

STATE OF MISSOURI
DEPARTMENT OF NATURAL RESOURCES
MISSOURI CLEAN WATER COMMISSION



CONSTRUCTION PERMIT

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

BENT TREE HARBOR HOME OWNER'S ASSOCIATION, INC.
Bent Tree Harbor WWTF
31321 Bent Tree Drive,
Warsaw, MO 65335

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 16, 2026
Effective Date

April 15, 2028
Expiration Date

A handwritten signature in black ink, appearing to read 'Heather Peters'.

Heather Peters, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

Improvements to an existing wastewater treatment facility (WWTF). Construction of a clarifier, aerobic digester, sludge pump station, RAS/WAS meter station and a new chemical storage and dosing building.

Together with all the necessary appurtenances to make a complete and usable wastewater system. The current design flow is 6,000 gpd. Outfall location will remain the same. Facility discharge is to a tributary to Harry S. Truman Lake (L2)(7207), Benton County.

A closure plan to close the four 2,000 gallon tanks and any other wastewater tanks being replaced must be submitted to the Kansas City Regional Office for review and approval prior to any closure activities.

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.

The department is not required to determine Cost Analysis for Compliance because the permit contains no new conditions or requirements that convey a new cost to the facility.

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 Gregory S. Kendall, P.E. with Lamp Rynearson 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 Kansas City Regional Office per 10 CSR 20-7.015(9)(G).
5. In addition to the requirements for a construction permit, 10 CSR 20-6.200 requires land disturbance activities of 1 acre or more to obtain a Missouri state operating permit to discharge stormwater. The permit requires best management practices sufficient to control runoff and sedimentation to protect waters of the state. Land disturbance permits will only be obtained by means of the department's ePermitting system available online at <https://dnr.mo.gov/data-e-services/missouri-gateway-environmental-management-mogem>. See <https://dnr.mo.gov/data-e-services/water/electronic-permitting-epermitting> for more information.
6. A United States Army Corps of Engineers (USACE) Clean Water Act Section 404 Department of the Army permit and a Section 401 Water Quality Certification issued by the department may be required for the activities described in this permit. This permit is not valid until these requirements are satisfied or notification is provided that no Section 404 permit is required by the USACE. You must contact your local USACE district since they determine what waters are jurisdictional and which permitting requirements may apply. You may call the department's Water Protection Program, Operating Permits Section at 573-522-4502 for more information. See <https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/section-401-water-quality> for more information.
7. In accordance with 10 CSR 20-6.010(12), a closure plan shall be submitted to the department's Kansas City Regional Office for review and approval of the four 2,000 gallon tanks and any other wastewater tanks being replaced. The closure plan must meet the requirements outlined in Standard Conditions Part III of the Missouri State Operating Permit No. MO-0112411. Closure shall not commence until the submitted closure plan is approved by the department.

8. All construction must adhere to applicable 10 CSR 20-8 (Chapter 8) requirements listed below.
 - Flood protection shall apply to new construction and to existing facilities undergoing major modification. The wastewater facility structures, electrical equipment, and mechanical equipment shall be protected from physical damage by not less than the one hundred- (100-) year flood elevation. 10 CSR 20-8.140(2)(B)
 - Unless another distance is determined by the Missouri Geological Survey or by the department's Public Drinking Water Branch, the minimum distance between wastewater treatment facilities and all potable water sources shall be at least three hundred feet (300'). 10 CSR 20-8.140(2)(C)1.
 - No treatment unit with a capacity of twenty-two thousand five hundred gallons per day (22,500 gpd) or less shall be located closer than the minimum distance of 200' to a neighboring residence and 50' to property line for lagoons; 200' to a neighboring residence for open recirculating media filters following primary treatment; and 50' to a neighboring residence for all other discharging facilities. See 10 CSR 20-2.010(68) for the definition of a residence. 10 CSR 20-8.140(2)(C)2
 - Facilities shall be readily accessible by authorized personnel from a public right-of-way at all times. 10 CSR 20-8.140(2)(D)
 - Disinfection and dechlorination, when used, shall be provided during all power outages. 10 CSR 20-8.140(7)(A)2.
 - Electrical systems and components in raw wastewater or in enclosed or partially enclosed spaces where hazardous concentrations of flammable gases or vapors that are normally present, shall comply with the NFPA 70 *National Electric Code (NEC)* (2017 Edition), as approved and published August 24, 2016, requirements for Class I, Division 1, Group D locations. 10 CSR 20-8.140(7)(B)
 - An audiovisual alarm or a more advanced alert system, with a self-contained power supply, capable of monitoring the condition of equipment whose failure could result in a violation of the operating permit, shall be provided for all wastewater treatment facilities. 10 CSR 20-8.140(7)(C)
 - No piping or other connections shall exist in any part of the wastewater treatment facility that might cause the contamination of a potable water supply. 10 CSR 20-8.140(7)(D)1.
 - Adequate provisions shall be made to effectively protect facility personnel and visitors from hazards. The following shall be provided to fulfill the particular needs of each wastewater treatment facility:
 - Fencing. Enclose the facility site with a fence designed to discourage the entrance of unauthorized persons and animals; 10 CSR 20-8.140 (8) (A)
 - Gratings over appropriate areas of treatment units where access for maintenance is necessary; 10 CSR 20-8.140(8)(B)
 - First aid equipment; 10 CSR 20-8.140(8)(C)

