

**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 Clarence  
200 E. Beech Street  
Clarence, MO 63437

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.

October 24, 2024  
Effective Date

October 23, 2026  
Expiration Date

  
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John Hoke, Director, Water Protection Program

## CONSTRUCTION PERMIT

### I. CONSTRUCTION DESCRIPTION

This project is for improvements to the Clarence Wastewater Treatment Facility (WWTF). The scope of work includes one base bid and two alternatives. The base bid consists of the upgrading the lagoon's effluent pumphouse and pumps and installation of a new ultraviolet (UV) light disinfection system. Alternative 1 includes grading and reshaping the two-cell lagoon to raise the berms from elevation of 766.5 feet to 771.5 feet. Alternative 2 is for adding rip rap to the exterior berms to minimize erosion and unsafe mowing grades.

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 required to determine "findings of affordability" because the permit applies to a combined or separate sanitary sewer system for a publicly-owned treatment works.

**Cost Analysis for Compliance** - The department has made a reasonable search for empirical data indicating the permit is affordable. The search consisted of a review of department records that might contain economic data on the community, a review of information provided by the applicant as part of the application, and public comments received in response to public notices of this draft permit. If the empirical cost data was used by the permit writer, this data may consist of median household income, any other ongoing projects that the department has knowledge, and other demographic financial information that the community provided as contemplated by Section 644. 145.3. The department is required to make a "finding of affordability" on the new environmental requirement(s) within the permit; however, due to no costs associated with the new requirement(s) the department has

determined the permit to be affordable based on the eight requirements listed in Section 644.145.4, RSMo. The current operating permit for this facility included a finding of affordability which resulted in a schedule of compliance. The previous Cost Analysis for Compliance was retained in this construction permit.

### **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 Mark C. Bross, P.E., with Klingner & Associates, P.C. 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 Northeast Regional Office per 10 CSR 20-7.015(9)(G).
5. In addition to the requirements for a construction permit, 10 CSR 20-6.200 requires land disturbance activities of one 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.
6. A United States Army Corps of Engineers (USACE) Clean Water Act Section 404 Department of the Army permit and a Section 401 Water Quality Certification issued by the department may be required for the activities described in this permit. This permit is not valid until these requirements are satisfied or notification is provided that no Section 404 permit is required by the USACE. You must contact your local USACE district since they determine what waters are jurisdictional and which permitting requirements may apply. 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.

7. All construction must adhere to applicable 10 CSR 20-8 (Chapter 8) requirements listed below.
  - Emergency Power. Disinfection and dechlorination processes, when used, shall be provided during all power outages. 10 CSR 20-8.190(2)(A)
  - 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 30,000 microwatt seconds per centimeters squared ( $\mu\text{W} \cdot \text{s}/\text{cm}^2$ ). 10 CSR 20-8.190(5)(A)4.
  - Closed vessel UV systems. The combination of the total number of closed vessels 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)2.
  - Closed vessel UV systems utilizing medium-pressure lamps shall be provided with an automatic cleaning system in order to prevent algae growth. 10 CSR 20-8.190(5)(B)3.
  - 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.
  - Lagoon berms shall be constructed of relatively impervious material and compacted to at least 95 percent maximum dry density test method to form a stable structure. 10 CSR 20-8.200(4)(A)1.
  - The minimum berm width shall be eight feet to permit access of maintenance vehicles. 10 CSR 20-8.200(4)(A)2.

- Minimum freeboard shall be two feet. 10 CSR 20-8.200(4)(A)3.
  - An emergency spillway shall be provided that—
    - Prevents the overtopping and cutting of berms; 10 CSR 20-8.200(4)(A)4.A.
    - Is compacted and vegetated or otherwise constructed to prevent erosion; 10 CSR 20-8.200(4)(A)4.B. and
    - Has the ability for a representative sample to be collected, if discharging. 10 CSR 20-8.200(4)(A)4.C.
  - Seep collars shall be provided on drainpipes where they pass through the lagoon seal. 10 CSR 20-8.200(4)(C)4.
8. Upon completion of construction:
- A. The City of Clarence will become the continuing authority for operation and maintenance of these facilities;
  - B. Submit an electronic copy of the as built if the project was not constructed in accordance with previously submitted plans and specifications; and
  - C. Submit the Statement of Work Completed form to the department in accordance with 10 CSR 20-6.010(5)(N) (<https://dnr.mo.gov/document-search/wastewater-construction-statement-work-completed-mo-780-2155>) and request the operating permit modification public noticed on September 13, 2024 be issued.

#### **IV. REVIEW SUMMARY**

##### **1. CONSTRUCTION PURPOSE**

The main purpose for this project is to install a disinfection system to attain compliance with the final effluent limits for *E. coli* set forth in the current Missouri State Operating Permit (MSOP), MO-0041076. The project also includes bid alternatives to either raise the lagoon berms to provide additional storage capacity or provide rip rap to the exterior berms to minimize erosion and unsafe mowing grades.

