

**STATE OF MISSOURI**  
**DEPARTMENT OF NATURAL RESOURCES**  
**MISSOURI CLEAN WATER COMMISSION**



**CONSTRUCTION PERMIT**

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

Francis Marchese  
Marchese WWTF  
6618 El Terra Rd.  
Osage Beach, MO 65065

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.

April 7, 2021  
Effective Date

Edward B. Galbraith  
Edward B. Galbraith, Director, Division of Environmental Quality

April 6, 2023  
Expiration Date

Chris Wieberg  
Chris Wieberg, Director, Water Protection Program

## **CONSTRUCTION PERMIT**

### **I. CONSTRUCTION DESCRIPTION**

The construction of this wastewater treatment facility (WWTF) will include the addition of a septic tank, preanoxic tank, Advantex AX -20 units with recirculation tanks, and ultraviolet (UV) disinfection. This WWTF is designed for a single residential property with two residential structures, a population equivalent (PE) of 7.4, a design average flow of 555 gallons per day (gpd), and a peak flow of 2,220 gpd.

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

### **II. COST ANALYSIS FOR COMPLIANCE**

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

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

### **III. CONSTRUCTION PERMIT CONDITIONS**

The permittee is authorized to construct subject to the following conditions:

1. This construction permit does not authorize discharge.
2. All construction shall be consistent with plans and specifications signed and sealed by Lake Professional Engineering Services, Inc. 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 wastewater treatment facility shall be located at least fifty feet (50') from any dwelling or establishment per 10 CSR 20-8.140(C)(2).
6. The wastewater treatment facility shall be located above the twenty-five (25)-year flood level.
7. 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.
8. 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 [dnr.mo.gov/env/wpp/epermit/help.htm](http://dnr.mo.gov/env/wpp/epermit/help.htm). See [dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm](http://dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm) for more information.
9. A United States (U.S.) Army Corps of Engineers (COE) permit (404) and a Water Quality Certification (401) issued by the Department or permit waiver may be required for the activities described in this permit. This permit is not valid until these requirements are satisfied. If construction activity will disturb any land below the ordinary high water mark of jurisdictional waters of the U.S. then a 404/401 will be required. Since the COE makes determinations on what is jurisdictional, you must contact the COE to determine permitting requirements. You may call the Department's Water Protection Program at 573-751-1300 for more information. See [dnr.mo.gov/env/wpp/401/](http://dnr.mo.gov/env/wpp/401/) for more information.
10. All construction must adhere to applicable 10 CSR 20-8 (Chapter 8) requirements listed below.
  - Flood protection shall apply to new construction and to existing facilities undergoing major modification. The wastewater facility structures, electrical equipment, and mechanical equipment shall be protected from physical damage by not less than the one hundred- (100-) year flood elevation. 10 CSR 20-8.140 (2) (B)
  - Unless another distance is determined by the Missouri Geological Survey or by the department's Public Drinking Water Branch, the minimum distance between wastewater treatment facilities and all potable water sources shall be at least three hundred feet (300'). 10 CSR 20-8.140 (2) (C) 1.

- No treatment unit with a capacity of twenty-two thousand five hundred gallons per day (22,500 gpd) or less shall be located closer than the minimum distance of 200' to a neighboring residence and 50' to property line for lagoons; 200' to a neighboring residence for open recirculating media filters following primary treatment; and 50' to a neighboring residence for all other discharging facilities. See 10 CSR 20-2.010(68) for the definition of a residence. 10 CSR 20-8.140 (2) (C) 2
- All sampling points shall be designed so that a representative and discrete twenty-four (24) hour automatic composite sample or grab sample of the effluent discharge can be obtained at a point after the final treatment process and before discharge to or mixing with the receiving waters. 10 CSR 20-8.140 (6) (B)
- All outfalls shall be posted with a permanent sign indicating the outfall number (i.e., Outfall #001). 10 CSR 20-8.140 (6) (C)
- All wastewater treatment facilities shall be provided with an alternate source of electric power or pumping capability to allow continuity of operation during power failures. 10 CSR 20-8.140 (7) (A) 1.
- An audiovisual alarm or a more advanced alert system, with a self-contained power supply, capable of monitoring the condition of equipment whose failure could result in a violation of the operating permit, shall be provided for all wastewater treatment facilities. 10 CSR 20-8.140 (7) (C)
- No piping or other connections shall exist in any part of the wastewater treatment facility that might cause the contamination of a potable water supply. 10 CSR 20-8.140 (7) (D) 1.
- A means of flow measurement shall be provided at all wastewater treatment facilities. 10 CSR 20-8.140 (7) (E)
- 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)
- All wastewater treatment facilities must have a screening device, comminutor, or septic tank for the purpose of removing debris and nuisance materials from the influent wastewater. 10 CSR 20-8.150 (2)
- A septic tank must have a minimum capacity of at least one thousand (1,000) gallons. 10 CSR 20-8.180 (2) (A)
- The septic tank shall be baffled. 10 CSR 20-8.180 (2) (B)
- 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)

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

11. Upon completion of construction:

- A. Francis Marchese will become the continuing authority for operation and maintenance of these facilities;
- B. Submit an electronic copy of the as built if the project was not constructed in accordance with previously submitted plans and specifications; and
- C. 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) and submit a Form MO 780-1512, Form B - Application for Operating Permit for Facilities That Receive Primarily Domestic Waste and Have a Design Flow Less Than or Equal to 100,000 gallons per day, and fee of \$150 to the Engineering Section

of the Water Protection Program 60 days prior to operation. Identify that the application is for a General Permit MOGD – Non-POTW discharging less than 50,000 gpd, permit #MO-GD00000 with expiration date of June 30, 2024.

#### **IV. REVIEW SUMMARY**

##### **1. CONSTRUCTION PURPOSE**

The permitted domestic wastewater collection and treatment system would serve two residential houses. There is no municipality, public sewer district, or sewer company regulated by the Public Service Commission available in the site vicinity to assume ownership of the treatment plant.

##### **2. FACILITY DESCRIPTION**

The Marchese WWTF is located at 6618 El Terra Road, Osage Beach, Camden County, Missouri. The facility is designed for domestic wastewater with a design average flow of 555 gpd, peak flow of 2,220 gpd, and serves a hydraulic population equivalent of 7.4 people. The new permitted WWTF will be constructed for a single residential property with two existing residential structures. The WWTF will be built with a septic tank, preanoxic tank, recirculating textile filters, UV disinfection, V-notch wier, and outfall.

The collection system will transfer domestic wastewater to a septic tank by gravity. The priliminary treated wastewater from the septic tank will flow by gravity to a pump tank where clarified wastewater is pumped to a preanoxic tank. Wastewater flows from the preanoxic tank to the first recirculation tank (RT) by gravity. The first RT recirculates to two AdvanTex AX-20 units in parallel. A two way valve will transfer wastewater to either the Stage I RT or the Stage II RT. The Stage II RT feeds the Stage II AdvanTex AX-20 unit in series from Stage I filters. The Stage II Advantex AX-20 discharges through a two way valve either to the Stage II RT or to two closed channel UV disinfection lamps in series. The disinfected wastewater flows by gravity through the wier in a sampling port and discharges through Outfall No. 001.

##### **3. COMPLIANCE PARAMETERS**

The proposed project shall meet the requirements of MOGD00000 Table E-1 and E-2 with an expiration date of June 30, 2024. The final effluent limits following the completion of construction will be applicable to the facility:

| Parameter                              | Units   | Daily Maximum Limit | Weekly Average Limit | Monthly Average Limit |
|--|---------|---------------------|----------------------|-----------------------|
| Flow                                   | gpd     | *                   |                      | *                     |
| Biochemical Oxygen Demand <sub>5</sub> | mg/L    |                     | 15                   | 10                    |
| Total Suspended Solids                 | mg/L    |                     | 20                   | 15                    |
| Ammonia as N-summer                    | mg/L    | 3.6                 |                      | 1.4                   |
| Ammonia as N-winter                    | mg/L    | 7.5                 |                      | 2.9                   |
| <i>E. coli</i>                         | #/100mL | 630                 |                      | 126                   |
| Total Phosphorus                       | mg/L    | *                   |                      | 0.5                   |
| Parameter                              | Unit    | Minimum             |                      | Maximum               |
| pH                                     | SU      | 6.0                 |                      | 9.0                   |

\* Monitoring Only

#### 4. ANTIDEGRADATION

The Department has reviewed the antidegradation report for this facility and issued the Water Quality and Antidegradation Review dated October 2020, due to the new facility construction. See **APPENDIX – ANTIDEGRADATION**.

#### 5. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

**Existing major components which will remain in use include the following:**

- Collection System – Portions of the existing service connection and collection system may be utilized as built.

**Construction will cover the following items:**

- Components are designed for a Population Equivalent of 7.4 based on organic loading to the system.
- Septic Tank – A septic tank provides passive primary treatment as the settleable solids in raw wastewater settle onto the bottom of the tank. Raw wastewater will flow by gravity to the 2,000 gallon septic tank. When the water level reaches a certain height, the wastewater flows into a pump tank by gravity via two tee-drop pipes. The septic tank provides approximately 3.6 days of detention at design average flow. Settled solids in the septic tank shall be removed by a contract hauler.
- Pump Tank – A 500 gallon pump tank will provide an additional 0.9 days of detention at design average flow. The pumped wastewater will discharge to the preanoxic tank. Settled solids in the pump tank shall be removed by a contract hauler.

- Preanoxic Tank – A preanoxic tank performs the function of preanoxic denitrification. Preliminary treated wastewater is pumped from the pump tank to the 1,000 gallon preanoxic tank. The preanoxic tank provides approximately 0.9 days of detention at design average flow. Settled solids in the preanoxic tank shall be removed by a contract hauler.
- Stage I Advantex AX-20 Textile Filter with Recirculating Tank – The Stage I, 2,000 gallon RT is piped to transfer wastewater to both of the Stage I Advantex AX-20 recirculating textile filters in parallel. A two way hydrotek valve will transfer the Stage I effluent wastewater to either the Stage I RT for recirculation or the Stage II RT. A pump and piping will also recycle wastewater from the Stage I RT back to the Preanoxic Tank. Each textile filter has approximately 20 ft<sup>2</sup> of total surface area which gives a total hydraulic loading of 13.9 gpd/ft<sup>2</sup> for Stage I at design average flow. The recirculated wastewater from Stage I will flow to the Stage II RT.
- Stage II Advantex AX-20 Textile Filter with Recirculating Tank – The Stage II, 500 gallon RT is piped to transfer wastewater through the Stage II Advantex AX-20 recirculating textile filter and either returns to the Stage II RT or the UV Disinfection Lamps. Each textile filter has approximately 20 ft<sup>2</sup> of total surface area which gives a hydraulic loading of 27.8 gpd/ft<sup>2</sup> for Stage II at design average flow. The recirculated wastewater from Stage II will flow to the UV Disinfection Lamps for disinfection.
- Closed Vessel Ultraviolet Disinfection – Disinfection is the process of removal, deactivation, or killing of pathogenic microorganisms. A closed vessel, gravity flow, low pressure high intensity UV disinfection system capable of treating a peak flow of 8,640 gpd while delivering a minimum UV intensity of 30 mJ/cm<sup>2</sup> with an expected ultraviolet transmissivity of 65% or greater. The closed vessel UV system consists of one lamp per unit. Two closed vessel UV reactors units are arranged in series. The disinfected effluent will flow by gravity through flow measurement equipment and to Outfall No. 001.
- Thel-mar Volumetric Weir Flow Measurement and Sampling Port – Installation of accurate flow measurement devices will give the treatment facility a means of improved data analysis. A 6 inch Volumetric V-notch weir with a 90 degree notch; appropriate for flows between 57 gpd to 3,700 gpd will be installed on the sampling port inlet. The 30 inch PVC riser sampling port will be installed below ground surface to house the weir and provide a location for grab or composite sampling.
- Outfall 001 – The outfall consists of a discharge pipe . Effluent samples are collected at the sampling port directly upstream of Outfall 001.

