

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION



CONSTRUCTION PERMIT

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

Ray Waldon
410 N. Iron Street
Salem, MO 65401

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.

May 10, 2018
Effective Date


Edward B. Galbraith, Director, Division of Environmental Quality

May 09, 2020
Expiration Date


Chris Wieberg, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

An intermediate pump station will be constructed following the 3 existing secondary clarifiers and flow meter structure. The wet well will house 3 submersible non-clog pumps to lift effluent to a new UV disinfection structure. 12 inch ductile iron pipe (DIP) will be placed to transport the flows from the pump station to the UV structure for disinfection during the recreational season. 18 inch DIP will be placed to allow flows during the non-recreational season to be diverted around the intermediate lift station and disinfection structure to outfall #001. The UV structure will house two banks of UV lamps and a serpentine weir to regulate flows.

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 Archer-Elgin on January 12, 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 South East 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. 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.
9. Upon completion of construction:
 - A. The city of Salem will become the continuing authority for operation, maintenance, and modernization 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)(D). When the facility applies for their next operating permit renewal, they will be expected to include an updated facility description on their application.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

In 2014 the Department issued a modified permit giving a four year schedule of compliance to meet effluent limits for E. coli by June 24, 2018. Construction of the UV disinfection will enable the treatment facility to achieve compliance with E. coli limits. The intermediate lift station is needed to overcome barriers in the hydraulic gradient.

2. FACILITY DESCRIPTION

Influent is transported to the existing facility by an 18 inch DIP and a 24 inch DIP. Flows are then joined at the old influent pump station. Effluent leaves the old pump station by a single 36 inch DIP and is pumped to the headworks facility by a more recently constructed influent pump station. The headworks facility has a peak flow splitter that directs excess flows to a peak flow storage basin. The wastewater flows to an oxidation ditch for secondary treatment.

Flows exit the oxidation ditch and move to three secondary clarifiers as directed by the secondary flow splitter box. Effluent from the clarifiers is transported and combined at the non-potable pump station. A flow meter structure follows the pump station and the effluent is then discharged at outfall #001.

Sludge is both wasted and returned to the head of the facility by a return activated sludge and waste activated sludge pump station. Waste sludge is pumped to 2 sludge storage basins and 3 reed beds.

The new construction will interject after the flow meter structure. Eccentric plug valves will be placed to direct flows through 18 inch DIP to the intermediate pump station during recreational season before being lifted to UV disinfection while a second 18 inch DIP will be able to divert flows around the pump station and UV system during the non-recreational season. Discharge of effluent will remain at outfall#1

The Salem WWTF is located at Highway 19 N., City of Salem, Dent County, Missouri. The facility has a design average flow of 741,000 gpd and serves a population equivalent of approximately 7410 people.

3. COMPLIANCE PARAMETERS

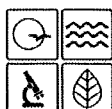
The final effluent limits the project is required to meet are E. coli daily maximum of 1030/100 ml and monthly average of 206/100 ml as established in Operating Permit MO-0021768.

4. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

- The intermediate pump station wet well will be constructed with outside dimensions of 14 ft by 10 ft by 16ft 9 inches deep. High water level in the well is 1116.00 ft elevation. The lag pump will be activated at 1150.00 ft. Lead pump will be activated at 1114 ft. The low water pump shutoff will be at 1110.25 ft. The low water level in the well is 1109.75ft. Three Fairbanks Morse 8' 9.7 HP, 3-phase, 120/240VAC, 60 Hz pumps will be installed. Two pumps will be in service at a time with the third serving as standby. Each pump will be rated for operation at full speed of 720rpm and minimum 440rpm. The dry well will be 8 ft 6-in by 14 ft by 8 ft deep. Both wet and dry wells will have their own access hatch. Ventilation will be provided for the pump station.
- UV disinfection unit – A single channel will be constructed at 34 ft length by 5 ft 4-in depth and a width of 1 ft. The wastewater will have a maximum depth of 2 ft 8-in and the flow elevation will be maintained by a serpentine weir. 2 UV banks will be placed in sequence with a horizontal configuration and measuring 8 ft 2-in long. Each bank will have 3 modules with 8 lamps per module for a total of 48 lamps. The facility will be designed to disinfect at peak flow of 3.62 MGD. The dosage produced by the system shall be no less than $35,000\mu W*s/cm^2$ with a UV transmission of 60%. The wavelength of the UV will be 253.7 nm. The UV lamps will be sleeved and the sleeves are rated for 92% transmission or more. The nominal wall thickness of the lamp sleeves will be at least 1 mm. A davit crane will be available to withdraw the modules for maintenance. An intensity monitoring system will be provided for each bank. A low water level sensor will be provided for the channel and will automatically extinguish the UV lamps if the water level drops below acceptable levels. Flow will leave the pump station via 12-in DIP to the UV disinfection system.
- An emergency standby power generator will be provided in the event of power loss and will be sized to accommodate the simultaneous operation of two pumps and any ancillary electrical loads

