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 Queen City
Queen City Wastewater Treatment Facility
0.25 mi SE of Chilly School Rd and Lincoln St
Queen City, MO 63561

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.

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.

August 26, 2025
Effective Date

August 25, 2027
Expiration Date

Heather S. Peters, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

The proposed upgrades include Moving Bed Biological Reactor (MMBR) system, sludge removal from the lagoons, stabilization of the earthen lagoon berms, manhole structure replacements, and ultraviolet (UV) disinfection system.

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 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 in accordance with the plans and specifications submitted by Benton & Associates, Inc. on May 9, 2025, and signed and sealed by Matthew Hardy, P.E., Cameron Jones, P.E., and Christopher Howe, P.E. on April 22, 2025, and approved by the department on August 26, 2025.

3. Regulation 10 CSR 20-4.040(18)(B)1 requires that projects be publicly advertised, allowing sufficient time for bids to be prepared and submitted. Projects should be advertised at least 30 days prior to bid opening.

4. The department must be contacted in writing prior to making any changes to the approved 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).

5. As per 10 CSR 20-4.040, all changes in contract price or time within the approved scope of work must be by change order in accordance with Section 19 of this rule.

6. 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 electronic Sanitary Sewer Overflow/Bypass Reporting system at https://dnr.mo.gov/mogem/ or Northeast Regional Office per 10 CSR 20-7.015(9)(G).

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) Section 404 Department of Army permit (§404) along with the department's Section 401 Water Quality Certification or waiver (§401) 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 likely be required. Since the USACE makes determinations on what is jurisdictional, you must contact the USACE to determine permitting requirements. See https://dnr.mo.gov/water/business-industry-other-entities/permits-certification-engineering-fees/section-401-water-quality for more information or you may contact the department's Water Protection Program at 573-522-4502 or wpsc401cert@dnr.mo.gov.

9. All construction must adhere to applicable 10 CSR 20-8 (Chapter 8) requirements.

10. Upon completion of construction:

    A. The City of Queen City 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 the operating permit modification be issued. 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

The project includes modifications to the existing wastewater treatment system to better meet effluent limitations. The new MBBR system will allow for ammonia reduction while the UV disinfection system will help meet *E. coli* limits consistantly. Sludge removal will allow for better treatment and help meet new 5-day biochemical oxygen demand (BOD_5) and total suspended solids (TSS) limits, as well as percent removal.

2. FACILITY DESCRIPTION

The exisiting facility has a four-cell lagoon and sludge is retained in the cells. Additions to the wastewater treatment process include MBBR system, UV disinfection system, and piping. Sludge will likely be removed from the lagoons. The upgrades will help meet *E. coli*, ammonia, BOD_5, and TSS limits, as well as percent removal.

The Queen City Wastewater Treatment Facility (WWTF) is located 0.25 miles southeast of Chilly School Road and Lincoln Street, Queen City, Missouri, in Schuyler County. The facility has a design average flow of 67,300 gpd and serves a population equivalent of approximately 673. The city has approximately 229 residential connections, 8 commercial connections, and no industrial connections. The collection system has approximately 40,000 feet (ft) of sewer mains.

3. COMPLIANCE PARAMETERS

The limits following the completion of construction will be applicable to the facility:

Parameter	Units	Daily Maximum Limit	Monthly Average Limit
Biochemical Oxygen Demand$_5$ (BOD_5)	mg/L	45	30
Total Suspended Solids (TSS)	mg/L	45	30
BOD_5 Percent Removal	%	-	85
TSS Percent Removal	%	-	85

4. REVIEW OF MAJOR TREATMENT DESIGN CRITERIA

Existing Components: Lagoon Cell Nos. 1, 2, 3, and 4 are non-aerated.

- Lagoon cell #1 has a surface area of approximately 178,596 ft^2 with a depth of 7 ft with a volume of 6 MG to provide approximately 89 days of storage.
- Lagoon cell #2 has a surface area of approximately 56,628 ft^2 with a depth of 7 ft with a volume of 1.8 MG to provide approximately 26 days of storage.