## **6. OPERATING PERMIT**

A neighbor notification letter dated March 3, 2021 was provided by the neighboring residence property owner, Richard Turlington. This letter described Richard Turlington's



awareness of the project and his awareness of the 50 foot setback. Richard Turlington stated in the letter that he waived the 50 foot setback requirement.

After the completion of the construction project, please submit the following:

- Form MO 780-2155, Wastewater Construction Statement of Work Completed (<https://dnr.mo.gov/forms/780-2155-f.pdf>),
- As-builts if the project was not constructed in accordance with previously submitted plans and specifications,
- At least 60 days prior to operation, submit Form MO 780-1512, Form B - Application for Operating Permit for Facilities That Receive Primarily Domestic Waste and Have a Design Flow Less Than or Equal to 100,000 gallons per day (<https://dnr.mo.gov/forms/780-1512-f.pdf>), and
- Application Fee of \$150.

Missouri State Operating Permit, General Permit MO-GDxxxxx, will be issued after receipt of the above documents.

## **V. NOTICE OF RIGHT TO APPEAL**

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

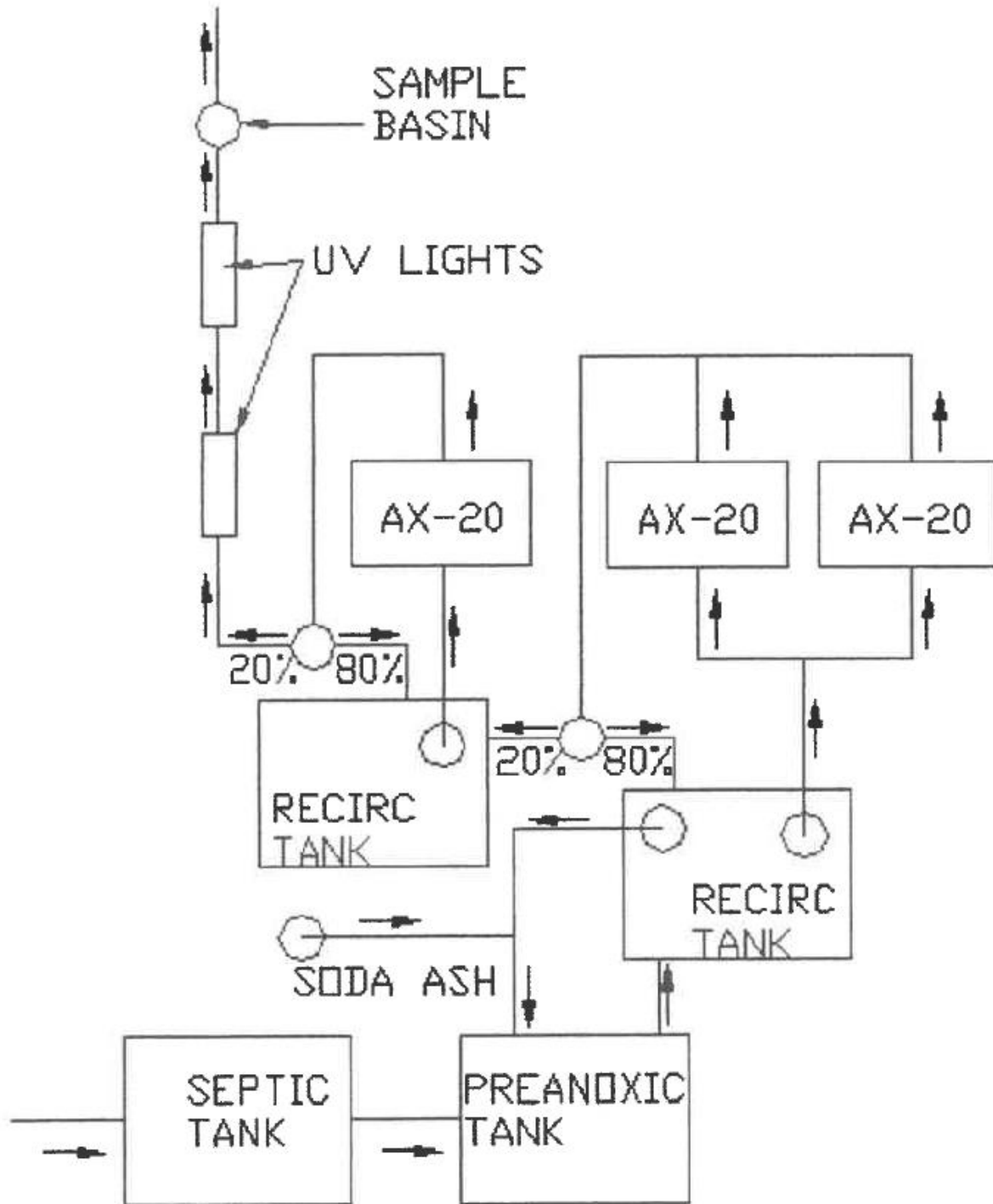
Administrative Hearing Commission  
U.S. Post Office Building, Third Floor  
131 West High Street, P.O. Box 1557  
Jefferson City, MO 65102-1557  
Phone: 573-751-2422  
Fax: 573-751-5018  
Website: <https://ahc.mo.gov>

Steven Hamm, P.E.  
Engineering Section  
[Steven.hamm@dnr.mo.gov](mailto:Steven.hamm@dnr.mo.gov)

## **APPENDICES**

- **Appendix A: Process Flow Diagram**
- **Appendix B: Antidegradation**

**Appendix A – Process Flow Diagram**



**Appendix B - Antidegradation**

**Water Quality and Antidegradation Review**

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

*For Protection of Water Quality  
and Determination of Effluent Limits at  
Marchese WWTF*

October, 2020



## 1. WATER QUALITY INFORMATION

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

## 2. APPLICABILITY

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

Facilities that are currently under enforcement will need to coordinate with the Water Protection Program's compliance and enforcement section to determine applicability for the Department's Alternatives Analysis. No mixing will be included in this review for receiving waterbodies. If the applicant would like to have effluent limitation derivation include mixing considerations, a site-specific alternatives analysis will need to be completed.

## 3. TIER DETERMINATION

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

Table 1. Pollutants of Concern and Tier Determination

| POLLUTANTS OF CONCERN                            | TIER* | DEGRADATION | COMMENT****           |
|--|-------|-------------|-----------------------|
| Biochemical Oxygen Demand (BOD <sub>5</sub> )/DO | 2     | Significant |                       |
| Total Suspended Solids (TSS)                     | **    | Significant |                       |
| Ammonia  | 2     | Significant |                       |
| pH   | ***   | Significant | Permit limits applied |
| <i>Escherichia coli</i> ( <i>E. coli</i> )       | 2     | Significant |                       |
| Total Phosphorus (TP)                            | 2     | Significant |                       |

\* Tier assumed.

\*\* Tier determination not possible: No in-stream standard for this parameter.

\*\*\* The standard for this parameter is a range.

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

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

#### **4. DEMONSTRATION OF NECESSITY AND SOCIAL AND ECONOMIC IMPORTANCE**

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

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

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

##### **4.1. NO DISCHARGE EVALUATION**

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

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

##### **4.2. DEMONSTRATION OF NECESSITY**

The Department has used available data to complete an alternatives analysis of previously evaluated treatment technologies and expected performance. Data from fifty-four Water Quality and Antidegradation Reviews (WQARs) completed between March 2011 and April 2018 was evaluated and results are presented in Figure 1, Figure 2, and Table 2 below.

The data includes eleven facilities designed to provide a high level of treatment to meet more stringent potential future ammonia as N effluent limits based on the 2013 EPA Ammonia criteria for the protection of mussels and gill-breathing snails. The data available to date indicates that the cost of facilities of this size range designed to meet these more stringent ammonia criteria is not substantively higher than other facilities designed to meet the current ammonia criteria.

The data include sixteen facilities designed to meet BOD and TSS effluent limits of 10 mg/L monthly average and 15 mg/L daily maximum or weekly average. The data available to date indicates that the cost of facilities designed to meet BOD and TSS effluent limits of 10 mg/L monthly average and 15 mg/L daily maximum or weekly average is not substantively higher than other facilities of this size range designed to meet less stringent BOD and TSS effluent limits.

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

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

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

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

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

footprint. Adequate mixing must be provided to ensure that free-floating media remains uniformly distributed and screens must be provided to retain the media within the reactors.

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

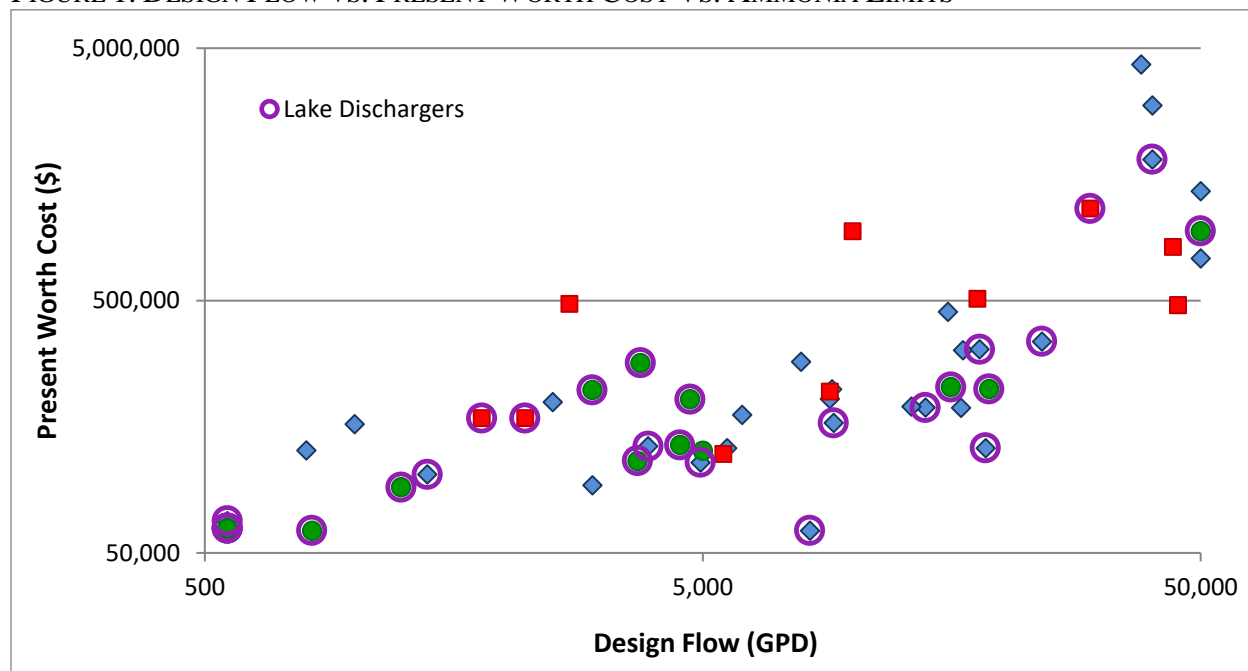
Recirculating sand filters (RSF) remove contaminants in wastewater through physical, chemical, and, most importantly, biological processes. The three common components are a pretreatment unit (generally a septic tank), a recirculation tank, and a sand filter. In the recirculation tank, raw effluent from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

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

In addition to the treatment technologies listed above, all of which had previous WQARs that established advanced ammonia limits, there are other technology alternatives that can meet the advanced ammonia limits including conventional activated sludge, oxidation ditch, and lagoon retrofits. To obtain this level of performance, all technologies must be properly designed to accommodate nitrification and de-nitrification and they must be properly and actively operated.

