



**NEW MEXICO ENVIRONMENT DEPARTMENT  
CONSTRUCTION PROGRAMS BUREAU**



**MEMORANDUM**

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Jim Chiasson, Bureau Chief

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**GREEN PROJECT RESERVE  
BUSINESS CASE**

City of Farmington Wastewater Treatment Plant  
CWSRF 012 – Wastewater Treatment Improvements Phase III

Prepared by:  
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Construction Programs Bureau  
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The City of Farmington operates a regional wastewater treatment plant (WWTP) that discharges to the San Juan River. In an order to ensure the plant continues to produce high quality effluent that meets the current requirements of the NPDES permit and in anticipation of future requirements to reduce nutrients and total dissolved solids in the effluent, the City is preparing to implement Phase III of the Wastewater Improvement Project.

Phase III of the City of Farmington regional wastewater treatment plant improvements project is being funded by the Clean Water State Revolving Loan Fund - CWSRF 012, through the New Mexico Environment Department (NMED) Construction Programs Bureau (CPB). The total cost of the project is a \$14 million dollars. The upgrades include the construction of two medium rate activated sludge (MRAS) basins, two secondary clarifiers, solids handling facilities, ultraviolet (UV) disinfection and a septic truck dumping station. Specifically the renovations considered to be “green” modifications, are the replacement of the chlorination, de-chlorination disinfection process with ultraviolet (UV) disinfection process.

A summary list of the “green” components in the contract are as follows:

Component	Description	Green Cost
<b>Environmentally Innovative (business case)</b>		
UV Disinfection	UV building facility complete	\$1,248,000.00
Gross Receipt Tax @ 7.375%	Tax	\$92,040.00
<b>Total Environmentally Innovative</b>		<b>\$1,340,040.00</b>
<b>TOTAL</b>		<b>\$1,382,990.00</b>

**Component UV Disinfection – Environmentally Innovative (business case):**

This component will be located on the wastewater treatment plant site in a new UV building. The estimated cost of this 100% green component is \$1,248,000 as shown in Items 5.1 through 5.12 of the Engineer’s Opinion of Estimated Probable Cost (Exhibit 1).

Currently the effluent from the Farmington wastewater treatment plant is disinfected with sodium hypochlorite. In order to meet the requirements of the NPDES permit, residual chlorine is removed from the effluent with sodium bisulfite. Farmington currently uses on average 5,795 gallons of sodium hypochlorite and 9,312 gallons of sodium bisulfite per month (Exhibit 2). The change to ultraviolet disinfection of the effluent from the plant will result in the elimination of approximately 69,545 gallons of sodium hypochlorite and 111,750 gallons of sodium bisulfite annually. This is clearly a significant reduction of chemical use in the wastewater treatment at the Farmington plant as a result of this project and therefore meets the Environmentally Innovative definition. A side benefit of this reduction in chemical use is the elimination of the requirements associated with storing the chemicals on site. Currently because of the quantity of chemicals stored at the plant, Farmington must do annual chemical handling training, and has double wall tanks for the sodium hypochlorite and a containment area for the sodium bisulfite. The total cost of chemicals is \$213,000 per year. The peristaltic pumps that inject the chemicals are 0.33 horse power each and run on variable frequency drives, so the cost to operate the pumps is less than \$500/year. Additionally, the City does not track the labor costs associated with operating the disinfection process itself, but rather to total labor cost to operate the entire plant. Therefore the total operation and maintenance for operating the disinfection process has not been itemized by the City and is minimal. For purposes of this business case it has been

assumed that training and O&M is roughly \$2,000 per year. Replacing the current chlorination/dechlorination disinfection process with UV will save the City of Farmington an estimated \$169,800 per year.