- Posted “No Smoking” signs in hazardous areas; 10 CSR 20-8.140(8)(D)
- Appropriate personal protective equipment (PPE); 10 CSR 20-8.140(8)(E)
- Portable blower and hose sufficient to ventilate accessed confined spaces; 10 CSR 20-8.140(8)(F)
- 10 CSR 20-8.140(8)(G) Portable lighting equipment complying with NEC requirements. See subsection (7)(B) of this rule;
- Appropriately-placed warning signs for slippery areas, non-potable water fixtures (see subparagraph (7)(D)3.B. of this rule), low head clearance areas, open service manholes, hazardous chemical storage areas, flammable fuel storage areas, high noise areas, etc.; 10 CSR 20-8.140(8)(I)
- Ventilation shall include the following:
 - Dampers are not to be used on exhaust or fresh air ducts. Avoid the use of fine screens or other obstructions on exhaust or fresh air ducts to prevent clogging; 10 CSR 20-8.140(8)(J)3.
 - Where continuous ventilation is needed (e.g., housed facilities), provide at least twelve (12) complete air changes per hour. Where continuous ventilation would cause excessive heat loss, provide intermittent ventilation of at least thirty (30) complete air changes per hour when facility personnel enter the area. Base air change demand on one hundred percent (100%) fresh air; 10 CSR 20-8.140(8)(J)4.
 - Electrical controls. Mark and conveniently locate switches for operation of ventilation equipment outside of the wet well or building. Interconnect all intermittently operated ventilation equipment with the respective wet well, dry well, or building lighting system. The manual lighting/ventilation switch is expected to override the automatic controls. For a two (2) speed ventilation system with automatic switch over where gas detection equipment is installed, increase the ventilation rate automatically in response to the detection of hazardous concentrations of gases or vapors; 10 CSR 20-8.140(8)(J)5.
 - Fabricate the fan wheel from non-sparking material. Provide automatic heating and dehumidification equipment in all dry wells and buildings. 10 CSR 20-8.140(8)(J)6.
- Explosion-proof electrical equipment, non-sparking tools, gas detectors, and similar devices, in work areas where hazardous conditions may exist, such as digester vaults and other locations where potentially explosive atmospheres of flammable gas or vapor with air may accumulate. 10 CSR 20-8.140(8)(K)
- Provisions for local lockout/tagout on stop motor controls and other devices; 10 CSR 20-8.140(8)(L)
- Provisions for an arc flash hazard analysis and determination of the flash protection boundary distance and type of PPE to reduce exposure to major electrical hazards shall be in accordance with NFPA 70E *Standard for Electrical Safety in the Workplace* (2018 Edition), as approved and published August 21, 2017. 10 CSR 20-8.140(8)(M)

- The materials utilized for storage, piping, valves, pumping, metering, and splash guards, etc., for chemical handling, shall be specially selected considering the physical and chemical characteristics of each hazardous or corrosive chemical. 10 CSR 20-8.140(9)(A)1.
- Secondary containment storage areas contain the stored volume of chemical until it can be safely transferred to alternate storage or released to the wastewater treatment plant at controlled rates that will not damage the facilities, inhibit the treatment processes, or contribute to stream pollution. Secondary containment shall be designed as follows:
 - A minimum volume of one hundred twenty-five percent (125%) of the volume of the largest storage container located within the containment area plus the space occupied by any other tanks located within the containment area when not protected from precipitation; 10 CSR 20-8.140(9)(A)2.A.
 - A minimum volume of one hundred ten percent (110%) of the volume of the largest storage container located within the containment area plus the space occupied by any other tanks located within the containment area when protected from precipitation; 10 CSR 20-8.140(9)(A)2.B.
 - Walls and floors of the secondary containment structure constructed of suitable material that is compatible with the specifications of the product being stored. 10 CSR 20-8.140(9)(A)2.C.
- All pumps or feeders for hazardous or corrosive chemicals shall have guards that will effectively prevent spray of chemicals into space occupied by facility personnel. 10 CSR 20-8.140(9)(A)3.
- All connections (flanged or other type), except those adjacent to storage or feeder areas, shall have guards that will direct any chemical leakage away from space occupied by facility personnel. 10 CSR 20-8.140(9)(A)4.B.
- The following shall be provided to fulfill the particular needs of each chemical housing facility:
 - Provide storage for a minimum of thirty (30) days' supply, unless local suppliers and conditions indicate that such storage can be reduced without limiting the supply; 10 CSR 20-8.140(9)(B) 1.
 - Construct the chemical storage room of fire and corrosion resistant material; 10 CSR 20-8.140(9)(B)2.
 - Equip doors with panic hardware. To prevent unauthorized access, doors lock but do not need a key to exit the locked room using the panic hardware; 10 CSR 20-8.140(9)(B)3.
 - Provide chemical storage areas with drains, sumps, finished water plumbing, and the hose bibs and hoses necessary to clean up spills and to wash equipment; 10 CSR 20-8.140(9)(B)4.
 - Construct chemical storage area floors and walls of material that is suitable to the chemicals being stored and that is capable of being cleaned; 10 CSR 20-8.140(9)(B)5.
 - Install floor surfaces to be smooth, chemical resistant, slip resistant, and well drained with three inches per ten feet (3"/10') minimum slope; 10 CSR 20-8.140(9)(B)6.

