Permit No. CP0002553

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 Warrensburg
Warrensburg West WWTP
75 Northwest Highway 50
Warrensburg, MO 64093

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.

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 17, 2025
Effective Date

July 16, 2027
Expiration Date

John Hoke, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

The proposed construction for the treatment plant includes the following expansions to the existing facility:

- Addition of a fourth sequencing batch reactor (SBR), built with an identical layout to the existing SBR #3, to provide treatment for anticipated increases in flow to the facility. The work will also include the modification to the influent and effluent valve vaults to address the increased flow.
- Expansion of the existing ultraviolet (UV) disinfection system, which will provide an increase in peak capacity from 12.4 million gallons per day (MGD) to 17.7 MGD by removing the baffle walls in the UV channels and adding two UV modules to each of the existing four UV banks, increasing the total number of modules from 16 to 24.
- Construction of three additional sludge reed beds, increasing the number of sludge reed beds from nine to twelve to provide additional capacity for biosolids stabilization.

This project will also include general site work appropriate to the scope and purpose of the project and all necessary appurtenances to make a complete and usable wastewater treatment facility.

II. COST ANALYSIS FOR COMPLIANCE

Pursuant to Section 644.145, RSMo., when issuing permits under this chapter that incorporate a new requirement for discharges from publicly owned combined or separate sanitary or storm sewer systems or publicly owned treatment works, or when enforcing provisions of this chapter or the Federal Water Pollution Control Act, 33 U.S.C. 1251 et seq., pertaining to any portion of a publicly owned combined or separate sanitary or storm sewer system or publicly owned treatment works, the Department of Natural Resources shall make a "finding of affordability" on the costs to be incurred and the impact of any rate changes on ratepayers upon which to base such permits and decisions, to the extent allowable under this chapter and the Federal Water Pollution Control Act. This process is completed through a cost analysis for compliance. Permits that do not include new requirements may be deemed affordable.

The department is required to determine "findings of affordability" because the permit applies to a combined or separate sanitary sewer system for a publicly owned treatment works. However, the facility chose to waive the finding of affordability requirement; therefore, no cost analysis for compliance was conducted.

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 HDR Inc. on June 17, 2025, and signed and sealed by the following engineers on May 27, 2025, Cole Duckworth, P.E., Anthony Hopson, P.E., Caleb Dady, P.E., Thomas Keith Boyd III, P.E., Mitchell Wiebelhaus, P.E., and Jerry Kevan Prinds, P.E.; and approved by the department on July 17, 2025.

3. Regulation 10 CSR 20-4.040(18)(B)1 requires that projects be publicly advertised, allowing sufficient time for bids to be prepared and submitted. Projects should be advertised at least 30 days prior to bid opening.

4. 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(11).

5. As per 10 CSR 20-4.040, all changes in contract price or time within the approved scope of work must be by change order in accordance with Section 19 of this rule.

6. 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 electronic Sanitary Sewer Overflow/Bypass Reporting system at https://dnr.mo.gov/mogem/ or Kansas City Regional Office per 10 CSR 20-7.015(9)(G).

7. 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 https://dnr.mo.gov/data-e-services/missouri-gateway-environmental-management-mogem. See https://dnr.mo.gov/data-e-services/water/electronic-permitting-epermitting for more information.

8. A United States Army Corps of Engineers (USACE) Section 404 Department of Army permit (§404) along with the department's Section 401 Water Quality Certification or waiver (§401) 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 likely be required. Since the USACE makes determinations on what is jurisdictional, you must contact the USACE to determine permitting requirements. See https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/section-401-water-quality for more information or you may contact the department's Water Protection Program at 573-522-4502 or wpsc401cert@dnr.mo.gov.

9. Upon completion of construction:

   A. The City of Warrensburg will become the continuing authority for operation and maintenance 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)(N) and request the operating permit modification be issued.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

The proposed construction covered under this permit is part of a larger project that will help expand the existing treatment facilities for the anticipated 20-year design period population. The methods of treatment will be retained, but will have additional capacity constructed to account for the expected growth in the community. This construction permit covers the construction being done for the Warrensburg West WWTP.

2. FACILITY DESCRIPTION

The Warrensburg West WWTP is located at 75 Northwest Highway 50, Warrensburg, Missouri, in Johnson County. The facility has an existing design flow of 1.5 MGD and serves a design population equivalent of 15,000 people. Following construction, the design flow will be 2.0 MGD with a design population equivalent of 22,500 people.

3. COMPLIANCE PARAMETERS

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

Parameter	Units	Daily Maximum Limit	Monthly Average Limit
Total Flow Ω	MG		* (Weekly Average)
CBOD5 (May-Oct)	mg/L	11	6
CBOD5 (Nov-Apr)	mg/L	16	9
Total Suspended Solids	mg/L	33 (weekly average)	22
Ammonia as N-January	mg/L	9.0	2.3
Ammonia as N-February	mg/L	7.5	2.0
Ammonia as N-March	mg/L	7.5	2.0
Ammonia as N-April	mg/L	4.2	0.9
Ammonia as N-May	mg/L	4.2	0.9
Ammonia as N-June	mg/L	4.2	0.9
Ammonia as N-July	mg/L	4.2	0.9
Ammonia as N-August	mg/L	4.2	0.9

Ammonia as N-September	mg/L	4.2	0.9
Ammonia as N-October	mg/L	9.0	1.9
Ammonia as N-November	mg/L	9.0	2.3
Ammonia as N-December	mg/L	7.5	2.0
Total Phosphorus	mg/L	*	*
Total Kjeldahl Nitrogen	mg/L	*	*
Nitrite + Nitrate	mg/L	*	*
Total Nitrogen	mg/L	*	*
Copper, Total Recoverable	mg/L	38.1	16

4. ANTIDEGRADATION

The department has reviewed the antidegradation report for this facility and issued the Water Quality and Antidegradation Review dated April 2024, due to an anticipated increase in flow at the facility. See **APPENDIX – Water Quality and Antidegradation Review**.

5. REVIEW OF MAJOR TREATMENT DESIGN CRITERIA

- Sequencing Batch Reactor (SBR) – One new sequencing batch reactor with a hydraulic retention time of 32.5 hours. The average design flow of the new basin is 0.5 MGD with a maximum design flow of 2.5 MGD. The basin is designed with 1.5 feet of freeboard, a minimum water depth of 16.4 ft, and a maximum water depth of 20.5 ft. The basin design is based on operating for 4 cycles per day, with each cycle duration being 6 hours. Aeration is provided by a blower providing up to 1,000 scfm. There will be two blowers for the basin, with one active and the other in standby. The actual oxygen requirements are 1,940 lbs/day for the entire system. The decant system will have a flow rate at maximum design flow is 7,200 gpm. The decant duration is 18 minutes with 4 decants per day.

- Disinfection – Disinfection is the removal, deactivation, or killing of pathogenic microorganisms.
    - Expansion of the existing Open Channel Ultraviolet (UV) Disinfection System – An open channel, gravity flow UV disinfection system is already in place, capable of treating for a peak flow of 12.4 MGD, while delivering a minimum UV intensity of 30 mJ/cm² with an expected ultraviolet transmissivity of 60 or greater. The dual open channel UV system consists of two UV banks for each channel, with four modules per bank and eight lamps per module. The proposed construction will add additional capacity by removing baffle walls constructed in the channels, which will allow for two additional modules to be added to each bank, increasing the total number of

modules from 16 to 24, resulting in an increase in the number of UV lamps in the system from 128 to 192.

- Sludge Reed Beds – Three new reed beds cells will be constructed, covering a total area of 0.74 acres . Each cell will be 90 feet long and 120 feet wide. The annual volume applied per unit area is less than 40 gal/ft² to accommodate the annual sludge production rate of 244 dry tons/year.

6. OPERATING PERMIT

Operating permit MO-0055905 will require a modification to reflect the construction activities. The modification was combined with the standard operating permit renewal process, as the operating permit expired on December 3, 2014. The modified Warrensburg West WWTF permit, MO-0055905, was successfully public noticed from June 13, 2025, to July 14, 2025, with no comments received. Upon substantial completion of the construction work, submit the Statement of Work Completed to the department in accordance with 10 CSR 20-6.010(5)(N).

Joshua Brown, P.E.
Technical Reviewer
joshua.brown@dnr.mo.gov

APPENDIX

- **Water Quality and Antidegradation Review**

MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Water Protection Program
Water Pollution Control Branch
Engineering Section

Water Quality and Antidegradation Review

For the Protection of Water Quality
and Determination of Effluent Limits

Tributary to Post Oak Creek (Presumed Use Stream)

Requested by
Cole Duckworth
HDR, Inc.

