Permit No. CP0002286

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

CONSTRUCTION PERMIT

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

Jeffery A. Schoen
Project Manager
Timbers Home Owners Association
PO Box 70
Shell Knob, MO 65747

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.

July 12, 2022
Effective Date

July 11, 2024
Expiration Date

Chris Wieberg

Chris Wieberg, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

A new wastewater treatment facility will be constructed to treat domestic wastewater for the existing Timbers Resort and Lodge. The new treatment facility will include 15 Septic Tank Effluent Pump (STEP) Tanks, a low pressure sewer system, a mixing tank, two settling tanks, a recirculation tank, a recirculating gravel filter bed, an ultraviolet disinfection unit in a housed facility with a chemical feed tank for phosphorus removal, and an outfall. A low pressure sewer system was chosen for this project due to the topography.

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 Michael E. Stalzer, P.E. with CPWG 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 3.5 gallons per square foot per day.

6. The wastewater treatment facility shall be located at least two hundred feet (200') from any dwelling or establishment.

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). 10 CSR 20-8.130(2)(A)

- Facilities shall be readily accessible by authorized personnel from a public right–of-way at all times. 10 CSR 20-8.140 (2)(D). 10 CSR 20-8.130 (2)(B)

- 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: 10 CSR 20-8.130(2)(C)
    - 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)
    - 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)

- Electrical equipment. Electrical equipment shall be provided with the following requirements:
    - 10 CSR 20-8.130 (3) (B) 2. A. Electrical equipment must comply with 10 CSR 20-8.140(7)(B);
    - Utilize corrosive resistant equipment located in the wet well; 10 CSR 20-8.130 (3) (B) 2. B.
    - Provide a watertight seal and separate strain relief for all flexible cable; 10 CSR 20-8.130(3) (B) 2. C.

- Install a fused disconnect switch located above ground for the main power feed for all pumping stations. 10 CSR 20-8.130 (3) (B) 2. D.
- When such equipment is exposed to weather, it shall comply with the requirements of weather proof equipment; enclosure NEMA 4; NEMA 4X where necessary; and *NEMA Standard 250-2014*, published December 15, 2014. 10 CSR 20-8.130 (3) (B) 2. E.
- Install lightning and surge protection systems; 10 CSR 20-8.130 (3) (B) 2. F.
- Install a one hundred ten volt (110 V) power receptacle inside the control panel located outdoors to facilitate maintenance; 10 CSR 20-8.130 (3) (B) 2. G.
- Provide Ground Fault Circuit Interruption (GFCI) protection for all outdoor receptacles. 10 CSR 20-8.130 (3) (B) 2. H.

- Force main system shall be designed to withstand all pressures (including water hammer and associated cyclic reversal of stresses), and maintain a velocity of at least two feet (2') per second. 10 CSR 20-8.130 (8) (A)

- 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

- 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.

- 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)

- The materials utilized for storage, piping, valves, pumping, metering, and splash guards, etc., for chemical handling, shall be specially selected considering the physical and chemical characteristics of each hazardous or corrosive chemical. 10 CSR 20-8.140 (9) (A) 1.

- Secondary containment storage areas contain the stored volume of chemical until it can be safely transferred to alternate storage or released to the wastewater treatment plant at controlled rates that will not damage the facilities, inhibit the treatment processes, or contribute to stream pollution. Secondary containment shall be designed as follows:
    - A minimum volume of one hundred twenty-five percent (125%) of the volume of the largest storage container located within the containment area plus the space occupied by any other tanks located within the containment area when not protected from precipitation; 10 CSR 20-8.140 (9) (A) 2. A.
    - A minimum volume of one hundred ten percent (110%) of the volume of the largest storage container located within the containment area plus the space occupied by any other tanks located within the containment area when protected from precipitation; 10 CSR 20-8.140 (9) (A) 2. B.
    - Walls and floors of the secondary containment structure constructed of suitable material that is compatible with the specifications of the product being stored. 10 CSR 20-8.140 (9) (A) 2. C.

- All pumps or feeders for hazardous or corrosive chemicals shall have guards that will effectively prevent spray of chemicals into space occupied by facility personnel. 10 CSR 20-8.140 (9) (A) 3.

- All piping containing or transporting corrosive or hazardous chemicals shall be identified with labels every ten feet (10') and with at least two (2) labels in each room, closet, or pipe chase. 10 CSR 20-8.140 (9) (A) 4. A.

- All connections (flanged or other type), except those adjacent to storage or feeder areas, shall have guards that will direct any chemical leakage away from space occupied by facility personnel. 10 CSR 20-8.140 (9) (A) 4. B.

- Facilities shall be provided for automatic shutdown of pumps and sounding of alarms when failure occurs in a pressurized chemical discharge line. 10 CSR 20-8.140 (9) (A) 5.

- The identification and hazard warning data included on chemical shipping containers, when received, shall appear on all containers (regardless of size or type) used to store, carry, or use a hazardous substance. 10 CSR 20-8.140 (9) (E)

- All wastewater treatment facilities must have a screening device, comminutor, or septic tank for the purpose of removing debris and nuisance materials from the influent wastewater. 10 CSR 20-8.150 (2)

- Grease interceptors shall be provided on kitchen drain lines from institutions, hospitals, hotels, restaurants, schools, bars, cafeterias, clubs, and other establishments from which relatively large amounts of grease may be discharged to a wastewater treatment facility owned by the grease producing entity. Grease interceptors are typically constructed from fiberglass reinforced polyester, high density polyethylene (HDPE), or concrete. For corrugated HDPE grease interceptors, follow ASTM F2649 – 14 *Standard Specification for Corrugated High Density Polyethylene (HDPE) Grease Interceptor Tanks*, as approved and published September 1, 2014. For precast concrete grease interceptor tanks, follow ASTM C1613 – 17 *Standard Specification for Precast Concrete Grease Interceptor Tanks*, as approved and published September 1, 2017. 10 CSR 20-8.150 (3)

- 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)

- 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)

- The materials utilized for storage, piping, valves, pumping, metering, and splash guards, etc., for chemical handling, shall be specially selected considering the physical and chemical characteristics of each hazardous or corrosive chemical. 10 CSR 20-8.140 (9) (A) 1.

- All pumps or feeders for hazardous or corrosive chemicals shall have guards that will effectively prevent spray of chemicals into space occupied by facility personnel. 10 CSR 20-8.140 (9) (A) 3.

- Piping, labeling, and coupling guard locations. 10 CSR 20-8.140 (9) (A) 4.

- All piping containing or transporting corrosive or hazardous chemicals shall be identified with labels every ten feet (10') and with at least two (2) labels in each room, closet, or pipe chase. 10 CSR 20-8.140 (9) (A) 4. A.

- All connections (flanged or other type), except those adjacent to storage or feeder areas, shall have guards that will direct any leakage away from space occupied by facility personnel. 10 CSR 20-8.140 (9) (A) 4. B.

- Facilities shall be provided for automatic shutdown of pumps and sounding of alarms when failure occurs in a pressurized chemical discharge line. 10 CSR 20-8.140 (9) (A) 5.

- The UV dosage shall be based on the design peak hourly flow, maximum rate of pumpage, or peak batch flow. 10 CSR 20-8.190 (5) (A) 1.

- If no flow equalization is provided for a batch discharger, the UV dosage shall be based on the peak batch flow. 10 CSR 20-8.190 (5) (A) 2.

- The UV system shall deliver the target dosage based on equipment derating factors and, if needed, have the UV equipment manufacturer verify that the scale up or scale down factor utilized in the design is appropriate for the specific application under consideration. 10 CSR 20-8.190 (5) (A) 3.

- The UV system shall deliver a minimum UV dosage of thirty thousand microwatt seconds per centimeters squared (30,000 $\mu W \bullet s/cm^2$). 10 CSR 20-8.190 (5) (A) 4.

