KC Water Biosolids Facility Improvements

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DETERMINING THE NEED

FOR A BIOSOLIDS FACILITY IMPROVEMENTS PROJECT



DETERMINING THE NEED



- Costly incinerator upgrades
- Air emissions challenges

KCWATER

- Landfills not available, no longer a viable option
- Class B biosolids have limited beneficial use





OWNER'S ADVISOR

- Staff augmentation
- Technical guidance
- Delivery method analysis and recommendation
- Risk identification and analysis support
- Owner's agent through construction
- BIM Development

WATER



RIGHT DECISIONS







OPTIONS CONSIDERED

SUSTAINABLE DECISIONS PROCESSES



OPTIONS CONSIDERED



Photo Credit: Shaun O'Kelley, Blue River WWTP

& KCWATER



Photo Source: Kuzu Grup, Fluid Bed http://www.kuzugrup.com/en/proje/buski-fluidized-bed-sludgeincineration-and-energy-production-plant/



Photo Source: Wikimedia, THP https://commons.wikimedia.org/w/index.php?curid=50970357



Photo Source: www.irishwaste.net/service/industrial-services/mobile-lime-stabilisation-plants/

Quadruple Bottom Line Evaluation of Alternatives Environment -Great Resource 20 **Recovery** (Nutrients & Biogas) 10 0

Financia

Multi-Hearth Furnance

Operations

Total

Thermal Hydrolysis

Environment

WATFR

2 Fluidized Bed

-10

-20

-30

-40

Community

-Class A Biosolids -Lower Regulatory Risk

-Lower Greenhouse Gas Permit

-Reducing Air Emissions

Community 1) Fewer Odors

Lime

8

PROJECT ELEMENTS

- Designed to handle max. month of 94 dry tons of sludge per day
- Raw Sludge from three (3) facilities:
 - Blue River WWTP
 - Westside WWTP
 - Birmingham WWTP
- Sludge screening
- Pre and post dewatering with centrifuges
- Thermal Hydrolysis Process (THP) Treatment System
- Biogas cleaning
- Boiler system for steam production
- Cake loadout facility





PROPOSED THP SYSTEM



BIOSOLIDS FACILITY CONCEPTUAL DESIGN







BENEFITS



BENEFITS











Elimination of incineration and emissions

All solids processed through existing digesters Class A product, beneficial use of biosolids

Energy recovery

Odor reduction



PROCUREMENT METHOD AND SCHEDULE



BEST VALUE DESIGN BUILD



COLLABORATIVE DESIGN/BUILD PROCUREMENT



PROPOSALS RECEIVED AND PRELIMINARY RECOMMENDATION

- · Proposals from Three Shortlisted Teams
 - Goodwin: BLACK&VEATCH
 - KC Water Partners: BURNS MEDONNELL
 - Kiewit: 🛞 Kiewit 🕥 Stantec
- Evaluation Matrix reflects RFP Requirements
 - ✓ Part 1. Project Plans/Management Approach (30 Points)
 - ✓ Part 2. Technical Proposal (60 points)
 - Part 3. Construction Schedule, Planning, and Sequencing (10 points)
- Preliminary Bid Recommendation Goodwin Brothers, highest ranked and \$127M vs. \$150M engineer's estimate



DESIGN/BUILD PROCESS YIELDED...

Savings AND Innovative Design





DRIVING INNOVATIONS



DRIVING INNOVATIONS





MISSOURI DEPARTMENT OF NATURAL RESOURCES

CLEAN WATER

State Revolving Fund

Intended Use Plan and Project Priority List for Fiscal Year 2021

- Approved financing Clean Water State Revolving Fund (SRF) ~1.5%
- Risk and asset management

- Collaborative Project Delivery (Design/Build)
- Building Information Model (BIM)
- Ultimate sustainability captured in Envision energy recovery and beneficial use



Approach for Achieving Silver or Higher Envision Rating



Quality of Life

- Narrated Virtual Tour provides educational tool to showcase environment benefits
- New Biosolids Building provides safe environment for O&M staff





Leadership

- Over 100 jobs for 23 local companies
- Apprentice program and new technology expands local workforce capacity
- Class A biosolids and biogas provides beneficial reuse opportunities
- SMART BIM provides long-term management tool



Approach for Achieving Silver or Higher Envision Rating



Resource Allocation

- 95% reduction in sludge sent to landfill
- Recycle 50% construction waste
- Energy efficient system to save 46% on annual heating costs
- 50% energy needs supplied from on-site biogas
- Translucent windows and skylights to enhance natural lighting

Natural World

- Minimizing need for additional land
- Pervious pavement and bioswales improves water quality



Climate and Risk

- 10% reduction in greenhouse gas emissions
- Achieves the Climate Look and Climate Resilience Strategy







DEFINING KC WATER'S BIM PROGRAM

- 3D-based design
- Automated interference detection
- Design and constructability reviews
- Contractor schedule/budget management, phasing scenarios
- <u>Whole-life asset</u> <u>management</u>

WATFR

Defined protocols for future
 BIM



Building Information Model (BIM)

FINANCIAL PLANNING FOR PROJECT



KC Water Cost of Service Task Force Final Recommendations

"The City should include the pursuit of state and federal funds for water and wastewater infrastructure on its legislative agenda."