5. OPERATING PERMIT

These construction activities do not require a modification to the operating permit. It is expected that the facility owner will include a new facility description in their next operating permit renewal application to reflect the installation of an intermediate pump station and UV disinfection system.



MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
**APPLICATION FOR CONSTRUCTION PERMIT –
WASTEWATER FACILITY**

RECEIVED

JAN 12 2018

Water Protection Program

CP 0881961

AP 29158

FOR DEPARTMENT USE ONLY	
APP NO.	CP NO.
FEE RECEIVED	CHECK NO.
DATE RECEIVED 1-12-18	

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: _____ 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: _____
- 1.4 Has the department approved the proposed project's facility plan*?
☐ YES Date of Approval: _____ ☒ 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

Salem, MO WWTF Improvements - Phase 1A

2.2 PROJECT DESCRIPTION

The Salem WWTF Phase 1A improvements project involves the construction of a intermediate pump station and UV disinfections facility, along with all appurtenant ancillary improvements necessary to meet mandated effluent E. coli limits contained within the currently effective Missouri State Operating Permit.

2.3 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION

Excess sludge produced from the biological secondary treatment processes is pumped to aerobic digester for stabilization. stabilized sludge is dosed to sludge reed beds for dewatering. Every seven to eleven years, the dewatered sludge is removed from the reed beds and land applied as a solid soil amendment.

2.4 DESIGN INFORMATION

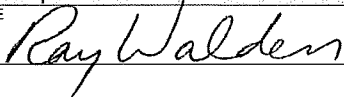
- A. Current population: 4924; Design population: 6053
- B. Actual Flow: 826000 gpd; Design Average Flow: 826000 gpd;
Actual Peak Daily Flow: 6500000 gpd; Design Maximum Daily Flow: 1321000 gpd;
Design Wet Weather Event: 6500000

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

\$ 4,066,000.00

3.0 WASTEWATER TREATMENT FACILITY					
NAME Salem, MO WWTF		TELEPHONE NUMBER WITH AREA CODE (573) 729-4811		EMAIL ADDRESS water@salem-mo.com	
ADDRESS (PHYSICAL) Highway 19 N		CITY Salem	STATE MO	ZIP CODE 65401	COUNTY Dent
Wastewater Treatment Facility: Mo- 0021768 (Outfall 001 Of 001)					
3.1 Legal Description: ¼, SE ¼, SE ¼, Sec. 12 , T 34N , R 06W (Use additional pages if construction of more than one outfall is proposed.)					
3.2 UTM Coordinates Easting (X): 628900 Northing (Y): 4168474 For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)					
3.3 Name of receiving streams: Spring Creek					
4.0 PROJECT OWNER					
NAME Ray Walden		TELEPHONE NUMBER WITH AREA CODE (573) 729-4811		EMAIL ADDRESS administration@salem-mo.com	
ADDRESS 410 N. Iron St.		CITY Salem	STATE MO	ZIP CODE 65401	
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 City of Salem, MO		TELEPHONE NUMBER WITH AREA CODE (573) 729-4811		EMAIL ADDRESS administration@salem-mo.com	
ADDRESS 410 N. Iron St.		CITY Salem	STATE MO	ZIP CODE 65560	
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 Ken Campbell P.E./ CM Archer Group, P.C.		TELEPHONE NUMBER WITH AREA CODE (573) 364-6362		EMAIL ADDRESS kcampbell@cmarcher.com	
ADDRESS 310 E. 6th St.		CITY Rolla	STATE MO	ZIP CODE 65401	
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 					
PRINTED NAME Ray Walden				DATE 1/9/18	
TITLE OR CORPORATE POSITION Administrator of Salem, MO		TELEPHONE NUMBER WITH AREA CODE (573) 729-4811		EMAIL ADDRESS administration@salem-mo.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.					