- Closed vessel UV systems. The combination of the total number of closed vessels shall be capable of treating the design peak hourly flow, maximum rate of pumpage, or peak batch flow. 10 CSR 20-8.190 (5) (B) 2.

- Closed vessel UV systems utilizing medium-pressure lamps shall be provided with an automatic cleaning system in order to prevent algae growth. 10 CSR 20-8.190 (5) (B) 3.

- The UV system must continuously monitor and display at the UV system control panel the following minimum conditions:
    - The relative intensity of each bank or closed vessel system; 10 CSR 20-8.190 (5) (C) 1. A.
    - The operational status and condition of each bank or closed vessel system; 10 CSR 20-8.190 (5) (C) 1. B.
    - The ON/OFF status of each lamp in the system; 10 CSR 20-8.190 (5) (C) 1. C. and
    - The total number of operating hours of each bank or each closed vessel system. 10 CSR 20-8.190 (5) (C) 1. D.

- The UV system shall include an alarm system. Alarm systems shall comply with 10 CSR 20-8.140(7)(C). 10 CSR 20-8.190 (5) (C) 2.

12. Upon completion of construction:

    A. The Timbers Owners Association 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. Sixty days prior to operation, submit the enclosed form, MO 780-2155, Wastewater Construction Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(N). https://dnr.mo.gov/document-search/wastewater-construction-statement-work-completed-mo-780-2155.

Form B - Application for an Operating Permit for Domestic or Municipal Wastewater (≤ 100,000 gallons per day) and the fee of $300 have already been submitted to the Department.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

A new recirculating media filter WWTF with phosphorus treatment and UV disinfection will be constructed to treat domestic wastewater for the existing Timbers Resort and Lodge, a residential resort.

2. FACILITY DESCRIPTION

The new recirculating media filter with phosphorus treatment will be constructed to treat domestic wastewater from a residential resort. The system will be sized for 37 PE, and a design flow of 6,500 gpd with 15 STEP tanks and low pressure sewers that will convey wastewater to a mixing tank where sodium aluminate will be added for phosphorus treatment via a chemical feed tank. After mixing, wastewater flows by gravity to the first of two settling tanks in series for primary treatment before flowing to a recirculation tank. For secondary treatment, wastewater is recirculated in a gravel filter bed and either flows back to the recirculating tank or flows to the UV disinfection unit before it is discharged from Outfall #001.

The Timbers Resort WWTF is located at White Rock Lane, Shell Knob, in Barry County, Missouri. The facility has a design average flow of 6,500 gpd and serves a hydraulic population equivalent of approximately 37.

3. COMPLIANCE PARAMETERS

The new facility can meet Total Ammonia as Nitrogen of 1.4 mg/L. The proposed project is required to meet final effluent limits as established in Missouri State Operating Permit MO-0139785.

The following effluent limits will be applied to the facility after the completion of construction:

Parameter	Units	Daily Maximum Limit	Weekly Average Limit	Monthly Average Limit	Monitoring Frequency
Flow	MGD	*		*	Once/Quarter
Biochemical Oxygen Demand$_5$	mg/L		15	10	Once/Quarter
Total Suspended Solids	mg/L		20	15	Once/Quarter
Ammonia as N-1st Quarter	mg/L	12.1		2.9	Once/Quarter
Ammonia as N-2nd Quarter	mg/L	12.1		1.4	Once/Quarter
Ammonia as N-3rd Quarter	mg/L	12.1		1.4	Once/Quarter
Ammonia as N-4th Quarter	mg/L	12.1		2.7	Once/Quarter
E. coli	#/100mL	630**		126**	Once/Quarter
Total Phosphorus	mg/L			0.5	Once/Quarter
Aluminum, Total Recoverable	µg/L	*		*	Once/Quarter
Parameter	**Units**	**Minimum**		**Maximum**	**Monitoring Frequency**
pH	SU	6.5		9.0	Once/Quarter

* Monitoring Requirement Only

** The Effluent limitations and monitoring requirements for *E. coli* 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.

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 wastewater treatment facility construction. See **APPENDIX – ANTIDEGRADATION**.

5. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

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

No existing major WWTF components are present.

Construction will cover the following items:

- Components are designed for a Population Equivalent of 37 based on organic loading to the system.

- Septic Tank Effluent Pump System – 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 from the cabins to one of the two compartment 1,500-gallon septic tanks. There are a total of 15 Septic Tank Effluent Pump (STEP) tanks servicing 10 cabins and ancillary facilities. When the water level reaches a certain height, the wastewater flows into the second compartment by two tee-drop pipes. Each septic tank is 5.6 ft x 12 ft x 4.1 ft with a water level depth of 3.75 ft. The STEP tanks provide approximately 1.4 – 6.25 days of detention at design average flow. There will be one simplex 0.5 HP Orenco high head effluent pump at each STEP tank. The pumped wastewater shall discharge into the Mixing Tank via 1.5-2.5 inch SDR 21 forcemains. Settled solids in the septic tanks will be removed by a contract hauler.

- Phosphorus Treatment Feed System – A sodium aluminate solution feed system will be installed to accomplish phosphorus removal during primary treatment. A Posiprime metering feed pump, Model No. 03016 will be used to transfer sodium aluminate solution from a 55 gallon drum to the Mixing Tank via a 2" chemical feed line. Secondary Containment is specified with a 400 gallon chemical containment basin.

- Mixing Tank – A 1,500 gallon Mixing Tank will be constructed to receive partially treated wastewater and receive sodium aluminate dosing from the Phosphorus Treatment Feed System. Wastewater with suspended sodium aluminate treatment will flow by gravity to Settling Tank 1. The Mixing Tank will have a wastewater level depth of 42 inches. The Mixing Tank provides approximately 0.23 days of detention at design average flow. Sodium aluminate treated effluent will flow by gravity to Settling Tank 1 by gravity. Settled solids in the Mixing Tank shall be removed by a contract hauler. The Mixing Tank will have a 2 inch diameter air diffuser located in the Mixing Tank. Air will be provided to the diffuser by a MicroFAST 0.5 motor and blower mounted on top of the Mixing Tank.

- Settling Tank 1 – Settling Tank 1 provides passive primary treatment as the settleable solids in the sodium aluminate treated wastewater settle onto the bottom of the tank. Sodium aluminate treated wastewater will flow by gravity to the 1,500 gallon single-compartment Settling Tank1 providing approximately 0.23 days of detention at design average flow. The settled wastewater shall flow by gravity to Settling Tank 2. Settled solids in the settling tanks will be removed by a contract hauler.

- Settling Tank 2 – Settling Tank 2 provides passive primary treatment as the settleable solids in the sodium aluminate treated wastewater settle onto the bottom of the tank. Sodium aluminate treated wastewater will flow by gravity to the 1,500 gallon single-compartment Settling Tank 2 providing approximately 0.23 days of detention at design average flow. The primary treated wastewater will flow by gravity to the Recirculation Tank. Settled solids in the settling tanks shall be removed by a contract hauler.

