City of Gorman

DWSRF GREEN PROJECT RESERVE BUSINESS CASE EVALUATION

STATE FISCAL YEAR 2015 INTENDED USE PLAN

PROJECT NUMBER 62660

COMMITMENT DATE: January 29, 2015

DATE OF LOAN CLOSING: May 21, 2015

GREEN ESTIMATE AT CLOSING: $272,879
Green Project Reserve

Green Project Information Worksheets

Drinking Water State Revolving Fund
Intended Use Plan

The Federal Appropriation Law for the current fiscal year Clean Water and Drinking Water State Revolving Fund programs contains the Green Project Reserve (GPR) requirement. The following Green Project Information Worksheets have been developed to assist TWDB Staff in verifying eligibility of potential GPR projects.

TWDB-0163
Revised 12/2/2010
PART I – GREEN PROJECT INFORMATION SUMMARY

Check all that apply and complete applicable worksheets:

Categorically Eligible

☐ Green Infrastructure $  
☒ Water Efficiency $ 65,000  
☐ Energy Efficiency $  
☐ Environmentally Innovative $  

Business Case Eligible

☐ Green Infrastructure $  
☒ Water Efficiency $ 210,000  
☐ Energy Efficiency $  
☐ Environmentally Innovative $  

Total Requested Green Amount $275,000  
Total Requested Funding Amount $275,000  

Type of Funding Requested:

☒ PAD (Planning, Acquisition, Design)  
☐ C (Construction)  

Completed by:

Name:  Cory Higgins  
Title:  EIT  
Signature:  [Signature]  
Date:  8/29/14

TWDB-0163  
Revised 12/2/2010
Complete this worksheet for projects being considered for the Green Project Reserve (GPR) as categorically eligible. Categorically eligible projects or project components are described in the following sections of the EPA GPR guidance (TWDB-0161):

- Green Infrastructure: Part B, Section 1.2
- Water Efficiency: Part B, Section 2.2
- Energy Efficiency: Part B, Section 3.2
- Environmentally Innovative: Part B, Section 4.2

Information provided on this worksheet should be of sufficient detail and should clearly demonstrate that the proposed improvements are consistent with EPA and TWDB GPR guidance for categorically eligible projects. Refer to Information on Completing Worksheets for additional information.

**Section 1 – General Project Information**

Applicant: City of Gorman  
PIF #:  

Project Name: Water System Improvements  

Contact Name: Ken Martin  

Contact Phone and e-mail: 325-695-1070 kbm@jacobmartin.com  

Total Project Cost: $275,000  
Green Amount: $65,000  
(Categorically Eligible)

The Business Case eligible portion of this project is to reduce its water loss by eliminating the old cast iron water lines (80 years old) which are the main source of water loss due to leaks. Also, the water quality provided by these old unlined cast iron mains is unacceptable due to the amount of cast iron residue and sediment in the pipe. The city has received numerous complaints from customers about poor water quality due to unlined cast iron piping. Finally the elimination of the old cast iron lines will allow the city to maintain a more acceptable disinfection residual since the large chlorine demand, created by the iron bacteria, will be eliminated. The currently proposed project will consist of replacing approximately 25,000 linear feet of cast iron water lines with 6” and 8” PVC water lines.

The Categorically Eligible portion of the project is to replace all existing water meters with an automatic meter reading system.
Section 3 – Water Efficiency
Certain water efficiency improvements may be considered categorically eligible for the GPR. Refer to EPA and TWDB GPR guidance for a complete list and description of categorically eligible GPR Projects. A few common types of water efficiency projects that may be considered categorically eligible, such as certain water meter improvements and leak detection are listed below. Complete these sections of the worksheet as applicable. For any other water efficiency improvement being considered for categorical eligibility, complete Section 3.3.

Section 3.1 - Water Meters
Check all that apply:

☐ Installation of new water meters in area currently receiving unmetered water service (the following must be provided)
  ☐ Attach copy of rate structure for area to be metered

☒ Replacement of existing broken/malfunctioning meters (the following must be provided)
  ☐ Accuracy of meters being replaced ________________________________
  ☐ Attach supporting documentation (meter accuracy tests, etc)
  ☒ Provide description below of proposed meters to be installed

☐ Retrofitting of existing meters (the following must be provided)
  ☐ Provide description below of reason for meter retrofit
  ☐ Provide description below of proposed meter system and benefits, including description of features that will result in water loss reduction or promote water conservation

The City of Gorman is proposing to replace all existing meters with an automatic meter reading system. The inaccuracy and leakage of the existing meters is causing significant water losses in the system. The proposed system will improve accuracy and reduce leaks.