SIGN HERE

PART B – LAND APPLICATION ONLY

(Submit only if the proposed construction project includes land application of wastewater.)

8.0 FACILITY INFORMATION

8.1 Type of wastewater to be irrigated: ☐ Domestic ☐ State/National Park ☐ Seasonal business
☐ Municipal ☐ Municipal with a pretreatment program or significant industrial users
☐ Other (explain) _____

8.2 Months when the business or enterprise will operate or generate wastewater:
☐ 12 months per year ☐ Part of the year (list months): _____

8.3 This system is designed for:
☐ No-discharge ☐ Subsurface
☐ Partial irrigation when feasible and discharge rest of time
☐ Irrigation during recreational season, April – October, and discharge during November – March
☐ Other (explain) _____

9.0 STORAGE BASINS

9.1 Number of storage basins: _____ (Use additional pages if greater than two basins.)

9.2 Type of basins: ☐ Steel ☐ Concrete ☐ Fiberglass ☐ Earthen ☐ Earthen with membrane liner

9.3 Storage basin dimensions at inside top of berm (feet). Report freeboard as feet from top of berm to emergency spillway or overflow pipe.
Basin #1: Length _____ Width _____ Depth _____ Freeboard _____ Depth _____ Safety _____ % Slope _____
Basin #2: Length _____ Width _____ Depth _____ Freeboard _____ Depth _____ Safety _____ % Slope _____

9.4 Storage Basin operating levels (report as feet below emergency overflow level).
Basin #1: Maximum operating water level _____ ft Minimum operating water level _____ ft
Basin #2: Maximum operating water level _____ ft Minimum operating water level _____ ft

9.5 Design depth of sludge in storage basins.
Basin #1: _____ ft Basin #2: _____ ft

9.6 Existing sludge depth, if the basins are currently in operation.
Basin #1: _____ ft Basin #2: _____ ft

9.7 Total design sludge storage: _____ dry tons and _____ cubic feet

10.0 LAND APPLICATION SYSTEM

10.1 Type of land application: ☐ Fixed Head Sprinklers ☐ Center Pivot ☐ Traveling Gun ☐ Drip Dispersal
☐ Subsurface Low Pressure Pipe ☐ Other (describe) _____

10.2 Number of irrigation sites 2 Total Acres _____ Maximum % field slopes _____
Location: _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres
Location: _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres
Location: _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres
(Use additional pages if greater than three irrigation sites.)

10.3 Type of vegetation: ☐ Grass hay ☐ Pasture ☐ Timber ☐ Row crops
☐ Other (describe) _____

10.4 Wastewater flow (dry weather) gallons per day: Average annual _____
Seasonal _____ Off-season _____

10.5 Land application rate (design flow including 1-in-10 year storm water flows):
Design: _____ inches/year _____ inches/hour _____ inches/day _____ inches/week
Actual: _____ inches/year _____ inches/hour _____ inches/day _____ inches/week

10.6 Total irrigation per year (gallons): Design: _____ gal Actual: _____ gal

10.7 Actual months used for irrigation (check all that apply):
☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec

10.8 Land application rate is based on:
☐ Hydraulic Loading ☐ Other (describe) _____
☐ Nutrient Management Plan (N and P) If N and P is selected, is the plan included? ☐ YES ☐ NO