

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION



CONSTRUCTION PERMIT

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

Little Blue Valley Sewer District
Middle Big Creek Wastewater Treatment Facility
1200 East State Route 58
Pleasant Hill, MO 64080

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.

March 7, 2025
Effective Date

March 6, 2027
Expiration Date



John Hoke, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

This project consists of the Phase 2 expansion of the Little Blue Valley Sewer District (LBVSD) Middle Big Creek (MBC) Wastewater Treatment Facility (WWTF), increasing the design flow from 2.25 million gallons per day (MGD) to 7.5 MGD.

The project includes the installation three new submersible pumps in the Raw Wastewater Lift Station; a new raw wastewater flow meter and vault; a second headworks building, including two mechanical step screens and a bypass manual bar screen rack, two forced vortex grit chambers, two grit classifiers and associated grit pumps, and an electrical room; construction of Anaerobic Selector Basin No. 1 in the existing Phase 1 treatment train, including three submersible propeller mixers; addition of two weir gates to the Raw Wastewater Flow Splitter Structure; construction of Anaerobic Selector Basin Nos. 2 and 3, including three submersible propeller mixers in each; new Aeration Basin Nos 2 and 3; modification to existing Aeration Basin No. 1, installing mooring arms in place of existing removal cables; two new Post Oxidation Basins; a new chemical phosphorous removal system; a new Final Clarifier flow splitter structure; three new Final Clarifiers, Nos. 3, 4, and 5; a new Return Activate Sludge (RAS)/Waste Activated Sludge (WAS) Pump Station No. 2; tertiary filters will be expanded with two new concrete filter channels and synthetic media disk filters; the effluent reaeration basin will be doubled in size; a new Aerobic Digester No. 3; a new pump station for thickened waste activated sludge (TWAS); new Sludge Reed Beds consisting of 18 cells covering approximately 5.8 acres; and a new Excess Flow Holding Basin No. 2.

In addition, the Raintree Pump Station (RTPS) will be rehabilitated, including improvements to interior surfaces and gate replacements.

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 WWTF.

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 make a “finding of affordability” on the new environmental requirement(s) within the permit. 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 Engineering, Inc. on January 21, 2025. These documents were signed and sealed on January 17, 2025, by the professionals listed below and approved by the department on March 7, 2025:
 - Brandon J. Coleman, P.E.
 - Leonard James Graham, P.E.
 - Timothy J. Sandmeyer, P.E.
 - Caleb Jay Dady, P.E.
 - Thomas Keith Boyd III, P.E.
 - David L. Wiseman, P.E.
 - John S. Rickert, P.E.
 - Michael J. Shumpert, P.E.
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/ Facility Bypass Reporting system at <https://dnr.mo.gov/data-e-services/missouri-gateway-environmental-management-mogem> or the Kansas City Regional Office during normal business hours, or the Environmental Emergency Response spill-line at 573-634-2436 outside of normal business hours 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 Little Blue Valley Sewer District 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 Statement of Work Completed form (<https://dnr.mo.gov/document-search/wastewaterconstruction-statement-work-completed-mo-780-2155>) to the department in accordance with 10 CSR 20-6.010(5)(N).

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

The MBC WWTF expansion is needed to treat projected future flows, which includes flow that will be directed to the MBC WWTF instead of being diverted to the Atherton WWTF through the RTPS. While the current MBC WWTF design flow is 2.25 MGD, the planned expansion is for a design flow of 7.5 MGD and the ability to treat a peak flow of 22.5 MGD. Existing storage of 37.4 million gallons (MG) at the Lake Winnebago EFHB and 6.3 MG at the WWTF will be supplemented by an additional 7.3 MG of storage at the WWTF to be constructed as part of this project. Rehabilitation of the RTPS is needed due to the age and condition of the pump station.

2. FACILITY DESCRIPTION

The existing MBC WWTF is an activated sludge treatment facility that includes raw sewage pumping, flow equalization, mechanical ¼-inch bar screening and vortex grit chamber for preliminary treatment followed by an aeration basin for nitrification, biological degradation of biochemical oxygen demand (BOD) and denitrification. Final Treatment consists of secondary clarification with tertiary filtration, UV disinfection and effluent aeration prior to discharging treated effluent to an unnamed tributary of Big Creek. Sludge is hauled for final disposal at the Atherton WWTP.

Expansion to the liquid treatment capacity includes, but is not limited to, lift station upgrades, expanding the on-site excess flow holding basin (EFHB) storage capacity, new aeration and clarifier basins, UV disinfection capacity expansion, new RAS/WAS lift stations, and a new aerobic digester.

The LBVSD Middle Big Creek WWTF is located at 1200 East State Route 58, Pleasant Hill, MO 64080. The facility has a design average flow of 2.25 MGD and serves a population equivalent of approximately 22,500 people.

3. COMPLIANCE PARAMETERS

The modifications to effluent limits following the completion of construction included calculating monitored Total Phosphorus levels in lb/month and adding monthly monitoring of Total Recoverable Aluminum, in µg/L (because chemicals used for phosphorous removal may contain aluminum).

4. ANTIDegradation

The department has reviewed the antidegradation report for this facility and issued the Water Quality and Antidegradation Review dated May 2022, due to the applicant's determination that all pollutants of concern (POC) are non-degrading in the receiving stream. This analysis was conducted to fulfill the requirements of the Antidegradation Implementation Procedure (AIP). See **APPENDIX – WATER QUALITY AND ANTIDegradation REVIEW**.

5. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

Existing Components:

- Raw Wastewater Lift Station – With three submersible 100-HP pumps (two firm/one standby) operating at 8.2 MGD each, the total firm capacity (once Phase 2 is complete) is 24.6 MGD.
- Raw Wastewater Meter Vault and Flow Splitter – The below grade, cast-in-place meter vault uses two magnetic flow meters to measure the instantaneous flowrate entering the WWTF. One meter measures the flow from the influent lift station and one meter measures flow from the Duncan Branch Lift Station.

- Excess Flow Holding Basin (EFHB) – The two existing EFHBs, one in Lake Winnebago and another at the treatment plant, have storage capacities of 37.4 MG and 6.3 MG, respectively.
- Headworks Building #1 – The existing Headworks is a Huber Step Screen that is able to handle a peak flow of 6.75 MGD. A series of manual gates direct flow to either a 2.5-foot wide channel which has a mechanical fine bar screen with ¼” spacings or to a bypass manual bar screen with 1.5” bar spacings. The screened influent then flows to a single, vortex style grit removal system with a flooded suction 5-HP grit removal pump. The separated grit is pumped to a 1-HP grit classifier able to handle flows up to 250 GPM. The pretreated influent then flows by gravity to the Aeration Basin via a 20-inch diameter pipe.
- Aeration Basin – The existing, 125-foot diameter circular Aeration Basin #1 is rated to handle flows of 2.25 MGD. The basin uses fine bubble, tube style diffused aeration in conjunction with three floating 15-HP mechanical mixers. Retrievable diffuser racks installed in a radial configuration along the basin wall with three (two firm/one standby) exterior mounted 125-HP blowers supply the necessary oxygen demand at a total blower capacity of 3,500 CFM.
- Secondary Clarifiers – Aerated effluent flows evenly flows via two adjustable weir gates to the two 75-foot diameter clarifiers operating in parallel. Able to handle a total flow of 10.125 MGD, the two clarifiers operate at a side water depth of 14 feet. After solids settle via gravity, a suction style (Tow-Bro) removal header which consists of a rotating sludge manifold on the basin floor and an opposite offset counterweight arm removes the settled solids. Floating scum is removed using a full radius surface skimmer with dual blades to a full radius scum trough. Final clarifier effluent exits through a 471.2-foot (each) V-notch weir to the Tertiary Filtration Building.
- RAS/WAS Lift Station – Located between the two Secondary Clarifiers, RAS/WAS Lift Station #1 pumps return activated sludge (RAS) to Aeration Basin #1, and waste activated sludge (WAS) and scum to Sludge Storage Basins #1 and #2. Three (two firm/one standby) 7.5-HP screw induced centrifugal impeller pumps in a dry pit configuration pumps flow controlled by variable frequency drives (VFDs). The average RAS flow is 1.125 MGD. The average WAS flow is 54,000 GPD and the average scum flow is 6,000 GPD. A dedicated submersible 4-HP mixer mixes the scum prior to pumping.
- Tertiary Filtration Building – Two (one firm/one standby) synthetic cloth media filter systems in vertical configuration are housed in separate parallel concrete channels. Each unit consists of 24 39.1-ft² disks, resulting in a total treatment area of 938 ft² per unit. The system handles 1,689 lbs/day of solids at the peak daily flow of 6.75 MGD.
- Ultraviolet Disinfection – Four (three firm/one standby) modules in a 2-foot-wide by 6-foot-deep vertical channel are equipped with 40 lamps each. The system can handle the peak daily flow of 6.75 MGD while delivering a UV intensity of a 30,000 mj/cm² at a transmissivity of 65% for the required retention time of 25 seconds.

- Effluent Reaeration System – This 20-foot wide and 30-foot long basin uses four diffuser racks with 30 fine bubble, retrievable tube style diffusers per rack. Air is supplied at a rate of 300 CFM to the diffusers using two (one firm/one standby) 25-HP blowers. At the peak daily flow of 6.75 MGD, the hydraulic retention time for flow in the basin is 6.7 minutes.
- Non-Potable Water System – The existing chamber is north of the UV channels and uses UV treated water for plant water needs. Two (one firm/one standby) 20-HP pumps deliver water to the water chamber. A 50-micron mesh strainer is utilized on the discharge of the reuse water system in the pump vault area.
- Aerobic Digestors – Two 70-foot diameter basins have a storage duration of 74 days and a volume of 475,000 gallons per basin. A telescoping decant valve returns supernatant to the head of the WWTF through the plant drain system. A center floating 75-HP aerator is located within each basin. Sludge is disposed using a digester valve vault containing two (one firm/one standby) 20-HP hose style peristaltic pumps at a rated capacity of 150 GPM. Currently sludge is hauled to the Raintree pump station (RTPS) for ultimate treatment at the Atherton WWTP.