The proposed system will include tamper prevention leak alarm and data logging among others. The system will also include a drive by data collection system to maximize meter reading efficiency. These features will improve operator’s awareness of their system and greatly improve overall efficiency.

Green amount associated with water meters: $65,000
(Attach detailed cost estimate if necessary)
PART III - BUSINESS CASE ELIGIBLE

Complete this worksheet for projects being considered for the Green Project Reserve (GPR) as business case eligible. Business case eligible projects or project components are described in the following sections of the EPA GPR guidance (TWDB-0161):

- Green Infrastructure Part B, Section 1.4
- Water Efficiency Part B, Section 2.4 and 2.5
- Energy Efficiency Part B, Section 3.4 and 3.5
- Environmentally Innovative Part B, Section 4.4 and 4.5

Information provided on this worksheet should be of sufficient detail and should clearly demonstrate that the proposed improvements are consistent with EPA and TWDB GPR guidance for business case eligible projects. Refer to Information on Completing Worksheets for additional information.

Section 1 – General Project Information

Applicant: City of Gorman PIF #: 

Project Name: Water System Improvements 

Contact Name: Ken Martin 

Contact Phone and e-mail: 325-695-1070 KBM@jacobmartin.com 

Total Project Cost: $275,000.00 Green Amount: $210,000.00 (Business Case Eligible)

Brief Overall Project Description:
The Business Case eligible portion of this project is to reduce its water loss by eliminating the old cast iron water lines (80 years old) which are the main source of water loss due to leaks. Also, the water quality provided by these old unlined cast iron mains is unacceptable due to the amount of cast iron residue and sediment in the pipe. The city has received numerous complaints from customers about poor water quality due to unlined cast iron piping. Finally the elimination of the old cast iron lines will allow the city to maintain a more acceptable disinfection residual since the large chlorine demand, created by the iron bacteria, will be eliminated. The currently proposed project will consist of replacing approximately 25,000 linear feet of cast iron water lines with 6” and 8” PVC water lines.

The Categorically Eligible portion of the project is to replace all existing water meters with an automatic meter reading system.
**Section 3 – Water Efficiency**

Certain water efficiency improvements may be considered business case eligible for the GPR. Refer to EPA and TWDB GPR guidance for a complete list and description of business case eligible GPR Projects. For all water efficiency business case eligible projects Section 3.1 must be completed. A common water efficiency project that may be considered business case eligible is water line replacements to address water loss. For this type of project complete Section 3.2 of the worksheet. For any other water efficiency improvement being considered for business case eligibility, complete Section 3.3.

**Section 3.1 - System and Water Loss Information**

Section 3.1 is required for all water efficiency business case eligible projects. Attach a copy of most recent Water Audit, if available. Otherwise, complete and attach Water Audit Worksheet or provide water audit data in a similar format. Additional information on water loss and water audits as well as a copy of the Water Audit Worksheet is available at:

[http://www.twdb.state.tx.us/assistance/conservation/Municipal/Water_Audit/wald.asp](http://www.twdb.state.tx.us/assistance/conservation/Municipal/Water_Audit/wald.asp)

Reference and attach water loss audit and/or any other completed planning or engineering studies:

- 2009-2014 Usage and Loss report
- 2013 Water Loss Audit
- Click here to enter text.

**Section 3.2 - Water Line Replacement**

Proposed pipe to be replaced:

<table>
<thead>
<tr>
<th>Length (LF)</th>
<th>Existing Pipe</th>
<th>Proposed Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Material</td>
<td>Age (yr)</td>
</tr>
<tr>
<td>15,000</td>
<td>Cast Iron</td>
<td>50+</td>
</tr>
<tr>
<td>10,000</td>
<td>Cast Iron</td>
<td>50+</td>
</tr>
</tbody>
</table>

Percent of distribution lines being replaced: **35%**

Number of breaks/leaks/repairs recorded in past 24 months for areas being replaced: ________________

Estimated water loss from pipe being replaced (provide calculations on following page): **3.78 MGY**

Estimated annual water savings (provide calculations on following page): **3.4 MGY**

Estimated annual cost savings (provide calculations on following page): **$15,726**
Provide detailed description of the propose improvements and provide supporting calculations. Description should include a description of the methodology used to select pipes for replacement (attach additional pages if necessary):

The City of Gorman provided the attached monthly water usage and loss reports for 2009 to the present. The report shows several months with “water sold” amounts greater than “water pumped”, resulting in a reported negative water loss and indicating there are consistent errors in the report. It is unknown if the source of the error is due to meter accuracy or meter reporting issues. The City is taking steps to identify and resolve the issue. The 2013 reported monthly water loss varies from -22% to 18% with an average of 5%.