For
Warrensburg West Wastewater Treatment Plant (WWTP) Improvements
City of Warrensburg Public Works Department

April 2024

Table of Contents

1. PURPOSE OF ANTIDEGRADATION REVIEW REPORT

An antidegradation review request was submitted by HDR, Inc for the City of Warrensburg Public Works Department to evaluate the expansion of the Warrensburg West WWTP (MO-0055905), which is currently designed to treat 1.5 million gallons per day (MGD). The proposed expansion will consist of construction of a fourth sequencing batch reactor (SBR), expansion of the UV disinfection system within the existing UV footprint, and expansion of the existing sludge reed beds from 9 cells to 12 cells. These improvements will allow the design average flow to be increased to 2 MGD. An antidegradation review was required to be conducted because the proposed project is considered an expanded discharge.

In accordance with Missouri's Water Quality Standards [10 CSR 20-7.031(3)] and federal antidegradation policy at Title 40 Code of Federal Regulation (CFR) Section 131.12 (a), the department developed a statewide antidegradation policy and corresponding procedures to implement the policy. A proposed discharge to a water body will be required to undergo a level of Antidegradation Review that documents that the use of a water body's available assimilative capacity is justified. Effective August 30, 2008, and revised July 13, 2016, a facility is required to use Missouri's Antidegradation Implementation Procedure (AIP) for new and expanded wastewater discharges.

The AIP specifies that when the proposed activity results in a reduction by 10 percent or more of the:

- facility assimilative capacity for any pollutant as a result of any single discharge;
- segment assimilative capacity for any pollutant as a result of all discharges combined after existing water quality (EWQ); or
- any new or expanded discharge that the department determines will likely result in the increased accumulation of pollutants or their degradation products in sediment or fish tissue,

then a demonstration of necessity (i.e., alternatives analysis) and a determination of social and economic importance are required.

The applicant elected to determine that all pollutants of concern (POC) are non-degrading in the receiving stream by demonstrating that the mass loading of all pollutants will be maintained or lowered as a result of the proposed expansion. This analysis was conducted to fulfill the requirements of the AIP. Information that was provided by the applicant in the submitted report and summary forms in Appendix D was used to develop this review document.

The preferred treatment technology is an additional SBR along with an expanded UV disinfection system and expansion of the existing sludge reed beds with three additional cells. The receiving waterbody is Tributary to Post Oak Creek. The proposed design flow is 2 MGD.

The following is a review of the Antidegradation Review Report for the West WWTP Improvements prepared by HDR, Inc. dated December 22, 2023.

2. PERMIT LIMITS AND MONITORING

Table 2-1: Performance Based Levels

PARAMETER	Unit	Basis	Monthly Average
Flow	MGD	FSR	*
$CBOD_5$ (Summer) May 1 – October 30	mg/L	NDEL	6
$CBOD_5$ (Winter) November 1 – April 30	mg/L	NDEL	9
TSS	mg/L	NDEL	22
*Escherichia coli***	#/100mL		206**
Ammonia as N (January) (February) (March) (Summer) April 1 – September 30 (October) (November) (December)	mg/L	NDEL	 2.3 2 2 0.9 1.9 2.3 2.0
Oil & Grease	mg/L	FSR	10
Copper, Total Recoverable	µg/L	NDEL	11.9
Total Phosphorus	mg/L	FSR	*
Total Kjeldahl Nitrogen	mg/L	FSR	*
Nitrite + Nitrate	mg/L	FSR	*
PARAMETER	**Unit**	**Basis for Limits**	**Minimum/ Maximum**
pH	SU	FSR	6.5-9.0
PARAMETER	**Unit**	**Basis for Limits**	**Monthly Avg. Min**
$CBOD_5$ Percent Removal	%	FSR	85
TSS Percent Removal	%	FSR	85

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

Basis for Limitations Codes:

MDEL – Minimally Degrading Effluent Limit
NDEL – Non-Degrading Effluent Limit
PEL – Preferred Effluent Limit
BPJ – Best Professional Judgment
TBEL – Technology-Based Effluent Limit
WQBEL – Water Quality-Based Effluent Limit
FSR – Federal or State Regulation

3. FACILITY INFORMATION

The Warrensburg West WWTP is a 1.5 MGD mechanical plant receiving actual flows of approximately 1.36 MGD based on the Discharge Monitoring Report data from the past 5 years of operation. The facility currently includes an influent pump station, bar screens, aerated grit chamber, flow equalization basin, 3 sequencing batch reactors, effluent pump station, UV disinfection, sludge gravity thickener, 4 aerobic sludge digester basins, and 9 cell reed beds for sludge application. The facility discharges to Tributary to Post Oak Creek. The city of Warrensburg is looking to expand the existing treatment plant to accommodate future growth and service demands.

Facility Name:	Warrensburg West Wastewater Treatment Plant
Address:	75 Northwest Highway 50, Warrensburg, MO 64093
Permit #:	MO-0055905
County:	Johnson
Facility Type:	POTW
Owner:	City of Warrensburg Public Works Department
Continuing Authority:	Same as Owner
UTM Coordinates:	X = 434040 Y = 4293043
Legal Description:	SW ¼, NW ¼, Sec. 14, T46N, R26W
12 digit watershed:	103001040108
Ecological Drainage Unit:	Central Plains/Blackwater/Lamine

A. FACILITY PERFORMANCE HISTORY:

A review of the past five years of Discharge Monitoring Report data showed no exceedances of any parameters.

The department conducted an inspection of the Warrensburg West Wastewater Treatment Plant on July 1, 2019 and determined that the facility was in compliance with the Missouri Clean Water Law, The Missouri Clean Water Commission regulations, and Missouri Operating Permit MO-0094579.

B. NATURAL HERITAGE REVIEW

A Missouri Department of Conservation Natural Heritage Review was obtained by the applicant. Two state-ranked species were identified near the project area, the Norther Crawfish Frog and the Long-Tailed Weasels. Three species of bats, Indiana, Northern Long-Eared, and Tri-colored, may be present in the project area. The following recommendations were made for construction activities:

- Manage construction to minimize sedimentation and run-off to nearby streams.
- Adherence to any Clean Water Act permit conditions.
- Do not enter caves known to harbor Indian bats or Northern long-eared bats, especially from September to April.
- If any trees need to be removed for the project, contact the U.S. Fish and Wildlife Service for coordination under the Endangered Species Act.
- Revegetation of disturbed areas is recommended to minimize erosion, as is restoration with of native plant species compatible with the local landscape and for wildlife needs. Annuals like ryegrass may be combined with native perennials for quicker green-up. Avoid aggressive exotic perennials such as crown vetch and sericea lespedeza.
- Please see Best Management Practices for Construction and Development Projects Affecting Missouri Rivers and Streams - https://mdc.mo.gov/sites/default/files/2022-10/202209_Streams.pdf.
- Remove any mud, soil, trash, plants (or plant material) or animals from equipment before leaving any water body or work area.
- Drain water from boats and machinery that has operated in water, checking motor cavities, live-well, bilge and transom wells, tracks, buckets, and any other water reservoirs.
- When possible, wash and rinse equipment thoroughly with hard spray or HOT water (≥140° F, typically available at do-it-yourself carwash sites), and dry in the hot sun before using again.

The report also requested further coordination with U.S Fish and Wildlife regarding Tri-colored Bats. The applicant provided further correspondence with U.S. Fish and Wildlife to the department on February 5, 2024.

C. GEOHYDROLOGIC EVALUATION

A Geohydrologic Evaluation was not submitted with the request because no earthen basins, no land application, and no change to the outfall location is being proposed as part of this project.