The above treatment system descriptions were adapted from EPA technology fact sheets and *Design of Municipal Wastewater Treatment Plants: WEF Manual of Practice No. 8 ASCE Manuals and Reports on Engineering Practice No. 76; Fifth Edition*, as well as other readily available sources and previous Water Quality and Antidegradation Reviews.

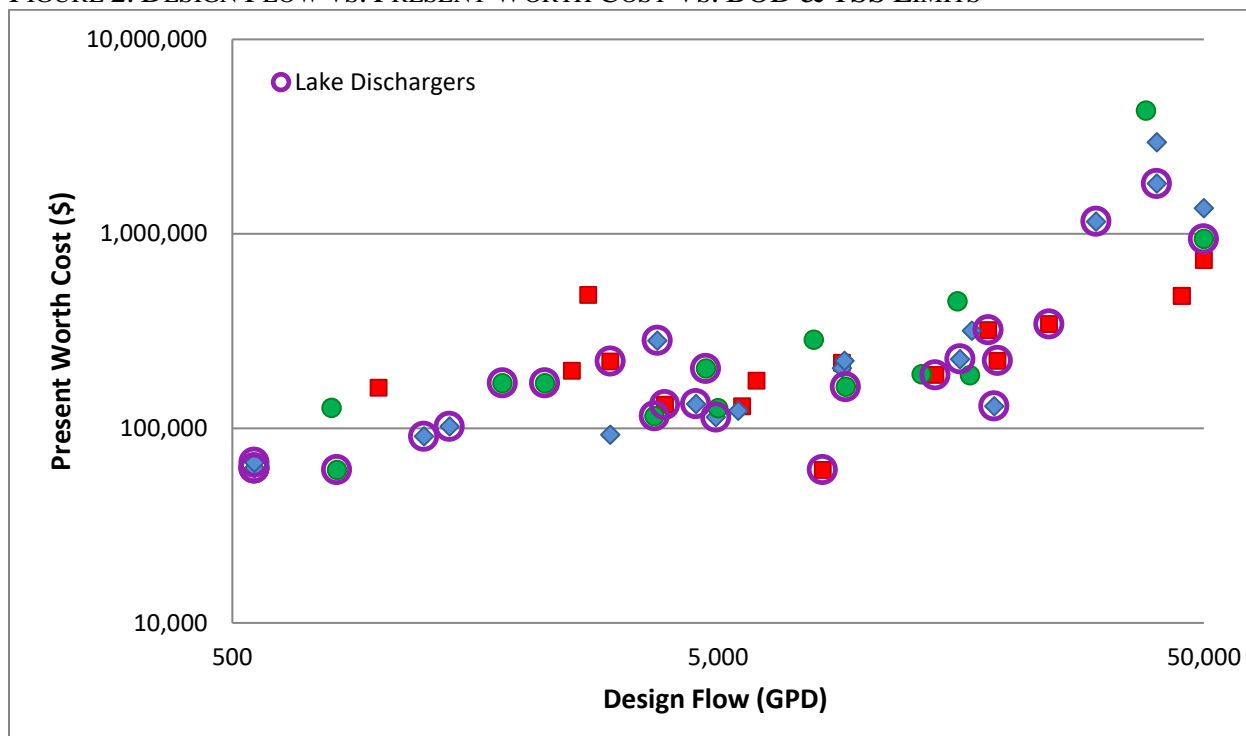
FIGURE 1. DESIGN FLOW VS. PRESENT WORTH COST VS. AMMONIA LIMITS



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



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



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

TABLE 2. DESIGN FLOW VS. PRESENT WORTH COST

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

| DATE      | Design Flow (MGD) | Technology  | BOD (mg/L)                  |                 | TSS (mg/L)                  |                 | Summer Ammonia (mg/L) |                 | Winter Ammonia (mg/L) |                 | Present Worth Cost (\$) | \$ PW/gpd |
|-----------|-------------------|---|-----------------------------|-----------------|-----------------------------|-----------------|-----------------------|-----------------|-----------------------|-----------------|-------------------------|-----------|
|           |                   |   | Daily Max or Weekly Average | Monthly Average | Daily Max or Weekly Average | Monthly Average | Daily Maximum         | Monthly Average | Daily Maximum         | Monthly Average |                         |           |
| 6/1/2011  | 0.006000          | Recirculating Sand Filter   | 15                          | 10              | 15                          | 10              | 3.7                   | 1.4             | 7.5                   | 2.9             | 176,239                 | 29        |
| 3/1/2011  | 0.007875          | Modular Fixed Film Activated Sludge with Constructed Wetlands                             | 30                          | 20              | 30                          | 20              | 3.7                   | 1.4             | 7.5                   | 2.9             | 285,780                 | 36        |
| 4/3/2012  | *0.008210         | Membrane Bioreactor   | 15                          | 10              | 15                          | 10              | 2.6                   | 1               | 2.6                   | 1               | 61,240                  | 7         |
| 8/5/2014  | 0.009000          | Recirculating Sand Filter   | 15                          | 10              | 20                          | 15              | 3.1                   | 1.2             | 7.5                   | 2.9             | 203,698                 | 23        |
| 1/1/2014  | 0.009000          | Membrane Bioreactor   | 15                          | 10              | 15                          | 10              | 1.6                   | 0.6             | 5.5                   | 2.1             | 217,739                 | 24        |
| 4/6/2012  | 0.009100          | Membrane Bioreactor   | 15                          | 10              | 20                          | 15              | 3.7                   | 1.4             | 7.5                   | 2.9             | 222,160                 | 24        |
| 3/7/2012  | *0.009158         | Recirculating Gravel filter   | 30                          | 20              | 30                          | 20              | 3.7                   | 1.5             | 6.5                   | 2.5             | 163,681                 | 18        |
| 3/6/2017  | 0.010000          | Extended aeration   | 33                          | 22              | 33                          | 22              | 1.7                   | 0.6             | 5.6                   | 2.1             | 941,800                 | 94        |
| 6/1/2014  | 0.013125          | Recirculating Sand Filter   | 45                          | 30              | 45                          | 30              | 3                     | 1.1             | 6                     | 2.3             | 189,985                 | 14        |
| 8/4/2012  | *0.014000         | Extended Aeration   | 15                          | 10              | 15                          | 10              | 3.7                   | 1.4             | 7.5                   | 2.8             | 188,208                 | 13        |
| 7/1/2014  | 0.015540          | Recirculating Sand Filter   | 23                          | 15              | 23                          | 15              | 3.9                   | 1.5             | 7.8                   | 3               | 450,986                 | 29        |
| 7/5/2011  | *0.015750         | Recirculating Sand Filter   | 15                          | 10              | 20                          | 15              | 7.8                   | 2.5             | 7.8                   | 2.5             | 226,969                 | 14        |
| 2/27/2015 | 0.016500          | Extended Aeration Package Plant   | 45                          | 30              | 45                          | 30              | 3.7                   | 1.4             | 7.5                   | 2.9             | 187,957                 | 11        |
| 7/1/2012  | 0.016650          | Extended Aeration   | 15                          | 10              | 20                          | 15              | 3.7                   | 1.4             | 7.5                   | 2.9             | 317,750                 | 19        |
| 9/3/2014  | 0.017800          | Extended Aeration Package Plant   | 45                          | 30              | 45                          | 30              | 1.4                   | 0.6             | 2.9                   | 2.1             | 507,618                 | 29        |
| 5/11/2015 | *0.018000         | Recirculating Sand Filter, Polishing Reactor, Chemical Phosphorus Removal                 | 15                          | 10              | 15                          | 10              | 3.7                   | 1.4             | 6.5                   | 2.1             | 320,318                 | 18        |
| 7/3/2013  | *0.018500         | Recirculating Textile Filter with Chemical & Filter Phosphorus Removal                    | 15                          | 10              | 20                          | 15              | 3.7                   | 1.4             | 7.5                   | 2.9             | 130,000                 | 7         |
| 12/7/2017 | *0.018800         | Recirculating Sand Filter   | 15                          | 10              | 15                          | 10              | 6                     | 2.3             | 6                     | 2.3             | 222,901                 | 12        |
| 2/27/2015 | *0.024000         | Recirculating Gravel Filter and Chemical Phosphorus Removal                               | 15                          | 10              | 15                          | 10              | 3.7                   | 1.4             | 6.5                   | 2.1             | 343,816                 | 14        |
| 9/1/2014  | *0.030000         | Recirculating Sand Filter and Moving Bed Biofilm Reactor with Chemical Phosphorus Removal | 15                          | 10              | 20                          | 15              | 1.7                   | 0.6             | 5.6                   | 2.1             | 1,157,390               | 39        |
| 6/2/2012  | 0.038000          | Aerated Lagoon with Recirculating Sand Filter   | 45                          | 30              | 45                          | 30              | 3.7                   | 1.4             | 7.5                   | 2.9             | 4,309,665               | 113       |
| 2/3/2013  | 0.040000          | Moving Bed Biofilm Reactor (can be operated as IFAS)                                      | 15                          | 10              | 20                          | 15              | 3.7                   | 1.4             | 7.5                   | 2.9             | 2,963,181               | 74        |

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

\* Lake Dischargers

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

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

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

As a result of this alternatives analysis, the Department has determined that for a facility that discharges less than 50,000 gallons per day, depending on site-specific conditions, there are technologies available that may be economically efficient and practicable, and that are capable of meeting the effluent limitations in Table 3 or Table 4. If the facility owners do not believe that there is a treatment technology that is both economically efficient and practicable for their facility to meet the limits in Table 3 or Table 4, a site-specific alternatives analysis may be required.

#### **4.3. DESIGN FLOW DETERMINATION**

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

#### **4.4. REGIONALIZATION ALTERNATIVE**

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

The applicant needs to fully evaluate regionalization and consolidation options when deciding on ways to comply with existing and future regulatory requirements. This includes evaluating connecting or selling

their utility to a larger public or private utility. With the rising costs of compliance and often-limited resources

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

#### **4.5. LOSING STREAM ALTERNATIVE DISCHARGE LOCATION**

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

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

#### **4.6. SOCIAL AND ECONOMIC IMPORTANCE EVALUATION**

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

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

### **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(2) Continuing Authorities and 10 CSR 20-6.010(4)(A)5.B., evaluation of no discharge] has been or will be addressed in a Missouri State Operating Permit or Construction Permit Application.
2. A WQAR does not indicate approval or disapproval of alternative analysis as per [10 CSR 20-7.015(4) Losing Streams], and/or any section of the effluent regulations.
3. Changes to Federal and State Regulations made after the drafting of this WQAR may alter Water Quality Based Effluent Limits (WQBEL).
4. Effluent limitations derived from Federal or Missouri State Regulations (FSR) may be WQBEL or Effluent Limit Guidelines (ELG).
5. WQBEL supersede ELG only when they are more stringent. Mass limits derived from technology based limits are still appropriate.
6. A WQAR does not allow discharges to waters of the state, and shall not be construed as a National Pollution Discharge Elimination System or Missouri State Operating Permit to discharge or a permit to construct, modify, or upgrade.
7. Limitations and other requirements in a WQAR may change as Water Quality Standards, Methodology, and Implementation procedures change.

8. Nothing in this WQAR removes any obligations to comply with county or other local ordinances or restrictions.
9. If the proposed treatment technology is not covered in 10 CSR 20-8 Minimum Design Standards, the treatment process may be considered a new technology. As a new technology, the permittee will need to work with the review engineer to ensure equipment is sized properly. The operating permit may contain additional requirements to evaluate the effectiveness of the technology once the facility is in operation. This Antidegradation Review is based on the information provided by the facility and is not a comprehensive review of the proposed treatment technology. If the review engineer determines the proposed technology will not consistently meet proposed effluent limits, the permittee will be required to revise their Antidegradation Report.