Chlorination/dechlorination disinfection process:

\$213,000/year for sodium hypochlorite and sodium bisulfite

\$1,000/year for operation and maintenance

\$1,000/year for training

Total cost of \$215,000 per year

UV disinfection process:

\$45,200/year for operation and maintenance

Reference

1. Amendment to Preliminary Engineering Report, HDR, June 10, 2015

**City of Farmington  
Wastewater Treatment Plant  
PRELIMINARY ESTIMATE OF PROBABLE QUANTITIES/COST**

ITEM No.	DESCRIPTION	UNIT	EST. QTY.	UNIT PRICE	AMOUNT
1.0	<b>Mobilization / Demobilization</b>				
1	Mobilization	LS	1	\$ 300,000.00	\$ 300,000.00
2	Contractor's Bond, Insurance & Permits	LS	1	\$ 300,000.00	\$ 300,000.00
3	Demobilization	LS	1	\$ 100,000.00	\$ 100,000.00
<b>Subtotal</b>					<b>\$ 700,000.00</b>
2.0	<b>MRAS Basin No. 1</b>				
1	Excavation & Backfill	CY	20,000	\$ 8.00	\$ 160,000.00
2	Concrete Foundation	CY	1,000	\$ 500.00	\$ 500,000.00
3	Concrete Exterior Walls	CY	800	\$ 800.00	\$ 640,000.00
4	Concrete Interior Walls	CY	250	\$ 800.00	\$ 200,000.00
5	Misc Metals	LS	1	\$ 75,000.00	\$ 75,000.00
6	Coatings	LS	1	\$ 50,000.00	\$ 50,000.00
7	Electrical	LS	1	\$ 150,000.00	\$ 150,000.00
8	Aeration Equipment	LS	1	\$ 125,000.00	\$ 125,000.00
9	High Speed Mixers	EA	2	\$ 20,000.00	\$ 40,000.00
10	Low Speed Mixers	EA	3	\$ 30,000.00	\$ 90,000.00
11	Drain Pump	EA	1	\$ 10,000.00	\$ 10,000.00
12	Interior Piping	LS	1	\$ 125,000.00	\$ 125,000.00
13	Slide Gates	LS	1	\$ 65,000.00	\$ 65,000.00
14	SS Air Piping	LS	1	\$ 55,000.00	\$ 55,000.00
15	24" Yard Piping	LF	110	\$ 140.00	\$ 15,400.00
16	30" Yard Piping	LF	30	\$ 200.00	\$ 6,000.00
17	36" Yard Piping	LF	50	\$ 250.00	\$ 12,500.00
<b>Subtotal</b>					<b>\$ 2,318,900.00</b>

*Exhibit 1*

2.0	MRAS Basin No. 3				
1	Excavation & Backfill	CY	20,000	\$ 8.00	\$ 160,000.00
2	Concrete Foundation	CY	1,000	\$ 500.00	\$ 500,000.00
3	Concrete Exterior Walls	CY	800	\$ 800.00	\$ 640,000.00
4	Concrete Interior Walls	CY	250	\$ 800.00	\$ 200,000.00
5	Misc Metals	LS	1	\$ 75,000.00	\$ 75,000.00
6	Coatings	LS	1	\$ 50,000.00	\$ 50,000.00
7	Electrical	LS	1	\$ 150,000.00	\$ 150,000.00
8	Aeration Equipment	LS	1	\$ 125,000.00	\$ 125,000.00
9	High Speed Mixers	EA	2	\$ 20,000.00	\$ 40,000.00
10	Low Speed Mixers	EA	3	\$ 30,000.00	\$ 90,000.00
11	Drain Pump	EA	1	\$ 10,000.00	\$ 10,000.00
12	Interior Piping	LS	1	\$ 125,000.00	\$ 125,000.00
13	Slide Gates	LS	1	\$ 65,000.00	\$ 65,000.00
14	SS Air Piping	LS	1	\$ 55,000.00	\$ 55,000.00
15	24" Yard Piping	LF	150	\$ 140.00	\$ 21,000.00
16	30" Yard Piping	LF	100	\$ 200.00	\$ 20,000.00
17	36" Yard Piping	LF	60	\$ 250.00	\$ 15,000.00
				<b>Subtotal</b>	<b>\$ 2,341,000.00</b>
3.0	Secondary Clarifier No. 2				
1	Excavation & Backfill	CY	1,500	\$ 8.00	\$ 12,000.00
2	Concrete Foundation	CY	220	\$ 500.00	\$ 110,000.00
3	Concrete Walls	CY	245	\$ 800.00	\$ 196,000.00
4	Concrete Launderers	CY	30	\$ 800.00	\$ 24,000.00
5	Misc Metals	LS	1	\$ 15,000.00	\$ 15,000.00
6	Electrical	LS	1	\$ 80,000.00	\$ 80,000.00
7	Mechanism	EA	1	\$ 175,000.00	\$ 175,000.00
8	Launder Covers	EA	1	\$ 25,000.00	\$ 25,000.00
9	6" Scum Yard Piping	LF	100	\$ 40.00	\$ 4,000.00
10	30" Yard Piping	LF	150	\$ 200.00	\$ 30,000.00
				<b>Subtotal</b>	<b>\$ 671,000.00</b>

