

MICHIGAN DEPARTMENT OF ENVIRONMENTAL QUALITY

INTEROFFICE COMMUNICATION

TO: File
FROM: Clarence Jones, Project Manager
DATE: May 19, 2011
SUBJECT: State Revolving Fund (SRF) Project No. 5379-01
Monroe County Project Plan
Green Project Reserve (GPR) Qualifying Costs

In the Part II Application for the above-referenced project, the accompanying bid information was used to determine the final qualifying GPR amounts to be included in the Order of Approval package.

The following items eligible for GPR qualification are from the bid proposal of the successful low bidder (Colisanti Construction Associates) on the Monroe County Wastewater Treatment Plant upgrades.

Bid Item A-2. LED Lighting Fixtures	\$165,000
Bid Item A-3. SCADA System	<u>\$417,000</u>
Total:	\$582,000

Bid Item A-2 includes replacing the existing lighting system at the City of Monroe Wastewater Treatment Plant (WWTP) with a new energy efficient system using light-emitting diodes (LED). Additionally, Bid Item A-3 includes a Supervisory Control and Data Acquisition (SCADA) system that will be installed at the WWTP. The new SCADA is a plant wide computerized monitoring system that will not only save energy by allowing the plant to operate more efficiently, but will also reduce the amount of chemicals used and labor costs.

Based on the information provided by URS Corporation on behalf of Monroe County, the operation of the new LED lighting portion of this project can save the city of Monroe up to 17,275 kilowatt hours (kWh) per year. The new SCADA system operation will save the city of Monroe an additional 394,200 kWh per year.

Attached is a copy of the bid proposal. The total eligible construction costs for this project is \$7,299,000. Therefore the percentage of green construction is $\$582,000 \div \$7,299,000 = 0.0797$. Since the SRF loan amount is \$9,115,000, the total green cost (construction and non-construction) is $\$9,115,000 \times 0.0797 = \$726,466$.

Because 50 percent of the GPR eligible costs qualify for "principal forgiveness," the maximum amount usable for this purpose is \$726,466 multiplied by 50 percent = \$363,233.

Please note that the eligibility of the two GPR items was documented in business case presentation letters dated June 22, 2010 (SCADA component) and June 29, 2010 (LED component). These letters were submitted by Mr. Terry Woodward of URS Corporation of Southfield on behalf of Monroe County and supported by Ms. Tiffany Myers of the Jackson District Office, Water Resources Division, in her memorandum to me dated August 11, 2010.

Attachment

SUBMIT IN TRIPLICATE

SECTION 00301 BID FORM

BID TO: Monroe County Drain Commissioner County Agency
1005 South Raisinville Road
Monroe, Michigan 48161

BID FROM: Colasanti Construction Services, Inc.
672 Woodbridge, Suite 100
Detroit, MI 48226

PROJECT: Wastewater System Improvements - Phase II
Monroe Metropolitan Wastewater Treatment Plant
2205 East Front Street
Monroe, Michigan 48161

The undersigned, having familiarized themselves with the local conditions affecting the cost of the Work and having examined the Project site and the Bidding Documents on file at the office of the Engineer, URS Corporation, 27777 Franklin Road, Southfield, Michigan, hereby propose to furnish all labor, materials, equipment, and services required by the Contract Documents for the proper completion of each of the following categories for the Project:

PART A WASTEWATER TREATMENT PLANT IMPROVEMENTS (All trades: including Civil, Architectural, Structural, Mechanical, Electrical and Instrumentation Trades).

Part A - Base Bid

A-1. Wastewater Treatment Plan Improvements, lump sum, excluding items listed in A-2 and A-3, below:

In Figures: \$ 6,717,000.00

A-2. LED Lighting Fixtures (Type S-1, S-2, S-3, S-4, S-5, S-6, W-1, W-2, and W-3), lump sum:

In Figures: \$ 165,000.00

A-3. SCADA System, lump sum, (Contract Drawings I-01 through I-50 and Specifications 17050 through 17500):

In Figures: \$ 417,000.00

Total Contract Price (A-1 + A-2 + A-3), in words:

Seven Million Two hundred and ninety seven thousand Dollars

In Figures (\$ 7,299,000.00)

Part B - Alternates

Base Bid amount may be increased or decreased by the amounts quoted in the following alternate bids selected by the Owner, following the procedures stated in the Instructions to Bidders. Refer to Section 01030 for a detailed explanation of each Alternate.

Alternate #1: This alternate consists of a new VFD for Settled Waste Pump #4 to replace existing ABB ACS500. The work associated with this alternate is described in Section 01030.

