Permit No. CP0002268

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

CONSTRUCTION PERMIT

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

Scott Miller
Workmen Cove Holdings, LLC
79 Forest Lake Circle
Lake Ozark, MO 65049

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.

January 27, 2022
Effective Date

January 26, 2024
Expiration Date

Chris Wieberg
Chris Wieberg, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

A new recirculating sand filter WWTF will be constructed to treat domestic wastewater flow for a residential subdivision with a pool and common ground. This facility will be sized for a design flow of 6,327 gpd and population equivalent of 70 PE. The treatment facility will include grinder pumps, force mains, septic tanks with an aluminum feeder for phosphorus reduction, a recirculating sand filter with recirculation tanks, tablet chlorination, chlorine contact basin, tablet disinfection, sampling port and an outfall.

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 Beverly R. Hall, P.E. with LO Environmental, LLC 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 Southwest Regional Office per 10 CSR 20-7.015(9)(G).

5. The completed project shall be field tested to verify actual pumped volume of each dose. The timer controls shall be set to ensure a dosing rate not to exceed the allowable rate of 2.5 gallons per square foot per day.

6. The wastewater treatment facility shall be located at least two hundred (200') from any residence per 10 CSR 20-8.140(2)(C)2.

7. The wastewater treatment facility shall be located above the twenty-five (25)-year flood level.

8. 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 per 10 CSR 20-8.140(2)(B). The minimum distance between wastewater treatment facilities and all potable water sources shall be at least three hundred feet (300') per 10 CSR 20-8.140(2)(C)1.

9. 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.

10. 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.

11. 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 the minimum distance of 200' to a neighboring residence and 50' to property line for lagoons; 200' to a neighboring residence for open recirculating media filters following primary treatment; and 50' to a neighboring residence for all other 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 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.

- Disinfection and dechlorination, when used, shall be provided during all power outages. 10 CSR 20-8.140 (7) (A) 2.

- Electrical systems and components in raw wastewater or in enclosed or partially enclosed spaces where hazardous concentrations of flammable gases or vapors that are normally present, shall comply with the NFPA 70 *National Electric Code (NEC)* (2017 Edition), as approved and published August 24, 2016, requirements for Class I, Division 1, Group D locations. 10 CSR 20-8.140 (7) (B)

- 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)

- Effluent twenty-four (24) hour composite automatic sampling equipment shall be provided at all mechanical wastewater treatment facilities and at other facilities where necessary under provisions of the operating permit. 10 CSR 20-8.140 (7) (F)

- 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:
    - Fencing. Enclose the facility site with a fence designed to discourage the entrance of unauthorized persons and animals; 10 CSR 20-8.140 (8) (A)
    - 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)
    - Portable blower and hose sufficient to ventilate accessed confined spaces; 10 CSR 20-8.140 (8) (F)
    - 10 CSR 20-8.140 (8) (G) Portable lighting equipment complying with NEC requirements. See subsection (7)(B) of this rule;
    - 10 CSR 20-8.140 (8) (H) Gas detectors listed and labeled for use in NEC Class I, Division 1, Group D locations. See subsection (7)(B) of this rule;
    - Appropriately-placed warning signs for slippery areas, non-potable water fixtures (see subparagraph (7)(D)3.B. of this rule), low head clearance areas, open service manholes, hazardous chemical storage areas, flammable fuel storage areas, high noise areas, etc.; 10 CSR 20-8.140 (8) (I)
    - Ventilation shall include the following:

        - Isolate all pumping stations and wastewater treatment components installed in a building where other equipment or offices are located from the rest of the building by an air-tight partition, provide separate outside entrances, and provide separate and independent fresh air supply; 10 CSR 20-8.140 (8) (J) 1.
        - Force fresh air into enclosed screening device areas or open pits more than four feet (4') deep. 10 CSR 20-8.140 (8) (J) 2.
        - Dampers are not to be used on exhaust or fresh air ducts. Avoid the use of fine screens or other obstructions on exhaust or fresh air ducts to prevent clogging; 10 CSR 20-8.140 (8) (J) 3.
        - Where continuous ventilation is needed (e.g., housed facilities), provide at least twelve (12) complete air changes per hour. Where continuous ventilation would cause excessive heat loss, provide intermittent ventilation of at least thirty (30) complete air changes per hour when facility personnel enter the area. Base air change demands on one hundred percent (100%) fresh air; 10 CSR 20-8.140 (8) (J) 4.
        - Electrical controls. Mark and conveniently locate switches for operation of ventilation equipment outside of the wet well or building. Interconnect all intermittently operated ventilation equipment with the respective wet well, dry well, or building lighting system. The manual lighting/ventilation switch is expected to override the automatic controls. For a two (2) speed ventilation system with automatic switch over where gas detection equipment is installed, increase the ventilation rate automatically in response to the detection of hazardous concentrations of gases or vapors; 10 CSR 20-8.140 (8) (J) 5.
        - Fabricate the fan wheel from non-sparking material. Provide automatic heating and dehumidification equipment in all dry wells and buildings. 10 CSR 20-8.140 (8) (J) 6.
    - Explosion-proof electrical equipment, non-sparking tools, gas detectors, and similar devices, in work areas where hazardous conditions may exist, such as digester vaults and other locations where potentially explosive atmospheres of flammable gas or vapor with air may accumulate. 10 CSR 20-8.140 (8) (K)
    - Provisions for local lockout/tagout on stop motor controls and other devices; 10 CSR 20-8.140 (8) (L)
    - Provisions for an arc flash hazard analysis and determination of the flash protection boundary distance and type of PPE to reduce exposure to major electrical hazards shall be in accordance with NFPA 70E *Standard for Electrical Safety in the Workplace* (2018 Edition), as approved and published August 21, 2017. 10 CSR 20-8.140 (8) (M)

- 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)

- 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)

- Recirculating media filters with a capacity of twenty-two thousand five hundred gallons per day (22,500 gpd) or less shall be located closer than the minimum distance of 200' to a neighboring residence and 50' to property line for lagoons; 200' to a neighboring residence for open recirculating media filters following primary treatment; and 50' to a neighboring residence for all other discharging facilities. See 10 CSR 20-2.010(68) for the definition of a residence. 10 CSR 20-8.180 (3) (A)

- A minimum of two (2) recirculating media filter beds and a diversion box are required for all design flows. 10 CSR 20-8.180 (3) (B)

- Dosing. Both timer and float switch controls are required; timers are the primary method of operation and the float switch control is a back-up. 10 CSR 20-8.180 (3) (C)

- The media is any of a number of physical structures whose sole purpose is to provide a surface to support biological growth. Commonly used media includes rock, gravel, and sand of various sizes, textile media, and peat. Finely crushed limestone, dolomite, slag, any clay, limestone, or appreciable amounts of organic material is not acceptable. 10 CSR 20-8.180 (3) (E)

- Emergency Power. Disinfection and dechlorination processes, when used, shall be provided during all power outages. 10 CSR 20-8.190 (2) (A)

- Contact period for Chlorine Disinfection. A minimum contact period of fifteen (15) minutes at design peak hourly flow or maximum rate of pumpage shall be provided after thorough mixing. 10 CSR 20-8.190 (3) (A)

- Alarm System for chlorination and dechlorination systems. The applicant shall conform to 10 CSR 20-8.140(7)(C) and be responsible for specifying what the alarm requirements are necessary to assure consistent disinfection in compliance with the applicable bacteria limits and the disinfection residual limit in the effluent. 10 CSR 20-8.190 (3) (C)

- Effluent twenty-four (24) hour composite automatic sampling equipment shall be provided at all mechanical wastewater treatment facilities and at other facilities where necessary under provisions of the operating permit. 10 CSR 20-8.190 (3) (D)

- Dilution tanks and mixing tanks are required when using dry compounds and may be necessary when using liquid compounds to deliver the proper dosage. 10 CSR 20-8.190 (4) (A)

- Solid dechlorination systems shall not be located in the chlorine contact tank. 10 CSR 20-8.190 (4) (B) 1.

- Contact time. A minimum of thirty (30) seconds for mixing and contact time of dechlorination systems shall be provided at the design peak hourly flow or maximum rate of pumpage. 10 CSR 20-8.190 (4) (B) 2.

12. Upon completion of construction:

    A. Workmen Cove Holdings, LLC will become the continuing authority for operation and maintenance of these facilities;

    B. Submit an electronic copy of the as builts if the project was not constructed in accordance with previously submitted plans and specifications; and

    C. Submit the enclosed form Wastewater Construction Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(N). Form B - Application for an Operating Permit for Domestic or Municipal Wastewater (≤100,000 gallons per day) and fee of $300 have already been submitted to the Department with the construction permit application.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

This new wastewater treatment facility will discharge treated domestic wastewater to Lake of the Ozarks from a 19 lot residential subdivision, tennis court, pool, and common area.

2. FACILITY DESCRIPTION

The new WWTF will be constructed to treat domestic wastewater flows from a residential subdivision. Wastewater will be conveyed from each residence by grinder pumps and force mains to common septic tanks with an aluminum feeder for phosphorus removal. The first septic tank will have 5,445 gallons of capacity with effluent flowing to the second septic tank by gravity. The second septic tank will have 5,445 gallons of capacity and will have a Polylok PL-525 effluent filter before primary treated wastewater flows by gravity to the first of two recirculating tanks for a recirculating media filter. Wastewater will flow by gravity from the first recirculating tank to the second recirculating tank by gravity before it is pumped to the recirculating media filter via a duplex pump system. Effluent from the recirculating media filter will be partitioned at the first recirculation tank thorough an Orenco RSV4U splitter valve with 80% being recirculated to the first recirculation tank and 20% of the secondary treated effluent partitioned to disinfection. 20% of the secondary treated effluent will be conveyed to a tablet chlorinator, chlorine contact chambers, and tablet dechlorinator in series.

Disinfected and dechlorinated wastewater will flow through a sampling port before discharging into Lake of the Ozarks.