4. RECEIVING WATERBODY INFORMATION

A. RECEIVING WATERBODY

Table 4-1: Outfalls Table

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	EFFLUENT TYPE
001	3.09	Secondary	Domestic

Table 4-2: Receiving Stream(s)

WATER-BODY NAME	CLASS	WBID	DESIGNATED USES*	12-DIGIT HUC	DISTANCE TO CLASSIFIED SEGMENT (MI)
Tributary to Post Oak Creek (Presumed Use Stream)	C	5067	AHP-WWH, WBC-B, SCR, HHP, IRR, LWP	013001040108	Direct Discharge
Post Oak Creek	P	0928	AHP-WWH, WBC-B, SCR, HHP, IRR, LWP		0.2

* **AHP** = Aquatic Habitat Protection - To ensure the protection and propagation of fish, shellfish, and wildlife. AHP is further subcategorized as: **WWH** = Warm Water Habitat; **CLH** = Cool Water Habitat; **CDH**= Cold Water Habitat; **EAH** = Ephemeral Aquatic Habitat; **MAH** = Modified Aquatic Habitat; **LAH** = Limited Aquatic Habitat; **DWS** = Drinking water supply; **GRW** = Groundwater; **HHP** = Human Health Protection as it relates to the consumption of fish; **IND** = Industrial water supply; **IRR** = Irrigation - Application of water to cropland or directly to cultivated plants that may be used for human or livestock consumption; **LWP** = Livestock and wildlife protection - Maintenance of conditions in waters to support health in livestock and wildlife; **WBC** = Whole Body Contact recreation where the entire body is capable of being submerged. WBC is further subcategorized as: **WBC-A** = Whole body contact recreation that supports swimming uses and has public access; **WBC-B** = Whole body contact recreation that supports swimming; **SCR** = Secondary Contact Recreation (like fishing, wading, and boating).

Table 4-3: Receiving Stream Segments

Receiving Water Body Segment Outfall #1:		
Upper end segment* UTM coordinates:	X = 434040 Y = 4293043	outfall
Lower end segment* UTM coordinates:	X = 433749 Y = 4293082	downstream confluence

*Segment is the portion of the stream where discharge occurs. Segment is used to track changes in assimilative capacity and is bound at a minimum by existing sources and confluences with other significant water bodies.

B. MIXING CONSIDERATIONS AND LOW FLOW VALUES

The proposed receiving waterbody is Tributary to Post Oak Creek, which is a presumed use class C stream. The department elected to use USGS StreamStats to establish low flow values. See Appendix C for StreamStats summary.

Table 4-4: Receiving Stream(s) Low-Flow Values

RECEIVING STREAM	LOW-FLOW VALUES (CFS)		
	1Q10	7Q10	30Q10
Tributary to Post Oak Creek (Presumed Use Stream)	0.0	0.0	0.0

Table 4-5: Mixing Considerations

Mixing Zone (CFS) [10 CSR 20-7.031(5)(A)4.B.(I)(a)]			Zone of Initial Dilution (CFS) [10 CSR 20-7.031(5)(A)4.B(I)(b)]		
1Q10	7Q10	30Q10	1Q10	7Q10	30Q10
0	0	0	0	0	N/A

C. Existing Water Quality

No existing water quality data was submitted. The facility discharges to Tributary to Post Oak Creek which flows into Post Oak Creek 0.2 miles downstream of the outfall.

Tributary to Post Oak Creek and Post Oak Creek are not listed on the 303(d) list and do not have a TMDL.

D. Receiving Water Monitoring Requirements

Upstream sampling for Total Phosphorus and Total Nitrogen are included in the current operating permit as these parameters are necessary to determine background stream concentrations in order to complete calculations that determine instream nutrient loading.

Downstream sampling for Total Hardness is included in the current operating permit because the permit includes metals that the toxicity of the metals are hardness dependent.

5. ANTIDEGRADATION REVIEW INFORMATION

A. Tier Determination

Waterbodies are assigned Tier 1, 2, or 3 protection levels.

Tier 1 protection is applied to a waterbody on a pollutant-by-pollutant basis for pollutants which may cause or contribute to the impairment of a beneficial use or violation of Water Quality Criteria (WQC); and prohibit further degradation of Existing Water Quality (EWQ) where additional pollutants of concern (POCs) would result in the water being included on the 303(d) List. According to the AIP, the waters may receive the POCs that are causing impairments if 1) the discharge would not cause or contribute to a violation of the WQS, 2) all other conditions of the state permitting requirements are met (i.e., no discharge options are explored and technology based requirements (including ELGs) are met); and 3) the permit is issued with the highest statutory and regulatory requirements.

- There are no Tier 1 pollutants of concern for this review as the receiving waterbody and downstream waterbodies do not have any TMDLs or 303(d) listings involving pollutants expected to be in this discharge.

Tier 2 level protection is assigned to the waterbody on a pollutant-by-pollutant basis that prohibits the degradation of water quality of a surface water unless a review of reasonable alternatives and social and economic considerations justifies the degradation in accordance with the methods presented in the AIP.

- Tier 2 Pollutants for this review include: carbonaceous biochemical oxygen demand ($CBOD_5$), total suspended solids (TSS), ammonia, oil and grease, copper, total phosphorus, total nitrogen, *E. coli* and pH.

Tier 3 protection prohibits any degradation of water quality of Outstanding National Resource Waters and Outstanding State Resource Waters as identified in Tables D and E of the Water Quality Standards (WQS).

Temporary degradation of water receiving Tier 3 protection may be allowed by the department on a case-by-case basis as explained in Section VI of the AIP.

- The receiving waterbody is not an Outstanding National Resource Water or an Outstanding State Resource Water, and as such Tier 3 is not applicable.

Below is a list of POCs reasonably expected and identified by the permittee in their application to be in the discharge. Pollutants of concern are defined as those pollutants "proposed for discharge that affect beneficial use(s) in waters of the state." They include pollutants that "create conditions unfavorable to beneficial uses in the water body receiving the discharge or proposed to receive the discharge" (AIP, Page 6).

Table 5-1: Pollutants of Concern and Tier Determinations

Pollutants of Concern	Tier	Review Type	Comment
Carbonaceous Biological Oxygen Demand ($CBOD_5$)/DO	2*	Insignificant	
Total Suspended Solids (TSS)	**	Insignificant	
Ammonia as N	2*	Insignificant	
Escherichia coli (E. coli)	2*		Disinfection required; UV proposed
Phosphorus, Total	2*		Nutrient Implementation Policy
Total Kjeldahl Nitrogen	2*		Nutrient Implementation Policy
Nitrite + Nitrate	2*		Nutrient Implementation Policy
Copper, Total Recoverable	2*	Insignificant	
Oil and Grease	2*		Permit limits applied
pH	***		Permit limits applied

* Tier assumed.
** Tier determination not possible: No in-stream standards for these parameters.
*** Standards for these parameters are ranges.

B. NECESSITY OF DEGRADATION

The AIP specifies that if the proposed activity does result in a reduction by 10 percent or more of the assimilative capacity then a demonstration of necessity (i.e., alternatives analysis) and a determination of social and economic importance are required. The proposed activity will result in insignificant degradation and therefore a demonstration of necessity is not required.

C. SOCIAL AND ECONOMIC IMPORTANCE

The AIP specifies that if the proposed activity results in a reduction by 10 percent or more of the assimilative capacity then a demonstration of social and economic importance is required. The proposed activity will result in insignificant degradation and therefore a demonstration of social and economic importance is not required.

D. DEMONSTRATION OF INSIGNIFICANCE

The AIP states that a demonstration of insignificance of the discharge requires the applicant to show a reduction, or maintenance of loading, i.e., no change in ambient water quality concentrations in the receiving waters. As demonstrated in Antidegradation Review Report for the East WWTP Improvements dated December 22, 2023, modified upon discussions with the applicant, below summarizes the results of current loading based on the current permit concentrations and proposed loadings based on the proposed permit concentrations.

Table 5-2: Net Changes in Loading

Pollutants of Concern	Current Weekly Average or Maximum Daily Limit (mg/L)	Proposed Weekly Average or Maximum Daily Limit (mg/L)	Current Loading (lbs/day)	Proposed Loading (lbs/day)	Net change (lbs/day)
$CBOD_5$ (Summer)	15 (MDL)	11(AWL)	187.65	183.48	-4.17
$CBOD_5$ (Winter)	22 (MDL)	16 (AWL)	275.22	266.88	-8.34
Total Suspended Solids (TSS)	45 (AWL)	33 (AWL)	562.95	550.44	-12.51
pH	6.5-9.0 SI units	6.5-9.0 SI units	Not applicable	Not applicable	Not applicable
Ammonia (April 1 - Sep 30)	5.6 (MDL)	4.2 (MDL)	70.056	70.056	0.0
Ammonia (January)	12.1 (MDL)	9 (MDL)	151.371	150.12	-1.251
Ammonia (February)	10.1 (MDL)	7.5 (MDL)	126.351	125.1	-1.251
Ammonia (March)	10.1 (MDL)	7.5 (MDL)	126.351	125.1	-1.251
Ammonia (October)	12.1 (MDL)	9 (MDL)	151.371	150.12	-1.251
Ammonia (November)	12.1 (MDL)	9 (MDL)	151.371	150.12	-1.251
Ammonia (December)	10.1 (MDL)	7.5 (MDL)	126.351	125.1	-1.251
Escherichia coli (*E. coli*)	Regulatory limits apply	Regulatory limits apply	Not applicable*	Not applicable	Not applicable
Copper	29.2 (µg/L) (MDL)	21.9 (µg/L) (MDL)	0.4	0.4	0.0
Total Phosphorus	Monitoring only	Monitoring only	Not applicable*	Not applicable	Not applicable
Total Kjeldahl Nitrogen	Monitoring only	Monitoring only	Not applicable*	Not applicable	Not applicable
Nitrite + Nitrate	Monitoring only	Monitoring only	Not applicable*	Not applicable	Not applicable
Oil and Grease	15 (MDL)	15 (MDL)	Not applicable*	Not applicable	Not applicable

* See Derivation and Discussion of Limits, Section 10. AWL = average weekly limit MDL = Maximum Daily Limit.