## 7. PERMIT LIMITS AND MONITORING INFORMATION

TABLE 3. EFFLUENT LIMITS – ALL OUTFALLS

| PARAMETER                                 | UNITS                          | DAILY<br>MAXIMUM | WEEKLY<br>AVERAGE | MONTHLY<br>AVERAGE | BASIS FOR<br>LIMIT<br>(NOTE 1) | MONITORING<br>FREQUENCY |
|---|--------------------------------|------------------|-------------------|--------------------|--------------------------------|-------------------------|
| FLOW                                      | MGD                            | *                |                   | *                  | FSR                            | ONCE/QUARTER            |
| BIOCHEMICAL OXYGEN DEMAND <sub>5</sub> ** | MG/L                           |                  | 15                | 10                 | PEL                            | ONCE/QUARTER            |
| TOTAL SUSPENDED SOLIDS **                 | MG/L                           |                  | 15                | 10                 | PEL                            | ONCE/QUARTER            |
| pH  | SU                             | 6.5–9.0          |                   | 6.5–9.0            | FSR                            | ONCE/QUARTER            |
| AMMONIA AS N (APR 1 – SEPT 30)            | MG/L                           | 1.7              |                   | 0.6                | PEL                            | ONCE/QUARTER            |
| AMMONIA AS N (OCT 1 – MAR 31)             | MG/L                           | 5.6              |                   | 2.1                | PEL                            | ONCE/QUARTER            |
| TOTAL PHOSPHORUS (NOTE 2)                 | MG/L                           | *                |                   | 0.5                | PEL                            | ONCE/QUARTER            |
| <i>ESCHERICHIA COLIFORM (E. COLI)</i>     | WBC(A) AND<br>WBC (B) (NOTE 3) | #/100ML          | 630***            | 126                | FSR                            | ONCE/QUARTER            |
|   | LOSING STREAM<br>(NOTE 4)      | #/100ML          | 126***            | *                  | FSR                            | ONCE/QUARTER            |

TABLE 4. EFFLUENT LIMITS – OUTFALLS TO LAKES

| PARAMETER                                 | UNITS   | DAILY<br>MAXIMUM | WEEKLY<br>AVERAGE | MONTHLY<br>AVERAGE | BASIS FOR<br>LIMIT<br>(NOTE 1) | MONITORING<br>FREQUENCY |
|---|---------|------------------|-------------------|--------------------|--------------------------------|-------------------------|
| FLOW                                      | MGD     | *                |                   | *                  | FSR                            | ONCE/QUARTER            |
| BIOCHEMICAL OXYGEN DEMAND <sub>5</sub> ** | MG/L    |                  | 15                | 10                 | PEL                            | ONCE/QUARTER            |
| TOTAL SUSPENDED SOLIDS **                 | MG/L    |                  | 20                | 15                 | PEL                            | ONCE/QUARTER            |
| pH  | SU      | 6.5–9.0          |                   | 6.5–9.0            | FSR                            | ONCE/QUARTER            |
| AMMONIA AS N (APR 1 – SEPT 30)            | MG/L    | 3.6              |                   | 1.4                | PEL                            | ONCE/QUARTER            |
| AMMONIA AS N (OCT 1 – MAR 31)             | MG/L    | 7.5              |                   | 2.9                | PEL                            | ONCE/QUARTER            |
| TOTAL PHOSPHORUS (NOTE 2)                 | MG/L    | *                |                   | 0.5                | PEL                            | ONCE/QUARTER            |
| <i>ESCHERICHIA COLIFORM (E. COLI)</i>     | #/100ML | 630***           |                   | 126                | FSR                            | ONCE/QUARTER            |

\* Monitoring requirements only.

\*\* Publicly owned treatment works will be required to meet a removal efficiency of 85% or more for BOD<sub>5</sub> and TSS. Influent BOD<sub>5</sub> and TSS data should be reported to ensure removal efficiency requirements are met.

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

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

NOTE 2 – Total Phosphorus limits are only applicable to discharges to a lake or watershed of a lake that is a water of the state and has an area of at least ten acres during normal pool conditions

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

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

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



## 8. RECEIVING WATER MONITORING REQUIREMENTS

No receiving water monitoring requirements recommended at this time.

## 9. DERIVATION AND DISCUSSION OF LIMITS

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

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

Where C = downstream concentration

C<sub>s</sub> = upstream concentration

Q<sub>s</sub> = upstream flow

C<sub>e</sub> = effluent concentration

Q<sub>e</sub> = effluent flow

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

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

Note: Under 40 CFR 133.105, permitting authorities shall require more stringent limitations than equivalent to secondary treatment limitations for 1) existing facilities if the permitting authority determines that the

30-day average and 7-day average BOD<sub>5</sub> and TSS effluent values that could be achievable through proper operation and maintenance of the treatment works, and 2) new facilities if the permitting authority determines that the 30-day average and 7-day average BOD<sub>5</sub> and TSS effluent values that could be achievable through proper operation and maintenance of the treatment works, considering the design capability of the treatment process.

## 10. 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<sub>5</sub>).** BOD<sub>5</sub> limits of 10 mg/L monthly average and 15 mg/L average weekly were determined by the Department to be achievable and protective of beneficial uses and existing water quality.

*As per the DO Modeling & BOD Effluent Limit Development Administrative Guidance for the Purpose of Conducting Water Quality Assistance Reviews, facilities less than 100,000 gallons per*

day, and proposing BOD treatment less than or equal to an average monthly of 10 mg/L and average weekly of 15 mg/L as demonstrated by performance specifications from a manufacturer or effluent sampling of an existing facility with the same treatment facility are exempt from the DO modeling requirement.

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

- **Total Suspended Solids (TSS)**

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

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

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

- **pH.** – 6.5-9.0 SU. Technology based effluent limitations of 6.0-9.0 SU [10 CSR 20-7.015] are not protective of the Water Quality Standard, which states that water contaminants shall not cause pH to be outside the range of 6.5-9.0 SU. No mixing zone is allowed when using the Department's Alternatives Analysis, therefore the water quality standard must be met at the outfall.
- **Total Ammonia Nitrogen for Table 3.** The Department has determined that the alternatives analysis-based technology limits of 0.6 mg/L monthly average and 1.7 mg/L daily maximum in summer, and 2.1 mg/L monthly average and 5.6 mg/L daily maximum in winter are achievable by some treatment technologies. Because these limits are more protective than the water quality-based limits calculated below for a stream with no mixing, the technology-based limits were used.

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

**Water Quality-Based Effluent Limits (WQBEL):**

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

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

**Summer: April 1 – September 30**

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

Chronic WLA:  $C_e = ((Q_e + 0.0)1.5 - (0.0 * 0.01))/Q_e = 1.5 \text{ mg/L}$

Acute WLA:  $C_e = ((Q_e + 0.0)12.1 - (0.0 * 0.01))/Q_e = 12.1 \text{ mg/L}$

$LTA_c = 1.5 \text{ mg/L (0.780)} = \mathbf{1.17 \text{ mg/L}}$  [CV = 0.6, 99<sup>th</sup> Percentile, 30 day avg.]

$LTA_a = 12.1 \text{ mg/L (0.321)} = 3.89 \text{ mg/L}$  [CV = 0.6, 99<sup>th</sup> Percentile]

$MDL = 1.17 \text{ mg/L (3.11)} = 3.6 \text{ mg/L}$  [CV = 0.6, 99<sup>th</sup> Percentile]

$AML = 1.17 \text{ mg/L (1.19)} = 1.4 \text{ mg/L}$  [CV = 0.6, 95<sup>th</sup> Percentile, n = 30]

Winter: October 1 – March 31

Chronic WLA:  $C_e = ((Q_e + 0.0)3.1 - (0.0 * 0.01))/Q_e = 3.1 \text{ mg/L}$

Acute WLA:  $C_e = ((Q_e + 0.0)12.1 - (0.0025 * 0.01))/Q_e = 12.1 \text{ mg/L}$

$LTA_c = 3.1 \text{ mg/L (0.780)} = \mathbf{2.42 \text{ mg/L}}$  [CV = 0.6, 99<sup>th</sup> Percentile, 30 day avg.]

$LTA_a = 12.1 \text{ mg/L (0.321)} = 3.89 \text{ mg/L}$  [CV = 0.6, 99<sup>th</sup> Percentile]

$MDL = 2.42 \text{ mg/L (3.11)} = 7.5 \text{ mg/L}$  [CV = 0.6, 99<sup>th</sup> Percentile]

$AML = 2.42 \text{ mg/L (1.19)} = 2.9 \text{ mg/L}$  [CV = 0.6, 95<sup>th</sup> Percentile, n = 30]

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

- **Total Ammonia Nitrogen for Table 4.** The Department has determined that the alternatives analysis-based technology limits for lake discharging facilities of 3.6 mg/L summer daily maximum, 1.4 mg/L summer monthly average and 7.5 mg/L winter daily max, 2.9 mg/L winter monthly average are achievable by some treatment technologies. Because these proposed limits are more protective than the water quality-based limits calculated below for a lake with mixing where acute criteria would be applicable for determining the baseline limits, the alternatives analysis limits were used.

Water Quality-Based Effluent Limits (WQBEL):

Early Life Stages Present Total Ammonia Nitrogen criteria apply

[10 CSR 20-7.031(5)(B)7.C. Table B1 & Table B3]. Background total ammonia nitrogen = 0.01 mg/L

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

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

Acute WLA:  $C_e = ((Q_e + 0)12.1 - (0 * 0.01))/Q_e$

$C_e = 12.1 \text{ mg/L}$

$LTA_a = 12.1 \text{ mg/L (0.321)} = \mathbf{3.88 \text{ mg/L}}$  [CV = 0.6, 99<sup>th</sup> Percentile]

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

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

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

- **Total Phosphorus**. Total Phosphorus limits are only applicable to discharges to a lake or watershed of a lake that is a water of the state and has an area of at least ten acres during normal pool conditions. Monthly average of 0.5 mg/L and monitoring only for daily maximum were determined by the Department to be achievable and an appropriate target for the discharge to not cause or contribute to an instream water quality standard excursion or impairment should future modeling by the department occur.
- **Escherichia coli (E. coli)**. Limits will be applied based on the receiving stream designated use.

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

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

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

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

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

$$\text{Chronic WLA: } C_e = ((Q_e + 0.0)10 - (0.0 * 0.0)) / Q_e = 10 \mu\text{g/L}$$

$$\text{Acute WLA: } C_e = ((Q_e + 0.0)19 - (0.0 * 0.0)) / Q_e = 19 \mu\text{g/L}$$

|  |  |
|--|--|
| $LTA_c = 10 \mu\text{g/L} (0.527) = 5.3 \mu\text{g/L}$ | [CV = 0.6, 99 <sup>th</sup> Percentile]        |
| $LTA_a = 19 \mu\text{g/L} (0.321) = 6.1 \mu\text{g/L}$ | [CV = 0.6, 99 <sup>th</sup> Percentile]        |
| $MDL = 5.3 \mu\text{g/L} (3.11) = 16.5 \mu\text{g/L}$  | [CV = 0.6, 99 <sup>th</sup> Percentile]        |
| $AML = 5.3 \mu\text{g/L} (1.55) = 8.2 \mu\text{g/L}$   | [CV = 0.6, 95 <sup>th</sup> Percentile, n = 4] |

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

- **Aluminum, Total Recoverable.** Monitoring only. The facility may use chemicals for phosphorous removal that contain aluminum. Monitoring may be included in the operating permit to determine if reasonable potential exists for this facility's discharge to exceed water quality standards for Aluminum (Total Recoverable).
- **Iron, Total Recoverable.** Monitoring only. This facility may use chemicals for phosphorous removal that contain iron. Monitoring may be included in the operating permit to determine if reasonable potential exists for this facility's discharge to exceed water quality standards for Iron (Total Recoverable).
- **Oil & Grease.** These limits will apply to publicly owned treatment works and may apply to other facilities as appropriate. Conventional pollutant, [10 CSR 20-7.031, Table A1]. Effluent limitation for protection of aquatic life; 10 mg/L monthly average, 15 mg/L daily maximum.