- Lagoon cell #3 has a surface area of approximately 52,272 ft^2 with a depth of 10 ft with a volume of 2 MG to provide approximately 30 days of storage.
- Lagoon cell #4 has a surface area of approximately 52,272 ft^2 with a depth of 10 ft with a volume of 2 MG to provide approximately 30 days of storage.

New Components:

- Moving Bed Biological Reactor (MBBR) – The lagoon-treated effluent from Cell No. 3 will flow by gravity to the MBBR system. The MBBR system is capable of treating a design average flow of 67,300 gpd. The system is composed of two tanks with each approximately 16 ft x 8 ft with a sidewater depth of 12 ft. Total volume of the two tanks is 22,979 gallons. The average flow hydraulic retention time is 3.9 hours and the peak flow hydraulic retention time is 2.7 hours. An insulated cover shall be installed in each tank. An immersion tank heater will be installed to maintain a minimum wastewater temperature of 5°C. Each tank shall be filled with high surface area media. Aeration by means of tri-lobe or bi-lobe positive displacement blowers each capable of supplying a total of 163 scfm with 10 HP motors. The effluent from the MBBR system will flow to Cell No. 4 for polishing prior to disinfection and discharge.
- Ultraviolet Disinfection – Disinfection is the process of removal, deactivation, or killing of pathogenic microorganisms. The UV disinfection system will have one bank with 15 low-pressure, high-intensity lamps capable of treating a peak flow of 250,000 gpd while delivering a minimum UV intensity of 30.0 mJ/cm2 with an expected ultraviolet transmissivity of 55 percent minimum.

5. OPERATING PERMIT

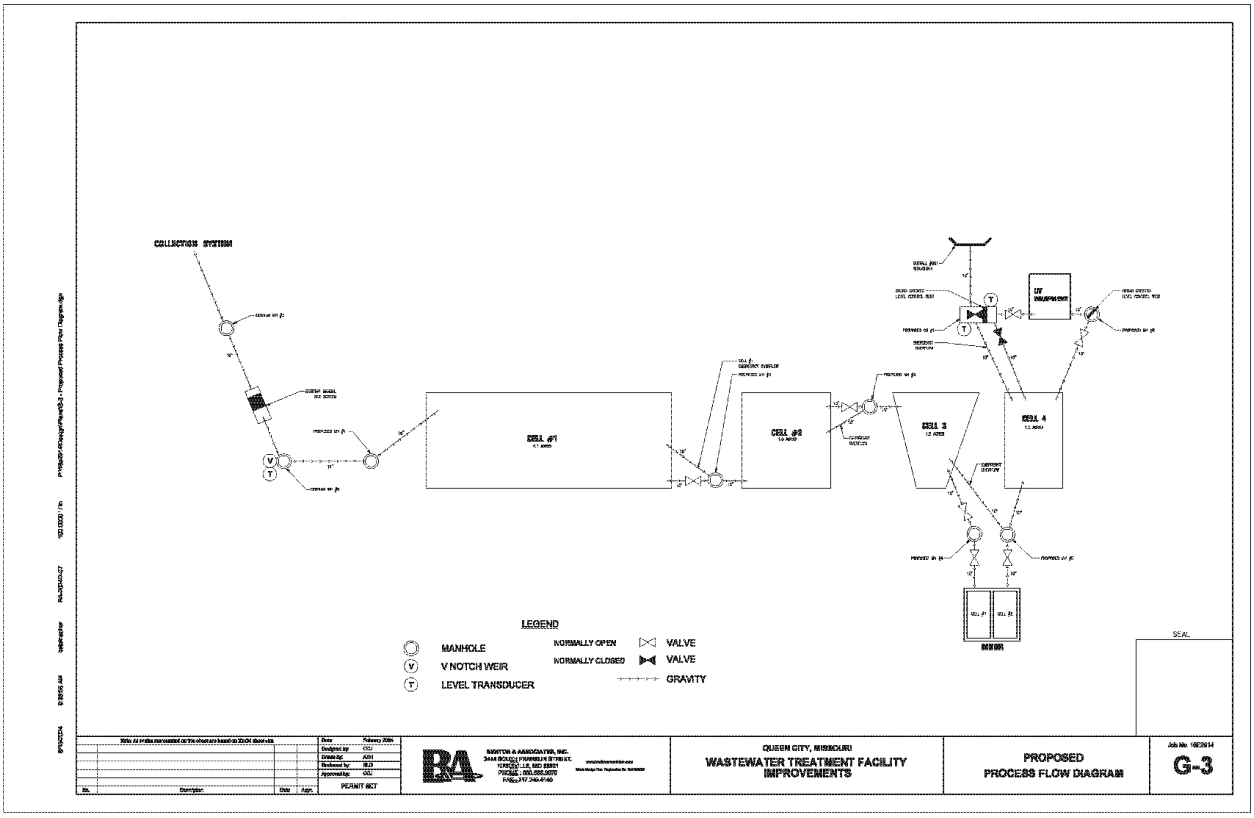
Operating permit MO-0093785 will require a modification to reflect the construction activities. The modified Queen City WWTF, MO-0093785, was successfully public noticed from June 20, 2025, to July 21, 2025, with no comments received. Submit the Statement of Work Completed to the department in accordance with 10 CSR 20-6.010(5)(N) and request the operating permit modification be issued.