Since the attached loss report and audit are most likely inaccurate, estimations were made to assess the water loss. City staff estimates there are approximately 35 breaks/year in the 4.7 miles of 6” and 8” lines being replaced. Assuming each leak is an average of 25 gpm with 3 day leak time, a conservative estimate can be made that the City loses 108,000 gal per leak. Therefore, total estimated water loss due to pipes being replaced is 3.78 MGY, or 12% of total usage.

The following cost savings calculations are based on these estimates:

<table>
<thead>
<tr>
<th>Estimated annual water loss in pipes being replaced</th>
<th>3,780,000 gal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss Reduction</td>
<td>x 90 %</td>
</tr>
<tr>
<td>Total Water Savings</td>
<td>= 3,402,000 gal</td>
</tr>
<tr>
<td>Water Production Cost per 1000 gal</td>
<td>x $3.96</td>
</tr>
<tr>
<td>Water Production Savings</td>
<td>= $13,472</td>
</tr>
<tr>
<td>Chemical &amp; Testing Savings</td>
<td>+ $1,000 (estimated)</td>
</tr>
<tr>
<td>Labor &amp; Equipment Savings</td>
<td>+ $1,000 (estimated)</td>
</tr>
<tr>
<td>Pumping Costs Savings</td>
<td>+ $254 (1)</td>
</tr>
<tr>
<td>Total Annual Savings</td>
<td>= $15,726</td>
</tr>
</tbody>
</table>

(1) Water pumping costs is estimated as: $C = (0.746 \times V \times h \times c \times (3960 \times \mu_p \times \mu_m)) / 60$

where:
- $C = $ Pumping Cost
- $V = $ volume pumped (gal)
- $h = $ head (ft) (150 ft assumed)
- $c = $ cost rate per kWh ($0.1 assumed)
- $\mu_p = $ pump efficiency (0.7 assumed)
- $\mu_m = $ motor efficiency (0.9 assumed)

Green amount associated with water line replacement: $210,000

(Attach detailed cost estimate if necessary)
### Monthly Averages

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<thead>
<tr>
<th>Jan</th>
<th>Feb</th>
<th>Mar</th>
<th>Apr</th>
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### 6 Month Totals

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</table>

### Usage and Loss Report

- **Water Use**: 20,000 gallons
- **Water Loss**: 0 gallons
- **Water Meter**: City of Savannah
- **Date**: Thursday, August 21, 2014

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*Page 2 of 3*
<table>
<thead>
<tr>
<th>Customer Use</th>
<th>Average Water Loss Percent</th>
<th>Total Water Loss</th>
<th>Total Water Use for Fire/Flush</th>
<th>Total Water Sold</th>
<th>Total Water Pumped</th>
<th>Percent of Water Meters Over 5000 G</th>
<th>Average Water Sold</th>
<th>Average Water Pumped</th>
<th>Average Water Used for Fire/Flush</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.111%</td>
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</tbody>
</table>

City of Gorman
Quality B: System Tests 01-09-10 to 08-14

Usage and Loss Report

Page 3 of 3

Thursday, August 21, 2014
**A. Water Utility General Information**

1. Water Utility Name: City of Gorman

2. Contact:
   - Name: Cory Higgins
   - Telephone #: 325-695-1070
   - Email Address: chiggins@jacobmartin.com

3. Reporting Period: From 1/1/2013 To 12/31/2013

4. Source Water Utilization, percentage:
   - Surface Water 100.00 %
   - Ground Water 0.00 %

5. Population Served:
   - Retail Population Served: 1,083
   - Wholesale Population Served: 60

6. Utility's Length of Main Lines, miles: 70,000.00

7. Number of Wholesale Connections Served: 25

8. Number of Retail Service Connections Served: 498

9. Service Connection Density:
   - (Number of retail service connections / miles of main lines)
   - Service Connection Density: 0.01

