



The City of
OKLAHOMA CITY
UTILITIES DEPARTMENT

July 12, 2024

Project Title: Deer Creek Wastewater Treatment Plant Clarifier Rehabilitation

Project Location: Deer Creek Wastewater Treatment Plant

Project Number: ST-0185

Estimated Project Cost: To Be Determined.

1.0 Project Description:

OCWUT is evaluating the rehabilitation of clarifiers at the Deer Creek Wastewater Treatment Plant (WWTP).

2.0 Project Intent:

The Engineer will provide all preliminary engineering services required to develop a clarifier rehabilitation plan for Deer Creek WWTP. Final design, bidding, construction administration and management, inspection, and as-built services may be completed under a future amendment.

3.0 Background:

OCWUT funds, operates, and maintains the Deer Creek WWTP to provide wastewater services to its citizens and wholesale customers. The WWTP is an activated sludge treatment plant located in the northwest part of Oklahoma City. The components of the primary, nitrification and final clarifiers have reached the end of their service lives and need to be replaced. The rehabilitation plan is anticipated to occur in two separate construction phases. The first phase will rehabilitate Primary Clarifiers 3, 4, and 44. The second phase will rehabilitate Nitrification Clarifiers 24 and 25, as well as Final Clarifiers 27 and 28. Preliminary design services will be completed for all seven clarifiers and will recommend a final phasing plan approach for the improvements.

The construction contract for Phase 1 will be funded with a Clean Water State Revolving Fund (CWSRF) Loan. The construction contract for Phase 2 is anticipated to be funded with a CWSRF Loan as well.

3.1 Plant Overview

The Deer Creek WWTP was constructed in 1982 and is rated to treat 15 million gallons per day (MGD). The plant underwent upgrades in 1996, 2011, and 2014. The facility treats wastewater from the Deer Creek sewershed using a combination of automatic bar screening, grit removal, primary clarification, bio-selector, secondary activated sludge treatment, secondary clarification, floc carry-over, sand filtration, chlorine disinfection, and chlorine removal using sodium dioxide.



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The WWTP also contains various odor control mechanisms such as chemical scrubbers and ferrous chloride dosing. The solids treatment process consists of primary and secondary activated sludge. Sludge dewatering is accomplished by belt press operation. All sludge is stabilized with lime to Class B designation prior to land application.

The treatment processes for the plant are outlined in the table below:

Process	Quantity	Details
Primary Clarifiers	3 units	All units 95 feet in diameter and 10 - 14 feet deep Total capacity: 1.379 MG
Activated Sludge	6 units	Two units 95 feet wide and 15 feet deep (anoxic) Four units 190 feet long, 25 feet wide and 15 feet deep (aerobic) Two units 190 feet long, 30 feet wide and 15 feet deep (aerobic) Total capacity: 5.00 MG
Final Clarifiers	4 units	Str. 24 & 25 - Two units 120 feet in diameter and 13 feet deep Str. 27 & 28 - Two units 98 ID 100 OD feet in diameter and 17-21 feet deep. Volume – 0.143MG x2 Str 24 – Recent catwalk and inner column rehabilitated. Total capacity: 3.797 MG
Filtration	8 units	All units 25 feet long and 25 feet wide with media depth of 1 foot Total media volume: 0.0374 MG
Chlorine Disinfection	2 units	Both units 20 feet long, 40 feet wide and 10 feet deep Total capacity: 0.120 MG
Sludge Holding	2 units	One unit 100 feet long, 20 feet wide and 15 feet deep One unit 100 feet long, 25 feet wide and 15 feet deep Total capacity: 0.505 MG
Miscellaneous Equipment		
Aeration Blowers	6 units	Four units providing a total of 35,200 cfs and 1,600 hp, 12.5% oxygen transfer Two units providing a total of 8,500 cfs and 400 hp, 12.5% oxygen transfer
RAS/WAS Pumps	3 units	Str 47, Final clarifier solids pumping. Str 27 & 28 to D2
RAS/WAS Pumps	4 units	Str. 26, RAS for Str. 24 & 25; ties to D2
Belt Filter Presses	2 units	Both units 2 meters Total processing capacity: 400 gallons per minute at 10 hp each



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4.0 Clarifiers

The Deer Creek WWTP utilizes primary clarifiers, nitrification clarifiers, and final clarifiers (formerly solids contact clarifiers).