New Components:

- Raw Wastewater Lift Station – Three new pumps and their associated piping and valves are to be installed at the existing Raw Water Lift Station. Matching the existing pumps at the lift station and having one of the new pumps act as a standby, the new total firm capacity after construction will be 41 MGD.
- Raw Wastewater Meter Vault and Flow Splitter – A 30-inch meter will be installed inside the existing flow meter vault on the 30-inch force main. Two 6-foot electrically actuated weir gates will be added to the splitter to direct up to 7.5 MGD of flow each to the new headworks structure. Up to 7.5 MGD will be directed to the existing headworks and any peak flows above 22.5 MGD will be directed to the EFHBs.
- EFHB #2 and Outlet Structure – A new 7.4 MG EFHB will be installed to bring the total capacity at the plant to 13.6 MG. Construction includes grading, a new 12-foot wide perimeter access road, a new outlet structure to the plant drain, and an erosion control blanket or approved alternate.
- Headworks Building #2 – Two new ¼” mechanical step screens are to be installed at the new Headworks Building #2, each with a firm capacity of 7.5 MGD. A manual bypass channel similar to the one in the existing Headworks Building #1 will also be built to allow for a future 7.5 MGD mechanical bar screen to be installed and act as a standby. Two new forced vortex grit systems of 7.6 MGD capacity (each) will be installed outside the building to achieve the Phase 2 peak daily flow of 22.5 MGD. 2-HP grit classifiers with a capacity of 250 GPM will be installed inside the new building.
- Aeration Basins #2 and #3 – The existing Aeration Basin #1 and the new #2 and #3 basins will provide for the oxidation of BOD and nitrogen removal. The two new basins will be sized to match Aeration Basin #1 which will be rerated from 2.25 MGD to 2.5 MGD. This will allow for a total capacity of 7.5 MGD ADF. Two firm blowers will be installed outside each basin, with one standby blower to be shared

- between both Basins #2 and #3. Each aeration basin train will have a hydraulic residence time of 16.7 hours and provide residual ammonia polishing.
- Post-Oxic Basin – A new 90-foot-long by 50-foot-wide basin operating with a side water depth of 18 feet, will be constructed downstream of the aeration basins to maintain the current HRT of 1.9 hours, provide ammonia polishing, and add dissolved oxygen during the air off cycle in the aeration basins prior to clarification. Two (one firm/one standby) blowers rated at 1,050 SCFM each will supply air to the retrievable fine bubble diffused aeration equipment. The basin will be split down the middle using a divider wall to allow for half the basin to be taken offline if needed.
 - Chemical Building – A new chemical building will be constructed to house chemical pumps and UV lamps. One 6,000 gallon double walled chemical storage tank will be located on an exterior concrete pad adjacent to the building to store aluminum sulfate (alum). The alum at a bulk concentration of 45 percent will be introduced at the downstream end of the new post-oxic basin as well as upstream of the Tertiary Filters.
 - Secondary Clarifiers #3, #4, and #5 – Three new 90-foot diameter clarifiers will be constructed to handle flows of 7.25 MGD per clarifier. Their design is similar to Clarifiers #1 and #2. The existing flow splitter for the Phase 1 train will be demolished and replaced. The basins are designed to operate at a side water depth of 14 feet and handle a solids loading rate of 32 lbs/day/ft². The weir length per basin is 283 feet.
 - RAS/WAS Pump Station #2 – A new dry pit style pump station will be constructed to serve the three new clarifiers. Three (two firm/one standby) horizontal centrifugal pumps will be dedicated to RAS pumping to Anaerobic Selector Basins #2 and #3. Two (one firm/one standby) screw type horizontal centrifugal pump will be dedicated to WAS pumping to Aerobic Digesters #1-#3. Under return operations RAS will be metered and flow paced based on a percentage of WWTF influent flow. Wasting will be timer controlled and metered. VFD's will be used to control RAS pumping rates and WAS pumps will be constant speed. A central scum pump station will be constructed with a common wall to the new RAS/WAS pump station and will serve Final Clarifiers No. 3 through No. 5. Two (one firm/one standby) 5-HP submersible non-clog pumps will be installed in the scum wet well to pump scum to the aerobic digesters. A dedicated 5-HP submersible mixer will be used to mix the scum prior to pumping. A valve vault will be provided for pump station isolation.
 - Tertiary Building Expansion – The existing 6.75 MGD filter units will be rerated to treat a peak flow of 7.5 MGD each. Two new similar filters will be added to achieve the Phase 2 design capacity of 22.5 MGD with a three firm/one standby arrangement. The maximum solids loading rate the filters will accommodate is 1.9 lbs/day/ft², with a required backwash rate of 145 GPM. The east wall of the building will be modified to accommodate the new units. Additionally, a filter diversion pipe will be provided that will direct secondary clarification effluent directly to the UV system if needed.
 - UV System Improvements – The unpopulated channels in the building will be populated with two new UV systems. The three total units will be modified/constructed to each include three modules with one backup module stored out of the channels. This allows each module to have a hydraulic flow capacity of 7.5

- MGD for a total disinfection capacity of 22.5 MGD. Each module will hold 40 lamps. The equipment will have a design UV transmittance of 65 percent or greater and a minimum dosage of 30 mJ/cm². An overhead canopy will be constructed over the UV building and non-potable water chamber.
- Effluent Reaeration Improvements – Two additional serpentine flow channels will be constructed similar to the existing channels to allow the four basins (three firm/one standby) to accommodate the Phase 2 peak flows of 22.5 MGD. Construction also includes two new 6-inch basin drains with sluice gates.
 - Aerobic Digester #3 and TWAS Pump Station – One new digester basin similar to the two existing basins is to be constructed along with its respective telescoping decant valve and a new thickened sludge pump station (TWAS) adjacent to Digester #3. The TWAS will include two (one firm/one standby) positive displacement pumps to convey digested biosolids to the new reed beds. The existing sludge pumps will be reconfigured to pump TWAS to the reed beds. The design solids retention time for all basins is 27 days.
 - Sludge Reed Beds – Three new reed beds each containing six cells will cover a total area of 252,000 ft². Each cell will be 144 feet long and 102 feet wide. The annual volume applied per unit area is less than 45 gal/ft² to accommodate the annual digested sludge volume of 11,607,000 gallons. Construction also includes an additional reed bed sludge staging structure to allow for space for the reed bed cleanout process.
 - Raintree Pump Station Improvements – Rehabilitation work includes surface blasting/preparation for coating and cementitious and epoxy lining for all wall and top slab interior surfaces, replacement of gates SLG-1 and SLG-2, and bypass pumping for the inlet chamber lining.

6. OPERATING PERMIT

Operating permit MO-0058629 will require a modification to reflect the construction activities. The modified Middle Big Creek WWTF, MO-0058629, was successfully public noticed from November 15, 2024, to December 16, 2024, with no comments received. Submit the Statement of Work Completed to the department in accordance with 10 CSR 20-6.010(5)(N) and request the operating permit modification be issued.

Victor Daos
Financial Assistance Center, Clean Water Engineering Unit
victor.daos@dnr.mo.gov

APPENDIX

- Water Quality and Antidegradation Review

APPENDIX — WATER QUALITY AND ANTIDEGRADATION REVIEW

Water Quality and Antidegradation Review

*For the Protection of Water Quality
and Determination of Effluent Limits for Discharge to the
Unnamed Tributary of Big Creek*

by
Little Blue Valley Sewer District
Middle Big Creek Wastewater Treatment Facility



May, 2022

Table of Contents

1.	PURPOSE OF ANTIDegradation REVIEW REPORT	3
2.	FACILITY INFORMATION	3
3.	FACILITY HISTORY	3
A.	FACILITY PERFORMANCE HISTORY:	4
B.	RECEIVING WATERBODY INFORMATION	4
C.	EXISTING WATER QUALITY	4
4.	PERMIT LIMITS AND MONITORING INFORMATION.....	5
5.	RECEIVING WATER MONITORING REQUIREMENTS.....	6
6.	ANTIDegradation REVIEW INFORMATION.....	6
A.	TIER DETERMINATION	6
B.	NECESSITY OF DegrADATION.....	8
i.	Regionalization	8
ii.	No Discharge Evaluation.....	8
iii.	Alternatives to No discharge.....	8
C.	SOCIAL AND ECONOMIC IMPORTANCE	9
D.	NATURAL HERITAGE REVIEW	9
E.	DEMONSTRATION OF INSIGNIFICANCE	10
7.	DERIVATION AND DISCUSSION OF PARAMETERS AND LIMITS.....	10
8.	GENERAL ASSUMPTIONS OF THE WATER QUALITY AND ANTIDegradation REVIEW	14
9.	ANTIDegradation REVIEW PRELIMINARY DETERMINATION.....	14
10.	Appendix A: Map of Discharge Location.....	15
11.	Appendix B: Geohydrologic Evaluation.....	16
12.	Appendix C: Antidegradation Review Summary Attachments.....	311
13.	Appendix D: Dissolved Oxygen Modeling.....	317

PURPOSE OF ANTIDegradation REVIEW REPORT

The current Middle Big Creek Wastewater Treatment Facility is a 2.25 million gallons per day (MGD) activated sludge plant receiving an actual flow of about 2.29 MGD based on Discharge Monitoring Report (DMR) data from the past 5 years of operation. The facility currently includes flow equalization, fine screening, a vortex grit chamber, an aeration basin, two secondary clarifiers, UV disinfection, and effluent aeration. HDR Engineering, Inc. consultants prepared, on behalf of Little Blue Valley Sewer District (LBVSD) the *Middle Big Creek Sewer Subdistrict Phase 2 Improvements Antidegradation Review* which outlines the proposed upgrades, including an expansion of design flow to 7.5 MGD. The scope of the project includes the construction of a new headworks building, new aeration and post-oxic basins, a chemical building for phosphorus removal, new secondary clarifiers, as well as expansions to the tertiary filtration and UV disinfection systems.

The applicant elected to determine that all pollutants of concern (POC) are non-degrading in the receiving stream because the receiving stream is effluent dominated, and the applicant has proposed effluent limits that maintain existing pollutant concentrations. 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 C was used to develop this review document.

FACILITY INFORMATION

Facility Name:	Middle Big Creek Wastewater Treatment Facility
Address:	1200 East State Route 58
Permit #:	MO-0058629
County:	Cass
Facility Type:	Municipal
Owner:	Little Blue Valley Sewer District (LBVSD)
Continuing Authority:	Little Blue Valley Sewer District (LBVSD)
UTM Coordinates:	X = 390338 ; Y = 4292741
Legal Description:	Sec. 29, T46N, R30W, Cass County
Ecological Drainage Unit:	Central Plains/Osage/South Grand

FACILITY HISTORY

The Middle Big Creek Wastewater Treatment Facility previously underwent the Antidegradation review process in 2010 when it expanded its flow to 2.25 MGD. The continued growth of the Middle Big Creek region has necessitated further upgrades to ensure that future flows can be appropriately treated. It is anticipated that average daily flows to the facility will exceed 5 MGD by the year 2025. This project proposes expanding the rated capacity to 7.5 MGD to allow the facility to treat all average daily flows within the Middle Big Creek watershed.

FACILITY PERFORMANCE HISTORY:

A review of the past 5 years of Discharge Monitoring Report data shows that the facility performs well and generally achieves effluent limitations of the operating permit, but has shown exceedances in the

following parameters: E. Coli (April 2020), ammonia (May 2021, August 2019). The facility is also operating at roughly 102% of the design flow.

RECEIVING WATERBODY INFORMATION

OUTFALL(S) TABLE:

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	EFFLUENT TYPE
001	11.6	Tertiary	Domestic

RECEIVING STREAM(S) TABLE:

WATER-BODY NAME	CLASS	WBID	DESIGNATED USES*	12-DIGIT HUC	DISTANCE TO CLASSIFIED SEGMENT (MI)
Unnamed Tributary to Big Creek	NA	NA	General Criteria	10290108-0306	0.74
Big Creek	P	1250	AQL, HHP, IRR, LWW, SCR, WBC-B		

* Protection of Warm Water Aquatic Life (AQL), Cold Water Fishery (CDF), Cool Water Fishery (CLF), Whole Body Contact Recreation – Category A (WBC-A), Whole Body Contact Recreation – Category B (WBC-B), Secondary Contact Recreation (SCR), Human Health Protection (HHP), Irrigation (IRR), Livestock & Wildlife Watering (LWW), Drinking Water Supply (DWS), Industrial (IND), Groundwater (GRW).