Add/Deduct forty nine thousand Dollars (\$ 49,000.00).

Alternate #2: This alternate consists of replacement of MCC P-1. The work associated with this alternate is described in Section 01030.

Add/Deduct forty eight thousand Dollars (\$ 48,000.00).

Alternate #3: This alternate consists of replacement of existing flush-mounted double tub branch circuit panelboard D on the filter floor level of the Equipment Building. The work associated with this alternate is described in Section 01030.

Add/Deduct fifty three hundred Dollars (\$ 5300.00).

Alternate #4: This alternate consists of providing MCC-8 in stainless steel. The work associated with this alternate is described in Section 01030.

Add/Deduct ninety thousand Dollars (\$ 90,000.00).

Alternate #5: This alternate provides cooling only split DX AC units and hot water Fin-Tube-Radiators (FTR) for both SCADA Control Rooms #101 & #104 in lieu of base-bid split DX heat pump units. The work of this alternate is described in Section 01030.

Add/Deduct nineteen thousand Dollars (\$ 19,000.00).

PROPOSED SUBCONTRACTORS

The following proposed Subcontractors are those whose subbids are included in the Base Bid and who are proposed for the Project:

<u>Trade</u>	<u>Proposed Subcontractor</u>
Civil	<u>WPM</u>
Mechanical	<u>Monroe</u>
Structural	<u>MZ Fabricators</u>
Electrical	<u>Detroit Electrical Services</u>
Technology	<u>Same as electrical</u>

MICHIGAN DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENT

INTEROFFICE COMMUNICATION

TO: Clarence Jones, Environmental Quality Analyst, Revolving Fund Section
Environmental Resource Management Division

FROM: Tiffany J. Myers, Environmental Engineer, Field Operations Section
Jackson District Office, Water Resources Division

DATE: August 11, 2010

SUBJECT: City of Monroe – State Revolving Fund Project No. 5379-01
Qualification for Green Project Reserve Funding

RECEIVED

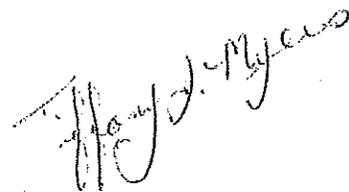
AUG 13 2010

WATER BUREAU
RLCC

The purpose of this memo is to confirm the basis for determining that the city of Monroe (city) State Revolving Fund Project No. 5379-01 qualifies for the green project reserve funding under Public Law 111-88. This project is replacing the existing lighting system at the wastewater treatment plant (WWTP) with a new system using light-emitting diodes (LED). Additionally, a Supervisory Control and Data Acquisition (SCADA) system will be installed at the WWTP which will not only save energy by allowing the plant to operate more efficiently, but will also reduce the amount of chemical used and labor costs. The city has made several submittals to us to outline the energy, chemical, and financial savings that could be realized through implementation of these proposed projects. The submittals were dated June 23, June 29, July 15, July 26, and July 27, 2010.

Based on information provided by URS Corporation on behalf of the city of Monroe, this project can save up to 17, 275 kWh per year for the LED lighting portion of the project. The project can also save an additional 394,200 kWh per year for the SCADA installation. Therefore, the project does qualify for the green project reserve funding.

TJM/CLH





June 22, 2010

Mr. Clarence T. Jones
Project Manager/Environmental Quality Analyst
Department of Natural Resources and Environment
Water Bureau Field Operations Division
Revolving Loan and Operator Certification Section
Constitution Hall, 3 South
525 W. Allegan Street
Lansing, MI 48933

RECEIVED
JUN 23 2010
WATER BUREAU
MLOC

Subject: City of Monroe Wastewater System Improvements -- Phase II
2010 SRF Project No. 5379-01

Dear Mr. Jones:

On behalf of the City of Monroe, please find enclosed two copies of the Green Project Reserve Business Case for the SCADA Implementation portion of the Monroe Wastewater System Improvements. This Business Case is submitted as an amendment to the 2010 SRF Project Plan for your review and comment. The Business Plan has been prepared in accordance with the Guidance for Determining Project Eligibility.

We look forward to your comments. Please call me at your convenience to discuss any aspect of the plan.