4.1 Background

The Deer Creek plant has 7 clarifiers.

Table 3.2

Parameter	Primary Clarifiers; Structure 3, 4, 44	Nitrification Clarifiers; Structures 24 & 25	Final Clarifiers; 27 & 28
Manufacturer	Peabody Wells	Peabody Wells	Unknown
Diameter (feet)	95	120	98
Volume (million gallons)	0.46	1.76	0.14
Side Water Depth (feet)	10	6.83	16
Gross Area (feet squared)	7,088	11,304	12,272
Weir Loading at Design (gallon per feet per day)	6,500	5,208	Unknown
Influent Well Diameter (feet)	10	54	26

Operations Process Control Levels

Clarifiers	Units	Design Value	LCL 50%	LWL 75%	Target
Number of Units Online	Number	4	2	3	4
Surface Loading Peak	gpd/sf	447	528	400	322
Surface Loading, Avg	gpd/sf	373	440	333	268
Solids Loading, Avg	lb/day/sf	10.88	13.48	10.21	8.22
Solids Loading, Peak	lb/day/sf	12.78	17.84	13.52	10.88
Weir Overflow Rate	gpd/lf	10799	13990	10000	7775
Depth of Blanket	Ft.			1.0	2.0



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4.2 Primary Clarifiers: Str. 3, 4 & 44 Rehabilitation

OCWUT staff completed an initial assessment of DC Primary Clarifiers and identified the following possible items for rehabilitation and/or replacement. The provided list is not intended to be exhaustive but provides the minimum scope for the rehabilitation of Primary Clarifiers 3, 4 & 44. The Engineer is responsible for completing an assessment and providing final recommendations.

4.2.1 Primary Clarifiers (Structures 3 & 4)

- Center Structure
 - Replace influent feed well, center column, influent baffle, supports, and all mounting hardware with 316L stainless steel.
- Rake Assembly
 - Replace rake arms, skimmers, skimmer blades, support frames, cage, cage bracing, blade support frames, and all mounting hardware with 316L stainless steel.
 - Replace scraper bracing and mounting hardware with 316 stainless steel.
 - Replace squeegees, blades, and mounting hardware with 304 stainless steel.
- Launderers
 - Replace effluent launder, launder inner and outer supports, scum baffle, and all mounting hardware with 316L stainless steel.
 - Install launder covers for odor control and protection from sunlight.
 - Install hatches for new launder covers to provide access for cleaning.
- Weirs
 - Replace serpentine weirs with flat weirs. Evaluate weir overflow rate requirements.
- Clarifier Drive Unit
 - Replaced entire clarifier drive assembly, motor drive package, torque drive control unit, and all associated hardware.
- Walkways
 - Replace all grating and all mounting hardware with 304L stainless steel.
 - Inspect and repair or replace (with matching) any existing damaged handrail.
- Concrete Structure and Attached Dome
 - Abrasive blast interior walls and repair all damaged concrete.
 - Coat interior of concrete structure.
 - Remove fiberglass dome and anchor bolts.
 - Install aluminum handrails along outer walls.
- Primary Sludge Pumping System & Scum Pit Pumping
 - Abrasive blast piping and apply appropriate coating system approved by Utilities Engineering Division.



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- Abrasive blast concrete floor and lower walls of Primary Sludge Pump Station to remove scale and debris. Re-seal concrete floor and lower walls
- Remove any abandoned wall penetrations and grout fill.
- Replace grating support angle brackets and mounting hardware with 316L stainless steel.
- Replace grating and mounting hardware with 304L stainless steel.
- Integrate scum box into structure (existing scum box is a separate pit outside of clarifier).
- Replace scum collector with 316 stainless steel.
- Install solenoid valve and switch that flushes scum collector as rake passes by.
- Install scum dewatering system.
- Remove odor scrubber systems and demolish old concrete pad.

