

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION



CONSTRUCTION PERMIT

The Missouri Department of Natural Resources hereby issues a permit to:

City of Lake Lotawana
Lake Lotawana Wastewater Treatment Plant No. 1
2 Lake Shore Drive
Lake Lotawana, MO 64086

for the construction of (described facilities):

See attached.

Permit Conditions:

See attached.

Construction of such proposed facilities shall be in accordance with the provisions of the Missouri Clean Water Law, Chapter 644, RSMo, and regulation promulgated thereunder, or this permit may be revoked by the Department of Natural Resources (Department).

As the Department does not examine structural features of design or the efficiency of mechanical equipment, the issuance of this permit does not include approval of these features.

A representative of the Department may inspect the work covered by this permit during construction. Issuance of a permit to operate by the Department will be contingent on the work substantially adhering to the approved plans and specifications.

This permit applies only to the construction of water pollution control components; it does not apply to other environmentally regulated areas.

March 3, 2021 December 15, 2022
Effective Date Modified Date

October 2, 2023
Expiration Date

Chris Wieberg
Chris Wieberg, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

Construction will include a new 6 pump influent pump station, new mechanically cleaned fine bar screen, a new 17,320 gallon anaerobic basin, the modified anoxic basins, and the modified aeration basins. The aeration basins will have a volume of 220,516 gallons with an HRT of 16.7 hours at 0.3177 MGD. The fine pore diffusers shall be capable of providing the minimum required 778 scfm for the 2 basins. Two new 35' diameter circular clarifiers with a 13 ft side water depth will be constructed with total surface area of 1,924 square feet. The detention time is 14 hours at 0.3177 MGD and 3.5 hours at 1.27 MGD in the 2 clarifiers. RAS WAS Pump Station shall have 3 pumps capable of operating at 450 gpm at 12 ft TDH. An open channel, gravity flow, low pressure high intensity UV disinfection system capable of treating a peak flow of 1.27 MGD. The design average flow will remain at 317,000 gpd (0.317 MGD).

This project will also include general site work appropriate to the scope and purpose of the project and all necessary appurtenances to make a complete and usable wastewater treatment facility.

II. COST ANALYSIS FOR COMPLIANCE

Pursuant to Section 644.145, RSMo, when issuing permits under this chapter that incorporate a new requirement for discharges from publicly owned combined or separate sanitary or storm sewer systems or publicly owned treatment works, or when enforcing provisions of this chapter or the Federal Water Pollution Control Act, 33 U.S.C. 1251 et seq., pertaining to any portion of a publicly owned combined or separate sanitary or storm sewer system or [publicly owned] treatment works, the Department of Natural Resources shall make a "finding of affordability" on the costs to be incurred and the impact of any rate changes on ratepayers upon which to base such permits and decisions, to the extent allowable under this chapter and the Federal Water Pollution Control Act. This process is completed through a cost analysis for compliance. Permits that do not include new requirements may be deemed affordable.

The Department is not required to determine Cost Analysis for Compliance because the permit contains no new conditions or requirements that convey a new cost to the facility.

III. CONSTRUCTION PERMIT CONDITIONS

The permittee is authorized to construct subject to the following conditions:

1. This construction permit does not authorize discharge.
2. All construction shall be consistent with plans and specifications signed and sealed by Lamp Rynearson and as described in this permit.

3. The Department must be contacted in writing prior to making any changes to the plans and specifications that would directly or indirectly have an impact on the capacity, flow, system layout, or reliability of the proposed wastewater treatment facilities or any design parameter that is addressed by 10 CSR 20-8, in accordance with 10 CSR 20-8.110(11).
4. State and federal law does not permit bypassing of raw wastewater, therefore steps must be taken to ensure that raw wastewater does not discharge during construction. If a sanitary sewer overflow or bypass occurs, report the appropriate information to the Department's Kansas City Regional Office per 10 CSR 20-7.015(9)(G).
5. The wastewater treatment facility shall be located above the twenty-five (25)-year flood level.
6. The wastewater facility structures, electrical equipment, and mechanical equipment shall be protected from physical damage by not less than the one hundred- (100-) year flood elevation per 10 CSR 20-8.140(2)(B). The minimum distance between wastewater treatment facilities and all potable water sources shall be at least three hundred feet (300') per 10 CSR 20-8.140(2)(C)1.
7. In addition to the requirements for a construction permit, 10 CSR 20-6.200 requires land disturbance activities of 1 acre or more to obtain a Missouri state operating permit to discharge stormwater. The permit requires best management practices sufficient to control runoff and sedimentation to protect waters of the state. Land disturbance permits will only be obtained by means of the Department's ePermitting system available online at <https://dnr.mo.gov/data-e-services/missouri-gateway-environmental-management-mogem>. See <https://dnr.mo.gov/data-e-services/water/electronic-permitting-epermitting> for more information.
8. A United States (U.S.) Army Corps of Engineers (COE) permit (404) and a Water Quality Certification (401) issued by the Department or permit waiver may be required for the activities described in this permit. This permit is not valid until these requirements are satisfied. If construction activity will disturb any land below the ordinary high water mark of jurisdictional waters of the U.S. then a 404/401 will be required. Since the COE makes determinations on what is jurisdictional, you must contact the COE to determine permitting requirements. You may call the Department's Water Protection Program, Operating Permits Section at 573-522-4502 for more information. See <https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/section-401-water-quality> for more information.
9. All construction must adhere to applicable 10 CSR 20-8 (Chapter 8) requirements listed below.
 - Flood protection shall apply to new construction and to existing facilities undergoing major modification. The wastewater facility structures, electrical equipment, and mechanical equipment shall be protected from physical damage by not less than the one hundred- (100-) year flood elevation. CSR 20-8.140(2)(B). 10 CSR 20-8.130 (2) (A)