6. DERIVATION AND DISCUSSION OF PARAMETERS, LIMITS, AND PERFORMANCE BASED EFFLUENT LEVELS

Wasteload allocations and limits were calculated using two methods:

A. **Water quality-based** – Using water quality criteria or water quality model results and the dilution equation below:

$$C = \frac{(C_s \times Q_s) + (C_e \times Q_e)}{(Q_e + Q_s)}$$ (EPA/505/2-90-001, Section 4.5.5)

$$C_e = \frac{(Q_e + Q_s)C - (C_s \times Q_s)}{Q_e}$$

Where C = downstream concentration (mg/L)
C_s = upstream concentration (mg/L)
Q_s = upstream flow (cfs)
C_e = effluent concentration (mg/L)
Q_e = effluent flow (cfs)

Chronic wasteload allocations were determined using applicable chronic water quality criteria (CCC: criteria continuous concentration) and stream volume of flow at the edge of the mixing zone (MZ). Acute wasteload allocations were determined using applicable water quality criteria (CMC: criteria maximum concentration) and stream volume of flow at the edge of the zone of initial dilution (ZID).

Water quality-based maximum daily and average monthly effluent limitations were calculated using methods and procedures outlined in USEPA's "Technical Support Document for Water Quality-based Toxics Control" (EPA/505/2-90-001).

B. **Alternative Analysis-based** – Using the preferred alternative's treatment capacity for conventional pollutants such as BOD_5 and TSS that are provided by the consultant as the WLA, the performance based effluent average monthly and average weekly limits are determined by applying the WLA as the average monthly (AML) and multiplying the AML by 1.5 to derive the average weekly limit (AWL).

Note: Performance based effluent limits have been based on the authority included in Section I.A. of the AIP. Also under 40 CFR 133.105, permitting authorities shall require more stringent limitations than equivalent to secondary treatment limitations for 1) existing facilities if the permitting authority determines that the 30-day average and 7-day average BOD_5 and TSS effluent values could be achievable through proper operation and maintenance of the treatment works, and 2) new facilities if the permitting authority determines that the 30-day average and 7-day average BOD_5 and TSS effluent values could be achievable through proper operation and maintenance of the treatment works, considering the design capability of the treatment process.

Outfall #001 – **Main Facility Outfall**

- **Flow.** Though not limited itself, the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations [40 CFR Part 122.44(i)(1)(ii)]. If the permittee is unable to obtain effluent flow, then it is the responsibility of the permittee to inform the department, which may require the submittal of an operating permit modification. Influent monitoring has been and will be required for this facility in its Missouri State Operating Permit.

- **Carbonaceous Biochemical Oxygen Demand ($CBOD_5$).**
  - $CBOD_5$ (Summer) Effluent limits of 6 mg/L average monthly and 11 mg/L daily maximum were established as a result of a mass loading maintenance or reduction demonstration by the applicant. At the existing design flow 1.5 MGD the mass loading to the waterbody is 187.65 lbs/day while the proposed loading was calculated to be 183.48 lbs/day at the proposed effluent concentration and increased design flow. These limits are at least as stringent as the current permit limits that were effective March 1, 2017.
  - $CBOD_5$ (Winter) Effluent limits of 9 mg/L average monthly and 16 mg/L daily maximum were established as a result of a mass loading maintenance or reduction demonstration by the applicant. At the existing design flow 1.5 MGD the mass loading to the waterbody is 275.22 lbs/day while the proposed loading was calculated to be 266.88 lbs/day at the proposed effluent concentration and increased design flow. These limits are at least as stringent as the current permit limits that were effective March 1, 2017.

- **Total Suspended Solids (TSS).** Effluent limits of 22 mg/L average monthly and 33 mg/L average weekly were established as a result of a mass loading maintenance or reduction demonstration by the applicant. At the existing design flow 1.5 MGD the mass loading to the waterbody is 562.95 lbs/day while the proposed loading was calculated to be 550.44 lbs/day at the proposed effluent concentration and increased design flow. These limits are at least as stringent as the minimum effluent regulations established in 10 CSR 20-7.015(8).

- ***Escherichia coli (E. coli).*** Effluent limits of 206 CFU per 100 mL monthly average and 1,030 CFU per 100 mL as a weekly average of geometric mean during the recreation season (April 1 – October 31) were established in the previous operating permit to protect Whole Body Contact Recreation (B) designated use of Tributary to Post Oak Creek. An effluent limit for both monthly average and weekly maximum is required by 40 CFR 122.45(d) for POTWs.

- **Total Ammonia Nitrogen.**
The proposed non-degrading effluent limits:

Parameter	Units	AML	MDL
Ammonia as N (Apr -1 – Sep 30)	mg/L	0.9	4.2
Ammonia as N- January	mg/L	2.3	9.0
Ammonia as N- February	mg/L	2.0	7.5
Ammonia as N- March	mg/L	2.0	7.5
Ammonia as N- October	mg/L	1.9	9.0
Ammonia as N- November	mg/L	2.3	9.0
Ammonia as N- December	mg/L	2.0	7.5

Non-Degrading Limitations Calculations

Current Loadings (Maximum Daily):
Ammonia (Apr 1 – Sep 30): 8.34 (lbs/MGD)/(mg/L) * 5.6 mg/L * 1.5 MGD = 70.056 lbs/day
Ammonia (January): 8.34 (lbs/MGD)/(mg/L) * 12.1 mg/L * 1.5 MGD = 151.371 lbs/day
Ammonia (February): 8.34 (lbs/MGD)/(mg/L) * 10.1 mg/L * 1.5 MGD = 126.351 lbs/day
Ammonia (March): 8.34 (lbs/MGD)/(mg/L) * 10.1 mg/L * 1.5 MGD = 126.351 lbs/day
Ammonia (October): 8.34 (lbs/MGD)/(mg/L) * 12.1 mg/L * 1.5 MGD = 151.371 lbs/day
Ammonia (November): 8.34 (lbs/MGD)/(mg/L) * 12.1 mg/L * 1.5 MGD = 151.371 lbs/day
Ammonia (December): 8.34 (lbs/MGD)/(mg/L) * 10.1 mg/L * 1.5 MGD = 126.351 lbs/day

Proposed Loadings (Maximum Daily):
Ammonia (Apr 1 – Sep 30): 8.34 (lbs/MGD)/(mg/L) * 4.2 mg/L * 2.0 MGD = 70.056 lbs/day
Ammonia (January): 8.34 (lbs/MGD)/(mg/L) * 9 mg/L * 2.0 MGD = 150.12 lbs/day
Ammonia (February): 8.34 (lbs/MGD)/(mg/L) * 7.5 mg/L * 2.0 MGD = 125.1 lbs/day
Ammonia (March): 8.34 (lbs/MGD)/(mg/L) * 7.5 mg/L * 2.0 MGD = 125.1 lbs/day
Ammonia (October): 8.34 (lbs/MGD)/(mg/L) * 9 mg/L * 2.0 MGD = 150.12 lbs/day
Ammonia (November): 8.34 (lbs/MGD)/(mg/L) * 9 mg/L * 2.0 MGD = 150.12 lbs/day
Ammonia (December): 8.34 (lbs/MGD)/(mg/L) * 7.5 mg/L * 2.0 MGD = 125.1 lbs/day

To verify that the proposed non-degrading limits provided by the facility are protective of the water quality based effluent limits, below is the following calculation of water quality based effluent limits. It demonstrates that the proposed non-degrading effluent limits proposed by the applicant are more protective.