- Provide adequate lighting; 10 CSR 20-8.140(9)(B)7.
- Comply with the NEC recommendation for lighting and electrical equipment based on the chemicals stored. 10 CSR 20-8.140(9)(B)8.
- Store chemical containers in a cool, dry, and well-ventilated area; 10 CSR 20-8.140(9)(B)9.
- Design vents from feeders, storage facilities, and equipment exhaust to discharge to the outside atmosphere above grade and remote from air intakes; 10 CSR 20-8.140(9)(B)10.
- Locate storage area for chemical containers out of direct sunlight; 10 CSR 20-8.140(9)(B)11.
- Maintain storage temperatures in accordance with relevant Material Safety Data Sheets (MSDS). 10 CSR 20-8.140(9)(B)12.
- Control humidity as necessary when storing dry chemicals; 10 CSR 20-8.140(9)(B)13.
- Design the storage area with designated areas for “full” and “empty” chemical containers; 10 CSR 20-8.140(9)(B)14.
- Provide storage rooms housing flammable chemicals with an automatic sprinkler system designed for four tenths gallons per minute per square foot (0.4 gpm/ft²) and a minimum duration of twenty (20) minutes; 10 CSR 20-8.140(9)(B)15.
- Store incompatible chemicals separately to ensure the safety of facility personnel and the wastewater treatment system. Store any two (2) chemicals that can react to form a toxic gas in separate housing facilities; 10 CSR 20-8.140(9)(B)16.
- Design and isolate areas intended for storage and handling of chlorine and sulfur dioxide and other hazardous gases. 10 CSR 20-8.140(9)(B)17.
- Design an isolated fireproof storage area and explosion proof electrical outlets, lights, and motors for all powdered activated carbon storage and handling areas in accordance with federal, state, and local requirements; 10 CSR 20-8.140(9)(B)18.
- Vent acid storage tanks to the outside atmosphere, but not through vents in common with day tanks; 10 CSR 20-8.140(9)(B)19.
- Keep concentrated acid solutions or dry powder in closed, acid-resistant shipping containers or storage units; 10 CSR 20-8.140(9)(B)20.
- Pump concentrated liquid acids in undiluted form from the original container to the point of treatment or to a covered storage tank. Do not handle in open vessels. 10 CSR 20-8.140(9)(B)21.
- The following shall be provided, where applicable, for the design of chemical handling:
 - Make provisions for measuring quantities of chemicals used for treatment or to prepare feed solutions over the range of design application rates; 10 CSR 20-8.140(9)(C)1.
 - Select storage tanks, piping, and equipment for liquid chemicals specific to the chemicals; 10 CSR 20-8.140(9)(C)2.
 - Install all liquid chemical mixing and feed installations on corrosion resistant pedestals; 10 CSR 20-8.140(9)(C)3.
 - Provide sufficient capacity of solution storage or day tanks feeding directly for twenty-four- (24-) hour operation at design average flow; 10 CSR 20-8.140(9)(C)4.

- Provide a minimum of two (2) chemical feeders for continuous operability. Provide a standby unit or combination of units of sufficient capacity to replace the largest unit out-of-service; 10 CSR 20-8.140(9)(C)5.
- Chemical feeders shall—
 - Be designed with chemical feed equipment to meet the maximum dosage requirements for the design average flow conditions; 10 CSR 20-8.140(9)(C)6.A.
 - Be able to supply, at all times, the necessary amounts of chemicals at an accurate rate throughout the range of feed; 10 CSR 20-8.140(9)(C)6.B.
 - Provide proportioning of chemical feed to the rate of flow where the flow rate is not constant; 10 CSR 20-8.140(9)(C)6.C.
 - Be designed to be readily accessible for servicing, repair, and observation; 10 CSR 20-8.140(9)(C)6.D.
 - Protect the entire feeder system against freezing; 10 CSR 20-8.140(9)(C)6.E.
 - Be located adjacent to points of application to minimize length of feed lines; 10 CSR 20-8.140(9)(C)6.F.
 - Provide for both automatic and manual operation for chemical feed control systems; 10 CSR 20-8.140(9)(C)6.G.
 - Utilize automatic chemical dose or residual analyzers, and where provided, include alarms for critical values and recording charts; 10 CSR 20-8.140(9)(C)6.H.
 - Provide screens and valves on the chemical feed pump suction lines; 10 CSR 20-8.140(9)(C)6.I.
 - Provide an air break or anti-siphon device where the chemical solution enters the water stream; 10 CSR 20-8.140(9)(C)6.J.
- Provide for uniform strength of solution consistent with the nature of the chemical solution for solution tank dosing; 10 CSR 20-8.140(9)(C)8.
- Use solution feed pumps to feed chemical slurries that are not diaphragm or piston type positive displacement types; 10 CSR 20-8.140(9)(C)9.
- Provide continuous agitation to maintain slurries in suspension; 10 CSR 20-8.140(9)(C)10.
- Provide a minimum of two (2) flocculation tanks or channels having a combined detention period of twenty to thirty (20 – 30) minutes. Provide independent controls for each tank or channel; 10 CSR 20-8.140(9)(C)11.
- Insulate pipelines carrying soda ash at concentrations greater than twenty percent (20%) solution to prevent crystallization; 10 CSR 20-8.140(9)(C)12.
- Prohibit bagging soda ash in a damp or humid place. 10 CSR 20-8.140(9)(C)13.
- The following chemical safety items shall be provided in addition to the safety provisions in section (8) of this rule:
 - Appropriate personal protective equipment (PPE). 10 CSR 20-8.140(9)(D)1.
 - Eye wash fountains and safety showers utilizing potable water shall be provided in the laboratory and on each level or work location involving hazardous or corrosive chemical storage, mixing (or slaking), pumping, metering, or transportation unloading. The design of eye wash fountains and safety showers shall include the following:

- Eye wash fountains with water of moderate temperature, fifty degrees to ninety degrees Fahrenheit (50°–90°F), suitable to provide fifteen to thirty (15–30) minutes of continuous irrigation of the eyes; 10 CSR 20-8.140(9)(D)2.A.
- Emergency showers capable of discharging twenty gallons per minute (20 gpm) of water of moderate temperature, fifty degrees to ninety degrees Fahrenheit (50°–90°F), and at pressures of thirty to fifty pounds per square inch (30–50 psi); 10 CSR 20-8.140(9)(D)2.B.
- Eye wash fountains and emergency showers located no more than twenty-five feet (25') from points of hazardous chemical exposure; CSR 20-8.140(9)(D)2.C.
- Eye wash fountains and showers that are to be fully operable during all weather conditions; 10 CSR 20-8.140(9)(D)2.D.
- Warning signs requiring use of goggles shall be located near chemical stations, pumps, and other points of frequent hazard. 10 CSR 20-8.140(9)(D)3.
- The identification and hazard warning data included on chemical shipping containers, when received, shall appear on all containers (regardless of size or type) used to store, carry, or use a hazardous substance. 10 CSR 20-8.140(9)(E)
- All screening devices and screening storage areas shall be protected from freezing. 10 CSR 20-8.150(4)(A)1.
- Provisions shall be made for isolating or removing screening devices from their location for servicing. 10 CSR 20-8.150(4)(A)2.
- Manually cleaned screen channels shall be protected by guard railings and deck gratings with adequate provisions for removal or opening to facilitate raking. 10 CSR 20-8.150(4)(A)3.A.(I)
- Provisions for location and safety of comminutors shall be in accordance with screening devices,
 - Manually cleaned channels shall be protected by guard railings and deck gratings with adequate provisions for removal or opening to facilitate raking. 10 CSR 20-8.150(4)(A)3.A.(I)
- Effective flow splitting devices and control appurtenances (*e.g.* gates and splitter boxes) shall be provided to permit proper proportioning of flow and solids loading to each settling unit, throughout the expected range of flows. 10 CSR 20-8.160(2)(B)
- Overflow weirs shall be readily adjustable over the life of the structure to correct for differential settlement of the tank. 10 CSR 20-8.160(3)(C)1.
- Walls of settling tanks shall extend at least six inches (6") above the surrounding ground surface and shall provide not less than twelve inches (12") of freeboard. 10 CSR 20-8.160(3)(E)

- Safety features shall appropriately include machinery covers, life lines, handrails on all stairways and walkways, and slip resistant surfaces. For additional safety follow the provisions listed in 10 CSR 20-8.140(8). 10 CSR 20-8.160(5)(A)
- The design shall provide for convenient and safe access to routine maintenance items such as gear boxes, scum removal mechanism, baffles, weirs, inlet stilling baffle areas, and effluent channels. 10 CSR 20-8.160(5)(B)
- For electrical equipment, fixtures, and controls in enclosed settling basins and scum tanks, where hazardous concentrations of flammable gases or vapors may accumulate, follow the provisions in 10 CSR 20-8.140(7)(B). The fixtures and controls shall be conveniently located and safely accessible for operation and maintenance. 10 CSR 20-8.160(5)(C)
- Aerobic Solids Digestion High Level Emergency Overflow. An unvalved emergency overflow shall be provided that will convey digester overflow to the treatment plant headworks, the aeration process, or to another liquid sludge storage facility and that has an alarm for high level conditions. 10 CSR 20-8.170(5)
- For solids pumping systems, audio-visual alarms shall be provided in accordance with 10 CSR 20-8.140(7)(C) for:
 - Pump failure; 10 CSR 20-8.170(6)(A)
 - Pressure loss; 10 CSR 20-8.170(6)(B) and
 - High pressure. 10 CSR 20-8.170(6)(C)
- Emergency Power. Disinfection and dechlorination processes, when used, shall be provided during all power outages. 10 CSR 20-8.190(2)(A)
- Contact period for Chlorine Disinfection. A minimum contact period of fifteen (15) minutes at design peak hourly flow or maximum rate of pumpage shall be provided after thorough mixing. 10 CSR 20-8.190(3)(A)
- Alarm System for chlorination and dechlorination systems. The applicant shall conform to 10 CSR 20-8.140(7)(C) and be responsible for specifying what the alarm requirements are necessary to assure consistent disinfection in compliance with the applicable bacteria limits and the disinfection residual limit in the effluent. 10 CSR 20-8.190(3)(C)
- Effluent twenty-four (24) hour composite automatic sampling equipment shall be provided at all mechanical wastewater treatment facilities and at other facilities where necessary under provisions of the operating permit. 10 CSR 20-8.190(3)(D)
- Dilution tanks and mixing tanks are required when using dry compounds and may be necessary when using liquid compounds to deliver the proper dosage. 10 CSR 20-8.190(4)(A)