- Facilities shall be readily accessible by authorized personnel from a public right-of-way at all times. 10 CSR 20-8.140 (2) (D). 10 CSR 20-8.130 (2) (B)
- Adequate provisions shall be made to effectively protect facility personnel and visitors from hazards. The following shall be provided to fulfill the particular needs of each wastewater treatment facility: 10 CSR 20-8.130 (2) (C)
 - Fencing. Enclose the facility site with a fence designed to discourage the entrance of unauthorized persons and animals; 10 CSR 20-8.140 (8) (A)
 - Gratings over appropriate areas of treatment units where access for maintenance is necessary; 10 CSR 20-8.140 (8) (B)
 - First aid equipment; 10 CSR 20-8.140 (8) (C)
 - Posted “No Smoking” signs in hazardous areas; 10 CSR 20-8.140 (8) (D)
 - Appropriate personal protective equipment (PPE); 10 CSR 20-8.140 (8) (E)
 - Portable blower and hose sufficient to ventilate accessed confined spaces; 10 CSR 20-8.140 (8) (F)
 - 10 CSR 20-8.140 (8) (G) Portable lighting equipment complying with NEC requirements. See subsection (7)(B) of this rule;
 - 10 CSR 20-8.140 (8) (H) Gas detectors listed and labeled for use in NEC Class I, Division 1, Group D locations. See subsection (7)(B) of this rule;
 - Appropriately-placed warning signs for slippery areas, non-potable water fixtures (see subparagraph (7)(D)3.B. of this rule), low head clearance areas, open service manholes, hazardous chemical storage areas, flammable fuel storage areas, high noise areas, etc.; 10 CSR 20-8.140 (8) (I)
 - Ventilation shall include the following:
 - Isolate all pumping stations and wastewater treatment components installed in a building where other equipment or offices are located from the rest of the building by an air-tight partition, provide separate outside entrances, and provide separate and independent fresh air supply; 10 CSR 20-8.140 (8) (J) 1.
 - Force fresh air into enclosed screening device areas or open pits more than four feet (4') deep. Interconnection between the wet well and dry well ventilation systems is not acceptable; 10 CSR 20-8.140 (8) (J) 2.
 - Dampers are not to be used on exhaust or fresh air ducts. Avoid the use of fine screens or other obstructions on exhaust or fresh air ducts to prevent clogging; 10 CSR 20-8.140 (8) (J) 3.
 - Where continuous ventilation is needed (e.g., housed facilities), provide at least twelve (12) complete air changes per hour. Where continuous ventilation would cause excessive heat loss, provide intermittent ventilation of at least thirty (30) complete air changes per hour when facility personnel enter the area. Base air change demands on one hundred percent (100%) fresh air; 10 CSR 20-8.140 (8) (J) 4.
 - Electrical controls. Mark and conveniently locate switches for operation of ventilation equipment outside of the wet well or building. Interconnect all intermittently operated ventilation equipment with the respective wet well, dry well, or building lighting system. The manual lighting/ventilation switch is expected to override the automatic controls. For a two (2) speed ventilation system with automatic switch over where gas detection equipment is installed, increase the ventilation rate automatically in

