STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

CONSTRUCTION PERMIT

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

City of O'Fallon
100 North Main Street
O'Fallon, MO 63366

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 22, 2019
Effective Date

Edward B. Galbraith, Director, Division of Environmental Quality

October 21, 2021
Expiration Date

Chris Wieberg, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

The project involves upgrades to the biological treatment system at the WWTP to meet more stringent ammonia limits in the City's discharge permit. The existing biological treatment process at the WWTP will be converted from a Bio-Filter Activated Sludge (BF/AS) process to an Activated Sludge with Biological Nutrient Removal (BNR) process to meet new more stringent ammonia limits set in the operating permit.

The project also involves a new high flow treated effluent outfall system to Peruque Creek (Outfall #002), which is adjacent to the WWTP, to reduce operational challenges and the risk of surcharging unit processes at the treatment plant during high flow events. Design flow for Outfall #002 is 4.53 MGD. Discharge from this outfall is expected to occur 0 to 5 times per year during high flow events and will consist of fully treated effluent.

Finally, the project involves significant upgrades to the majority of the plant's existing electrical and control systems due to age, condition, and the need to support plant upgrades.

The existing permitted sludge processes at the plant will continue. 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 determine Cost Analysis for Compliance because the permittee has waived the requirement for an affordability finding.

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 Robert Polys of Woodard and Curran, 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 St. Louis Regional Office per 10 CSR 20-7.015(9)(G).

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

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 dnr.mo.gov/env/wpp/epermit/help.htm. See dnr.mo.gov/env/wpp/stormwater/sw-land-disturb-permits.htm for more information.

8. 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/ 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)

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

- Adequate provisions shall be made to effectively protect facility personnel and visitors from hazards. The following shall be provided to fulfill the particular needs of each wastewater treatment facility: 10 CSR 20-8.130 (2) (C)

  - Fencing. Enclose the facility site with a fence designed to discourage the entrance of unauthorized persons and animals; 10 CSR 20-8.140 (8) (A)
  - Gratings over appropriate areas of treatment units where access for maintenance is necessary; 10 CSR 20-8.140 (8) (B)
  - First aid equipment; 10 CSR 20-8.140 (8) (C)
  - Posted "No Smoking" signs in hazardous areas; 10 CSR 20-8.140 (8) (D)
  - Appropriate personal protective equipment (PPE); 10 CSR 20-8.140 (8) (E)
  - Portable blower and hose sufficient to ventilate accessed confined spaces; 10 CSR 20-8.140 (8) (F)
  - 10 CSR 20-8.140 (8) (G) Portable lighting equipment complying with NEC requirements. See subsection (7)(B) of this rule;
  - 10 CSR 20-8.140 (8) (H) Gas detectors listed and labeled for use in NEC Class I, Division 1, Group D locations. See subsection (7)(B) of this rule;
  - Appropriately-placed warning signs for slippery areas, non-potable water fixtures (see subparagraph (7)(D)3.B. of this rule), low head clearance areas, open service manholes, hazardous chemical storage areas, flammable fuel storage areas, high noise areas, etc.; 10 CSR 20-8.140 (8) (I)
  - Ventilation shall include the following:
    - Isolate all pumping stations and wastewater treatment components installed in a building where other equipment or offices are located from the rest of the building by an air-tight partition, provide separate outside entrances, and provide separate and independent fresh air supply; 10 CSR 20-8.140 (8) (J) 1.
    - Force fresh air into enclosed screening device areas or open pits more than four feet (4') deep. Interconnection between the wet well and dry well ventilation systems is not acceptable; 10 CSR 20-8.140 (8) (J) 2.
    - Dampers are not to be used on exhaust or fresh air ducts. Avoid the use of fine screens or other obstructions on exhaust or fresh air ducts to prevent clogging; 10 CSR 20-8.140 (8) (J) 3.
    - Where continuous ventilation is needed (e.g., housed facilities), provide at least twelve (12) complete air changes per hour. Where continuous ventilation would cause excessive heat loss, provide intermittent ventilation of at least thirty (30) complete air changes per hour when facility personnel enter the area. Base air change demands on one hundred percent (100%) fresh air; 10 CSR 20-8.140 (8) (J) 4.
    - Electrical controls. Mark and conveniently locate switches for operation of ventilation equipment outside of the wet well or building. Interconnect all intermittently operated ventilation equipment with the respective wet well, dry well, or building lighting system. The manual lighting/ventilation switch is expected to override the automatic controls. For a two (2) speed ventilation system with automatic switch over where gas detection

equipment is installed, increase the ventilation rate automatically in response to the detection of hazardous concentrations of gases or vapors; 10 CSR 20-8.140 (8) (J) 5.

- Fabricate the fan wheel from non-sparking material. Provide automatic heating and dehumidification equipment in all dry wells and buildings.; 10 CSR 20-8.140 (8) (J) 6.

- Explosion-proof electrical equipment, non-sparking tools, gas detectors, and similar devices, in work areas where hazardous conditions may exist, such as digester vaults and other locations where potentially explosive atmospheres of flammable gas or vapor with air may accumulate.; 10 CSR 20-8.140 (8) (K)
- Provisions for local lockout/tagout on stop motor controls and other devices; 10 CSR 20-8.140 (8) (L)
- Provisions for an arc flash hazard analysis and determination of the flash protection boundary distance and type of PPE to reduce exposure to major electrical hazards shall be in accordance with NFPA 70E *Standard for Electrical Safety in the Workplace* (2018 Edition), as approved and published August 21, 2017. 10 CSR 20-8.140 (8) (M)

10 CSR 20-8.120 Gravity Sewers.

- Rain water from roofs, streets, and other areas and groundwater from foundation drains shall be excluded from all new sewers. 10 CSR 20-8.120 (2)

- Leakage tests shall be specified for gravity sewers except polyvinyl chloride (PVC) pipe with a diameter of twenty-seven inches (27") or less. 10 CSR 20-8.120 (3) (C) 2.

  - The leakage exfiltration or infiltration for gravity sewers shall not exceed one hundred (100) gallons per inch of pipe diameter per mile per day for any section between manholes of the system. An exfiltration or infiltration test shall be performed with a minimum positive head of two feet (2'). The exfiltration or infiltration test shall conform to the test procedure described in ASTM C969 – 17 *Standard Practice for Infiltration and Exfiltration Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines*, as approved and published April 1, 2017, for precast concrete pipe. 10 CSR 20-8.120 (3) (C) 2. A.
  - The air test for sewers shall, conform to the test procedure described in ASTM C1103 – 14 *Standard Practice for Joint Acceptance Testing of Installed Precast Concrete Pipe Sewer Lines*, as approved and published November 1, 2014, for concrete pipe twenty-seven inches (27") or greater in diameter, and ASTM F1417 – 11a(2015) *Standard Practice for Installation Acceptance of Plastic Non-pressure Sewer Lines Using Low-Pressure Air*, as approved and published August 1, 2015, for plastic, composite, and ductile iron pipe.
    10 CSR 20-8.120 (3) (C) 2. B.

