

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION



CONSTRUCTION PERMIT

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

All-Pro Properties, LLC
Tim McDuffey, Owner
All Pro Chimney Cove Circle 2 Lot WWTP
270 Chimney Cove Cir
Osage Beach, MO 65079

for the construction of (described facilities):

See attached.

Permit Conditions:

See attached.

Construction of such proposed facilities shall be in accordance with the provisions of the Missouri Clean Water Law, Chapter 644, RSMo, and regulation promulgated thereunder, or this permit may be revoked by the Department of Natural Resources (department).

As the department does not examine structural features of design or the efficiency of mechanical equipment, the issuance of this permit does not include approval of these features.

A representative of the department may inspect the work covered by this permit during construction. Issuance of a permit to operate by the department will be contingent on the work substantially adhering to the approved plans and specifications.

This permit applies only to the construction of water pollution control components; it does not apply to other environmentally regulated areas.

June 29, 2026
Effective Date

June 28, 2028
Expiration Date

Heather Peters, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

Construction of a membrane bioreactor (MBR) wastewater treatment system and associated collection system to serve two single family homes at the Lake of the Ozarks. For the collection system, wastewater flows by gravity from each home to one of two septic tanks before flowing by gravity to the treatment system. The MBR treatment system includes a settling zone, anoxic zone, and aerobic zone followed by filtrate pumps that convey treated effluent for discharge to the Lake of the Ozarks. The design average flow of the facility is 1,200 gallons per day (gpd).

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

II. COST ANALYSIS FOR COMPLIANCE

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

The department is not required to complete a cost analysis for compliance because the facility is not a combined or separate sanitary sewer system for a publically-owned treatment works.

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 consistent with plans and specifications signed and sealed by Matthew John Marschke, P.E., with Marschke Engineering, and as described in this permit.
3. The department must be contacted in writing prior to making any changes to the 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).

4. State and federal law does not permit bypassing of raw wastewater, therefore steps must be taken to ensure that raw wastewater does not discharge during construction. If a sanitary sewer overflow or bypass occurs, report the appropriate information to the department's Central Field Operations Office per 10 CSR 20-7.015(9)(G).
5. In addition to the requirements for a construction permit, 10 CSR 20-6.200 requires land disturbance activities of 1 acre or more to obtain a Missouri state operating permit to discharge stormwater. The permit requires best management practices sufficient to control runoff and sedimentation to protect waters of the state. Land disturbance permits will only be obtained by means of the department's ePermitting system available online at <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.
6. A United States Army Corps of Engineers (USACE) Clean Water Act Section 404 Department of the Army permit and a Section 401 Water Quality Certification issued by the department may be required for the activities described in this permit. This permit is not valid until these requirements are satisfied or notification is provided that no Section 404 permit is required by the USACE. You must contact your local USACE district since they determine what waters are jurisdictional and which permitting requirements may apply. You may call the department's Water Protection Program, Operating Permits Section at 573-522-4502 for more information. See <https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/section-401-water-quality> for more information.
7. All construction must adhere to applicable 10 CSR 20-8 (Chapter 8) requirements listed below.
 - Flood protection shall apply to new construction and to existing facilities undergoing major modification. The wastewater facility structures, electrical equipment, and mechanical equipment shall be protected from physical damage by not less than the one hundred (100)-year flood elevation. 10 CSR 20-8.140(2)(B)
 - Unless another distance is determined by the Missouri Geological Survey or by the department's Public Drinking Water Branch, the minimum distance between wastewater treatment facilities and all potable water sources shall be at least three hundred feet (300'). 10 CSR 20-8.140(2)(C)1.
 - No treatment unit with a capacity of twenty-two thousand five hundred gallons per day (22,500 gpd) or less shall be located closer than 50' to a neighboring residence for all discharging facilities. See 10 CSR 20-2.010(68) for the definition of a residence. 10 CSR 20-8.140(2)(C)2
 - Facilities shall be readily accessible by authorized personnel from a public right-of-way at all times. 10 CSR 20-8.140(2)(D)
 - The alarm for pump and haul systems shall be activated in cases of high water levels. Follow the provisions in subsection (7)(C) of this rule for alarm systems. 10 CSR 20-8.140(4)(D)

- The outfall shall be so constructed and protected against the effects of flood water, ice, or other hazards as to reasonably ensure its structural stability and freedom from stoppage. 10 CSR 20-8.140(6)(A)
- All sampling points shall be designed so that a representative and discrete twenty-four (24) hour automatic composite sample or grab sample of the effluent discharge can be obtained at a point after the final treatment process and before discharge to or mixing with the receiving waters. 10 CSR 20-8.140(6)(B)
- All outfalls shall be posted with a permanent sign indicating the outfall number (i.e., Outfall #001). 10 CSR 20-8.140(6)(C)
- All wastewater treatment facilities shall be provided with an alternate source of electric power or pumping capability to allow continuity of operation during power failures. 10 CSR 20-8.140(7)(A)1.
- An audiovisual alarm or a more advanced alert system, with a self-contained power supply, capable of monitoring the condition of equipment whose failure could result in a violation of the operating permit, shall be provided for all wastewater treatment facilities. 10 CSR 20-8.140(7)(C)
- No piping or other connections shall exist in any part of the wastewater treatment facility that might cause the contamination of a potable water supply. 10 CSR 20-8.140(7)(D)1.
- A means of flow measurement shall be provided at all wastewater treatment facilities. 10 CSR 20-8.140(7)(E)
- Adequate provisions shall be made to effectively protect facility personnel and visitors from hazards. The following shall be provided to fulfill the particular needs of each wastewater treatment facility:
 - Gratings over appropriate areas of treatment units where access for maintenance is necessary; 10 CSR 20-8.140(8)(B)
 - First aid equipment; 10 CSR 20-8.140(8)(C)
 - Posted "No Smoking" signs in hazardous areas; 10 CSR 20-8.140(8)(D)
 - Appropriate personal protective equipment (PPE); 10 CSR 20-8.140(8)(E)
- The materials utilized for storage, piping, valves, pumping, metering, and splash guards, etc., for chemical handling, shall be specially selected considering the physical and chemical characteristics of each hazardous or corrosive chemical. 10 CSR 20-8.140(9)(A)1.
- Secondary containment storage areas contain the stored volume of chemical until it can be safely transferred to alternate storage or released to the wastewater treatment plant at controlled rates that will not damage the facilities, inhibit the treatment processes, or contribute to stream pollution. Secondary containment shall be designed as follows:
 - A minimum volume of one hundred ten percent (110%) of the volume of the largest storage container located within the containment area plus the space occupied by any other tanks located within the containment area when protected from precipitation; 10 CSR 20-8.140(9)(A)2.B.
 - Walls and floors of the secondary containment structure constructed of suitable material that is compatible with the specifications of the product being stored. 10 CSR 20-8.140(9)(A)2.C.

- The following shall be provided to fulfill the particular needs of each chemical housing facility:
 - Provide storage for a minimum of thirty (30) days' supply, unless local suppliers and conditions indicate that such storage can be reduced without limiting the supply; 10 CSR 20-8.140(9)(B) 1.
 - Construct the chemical storage room of fire and corrosion resistant material; 10 CSR 20-8.140(9)(B)2.
 - Provide chemical storage areas with drains, sumps, finished water plumbing, and the hose bibs and hoses necessary to clean up spills and to wash equipment; 10 CSR 20-8.140(9)(B)4.
 - Construct chemical storage area floors and walls of material that is suitable to the chemicals being stored and that is capable of being cleaned; 10 CSR 20-8.140(9)(B)5.
 - Comply with the NEC recommendation for lighting and electrical equipment based on the chemicals stored. 10 CSR 20-8.140(9)(B)8.
 - Store chemical containers in a cool, dry, and well-ventilated area; 10 CSR 20-8.140(9)(B)9.
 - Locate storage area for chemical containers out of direct sunlight; 10 CSR 20-8.140(9)(B)11.
 - Maintain storage temperatures in accordance with relevant Material Safety Data Sheets (MSDS). 10 CSR 20-8.140(9)(B)12.
- The following shall be provided, where applicable, for the design of chemical handling:
 - Select storage tanks, piping, and equipment for liquid chemicals specific to the chemicals; 10 CSR 20-8.140(9)(C)2.
 - Provide sufficient capacity of solution storage or day tanks feeding directly for twenty-four- (24-) hour operation at design average flow; 10 CSR 20-8.140(9)(C)4.
 - Provide a minimum of two (2) chemical feeders for continuous operability. Provide a standby unit or combination of units of sufficient capacity to replace the largest unit out-of-service; 10 CSR 20-8.140(9)(C)5.
 - Chemical feeders shall—
 - Be designed with chemical feed equipment to meet the maximum dosage requirements for the design average flow conditions; 10 CSR 20-8.140(9)(C)6.A.
 - Be able to supply, at all times, the necessary amounts of chemicals at an accurate rate throughout the range of feed; 10 CSR 20-8.140(9)(C)6.B.
 - Provide proportioning of chemical feed to the rate of flow where the flow rate is not constant; 10 CSR 20-8.140(9)(C)6.C.
 - Be designed to be readily accessible for servicing, repair, and observation; 10 CSR 20-8.140(9)(C)6.D.
 - Protect the entire feeder system against freezing; 10 CSR 20-8.140(9)(C)6.E.
 - Be located adjacent to points of application to minimize length of feed lines; 10 CSR 20-8.140(9)(C)6.F.
 - Provide for both automatic and manual operation for chemical feed control systems; 10 CSR 20-8.140(9)(C)6.G.

- The following chemical safety items shall be provided in addition to the safety provisions in section (8) of this rule:
 - Appropriate personal protective equipment (PPE). 10 CSR 20-8.140(9)(D)1.
 - Warning signs requiring use of goggles shall be located near chemical stations, pumps, and other points of frequent hazard. 10 CSR 20-8.140(9)(D)3.
- The identification and hazard warning data included on chemical shipping containers, when received, shall appear on all containers (regardless of size or type) used to store, carry, or use a hazardous substance. 10 CSR 20-8.140(9)(E)
- All wastewater treatment facilities must have a screening device, comminutor, or septic tank for the purpose of removing debris and nuisance materials from the influent wastewater. 10 CSR 20-8.150(2)
- All screening devices and screening storage areas shall be protected from freezing. 10 CSR 20-8.150(4)(A)1.
- A septic tank must have a minimum capacity of at least one thousand (1,000) gallons. 10 CSR 20-8.180(2)(A)
- The septic tank shall be baffled. 10 CSR 20-8.180(2)(B)
- Membrane Bioreactor design flux criteria must be satisfied with one (1) membrane module out-of-service (e.g., for external clean in place, recovery cleaning, repair). For purposes of these criteria, a membrane module is the smallest membrane unit capable of separate removal from the tank while maintaining operation of other membrane units in the same tank. 10 CSR 20-8.180(7)(A)2.
- Membranes placed in the aeration basin(s) rather than a separate membrane tank shall have—
 - Individual modules and individual diffusers that can be removed separately for maintenance and repair; 10 CSR 20-8.180(7)(A)3.A. and
 - Aeration basin(s) volume sized for complete nitrification; 10 CSR 20-8.180 (7)(A)3.B.
- Membrane Bioreactor preliminary treatment systems shall be consistent with the membrane manufacturer recommendations; 10 CSR 20-8.180(7)(B)1.
- Grit removal facilities are required for wastewater treatment facilities that utilize membrane bioreactors for secondary treatment. 10 CSR 20-8.150(6) and 10 CSR 20-8.180(7)(B)2.
- Membrane Bioreactors shall provide oil and grease removal when the levels in the influent may cause damage to the membranes; 10 CSR 20-8.180(7)(B)3.
- Membrane Bioreactors shall provide a fine screen and high water alarm, designed to treat peak hourly flow. Coarse screens followed by fine screens may be used in larger facilities to minimize the complications of fine screening; and 10 CSR 20-8.180(7)(B)4.
- Membrane Bioreactor preliminary treatment shall comply with 10 CSR 20-8.150(4)(B) for reliability. 10 CSR 20-8.180(7)(B)5.
- The Membrane Bioreactor's aeration blowers must provide adequate air for membrane scour and process demands. 10 CSR 20-8.180(7)(C)