##### **2. FACILITY DESCRIPTION**

The existing system includes a two-cell lagoon, lagoon's effluent pumphouse, and three overland flow fields. Sludge is retained in the lagoon.

New construction includes upgrading the pumphouse, installing a new UV light disinfection prior to the overland flow fields.

The Clarence WWTF is located approximately 0.25 miles north of County Roads 305 and 306 intersection, Clarence City, in Shelby County, Missouri. The facility has a design average flow of 147,000 gpd and a population equivalent of 1,200 people.

### **3. COMPLIANCE PARAMETERS**

The proposed project is required to meet final effluent limits as established in Operating Permit MO-0041076.

### **4. REVIEW of MAJOR TREATMENT DESIGN CRITERIA**

#### **Existing major components that will remain in use include the following:**

- Two-Cell Lagoon – The lagoon is non-aerated and has a total surface area of approximately 9 acres and a wastewater volume of approximately 8.7 million gallons from the bottom to the maximum operating level at 764.5 feet. The first cell has approximately 6.6 acres, bottom elevation at 762.0 feet, and berm elevation at 766.5 feet. The second cell has approximately 2.4 acres, bottom elevation at 757.0 feet, and berm top elevation at 766.5 feet. If bid alternative 1 is selected, the berms will be raised to 771.5 feet elevation.
- Overland Flow Fields – The existing three overland flow fields will remain in service. The new UV disinfection will be installed prior to the fields.

#### **Construction will cover the following items:**

- Components are designed for a design flow of 147,000 gpd and Population Equivalent of 1,200 people as listed in the current operating permit.
- Pumphouse Improvements – Replacing the existing pumps at the lagoon's effluent pumphouse with two dry pit suction pumps each capable of pumping 250 gallons per minutes at 82 feet total dynamic head (TDH) and controlled by a Variable Frequency Drive (VFD).
- Flow Measurement – Installation of accurate flow measurement devices will give the treatment facility a means of improved data analysis.
  - Electromagnetic Meter – An effluent electromagnetic 6-inch flow meter shall measure the disinfected wastewater prior to delivering to the overland flow fields.
- Disinfection – Disinfection is the process of removal, deactivation, or killing of pathogenic microorganisms.
  - Closed Vessel Ultraviolet (UV) – A closed vessel, low pressure high intensity UV disinfection system capable of treating a peak flow of 280,000 gpd while delivering a minimum UV intensity of 30 mJ/cm<sup>2</sup> with an expected ultraviolet

transmissivity of 50 percent or greater. The closed vessel UV system consists of 8 lamps per reactor. Two closed vessel UV reactors are arranged in parallel. The disinfected effluent will flow through flow measurement equipment and to three overland flow fields before discharging into tributary to Cat Branch.

- Two-Cell Lagoon Improvements – If bid alternative 1 is selected, this work involves the grading and berm reshaping of the existing 2 cells to raise the top of the berms and reshape to maintain grading requirements. The work would include the replacement and removal of the existing transfer gallery between cells 1 and 2 and the effluent gallery to the pumphouse.
  - Lagoon cell #1's berm is raised 5 feet from elevation 766.5 feet to elevation 771.5 feet which provides a storage capacity of approximately 12,642,000 gallons from the minimum operating level at 763 feet to the maximum operating level at 769.5 feet. This provides approximately 86 days of retention at the design flow. The basin will have 4:1 sloping walls, the depth from the top of the berms to the lagoon floor at 761 feet will be 10.5 ft. The basin is non-aerated and has a surface area of 6.7 acres. The berm width will be 8 ft.
  - Lagoon cell #2's berm is raised 5 feet from elevation 766.5 feet to elevation 771.5 feet which provides a storage capacity of approximately 6,048,000 gallons from the minimum operating level at 759 feet to the maximum operating level at 769.5 feet. This provides approximately 41 days of retention at the proposed design flow. The basin will have 4:1 sloping walls, the depth from the top of the berms to the lagoon floor at 757 feet will be 14.5 ft. The basin is non-aerated and has a surface area of 2.4 acres. The berm width will be 8 ft. An emergency spill way will be provided at 770.5 feet.
- Alternate 2 – This work would be to add rip rap to the exterior berms to minimize erosion and unsafe mowing grades.

## **5. OPERATING PERMIT**

Operating permit MO-0041076 will require a modification to reflect the construction activities. The modified Clarence WWTF, MO-0041076, was successfully public noticed from September 13, 2024, to October 14, 2024 with no comments received. Submit the Statement of Work Completed to the department in accordance with 10 CSR 20-6.010(5)(N) and request the operating permit modification be issued.

## **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>

Sieu T. Dang, P.E.  
Engineering Section  
[sieu.dang@dnr.mo.gov](mailto:sieu.dang@dnr.mo.gov)

## **APPENDIX**

- **Process Flow Diagram**



### APPENDIX - PROCESS FLOW DIAGRAM

CLARENCE WASTEWATER TREATMENT FACILITY - PROCESS FLOW DIAGRAM