The Cove WWTF is located at the corner of Andris & Glodenrod, Lake Ozark, in Camden County, Missouri. The facility has a design average flow of 6,327 gpd and serves a hydraulic population equivalent of approximately 70 people.

3. COMPLIANCE PARAMETERS

The new facility can meet BOD_5 of 10 mg/l Monthly Average. The proposed project is required to meet the requirements of MO-GD00000 Table E-1 and E2 with an expiration date of June 30, 2024.

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

Parameter	Units	Daily Maximum Limit	Weekly Average Limit	Monthly Average Limit
Flow	gpd	*		*
Biochemical Oxygen Demand$_5$	mg/L		15	10
Total Suspended Solids	mg/L		20	15
Ammonia as N-summer	mg/L	3.6		1.4
Ammonia as N-winter	mg/L	7.5		2.9
Total Residual Chlorine	µg/L	17 (130 ML)		8 (130 ML)
E. coli	#/100mL	630		126
Total Phosphorus	mg/L	*		0.5
Aluminum, Total Recoverable	µg/L	750.0		373.8
Parameter	**Unit**	**Minimum**		**Maximum**
pH	SU	6.5		9.0
Parameter	**Unit**	**Daily Minimum**	**Weekly Average Minimum**	**Monthly Average Minimum**
Dissolved Oxygen	mg/L	*		*

* Monitoring Requirement Only

4. ANTIDEGRADATION

The Department has reviewed the antidegradation report for this facility and issued the Water Quality and Antidegradation Review dated September 2021, due to the new facility construction. See **APPENDIX – ANTIDEGRADATION**.

5. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

Existing major components that will remain in use include the following:

- No major components are currently in place.

Construction will cover the following items:

- Components are designed for a Population Equivalent of 70 based on organic loading to the system.

- Grinder Pumps and Force main Collection System – Each residence will have a grinder pump vault with a Myers WGL20H-21 grinder pump or approved equal capable of 15 gpm at 115.1 ft of TDH.

- Septic Tank 1 – A septic tank provides passive primary treatment as the settleable solids in raw wastewater settle onto the bottom of the tank. Raw wastewater will flow via force main to a minimum 5,445 gallon Septic Tank (ST1). Together, the septic tanks provide approximately 1.72 days of detention at design average flow. The ST1 compartment is 8 ft x 14 ft x 8 ft with a water level depth of 6.5 ft. Aluminum dosing Stenner pump equipment will be installed on the septic tank for phosphorus treatment. ST1 provides approximately 0.86 days of detention at design average flow. The ST1 effluent wastewater will flow by gravity to Septic Tank 2 through a T-drop pipe. Settled solids in the septic tank shall be removed by a contract hauler.

- Septic Tank 2 – A septic tank provides passive primary treatment as the settleable solids in raw wastewater settle onto the bottom of the tank. Raw wastewater will flow by gravity to the 5,445 gallon Septic Tank 2 (ST2). Each septic tank compartment is 8 ft x 14 ft x 8 ft with a water level depth of 6.5 ft. ST1 and ST2 have a total capacity of 10,890 gallons and provide a total detention time of 1.72 days together at design average flow. A septic tank effluent filter polylok PL-525 or approved equal will be installed on ST2. The primary treated wastewater will flow by gravity to Recirculation Tank 1. Settled solids in the septic tank shall be removed by a contract hauler.

- Recirculation Tank 1 – Recirculation Tank 1 (RT1) will be the first of two recirculation tanks in series established for the sand filter. RT1 will have a minimum capacity of 3,000 gallons. RT1 will receive primary treated wastewater from ST2 effluent and 80% of the sand filter effluent (recirculated secondary treated wastewater). RT1 is 15.67 ft x 4.8 ft x 5.33 ft deep with a water level depth of 3.7 ft for a wastewater volume of approximately 2,081 gallons. RT1 has an Orenco RSV4U or approved equal splitter valve that feeds secondary treated wastewater from the RMF back into the recirculation tanks with 80% of the flow being recirculated to RT1 and 20% of the flow being conveyed to the disinfection system. All of the RT1 effluent will flow to Recirculation Tank 2 by gravity.

- Recirculation Tank 2 – The second of two recirculation tanks will be constructed in series after RT1 and before the Recirculating Media Filter (RMF). Recirculation Tank 2 (RT2) will have a minimum capacity of 4,500 gallons. RT2 is 15 ft x 7 ft x 5.73 ft deep with a water level depth of 6.25 ft for a wastewater volume of approximately 4,018 gallons. Recirculation Tank

2 (RT2) will have a duplex pump system to convey primary treated wastewater and recirculated secondary treated wastewater to the RMF. RT2 has 2 – 1.5 HP Goulds Model 55 submersible pumps – each capable of 55 gpm at 28 ft TDH. The pumps transfer wastewater to 6 separate zones of the recirculating media filter by means of a 6 zone sequencing valve feeding six 1.5-inch PVC lateral pipes as the distribution manifold. Each of those 6 laterals branches to 5 laterals per zone that feed the RMF, 30 laterals total.

- Recirculating Media Filter – The concrete lined Recirculating Media Filter (RMF) is split into six zones. The filter bed is approximately 60 ft x 53.25 ft x 3.5 ft deep for a total surface area of 3,000 ft^2 for a total hydraulic loading of 2.5 gpd/ft^2 at design average flow (with the RMF sized at 6,660 gpd). The PVC laterals are spaced 2-ft apart with twenty five 1/8-inch shielded orifices per lateral. The laterals are located in the center of the top 6-inch layer of 3/8-inch pea gravel. The filter media layer is 2 ft deep containing media with an effective size of 0.5 mm to 2.0 mm and a uniformity coefficient less than 3.5. The underdrain layer has a 6-inch layer of 3/8-inch pea gravel on top of a 6-inch layer of 1/2-inch to 3/4-inch rock. The filter bed contains 3 underdrains comprised of 4-inch slotted PVC piping with approximate 20-ft spacing. The three underdrains combine to a common 4-inch PVC pipe that conveys secondary treated wastewater to the RT1 Orenco RSV4U splitter valve by gravity. The Orenco RSV4U splitter valve partitions 80% of the secondary treated wastewater back to RT1 for recirculation and 20% of the secondary treated wastewater to disinfection as secondary treated effluent.

- Disinfection – Disinfection is the process of removal, deactivation, or killing of pathogenic microorganisms.
  - Tablet Chlorinator – Installation of a tablet Norweco LF2000 tablet chlorinator receiving secondary treated effluent prior to the chlorine contact tank. The tablet chlorinator are rated for a design flow of 20,000 gpd and a maximum flow of 100,000 gpd. The system will dispense hypochlorite as the wastewater comes into contact with the tablets.
  - Chlorine Contact Tank – Installation of two pre-cast concrete tanks in series approximately 1.66 ft x 3.66 ft x 2.92 ft each with a total of 14 end-around baffles allowing for a 56:1 length to width ratio. This tank will allow for a 15.4-minute contact time during a peak flow of 25,308 gpd.
  - Tablet Dechlorinator – Installation of a tablet Norweco LF2000 dechlorination chamber receiving the chlorinated effluent and prior to Outfall No. 001. The tablet dechlorinator shall have a design flow of 20,000 gpd and a maximum flow of 100,000 gpd. The system will dispense sodium sulfite as the wastewater comes into contact with the tablets.

- V-notch Weir Flow Measurement – Installation of accurate flow measurement devices will give the treatment facility a means of improved data analysis. A V-notch weir with a 90 degree notch will be installed in the sample port. This measurement device does not include flow totalizing or recording.

6. OPERATING PERMIT

After completion of construction project submit:

- Wastewater Construction Statement of Work Completed, Form MO 780-2155, https://dnr.mo.gov/document-search/wastewater-construction-statement-work-completed-mo-780-2155, and
- As-builts if the project was not constructed in accordance with previously submitted plans and specifications,

Operating Permit Application Form B and a fee of $300 has already been submitted to the Department. Missouri State Operating Permit, General Permit MO-GD00598, will be issued after receipt of the above documents.

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

Steve Hamm, P.E.
Engineering Section
Steven.hamm@dnr.mo.gov

APPENDIX – Antidegradation

Missouri Department of Natural Resources
Water Protection Program
Water Pollution Control Branch
Engineering Section

Water Quality and Antidegradation Review

Department's Alternatives Analysis for Domestic Wastewater Facilities with Design Flow Less Than 50,000 Gallons per Day

For Protection of Water Quality
and Determination of Effluent Limits at

The Cove WWTF

September, 2021

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1. Water Quality Information

In accordance with Missouri's Water Quality Standard [10 CSR 20-7.031(3)] and federal antidegradation policy at Title 40 Code of Federal Regulation (CFR) Section 131.12 (a), the Missouri Department of Natural Resources (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.

2. Applicability

This Water Quality and Antidegradation Review is for facilities that produce primarily domestic wastewater and discharge less than 50,000 gallons per day. This General Antidegradation Review is not applicable to facilities where the receiving waterbody, or downstream waterbodies, have a Total Maximum Daily Load (TMDL) or are 303(d) or 305(b) listed for the pollutants of concern (POCs) addressed in this alternatives analysis, with an exception for waterbodies that are listed for *E. coli* since disinfection will be required. For receiving waters that are impaired for pollutants other than *E. coli*, the Antidegradation Implementation Procedure requires a Tier 1 approach and the applicant must demonstrate that the discharge will not "cause or contribute" to the impairment. For these site-specific mixed tier reviews (where some POCs are Tier 1 and others are Tier 2) applicants may use the alternative analysis presented in this document for the Tier 2 pollutants.

Facilities that are 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. No mixing will be included in this review for receiving waterbodies. If the applicant would like to have effluent limitation derivation include mixing considerations, a site-specific alternatives analysis will need to be completed.