Early Life Stages Present Total Ammonia Nitrogen criteria apply [10 CSR 20-7.031(5)(B)7.C. & Table B3]. Background total ammonia nitrogen = 0.01 mg/L. No mixing allowed; therefore WLA = appropriate criterion

Table 6-1: Ammonia Criteria as of February 2024

Season/Month	Temp (°C)*	pH (SU)*	Total Ammonia Nitrogen CCC (mg/L)	Total Ammonia Nitrogen CMC (mg/L)
Summer	26	7.8	1.5	12.1
January	2.8	7.8	3.1	12.1
February	4.0	7.9	2.7	10.1
March	10.6	7.9	2.7	10.1
October	17.5	7.8	2.6	12.1
November	11.6	7.8	3.1	12.1
December	4.9	7.9	2.7	10.1

* Ecoregion Data (Central Irregular Plains)

WBQEL equation
$C_e = (((Q_e+Q_s)*C) - (Q_s*C_s))/Q_e$

Summer
Chronic WLA: Ce = ((3.09+ 0.0)1.5 – (0.0 * 0.01))/ 3.09 = 1.5 mg/L
Acute WLA: Ce = ((3.09+ 0.0)12.1 – (0.0 * 0.01))/ 3.09 = 12.1 mg/L
AML = 1.5 mg/L
MDL = 12.1 mg/L

January
Chronic WLA: Ce = ((3.09 + 0.0)3.1 – (0.0 * 0.01)) / 3.09 = 3.1
Acute WLA: Ce = ((3.09 + 0.0)12.1 – (0.0 * 0.01)) / 3.09 = 12.1
AML = WLAc = 3.1 mg/L
MDL = WLAa = 12.1 mg/L

February
Chronic WLA: Ce = ((3.09 + 0.0)2.7 – (0.0 * 0.01)) / 3.09 = 2.7
Acute WLA: Ce = ((3.09 + 0.0)10.1 – (0.0 * 0.01)) / 3.09 = 10.1
AML = WLAc = 2.7 mg/L
MDL = WLAa = 10.1 mg/L

March
Chronic WLA: Ce = ((3.09 + 0.0)2.7 – (0.0 * 0.01)) / 3.09 = 2.7
Acute WLA: Ce = ((3.09 + 0.0)10.1 – (0.0 * 0.01)) / 3.09 = 10.1
AML = WLAc = 2.7 mg/L
MDL = WLAa = 10.1 mg/L

October
Chronic WLA: Ce = ((3.09 + 0.0)2.6 – (0.0 * 0.01)) / 3.09 = 2.6
Acute WLA: Ce = ((3.09 + 0.0)12.1 – (0.0 * 0.01)) / 3.09 = 12.1
AML = WLAc = 2.6 mg/L
MDL = WLAa = 12.1 mg/L

November
Chronic WLA: Ce = ((3.09 + 0.0)3.1 – (0.0 * 0.01)) / 3.09 = 3.1
Acute WLA: Ce = ((3.09 + 0.0)12.1 – (0.0 * 0.01)) / 3.09 = 12.1
AML = WLAc = 2.4 mg/L
MDL = WLAa = 8.4 mg/L

December
Chronic WLA: Ce = ((3.09 + 0.0)2.7 – (0.0 * 0.01)) / 3.09 = 2.7
Acute WLA: Ce = ((3.09 + 0.0)10.1 – (0.0 * 0.01)) / 3.09 = 10.1
AML = WLAc = 2.7 mg/L
MDL = WLAa = 10.1 mg/L

Table 6-2: Comparison of WQBEL and Performance Based Levels

Season /Month	Monthly Average Limit	
	WQBEL (mg/L)	PBL (mg/L)
Summer (Apr 1 – Sep 30)	1.5	**0.9**
January	3.1	**2.3**
February	2.7	**2**
March	2.7	**2**
October	2.6	**1.9**
November	2.4	**2.3**
December	2.7	**2**

- **Ammonia as N, Influent Monitoring.** As the proposed facility design flow is greater than 0.1 MGD, influent monitoring will be required per 10 CSR 20-7.015(9)(D)8.

- **Oil & Grease.** Conventional pollutant, [10 CSR 20-7.031(4)(B)]. Waters shall be free from oil, scum, and floating debris in sufficient amounts to be unsightly or prevent full maintenance of beneficial uses.

- **Total Phosphorus** Monitoring required for facilities greater than 100,000 gpd design flow per 10 CSR 20-7.015(9)(D)7.
  - As a major facility with a design flow greater than 1.0 MGD, the facility is required to meet 1.0 mg/L effluent limit [10 CSR 20-7.015(9)(B)2.A, effective October 30, 2023] by January 1, 2033 [10 CSR 20-7.015(9)(B)2.D.(II)]. The facility proposes to meet this limit through sequencing batch reactor cycle times being adjusted in the fill and mixed phases to promote anaerobic conditions where biological phosphorus removal can be promoted.
  - **Total Phosphorus, Influent Monitoring.** As the proposed facility is greater than 0.1 MGD, influent monitoring will be required per 10 CSR 20-7.015(9)(D)8.

- **Total Kjeldahl Nitrogen, & Nitrate + Nitrite.** Effluent monitoring for Total Kjeldahl Nitrogen, and Nitrate + Nitrite are required per 10 CSR 20-7.015(9)(D)8. The preferred alternative selected for ammonia treatment serves as the base case for total nitrogen. As the facility does not discharge into an impaired stream or lake watershed, ammonia effluent limits are all that are being required at this time, with monthly monitoring of TKN and nitrate+nitrite at this time. Total Nitrogen will be a sum of TKN and nitrate+nitrite.
  - **Total Kjeldahl Nitrogen, & Nitrate + Nitrite, Influent Monitoring.** As the proposed facility is greater than 0.1 MGD, influent monitoring will be required per 10 CSR 20-7.015(9)(D)8.

- **pH.** The preferred alternative selected for ammonia treatment serves as the base case for pH with effluent limit range of 6.5-9.0 SU. Technology based effluent limitations of 6.0-9.0 SU [10 CSR 20-7.015] are not protective of the Water Quality Standard, which states that water contaminants shall not cause pH to be outside the range of 6.5-9.0 SU. No mixing zone is allowed due to the classification of the receiving stream, therefore the water quality standard must be met at the outfall.

- **Carbonaceous Biochemical Oxygen Demand (BOD_5) Percent Removal.** In accordance with 40 CFR Part 133, removal efficiency is a method by which the Federal Regulations define Secondary Treatment and Equivalent to Secondary Treatment, which applies to $CBOD_5$ and TSS for Publicly Owned Treatment Works (POTWs. This facility is required to meet 85 percent removal efficiency for BOD_5.

- **Total Suspended Solids (TSS) Percent Removal.** In accordance with 40 CFR Part 133, removal efficiency is a method by which the Federal Regulations define Secondary Treatment and Equivalent to Secondary Treatment, which applies to $CBOD_5$ and TSS for Publicly Owned Treatment Works (POTWs). This facility is required to meet 85 percent removal efficiency for TSS.

Metals.

- **Copper, Total Recoverable.** Effluent limits of 11.9 µg/L average monthly and 21.9 µg/L daily maximum were established as a result of a mass loading maintenance or reduction demonstration by the applicant. At the existing design flow 1.5 MGD the mass loading to the waterbody is 0.4 lbs/day while the proposed loading was calculated to be 0.4 lbs/day at the proposed effluent concentration and increased design flow. These limits are at least as stringent as the minimum effluent regulations established in 10 CSR 20-7.031(6).

7. GENERAL ASSUMPTIONS OF THE WATER QUALITY AND ANTIDEGRADATION REVIEW

A. A Water Quality and Antidegradation Review (WQAR) assumes that [10 CSR 20-6.010(2) Continuing Authorities and 10 CSR 20-6.010(4)(A)5.B., consideration for no discharge] has been or will be addressed in a Missouri State Operating Permit or Construction Permit Application.
B. A WQAR does not indicate approval or disapproval of alternative analysis as per [10 CSR 20-7.015(4) Losing Streams], and/or any section of the effluent regulations.
C. Changes to Federal and State Regulations (FSR) made after the drafting of this WQAR may alter Water Quality Based Effluent Limits (WQBEL).
D. Effluent limitations derived from FSR may be WQBEL or Effluent Limit Guidelines (ELG).
E. WQBEL supersede ELG only when they are more stringent. Mass limits derived from technology based limits are still appropriate.
F. A WQAR does not allow discharges to waters of the State, and shall not be construed as a National Pollution Discharge Elimination System (NPDES) or Missouri State Operating Permit to discharge or a permit to construct, modify, or upgrade.
G. Limitations and other requirements in a WQAR may change as Water Quality Standards (WQS), Methodology, and Implementation procedures change.
H. Nothing in this WQAR removes any obligations to comply with county or other local ordinances or restrictions.
I. The operating permit may contain additional requirements to evaluate the effectiveness of the technology once the facility is in operation. This Antidegradation Review is based on the information provided by the facility and is not a comprehensive review of the proposed treatment technology. If the review engineer determines the proposed technology will not consistently meet proposed effluent limits, the permittee will be required to revise their Antidegradation Report.

