

**STATE OF MISSOURI**  
**DEPARTMENT OF NATURAL RESOURCES**  
**MISSOURI CLEAN WATER COMMISSION**



**CONSTRUCTION PERMIT**

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

**The Honorable Gail Reich  
Mayor of the City of Gainesville  
P.O. Box 355  
Gainesville, MO 65655**

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.

January 3, 2020  
Effective Date

Edward B. Galbraith, Director, Division of Environmental Quality

January 2, 2022  
Expiration Date

Chris Wieberg, Director, Water Protection Program

## **CONSTRUCTION PERMIT**

### **I. CONSTRUCTION DESCRIPTION**

The existing Gainesville WWTF is 206,400 gallons per day (gpd) discharging two-cell aerated lagoon. The proposal includes reducing the design average flow to 125,000 gpd. The installation and construction of inflow pump station, a flow splitter, a mechanical screen, and an extended aeration basin located in 2<sup>nd</sup> cell, two secondary clarifiers in parallel, ultraviolet disinfection, flow measurement, sludge pumping and treatment are proposed. The existing primary lagoon cell will be reutilized for flow equalization and sludge storage.

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 the Archer-Elgin Engineers 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 Southwest Regional Office per 10 CSR 20-7.015(9)(G).

5. The wastewater treatment facility shall be located at least fifty feet (50') from any dwelling or establishment.
6. The wastewater treatment facility shall be located above the twenty-five (25)-year flood level.
7. 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.
8. 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 [dnr.mo.gov/env/wpp/epermit/help.htm](http://dnr.mo.gov/env/wpp/epermit/help.htm). See [dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm](http://dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm) for more information.
9. 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 at 573-751-1300 for more information. See [dnr.mo.gov/env/wpp/401/](http://dnr.mo.gov/env/wpp/401/) for more information.
10. 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. 10 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)
- 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.

- 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)
- The alarm shall be activated in cases of high water levels. Follow the provisions in subsection (7)(C) of this rule for alarm systems. 10 CSR 20-8.140 (4) (D)
- The outfall shall be so constructed and protected against the effects of flood water, ice, or other hazards as to reasonably ensure its structural stability and freedom from stoppage. 10 CSR 20-8.140 (6) (A)
- 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)
- 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 sillcock 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)
- 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.
- 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)

- 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)
- Electrical fixtures, equipment, and controls. Electrical fixtures, equipment, and controls shall comply with the National Electrical Manufacturers Association (NEMA) 4X enclosure rating where necessary; *NEMA Standard 250-2014*, published December 15, 2014. This standard shall hereby be incorporated by reference into this rule, as published by National Electrical Manufacturers Association, 1300 North 17th Street, Arlington, VA 22209. This rule does not incorporate any subsequent amendments or additions. Electrical equipment, fixtures, and controls, in places enclosing and adjacent to anaerobic digestive appurtenances where hazardous gases are included. 10 CSR 20-8.170 (4) (C) 3.
- Water supplies using indirect connections shall comply with 10 CSR 20-8.140(7)(D). 10 CSR 20-8.170 (4) (D)
  - 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.
- Aerobic Solids Digestion High Level Emergency Overflow. An unvalved emergency overflow shall be provided that will convey digester overflow to the treatment plant headworks, the aeration process, or to another liquid sludge storage facility and that has an alarm for high level conditions. 10 CSR 20-8.170 (5)
- 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)
- Alarm systems shall be provided for sludge dewatering processes to notify the operator(s) of conditions that could result in process equipment failure or damage, threaten operator safety, or a solids spill or overflow condition. 10 CSR 20-8.170 (7) (B)
- 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.
- 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.

11. Upon completion of construction:

- A. The City of Gainesville 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 enclosed form Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(N) and request the draft operating permit public noticed on May 18, 2017 to be issued; The current operating permit was issued on November 1, 2013. The draft operating permit is the modification of the facility's current operating permit to reflect the proposed upgrades.

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

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

The City wastewater treatment plant is a two cell aerated lagoon designed for the reduction of biological oxygen demand (BOD) and total suspended solids (TSS). The facility's state operating permit issued on November 1, 2013 contains the Schedule of Compliance to meet ammonia limits and disinfection requirement. The treatment plant was not originally designed to provide for disinfection or removal of ammonia from the wastewater. The proposed upgrade will provide for disinfection and removal of ammonia.

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

The proposed facility will include mechanical screening, extended aeration basin, two secondary clarifiers, ultraviolet disinfection, wet weather flow equalization, and sludge treatments. The discharge location remains the same to Lick Creek.

The treatment facility is in the vicinity of Missouri State Highway 5 and US Highway 160, in the City of Gainesville, Ozark County, Missouri. The facility will reduce the design average flow from 206,400 gpd to 125,000 gpd and serve a reduced population equivalent of approximately 1,119 people.