9. Upon completion of construction:
 - A. BENT TREE HARBOR HOME OWNER’S ASSOCIATION, INC. 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 Statement of Work Completed form to the department in accordance with 10 CSR 20-6.010(5)(N) (<https://dnr.mo.gov/document-search/wastewater-construction-statement-work-completed-mo-780-2155>) and requested the operating permit Outfall #001 – Post Construction (CP0002568) be activated.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

The purpose of construction is to upgrade the facility to meet permitted limits in compliance with an Abatement Order on Consent (AOC.) Upgrades include installation of a new manual screen on top of the existing equalization basin, construction of a new clarifier, construction of an aerobic digester, construction of a sludge pump station, a meter vault, and a chemical storage building. The new clarifier will simplify the separation process, improve operating reliability, and reduce solids loading to the recirculating filters. The new aerobic digester will reduce the volume of sludge disposed of off-site. The new sludge pump station will transfer waste activated sludge (WAS)/ return activated sludge (RAS) from the clarifier to the new proposed digester, equalization basin, and the aeration basin. A meter vault will measure RAS/WAS flows.

2. FACILITY DESCRIPTION

The existing WWTF consists of a bar screen, a 20,000 gallons equalization tank, a 20,000 gallons aeration tank, four 2,000 gallon tanks, a recirculation tank with an estimated capacity between 10,000 and 16,000 gallons as part of a textile filter system that includes two AdvanTex AX100 filter pods, a chlorine contact basin with a volume of approximately 930 gallons and a dechlorination system followed by a discharge.

On February 23, 2024, the BTH HOA entered into Abatement Order on Consent (AOC) No. 2024-WPCB-1553 with the department’s Water Pollution Control Branch Compliance and Enforcement Section to resolve violations of the Missouri Clean Water Law. The AOC requires several actions including an evaluation of the existing WWTF and upgrades to the WWTF to meet permitted effluent limits.

The Bent Tree Harbor Subdivision WWTF is located at the intersection of East Bent Tree Dr. and Edgewater Dr. City of Warsaw, Mo, in Benton County, Missouri. The facility has been re-rated to a design flow of 6,000 gpd.

3. COMPLIANCE PARAMETERS

The proposed project is to improve the settling and treatment of solids at the wastewater treatment plant and to meet the effluent limitations of table A-1 in the current operating permit MO-0112411. While the improvements are expected to improve the level of treatment provided, additional improvements may be necessary to meet the final effluent limitations in table A-2 which will be effective at the end of the schedule of compliance.

4. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

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

- **Screening** – Screening devices remove nuisance inorganic materials from raw wastewater.
 - **Trash Rack** – A coarse manual trash rack channel is located on top of the equalization basin. The channel is equipped with an expanded metal screen and a plastic milk crate. All pump trucks are emptied at the WWTF into this concrete influent channel.

- **Flow Equalization** – The flow equalization tank, is a buried, concrete encased, horizontal steel tank with a volume of 19,812 gallon. This unit was built under construction permit number 26-1540 issued July 25, 1991. The flow equalization tank is used to regulate the flow rate into the WWTF. There is a single access port on the west end of the tank where influent enters, where the effluent pump is located, and where a small compressor provides air continuously. This tank is not mixed but is aerated by a five cubic feet per minute (cfm) blower. The facility plans to install a larger 41 cfm blower and relocate the effluent pump to the east end of the tank. This tank was modified into an equalization basin from use as a holding basin as a part of the pilot project (ACT1494) approved October 19, 2023. The operating permit description will be updated at renewal to reflect this modification.
 - **Chemical Addition** –Hydrogen peroxide is fed at the aeration tank as needed to control filamentous bacteria and reduce odor.

- **Extended Aeration Package Plant** – A Jumbo Jet Treatment Plant was built under construction permit number 26-1540 issued July 25, 1991.
 - **Aeration Chamber** – 20,000 gallon aeration tank. Aeration is provided by three 41 cfm blowers. One blower is in operation 24 hours per day with the other two blowers operated on timers. The control scheme is intended to achieve simultaneous nitrification/denitrification. An experimental addition of filter media similar to moving bed biofilm reactor (MBBR) has been completed. Approximately 45 cubic feet of media (16% of tank volume) has been installed. Effluent pumps controlled by tank level with a pumping capacity of 79 gpm send flow to the intermediate tanks.

