STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION

CONSTRUCTION PERMIT

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

Bryan Adams, Aviary Recovery Center CEO
Summit Behavioral Health Center WWTF
22933 HWY 61
Eolia, MO 63344

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.

October 4, 2021
Effective Date

Edward B. Galbraith, Director, Division of Environmental Quality

October 3, 2023
Expiration Date

Chris Wieberg, Director, Water Protection Program
CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

Construction will include installation of two 5,000 gallon septic tanks in parallel (to replace one of the existing septic tanks), an additional 1,500-gallon pump tank with an Orenco PKP350 submersible effluent pump (capable of approximately 33 gpm against a 20-ft TDH) to pump to a new earthen holding basin (approximately 176 ft by 96 ft at the bottom, with a total depth of 7 ft, for approximately 568,000-gallon capacity from 1 to 4½ feet with approximately 126 days of dry-weather capacity and an estimated 74 days of wet-weather capacity) with an Orenco PKP350 submersible pump and a concrete level gauge along the berm, and a duplicate manual disc filter (Netafim 1-inch, 120-mesh) between the existing pump tanks and existing subsurface drip distribution system. The construction will include installation of 2-inch PVC CL200 force main between the new pump tank and basin and between the basin and existing splitter tank, with 2 air release valves.

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 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 Kyle Pociask, P.E., with Four Points Land Surveying & Engineering, 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 Northeast Regional Office per 10 CSR 20-7.015(9)(G).

5. The wastewater treatment facility shall be located at least 200 feet from any dwelling or establishment and at least 50 feet to the property line per 10 CSR 20-8.140(2)(C)2.

6. 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.

7. In addition to the requirements for a construction permit, 10 CSR 20-6.200 requires land disturbance activities of 1 acre or more to obtain a Missouri state operating permit to discharge stormwater. The permit requires best management practices sufficient to control runoff and sedimentation to protect waters of the state. Land disturbance permits will only be obtained by means of the Department’s ePermitting system available online at https://dnr.mo.gov/data-e-services/missouri-gateway-environmental-management-mogem. See https://dnr.mo.gov/data-e-services/water/electronic-permitting-epermitting for more information.

8. A United States Army Corps of Engineers (USACE) Clean Water Act Section 404 Department of the Army permit and a Section 401 Water Quality Certification issued by the Department may be required for the activities described in this permit. This permit is not valid until these requirements are satisfied or notification is provided that no Section 404 permit is required by the USACE. You must contact your local USACE district since they determine what waters are jurisdictional and which permitting requirements may apply. You may call the Department’s Water Protection Program, Operating Permits Section at 573-522-4502 for more information. See https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/section-401-water-quality for more information.
9. 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 300 feet. 10 CSR 20-8.140(2)(C)1.

- No treatment unit with a capacity of twenty-two thousand five hundred gallons per day (22,500 gpd) or less shall be located closer than the minimum distance of 200' to a neighboring residence and 50' to property line for lagoons; 200' to a neighboring residence for open recirculating media filters following primary treatment; and 50' to a neighboring residence for all other discharging facilities. See 10 CSR 20-2.010(68) for the definition of a residence. 10 CSR 20-8.140(2)(C)2

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

- 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.

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

- 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.

- Where a potable water supply is to be used for any purpose in a wastewater treatment facility other than direct connections, a break tank, pressure pump, and pressure tank or a reduced pressure backflow preventer consistent with the department’s Public Drinking Water Branch shall be provided. 10 CSR 20-8.140(7)(D)3.A.

- A means of flow measurement shall be provided at all wastewater treatment facilities. 10 CSR 20-8.140(7)(E)
• Adequate provisions shall be made to effectively protect facility personnel and visitors from hazards. The following shall be provided to fulfill the particular needs of each wastewater treatment facility:
  o Fencing. Enclose the facility site with a fence designed to discourage the entrance of unauthorized persons and animals; 10 CSR 20-8.140(8)(A)
  o Appropriate personal protective equipment (PPE); 10 CSR 20-8.140(8)(E)
  o Appropriately-placed warning signs for slippery areas, non-potable water fixtures (see subparagraph (7)(D)3.B. of this rule), low-head clearance areas, open service manholes, hazardous chemical storage areas, flammable fuel storage areas, high noise areas, etc.; 10 CSR 20-8.140(8)(I)

• 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)

• Lagoon berms shall be constructed of relatively impervious material and compacted to at least ninety-five percent (95%) maximum dry density test method to form a stable structure. 10 CSR 20-8.200(4)(A)1.

• The minimum berm width shall be eight feet (8') to permit access of maintenance vehicles. 10 CSR 20-8.200(4)(A)2.

• Minimum freeboard shall be two feet (2'). 10 CSR 20-8.200(4)(A)3.

• An emergency spillway shall be provided that—
  o Prevents the overtopping and cutting of berms; 10 CSR 20-8.200(4)(A)4.A.
  o Is compacted and vegetated or otherwise constructed to prevent erosion; 10 CSR 20-8.200(4)(A)4.B. and
  o Has the ability for a representative sample to be collected, if discharging. 10 CSR 20-8.200(4)(A)4.C.