- Recirculation Tank – One Recirculation Tank will be constructed to pump primary treated and phosphorus treated wastewater to the Recirculating Media Filter. The recirculation tank is 10 ft x 13 ft x 11.8 ft deep with a wastewater volume of approximately 6,544 gallons. Effective flow equalization volume of 1,131 gallons between the low water level and the high water "on" level. The recirculation tank has 2 - 1 HP submersible pumps – each capable of 40 gpm at 72 ft TDH. The pumps transfer wastewater to 4 separate zones of the recirculating media filter by means of a 1-inch PVC distribution manifold which splits the flow into 24 - 1-inch PVC laterals

- Recirculating Media Filter – The concrete lined recirculating media filter is split into a single filter bed with the 4 separate zones for the influent laterals. The underdrain system is separated by a concrete wall with 80% of the total area designated as underdrains that lead back to the recirculation tank and the remaining 20% of the total underdrain area leads to Ultraviolet (UV) disinfection. The filter bed is approximately

44 ft x 45 ft x 4 ft deep for a total surface area of 1,980 ft^2 which gives a total hydraulic loading of 3.3 gpd/ft^2 at design average flow. The PVC laterals are spaced 2-ft apart with 21 – 1/8-inch shielded orifices per lateral. The laterals are located in the bottom of the top 6-inch layer of 1.5-inch pea gravel. The filter media layer is 3 ft deep containing media with an effective size of 3 mm to 5 mm and a uniformity coefficient less than 2. The underdrain layer is an 8-inch layer of 3/4-inch chert. The filter bed in the recirculation underdrain area contains 5 underdrains comprised of 4-inch slotted PVC piping with approximate 8.8-ft spacing. In both underdrain sections of the filter bed, 5 underdrains flow by gravity to the recirculation tank while the last underdrain flows by gravity to the UV disinfection system, which achieves 80% recirculation flow to the Recirculation Tank and 20% effluent flow to Disinfection.

- Closed Channel Ultraviolet Disinfection – Disinfection is the process of removal, deactivation, or killing of pathogenic microorganisms. A closed channel, gravity flow, low pressure high intensity UV disinfection system is capable of treating a peak flow of 28,210 gpd while delivering a minimum UV intensity of 30 mJ/cm^2 with an expected ultraviolet transmissivity of 65% or greater. The closed channel UV system is a SANITRON Model S5000C manufactured by Atlantic UV Corporation consisting of 2 modules per bank connected in series. The disinfected effluent will flow by gravity through a V notch Weir for flow measurement and eventually discharges through Outfall No. 001.

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

- Housed Facility – The proposed chemical feed tank and UV disinfection unit will be housed in a 13 ft by 12 ft wood frame building. Ventilation will be accomplished by a 3ft by 8 ft man door and a canarm SD10 Standard Exhaust Fan capable of providing 400 scfm.

6. OPERATING PERMIT

Operating permit MO-0139785 will be established as a new operating permit to reflect the construction activities. The new Timbers Resort WWTF operating permit, MO-0139785, was successfully public noticed from May 6, 2022 to June 6, 2022 with no comments received. Submit the Wastewater Construction Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(N) and request the new operating permit be issued.

This facility does not meet the requirements of the MOGD00000 issued on June 30, 2024 for the following reason: public noticed site specific operating permit with a Water Quality and Antidegradation Review. This facility is not being converted to a general operating permit at this time; however, it will be evaluated at operating permit renewal to determine if it qualifies for a general permit.

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, PE
Engineering Section
Steven.hamm@dnr.mo.gov

APPENDIX

- **Antidegradation**

Water Quality and Antidegradation Review

For the Protection of Water Quality
and Determination of Effluent Limits for Discharge to
Table Rock Lake
by
Timbers Resort Wastewater Treatment Facility

September, 2021

1. Facility Information

FACILITY NAME: Timbers Resort WWTF NPDES #: NEW FACILITY

FACILITY TYPE: NON-POTW – Vacation Residential Rentals
FACILITY DESCRIPTION: The existing resort is served by failing septic systems that are proposed to be replaced with Eight STEP units flowing to a recirculating gravel filter bed with UV disinfection discharging to Table Rock Lake. The applicant is proposing a new treatment system and conducted a cost analysis of discharging alternatives to determine the preferred treatment technology. The WWTF will serve 10 rental cabins, a main lodge, office, pool and laundry and the proposed design flow is 6,500 gpd.

COUNTY:	Barry	UTM COORDINATES:	X = 447583 / Y = 4050608
12- DIGIT HUC:	11010001-1204	LEGAL DESCRIPTION:	Section 24, T22N, R25W
EDU*:	Ozark/White	ECOREGION:	Ozark/Highlands

* - Ecological Drainage Unit

2. 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 which documents that the use of a water body's available assimilative capacity is justified. Effective August 30, 2008, and revised
July 13, 2016, a facility is required to use *Missouri's Antidegradation Implementation Procedure (AIP)* for new and expanded wastewater discharges.

2.1. Water Quality History:

Table Rock lake is on the 303(d) list for chlorophyll-a, Total Nitrogen, and Nutrient/Eutrophication Biological Indicators.

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	RECEIVING WATERBODY	DISTANCE TO CLASSIFIED SEGMENT (MI)
001	0.01	Secondary	Tributary to Table Rock Lake	0.15
			Table Rock Lake	0.0

3. Receiving Waterbody Information

WATERBODY NAME	CLASS	WBID	LOW-FLOW VALUES (CFS)			DESIGNATED USES**
			1Q10	7Q10	30Q10	
Tributary to Table Rock Lake	-	-	-	-	-	General Criteria
Table Rock Lake	L2	7313	-	-	-	IRR, LWP, AQL, HHP, WBC(A), SCR

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

RECEIVING WATER BODY SEGMENT #1: Tributary to Table Rock Lake
Upper end segment* UTM coordinates: X = 447583 / Y = 4050608 (Outfall)
Lower end segment* UTM coordinates: X = 447533 / Y = 4050805 (Meets Table Rock Lake)

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

4. General Comments

CPWG Engineering prepared, on behalf of Timbers Home Owners Association, the *Antidegradation Report Proposed a STEP system followed by Recirculating Gravel Filter with UV Disinfection received April 26, 2021*. Applicant elected to assume that all pollutants of concern (POC) are significantly degrading the receiving stream in the absence of existing water quality. An alternative analysis was conducted to fulfill the requirements of the AIP. Dissolved oxygen modeling analysis was not submitted. The applicant propose BOD effluent limits of 10/15 mg/L.

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

A Missouri Department of Conservation Natural Heritage Review was obtained by the applicant; and no records of endangered species were found for the project area (Appendix B: Natural Heritage Evaluation).

5. Antidegradation Review Information

The following is a review of the *Antidegradation Report* dated April 26, 2021

5.1. TIER DETERMINATION

Below is a list of pollutants of concern reasonably expected to be in the discharge (see Appendix D), 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). Tier 2 was assumed for all POCs except Total Phosphorus due to impairment designation (see Appendix D).

Table 1. Pollutants of Concern and Tier Determination

POLLUTANTS OF CONCERN	TIER*	DEGRADATION	COMMENT
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	1	Insignificant	
Aluminum, Total Recoverable	*	Insignificant	

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

The following Antidegradation Review Summary attachments in Appendix D were used by the applicant:

For pollutants of concern, the attachments are:
☒ Attachment A, Tier 2 with significant degradation.

5.2. EXISTING WATER QUALITY

No existing water quality data was submitted. Table Rock lake is on the 303(d) list for chlorophyll-a, Total Nitrogen, and Nutrient/Eutrophication Biological Indicators.

5.3. NO DISCHARGE EVALUATION

According to 10 CSR 20-6.010 (4)(D), reports for the purpose of constructing a wastewater treatment facility shall consider the feasibility of constructing and operating a no discharge facility. Because Missouri's antidegradation

implementation procedures 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. Part of that analysis as shown below is the non-degrading or no discharge evaluation. See Section 5.4.1 discussion for the regionalization alternative.

The applicant evaluated the potential for land application and determined a lack of available land made ruled out this no discharge alternative. See Antidegradation: Regionalization and No-discharge Evaluation found in Appendix D.