10 CSR 20-8.130 Pumping Stations.

- Dry wells, including their superstructure, shall be completely separated from the wet well with gas tight common walls. 10 CSR 20-8.130 (3) (A) 1.

- Suitable and safe means of access to dry wells and to wet wells shall be provided to persons wearing self-contained breathing apparatus. 10 CSR 20-8.130 (3) (A) 2.

- Multiple pumps shall be provided except for design average flows of less than fifteen hundred (1,500) gallons per day. 10 CSR 20-8.130 (3) (B) 1.

- Electrical equipment. Electrical equipment shall be provided with the following requirements:
  - 10 CSR 20-8.130 (3) (B) 2. A. Electrical equipment must comply with 10 CSR 20-8.140(7)(B);
  - Utilize corrosive resistant equipment located in the wet well; 10 CSR 20-8.130 (3) (B) 2. B.
  - Provide a watertight seal and separate strain relief for all flexible cable; 10 CSR 20-8.130 (3) (B) 2. C.
  - Install a fused disconnect switch located above ground for the main power feed for all pumping stations. 10 CSR 20-8.130 (3) (B) 2. D.
  - When such equipment is exposed to weather, it shall comply with the requirements of weather proof equipment; enclosure NEMA 4; NEMA 4X where necessary; and *NEMA Standard 250-2014*, published December 15, 2014. 10 CSR 20-8.130 (3) (B) 2. E.
  - Install lightning and surge protection systems; 10 CSR 20-8.130 (3) (B) 2. F.
  - Install a one hundred ten volt (110 V) power receptacle inside the control panel located outdoors to facilitate maintenance; 10 CSR 20-8.130 (3) (B) 2. G.
  - Provide Ground Fault Circuit Interruption (GFCI) protection for all outdoor receptacles. 10 CSR 20-8.130 (3) (B) 2. H.

- Water level controls must be accessible without entering the wet well. 10 CSR 20-8.130 (3) (C)

- Valves shall not be located in the wet well unless integral to a pump or its housing. 10 CSR 20-8.130 (3) (D)

- Covered wet wells shall have provisions for air displacement to the atmosphere, such as an inverted and screened "j" tube or other means. 10 CSR 20-8.130 (3) (E)

- Interconnection between the wet well and dry well ventilation systems is not acceptable10 CSR 20-8.130 (3) (F)

- There shall be no physical connection between any potable water supply and a wastewater pumping station, which under any conditions, might cause contamination of the potable water supply. If a potable water supply is brought to the station, 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 20-8.130 (3) (G)
  - Hot water for any direct connections shall not be taken directly from a boiler used for supplying hot water to a digester heating unit or heat exchanger. 10 CSR 20-8.140 (7) (D) 2.
  - 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.
  - For indirect connections, a sign shall be permanently posted at every hose bib, faucet, hydrant, or sill cock located on the water system beyond the break tank or backflow preventer to indicate that the water is not safe for drinking. 10 CSR 20-8.140 (7) (D) 3. B.
  - Where a separate non-potable water supply is to be provided, a break tank will not be necessary, but all system outlets shall be posted with a permanent sign indicating the water is not safe for drinking. 10 CSR 20-8.140 (7) (D) 4.

- Submersible pump stations shall meet the applicable requirements under section (3) of this rule, except as modified in this section. 10 CSR 20-8.130 (5)
  - Pump Removal. Submersible pumps shall be readily removable and replaceable without personnel entering, dewatering, or disconnecting any piping in the wet well. 10 CSR 20-8.130 (5) (A)
  - 10 CSR 20-8.130 (5) (B) Valve Chamber and Valves. Valves required under subsection (3)(D) of this rule shall be located in a separate valve chamber.
  - A minimum access hatch dimensions of twenty-four inches by thirty-six inches (24" x 36") shall be provided. 10 CSR 20-8.130 (5) (B) 1.

- A portable pump connection on the discharge line with rapid connection capabilities shall be provided. 10 CSR 20-8.130 (5) (B) 2.

- Alarm systems with an uninterrupted power source shall be provided for pumping stations. 10 CSR 20-8.130 (6)

- Where independent substations are used for emergency power, each separate substation and its associated distribution lines shall be capable of starting and operating the pump station at its rated capacity. 10 CSR 20-8.130 (7) (B)

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

10 CSR 20-8.140 Wastewater Treatment Facilities

- The outfall shall be so constructed and protected against the effects of flood water, ice, or other hazards as to reasonably ensure its structural stability and freedom from stoppage. 10 CSR 20-8.140 (6) (A)

- All sampling points shall be designed so that a representative and discrete twenty-four (24) hour automatic composite sample or grab sample of the effluent discharge can be obtained at a point after the final treatment process and before discharge to or mixing with the receiving waters. 10 CSR 20-8.140 (6) (B)

- All outfalls shall be posted with a permanent sign indicating the outfall number (i.e., Outfall #001). 10 CSR 20-8.140 (6) (C)

- All wastewater treatment facilities shall be provided with an alternate source of electric power or pumping capability to allow continuity of operation during power failures. 10 CSR 20-8.140 (7) (A) 1.

- 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.

- 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.

- For indirect connections, a sign shall be permanently posted at every hose bib, faucet, hydrant, or sill cock located on the water system beyond the break tank or backflow preventer to indicate that the water is not safe for drinking. 10 CSR 20-8.140 (7) (D) 3. B.

- 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)

10 CSR 20-8.160 Settling.

- 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)

10. Upon completion of construction:

A. The City of O'Fallon will become the continuing authority for operation and maintenance of these facilities;

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

C. Submit the enclosed form Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(N) and request that the operating permit modification be issued.

IV. REVIEW SUMMARY

1. CONSTRUCTION PURPOSE

The project involves upgrades to the biological treatment system at the WWTP to meet more stringent ammonia limits in the City's discharge permit, and a new high flow treated effluent outfall system to Peruque Creek, which is adjacent to the WWTP, to reduce operational challenges and the risk of surcharging unit processes at the treatment plant during high flow events.