- response to the detection of hazardous concentrations of gases or vapors; 10 CSR 20-8.140 (8) (J) 5.
- Fabricate the fan wheel from non-sparking material. Provide automatic heating and dehumidification equipment in all dry wells and buildings.; 10 CSR 20-8.140 (8) (J) 6.
- Explosion-proof electrical equipment, non-sparking tools, gas detectors, and similar devices, in work areas where hazardous conditions may exist, such as digester vaults and other locations where potentially explosive atmospheres of flammable gas or vapor with air may accumulate.; 10 CSR 20-8.140 (8) (K)
- Provisions for local lockout/tagout on stop motor controls and other devices; 10 CSR 20-8.140 (8) (L)
- Provisions for an arc flash hazard analysis and determination of the flash protection boundary distance and type of PPE to reduce exposure to major electrical hazards shall be in accordance with NFPA 70E *Standard for Electrical Safety in the Workplace* (2018 Edition), as approved and published August 21, 2017. 10 CSR 20-8.140 (8) (M)
- The distance between wastewater pumping stations and all potable water sources shall be at least fifty feet (50') in accordance with 10 CSR 23-3.010(1)(B). 10 CSR 20-8.130 (2) (D)
- Dry wells, including their superstructure, shall be completely separated from the wet well with gas tight common walls. 10 CSR 20-8.130 (3) (A) 1.
- Suitable and safe means of access to dry wells and to wet wells shall be provided to persons wearing self-contained breathing apparatus. 10 CSR 20-8.130 (3) (A) 2.
- Multiple pumps shall be provided except for design average flows of less than fifteen hundred (1,500) gallons per day. 10 CSR 20-8.130 (3) (B) 1.
- Electrical equipment. Electrical equipment shall be provided with the following requirements:
 - 10 CSR 20-8.130 (3) (B) 2. A. Electrical equipment must comply with 10 CSR 20-8.140(7)(B);
 - Utilize corrosive resistant equipment located in the wet well; 10 CSR 20-8.130 (3) (B) 2. B.
 - Provide a watertight seal and separate strain relief for all flexible cable; 10 CSR 20-8.130 (3) (B) 2. C.
 - Install a fused disconnect switch located above ground for the main power feed for all pumping stations. 10 CSR 20-8.130 (3) (B) 2. D.
 - When such equipment is exposed to weather, it shall comply with the requirements of weather proof equipment; enclosure NEMA 4; NEMA 4X where necessary; and *NEMA Standard 250-2014*, published December 15, 2014. 10 CSR 20-8.130 (3) (B) 2. E.
 - Install lightning and surge protection systems; 10 CSR 20-8.130 (3) (B) 2. F.
 - Install a one hundred ten volt (110 V) power receptacle inside the control panel located outdoors to facilitate maintenance; 10 CSR 20-8.130 (3) (B) 2. G.
 - Provide Ground Fault Circuit Interruption (GFCI) protection for all outdoor receptacles. 10 CSR 20-8.130 (3) (B) 2. H.
- Water level controls must be accessible without entering the wet well. 10 CSR 20-8.130 (3) (C)

- Valves shall not be located in the wet well unless integral to a pump or its housing. 10 CSR 20-8.130 (3) (D)
- Covered wet wells shall have provisions for air displacement to the atmosphere, such as an inverted and screened “j” tube or other means. 10 CSR 20-8.130 (3) (E)
- Interconnection between the wet well and dry well ventilation systems is not acceptable 10 CSR 20-8.130 (3) (F)
- Ventilation shall include the following:
 - Isolate all pumping stations and wastewater treatment components installed in a building where other equipment or offices are located from the rest of the building by an air-tight partition, provide separate outside entrances, and provide separate and independent fresh air supply; 10 CSR 20-8.140 (8) (J) 1.
 - Force fresh air into enclosed screening device areas or open pits more than four feet (4') deep. Interconnection between the wet well and dry well ventilation systems is not acceptable; 10 CSR 20-8.140 (8) (J) 2.
 - Dampers are not to be used on exhaust or fresh air ducts. Avoid the use of fine screens or other obstructions on exhaust or fresh air ducts to prevent clogging; 10 CSR 20-8.140 (8) (J) 3.
 - Where continuous ventilation is needed (e.g., housed facilities), provide at least twelve (12) complete air changes per hour. Where continuous ventilation would cause excessive heat loss, provide intermittent ventilation of at least thirty (30) complete air changes per hour when facility personnel enter the area. Base air change demands on one hundred percent (100%) fresh air; 10 CSR 20-8.140 (8) (J) 4.
 - Electrical controls. Mark and conveniently locate switches for operation of ventilation equipment outside of the wet well or building. Interconnect all intermittently operated ventilation equipment with the respective wet well, dry well, or building lighting system. The manual lighting/ventilation switch is expected to override the automatic controls. For a two (2) speed ventilation system with automatic switch over where gas detection equipment is installed, increase the ventilation rate automatically in response to the detection of hazardous concentrations of gases or vapors; 10 CSR 20-8.140 (8) (J) 5.
 - Fabricate the fan wheel from non-sparking material. Provide automatic heating and dehumidification equipment in all dry wells and buildings; 10 CSR 20-8.140 (8) (J) 6.
- There shall be no physical connection between any potable water supply and a wastewater pumping station, which under any conditions, might cause contamination of the potable water supply. If a potable water supply is brought to the station, No piping or other connections shall exist in any part of the wastewater treatment facility that might cause the contamination of a potable water supply. 10 CSR 20-8.130 (3) (G)
 - Hot water for any direct connections shall not be taken directly from a boiler used for supplying hot water to a digester heating unit or heat exchanger. 10 CSR 20-8.140 (7) (D) 2.
 - Where a potable water supply is to be used for any purpose in a wastewater treatment facility other than direct connections, a break tank, pressure pump, and pressure tank or a reduced pressure backflow preventer consistent with the