3. Tier Determination

Below is a list of pollutants of concern reasonably expected to be in the discharge for a domestic wastewater treatment facility. Pollutants of concern are defined as those pollutants "proposed for discharge that affects beneficial use(s) in waters of the state. POCs include pollutants that create conditions unfavorable to beneficial uses in the water body receiving the discharge or proposed to receive the discharge" (AIP, Page 7). No existing water quality data is required because all POCs were considered to be Tier 2 and significantly degrading in the absence of existing water quality. Assumed uses for the receiving waterbody are General Criteria, Protection of Warm Water Aquatic Life (AQL), Human Health Protection (HHP), Irrigation (IRR), and Livestock & Wildlife Protection (LWP). If any Tier 1 Pollutants of Concern not addressed in this alternatives analysis will be discharged, the applicant must submit the *Path D: Tier 1 Preliminary Review Request form* for those pollutants.

Table 1. Pollutants of Concern and Tier Determination

Pollutants of Concern	Tier*	Degradation	Comment****
Biochemical Oxygen Demand (BOD_5)/DO	2	Significant	
Total Suspended Solids (TSS)	**	Significant	
Ammonia	2	Significant	
pH	***	Significant	Permit limits applied
Escherichia coli (*E. coli*)	2	Significant	
Total Phosphorus (TP)	2	Significant	

* Tier assumed.
** Tier determination not possible: No in-stream standard for this parameter.
*** The standard for this parameter is a range.

**** Permit limits for other parameters including Oil & Grease, Total Residual Chlorine, and Nitrates will be applied based on water quality standards and criteria as applicable.

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.

4. Demonstration Of Necessity And Social And Economic Importance

Missouri's Antidegradation Implementation Procedures (AIP) specify that if the proposed activity results in significant degradation then a demonstration of necessity (i.e., alternatives analysis) and a determination of social and economic importance are required. The applicant must submit the Antidegradation Review Submittal: Voluntary Tier 2 – Significant Degradation for Domestic Wastewater Facilities with Design Flow Less Than 50,000 Gallons per Day form. This analysis will serve as the applicant's alternatives analysis to fulfill the requirements of the AIP.

A Geohydrologic Evaluation must be submitted with the Antidegradation Review Request.

A Missouri Department of Conservation Natural Heritage Review Report must be obtained by the applicant. The applicant should review the Natural Heritage Review and contact the U.S. Fish and Wildlife Service and the Missouri Department of Conservation for further coordination if necessary.

4.1. No Discharge Evaluation

According to 10 CSR 20-6.010(4)(A)5.B., facility plans must include an evaluation of the feasibility of constructing and operating a facility with no discharge to waters of the state if the report is for a new or modified wastewater treatment facility. Per the Antidegradation Implementation Procedure Section II.B.1, for discharges likely to cause significant degradation, applicants must provide an analysis of non-degrading alternatives. No-discharge alternatives may include surface land application, subsurface land application, and connection to a regional treatment facility.

The applicant must submit the *Antidegradation: Regionalization and No-Discharge Evaluation* form to demonstrate that a no-discharge facility is not feasible for this site. If the information provided on the form is not sufficient to demonstrate that a no-discharge facility is not feasible, a more detailed evaluation of no discharge options will be required before the Department can complete its determination.

4.2. Demonstration of Necessity

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 and results are presented in Figure 1, Figure 2, and Table 2 below.

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 5.6 mg/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) 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.

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 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) 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) 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) 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 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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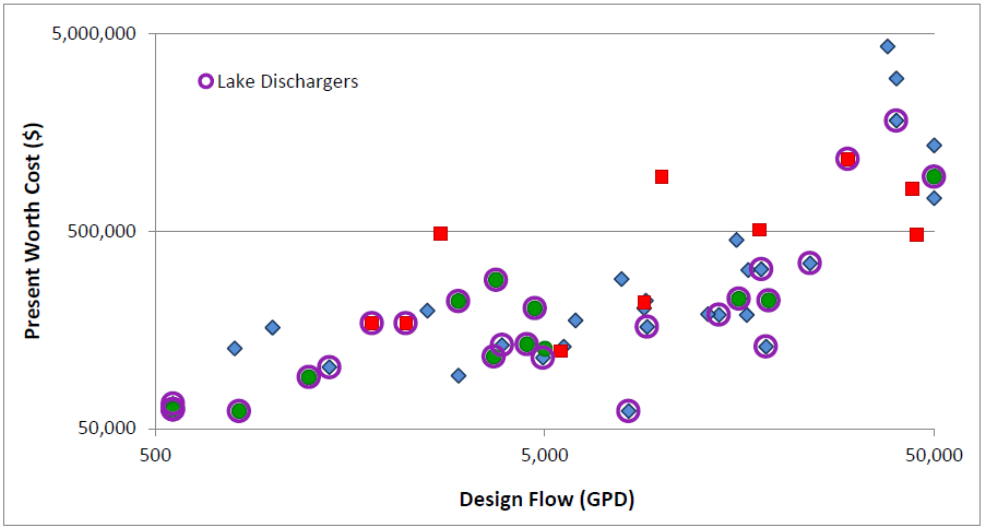
FIGURE 1. DESIGN FLOW VS. PRESENT WORTH COST VS. AMMONIA LIMITS



LEGEND		Summer Ammonia (mg/L)		Winter Ammonia (mg/L)	
		Daily Max	Monthly Avg.	Daily Max	Monthly Avg.
2013 EPA Criteria	■	≤1.7	≤0.6	≤5.6	≤2.1
Existing Aquatic Life Criteria (no mixing)	◆	approx. 3.7	approx. 1.4	approx. 7.5	approx. 2.9
Less Stringent (mixing)	●	>3.7	>1.4	>7.5	>2.9

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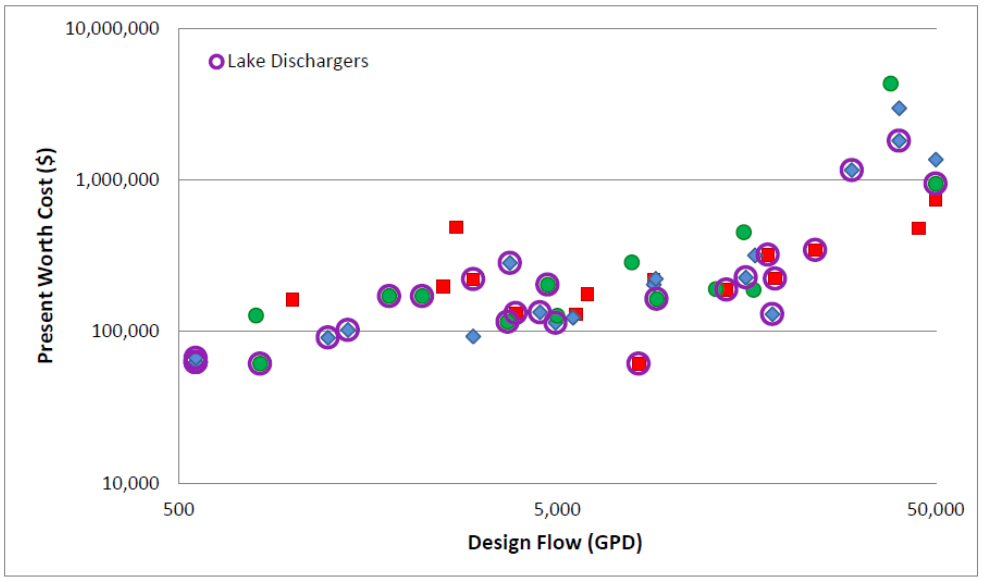
FIGURE 2. DESIGN FLOW VS. PRESENT WORTH COST VS. BOD & TSS LIMITS



LEGEND	BOD (mg/L)		TSS (mg/L)	
	Daily Max	Monthly Avg.	Daily Max	Monthly Avg.
■	15	10	15	10
◆	15	10	>15	>10
●	>15	>10	>15	>10

TABLE 2. DESIGN FLOW VS. PRESENT WORTH COST

DATE	Design Flow (MGD)	Technology	BOD (mg/L)		TSS (mg/L)		Summer Ammonia (mg/L)		Winter Ammonia (mg/L)		Present Worth Cost ($)	$ PW/gpd
			Daily Max or Weekly Average	Monthly Average	Daily Max or Weekly Average	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Monthly Average		
4/16/2018	*0.000450	Recirculating Textile Filter	15	10	20	15	3.7	1.4	7.5	2.9	66,838	149
5/2/2012	*0.000555	Recirculating Textile Filter	15	10	20	15	12.1	4.6	12.1	4.6	62,506	113
4/2/2013	*0.000555	Recirculating Textile Filter	15	10	20	15	12.1	4.6	12.1	4.6	62,506	113
10/1/2014	*0.000555	Extended Aeration Package Plant	15	10	22.5	15	7.8	3	7.8	3	62,506	113
4/17/2017	*0.000555	Recirculating Textile Filter	15	10	20	15	3.7	1.4	7.5	2.9	66,838	120
4/4/2012	0.000800	Recirculating Textile Filter	30	15	30	15	4	1.5	7.7	2.9	127,427	159
12/1/2013	*0.000821	Membrane Bioreactor	30	20	30	20	12.1	4.6	12.1	4.6	61,240	75
9/2/2012	0.001000	Recirculating Textile Filter	15	10	15	10	3.7	1.4	7.5	2.9	162,007	162
7/6/2011	*0.001240	Recirculating Textile Filter	15	10	22	15	6	3	6	3	91,000	73
1/1/2015	*0.001400	Recirculating Textile Filter	15	10	23	15	3.7	1.4	7.6	2.9	102,174	73
9/8/2017	*0.001800	Recirculating Textile Filter	30	20	30	20	1.7	0.6	1.7	0.6	170,879	95
9/5/2017	*0.002200	Recirculating Textile Filter	30	20	30	20	1.7	0.6	1.7	0.6	170,879	78
5/5/2011	0.002500	Extended Aeration	15	10	15	10	3.7	1.4	7.5	2.9	198,000	79
8/31/2017	0.002700	New Technology Primary Tank with Aeration	15	10	15	10	1.7	0.6	5.6	2.1	485,000	180
9/1/2011	*0.003000	Recirculating Textile Filter	15	10	15	10	12.1	4.6	12.1	4.6	220,915	74
3/1/2012	0.003000	Extended Aeration Package Plant	15	10	20	15	3.7	1.4	7.5	2.9	92,604	31
2/22/2016	*0.003700	Recirculating Rock Filter	30	20	30	20	7.3	2.8	7.3	2.8	115,688	31
7/4/2011	*0.003750	Recirculating Textile Filter	15	10	20	15	12.1	4.6	12.1	4.6	283,000	75
4/1/2014	*0.003885	Recirculating Sand Filter	15	10	15	10	3.7	1.4	7.5	2.9	132,185	34
12/1/2012	*0.004500	Recirculating Sand Filter	15	10	23	15	12.1	4.6	12.1	4.6	133,676	30
6/3/2013	*0.004718	Recirculating Sand Filter	30	20	30	20	12.1	4.6	12.1	4.6	203,060	43
11/2/2011	*0.004950	Recirculating Sand Filter	15	10	20	15	3.5	1.4	7.5	2.9	114,058	23
6/4/2011	0.005000	Moving Bed Biofilm Reactor	45	30	45	30	5.7	2.2	8.2	3.2	127,000	25
8/22/2017	0.005500	Recirculating Sand Filter	15	10	20	15	1.7	0.6	5.6	2.1	123,224	22
9/6/2012	0.005600	Extended Aeration with Filtration and Aerated Holding Tanks	15	10	15	10	3.7	1.4	7.5	2.9	130,000	23