RECEIVING STREAM(S) LOW-FLOW VALUES:

RECEIVING STREAM	LOW-FLOW VALUES (CFS)		
	1Q10	7Q10	30Q10
Unnamed Tributary to Big Creek	0.0	0.0	0.0
Big Creek	0.462	0.635	1.5

Receiving Water Body Segment Outfall #1:		
Upper end segment* UTM coordinates:	X = 390338 ; Y = 4292736	outfall
Lower end segment* UTM coordinates:	X = 390736 ; Y = 4292071	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.

A Geohydrologic Evaluation was not submitted with the request.

EXISTING WATER QUALITY

No existing water quality data was submitted. Assumptions regarding existing water quality are based on effluent limits since the receiving stream is effluent dominated. The facility discharges to an unnamed tributary that flows into Big Creek. Big Creek has a Total Maximum Daily Load (TMDL) for total suspended solids.

PERMIT LIMITS AND MONITORING INFORMATION
Proposed Monitoring Parameters and Effluent Limits

PARAMETER	Unit	Basis for Limits	Daily Maximum	Weekly Average	Monthly Average	Previous Permit Limit	Sampling Frequency	Reporting Frequency	Sample Type
Flow	MGD	FSR	*			*	once/weekday	once/month	24 hr. total
Monthly Total Flow	MG				*	N/A	once/month	once/month	calculated
BOD ₅	mg/L	NDEL		15	10	15/10	once/week	once/month	composite
TSS	mg/L	NDEL		15	10	15/10	once/week	once/month	composite
<i>Escherichia coli</i> **	#/100mL	FSR		1,030	206**	1,030/206**	once/week	once/month	grab
Ammonia as N (January) (February) (March) (April) (May) (June) (July) (August) (September) (October) (November) (December)	mg/L	NDEL	29.5 29.5 29.5 29.0 29.0 29.0 29.0 29.0 29.5 29.5 29.5		5.4 5.4 5.4 4.5 3.3 1.1 1.1 1.1 2.9 4.4 5.4 5.4	29.5/5.4 29.5/5.4 29.5/5.4 29.0/4.5 29.0/3.3 29.0/1.1 29.0/1.1 29.0/1.1 29.0/2.9 29.5/4.4 29.5/5.4 29.5/5.4	once/month	once/month	composite
Oil & Grease	mg/L	FSR	15		10	*	once/quarter	once/month	grab
Total Phosphorus	mg/L	PEL			***	*	once/week	once/month	composite
Total Kjeldahl Nitrogen	mg/L	FSR	*		*	*	once/month	once/month	composite
Nitrite + Nitrate	mg/L	FSR	*		*	*	once/month	once/month	composite
Acute WET		FSR	*		*	*	once/year	once/year	composite
Chronic WET		FSR	*		*	*	once/permit cycle	once/permit cycle	composite
PARAMETER	Unit	Basis for Limits	Minimum		Maximum	Previous Permit Limit	Sampling Frequency	Reporting Frequency	Sample Type
pH	SU	FSR	6.0		9.0	6.0/9.0	once/week	once/month	grab
PARAMETER	Unit	Basis for Limits	Daily Minimum		Monthly Avg. Min	Previous Permit Limit	Sampling Frequency	Reporting Frequency	Sample Type
Dissolved Oxygen (DO)	mg/L	NDEL	6.0		6.0	6.0	once/month	once/month	grab
BOD ₅ Percent Removal	%	FSR			85	85	once/month	once/month	calculated
TSS Percent Removal	%	FSR			85	85	once/month	once/month	calculated

* - Monitoring requirement only

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

*** - The facility will calculate monthly averages based upon weekly monitoring. The new limit for the facility is 22,831 lbs/year (1.0 mg/L at 7.5 MGD) as an annual average. Compliance will be assessed in December of each year using actual flow values and the previous 12 months' worth of data. The

Department is currently in the process of establishing a statewide water quality trading program and accompanying permit language to provide an alternative compliance option for meeting mass-based nutrient limits.

The Department intends to modify permit conditions for this expanded facility to reflect these developments in order to provide the maximum flexibility to allow trading or other compliance approaches that may be developed in the future.

Basis for Limitations Codes:

MDEL – Minimally Degrading Effluent Limit

NDEL – Non-Degrading Effluent Limit

PEL – Preferred Effluent Limit

TBEL – Technology-Based Effluent Limit

WQBEL – Water Quality-Based Effluent Limit

FSR – Federal/State Regulation

RECEIVING WATER MONITORING REQUIREMENTS

No receiving water monitoring requirements recommended at this time.

ANTIDegradation REVIEW INFORMATION

In accordance with Missouri's Water Quality Standard [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, which 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 AIP for new and expanded wastewater discharges.

The AIP specifies that if the proposed activity results in significant degradation then a demonstration of necessity (i.e., alternatives analysis) and a determination of social and economic importance are required.

The following is a review of the Antidegradation Review Report for the Middle Big Creek Sewer Subdistrict Phase 2 Improvements dated January 20, 2022.

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 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.

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 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.

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). Tier 2 was assumed for all POCs except for Total Suspended Solids and Total Phosphorus. Total Suspended Solids is considered Tier 1 because Big Creek has a Total Maximum Daily Load for sediment. Total Phosphorus is considered Tier 1 because the Truman Reservoir, located about 70 miles downstream from the Middle Big Creek WWTF, was included on Missouri’s 2020 303(d) list as impaired for chlorophyll-a. Total Nitrogen was not included because phosphorus is generally considered the limiting nutrient for Missouri lakes.

Pollutants of Concern and Tier Determination

Pollutants of Concern	Tier	Degradation	Comment
Biological Oxygen Demand (BOD ₅)/DO	2	Insignificant	Permit limits applied
Total Suspended Solids (TSS)	1		Permit limits applied
Ammonia as N	2	Insignificant	Permit limits applied
<i>Escherichia coli (E. coli)</i>	2	Insignificant	Permit limits applied
Phosphorus, Total	1		
Oil & Grease	2	Insignificant	Permit limits applied

* Tier assumed.

** Tier determination not possible: No in-stream standards for these parameters.

*** Standards for these parameters are ranges.

Tier 1 Review

Truman Reservoir, located approximately 70 miles downstream, is on the 2020 303(d) list for chlorophyll-a. No total maximum daily load currently exists for Truman Reservoir to address the impairment. Big Creek, located approximately 0.73 miles downstream, is not 303(d) listed but has a total maximum daily load for sediment.

Because chlorophyll-a is a response variable, total nitrogen and total phosphorus are typically targeted for reductions in order to control algal growth. Total nitrogen was not considered a tier 1 POC due to the fact that for most lakes in Missouri, total phosphorus is considered the limiting nutrient. Therefore phosphorus will be considered a tier 1 POC. As a tier 1 POC, the discharge cannot cause or contribute to further degradation of total phosphorus in the Truman Reservoir. To make this determination, the anticipated TP loading from the facility was compared to the loading experienced by the entire watershed. At the preferred alternative scenario (TP = 1.0 mg/L as an annual average) and design flow (7.5 MGD) the facility accounted for a loading of 22,831 lbs/yr. This loading accounts for only 0.6% of the total accumulated TP at the Truman Reservoir per a USGS SPARROW model for the Mississippi-Atchafalaya River Basin. Furthermore, natural instream nutrient attenuation is expected over the roughly 70 miles of stream prior to Truman Reservoir, so the loading estimates are considered conservative. Hence, the facility is not expected to cause or contribute to the nutrient impairment.

TSS was determined to be a tier 1 POC because Big Creek has a 2006 TMDL for sediment. According to the TMDL, the source of the impairment is agricultural nonpoint sources, and as such, point sources are not believed to contribute to water quality impairment relative to sediment impacts on stream biology. Hence, the facility is not expected to cause or contribute to the sediment impairment. The existing permit limits are expected to be protective of water quality and will be retained.

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.

B. NECESSITY OF DEGRADATION

The AIP specifies that if the proposed activity does result in significant degradation then a demonstration of necessity (i.e., alternatives analysis) and a determination of social and economic importance are required. Part of that analysis as shown below is the evaluation of non-degrading alternatives, such as regionalization or no discharge systems.

The applicant has the option of assuming discharge will be significant and proceeding directly to the alternatives analysis, thereby avoiding the determination of the assimilative capacity of the receiving water. The applicant has not elected this option.

Regionalization

A regionalization alternative was not presented in the application. The size of the facility would mean that regionalization would require a large plant with enough remaining capacity. Middle Big Creek WWTF is the largest facility within several miles. Due to the distance to the nearest sizable facility, costs associated with construction, and pumping and logistics of obtaining right of ways this alternative is considered impracticable.

No Discharge Evaluation

Effluent irrigation was evaluated as a no discharge alternative. The Middle Big Creek WWTF is proposing to upgrade its rated flow from 2.25 MGD to 7.50 MGD. The existing facility provides advanced treatment, with filtration and disinfection prior to discharge. For the purpose of this alternative evaluation, it was assumed that irrigated flows would not be filtered or discharged prior to application. Therefore flows above the existing rated capacity would be irrigated. However, this would demand an irrigation system sized to be capable of conveying 5.25 MGD of flow, which the applicant estimates would be prohibitively expensive and require impractical amounts of land.

Alternatives to No discharge

Two levels of phosphorus treatment were analyzed as alternatives for this project. Alternative 1 involved total phosphorus at 1.0 mg/L as an annual average, whereas alternative 2 looked at 0.5 mg/L as an annual average. In both cases, the anticipated phosphorus loading was found to be less than 1% of the total watershed loading. Therefore it was determined that neither scenario represents a reasonable potential to cause or contribute to the nutrient impairment. Alternative 1 was the preferred alternative that the facility intends to achieve via biological nutrient removal. Alternative 2 was the less preferred alternative, as the chemical addition required to achieve 0.5 mg/L could interrupt the efficient operation of the downstream sludge reed bed process.

Alternatives Analysis Comparison

Pollutant	Alternative 1 No TP Limits	Alternative 2 1.0 mg/L TP Limits	Alternative 3 0.5 mg/L TP Limits
BOD ₅	≤ 10 mg/l	≤ 10 mg/l	≤ 10 mg/l
TSS	≤ 10 mg/l	≤ 10 mg/l	≤ 10 mg/l
Ammonia as N (Nov-Mar)	≤ 5.4 mg/l	≤ 5.4 mg/l	≤ 5.4 mg/l
Ammonia as N (Apr)	≤ 4.5 mg/l	≤ 4.5 mg/l	≤ 4.5 mg/l
Ammonia as N (May)	≤ 3.3 mg/l	≤ 3.3 mg/l	≤ 3.3 mg/l
Ammonia as N (Jun-Aug)	≤ 1.1 mg/l	≤ 1.1 mg/l	≤ 1.1 mg/l
Ammonia as N (Sep)	≤ 2.9 mg/l	≤ 2.9 mg/l	≤ 2.9 mg/l
Ammonia as N (Oct)	≤ 4.4 mg/l	≤ 4.4 mg/l	≤ 4.4 mg/l
Escherichia coli (E. coli)	≤ 206 CFU/100ml	≤ 206 CFU/100ml	≤ 206 CFU/100ml
Phosphorus, Total	*	1.0 mg/l	0.5 mg/l
Oil & Grease	≤ 10 mg/l	≤ 10 mg/l	≤ 10 mg/l
Life Cycle Cost	**	**	**
Ratio	**	**	**

* monitoring requirement

**A cost analysis of alternatives was not conducted by the applicant. Biological nutrient removal with total phosphorus limits of 1.0 mg/L was selected as the preferred treatment alternative. More stringent limits of 0.5 mg/L was considered impracticable, as the applicant believes that achieving reliable phosphorus treatment to reach 0.5 mg/L would necessitate chemical addition, which would be detrimental to the existing downstream sludge reed bed process.