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

## 11. ANTIDEGRADATION REVIEW PRELIMINARY DETERMINATION

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

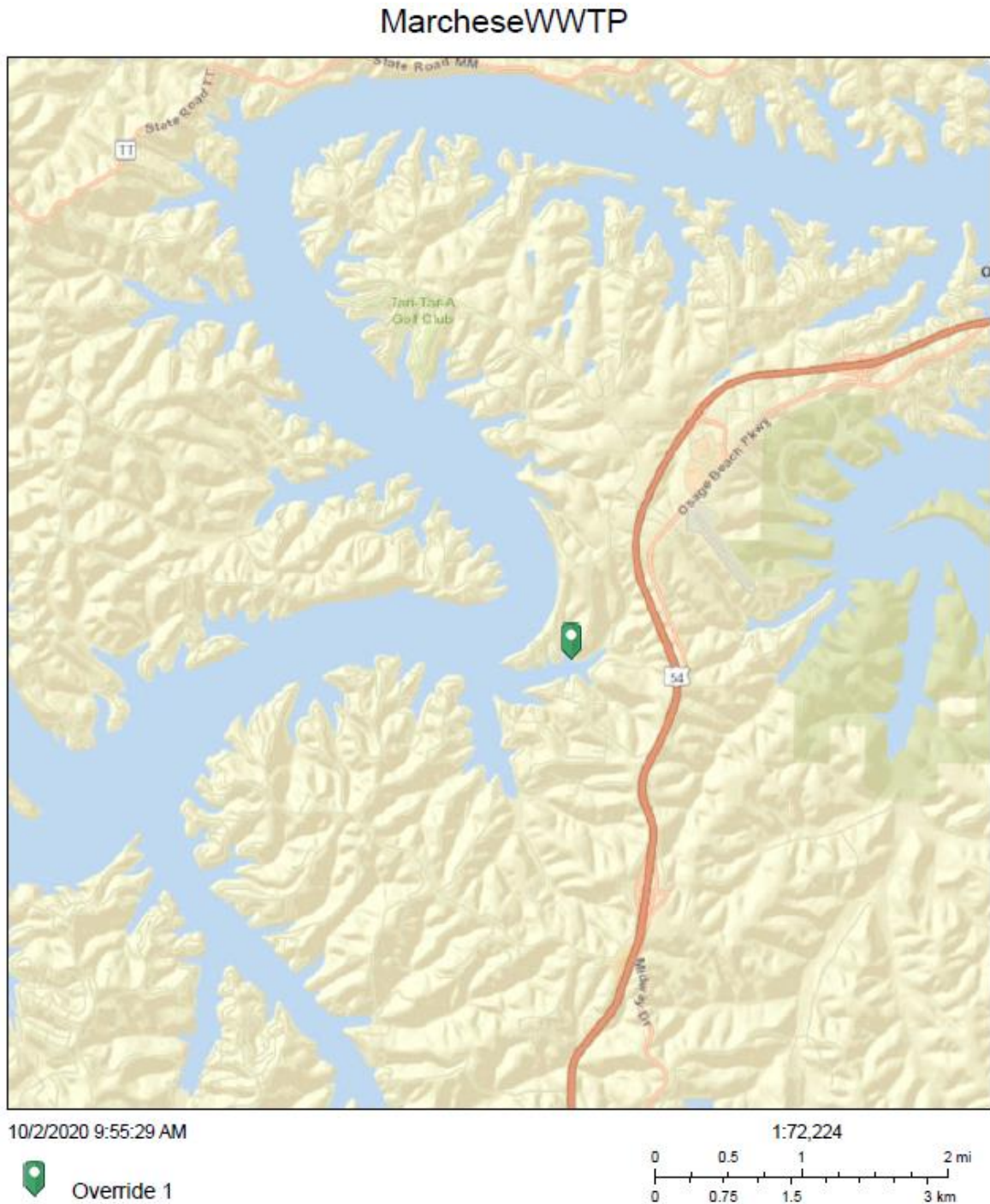
Any treatment option designed to meet these effluent limits may be considered a reasonable alternative in moving forward with the appropriate facility plan, construction permit application, or other future submittals.

If the proposed treatment system is not covered in 10 CSR 20-8 Minimum Design Standards and is considered a new treatment technology, your construction permit application must address approvability of the technology in accordance with the *New Technology Definitions and Requirements* factsheet. If you have any questions regarding the new technology factsheet, please contact Cindy LePage of the Water Protection Program. The permittee will need to work with the review engineer to ensure equipment is

sized properly and that the technology will consistently achieve the proposed effluent limits. The operating permit may contain additional requirements to evaluate the effectiveness of the technology once the facility is in operation.

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

## APPENDIX A: MAP OF DISCHARGE LOCATION



Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

State of Missouri

Although all data in this data set have been compiled by the Missouri Department of Natural Resources, no warranty, expressed or implied, is made by the department as to the accuracy of the data

## APPENDIX B: GEOHYDROLOGIC EVALUATION



LWE20089  
Camden County

August 25, 2020

Jim Jackson, Jr  
PO Box 27  
Camdenton, MO 65020

RECEIVED

SEP 25 2020

Water Protection Program

**RE: Marchese WWTP**

Dear Jim Jackson, Jr:

On June 23, 2020, the Missouri Geological Survey received a request to perform a geohydrologic evaluation for the above referenced project located in Camden County. Included with this letter is a report that details the geologic and hydrologic conditions at the site and the potential for groundwater contamination in the event of wastewater treatment failure.

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

Sincerely,

MISSOURI GEOLOGICAL SURVEY





Molly Starkey  
Geologist  
Environmental Geology Section


c: Francis Marchese  
WPP  
Southwest Regional Office



08/25/2020



|  |  |   |   |  |   |  |
|--|--|---|---|--|---|--|
| <br><br><br>   | <b>Missouri Department Of Natural Resources</b><br>Missouri Geological Survey<br>Geological Survey Program<br>Environmental Geology Section  | <b>Project ID Number</b><br><b>LWE20089</b><br><b>County</b><br><b>Camden</b>   |   |  |   |  |
| <b>Request Details</b>   |  |   |   |  |   |  |
| Project: Marchese WWTP<br><br><b>Organization Official</b><br>Name: Francis Marchese<br>Address: 6622 El Terra<br>City: Osage Beach<br>State: MO Zip: 65020<br>Phone: 573-348-6337<br>Email:   |  | Legal Description: 20 T39N R16W<br>Quadrangle: CAMDENTON<br>Latitude: 38 5 59.71<br>Longitude: -92 41 58.54<br><br><b>Preparer</b><br>Name: Jim Jackson, Jr<br>Address: PO Box 27<br>City: Camdenton<br>State: MO Zip: 65020<br>Phone: 573-872-3898<br>Email: jimjacksonjr@charter.net                                    |   |  |   |  |
| <b>Project Details</b>   |  |   |   |  |   |  |
| Report Date: 08/25/2020<br>Date of Field Visit: 08/06/2020   |  | Previous Reports: Not Applicable  |   |  |   |  |
| <table style="width: 100%;"> <tr> <td style="width: 33%; vertical-align: top;"> <b>Facility Type</b><br/> <input type="checkbox"/> Mechanical treatment plant<br/> <input checked="" type="checkbox"/> Recirculating filter bed<br/> <input type="checkbox"/> Land application<br/> <input type="checkbox"/> Lagoon or storage basin<br/> <input type="checkbox"/> Subsurface soil absorption system<br/> <input type="checkbox"/> Lagoon or storage basin W/Land App<br/> <input type="checkbox"/> Lagoon or storage basin W/SSAS<br/> <input type="checkbox"/> Other type of facility         </td> <td style="width: 33%; vertical-align: top;"> <b>Type of Waste</b><br/> <input type="checkbox"/> Animal<br/> <input checked="" type="checkbox"/> Human<br/> <input type="checkbox"/> Process or industrial<br/> <input type="checkbox"/> Leachate<br/> <input type="checkbox"/> Other waste type         </td> <td style="width: 33%; vertical-align: top;"> <b>Funding Source</b><br/> <input checked="" type="checkbox"/> IWT<br/> <input type="checkbox"/> WWL-SRF<br/><br/> <b>Additional Information</b><br/> <input type="checkbox"/> Plans were submitted<br/> <input type="checkbox"/> Site was investigated by NRCS<br/> <input type="checkbox"/> Soil or geotechnical data were submitted         </td> </tr> </table> |  |   | <b>Facility Type</b><br><input type="checkbox"/> Mechanical treatment plant<br><input checked="" type="checkbox"/> Recirculating filter bed<br><input type="checkbox"/> Land application<br><input type="checkbox"/> Lagoon or storage basin<br><input type="checkbox"/> Subsurface soil absorption system<br><input type="checkbox"/> Lagoon or storage basin W/Land App<br><input type="checkbox"/> Lagoon or storage basin W/SSAS<br><input type="checkbox"/> Other type of facility | <b>Type of Waste</b><br><input type="checkbox"/> Animal<br><input checked="" type="checkbox"/> Human<br><input type="checkbox"/> Process or industrial<br><input type="checkbox"/> Leachate<br><input type="checkbox"/> Other waste type | <b>Funding Source</b><br><input checked="" type="checkbox"/> IWT<br><input type="checkbox"/> WWL-SRF<br><br><b>Additional Information</b><br><input type="checkbox"/> Plans were submitted<br><input type="checkbox"/> Site was investigated by NRCS<br><input type="checkbox"/> Soil or geotechnical data were submitted |  |
| <b>Facility Type</b><br><input type="checkbox"/> Mechanical treatment plant<br><input checked="" type="checkbox"/> Recirculating filter bed<br><input type="checkbox"/> Land application<br><input type="checkbox"/> Lagoon or storage basin<br><input type="checkbox"/> Subsurface soil absorption system<br><input type="checkbox"/> Lagoon or storage basin W/Land App<br><input type="checkbox"/> Lagoon or storage basin W/SSAS<br><input type="checkbox"/> Other type of facility  | <b>Type of Waste</b><br><input type="checkbox"/> Animal<br><input checked="" type="checkbox"/> Human<br><input type="checkbox"/> Process or industrial<br><input type="checkbox"/> Leachate<br><input type="checkbox"/> Other waste type | <b>Funding Source</b><br><input checked="" type="checkbox"/> IWT<br><input type="checkbox"/> WWL-SRF<br><br><b>Additional Information</b><br><input type="checkbox"/> Plans were submitted<br><input type="checkbox"/> Site was investigated by NRCS<br><input type="checkbox"/> Soil or geotechnical data were submitted |   |  |   |  |
| <b>Geologic Stream Classification:</b> <input checked="" type="checkbox"/> Gaining <input type="checkbox"/> Losing <input type="checkbox"/> No discharge   |  |   |   |  |   |  |
| <table style="width: 100%;"> <tr> <td style="width: 25%; vertical-align: top;"> <b>Overall Geologic Limitations</b><br/> <input checked="" type="checkbox"/> Slight<br/> <input type="checkbox"/> Moderate<br/> <input type="checkbox"/> Severe         </td> <td style="width: 25%; vertical-align: top;"> <b>Collapse Potential</b><br/> <input checked="" type="checkbox"/> Not applicable<br/> <input type="checkbox"/> Slight<br/> <input type="checkbox"/> Moderate<br/> <input type="checkbox"/> Severe         </td> <td style="width: 25%; vertical-align: top;"> <b>Topography</b><br/> <input type="checkbox"/> &lt;4%<br/> <input type="checkbox"/> 4% to 8%<br/> <input checked="" type="checkbox"/> 8% to 15%<br/> <input type="checkbox"/> &gt;15%         </td> <td style="width: 25%; vertical-align: top;"> <b>Landscape Position</b><br/> <input type="checkbox"/> Broad uplands    <input type="checkbox"/> Floodplain<br/> <input type="checkbox"/> Ridgetop    <input type="checkbox"/> Alluvial plain<br/> <input checked="" type="checkbox"/> Hillslope    <input type="checkbox"/> Terrace<br/> <input type="checkbox"/> Narrow ravine    <input type="checkbox"/> Sinkhole         </td> </tr> </table>  |  |   | <b>Overall Geologic Limitations</b><br><input checked="" type="checkbox"/> Slight<br><input type="checkbox"/> Moderate<br><input type="checkbox"/> Severe   | <b>Collapse Potential</b><br><input checked="" type="checkbox"/> Not applicable<br><input type="checkbox"/> Slight<br><input type="checkbox"/> Moderate<br><input type="checkbox"/> Severe   | <b>Topography</b><br><input type="checkbox"/> <4%<br><input type="checkbox"/> 4% to 8%<br><input checked="" type="checkbox"/> 8% to 15%<br><input type="checkbox"/> >15%  | <b>Landscape Position</b><br><input type="checkbox"/> Broad uplands <input type="checkbox"/> Floodplain<br><input type="checkbox"/> Ridgetop <input type="checkbox"/> Alluvial plain<br><input checked="" type="checkbox"/> Hillslope <input type="checkbox"/> Terrace<br><input type="checkbox"/> Narrow ravine <input type="checkbox"/> Sinkhole |
| <b>Overall Geologic Limitations</b><br><input checked="" type="checkbox"/> Slight<br><input type="checkbox"/> Moderate<br><input type="checkbox"/> Severe  | <b>Collapse Potential</b><br><input checked="" type="checkbox"/> Not applicable<br><input type="checkbox"/> Slight<br><input type="checkbox"/> Moderate<br><input type="checkbox"/> Severe   | <b>Topography</b><br><input type="checkbox"/> <4%<br><input type="checkbox"/> 4% to 8%<br><input checked="" type="checkbox"/> 8% to 15%<br><input type="checkbox"/> >15%  | <b>Landscape Position</b><br><input type="checkbox"/> Broad uplands <input type="checkbox"/> Floodplain<br><input type="checkbox"/> Ridgetop <input type="checkbox"/> Alluvial plain<br><input checked="" type="checkbox"/> Hillslope <input type="checkbox"/> Terrace<br><input type="checkbox"/> Narrow ravine <input type="checkbox"/> Sinkhole  |  |   |  |
| <b>Bedrock:</b> Ordovician-age Gasconade Dolomite  |  |   |   |  |   |  |
| <b>Surficial Materials:</b> Very gravelly silt loam  |  |   |   |  |   |  |