DATE	Design Flow (MGD)	Technology	BOD (mg/L)		TSS (mg/L)		Summer Ammonia (mg/L)		Winter Ammonia (mg/L)		Present Worth Cost ($)	$ PW/gpd
			Daily Max or Weekly Average	Monthly Average	Daily Max or Weekly Average	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Monthly Average		
6/1/2011	0.006000	Recirculating Sand Filter	15	10	15	10	3.7	1.4	7.5	2.9	176,239	29
3/1/2011	0.007875	Modular Fixed Film Activated Sludge with Constructed Wetlands	30	20	30	20	3.7	1.4	7.5	2.9	285,780	36
4/3/2012	*0.008210	Membrane Bioreactor	15	10	15	10	2.6	1	2.6	1	61,240	7
8/5/2014	0.009000	Recirculating Sand Filter	15	10	20	15	3.1	1.2	7.5	2.9	203,698	23
1/1/2014	0.009000	Membrane Bioreactor	15	10	15	10	1.6	0.6	5.5	2.1	217,739	24
4/6/2012	0.009100	Membrane Bioreactor	15	10	20	15	3.7	1.4	7.5	2.9	222,160	24
3/7/2012	*0.009158	Recirculating Gravel filter	30	20	30	20	3.7	1.5	6.5	2.5	163,681	18
3/6/2017	0.010000	Extended aeration	33	22	33	22	1.7	0.6	5.6	2.1	941,800	94
6/1/2014	0.013125	Recirculating Sand Filter	45	30	45	30	3	1.1	6	2.3	189,985	14
8/4/2012	*0.014000	Extended Aeration	15	10	15	10	3.7	1.4	7.5	2.8	188,208	13
7/1/2014	0.015540	Recirculating Sand Filter	23	15	23	15	3.9	1.5	7.8	3	450,986	29
7/5/2011	*0.015750	Recirculating Sand Filter	15	10	20	15	7.8	2.5	7.8	2.5	226,969	14
2/27/2015	0.016500	Extended Aeration Package Plant	45	30	45	30	3.7	1.4	7.5	2.9	187,957	11
7/1/2012	0.016650	Extended Aeration	15	10	20	15	3.7	1.4	7.5	2.9	317,750	19
9/3/2014	0.017800	Extended Aeration Package Plant	45	30	45	30	1.4	0.6	2.9	2.1	507,618	29
5/11/2015	*0.018000	Recirculating Sand Filter, Polishing Reactor, Chemical Phosphorus Removal	15	10	15	10	3.7	1.4	6.5	2.1	320,318	18
7/3/2013	*0.018500	Recirculating Textile Filter with Chemical & Filter Phosphorus Removal	15	10	20	15	3.7	1.4	7.5	2.9	130,000	7
12/7/2017	*0.018800	Recirculating Sand Filter	15	10	15	10	6	2.3	6	2.3	222,901	12
2/27/2015	*0.024000	Recirculating Gravel Filter and Chemical Phosphorus Removal	15	10	15	10	3.7	1.4	6.5	2.1	343,816	14
9/1/2014	*0.030000	Recirculating Sand Filter and Moving Bed Biofilm Reactor with Chemical Phosphorus Removal	15	10	20	15	1.7	0.6	5.6	2.1	1,157,390	39
6/2/2012	0.038000	Aerated Lagoon with Recirculating Sand Filter	45	30	45	30	3.7	1.4	7.5	2.9	4,309,665	113

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DATE	Design Flow (MGD)	Technology	BOD (mg/L)		TSS (mg/L)		Summer Ammonia (mg/L)		Winter Ammonia (mg/L)		Present Worth Cost ($)	$ PW/gpd
			Daily Max or Weekly Average	Monthly Average	Daily Max or Weekly Average	Monthly Average	Daily Maximum	Monthly Average	Daily Maximum	Monthly Average		
2/3/2013	0.040000	Moving Bed Biofilm Reactor (can be operated as IFAS)	15	10	20	15	3.7	1.4	7.5	2.9	2,963,181	74
8/20/2015	*0.040000	Recirculating Sand Filter and Moving Bed Biofilm Reactor	15	10	20	15	3.7	1	5.6	2.1	1,812,000	45
12/1/2016	0.044000	Fixed Film Extended Aeration	30	20	45	30	1.7	0.6	5.6	2.1	816,367	19
6/4/2013	0.045000	Moving Bed Biofilm Reactor	15	10	15	10	1.7	0.6	5.6	2.1	479,344	11
3/9/2016	0.045000	Moving Bed Biofilm Reactor	15	10	15	10	1.7	0.6	5.6	2.1	479,344	11
6/4/2012	*0.050000	New Technology Package Plant	30	20	30	20	7.5	2.9	7.5	2.9	942,050	19
7/3/2011	0.050000	Extended Aeration Package Plant	15	10	20	15	3.7	1.4	7.5	2.9	1,357,506	27
8/3/2014	0.050000	Recirculating Sand Filter	15	10	15	10	3.7	1.4	7.5	2.9	733,723	15

* Lake Dischargers

Additionally, the table of wastewater treatment technologies in the *Ammonia Criteria: New EPA Recommended Criteria* factsheet includes several technologies that have demonstrated capability in meeting ammonia effluent limits of less than 0.7 mg/L when designed appropriately.

The EPA has approved the nutrient water quality standards at 10 CSR 20-7.031. Numeric water quality standards for specific lakes are listed in Table N of 10 CSR 20-7.031. Nutrient standards at 10 CSR 20-7.031(5)(N) apply to all other lakes that are waters of the state and have an area of at least ten acres during normal pool conditions, with the exception of the lakes located in the Big River Floodplain ecoregion (see 10 CSR 20-7.031(5)(N)2.). Waters that are 303(d) listed for nutrients will need to complete a site-specific antidegradation review to determine appropriate limits.

The base case treatment option for total phosphorus to ensure that water quality standards will be protected is assumed to be conventional secondary treatment. Total phosphorus effluent levels from conventional secondary treatment typically range from 1 to 4 mg/L. Three less degrading options that were considered are chemical addition for precipitation and settling, biological nutrient removal (BNR), and enhanced nutrient removal (ENR). Chemical addition is a common practice for phosphorus removal and has been used for a number of years in Southwest Missouri for discharges to lakes that are subject to the 0.5 mg/L effluent limits required at 10 CSR 20-7.015. An effluent limit of 0.5 mg/L was therefore determined to be a reasonable and economically efficient treatment level for the Department's Alternatives Analysis. The cost to treat beyond this level may not be economically efficient for facilities with a design flow less than 50,000 gallons per day.

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 3 or Table 4. If the facility owners do not believe that there is a treatment technology that is both economically efficient and practicable for their facility to meet the limits in Table 3 or Table 4, a site-specific alternatives analysis may be required.

4.3. Design Flow Determination

As part of the Department's alternatives analysis, facilities up to 50,000 gallons per day were evaluated. A design flow maximum of 50,000 gallons per day was chosen for applicability of this alternatives analysis for a variety of reasons. As facilities increase in size, site-specific factors may require a more site-specific alternatives analysis. For example, larger facilities are more likely to have wet weather flows that must be addressed and are more likely to need Whole Effluent Toxicity testing or nutrient monitoring. Larger facilities are also more likely to discharge a larger variety of pollutants of concern, which may not be addressed in this review. Larger facilities also benefit from an economy of scale; smaller facilities tend to have a higher cost per gallon of wastewater treated, which is distributed over fewer paying customers. Finally, as we are working with a limited amount of data, limiting the design flow applicability for the Department's alternatives analysis ensures a factor of safety in our review.

4.4. Regionalization Alterative

Within Section II B 1. of the AIP, discussion of the potential for discharge to a regional wastewater collection system is mentioned. The applicant must provide justification for not pursuing regionalization on the *Regionalization and No-Discharge Evaluation* form. If the information provided on the form is not sufficient to demonstrate that a regionalization alternative is not feasible, a more detailed evaluation will be required before the Department can complete its determination.

The applicant needs to fully evaluate regionalization and consolidation options when deciding on ways to comply with existing and future regulatory requirements. This includes evaluating connecting or selling their utility to a larger public or private utility. With the rising costs of compliance and often-limited resources

available to smaller facilities, not owning and operating a small utility may be the most beneficial and cost-effective alternative for achieving consistent compliance.

4.5. Losing Stream Alterative Discharge Location

Under 10 CSR 20-7.015(4)(A), *prior to discharging to a losing stream, alternatives such as relocating the discharge to a gaining stream, and connection to a regional wastewater treatment facility are to be evaluated and determined to be unacceptable for environmental and/or economic reasons*.