C. SOCIAL AND ECONOMIC IMPORTANCE

Missouri’s antidegradation implementation procedures specify that if a proposed activity does not result in significant degradation then a determination of social and economic importance are not required.

D. NATURAL HERITAGE REVIEW

A Missouri Department of Conservation Natural Heritage Review was obtained by the applicant. Two species of bats, Indiana and Northern Long-Eared, may be present in the project area. The Natural Heritage Review can be found in appendix B. The following recommendations were made for construction activities:

- Manage construction to minimize sedimentation and run-off to nearby streams.
- Revegetate disturbed areas to minimize erosion, preferably with native plant species. Avoid aggressive exotic perennials.
- Where possible, leave snags standing and preserve mature forest canopy.
- Do not enter caves known to harbor Indiana or Northern long-eared bats.
- 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.
- Remove any mud, soil, trash, plants or animals from equipment before leaving any water body or work area.

- Drain water from boats and machinery that have operated in water, checking any water reservoirs
- When possible, wash and rinse equipment thoroughly with hard spray or hot water and dry in the sun before using again.

E. 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 the *Middle Big Creek Sewer Subdistrict Phase 2 Improvements Antidegradation Review Report* dated January 20, 2022, the outfall discharges to the unnamed tributary to Big Creek, which is an effluent dominated tributary. Maintenance of existing limits is therefore expected to maintain existing concentrations in the receiving waters. As such ambient water quality concentrations in the receiving stream are not anticipated to be affected by the activities.

DERIVATION AND DISCUSSION OF PARAMETERS AND LIMITS

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:

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

Where

- C = downstream concentration
- C_s = upstream concentration
- Q_s = upstream flow
- C_e = effluent concentration
- Q_e = effluent flow

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 BOD₅ and TSS that are provided by the consultant as the WLA, the significantly-degrading 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: Significantly-degrading 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 BOD₅ 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 BOD₅ 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.
- **Biochemical Oxygen Demand (BOD₅).** Effluent limits of 10 mg/L average monthly and 15 mg/L average weekly maximum were established as a result of maintaining the existing permit limits. These limits are at least as stringent as the minimum effluent regulations established in 10 CSR 20-7.015(8)(A)1.
- **Total Suspended Solids (TSS).** Effluent limits of 10 mg/L average monthly and 15 mg/L average weekly maximum were established as a result of maintaining the existing permit limits. These limits are at least as stringent as the minimum effluent regulations established in 10 CSR 20-7.015(8)(A)1.
- **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 as a result of a discharging technology alternatives analysis conducted by the applicant. Middle Big Creek WWTF will utilize UV irradiation for disinfection and therefore will not contribute to impairment of the WBC (B) designated use of the receiving stream, as per 10 CSR 20-7.031(5)(C). An effluent limit for both monthly average and weekly maximum is required by 40 CFR 122.45(d) for POTWs.
- **Total Ammonia Nitrogen.** 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

Month	Temp (°C)*	pH (SU)**	Total Ammonia Nitrogen CCC (mg N/L)	Total Ammonia Nitrogen CMC (mg N/L)
January	2.8	7.2	5.4	29.5
February	4.0	7.2	5.4	29.5
March	10.6	7.2	5.4	29.5
April	17.0	7.2	4.5	29.0
May	22.0	7.2	3.3	29.0
June	26.0	7.2	1.1***	29.0
July	28.9	7.2	1.1***	29.0
August	28.0	7.2	1.1***	29.0
September	24.1	7.2	2.9	29.0
October	17.5	7.2	4.4	29.5
November	11.6	7.2	5.4	29.5
December	4.9	7.2	5.4	29.5

*Ecoregion Data (Central Irregular Plains)

**Median, seasonal (Apr – Sep & Oct – Mar) pH of site-specific data from LBVSD, Middle Big Creek WWTF’s effluent

***CCC is set equal to the WLA of 1.1 mg/L for the critical months of June, July, and August to reflect the steady-state assumptions of the DO model performed at the time of the previous Antidegradation Review to maintain a DO level above 5.0 mg/L in the receiving stream.

WBOEL equation

$$C_e = (((Q_c + Q_s) * C) - (Q_s * C_s)) / Q_c$$

January

Chronic WLA: $C_e = ((11.6 + 0.0)5.4 - (0.0 * 0.01)) / 11.6$ $C_e = 5.4$
Acute WLA: $C_e = ((11.6 + 0.0)29.5 - (0.0 * 0.01)) / 11.6$ $C_e = 29.5$
AML = WLA_c = 5.4 mg/L
MDL = WLA_a = 29.5 mg/L

February

Chronic WLA: $C_e = ((11.6 + 0.0)5.4 - (0.0 * 0.01)) / 11.6$ $C_e = 5.4$
Acute WLA: $C_e = ((11.6 + 0.0)29.5 - (0.0 * 0.01)) / 11.6$ $C_e = 29.5$
AML = WLA_c = 5.4 mg/L
MDL = WLA_a = 29.5 mg/L

March

Chronic WLA: $C_e = ((11.6 + 0.0)5.4 - (0.0 * 0.01)) / 11.6$ $C_e = 5.4$
Acute WLA: $C_e = ((11.6 + 0.0)29.5 - (0.0 * 0.01)) / 11.6$ $C_e = 29.5$
AML = WLA_c = 5.4 mg/L
MDL = WLA_a = 29.5 mg/L

April

Chronic WLA: $C_e = ((11.6 + 0.0)4.5 - (0.0 * 0.01)) / 11.6$ $C_e = 4.5$
Acute WLA: $C_e = ((11.6 + 0.0)29.0 - (0.0 * 0.01)) / 11.6$ $C_e = 29.0$
AML = WLA_c = 4.5 mg/L
MDL = WLA_a = 29.0 mg/L

May

Chronic WLA: $C_e = ((11.6 + 0.0)3.3 - (0.0 * 0.01)) / 11.6$ $C_e = 3.3$
Acute WLA: $C_e = ((11.6 + 0.0)29.0 - (0.0 * 0.01)) / 11.6$ $C_e = 29.0$
AML = WLA_c = 3.3 mg/L
MDL = WLA_a = 29.0 mg/L

June

Chronic WLA: $C_e = ((11.6 + 0.0)1.1 - (0.0 * 0.01)) / 11.6$ $C_e = 1.1$
Acute WLA: $C_e = ((11.6 + 0.0)29.0 - (0.0 * 0.01)) / 11.6$ $C_e = 29.0$
AML = WLA_c = 1.1 mg/L
MDL = WLA_a = 29.0 mg/L

July

Chronic WLA: $C_e = ((11.6 + 0.0)1.1 - (0.0 * 0.01)) / 11.6$ $C_e = 1.1$
Acute WLA: $C_e = ((11.6 + 0.0)29.0 - (0.0 * 0.01)) / 11.6$ $C_e = 29.0$
AML = WLA_c = 1.1 mg/L
MDL = WLA_a = 29.0 mg/L

August

Chronic WLA: $C_e = ((11.6 + 0.0)1.1 - (0.0 * 0.01)) / 11.6$ $C_e = 1.1$
Acute WLA: $C_e = ((11.6 + 0.0)29.0 - (0.0 * 0.01)) / 11.6$ $C_e = 29.0$
AML = WLA_c = 1.1 mg/L
MDL = WLA_a = 29.0 mg/L

September

Chronic WLA: $C_e = ((11.6 + 0.0)2.9 - (0.0 * 0.01)) / 11.6$ $C_e = 2.9$
Acute WLA: $C_e = ((11.6 + 0.0)29.0 - (0.0 * 0.01)) / 11.6$ $C_e = 29.0$
AML = WLA_c = 2.9 mg/L

MDL = WLAa = 29.0 mg/L

October

Chronic WLA: $C_e = ((11.6 + 0.0)4.4 - (0.0 * 0.01)) / 11.6$ $C_e = 4.4$
Acute WLA: $C_e = ((11.6 + 0.0)29.5 - (0.0 * 0.01)) / 11.6$ $C_e = 29.5$
AML = WLAc = 4.4 mg/L
MDL = WLAa = 29.5 mg/L

November

Chronic WLA: $C_e = ((11.6 + 0.0)5.4 - (0.0 * 0.01)) / 11.6$ $C_e = 5.4$
Acute WLA: $C_e = ((11.6 + 0.0)29.5 - (0.0 * 0.01)) / 11.6$ $C_e = 29.5$
AML = WLAc = 5.4 mg/L
MDL = WLAa = 29.5 mg/L

December

Chronic WLA: $C_e = ((11.6 + 0.0)5.4 - (0.0 * 0.01)) / 11.6$ $C_e = 5.4$
Acute WLA: $C_e = ((11.6 + 0.0)29.5 - (0.0 * 0.01)) / 11.6$ $C_e = 29.5$
AML = WLAc = 5.4 mg/L
MDL = WLAa = 29.5 mg/L

- **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.** The preferred alternative selected for biological nutrient removal serves as the base case for total phosphorus. The new limit for the facility is set at 1.0 mg/L as an annual rolling average, which will be calculated based upon monthly averages. These limits were established as a result of a discharging technology alternatives analysis conducted by the applicant. This limit will be implemented as an annual average load (22,831 lbs/year). The facility will calculate monthly averages based upon weekly monitoring. Compliance will be assessed in December of each year using actual flow values and the previous 12 months' worth of data. The Department is currently in the process of establishing a statewide water quality trading program and accompanying permit language to provide an alternative compliance option for meeting mass-based nutrient limits. The Department intends to modify permit conditions for this expanded facility to reflect these developments in order to provide the maximum flexibility to allow trading or other compliance approaches that may be developed in the future.
- **Total Nitrogen.** Monitoring requirement only.
- **pH.** 6.0-9.0. The permit writer has made a reasonable potential determination based on effluent data submitted to the department that the discharge will not cause or contribute to the excursion of the water quality standard for pH instream. Therefore, effluent limitations as required by 10 CSR 20-7.015 are substituted for the pH water quality criteria of 6.5-9.0 SU.
- **Biochemical Oxygen Demand (BOD5) 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 BOD₅ and TSS for Publicly Owned Treatment Works (POTWs)/municipals. This facility is required to meet 85% removal efficiency for BOD₅.
- **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 BOD₅ and TSS for Publicly Owned Treatment Works (POTWs)/municipals. This facility is required to meet 85% removal efficiency for TSS.