Angie Garcia, E.I.
Financial Assistance Center
angie.garcia@dnr.mo.gov

APPENDICES

1. Process Flow Diagram
2. Summary of Design

APPENDIX 1 – PROCESS FLOW DIAGRAM


COLLECTION SYSTEM
CELL #1
CELL #2
CELL 3
CELL 4
UV DISINFECTION
MIXER
LEGEND
MANHOLE
V NOTCH WEIR
LEVEL TRANSDUCER
NORMALLY OPEN
NORMALLY CLOSED
VALVE
VALVE
GRAVITY
SEAL
QUEEN CITY, MISSOURI
WASTEWATER TREATMENT FACILITY IMPROVEMENTS
PROPOSED PROCESS FLOW DIAGRAM
G-3
PERMIT SET

APPENDIX 2 – SUMMARY OF DESIGN

BENTON & ASSOCIATES INC

Benton & Associates, Inc.
Consulting Engineers/Land Surveyors
2414 South Franklin Street
Kirksville MO 63501
Voice (660) 665-3575 • Fax (217) 245-4149
email: info@bentonassociates.com
www.bentonassociates.com

MEMO

To: Missouri Department of Natural Resources
From: Cameron Jones, P.E. SIT
Subject: Basis of Design – Queen City, MO - Lagoon Treatment Improvements
Date: February 12, 2024

This technical memo is provided to supplement the Queen City's February 2024 Wastewater Construction Permit Application. The goal of the memo is to provide additional technical and basis of design information to review the City's plans for MDNR permitting approval. Additional sheets can be provided for your consideration and review upon request.

B&A has performed a design analysis in consultation with MDNR's "Wastewater Guidelines and Standards Document" to confirm Missouri treatment requirements are met as detailed on the following pages.

The following design assumptions were utilized based on standard treatment conditions generally accepted within the wastewater treatment industry based on common waste characteristics, load variation, and temperature.

Current Flows, Design Flows, & NPDES Requirements

The following tables contain a summary of the City's current NPDES limits and describes the anticipated design flows into the lagoon wastewater treatment plant (WWTP).

Parameter	FLOW (GPD)
NPDES Daily Average Flow at WWTP	67,300
Average Water Usage	42,000
Per Capita Sewage Flow Calculation (100 GPD / person)	67,300

It is our goal to reduce the amount of inflow and infiltration reaching the plant over time, therefore the plant was designed to handle the hydraulic capacity needed currently but will operate efficiently as inflow and infiltration is reduced with future projects.