The project will involve selective demolition; new process equipment, piping, valves, building upgrades, supports, and materials; equipment; electrical work; controls; site work, HVAC, plumbing, communications systems; and services and construction inherent to the work. Significant upgrades to the plant's electrical and control systems are necessary due to age, condition and the need to support plant upgrades.

2. FACILITY DESCRIPTION

The WWTP was originally constructed in 1971. The first major upgrade to the WWTP occurred in 1981 and gave the WWTP the current treatment process configuration it now uses. Several subsequest upgrades and improvements have also been completed. The WWTP currrently includes two influent equalization tanks/basins, preliminary treatment including screening and grit removal, four primary clarifiers, three activated bio-towers, four aeration tanks, four final clarifiers, a seasonal UV disinfection system, and an effluent pump station that transports treated effluent to the Mississippi River. The facility also includes a sludge & biosolids processing system which includes sludge thickening, sludge dewatering and a thermal lime pasteurization process which produces Class-A biosolids. Treated effluent from the WWTP is discharged to the Mississippi River.

The proposed construction will include conversion of the existing Bio-Filter Activated Sludge process to an Activated Sludge with Biological Nutrient Removal (BNR) process, a new high flow treated effluent discharge to Peruque Creek (Outfall #002 with design flow of 4.53 MGD), and upgrades to the electrical system.

The O'Fallon WWTP is located at 150 Firma Road, O'Fallon, in St. Charles County, Missouri. The facility has a design average flow of 11.25 MGD and serves a population equivalent of approximately 93,000 people.

3. COMPLIANCE PARAMETERS

The proposed project is required to meet final effluent limits established in Operating Permit MO-0028720 and in the Antidegradation review dated March 2, 2018.

The following limits will be applicable to Outfall #002 at the facility after completion of construction:

PARAMETER	UNITS	DAILY MAXIMUM	WEEKLY AVERAGE
FLOW	MGD	*	
BIOCHEMICAL OXYGEN DEMAND$_5$	MG/L		45
TOTAL SUSPENDED SOLIDS	MG/L		45
pH	SU	6.5– 9.0	
AMMONIA AS N	MG/L	23.8	
ESCHERICHIA COLIFORM (*E. COLI SUMMER*)	#/100 mL		630
OIL & GREASE	MG/L	15	
TOTAL NITROGEN	MG/L	*	
TOTAL PHOSPHORUS	MG/L	*	
COPPER, TOTAL RECOVERABLE	µG/L	*	
ZINC, TOTAL RECOVERABLE	µG/L	*	

4. ANTIDEGRADATION

The Department has reviewed the antidegradation report for this facility and issued the Water Quality and Antidegradation Review dated March 2, 2018, due to the new outfall location Outfall #002.

5. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

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

- Headworks:
  - Two influent equalization tanks with control valves for use during high flow conditions
  - Influent flow measurement
  - Mechanical Bar Screen

- Influent sampling is conducted just upstream of the Grit Tank on the downstream side of the Influent Screen
- Grit Removal: proprietary Aeroductor® system
    - Captured grit is dewatered via a mechanical dewatering screw which is located in the Headworks Building
- The Old Headworks is located downstream of the Grit Tank and includes a below grade vault and channels containing equipment and related appurtenances, all of which are out of service. Effluent from the Old Headworks flows via gravity to Distribution Box #1.
- Primary Treatment:
    - Four 75-foot diameter circular primary clarifiers
    - Primary Sludge is removed via two dedicated below grade Primary Sludge Pump Station vaults.
    - Primary Sludge is pumped to the Waste Activated Sludge (WAS) Holding Tank. The design of the WWTP also includes provisions to pump Primary Sludge directly to the Sludge Blend Tank.
- Primary effluent from Primary Clarifiers #3 and #4 flows by gravity to Junction Box #4. Junction Box #1 accepts primary effluent flow from Junction Box #4, Primary Clarifier #1 and Primary Clarifier #2. Primary Effluent composite sampling also occurs from Junction Box #1.
- Primary Effluent from Distribution Box #1 mixes with Return Activated Sludge (RAS) from the Final Clarifiers in the Primary Effluent Wet Well (old Bio-Filter Feed Pump Wet Well).
- (Existing Bio-Filter/Activated Sludge Process, see below)
- Effluent from the Aeration Tanks flows via gravity to four, 80-foot diameter, center feed, suction header (draft tube) type Final Clarifiers.
    - Settled secondary sludge is currently transported by gravity to the Activated Bio-Filter wet well.
- Disinfection: Effluent from the Final Clarifiers flows by gravity to an in-channel UV Disinfection System.
- Effluent Pump Station
    - Following disinfection, treated effluent flows to the the Effluent Pump Station. The wet-well includes four submersible centrifugal pumps which transport effluent to the Mississippi River.
- Secondary Waste Activated Sludge (WAS) is currently removed from the treatment process via gravity from a chamber just upstream of the Activated Bio-Filter wet well. The facility design includes provisions for thickened WAS to be pumped to a dedicated Sludge Blend Tank where it can be mixed with Primary Sludge prior to sludge dewatering. The blended sludge is processed via three new Screw Presses. Dewatered sludge cake is then processed by a proprietary Thermal Lime Pasteurization (RDP) Process which produces Class-A Biosolids.

Existing major componenets to be removed:

- Bio-Filter/Activated Sludge Process which uses a combination of attached-growth and suspended-growth biological treatment. The proposed projects includes demolition of the Biofilter Towers and media, roof repair, lifting systems, concrete pads, piping, structure improvements and related systems.
  - Primary effluent enters the activated Bio-Tower wet well where it is combined with secondary Return Activated Sludge (RAS) and is pumped to three Activated Bio-Towers.
  - Effluent from the Activated Bio-Towers flows to four Aeration Tanks which include fixed floor ultra-fine bubble diffused aeration systems.
  - Low pressure air is delivered via blowers located on the third level of the Bio-Filter Complex.
  - The Aeration Tanks also include a Recirculated Sludge Pumping System which is located in the Basement of the Bio-Filter Complex.

Construction will cover the following items:

- Distribution Box #1 Upgrades: An existing concrete structure used to split the flow to the Primary Clarifiers. Flow is distributed to the four Primary Clarifiers via effluent boxes. Each of the four effluent boxes contains a manual isolation slide gate to allow flow control to the Primary Clarifiers. Upgrades includes new slide gates and piping, as well as modifications to the walls of the Distribution Box, safety rail, and new access stairs.