- department's Public Drinking Water Branch shall be provided. 10 CSR 20-8.140 (7) (D) 3. A.
- For indirect connections, a sign shall be permanently posted at every hose bib, faucet, hydrant, or sill cock located on the water system beyond the break tank or backflow preventer to indicate that the water is not safe for drinking. 10 CSR 20-8.140 (7) (D) 3. B.
 - Where a separate non-potable water supply is to be provided, a break tank will not be necessary, but all system outlets shall be posted with a permanent sign indicating the water is not safe for drinking. 10 CSR 20-8.140 (7) (D) 4.
 - 10 CSR 20-8.130 (4) (C) Wet well access shall not be through the equipment compartment.
 - Submersible pump stations shall meet the applicable requirements under section (3) of this rule, except as modified in this section. 10 CSR 20-8.130 (5)
 - Pump Removal. Submersible pumps shall be readily removable and replaceable without personnel entering, dewatering, or disconnecting any piping in the wet well. 10 CSR 20-8.130 (5) (A)
 - 10 CSR 20-8.130 (5) (B) Valve Chamber and Valves. Valves required under subsection (3)(D) of this rule shall be located in a separate valve chamber.
 - A minimum access hatch dimensions of twenty-four inches by thirty-six inches (24" x 36") shall be provided. 10 CSR 20-8.130 (5) (B) 1.
 - A portable pump connection on the discharge line with rapid connection capabilities shall be provided. 10 CSR 20-8.130 (5) (B) 2.
 - Alarm systems with an uninterrupted power source shall be provided for pumping stations. 10 CSR 20-8.130 (6)
 - Where independent substations are used for emergency power, each separate substation and its associated distribution lines shall be capable of starting and operating the pump station at its rated capacity. 10 CSR 20-8.130 (7) (B)
 - Unless another distance is determined by the Missouri Geological Survey or by the department's Public Drinking Water Branch, the minimum distance between wastewater treatment facilities and all potable water sources shall be at least three hundred feet (300'). 10 CSR 20-8.140 (2) (C) 1.
 - All sampling points shall be designed so that a representative and discrete twenty-four (24) hour automatic composite sample or grab sample of the effluent discharge can be obtained at a point after the final treatment process and before discharge to or mixing with the receiving waters. 10 CSR 20-8.140 (6) (B)
 - All outfalls shall be posted with a permanent sign indicating the outfall number (i.e., Outfall #001). 10 CSR 20-8.140 (6) (C)
 - All wastewater treatment facilities shall be provided with an alternate source of electric power or pumping capability to allow continuity of operation during power failures. 10 CSR 20-8.140 (7) (A) 1.
 - Disinfection and dechlorination, when used, shall be provided during all power outages. 10 CSR 20-8.140 (7) (A) 2.
 - Electrical systems and components in raw wastewater or in enclosed or partially enclosed spaces where hazardous concentrations of flammable gases or vapors that are normally present, shall comply with the NFPA 70 *National Electric Code (NEC)* (2017 Edition), as

approved and published August 24, 2016, requirements for Class I, Division 1, Group D locations. 10 CSR 20-8.140 (7) (B)