- Redundancy. The Membrane Bioreactor shall have at least one (1) of the following:
 - The ability to run in full programmable logic control (PLC) or standby power mode in case of an automatic control failure; 10 CSR 20-8.180(7)(D)1.
 - An operational battery backup PLC if manual control is not possible; 10 CSR 20-8.180(7)(D)2. or
 - Sufficient standby power generating capabilities to provide continuous flow through the membranes during a power outage (e.g., preliminary screening, process aeration, recycle/RAS/permeate pumps, air scour, vacuum pumps) or an adequate method to handle flow for an indefinite period (e.g., private control of influent combined with contingency methods). 10 CSR 20-8.180(7)(D)3.
 - Operations and Maintenance. The MBR design shall—
 - Include provisions to monitor membrane integrity; 10 CSR 20-8.180(7)(E)1.
 - Provide on-line continuous turbidity monitoring of filtrate or an equivalent for operational control and indirect membrane integrity monitoring for a treatment plant with design average flow greater than or equal to one hundred thousand gallons per day (100,000 gpd); 10 CSR 20-8.180(7)(E)2. and
 - Include provisions to remove membrane cassette for cleaning considering the membrane cassette wet weight plus additional weight of the solids accumulated on the membranes. 10 CSR 20-8.180(7)(E)3.
8. Upon completion of construction:
- A. All-Pro Properties, LLC, will become the continuing authority for operation and maintenance of these facilities;
 - B. Submit an electronic copy of the as built if the project was not constructed in accordance with previously submitted plans and specifications;
 - C. Submit the Statement of Work Completed form to the department in accordance with 10 CSR 20-6.010(5)(N) (<https://dnr.mo.gov/document-search/wastewater-construction-statement-work-completed-mo-780-2155>) and request the operating permit modification public noticed April 17, 2026, through May 18, 2026, be issued.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

The All-Pro Chimney Cove Circle 2 Lot Wastewater Treatment Plant (WWTP) is a proposed new facility that will treat domestic wastewater contributed by two single family homes at the Lake of the Ozarks in Osage Beach.

2. FACILITY DESCRIPTION

The new wastewater collection and treatment system is being constructed to serve two residential homes at Lake of the Ozarks. Sewage will first flow by gravity from each home to a 1,250-gallon septic tank, one per home. From the septic tanks, effluent flows by gravity to the MBR treatment system. The MBR system provides a settling zone, anoxic zone, and aerobic zone to provide secondary treatment and nutrient removal. Next, treated effluent is pumped for discharge by the filtrate pumps. A flow meter and sampling manhole will be installed on the effluent line.

The All-Pro Chimney Cove Circle 2 Lot WWTP is located at 1706 Torino Circle, Osage Beach, in Camden County, Missouri. The facility has a design average flow of 1,200 gpd and serves a hydraulic population equivalent of approximately 12 people. The design peak flow rate is 250.2 gallons per hour.

3. COMPLIANCE PARAMETERS

The proposed project is required to meet final effluent limits as established in the Antidegradation review dated November 2025.

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

Parameter	Units	Monthly average limit
Biochemical Oxygen Demands	mg/L	10
Total Suspended Solids	mg/L	15
<i>E. coli</i>	#/100mL	126
Ammonia as N-summer	mg/L	1.4
Ammonia as N-winter	mg/L	2.9
Total Phosphorus	mg/L	0.5
Total Nitrogen	mg/L	10
pH	SU	6.5-9.0

4. ANTIDegradation

The department has reviewed the antidegradation report for this facility and issued the Water Quality and Antidegradation Review dated November 2025, due to the proposed new discharge. See **APPENDIX – ANTIDegradation**.

5. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

Construction will cover the following items:

- Components are designed for a Population Equivalent of 12 based on hydraulic loading to the system.
- Flow Measurement – Installation of accurate flow measurement devices will give the treatment facility a means of improved data analysis.
 - Electromagnetic Meter – An effluent electromagnetic flow meter shall measure the secondary treated and disinfected wastewater prior to discharge at Outfall No. 001.

- **Septic Tanks** – A septic tank provides passive primary treatment as the settleable solids in raw wastewater settle onto the bottom of the tank. Construction will include two septic tanks, one per home. Raw wastewater will flow by gravity from each of the two proposed homes to a single-compartment septic tank. The outlet tee-drop pipe will be equipped with an effluent filter. Each septic tank compartment is approximately 126 in x 70 in x 56 in with a water level depth of 47 inches. Each septic tank provides 1,250-gallon total liquid capacity; therefore, the septic tanks provide approximately 50 hours of detention at the design average flow. Settled solids in the septic tank shall be removed by a contract hauler. Following the septic tanks, wastewater from each of the two septic tanks flows by gravity to the membrane bioreactor treatment system.
- **Membrane Bioreactor (MBR)** — The MBR system is a BioBarrier HSMBR 1.5-N by BioMicrobics. The system has a capacity of 1,500 gallons per day.
 - The membrane is a flat plate membrane utilizing a combination of ultrafiltration and microfiltration.
 - The design flux rate through the membranes at peak flow is 4.55 gallons/ft²/day (7.74 lmh) at peak flow with a maximum operating flux of 8.82 gallons/ft²/day (15 lmh).
 - The surface area of the membranes is 28 m² (301 ft²).
 - The maximum filtration rate through the membranes is 1.85 gpm
 - The minimum design SRT is 30 days
 - The minimum MLSS is 2,000 mg/L and the maximum MLSS is 10,000 mg/L
 - The maximum F/M ratio at design flow is 0.15
 - Aeration to be supplied by two FPZ R30MD blowers, each having a capacity of 45 cfm.
 - Disinfection is not proposed for this system because it utilizes ultrafiltration. The BioMicrobics system has been tested by National Science Foundation (NSF) and found to have an overall fecal coliform from 1.0 cfu/100 mL to 1.6 cfu/100 mL. In testing done under the NSF Standard 350, the BioBarrier had a geometric average *E. coli* of 1.3 MPN/100 mL.
- **Recirculation Pump** – Installation of 0.5-HP timer-controlled pump in the aerobic zone of the MBR treatment system to recycle flows from the aerobic zone back to the anoxic zone. Pump is capable of operating at approximately 32 gpm at 27 feet of TDH.
- **Anoxic Pump** – Installation of 0.5-HP continuously running pump to provide mixing of the anoxic zone of the MBR treatment system.
- **Filtrate Pump** – Installation of two 1/30 HP float-controlled pumps following the MBR treatment system to convey treated effluent to the outfall. Pumps are capable of operating at approximately 5 gpm at 3.56 feet of TDH.
- **Alum Dosing System** – Installation of two 30-gallon tanks to store alum which will be dosed into the aeration zone of the MBR system by 1/30 HP Stenner 45 MJL4 pump or approved equal. The Stenner 45 MJL4 pump has an adjustable flow rate, capable of between 0.07 gph to 1.46 gph. The design dosing rate is approximately 1 gph at an operating pressure of approximately 2.33 psi.

6. OPERATING PERMIT

The new All Pro Chimney Cove Circle 2 Lot WWTP, MO-0141097, was successfully public noticed from April 17, 2026, through May 18, 2026, 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 be issued.

This facility does not meet the requirements of the MOGD issued on July 1, 2024, for the following reason: The Antidegradation Review dated November 2025 established tier 1 effluent limits for total phosphorus and total nitrogen because the Lake of the Ozarks is on the 2022 303(d) list for chlorophyll-a, an indicator parameter for the presence of excessive nutrients. These tier 1 effluent limits are not compatible with the MOGD permit. Therefore, a site-specific permit is necessary.

V. NOTICE OF RIGHT TO APPEAL

If you were adversely affected by this decision, you may be entitled to an appeal before the Administrative Hearing Commission (AHC) pursuant to Section 621.250 RSMo. To appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC. Any appeal should be directed to:

Administrative Hearing Commission
U.S. Post Office Building, Third Floor
131 West High Street, P.O. Box 1557
Jefferson City, MO 65102-1557
Phone: 573-751-2422
Fax: 573-751-5018
Website: <https://ahc.mo.gov>

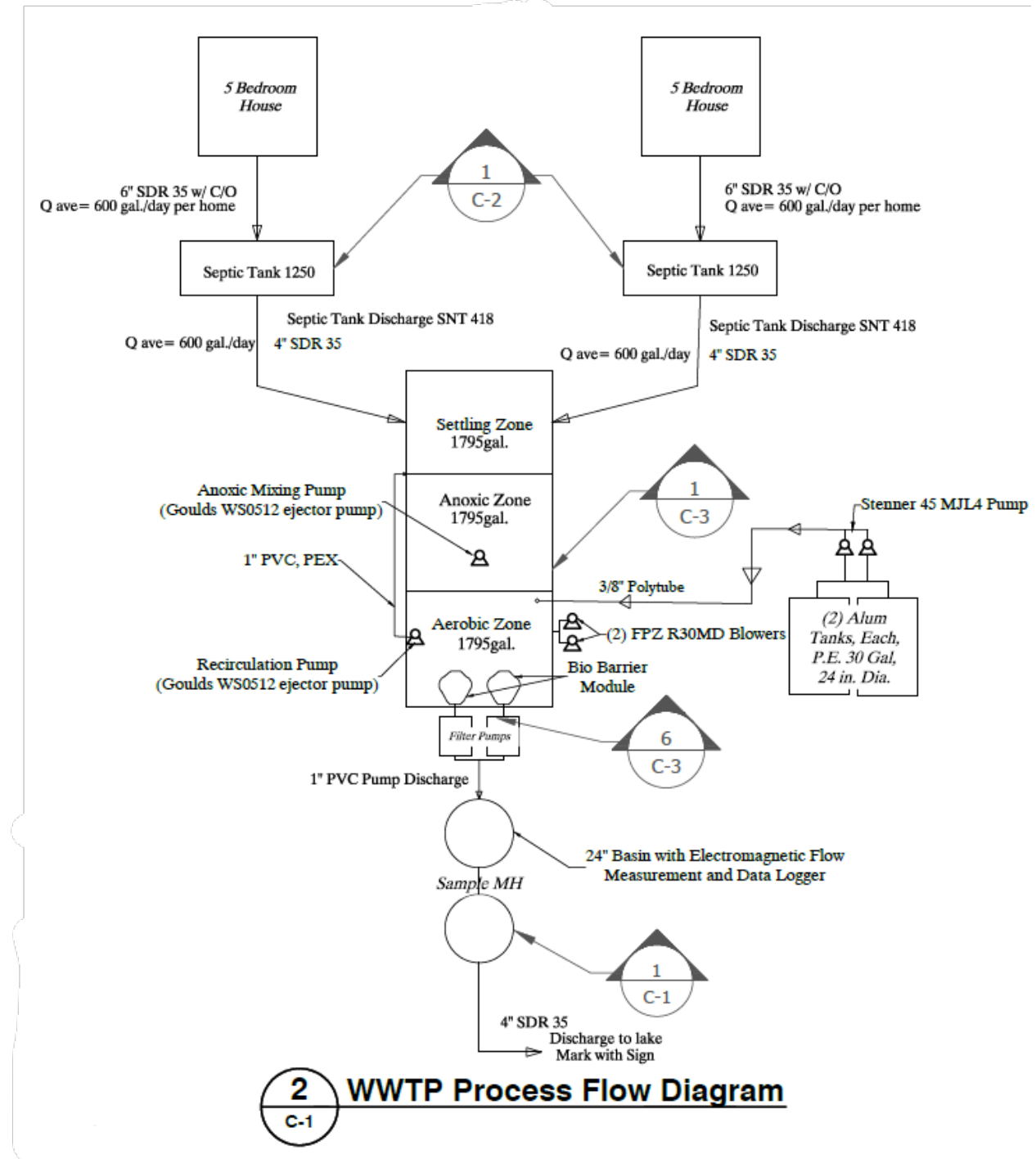
Thomas Silkwood
Engineering Section
thomas.silkwood@dnr.mo.gov

Chia-Wei Young, P.E.
Engineering Section
Chia-wei.young@dnr.mo.gov

APPENDICES

- **Process Flow Diagram**
- **Antidegradation**

Process Flow Diagram



Antidegradation



Water Quality and Antidegradation Review

For the Protection of Water Quality
and Determination of Antidegradation Effluent Limits for Discharge to

The Lake of the Ozarks

Requested by
Matthew J. Marschke, P.E.
MIDWEST ENGINEERING COMPANY, L.L.C.