4.2.2 Primary Clarifier Structure 44

- Center Structure
 - Replace influent feed well, center column, influent baffle, supports, and all mounting hardware with 316L stainless steel.
- Rake Assembly
 - Replace rake arms, skimmers, skimmer blades, support frames, cage, cage bracing, blade support frames, and all mounting hardware with 316L stainless steel.
 - Replace scraper bracing and mounting hardware with 316 stainless steel.
 - Replace squeegees, blades, and mounting hardware with 304 stainless steel.
- Launderers
 - Replace effluent launder, launder inner and outer supports, scum baffle, and all mounting hardware with 316L stainless steel.
 - Install launder covers for odor control and protection from sunlight.
 - Install hatches for new launder covers to provide access for cleaning.
- Weirs
 - Replace serpentine weirs with flat weirs. Evaluate weir overflow rate requirements.
- Clarifier Drive Unit
 - Replaced entire clarifier drive assembly, motor drive package, torque drive control unit, and all associated hardware.
- Walkways
 - Replace all grating and all mounting hardware with 304L stainless steel.
 - Inspect and repair or replace (with matching) any existing damaged handrail.
- Concrete Structure and Attached Dome
 - Abrasive blast interior walls and repair all damaged concrete.



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- Coat interior of concrete structure.
- Remove fiberglass dome and anchor bolts.
- Install aluminum handrails along outer walls.
- Primary Sludge Pumping System & Scum Pit Pumping
 - Abrasive blast piping and apply appropriate coating system approved by Utilities Engineering Division.
 - Abrasive blast concrete floor and lower walls of Primary Sludge Pump Station to remove scale and debris. Re-seal concrete floor and lower walls
 - Remove any abandoned wall penetrations and grout fill.
 - Replace grating support angle brackets and mounting hardware with 316L stainless steel.
 - Replace grating and mounting hardware with 304L stainless steel.
 - Integrate scum box into structure (existing scum box is a separate pit outside of clarifier).
 - Replace scum collector with 316 stainless steel.
 - Install solenoid valve and switch that flushes scum collector as rake passes by.
 - Install scum dewatering system.

4.2.3 Clarifiers 24, 25, 27 & 28

- Center Structure
 - Replace influent feed well, center column, influent baffle, supports, and all mounting hardware with 316L stainless steel.
- Rake Assembly
 - Replace rake arms, skimmers, skimmer blades, support frames, cage, cage bracing, blade support frames, and all mounting hardware with 316L stainless steel.
 - Replace scraper bracing and mounting hardware with 316 stainless steel.
 - Replace squeegees, blades, and mounting hardware with 304 stainless steel.
- Launderers
 - Replace effluent launder, launder inner and outer supports, scum baffle, and all mounting hardware with 316L stainless steel.
 - Install launder covers for odor control and protection from sunlight.
 - Install hatches for new launder covers to provide access for cleaning.
- Weirs
 - Replace serpentine weirs with flat weirs. Evaluate weir overflow rate requirements.
- Clarifier Drive Unit
 - Replaced entire clarifier drive assembly, motor drive package, torque drive control unit, and all associated hardware.



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- Walkways
 - Replace all grating and all mounting hardware with 304L stainless steel.
 - Inspect and repair or replace (with matching) any existing damaged handrail.
- Super Structure
 - Evaluate flow dispersion and weir overflow rates. Flow balancing between each clarifier is an operational challenge. Clarifier influent valves need to be replaced and clarifier fill lines need to be evaluated for damage.
- Concrete Structure
 - Abrasive blast interior walls and repair any damage found.
 - Re-coat the interior of the concrete structure.
- Secondary Sludge & Scum Pit Pumping
 - Abrasive blast piping and apply appropriate coating system approved by Utilities Engineering Division.
 - Remove any abandoned wall penetrations and grout fill.
 - Replace grating support angle brackets and mounting hardware with 316L stainless steel.
 - Replace grating and mounting hardware with 304L stainless steel.
 - Integrate scum box into structure (existing scum box is a separate pit outside of clarifier).
 - Replace scum collector with 316 stainless steel.
 - Install solenoid valve and switch that flushes scum collector as rake passes by.
 - Install scum dewatering system.