5.4. Demonstration of Necessity and Social and Economic Importance

Missouri's antidegradation implementation procedures specify that if the proposed activity does result in significant degradation then a demonstration of necessity (i.e., alternatives analysis) and a determination of social and economic importance are required. Non-discharging alternatives of regionalization and land application were evaluated and determined to be impractical due to lack of proximity to a regional facility able to accept flows and available land. Three discharging alternatives less degrading to degrading alternatives were evaluated. Alternative #1: Extended aeration plant, and alternative #3: MBR were eliminated economically inefficient when the lifecycle cost was compared to the preferred alternative #2: Recirculating Gravel Filter. Only those alternatives that were considered practicable were included in the economic efficiency analysis. This analysis showed that the return on environmental benefits with increasing cost of treatment did not justify more expenditure beyond the base case treatment alternative (see Appendix D). The Recirculating Gravel Filter was the preferred alternative based on this analysis. The affordability analysis further argued the value of constructing the sand filter.

Table 2: Alternatives Analysis Comparison

	Alternative 1: Extended Aeration	Alternative 2: Recirculating Gravel Filter	Alternative 3: MBR
BOD	20	10	3
TSS	20	15	3
Ammonia (s/w)	1.5/2.5	1.4/2.9	0.8/1.8
Phosphorus	0.5	0.5	0.5
Practical	Y	Y	Y
Economical	N	Y	N
Life Cycle Cost*	$234,270	$177,471	$365,632
Ratio	1:1.32	1:1	1:2.0

* Life cycle cost at 20 year design life and 8% interest

5.4.1. 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 provided discussion of this alternative. The alternative analysis mentions that Shell Knob does not have a regional authority. This authority is not operative at this time so a waiver required under 10 CSR
20-6.010(3) (B) 1 Continuing Authorities cannot be obtained.

Needs a Waiver to prevent conflict with area wide management plan approved under Section 208 of the Clean Water Act and/or under 10 CSR 20-6.010(3) (B) 1 or 2 Continuing Authorities? (Y or N) N

5.3.2 Losing Stream Alterative Discharge Location

Under 10 CSR 20-7.015(4) (A), *discharges to losing stream shall be permitted only after other alternatives including land application, discharge to gaining stream and connection to a regional facility have been evaluated and determined to be unacceptable for environmental and/or economic reasons*. The Discharge does not discharge to a losing stream segment or will not discharge with 2 miles of a losing stream segment.

5.3.3 Social and Economic Importance Evaluation

Shell Knob was identified as the impacted community. The proposed upgrades to the resorts wastewater treatment systems will allow the Resort to maintain operation as needed. The resort provides vacation cabin rentals and brings people from out of town that contribute to the local tax base and businesses. The proposed treatment system will replace the inadequate existing treatment system and ensure water quality in the lake is preserved. Appendix D: Tier 2 with Significant Degradation form contains a summary of this information.

6. General Assumptions of the Water Quality and Antidegradation Review

1. A Water Quality and Antidegradation Review (WQAR) assumes that [10 CSR 20-6.010(3) Continuing Authorities and 10 CSR 20-6.010(4) (D), consideration for no discharge] has been or will be addressed in a Missouri State Operating Permit or Construction Permit Application.
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.

7. Mixing Considerations

Mixing Zone (MZ): One-quarter (1/4) of the stream volume of flow; length one-quarter (1/4) mile. [10 CSR 20-7.031(5)(A)4.B.(III)(a)].

Not to exceed one-quarter (1/4) of the lake width at the discharge point or one hundred feet (100') from the discharge point, whichever is less [10 CSR 20-7.031(5)(A)4.B.(IV)(b)].

Zone of Initial Dilution (ZID): One-tenth (0.1) of the mixing zone volume of flow, not to exceed 10 times the effluent design flow. [10 CSR 20-7.031(5)(A)4.B.(III)(b)].

Mixing Zone:

The proposed discharge location is eligible for mixing considerations, however; the applicant proposed less-degrading effluent limits compared to those that would be given with mixing considerations accounted for in water quality based effluent limit derivations.

8. Permit Limits and Monitoring Information

WASTELOAD ALLOCATION STUDY CONDUCTED (Y OR N):	N	USE ATTAINABILITY ANALYSIS CONDUCTED (Y OR N):	N	WHOLE BODY CONTACT USE RETAINED (Y OR N):	Y

OUTFALL #001

TABLE 3. EFFLUENT LIMITS OUTFALL #001

PARAMETER	UNITS	DAILY MAXIMUM	WEEKLY AVERAGE	MONTHLY AVERAGE	BASIS FOR LIMIT (NOTE 2)	MONITORING FREQUENCY

FLOW	MGD	*		*		**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 (1ST QUARTER)	MG/L	12.1		2.9	**PEL**	**once/quarter**
AMMONIA AS N (2ND QUARTER)	MG/L	12.1		1.4	**PEL**	**once/quarter**
AMMONIA AS N (3RD QUARTER)	MG/L	12.1		1.4	**PEL**	**once/quarter**
AMMONIA AS N (4TH QUARTER)	MG/L	12.1		2.9	**PEL**	**once/quarter**
ESCHERICHIA COLIFORM (*E. COLI*)	NOTE 1	630**		126**	FSR	**once/quarter**
TOTAL PHOSPHORUS				0.5	**FSR**	**Once/quarter**
ALUMINUM, TOTAL RECOVERABLE	µG/L	*		*	**FSR**	**once/quarter**

NOTE 1 – COLONIES/100 ML
NOTE 2– WATER QUALITY-BASED EFFLUENT LIMITATION – WQBEL; OR MINIMALLY DEGRADING EFFLUENT LIMIT – MDEL; OR PREFERRED ALTERNATIVE EFFLUENT LIMIT – PEL; OR TECHNOLOGY-BASED EFFLUENT LIMIT – TBEL; OR NO DEGRADATION EFFLUENT LIMIT – NDEL; OR FEDERAL/STATE REGULATION – FSR; OR NOT APPLICABLE – N/A. ALSO, PLEASE SEE THE **GENERAL ASSUMPTIONS OF THE WQAR #4 & #5.**

* Monitoring requirements only.

** The Monthly and Weekly Average for *E. coli* shall be reported 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

9. Receiving Water Monitoring Requirements

No receiving water monitoring requirements recommended at this time.

10. Derivation and Discussion of Limits

Wasteload allocations and limits were calculated using two methods:

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

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

2) Alternative Analysis-based – Using the preferred alternative's treatment capacity for conventional pollutants such as BOD_5 and TSS that are provided by the consultant as the WLA, the significantly-degrading effluent average monthly and average weekly limits are determined by applying the WLA as the average monthly (AML) and

multiplying the AML by 1.5 to derive the average weekly limit (AWL). For toxic and nonconventional pollutant such as ammonia, the treatment capacity is applied as the significantly-degrading effluent monthly average (AML). A maximum daily can be derived by dividing the AML by 1.19 to determine the long-term average (LTA). The LTA is then multiplied by 3.11 to obtain the maximum daily limitation. This is an accepted procedure that is defined in USEPA's "Technical Support Document For Water Quality-based Toxics Control" (EPA/505/2-90-001).

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

10.1. OUTFALL #001 – MAIN FACILITY OUTFALL

10.2. 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, 15 mg/L average weekly limits were proposed.

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

- **Total Suspended Solids (TSS).** 15 mg/L monthly average, 20 mg/L average weekly limit. According to EPA, because TSS and BOD are closely correlated, we apply the same limits for TSS as BOD.

  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 due to the classification of the receiving stream, therefore the water quality standard must be met at the outfall.

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

Lake Water Quality Based Effluent Limits with no mixing included in calculation.