For
All Pro Chimney Cove Circle 2 Lot WWTP
All-Pro Properties, LLC

November 2025

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1. PURPOSE OF ANTIDEGRADATION REVIEW REPORT

An Antidegradation Review Request was submitted by Matthew J. Marschke, P.E., with MIDWEST ENGINEERING COMPANY, L.L.C. on behalf of All-Pro Properties, LLC for the All Pro Chimney Cove Circle 2 Lot WWTP to evaluate construction of a new wastewater treatment facility to serve two five-bedroom homes and designed to treat 1,200 gallons per day. The preferred treatment technology is a membrane bioreactor (MBR). The receiving waterbody is the Lake of the Ozarks.

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

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

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

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

The applicant elected to determine that all pollutants of concern (POC), with the exception of total phosphorus and total nitrogen, require a demonstration of necessity (i.e., alternatives analysis) and a determination of social and economic importance in the absence of existing water quality data for the receiving lake. Total phosphorus and total nitrogen are classified as Tier 1 POCs due to the chlorophyll-a impairment at the Lake of the Ozarks. Refer to section 4.D. *Existing Water Quality* for additional discussion on the tier 1 consideration for nutrients.

The department's voluntary general antidegradation review pathway is available to domestic wastewater systems with design flows up to 50,000 gallons per day and which are classified as tier 2 reviews. This facility does not qualify for the general review pathway due to the tier 1 classification of total phosphorus and total nitrogen. However, the *Water Quality and Antidegradation Review for the Department's Alternatives Analysis for Domestic Wastewater Facilities with Design Flow Less Than 50,000 Gallons per Day* provides, "For these site-specific mixed tier reviews (where some POCs are Tier 1 and others are Tier 2) applicants may use the alternatives analysis presented in this document for the Tier 2 pollutants." For this antidegradation review, the applicant is pursuing a mixed tier review utilizing the department's alternatives analysis for the tier 2 POCs.

The following is a review of the antidegradation application and the supporting documents for All Pro Chimney Cove Circle 2 Lot prepared by Matthew J. Marschke, P.E., with MIDWEST ENGINEERING COMPANY, L.L.C.

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2. ANTIDEGRADATION LIMITS AND MONITORING INFORMATION

Table 2-1: Antidegradation Limits

PARAMETER	Unit	Basis	Daily Maximum	Weekly Average	Monthly Average
Flow	MGD		*		*
BOD ₅	mg/L	WQBEL	15		10
TSS	mg/L	WQBEL	20		15
<i>Escherichia coli</i> **	#/100mL	FSR	630		126**
Ammonia as N (Apr 1 – Sep 30) (Oct 1 – Mar 31)	mg/L	PBEL	3.6 7.5		1.4 2.9
Total Phosphorus	mg/L	BPI, PEEL	*		0.5
Total Nitrogen	mg/L	BPI	*		10
PARAMETER	Unit	Basis for Limits			Minimum/ Maximum
pH	SU	FSR			6.5/9.0

* - Monitoring requirement only

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

Basis for Limitations Codes:

MDEL – Minimally Degrading Effluent Limit

NDEL – Non-Degrading Effluent Limit

PBEL – Performance Based Effluent Limit

BPI – Best Professional Judgment

TBEL – Technology-Based Effluent Limit

WQBEL – Water Quality-Based Effluent Limit

FSR – Federal or State Regulation

3. FACILITY INFORMATION

The All Pro Chimney Cove Circle 2 Lot WWTP is a proposed new wastewater treatment plant (WWTP) that will treat domestic wastewater contributed by two five-bedroom homes at the Lake of the Ozarks in Sunrise Beach.

Facility Name:	All Pro Chimney Cove Circle 2 Lot WWTP
Address:	270 Chimney Cove Cir, Sunrise Beach, MO 65079
Permit #:	MO-NEW
County:	Camden
Facility Type:	Domestic, <u>Non - POTW</u>
Owner:	All-Pro Properties, LLC
Continuing Authority:	TBD – will be Homeowner's Association
Sec. of State Charter No:	TBD
UTM Coordinates:	X = 525832; Y = 4224900
Legal Description:	Sec. 05, T39N, R16W
<u>12.digit</u> watershed:	10290109-0406 (Buck Creek-Lake of the Ozarks)
Ecoregion:	Ozark Highlands

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A. FACILITY PERFORMANCE HISTORY:

There is no performance history for this facility since it is a proposed new discharging facility.

B. 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 following recommendations were made for construction activities:

- Manage construction to minimize sedimentation and run-off to nearby streams.
- At stream and drainage crossings, avoid erosion, silt introduction, petroleum or chemical pollution, and disruption or realignment of stream banks and beds.
- 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.
- Revegetate disturbed areas to minimize erosion.
- Remove mud, soil, plants, and animals from equipment before leaving site.

C. GEOHYDROLOGIC EVALUATION

A Geohydrologic Evaluation was submitted with the request and the receiving stream is gaining for discharge purposes (see Appendix B).

4. RECEIVING WATERBODY INFORMATION

A. RECEIVING WATERBODY

Table 4-1: Outfalls Table

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	EFFLUENT TYPE
001	0.0019	Secondary	Domestic

Table 4-2: Receiving Stream(s)

WATER-BODY NAME	CLASS	WBID	DESIGNATED USES*	12-DIGIT HUC	DISTANCE TO CLASSIFIED SEGMENT (MI)
Lake of the Ozarks	L2	7205	AHP-WWH, WBC-A, SCR, HHP, IRR, LWP, IND	10290109-0406	0

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

Table 4-3: Receiving Stream Segments

Receiving Water Body Segment Outfall #1:		
Upper end segment* UTM coordinates:	X = <u>525832</u> ; Y = 4224900	outfall
Lower end segment* UTM coordinates:	X = <u>532898</u> ; Y = 4228507	Bagnell Dam

*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.

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B. LOSING STREAM ALTERNATIVE DISCHARGE LOCATION

Under 10 CSR 20-7.015(4)(A), discharges to losing stream shall be permitted only after other alternatives including land application, discharge to gaining stream and connection to a regional facility have been evaluated and determined to be unacceptable for environmental and/or economic reasons.

The proposed outfall will discharge to the Lake of the Ozarks, which is classified as gaining for discharge purposes.

C. MIXING CONSIDERATIONS

Zone of Initial Dilution: Not Allowed [10 CSR 20-7.031(5)(A)4.B.(IV)(b)].

Mixing Zone:

Mixing Zone (MZ) Parameters: According to the USGS 1:24,000K Quadrangle, the lake width near the new facility outfall location is approximately 700 feet (ft.). Using "normal" water levels of 700 ft. wide and one-quarter of this width equals 175 ft. Therefore, because 100 feet is less than 175 ft., MZ = 100 feet [10 CSR 20-7.031(5)(A)5.B.(IV)(a)].

Mixing Zone Volume: The flow volume approximates a triangular prism because of the slope of the lake bottom, where the formula is $Volume = L * W * (D * 0.5)$. Assuming that the width will be either side of the discharge (MZ) length (100 feet) to form the plume effect, the box dimensions are length (L) = 100 ft., width (W) = 100 ft., and depth (D) = 5 ft. Depth was obtained using mixing zone length projected 100 ft. from shoreline to the intersecting contour on 7.5' USGS topographic map (shoreline contour = 205 ft. and lake depth contour at 100 ft. from shore = 200 ft.).

$$Volume = L * W * (D * 0.5) = (100') * (100') * (5' * 0.5) = 25,000 \text{ ft}^3.$$

The flow volume of 25,000 ft³ is assumed as the daily mixing zone. Therefore:
 $30Q10 = (25,000 \text{ ft}^3/\text{day}) * (1 \text{ day}/86,400 \text{ sec}) = 0.29 \text{ ft}^3/\text{sec}.$

D. EXISTING WATER QUALITY

No existing water quality data was submitted. The facility will discharge to the Lake of the Ozarks. The Lake of the Ozarks is included on the 2022 Missouri 303(d) list due to chlorophyll-a, which is an indicator parameter for the presence of excess nutrients in a waterbody.

Section 303(d) of the federal Clean Water Act requires that each state identify waters that are not meeting water quality standards and for which adequate water pollution controls have not been required. Water quality standards protect such beneficial uses of water as whole-body contact (such as swimming), maintaining fish and other aquatic life, and providing drinking water for people, livestock and wildlife. The 303(d) list helps state and federal agencies keep track of waters that are impaired but not addressed by normal water pollution control programs.

- o While the 303(d) listing for chlorophyll-a at the Lake of the Ozarks identifies nonpoint sources as the source of the impairment, the proposed WWTP is a domestic wastewater treatment facility and nutrients can reasonably be expected to be present in the discharge. Therefore, the facility is anticipated to have the potential to contribute to the impairment. As a result, total nitrogen and total phosphorus are classified as tier 1 POCs for this review. A total maximum daily load (TMDL) has not yet been developed by the department and is believed to be several years from completion. In the absence of a TMDL or watershed modeling, best professional judgment is utilized to remain protective of water quality. Therefore, the facility will be subject to effluent limits of 0.5 mg/L and 10 mg/L for total phosphorus and total nitrogen, respectively. Once a TMDL is developed, the permit may be modified to include WLAs from the TMDL.

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E. RECEIVING WATER MONITORING REQUIREMENTS

No receiving water monitoring requirements recommended at this time.

5. ANTIDegradation REVIEW INFORMATION

A. TIER DETERMINATION

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

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

- Tier 1 pollutants for this review include: total phosphorus and total nitrogen as Lake of the Ozarks is on the 2020 303(d) list for nutrient impairments.

The proposed discharge is to Lake of the Ozarks, which is on the 2020 303(d) list for chlorophyll-a impairments. Chlorophyll-a is an indicator for total phosphorus and total nitrogen exceedances in the waterbody. The department has not developed a total maximum daily load (TMDL) for Lake of the Ozarks. Following the department's Nutrient Implementation Policy, the proposed project has an effluent limit of 10 mg/L for total nitrogen and 0.5 mg/L for total phosphorus.

While the treatment plant is designed to provide a high level of treatment, there is still the potential when a TMDL is developed for Lake of the Ozarks, that the facility's permit may be reopened to establish more protective wasteload allocations.

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

- Tier 2 pollutants for this review include: biochemical oxygen demand (BOD), total suspended solids (TSS), *E. coli*, ammonia, and pH.

Tier 3 protection prohibits any degradation of water quality of Outstanding National Resource Waters and Outstanding State Resource Waters as identified in Tables D and E of the Water Quality Standards (WQS). Temporary degradation of water receiving Tier 3 protection may be allowed by the department on a case-by-case basis as explained in Section VI of the AIP.

- As this proposed discharge is located at Lake of the Ozarks, the receiving waterbody is not an Outstanding National Resource Water or an Outstanding State Resource Water, and as such Tier 3 is not applicable.

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

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Table 5-1: Pollutants of Concern and Tier Determinations

Pollutants of Concern	Tier	Review Type	Comment
Biological Oxygen Demand (BOD ₅)/DO	2*	Department's Alternatives Analysis	
Total Suspended Solids (TSS)	**	Department's Alternatives Analysis	
<i>Escherichia coli</i> (<i>E. coli</i>)	2*	Department's Alternatives Analysis	
Ammonia as N	2*	Department's Alternatives Analysis	
Phosphorus, Total	1		Nutrient Implementation Policy
Nitrogen, Total	1		Nutrient Implementation Policy
pH	***	Department's Alternatives Analysis	10 CSR 20-7.015(3)(A)1.B applied

* Tier assumed.

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

*** Standards for these parameters are ranges.

B. NECESSITY OF DEGRADATION

The AIP specifies that if the proposed activity does result in a reduction by 10 percent or more of the assimilative capacity then a demonstration of necessity (i.e., alternatives analysis) and a determination of social and economic importance are required. 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 result in a reduction by 10 percent or more of the assimilative capacity and proceeding directly to the alternatives analysis, thereby avoiding the determination of the assimilative capacity of the receiving water. The applicant has elected this option.