4.3 Operational Challenges

Current operations issues with Clarifiers 3 and 4 are listed below:

- Dome covers prevent operators from accessing serpentine weirs to remove algae and debris to prevent hydraulic overload of weirs.
 - Even when domes are removed, current wall heights in reference to the current finished grade will prevent operators from accessing the effluent launder and weirs from outside of the clarifier.
- Diversion Box 2 (DB2) receives flow from Backwash Basin (Str. 38). This flow only can be sent to Clarifiers 3 & 4. This creates a hydraulic imbalance between Clarifiers 3 & 4 and 44.
- The current bioselectors could potentially be converted to gravity thickeners for waste activated sludge (WAS). This should be evaluated further.
- Secondary flow balancing is a challenge due to potential line failures and improper weir overflow in Diversion Box 6 (DB6).



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- Scum and grease management is not in place currently. Grease dewatering should be evaluated.

Current operations issues with Clarifier 44 are listed below:

- Sludge and Scum withdrawal from Clarifier 44 is challenging due to the distance from the Pump station. Sludge line tends to clog and must be flushed to maintain normal operations.

Current operations issues with Clarifiers 27 and 28 are listed below:

- Flow imbalance between clarifiers. Flow is restricted on Str. 28 when valves are open.
- Str. 27 scum box should be replaced to match other clarifiers (standard scum box and rake system – like-in-kind to Str. 28).

5.0 Current Projects:

The following projects are currently either in design, construction, or planned for the Deer Creek WWTP.

5.1 ST-0170 Deer Creek WWTP Filter Valve Actuator Improvements

- Status: Construction.
- Estimated completion: Summer 2024.

5.2 ST-0163-1 Deer Creek WWTP Aeration System Improvements

- Status: Bidding.
- Construction Start: Fall 2024.
- Estimated completion: Spring 2026.

5.3 ST-0154/ST-0161 Deer Creek WWTP Biosolids, Odor Management and Electrical Improvements – Phase 1

- Status: Final Design.
- Construction Start: Fall 2024.
- Estimated completion: Winter 2027.

6.0 Draft Project Scope:

The initial contract will include Task 1A - Preliminary Report services. The following subtasks are proposed. This list is not exhaustive, and it is expected the selected engineer will review and make additional recommendations.

6.1 Primary Subtasks

- Project Management and Progress Reporting.
- Kickoff Meeting.
- Data collection and analysis.
- Field Investigations.
- Condition Assessment of Clarifiers.



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- Preliminary Engineering Report with phasing plan.
- SRF formatted Engineering Report for Phase 1 Improvements constituting a 15% design deliverable.

7.0 Letter of Interest Requirements:

In addition to the requirements outlined in the advertisement, Letter of Interest submittals must also provide the below information.

7.1 Similar Project Experience

- Indicate the key aspects or characteristics of the reference project that are relevant to OCWUT for the project the letter of interest is being submitted.
- Indicate the members of the proposed project team that worked on the reference project and what role they served on the project.

7.2 Project Team Availability

- Specifically address the availability of each proposed project member and communicate in a quantifiable manner how much availability they have (e.g. 25%, 50%, 75%, 100%).
- If the firm has existing projects with the City of Oklahoma City or any of its Trusts, provide a list of those projects, the members of the proposed project team working on those projects, and how much of their workload is allocated to those projects.

8.0 Available Information:

Upon execution of a non-disclosure agreement, the following information will be made available for review in preparation of Letter of Interest submissions. The executed form must be submitted to Joy Kotey (Joy.Kotey@okc.gov) and Patty Pool (patty.butenhoff@okc.gov) via e-mail.

- Relevant plant operational data.
- Available as-built drawings for the clarifiers.
- Available construction shop drawing submittals for the clarifiers.
- Available operation & maintenance manuals for the clarifiers.



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9.0 Proposal Schedule:

- Advertisement: 07/24/2024
- Optional Pre-Submittal Meeting and Site Visit: 07/31/2024
- Deadline for Submitting Questions: 08/05/2024
- Answers Published: 08/08/2024
- Letter of Interest Submission Deadline: 08/15/2024
- Notification of Short-Listed Firms: 09/17/2024
- Interviews: 10/01/2024