### 3. COMPLIANCE PARAMETERS

The limits following the completion of construction will be applicable to the facility:

Parameter	Units	Monthly average limit
Biochemical Oxygen Demand <sub>5</sub>	mg/L	30
Total Suspended Solids	mg/L	30
Ammonia as N-summer	mg/L	1.4
Ammonia as N-winter	mg/L	2.9
pH	SU	6.5-9.0
Oil & Grease	mg/L	10
E. Coli	#/100mL	206

### 4. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

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

- Lagoon Cell No. 1 –Lagoon Cell No. 1 is aerated and a wastewater volume of 4,481,755 gallons with impermeable high density polyethylene liner. A total of six static aspirating-type mechanical aerators were strategically installed.

Proposed construction will cover the following items:

- Influent Pump Station – Construction of a new interconnected wet well was proposed. Two low to moderate flow pumps and two peak flow pumps will be installed. The low flow pumps will transfer wastewater to the extended aeration basin with each submersible pump capable of operating at 260 gpm at 20.2 feet of TDH. The peak flow pumps will transfer wastewater to the extended aeration basin with each submersible pump capable of operating at 868 gpm at 20.2 feet of TDH. The existing trash basket will remain and the new screening system will be installed downstream. A manual transfer switch will be installed for connection of a portable generator. A quick connect coupling will also be installed for a portable pump.
- Flow Splitter – The influent pump station will discharge to a flow splitter structure. Flows of 500,000 gpd and less will be routed through the new mechanical screen and the new biological treatment basin. Flows exceeding 500,000 gpd will receive manual screening and be routed to the existing primary lagoon cell. The flow splitting weir is manually adjustable.
- Mechanical Fine Screen – A cylindrical fine screen of nominal 9-7/8 inch diameter is going to be installed to capture hair and other fine material. Screen openings will be ¼ inch (6 mm). A pole light will be installed adjacent to the screen.

- Selector Basin – A 10-foot diameter by 9-foot depth selector basin (5,285 gallons) with 30 mins detention time at the design flow is proposed as a bid alternate and will be installed if the whole project remains within budget. The selector's purpose is to select for phosphorus accumulating organisms that biologically remove phosphorus from the wastewater.
- Biological Treatment– Secondary treatment is provided by extended aeration utilizing diffused fine bubble aeration in an earthen basin located in the current lagoon cell #2. Water depth is 10 feet and freeboard is 1.5 feet. The basin flat bottom measures 44' wide by 61' length. Three sides are earth with a slope of 1.5:1 and the fourth side is a common vertical concrete wall with the two proposed clarifiers. The total basin volume is 44,120 ft<sup>3</sup> or 330,061 gallons. Detention time at average design flow of 125,000 gpd is 63 hours. Aeration by means of duplex 15 hp blowers capable of supplying 320 scfm each to 21 fine bubble diffusers with a capacity of 15 scfm per diffuser. The aeration basin is designed for an average daily loading of 372.5 lbs BOD<sub>5</sub>. Two dissolved oxygen probes measure D.O. levels continuously and a programmable logic controller utilizes this input to operate the two system blowers. A transfer pipe and elbow allows wastewater from aeration basin to move by gravity to the clarifiers.
- Clarifiers – Two rectangular clarifiers are provided, each with 10' x 30' dimensions. Two final clarifiers will have a settling volume of 35,900 gallons and a detention time of 7 hours at the design flow and 2 hours at the peak flow with a settling rate of 260 gpd/ft<sup>2</sup> at the design flow and 1040 gpd/ft<sup>2</sup> at the peak flow. The clarified effluent will flow by gravity to the disinfection system.
- Return and Waste Sludge Pumping – Each clarifier is equipped with a dedicated submersible sludge pump. The pumps selected are capable of operating at 87 gpm at 8.8 feet of TDH.
- Disinfection – Disinfection is the process of removal, deactivation, or killing of pathogenic microorganisms. An open channel, gravity flow, Trojan UV 3000 Plus UV disinfection system capable of treating a peak flow of 504,000 GPD while delivering a minimum UV intensity of 30 mJ/cm<sup>2</sup>. The single open channel UV system consists of a single bank with 3 modules and 4 lamps per module. The disinfected effluent will flow by gravity through flow measurement equipment and to Outfall No. 001.
- Flow Measurement – Effluent flow measurement is provided by a 6-inch Parshall Flume and transducer. The reading is sent to the operations building.
- Wet Weather Flow Equalization – Wet weather flow equalization is utilized during wet weather events where the peak flow is greater than the design peak capacity of the treatment facility (500,000 GPD).

