

Clean Water State Revolving Fund FY20 Green Project Reserve
- Preliminary -



City of Genesee FY20 Wastewater System Project
SRF Loan #WW2005 (pop. 959)
\$6,438,000

Preliminary Green Project Reserve Justification¹

Categorical GPR Documentation

1. INSTALLS UV DISINFECTION ELIMINATING EXISTING CHLORINE DISINFECTION (Innovative). Categorically GPR per 4.5-5a, 4.5-5b: *Projects that significantly reduce or eliminate the use of chemicals; treatment technologies or approaches that lower the amount of chemicals in residuals (\$xxxx).*

Business Case GPR Documentation

2. INSTALL IN THE INTERMEDIATE PUMP STATION NEW PUMPS WITH PREMIUM ENERGY-EFFICIENT MOTORS AND VFDS (Energy Efficiency). Business Case per GPR 3.2-2: *projects that achieve a 20% reduction in energy consumption; if a project achieves less than a 20% reduction in energy efficiency, then it may be justified using a business case; also, per 3.5-9: VFDS can be justified based upon substantial energy savings (\$xxxxxx).*

¹In the GPR Technical Memorandum due at final design stage, the Loan recipient shall update all text and furnish cost estimates and calculations justifying components as GPR-eligible
State of Idaho SRF Loan Program

1. UV DISINFECTION SYSTEM

Summary

- An ultraviolet light (UV) system is specified for the project to replace the existing chlorine system.
- Estimated loan amount = \$6,438,000
- Estimated green portion of loan = \$xxxx (2.3%)

Background

- The city will replace the existing chlorine disinfection/dechlorination system with a UV disinfection system.

Results

- The UV system to be installed is an effective germicidal agent, without the use of dangerous chemicals.
- Replacing the current chlorine system with a UV disinfection system also eliminates a chemical residual.



Conclusion

- By selecting a UV disinfection system and retiring the current chlorine disinfection/dechlorination system, the use of chemicals, and any potential chlorine residual, are eliminated.
- **GPR Costs:** UV disinfection system: \$xxxxx
- **GPR Justification:** Business Case GPR-eligible (Innovative) per Section 4.5-5a: *Projects that significantly reduce or eliminate the use of chemicals in wastewater treatment;* and 4.5-5b: *technologies that minimize the generation of residuals.*

2. NEW PUMPS & VFDs IN PUMP STATION

Summary

- As part of the upgrade project, the City will install new **centrifugal** pumps equipped with premium efficiency motors and VFDs to conserve energy.
- Total Loan amount = \$6,438,000
- Estimated energy efficient (green) portion of loan = **xx%** (\$xxxxx)

GPR Justification

Motors/VFDs:

The Baseline Standard Practice for comparison is a standard Epact motor that is not controlled by a VFD². Published operating curves by the pump manufacturer provided VFD efficiency data:

- **Proposed Pumps - no VFD, standard efficiency motor**
Type **submersible, centrifugal**
Motor rating = 25 hp; Motor type = standard efficiency (89.3% assumed at 75% of full load³); % operation = 34% (average day flow/pump output)
Energy usage = 45,239 kW-hr
- **Proposed Pumps - no VFD, with premium efficiency motor**
(93.4% assumed at 75% of full load) ; % operation = 34% (average day flow/pump output)
Energy usage = 43,254 kW-hr
- **Proposed Pumps - VFD operation with premium efficiency motor**
Motor rating = 25 hp; Motor type = standard efficiency (93.4% assumed at 75% full load)
% operation = 100% (VFD control to match flow)
Energy usage 31,804 kW-hr
- **Energy Reduction - comparing with VFD to without VFD**
Energy usage, w/o VFD 43,254 kW-hr
Energy usage, w/ VFD 31,804 kW-hr
∴ There is a 26% energy reduction compared to non-VFD, standard efficiency motors

Conclusion

- The premium energy-efficient pumps/VFDs are categorically GPR eligible as they achieve greater than 20% reduction in energy consumption.
- **GRP Costs Identified:**
VFDs = \$65,026 + Pumps = \$47,350 = **Total = \$112,376**
- **GPR Justification:**
The Pump/VFD system is Categorically GPR eligible (Energy Efficiency) per Section 3.2-2: *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.*

² NYS Energy Research and Development Authority, Energy Evaluation Memorandum, Village of Greenport WWTP Upgrade 8-2009.

³ http://www.copper.org/environment/sustainable-energy/electric-motors/education/motor_text.html