STATE OF MISSOURI
C. CAMERON D. JONES
NUMBER PE-2020013726
PROFESSIONAL ENGINEER

Date: 2/15/24
Exp: 12/31/24

Design Parameter	Unit	WWTP Influent	WWTP Design
Daily Average Flow (DAF)	GPD	53,000	67,300
Daily Maximum Flow (DMF)	GPD	250,000	250,000
BOD	mg/L (ppd)	236 (104)	250 (140)
TSS	mg/L (ppd)	177 (78)	250 (140)
*Ammonia (as N)	mg/L (ppd)	30 (13)	30 (17)
pH	S.U.	7.0	7.0

The tables above indicate significant inflow and infiltration at the wastewater treatment plant as can be interpreted by current loadings consistent with proposed design loadings despite much higher flows. Design loadings were based on design standards and current loadings to provide the City with ample capacity to treat current and future customers while meeting the NPDES limits shown below.

NPDES LIMITS

Effluent Design Criteria Parameter	Daily Maximum (mg/l)	Monthly Average (mg/l)	Weekly Average (mg/l)
$CBOD_5$ @ 0.0673 MGD		45	65
TSS @ 0.0673 MGD		80	120
E. coli @0.0673 MGD		206	1030
Ammonia as N (Apr 1 – Sep 30) (Oct 1 – Mar 31)	 5.5 7.6	1.3 2.9	
Oil & Grease	15	10	
pH shall be at a daily minimum of 6.5 S.U.			

Treatment Design

The proposed WWTP will be modified from a purely facultative lagoon with two (2) lagoons in series with an additional two (2) cells in parallel. The primary lagoon is approximately 4.1 acres at five-foot (5') of depth. The secondary lagoon is approximately 1.3 acres at five-foot (5') of depth, followed by 2 polishing cells of equal volume (1.2 acres) at eight-foot (8') of depth.

Rehabilitation of the facultative lagoons involves utilizing a biological sludge removal treatment program to meet treatment volume requirements of the statute. Sludge removal will increase wastewater treatment effluent quality. The WWTP Improvement Plan Sheets are attached to this memo as part of the permit submittal plans.

Treatment plant improvements include replacement of existing site piping with provisions for lagoon by-pass piping, hydraulic flow through capacity, and emergency overflow berm protection. Additionally, ammonia treatment required by MDNR NPDES Permitting will be accomplished using a Moving Bed Biological Reactor (MBBR). Typical flows will be routed through the first three (3) cells, followed by MBBR treatment, with BOD and TSS polishing in the fourth cell. Lastly, Ultraviolet Disinfection (UV Disinfection) will be used to inactivate E. coli bacteria before discharging into the North Fork Salt River.

Lagoon Design

Facultative lagoon sizing in Missouri is standardized by the most conservative method available, called the areal loading rate method. Other methods, which typically require much less treatment volume, include plug flow with axial dispersion, multiple correlation method, complete-mix model, and plug-flow model.

As outlined in 10 CSR 20-8.200 Wastewater Treatment Lagoons and Wastewater Irrigation Alternatives and MDNR Wastewater Guidelines and Standards Document Chapter 11 Section 11.2.2. Missouri standards outline BOD loadings limits of thirty-four pounds per day per acre (34 lbs/day/acre) at three-foot (3') operating depth in the primary cells. The second cell requires three-tenths (0.3) the area of the primary cell. The third and fourth cells should have one-tenth (0.1) the area of the primary cell.

The "freeboard" height for the rehabilitated lagoons is 2 feet, which is the standard minimum of 2 feet.

Lagoon depths are controlled via an effluent control structure featuring draw off valves at two foot increments on the effluent. This will give the operator the flexibility to select the draw-off level in the lagoons by time of year and lagoon conditions. Additionally, the Primary Lagoon will act as Flow Equalization for storm flows across the 4.1 acres of surface area.