Sincerely,

URS CORPORATION

Terry L. Woodward, P.E.
Senior Project Manager

Cc: Barry S. LaRoy, P.E. -- City of Monroe
Jan M. Hauser, P.E. - URS

**Clean Water State Revolving Fund
Green Project Reserve Business Case – SCADA Implementation**

**Monroe Metropolitan Area Wastewater Treatment Plant
2010 Non-Flow Related Improvements - SRF Project No. 5379-01**

Summary

A Supervisory Control and Data Acquisition (SCADA) system is being considered to assist the plant staff in monitoring, controlling, maintaining and optimizing the wastewater treatment process. The SCADA system will link field instruments (flow meters, level sensors, pressure sensors, running and fault signals, etc.) through remote telemetry units to a SCADA controller with multiple workstations. The SCADA system will allow real time monitoring of each process, controlling of mechanical equipment, tracking of equipment maintenance and inventories and can assist with reporting functions.

Through use of the SCADA system, energy usage can be shifted to off-peak hours, plant processes can be efficiently monitored and controlled, inventories can be maintained electronically and reports can be automatically generated.

Loan Amount: \$6,250,000

Energy Saving (Green) portion of loan: \$750,000

Annual Energy, Chemical and Manpower Savings: \$64,500 (2009) – \$116,500 (2029)

Background

The Monroe Metropolitan Area Wastewater Treatment Plant serves the City of Monroe, Frenchtown Township, Monroe Township and portions of Raisinville Township. The rated plant capacity is 24 million gallons per day (MGD), with a peak rated flow capacity of 32 MGD. Plant processes include screening, grit removal, primary clarification, aeration, final settling and disinfection. Sludge is dewatered through centrifuges for off-site disposal.

The plant consumes significant electricity associated with raw wastewater pumping, aeration, sludge pumping, sludge dewatering and wastewater disinfection. Chemicals, including polymer and lime are used for sludge processing. Current plant operation relies on manual monitoring and control of processes, chemical inventory and usage.

Classification

Classification of the project falls under two categories of the Green Project Reserve program. These categories are Energy Efficiency and Environmentally Innovative

projects. The goal of the project is to provide wastewater treatment in a sustainable, manageable and efficient manner.

The SCADA system will allow the City to monitor and operate the WWTP as efficiently and effectively as possible. The SCADA system will provide a reduction in both energy and chemical usage, and more efficient use of limited manpower resources. Therefore, this improvement falls within both the Energy Efficiency and Environmentally Innovative project categories.

Confirmation

A Present Worth Analysis was performed, demonstrating that through a reduction in manpower associated with monitoring, operating and reporting requirements, along with reduced power and chemical costs, the SCADA system would result in a lower present worth value. Efficiency will be achieved through:

- Monitoring of power usage and time shifting of process operations (such as sludge processing) to reduce utility peak demand charges.
- Monitoring and automatic control of plant processes to match flows and loading.
- Monitoring and control of chemical usage based on optimum dosage.
- Reduced labor for manual monitoring of equipment status and process setpoints that can then be directed to preventive maintenance, resulting in process efficiency.

Based on a recent electrical bill (April 2010), a modest 1.5% reduction in power consumption would result in an annual savings of over \$6,000. (The present worth analysis completed in 2009 used \$5,000). Similar savings are expected for chemical usage, as process control is enhanced through system monitoring.

Labor associated with monitoring of plant operations, controlling equipment and preparation of reports is expected to be reduced by approximately 5% (or \$50,000 annually). Maintenance and repair costs are also expected to be reduced through maintenance monitoring and predictive, rather than reactive maintenance.

Documentation of the cost-effectiveness is presented in the Monroe Wastewater System Improvements 2010 SRF Project Plan (Appendix F).

Conclusion

By implementing a SCADA system, energy savings can be realized, chemical usage and operating labor can be reduced and process efficiency can be enhanced.

Improving process efficiency will be important as the City moves toward implementation of measures to reduce or eventually eliminate the blending process used during wet weather.



June 29, 2010

Mr. Clarence T. Jones
Project Manager/Environmental Quality Analyst
Department of Natural Resources and Environment
Water Bureau Field Operations Division
Revolving Loan and Operator Certification Section
Constitution Hall, 3 South
525 W. Allegan Street
Lansing, MI 48933

RECEIVED

JUN 30 2010

WATER BUREAU
RLCC

Subject: City of Monroe Wastewater System Improvements – Phase II
2010 SRF Project No. 5379-01

Dear Mr. Jones:

On behalf of the City of Monroe, please find enclosed two copies of the Green Project Reserve Business Case for use of LED lighting for the site lighting portion of the Monroe Wastewater System Improvements. As you are aware, the Project Plan includes safety, security and site lighting as one component of the plan. A Business Case has been prepared to compare the cost effectiveness of LED lighting over metal halide lighting. This Business Case is submitted as an amendment to the 2010 SRF Project Plan for your review and comment. The Business Plan has been prepared in accordance with the Guidance for Determining Project Eligibility.