GENERAL ASSUMPTIONS OF THE WATER QUALITY AND ANTIDegradation REVIEW

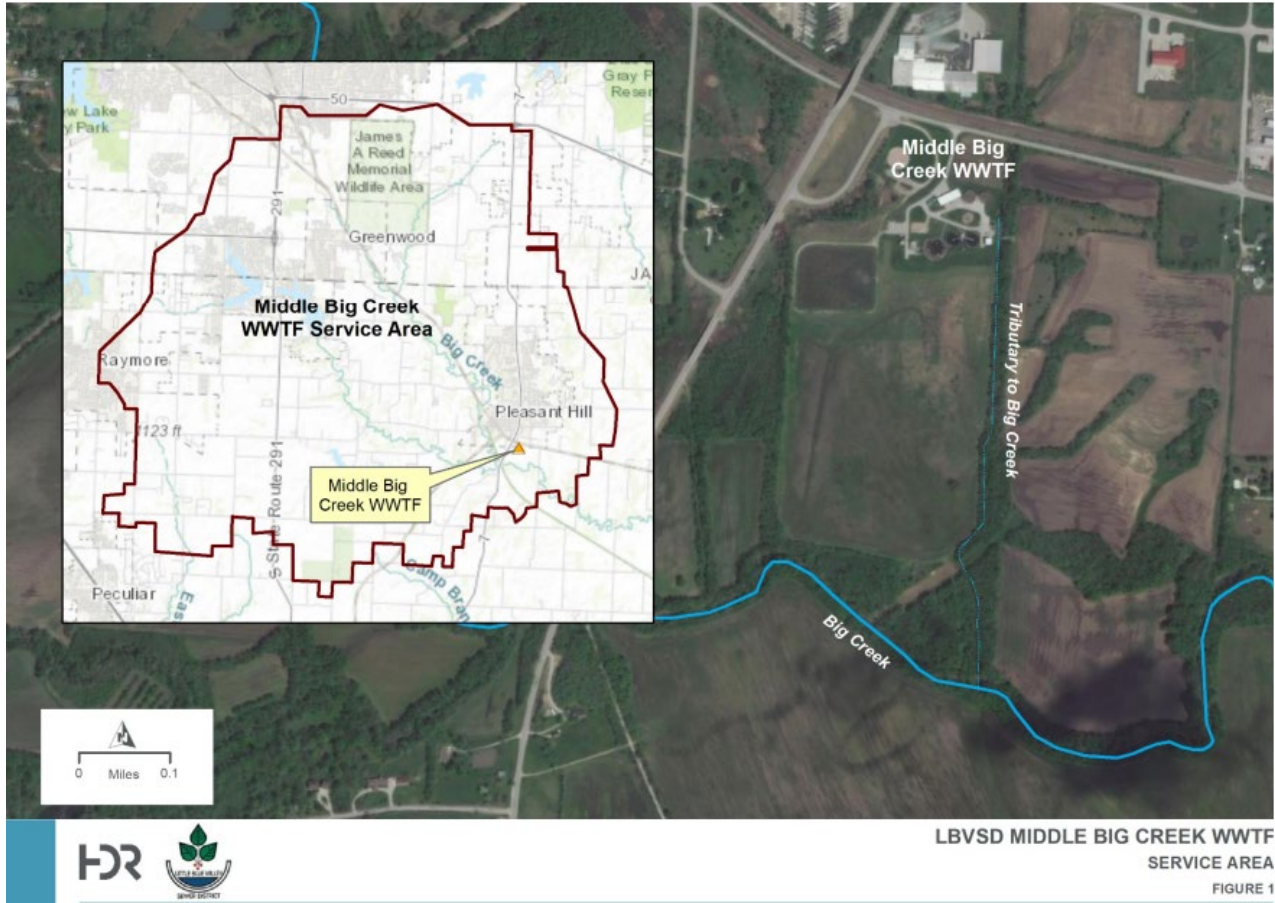
- A. A Water Quality and Antidegradation Review (WQAR) assumes that [10 CSR 20-6.010(3) Continuing Authorities and 10 CSR 20-6.010(4) (D), consideration for no discharge] has been or will be addressed in a Missouri State Operating Permit or Construction Permit Application.
- B. A WQAR does not indicate 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.

ANTIDegradation REVIEW PRELIMINARY DETERMINATION

The proposed facility upgrades will result in no degradation of the unnamed tributary to Big 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: Thomas Silkwood
Date: May 2022
Unit Chief: John Rustige, P.E.

Appendix A: Map of Discharge Location



Appendix B: Natural Heritage Review



Missouri Department of Conservation

Missouri Department of Conservation's Mission is to protect and manage the forest, fish, and wildlife resources of the state and to facilitate and provide opportunities for all citizens to use, enjoy and learn about these resources.

Natural Heritage Review Level Two Report: State Listed Endangered Species and/or Missouri Species/Natural Communities of Conservation Concern

There are records of state-listed Endangered Species, or Missouri Species or Natural Communities of Conservation Concern within or near the defined Project Area. Please contact Missouri Department of Conservation for further coordination.

Foreword: Thank you for accessing the Missouri Natural Heritage Review Website developed by the Missouri Department of Conservation with assistance from the U.S. Fish and Wildlife Service, the U.S. Army Corps of Engineers, Missouri Department of Transportation and NatureServe. The purpose of this website is to provide information to federal, state and local agencies, organizations, municipalities, corporations and consultants regarding sensitive fish, wildlife, plants, natural communities and habitats to assist in planning, designing and permitting stages of projects.

PROJECT INFORMATION

Project Name and ID Number: LBVSD MBC WWTF Phase 2 Expansion #10143

Project Description: The LBVSD is proposing to expand the Middle Big Creek WWTF (MBC) from 2.25 MGD to 7.5 MGD. The MBC WWTF discharges to a tributary of Big Creek in Pleasant Hill, Missouri.

Project Type: Waste Transfer, Treatment, and Disposal, Liquid waste/Effluent, Effluent Discharge, Effluent discharge - renewal or modification of discharge to stream

Contact Person: John Christiansen

Contact Information: john.christiansen2@hdrinc.com or 573-886-8932

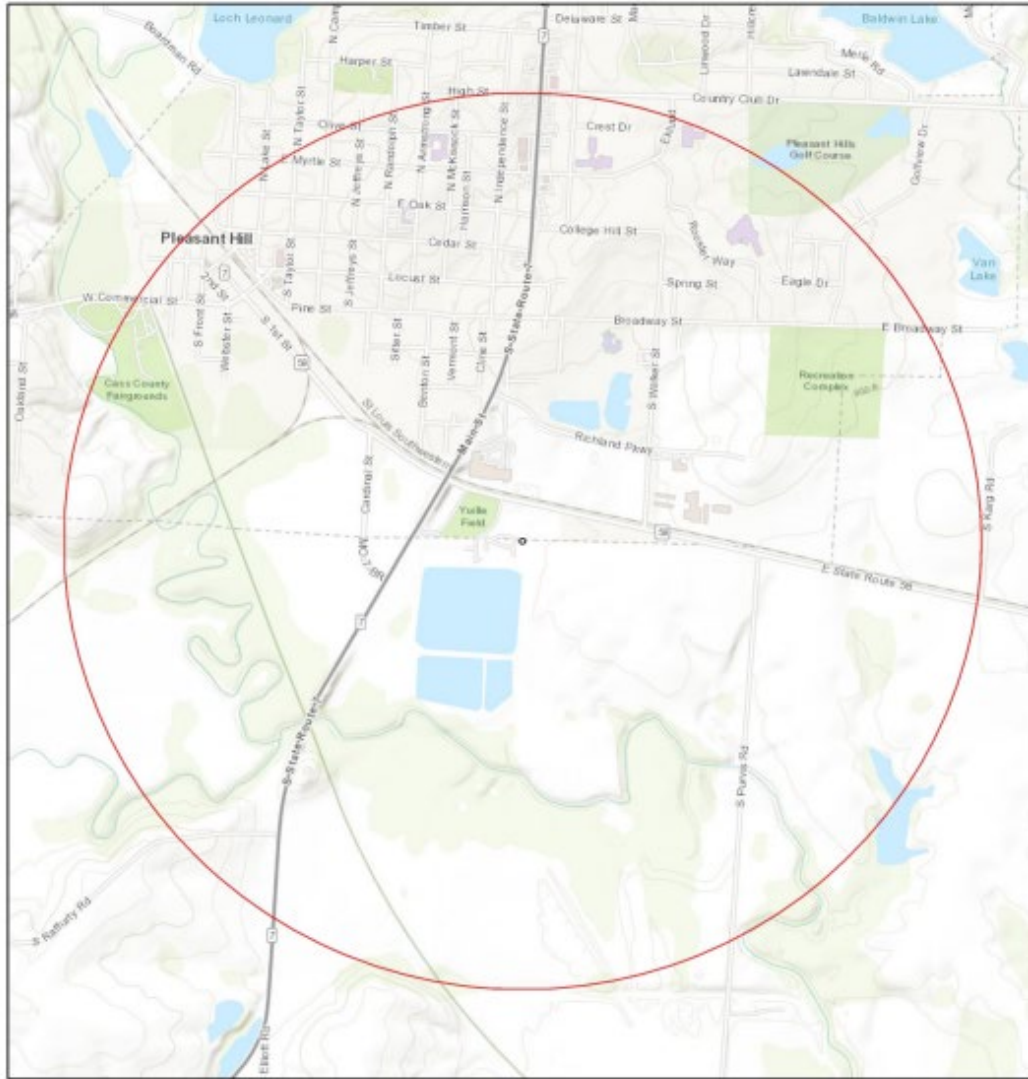
Disclaimer: The NATURAL HERITAGE REVIEW REPORT produced by this website identifies if a species tracked by the Natural Heritage Program is known to occur within or near the area submitted for your project, and shares suggested recommendations on ways to avoid or minimize project impacts to sensitive species or special habitats. If an occurrence record is present, or the proposed project might affect federally listed species, the user must contact the Department of Conservation or U.S. Fish and Wildlife Service for more information. The Natural Heritage Program tracks occurrences of sensitive species and natural communities where the species or natural community has been found. Lack of an occurrence record does not mean that a sensitive plant, animal or natural community is not present on or near the project area. Depending on the project, current habitat conditions, and geographic location in the state, surveys may be necessary. Additionally, 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.

The Natural Heritage Report is not a site clearance letter for the project. It provides an indication of whether or not public lands and sensitive resources are known to be (or are likely to be) located close to the proposed project. Incorporating information from the Natural Heritage Program into project plans is an important step that can help reduce unnecessary impacts to Missouri's sensitive fish, forest and wildlife resources. However, the Natural Heritage Program is only one reference that should be used to evaluate potential adverse project impacts. Other types of information, such as wetland and soils maps and on-site inspections or surveys, should be considered. Reviewing current landscape and habitat information, and species' biological characteristics would additionally ensure that Missouri Species of Conservation Concern are appropriately identified and addressed in planning efforts.

U.S. Fish and Wildlife Service – Endangered Species Act (ESA) Coordination: Lack of a Natural Heritage Program occurrence record for federally listed species in your project area does not mean the species is not present, as the area may never have been surveyed. Presence of a Natural Heritage Program occurrence record does not mean the project will result in negative impacts. The information within this report is not intended to replace Endangered Species Act consultation with the U.S. Fish and Wildlife Service (USFWS) for listed species. Direct contact with the USFWS may be necessary to complete consultation and it is required for actions with a federal connection, such as federal funding or a federal permit; direct contact is also required if ESA concurrence is necessary. Visit the USFWS Information for Planning and Conservation (IPaC) website at <https://ecos.fws.gov/ipac/> for further information. This site was developed to help streamline the USFWS environmental review process and is a first step in ESA coordination. The Columbia Missouri Ecological Field Services Office may be reached at 573-234-2132, or by mail at 101 Park Deville Drive, Suite A, Columbia, MO 65203.