- An audiovisual alarm or a more advanced alert system, with a self-contained power supply, capable of monitoring the condition of equipment whose failure could result in a violation of the operating permit, shall be provided for all wastewater treatment facilities. 10 CSR 20-8.140 (7) (C)
- No piping or other connections shall exist in any part of the wastewater treatment facility that might cause the contamination of a potable water supply. 10 CSR 20-8.140 (7) (D) 1.
- Hot water for any direct connections shall not be taken directly from a boiler used for supplying hot water to a digester heating unit or heat exchanger. 10 CSR 20-8.140 (7) (D) 2.
- Where a potable water supply is to be used for any purpose in a wastewater treatment facility other than direct connections, a break tank, pressure pump, and pressure tank or a reduced pressure backflow preventer consistent with the department's Public Drinking Water Branch shall be provided. 10 CSR 20-8.140 (7) (D) 3. A.
- For indirect connections, a sign shall be permanently posted at every hose bib, faucet, hydrant, or sill cock located on the water system beyond the break tank or backflow preventer to indicate that the water is not safe for drinking. 10 CSR 20-8.140 (7) (D) 3. B.
- Where a separate non-potable water supply is to be provided, a break tank will not be necessary, but all system outlets shall be posted with a permanent sign indicating the water is not safe for drinking. 10 CSR 20-8.140 (7) (D) 4.
- A means of flow measurement shall be provided at all wastewater treatment facilities. 10 CSR 20-8.140 (7) (E)
- Effluent twenty-four (24) hour composite automatic sampling equipment shall be provided at all mechanical wastewater treatment facilities and at other facilities where necessary under provisions of the operating permit. 10 CSR 20-8.140 (7) (F)
- The materials utilized for storage, piping, valves, pumping, metering, and splash guards, etc., for chemical handling, shall be specially selected considering the physical and chemical characteristics of each hazardous or corrosive chemical. 10 CSR 20-8.140 (9) (A) 1.
- Secondary containment storage areas contain the stored volume of chemicals until it can be safely transferred to alternate storage or released to the wastewater treatment plant at controlled rates that will not damage the facilities, inhibit the treatment processes, or contribute to stream pollution. Secondary containment shall be designed as follows:
 - A minimum volume of one hundred twenty-five percent (125%) of the volume of the largest storage container located within the containment area plus the space occupied by any other tanks located within the containment area when not protected from precipitation; 10 CSR 20-8.140 (9) (A) 2. A.
 - A minimum volume of one hundred ten percent (110%) of the volume of the largest storage container located within the containment area plus the space occupied by any other tanks located within the containment area when protected from precipitation; 10 CSR 20-8.140 (9) (A) 2. B.
 - Walls and floors of the secondary containment structure constructed of suitable material that is compatible with the specifications of the product being stored. 10 CSR 20-8.140 (9) (A) 2. C.

- All pumps or feeders for hazardous or corrosive chemicals shall have guards that will effectively prevent spray of chemicals into space occupied by facility personnel. 10 CSR 20-8.140 (9) (A) 3.
- Piping, labeling, and coupling guard locations. 10 CSR 20-8.140 (9) (A) 4.
- All piping containing or transporting corrosive or hazardous chemicals shall be identified with labels every ten feet (10') and with at least two (2) labels in each room, closet, or pipe chase. 10 CSR 20-8.140 (9) (A) 4. A.
- All connections (flanged or other type), except those adjacent to storage or feeder areas, shall have guards that will direct any leakage away from space occupied by facility personnel. 10 CSR 20-8.140 (9) (A) 4. B.
- Facilities shall be provided for automatic shutdown of pumps and sounding of alarms when failure occurs in a pressurized chemical discharge line. 10 CSR 20-8.140 (9) (A) 5.
- Dust collection equipment shall be provided to protect facility personnel from dusts injurious to the lungs or skin and to prevent polymer dust from settling on walkways that become slick when wet. 10 CSR 20-8.140 (9) (A) 6.
- The identification and hazard warning data included on chemical shipping containers, when received, shall appear on all containers (regardless of size or type) used to store, carry, or use a hazardous substance. 10 CSR 20-8.140 (9) (E)
- All wastewater treatment facilities must have a screening device, comminutor, or septic tank for the purpose of removing debris and nuisance materials from the influent wastewater. 10 CSR 20-8.150 (2)
- All screening devices and screening storage areas shall be protected from freezing. 10 CSR 20-8.150 (4) (A) 1.
- Provisions shall be made for isolating or removing screening devices from their location for servicing. 10 CSR 20-8.150 (4) (A) 2.
- Manually cleaned screen channels shall be protected by guard railings and deck gratings with adequate provisions for removal or opening to facilitate raking. 10 CSR 20-8.150 (4) (A) 3. A. (I)
- Mechanically cleaned screen channels shall be protected by guard railings and deck gratings. 10 CSR 20-8.150 (4) (A) 3. A. (II)
- Mechanical screening equipment shall have adequate removal enclosures to protect facility personnel against accidental contact with moving parts and to prevent dripping in multi-level installations. 10 CSR 20-8.150 (4) (A) 3. B. (I)
- A positive means of locking out each mechanical screening device shall be provided. 10 CSR 20-8.150 (4) (A) 3. B. (II)
- An emergency stop button with an automatic reverse function shall be located in close proximity to the mechanical screening device. 10 CSR 20-8.150 (4) (A) 3. B. (III)
- Electrical systems and components in raw wastewater or in enclosed or partially enclosed spaces where hazardous concentrations of flammable gases or vapors that are normally present, shall comply with the NFPA 70 *National Electric Code (NEC)* (2017 Edition), as approved and published August 24, 2016, requirements for Class I, Division 1, Group D locations. 10 CSR 20-8.140 (7) (B)
- Where two (2) or more mechanically cleaned bar screens are used, the design shall provide for taking the largest unit out-of-service without sacrificing the capability to