Information provided by the applicant on the *No Discharge Evaluation* form must include evaluation and justification for why the owner is not pursuing land application, or connection to a regional facility.

4.6. Social And Economic Importance Evaluation

Missouri's antidegradation implementation procedures specify that if the proposed activity results in significant degradation then a determination of social and economic importance is required.

Information provided by the applicant in the *Antidegradation Review Submittal: Voluntary Tier 2 – Significant Degradation for Domestic Wastewater Facilities with Design Flow Less Than 50,000 Gallons per Day* form must include a detailed social and economic importance evaluation. If the information provided on the form is not sufficient to demonstrate important social and economic importance, then a more detailed evaluation will be required before the Department can complete its determination.

5. General Assumptions of the Water Quality and Antidegradation Review

1. 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., evaluation of no discharge] has been or will be addressed in a Missouri State Operating Permit or Construction Permit Application.
2. 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.
3. Changes to Federal and State Regulations made after the drafting of this WQAR may alter Water Quality Based Effluent Limits (WQBEL).
4. Effluent limitations derived from Federal or Missouri State Regulations (FSR) may be WQBEL or Effluent Limit Guidelines (ELG).
5. WQBEL supersede ELG only when they are more stringent. Mass limits derived from technology based limits are still appropriate.
6. A WQAR does not allow discharges to waters of the state, and shall not be construed as a National Pollution Discharge Elimination System or Missouri State Operating Permit to discharge or a permit to construct, modify, or upgrade.
7. Limitations and other requirements in a WQAR may change as Water Quality Standards, Methodology, and Implementation procedures change.
8. Nothing in this WQAR removes any obligations to comply with county or other local ordinances or restrictions.
9. If the proposed treatment technology is not covered in 10 CSR 20-8 Minimum Design Standards, the treatment process may be considered a new technology. As a new technology, the permittee will need to work with the review engineer to ensure equipment is sized properly. 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.

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6. Permit Limits and Monitoring Information

TABLE 3. EFFLUENT LIMITS – ALL OUTFALLS

PARAMETER		UNITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	BASIS FOR LIMIT (NOTE 1)	MONITORING FREQUENCY
FLOW		MGD	*		*	FSR	ONCE/QUARTER
BIOCHEMICAL OXYGEN DEMAND$_5$ **		MG/L		15	10	PEL	ONCE/QUARTER
TOTAL SUSPENDED SOLIDS **		MG/L		15	10	PEL	ONCE/QUARTER
PH		SU	6.5– 9.0		6.5 – 9.0	FSR	ONCE/QUARTER
AMMONIA AS N (APR 1 – SEPT 30)		MG/L	1.7		0.6	PEL	ONCE/QUARTER
AMMONIA AS N (OCT 1 – MAR 31)		MG/L	5.6		2.1	PEL	ONCE/QUARTER
TOTAL PHOSPHORUS (NOTE 2)		MG/L	*		0.5	PEL	ONCE/QUARTER
ESCHERICHIA COLIFORM (*E. COLI*)	WBC(A) AND WBC (B) (NOTE 3)	#/100ML	630***		126	FSR	ONCE/QUARTER
	LOSING STREAM (NOTE 4)	#/100ML	126***		*	FSR	ONCE/QUARTER

TABLE 4. EFFLUENT LIMITS – OUTFALLS TO LAKES

PARAMETER	UNITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	BASIS FOR LIMIT (NOTE 1)	MONITORING FREQUENCY
FLOW	MGD	*		*	FSR	ONCE/QUARTER
BIOCHEMICAL OXYGEN DEMAND$_5$ **	MG/L		15	10	PEL	ONCE/QUARTER
TOTAL SUSPENDED SOLIDS **	MG/L		20	15	PEL	ONCE/QUARTER
PH	SU	6.5– 9.0		6.5 – 9.0	FSR	ONCE/QUARTER
AMMONIA AS N (APR 1 – SEPT 30)	MG/L	3.6		1.4	PEL	ONCE/QUARTER
AMMONIA AS N (OCT 1 – MAR 31)	MG/L	7.5		2.9	PEL	ONCE/QUARTER
TOTAL PHOSPHORUS (NOTE 2)	MG/L	*		0.5	PEL	ONCE/QUARTER
ESCHERICHIA COLIFORM (*E. COLI*)	#/100ML	630***		126	FSR	ONCE/QUARTER

* Monitoring requirements only.

** Publicly owned treatment works will be required to meet a removal efficiency of 85% or more for BOD$_5$ and TSS. Influent BOD$_5$ and TSS data should be reported to ensure removal efficiency requirements are met.

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

NOTE 1 – Preferred Alternative Effluent Limit – PEL; or Federal/State Regulation – FSR. Water Quality-Based Effluent Limitation – WQBEL Also, please see the **GENERAL ASSUMPTIONS OF THE WQAR #4 & #5.**

NOTE 2 – 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 ten acres during normal pool conditions

NOTE 3 - Effluent limitations and monitoring requirements for *E. coli* for WBC(A) and WBC(B) are applicable only during the recreational season from April 1 through October 31. The Monthly Average Limit for *E. coli* is expressed as a geometric mean. The Weekly Average for *E. coli* will be expressed as a geometric mean if more than one (1) sample is collected during a calendar week (Sunday through Saturday).

NOTE 4 – Effluent limits and monitoring requirements for *E. coli* are applicable year round for designated losing streams. No more than 10% of samples over the course of a calendar year shall exceed the 126 #/100 mL daily maximum.

Permit limits or monitoring requirements for other applicable parameters, including Oil & Grease, Total Residual Chlorine, Dissolved Oxygen, Nitrates, Total Recoverable Aluminum, and Total Recoverable Iron, may be included in the operating permit based on water quality standards and criteria as applicable.

7. Receiving Water Monitoring Requirements

No receiving water monitoring requirements recommended at this time.

8. Derivation and Discussion of Limits

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

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

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

Chronic wasteload allocations were determined using applicable chronic water quality criteria (CCC: criteria continuous concentration). Acute wasteload allocations were determined using applicable water quality criteria (CMC: criteria maximum concentration).

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).

Note: Under 40 CFR 133.105, permitting authorities shall require more stringent limitations than equivalent to secondary treatment limitations for 1) existing facilities if the permitting authority determines that the 30-day average and 7-day average BOD_5 and TSS effluent values that could be achievable through proper operation and maintenance of the treatment works, and 2) new facilities if the permitting authority determines that the 30-day average and 7-day average BOD_5 and TSS effluent values that could be achievable through proper operation and maintenance of the treatment works, considering the design capability of the treatment process.

9. Limit Derivation

- **Flow**. In accordance with [40 CFR Part 122.44(i)(1)(ii)] the volume of effluent discharged from each outfall is needed to assure compliance with permitted effluent limitations. 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 (BOD_5).** BOD_5 limits of 10 mg/L monthly average and 15 mg/L average weekly were determined by the Department to be achievable and protective of beneficial uses and existing water quality.

  As per the *DO Modeling & BOD Effluent Limit Development Administrative Guidance for the Purpose of Conducting Water Quality Assistance Reviews*, facilities less than 100,000 gallons per day, and proposing BOD treatment less than or equal to an average monthly of 10 mg/L and average weekly of 15 mg/L as demonstrated by performance specifications from a manufacturer or effluent sampling of an existing facility with the same treatment facility are exempt from the DO modeling requirement.

Influent monitoring may be required for this facility in its Missouri State Operating Permit.

- **Total Suspended Solids (TSS).**
  Table 3: TSS limits of 10 mg/L monthly average and 15 mg/L average weekly were determined by the Department to be achievable and protective of beneficial uses and existing water quality. According to EPA, because TSS and BOD are closely correlated, we apply the same limits for TSS as BOD.

  Table 4: For lake discharging facilities, TSS limits of 15 mg/L monthly average and 20 mg/L average weekly were determined by the Department to be achievable and protective of beneficial uses and existing water quality for discharges to lakes where mixing would apply. These limits are more protective than the TSS limitations designated at 10 CSR 20-7.015(3)(A)1.A. for lakes and reservoirs.

  Influent monitoring may be required for this facility in its Missouri State Operating Permit.

- **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.

- **Total Ammonia Nitrogen for Table 3**. The Department has determined that the alternatives analysis-based technology limits of 0.6 mg/L monthly average and 1.7 mg/L daily maximum in summer, and 2.1 mg/L monthly average and 5.6 mg/L daily maximum in winter are achievable by some treatment technologies. Because these limits are more protective than the water quality-based limits calculated below for a stream with no mixing, the technology-based limits were used.

  In choosing to use the Department's alternatives analysis, the facility is electing to build a treatment plant that provides a high level of treatment that meets potential future limits based on the 2013 EPA Ammonia criteria and will potentially reduce the need to upgrade in the near future. If the facility owners do not believe that there is a treatment technology that is both economically efficient and practicable for their facility to meet these limits, a site-specific alternatives analysis may be required.

  Water Quality-Based Effluent Limits (WQBEL):
  Early Life Stages Present Total Ammonia Nitrogen criteria apply
  [10 CSR 20-7.031(5)(B)7.C. & Table B1 and Table B3]. Background total ammonia nitrogen = 0.01 mg/L

Season	Temp (°C)	pH (SU)	Total Ammonia Nitrogen CCC (mg N/L)	Total Ammonia Nitrogen CMC (mg N/L)
Summer	26	7.8	1.5	12.1
Winter	6	7.8	3.1	12.1

  Summer: April 1 – September 30

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

  Chronic WLA: $C_e = ((Q_e + 0.0)1.5 – (0.0 * 0.01))/Q_e = 1.5$ mg/L

  Acute WLA: $C_e = ((Q_e + 0.0)12.1 – (0.0 * 0.01))/Q_e = 12.1$ mg/L

  LTA_c = 1.5 mg/L (0.780) = **1.17 mg/L** [CV = 0.6, 99th Percentile, 30 day avg.]