Season	Temp (°C)	pH (SU)	Total Ammonia Nitrogen CCC (mg N/L)	Total Ammonia Nitrogen CMC (mg N/L)
1st Quarter	11.0	7.8	3.1	12.1
2nd Quarter	21.2	7.8	3.1	12.1
3rd Quarter	26.0	7.8	3.1	12.1
4th Quarter	15.5	7.8	2.7	12.1

1st Quarter: January 1 – March 31

2nd Quarter: April 1 – June 30

3rd Quarter: July 1 – September 30

4th Quarter: October 1 – December 31

1Q
Chronic WLA: Ce = ((0.010075 + 0)3.1 – (0 * 0.01)) / 0.010075
Ce = 3.1
Acute WLA: Ce = ((0.010075 + 0)12.1 – (0 * 0.01)) / 0.010075
Ce = 12.1
AML = WLAc = 3.1 mg/L
MDL = WLAa = 12.1 mg/L

2Q
Chronic WLA: Ce = ((0.010075 + 0)3.1 – (0 * 0.01)) / 0.010075
Ce = 3.1
Acute WLA: Ce = ((0.010075 + 0)12.1 – (0 * 0.01)) / 0.010075
Ce = 12.1
AML = WLAc = 3.1 mg/L
MDL = WLAa = 12.1 mg/L

3Q
Chronic WLA: Ce = ((0.010075 + 0)3.1 – (0 * 0.01) / 0.010075
Ce = 3.1
Acute WLA: Ce = ((0.010075 + 0)12.1 – (0 * 0.01)) / 0.010075
Ce = 12.1
AML = WLAc = 3.1 mg/L
MDL = WLAa = 12.1 mg/L

4Q
Chronic WLA: Ce = ((0.010075 + 0)2.7 – (0 * 0.01) / 0.010075
Ce = 2.7
Acute WLA: Ce = ((0.010075 + 0)12.1 – (0 * 0.01)) / 0.010075
Ce = 12.1
AML = WLAc = 2.7 mg/L
MDL = WLAa = 12.1 mg/L

Applicant proposed technology limitations.MDL AML

AMMONIA AS N (1ST QUARTER)	MG/L	12.1	2.9
AMMONIA AS N (2ND QUARTER)	MG/L	12.1	1.4
AMMONIA AS N (3RD QUARTER)	MG/L	12.1	1.4
AMMONIA AS N (4TH QUARTER)	MG/L	12.1	2.9

- ***Escherichia coli (E. coli)***. Monthly average of 126 per 100 mL as a geometric mean and Daily Maximum of 630 during the recreational season (April 1 – October 31), to protect Whole Body Contact Recreation (A)

designated use of the receiving stream, as per 10 CSR 20-7.031(5)(C). An effluent limit for both monthly average and daily maximum is required by 40 CFR 122.45(d).

For facilities less than 100,000 gpd: Per the effluent regulations the *E. coli* sampling/monitoring frequency 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). The weekly average requirement is consistent with EPA federal regulation 40 CFR 122.45(d). Please see **GENERAL ASSUMPTIONS OF THE WQAR #7**

- **Total Phosphorus.** To Table Rock Lake and Lake Taneycomo 0.5 mg/L per 10 CSR 20-7.015 (3).

- **Aluminum, Total Recoverable**. Monitoring requirement only. This facility uses chemicals for phosphorous removal that may contain aluminum. Monitoring is required to determine if reasonable potential exists for this facility's discharge to exceed water quality standards for Aluminum (Total Recoverable).

11. ANTIDEGRADATION REVIEW PRELIMINARY DETERMINATION

The proposed new facility discharge, Timbers Resort WWTF, 6,500 gpd will result in significant degradation of the segment identified in Table Rock Lake. Implementing 8 STEP units flowing to a Recirculating Gravel Filter with UV disinfection was determined to be the base case technology (lowest cost alternative that meets technology and water quality based effluent limitations). The cost effectiveness of the other technologies were evaluated, and the Recirculating Gravel Filter with UV disinfection was found to be cost effective and was determined to be the preferred alternative.

It has also been determined that the other treatment options presented (Extended Aeration and MBR) may also be considered reasonable alternatives provided they are designed to be capable of meeting the effluent limitations developed based on the preferred alternative. If any of these options are selected, you may proceed with the appropriate facility plan, construction permit application, or other future submittals without the need to modify this Antidegradation review document.

Per the requirements of the AIP, the effluent limits in this review were developed to be protective of beneficial uses and to attain the highest statutory and regulatory requirements. The Department has determined that the submitted review is sufficient and meets the requirements of the AIP. No further analysis is needed for this discharge.

Reviewer: Aaron Sawyer
Date: 8/31/2021
Unit Chief: John Rustige, P.E.

Appendix A: Geohydrologic Evaluation

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

LWE22018
Barry County

August 20, 2021

Michael Stalzer
1658 W Riverside Street
Springfield, FL 65807

RE: Timbers Resort

Dear Michael Stalzer:

On August 19, 2021, the Missouri Geological Survey received a request to perform a geohydrologic evaluation for the above referenced project located in Barry 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

Molly A. Starkey

Molly Starkey
Geologist
Environmental Geology Section

STATE OF MISSOURI
MOLLY A STARKEY
REGISTERED GEOLOGIST

08/20/2021

c: Jeff Schoen
WPP
Southwest Regional Office

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

Project ID Number
LWE22018
County
Barry

Request Details

Project: Timbers Resort

Legal Description: 24 T22N R25W
Quadrangle: VIOLA
Latitude: 36 36 2.54
Longitude: -93 35 14.73

Organization Official
Name: Jeff Schoen
Address: PO Box 70
City: Shell Knob
State: MO Zip: 65747
Phone: 417-860-9697
Email:

Preparer
Name: Michael Stalzer
Address: 1658 W Riverside Street
City: Springfield
State: FL Zip: 65807
Phone: 417-860-9697
Email:

Project Details

Report Date: 08/20/2021
Date of Field Visit: 06/23/2021
Previous Reports: RHD21029

Facility Type
- [ ] Mechanical treatment plant
- [X] 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: [X] Gaining [ ] Losing [ ] No discharge

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

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

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

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

Bedrock: Ordovician-age Cotter and Jefferson City Dolomite

Surficial Materials: Red-brown very gravelly silty clay

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

Project ID Number
LWE22018
County
Barry

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 June 23rd, 2021 geologists with the Missouri Geological Survey conducted a geohydrological evaluation of the existing development at Timbers Resort in Barry County for a proposed recirculating filter bed. The site is located on a ridge and hillslope adjacent to Table Rock Lake in Shell Knob. The purpose of the site visit was to determine the geologic and hydrologic characteristics of the site and the potential impacts to water quality in the event of treatment failure. This report is to supplement report number RHD21029, because the original request was for a residential housing development.

Surficial materials observed on site were a thin layer of topsoil above red-brown silty clay loam with greater than 20 percent gravel. These materials have a moderate to high permeability. Based on the elevation of bedrock outcrops at the site and nearby well records, the surficial materials are generally less than five feet thick.

Bedrock was observed in multiple locations is a hard, gray, argillaceous dolomite with low primary permeability. Outcrops displayed some surficial weathering and solution widening along fractures, but there was no evidence of karst features or deep systemic weathering. The bedrock is the Ordovician-age Cotter and Jefferson City Dolomite.

Surface water runoff from the site is westward, into Table Rock Lake. The drainages on the property were dry, with characteristics consistent with losing stream conditions. For the purposes of this evaluation, sites located adjacent to the lake are considered gaining. There are no sinkholes or springs within one mile of the site.

Overall this site receives a slight geologic limitations rating. In the event of treatment failure the local shallow and regional groundwater may be adversely impacted, as well as the surface water of Table Rock Lake.

