GREEN PROJECT RESERVE BUSINESS CASE

Village of Merrillan, WI

Sanitary Sewer Main and lateral Replacement Project

CWF No. #4087-03

April 2013

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1.0 GENERAL INFORMATION

1.1. Introduction

This business case demonstrates that the Merrillan Sanitary Sewer Main & Lateral Replacement (CWF #4087-03) project achieves identifiable and substantial "green" benefits in the project components listed below. This business case was developed according to the "2010 Clean Water and Drinking Water State Revolving Fund 20% Green Project Reserve: Guidance for Determining Project Eligibility" publication, dated April 21, 2010.

1.2. Project Need & Scope

The project includes replacement of existing clay-tile interceptor sewer, the rehabilitation of existing manholes to correct open jointed infiltration flows, and the replacement of sewer laterals. Due to high groundwater, sandy soil conditions, and the leaky pipes, the Merrillan waste water treatment facility (WWTF) receives excessive infiltration. The open joints of the sewer mains also allow exfiltration from the deficient pipe into the soils.

1.3. Green Components Summary As Submitted in GPR Addendum

COMPONENT	DESCRIPTION	BUSINESS CASE No.	GREEN COST
A	Inflow/Infiltration Correction	3.5-4	$192,000
	TOTAL GREEN COMPONENTS		**$192,000**

1.4. Green Components Summary Revised

COMPONENT	DESCRIPTION	BUSINESS CASE No.	GREEN COST
A	Inflow/Infiltration Correction	3.5-4	$167,451
	TOTAL GREEN COMPONENTS		**$167,451**

2.0 COMPONENT A – INFLOW/INFILTRATION CORRECTION

2.1. Reason for Change since GPR Addendum

The original GPR Addendum included $192,000 for sewer main and lateral replacement work. The numbers below have been updated to reflect actual bid prices for the sewer lining work.

2.2. Technical Justification

According to the 2003 Existing Sewer and Septic System Evaluation Report, by MSA Professional Services, Inc, the previous time the system was televised and cleaned, "it was found that approximately 90% of the lines were ¼ to ¾ full of sand. High groundwater conditions prevalent in the Village of Merrillan have been reported to cause the sand deposits by infiltrating through cracks and joints in the pipes." This CWF project

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improves this concern and reduced inflow by replacing the existing clay-tile sanitary sewer mains and laterals. Further, the connections of the lateral pipe to the sewer main (31 laterals) in the project area were made using water tight joints

The projected savings and technical justification are based on results from the 2011 sewer project completed for the Village. Those results are included in the business case as part of the justification.

A comparison of Waste Water Treatment Facility Influent Flow from November & December 2009, 2010, and 2011 was completed as part of the previous project. November 2011 was the first full month since the completion of the sewer lining project. The initial data suggests that the sewer lining has a significant impact in reducing inflow and infiltration. In fact, the data shows that influent flow during the month of November 2011 was 33% less than the average total November influent flow for 2009 and 2010. December of 2011 also showed a significant decrease of 32% less influent flow as compared to 2009 and 2010.

The previous project sealed approximately 3,640 lineal feet of the oldest existing clay tile sewer mains in the Village. There may be other reasons for the dramatic decrease of influent flow noted above such as decrease rainfall, and reduced Village-wide water usage, but those reasons alone can't account for a 32% reduction. Since the village-wide water use on an annual basis decreased in 2011 by 19%, it is assumed that 19% of the 32% decrease will be attributed from decreased rainfall and decreased Village-wide water use. The remaining 13% decrease is assumed to be attributed to the sewer lining project. To normalize the inflow/ infiltration reduction we took the percent decrease in flow and divided it by the total footage of lined pipe to determine a per foot reduction of flow of 0.004% per foot of pipe. See Appendix A for previous project data for flow reduction.

The proposed project includes 1,370 feet of sewer lateral replacement and 172 feet of main replacement. Using the assumed percent reduction per foot detailed previously, this results is an inflow/ infiltration reduction of approximately 6%.