- **Chemical Addition** – Sodium bisulfite is fed at the aeration tank as needed to reduce pH to the optimal range for treatment. Additionally, hydrogen peroxide is fed at the aeration tank as needed to control filamentous bacteria.
- **Recirculation Tank** – One recirculation tank pumps wastewater received from the intermediate tanks to the recirculating media filter. The recirculation tank was built under construction permit number 21-8771 issued May 28, 2009. The recirculation tank has a wastewater volume of approximately 9,876 gallons. Effective flow equalization volume of 1,821 gallons between the low water level and the high water “on” level. The recirculation tank dual PF500712 pumps capable of 50 gpm at 40 ft TDH. The pumps discharge to a splitter valve, which alternates flow between the two recirculating media filter beds. Each filter bed splits flow by means of a distribution manifold to eight laterals.
 - **Chemical Addition** – Sodium carbonate is fed prior to the recirculation tank to increase alkalinity
- **Recirculating Media Filters** – Two Orenco System, Inc. AdvanTex (AX 100) units were built under construction permit number 21-8771 issued May 28, 2009. Each filter bed consists of 100 ft², for a total area of 200 ft². At a flow of 6,000 gpd the filter loading is 30 gpd/ft² and will produce an expected effluent quality less than 5 mg/L BOD, 5 mg/L TSS, provided the filter influent BOD is below 40 mg/L and TSS is below 20 mg/L. TKN removal performance is not specified, and the filter will not be relied upon to reduce ammonia levels.
- **Disinfection** – Disinfection is the process of removal, deactivation, or killing of pathogenic microorganisms.
 - **Tablet Chlorinator** – A Norweco IT-2000-S Tablet Feeder chlorination chamber was built under construction permit number 26-1540 issued July 25, 1991, and receives effluent from the recirculating media filters prior to the chlorine contact tank. The tablet chlorinator has a design flow of 20,000 gpd and a maximum flow of 100,000 gpd. The system will dispense hypochlorite as the wastewater comes into contact with the tablets.
 - **Chlorine Contact Tank** – A baffled basin of an approximately 4.75 ft x 7.75 ft with a side water depth of 4.96 ft was built under construction permit number 26-1540 issued July 25, 1991. The volume of the basin taking into account baffles is approximately 930 gallons. This tank allows for a 15-minute contact time during a peak design flow of 89,280 gpd.
- **Flow Measurement** – An effluent flow gauge provides accurate flow measurement devices.
 - **Carbon Filter** – A carbon filter ensures solids are not discharged.
- **Chemical Dosing** – The facility’s existing chemical dosing equipment including totes, mixers, and feed pumps will be retained and moved inside of the proposed chemical storage building.

Construction will cover the following items:

- Components are designed for a Population Equivalent of 60 based on the design flow of 6,000 gpd.
- **Screening** – Replacement of aged screen with a new one rated at 400 gpm to remove nuisance inorganic materials from raw wastewater.
 - **Manual Coarse Bar Screen** – The manual coarse bar screen will have clear bar spacings of 3/8-inch, will have a 400-gpm rating, be V shaped, and will be positioned at an angle of 30 degrees from the horizontal to allow for manual raking of the screen. The coarse bar screen is followed by the inlet of the equalization basin.
- **Secondary Clarifier** – A secondary clarifier will be constructed between the extended aeration package plant and the recirculating media filters. The clarifier will have a total surface area of 28.1 sf at the 0.006 MGD peak flow. The clarifier will have a 6 ft diameter. The sidewater depth will be 12 ft. The weir loading rate is 382 gpd/lf which meets the requirements of 10 CSR 20-8.160(3)(C)2. of being less than 10,000 gpd/sf. The solid's loading rate is 9.9 lbs/day/sf which meets the requirements of 10 CSR 20-8.160(3)(B)3 of less than 35 lbs/day/sf at peak flow. The secondary clarifier will replace the four 2,000 gallon settling tanks.
- **Sludge Pump Station** – Construction of a single sludge pump station and associated valves. The sludge pump will be a submersible Goulds 2DV51E1VA pump capable of pumping at least 20 gpm at 30 ft of TDH with a 1 HP motor. The sludge pumps are utilized to pump WAS/RAS from the secondary clarifiers to the aerobic digester, equalization basin and aeration basin. 6,000 gpd is maximum design RAS flow.
 - **Meter Vault** – Construction of a meter vault with a magnetic flow meter to measure RAS/WAS flows.
- **Aerobic Digester** – Construction of one aerobic digester with an 8 ft diameter, a 13 ft sidewater depth, and a volume of 4,888 gallons. The design basis of the digester is an influent concentration of 2,789 mg/L with a flowrate of 650 gpd. Installation of fine bubble diffusers will provide aeration and mixing of the sludge to prevent anaerobic conditions. Two blowers with 1 HP motors are capable of providing a maximum air rate of 9.8 standard cubic feet per minute (scfm) to treat 19 lbs of solids.

- **Chemical Storage Building** – A storage building with dimensions of 12 x 22 feet is proposed for the storage of chemicals on site. This building will have two separate rooms to store acid and base chemicals separately, each having its own entrance, portable eyewash, light system, heater and ventilation fan.
 - The chemical storage building will be used to store, prepare, and dose the following chemicals to the treatment process: hydrogen peroxide, sodium bisulfate, aluminum sulfate, sodium bicarbonate, sodium carbonate, sodium hypochlorite.

5. OPERATING PERMIT

Operating permit MO-0112411 will require modification to reflect the construction activities. The operating permit renewal and modification of Bent Tree Harbor Subdivision WWTP, MO-0112411, were combined and was successfully public noticed from March 6, 2026, to April 6, 2026, with no comments received. Submit the Statement of Work Completed to the department in accordance with 10 CSR 20-6.010(5)(N) and request the operating permit modification be issued.

This facility does not meet the requirements of the MOGDS issued on July 1, 2024, for the following reasons: a site specific operating permit is necessary to implement the schedule of compliance requested by the facility.