I. REGIONALIZATION

Regionalization eliminates the need for a discharge permit by sending flows to a capable regional facility. The applicant evaluated the alternative of regionalizing at the CCPWSD No. 4, Palisades Point WWTP, including two different routes for connection. The first route was a 500-foot extension. While this is the shorter of the two routes, this path was rejected by the district due to the lack of maintenance access that would prevent the district from adequately servicing the proposed line. A second, 1,400-foot extension was recommended by the district in lieu of the shorter 500-foot line. However, the consultant engineer estimated the cost of the longer route would make the project impracticable for economic efficiency concerns.

II. NO DISCHARGE EVALUATION

Land application was evaluated by the applicant as a no-discharge alternative. Due to the local topography and geology, there is no suitable land in the immediate area for land application. Further, nearby lots have already been developed and are not available for sale. Due to the lack of soils with suitable characteristics and land space in the area, land application was rejected as impracticable.

III. ALTERNATIVES TO NO DISCHARGE

For the Tier 2 POCs in this review, the applicant used the *Department's Alternatives Analysis for Domestic Wastewater Facilities with Design Flow Less Than 50,000 Gallons per Day* to satisfy the requirements of the AIP.

The department has used available data to complete an alternatives analysis of previously evaluated treatment technologies and expected performance. Data from fifty-four Water Quality and Antidegradation Reviews (WQARs) completed between March 2011 and April 2018 was evaluated.

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The data include eleven facilities designed to provide a high level of treatment to meet more stringent potential future ammonia as N effluent limits based on the 2013 EPA Ammonia criteria for the protection of mussels and gill-breathing snails. The data available to date indicates that the cost of facilities of this size range designed to meet these more stringent ammonia criteria is not substantively higher than other facilities designed to meet the current ammonia criteria. The data include sixteen facilities designed to meet BOD and TSS effluent limits of 10 mg/L monthly average and 15 mg/L daily maximum or weekly average. The data available to date indicates that the cost of facilities designed to meet BOD and TSS effluent limits of 10 mg/L monthly average and 15 mg/L daily maximum or weekly average is not substantively higher than other facilities of this size range designed to meet less stringent BOD and TSS effluent limits.

The data include 28 facilities that will discharge to lakes. Of those facilities, 12 received ammonia limits in line with water quality-based effluent limits for discharges to streams without mixing of around 3.7 mg/L summer daily maximum, 1.4 mg/L summer monthly average and 7.5 mg/L winter daily max, 2.9 mg/L winter monthly average. Two of the lake-discharging facilities received more stringent ammonia limits of 1.7 mg/L daily maximum, 0.6 mg/L monthly average; and one received ammonia limits of 1.7 mg/L summer daily maximum, 0.6 mg/L summer monthly average and 5.6mg/L winter daily max, 2.1 mg/L winter monthly average. The data available indicate that the cost for facilities designed to meet ammonia limits in line with water quality-based effluent limits for streams without mixing (3.7/1.4, 7.5/2.9) is not higher than other facilities of this size range designed to meet less stringent ammonia limits. These limits are more protective than existing water quality-based effluent limits for discharges to lakes where the acute criteria is used to determine the baseline (12.1 mg/L daily maximum, 4.6 mg/L monthly average).

Facilities that were designed to meet limits based on the 2013 EPA ammonia criteria included a membrane bioreactor, extended aeration package plant, recirculating textile filter, recirculating sand filter, recirculating sand filter with moving bed biofilm reactor, sequencing batch reactor, integrated fixed film activated sludge system, and a proprietary aeration system.

Membrane Bioreactor (MBR)

Membrane bioreactor (MBR) systems combine a suspended growth biological reactor with solids removal via filtration across a membrane. The membranes can be designed for and operated in small spaces and with high removal efficiency of contaminants such as nitrogen, phosphorus, bacteria, biochemical oxygen demand, and total suspended solids. Membrane filtration allows a higher biomass concentration to be maintained in the treatment tank, thereby allowing smaller bioreactors to be used for a smaller footprint. MBR systems provide operational flexibility with respect to flow rates, as well as the ability to readily add or subtract units as needed, but that flexibility has limits. Membranes typically require that the water surface be maintained above a minimum elevation so that the membranes remain wet during operation. Throughput limitations are dictated by the physical properties of the membrane, and the result is that peak design flows generally should be no more than 1.5 to 2 times the average design flow. If peak flows exceed that limit, additional membranes may be needed to process the peak flow, or equalization may need to be included in the design. MBR systems typically have higher capital and operating costs than conventional systems.

Extended Aeration

The extended aeration process is a modification of the activated sludge process that provides biological treatment for the removal of biodegradable organic wastes under aerobic conditions. Wastewater in the aeration tank is mixed and oxygen is provided to the microorganisms. The mixed liquor then flows to a clarifier or settling chamber where most microorganisms settle to the bottom of the clarifier and a portion are pumped back to the beginning of the plant. The clarified wastewater flows over a weir and into a collection channel before being disinfected and discharged. Extended aeration is often used in smaller prefabricated package-type plants where lower operating efficiency is offset by mechanical simplicity and minimized design costs. In comparison to traditional activated sludge, longer mixing time with aged sludge and light loading (low F:M) offers a stable biological ecosystem better adapted for effectively treating waste load fluctuations from variable occupancy

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situations. Although the process is stable and easier to operate, extended aeration systems may discharge higher effluent suspended solids than found under conventional loadings.

Moving Bed Biofilm Reactor (MBBR)

Moving Bed Biofilm reactor (MBBR) systems may be a single aerated reactor, or several in series, with a buoyant free-moving plastic biofilm carrier media. MBBR systems can be designed to be capable of meeting more stringent total nitrogen limits. They produce a significantly reduced solids loading to the liquid-solids separation unit, the biofilm improves process stability, they offer flexibility to meet specific treatment objectives, and they are well suited for retrofit into existing treatment systems. MBBR systems require a smaller tank volume than a conventional activated sludge system and therefore have a smaller footprint. Adequate mixing must be provided to ensure that free-floating media remains uniformly distributed and screens must be provided to retain the media within the reactors.

Integrated Fixed Film Activated Sludge (IFAS)

Integrated fixed film activated sludge (IFAS) systems add fixed or free-floating media to an activated sludge basin. The process gets its name from combining a conventional activated sludge process with a fixed film system. This treatment system is similar to an MBBR; however, MBBR systems do not recycle sludge. IFAS systems are often installed as a retrofit solution to conventional activated sludge systems. They require a smaller tank volume than a conventional activated sludge system and therefore have a smaller footprint. The biofilm combines aerobic, anaerobic, and anoxic zones promoting better nitrification compared to conventional activated sludge systems and the biofilm improves process stability. Adequate mixing must be provided to ensure that free-floating media remains uniformly distributed and to slough biomass from the media. Higher dissolved oxygen concentrations may be required as compared to conventional activated sludge. Screens must be provided to retain the media within the reactors.

Recirculating Sand Filters (RSF)

Recirculating sand filters (RSF) remove contaminants in wastewater through physical, chemical, and, most importantly, biological processes. The three common components are a pretreatment unit (generally a septic tank), a recirculation tank, and a sand filter. In the recirculation tank, raw effluent from the septic tank and the sand filter filtrate are mixed and pumped back to the sand filter bed. RSFs are effective in applications with high levels of BOD and can provide a good effluent quality with 85 -95% removal of BOD and TSS. They can be designed to provide nitrification, but this requires increased surface area. Treatment is affected by extremely cold weather. Treatment capacity can be expanded through modular design. RSFs require routine maintenance, although the complexity of maintenance is generally minimal.

Recirculating Textile Filters

Recirculating textile filters systems are configured similar to an RSF except the filter media is an engineered fabric textile. They can be configured to provide nitrification, but this may require additional treatment units. They have a small operating footprint, are more aesthetically pleasing than some other treatment options, produce minimal noise, have the ability to handle variable flows, and have simple maintenance.

In addition to the treatment technologies listed above, all of which had previous WQARs that established advanced ammonia limits, there are other technology alternatives that can meet the advanced ammonia limits including conventional activated sludge, oxidation ditch, and lagoon retrofits. To obtain this level of performance, all technologies must be properly designed to accommodate nitrification and de-nitrification and they must be properly and actively operated. The above treatment system descriptions were adapted from EPA technology fact sheets and Design of Municipal Wastewater Treatment Plants: WEF Manual of Practice No. 8 ASCE Manuals and Reports on Engineering Practice No. 76; Fifth Edition, as well as other readily available sources and previous Water Quality and Antidegradation Reviews.

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As a result of this alternatives analysis, the department has determined that for a facility that discharges less than 50,000 gallons per day, depending on site-specific conditions, there are technologies available that may be economically efficient and practicable, and that are capable of meeting the effluent limitations in Table 2-1. The applicant is proposing an MBR system. Based on the submitted application forms, the proposed treatment is expected to be capable of reliable compliance with Table 2-1 limits.

C. SOCIAL AND ECONOMIC IMPORTANCE

The affected community consists of citizens living in the Lake of the Ozarks region, and more specifically, the residents of the two single-family homes to be served by the proposed facility. Based on data compiled from the U.S. Census Bureau and U.S. Bureau of Labor Statistics, Sunrise Beach Village had a population of 398 as of 2023. The median age is significantly older than the state average and the unemployment rate is significantly higher than the state average. Other socioeconomic factors as shown below are roughly in line with state average numbers.

No.	Administrative Unit	Sunrise Beach Village	Missouri State	United States	Comparison (Community vs. State)
1	Population (2023)	398	6,168,181	332,387,540	
2	Percent Change in Population (2000-2023)	8.2%	10.2%	18.1%	Slightly lower than state average
3	2023 Median Household Income (in 2024 Dollars)	\$52,118	\$70,567	\$80,011	Slightly lower than state average
4	Percent Change in Median Household Income (2000-2023)	0.0%	-1.2%	1.2%	Slightly higher than state average
5	Median Age (2023)	49.4	38.9	38.7	Significantly older than state average
6	Change in Median Age in Years (2000-2023)	-1.2	2.8	3.4	Slightly lower than state average
7	Unemployment Rate (2023)	13.8%	4.1%	5.2%	Significantly higher than state average
8	Percent of Population Below Poverty Level (2023)	10.3%	12.6%	12.4%	Slightly lower than state average
9	Percent of Household Received Food Stamps (2023)	6.1%	9.9%	11.8%	Slightly lower than state average
10	(Primary) County Where the Community Is Located	Camden County			

Without a suitable means of wastewater treatment, the two single-family homes would not be habitable. Therefore, the provision of the WWTP will increase the available housing in the area, and by extension is expected to increase the overall community tax base. Other means of providing wastewater treatment without an onsite treatment plant were rejected for economic and practicability concerns, as discussed in 5.B. *Necessity of Degradation.* The WWTP is designed to provide a high level of treatment in order to meet the effluent limits required by the *Department's Alternatives Analysis for Domestic Wastewater Facilities with Design Flow Less Than 50,000 Gallons per Day.*

6. 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:

$$C = \frac{(C_u \times Q_u) + (C_d \times Q_d)}{(Q_u + Q_d)} \quad (\text{EPA/505/2-90-001, Section 4.5.5})$$

$$C_d = \frac{(Q_u + Q_d)C - (C_u \times Q_u)}{Q_d}$$

Where
C = downstream concentration (mg/L)
C_u = upstream concentration (mg/L)
Q_u = upstream flow (cfs)

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C_e = effluent concentration (mg/L)
 Q_e = effluent flow (cfs)

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

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

- B. Alternative Analysis-based** – Using the preferred alternative's treatment capacity for conventional pollutants such as BOD₅ and TSS that are provided by the consultant as the WLA, the performance based effluent average monthly and average weekly limits are determined by applying the WLA as the average monthly (AML) and multiplying the AML by 1.5 to derive the average weekly limit (AWL).