Estimated flow reduction
1,542 feet of pipe X 0.004% per foot = 6.2% reduction in flow

2.3. Financial Justification

Assuming the decreased influent flow will allow for smaller blower motors or sheives that result in a smaller horse power draw, the estimated electrical savings is as follows:

Estimated Current Electricity Use:
(.746) x 24 hrs/day x 365 days/year x 25 hp/.75 = 217,832 kWh/yr

Estimated Potential Electricity Use Due to Reduced Flows:
217,832 kW/yr x (1.00-0.06) = 204,762 kWh/yr

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Estimated Savings:
(Existing kWh/yr – Proposed kWh/yr) = **13,070 kWh/yr**

= **6%**

See **Appendix B** for determination of green cost based on project bid.

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Appendix A

2011 WWTF Flow Reduction Data

WWTF Influent Flow Comparison

Village of Merrillan

CWF # 4087-02

November of	Monthly Total (MGD)	Monthly Avg. (MGD)	* (gpcd)	Daily Max. (MGD)	Daily Min. (MGD)	Month Gallons Pumped	Annual Gallons Sold	Marshfield Rainfall (in)
2009	2.34	0.078	139.0	0.085	0.075	860	11,742	0.08
2010	2.40	0.080	142.6	0.085	0.077	850	10,574	1.21
Decrease	-2.6%					1.2%	9.9%	
09-10 Average	2.37	0.079	140.8	0.085	0.076	855	11,158	0.65
2011	1.59	0.053	94.5	0.063	0.044	no data	9,057	0.29
Decrease	33%	33%	33%	26%	42%		19%	55%

* EPA states infiltration is not excessive if the 7-14 day average domestic wastewater flow does not exceed 120-130 gpcd

WWTF Influent Flow Comparison

Village of Merrillan

CWF # 4087-02

DECEMBER of	Monthly Total (MGD)	Monthly Avg. (MGD)	* (gpcd)	Daily Max. (MGD)	Daily Min. (MGD)	Month Gallons Pumped	Annual Gallons Sold	Marshfield Rainfall (in)
2009	2.33	0.075	133.7	0.078	0.070	877	11,742	0.42
2010	2.29	0.074	131.9	0.078	0.064	901	10,574	0.34
Decrease	1.3%					-2.7%	9.9%	
09-10 Average	2.31	0.075	132.8	0.078	0.067	889	11,158	0.38
2011	1.58	0.051	90.9	0.063	0.044	no data	9,057	0.57
Decrease	32%	32%	32%	19%	34%		19%	-50%

* EPA states infiltration is not excessive if the 7-14 day average domestic wastewater flow does not exceed 120-130 gpcd

Appendix B

Project Cost Breakdown

(Based on Awarded Bid)

