

MILK RIVER INTERCOUNTY DRAIN DRAINAGE DISTRICT

SRF No. 5446-01

PRIORITY 1B AND SELECT IMPROVEMENTS PROJECT

**BUSINESS CASE FOR
GREEN PROJECT RESERVE
CLEAN WATER STATE REVOLVING FUND**

August 14, 2015

INTRODUCTION

The purpose of this Business Case for the Milk River Intercounty Drain Drainage District Priority 1B and Select Improvements Project SRF# 5446-01 is to present the finding that this project qualifies for the Green Project Reserve (GPR) Funding. The GPR improvements at the Milk River Combined Sewer Overflow (CSO) Retention Treatment Basin (RTB) and Pump Station include Green Infrastructure, Supervisory Control and Data Acquisition (SCADA) system remote operation capability, Disinfection Building control room heating and ventilation, interior and exterior lighting, variable frequency drive (VFD) for the chemical feed pumps, and Pump Station building energy reduction improvements (low-E windows, insulated exterior entrance doors, and insulated exterior overhead doors). The GPR improvements at the Milk River Recirculation Pump Station include control room heating and ventilation improvements.

GREEN PROJECT RESERVE PROJECT COST

The business case for each GPR improvement is shown below. The following is a summary of the GPR project costs:

1. Green Infrastructure	\$164,504
2. SCADA System Remote Operation Capability	\$ 63,900
3. Disinfection Building Control Room Heating and Ventilation	\$ 71,178
4. Interior and Exterior Lighting	\$410,948
5. Chemical Feed Pumps Variable Frequency Drives	\$ 79,520
6. Pump Station Building Energy Reduction Improvements	\$ 60,350
7. Recirculation Pump Station Heating and Ventilation	<u>\$ 22,472</u>

TOTAL GPR \$ 872,872

\$100,000
GPR
—

MILK RIVER CSO RTB AND PUMP STATION

Green Infrastructure

General – Green infrastructure improvements will be added to the site that includes rain gardens, prairie grass, and bioretention swales.

Cost – The project cost for these improvements is as follows:

Construction.....	\$ 75,000
General Conditions	\$ 22,500
Engineering.....	\$ 9,000
	\$106,500

Eligibility - These improvements are categorically eligible.

SCADA System Remote Operation Capability

General – The existing SCADA system will be upgraded to allow control from a remote location. This improvement will save automobile fuel used by staff to man the pump station during rain events and to visit the facilities to check the status of the equipment. This SCADA system upgrade will decrease staff time required at the facilities which means less miles driven with a corresponding reduction in fuel consumed.

Cost – The project cost for these improvements is as follows:

Construction.....	\$ 45,000
General Conditions	\$ 12,500
Engineering.....	\$ 5,400
	\$ 63,900

Energy Savings – The savings will be from the number of miles driven and fuel saved annually. It is estimated that the mileage incurred by staff will be reduced by over 40%.

Current annual staff mileage = 15,600 miles
Current annual fuel usage = 1,040 gals
Current annual cost (IRS rate \$0.575/mile) = \$8,970

Future annual staff mileage = 9,360 miles
Future annual fuel usage = 624 gals
Future annual cost (IRS rate \$0.575/mile) = \$5,382

Energy Savings (fuel): (1,040 – 624) gals = 416 gals
20% Energy Reduction (fuel): 1,040 gals * 20% = 208 gals

Eligibility - This improvement is categorically eligible because it achieves a 20% reduction in energy consumption.

Disinfection Building Control Room Heating and Ventilation

General – The existing heating and ventilation system will be replaced with new equipment that has a means to provide continuous ventilation for the chemical storage and pump areas. The ventilation scheme will be 3 air changes per hour (ACH) when unoccupied and 6 ACH when occupied.

Cost – The project cost for these improvements is as follows:

Construction.....	\$ 50,125
General Conditions	\$ 15,038
Engineering.....	<u>\$ 6,015</u>
	\$ 71,178

Energy Savings – The savings will be from providing for two levels of air changes to reduce energy consumption when the space is not occupied.

Current Operation at 100% Ventilation (24/7) 8760 hrs/year = 527,956,856 BTU/year (~ \$6,045/year)

Future Operation at 50% Ventilation for 8760 - 520 hrs/year = 248,308,476 BTU/year (~ \$2,843/ year)

Future Operation at 100% ventilation for 520 hrs = 31,339,905 BTU/year (~ \$359/year)

Total future operation energy per year = 279,648,381 BTU per year (~ \$3,202/year)

Energy Savings: (527,956,856 – 279,648,381) BTU = 248,308,475 BTU (~ \$2,843/year)

20% Energy Reduction: 527,956,856 BTU/year * 20% = 105,591,371 BTU/year

Eligibility - This improvement is categorically eligible because it achieves a 20% reduction in energy consumption.