Note: Alternatives analysis-based effluent limits have been based on the authority included in Section I.A. of the AIP. Also under 40 CFR 133.105, permitting authorities shall require more stringent limitations than equivalent to secondary treatment limitations for 1) existing facilities if the permitting authority determines that the 30-day average and 7-day average 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.
- **Biochemical Oxygen Demand (BOD₅).** BOD₅ effluent limits of 10 mg/L average monthly and 15 mg/L daily maximum were determined by the department to be achievable and protective of beneficial uses and existing water quality. These limits are at least as stringent as the minimum effluent regulations established in 10 CSR 20-7.015(3)(A)1.A. A daily maximum limit for BOD₅ is assigned in accordance with 40 CFR Part 122.45(d), which states that effluent limits shall be expressed as a maximum daily limit for all dischargers other than publicly owned treatment works.

Dissolved Oxygen Modeling:

As per the *DO Modeling & BOD Effluent Limit Development Administrative Guidance for the Purpose of Conducting Water Quality Assistance Reviews*, facilities with a design flow of less than 100,000 gallons per day, and proposing BOD₅ treatment less than or equal to an average monthly of 10 mg/L and daily maximum of 15 mg/L are exempt from the DO modeling requirement.

- **Total Suspended Solids (TSS).** TSS effluent limits of 15 mg/L average monthly and 20 mg/L daily maximum were determined by the department to be achievable and protective of beneficial uses and existing water quality. These limits are at least as stringent as the minimum effluent regulations established in 10 CSR 20-7.015(3)(A)1.A. A daily maximum limit for TSS is assigned in accordance with 40 CFR Part 122.45(d), which states that effluent limits shall be expressed as a maximum daily limit for all dischargers other than publicly owned treatment works.

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- **Escherichia coli (E. coli)**. Effluent limits of 126 CFU per 100 mL monthly average and 630 CFU per 100 mL as a daily maximum of geometric mean during the recreation season (April 1 – October 31) were established to protect the Whole Body Contact Recreation designated use of the receiving water body, as per 10 CSR 20-7.015(9)(B)1. An effluent limit for both monthly average and weekly or daily maximum is required by 40 CFR 122.45(d) for POTWs.
- **Total Ammonia Nitrogen**. The department has determined that the alternatives analysis-based technology limits for lake discharging facilities of 3.6 mg/L summer daily maximum, 1.4 mg/L summer monthly average and 7.5 mg/L winter daily max, 2.9 mg/L winter monthly average are achievable by some treatment technologies.

The proposed alternative analysis performance-based levels are:

Parameter	Units	MDL	AML
Ammonia as N-summer	mg/L	3.6	1.4
Ammonia as N-winter	mg/L	7.5	2.9

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

Early Life Stages Present Total Ammonia Nitrogen criteria apply [10 CSR 20-7.031(5)(B)7.C. & Table B3]. Background total ammonia nitrogen = 0.01 mg/L

Table 6-1: Ammonia Criteria as of February 2019

Quarter	Temp (°C)*	pH (SU)*	Total Ammonia Nitrogen CCC (mg/L)	Total Ammonia Nitrogen CMC (mg/L)
Summer	26.0	7.8	1.5	12.1
Winter	6.0	7.8	3.1	12.1

WBQEL equation

$$C_c = (((Q_c + Q_w) * C) - (Q_w * C_w)) / Q_c$$

Acute WLA: $C_c = (((Q_c + 0) * 12.1 - (0 * 0.01)) / Q_c$
 $C_c = 12.1 \text{ mg/L}$

$$LTA = 12.1 \text{ mg/L} (0.321) = 3.88 \text{ mg/L} \quad [CV = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$MDL = 3.88 \text{ mg/L} (3.11) = 12.1 \text{ mg/L} \quad [CV = 0.6, 99^{\text{th}} \text{ Percentile}]$$

$$AML = 3.88 \text{ mg/L} (1.19) = 4.6 \text{ mg/L} \quad [CV = 0.6, 95^{\text{th}} \text{ Percentile, } n = 30]$$

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

Month	Maximum Daily Limit (mg/L)		Average Monthly Limit (mg/L)	
	Summer	Winter	Summer	Winter
WBQEL	12.1	12.1	4.6	4.6
Alternatives Analysis Limits	3.6	7.5	1.4	2.9

- **Total Phosphorus**. The preferred alternative selected for ammonia treatment serves as the base case for total nitrogen and phosphorus. The applicant evaluated alternatives for total phosphorus and total nitrogen removal per the Lake Nutrient Implementation Policy and the knowledge that Lake of the Ozarks is on the 303(d) list for nutrient impairments. Effluent levels of 0.5 mg/L average monthly were established as a result of a discharging technology alternatives analysis conducted by the applicant and best professional judgment.

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- **Total Nitrogen.** The preferred alternative selected for ammonia treatment serves as the base case for total nitrogen and phosphorus. The applicant evaluated alternatives for total phosphorus and total nitrogen removal per the Lake Nutrient Implementation Policy and the knowledge that Lake of the Ozarks is on the 303(d) list for nutrient impairments. Effluent limits of 10 mg/L average monthly were established as a result of a discharging technology alternatives analysis conducted by the applicant and best professional judgment.
- **pH.** 6.5-9.0 SU. Technology based effluent limitations of 6.0-9.0 SU [10 CSR 20-7.015] are not protective of the Water Quality Standard, which states that water contaminants shall not cause pH to be outside the range of 6.5-9.0 SU. No mixing zone is allowed when using the department's alternatives analysis, therefore the water quality standard must be met at the outfall.

7. GENERAL ASSUMPTIONS OF THE WATER QUALITY AND ANTIDegradation REVIEW

- A Water Quality and Antidegradation Review (WQAR) assumes that [10 CSR 20-6.010(2) Continuing Authorities and 10 CSR 20-6.010(4)(A) 5.B., consideration for no discharge] has been or will be addressed in a Missouri State Operating Permit or Construction Permit Application.
- 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.
- Changes to Federal and State Regulations (FSR) made after the drafting of this WQAR may alter Water Quality Based Effluent Limits (WQBEL).
- Effluent limitations derived from FSR may be WQBEL or Effluent Limit Guidelines (ELG).
- WQBEL supersede ELG only when they are more stringent. Mass limits derived from technology based limits are still appropriate.
- 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.
- Limitations and other requirements in a WQAR may change as Water Quality Standards (WQS), Methodology, and Implementation procedures change.
- Nothing in this WQAR removes any obligations to comply with county or other local ordinances or restrictions.
- The operating permit may contain additional requirements to evaluate the effectiveness of the technology once the facility is in operation. This Antidegradation Review is based on the information provided by the facility and is not a comprehensive review of the proposed treatment technology. If the review engineer determines the proposed technology will not consistently meet proposed effluent limits, the permittee will be required to revise their Antidegradation Report.

8. ANTIDegradation REVIEW PRELIMINARY DETERMINATION

The proposed new discharge will result in significant degradation of the Lake of the Ozarks with respect to all pollutants of concern except for total phosphorus and total nitrogen. Effluent limits for total phosphorus and total nitrogen were developed to prohibit degradation that may cause or contribute to the nutrient impairment of the Lake of the Ozarks per the AIP. The applicant elected to utilize the *Department's Alternatives Analysis for Domestic Wastewater Facilities with Design Flow Less Than 50,000 Gallons per Day* for the analysis of tier 2 pollutants of concern. The preferred treatment alternative is to provide a membrane bioreactor treatment system.

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: November 2025
Reviewer: Cailie Carlile, P.E.

Approximate outfall location marked by red "x"



All Pro Chimney Cove Circle 2 Lot WWTP
November 2025
Appendix B Page 17

APPENDIX B: GEOHYDROLOGIC EVALUATION



MISSOURI
DEPARTMENT OF
NATURAL RESOURCES

Mike Kehoe
Governor

Kurt U. Schaefer
Director

LWE25276
Camden County

September 26, 2025

Midwest Engineering Company
415 E Vandalia St
Edwardsville, IL 62025

RE: All Pro Chimney Cove Circle 2 Lot WWTP

Dear Midwest Engineering Company :

On June 04, 2025 , the Missouri Geological Survey received a request to perform a geohydrologic evaluation for the above referenced project located in Camden County . Included with this letter is a report that details the geologic and hydrologic conditions at the site and the potential for groundwater contamination in the event of wastewater treatment failure.

Thank you for the evaluation request. If you are in need of further assistance or have questions regarding the report, please contact our office at P.O Box 250, Rolla, Mo 65402-0250, by telephone at 573-368-2100 or gspeg@dnr.mo.gov.

Sincerely,

MISSOURI GEOLOGICAL SURVEY

Andrew Herrera
Geologist
Environmental Geology Section

c: All Pro Properties LLC
WPP
Central Field Operations



	Missouri Department Of Natural Resources Missouri Geological Survey Geological Survey Program Environmental Geology Section	Project ID Number LWE25276 County Camden County
Request Details		
Project: All Pro Chimney Cove Circle 2 Lot WWTP		Legal Description: 05 T39N R16W Quadrangle: LAKE OZARK Latitude: 38 10 18.36 Longitude: -92 42 19.04
<u>Organization Official</u> Name: All Pro Properties LLC Address: 1706 Torino Circle City: Osage Beach State: MO Zip: 65065 Phone: 573-280-7655 Email: tim@mcduffeylaw.com		<u>Preparer</u> Name: Midwest Engineering Company Address: 415 E Vandalia St City: Edwardsville State: IL Zip: 62025 Phone: 573-216-0066 Email: matt.m@mwec.us
Project Details		
Report Date: Date of Field Visit: 07/18/2025		Previous Reports: Not Applicable
<u>Facility Type</u> ☒ Mechanical treatment plant ☐ Recirculating filter bed ☐ Land application ☐ Lagoon or storage basin ☐ Subsurface soil absorption system ☐ Lagoon or storage basin W/Land App ☐ Lagoon or storage basin W/SSAS ☐ Other type of facility	<u>Type of Waste</u> ☐ Animal ☒ Human ☐ Process or industrial ☐ Leachate ☐ Other waste type	<u>Funding Source</u> ☒ IWT ☐ WWL-SRF <u>Additional Information</u> ☐ Plans were submitted ☐ Site was investigated by NRCS ☐ Soil or geotechnical data were submitted
Geologic Stream Classification: ☐ Gaining ☐ Losing ☐ No discharge		
<u>Overall Geologic Limitations</u> ☒ Slight ☐ Moderate ☐ Severe	<u>Collapse Potential</u> ☒ Not applicable ☐ Slight ☐ Moderate ☐ Severe	<u>Topography</u> ☒ <4% ☐ 4% to 8% ☒ 8% to 15% ☐ >15%
<u>Landscape Position</u> ☐ Broad uplands ☐ Floodplain ☐ Ridgetop ☐ Alluvial plain ☒ Hillslope ☐ Terrace ☐ Narrow ravine ☐ Sinkhole		
<u>Bedrock:</u> The uppermost bedrock is the Ordovician-age Jefferson City-Cotter Dolomite.		
<u>Surficial Materials:</u> The surficial materials are gravelly silt loam and clay with gravelly residuum.		

 Missouri Department Of Natural Resources Missouri Geological Survey Geological Survey Program Environmental Geology Section		Project ID Number LWE25276 County Camden County
Recommended Construction Procedures for Earthen Facility ☐ Installation of clay pad and Compaction ☐ Diversion of subsurface flow ☐ Artificial sealing ☐ Rock excavation ☐ Limit excavation depth	Determine Overburden Properties ☐ Particle size analysis ☐ Atterberg limits ☐ 95% Max. dry density test method ☐ Overburden thickness ☐ Permeability coefficient-undisturbed ☒ Permeability coefficient-remolded	Determine Hydrologic Conditions ☐ Groundwater elevation ☐ Direction of groundwater flow ☐ 25-Year flood level ☐ 100-Year flood level

Remarks:

On July 18, 2025, a geologist with the Missouri Geological Survey (MGS) conducted a geological evaluation for a proposed mechanical treatment plant located at approximately 38°10'18" North, 92°42'19" West in Camden County, Missouri. The mechanical treatment plant will discharge directly into Lake of the Ozarks. The purpose of the site visit is to observe the geologic and hydrologic characteristics of the site and to determine the potential for groundwater contamination in the event of wastewater treatment failure.

Surface water from the site drains east to Lake of the Ozarks. Lake of the Ozarks is classified as gaining for discharge purposes.

