FREDERICK-WINCHESTER SERVICE AUTHORITY

WINCHESTER, VA

SAFETY RECORD
ZERO Recordable Events

PROJECT SIZE
$47M

PROJECT SCHEDULE
3/25/2014-4/5/2018

CONTRACT METHOD
ESPC

The Frederick Winchester Service Authority's (FWSA) $47M energy performance contract with Energy Systems Group (ESG) included the design and construction of comprehensive energy efficiency and infrastructure improvements at its Opequon Water Reclamation Facility. The 12.6 million gallon per day enhanced nutrient removal facility has very strict nitrogen and phosphorus removal requirements necessary to help preserve the well-being of the Chesapeake Bay. The project created a new revenue stream for FWSA through high strength waste acceptance that has helped to stabilize rates for customers, and it has promoted economic development in the City of Winchester and Frederick County area.

The centerpiece of the FWSA project was the construction of a green energy facility that processes municipal sludge and high-strength organic waste to produce methane gas, a renewable fuel, through the process of anaerobic codigestion. The methane gas is then utilized on-site to generate up to 848 kilowatts of electricity to power the plant under average loading conditions. The project improvements also included a new sludge dewatering process that reduces the use of chemicals and cuts the amount of biosolids hauled to the regional landfill for final disposal by approximately 50 percent.

FWSA's facility became operational in 2016 and can now take over 125,000 gallons per day of high strength waste. The facility currently takes FOG, DAF, and dairy waste, and the revenue potential from the green energy facility is between $1.25 and $1.5 million per year. One of the green energy facility's additional benefits is its ability to harvest phosphorus from the wastewater stream. This rare element is an essential ingredient for fertilizer and crop production.

esg energy systems group

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SAVINGS INFORMATION

ESG exceeded its 3-year revenue guarantee expectation of $2.01M by over $500k

SOLUTION

Treatment Infrastructure Renewal

- Dewatering: Gravity belt thickeners, belt filter presses, polymer feed pumps, progressive cavity pumps and associated electrical
- Controls: SCADA control system upgrade
- Electrical: New primary 12.5 kV switchgear unit, 800 kW emergency power system interconnected to cogeneration, net metering/grid paralleling capability
- Aeration: Replace four (4) 450 hp. multistage blowers with four (4) 150 hp. turbo blowers, new electrical, fine bubble diffusers, piping and controls

Green Energy & Resource Recovery

- 848 kW electric cogeneration with biogas conditioning system
- Anaerobic digestion: Three (3) 1.25 million gallon digesters, 13,000 sq. ft. control building housing switchgear, lab, boilers, heat exchangers, grinders, pumps, compressors
- High-strength food waste and FOG receiving facility with segregated waste storage
- Ostara Pearl® phosphorus nutrient recovery system

Facility Efficiency Improvements

- Building energy management control system
- Lighting and mechanical system improvements
- Potable water system upgrade

SERVICE QUALITY

"ESG brought to the table levels of expertise that we could not really expect one general contractor to come up with."

- **Dick Helm**, FWSA Executive Director

RESULTS

Through the partnership with ESG, the Frederick Winchester Service Authority has a new green energy revenue stream with the ability to capture rare elements vital for fertilization and crop production.

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