3.0	Secondary Clarifier No. 3				
1	Excavation & Backfill	CY	1,500	\$ 8.00	\$ 12,000.00
2	Concrete Foundation	CY	220	\$ 500.00	\$ 110,000.00
3	Concrete Walls	CY	245	\$ 800.00	\$ 196,000.00
4	Concrete Launderers	CY	30	\$ 800.00	\$ 24,000.00
5	Misc Metals	LS	1	\$ 15,000.00	\$ 15,000.00
6	Electrical	LS	1	\$ 80,000.00	\$ 80,000.00
7	Mechanism	EA	1	\$ 175,000.00	\$ 175,000.00
9	Launder Covers	EA	1	\$ 25,000.00	\$ 25,000.00
10	6" Scum Yard Piping	LF	100	\$ 40.00	\$ 4,000.00
11	30" Yard Piping	LF	150	\$ 200.00	\$ 30,000.00
				<b>Subtotal</b>	<b>\$ 671,000.00</b>
4.0	Solids Handling Building				
1	Demolish Trickling Filter	LS	1	\$ 30,000.00	\$ 30,000.00
2	Concrete Slab	CY	180	\$ 500.00	\$ 90,000.00
3	CMU Building	SY	800	\$ 200.00	\$ 160,000.00
4	Hollowcore Roof	SF	4,400	\$ 15.00	\$ 66,000.00
5	Membrane Roofing	SF	4,400	\$ 10.00	\$ 44,000.00
6	Misc Metals	LS	1	\$ 20,000.00	\$ 20,000.00
7	Coatings	LS	1	\$ 30,000.00	\$ 30,000.00
8	Mechanical	LS	1	\$ 150,000.00	\$ 150,000.00
9	Electrical	LS	1	\$ 150,000.00	\$ 150,000.00
10	Thickening Units	EA	2	\$ 200,000.00	\$ 400,000.00
11	Dewatering Units	EA	2	\$ 250,000.00	\$ 500,000.00
12	Sludge Pumps	EA	2	\$ 15,500.00	\$ 31,000.00
13	Polymer Feed System	EA	2	\$ 30,000.00	\$ 60,000.00
14	Conveyor	EA	1	\$ 85,000.00	\$ 85,000.00
15	Hoist & Trolley	EA	1	\$ 40,000.00	\$ 40,000.00
16	Interior Piping	LS	1	\$ 75,000.00	\$ 75,000.00
17	Dilute WAS Tank Structure	LS	1	\$ 250,000.00	\$ 250,000.00
18	DWAS Aeration Equipment	LS	1	\$ 50,000.00	\$ 50,000.00
19	DWAS Pumps	LS	1	\$ 20,000.00	\$ 20,000.00
20	Filtrate Pump Station	LS	1	\$ 150,000.00	\$ 150,000.00
21	6" Yard Piping (Sludge and Drain)	LF	600	\$ 30.00	\$ 18,000.00
22	8" Yard Piping (Filtrate Forcemain)	LF	340	\$ 40.00	\$ 13,600.00
23	Arterial Asphalt Concrete, includes subgrade and base course	SY	500	\$ 20.00	\$ 10,000.00
24	Curb & Gutter	LF	400	\$ 15.00	\$ 6,000.00
				<b>Subtotal</b>	<b>\$ 2,448,600.00</b>