handle the average design flow. Where only one mechanically cleaned screen is used, it shall be sized to handle the design peak instantaneous flow. 10 CSR 20-8.150 (4) (B)

- Effective flow splitting devices and control appurtenances (*e.g.* gates and splitter boxes) shall be provided to permit proper proportioning of flow and solids loading to each settling unit, throughout the expected range of flows. 10 CSR 20-8.160 (2) (B)
- Overflow weirs shall be readily adjustable over the life of the structure to correct for differential settlement of the tank. 10 CSR 20-8.160 (3) (C) 1.
- Walls of settling tanks shall extend at least six inches (6") above the surrounding ground surface and shall provide not less than twelve inches (12") of freeboard. 10 CSR 20-8.160 (3) (E)
- Safety features shall appropriately include machinery covers, life lines, handrails on all stairways and walkways, and slip resistant surfaces. For additional safety follow the provisions listed in 10 CSR 20-8.140(8). 10 CSR 20-8.160 (5) (A)
- The design shall provide for convenient and safe access to routine maintenance items such as gear boxes, scum removal mechanism, baffles, weirs, inlet stilling baffle areas, and effluent channels. 10 CSR 20-8.160 (5) (B)
- For electrical equipment, fixtures, and controls in enclosed settling basins and scum tanks, where hazardous concentrations of flammable gases or vapors may accumulate, follow the provisions in 10 CSR 20-8.140(7)(B). The fixtures and controls shall be conveniently located and safely accessible for operation and maintenance. 10 CSR 20-8.160 (5) (C)
- For solids pumping systems, audio-visual alarms shall be provided in accordance with 10 CSR 20-8.140(7)(C) for:
 - Pump failure; 10 CSR 20-8.170 (6) (A)
 - Pressure loss; 10 CSR 20-8.170 (6) (B) and
 - High pressure. 10 CSR 20-8.170 (6) (C)
- The UV dosage shall be based on the design peak hourly flow, maximum rate of pumpage, or peak batch flow. 10 CSR 20-8.190 (5) (A) 1.
- If no flow equalization is provided for a batch discharger, the UV dosage shall be based on the peak batch flow. 10 CSR 20-8.190 (5) (A) 2.
- The UV system shall deliver the target dosage based on equipment derating factors and, if needed, have the UV equipment manufacturer verify that the scale up or scale down factor utilized in the design is appropriate for the specific application under consideration. 10 CSR 20-8.190 (5) (A) 3.
- The UV system shall deliver a minimum UV dosage of thirty thousand microwatt seconds per centimeters squared ($30,000 \mu\text{W} \cdot \text{s}/\text{cm}^2$). 10 CSR 20-8.190 (5) (A) 4.
- Open channel UV systems. The combination of the total number of banks shall be capable of treating the design peak hourly flow, maximum rate of pumpage, or peak batch flow. 10 CSR 20-8.190 (5) (B) 1.
- The UV system must continuously monitor and display at the UV system control panel the following minimum conditions:
 - The relative intensity of each bank or closed vessel system; 10 CSR 20-8.190 (5) (C) 1. A.
 - The operational status and condition of each bank or closed vessel system; 10 CSR 20-8.190 (5) (C) 1. B.

- The ON/OFF status of each lamp in the system; 10 CSR 20-8.190 (5) (C) 1. C. and
- The total number of operating hours of each bank or each closed vessel system. 10 CSR 20-8.190 (5) (C) 1. D.
- The UV system shall include an alarm system. Alarm systems shall comply with 10 CSR 20-8.140(7)(C). 10 CSR 20-8.190 (5) (C) 2.

