Permit No. CP0001959

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 City of Russellville
P.O. Box 128
Russellville, MO 65074

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.

July 18, 2018
Effective Date

June 1, 2020
Modification Date

Edward B. Galbraith, Director, Division of Environmental Quality

July 17, 2021
Expiration Date

Chris Wieberg, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

The City of Russellville proposed to construct a new 60,000 gpd design flow MBBR/IFAS treatment facility. The new facility consists of preliminary screening, flow equalization lagoon cell (existing cell #1), secondary screening, anoxic IFAS bioreactor, aerobic IFAS bioreactor, de-oxygenation tank, secondary clarifier, aerobic digester, UV disinfection, post aeration basin, and outfall structure.

A closure plan of two of the three existing lagoon cells (cell #2 & #3) will need to be submitted to the Northeast Regional Office for review and approval prior to and closure activates.

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 in accordance with the plans and specifications submitted by Bartlett & West on January 10 and June 4, 2018.

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 Northeast Regional Office per 10 CSR 20-7.015(9)(E)2.

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. Wastewater treatment facility shall not be located within one hundred feet (100'), and preferably three hundred feet (300') of any water well or water supply structure.

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. See 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/ for more information.

10. A full closure plan of two of the existing three lagoon cells shall be submitted to the Department's Northeast Regional Office for review and approval of any permitted wastewater treatment system being replaced. In accordance with 10 CSR 20-6.010(12), the closure plan must meet the requirements outlined in Standard Conditions Part III of the Missouri State Operating Permit No. MO-0106348. Closure shall not commence until the submitted closure plan is approved by the Department.

11. Upon completion of construction:

    A. The City of Russellville will become the continuing authority for operation, maintenance, and modernization 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)(D) and request the operating permit modification be issued.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

The City constructed the current wastewater treatment plant in 1987. The existing wastewater treatment facility is a three-cell lagoon system with supplemental aeration in the primary cell. The facility's NPDES operating permit includes effluent ammonia limitations and a Schedule of Compliance. A three-cell lagoon system cannot consistently meet these limits. In addition to the more stringent ammonia effluent limitations, disinfection requirements are applied to the effluent. The City of Russellville evaluated wastewater treatment alternatives and proposed to construct a new 60,000 gpd design flow MBBR/IFAS treatment facility.

2. FACILITY DESCRIPTION

The existing wastewater treatment facility is a three-cell lagoon system with supplemental aeration in the primary cell. Sludge is retained in lagoon.

The new facility consists preliminary screening, flow equalization lagoon cell, secondary screening, anoxic IFAS bioreactor, aerobic IFAS bioreactor, de-oxygenation tank, secondary clarifier, aerobic digester, UV disinfection, post aeration basin, and a outfall structure.

The Russellville WWTF is located at South Hatler Street and Sleepy Meadows Lane, Russellville City, in Cole County, Missouri. The facility has a design average flow of 60,000 gpd and serves a hydraulic population equivalent of approximately 800 people.

3. COMPLIANCE PARAMETERS

The final effluent limits the project is required to meet are established in the draft Operating Permit MO-0106348 public noticed from June 8 to July 7, 2018.

PARAMETER	Unit	Daily Maximum	Weekly Average	Monthly Average
Flow	MGD	*		*
BOD_5	mg/L		45	30
TSS	mg/L		45	30
Ammonia as N (Apr 1 –Sep 30)	mg/L	4.2		1.4
Ammonia as N (Oct 1 – Mar 31)	mg/L	11.7		2.6
Escherichia coli **	#/100mL		1,030	206
Oil & Grease	mg/L	15		10
Acute Whole Effluent Toxicity	TUa	*		
PARAMETER	Unit	Minimum		Maximum
pH	SU	6.5		9.0

* - Monitoring requirement only.

** - #/100mL; the Monthly Average for *E. coli* is a geometric mean.

4. ANTIDEGRADATION

No degradation proposed and no further review necessary. Facility did not apply for authorization to increase pollutant loading or to add additional pollutants to their discharge.

5. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

- Preliminary Screening: Influent pre-screening is a Halliday Trash Basket B1A series (18"W x 28"H x 8"D) with ¾ inch bar spacing located in wetwell.

- Influent pump station: Construction of a triplex influent pump station with each 1.5 HP submersible pump capable of operating at 111 gpm at 27.3 feet of TDH.

- Flow Equalization Lagoon: 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. Once the wet weather event subsides, the flow will be returned to the head of the treatment facility for full secondary treatment. The current lagoon cell #1 will be converted into an equalization basin to absorb peak flows during wet weather conditions. The equalization cell has a design volume of 1.67 MG.

- Secondary Screening: One mechanically self-cleaned fine screen is located above the anoxic tank and supported from the tank. It is a combination cylindrical auger screen/grit separator device for removing floating, particulate, or fibrous material. The orifice opening diameter of the screen is 3 mm and maximum hydraulic capacity is 150 GPM.