5.0		UV Facility			
1	Demolition Chlorine Contact Basin	LS	1	\$ 20,000.00	\$ 20,000.00
2	Concrete Slab and Channels	CY	160	\$ 800.00	\$ 128,000.00
3	CMU Building	SY	325	\$ 200.00	\$ 65,000.00
4	Hollowcore Roof	SF	2,200	\$ 15.00	\$ 33,000.00
5	Membrane Roofing	SF	2,200	\$ 10.00	\$ 22,000.00
6	Misc Metals	LS	1	\$ 20,000.00	\$ 20,000.00
7	Coatings	LS	1	\$ 20,000.00	\$ 20,000.00
8	Mechanical	LS	1	\$ 50,000.00	\$ 50,000.00
9	Electrical	LS	1	\$ 100,000.00	\$ 100,000.00
10	UV Equipment	LS	1	\$ 725,000.00	\$ 725,000.00
11	Washwater Pumps	LS	1	\$ 25,000.00	\$ 25,000.00
12	Hoist & Trolley	EA	1	\$ 40,000.00	\$ 40,000.00
<b>Subtotal</b>					<b>\$ 1,248,000.00</b>
6.0		Miscellaneous Equipment			
1	Pump/Blower Building - RAS Pump	EA	1	\$ 20,000.00	\$ 20,000.00
2	Pump/Blower Building - Blowers	EA	2	\$ 120,000.00	\$ 240,000.00
3	Pump/Blower Building - PD Blowers	EA	2	\$ 20,000.00	\$ 40,000.00
4	MRAS Basin No. 2 - Replace Diffuser Membranes	LS	1	\$ 45,000.00	\$ 45,000.00
6	Recoat Clarifiers	EA	3	\$ 35,000.00	\$ 105,000.00
<b>Subtotal</b>					<b>\$ 450,000.00</b>
7.0		Allowances			
1	Testing Allowance	LS	1	\$ 35,000.00	\$ 35,000.00
<b>Subtotal</b>					<b>\$ 35,000.00</b>

<b>Subtotal</b>	<b>\$ 10,884,000.00</b>
<b>Contingency @ 20%</b>	<b>\$ 2,177,000.00</b>
<b>Total</b>	<b>\$ 13,061,000.00</b>
<b>NMGRT @ 7.1875%</b>	<b>\$ 939,000.00</b>
<b>Total Including NMGRT</b>	<b>\$ 14,000,000.00</b>

	A	B	C	D
1				
2		<b>EFFLUENT CHEMICAL USAGE</b>		
3				
4				
5		<b>MONTH</b>	<b>CL2 USE</b>	<b>BISULFITE USE</b>
6			<b>GPD</b>	<b>GPD</b>
7			<b>315</b>	<b>316</b>
8		Jan 2014	5,352.00	11,569.00
9		Feb 2014	4,636.00	10,368.00
10		Mar 2014	5,200.00	9,243.00
11		Apr 2014	5,270.00	7,932.00
12		May 2014	5,715.00	8,549.00
13		Jun 2014	5,718.00	8,423.00
14		Jul 2014	6,267.00	9,214.00
15		Aug 2014	6,946.00	9,595.00
16		Sep 2014	5,805.00	9,074.00
17		Oct 2014	6,666.00	9,573.00
18		Nov 2014	5,814.00	8,844.00
19		Dec 2014	6,156.00	9,366.00
20				
21		Total	69,545.00	111,750.00
22				
23				
24				
25				
26				