Cell #1 – Areal Loading Rate

Cell #1 Design Loading	= 140 ppd	
÷ Required 1st Cell Loading Rate	= 35 lbs/acre/day	
Required Cell #1 Sizing	= 4 acres	**< Existing Cell #1 (4.1 Acres) MDNR Reg OK!**

Cell #2 – Areal Loading Rate

Required Cell #1 Sizing	= 4 acres	
× Required Cell #2 Sizing	= 0.3 Cell #1	
Required Cell #2 Sizing	= 1.2 Acres	**< Existing Cell #2 (1.3 Acres) MDNR Reg OK!**

Cell #3 – Areal Loading Rate

Required Cell #1 Sizing	= 4 Acres	
× Required Cell #3 Sizing	= 0.1 Cell #1	
Required Cell #3 Sizing	= 0.4 Acres	**< Existing Cell #3 (1.2 Acres) MDNR Reg OK!**

Cell #4 – Areal Loading Rate

Required Cell #1 Sizing	= 4 Acres	
× Required Cell #4 Sizing	= 0.1 Cell #1	
Required Cell #4 Sizing	= 0.4 Acres	**< Existing Cell #4 (1.2 Acres) MDNR Reg OK!**

Detention Time

MDNR Wastewater Guidelines and Standards Document Chapter 11 Section 11.2.2 includes additional requirements of one hundred twenty (120) days detention time between the two-foot (2') level and the maximum operating depth in the entire lagoon system and one (1) month's storage of average daily flow in each of the 3rd and 4th Cells.

Cell 1 has approximate dimensions and geometries as follows:

Top-to-Top Length	=	710 feet
Top-to-Top Width	=	260 feet
Side Slope - Uniform (Rise/Run)	=	3:1
Depth	=	7 feet
Water Depth	=	5 feet

The geometry of existing Cell 1 with sloped sides can best be described as a "truncated pyramid." The volume of a truncated pyramid utilizing the dimensions above and others including water depth, has been calculated using 3-dimensional modeling.

Based on the proposed geometries, Cell 1 has the following approximate volumes:

Total Volume (To Top-of-Berm)	=	8,630,470 Cubic Feet
Water Volume	=	796,070 Cubic Feet
÷ Design Average Flow	=	8,997 Cubic Feet/Day
Detention Time	=	89 Days
Water Volume less bottom 2'	=	494,094 Cubic Feet
÷ Design Average Flow	=	8,997 Cubic Feet/Day
Detention Time	=	55 Days

Cell 2 has approximate dimensions and geometries as follows:

Top-to-Top Length	=	250 feet
Top-to-Top Width	=	240 feet
Side Slope - Uniform (Rise/Run)	=	3:1
Depth	=	7 feet
Water Depth	=	5 feet

The geometry of existing Cell 2 with sloped sides can best be described as a "truncated pyramid." The volume of a truncated pyramid utilizing the dimensions above and others including water depth, has been calculated using 3-dimensional modeling.

Based on the proposed geometries, Cell 2 has the following approximate volumes:

Total Volume (To Top-of-Berm)	=	352,086 Cubic Feet
Water Volume	=	237,870 Cubic Feet
+ Design Average Flow	=	8,997 Cubic Feet/Day
Detention Time	=	26 Days
Water Volume less bottom 2'	=	150,534 Cubic Feet
+ Design Average Flow	=	8,997 Cubic Feet/Day
Detention Time	=	17 Days

Cells 3 & 4 have approximately the same water surface area based on survey data and as-built plans. Cell 3 is triangle shaped and therefore Cell 4 was used to calculate volumes for both Cell 3 and Cell 4.