8. ANTIDEGRADATION REVIEW PRELIMINARY DETERMINATION

The proposed improvements will result in insignificant degradation of Tributary to Post Oak Creek. Per the requirements of the AIP, the effluent limits in this review were developed to be protective of beneficial uses and to attain the highest statutory and regulatory requirements. The department has determined that the submitted review is sufficient and meets the requirements of the AIP. No further analysis is needed for this discharge.

Reviewer: Joe Blume, P.E.
Date: April 2024
Reviewer: Cailie Carlile, P.E.

APPENDIX A: MAP OF DISCHARGE LOCATION

APPENDIX B: NATURAL HERITAGE REVIEW

Missouri Department of Conservation

Natural Heritage Review Report

January 25, 2024

Science Branch
P. O. Box 180
Jefferson City, MO 65102
Prepared by: Shelly Colatskie
NaturalHeritageReview@mdc.mo.gov
(573) 522 - 4115 ext. 3182

Page Haynes
HDR, Inc.
Page.Haynes@hdrinc.com

NHR ERT ID:	13818
NHR ERT Level:	2
Project type:	Wastewater
Location/Scope:	T46NR25WS03 and T46NR25WS14
County:	Johnson
Project Title:	City of Warrensburg, Missouri West and East Wastewater Treatment Plant Improvements
Query received:	12/27/2023

This NATURAL HERITAGE REVIEW is not a site clearance letter. Rather, it identifies public lands and records of sensitive resources located close to and/or potentially affected by the proposed project. If project plans or location change, this report may no longer be valid. Because land use conditions change and animals move, the existence of an occurrence record does not mean the species/habitat is still present. Therefore, reports include information about records near but not necessarily on the project site. Lack of an occurrence record does not mean that a sensitive species or natural community is not present on or near the project area. On-site verification is the responsibility of the project. These records serve as one reference and additional information (e.g. wetland or soils maps, on-site inspections or surveys) should be considered. Look for additional information about the biological and habitat needs of records listed to avoid or minimize impacts. More information is at Natural Areas | Missouri Department of Conservation (mo.gov) and Missouri Fish and Wildlife Information System (MOFWIS).

Level 3: Records of federal-listed (also state-listed) species or critical habitats near the project site:

Natural Heritage records identify no wildlife preserves, no designated wilderness areas or critical habitats, and no federal-listed species records within the project area, or in the public land survey section or sections adjacent.

FEDERAL LIST species/habitats are protected under the Federal Endangered Species Act. **Contact U.S. Fish & Wildlife Service** (101 Park Deville Drive Suite A, Columbia, Missouri 65203-0007; 573-234-2132) for Endangered Species Act coordination and concurrence information).

Level 2: Records of state-listed (not federal-listed) endangered species AND / OR state-ranked (not state-listed endangered) species and natural communities of conservation concern. The Department tracks these species and natural communities due to population declines and/or apparent vulnerability.

Natural Heritage records identify no state-listed endangered species within the project area.

Natural Heritage records indicate the following state-ranked species near the project area:

Scientific Name	Common Name	State Rank	Proximity (miles)	Primary Habitat
Lithobates areolatus circulosus	Northern Crawfish Frog	S3	<3	Grassland matrix, Ephemeral pools, Wet ditches, Wet prairie/meadow
Mustela frenata	Long-tailed Weasel	S3	<1	Habitat generalist, Savanna/Shrub/Woodland matrix, Forest matrix, Grassland matrix

State Rank Definitions:

- S1: Critically imperiled in the state because of extreme rarity of or because of some factor(s) making it especially vulnerable to extirpation from the state. Typically, 5 or fewer occurrences or very few remaining individuals (<1,000).

- S2: Imperiled in the state because of rarity or because of some factor(s) making it very vulnerable to extirpation from the state (6 to 20 occurrences or few remaining individuals).
- S3: Vulnerable in the state either because rare and uncommon, or found only in a restricted range (even if abundant at some locations), or because of other factors making it vulnerable to extirpation. Typically 21 to 100 occurrences or between 3,000 and 10,000 individuals.
- S4: Uncommon but not rare, and usually widespread in the nation or state. Possible cause of long-term concern. Usually more than 100 occurrences and more than 10,000 individuals.
- S#S#: Range Rank: A numeric range rank (e.g., S2S3) is used to indicate the range of uncertainty about the exact status.
- ?: Denotes inexact or uncertain numeric rank.
- SU: Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.

There are no regulatory requirements associated with this status, however we encourage voluntary stewardship to minimize the risk of further decline that could lead to listing.

STATE ENDANGERED species are protected under the Wildlife Code of Missouri (3CSR10-4.111).
See the Missouri Species And Communities Of Conservation Concern Checklist (mo.gov) for a complete list.

General recommendations related to this project or site, or based on information about the historic range of species (unrelated to any specific Natural Heritage records):

- **Wastewater:** Clean Water Act permits issued by other agencies (Missouri DNR or US Army Corps of Engineers) regulate both construction and operation of wastewater systems, and provide many important protections for fish and wildlife resources throughout the project area and at some distance downstream. Fish and wildlife almost always benefit when unnatural pollutants are removed from water, and concerns are minimal if construction is managed to minimize erosion and sedimentation/runoff to nearby streams and lakes, including adherence to any Clean Water Act permit conditions.
  - Revegetation of disturbed areas is recommended to minimize erosion, as is restoration with of native plant species compatible with the local landscape and for wildlife needs. Annuals like ryegrass may be combined with native perennials for quicker green-up. Avoid aggressive exotic perennials such as crown vetch and sericea lespedeza.
  - Please see Best Management Practices for Construction and Development Projects Affecting Missouri Rivers and Streams (mo.gov).

- **Tri-colored Bats:** Tri-colored bats (*Perimyotis subflavus*, federally proposed endangered) are known to occur within 5 miles of the project area. In Missouri, most tri-colored bats hibernate in winter in the most humid and warm parts of caves. In summer, they roost in trees, in crannies about cliffs or buildings, in barns, or sometimes in high domes of caves. Tri-colored bats have been significantly impacted by White-nose syndrome. Please contact U.S. Fish and Wildlife Service (Ecological Services, 101 Park Deville Drive, Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132 Ext. 100 for Ecological Services) for further coordination under the Endangered Species Act.

- **Conservation Opportunity Areas:** The project is near the Blackwater River Wetlands Conservation Opportunity Area. COAs are key landscapes that represent the greatest opportunities for sustainable conservation of the Missouri's diverse flora and fauna and the natural communities they depend upon, including: grasslands (including prairie and savanna), glades,

forests and woodlands, wetlands, caves and karst, and rivers and streams. COAs have been identified based on several factors, including the diversity and rarity of species and natural communities present, and the comparative likelihood/importance of projects to maintain them in the area over time. COAs have no regulatory role, but do reflect interest as a planning tool from multiple government agencies, non-governmental organizations and citizen groups to facilitate conservation in the area. Maintenance of high quality natural terrestrial and aquatic communities will help provide important habitat for the COA's biodiversity. Funding might be available to manage for important habitats within the COA. Please contact Missouri Department of Conservation for more information.

- **Indiana Bats and Northern Long-eared Bats: If this project has the potential to alter habitat (e.g. tree removal, projects in karst habitat) or cause direct mortality of bats, please coordinate directly with U.S. Fish and Wildlife Service (Ecological Services, 101 Park Deville Drive, Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132 Ext. 100 for Ecological Services) for further coordination under the Endangered Species Act.**

  Though Indiana and Northern Long-eared bats are not known to occur in the project area, these species should be assumed present wherever habitat exists and could occur in the project area. Indiana Bats *(Myotis sodalis*, federal and state-listed endangered) and Northern Long-eared Bats (*Myotis septentrionalis,* federal-listed endangered) hibernate during winter months in caves and mines. During the summer months, they roost and raise young under the bark of trees in riparian forests and upland forests near perennial streams. During project activities, avoid degrading stream quality and where possible leave snags standing and preserve mature forest canopy. Do not enter caves known to harbor Indiana Bats and/or Northern Long-eared Bats, especially from September to April.