Once the wet weather event subsides, the flow should be returned to the influent pump station for full secondary treatment. Primarily Lagoon Cell No. 1 will be the wet weather flow equalization basin.

- Sludge Treatment – Waste activated sludge is processed in two aerated sludge holding tanks (12'Wx25'Lx12'D) with 7,200 ft<sup>3</sup> or 53893 gallons capacity each. Three 10 HP blowers and a coarse bubble aeration system are provided to meet the mixing requirements and oxygen demand.
- Emergency Power – The city will seek to purchase used portable generators of sufficient capacity to operate this treatment plant.

## **5. OPERATING PERMIT**

Operating permit MO-0002108 will require a modification to reflect the construction activities. The modified Gainesville WWTF, MO-0027570, was successfully public noticed from May 18, 2017 to June 17, 2017 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.

Lei Hou, PE  
Engineering Section  
[lei.hou@dnr.mo.gov](mailto:lei.hou@dnr.mo.gov)



MISSOURI DEPARTMENT OF NATURAL RESOURCES  
WATER PROTECTION PROGRAM

**APPLICATION FOR CONSTRUCTION PERMIT –  
WASTEWATER FACILITY**

RECEIVED

NOV 12 2019

Water Protection Program

FOR DEPARTMENT USE ONLY	
APP NO. AP 33962	CP NO. CP0002108
FEE RECEIVED \$1000.00	CHECK NO. 25489
DATE RECEIVED 11-12-19	

**APPLICATION OVERVIEW**

The Application for Construction Permit – Wastewater Facility form is for construction pertaining to domestic wastewater treatment facilities, agrichemical facilities, and components thereof. This form has been developed in a modular format and consists of Part A and B. **All applicants must complete Part A.** Part B should be completed for applicants who currently land-apply wastewater or propose land application for wastewater treatment. **Please read the accompanying instructions before completing this form. Submittal of an incomplete application may result in the application being returned.**

**PART A – BASIC INFORMATION**

**1.0 APPLICATION INFORMATION** (Note – If any of the questions in this section are answered NO, this application may be considered incomplete and returned.)

- 1.1 Is this a Federal/State funded project?  YES  N/A Funding Agency: USDA Rural Dev. Project #: \_\_\_\_\_
- 1.2 Is this an application for an agrichemical?  YES (See instructions.)  N/A
- 1.3 Has the Missouri Department of Natural Resources approved the proposed project's antidegradation review?  
 YES Date of Approval: NA
- 1.4 Has the department approved the proposed project's facility plan\*?  
 YES Date of Approval: 31 May, 2013  NO  N/A (If Not Applicable, complete No. 1.5.)
- 1.5 [Complete only if answered Not Applicable on No. 1.4] Is a copy of the engineering report\* for wastewater treatment facilities with a design flow less than 22,500 gpd included with this application?  
 YES  NO
- 1.6 Is a copy of the appropriate plans\* and specifications\* included with this application?  
 YES Denote which form is submitted:  Hard copy  Electronic copy (See instructions.)  NO
- 1.7 Is a summary of design\* included with this application?  YES  NO
- 1.8 Is a general operating permit applicable?  
 YES Submit the appropriate operating permit application to the Regional Office at least 60 days prior to operation.  
 NO Enclose the appropriate operating permit application and fee submittal. Denote which form:  B  B2
- 1.9 Is the facility currently under enforcement with the department or the Environmental Protection Agency?  YES  NO
- 1.10 Is the appropriate fee included with this application?  YES  NO (See instructions for appropriate fee.)

\* Must be affixed with a Missouri registered professional engineer's seal, signature and date.

**2.0 PROJECT INFORMATION**

2.1 NAME OF PROJECT  
Gainesville Water Resource Recovery Facility Improvements

2.2 PROJECT DESCRIPTION  
Construction of a new 1.1 mgd influent pump station, modification of the existing influent pump station, a new flow splitter and mechanical screen, new selector basin (bid alternate), extended aeration basin with fine bubble diffusers, two rectangular clarifiers, ultraviolet light disinfection, new outfall sewer and a two cell aerated sludge holding tank. The north, secondary cell of the existing lagoon will be dewatered and sludge removed for land application and the new facility will be constructed in this basin.

2.3 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION  
Sludge will be digested in a new, two cell aerated sludge holding tank. Biosolids will be land applied as a liquid by the City when documented to meet US EPA Part 503 requirements. Biosolids from the existing north, secondary cell will be land applied by a contract hauler. Estimated biosolids quantity in the north, secondary cell is 53 dry tons. A sludge management plan will be submitted.