• The soil of the lagoon bottom shall be compacted with the moisture content between two percent (2%) below and four percent (4%) above the optimum water content and compacted to at least ninety-five percent (95%) maximum dry density test method. 10 CSR 20-8.200(4)(B)

• The lagoon shall be sealed to ensure that seepage loss is as low as possible and has a design permeability not exceeding 1.0 x 10-7 cm/sec. 10 CSR 20-8.200(4)(C)1.
• The minimum thickness of the compacted clay liner must be twelve inches (12"). For permeability coefficients greater than $1.0 \times 10^{-7}$ cm/sec or for heads over five feet (5') such as an aerated lagoon system, the following formula shall be used to determine minimum seal thickness, Equation 200-1 per 10 CSR 20-8.200(4)(C)2:

$$t = \frac{H \times K}{5.4 \times 10^{-7} \text{ cm/sec}}$$

where:

K = the permeability coefficient of the soil in question;
H = the head of water in the lagoon; and

t = the thickness of the soil seal.

• Seep collars shall be provided on drainpipes where they pass through the lagoon seal. 10 CSR 20-8.200(4)(C)4.

• Unlined corrugated metal pipe shall not be used for influent lines due to corrosion problems. 10 CSR 20-8.200(4)(D)1.

• The influent line(s) shall be located along the bottom of the lagoon so that the top of the pipe is just below the average elevation of the lagoon seal; however, there shall be an adequate seal below the pipe. 10 CSR 20-8.200(4)(D)3.

10. Upon completion of construction:

A. The Summit BHC Saint Louis, LLC, will become the continuing authority for operation and maintenance of these facilities;

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

C. Submit the enclosed form Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(N). When the facility applies for their next operating permit renewal, they will be expected to include an updated facility description on their application.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

According to the consulting engineer, issues with the existing system include overloading, poor installation, and poor maintenance. Modifications are proposed to improve the existing system and to install an earthen basin to allow maintenance and repairs on the existing subsurface drip distribution system as needed, as well as to hold occasional peak flows until they can be routed back to the drip distribution system.
2. FACILITY DESCRIPTION

The Summit Behavioral Health Center WWTF is located at 22933 Highway 61, Eolia, in Pike County, Missouri. The facility has a design average flow of 4,500 gpd and serves a hydraulic population equivalent of approximately 45 people. The new construction does not add any additional flow but adds flexibility for wet-weather periods and to allow easier maintenance. Water records show the highest monthly flow was in August 2020, which averaged to 5,066 gpd. The average water usage is approximately 2,700 gpd. While this facility is not expected to have any significant peak flows, the addition of an earthen basin acting as a holding cell is partially to mitigate any peak flows that may occur. The average annual rainfall minus evaporation for this lagoon appears to be 28,130 gallons, which averages out to approximately 77 additional gpd.

The existing system includes two 1,000-gallon septic tanks (one for the main building and one for Barn 1), a 250-gallon distribution box, six ECOPOD fixed film treatment units (750 gpd each), two 1,000-gallon pump tanks that dose approximately 32,000 square feet of a Netafim dripline system divided into 6 zones, which drain back to the pump tank. A 2018 summary of design stated the soils are rated for 0.25 gpd/sf with a proposed 0.153 gpd/sf; therefore, the soils can accept up to at least 8,000 gpd.

The proposed modifications will include the following:

- **Replace the existing 1,000-gallon septic tank from the main building with two 5,000-gallon septic tanks in parallel.**
- **Install a 1,500-gallon pump tank with an Orenco PKP350 submersible effluent pump.**
- **Install a duplicate disc filter in parallel with the existing disk filter between the existing treatment system and the drip distribution field.**
- **Construct an earthen holding basin approximately 176 feet by 96 feet at the bottom (200 feet by 120 feet at the 4-foot design level); approximately 7 feet deep; 3-to-1 side slopes (inner and outer); and an 8-foot-wide, riprapped, emergency overflow spillway 6 inches from the top of berm. There will be 1 foot of permanent water depth for sludge and seal protection, 2 feet of freeboard, and 0.5 feet above the emergency spillway, for a total of approximately 568,000 gallons usable depth. The top of berm shall be 8 feet wide.**
- **The earthen basin shall include an Orenco PKP350 submersible effluent pump within a vertical 24-inch-diameter rubber HDPE pipe, with four 4-inch diameter holes cut 1 foot above the bottom of the earthen basin to maintain the minimum permanent water depth.**
3. **COMPLIANCE PARAMETERS**

The facility will be required to monitor storage basin freeboard (monthly) and precipitation (daily), as well as to report sludge removal (annually). These are to be submitted via the eDMR system as required by the issued operating permit.

4. **REVIEW of MAJOR TREATMENT DESIGN CRITERIA**

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

- One of the 1,000-gallon septic tanks.
- 250-gallon distribution box followed by six ECOPOD fixed-film treatment units (750 gpd each).
- Two 1,000-gallon pump tanks (one actual pump tank and one connected holding tank to expand capacity).
- a 32,000 square foot Netafim dripline system with 6 zones, which drains back to the pump tank.