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LTA_a = 12.1 mg/L (0.321) = 3.89 mg/L [CV = 0.6, 99th Percentile]

MDL = 1.17 mg/L (3.11) = 3.6 mg/L [CV = 0.6, 99th Percentile]
AML = 1.17 mg/L (1.19) = 1.4 mg/L [CV = 0.6, 95th Percentile, n = 30]

Winter: October 1 – March 31
Chronic WLA: $C_e = ((Q_e + 0.0)3.1 – (0.0 * 0.01))/Q_e$ = 3.1 mg/L

Acute WLA: $C_e = ((Q_e + 0.0)12.1 – (0.0025 * 0.01))/Q_e$ = 12.1 mg/L

LTA_c = 3.1 mg/L (0.780) = **2.42 mg/L** [CV = 0.6, 99th Percentile, 30 day avg.]
LTA_a = 12.1 mg/L (0.321) = 3.89 mg/L [CV = 0.6, 99th Percentile]

MDL = 2.42 mg/L (3.11) = 7.5 mg/L [CV = 0.6, 99th Percentile]
AML = 2.42 mg/L (1.19) = 2.9 mg/L [CV = 0.6, 95th Percentile, n = 30]

	Maximum Daily Limit (mg/l)		Average Monthly Limit (mg/l)	
	Summer	Winter	Summer	Winter
WQBEL	3.6	7.5	1.4	2.9
Alternatives Analysis Limits	1.7	5.6	0.6	2.1

- **Total Ammonia Nitrogen for Table 4**. 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. Because these proposed limits are more protective than the water quality-based limits calculated below for a lake with mixing where acute criteria would be applicable for determining the baseline limits, the alternatives analysis limits were used.

  Water Quality-Based Effluent Limits (WQBEL):
  Early Life Stages Present Total Ammonia Nitrogen criteria apply
  [10 CSR 20-7.031(5)(B)7.C. Table B1 & Table B3]. Background total ammonia nitrogen = 0.01 mg/L

Season	Temp (°C)	pH (SU)	Total Ammonia Nitrogen CCC (mg N/L)	Total Ammonia Nitrogen CMC (mg N/L)
Summer	26	7.8	1.5	12.1
Winter	6	7.8	3.1	12.1

$C_e = (((Q_e+Q_s)*C) - (Q_s*C_s))/Q_e$
Acute WLA: $C_e = ((Q_e + 0)12.1 – (0 * 0.01))/Q_e$
C_e = 12.1 mg/L

LTA_a = 12.1 mg/L (0.321) = **3.88 mg/L** [CV = 0.6, 99th Percentile]
MDL = 3.88 mg/L (3.11) = 12.1 mg/L [CV = 0.6, 99th Percentile]
AML = 3.88 mg/L (1.19) = 4.6 mg/L [CV = 0.6, 95th Percentile, n = 30]

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

- **Total Phosphorus**. 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 ten acres during normal pool conditions. Monthly average of 0.5 mg/L and monitoring only for daily maximum were determined by the Department to be achievable and an appropriate target for the discharge to not cause or contribute to an instream water quality standard excursion or impairment should future modeling by the department occur.

- ***Escherichia coli (E. coli)***. Limits will be applied based on the receiving stream designated use.

  Whole Body Contact: Monthly average of 126 per 100 mL as a geometric mean and Daily Maximum or Weekly Average as a geometric mean of 630 per 100 mL during the recreational season (April 1 – October 31), to protect Whole Body Contact Recreation designated use of the receiving water body, as per 10 CSR 20-7.031(5)(C) and 10 CSR 20-7.015 (9)(B)1. An effluent limit for both monthly average and daily maximum or weekly average is required by 40 CFR 122.45(d). Publicly owned treatment works will receive weekly average limits, while non-publicly owned treatment works will receive daily maximum limits.

  Losing Stream: Discharges to losing streams shall not exceed 126 per 100 mL as a Daily Maximum at any time, as per 10 CSR 20-7.031(5)(C). Monitoring only for a monthly average. No more than 10% of samples over the course of the calendar year shall exceed 126 #/100 mL daily maximum as per 10 CSR 20-7.015(9)(B)1.G.

  Per the effluent regulations, the *E. coli* sampling/monitoring frequency for facilities less than 100,000 gallons per day shall be set to match the monitoring frequency of wastewater and sludge sampling program for the receiving water category in 7.015(1)(B)3. during the recreational season (April 1 – October 31), with compliance to be determined by calculating the geometric mean of all samples collected during the reporting period (samples collected during the calendar week for the weekly average, and samples collected during the calendar month for the monthly average). Please see GENERAL ASSUMPTIONS OF THE WQAR #7

- **Total Residual Chlorine (TRC)**. These limits will apply to facilities that chlorinate. Warm-water Protection of Aquatic Life CCC = 10 µg/L, CMC = 19 µg/L [10 CSR 20-7.031, Table A1]. Background TRC = 0.0 µg/L.

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

  Chronic WLA: $C_e = ((Q_e + 0.0)10 – (0.0 * 0.0))/ Q_e = 10$ µg/L

  Acute WLA: $C_e = ((Q_e + 0.0)19 – (0.0 * 0.0))/ Q_e = 19$ µg/L

  LTA_c = 10 µg/L (0.527) = **5.3 µg/L** [CV = 0.6, 99th Percentile]
  LTA_a = 19 µg/L (0.321) = 6.1 µg/L [CV = 0.6, 99th Percentile]

  MDL = **5.3 µg/L** (3.11) = 16.5 µg/L [CV = 0.6, 99th Percentile]
  AML = **5.3 µg/L** (1.55) = 8.2 µg/L [CV = 0.6, 95th Percentile, n = 4]

  Total Residual Chlorine 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), should be included in the permit.

- **Aluminum, Total Recoverable**. Monitoring only. The facility may use chemicals for phosphorous removal that contain aluminum. Monitoring may be included in the operating permit to determine if reasonable potential exists for this facility's discharge to exceed water quality standards for Aluminum (Total Recoverable).

- **Iron, Total Recoverable.** Monitoring only. This facility may use chemicals for phosphorous removal that contain iron. Monitoring may be included in the operating permit to determine if reasonable potential exists for this facility's discharge to exceed water quality standards for Iron (Total Recoverable).

- **Oil & Grease**. These limits will apply to publicly owned treatment works and may apply to other facilities as appropriate. Conventional pollutant, [10 CSR 20-7.031, Table A1]. Effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum.

Permit limits for any other applicable parameters may be included in the operating permit based on water quality standards and criteria as applicable.

10. Antidegradation Review Preliminary Determination

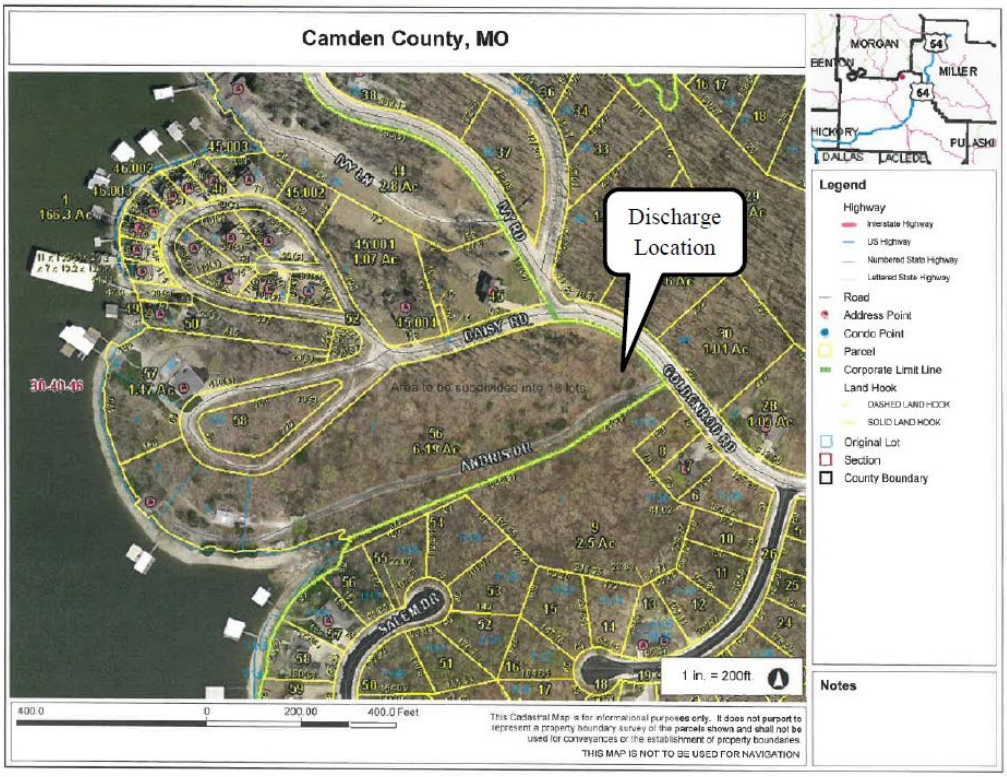
The proposed new or expanded facility discharge is assumed to result in significant degradation of the receiving waterbody. The Department has used available data to complete a review of available treatment technologies and expected performance. As a result of this review, the Department has determined that, depending on site specific conditions, there may be technologies available which are economically efficient and practicable for a facility that are capable of meeting the effluent limits in Table 3 or Table 4. If the facility owners do not believe that there is a treatment technology that is both economically efficient and practicable for their facility to meet the limits in Table 3 or Table 4, a site specific WQAR may be requested.

Any treatment option designed to meet these effluent limits may be considered a reasonable alternative in moving forward with the appropriate facility plan, construction permit application, or other future submittals.

If the proposed treatment system is not covered in 10 CSR 20-8 Minimum Design Standards and is considered a new treatment technology, your construction permit application must address approvability of the technology in accordance with the *New Technology Definitions and Requirements* factsheet. If you have any questions regarding the new technology factsheet, please contact Cindy LePage of the Water Protection Program. The permittee will need to work with the review engineer to ensure equipment is sized properly and that the technology will consistently achieve the proposed effluent limits. The operating permit may contain additional requirements to evaluate the effectiveness of the technology once the facility is in operation.