|   |  |  |
|---|--|--|
|  <b>Missouri Department Of Natural Resources</b><br>Missouri Geological Survey<br>Geological Survey Program<br>Environmental Geology Section   |  | <b>Project ID Number</b><br><b>LWE20089</b><br><b>County</b><br><b>Camden</b>  |
| <b><u>Recommended Construction Procedures for Earthen Facility</u></b><br><input type="checkbox"/> Installation of clay pad and Compaction<br><input type="checkbox"/> Diversion of subsurface flow<br><input type="checkbox"/> Artificial sealing<br><input type="checkbox"/> Rock excavation<br><input type="checkbox"/> Limit excavation depth | <b><u>Determine Overburden Properties</u></b><br><input type="checkbox"/> Particle size analysis<br><input type="checkbox"/> Atterberg limits<br><input type="checkbox"/> 95% Max. dry density test method<br><input type="checkbox"/> Overburden thickness<br><input type="checkbox"/> Permeability coefficient-undisturbed<br><input type="checkbox"/> Permeability coefficient-remolded | <b><u>Determine Hydrologic Conditions</u></b><br><input type="checkbox"/> Groundwater elevation<br><input type="checkbox"/> Direction of groundwater flow<br><input type="checkbox"/> 25-Year flood level<br><input type="checkbox"/> 100-Year flood level |

**Remarks:**

On August 6, 2020 a geologist with the Missouri Geological Survey conducted a geohydrologic evaluation of a proposed recirculating filter bed for the Marchese family at 6622 El Terra Road in Osage Beach, Camden County.

Extremely little soil was observed in the proposed area at the site of the existing treatment system; the area is primarily gravel sized chert and chert residuum. The entire shoreline at the location has been modified, and no bedrock was observed in place. Float cobbles and boulders have been utilized in the construction of retaining walls, and these materials were also chert. Geologic mapping of the area indicates that the uppermost bedrock in this area is the Ordovician-age Gasconade Dolomite, which is consistent with the types of chert nodules observed in the area. Local well logs have a variable depths to bedrock, ranging from less than 10 to over 20 feet.

The proposed facility will discharge into Lake of the Ozarks, which is considered a gaining setting. The overall geologic limitations for a recirculating filter bed at this site are low. In the event of treatment failure, the local shallow groundwater and the surface water of Lake of the Ozarks may be adversely impacted.

## APPENDIX C: NATURAL HERITAGE REVIEW



### Missouri Department of Conservation

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

RECEIVED

SEP 25 2020

Water Protection Program

### **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:** Marchese WWTP #8110

**Project Description:** 2 House Wastewater Treatment Plant. Discharging into the Lake of the Ozarks, Camden County. 38.09987N 92.69960W

**Project Type:** Waste Transfer, Treatment, and Disposal, Liquid waste/Effluent, Effluent Discharge, New outfall/discharge (e.g., NPDES) to stream

**Contact Person:** Jim Jackson

**Contact Information:** jimjacksonjr@charter.net or 573-873-3898

**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.

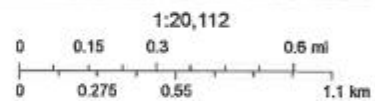
The Natural Heritage Report is not a site clearance letter for the project. It provides an indication of whether or not public lands and sensitive resources are known to be (or are likely to be) located close to the proposed project. Incorporating information from the Natural Heritage Program into project 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](http://www.modot.mo.gov/ehp/index.htm) for additional information on recommendations.

 Project Boundary

 Buffered Project Boundary



Report Created: 9/19/2020 05:16:31 PM



#### **Species or Communities of Conservation Concern within the Area:**

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  
Resource Science Division  
P.O. Box 180  
Jefferson City, MO  
65102-0180  
Phone: 573-522-4115 ext. 3182  
[NaturalHeritageReview@mdc.mo.gov](mailto:NaturalHeritageReview@mdc.mo.gov)

#### **Other Special Search Results:**

No results have been identified for this project location.

#### **Project Type Recommendations:**

**Waste Transfer, Treatment, and Disposal - Liquid Effluent Discharge - New or Renewal of Permit:** Clean Water Act permits issued by other agencies regulate both construction and operation of wastewater systems, and provide many important protections for fish and wildlife resources throughout the project area and at some distance downstream. Fish and wildlife almost always benefit when unnatural pollutants are removed from water, and concerns are minimal if construction is managed to minimize erosion and sedimentation/runoff to nearby streams and lakes, including adherence to any "Clean Water Permit" conditions.

Revegetation of disturbed areas is recommended to minimize erosion, as is restoration with of native plant species compatible with the local landscape and for wildlife needs. Annuals like ryegrass may be combined with native perennials for quicker green-up. Avoid aggressive exotic perennials such as crown vetch and sericea lespedeza.

#### **Project Location and/or Species Recommendations:**

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

The project location submitted and evaluated is within the geographic range of nesting Bald Eagles in Missouri. Bald Eagles (*Haliaeetus leucocephalus*) may nest near streams or water bodies in the project area. Nests are large and fairly easy to identify. Adults begin nesting activity in late December and January and young birds leave the nest in late spring to early summer. While no longer listed as endangered, eagles continue to be protected by the federal government under the Bald and Golden Eagle Protection Act. Work managers should be alert for nesting areas within 1500 meters of project activities, and follow federal guidelines at: <http://www.fws.gov/midwest/MidwestBird/EaglePermits/index.html> if eagle nests are seen.

The project location submitted and evaluated is within the range of the Gray Myotis (i.e., Gray Bat) in Missouri. Depending on habitat conditions of your project's location, Gray Myotis (*Myotis grisescens*, federal and state-listed endangered) could occur within the project area, as they forage over streams, rivers, lakes, and reservoirs. Avoid entry or disturbance of any cave inhabited by Gray Myotis and when possible retain forest vegetation along the stream and from the cave opening to the stream. See <http://mdc.mo.gov/104> for best management recommendations.

**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  
Resource Science Division  
P.O. Box 180  
Jefferson City, MO  
65102-0180  
Phone: 573-522-4115 ext. 3182  
[NaturalHeritageReview@mdc.mo.gov](mailto: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](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 D: ANTIDEGRADATION REVIEW SUMMARY FORMS

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

- 1) Antidegradation Review Summary / Request form:
  - a. Average monthly phosphorus effluent limits of 0.5 mg/L were included.

RECEIVED  
SEP 25 2020

|  |  |                                |  |
|--|--|--------------------------------|--|
|  <b>MISSOURI DEPARTMENT OF NATURAL RESOURCES</b><br>WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH<br><b>ANTIDEGRADATION REVIEW SUMMARY / REQUEST</b> |  | <b>FOR DEPARTMENT USE ONLY</b> |  |
|  |  | APP NO.                        |  |
|  |  | REF. RECEIVED / CHECK NO.      |  |
|  |  | DATE RECEIVED                  |  |

**1. FACILITY**

|   |                                 |                  |                   |
|---|---------------------------------|------------------|-------------------|
| NAME<br>Marchese Wastewater Treatment Plant |                                 | COUNTY<br>Camden |                   |
| ADDRESS (PHYSICAL)<br>6618 El Terra Road    | CITY<br>Osage Beach             | STATE<br>MO      | ZIP CODE<br>65065 |
| PERMIT NUMBER                               | PROPOSED DESIGN FLOW<br>740 gpd | SIC / NAICS CODE |                   |

**2. OWNER**

|                               |                                 |             |                   |
|-------------------------------|---------------------------------|-------------|-------------------|
| NAME<br>Francis Marchese      |                                 |             |                   |
| ADDRESS<br>6622 El Terra Road | CITY<br>Osage Beach             | STATE<br>MO | ZIP CODE<br>65065 |
| 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<br>Francis Marchese      |   | SECRETARY OF STATE CHARTER NUMBER |                   |
| ADDRESS<br>6622 El Terra Road | CITY<br>Osage Beach                             | STATE<br>MO                       | ZIP CODE<br>65065 |
| EMAIL ADDRESS                 | TELEPHONE NUMBER WITH AREA CODE<br>573-348-6337 |                                   |                   |

**4. CONSULTANT**

|  |   |   |                   |
|--|---|---|-------------------|
| PREPARER NAME<br>James O. Jackson, Jr., PE |   | COMPANY NAME<br>Lake Professional Engineering Services, Inc |                   |
| ADDRESS<br>PO Box 27                       | CITY<br>Camdenton                               | STATE<br>MO   | ZIP CODE<br>65020 |
| EMAIL ADDRESS<br>jimjacksonjr@charter.et   | TELEPHONE NUMBER WITH AREA CODE<br>573-873-3898 |   |                   |