- Primary Effluent Pump Station:
  - The existing Bio-Filter Feed Pump Wet Well and four (4) submersible centrifugal Bio-Filter feed pumps will be re-purposed to pump primary effluent to the new Aeration Tank Splitter Box. The four (4) pumps (3 duty, 1 standby) are each capable of 4,167 gpm at 33 ft TDH.
  - New isolation valves and check valves will be added to the four existing discharge lines, which will connect into one new force main with an in-line magnetic flow meter.

- Aeration Splitter Box: Construction of a new flow-splitting box. Include manual slide gates and overflow weirs to allow combined or independent delivery of RAS and Primary Effluent to the biological treatment system.

- Biological Nutrient Removal (BNR): Construction of four new BNR Tanks with new mixers, pumps, and diffused aeration systems. The activated sludge system is designed to operate in a Modified Ludzak-Ettinger (MLE) type configuration with flexibility for future process modifications to treat for Total Nitrogen and Total Phosphorous. Each tank will include high flow modes of operation such as step-feed for peak wet weather management.
  - Anoxic - Each of the four BNR tanks will have four anoxic zones with lengths of 12 ft, 24 ft, 47 ft, and 47 ft, widths of 30 feet and working depths of 18 ft, with an anoxic volume of 0.53 MG provided in each of the four BNR tanks

for a total anoxic volume of 2.1 MG. Each anoxic zone will have a floating mixer.

- Aeration – Each of the four BNR tanks will have one aerobic zone, each 237 ft by 30 ft by 18 feet working depth, with a total volume of 3.84 MG provided. Ultra-fine bubble fixed floor diffused aeration by means of three 150 hp blowers each capable of supplying 2,600 scfm to supply 390 membrane strip diffusers per chamber (1,560 total). A new Blower Building will be constructed to house the new aeration blowers. The aeration zones are designed for an average loading of 19 lbs BOD_5 per 1000 cubic feet per day, a design SRT of 9 days, and an MLSS of 3,000 mg/L.
- Nitrate Recycle. Each BNR tank will be outfitted with a Nitrate Recycle System to facilitate Denitrification and Nitrogen management. The system will include a submersible pump in a dedicated de-oxygenation zone at the end of each Aerobic Zone. Each pump will be capable of 5,250 gpm at 4.3 ft TDH.
- Distribution Box #3: An existing structure located downstream of the existing Aeration Tanks. Flow is split over four weirs into effluent boxes that distribute flow to each Final Clarifier. Upgrades will include new slide gates, modifications to the walls of the structure, addition of new safety rails, new access stairs. Improved flow splitting capabilities will ensure even flow split between all four Final Clarifiers.
- Final Clarifier Upgrades: Final Clarifiers #1, #2, and #3 have been previously upgraded. Upgrades include refurbishments to Final Clarifier #4, as well as to the associated scum pumping and piping of three of the four clarifiers; addition of density current baffles to all four final clarifiers; and repair of existing concrete tanks.

- Junction Box #3: a rectangular concrete structure that combines effluent flow from all Final Clarifiers and directs flow to the UV Disinfection System or to the Effluent Flow Control Structure. Upgrades include refurbishments to Junction Box #3 to install a new aluminum cover system.

- WAS Valve Vault Upgrades: Refurbishment of the vault that includes safety railing, painting and concrete repair.

- Return Activated Sludge (RAS) Pump Station: Construction of a new RAS Pump Station in existing Aeration Tank #2 with new pumps, piping, valves, access stairs, metals, roof and related work. The RAS VFD pumps are designed for a maximum flow capacity of 2,600 gpm at 27 ft TDH, average flow capacity of 1,690 gpm at 19 ft TDH, and minimum flow capacity of 1,270 gpm at 18 ft TDH. There will be 5 pumps, 4 lead and 1 standby.

- Effluent Pump Station: Upgrades include safety rails, hatch netting, concrete repair, painting, new discharge valves, and related upgrades.

- Gravity Bypass Valve Vault Upgrades: A below grade structure which includes two plug valves and a swing check valve on the outfall pipe. Upgrades include various improvements including crack repair and concrete repair.

- High Water Level Pump Station: Construct a new pump station, including pumps, piping, concrete structure, wet well, valve vault, piping, valves, hatches, electrical and controls. The high water level pump station is only to be utilized when the receiving stream is at a level that the discharge cannot flow out with gravity. The pump station will include three (3) submersible centrifigual pumps (2 duty, 1 standby) each capable of pumping 1,570 gpm at 29 ft TDH. Each pump discharge will be outfitted with pressure indicators, isolation valves, check valves, and will share a common magnetic flow meter to measure flow discharged to Peruque Creek.

- Cascade Aerator: A new cascade aeration system will be constructed consisting of seven (7) one and one-half (1.5) ft wide steps with a 10.25 ft total drop followed by a rip-rapped channel to the new outfall location

- Electrical & Control System Upgrades (Multiple Areas): The existing Electrical Distribution Systems, Controls, MCC, Transformers, Panelboards, and Control Panels in the project areas are upgraded as a part of this project.