Approximate dimensions and geometries of Cell 4 are as follows:

Top-to-Top Length	=	285 feet
Top-to-Top Width	=	170 feet
Side Slope - Uniform (Rise/Run)	=	3:1
Depth	=	10 feet
Water Depth	=	8 feet

The geometry of existing Cells 3 & 4 with sloped sides can best be described as a "truncated pyramid." The volume of a truncated pyramid utilizing the dimensions above and others including water depth, has been calculated using 3-dimensional modeling.

Based on the proposed geometries, Cells 3 & 4 has the following approximate volumes:

Total Volume (To Top-of-Berm)	=	360,000 Cubic Feet
Water Volume	=	268,464 Cubic Feet
+ Design Average Flow	=	8,997 Cubic Feet/Day
Detention Time	=	30 Days
Water Volume less bottom 2'	=	214,848 Cubic Feet
+ Design Average Flow	=	8,997 Cubic Feet/Day
Detention Time	=	24 Days

Total Detention Time

Cell #1	= 89 Days	
Cell #2	= 26 Days	
Cell #3	= 30 Days	**= One Month Storage MDNR Reg OK!**
+ Cell #4	= 30 Days	**= One Month Storage MDNR Reg OK!**
	175 Days	

Detention Time Less Bottom 2'

Cell #1	= 55 Days	
Cell #2	= 17 Days	
Cell #3	= 24 Days	
+ Cell #4	= 24 Days	
	120 Days	**= 120 Days Storage MDNR Reg OK!**

MBBR Design

MBBR Design and selection included manufacture proposals, cost comparisons, site visits, and owner input on operational considerations. A manufacture was designated as the Basis of Design and multiple manufactures will be considered for construction bids on a performance basis. Manufactures will need to meet or exceed design parameters listed below in the Triplepoint Environmental design proposal for their NitrOx Process.

The NitrOx Process utilizes the existing lagoon infrastructure for 90% BOD removal, after which nitrifying bacteria begin to nitrify. The effluent from the lagoons then flows hydraulically or is pumped into a two-stage nitrification reactor. In colder climates where the winter water temperature drops below 4° C, a thermal regulation heat exchanger is added in order to increase the water temperature; typically, only a few degrees during the coldest months of the year. In the two NitrOx Reactor cells, there are millions of individual biofilm carriers that provide a habitat for nitrifying bacteria, ensuring that there are sufficient nitrifying bacteria even in the coldest water conditions. Each NitrOx Reactor cell has aeration to provide the necessary oxygen, as well as to create a complete mix environment to keep the biofilm carriers in constant motion. The two cells are covered with floating insulated covers to mitigate heat loss and the media is kept in the tank with stainless steel sieves. Finally the influent from the second NitrOx Reactor is discharged into a final polishing/clarification lagoon prior to the ultimate discharge from the lagoon system.

Considering the lagoon geometry and preceding assumptions, the MBBR design calculations are as follows. Note that the MBBR system has been primarily designed by Triplepoint Environmental.

SUMMARY - Design Input Values

	Plant Influent Characteristics	Units	Values
1	Annual Average Daily Flow	gpd	67,300
2	Maximum Monthly Average Daily Flow	gpd	140,225
3	Peak Daily Flow	gpd	201,900
4	Peak Hourly Flow	gpd	269,200
5	Influent BOD	mg/L	250
6	Influent BOD	lbs/day	292.4
7	Influent TSS	mg/L	250
8	Influent TSS	lbs/day	292.4
9	Influent NH3-N	mg/L	30.0
10	Influent NH3-N	lbs/day	35.1
11	Influent TKN	mg/L	35.0
12	Influent TKN	lbs/day	40.9
13	Influent pH		7
14	Water Temperature	deg-C	12
	NitrOx Influent Characteristics	**Units**	**Values**
15	Annual Average Daily Flow	gpd	67,300
16	Maximum Monthly Average Daily Flow	gpd	140,225
17	Peak Daily Flow	gpd	171,063
18	Peak Hourly Flow	gpd	204,713
19	Influent BOD	mg/L	30
20	Influent TSS	mg/L	30
21	Influent NH3-N	mg/L	26.2
22	Influent TKN	mg/L	31.2
23	Design Influent TKN	mg/L	31.2
A4	Alkalinity Required as CaCO3 (Minumum)	mg/L	250
24	Influent pH		7
25	NitrOx Water Temperature	deg-C	5