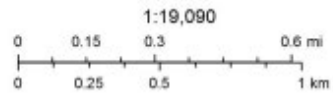
Transportation Projects: If the project involves the use of Federal Highway Administration transportation funds, these recommendations may not fulfill all contract requirements. Please contact the Missouri Department of Transportation at 573-526-4778 or visit <https://www.modot.org/> for additional information on recommendations.

LBVSD MBC WWTF Phase 2 Expansion



December 21, 2021

- Project Boundary
- Buffered Project Boundary



Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAD, NPS, NRCAN, GeoBasis, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Species or Communities of Conservation Concern within the Area:

There are records of state-listed Endangered Species, or Missouri Species or Natural Communities of Conservation Concern within or near the defined Project Area. Please contact the Missouri Department of Conservation for further coordination.

Email (preferred): NaturalHeritageReview@mdc.mo.gov
MDC Natural Heritage Review
Science Branch
P.O. Box 180
Jefferson City, MO
65102-0180
Phone: 573-522-4115 ext. 3182

Other Special Search Results:

Your project is near a designated Natural Area . Please contact MDC Natural Areas Coordinator, 573-751-4115 for more information.

Project Type Recommendations:

Waste Transfer, Treatment, and Disposal - Liquid Effluent Discharge - New or Renewal of Permit: [Clean Water Act](#) permits issued by other agencies 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 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.

Project Location and/or Species Recommendations:

Endangered Species Act Coordination - Indiana bats (*Myotis sodalis*, federal- and state-listed endangered) and Northern long-eared bats (*Myotis septentrionalis*, federal-listed threatened) may occur near the project area. Both of these species of bats hibernate during winter months in caves and mines. During the summer months, they roost and raise young under the bark of trees in wooded areas, often 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 or Northern long-eared bats, especially from September to April. **If any trees need to be removed for your project, please contact the 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.**

Invasive exotic species are a significant issue for fish, wildlife and agriculture in Missouri. Seeds, eggs, and larvae may be moved to new sites on boats or construction equipment. Please inspect and clean equipment thoroughly before moving between project sites. See <https://mdc.mo.gov/community-conservation/managing-invasive-species-your-community> for more information.

- Remove any mud, soil, trash, plants or animals from equipment before leaving any water body or work area.
- Drain water from boats and machinery that have 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 car wash sites), and dry in the hot sun before using again.

Streams and Wetlands – Clean Water Act Permits: Streams and wetlands in the project area should be protected from activities that degrade habitat conditions. For example, soil erosion, water pollution, placement of fill, dredging, in-stream activities, and riparian corridor removal, can modify or diminish aquatic habitats. Streams and wetlands may be protected under the Clean Water Act and require a permit for any activities that result in fill or other modifications to the site. Conditions provided within the U.S. Army Corps of Engineers (USACE) Clean Water Act Section 404 permit (<http://www.nwk.usace.army.mil/Missions/RegulatoryBranch.aspx>) and the Missouri Department of Natural Resources (DNR) issued Clean Water Act Section 401 Water Quality Certification (<http://dnr.mo.gov/env/wpp/401/index.html>), if required, should help minimize impacts to the aquatic organisms and aquatic habitat within the area. Depending on your project type, additional permits may be required by the Missouri Department of Natural Resources, such as permits for stormwater, wastewater treatment facilities, and confined animal feeding operations. Visit <http://dnr.mo.gov/env/wpp/permits/index.html> for more information on DNR permits. Visit both the USACE and DNR for more information on Clean Water Act permitting.

For further coordination with the Missouri Department of Conservation and the U.S. Fish and Wildlife Services, please see the contact information below:

Email (preferred): NaturalHeritageReview@mdc.mo.gov
MDC Natural Heritage Review
Science Branch
P.O. Box 180
Jefferson City, MO
65102-0180
Phone: 573-522-4115 ext. 3182

U.S. Fish and Wildlife Service
Ecological Service
101 Park Deville Drive
Suite A
Columbia, MO
65203-0007
Phone: 573-234-2132

Miscellaneous Information


FEDERAL Concerns are species/habitats protected under the Federal Endangered Species Act and that have been known near enough to the project site to warrant consideration. For these, project managers must contact the U.S. Fish and Wildlife Service Ecological Services (101 Park Deville Drive Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132; Fax 573-234-2181) for consultation.

STATE Concerns are species/habitats known to exist near enough to the project site to warrant concern and that are protected under the Wildlife Code of Missouri (RSMo 3 CSR 1 0). "State Endangered Status" is determined by the Missouri Conservation Commission under constitutional authority, with requirements expressed in the Missouri Wildlife Code, rule 3CSR 1 0-4.111. Species tracked by the Natural Heritage Program have a "State Rank" which is a numeric rank of relative rarity. Species tracked by this program and all native Missouri wildlife are protected under rule 3CSR 10-4.110 General Provisions of the Wildlife Code.

See https://mdc.mo.gov/sites/default/files/mo_nature/downloads/2021_SOCC.pdf for a complete list of species and communities of conservation concern. Detailed information about the animals and some plants mentioned may be accessed at https://mdc12.mdc.mo.gov/applications/mofwis/mofwis_search1.aspx. If you would like printed copies of best management practices cited as internet URLs, please contact the Missouri Department of Conservation.

Appendix C: Antidegradation Review Summary Attachments

1.) Antidegradation Review Summary / Request Form

		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 Middle Big Creek Wastewater Treatment Facility				COUNTY Cass	
ADDRESS (PHYSICAL) 1200 East State Route 58		CITY Pleasant Hill		STATE MO	ZIP CODE 64058
PERMIT NUMBER MO-0058629		PROPOSED DESIGN FLOW 7.5 MGD	SIC / NAICS CODE 4952		
2. OWNER					
NAME Little Blue Valley Sewer District (LBVSD)					
ADDRESS 21208 East Old Atherton Road		CITY Independence		STATE MO	ZIP CODE 64080
EMAIL ADDRESS odell@lbvdsd.org				TELEPHONE NUMBER WITH AREA CODE (816) 796-7660 ext. 2214	
3. CONTINUING AUTHORITY The regulatory requirement regarding continuing authority is found in 10 CSR 20-6.010(2).					
NAME Little Blue Valley Sewer District (LBVSD)		SECRETARY OF STATE CHARTER NUMBER			
ADDRESS 21208 East Old Atherton Road		CITY Independence		STATE MO	ZIP CODE 64080
EMAIL ADDRESS odell@lbvdsd.org				TELEPHONE NUMBER WITH AREA CODE (816) 796-7660 ext. 2214	
4. CONSULTANT					
PREPARER NAME David Carani		COMPANY NAME HDR Engineering, Inc.			
ADDRESS 3610 Buttonwood Drive, Suite 243		CITY Columbia		STATE MO	ZIP CODE 65203
EMAIL ADDRESS david.carani@hdrinc.com				TELEPHONE NUMBER WITH AREA CODE 573-823-9873	
5. RECEIVING WATER BODY SEGMENT #1					
NAME Tributary to Big Creek					
5.1 Upper end of segment – Location of discharge UTM: X= 390338, Y= 4292741 OR Lat _____, Long _____					
5.2 Lower end of segment – UTM: X= 390300, Y= 4291905 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 Big Creek					
6.1 Upper end of segment – End of Segment #1 UTM: X= 390300, Y= 4291905 OR Lat _____, Long _____					
6.2 Lower end of segment – UTM: X= 422199, Y= 4249326 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? <input type="checkbox"/> Yes <input type="checkbox"/> 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.

Effluent irrigation was evaluated to determine whether it represented a feasible non-degrading alternative to the proposed expansion. Since the proposed Phase 2 MBC WWTF would increase the average daily rated flow from 2.25 MGD to 7.50 MGD, the effluent irrigation system would be sized to convey an average daily flow of 5.25 MGD, plus an irrigation factor. An average daily effluent flow of 5.25 MGD results in a total annual irrigation flow of approximately 2 billion gallons. Due to the unknown locations of potential irrigation, a conservative irrigation application rate of 12-inches per area of land was used. If 12-inch is applied per square foot of land per year, this requires roughly 5,881 acres for irrigation purposes. A University of Missouri Farmland Values Opinion Survey conducted in September 2020 indicated an average cost of irrigated cropland in Missouri of \$6,670. Based on its estimated value, the District would be required to purchase anywhere from \$40 to \$50 million of land just for irrigation purposes. Additionally, 105 days of storage are required for effluent irrigation. The total conceptual cost to irrigate effluent in lieu of expanding the MBC discharge to the receiving stream is approximately \$321 million, which does not include the cost for pumping and irrigation equipment to the application sites. Based on the increased cost and limitations associated with obtaining the necessary amount of land, this alternative is neither practicable or economically feasible.

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 | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Path B: Tier 2 – Minimal Degradation | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Path C: Tier 2 – Significant Degradation | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Path D: Tier 1 – Preliminary Review Request | <input type="checkbox"/> Yes | <input type="checkbox"/> No |
| Path E: Temporary Degradation | <input type="checkbox"/> Yes | <input type="checkbox"/> 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		Tier 2 - Insignificant	10	15 (weekly)
TSS	X		Tier 2 - Insignificant	10	15 (weekly)
Ammonia (Summer)	X		Tier 2 - Insignificant	varies by month	
Ammonia (Winter)	X		Tier 2 - Insignificant	varies by month	
Total Phosphorus	X		Tier 1	1 mg/L ann. avg.	