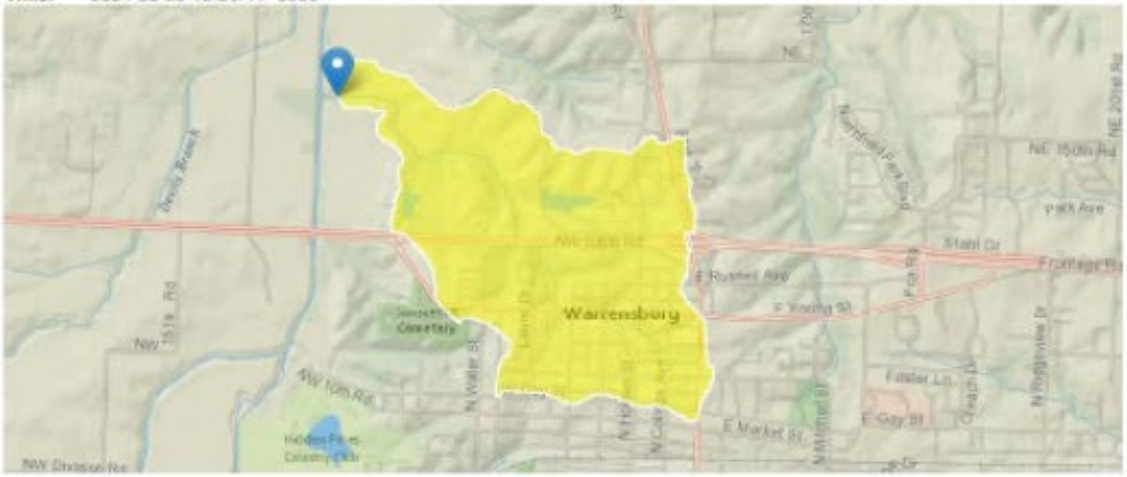
- Invasive exotic species are a significant issue for fish, wildlife and agriculture in Missouri. Seeds, eggs, larvae, and aquatic plant material may be moved to new sites on boats or construction equipment, so inspect and clean equipment thoroughly before moving between project sites.
  - Remove any mud, soil, trash, plants (or plant material) or animals from equipment before leaving any water body or work area.
  - Drain water from boats and machinery that has operated in water, checking motor cavities, live-well, bilge and transom wells, tracks, buckets, and any other water reservoirs.
  - When possible, wash and rinse equipment thoroughly with hard spray or HOT water (≥140° F, typically available at do-it-yourself carwash sites), and dry in the hot sun before using again.

These recommendations are ones project managers might prudently consider based on a general understanding of species needs and landscape conditions. Natural Heritage records largely reflect sites visited by specialists in the last 30 years. Many privately owned tracts have not been surveyed and could host remnants of species once but no longer common.

APPENDIX C: STREAMSTATS REPORT

StreamStats Report

Region ID: MO
Workspace ID: MO20240223182018444000
Clicked Point (Latitude, Longitude): 38.78373, -93.76147
Time: 2024-02-23 12:20:41 -0600



Collapse All

Basin Characteristics

Parameter Code	Parameter Description	Value	Unit
DRNAREA	Area that drains to a point on a stream	1.15	square miles
LFPLENGTH	Length of longest flow path	2.34	miles
STREAM_VARG	Streamflow variability index as defined in WRIR 02-4068, computed from regional grid	0.77	dimensionless

Low-Flow Statistics

Low-Flow Statistics Parameters [LowFlow Region 1 SIR 2013 5090]

Parameter Code	Parameter Name	Value	Units	Min Limit	Max Limit
DRNAREA	Drainage Area	1.15	square miles	0.34	4320
LFPLENGTH	LFP length	2.34	miles	1.28	268
STREAM_VARG	Streamflow Variability Index from Grid	0.77	dimensionless	0.376	1.03

Low-Flow Statistics Flow Report [LowFlow Region 1 SIR 2013 5090]

Statistic	Value	Unit
1 Day 10 Year Low Flow	0.0000874	ft^3/s

Statistic	Value	Unit
2 Day 10 Year Low Flow	0.0000911	ft^3/s
3 Day 10 Year Low Flow	0.000107	ft^3/s
7 Day 10 Year Low Flow	0.000127	ft^3/s
10 Day 10 Year Low Flow	0.000158	ft^3/s
30 Day 10 Year Low Flow	0.000815	ft^3/s
60 Day 10 Year Low Flow	0.00138	ft^3/s

Low-Flow Statistics Citations

Southard, R.E.,2013, Computed statistics at streamgages, and methods for estimating low-flow frequency statistics and development of regional regression equations for estimating low-flow frequency statistics at ungaged locations in Missouri: U.S. Geological Survey Scientific Investigations Report 2013–5090, 28 p. (http://pubs.usgs.gov/sir/2013/5090/)

Application Version: 4.19.4
StreamStats Services Version: 1.2.22
NSS Services Version: 2.2.1

APPENDIX D: ANTIDEGRADATION REVIEW SUMMARY ATTACHMENTS

The attachments that follow contain summary information provided by the applicant, City of Warrensburg. department staff or the applicant determined that changes must be made to the information contained within these attachments. The following were modified per discussion with the applicant and can be found within the department WQAR:

1) Antidegradation Review Summary Request: Section 11. Applicant Proposed Antidegradation Review Effluent Limits values were changed for Ammonia as N (Summer), Ammonia as N (Winter), $CBOD_5$ and TSS to ensure that loading to the receiving stream was not increased. The proposed changes were sent by the department in a comment email on January 26, 2024 and a response from the applicant accepting the proposed changes was sent to the department on February 5, 2024.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH
ANTIDEGRADATION REVIEW SUMMARY / REQUEST

FOR DEPARTMENT USE ONLY	
APP NO.	
FEE RECEIVED	CHECK NO.
DATE RECEIVED	

1. FACILITY

NAME			COUNTY	
Warrensburg West Wastewater Treatment Plant			Johnson	
ADDRESS (PHYSICAL)	CITY		STATE	ZIP CODE
75 Northwest 50 Highway	Warrensburg		MO	64093
PERMIT NUMBER	PROPOSED DESIGN FLOW	SIC / NAICS CODE		
MO0094579	2.0 MGD	4952		

2. OWNER

NAME			
City of Warrensburg Public Works Department			
ADDRESS	CITY	STATE	ZIP CODE
102 S. Holden Street	Warrensburg	MO	64903
EMAIL ADDRESS		TELEPHONE NUMBER WITH AREA CODE	
Phil@Warrensburg-mo.com		660-262-4710	

3. CONTINUING AUTHORITY The regulatory requirement regarding continuing authority is found in 10 CSR 20-6.010(2).

NAME	SECRETARY OF STATE CHARTER NUMBER		
City of Warrensburg Public Works Department			
ADDRESS	CITY	STATE	ZIP CODE
102 S. Holden Street	Warrensburg	MO	64903
EMAIL ADDRESS		TELEPHONE NUMBER WITH AREA CODE	
Phil@Warrensburg-mo.com		660-262-4710	

4. CONSULTANT

PREPARER NAME	COMPANY NAME		
Cole Duckworth	HDR Engineering		
ADDRESS	CITY	STATE	ZIP CODE
10450 Holmes Road Suite 600	Kansas City	MO	64131
EMAIL ADDRESS		TELEPHONE NUMBER WITH AREA CODE	
Cole.Duckworth@hdrinc.com		816-347-1106	

5. RECEIVING WATER BODY SEGMENT #1

NAME: Unnamed tributary to Post Oak Creek (WBID 3960)

5.1 Upper end of segment – Location of discharge
UTM: X= 434040, Y= 4293043 OR Lat _____, Long _____

5.2 Lower end of segment – Confluence with Post Oak Creek
UTM: X= 433749, Y= 4293082 OR Lat _____, Long _____

Per the Missouri Antidegradation Implementation Procedure (AIP), the definition of a segment, "a segment is a section of water that is bound, at a minimum, by significant existing sources and confluences with other significant water bodies."

6. WATER BODY SEGMENT #2 (IF APPLICABLE, Use another form if a third segment is needed)

NAME: Post Oak Creek (WBID 928)

6.1 Upper end of segment – End of Segment #1
UTM: X= 433749, Y= 4293082 OR Lat _____, Long _____

6.2 Lower end of segment – Confluence with Blackwater River
UTM: X= 435638, Y= 4295647 OR Lat _____, Long _____

7. DECHLORINATION

If chlorination and dechlorination is the existing or proposed method of disinfection treatment, will the effluent discharged be equal to or less than the Water Quality Standards for Total Residual Chlorine stated in Table A1 of 10 CSR 20-7.031?