- De-oxygenation Tank: The de-oxygenation tank reduces oxygen levels in the mixed liquor return flows prior to the anoxic tank. The tank is 10 ft x 13 ft x 10 ft with a total volume of 9,725 gallons. The HRT is about 4 hours at design average flow. The tank includes a submersible anoxic mixer (0.5 HP) capable of maintaining completely mixed conditions while maintaining low dissolved oxygen.

- Anoxic Bioreactor: The anoxic tank is 19 ft x 13 ft x 10 ft with a total volume of 18,000 gallons. The HRT is about 7.2 hours at design average flow of 60,000 GPD and 2.7 hours at peak flow of 160,000 gpd. The tank includes a submersible anoxic mixer (0.75 HP) capable of 40HP/MG in order to maintain completely mixed conditions while maintain low dissolved oxygen environment.

- Aerobic IFAS Bioreactor: Two (2) – 22 ft by 13 ft by 9.7 feet sidewater depth aeration reactors operating in parallel. Both tanks together provide a total volume of 40,000 gallons. The reactors are for biological oxygen demand (BOD_5) removal and nitrification. Aeration is provided by duplex 10 hp blowers capable of supplying 375 scfm each to 2 medium course bubble diffusers per reactor with a capacity of 250 scfm per diffuser at 5.0 psig in order to maintain minimum dissolved oxygen of 3 milligrams per liter (mg/L). The media contained in the bioreactor is Kontakt 500 floating media with 88 cute feet per reactor. The media has a surface area of 152 ft2/ft3 (total media volume 176 ft^3). The aeration reactors are designed to supply an average daily 848 lbs of O_2. A transfer pipe and elbow allows wastewater from the reactors to move by gravity to the clarifier.

- Secondary Clarifier: Settling is achieved with two clarifiers. Each clarifier is 12 feet in diameter with a surface area of 113.04 ft^2 (total surface acre 226 sf), which provides a surface settling rate at peak flow rate of 800 gallon per day per square foot (gpd/sf) which is less than the maximum of 1000 gpd/sf required in 10CSR 20-8.020(13)(B)7B. Each clarifier is 12.96 feet in depth. The maximum hydraulic retention time is 8.76 hours at the design average flow. The design maximum solids loading rate is 24 lbs/day/sf which meets the requirements of 10 CSR 20-8.160(4)(B)3 of less than 50 lbs/day/sf at peak flow. The clarified effluent will flow by gravity to disinfection system.

- Aerobic Digester: Construction of two sludge holding basins each with a 21 ft length, 13 ft width, a 10 ft sidewater depth, and a volume of 16,337 gallons for a total of 32,675 gallons. The design basis of the digester is an influent concentration of 10,000 mg/L (1%) with a flowrate of 1,400 gpd. Installation of medium/coarse diffuser will provide aeration and mixing of the sludge to prevent anaerobic conditions. One blower with a 10 HP motor will provide a maximum air rate of 40 standard cubic feet per minute (scfm) at 6 psig to treat 117 lbs of solids per day. The standby IFAS blower also serves as a backup digester blower.

- UV Disinfection: An open channel, gravity flow, low pressure low intensity UV disinfection system capable of treating a peak flow of 160,000 gpd while delivering a minimum UV intensity of 30 mJ/cm^2 with an expected ultraviolet transmissivity of 10% or greater. The dual open channel UV system consists of two banks in parallel with 2 modules per bank and 2 lamps per module. The disinfected effluent will flow by gravity through flow measurement equipment and to Outfall No. 001.

- Post Aeration Basin: To increase dissolved oxygen in the effluent after disinfection, the treated wastewater will go through 5,105 gallons aeration basin (7 ft x 13 ft x 7.5 ft). HRT at design average flow is 2.04 hours; HRT at Maximum daily flow is 0.77 hours. The tanks will be provided mixing and aeration by a medium/fine bubble submersible aerator which is capable of 30 SCF/1,000 CF air in order to meet D.O. effluent limits.

- Outfall Structure: The new outfall location is approximately 470 feet northwest and upstream from the current outfall location.

- Emergency power: The city of Russellville will use a trailer-mounted emergency generator to provide power in case of an emergency. The generators will be capable of operating the proposed wastewater treatment plant during a power outage.

6. OPERATING PERMIT

Operating permit MO-0106348 will require a modification to reflect the construction activities. The modified operating permit of Russellville WWTF, MO-0106348, was successfully public noticed from June 8 to July 7, 2018 with one comment received. Submit the Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(D) and request the operating permit modification be issued.