We look forward to your comments. Please call me at your convenience to discuss any aspect of the plan.

Sincerely,

URS CORPORATION

Terry L. Woodward, P.E.
Senior Project Manager

Cc: Barry S. LaRoy, P.E. – City of Monroe
Jan M. Hauser, P.E. - URS

P:\Resources\WATER_RESOURCES\Projects\13649608\Project Plan\transmittal letter GPR LED.doc

URS Corporation
27777 Franklin Road, Suite 2000
Southfield, MI 48034
Tel: 248.204.5900
Fax: 248.204.5901

**Clean Water State Revolving Fund
Green Project Reserve Business Case – LED Lighting**

**Monroe Metropolitan Area Wastewater Treatment Plant
2010 Non-Flow Related Improvements - SRF Project No. 5379-01**

Summary

An upgraded site lighting system is being considered for security and maintenance activities at the wastewater treatment plant. Lighting improvements are required due to the failing condition of many of the existing fixtures and stanchions. The failing fixtures create areas of poor lighting that represent a safety hazard during maintenance activities and a concern for plant security.

It is proposed that the area lighting be upgraded using light-emitting diode (LED)

Loan Amount:	\$6,250,000
Energy Saving (Green) portion of loan:	\$96,600
Annual Energy and Manpower Savings:	\$3,776

Background

The Monroe Metropolitan Area Wastewater Treatment Plant serves the City of Monroe, Frenchtown Township, Monroe Township and portions of Raisinville Township. The rated plant capacity is 24 million gallons per day (MGD), with a peak rated flow capacity of 32 MGD. Plant processes include screening, grit removal, primary clarification, aeration, final settling and disinfection. Sludge is dewatered through centrifuges for off-site disposal.

The plant consumes significant electricity associated with process operations and area lighting.

Classification

Classification of the project falls under the Energy Efficiency category of the Green Project Reserve program. The goal of the project is to provide wastewater treatment in a sustainable, manageable and efficient manner.

The LED lighting system will allow the City to improve lighting efficiency and reduce energy and maintenance costs. Additional benefits include reduced environmental impacts (emission reduction and coal-burning avoidance in producing electricity) and a reduction in future waste materials.

Confirmation

A Payback Analysis was performed between use of metal halide lamps and LED lighting, demonstrating that through a reduction in wattage associated with LED lighting, along with reduced relamping frequency, the LED lighting system would result in a 52% reduction in energy usage and a 24% savings in total cost of ownership. A payback period of 5 years is anticipated.

Documentation of the cost-effectiveness of the safety, security and lighting modifications was presented in the Monroe Wastewater System Improvements 2010 SRF Project Plan (Appendix F). The attached Outdoor Lighting Payback Summary documents the savings to be realized from conversion of metal halide lighting to LED lighting.

Conclusion

By implementing an LED outdoor lighting system, energy savings can be realized, maintenance labor can be reduced and waste generation can be minimized.