6. OPERATING PERMIT

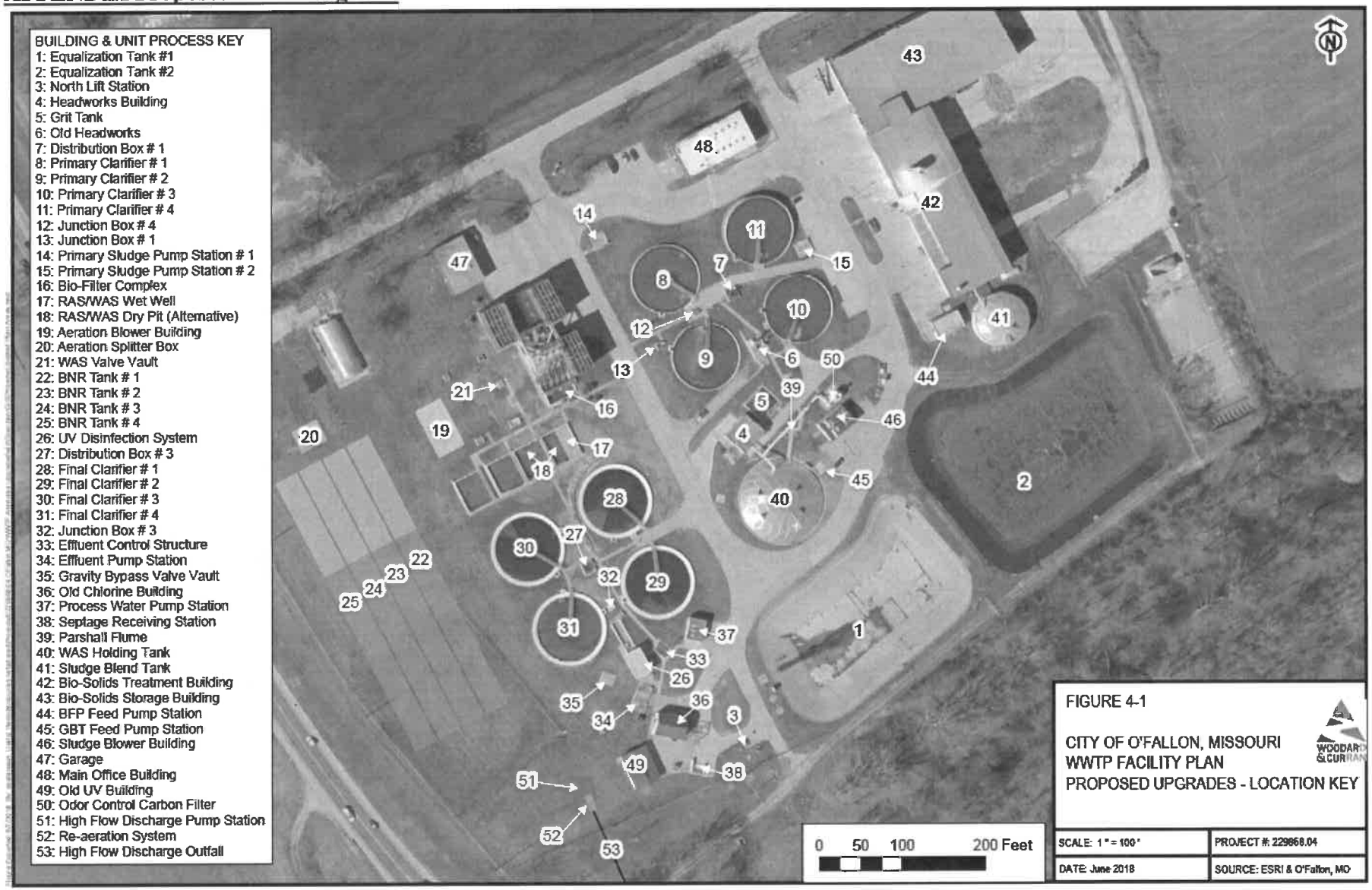
Operating permit MO-0028720 will require a modification to reflect the construction activities. The modified O'Fallon WWTP, MO-0028720, was successfully public noticed from Augsut 30, 2019 to September 30, 2019 with no comments received. Submit the Statement of Work Completed to the Department in accordance with 10 CSR 20-6.010(5)(N) and request the operating permit modification be issued.

With your construction permit application, an operating permit modification was submitted for public notice to reflect the change in your operating permit. Your operating permit application for a renewal will be due before your construction permit is expired. The modification action does not fulfill the renewal application obligation. A renewal application must be filed before October 3, 2019.

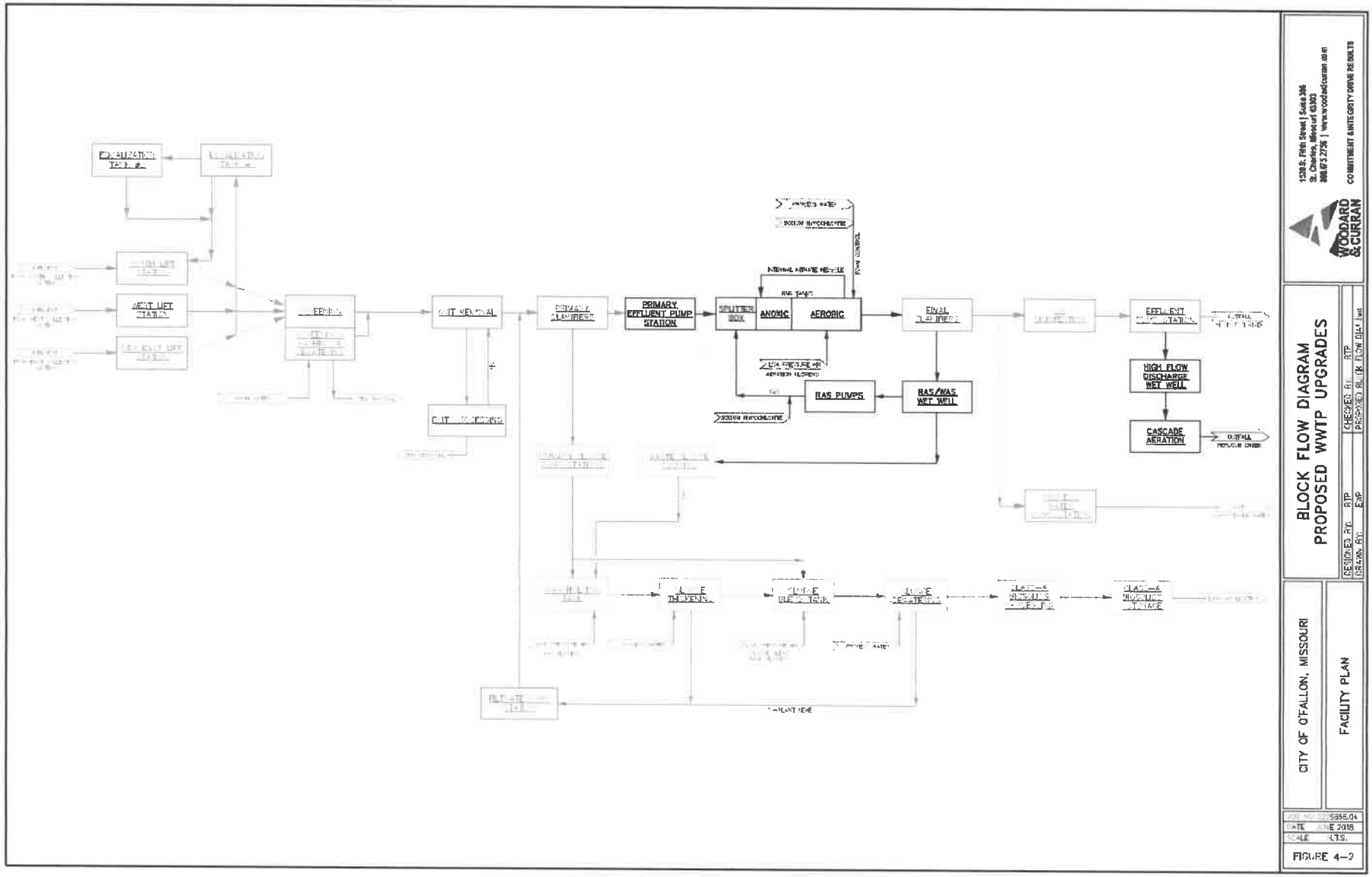
Cailie Carlile, PE
Engineering Section
cailie.carlile@dnr.mo.gov