Line No.	Item Number	Item Description	Estimated Quantity	Item Unit	Unit Price	Solve/Check	
1890	201.012	Clearing	6	ID	$31.00	$186.00	
1900	201.022	Grubbing	6	ID	$31.00	$186.00	
1910	305.011	BASE AGGREGATE DENSE 3/4-INCH	3	TON	$12.28	$36.84	
1920	305.012	BASE AGGREGATE DENSE 1 1/4-INCH	195	TON	$10.80	$2,106.00	
1930	602.0405	Concrete Sidwalk 4-inch	165	SF	$2.50	$412.50	
1940	619.1	Mobilization	0.07	EACH	$157,035.00	$10,992.45	
1950	624.01	WATER	2.7	MGAL	$20.00	$54.00	
1960	625.01	TOPSOIL	50	SY	$2.32	$116.00	
1970	628.2008	EROSION MAT URBAN CLASS I TYPE B	50	SY	$1.65	$82.50	
1980	629.021	FERTILIZER TYPE B	0.1	CWT	$45.00	$4.50	
1990	630.014	SEEDING MIXTURE NO. 40	1	LB	$11.75	$11.75	
2000	690.015	SAWING ASPHALT	85	LF	$1.35	$114.75	
2010	SPV.0060	SPECIAL 60. CONNECT TO EXISTING WATER MAIN	6	EACH	$626.50	$3,759.00	
2020	SPV.0060	SPECIAL 61. ABANDON WATER MAIN	6	EACH	$571.00	$3,426.00	
2030	SPV.0060	SPECIAL 62. SALVAGE EXISTING HYDRANT	1	EACH	$660.00	$660.00	
2040	SPV.0060	SPECIAL 63. 8-INCH X 8-INCH TEE	1	EACH	$475.00	$475.00	
2050	SPV.0060	SPECIAL 64. 8-INCH X 6-INCH TEE	1	EACH	$425.00	$425.00	
2060	SPV.0060	SPECIAL 65. 8-INCH X 6-INCH CROSS	1	EACH	$641.00	$641.00	
2070	SPV.0060	SPECIAL 66. 8-INCH SLEEVE	1	EACH	$337.00	$337.00	
2080	SPV.0060	SPECIAL 67. 8-INCH VALVE AND BOX	3	EACH	$1,537.00	$4,611.00	
2090	SPV.0060	SPECIAL 68. 6-INCH VALVE AND BOX	3	EACH	$1,180.00	$3,540.00	
2100	SPV.0060	SPECIAL 69. 4-INCH PLUG	1	EACH	$139.00	$139.00	
2110	SPV.0060	SPECIAL 70. 6-INCH PLUG UNDISTRIBUTED	2	EACH	$210.00	$420.00	
2120	SPV.0060	SPECIAL 71. 1-INCH CORPORATION CURB STOP AND BOX	23	EACH	$422.00	$9,706.00	
2130	SPV.0060	SPECIAL 72. CONNECT TO EXISTING WATER SEVICES	22	EACH	$132.00	$2,904.00	
2140	SPV.0060	SPECIAL 73. FIRE HYDRANT COMPLETE	1	EACH	$3,035.00	$3,035.00	
2150	SPV.0060	SPECIAL 74. ADJUST WATER MAIN VALVE BOX HEIGHT	18	EACH	$188.00	$3,384.00	
2160	SPV.0060	SPECIAL 75. 2-INCH POLYSTYRENE INSULATION FOR WATER MAIN (4'X8' SHEET)	20	EACH	$53.50	$1,070.00	
2170	SPV.0060	SPECIAL 76. WATER MAIN OFFSET UNDISTRIBUTED	3	EACH	$3,520.00	$10,560.00	
2180	SPV.0060	SPECIAL 77. 12-INCH HYDRANT EXTENSION UNDISTRIBUTED	2	EACH	$546.00	$1,092.00	
2190	SPV.0060	SPECIAL 78. REMOVE EXISTING SANITARY MANHOLE	2	EACH	$337.00	$674.00	
2200	SPV.0060	SPECIAL 79. ADJUST EXISTING SANITARY MANHOLE	5	EACH	$460.00	$2,300.00	
2210	SPV.0060	SPECIAL 80. ADJUST EXISTING SANITARY MANHOLE AND BARREL HEIGHT	4	EACH	$902.00	$3,608.00	
2220	SPV.0060	SPECIAL 81. SANITARY MANHOLE BARREL ROTATION	1	EACH	$893.00	$893.00	
2230	SPV.0060	SPECIAL 82. SANITARY MANHOLE TYPE 1 COMPLETE	3	EACH	$2,600.00	$7,800.00	
2240	SPV.0060	SPECIAL 83. CONNECT TO EXISTING SANITARY SEWER WITHOUT LINER	4	EACH	$355.00	$1,420.00	
2250	SPV.0060	SPECIAL 84. CONNECT TO EXISTING SANITARY SEWER WITH LINER	1	EACH	$500.00	$500.00	
2260	SPV.0060	SPECIAL 85. CONNECT TO EXISTING SANITARY LATERAL	31	EACH	$114.00	$3,534.00	
2270	SPV.0060	SPECIAL 86. 12-INCH X 6-INCH SADDLE WYE	3	EACH	$257.00	$771.00	
2280	SPV.0060	SPECIAL 87. 10-INCH X 6-INCH SADDLE WYE	27	EACH	$175.00	$4,725.00	
2290	SPV.0060	SPECIAL 88. 8-INCH X 6-INCH WYE	2	EACH	$100.00	$200.00	
2300	SPV.0060	SPECIAL 89. SANITARY SEWER CLEAN OUT	3	EACH	$350.00	$1,050.00	
2310	SPV.0060	SPECIAL 90. 2-INCH POLYSTYRENE INSULATION FOR SANITARY SEWER (4'X8' SHEET)	24	EACH	$53.00	$1,272.00	
2320	SPV.0060	SPECIAL 91. ABANDON EXISTING WATER SERVICE	12	EACH	$132.00	$1,584.00	
2330	SPV.0090	SPECIAL 60. 8-INCH DUCTILE IRON WATER MAIN	345	LF	$33.30	$11,488.50	
2340	SPV.0090	SPECIAL 61. 6-INCH DUCTILE IRON WATER MAIN	130	LF	$27.75	$3,607.50	
2350	SPV.0090	SPECIAL 62. 1-INCH COPPER WATER SERVICE	1,365.00	LF	$19.70	$26,890.50	
2360	SPV.0090	SPECIAL 63. TEMPORARY WATER SERVICE STA 584+53 TO STA 587+47	300	LF	$10.70	$3,210.00	
2370	SPV.0090	SPECIAL 64. 8-INCH PVC SANITARY SEWER	172	LF	$14.00	$2,408.00	
2380	SPV.0090	SPECIAL 65. 6-INCH PVC SANITARY LATERAL	1,370.00	LF	$16.30	$22,331.00	
2390	SPV.0105	SPECIAL 60. WISCONSIN EIF REVOLVING LOAN PROGRAM FUNDING REQUIREMENTS	1	LUMP	$2,500.00	$2,500.00	
2400	SPV.0105	SPECIAL 61. CDBG FUNDING REQUIREMENTS	1	LUMP	$2,500.00	$2,500.00	
2410	SPV.0105	SPECIAL 62. PROJECT SIGN	1	LUMP	$500.00	$500.00	
2420	SPV.0165	SPECIAL 01. CONCRETE SIDEWALK CURE AND SEAL TREATMENT	165	SF	$0.10	$16.50	
2430	SPV.0195	SPECIAL 01. ASPHALTIC SURFACE SPECIAL	85	TON	$98.06	$8,335.10	$178,605.39