Outdoor Lighting Payback Calculator

PAYBACK SUMMARY PAYS FOR ITSELF IN 5 YEARS

SYSTEM OVERVIEW		Metal Halide - 400W			GE LED Area Light			LED SAVINGS
Lamp Life	20,000 hours			50,000 hours @ 85% lumen maint.				
Operating Hours	12 hours			12 hours				
	TYPE 5	TYPE 4	TYPE 3	TYPE 5	TYPE 4	TYPE 3		
Wattage Per Fixture	442	442	442	210	94	132	<i>You may change the LED prices for evaluation.</i> RESET PRICES <i>Prices are for example only. Actual prices may vary.</i>	
Fixture Quantity	17	0	0	17	0	0		
Price Per Fixture	\$ 500.00	\$ 500.00	\$ 500.00	\$ 1,450.00	\$ 1,150.00	\$ 1,300.00		
Total Site Fixtures	17 fixtures			17 fixtures				
Average Fixture Price	\$ 500.00			\$ 1,450.00				
ENERGY PROFILE								52 %
Site Wattage	7,514			3,570				
Average Fixture Wattage	442			210				
Energy Rate	\$ 0.60 per KWH			\$ 0.60 per KWH				
Annual Energy Consumption	32,912 KWH			15,637 KWH			17,275 KWH	
Annual Energy Cost	\$ 1,975.00			\$ 939.00			\$ 1,036.00	
Lifetime Energy Cost	\$ 22,546.00			\$ 10,720.00			\$ 11,826.00	
LAMP MAINTENANCE								100 %
Relamp Frequency	every 5 years			every 11 years				
Lamp Cost	\$ 100.00			\$ 1,450.00				
Labor Cost	\$ 800.00			\$ 800.00				
Poles	15			15				
Fixtures	17			17				
Annual Relamp Cost	\$ 2,740.00			\$ 0.00			\$ 2,740.00	
Total Life Relamp Cost	\$ 27,400.00			\$ 0.00			\$ 27,400.00	
ANNUAL SAVINGS								80 %
Annual Energy Cost	\$ 1,975.00			\$ 939.00			\$ 1,036.00	
Annual Maintenance Cost	\$ 2,740.00			\$ 0.00			\$ 2,740.00	
Annual Operating Cost	\$ 4,715.00			\$ 939.00			\$ 3,776.00	
Annual Operating Cost Comparison								
LIFETIME SAVINGS								79 %
Lifetime Energy Cost	\$ 22,546.00			\$ 10,720.00			\$ 11,826.00	
Lifetime Maintenance Cost	\$ 27,400.00			\$ 0.00			\$ 27,400.00	
Lifetime Operating Cost	\$ 49,946.00			\$ 10,720.00			\$ 39,226.00	
Lifetime Operating Cost Comparison								



Outdoor Lighting Payback Calculator

PAYBACK SUMMARY (continued)

▼ COST OF OWNERSHIP			
System Description	New MH - 400W Installation	New LED Installation	
Fixture Cost	\$ 8,500.00	\$ 24,650.00	24% TOTAL SAVINGS
Installation Cost	\$ 37,500.00 @ \$2500 per pole	\$ 37,500.00 @ \$2500 per pole	
Lifetime Energy Cost	\$ 22,546.00	\$ 10,720.00	
Lifetime Maintenance Cost	\$ 27,400.00	\$ 0.00	
TOTAL COST OF OWNERSHIP	\$ 95,946.00	\$ 72,870.00	

ECO ENERGY SUMMARY

▼ FINANCIAL IMPACT			
Location Details	4,380 hours burned per year at a cost of 0.60 per KiloWatt Hour		
	Current / Comparison System	Proposed System	
System Description	Metal Halide - 400W	GE LED Area Light	
Number of Fixtures	17 fixtures	17 fixtures	
Watts per Fixture	442	210	
Energy Used per Year	\$ 1,975.00	\$ 939.00	
Kilowatt Load	7 KiloWatt Load	3 KiloWatt Load	
Estimated Cost per Fixture to Upgrade to Proposed System	\$ 950.00 per fixture	Yearly Energy Savings	\$ 1,036.00
WHAT IT COSTS YOU TO WAIT <i>Not changing your lights could be costing you money!</i>	\$ 2.84 per day	New Fixture Savings For each new system fixture	\$ 60.94
	\$ 86.33 per month	Simple Payback Based only on energy savings	188 months
	\$ 1,036.00 per year		

▼ ENVIRONMENTAL IMPACT

REDUCTION OF ANNUAL HARMFUL EMISSIONS Carbon Dioxide (CO ₂) 26,590 lbs. Sulfur Dioxide (SO ₂) 104 lbs. Nitrogen Oxide (NO, NO ₂) 51 lbs.	COAL-BURNING AVOIDED  12,425 lbs. per year or 5 tons per year <small>50% of US Electric Power Generation in 2005 came from coal-burning power plants.</small>	THE REDUCED ENVIRONMENTAL IMPACT IS THE EQUIVALENT OF  3 Acres of Forest Added  2 Cars Removed from the Road
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ATMOSPHERIC MERCURY CONTAMINATION AVOIDED 574 mg per year

For more calculations, go to www.ge.com/led based on EPA Energy Star and Air Pollution Study 2007

Emission Factors: Gasses released per kWh of electricity generated (EPA 2007)		Carbon dioxide and mercury released per lb. of coal burned (EPA 2007) (can vary based on type of coal)		Annual carbon dioxide (lbs.) sequestration by forest and emission by cars (EPA 2007)	
lbs. of CO ₂ released	1.54	lbs. of CO ₂ generated	2.14	CO ₂ sequestration per acre	8,066
lbs. of SO ₂ released	0.006044	lbs. of mercury released	0.0216	CO ₂ emission per average car	11,470
lbs. of NO ₂ released	0.002967				