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:

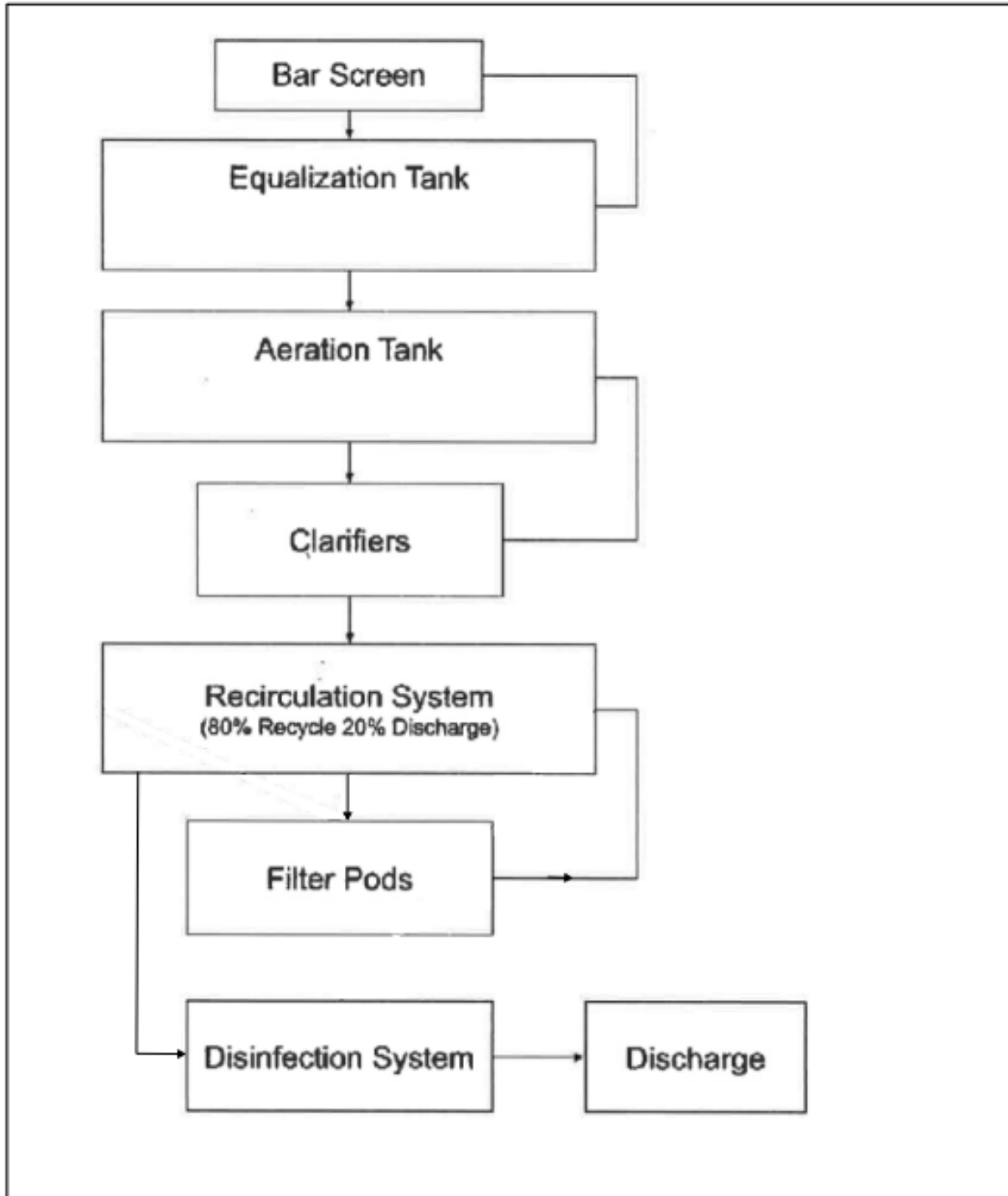
Administrative Hearing Commission
U.S. Post Office Building, Third Floor
131 West High Street, P.O. Box 1557
Jefferson City, MO 65102-1557
Phone: 573-751-2422
Fax: 573-751-5018
Website: <https://ahc.mo.gov>

Andrew Sell
Engineering Section
andrew.sell@dnr.mo.gov

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

APPENDIX

• **Process Flow Diagram**



PLANT SCHEMATIC



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

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

APPLICATION OVERVIEW

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

PART A – BASIC INFORMATION

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

- 1.1 Is this a Federal/State funded project? YES N/A Funding Agency: _____ Project #: _____
- 1.2 Has the Missouri Department of Natural Resources approved the proposed project's antidegradation review?
 YES Date of Approval: _____ N/A
- 1.3 Has the department approved the proposed project's facility plan*?
 YES Date of Approval: _____ NO (If No, complete No. 1.4.)
- 1.4 [Complete only if answered No on No. 1.3.] Is a copy of the facility plan* for wastewater treatment facilities included with this application?
 YES NO Exempt because _____
- 1.5 Is a copy of the appropriate plans* and specifications* included with this application?
 YES Denote which form is submitted: Hard copy Electronic copy (See instructions.) NO
- 1.6 Is a summary of design* included with this application? YES NO
- 1.7 Has the appropriate operating permit application (A, B, or B2) been submitted to the department?
 YES Date of submittal: _____
 Enclosed is the appropriate operating permit application and fee submittal. Denote which form: A B B2
 N/A: However, In the event the department believes that my operating permit requires revision to permit limitation such as changing equivalent to secondary limits to secondary limits or adding total residual chlorine limits, please share a draft copy prior to public notice? YES NO
- 1.8 Is the facility currently under enforcement with the department or the Environmental Protection Agency? YES NO
- 1.9 Is the appropriate fee or JetPay confirmation included with this application? YES NO
 See Section 7.0

* Must be affixed with a Missouri registered professional engineer's seal, signature and date.

