

Drinking Water State Revolving Fund Green Project Reserve
- Preliminary -



City of Filer Drinking Water Facility Project
SRF Loan #DW 1703 (pop. 2,508)
\$3,299,660

Preliminary Green Project Reserve Justification¹

Categorical GPR Documentation

1. INSTALLS PRESSURE SUSTAINING VALVE (Water Efficiency). Categorical GPR per 2.2-12: *Installing water efficient devices. (\$xxxxxx).*

Business Case GPR Documentation

2. INSTALLS PREMIUM ENERGY EFFICIENT MOTORS AND VFD IN THE NEW PUMP STATION (Energy Efficiency). Business Case GPR per 3.5-1: *Energy efficient ...new pumping systems... (including variable frequency drives (VFDs)) (\$xxxxx).*

Prepared by the State of Idaho SRF Loan Program
June 2017

¹ To be updated in the GPR Technical Memorandum at the time of approval of the apparent low bid

1. PRESSURE SUSTAINING VALVE² (PRELIMINARY)

Summary

- Pressure Sustaining Valve will be installed to ensure a preset pressure in the system is maintained.
- Loan amount = \$3,299,660
- GPR-eligible = x% (\$xxxx) (Preliminary)

Background

- The system is hydraulically unstable in that customer pressures on the south end of town tend to be lower than for the rest of the City. The Master Plan recommends the City create a third pressure zone to alleviate this problem, and enable this zone to maintain required minimum standard pressure of 40 psi during peak hour and peak day conditions.

Results

- Installing pressure-sustaining valve (PRV) – in conjunction with the new VFD pump station - is the most important feature for controlling the pressure fluctuations in this part of the system, improving reliability and reducing inefficiencies.



Conclusion

- Pressure Regulating valve (PRV) installation = \$xxxxx
- The PRV is categorically GPR-eligible as it is a water efficient device.
- **GRP Costs Identified**
PRV installed = \$xxxx = **Total** = \$xxxx (Preliminary)
- **GPR Justification:** The PRVs are Categorically GPR eligible (Water Efficiency) per Section 2.2-12³: *Installing water efficient devices...*

² City of Filer Water System Facilities Plan, JUB Engineers, May 2016

³ Attachment 2. April 21, 2011 EPA Guidance for Determining Project Eligibility

2. NEW ENERGY-EFFICIENT PUMP & VFD⁴ (PRELIMINARY)

Summary

- Water treatment system upgrade project includes a new pump station consisting of premium energy efficient motors and VFDs to create a third pressure zone in the south part of the City.
- Estimated loan amount = \$3,299,660
- Estimated energy efficiency (green) portion of loan = x% (\$xxxxxx)

Background

- Treatment system upgrade project includes a new pump station consisting of premium energy efficient motors and VFDs to create a third pressure zone in the south part of the City. This is to reduce pressure fluctuations and ensure reliable conformance with the required minimum pressure standard of 40psi for peak hour and peak daily flows.



GPR Justification⁵

Motors/VFDs:

The Baseline Standard Practice for comparison is a standard Epact motor that is not controlled by a VFD⁶. Published operating curves by the pump manufacturer provided VFD efficiency data:

- **Proposed Pump - no VFD, standard Epact efficiency motor**
Type: Vertical Turbine Hollow Shaft
Efficiency 82%; Flow 1,400 gpm; 2.02 mgd; Head 265 ft.
Motor rating = 125 hp; Motor type = standard efficiency (93.0% assumed at 75% of full load⁷)
BHP, existing avg. flow = 115 hp
% operation = 33% (average day flow/pump output)
% Annual Usage = 50% (average daily operation throughout the year)
Energy usage = 125,078 kW-hr
- **Proposed Pump - no VFD, with premium efficiency motor**
(95.4% assumed at 75% of full load)
BHP, existing avg. flow = 112.24 hp
% operation = 33% (average day flow/pump output)
% Annual Usage = 50% (average daily operation throughout the year)
Energy usage = 122,076 kW-hr
- **Proposed Pumps - VFD operation with premium efficiency motor**
Type Hollow Shaft Vertical Turbine
Efficiency 82%; Head 230 ft;
Motor rating = 125 hp; Motor type = standard efficiency (95.4% assumed at 75% of full load)
BHP, existing avg flow = 90.75 hp
% operation = 33% (average day flow/pump output)
% Annual Usage = 50% (average daily operation throughout the year)
Energy usage 98,703 kW-hr

⁴ City of Filer Water System Facilities Plan, JUB Engineers, May 2016

⁵ To be updated with project-specific information at the conclusion of design

⁶ NYS Energy Research and Development Authority, Energy Evaluation Memorandum, Village of Greenport WWTP Upgrade 8-2009.

⁷ http://www.copper.org/environment/sustainable-energy/electric-motors/education/motor_text.html

PREMIUM PUMP AND VFD (CON'T)

- **Energy Reduction - comparing with VFD to without VFD**
Energy usage, w/o VFD 122,076 kW-hr
Energy usage, w/ VFD 98,703 kW-hr
- The premium motor with VFD results in a **xx%** energy reduction compared to non-VFD, standard efficiency motor

Conclusion

- The combined annual energy savings for utilizing premium pump and VFD is estimated to be **26,375** kWh/year per motor/VFD system - corresponding to an energy reduction of **xx%** when compared to the Baseline Standard Practice.
- The premium energy-efficient pumps/VFDs are categorically GPR eligible as they achieve greater than 20% reduction in energy consumption.
- **GRP Costs Identified:**
Booster Station VFD (\$15,000) + Pump & Motor (\$165,000) = **Total = \$180,000**
- **GPR Justification:**
The Pump/VFD system is Categorically GPR eligible (Energy Efficiency) per Section 3.2-2 page 9⁸:
Projects that achieve a 20% reduction in energy consumption are categorically eligible for GPR; also, per 3.5-9: VFDs can be justified based upon substantial energy savings.

⁸ Attachment 2. April 21, 2010 EPA Guidance for Determining Project Eligibility