10. Average Yearly System Operating Pressure (psi): 50.00

11. Volume Units of Measure: Gallons

**B. System Input Volume**

12. Produced Water: 0 gallons

13. Production Meter Accuracy (enter percentage): 0.00 %

14. Corrected Input Volume: 0 gallons

15. Water Imported: 32,191,100 gallons

16. Water Exported: 1,322,100 gallons

17. System Input Volume: 30,869,000 gallons

**C. Authorized Consumption**

18. Billed Metered: 28,479,300 gallons

19. Billed Unmetered: 0 gallons

20. Unbilled Metered: 0 gallons

21. Unbilled Unmetered: 385,863 gallons

22. Total Authorized Consumption: 28,865,163 gallons
### D. Water Losses

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>23. Water Losses (Line 17 minus Line 22)</td>
<td>2,003,838</td>
</tr>
</tbody>
</table>

### E. Apparent Losses

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>24. Average Customer Meter Accuracy (Enter percentage)</td>
<td>100.00%</td>
</tr>
<tr>
<td>25. Customer Meter Accuracy Loss</td>
<td>0 gallons</td>
</tr>
<tr>
<td>26. Systematic Data Handling Discrepancy</td>
<td>0 gallons</td>
</tr>
<tr>
<td>27. Unauthorized Consumption</td>
<td>0</td>
</tr>
</tbody>
</table>

| 28. Total Apparent Losses                                                   | 77,173      |

### F. Real Losses

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>29. Reported Breaks and Leaks</td>
<td>0 gallons</td>
</tr>
<tr>
<td>(Estimated volume of leaks &amp; breaks repaired during the audit period)</td>
<td>1</td>
</tr>
<tr>
<td>30. Unreported Loss (Includes all unknown water loss)</td>
<td>1,926,665</td>
</tr>
</tbody>
</table>

| 31. Total Real Losses (Line 29, plus Line 30)                               | 1,926,665   |

| 32. Water Losses (Apparent + Real) (Line 28 plus Line 31) = Line 23         | 2,003,838   |

| 33. Non-revenue Water (Water Losses + Unbilled Authorized Consumption)      | 2,389,700   |

| (Line 32, plus Line 20, plus Line 21)                                       |             |

### G. Technical Performance Indicator for Apparent Loss

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>34. Apparent Losses Normalized (Apparent Loss Volume / # of Retail Service Connections/365)</td>
<td>0 gallons</td>
</tr>
</tbody>
</table>

### H. Technical Performance Indicators for Real Loss

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>35. Real Loss Volume (Line 31)</td>
<td>1,926,665</td>
</tr>
<tr>
<td>36. Unavoidable Annual Real Losses, volume (calculated)</td>
<td>6,912,638,275</td>
</tr>
<tr>
<td>37. Infrastructure Leakage Index (calculated) (Equals real loss volume divided by unavoidable annual real losses)</td>
<td>0.00030</td>
</tr>
<tr>
<td>38. Real Losses Normalized (Real Loss Volume / # of Service Connections / 365)</td>
<td>11 gallons</td>
</tr>
</tbody>
</table>

(This indicator applies if service connection density is greater than 32 / mile)
39. Real Losses Normalized 

(Real Loss Volume/Miles of Main Lines/365)

(This indicator applies if service connection density is less than 32/mile)

I. Financial Performance Indicators

40. Total Apparent Losses (Line 28) 

_________________________ 77,173 gallons

41. Retail Price of Water 

_________________________ $0.00900 3

42. Cost of Apparent Losses 

(Apparent loss volume multiplied by retail cost of water, Line 40 x Line 41)

_________________________ $694.55

43. Total Real Losses (Line 31) 

_________________________ 1,926,665.00

44. Variable Production Cost of Water* 

(*Note: in case of water shortage, real losses might be valued at the retail price of water instead of the variable production cost.)

_________________________ $0.00396 3

45. Cost of Real Losses 

(Real Loss multiplied by variable production cost of water, Line 43 x Line 44)

_________________________ $7,629.59

46. Total Assessment Scale 

_________________________ 21

47. Total Cost Impact of Apparent and Real Losses 

_________________________ $8,324.14

48. Comments 

49. Total Water Loss % 

_________________________ 6.49 %