2.4 DESIGN INFORMATION  
A. Current population: 773; Design population: 1119  
B. Actual Flow: 65,000 (dry) gpd; Design Average Flow: 125,000 gpd;  
Actual Peak Daily Flow: 300,000 gpd; Design Maximum Daily Flow: 800,000 gpd;  
Design Wet Weather Event: 800,000 gpd

2.5 ADDITIONAL INFORMATION  
A. Is a topographic map attached?  YES  NO  
B. Is a process flow diagram attached?  YES  NO

2.6 ESTIMATED PROJECT CONSTRUCTION COST  
\$ 2,100,000.00

3.0 WASTEWATER TREATMENT FACILITY				
NAME Gainesville Water Resource Recovery Facility		TELEPHONE NUMBER WITH AREA CODE (417) 679-4858		EMAIL ADDRESS gainesville@ozbb.net
ADDRESS (PHYSICAL) 0.25 mi SW of MO 5/US 160 intersection	CITY Gainesville	STATE MO	ZIP CODE 65655	COUNTY Ozark
Wastewater Treatment Facility: Mo- 0027570 (Outfall 1 Of 1 )				
3.1 Legal Description: SW ¼, NW ¼, SE ¼, Sec. 7 , T 22N , R 13W (Use additional pages if construction of more than one outfall is proposed.)				
3.2 UTM Coordinates Easting (X): 550653 Northing (Y): 4050296 For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)				
3.3 Name of receiving streams: Lick Creek				
4.0 PROJECT OWNER				
NAME City of Gainesville		TELEPHONE NUMBER WITH AREA CODE (417) 679-4858		EMAIL ADDRESS gainesville@ozbb.net
ADDRESS P.O. Box 355	CITY Gainesville	STATE MO	ZIP CODE 65655	
5.0 CONTINUING AUTHORITY: Permanent organization that will serve as the continuing authority for the operation, maintenance and modernization of the wastewater collection system.				
NAME same as Project Owner		TELEPHONE NUMBER WITH AREA CODE		EMAIL ADDRESS
ADDRESS	CITY	STATE	ZIP CODE	
5.1 A letter from the continuing authority, if different than the owner, is included with this application. <input type="checkbox"/> YES <input type="checkbox"/> NO <input checked="" type="checkbox"/> N/A				
5.2 COMPLETE THE FOLLOWING IF THE CONTINUING AUTHORITY IS A MISSOURI PUBLIC SERVICE COMMISSION REGULATED ENTITY.				
A. Is a copy of the certificate of convenience and necessity included with this application? <input type="checkbox"/> YES <input type="checkbox"/> NO				
5.3 COMPLETE THE FOLLOWING IF THE CONTINUING AUTHORITY IS A PROPERTY OWNERS ASSOCIATION.				
A. Is a copy of the as-filed restrictions and covenants included with this application? <input type="checkbox"/> YES <input type="checkbox"/> NO				
B. Is a copy of the as-filed warranty deed, quitclaim deed or other legal instrument which transfers ownership of the land for the wastewater treatment facility to the association included with this application? <input type="checkbox"/> YES <input type="checkbox"/> NO				
C. Is a copy of the as-filed legal instrument (typically the plat) that provides the association with valid easements for all sewers included with this application? <input type="checkbox"/> YES <input type="checkbox"/> NO				
D. Is a copy of the Missouri Secretary of State's nonprofit corporation certificate included with this application? <input type="checkbox"/> YES <input type="checkbox"/> NO				
6.0 ENGINEER				
ENGINEER NAME / COMPANY NAME Alissha Feeler, P.E./Archer-Elgin Engineers		TELEPHONE NUMBER WITH AREA CODE (573) 364-6362		EMAIL ADDRESS afeeler@cmarcher.com
ADDRESS 310 East 6th Street	CITY Rolla	STATE MO	ZIP CODE 65401	
<b>7.0 PROJECT OWNER:</b> I hereby certify that I am familiar with the information contained in this application and to the best of my knowledge and belief such information is true, complete, and accurate, and if granted this permit, I agree to abide by the Missouri Clean Water Law and all rules, regulations, orders, and decisions, subject to any legitimate appeal available to applicant under Missouri Clean Water Law. I also understand the issuance of the construction permit does not guarantee the proposed wastewater treatment will meet the required effluent limitations of the issued Missouri State Operating Permit for this facility.				
PROJECT OWNER SIGNATURE 				
PRINTED NAME Gail Reich			DATE 11/6/2019	
TITLE OR CORPORATE POSITION Mayor		TELEPHONE NUMBER WITH AREA CODE (417) 679-4858		EMAIL ADDRESS gainesville@ozbb.net
Mail completed copy to: MISSOURI DEPARTMENT OF NATURAL RESOURCES WATER PROTECTION PROGRAM P.O. BOX 176 JEFFERSON CITY, MO 65102-0176				
END OF PART A. REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHETHER PART B NEEDS TO BE COMPLETE.				