficient 75-hp pumps with VFDs.
- A new booster pump was added to the North Well booster pump station; the pump is a premium energy-efficient 150-hp pump with VFD.

## Energy Efficiency Improvements<sup>2</sup>

### Motor Analysis: Well Pumps - North Well Reservoir and Madison High School (2) 100-hp turbine pumps

- Energy savings of the Premium motor over the EPAct motor = 3,158 kWh/yr. = \$315.80/yr. EPAct motor cost = \$98,000; Premium motor cost = \$100,000. Pay-back for the cost difference = **6.3 yrs**.

### Motor Analysis: Madison HS Booster Pump Station - (2) 75-hp pumps

- Energy savings of the Premium 75-hp motor over the EPAct motors = 3,803 kWh/yr. = \$380.30/yr. EPAct motor cost = \$92,500; Premium motor cost = \$94,000. Pay-back for the difference = **3.9 yrs**

### Motor Analysis: North Well Booster Pump Station - 150-hp pump

- Energy savings of the Premium motor over the EPAct motor<sup>1</sup> = 2,156 kWh/yr. = \$216/yr. EPAct motor cost = \$83,500; Premium motor cost = \$85,000. Pay-back for the difference = **11 years**.

### VFD Analysis: Madison HS Booster Pumps:

- WITH A VFD: 260,413 kWh/year savings = \$26,041/year, payback for \$13,000 VFD = **0.49 years**

### VFD Analysis: North Well Booster Pump:

- WITH A VFD: 259,700 kWh/year savings = \$25,970/year, payback for \$13,000 VFD = **0.51 years**

## Conclusion

- The premium energy-efficient pump/VFDs are categorically GPR-eligible as they are cost effective i.e. their payback periods do not exceed the life of the equipment.
- **GRP Costs Identified**<sup>3</sup>

<b>NEW WELLS</b>	Pumps: 3 @ \$100,000 ea = \$300,000
<b>BOOSTER STATIONS</b>	Pumps: \$85k + \$94k + \$94k = \$273,000
	3 VFDs: 3 @ \$13,000 = \$39,000
	<b>Total = \$612,000</b>

- **GPR Justification:** Business Case GPR-eligible (Energy Efficiency) per Section 3.2-3: “*NEMA Premium energy efficiency motors*”; and Section 3.5-1: “*Energy efficient...upgrades, or new pumping systems...including VFDs.*”

<sup>1</sup> Assistant Public Works Director, City of Rexburg, 9/15/20 email to K McNeill

<sup>2</sup> City of Rexburg Water Facilities Planning Study, December, 2014 Keller Associates

## 2. SCADA IMPROVEMENTS

### Summary

- The City of Rexburg uses a SCADA system to operate the majority of its wells and to collect information on pump operation, pressures, and storage volumes within the system.
- Loan amount = \$11,100,000
- Estimated energy efficiency (green) portion of loan = 1.3% (\$143,830) (Final)
- Estimated annual energy and labor savings = \$52,000 per year.

### Background<sup>3</sup>

The Facility Plan concluded that the current SCADA is insufficient to meet the monitoring and operational requirements of the water system and documented the following concerns:

- Age and reliability of current SCADA main computer.
- Lack of redundancy for main computer.
- Lack of redundancy for remote stations.
- Effectiveness of serial radio communication compared to other available technology.

### Energy Efficiency Improvements

- The following SCADA improvements were implemented:

Improvement	Purpose
Replace Main Computer, Software, and Upgrade Remote Stations	Improve reliability by replacing aging equipment and adding redundant main computer.
Programmable Logic Controllers (PLC's)	Allows each remote station to function independently if communication with the main computer is lost.
Ethernet Based Radios	Allows the main computer to communicate with each remote station simultaneously. Allows remote programming of PLC's.
Local Pressure as Secondary Control at North Well Boosters	Will activate North Well Boosters to maintain adequate local flow in the event of a sudden, large demand (such as a fire) north of the Teton River.

### Conclusion

- Total SCADA savings are approximately \$52,000 per year in labor and energy costs = payback of 2.8 years; therefore SCADA costs are GPR-eligible by 3.5-7.
- **GPR Costs:** SCADA = **\$143,830** (Final Installed Costs)
- **GPR Justification:** SCADA system costs are GPR-eligible by a Business Case per 3.5-7: *automated and remote control systems (SCADA) that achieve substantial energy savings.*

<sup>3</sup> City of Rexburg Water Facilities Planning Study, December, 2014 Keller Associates  
State of Idaho SRF Loan Program

## 3. PRESSURE REDUCING VALVES<sup>4</sup>

### Summary

- Pressure Reducing Valves were installed to ensure a preset pressure in the system is not exceeded.
- Loan amount = \$11,100,000
- GPR-eligible = <1% (\$37,000) (Installed costs)



### Background

- The system is hydraulically unstable in that customer pressures can be exceeded during the day. High pressure can have deleterious impacts on water fittings and equipment, requiring additional maintenance and early replacement. High pressure also results in water inefficiencies.

### Results

- Installing pressure-reducing valves (PRVs) is the most important feature for controlling the pressure fluctuations in the system, and reducing overuse of water.
- One PRV was installed at Millhollow Street and one on Rolling Hills Drive.



### Conclusion

- Pressure Reducing valves (PRV) installation = \$37,000
- The PRVs are categorically GPR-eligible as they are water efficient devices.
- **GRP Costs Identified**: 2 PRVs installed = **Total = \$37,000** (Installed Costs)
- **GPR Justification**: The PRVs are Categorically GPR eligible (Water Efficiency) per Section 2.2-12<sup>5</sup>: *Installing water efficient devices...*

<sup>4</sup> Assistant Public Works Director, City of Rexburg, 9/15/20 email to K McNeill

<sup>5</sup> Attachment 2. April 21, 2011 EPA Guidance for Determining Project Eligibility  
State of Idaho SRF Loan Program