**5. RECEIVING WATER BODY SEGMENT #1**

|   |  |
|---|--|
| NAME<br>Lake of the Ozarks  |  |
| 5.1 Upper end of segment – Location of discharge<br>UTM: X= _____ Y= _____ OR Lat N 38.09991 Long W 92.69954  |  |
| 5.2 Lower end of segment –<br>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<br>UTM: X= _____ Y= _____ OR Lat _____ Long _____ |  |
| 6.2 Lower end of segment –<br>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 light


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.





|  |           |
|--|-----------|
| <b>12. PROPOSED PROJECT SUMMARY</b>  |           |
| Construction of a discharging wastewater treatment plant consisting of Advantex AX-20 pods with the needed recirculation tanks and disinfection components to treat the wastewater from two residential houses in Camden County  |           |
| Applicants choosing to use a new wastewater technology that are considered an "unproven technology" in Missouri must comply with the requirements set forth in the <i>New Technology Definitions and Requirements fact sheet</i> .   |           |
| <b>13. CONTINUING AUTHORITY WAIVER (For New Discharges)</b>  |           |
| In accordance with 10 CSR 20-6.010(2)(C), applicants proposing use of a lower preference continuing authority, when the higher level authority is available, must submit a waiver from the existing higher authority one or other documentation for the department's review, provided it does not conflict with any area-wide management plan approved under section 208 of the Federal Clean Water Act or by the Missouri Clean Water Commission. Is the waiver necessary? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No<br>If yes, provide a copy. |           |
| <b>14. APPLICATION FEE</b>   |           |
| <input checked="" type="checkbox"/> CHECK NUMBER   | 3093      |
| <input type="checkbox"/> JETPAY CONFIRMATION NUMBER  |           |
| <b>15. SIGNATURE</b>   |           |
| 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      |
|   | 8/20/2020 |
| PRINT NAME   | TITLE     |
| Francis Marchese   | Owner     |
| PLEASE IDENTIFY YOUR STATUS FOR THIS PROJECT: <input checked="" type="checkbox"/> OWNER <input type="checkbox"/> CONTINUING AUTHORITY <input type="checkbox"/> CONSULTANT  |           |

- 2) Antidegradation Review Submittal: Voluntary Tier 2 – Significant Degradation for Domestic Wastewater Facilities with Design Flow Less Than 50,000 Gallons Per Day:
- a. No changes necessary.

| RECEIVED  |           |
|---|-----------|
| SEP 25 2020   |           |
|    |           |
| MISSOURI DEPARTMENT OF NATURAL RESOURCES<br>WATER PROTECTION PROGRAM, WATER POLLUTION CONTROL BRANCH<br><b>ANTIDEGRADATION REVIEW SUBMITTAL</b><br>Water Protection Program<br><b>VOLUNTARY TIER 2 – SIGNIFICANT DEGRADATION FOR DOMESTIC WASTEWATER FACILITIES WITH DESIGN FLOW LESS THAN 50,000 GALLONS PER DAY</b> |           |
| <b>FOR DEPARTMENT USE ONLY</b>  |           |
| APP NO.   |           |
| CHECK NO.   | CHECK NO. |
| DATE RECEIVED   |           |

| 1. APPLICABILITY   |   |                              |  |
|--|---|------------------------------|--|
| If you answer "Yes" to any of the below questions, a site-specific alternatives analysis may be required.  |   |                              |  |
| The Missouri Department of Natural Resources' alternatives analysis is <i>not</i> applicable to facilities that have a Total Maximum Daily Load (TMDL) or are 303(d) or 305(b) listed for the pollutants of concern addressed in this alternatives analysis, with an exception for <i>E. coli</i> since disinfection will be required. |   |                              |  |
| Facilities currently under enforcement will need to coordinate with the Water Protection Program's compliance and enforcement section to determine applicability for the department's alternatives analysis.   |   |                              |  |
| 1.1  | Does the receiving waterbody or downstream waterbody have a Total Maximum Daily Load (TMDL)?                    | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| 1.2  | Is the receiving waterbody or downstream waterbody 303(d) or 305(b) listed as impaired or potentially impaired? | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| 1.3  | Is the facility currently under enforcement with the department or the U.S. Environmental Protection Agency?    | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| 1.4  | Is the design flow 50,000 gallons per day or more?  | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| 1.5  | Is a non-discharging system a viable option?  | <input type="checkbox"/> Yes | <input checked="" type="checkbox"/> No |
| Submit the following with this form:   |   |                              |  |
| <input checked="" type="checkbox"/> Regionalization and No Discharge Evaluation Form – Available on the department's website   |   |                              |  |
| <input checked="" type="checkbox"/> Copy of the Geohydrologic Evaluation – Submit request through the Missouri Geological Survey website   |   |                              |  |
| <input checked="" type="checkbox"/> Copy of the Missouri Natural Heritage Review from the Missouri Department of Conservation website  |   |                              |  |

| 2. FACILITY                         |             |        |          |
|-------------------------------------|-------------|--------|----------|
| NAME                                |             | COUNTY |          |
| Marchese Wastewater Treatment Plant |             | Camden |          |
| ADDRESS (PHYSICAL)                  | CITY        | STATE  | ZIP CODE |
| 6622 El Terra Road                  | Osage Beach | MO     | 65065    |

| 3. OWNER           |                                 |       |          |
|--------------------|---------------------------------|-------|----------|
| NAME               |                                 |       |          |
| Francis Marchese   |                                 |       |          |
| ADDRESS            | CITY                            | STATE | ZIP CODE |
| 6622 El Terra Road | Osage Beach                     | MO    | 65065    |
| EMAIL ADDRESS      | TELEPHONE NUMBER WITH AREA CODE |       |          |

| 4. CONTINUING AUTHORITY The regulatory requirement regarding continuing authority is found in 10 CSR 20-6.010(2). |                                 |                                   |          |
|---|---------------------------------|-----------------------------------|----------|
| NAME  |                                 | SECRETARY OF STATE CHARTER NUMBER |          |
| Francis Marchese  |                                 |                                   |          |
| ADDRESS   | CITY                            | STATE                             | ZIP CODE |
| 6622 El Terra Road  | Osage Beach                     | MO                                | 65065    |
| EMAIL ADDRESS   | TELEPHONE NUMBER WITH AREA CODE |                                   |          |
|   | 573-348-                        |                                   |          |

|  |  |
|--|--|
| <b>5. RECEIVING WATER BODY SEGMENT #1</b>  |  |
| NAME<br>Lake of the Ozarks   |  |
| 5.1 Upper end of segment – Location of discharge<br>UTM: X= _____, Y= _____ OR Lat N 38.09991 _____, Long W 92.69954 _____   |  |
| 5.2 Lower end of segment –<br>UTM: X= _____, Y= _____ OR Lat _____, Long _____ Per the Missouri Antidegradation Implementation Procedure (AIP), the definition of a segment is: "A section of water that is bound, at a minimum, by significant existing sources and confluences with other significant water bodies."   |  |
| <b>6. WATER BODY SEGMENT #2 (If Necessary)</b>   |  |
| NAME   |  |
| 6.1 Upper end of segment – End of Segment #1<br>UTM: X= _____, Y= _____ OR Lat _____, Long _____   |  |
| 6.2 Lower end of segment –<br>UTM: X= _____, Y= _____ OR Lat _____, Long _____   |  |
| <b>7. SOCIAL AND ECONOMIC IMPORTANCE OF THE PREFERRED ALTERNATIVE</b>  |  |
| This section must be completed with adequate and thorough descriptions of the social and economic importance associated with the proposed project in accordance with the Antidegradation Implementation Procedure Section II.E. for discharge to be allowed.   |  |
| Social and economic importance is defined as the social and economic benefits to the community that will occur from any activity involving a new or expanding discharge.   |  |
| <b>7.1 Identify the affected community:</b><br>(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.")<br><br>The site for the proposed treatment plant is located on El Terra Road, Osage Beach, Missouri. The subdivision is located approximately 1.25 miles from the city limits of Osage Beach. The area is primarily composed of older midrange housing with the two residential houses located on the shoreline of the Lake of the Ozarks. The addition of the wastewater treatment plant would remove a leaking septic drain field for two residential houses from the Lake of the Ozarks. The leaking drain field is an environmental hazard to the residents of the Lake of the Ozarks as well as to the surrounding animal life. The Lake of the Ozarks has been the target of an E.Coli investigation and there is pending legislation that would declare the Lake of the Ozarks as a distressed waterway. If the Lake of the Ozarks is declared a distressed waterway, septic fields will become the primary source of investigation. This proposed treatment plant would remove the effluent of a leaking septic field two- residential houses from entering the Lake of the Ozarks. Therefore, the effected community is the people who vacation and enjoy the Lake of the Ozarks as well as the landowners and residents of the Lake of the Ozarks area. |  |
| <b>7.2 Identify the important social and economic development associated with the project:</b><br><br>Will the proposed discharging activity:  |  |
| Create or expand employment?   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/> N/A |
| Increase median family income?   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/> N/A |
| Reduce the number of households below the poverty line?  | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/> N/A |
| Increase the community tax base?   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/> N/A |
| Increase needed housing supply?  | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/> N/A |
| Provide necessary public services (e.g., school, infrastructure, fire department, etc.)?   | <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/> N/A |
| Correct a public health, safety, or environmental problem?   | <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Don't know <input type="checkbox"/> N/A |
| Other:   |  |

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

The applicant must describe the expected changes in the factors identified in question 7.2 that are associated with the project and provide information on any additional items demonstrating important social and economic development. The applicant should first describe the existing condition of the affected community. This base condition should then be compared to the predicted change (benefit) in social and economic condition after the discharge is allowed. The social and economic measures identified above do not constitute a comprehensive list. Each situation and community is different and will require an analysis of unique social and economic factors in accordance with the Antidegradation Implementation Procedure Section II.E.1.

The construction of the wastewater treatment plant would remove a failing unmonitored on-site septic systems from leaching into the Lake of the Ozarks. This in turn would help keep the waters of the Lake of the Ozarks clean. The treatment plant would provide monitored sewage treatment at acceptable discharge levels utilizing a recirculating fabric filter technology.

**7.4 Is any other written correspondence or documentation included with this application to provide further evidence of social and economic importance:**

☒ No

☐ Yes

☐ Letter(s) from the mayor or community in support of the proposed project

☐ Rezoning approval

☐ Other:

**8. NO DISCHARGE ALTERNATIVES EVALUATION**

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


You must submit the *Regionalization and No-Discharge Evaluation Form (780-2805)* to demonstrate that a non-discharging alternative is not feasible. If sufficient information is not provided on the *No-Discharge Evaluation Form* to demonstrate that a non-discharging facility is not feasible, a more detailed evaluation of no discharge options must be submitted.

**9. IDENTIFY PREFERRED TREATMENT ALTERNATIVE**

Describe your preferred treatment alternative that has been recommended or approved by a registered professional engineer licensed to practice in Missouri. The preferred treatment alternative must be capable of meeting the effluent limits in the table under item 10 of this form.

Applicants choosing to use a new wastewater technology considered an "unproven technology" in Missouri must comply with the requirements set forth in the Innovative Technology factsheet found on the department's website.