APPENDIX Existing Plant Diagram:

APPENDIX Proposed Plant Diagram:



APPENDIX Proposed Flow Diagram:



AP 32411 CP0002069

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 $3000.00	CHECK NO. 162940
DATE RECEIVED 5-7-19	BB

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: 3/2/18 ☐ N/A

1.3 Has the department approved the proposed project's facility plan*?
☑ YES Date of Approval: 8/16/18 ☐ 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
O'Fallon WWTP Ammonia & High Flow Discharge Upgrades	$ 29,772,000

2.3 PROJECT DESCRIPTION
The Ammonia & High Flow Discharge project consists of: (1) Conversion of the existing biological treatment process at the WWTP from a Bio-Filter Activated Sludge (BF/AS) process to an Activated Sludge with Biological Nutrient Removal (BNR) process to meet the new more stringent ammonia limits set in the discharge permit. (2) a new high flow treated effluent discharge to Peruque Creek. This cost-effective approach will reduce operational challenges and the risk of surcharging unit processes at the WWTP during high flow events. (3) upgrades to the majority of the existing electrical systems at the WWTP, which are at or beyond their useful life.

2.4 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION
Primary and secondary sludge are thickened, dewatered and processed through a proprietary thermal lime pasteurization system to produce Class A Biosolids. The Biosolids Processing System includes a WAS holding tank, thickener feed pump station, dewatering feed pump station, polymer feed system, rotary drum thickeners, TWAS pumps, and dewatering equipment, The existing permitted sludge disposal practice will continue to be conducted by the City.

2.5 DESIGN INFORMATION

A. Current population: 86,275; Design population: 120,731

B. Actual Flow: 7.3M gpd; Design Average Flow: 11.25 Mgpd;
Actual Peak Daily Flow: 13.8 M gpd; Design Maximum Daily Flow: 16.5M gpd; Design Wet Weather Event: 16.5 MGD

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
O'Fallon Wastewater Treatment Plant	636-379-2212	chorvath@ofallon.mo.us

ADDRESS (PHYSICAL)	CITY	STATE	ZIP CODE	COUNTY
150 Firma Road	O'Fallon	MO	63366	St. Charles

Wastewater Treatment Facility: Mo- 0028720 (Outfall 001 Of 1)

3.1 Legal Description: _____ ¼, _____ ¼, _____ ¼, Sec. _____, T _____, R _____ Landgrant 01687, St. Charles County
(Use additional pages if construction of more than one outfall is proposed.)

3.2 UTM Coordinates Easting (X): 703989 Northing (Y): 4307940
For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)

3.3 Name of receiving streams: Mississippi River (Outfall #001) & Peruque Creek (Outfall #002)

4.0 PROJECT OWNER

NAME	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
City of O'Fallon	636-379-4225	chorvath@ofallon.mo.us

ADDRESS	CITY	STATE	ZIP CODE
401 South Cool Springs Road	O'Fallon	MO	63366

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
City of O'Fallon	636-379-4225	chorvath@ofallon.mo.us

ADDRESS	CITY	STATE	ZIP CODE
401 South Cool Springs Road	O'Fallon	MO	63366

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
Robert Polys, P.E.	207-558-3812	rpolys@woodardcurran.com

ADDRESS	CITY	STATE	ZIP CODE
1520 South Fifth Street, Suite 306	St. Charles	MO	63303

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.