Appendix B: Natural Heritage Review

Missouri Department of Conservation

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

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

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

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

PROJECT INFORMATION

Project Name and ID Number: Timbers Resort #9212
Project Description: Replace 9 septic systems with 6500 gpd discharging recirculating gravel filter bed
Project Type: Residential, Commercial and Governmental Building Development
Contact Person: Michael Stalzer
Contact Information: michael.stalzer@cpwgengineering.com or 8139062851

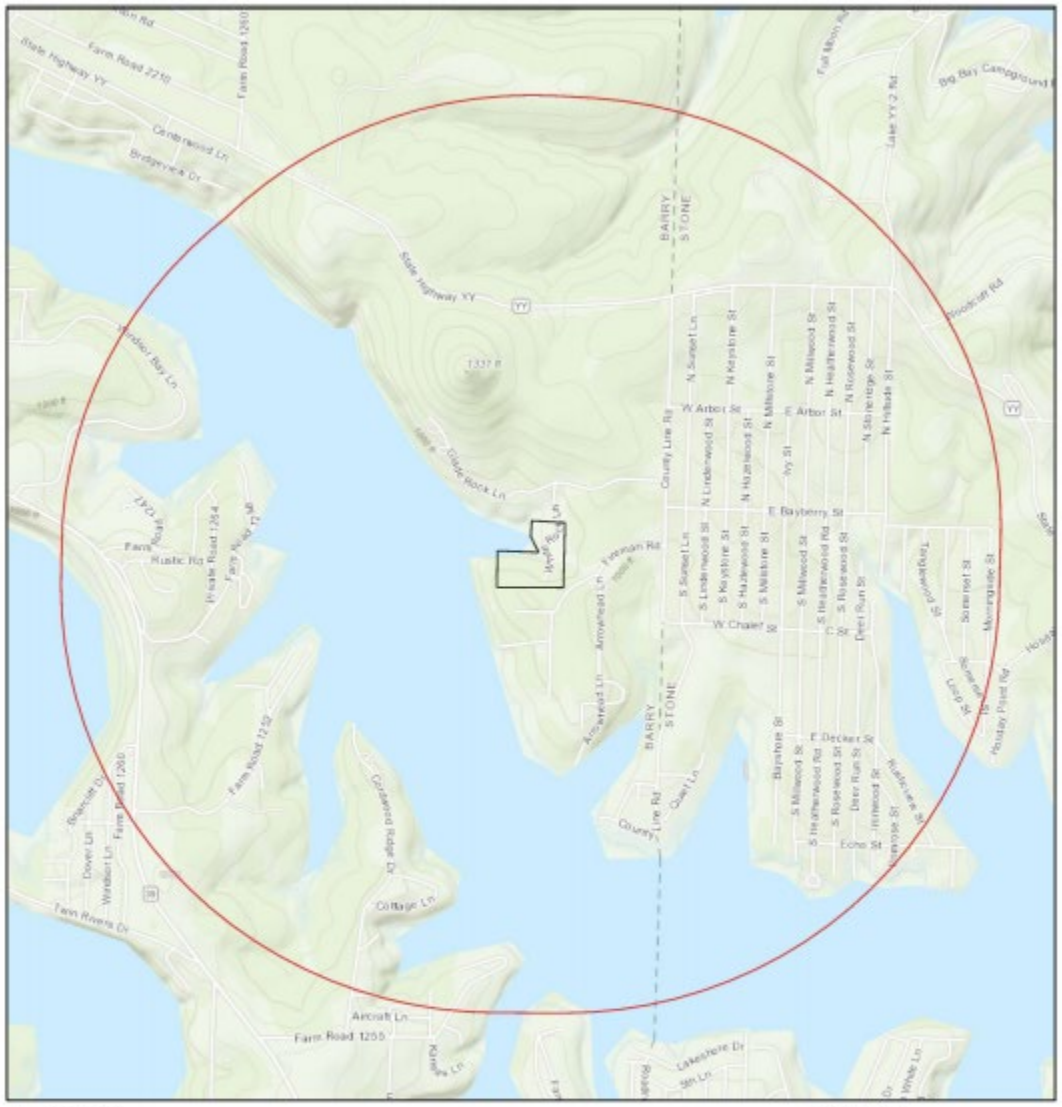
Disclaimer: The NATURAL HERITAGE REVIEW REPORT produced by this website identifies if a species tracked by the Natural Heritage Program is known to occur within or near the area submitted for your project, and shares suggested recommendations on ways to avoid or minimize project impacts to sensitive 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 www.modot.mo.gov/ehp/index.htm for additional information on recommendations.

Timbers Resort



June 3, 2021

1:20,318

0 0.175 0.35 0.7 mi

0 0.275 0.55 1.1 km

- Project Boundary
- Buffered Project Boundary

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

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

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

Other Special Search Results:

The project occurs on or near public land, MARK TWAIN NF, TABLE ROCK LAKE USACOE, please contact USFS, COE.

Project Type Recommendations:

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

Project Location and/or Species Recommendations:

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

Invasive exotic species are a significant issue for fish, wildlife and agriculture in Missouri. Seeds, eggs, and larvae may be moved to new sites on boats or construction equipment. Please inspect and clean equipment thoroughly before moving between project sites. See http://mdc.mo.gov//9633 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

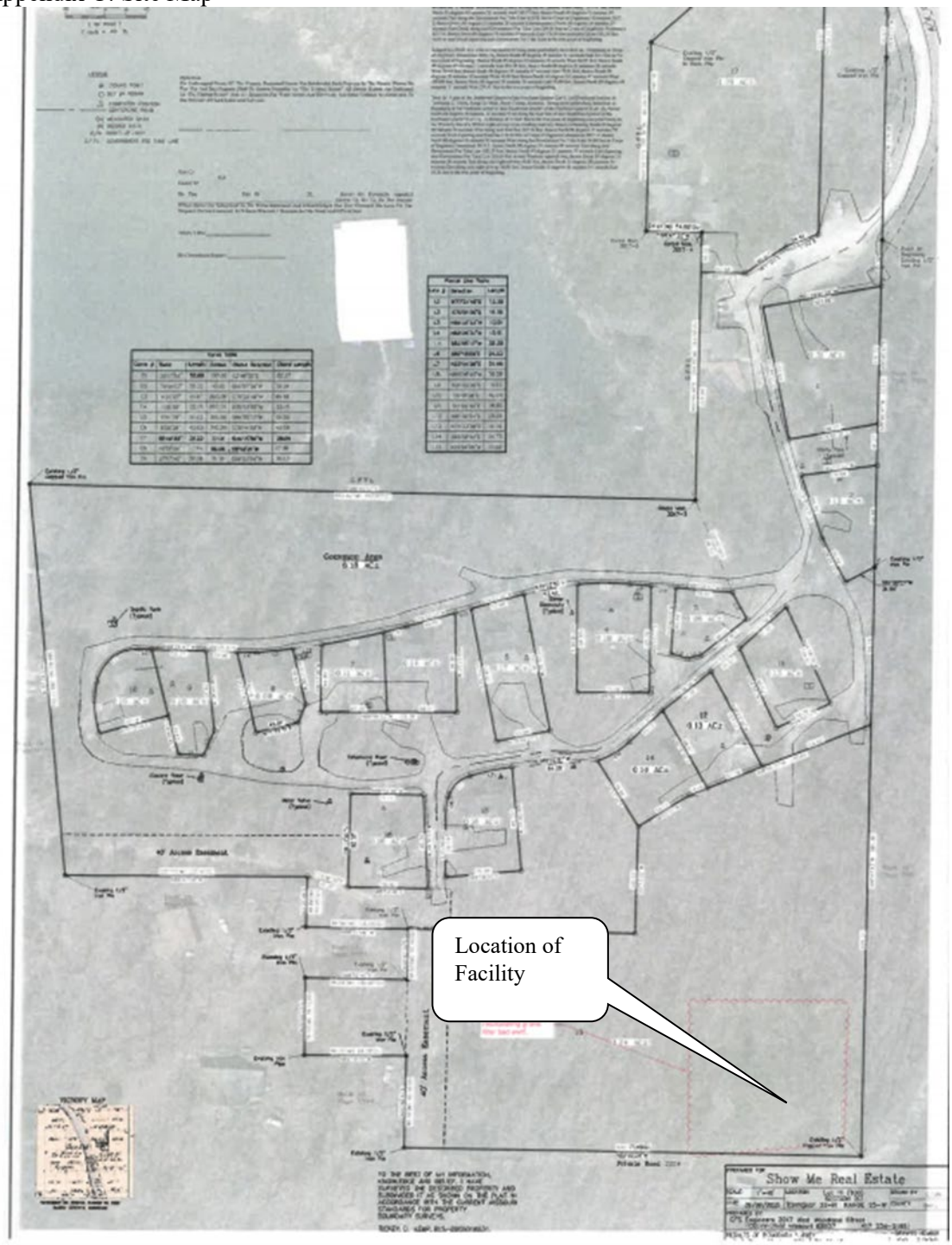
Miscellaneous Information

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.