☐ Yes ☑ No – What is the proposed method of disinfection? UV disinfection

Based on the disinfection treatment system being designed for total removal of Total Residual Chlorine, minimal degradation for Total Residual Chlorine is assumed and the facility will be required to meet the water quality based effluent limits. These compliance limits for Total Residual Chlorine are much less than the method detection limit of 0.13 mg/L.

8. SUMMARIZE THE FEASIBILITY OF CONSTRUCTING A NO-DISCHARGE TREATMENT WASTEWATER FACILITY

According to the Antidegradation Implementation Procedure Sections I.B. and II.B.1., the feasibility of no-discharge alternatives must be considered. No-discharge alternatives may include connection to a regional treatment facility, surface land application, subsurface land application, and recycle or reuse.
Not applicable. The City is proposing non-degrading limits.

9. ADDITIONAL REQUIREMENTS

Complete and submit the following with this submittal:

- ☐ Copy of the Geohydrologic Evaluation – Submit request through the Missouri Geological Survey website
- ☑ Copy of the Missouri Natural Heritage from the Missouri Department of Conservation website
- ☑ Attach your Antidegradation Review Report and all supporting documentation as these forms are only a summary.
- ☐ If applicable, submit a copy of any Existing Water Quality data used in this process. Include the date range of the data, source(s) of the data, and location of data collection relative to the outfall. If using your own collected water quality data, submit a copy of the Quality Assurance Project Plan (QAPP) approved by the department's Watershed Protection Section. For more detailed information, see the Missouri Antidegradation Implementation Procedure (AIP), Section II.A.1.

10. PATH / TIER REVIEW ATTACHMENTS ENCLOSED

Path A: Tier 2 – Non-Degradation Mass Balance	☑ **Yes**	☐ **No**
Path B: Tier 2 – Minimal Degradation	☐ **Yes**	☑ **No**
Path C: Tier 2 – Significant Degradation	☐ **Yes**	☑ **No**
Path D: Tier 1 – Preliminary Review Request	☐ **Yes**	☑ **No**
Path E: Temporary Degradation	☐ **Yes**	☑ **No**

11. APPLICANT PROPOSED ANTIDEGRADATION REVIEW EFFLUENT LIMITS

Preliminary effluent limits for the proposed project are dependent upon the path selected:

Applicable Pollutants of Concern	Concentration*		Path / Tier Review Attachment Used for POC Evaluation	Average Monthly Limit	Daily Maximum Limit or Average Weekly Limit
	mg/L	µg/L			
BOD_5	X		N/A	N/A	N/A
TSS	X		Path A	23	34
Ammonia (Summer)	X		Path A	1.0	4.2
Ammonia (Winter)	X		Path A	1.9-2.6	7.6-10.8
Total Phosphorus	X		Path A	monitor only	
CBOD5 (May - Oct)	X		Path A	6	11
CBOD5 (Nov - Apr)	X		Path A	9	17
pH			Path A		6.5 - 9.0 S.U.
E. coli (Apr 1 - Oct 31)			Path A	206/100 mL	1030/100 mL
Copper		X	Path A	11.9	21.9

* Place an X in appropriate box for the concentration units for each Pollutant of Concern.

12. PROPOSED PROJECT SUMMARY

The existing WWTP includes influent pumping, headworks screening and grit removal, sequencing batch reactors, UV pump station, UV disinfection, sludge storage/digestion and sludge reed beds. WWTP improvements are recommended to accommodate future average daily flow projections by increasing the average daily flow capacity from 1.5 MGD to 2 MGD and peak throughput from 9 MGD to 12 MGD. The following general improvements will be constructed to support the WWTP expansion: add a fourth sequencing batch reactor, expand the UV system within the existing UV footprint, and expand the existing sludge reed beds from nine cells to twelve cells.

Applicants choosing to use a new wastewater technology that are considered an "unproven technology" in Missouri must comply with the requirements set forth in the *New Technology Definitions and Requirements fact sheet*.

13. CONTINUING AUTHORITY WAIVER (For New Discharges)

In accordance with 10 CSR 20-6.010(2)(C), applicants proposing use of a lower preference continuing authority, when the higher level authority is available, must submit a waiver from the existing higher authority one or other documentation for the department's review, provided it does not conflict with any area-wide management plan approved under section 208 of the Federal Clean Water Act or by the Missouri Clean Water Commission. Is the waiver necessary? ☐ Yes ☑ No

If yes, provide a copy.

14. APPLICATION FEE

☐ CHECK NUMBER ☑ JETPAY CONFIRMATION NUMBER 20049627

15. SIGNATURE

I am authorized and hereby certify that I am familiar with the information contained in this document and to the best of my knowledge and belief such information is true, complete and accurate.

SIGNATURE	DATE
Phil Adlich	12/22/2023
PRINT NAME	TITLE
Phil Adlich	Assistant Director of Public work

PLEASE IDENTIFY YOUR STATUS FOR THIS PROJECT: ☑ **OWNER** ☐ **CONTINUING AUTHORITY** ☐ **CONSULTANT**

1) Antidegradation Review Summary Path A: Tier 2 – Non-Degradation Mass Balance: Section 2. values were changed for were changed for Ammonia as N (Summer), Ammonia as N (Oct), Ammonia as N (Nov), Ammonia as N (Dec), Ammonia as N (Jan), Ammonia as N (Feb), Ammonia as N (Mar), $CBOD_5$, and TSS to ensure that loading to the receiving stream was not increased. The proposed changes were sent by the department in a comment email on January 26, 2024 and a response from the applicant accepting the proposed changes was sent to the department on February 5, 2024.

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH
ANTIDEGRADATION REVIEW SUMMARY
PATH A: TIER 2 – NON-DEGRADATION MASS BALANCE

1. FACILITY

NAME	COUNTY
Warrensburg West Wastewater Treatment Plant	Johnson

2. EXISTING LOAD SUMMARY – NET CHANGE

Pollutant of Concern	Type of Limit	Current Permit Limit*	Current Design Flow	Current Load	New Load	New Expanded Design Flow	No-Degradation Expansion Concentration
		mg/L	MGD	lbs/day	lbs/day	MGD	mg/L
Biochemical Oxygen Demand (BOD_5)	AWL	N/A	1.5	N/A	N/A	2.0	N/A
	AML	N/A		N/A	N/A		N/A
Total Suspended Solids (TSS)	AWL	45		563	563		34
	AML	30		375	375		23
Ammonia (Summer)	MDL	5.6		70	70		4.2
	AML	1.3		16	16		1.0
Ammonia (Winter)	MDL	N/A		N/A	N/A		N/A
	AML	N/A		N/A	N/A		N/A
CBOD5 (May - Oct)	MDL	15*		188	188		11
	AML	8*		100	100		6.0
CBOD5 (Nov - Apr)	MDL	22*		275	275		17
	AML	12*		150	150		9.0
Ammonia (Oct)	MDL	12.1*		152	152		9.1
	AML	2.6*		32	32		1.9
Ammonia (Nov)	MDL	14.4*		181	181		10.8
	AML	3.5*		44	44		2.6
Ammonia (Dec)	MDL	12.1*		152	152		9.1
	AML	3.1*		39	39		2.3
Ammonia (Jan)	MDL	14.4*		181	181		10.8
	AML	3.5*		44	44		2.6
Ammonia (Feb)	MDL	12.1*		152	152		9.1
	AML	3.1*		39	39		2.3
Ammonia (Mar)	MDL	10.1*		127	127		7.6
	AML	2.7*		34	34		2.0
Copper	MDL	29.2 ug/L		365	365		21.9 ug/L
	AML	15.9 ug/L		199	199		11.9 ug/L

* If current facility discharges the pollutant of concern and does not have a current permit limit for this pollutant of concern, the water quality standard should be used in the calculation.

AWL – Average Weekly Limit MDL – Maximum Daily Limit AML – Average Monthly Limit

Equation: Load = Limit (mg/L)* Conversion Factor (8.34 (LBS/MG)/(mg/L))*Design Flow (MGD). Note: New Load must be less than or equal to the Current Load.

Is mass balance non-degradation proposed for all pollutants of concern? ☑ Yes ☐ No
If no, the appropriate additional forms must be used for those pollutants which are degrading.

MO 780-2872 (02-19) Page 1

3. PROPOSED PROJECT SUMMARY

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