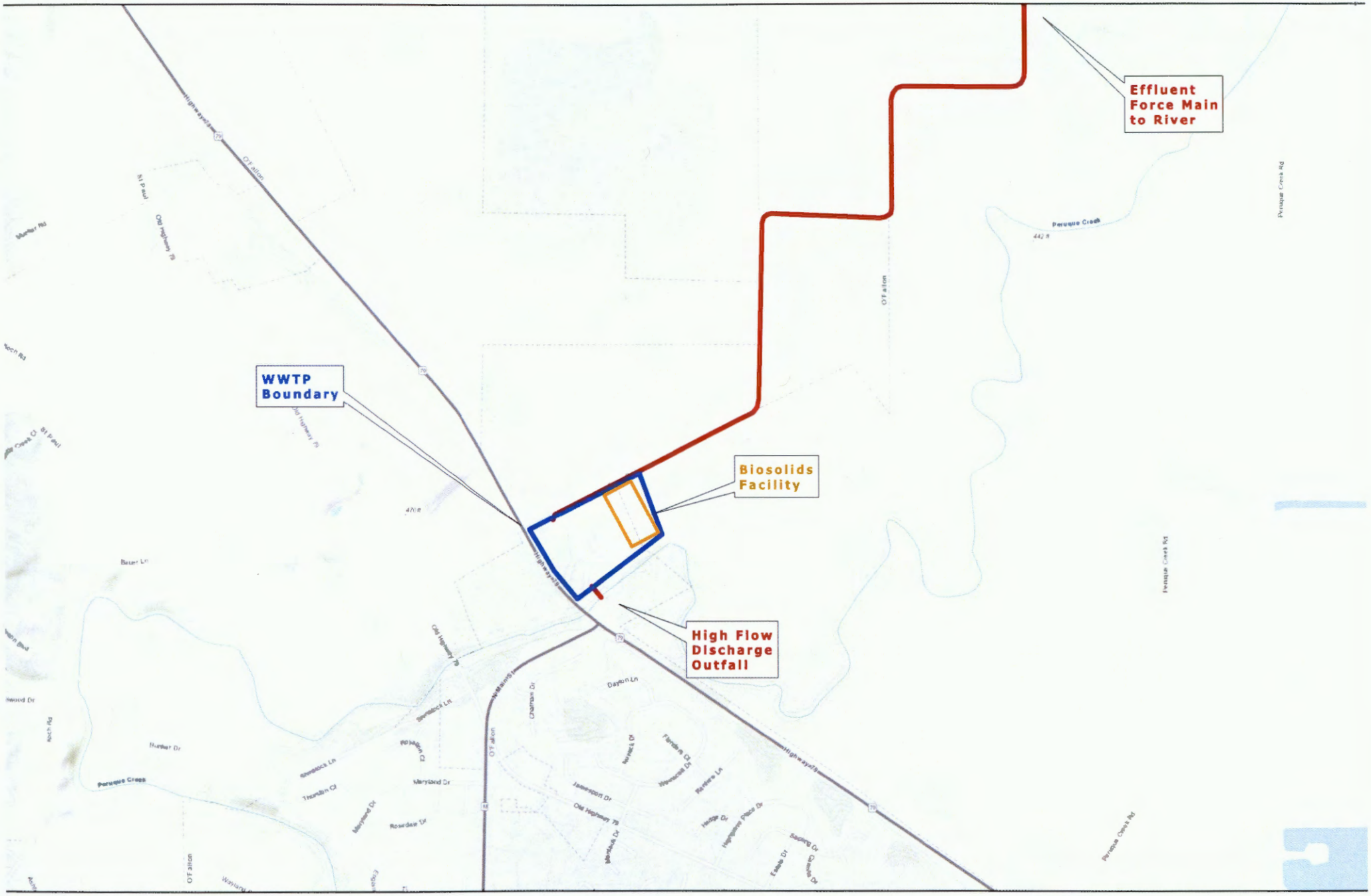
PROJECT OWNER SIGNATURE

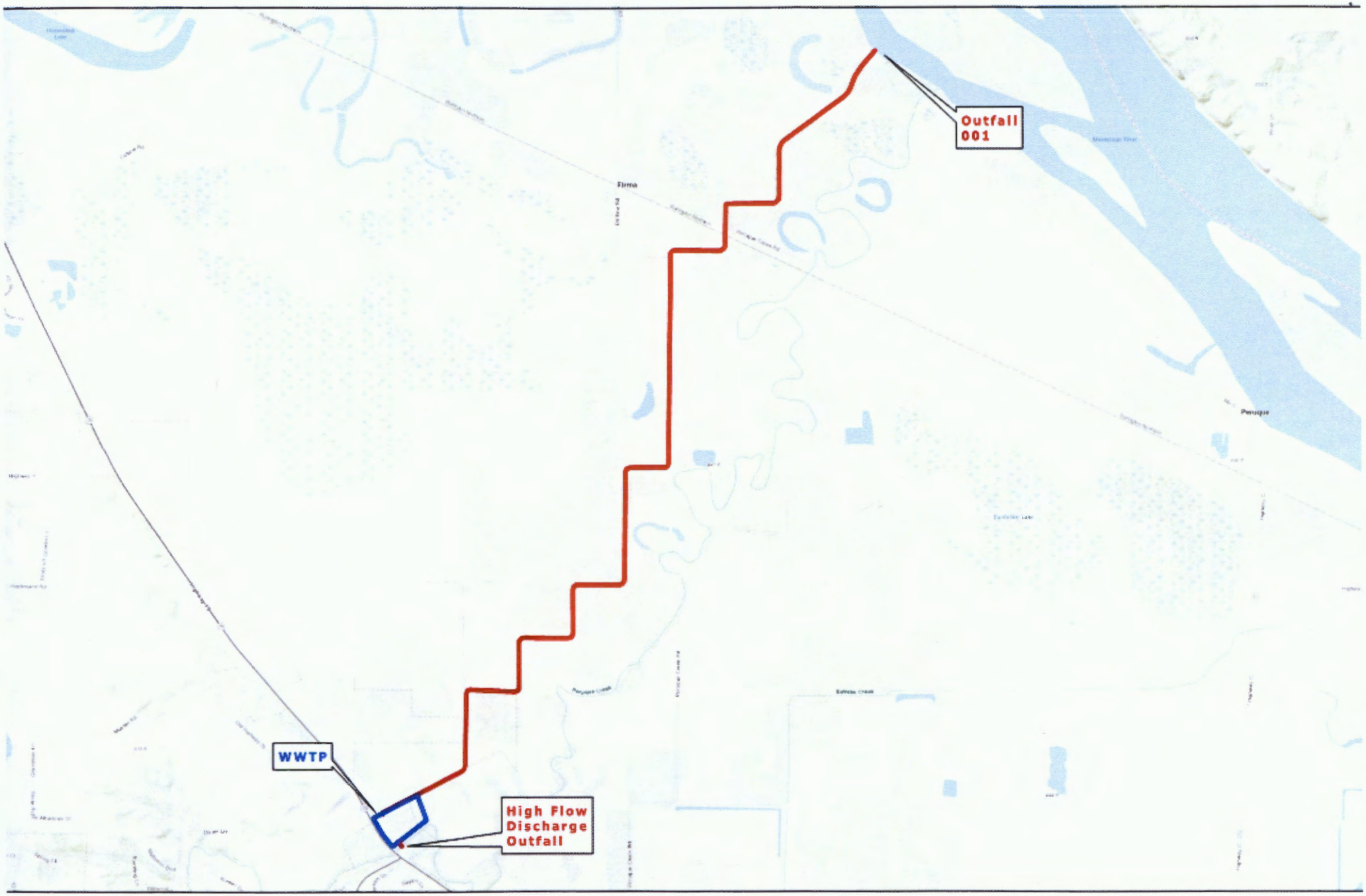
PRINTED NAME	DATE
Chris Horvath	4/22/19

TITLE OR CORPORATE POSITION	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
Water & Sewer Senior Project Manager	636-379-4225	chorvath@ofallon.mo.us

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.


Effluent Force Main to River
WWTP Boundary
Biosolids Facility
High Flow Discharge Outfall
Highway 79
O'Fallon
Peruque Creek
Peruque Creek Rd
Old Highway 79
Dayton Ln
Maryland Dr
Rosedale Dr
Jamestown Dr
Bauer Ln
Hunter Dr
Shinstock Ln
Thornton Ct
Chatham Dr
Flanders Ct
Newcastle Dr
Rentiere Ln
Hedge Dr
Highgrove Place Dr
Sapling Dr
Estate Dr
Camille Dr
Mandarin Dr
Old Highway 79
St Paul
Muller Rd
Peruque Creek Rd