Interior and Exterior Lighting

General – The existing high intensity discharge, incandescent, fluorescent and emergency lighting will be replaced with new LED-style, energy efficient lighting fixtures. This increases the energy efficiency of the lighting system, decreases the power usage required for lighting, and decreases the overall lighting system maintenance for lamp replacement. Lighting controls will be updated to include the replacement of switches and the addition of timers and motion sensors to turn off lighting when areas are unoccupied

Cost – The project cost for these improvements is as follows:

Construction.....	\$ 289,400
General Conditions	\$ 86,820
Engineering.....	<u>\$ 4,728</u>
	\$ 410,948

Energy Savings – The savings will be from using energy efficient products.

Existing Lighting Energy Use = 110,549 kWh/year (~\$12,611/year)

Proposed Lighting Energy Use = 56,607 kWh/year (~\$7,152/year)

Energy Savings: (110,549 - 56,607) kWh = 53,942 kWh (~\$5,459/year)

20% Energy Reduction: 110,549 kWh/year * 20% = 22,110 kWh/year

Eligibility - This improvement is categorically eligible because it achieves a 20% reduction in energy consumption.

Chemical Feed Pumps Variable Frequency Drive

General – The new chemical feed pumps will be equipped with variable frequency drives (VFD) to provide operation flexibility for the chemical feed. The VFDs will allow the operators to adjust the disinfection dosing needed by adjusting the speed of the chemical pumps and minimize chemical use. Minimizing chemical use has a positive impact on the environment.

Cost – The project cost for these improvements is as follows:

Construction.....	\$ 56,000
General Conditions	\$ 16,800
Engineering.....	\$ 6,720
	<u>\$ 79,520</u>

Energy Savings – The savings will be from using an energy efficient process to provide the chemical dosing of the effluent. The VFDs allow the pumps to be slowed to meet changes in dosing requirements and thereby save energy by minimizing stopping and restarting pumps. The largest power draw exerted by a pump takes place upon start up. VFD's typically provide an energy savings close to 25%.

Eligibility - This improvement is categorically eligible because it achieves a 20% reduction in energy consumption.

Pump Station Building Energy Reduction Improvements

General – The existing single pane uninsulated frame windows will be replaced with Low Emissivity (Low-E) glass insulated frame windows. The existing wood entrance doors will be replaced with fiber reinforced plastic (FRP) insulated doors. The existing uninsulated steel exterior overhead doors will be replaced with insulated overhead coil doors.

Cost – The project cost for these improvements is as follows:

Construction.....	\$ 42,500
General Conditions	\$ 12,750
Engineering.....	\$ 5,100
	<u>\$ 60,350</u>

Energy Savings – The savings will be from using energy efficient products.

Existing Energy Loss = 32,007 BTU/hr (~ \$5,341/year)

New Energy Loss = 18,204 BTU/hr (~ \$3,038/year)

Energy Savings: (32,007 – 18,204) BTU/hr = 13,803 BTU/hr (~ \$2,303/year)

20% Energy Loss Reduction: 32,007 BTU/hr * 20% = 6,402 BTU/hr

Eligibility - This improvement is categorically eligible because it achieves a 20% reduction in energy consumption.

MILK RIVER RECIRCULATION PUMP STATION

Recirculation Pump Station Heating and Ventilation

General – The existing heating and ventilation system will be replaced with new equipment that has a means to provide continuous ventilation for the space. The ventilation scheme will be 3 air changes per hour (ACH) when unoccupied and 6 ACH when occupied.

Cost – The project cost for these improvements is as follows:

Construction.....	\$ 15,825
General Conditions	\$ 4,748
Engineering.....	\$ 1,899
	\$ 22,472

Energy Savings – The savings will be from providing for two levels of air changes to reduce energy consumption when the space is not occupied as shown below.

Current Operation at 100% Ventilation (24/7) 8760 hrs/year = 142,098,562 BTU/year (~ \$1,627/year)

Future Operation at 50% Ventilation for 8760 - 520 hrs/year = 66,813,399 BTU/year (~ \$1,627/ year)

Future Operation at 100% ventilation for 520 hrs = 8,471,764 BTU/year (~ \$97/year)

Total future operation energy per year = 75,285,163 BTU per year (~ \$862/year)

Energy Savings: (142,098,562 – 75,285,163) BTU = 66,813,399 BTU (~ \$765/year)

20% Energy Reduction: 142,098,562 BTU/year * 20% = 28,419,712 BTU/year

Eligibility - This improvement is categorically eligible because it achieves a 20% reduction in energy consumption.