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.

APPENDIX A: MAP OF DISCHARGE LOCATION



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APPENDIX B: GEOHYDROLOGIC EVALUATION LOCATION

Missouri Department of NATURAL RESOURCES
dnr.mo.gov
Michael L. Parson, Governor
Dru Buntin, Director

LWE22011
Camden County

August 20, 2021

Shelly Hall, PE
1071 Industrial Dr
Osage Beach, MO 65065

RE: The Cove WWTF

Dear Shelly Hall, PE:

On August 05, 2021, 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 gspgeol@dnr.mo.gov.

Sincerely,

MISSOURI GEOLOGICAL SURVEY

Fletcher N. Bone

Fletcher N. Bone
Geologist
Environmental Geology Section

c: Workmen Cove Holdings, LLC
WPP
Southwest Regional Office

STATE OF MISSOURI
FLETCHER N BONE
REGISTERED GEOLOGIST

08/20/2021

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Missouri Department Of Natural Resources
Missouri Geological Survey
Geological Survey Program
Environmental Geology Section

Project ID Number
LWE22011
County
Camden

Request Details

Project: The Cove WWTF

Legal Description: 30 T40N R16W
Quadrangle: LAKE OZARK
Latitude: 38 11 54.55
Longitude: -92 44 24.53

Organization Official

Name: Workmen Cove Holdings, LLC
Address: 273 Fantail Lane
City: Sunrise Beach
State: MO Zip: 65079
Phone: 573-569-2315
Email: heartlandflooringindustries@gmail.com

Preparer

Name: Shelly Hall, PE
Address: 1071 Industrial Dr
City: Osage Beach
State: MO Zip: 65065
Phone: 573-964-6956
Email: shelly@loenvironmental.com

Project Details

Report Date: 08/20/2021
Date of Field Visit: 08/10/2021

Previous Reports: Not Applicable

Facility Type
- [X] 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

Type of Waste
- [ ] Animal
- [X] Human
- [ ] Process or industrial
- [ ] Leachate
- [ ] Other waste type

Funding Source
- [X] IWT
- [ ] WWL-SRF

Additional Information
- [ ] Plans were submitted
- [ ] Site was investigated by NRCS
- [ ] Soil or geotechnical data were submitted

Geologic Stream Classification: [ ] Gaining [X] Losing [ ] No discharge

Overall Geologic Limitations
- [X] Slight
- [ ] Moderate
- [ ] Severe

Collapse Potential
- [X] Not applicable
- [ ] Slight
- [ ] Moderate
- [ ] Severe

Topography
- [ ] <4%
- [X] 4% to 8%
- [X] 8% to 15%
- [X] >15%

Landscape Position
- [ ] Broad uplands
- [ ] Floodplain
- [ ] Ridgetop
- [ ] Alluvial plain
- [X] Hillslope
- [ ] Terrace
- [ ] Narrow ravine
- [ ] Sinkhole

Bedrock: The uppermost bedrock is Ordovician-age Roubidoux Formation

Surficial Materials: The surficial materials are very gravelly silt loam residuum

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Missouri Department Of Natural Resources
Missouri Geological Survey
Geological Survey Program
Environmental Geology Section

Project ID Number
LWE22011
County
Camden

Recommended Construction Procedures for Earthen Facility	Determine Overburden Properties	Determine Hydrologic Conditions
	☐ Particle size analysis	☐ Groundwater elevation
☐ Installation of clay pad and Compaction	☐ Atterberg limits	☐ Direction of groundwater flow
☐ Diversion of subsurface flow	☐ 95% Max. dry density test method	☐ 25-Year flood level
☐ Artificial sealing	☐ Overburden thickness	☐ 100-Year flood level
☐ Rock excavation	☐ Permeability coefficient-undisturbed	
☐ Limit excavation depth	☐ Permeability coefficient-remolded	

Remarks:
On August 10, 2021, a geologist with the Missouri Geological Survey (MGS) performed a geohydrologic evaluation for a proposed discharging mechanical treatment plant (MTP) that will serve The Cove in Lake Ozark, Missouri. The purpose of the site visit is to observe the geologic and hydrologic elements of the site and determine the potential for groundwater contamination in the event of wastewater treatment failure.

The uppermost bedrock is highly permeable Ordovician-age Roubidoux Formation. These bedrock types are susceptible to solution weathering, and commonly host karst features, such as, caves, sinkholes, and losing streams. Extensive faulting in the area may also increases permeability of the bedrock, with multiple inactive faults located within 1 mile of the site. The closest fault is the Workman Hollow fault, which is located within 0.13 miles of the site. The surficial materials consist of very gravelly, silt loam residuum which is derived from the underlying bedrock. The surficial materials are highly permeable and are, most likely, less than 5 feet thick.

There are no known sinkholes or springs located within 1 mile of the site.

The wastewater treatment facility will discharge to Lake of the Ozarks. Although the area exhibits losing characteristics, based on the close proximity of Lake of the Ozarks, the receiving stream will be considered gaining for discharge purposes, but formally classified as losing. Furthermore, based on the geologic and hydrologic conditions observed, the site receives an overall slight geologic limitations rating, primarily based on the method of wastewater treatment and close proximity to Lake of the Ozarks. In the event of treatment failure, impact to regional groundwater supplies would be minimal; however, surface waters of Lake of the Ozarks, and shallow groundwater, may be adversely impacted.

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 One Report: No Known Records

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

PROJECT INFORMATION

Project Name and ID Number: The Cove Wastewater Treatment Facility #9514
Project Description: The Cove WWTF, 38.198973/-92.738416, Lake of the Ozarks, Camden County
Project Type: Waste Transfer, Treatment, and Disposal, Liquid waste/Effluent, Wastewater treatment plant, Construction or expansion
Contact Person: Shelly Hall, PE
Contact Information: shelly@loenvironmental.com or 573-964-6956

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

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

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

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

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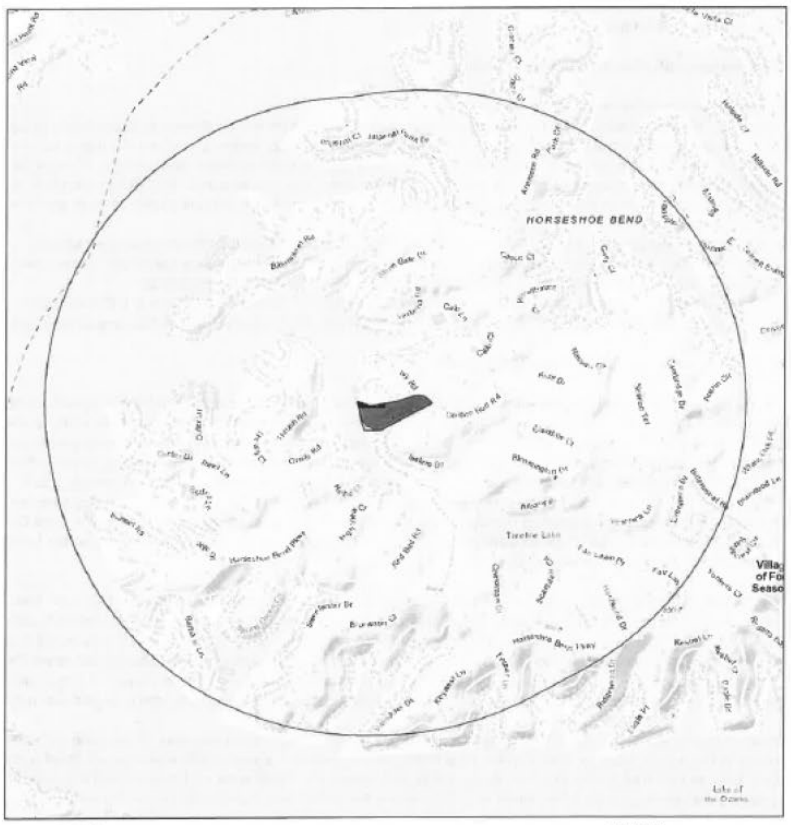
The Cove Wastewater Treatment Facility



August 5, 2021

☐ Project Boundary
☐ Buffered Project Boundary

1:21,012

0 0.175 0.35 0.7 mi
0 0.275 0.55 1.1 km

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

Species or Communities of Conservation Concern within the Area:

There are no known records of Species or Natural Communities of Conservation Concern within the defined Project Area.

Other Special Search Results:

No results have been identified for this project location.

Project Type Recommendations:
Waste Transfer, Treatment and Disposal -Wastewater treatment plant: New or Maintenance; Clean Water Act permits issued by other agencies regulate both construction and operation of wastewater systems, and provide many important protections for fish and wildlife resources throughout the project area and at some distance downstream. Fish and wildlife almost always benefit when unnatural pollutants are removed from water, and concerns are minimal if construction is managed to minimize erosion and sedimentation/runoff to nearby streams and lakes, including adherence to any "Clean Water Permit" conditions.
Revegetation of disturbed areas is recommended to minimize erosion, as is restoration with of native plant species compatible with the local landscape and for wildlife needs. Annuals like ryegrass may be combined with native perennials for quicker green-up. Avoid aggressive exotic perennials such as crown vetch and sericea lespedeza.
Management Recommendations for Construction Projects Affecting Missouri Streams and Rivers is a Conservation Department publication available at http://mdc.mo.gov/sites/default/files/resources/2013/02/constprojnearstreams_2013.pdf

Project Location and/or Species Recommendations:

Endangered Species Act Coordination - Indiana bats (*Myotis sodalis*, federal- and state-listed endangered) and **Northern long-eared bats** (*Myotis septentrionalis*, federal-listed threatened) may occur near the project area. Both of these species of bats hibernate during winter months in caves and mines. During the summer months, they roost and raise young under the bark of trees in wooded areas, often riparian forests and upland forests near perennial streams. During project activities, avoid degrading stream quality and where possible leave snags standing and preserve mature forest canopy. Do not enter caves known to harbor Indiana bats or Northern long-eared bats, especially from September to April. **If any trees need to be removed for your project, please contact the U.S. Fish and Wildlife Service (Ecological Services, 101 Park Deville Drive, Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132 ext. 100 for Ecological Services) for further coordination under the Endangered Species Act.**

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: http://www.fws.gov/midwest/MidwestBird/EaglePermits/index.html if eagle nests are seen.