The surficial materials onsite were measured using a handheld soil auger. The measurement of surficial material thickness was inhibited due to an abundance of gravelly residuum present in the soil. According to the United States Department of Agriculture's Web Soil Survey and nearby geologic well log data, surficial materials onsite are at most 8 feet thick. The surficial materials onsite are very gravelly silt loam and clay with gravelly residuum. The permeability of surficial materials is moderate to high.

Bedrock was not observed onsite; however, according to nearby geologic well log data and areal geologic mapping indicates the uppermost bedrock at the site is Ordovician-age Gasconade Dolomite. This bedrock unit is a light to grey, medium crystalline, cherty dolomite. This bedrock unit typically exhibits moderate to high near surface permeability and low permeability at depth.

There are no known springs or sinkholes within 1 mile of the site. There are at least 3 geologic structures located within 1 mile of the site. These geologic structures include the Davey Hollow Fault, Shawnee Bend Fault, and Workmen Hollow Fault. Workmen Hollow Fault is hydrologically downgradient from the site and may provide preferential pathways for the flow of groundwater.

Based on the characteristics observed, the site receives a slight geologic limitation rating. In the event of storage basin collapse or wastewater treatment failure, local, shallow groundwater resources, and surface waters of Lake of the Ozarks may be adversely impacted.

This is a report, not a permit, and does not review the engineering and/or best management practice controls required by applicable regulations. Additional data may be required by the Department of Natural Resources prior to the issuance of a permit. This report is valid only at the above location and MGS reserves the right to review this report and re-evaluate a site at any time.



All Pro Chimney Cove Circle 2 Lot WWTP
November 2025
Appendix C Page 20

APPENDIX C: 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 Three Report: Species Listed Under the Federal Endangered Species Act

There are records of species listed under the Federal Endangered Species Act, and possibly also records for species listed Endangered by the state, or Missouri Species and/or Natural Communities of Conservation Concern within or near the the defined Project Area. Please contact the U.S. Fish and Wildlife Service and the 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 report 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: Tim McDuffy Chimney Cove #17082
Project Description: 5-39-16, 38°10'18.4"N 92°42'18.6"W, Wideford Hallow Cove, and Camden
Project Type: Residential, Commercial and Governmental Building Development
Contact Person: Jordan Snider
Contact Information: jordan.s@mwec.us or 6188828602

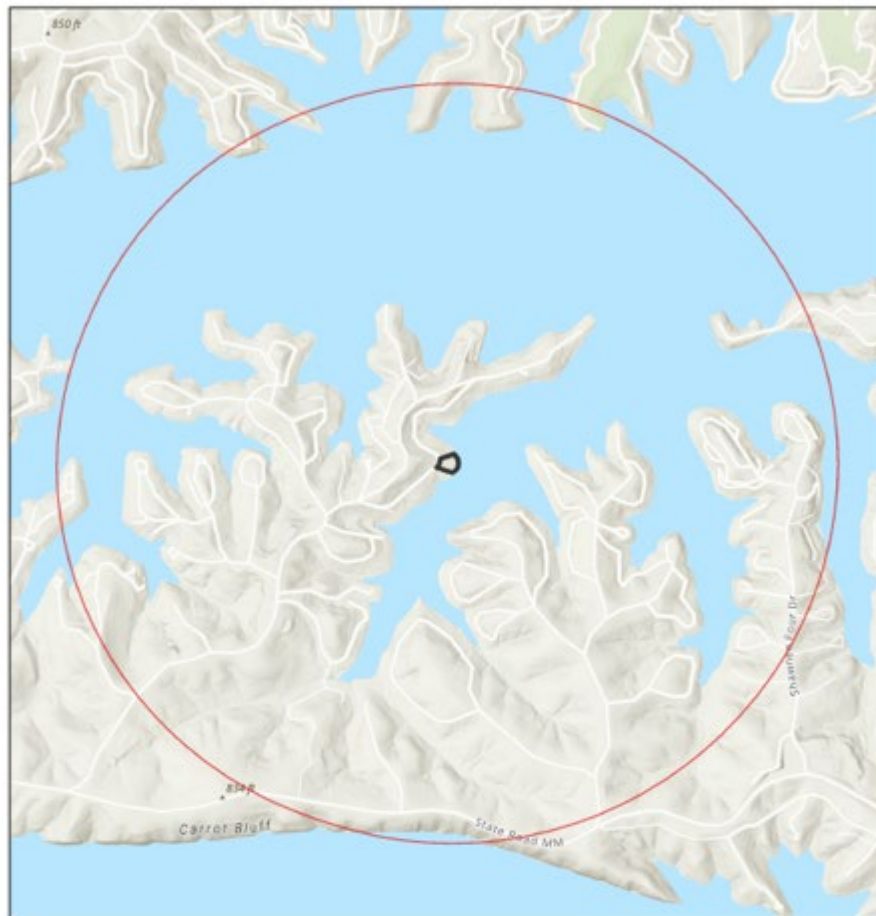
Disclaimer: This NATURAL HERITAGE REVIEW REPORT identifies if a species or natural community tracked by the Natural Heritage Program is known to occur within or near the project area submitted, and shares recommendations to avoid or minimize project impacts to sensitive species or natural habitats. Incorporating information from the Natural Heritage Program into project plans is an important step in reducing impacts to Missouri's sensitive natural resources. 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.

This Natural Heritage Review Report is not a site clearance letter for the project. Rather, it identifies public lands and records of sensitive resources located close to and/or potentially affected by the proposed project. If project plans or location change, this report may no longer be valid. Because land use conditions change and animals move, the existence of an occurrence record does not mean the species/habitat is still present. Therefore, reports include information about records near but not necessarily on the project site. Lack of an occurrence record does not mean that a sensitive species or natural community is not present on or near the project area. On-site verification is the responsibility of the project. However, the Natural Heritage Program is only one reference that should be used to evaluate potential adverse project impacts and additional information (e.g. wetland or soils maps, 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. This report does not fulfill 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 [IPaC: Home \(fws.gov\)](https://www.fws.gov) to initiate USFWS Information for Planning and Conservation (IPaC) consultation. Contact the Columbia Missouri Ecological Field Services Office (573-234-2132, or by mail at 101 Park Deville Drive, Suite A, Columbia, MO 65203) for more information.

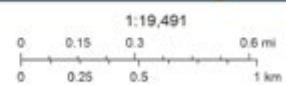
Transportation Projects: If the project involves the use of Federal Highway Administration transportation funds, these recommendations may not fulfill all contract requirements. Please contact the Missouri Department of Transportation at 573-526-4778 or visit [Home Page | Missouri Department of Transportation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

Tim McDuffy Chimney Cove



June 2, 2025

 Buffered Project Boundary
 Project Boundary



Missouri Dept. of Conservation, Missouri DNR, Esri, Garmin, Google, GeoTechnologies, Inc., METI/NASA, USGS, EPA, NPS, US Census Bureau, USGS, USFWS, Esri, NASA, NOAA, USGS, FEMA

Species or Communities of Conservation Concern within the Area:

There are records of species listed under the Federal Endangered Species Act, and possibly also records for species listed Endangered by the state, or Missouri Species and/or Natural Communities of Conservation Concern within or near the defined Project Area. Please contact the U.S. Fish and Wildlife Service and 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

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

Other Special Search Results:

No results have been identified for this project location.

Project Type Recommendations:

New construction, maintenance and remodeling, including government, commercial and residential buildings and other structures. Fish, forest, and wildlife impacts can be avoided by siting projects in locations that have already been disturbed or previously developed, where and when feasible, and by avoiding alteration of areas providing existing habitat, such as wetlands, streams, forest, native grassland, etc. The project should be managed to minimize erosion and sedimentation/runoff to nearby wetlands, streams and lakes, including adherence to any Clean Water Act permit conditions. Project design should include stormwater management elements that assure storm discharge rates to streams for heavy rain events will not increase from present levels. Revegetate areas in which the natural cover is disturbed to minimize erosion using native plant species compatible with the local landscape and wildlife needs. Annual ryegrass may be combined with native perennials for quicker green-up. Avoid aggressive exotic perennials such as crownvetch and sericea lespedeza. Pollutants, including sediment, can have significant impacts far downstream. Use silt fences and/or vegetative filter strips to buffer streams and drainages, and monitor the site after rain events and until a well-rooted ground cover is reestablished. Please see [Best Management Practices for Construction and Development Projects Affecting Missouri Rivers and Streams \(mo.gov\)](#).

Project Location and/or Species Recommendations:

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

Bald Eagle: The project location submitted and evaluated is within the geographic range of nesting Bald Eagles in Missouri. Bald Eagles (*Haliaeetus leucocephalus*) may nest near streams or water bodies in the project area. Nests are large and fairly easy to identify. Adults begin nesting activity in late December and January and young birds leave the nest in late spring to early summer. While no longer listed as endangered, eagles continue to be protected by the federal government under the Bald and Golden Eagle Protection Act. Work managers should be alert for nesting areas within 1500 meters of project activities, and follow federal guidelines at: [Do I need an eagle take permit? | U.S. Fish & Wildlife Service \(fws.gov\)](https://www.fws.gov/landmanagement/conservation/bald-eagle) if eagle nests are seen.

Gray Bat: The submitted project location is within the range of the Gray Myotis (i.e., Gray Bat) in Missouri. Depending on habitat conditions of your project's location, Gray Myotis (*Myotis grisescens*, federal and state-listed endangered) could occur within the project area, as they forage over streams, rivers, lakes, and reservoirs. Avoid entry or disturbance of any cave inhabited by Gray Myotis and when possible retain forest vegetation along the stream and from the cave opening to the stream. Please see [Best Management Practices for Construction and Development Projects Gray bat \(mo.gov\)](https://www.mo.gov/conservation/best-management-practices-for-construction-and-development-projects-gray-bat).

Karst: This county has known karst geologic features (e.g., caves, springs, and sinkholes, all characterized by subterranean water movement). Few karst features are recorded in Natural Heritage records, and ones not noted here may be encountered at the project site or affected by the project. Cave fauna (many of which are Species of Conservation Concern) are influenced by changes to water quality; please check your project site for any karst features and make every effort to protect groundwater in the project area. Additional information and specific recommendations are available at [Management Recommendations for Construction and Development Projects Affecting Missouri Karst Habitat \(mo.gov\)](https://www.mo.gov/conservation/management-recommendations-for-construction-and-development-projects-affecting-missouri-karst-habitat).

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 [Managing Invasive Species in Your Community | Missouri Department of Conservation \(mo.gov\)](#) 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 ([Kansas City District Regulatory Branch \(army.mil\)](#)) and the Missouri Department of Natural Resources (DNR) issued Clean Water Act Section 401 Water Quality Certification ([Section 401 Water Quality Certification | Missouri Department of Natural Resources \(mo.gov\)](#)), 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 [Wastewater Permits | Missouri Department of Natural Resources \(mo.gov\)](#) 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 [Missouri Species and Communities of Conservation Concern Checklist \(mo.gov\)](#) for a complete list of species and communities of conservation concern. Detailed information about the animals and some plants mentioned may be accessed at [Mofwis Search Results](#). Please contact the Missouri Department of Conservation to request printed copies of any materials linked in this document.

All Pro Chimney Cove Circle 2 Lot WWTP
November 2025
Appendix D Page 27

APPENDIX D: ANTIDEGRADATION REVIEW SUMMARY ATTACHMENTS

The attachments that follow contain summary information provided by the applicant.