10. Upon completion of construction:

- A. The City of Lake Lotawana will become the continuing authority for operation and maintenance of these facilities;
- B. Submit an electronic copy of the as builts if the project was not constructed in accordance with previously submitted plans and specifications; and
- C. Submit the enclosed form Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(N). When the facility applies for their next operating permit renewal, they will be expected to include an updated facility description on their application.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

The purpose of the upgrades are to improve operations at the treatment facility and prepare the facility for nutrient removal in the future.

2. FACILITY DESCRIPTION

The Lake Lotawana WWTF No. 1 is located at 2 Lake Shore Drive, Lake Lotawana, in Jackson County, Missouri. The facility has a design average flow of 317,000 gpd and serves a hydraulic population equivalent of approximately 3,177 people.

Construction will include new screening, influent pump station, anaerobic basin, modifications to the 2 anoxic and aeration basins, internal recycle pump station, 2 new clarifiers, disinfection system, and potentially cascade post-aeration.

3. COMPLIANCE PARAMETERS

The facility is in compliance with their existing permit effluent limits. The upgrades are to improve operations at the treatment facility and prepare the facility for nutrient removal in the future. There is no change to effluent limits or permit conditions as a result of this construction.

4. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

Existing major components which will remain in use include the following:

- Peak flow basin - The lagoon has a high water level surface area of approximately 12.8 acres. The upper three feet of the lagoon is used for peak flow storage, providing approximately 12.2 million gallons of storage capacity, or approximately 9.6 days at peak flow of 1.27 MGD.
- Sludge storage lagoon

Construction will cover the following items:

- Screening – Installation of screening devices removes nuisance inorganic materials from raw wastewater.
 - Manually cleaned bypass screen with 1 ¾ inch openings.
 - Mechanical Fine Screen – A mechanically cleaned fine screen with multi-rake screens and a compactor will be installed. The screening devices shall be capable of treating a design average flow of 0.317 MGD and a peak flow of 3.5 MGD with 0.25 inch opening.
 - Rakes and scrapers shall be spaced 20.75 inches apart and move at a linear speed of 25 inches per minute at 0.54 rpm.
 - The addition of a compactor and screenings conveyor will mitigate the increased volume of screenings captured by washing, dewatering, and compacting the screenings prior to disposal.
- Influent Pump Station – Construction of an influent pump station.
 - 2 peak flow pumps, 3 influent flow pumps and one pump capable of either operating as a peak flow or influent pump.
 - Each 5.5 HP submersible centrifugal pump capable of operating at 325 gpm at 30 feet of TDH.
 - Each pump will have a pump discharge size of 4 inches with a solids passage size of 3 inches.
 - The pump station provides storage volume of 4,000 gallons and an additional 670 gallons for peak flow storage.
 - If the three influent pumps are not able to pump down the normal flow and the wetwell level rises, the peak flow pumps will be activated to send flows to the peak flow basin.
 - Return flow from the peak flow lagoon is gravity flowed, controlled by a manually operated sluice gate.
 - From the influent pumps, flow will go to the new anaerobic basin.
- Anaerobic basin -. The new basin will have a 16.5 ft diameter, 10.83 ft water depth, with a capacity of 17,320 gallons. RAS will be returned to the anaerobic basin where it is mixed with the influent. At design average flow with the RAS flow, the expected detention time is 41 minutes and at peak flow 15 minutes.
 - A 2.5 horsepower mixer will be provided in the basin
- Anoxic Flow Splitter- flow will be split between the 2 anoxic basins and the internal recycle pump station will return flows to the flow splitter.