2.0 PROJECT INFORMATION

2.1 NAME OF PROJECT	2.2 ESTIMATED PROJECT CONSTRUCTION COST \$
---------------------	---

2.3 PROJECT DESCRIPTION

2.4 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION

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		TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS	
ADDRESS (PHYSICAL)	CITY	STATE	ZIP CODE	COUNTY

Wastewater Treatment Facility: Mo- (Outfall Of)

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

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

3.3 Name of receiving streams: _____

4.0 PROJECT OWNER

NAME		TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS	
ADDRESS	CITY	STATE	ZIP CODE	

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

NAME		TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS	
ADDRESS	CITY	STATE	ZIP CODE	

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

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

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

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

- A. Is a copy of the as-filed restrictions and covenants included with this application? YES NO
- B. Is a copy of the as-filed warranty deed, quitclaim deed or other legal instrument which transfers ownership of the land for the wastewater treatment facility to the association included with this application? YES NO
- C. Is a copy of the as-filed legal instrument (typically the plat) that provides the association with valid easements for all sewers included with this application? YES NO
- D. Is a copy of the Missouri Secretary of State's nonprofit corporation certificate included with this application? YES NO

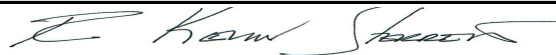
6.0 ENGINEER

ENGINEER NAME / COMPANY NAME		TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS	
ADDRESS	CITY	STATE	ZIP CODE	

7.0 APPLICATION FEE

CHECK NUMBER JETPAY CONFIRMATION NUMBER

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

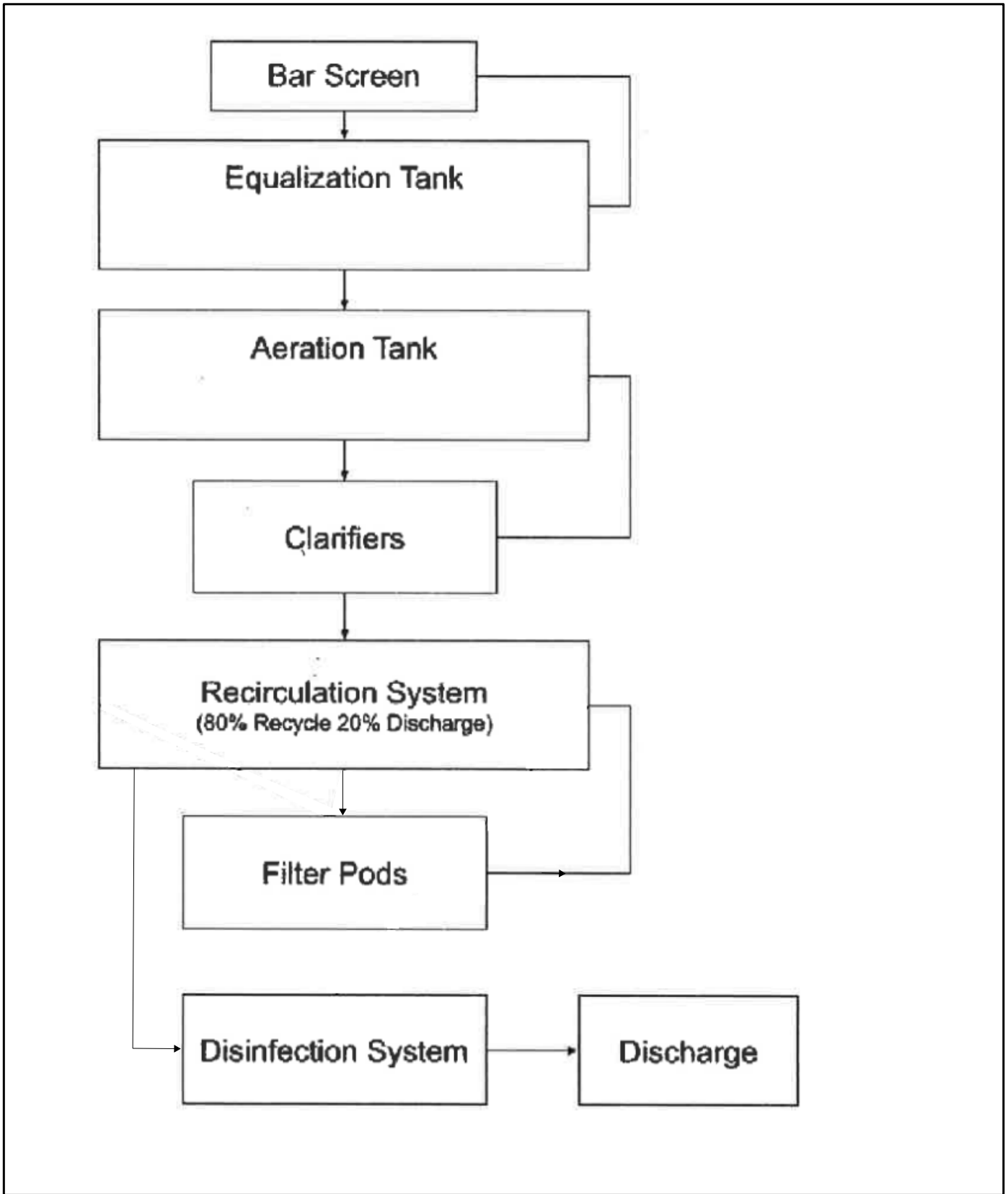
PROJECT OWNER SIGNATURE 

PRINTED NAME _____ DATE _____

TITLE OR CORPORATE POSITION _____ 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.



PLANT SCHEMATIC