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.

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

- Remove any mud, soil, trash, plants or animals from equipment before leaving any water body or work area.
- Drain water from boats and machinery that have operated in water, checking motor cavities, live-well, bilge and transom wells, tracks, buckets, and any other water reservoirs.
- When possible, wash and rinse equipment thoroughly with hard spray or HOT water (>140° F, typically available at do-it-yourself car wash sites), and dry in the hot sun before using again.

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

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

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

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

Miscellaneous Information
FEDERAL Concerns are species/habitats protected under the Federal Endangered Species Act and that have been known near enough to the project site to warrant consideration. For these, project managers must contact the U.S. Fish and Wildlife Service Ecological Services (101 Park Deville Drive Suite A, Columbia, Missouri 65203-0007; Phone 573-234-2132; Fax 573-234-2181) for consultation.
STATE Concerns are species/habitats known to exist near enough to the project site to warrant concern and that are protected under the Wildlife Code of Missouri (RSMo 3 CSR 1 0). "State Endangered Status" is determined by the Missouri Conservation Commission under constitutional authority, with requirements expressed in the Missouri Wildlife Code, rule 3CSR 1 0-4.111. Species tracked by the Natural Heritage Program have a "State Rank" which is a numeric rank of relative rarity. Species tracked by this program and all native Missouri wildlife are protected under rule 3CSR 10-4.110 General Provisions of the Wildlife Code.

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

APPENDIX D: ANTIDEGRADATION REVIEW SUMMARY FORMS

The forms that follow contain summary information provided by the applicant. Department staff determined that the following changes must be made to the information contained within these forms:

1) Antidegradation Review Submittal: Voluntary Tier 2 – Significant Degradation for Domestic Wastewater Facilities with Design Flow Less Than 50,000 Gallons Per Day:

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

FOR DEPARTMENT USE ONLY	
APP NO.	
CHECK NO. $500.00	CHECK NO. 131990
DATE RECEIVED 9-9-21	

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 *not* 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 *E. coli* 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

SCANNED

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		COUNTY	
The Cove WWTF		Camden	
ADDRESS (PHYSICAL)	CITY	STATE	ZIP CODE
Andris & Goldenrod Drive	Lake Ozark	MO	65049

3. OWNER

NAME			
Workmen Cove Holdings, LLC			
ADDRESS	CITY	STATE	ZIP CODE
273 Fantail Lane	Sunrise Beach	MO	65079
EMAIL ADDRESS	TELEPHONE NUMBER WITH AREA CODE		
heartlandflooringindustries@gmail.com	573-569-2315		

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

NAME	SECRETARY OF STATE CHARTER NUMBER		
same as owner			
ADDRESS	CITY	STATE	ZIP CODE
EMAIL ADDRESS	TELEPHONE NUMBER WITH AREA CODE		

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5. RECEIVING WATER BODY SEGMENT #1

NAME
Lake of the Ozarks

5.1 Upper end of segment – Location of discharge
UTM: X= 522902, Y= 4227895 OR Lat _____, Long _____

5.2 Lower end of segment –
UTM: X= 522717, Y= 4227809 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.")

The affected community will be the area around the development and the future homeowners in the development itself. The Lake of the Ozarks will also be affected as the discharge will flow to the lake. The system is being designed using DNR flow data actual flows may be less if so, then there may be available capacity for future development or for homeowners with failing onsite systems.

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:				

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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 II.E.1.

The project will provide wastewater treatment for a new subdivision. The new homes will help with housing shortage. The discharge system will eliminate the need for onsite systems that are typically not well monitored or maintained. Tourist and vacation homeowners help support the local businesses thus adding to the local tax base and local commerce.

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 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.

You must submit the *Regionalization and No-Discharge Evaluation Form* (780-2805) to demonstrate that a non-discharging alternative is not feasible. If sufficient information is not provided on the *No-Discharge Evaluation Form* 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.

Recirculating sandfilter systems are proven technology and in this case proves to be the most economical. The collection system will either be STEP tanks or grinders with a septic tank at the plant site.

ENGINEERING CONSULTANT NAME		COMPANY NAME	
Beverly (Shelly) Hall, PE		LO Environmental, LLC	
ADDRESS	STATE	ZIP CODE	TELEPHONE NUMBER WITH AREA CODE
1071 Industrial Drive	MO	65065	573-964-6956
SIGNATURE		EMAIL ADDRESS	
		shelly@loenvironmental.com	

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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
Escherichia coli (*E. coli*)		#/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
Escherichia coli (*E. coli*)	WBC(A) AND WBC (B)	#/100 ML	630***		126
	Losing Stream**	#/100 ML	126***		Monitoring only

* 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.

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11. APPLICATION FEE	
☐ CHECK NUMBER	☐ JETPAY 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 09/03/2021
PRINT NAME Shelly Hall, PE	TITLE
PLEASE IDENTIFY YOUR STATUS FOR THIS PROJECT: ☐ OWNER ☐ CONTINUING AUTHORITY ☑ CONSULTANT	

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2) Antidegradation: Regionalization and No-Discharge Evaluation:

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 *No-Discharge Alternative Evaluation* 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	COUNTY
The Cove WWTF	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? unknown

B. List facilities contacted about possible regionalization. None, there are none in the area.

C. Is there any planning or zoning in the area regarding development and services? Yes, but no services are available

D. Who would have the responsibility to maintain the sewer connection line? Workmen Cove Holdings, LLC

E. What is the estimated cost for piping and pumps to regionalize? unknown

F. Explain any engineering challenges with the regionalization connection – topography, rivers, highways, or other issues. distance to facility

G. Does a regional facility have the capacity to treat the additional effluent from this project? None are in the area.

H. Were land owners contacted for rights to an easement? ☐ Yes ☑ No

I. Describe the easement issues:

2.2 Summarize why regionalization was not a practicable or economically efficient alternative

There are no facilities with capacity to accept and treat the wastewater from the development.

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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: Most of the land in the area has been subdivided into lots.

If yes, answer the following:

B. How many acres are required for land application of the effluent? approximately 1.77 acres

C. Provide a breakdown of the capital cost for any necessary additional land, piping, pumps, and irrigation equipment?
Land is not available so a cost analysis was not done.

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:
Landowners are unwilling to sell or the cost would render the project unbuildable.

☐ **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?
No, the land is not available.

☐ **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

The land is not available. If the lots across from the homes could have been purchased soils would have had to be imported. So a no-discharge system was considered and found to be not viable due to no available land.

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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:

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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: 9/23/21 ☐ 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	2.2 ESTIMATED PROJECT CONSTRUCTION COST
The Cove	$ 225,000

2.3 PROJECT DESCRIPTION

Approximately 940 L.F. of 3" SDR 21 pressure main and a new treatment facility

2.4 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION

A contract hauler will be used to pump and dispose of sludge.

2.5 DESIGN INFORMATION

A. Current population: _____; Design population: 70

B. Actual Flow: _____ gpd; Design Average Flow: 5624 gpd;
Actual Peak Daily Flow: _____ gpd; Design Maximum Daily Flow: 7500 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	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
The Cove WWTF		

ADDRESS (PHYSICAL)	CITY	STATE	ZIP CODE	COUNTY
corner of Andris & Goldenrod	Lake Ozark	MO	65049	Camden

Wastewater Treatment Facility: Mo- (Outfall 1 Of 1)

3.1 Legal Description: SW ¼, NE ¼, SW ¼, Sec. 30, T 40, R 16
(Use additional pages if construction of more than one outfall is proposed.)

3.2 UTM Coordinates Easting (X): 522902 Northing (Y): 4227895
For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)

3.3 Name of receiving streams: Lake of the Ozark

4.0 PROJECT OWNER

NAME	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
Workmen Cove Holdings, LLC		Lance.French@outlook.com

ADDRESS	CITY	STATE	ZIP CODE
79 Forest Lake Circle	Lake Ozark	MO	65049

5.0 CONTINUING AUTHORITY:

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

NAME	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
same as owner		

ADDRESS	CITY	STATE	ZIP CODE

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

5.2 COMPLETE THE FOLLOWING IF THE CONTINUING AUTHORITY IS A MISSOURI PUBLIC SERVICE COMMISSION REGULATED ENTITY.

A. Is a copy of the certificate of convenience and necessity included with this application? ☐ YES ☐ NO

5.3 COMPLETE THE FOLLOWING IF THE CONTINUING AUTHORITY IS A PROPERTY OWNERS ASSOCIATION.

A. Is a copy of the as-filed restrictions and covenants included with this application? ☐ YES ☐ NO

B. Is a copy of the as-filed warranty deed, quitclaim deed or other legal instrument which transfers ownership of the land for the wastewater treatment facility to the association included with this application? ☐ YES ☐ NO

C. Is a copy of the as-filed legal instrument (typically the plat) that provides the association with valid easements for all sewers included with this application? ☐ YES ☐ NO

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

6.0 ENGINEER

ENGINEER NAME / COMPANY NAME	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
Beverly (Shelly) Hall, PE	573-964-6956	shelly@loenvironmental.com

ADDRESS	CITY	STATE	ZIP CODE
1071 Industrial Drive	Osage Beach	MO	65065

7.0 APPLICATION FEE

☑ CHECK NUMBER ☐ JETPAY CONFIRMATION NUMBER

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

PROJECT OWNER SIGNATURE

PRINTED NAME	DATE
Scott Miller	10/18/21

TITLE OR CORPORATE POSITION	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
Project Manager	314-486-1040	scottmiller@affinityhomes.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.