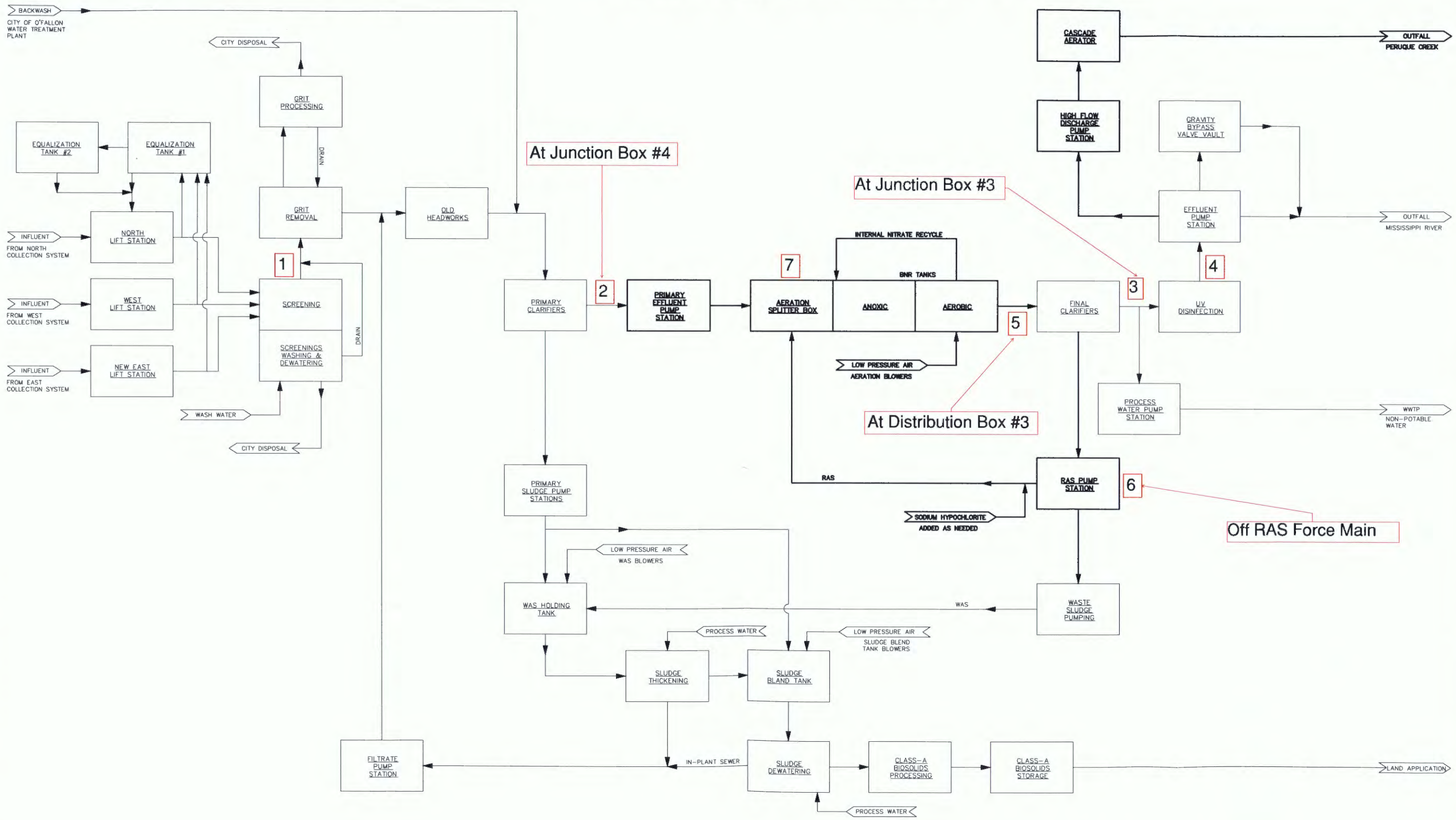

Outfall
001
WWTP
High Flow
Discharge
Outfall

22x34 SHEET
1:1

1. Influent Sampling Point
2. Primary Effluent Sampling
3. Final Sampling Point
4. E. Coli Sampling Point
5. MLSS Sampling
6. RAS Sampling
7. Influent MLSS Sampling

DESIGN FLOWS AND LOADINGS

PARAMETER	FLOW	BOD_5	TSS	TKN	TOTAL P
RAW INFLUENT	AVERAGE DAY: 7.30 MGD PERMITTED ADF: 11.25 MGD MAX MONTH: 12.30 MGD MAX DAY: 16.50 MGD PEAK HOUR: 19.90 MGD	AVERAGE DAY: 15,293 #/DAY MAX MONTH: 17,750 #/DAY MAX DAY: 26,916 #/DAY	AVERAGE DAY: 20,266 #/DAY MAX MONTH: 23,188 #/DAY MAX DAY: 40,293 #/DAY	AVERAGE DAY: 3,750 #/DAY MAX MONTH: 4,100 #/DAY MAX DAY: 2,750 #/DAY	AVERAGE DAY: 656 #/DAY MAX MONTH: 718 #/DAY MAX DAY: 481 #/DAY
SEPTAGE	--------	--------	--------	--------	--------
PRIMARY EFFLUENT	AVERAGE DAY: 8.31 MDG PERMITTED ADF: 12.26 MGD MAX MONTH: 13.31 MGD MAX DAY: 17.51 MGD	AVERAGE DAY: 5,430 #/DAY PERMITTED ADF: 9,729 #/DAY MAX MONTH: 14,022 #/DAY MAX DAY: 26,903 #/DAY	AVERAGE DAY: 4,484 #/DAY PERMITTED ADF: 8,323 #/DAY MAX MONTH: 12,521 #/DAY MAX DAY: 34,334 #/DAY	AVERAGE DAY: 2,255 #/DAY PERMITTED ADF: 3,468 #/DAY MAX MONTH: 4,998 #/DAY MAX DAY: 9,589 #/DAY	AVERAGE DAY: 395 #/DAY PERMITTED ADF: 607 #/DAY MAX MONTH: 875 #/DAY MAX DAY: 1,678 #/DAY



MDNR REVIEW - NOT FOR CONSTRUCTION

1520 S Fifth Street Suite 306
St Charles, Missouri 63303
www.woodardcurran.com
MISSOURI ENGINEERING CORPORATION LICENSE NO.: 2009027958
MISSOURI CERTIFICATE OF AUTHORITY NO.: 00097447
WOODARD & CURRAN
COMMITMENT & INTEGRITY DRIVE RESULTS

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REV	DESCRIPTION	DATE

DESIGNED BY: RTP
CHECKED BY: RTP
DRAWN BY: MNK
229868\04-P-002.dwg

BLOCK FLOW DIAGRAM

CITY OF O'FALLON
ST. CHARLES COUNTY, MISSOURI

O'FALLON WWTP AMMONIA & HIGH FLOW DISCHARGE UPGRADES

JOB NO.: 229868.04
DATE: MARCH 2019
SCALE: AS NOTED
SHEET: 125 OF 353

P-002

\\woodardcurran.net\shares\Projects\0229868.04 ofallon mo wwtf ammonia upgrades\wip\cad drawings\Process\229868\04-P-002.dwg, Mar 22, 2019 - 2:31pm