Lei Hou, PE
Engineering Section
Lei.hou@dnr.mo.gov

AP 29122
CP0001959

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM

APPLICATION FOR CONSTRUCTION PERMIT – WASTEWATER TREATMENT FACILITY

RECEIVED
JAN 10 2018
Water Protection Program

FOR DEPARTMENT USE ONLY	
APP NO.	CP NO.
FEE RECEIVED $1000.00	CHECK NO. 2760
DATE RECEIVED 1-10-18	

APPLICATION OVERVIEW

The Application for Construction Permit – Wastewater Treatment Facility 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-RD Project #: _____

1.2 Has the Missouri Department of Natural Resources approved the proposed project's antidegradation review?
☐ YES Date of Approval: _____

1.3 Has the department approved the proposed project's facility plan*?
☑ YES Date of Approval: 6/28/2017 ☐ NO ☐ N/A (If Not Applicable, complete No. 1.4.)

1.4 [Complete only if answered Not Applicable on No. 1.3.] 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

1.5 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

1.6 Is a summary of design* included with this application? ☑ YES ☐ NO

1.7 Has the appropriate operating permit application (A, B, or B2) been submitted to the department?
☑ YES Date of submittal: 02-17
☐ Enclosed is the appropriate operating permit application submittal. Denote which form: ☐ A ☐ B ☐ B2
☐ N/A Please explain: _____

1.8 Is the facility currently under enforcement with the department or the Environmental Protection Agency? ☑ YES ☐ NO

1.9 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

Wastewater Treatment Improvements, City of Russellville

2.2 PROJECT DESCRIPTION

Construction of a new 40,000 GPD (ADF) MBBR Treatment Facility Consisting of the following:
-Preliminary Screening (x2), Flow Equalization Tank (x2), Anoxic IFAS Bioreactor (x2), Stage 1 Aerobic IFAS Bioreactor (x2), Stage 2 Aerobic IFAS Bioreactor (x2), Secondary Clarifier (x2), Aerobic Digester (x2), UV Disinfection Stage 1, UV Disinfection Stage 2, Post Aeration Basin, and Outfall Structure.
-System also includes Nitrate Recycle Pumping, Returned Activated Sludge Pumping, and Waste Sludge Pumping.
Project also includes collection system upgrades consisting of pump stations, gravity mains, and force mains.
Closure of both of their existing lagoons upon completion of their collection upgrades and testing of their new 40,000 GPD (ADF) MBBR Treatment Facility will also be included in this project. Closure plan shall be submitted by awarded contractor.

2.3 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION

Sludge hauling is required from the new treatment facility to a larger treatment facility (Jefferson City). The new plant will have a 3,457 cubic feet of aerobic sludge digester that will accommodate 48 days of storage.

2.4 DESIGN INFORMATION

A. Current population: 814; Design population: 1580

B. Actual Flow: 57,500 gpd; Design Average Flow: 60,000 gpd;
Actual Peak Daily Flow: 107,982 gpd; Design Maximum Daily Flow: 159,711 gpd; Design Wet Weather Event: 411,000

2.5 ADDITIONAL INFORMATION

A. Is a topographic map attached? ☑ YES ☐ NO

B. Is a process flow diagram attached? ☑ YES ☐ NO

3.0 WASTEWATER TREATMENT FACILITY

NAME	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
Russellville Wastewater Lagoon	573-338-4001	jmccoy@peopleservice.com

ADDRESS (PHYSICAL)	CITY	STATE	ZIP CODE	COUNTY
South Hatler St. & Sleepy Meadows Lane	Russellville	MO	65074	Cole County

Wastewater Treatment Facility: Mo- ~~0058203~~ 0106348 (Outfall 1 Of 1)

3.1 Legal Description: ____ ¼, SW ¼, SE ¼, Sec. 3, T 43N, R 14W
(Use additional pages if construction of more than one outfall is proposed.)

3.2 UTM Coordinates Easting (X): 548630 Northing (Y): 4261783
For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)

3.3 Name of receiving streams: Tributary to Roark Branch (C)

4.0 PROJECT OWNER

NAME	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
City of Russellville	(573) 782-3511	russellville@embarqmail.com

ADDRESS	CITY	STATE	ZIP CODE
P.O. Box 128	Russellville	MO	65074

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	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS

ADDRESS	CITY	STATE	ZIP CODE

5.1 A letter from the continuing authority, if different than the owner, is included with this application. ☐ YES ☐ NO ☑ 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? ☐ YES ☐ 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? ☐ YES ☐ 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? ☐ YES ☐ 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? ☐ YES ☐ NO

D. Is a copy of the Missouri Secretary of State's nonprofit corporation certificate included with this application? ☐ YES ☐ NO

6.0 ENGINEER

ENGINEER NAME / COMPANY NAME	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
Tyler V. Pjesky / Bartlett & West	(785) 228-3203	tyler.pjesky@bartwest.com

ADDRESS	CITY	STATE	ZIP CODE
1200 SW Executive Dr.	Topeka	KS	66615

7.0 PROJECT OWNER: 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: Sharon Morgan

PRINTED NAME	DATE
Sharon Morgan	1/9/2018

TITLE OR CORPORATE POSITION	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
Mayor	(573) 782-3511	russellville@embarqmail.com

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.