1) Antidegradation Review Summary Request: no changes needed

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 All Pro Chimney Cove Circle 2 Lot WWTP		COUNTY Camden	
ADDRESS (PHYSICAL) 270 Chimney Cove Circle	CITY Sunrise Beach	STATE MO	ZIP CODE 65079
PERMIT NUMBER	PROPOSED DESIGN FLOW 1200 gpd	SIC / NAICS CODE	
2. OWNER			
NAME All Pro Properties, LLC			
ADDRESS 1706 Torino Circle	CITY Osage Beach	STATE MO	ZIP CODE 65065
EMAIL ADDRESS tim@mcduffeylaw.com	TELEPHONE NUMBER WITH AREA CODE 573-280-7655		
3. CONTINUING AUTHORITY The regulatory requirement regarding continuing authority is found in 10 CSR 20-6.010(2).			
NAME Homeowner's Association to be determined		SECRETARY OF STATE CHARTER NUMBER	
ADDRESS	CITY	STATE	ZIP CODE
EMAIL ADDRESS		TELEPHONE NUMBER WITH AREA CODE	
4. CONSULTANT			
PREPARED NAME Matthew J. Marschke, P.E.		COMPANY NAME Midwest Engineering Company, LLC	
ADDRESS 5510 Alona Point	CITY Osage Beach	STATE MO	ZIP CODE 65065
EMAIL ADDRESS matt.m@mwec.us	TELEPHONE NUMBER WITH AREA CODE (573) 216-0066		
5. RECEIVING WATER BODY SEGMENT #1			
NAME Osage Arm of the Lake of the Ozarks.			
5.1 Upper end of segment – Location of discharge UTM: X= _____, Y= _____ OR Lat 38°10'17.9"N, Long 92°42'18.3"W			
5.2 Lower end of segment – UTM: X= _____, Y= _____ 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			
6.1 Upper end of segment – End of Segment #1 UTM: X= _____, Y= _____ OR Lat _____, Long _____			
6.2 Lower end of segment – UTM: X= _____, Y= _____ 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 20-7.0317 ☐ Yes ☒ No – What is the proposed method of disinfection? MBR Filter			
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.			

M07-186-2025 (03-19)

12. PROPOSED PROJECT SUMMARY	
This project is to treat two five bedroom homes and discharge. There is no reasonable available sewer connection nearby that was acceptable to the owner and the sewer district.	
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>.	
13. CONTINUING AUTHORITY WAIVER (For New Discharges)	
In accordance with 10 CSR 20-6.010(2)(C), applicants proposing use of a lower preference continuing authority, when the higher level authority is available, must submit a waiver from the existing higher authority one or other documentation for the department's review, provided it does not conflict with any area-wide management plan approved under section 208 of the Federal Clean Water Act or by the Missouri Clean Water Commission. Is the waiver necessary? ☐ Yes ☐ No If yes, provide a copy.	
14. APPLICATION FEE	
☒ CHECK NUMBER	☐ JETPAY CONFIRMATION NUMBER
15. SIGNATURE	
I am authorized and hereby certify that I am familiar with the information contained in this document and to the best of my knowledge and belief such information is true, complete and accurate.	
SIGNATURE 	DATE 09/23/2025
PRINT NAME Matthew J. Marschke, P.E.	TITLE Project Engineer
PLEASE IDENTIFY YOUR STATUS FOR THIS PROJECT: ☐ OWNER ☐ CONTINUING AUTHORITY ☒ CONSULTANT	

2) Antidegradation Review Summary Path D: Tier 1 Preliminary Review Request: no changes needed



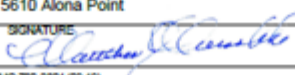
MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH
ANTIDEGRADATION REVIEW SUMMARY
PATH D: TIER 1 PRELIMINARY REVIEW REQUEST

1. FACILITY AND CONTACT INFORMATION				
FACILITY NAME All Pro Chimney Cove Circle 2 Lot WWTP		COUNTY		
ADDRESS (PHYSICAL)	CITY	STATE	ZIP CODE	
CONTACT NAME Matthew J. Marschke, P.E.				
ADDRESS 5610 Alona Point	CITY Osage Beach	STATE MO	ZIP CODE 65065	
EMAIL ADDRESS matt.m@mwec.us		TELEPHONE NUMBER WITH AREA CODE (573) 216-0066		
2. EXISTING WATER QUALITY DATA OR MODEL SUMMARY				
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. Provide all the relevant data and reports for approval by the Watershed Protection Section. Name of Receiving Stream: Wideford Hollow Cove Does the receiving stream have a Total Maximum Daily Load (TMDL)? ☒ Yes ☐ No If known, what is the source(s) of the impairment? Chlorophyll-a List the pollutants for which the stream is impaired: Chlorophyll-a What is the design flow of the proposed facility? Comments/Discussion: The discharge will be to the Lake of the Ozarks, which is on the 2022 303(d) list for chlorophyll-a (an indicator for excess nutrients).				
Tier Determination: Identify all Tier 1 pollutants below.				
Tier 1 Pollutant of Concern	Concentration*		Water Quality Standard	Proposed Effluent Concentration
	mg/L	µg/L		
* Place an X in appropriate box for the concentration units for each Pollutant of Concern				
3. PROPOSED PROJECT SUMMARY				
WWTP to serve two 5 bedroom homes.				

3) Antidegradation Review Submittal Voluntary Tier 2 – Significant Degradation for Domestic Wastewater Facilities with Design Flow Less Than 50,000 Gallons per Day: no changes needed

	MISSOURI DEPARTMENT OF NATURAL RESOURCES WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH ANTIDEGRADATION REVIEW SUBMITTAL VOLUNTARY TIER 2 – SIGNIFICANT DEGRADATION FOR DOMESTIC WASTEWATER FACILITIES WITH DESIGN FLOW LESS THAN 50,000 GALLONS PER DAY	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: left; padding: 2px;">FOR DEPARTMENT USE ONLY</th> </tr> <tr> <td style="padding: 2px;">APP NO.</td> <td style="padding: 2px;"></td> </tr> <tr> <td style="padding: 2px;">CHECK NO.</td> <td style="padding: 2px;">CHECK NO.</td> </tr> <tr> <td colspan="2" style="padding: 2px;">DATE RECEIVED</td> </tr> </table>	FOR DEPARTMENT USE ONLY		APP NO.		CHECK NO.	CHECK NO.	DATE RECEIVED	
FOR DEPARTMENT USE ONLY										
APP NO.										
CHECK NO.	CHECK NO.									
DATE RECEIVED										
1. APPLICABILITY										
If you answer "Yes" to any of the below questions, a site-specific alternatives analysis may be required. The Missouri Department of Natural Resources' alternatives analysis is <i>not</i> applicable to facilities that have a Total Maximum Daily Load (TMDL) or are 303(d) or 305(b) listed for the pollutants of concern addressed in this alternatives analysis, with an exception for <i>E. coli</i> since disinfection will be required. Facilities currently under enforcement will need to coordinate with the Water Protection Program's compliance and enforcement section to determine applicability for the department's alternatives analysis. 1.1 Does the receiving waterbody or downstream waterbody have a Total Maximum Daily Load (TMDL)? ☒ Yes ☐ No 1.2 Is the receiving waterbody or downstream waterbody 303(d) or 305(b) listed as impaired or potentially impaired? ☒ Yes ☐ No 1.3 Is the facility currently under enforcement with the department or the U.S. Environmental Protection Agency? ☐ Yes ☒ No 1.4 Is the design flow 50,000 gallons per day or more? ☐ Yes ☒ No 1.5 Is a non-discharging system a viable option? ☐ Yes ☒ No Submit the following with this form: ☐ Regionalization and No Discharge Evaluation Form – Available on the department's website ☐ Copy of the Geohydrologic Evaluation – Submit request through the Missouri Geological Survey website ☐ Copy of the Missouri Natural Heritage Review from the Missouri Department of Conservation website										
2. FACILITY										
NAME All Pro Chimney Cove Circle 2 Lot WWTP		COUNTY Camden								
ADDRESS (PHYSICAL) 270 Chimney Cove Circle	CITY Sunrise Beach	STATE MO								
		ZIP CODE 65079								
3. OWNER										
NAME All Pro Properties, LLC										
ADDRESS 1706 Torino Circle	CITY Osage Beach	STATE MO								
		ZIP CODE 65065								
EMAIL ADDRESS tim@mcduffylaw.com	TELEPHONE NUMBER WITH AREA CODE 573-280-7655									
4. CONTINUING AUTHORITY The regulatory requirement regarding continuing authority is found in 10 CSR 20-6.010(2).										
NAME Tim McDuffy		SECRETARY OF STATE CHARTER NUMBER								
ADDRESS 1706 Torino Circle	CITY Osage Beach	STATE MO								
		ZIP CODE 65065								
EMAIL ADDRESS tim@mcduffylaw.com	TELEPHONE NUMBER WITH AREA CODE 573-280-7655									

5. RECEIVING WATER BODY SEGMENT #1	
NAME _____	
5.1 Upper end of segment – Location of discharge UTM: X= _____, Y= _____ OR Lat 38°10'17.9"N, Long 92°42'18.3"W	
5.2 Lower end of segment – UTM: X= _____, Y= _____ OR Lat _____, Long _____ Per the Missouri Antidegradation Implementation Procedure (AIP), the definition of 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 Necessary)	
NAME _____	
6.1 Upper end of segment – End of Segment #1 UTM: X= _____, Y= _____ OR Lat _____, Long _____	
6.2 Lower end of segment – UTM: X= _____, Y= _____ OR Lat _____, Long _____	
7. SOCIAL AND ECONOMIC IMPORTANCE OF THE PREFERRED ALTERNATIVE	
This section must be completed with adequate and thorough descriptions of the social and economic importance associated with the proposed project in accordance with the Antidegradation Implementation Procedure Section II.E. for discharge to be allowed.	
Social and economic importance is defined as the social and economic benefits to the community that will occur from any activity involving a new or expanding discharge.	
7.1 Identify the affected community: (The affected community is defined in 10 CSR 20-7.031(2)(B) as the community "in the geographical area in which the waters are located." Per the Antidegradation Implementation Procedure Section II.E.1, "the affected community should include those living near the site of the proposed project as well as those in the community that are expected to directly or indirectly benefit from the project.")	
7.2 Identify the important social and economic development associated with the project:	
Will the proposed discharging activity:	
Create or expand employment?	☒ Yes ☐ No ☐ Don't know ☐ N/A
Increase median family income?	☒ Yes ☐ No ☐ Don't know ☐ N/A
Reduce the number of households below the poverty line?	☐ Yes ☒ No ☐ Don't know ☐ N/A
Increase the community tax base?	☒ Yes ☐ No ☐ Don't know ☐ N/A
Increase needed housing supply?	☒ Yes ☐ No ☐ Don't know ☐ N/A
Provide necessary public services (e.g., school, infrastructure, fire department, etc.)?	☐ Yes ☒ No ☐ Don't know ☐ N/A
Correct a public health, safety, or environmental problem?	☐ Yes ☒ No ☐ Don't know ☐ N/A
Other: _____	

7.3 Describe the important social and economic development associated with the project: The applicant must describe the expected changes in the factors identified in question 7.2 that are associated with the project and provide information on any additional items demonstrating important social and economic development. The applicant should first describe the existing condition of the affected community. This base condition should then be compared to the predicted change (benefit) in social and economic condition after the discharge is allowed. The social and economic measures identified above do not constitute a comprehensive list. Each situation and community is different and will require an analysis of unique social and economic factors in accordance with the Antidegradation Implementation Procedure Section I.E.1.			
7.4 Is any other written correspondence or documentation included with this application to provide further evidence of social and economic importance: ☒ No ☐ Yes ☐ Letter(s) from the mayor or community in support of the proposed project ☐ Rezoning approval ☐ Other:			
8. NO DISCHARGE ALTERNATIVES EVALUATION According to the Antidegradation Implementation Procedure Sections I.B. and I.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. You must submit the <i>Regionalization and No-Discharge Evaluation Form (780-2805)</i> to demonstrate that a non-discharging alternative is not feasible. If sufficient information is not provided on the <i>No-Discharge Evaluation Form</i> to demonstrate that a non-discharging facility is not feasible, a more detailed evaluation of no discharge options must be submitted.			
9. IDENTIFY PREFERRED TREATMENT ALTERNATIVE Describe your preferred treatment alternative that has been recommended or approved by a registered professional engineer licensed to practice in Missouri. The preferred treatment alternative must be capable of meeting the effluent limits in the table under item 10 of this form. Applicants choosing to use a new wastewater technology considered an "unproven technology" in Missouri must comply with the requirements set forth in the Innovative Technology factsheet found on the department's website.			
ENGINEERING CONSULTANT NAME Matthew J Marschke		COMPANY NAME Midwest Engineering Company, LLC	
ADDRESS 5610 Alona Point	STATE MO	ZIP CODE 65065	TELEPHONE NUMBER WITH AREA CODE 573-216-0066
SIGNATURE 		EMAIL ADDRESS matt.m@mwec.us	

10. SUMMARY OF THE POLLUTANTS OF CONCERN AND EFFLUENT LIMITS

Pollutants of concern to be considered include those pollutants reasonably expected to be present in the discharge per the Antidegradation Implementation Procedure Section II.A. and assumed or demonstrated to cause significant degradation. The tier protection levels are specified and defined in rule at 10 CSR 20-7.031(2). All POCs in this alternatives analysis were considered to be Tier 2 and significantly degrading in the absence of existing water quality.

