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VILLAGE OF ELIZABETH

Mandy L. Green, Mayor

Independent Engineering Evaluation & Forensic Audit

Village of Elizabeth Wastewater Treatment System

1. Project Overview

The Village of Elizabeth is requesting qualifications from experienced and independent engineering consulting firms to perform a forensic engineering evaluation of persistent mechanical and operational failures within the municipal wastewater treatment plant pumping system.

Project Objectives

The selected firm shall:

- Identify the root cause(s) of recurring pump failures
- Evaluate whether the installed equipment and system design are appropriate for actual operating conditions
- Provide actionable, cost-effective engineering recommendations to ensure long-term system reliability

Important Context

- Pumps have experienced significant degradation and/or failure within one year of installation
- The system is subject to infiltration and inflow (I/I) conditions
- There is documented or anticipated sand and silt loading, contributing to abrasive wear

2. Facility & Asset Details

Facility Name/Location:

Town of Elizabeth Wastewater Treatment Plant

W. Bay Rd, Elizabeth, Louisiana 70638

System Description:

- Mechanical Sewer Treatment Plant – Extended Aeration
- Model: Hoot 94,000C-SC
- Design Capacity: 85,000 GPD
- Basin: Existing concrete-lined oxidation ditch repurposed as a wet-weather lagoon
- Total Volume: 112,000 gallons

Current Pumping Equipment:

- (2) Flygt N-Technology Pumps
- Model: 3085
- 3 HP, 3-inch discharge
- Submerged wet well installation
- Base-mounted with automatic discharge connection
- Dual guide rail system for maintenance access

Observed Issues

Frequent pump failures and reduced hydraulic performance

Mechanical wear and recurring maintenance problems, including:

- Clogging
- Vibration
- Seal failure
- Condensation found in the housing

Additional Observations

- Evidence of abrasive wear consistent with sand and silt intrusion
- Elevated hydraulic loading during wet-weather events (I/I influence)

3. Scope of Services

The selected firm shall complete a forensic-level engineering evaluation consisting of the following phases:

Phase I: Hydraulic Design & Configuration Audit

Review of original design documents, plans, and specifications

Evaluation of:

- Pump selection versus actual field operating conditions
- Wet well geometry and potential for sediment accumulation

- Pump cycling frequency and operational efficiency

Perform Infiltration & Inflow (I/I) and solids loading analysis:

- Peak wet-weather flow conditions
- Estimated sand/silt loading versus original design assumptions

Determine whether pumps are:

- Properly sized for actual operating conditions
- Appropriate for grit-laden and abrasive wastewater environments

Phase II: Mechanical, Hydraulic & Electrical System Review

Mechanical / Pump Evaluation

Inspection of failed and/or degraded pump components

Identification of:

- Abrasive wear patterns
- Material degradation
- Seal and bearing failures

Assessment of:

- Suitability of pump design and materials for abrasive service
- Whether observed wear is normal or excessive

Hydraulic System Analysis

Evaluation of downstream force main, including:

- Total Dynamic Head (TDH) calculations
- Friction losses and system resistance
- Identification of restrictions, bottlenecks, or inefficiencies

Assessment of risks such as:

- System overloading
- Water hammer
- Cavitation or hydraulic instability

Electrical & Controls Review

Evaluation of:

- Variable Frequency Drive (VFD) programming and operation
- Voltage stability and electrical supply conditions
- Control logic contributing to excessive pump cycling or stress

Phase III: Engineering Report & Recommendations

The selected firm shall provide a signed and sealed Professional Engineer (P.E.) report including:

A. Root Cause Determination

Identification of primary failure mechanisms

Contributing factors:

- Mechanical
- Hydraulic
- Operational

B. Standard of Care Evaluation

Professional opinion regarding whether:

- Original design and pump selection met industry standards
- Reasonably foreseeable I/I and grit-loading conditions were adequately considered

C. Pump Technology Assessment (Critical Requirement)

Provide evaluation and recommendations for pump technologies suitable for abrasive wastewater service, including:

- Vortex (recessed impeller) pumps
- Slurry-duty pumps
- Screw centrifugal pumps (e.g., Hidrostal-type)
- *Other appropriate alternatives*

Each option shall include:

- Advantages and disadvantages
- Expected service life
- Maintenance requirements
- Lifecycle cost comparison

D. Corrective Actions

Provide at least two engineered alternatives, which may include:

- Pump replacement (type/material upgrades)
- Installation of grit removal or pre-treatment systems
- Wet well modifications
- Control system improvements
- Include order-of-magnitude cost estimates for each alternative.

4. Deliverables

The selected firm shall provide:

Comprehensive Forensic Engineering Audit Report (signed and sealed by a Louisiana P.E.)

Supporting documentation:

- Photographs
- Field data
- Engineering calculations

Executive summary suitable for leadership and funding stakeholders

Formal presentation of findings and recommendations

5. Proposal Submission Requirements

Interested firms shall submit:

- Statement of qualifications and relevant forensic wastewater experience
- Demonstrated experience with abrasive/solids-handling pump systems
- Resume of the Lead Professional Engineer (P.E.)
- Proposed fee structure:

Fixed fee or hourly rates with estimated total cost

- Project timeline with key milestones

6. Additional Considerations

This evaluation must be conducted as an independent and unbiased technical review

Findings may be used for:

- Capital budget justification
- Insurance or warranty evaluation
- Potential dispute resolution

Preference will be given to firms with forensic engineering and expert witness experience

7. Submission Deadline

All proposals must be received no later than:

July 3, 2026

Time: 11:00 AM CST

Submission Method

Proposals shall be submitted via:

mgreen@villageofelizabeth.com & dlee@villageofelizabeth.com

or

Mailed to PO BOX 457, Elizabeth, LA 70638 or dropped off at 230 Poplar Street, Elizabeth, LA 70638
Monday – Thursday 8am -3pm (closed for lunch 12-1pm)

Late submissions may not be considered.

Point of Contact

All questions and proposal submissions shall be directed to:

Mandy Green, Mayor

Or

Denise Lee, LCM Clerk

Village of Elizabeth, LA

P: 318-634-5100 F:318-634-7881