Approved on June 6, 2017



CLEAN WATER STATE REVOLVING FUND (CWSRF) FINANCING

- Applied for and received approval for \$100 million in State Revolving Fund Subsidization for FY21.
- Projects receiving funding are to be financed in FY21, which ends September 30, 2021.
- Anticipated \$12-\$18 million in cost avoidance as a result of utilizing this funding.



Total Wastewater CIP 2021-2035, With Proposed 3rd Modification



18

CWATER

28

Total Wastewater CIP 2021-2035, With Proposed 3rd Modification







EQUIPMENT AND SKILLED TRADES



EQUIPMENT AND SKILLED TRADES

Equipment Boilers **Cooling towers** HVAC **Electrical MCC and** switchgear Centrifuges Pumps **Chemical feed** Odor control

ATFR

Trades Boilermaker Carpenter Electrician Flatwork Linemen **Elevator** mechanic Heavy equipment operator Ironworker Programming/I&C

0

Laborer Mason Pile driver Plumber **Pipefitter** Sheet metal worker Painter/finisher **Mechanical** Worker



MINORITY AND WOMEN'S BUSINESS ENTERPRISES



MINORITY AND WOMEN BUSINESS PARTICIPATION

Typically, the State Revolving Fund (SRF) utilizes the State's Disadvantaged Business Entities (DBE) Program.



KC Water obtained approval to use KCMO's MBE/WBE Program.

- 1. As far as we know, first time for the State.
- 2. Drives more funding to local firms.



CITY OF KANSAS CITY, MISSOURI



M/WBE PARTNERS AND GOALS (\$26 M)

MBE (11.9% Estimate, 11% Goal)*

- WITEC
- Blue Nile
- Pro Metals
- Vazquez Commercial
 DuBois Consultants
 Custom Engineering
 TSI Geotechnical
 Taliaferro & Browne

\$9,650,000
\$ 750,000
\$2,595,600
\$1,365,984
\$ 407,780
\$ 185,354
\$ 34,063
\$ 118,140

WBE (8.2% Estimate, 8% Goal)*

- EAE (Designer)Realm Construction
- Richardson Hauling
- Little Joe's Asphalt
- Cornell Roofing
- A K Lee
- American Fire Sprinkler
- KC Electrical (Supplier)
- Trekk Design Group
- CJ Industries

\$2,540,000 \$ 100,000 \$ 60,000 \$ 150,000 \$1,500,000 \$ 210,000

\$ 272,293

- \$ 850,000
- \$ 167,740
- \$4,900,000

M/WBE design firms on Owner's Advisor Team that joined Goodwin Team *Contractor Utilization Plan approved by HRD on September 11, 2020.



PROJECT URGENCY AND DRAFT ORDINANCE LANGUGE



PROJECT SCHEDULE URGENCY

- ✓ Need reliable sludge disposal method 24/7 for permit compliance
 - o Incinerators shut down permanently
 - Landfills not viable option
- ✓ Good pricing, even despite global pandemic
- ✓ Biosolids project moved up and included in proposed 3rd modification to Consent Decree
- ✓ Sustainable project
 - \circ Recover resources
 - $\,\circ\,$ Reduce energy use and greenhouse gas emissions
- ✓ SRF loan approved and should close in First Quarter 2021, avoiding \$12 – 18 million in debt-financing cost

Would like to request advance if possible with November holiday

Draft Ordinance Language, to LUSI 10/20 for 11/5 Introduction, 11/10 TIO

Estimating revenue in the amount of \$100,000,000 in the 2021A SRF Sewer Revenue Bond Fund and appropriating the same; appropriating \$52,750,000.00 from the Unappropriated Fund Balance of the Sewer Fund; authorizing a \$127,000,000.00 Design-Build contract with Goodwin Bros. Construction Co., for the Blue River WWTP Biosolids Facility Project, authorizing a maximum expenditure of \$140,000,000.00; authorizing a \$5,170,000.00 Design Professional Services Amendment No. 3 plus additional future amendments totaling \$6,830,000.00 and authorizing an extension of the term of Contract No. 1394 with Carollo Engineering, Inc. for an additional 5 years without further City Council approval for a total contract amount of \$20,547,902.77; authorizing a \$375,000.00 Professional, Specialized or Technical Services contract with Kiewit Power Constructors Co. for Blue River WWTP Biosolids Facility Project; authorizing a \$375,000.00 Professional, Specialized or Technical Services contract with KC Water Partners for Blue River WWTP Biosolids Facility Project; declaring the intent of the City to reimburse itself from the bond proceeds for certain expenditures; and designating requisitioning authority.



THANK YOU

For more information, contact: Matt Bond, matt.bond@kcmo.org

