

**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 Winfield  
51 Harry's Way  
Winfield, MO 63389

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 18, 2019  
Effective Date

September 22, 2020  
Modification Date

  
Edward B. Galbraith, Director, Division of Environmental Quality

January 17, 2023  
Expiration Date

  
Chris Wieberg, Director, Water Protection Program

## **CONSTRUCTION PERMIT**

### **I. CONSTRUCTION DESCRIPTION**

Upgrades to this existing lagoon system include installing a lift station and new headworks structure (screening); converting one cell of a three-cell lagoon system to a flow equalization basin; installing a baffle and multiple static tube air diffusers in Cells #1 and 2; installing a moving bed biofilm reactor (MBBR) chamber; constructing an overflow cell for high flows; and installing an ultraviolet (UV) disinfection system. Sludge will be hauled by a certified waste hauler and land applied.

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.

**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 cost analysis for compliance was part of draft operating permit public noticed November 2, 2018 – December 3, 2018.

### **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 in accordance with the plans and specifications submitted by Meco Engineering on April 23, 2018 and the revised plans and specifications of June 9, 2020.
3. The Department must be contacted in writing prior to making any changes to the approved 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(8).
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 St. Louis Regional Office per 10 CSR 20-7.015(9)(E)2.
5. 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.
6. 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.
7. Upon completion of construction:
  - A. The City of Winfield 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 operating permit modification be issued.

**IV. REVIEW SUMMARY**

**1. CONSTRUCTION PURPOSE**

This facility is under enforcement due to failure to make upgrades to meet permit limits. The modifications and additional components to the system will make achieving the ammonia limits possible.

**2. FACILITY DESCRIPTION**

The City of Winfield Municipal Lagoon is located at Oak St. and the Winfield Sports Association Complex, Winfield, in Lincoln County, Missouri. The facility has a design average flow of 300,000 gpd and serves a population equivalent of approximately 3000 people.

The existing facility is a 3-cell, discharging lagoon.

**3. COMPLIANCE PARAMETERS**

The final effluent limits the project is required to meet are established in the Antidegradation Report dated September 2018 as follows:

PARAMETER	UNITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE
FLOW	MGD	*		*
BOD <sub>5</sub> ***	MG/L		20	10
TSS***	MG/L		45	30
PH	SU	6.5 – 9.0		6.5 – 9.0
AMMONIA AS N (APRIL 1 – SEPT 30)	MG/L	0.8		0.6
AMMONIA AS N (OCT 1 – MAR 31)	MG/L	2.3		1.7
OIL & GREASE	MG/L	15		10
<i>ESCHERICHIA COLIFORM (E. COLI)</i>	COLONIES /100 ML		1,030**	206**
WET TESTING	TU	*		*
TOTAL NITROGEN	MG/L	*		*
TOTAL PHOSPHORUS	MG/L	*		*

\* Monitoring requirements only.

\*\* The Monthly and Weekly Average for *E. coli* shall be reported as a Geometric Mean. The Weekly Average for *E. coli* will be expressed as a geometric mean if more than one (1) sample is collected during a calendar week (Sunday through Saturday).

\*\*\* This facility is required to meet a removal efficiency of 85% or more for BOD<sub>5</sub> and TSS. Influent BOD<sub>5</sub> and TSS data should be reported to ensure removal efficiency requirements are met.

#### **4. ANTIDegradation**

The Department has reviewed the antidegradation report for this facility and issued the Water Quality and Antidegradation Review dated September 2018, due to an increase in design flow. See **APPENDIX – ANTIDegradation**.

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

The existing forcemain to Lagoon Cell 3 is being abandoned and influent is being redirected by gravity flow through 4 manholes to a lift station with three, 10 HP submersible chopper pumps that precedes the headworks structure or the alternate bid is to locate the new lift station outside of the old cell #3 and place it adjacent to the existing lift station, with a capacity of 510 gpm at 18 ft TDH.

The headworks consists of a mechanically cleaned bar screen positioned at a 75° angle and a manually cleaned bar screen in the bypass channel.

Wastewater then gravity flows to the first cell of the partitioned lagoon. Excess flow passes through the bypass channel to the overflow basin and is lifted back to Cell No. 1 from an overflow return pump station with duplex, 10 HP submersible pumps. The existing cell no. 1 will become the equalization basin. The volume of the equalization basin is 15.6 MG and has the capacity to store for 1.7 months at 300,000 gpd.

The partitioned lagoon is aerated with static tube air diffusers. Wastewater flows from Cell No. 1 through a 2 ft<sup>2</sup> “window” in the 241 foot long baffle skirt to Cell No. 2. The baffle wall is to be constructed with 30 mil polyester reinforced geomembrane equipped with bottom anchors and a floatation collar. All basins will have 2' thick clay liners, 3:1 side slopes, and a graveled surface on the tops of the berms.

Wastewater from Cell No. 2 flows by gravity through a manhole to a moving bed biofilm reactor (MBBR) aerator basin. The MBBR will be a Triplepoint Environmental, NitrOx for nitrification. This system will be designed to treat an average daily flow of 300,000 gpd and a peak flow of 525,000 gpd. The unit will have two chambers, operated in parallel, each with a total length of 45.5 ft., 22 foot width, and a total depth of 20.3 feet. Sidewater depth will be 14 ft. Units will have submersible heaters. The chambers will be filled approximately 50% with high surface area media.

Aeration will be by means of 3 positive displacement type blowers each capable of supplying 333 scfm. One blower will be 30 HP and two will have 40 HP motors servicing both the static tube air diffusers in Cells 1 and 2 and the 2 chambers of the aerator reactor. Coarse bubble aeration in the aerator chamber will be from 3/16” holes, spaced at 1.5' intervals along 2” diameter schedule 10S air piping. The effluent from the aerator basin will flow by gravity to Cell No. 3 and then to the disinfection system.

An open channel, gravity flow, high intensity UV disinfection system capable of treating a peak flow of 750,000 gpd while delivering a minimum UV intensity of 40 mJ/cm<sup>2</sup> will be installed. The unit will have an expected ultraviolet transmissivity of 50% or greater. The UV system consists of two banks in series with 5 modules per bank and 8 lamps per module. The UV disinfection system will be located outside under a roof canopy. The disinfected effluent will flow by gravity through a parshall flume structure to Outfall No. 001.

## **6. OPERATING PERMIT**

Operating permit MO-0088676 will require a modification to reflect the construction activities. The draft operating permit for the City of Winfield WWTF, MO-0088676, was successfully public noticed from November 2, 2018 to December 3, 2018 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.

## **7. CONSTRUCTION PERMIT MODIFICATION**

**2020 Modification-** The 2020 modification reflects the changes due to redesign of the treatment plant as a result of the bidding process. Permit condition #2 was updated to reflect the updated plan and specification submittal. Condition #7 was updated to reflect the correct regulatory reference for the Statement of Work Complete submittal. See Section 5 for the changes, which includes the reduction in blowers to 3, the removal of the influent flow monitoring, and the reduction of storage volume of the equalization basin. It also extends the expiration date of the construction permit for 2 years till January 2023.

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**Sept. 2020 CP modification:**  
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