**Construction will cover the following items:**

- Existing components are designed for an average flow of 4,500 gpd.
- Septic Tanks – Septic tanks provide 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 two new 5,000-gallon septic tanks and the one existing 1,000-gallon septic tank. Each of the new septic tanks is approximately 17.5 ft x 8.5 ft x 5.9 ft (totaling 5,000 gallons of usable space). The septic tanks each provide approximately 1.1 days of detention at the design average flow of 4,500 gpd. The wastewater will discharge via gravity to the existing 250-gallon distribution box then to the existing ECOPODs. Settled solids in the septic tank shall be removed by a contract hauler.
- Pump Tank – Construction of one additional pump tank (1,500 gallons) past the existing ECOPODs with two manually-operated 4-inch gate valves to divert flow from the existing pump tanks to the new pump tank as needed. The pump tank shall include one Orenco PKP350 submersible effluent pump to pump wastewater to the earthen holding basin as needed for peak flows or to perform maintenance and repair of the drip-distribution system.
- Pretreatment disc filters – Installation of a duplicate 1-inch manual disc filter (120 mesh) [Netafim DF100-120, 25A47-120], located between the existing pump tank and the existing drip-distribution field to improve operational efficiency. Each unit is capable of treating from 5 to 26 gpm, with 49 sq. in. of filtering surface area and a maximum pressure of 140 psi.
• Earthen Holding Basin – An earthen basin will be constructed and sealed with clay-rich soils at the basin site. The basin will have 3:1 sloping walls (inner and outer). The depth from the top of the berms to the basin floor will be 7 feet, which will include 1 foot of permanent water depth at the bottom for sludge and clay-liner protection and 2 feet of freeboard below a 0.5-foot emergency spillway at the top. The operating depth is 3.5 feet (between 1 and 4.5 feet). The basin is non-aerated and has a water surface area of approximately 0.57 acres and a wastewater volume of approximately 568,000 gallons at a depth of 4.5 feet. This provides over 126 days of retention at the proposed dry-weather design flow and over 74 days at the estimated 1-in-10 year rainfall minus evaporation. Average annual rainfall minus evaporation onto the new earthen basin may increase flow to the drip irrigation field, but will not exceed the existing design flow. The basin will include one Orenco PKP350 submersible pump, housed within an Orenco Biotube pump vault and within a 24-inch diameter ribbed HDPE vertical pipe with four 4-inch diameter holed cut 1-foot above the basin floor. Wastewater will be pumped back to the 250-gallon distribution box. The berm width will be 8 ft. The basin will be fenced. The 0.5-horsepower pump is capable of operating at approximately 33 gpm at 20 feet of TDH.

5. OPERATING PERMIT

The facility is currently operating under the authority of general operating permit number MO-G823118, which will expire August 24, 2022. The operating permit will still be applicable after construction. A renewal application must be filed before July 25, 2022, regardless of the status of these construction activities. If you have questions on completing the renewal application, please contact the NPDES permitting section at 573-751-1300.

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
Scott Adams, P.E.
Engineering Section
scott.adams@dnr.mo.gov
APPENDIX - Process Flow Diagram
(Showing complete system)

No-Discharge Earthen Holding Basin
218 x 138 @ Top of Berm
~ 568,000 usable gallons
Includes pump station

ARV = Air Release Valve
G = Gate Valve
CV = Check Valve

Process Flow Diagram
(Showing new components)
**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** (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  
System Expansion - Wastewater Lagoon

2.2 ESTIMATED PROJECT CONSTRUCTION COST  
$  

2.3 PROJECT DESCRIPTION  
Project will expand the treatment capacity at the Aviary Recovery Center. The existing system is designed for 4,500 gpd. The new no discharge lagoon is designed for an additional 8,000 gpd. Total capacity at the Aviary will be 9,500 gpd.

2.4 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION  
Sludge will be stored in the lagoon.

2.5 DESIGN INFORMATION  

A. Current population: ______; Design population: ______  
B. Actual Flow: ______ gpd; Design Average Flow: ______ gpd;  
   Actual Peak Daily Flow: ______ gpd; Design Maximum Daily Flow: ______ gpd; Design Wet Weather Event: ______

2.6 ADDITIONAL INFORMATION  

A. Is a topographic map attached? ☑ YES ☐ NO

B. Is a process flow diagram attached? ☑ YES ☐ NO
3.0 WASTEWATER TREATMENT FACILITY

NAME: Aviary Recovery Center
ADDRESS (PHYSICAL): 22933 Hwy 61, Eolia, MO 63344

3.1 Legal Description: Sec. 20, T 52N, R 01W
For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)

3.3 Name of receiving streams: ______

4.0 PROJECT OWNER

NAME: Summit BHC St. Louis, LLC. dba Aviary Recovery
ADDRESS: 22933 Hwy 61, Eolia, MO 63344

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

NAME: Same as above
ADDRESS: ______

6.0 ENGINEER

ENGINEER NAME / COMPANY NAME: Kyle Pociask / Four Points Land Surveying & Engineering
ADDRESS: 17 Northpoint Plaza, Hannibal, MO 63401

7.0 APPLICATION FEE

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: ______

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.