The preferred alternative is the Orenco Advantex. Although other forms of treatment were more economically efficient and performed just as effectively, the Orenco Advantex is chosen due to the size constraints of the available area and the aesthetics of the Advantex unit

|  |             |   |   |
|--|-------------|---|---|
| ENGINEERING CONSULTANT NAME<br>James O. Jackson, Jr., PE   |             | COMPANY NAME<br>Lake Professional Engineering Services, Inc |   |
| ADDRESS<br>PO Box 27, Camdenton  | STATE<br>MO | ZIP CODE<br>65020   | TELEPHONE NUMBER WITH AREA CODE<br>573-873-3898 |
| SIGNATURE<br> |             | EMAIL ADDRESS<br>Jim.Jackson-Jr@Charter.net                 |   |



10. SUMMARY OF THE POLLUTANTS OF CONCERN AND EFFLUENT LIMITS

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

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

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

| EFFLUENT LIMITS— OUTFALLS TO LAKES         |                    |               |                |                 |
|--|--------------------|---------------|----------------|-----------------|
| Pollutant of Concern*                      | Units              | Daily Maximum | Weekly Average | Monthly Average |
| BOD <sub>5</sub>                           | MG/L               |               | 15             | 10              |
| TSS  | MG/L               |               | 20             | 15              |
| pH   | SU                 | 6.5– 9.0      |                | 6.5 – 9.0       |
| Ammonia as N Summer                        | MG/L               | 3.6           |                | 1.4             |
| Ammonia as N Winter                        | MG/L               | 7.5           |                | 2.9             |
| Total Phosphorus****                       | MG/L               | *             |                | 0.5             |
| <i>Escherichia coli</i> ( <i>E. coli</i> ) | #/100ML            | 630***        |                | 126             |
| EFFLUENT LIMITS— ALL OTHER OUTFALLS        |                    |               |                |                 |
| BOD <sub>5</sub>                           | mg/L               |               | 15             | 10              |
| TSS  | mg/L               |               | 15             | 10              |
| pH   | SU                 | 6.5– 9.0      |                | 6.5 – 9.0       |
| Ammonia as N Summer                        | mg/L               | 1.7           |                | 0.6             |
| Ammonia as N Winter                        | mg/L               | 5.6           |                | 2.1             |
| Total Phosphorus****                       | mg/L               | *             |                | 0.5             |
| <i>Escherichia coli</i> ( <i>E. coli</i> ) | WBC(A) AND WBC (B) | #/100 ML      | 630***         | 126             |
|  | Losing Stream**    | #/100 ML      | 126***         | Monitoring only |

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

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

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

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

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


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

|   |   |
|---|---|
| <b>11. APPLICATION FEE</b>  |   |
| <input checked="checked" type="checkbox"/> CHECK NUMBER <u>3093</u>   | <input type="checkbox"/> JETPAY CONFIRMATION NUMBER |
| <b>12. SIGNATURE</b>  |   |
| 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<br><u>Francis J. Marchese</u>   | DATE<br><u>9/20/2020</u>                            |
| PRINT NAME<br><u>Francis Marchese</u>   | TITLE<br><u>Owner</u>                               |
| PLEASE IDENTIFY YOUR STATUS FOR THIS PROJECT: <input checked="checked" type="checkbox"/> OWNER <input type="checkbox"/> CONTINUING AUTHORITY <input type="checkbox"/> CONSULTANT                  |   |

3) Antidegradation: Regionalization and No-Discharge Evaluation:

- a. No changes necessary.

RECEIVED  
SEP 25 2020  
Water Protection Program

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

| REGIONALIZATION AND NO-DISCHARGE EVALUATION  |        |
|--|--------|
| <p>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.</p> <p>Please refer to the <i>No-Discharge Alternative Evaluation</i> fact sheet for examples of information to provide to justify common reasons for not pursuing regionalization or no-discharge land application. If sufficient information is not provided on this form to demonstrate that these alternatives are not feasible, a more detailed evaluation of no-discharge options may have to be submitted.</p> <p>Additional pages may be attached if more room is needed.</p> |        |
| <b>1. FACILITY:</b>  |        |
| NAME   | COUNTY |
| Marchese Wastewater Treatment Plant  | Camden |
| <b>2. EVALUATION OF REGIONALIZATION</b> (Complete all applicable reasons why regionalization was not pursued)  |        |
| <b>2.1 Regionalization Feasibility:</b>  |        |
| A. What is the distance to connect to the closest municipality's line or other facility's line? 1.25 miles   |        |
| B. List facilities contacted about possible regionalization. City of Osage Beach   |        |
| C. Is there any planning or zoning in the area regarding development and services? Camden County Planning and Zoning   |        |
| D. Who would have the responsibility to maintain the sewer connection line? Francis Marchese   |        |
| E. What is the estimated cost for piping and pumps to regionalize? \$218,000   |        |
| F. Explain any engineering challenges with the regionalization connection – topography, rivers, highways, or other issues.<br>Undulating terrain   |        |
| G. Does a regional facility have the capacity to treat the additional effluent from this project? Yes  |        |
| H. Were land owners contacted for rights to an easement? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No   |        |
| I. Describe the easement issues:<br>Easements from 23 landowners would have to be acquired. If one land owner refused then the project could not move forward.   |        |
| <b>2.2 Summarize why regionalization was not a practicable or economically efficient alternative</b><br>Easements from 23 landowners would have to be acquired. If one land owner refused then the project could not move forward.   |        |



### 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: The houses take up most of the lots.

If yes, answer the following:

B. How many acres are required for land application of the effluent? 2.42 acres or 18,000 square feet

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

D. Were long-term costs evaluated and compared for upgrading to a mechanical plant with future Water Quality Standards changes (i.e. mussel ammonia, bacteria, TP, TN) versus cost for a land application system? ☐ Yes ☒ No

E. Were land owners contacted for rights to an easement? ☒ Yes ☐ No

F. Describe the easement issues:

Neighbor across the street was contacted about using his available area for a septic field. He agreed and plans were drawn up. Camden County Wastewater Department approved the plans contingent upon the neighbor signing a septic easement. The neighbor refused to sign the easement stating that he decided that he might need to use the area in the future and had changed his mind.

#### ☐ 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

The area needed for on on-site septic system is 6,000 square feet. The available area is 676 square feet.

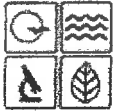
#### 4. DOCUMENTATION

**4.1 Is any other written correspondence or documentation included with this application to provide further justification for not pursuing a no-discharge option or regionalization?**

☐ No

☒ Yes:

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



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

RECEIVED

Water Protection Program

**FOR DEPARTMENT USE ONLY**

|               |           |
|---------------|-----------|
| APP NO.       | GP NO.    |
| FEE RECEIVED  | CHECK NO. |
| DATE RECEIVED |           |

*Handwritten:* \$100,000, 3186, 12-9-20, 8B

**APPLICATION OVERVIEW**

The Application for Construction Permit – Wastewater Treatment Facility form has been developed in a modular format and consists of Part A and B. **All applicants must complete Part A.** Part B should be completed for applicants who currently land-apply wastewater or propose land application for wastewater treatment. **Please read the accompanying instructions before completing this form. Submittal of an incomplete application may result in the application being returned.**

**PART A – BASIC INFORMATION**

**1.0 APPLICATION INFORMATION** (Note – If any of the questions in this section are answered NO, this application may be considered incomplete and returned.)

- 1.1 Is this a Federal/State funded project? ☐ YES ☒ N/A Funding Agency: \_\_\_\_\_ Project #: \_\_\_\_\_
- 1.2 Has the Missouri Department of Natural Resources approved the proposed project's antidegradation review?  
☐ YES Date of Approval: \_\_\_\_\_ ☐ N/A
- 1.3 Has the department approved the proposed project's facility plan\*?  
☐ YES Date of Approval: \_\_\_\_\_ ☒ NO (If No, complete No. 1.4.)
- 1.4 [Complete only if answered No on No. 1.3.] Is a copy of the facility plan\* for wastewater treatment facilities included with this application?  
☒ YES ☐ NO ☐ Exempt because \_\_\_\_\_
- 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<br><i>Marchese WWTP</i>   | 2.2 ESTIMATED PROJECT CONSTRUCTION COST<br><i>\$ 60,000</i> |
| 2.3 PROJECT DESCRIPTION<br><i>2 Advantex AX20 Recirc Tank &amp; UV lights Anox tank Recirc Stage II tank AX20 Polish filter for 2 Homes</i>   |   |
| 2.4 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION<br><i>A+A Septic-Septic tank</i>  |   |
| 2.5 DESIGN INFORMATION<br>A. Current population: <i>7.4</i> ; Design population: <i>7.4</i><br>B. Actual Flow: <i>555</i> gpd; Design Average Flow: <i>555</i> gpd;<br>Actual Peak Daily Flow: <i>2000</i> gpd; Design Maximum Daily Flow: <i>555</i> gpd; Design Wet Weather Event: <i>0</i> |   |
| 2.6 ADDITIONAL INFORMATION<br>A. Is a topographic map attached? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO<br>B. Is a process flow diagram attached? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO   |   |

**3.0 WASTEWATER TREATMENT FACILITY**

|  |  |  |                    |                          |                         |
|--|--|--|--------------------|--------------------------|-------------------------|
| NAME<br><u>Marchese WWTP</u>   |  | TELEPHONE NUMBER WITH AREA CODE<br><u>573-348-6337</u> |                    | E-MAIL ADDRESS           |                         |
| ADDRESS (PHYSICAL)<br><u>1418 El Terra Rd</u>  |  | CITY<br><u>Osage Beach</u>                             | STATE<br><u>MO</u> | ZIP CODE<br><u>65065</u> | COUNTY<br><u>Camden</u> |
| Wastewater Treatment Facility: Mo- (Outfall Of )   |  |  |                    |                          |                         |
| 3.1 Legal Description: _____ ¼, _____ ¼, _____ ¼, Sec. <u>20</u> , T <u>39</u> , R <u>16</u><br>(Use additional pages if construction of more than one outfall is proposed.) |  |  |                    |                          |                         |
| 3.2 UTM Coordinates Easting (X): _____ Northing (Y): _____<br>For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)         |  |  |                    |                          |                         |
| 3.3 Name of receiving streams: <u>Lake of the Ozarks</u>   |  |  |                    |                          |                         |

**4.0 PROJECT OWNER**

|   |  |  |                    |                          |  |
|---|--|--|--------------------|--------------------------|--|
| NAME<br><u>Francis Marchese</u>   |  | TELEPHONE NUMBER WITH AREA CODE<br><u>573-348-6337</u> |                    | E-MAIL ADDRESS           |  |
| ADDRESS<br><u>1422 El Terra Rd</u>  |  | CITY<br><u>Osage Beach</u>                             | STATE<br><u>MO</u> | ZIP CODE<br><u>65065</u> |  |
| 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<br><u>Francis Marchese</u>    |  | TELEPHONE NUMBER WITH AREA CODE<br><u>573-348-6337</u> |                    | E-MAIL ADDRESS           |  |
| ADDRESS<br><u>1422 El Terra Rd</u> |  | CITY<br><u>Osage Beach</u>                             | STATE<br><u>MO</u> | ZIP CODE<br><u>65065</u> |  |

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 ☒ NOB. 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 ☒ NOC. 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 ☒ NOD. 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<br><u>Jim Jackson Jr Lake PE</u> |  | TELEPHONE NUMBER WITH AREA CODE<br><u>573-873-3898</u> |                    | E-MAIL ADDRESS<br><u>Jim.Jackson.Jr@charter.net</u> |  |
| ADDRESS<br><u>83 Oak Tree Rd</u>                              |  | CITY<br><u>Camden</u>                                  | STATE<br><u>MO</u> | ZIP CODE<br><u>65020</u>                            |  |

**7.0 APPLICATION FEE**☒ CHECK NUMBER 3126 ☐ 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

Francis Marchese

PRINTED NAME

Francis Marchese

DATE

TITLE OR CORPORATE POSITION

Owner

TELEPHONE NUMBER WITH AREA CODE

E-MAIL ADDRESS

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.**