Additional information on Missouri's sensitive species may be found at http://mdc.mo.gov/discover-nature/field-guide/endangered-species . Detailed information about the animals and some plants mentioned may be accessed at http://mdc4.mdc.mo.gov/applications/mofwis/mofwis_search1.aspx . If you would like printed copies of best management practices cited as internet URLs, please contact the Missouri Department of Conservation.

Appendix C: Site Map



Appendix D: Antidegradation Review Summary Attachments

1) Attachment A: Summary Review Request

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

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

1. FACILITY

NAME			
Timbers Resort WWTF		COUNTY	
ADDRESS (PHYSICAL)	CITY	STATE	ZIP CODE
White Rock Lane	Shell Knob	MO	65747
PERMIT NUMBER	PROPOSED DESIGN FLOW	SIC / NAICS CODE	
	6500		

2. OWNER

NAME			
Timbers Home Owners Association			
ADDRESS	CITY	STATE	ZIP CODE
P.O. Box 70	Shell Knob	MO	65747
EMAIL ADDRESS		TELEPHONE NUMBER WITH AREA CODE	

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

NAME	SECRETARY OF STATE CHARTER NUMBER		
Timbers Home Owners Association			
ADDRESS	CITY	STATE	ZIP CODE
P.O. Box 70	Shell Knob	MO	65747
EMAIL ADDRESS		TELEPHONE NUMBER WITH AREA CODE	

4. CONSULTANT

PREPARER NAME	COMPANY NAME		
Michael Stalzer, P.E.	CPWG		
ADDRESS	CITY	STATE	ZIP CODE
131 Industrial Park, Dr, Suite 1	Hollister	MO	65672
EMAIL ADDRESS		TELEPHONE NUMBER WITH AREA CODE	
michael.stalzer@madridcpwg.com		417-860-9697	

5. RECEIVING WATER BODY SEGMENT #1

NAME: Table Rock Lake

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

5.2 Lower end of segment –
UTM: X= _____, Y= _____ OR Lat _____, Long _____

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

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

NAME:

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

6.2 Lower end of segment –
UTM: X= _____, Y= _____ OR Lat _____, Long _____

7. DECHLORINATION

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

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

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

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

According to the Antidegradation Implementation Procedure Sections I.B. and II.B.1., the feasibility of no-discharge alternatives must be considered. No-discharge alternatives may include connection to a regional treatment facility, surface land application, subsurface land application, and recycle or reuse.

Given this project will take 8 septic systems off line, a STEP collection system will need to be installed. If the cost of a drip field were added to the scope of work, the project would be to costly for the HOA to bear. The proposed treatment facility will significantly reduce the nutrient load, which meets the intent of the regulation.

9. ADDITIONAL REQUIREMENTS

Complete and submit the following with this submittal:

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

10. PATH / TIER REVIEW ATTACHMENTS ENCLOSED

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

11. APPLICANT PROPOSED ANTIDEGRADATION REVIEW EFFLUENT LIMITS

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

Applicable Pollutants of Concern	Concentration* mg/L	Concentration* µg/L	Path / Tier Review Attachment Used for POC Evaluation	Average Monthly Limit	Daily Maximum Limit or Average Weekly Limit
BOD_5	X		10		
TSS	X		15		
Ammonia (Summer)	X		1.4		
Ammonia (Winter)	X		2.9		
Total Phosphorus	X		0.5		

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

MO 780-2525 (03-10)

12. PROPOSED PROJECT SUMMARY

The project includes replacing 8 septic tanks with a STEP collection system and a recirculating gravel filter bed with UV disinfection.

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

13. CONTINUING AUTHORITY WAIVER (For New Discharges)

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

14. APPLICATION FEE

☐ CHECK NUMBER ☐ JETPAY CONFIRMATION NUMBER

15. SIGNATURE

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

SIGNATURE	DATE
	7-29-2021
PRINT NAME	TITLE
Michael Stalzer, P.E.	Principal

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

2) Attachment B: Regionalization/No-discharge Form

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
Timbers Resort WWTF	Barry

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? No regional facility in Shell KNob

B. List facilities contacted about possible regionalization. N/A

C. Is there any planning or zoning in the area regarding development and services? No

D. Who would have the responsibility to maintain the sewer connection line? N/A

E. What is the estimated cost for piping and pumps to regionalize? N/A

F. Explain any engineering challenges with the regionalization connection – topography, rivers, highways, or other issues.
No regional plant exists

G. Does a regional facility have the capacity to treat the additional effluent from this project? N/A

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
The town of Shell Knob does not have a regional plan.

780-2805 (02-19)

Page 1

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: There is a planned resort expansion

If yes, answer the following:

B. How many acres are required for land application of the effluent? 0.75

C. Provide a breakdown of the capital cost for any necessary additional land, piping, pumps, and irrigation equipment?

$65000

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:

☐ **3.2 Zoning or Suitability of Site in Proximity to Neighboring Sites or Waterbodies:**

A. Was drip or subsurface irrigation evaluated as opposed to surface application? ☐ Yes ☑ No

B. Does the county ordinance specifically restrict land application, surface and subsurface? ☐ Yes ☑ No

C. Can a vegetated buffer be installed to reduce necessary buffer distances? ☐ Yes ☑ No

D. Are there other steps or considerations that can be made?

☐ **3.3 Unsuitability of Geology or Soils**

A. Is a geohydrologic evaluation, county soils survey map, or other resource showing suitability and application rates included with this application? ☑ Yes ☐ No

B. Is it cost-effective to bring in additional soils? ☐ Yes ☑ No

C. Can the application rate be decreased to a suitable rate? ☐ Yes ☑ No

D. Were subsurface application alternatives (e.g. low pressure pipe, drip) considered? ☐ Yes ☑ No

E. If collapse potential is a concern, was using a liner or alternative site evaluated? ☐ Yes ☑ No

3.4 Summarize why no-discharge land application was not a practicable or economically efficient alternative

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?

- [x] 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:

3) Attachment C: Tier 2 Significant Degradation

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

ANTIDEGRADATION REVIEW SUMMARY
PATH C: TIER 2 – SIGNIFICANT DEGRADATION

1. FACILITY

NAME	COUNTY
Timbers Resort WWTF	Barry

2. SUMMARY OF THE POLLUTANTS OF CONCERN

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).

What are the proposed pollutants of concern and their respective effluent limits that the selected treatment option will comply with:

Pollutants of Concern*	Concentration*		Base Case Limit	Basis (WQS, WLA, ELG, Other)**
	mg/L	µg/L		
BOD_5	X			1.08
TSS	X			1.08
Ammonia (Summer)	X			
Ammonia (Winter)	X			
Total Nitrogen	X		1.6	0.2
Total Phosphorus	X		0.269	0.0271

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

** Provide the Basis for the Base Case Limit: WQS – Water Quality Standard, WLA – Wasteload Allocation, ELG – Effluent Limit Guideline, or describe other.

3. IDENTIFYING ALTERNATIVES

Supply a summary of the non-discharging alternatives considered. "For Discharges likely to cause significant degradation, an analysis of non-degrading and less-degrading alternatives must be provided," as stated in the Antidegradation Implementation Procedure Section II.B.1. These alternatives include no-discharge. Attach all supportive documentation in the Antidegradation Review report.