As a result of this alternatives analysis review, the department has determined, depending on site specific conditions, there are treatment technologies available that may be economically efficient and practicable, which are capable of meeting the effluent limitations below. If the facility owners do not believe there is a treatment technology that is economically efficient, affordable, or practicable for their facility to meet these limits, a site-specific alternatives analysis will be required.

The chosen alternative must be capable of meeting the following effluent limitations:

EFFLUENT LIMITS – OUTFALLS TO LAKES				
Pollutant of Concern*	Units	Daily Maximum	Weekly Average	Monthly Average
BOD ₅	MG/L		15	10
TSS	MG/L		20	15
pH	SU	6.5– 9.0		6.5 – 9.0
Ammonia as N Summer	MG/L	3.6		1.4
Ammonia as N Winter	MG/L	7.5		2.9
Total Phosphorus****	MG/L	*		0.5
<i>Escherichia coli</i> (<i>E. coli</i>)	#/100ML	630***		126

EFFLUENT LIMITS – ALL OTHER OUTFALLS				
BOD ₅	mg/L		15	10
TSS	mg/L		15	10
pH	SU	6.5– 9.0		6.5 – 9.0
Ammonia as N Summer	mg/L	1.7		0.6
Ammonia as N Winter	mg/L	5.6		2.1
Total Phosphorus****	mg/L	*		0.5
<i>Escherichia coli</i> (<i>E. coli</i>)	WBC(A) AND WBC (B)	#/100 ML	630***	
	Losing Stream**	#/100 ML	126***	

* Permit limits for other parameters, including oil and grease, total residual chlorine and nitrates, will be included in the operating permit based on applicable water quality standards and criteria.

Total residual chlorine (TRC) effluent limits of 0.017 mg/L daily maximum, 0.008 mg/L monthly average are recommended if chlorine is used as a disinfectant. Standard compliance language for TRC, including the minimum level (ML), may be included in the operating permit.

** For any facility that will discharge to a waterbody designated as a losing stream or within two miles flow distance upstream of a losing stream.

*** Publicly owned treatment works will receive a weekly average limit and private facilities will receive a daily maximum limit.

**** Total Phosphorus limits are only applicable to discharges to a lake or watershed of a lake that is a water of the state and has an area of at least 10 acres during normal pool conditions.

If any Tier 1 Pollutants of Concern not addressed in this alternatives analysis will be discharged, the applicant must submit Attachment D: Tier 1 Review for those pollutants.

11. APPLICATION FEE	
☒ CHECK NUMBER	☐ JETRAY CONFIRMATION NUMBER
12. SIGNATURE	
I am authorized and hereby certify that I am familiar with the information contained in this document and to the best of my knowledge and belief such information is true, complete and accurate.	
SIGNATURE: 	DATE: 09/22/2025
PRINT NAME: Matthew J Marschke	TITLE: Project Engineer
PLEASE IDENTIFY YOUR STATUS FOR THIS PROJECT: ☐ OWNER ☐ CONTINUING AUTHORITY ☒ CONSULTANT	

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- 4) Antidegradation: Regionalization and No-Discharge Evaluation: Additional information was necessary to support that regionalization was not a practicable alternative to avoiding the need for discharge. Following department comments, additional information was supplied via email on September 23, 2023, and October 6, 2025 that supported the determination.



MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH
ANTIDEGRADATION: REGIONALIZATION AND NO-DISCHARGE EVALUATION

REGIONALIZATION AND NO-DISCHARGE EVALUATION	
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. Please refer to the <i>No-Discharge Alternative Evaluation</i> fact sheet for examples of information to provide to justify common reasons for not pursuing regionalization or no-discharge land application. If sufficient information is not provided on this form to demonstrate that these alternatives are not feasible, a more detailed evaluation of no-discharge options may have to be submitted. Additional pages may be attached if more room is needed.	
1. FACILITY:	
NAME All Pro Chimney Cove Circle 2 Lot WWTP	COUNTY Camden
2. EVALUATION OF REGIONALIZATION (Complete all applicable reasons why regionalization was not pursued)	
2.1 Regionalization Feasibility:	
A. What is the distance to connect to the closest municipality's line or other facility's line? 500 feet	
B. List facilities contacted about possible regionalization. Camden County PWS #4	
C. Is there any planning or zoning in the area regarding development and services? Yes	
D. Who would have the responsibility to maintain the sewer connection line? The user.	
E. What is the estimated cost for piping and pumps to regionalize? \$250,000	
F. Explain any engineering challenges with the regionalization connection – topography, rivers, highways, or other issues. Forced RW path by district makes the extension three times the cost of easiest connection point.	
G. Does a regional facility have the capacity to treat the additional effluent from this project?	
H. Were land owners contacted for rights to an easement? ☐ Yes ☒ No	
I. Describe the easement issues: A private easement would be required to avoid rock. The cost of said easement is unknown at this time.	
2.2 Summarize why regionalization was not a practicable or economically efficient alternative Regionalization would cost three times that of on site wastewater treatment plant.	

3. EVALUATION OF NO-DISCHARGE LAND APPLICATION	
Check all applicable reasons why no-discharge land application was not pursued:	
☒ 3.1 Land Availability and Cost: A. Is land available for land application? ☐ Yes ☒ No If not, explain: <u>Soils are poor and unsuitable for land application.</u> If yes, answer the following: B. How many acres are required for land application of the effluent? <u>0.25 Acres</u> C. Provide a breakdown of the capital cost for any necessary additional land, piping, pumps, and irrigation equipment? D. Were long-term costs evaluated and compared for upgrading to a mechanical plant with future Water Quality Standards changes (i.e. mussel ammonia, bacteria, TP, TN) versus cost for a land application system? ☒ Yes ☐ No E. Were land owners contacted for rights to an easement? ☐ Yes ☒ No F. Describe the easement issues: <u>There is no land available.</u>	
☒ 3.2 Zoning or Suitability of Site in Proximity to Neighboring Sites or Waterbodies: A. Was drip or subsurface irrigation evaluated as opposed to surface application? ☐ Yes ☒ No B. Does the county ordinance specifically restrict land application, surface and subsurface? ☒ Yes ☐ No C. Can a vegetated buffer be installed to reduce necessary buffer distances? ☒ Yes ☐ No D. Are there other steps or considerations that can be made? 	
☒ 3.3 Unsuitability of Geology or Soils A. Is a geohydrologic evaluation, county soils survey map, or other resource showing suitability and application rates included with this application? ☒ Yes ☐ No B. Is it cost-effective to bring in additional soils? ☐ Yes ☒ No C. Can the application rate be decreased to a suitable rate? ☒ Yes ☐ No D. Were subsurface application alternatives (e.g. low pressure pipe, drip) considered? ☒ Yes ☐ No E. If collapse potential is a concern, was using a liner or alternative site evaluated? ☐ Yes ☒ No 3.4 Summarize why no-discharge land application was not a practicable or economically efficient alternative <u>The land required is not cost effective. The flow is minimal to treatment. On site treatment is not allowed in the County when the lots are not the minimal size required by the land use code.</u>	

4. DOCUMENTATION
4.1 Is any other written correspondence or documentation included with this application to provide further justification for not pursuing a no-discharge option or regionalization? ☒ No ☐ Yes: ☐ A letter from an existing higher preference continuing authority waiving preferential status where service is not available in accordance with 10 CSR 20-6.0 10 (2) or if capacity is not available. ☐ A letter from the existing higher preference continuing authority stating that the regional facility has no interest in taking flow from the new or expanded facility. ☐ A letter from the regional municipality stating that the project area is outside city limits and annexation would be required. ☐ Council meeting minutes. ☐ Correspondence with land owners regarding easement rights. ☐ Correspondence with land owners regarding land for sale or lease. ☐ Letters from the community or a consulting engineer regarding availability, proximity, and location of suitable land and the reasonable cost of such land. ☐ Documentation of recent land sales or appraisals. ☐ Calculations for sizing a land application system. ☐ Detailed cost estimates for a land application system or regionalization including lift stations, piping, easements, liners, and/or connection costs. ☐ Geohydrologic evaluation or other soils report. ☐ Copy of a county or city ordinance. ☐ Verification of funding from State Revolving Fund, which does not fund projects outside city limits. ☐ Other:

785-2884 (05-19)

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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: 11/2025 ☐ 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 _____
- 1.5 Is a copy of the appropriate plans* and specifications* included with this application?
☒ YES Denote which form is submitted: ☒ Hard copy ☒ Electronic copy (See instructions.) ☐ NO
- 1.6 Is a summary of design* included with this application? ☒ YES ☐ NO
- 1.7 Has the appropriate operating permit application (A, B, or B2) been submitted to the department?
☐ YES Date of submittal: _____
☒ 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 All Pro Chimney Cove Circle 2 Lot WWTP	2.2 ESTIMATED PROJECT CONSTRUCTION COST \$ 125,000
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2.3 PROJECT DESCRIPTION

The Chimney Cove Project includes two year-round residential homes requiring an efficient wastewater collection and treatment system. The system will provide reliable and economical wastewater management for both properties.

2.4 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION

By Contract Hauler

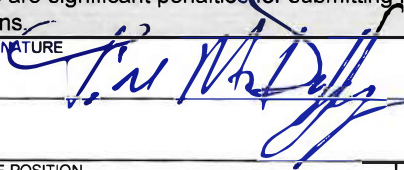
2.5 DESIGN INFORMATION

A. Current population: 0; Design population: 7.4

B. Actual Flow: 1200 gpd; Design Average Flow: 1200 gpd;
Actual Peak Daily Flow: 1500 gpd; Design Maximum Daily Flow: 1200 gpd; Design Wet Weather Event: _____

2.6 ADDITIONAL INFORMATION

- A. Is a topographic map attached? ☒ YES ☐ NO
- B. Is a process flow diagram attached? ☒ YES ☐ NO

3.0 WASTEWATER TREATMENT FACILITY				
NAME All Pro Chimney Cove Circle 2 Lot WWTP		TELEPHONE NUMBER WITH AREA CODE		E-MAIL ADDRESS
ADDRESS (PHYSICAL) 270 Chimney Cove Circle		CITY Sunrise Beach	STATE MO	ZIP CODE 65079
Wastewater Treatment Facility: Mo- (Outfall Of)				
3.1 Legal Description: 2 1/4, 2 1/4, 1 1/4, Sec. 16, T 5, R 39 (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: Wideford Hollow Cove, Lake of the Ozarks, Osage River				
4.0 PROJECT OWNER				
NAME All Pro Properties, LLC		TELEPHONE NUMBER WITH AREA CODE 573-280-7655		E-MAIL ADDRESS tim@mcduffeylaw.com
ADDRESS 1706 Torino Circle		CITY Osage Beach	STATE MO	ZIP CODE 65065
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 Same as 4.0		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 Matthew J. Marschke, P.E.		TELEPHONE NUMBER WITH AREA CODE (573) 216-0066		E-MAIL ADDRESS matt.m@mwec.us
ADDRESS 5610 Alona Point		CITY Osage Beach	STATE MO	ZIP CODE 65065
7.0 APPLICATION FEE				
☒ CHECK NUMBER 007300 ☐ 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 Tim McDuffy			DATE 11/10/2025	
TITLE OR CORPORATE POSITION Owner		TELEPHONE NUMBER WITH AREA CODE 573-280-7655		E-MAIL ADDRESS tim@mcduffeylaw.com
Mail completed copy to: MISSOURI DEPARTMENT OF NATURAL RESOURCES WATER PROTECTION PROGRAM P.O. BOX 176 JEFFERSON CITY, MO 65102-0176				
END OF PART A.				
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHETHER PART B NEEDS TO BE COMPLETE.				

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: _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres
Location: _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres
Location: _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres
(Use additional pages if greater than three irrigation sites.)

10.2 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