		Village Storm Sewer and Sidewalk Cost Share (Applied Proportionally below)	
N/A	N/A	Storm Sewer (Village Share from Chad Hines based on bid 12/11/12)	$101,433.00
N/A	N/A	Sidewalk (Village Share of sidewalk restoration based on water & sewer laterals)	$17,208.00
		Water Costs	$97,018.50
		Sewer Costs	$53,486.00
		TOTAL Water/Sewer (without general or delivery)	$150,504.50
		Percent Water	$0.64
		Percent Sewer	$0.36
		Village Storm Sewer and Sidewalk Cost Share (Applied Proportionally below)	$118,641.00
		Water Costs	$76,478.59
		Sewer Costs	$42,162.41
		TOTAL Water/Sewer (without general or delivery)	$118,641.00
		Percent Water	$0.64
		Percent Sewer	$0.36
		General Items	$28,100.89
		General Split Water	$18,114.45
		General Split Sewer	$9,986.44
		Delivery Costs	$21,432.65
		Delivery Costs Water	$13,815.96
		Delivery Costs Sewer	$7,616.69

	Proportional Split
Water+Restoration (Storm & Sidewalk)+General+Delivery	$205,427.50
Sewer+Restoration (Storm & Sidewalk)+General+Delivery	$113,251.54
TOTAL Water+Sewer (with General and Delivery)	**$318,679.04**
Sewer Engineering	**$54,200.00**
Sewer Total w/Engineering	**$167,451.54**
Water Engineering	**$58,200.00**
Water Total w/Engineering	**$263,627.50**