- 12 inch DIP to the anoxic basins, the anoxic basin bypass line to the aeration basin.
- Anoxic basins - the 2-existing each 19' diameter x 12' deep basin will have new concrete walls installed.
 - One new single speed 2.5 hp submersible mixer per basin with a minimum diameter of 22 inches and a minimum 276 rpm.
 - Set 24 inches above the floor.
- Aeration basins - the 2-existing 40' diameter x 11.73' deep basin will have new concrete walls and floors installed.
 - Total aeration volume is 220,516 gallons (110,258 gallons each) with an HRT of 16.7 hours at 0.3177 MGD and 4.2 hours at 1.27 MGD peak flow.
 - New submersible mixer - 2 mixers per basin or by contractor's option 1 larger mixer per basin. The minimum blade diameter is 22 inches with a minimum 276 rpm.
 - If 1 mixer is used per basin, the minimum required horsepower motor is 3.6 but if 2 are used, the minimum hp is 1.21.
 - Set 24 inches above the floor.
 - Diffusers -The fine pore diffusers shall be capable of providing 846 pounds of oxygen per day with a total of 17 hours of aeration time. 778 scfm is required for the 2 basins with 222 sq ft of active surface area per basin.
 - Blowers - 1 new blower and 2 modified existing blowers will be located on the new blower pad. Each blower will be a 20 hp-horizontal, rotary, positive displacement blower capable of operating with a volume of 450 cfm.
 - Internal recycle line -12 inch DIP from the basin to the Internal Recycle Pump Station.
 - Internal Recycle Pump Station - The existing UV flow equalization will be replaced with two 5.5 hp submersible centrifugal pumps capable of operating at 550 gpm at 22 ft TDH.
 - Each pump will have a pump discharge size of 4 inches with a solids passage size of 3 inches and returning flows back to the flow splitter through 6 inch DIP lines.
 - Total internal recycle flow is six times average day flow, or 1.91 mgd.
- Clarifiers - 2 new 35' diameter circular clarifiers with a 13 ft side water depth will be constructed with a total surface area of 1,924 square feet. Each clarifier will have a settling volume of 93,544 gallons with a surface area of 962 square ft. The detention time of approximately 14 hours at 0.3177 MGD and 3.5 hours at 1.27 MGD in the 2 clarifiers.
 - The surface overflow rate at peak flow is 661 gpd/ sf, meeting the requirements of 10 CSR 20-8.160(3)(B) of being less than 800 gpd/sf.
 - The weir overflow rate is 2,1486 gpd/sq ft, meeting the requirements of 10 CSR 20-8.160(3)(C)2 of being less than 30,000 gpd/sf.
 - The solids loading rate is 16.5 lbs/day/sf which meets the requirements of 10 CSR 20-8.160(4)(B)3 of less than 35 lbs/day/sf at peak flow.

- Sludge flow from the two clarifiers is controlled by a 6” telescoping valve for each clarifier. The two telescoping valves and clarifier drain valves are located in the RAW/WAS wetwell located between the clarifiers
 - 4 inch scum line from the clarifiers to the RAS/WAS pump station.
- RAS/WAS Pump Station
 - 3-3 hp submersible centrifugal pumps capable of operating at 450 gpm at 12 ft TDH.
 - Each pump will have a pump discharge size of 4 inches with a solids passage size of 3 inches.
 - Design RAS rate is 150% of average day, or 0.477 mgd. RAS is pumped to the anoxic basin splitter structure. The combined RAS will be measured through a mag-meter.
 - WAS will be pumped to the sludge holding lagoon. WAS will also be measured through a mag-meter.
- Disinfection – Disinfection is the process of removal, deactivation, or killing of pathogenic microorganisms.
 - Open Channel Ultraviolet (UV) – An open channel, gravity flow, low pressure high intensity UV disinfection system capable of treating a peak flow of 1.27 MGD while delivering a minimum UV intensity of 30 mJ/cm² with an expected ultraviolet transmissivity of 65% or greater. The single open channel UV system consists of two banks in series with 1 module per bank and 6 lamps per module. The disinfected effluent will flow by gravity through flow measurement equipment and to Outfall No. 001.
 - The weir is designed to accommodate future expansion up to 2.4 mgd.
 - Housed Facility – The proposed disinfection system shall be housed in approximately 16 ft by 29 ft building.
- Post Aeration – This is an alternate bid to add cascade aeration.
 - Cascade – To increase dissolved oxygen in the effluent, the proposed re-aeration structure is four feet wide and drops 11 feet in 11 steps.

5. OPERATING PERMIT

These construction activities do not require a modification to the operating permit. It is expected that the facility owner will include a new facility description and process flow diagram in their next operating permit renewal application to reflect the installation of the new screening, influent pump station, clarifier, anaerobic digester, and ultraviolet disinfection system.

Operating permit MO- 0055425 will be expiring on March 31, 2024. A renewal application must be filed before October 3, 2023 regardless of the status of these construction activities. If you have questions on completing the renewal application, please contact the NPDES permitting section at 573-522-4502 or cleanwaterpermits@dnr.mo.gov.

6. CONSTRUCTION PERMIT MODIFICATION

This construction permit is being modified upon the request of the facility owner to extend the construction permit schedule. The construction permit will now expire on October 2, 2023.

V. NOTICE OF RIGHT TO APPEAL

If you were adversely affected by this decision, you may be entitled to an appeal before the Administrative Hearing Commission (AHC) pursuant to Section 621.250 RSMo. To appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC. Any appeal should be directed to:

Administrative Hearing Commission
U.S. Post Office Building, Third Floor
131 West High Street, P.O. Box 1557
Jefferson City, MO 65102-1557
Phone: 573-751-2422
Fax: 573-751-5018
Website: <https://ahc.mo.gov>

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APPENDIX A- Process Flow Diagram