Feasibility of non-discharging alternatives (regionalization, land application, subsurface irrigation, and recycling or reuse):
The objective of this project is to take the existing septic systems off-line and replace with a wastewater treatment plant.

There is not adequate land area to accommodate a subsurface disposal field. There is not opportunity at rerionalization either. The site is located in rural Barry County.

MO 780-2021 (02-19)

Minimum of three (preferably five or more) discharging alternatives* ranging from less-degrading to degrading including Preferred Alternative (All treatment levels for POCs must at a minimum meet water quality standards):

Discharging Alternative #	Treatment Type	Description
1	extended aeration	6500 gpd extended aeration plant with open discharge
2	recirculating gravel filter bed	6500 gpd filter bed with oped discharge
3	MBR	6500 gpd membrane bio-reactor
4		
5		
6		

* Same technology may be multiple alternatives as you have the base unit and add to it with more capacity to provide additional treatment.

4. DETERMINATION OF THE REASONABLE ALTERNATIVE

Per the Antidegradation Implementation Procedure Section II.B.2, "a reasonable alternative is one that is practicable, economically efficient and affordable." Provide basis and supporting documentation in the Antidegradation Review report. **Please do not write "See Report" for any box below.**

Practicability Summary:

"The practicability of an alternative is considered by evaluating the effectiveness, reliability, and potential environmental impacts," according to the Antidegradation Implementation Procedure Section II.B.2.a. Examples of factors to consider, including secondary environmental impacts, are given in the Antidegradation Implementation Procedure Section II.B.2.a.

Given the property is a resort that operates seasonally, the most practical plant would be a recirculating gravel filter bed. The maintenance cost, effectiveness to treat seasonal flow, and effluent quality will meet the stated goal of reducing nutrient load.

Economic Efficiency Basis:

What is the design life cycle for the comparison? twenty years

What interest rate was used in the present worth calculations? 8%

Economic Efficiency Summary:

Alternatives that are deemed practicable must undergo a direct cost comparison in order to determine economic efficiency. Means to determine economic efficiency are provided in the Antidegradation Implementation Procedure Section II.B.2.b.

TABLE OF THE ALTERNATIVES EVALUATION (Attach additional page if necessary)

PARAMETERS	Alternatives #					
	1	2	3	4	5	6
BOD_5 – mg/L	1.08	0.54	0.16			
TSS – mg/L	1.08	0.81	0.16			
Ammonia (Summer) – mg/L						
Ammonia (Winter) – mg/L						
E. Coli – #/100 mL						
Total Nitrogen – mg/L	0.13	0.15	0.09			
Total Phosphorus – mg/L	0.027	0.027	0.0271			
Construction Cost – $	87000	95000	130000			
Operating Cost – $	147270	82471	235632			
Present Worth – $	234270	177471	365632			
Ratio present worth to base case	0.37	0.53	0.35			

Affordability Summary:

Alternatives identified as most practicable and economically efficient are considered affordable if the applicant does not supply an affordability analysis. An affordability analysis per the Antidegradation Implementation Procedure Section II.B.2.c, "may be used to determine if the alternative is too expensive to reasonably implement."

See Report.

Justification for Preferred Alternative:

Given the seasonal nature of the resort and the lower first cost, the most reasonable alternative would be to construct the recirculating gravel filter bed. This plant will provide a significant improvement to water quality at a manageable cost.

Reasons for Rejecting the other Evaluated Alternatives:

Seasonal nature of resort and the implications of maintaining plant operations and effluent quality with little to no flow.

Comments/Discussion:

5. SOCIAL AND ECONOMIC IMPORTANCE OF THE PREFERRED ALTERNATIVE

If the preferred alternative will result in significant degradation, then it must be demonstrated that it will allow important economic and social development in accordance to the Antidegradation Implementation Procedure Section II.E. 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.

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."

Shell Knob, population 2,126, median age 62.4

Identify relevant factors that characterize the social and economic conditions of the affected community:

Examples of social and economic factors are provided in the Antidegradation Implementation Procedure Section II.E.1., but specific community examples are encouraged.

The development is located near the town of Shell Knob, which has a population of 2,126 people with a median age of 62.4. The current poverty rate is 1.5 times the rate in Missouri. The tourism associated with the lake is a contributor to the economic well being of the community. By, improving the water quality of the lake through the construction of the wwtf, the water quality will improve and the associated economic activity will continue.

Describe the important social and economic development associated with the project:

Determining benefits for the community and the environment should be site specific and in accordance with the Antidegradation Implementation Procedure Section II.E.1.

The development is located near the town of Shell Knob, which has a population of 2,126 people with a median age of 62.4. The current poverty rate is 1.5 times the rate in Missouri. By taking the existing septic systems off-line, the resort will continue to function as intended. This will provide the local economy with an opportunity to provide the resort patrons with services. In addition, the proposed treatment plant will improve the water quality of Table Rock Lake.

The proposed project will provide both social and economic benefit to the community while improving the water quality of the Lake. The proposed development can be considered a benefit to the community.

PROPOSED PROJECT SUMMARY:

The objective of this project is to take the existing septic systems off-line and replace with a wastewater treatment plant. There are eight septic systems which serve the resort generating 5200 gallons per day of flow.

Attach the Antidegradation Review report and all supporting documentation. This is a technical document, which must be signed, sealed and dated by a registered professional engineer of Missouri.

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 1000.00	CHECK NO. 1007
DATE RECEIVED 12/14/21 SH	

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: 9/2021 ☐ 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: Timbers Resort WWTF

2.2 ESTIMATED PROJECT CONSTRUCTION COST: $

2.3 PROJECT DESCRIPTION

This is a proposed replacement for the existing resort's failing septic systems. The proposed wastewater treatment facility will consist of STEP tanks that will flow to a recirculating gravel filter bed, undergo UV disinfection, and discharge into Table Rock Lake.

2.4 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION

The handling, use, and disposal of the sludge shall be handled by the project owner, as specified in Section 4.0 of this permit application.

2.5 DESIGN INFORMATION

A. Current population: _____; Design population: 37

B. Actual Flow: _____ gpd; Design Average Flow: 6500 gpd;
Actual Peak Daily Flow: _____ gpd; Design Maximum Daily Flow: 28E3 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

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3.0 WASTEWATER TREATMENT FACILITY

NAME	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
Timbers Resort WWTF		

ADDRESS (PHYSICAL)	CITY	STATE	ZIP CODE	COUNTY
White Rock Lane	Shell Knob	MO	65747	Barry

Wastewater Treatment Facility: Mo- (Outfall Of)

3.1 Legal Description: ____ ¼, ____ ¼, ____ ¼, Sec. 24, T 22N, R 25W
(Use additional pages if construction of more than one outfall is proposed.)

3.2 UTM Coordinates Easting (X): 447583 Northing (Y): 4050608
For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)

3.3 Name of receiving streams: Tributary to Table Rock Lake, Table Rock Lake

4.0 PROJECT OWNER

NAME	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
Timbers Home Owners Association		

ADDRESS	CITY	STATE	ZIP CODE
P.O. Box 70	Shell Knob	MO	65747

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
Timbers Home Owners Association		

ADDRESS	CITY	STATE	ZIP CODE
P.O. Box 70	Shell Knob	MO	65747

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
CPWG Engineering, Inc.	417-320-6065	

ADDRESS	CITY	STATE	ZIP CODE
131 Industrial Park Drive, Suite 1	Hollister	MO	65672

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: [signature] / Timbers HOA

PRINTED NAME: Jeffery A. Schoa

DATE: 11-30-21

TITLE OR CORPORATE POSITION: Project Manager

TELEPHONE NUMBER WITH AREA CODE: 918-645-9365

E-MAIL ADDRESS: jeff.schoa@bochringer-Ingelheim.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.