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

12. PROPOSED PROJECT SUMMARY	
<p>Average daily flow projections indicate that flows to the Middle Big Creek (MBC) WWTF will exceed 5 MGD prior to year 2025, the anticipated completion of Phase 2 improvements. This will put significant reliance on pumping of average daily flows from the Raintree pump station (RTPS) for treatment at Atherton WWTP. Furthermore, at the Phase 2 design year 2040, the average daily flow projections support an expansion to 7.5 MGD in order to treat all average daily flows within the MBC watershed at the MBC WWTF, reducing the reliance on the RTPS for average daily flows and supporting development needs within the MBC watershed.</p> <p>The recommended improvements at the MBC WWTF includes increasing capacity from 2.25 MGD to 7.5 MGD, constructing 7.3 MG of peak flow storage at the MBC WWTF, providing facilities to achieve future nutrient reductions, if necessary, and constructing new sludge reed beds to stabilize biosolids onsite, thereby providing a more cost effective and sustainable method of waste sludge processing compared to the current practice of hauling to RTPS for treatment at Atherton WWTP. The following general improvements will be constructed to support the WWTF expansion:</p> <p>•Raw Wastewater Lift Station capacity expansion, •Raw Wastewater Meter Vault modifications, •Raw Wastewater Flow Splitter modifications, •New 7.3 MG EFHB (EFHB No. 2), •New Headworks Building No. 2 for fine screening and grit removal, •Anaerobic Selector Basins No. 1 through No. 3, •New Aeration Basins No. 2 and No. 3, •Post-Oxic Basins No. 1 through No. 3, •Chemical Building for phosphorus removal, •New Final Clarifier Splitter No. 2 and No. 3, •New Final Clarifiers No. 3 through No. 6, •Tertiary Filter Building expansion and tertiary filter capacity expansion, •UV disinfection capacity expansion, •Effluent Reaeration Structure expansion, •New RAS/WAS Lift Station No. 2 and No. 3, •New Aerobic Digester No. 3, and •Construction of Sludge Reed B</p>	
<p>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 <i>New Technology Definitions and Requirements fact sheet</i>.</p>	
13. CONTINUING AUTHORITY WAIVER (For New Discharges)	
<p>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? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>If yes, provide a copy.</p>	
14. APPLICATION FEE	
<input type="checkbox"/> CHECK NUMBER	<input checked="" type="checkbox"/> JETPAY CONFIRMATION NUMBER 20031265
15. SIGNATURE	
<p>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.</p>	
SIGNATURE 	DATE 2/25/2022
PRINT NAME David Carani	TITLE Project Manager
<p>PLEASE IDENTIFY YOUR STATUS FOR THIS PROJECT: <input type="checkbox"/> OWNER <input type="checkbox"/> CONTINUING AUTHORITY <input checked="" type="checkbox"/> CONSULTANT</p>	

2.) Attachment D



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH
ANTIDEGRADATION REVIEW SUMMARY
PATH D: TIER 1 PRELIMINARY REVIEW REQUEST

1. FACILITY AND CONTACT INFORMATION				
FACILITY NAME Middle Big Creek Wastewater Treatment Facility			COUNTY Cass	
ADDRESS (PHYSICAL) 1200 East State Route 58		CITY Pleasant Hill	STATE MO	ZIP CODE 64058
CONTACT NAME Lisa O'Dell				
ADDRESS 21208 East Old Atherton Road		CITY Independence	STATE MO	ZIP CODE 64080
EMAIL ADDRESS odell@lbvdsd.org			TELEPHONE NUMBER WITH AREA CODE (816) 796-7660 ext. 2214	
2. EXISTING WATER QUALITY DATA OR MODEL SUMMARY				
<p>The proposed project will be reviewed by the Watershed Protection Section to determine whether or not the discharge will cause or contribute to the impairment. Once this determination has been completed, the applicant may proceed by paying the review fee and submitting the request forms for the entire project.</p> <p>Provide all the relevant data and reports for approval by the Watershed Protection Section.</p> <p>Name of Receiving Stream: Truman Reservoir via Big Creek</p> <p>Does the receiving stream have a Total Maximum Daily Load (TMDL)? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No</p> <p>If known, what is the source(s) of the impairment? Nonpoint sources</p> <p>List the pollutants for which the stream is impaired: Truman Reservoir is 303(d) impaired for exceedance of the Chl-a screening level and algal related fish kills.</p> <p>What is the design flow of the proposed facility?</p> <p>Comments/Discussion: 7.5 MGD</p>				
Tier Determination: Identify all Tier 1 pollutants below.				
Tier 1 Pollutant of Concern	Concentration*		Water Quality Standard	Proposed Effluent Concentration
	mg/L	µg/L		
Phosphorus	X		Causal parameter	1.0 mg/L annual average
* Place an X in appropriate box for the concentration units for each Pollutant of Concern				
3. PROPOSED PROJECT SUMMARY				
<p>The recommended improvements at the MBC WWTF includes increasing capacity from 2.25 MGD to 7.5 MGD, constructing 7.3 MG of peak flow storage at the MBC WWTF, providing facilities to achieve future nutrient reductions, if necessary, and constructing new sludge reed beds to stabilize biosolids onsite, thereby providing a more cost effective and sustainable method of waste sludge processing compared to the current practice of hauling to RTPS for treatment at Atherton WWTP.</p>				

3.) Attachment B



MISSOURI DEPARTMENT OF NATURAL RESOURCES
 WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH

ANTIDEGRADATION REVIEW SUMMARY
PATH B: TIER 2 – MINIMAL DEGRADATION

1. FACILITY						
NAME Middle Big Creek Wastewater Treatment Facility					COUNTY Cass	
2. EXISTING WATER QUALITY SUMMARY						
If using your own collected water quality data, submit a copy of the Quality Assurance Project Plan (QAPP) to the Watershed Protection Section for approval and then submit the collected data for their approval prior to Antidegradation submittal. When using existing sources of water quality data (eg. USGS), the Engineering Section will conduct the review. For more detailed information, see the Missouri Antidegradation Implementation Procedure (AIP), Section II.A.1.						
Provide all the relevant data and reports for approval by the Watershed Protection Section.						
Name of Receiving Stream: Unnamed tributary to Big Creek						
Source of Existing Water Quality Data: NA						
Distance of outfall to Existing Water Quality Data sampling location: NA						
Is outfall upstream or downstream of the sampling location? NA						
Date range of the Existing Water Quality Data: NA						
What is the design flow of the proposed facility? 7.5 MGD						
Critical Low-Flow Receiving Stream Values			1Q10	7Q10	30Q10	
Flow (cfs)			0	0	0	
Existing Water Quality and Water Quality Standard for Each Pollutant of Concern						
Pollutants of Concern	Concentration*		1Q10	7Q10	30Q10	Water Quality Standard
	mg/L	µg/L				
BOD5			0	0	0	DO = 5 mg/L
TSS			0	0	0	NA
Ammonia			0	0	0	Varies by season
E. coli			0	0	0	206 cfu/100 mL
Oil & Grease			0	0	0	10 mg/L
* Place an X in appropriate box for the concentration units for each Pollutant of Concern						
Comments/Discussion: BOD5 - BOD5 is based on meeting a DO criterion of 5 mg/L. TSS - There is no TSS criterion. It is typically set equal to the BOD5 limit. Ammonia - Water quality criteria is pH and temperature dependent.						

3. ASSIMILATIVE CAPACITY				
Determining the facility assimilative capacity, or FAC, and the segment assimilative capacity, or SAC for each pollutant of concern is explained in detail in the Antidegradation Implementation Procedure, Section II.A.3, and Appendix 3. POCs to be considered include those pollutants reasonably expected to be present in the discharge per the Antidegradation Implementation Procedure, Section II.A. Provide all calculations in the Antidegradation Review Report.				
Pollutant of Concern	Facility Assimilative Capacity	New Load		Percent of Facility Assimilative Capacity
	(lbs/day)	(mg/L)	(lbs/day)	(%)
BOD5	see comments below			
TSS	see comments below			
Ammonia	see comments below			
E. coli	see comments below			
Oil & Grease	see comments below			
Assimilative capacity summary BOD5 - Model demonstrates no impact on instream DO TSS - No applicable criterion Ammonia - Maintaining water quality-based limits will not impact water quality in receiving stream due to lack of flow E. coli - Facility will disinfect which is considered insignificant Oil & Grease - Limits of 10 mg/L AML and 15 mg/L AWL are considered insignificant				
Is degradation considered minimal for all pollutants of concern? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
Degradation is considered minimal if the new or proposed loading is less than 10 percent of the FAC and the cumulative degradation is less than 10 percent of the SAC according to the Antidegradation Implementation Procedure, Section II.A.3. If yes, an alternatives analysis and a social and economic importance analysis are not required.				
Comments/Discussion Insignificance was demonstrated by showing no change in the receiving stream concentration for the pollutants of concern.				
4. PROPOSED PROJECT SUMMARY				
The recommended improvements at the MBC WWTF includes increasing capacity from 2.25 MGD to 7.5 MGD, constructing 7.3 MG of peak flow storage at the MBC WWTF, providing facilities to achieve future nutrient reductions, if necessary, and constructing new sludge reed beds to stabilize biosolids onsite, thereby providing a more cost effective and sustainable method of waste sludge processing compared to the current practice of hauling to RTPS for treatment at Atherton WWTP.				

Appendix D: Dissolved Oxygen Modeling

Segment 1: Big Creek Receiving Stream Spreadsheet Model (Outfall to Big Creek)
Modified Streeter-Phelps Dissolved Oxygen Equation

Part 1: Analysis Documentation

Permit Applicant: **Little Blue Valley Sewer District - Middle Big Creek Sub-District**

Analysis Date: **11/17/2021** Permit Number: **MO-0058629**

Analysis Performed By: **HDR**

Part 2: Facility Discharge Information

County: **Cass** Latitude: **38.7766** Longitude: **-94.2624**

Effluent Characteristics			
Variable	Unit	Value	Suggested Value & Comments
Flow	MGD	7.5	Facility Design Average Flow
Soluble CBODU	[mg/L]	14.2	Adjust to meet D.O. criteria
CBOD ₅	[mg/L]	10.0	Calculated Permit Variable
BOD ₅	[mg/L]	15.0	Calculated Permit Variable Per 10 CSR 20-7.015
NH ₃ -N	[mg/L]	1.1	Equal to or less than toxicity-based ammonia WLA. Adjust to meet D.O.
TSS	[mg/L]	15	Adjust to meet D.O. criteria
D.O.	[mg/L]	6.0	Adjust to meet D.O. criteria
pH	S.U.	7.8	Use median from DMR data if available, otherwise assume 7.8 S.U.
Temperature	°C	26	Default - 26° C for summer allocations, 6° C winter allocations

Part 3: Receiving Stream Information

Name: **Unnamed Receiving Tributary** Class: **U** Watershed Area (mi²): **0.1**

WBID: **Not Applicable** Type: **Rifle-Pool** Aquatic Life Use Designation: **GW/WF**

Upstream Conditions			
Variable	Unit	Value	Default Value
Streamflow	ft ³ sec ⁻¹	0.00	-----
Soluble CBODU	[mg/L]	0.5	
CBOD ₅	[mg/L]	0.9	NA - Permit Variable
BOD ₅	[mg/L]	5.9	NA - Permit Variable
NH ₃ -N	[mg/L]	0.1	
VSS	[mg/L]	2	
D.O.	[mg/L]	5	5
pH	S.U.	7.8	7.8
Temperature	°C	26	26° C

Hydrogeometry & Transport		
Variable	Unit	Value
Slope	ft/ft	0.008
Elevation	ft ASL	630
Velocity	ft. sec ⁻¹	0.396
Velocity Default	ft. sec ⁻¹	0.386
Width	ft.	10.6
Width Default	ft.	10.6
Depth	ft.	2.9
Depth Default	ft.	2.9

Water Quality Criteria of Receiving Stream			
Criteria	Unit	Value	Type
D.O.	[mg/L]	5.0	Chronic
NH ₃ -N	[mg/L]	1.5	Chronic - ELP
NH ₃ -N	[mg/L]	12.1	Acute

Mixing Zone and Critical Flows		
Flow	Unit	Value
7Q10	ft ³ sec ⁻¹	0
Default 7Q10 value	ft ³ sec ⁻¹	0.0
D.O. Mixing Zone	ft ³ sec ⁻¹	0.0
Default Mixing Zone	ft ³ sec ⁻¹	0.00

Part 4: Model Parameters and Rate Constants

Reach Length **0.5** miles

Global Rates						
Rate	Unit	Value at 20°C	Value at Simulated Temperature	Theta	Uncalibrated Value	Comments
CBODU:CBOD ₅	mgU:mg5-day	2.8	-----	-----	2.8	Varies between 1.5 to 4.
Effluent VSS:TSS	mg/100:mg/100	0.85	-----	-----	0.85	Generally greater than 70%
CBOD Oxidation	day ⁻¹	0.47	0.62	1.05	0.47	Varies between 0.1 to 4
NBOD Oxidation	day ⁻¹	0.3	0.48	1.08	0.3	Varies between 0.1 to 2+
SOD	gO ₂ /m ³ day ⁻¹	4	5.8	1.07	4.0	Varies between 0.2 and 9
SOD Coverage	%	25%	-----	-----	25%	Varies between 0% to 100%
Reaeration Rate	day ⁻¹	17.6	20.3	1.02	17.6	See Mixing and Flow (1999)

Mass Balance at Point of Mixing		
Variable	Unit	Value
Streamflow	ft ³ sec ⁻¹	11.63
Soluble CBODU	[mg/L]	14.20
CBOD ₅	[mg/L]	9.97
BOD ₅	[mg/L]	14.97
NH ₃ -N	[mg/L]	1.10
VSS	[mg/L]	12.75
D.O.	[mg/L]	6.00
D.O. Saturation	[mg/L]	7.98
D.O. Deficit	[mg/L]	1.98
pH	S.U.	7.80
Temperature	°C	26.00

RUN Streeter-Phelps

Minimum Reach D.O. **6.00** [mg/L]
 Location of Minimum Reach D.O. **0.00** miles
 D.O. at 1/4 mile **6.7** [mg/L]
 Minimum Mixing Zone D.O. **6.0** [mg/L]

**Segment 2: Big Creek Receiving Stream Spreadsheet Model (Confluence to Parris Rd.)
 Modified Streeter-Phelps Dissolved Oxygen Equation**

Part 1: Analysis Documentation

Permit Applicant: Little Blue Valley Sewer District -Middle Big Creek Sub-District

Analysis Date: 11/17/2021 Permit Number: MO-0058629

Analysis Performed By: HDR

Part 2: Facility Discharge Information

County: Cass Latitude: 38.7766 Longitude: -94.2624

Effluent Characteristics			
Variable	Unit	Value	Suggested Value & Comments
Flow	MGD	<u>7.5</u>	Facility Design Average Flow
Soluble CBOD ₅	[mg/L]	<u>13.5</u>	Adjust to meet D.O. criteria
CBOD ₅	[mg/L]	9.7	Calculated Permit Variable
BOD ₅	[mg/L]	14.7	Calculated Permit Variable Per 10 CSR 20-7.015
NH ₃ -N	[mg/L]	<u>1.1</u>	Equal to or less than toxicity-based ammonia WLA. Adjust to meet D.O.
TSS	[mg/L]	<u>14.9</u>	Adjust to meet D.O. criteria
D.O.	[mg/L]	<u>7.0</u>	Adjust to meet D.O. criteria
pH	S.U.	<u>7.8</u>	Use median from DMR data if available, otherwise assume 7.8 S.U.
Temperature	°C	<u>26</u>	Default - 26°C for summer allocations, 6°C winter allocations

Part 3: Receiving Stream Information

Name: Big Creek Class: P Watershed Area (mi²): 90.8

WBID: 1250 Type: Glide-Pool Aquatic Life Use Designation: GWWF

Upstream Conditions			
Variable	Unit	Value	Default Value
Streamflow	ft ³ sec ⁻¹	0.62	-----
Soluble CBOD ₅	[mg/L]	<u>0.5</u>	
CBOD ₅	[mg/L]	0.9	NA - Permit Variable
BOD ₅	[mg/L]	5.9	NA - Permit Variable
NH ₃ -N	[mg/L]	<u>0.1</u>	
VSS	[mg/L]	<u>2</u>	
D.O.	[mg/L]	<u>5</u>	5
pH	S.U.	<u>7.8</u>	7.8
Temperature	°C	<u>26</u>	26°C

Hydrogeometry & Transport			
Variable	Unit	Value	
Slope	ft/ft	<u>0.0006</u>	
Elevation	ft ASL	<u>815</u>	
Velocity	ft. sec ⁻¹	<u>0.235</u>	
Velocity Default	ft. sec ⁻¹	0.235	
Width	ft.	<u>21.8</u>	
Width Default	ft.	21.8	
Depth	ft.	<u>2.4</u>	
Depth Default	ft.	2.4	

Water Quality Criteria of Receiving Stream			
Criteria	Unit	Value	Type
D.O.	[mg/L]	5.0	Chronic
NH ₃ -N	[mg/L]	1.5	Chronic - ELP
NH ₃ -N	[mg/L]	12.1	Acute

Mixing Zone and Critical Flows			
Flow	Unit	Value	
7Q10	ft ³ sec ⁻¹	<u>0.62</u>	
Default 7Q10 value	ft ³ sec ⁻¹	0.1	
D.O. Mixing Zone	ft ³ sec ⁻¹	<u>0.16</u>	
Default Mixing Zone	ft ³ sec ⁻¹	0.03	

Part 4: Model Parameters and Rate Constants

Reach Length 4.7 miles

Global Rates						
Rate	Unit	Value at 20°C	Value at Simulated Temperature	Theta	Uncalibrated Value	Comments
CBOD ₅ :CBOD ₅	mg/mg-day	<u>2.8</u>	-----	-----	2.8	Varies between 1.5 to 4.
Effluent V33-TS3	mg/100 mgTOD	<u>0.85</u>	-----	-----	0.85	Generally greater than 70%
CBOD Oxidation	day ⁻¹	<u>0.51</u>	0.67	1.05	0.51	Varies between 0.1 to 4
NBOD Oxidation	day ⁻¹	<u>0.3</u>	0.48	1.08	0.3	Varies between 0.1 to 2+
SOD	gO ₂ m ⁻² day ⁻¹	<u>2.0</u>	2.9	1.07	3.4	Varies between 0.2 and 9
SOD Coverage	%	<u>75%</u>	-----	-----	75%	Varies between 0% to 100%
Reaeration Rate	day ⁻¹	<u>3.4</u>	3.9	1.02	3.4	See Melching and Flores (1999)

Mass Balance at Point of Mixing		
Variable	Unit	Value
Streamflow	ft ³ sec ⁻¹	11.8
Soluble CBOD ₅	[mg/L]	13.3
CBOD ₅	[mg/L]	8.6
BOD ₅	[mg/L]	14.6
NH ₃ -N	[mg/L]	1.1
VSS	[mg/L]	12.5
D.O.	[mg/L]	7.0
D.O. Saturation	[mg/L]	7.88
D.O. Deficit	[mg/L]	0.9
pH	S.U.	7.8
Temperature	°C	26.0

RUN Streeter-Phelps

Minimum Reach D.O. 5.07 [mg/L]
 Location of Minimum Reach D.O. 2.10 miles
 D.O. at 1/4 mile 6.4 [mg/L]
 Minimum Mixing Zone D.O. 6.4 [mg/L]



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

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

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: _____ Project #: _____
- 1.2 Has the Missouri Department of Natural Resources approved the proposed project’s antidegradation review?
 YES Date of Approval: _____ N/A
- 1.3 Has the department approved the proposed project’s facility plan*?
 YES Date of Approval: _____ NO (If No, complete No. 1.4.)
- 1.4 [Complete only if answered No on No. 1.3.] Is a copy of the facility plan* for wastewater treatment facilities included with this application?
 YES NO Exempt because _____ **FACILITY PLAN WAS SUBMITTED TO MDNR 12/29/2021.**
- 1.5 Is a copy of the appropriate plans* and specifications* included with this application? **ELECTRONIC COPY OF THE PLANS AND SPECIFICATIONS WERE SUBMITTED TO MDNR 5/1/2024.**
 YES Denote which form is submitted: Hard copy Electronic copy (See in _____)
- 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: _____
 Enclosed is the appropriate operating permit application and fee submittal. Denote which form: A B B2
 N/A: However, In the event the department believes that my operating permit requires revision to permit limitation such as changing equivalent to secondary limits to secondary limits or adding total residual chlorine limits, please share a draft copy prior to public notice? YES NO
- 1.8 Is the facility currently under enforcement with the department or the Environmental Protection Agency? YES NO
- 1.9 Is the appropriate fee or JetPay confirmation included with this application? YES NO
 See Section 7.0

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

2.0 PROJECT INFORMATION

2.1 NAME OF PROJECT	2.2 ESTIMATED PROJECT CONSTRUCTION COST \$
2.3 PROJECT DESCRIPTION	
2.4 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION	
2.5 DESIGN INFORMATION	
A. Current population: _____; Design population: _____	
B. Actual Flow: _____ gpd; Design Average Flow: _____ gpd; Actual Peak Daily Flow: _____ gpd; Design Maximum Daily Flow: _____ gpd; Design Wet Weather Event: _____	
2.6 ADDITIONAL INFORMATION	
A. Is a topographic map attached? <input type="checkbox"/> YES <input type="checkbox"/> NO	
B. Is a process flow diagram attached? <input type="checkbox"/> YES <input type="checkbox"/> NO	

3.0 WASTEWATER TREATMENT FACILITY

NAME		TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS	
ADDRESS (PHYSICAL)	CITY	STATE	ZIP CODE	COUNTY

Wastewater Treatment Facility: Mo- (Outfall Of)

3.1 Legal Description: _____ 1/4, _____ 1/4, _____ 1/4, Sec. _____, T _____, R _____
(Use additional pages if construction of more than one outfall is proposed.)

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

3.3 Name of receiving streams: _____

4.0 PROJECT OWNER

NAME		TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS	
ADDRESS	CITY	STATE	ZIP CODE	

5.0 CONTINUING AUTHORITY: A continuing authority is a company, business, entity or person(s) that will be operating the facility and/or ensuring compliance with the permit requirements.

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

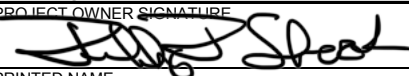
6.0 ENGINEER

ENGINEER NAME / COMPANY NAME		TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS	
ADDRESS	CITY	STATE	ZIP CODE	

7.0 APPLICATION FEE

CHECK NUMBER JETPAY CONFIRMATION NUMBER

8.0 PROJECT OWNER: I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

PROJECT OWNER SIGNATURE


PRINTED NAME _____ DATE **7/17/24**

TITLE OR CORPORATE POSITION	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
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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.

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.
 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 three 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 _____
Basin #3:	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
Basin #3:	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 Basin #3: _____ ft

9.6 Existing sludge depth, if the basins are currently in operation.
 Basin #1: _____ ft Basin #2: _____ ft Basin #3: _____ ft

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

10.0 LAND APPLICATION SYSTEM

10.1 Number of irrigation sites _____ Total Acres _____ Maximum % field slopes _____

Location:	_____ 1/4, _____ 1/4, _____ 1/4, _____	Sec. _____	T _____	R _____	County _____	Acres _____
Location:	_____ 1/4, _____ 1/4, _____ 1/4, _____	Sec. _____	T _____	R _____	County _____	Acres _____
Location:	_____ 1/4, _____ 1/4, _____ 1/4, _____	Sec. _____	T _____	R _____	County _____	Acres _____

(Use additional pages if greater than three irrigation sites.)

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

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

10.4 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

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

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

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