SUMMARY - General Design Parameters

	NitrOx Tank Sizing Summary	Units	Values
26	Number of Treatment Trains Proposed		1
27	Number of Tanks Per Train		2
28	Total Number of Tanks		2
29	Length of Each	ft	16.0
30	Width of Each	ft	8.0
31	Side Water Depth of Each	ft	12
32	Tank Height of Each	ft	15
33	Volume of Each	gallons	11,489
34	Volume Total	gallons	22,979
35	Hydraulic Retention Time at Max Month Flow	hours	3.9
36	Hydraulic Retention Time at Peak Hourly Flow	hours	2.7
40	Number of Ares Units per Tank		2
41	Total Number of Ares Units		4

	NitrOx Air Requirement (Per Treatment Train)	Stage 1	Stage 2
42	AOR (lbs/day)	107	107
43	Assumed Diffuser Subm. at AWL (ft.)	11.25	11.25
44	Elevation (ft.)	1,004	1,004
45	Alpha	0.60	0.60
46	Beta	0.9	0.9
47	Target DO Residual (MBBR Process) (mg/L)	5.0	5.0
48	SOR (lbs/day)	444	444
49	Target Diffuser Efficiency/ft. Submergence	1.9	1.9
50	**Airflow (scfm)**	**82**	**82**
	NitrOx Blower Requirement Summary	**Units**	**Values**
51	No. of Blowers		2
52	Airflow Requirement per Blower	scfm	163
53	Airflow per 1,000 scfm	scfm/1,000 cf	53
54	Water Pressure at Air Release Depth	psig	4.87
55	Piping and Diffuser Losses	psig	0.50
56	Cushion	psig	1.00
57	**Maximum Design Discharge Pressure**	**psig**	**6.37**
58	Assumed Overall Efficiency		0.62
59	Approximate BHP Requirement/Blower	bhp	7.3
60	Approximate BHP Requirement Total	bhp	7.3
61	Estimated Nameplate HP / Blower	hp	10
62	Blower Type		Tri-Lobe PD

SUMMARY - Calculated Output Values

	NitrOx Effluent Parameters	Units	Values
63	Effluent SCBOD	mg/L	7.5
64	Effluent SCBOD	lbs/day	8.8
65	Effluent NH3-N in Winter (Monthly Average)	mg/L	2.9
66	Effluent NH3-N in Winter (Monthly Average)	lbs/day	3.4
67	Effluent NH3-N in Summer (Monthly Average)	mg/L	1.3
68	Effluent NH3-N in Summer (Monthly Average)	lbs/day	1.5

4. $FTE = \alpha\ (SOTE)\ \theta^{(T-20)}\ (\beta\ C^*_{-T} - DO) \div C^*_{-20}$ *field transfer efficiency*

Where,

α	contaminant factor (contaminants. depth. bubble size) (range: 0.40–0.70)
β	TDS factor (total dissolved solids) (range: 0.90–1.00)
$\theta = 1.024$	temperature factor
DO	target dissolved oxygen level (mg/L)
C^*_{-T}	saturation oxygen concentration at site—adjusted for water depth
C^*_{-20}	sat. oxygen concentration at STP conditions—adjusted for water depth
T	water temperature (Celsius)

As can be seen in the calculations above, conservative influent values assume very little ammonia removal in the facultative lagoons and relatively low water temperature while meeting NPDES effluent limitations. Certain upstream preliminary treatment units are required by MDNR regulation 10 CSR 20-8.180(8). Each of the following are met by the three upstream lagoons: reduction of pass-through and suspended solids, grit removal, oil and grease removal, primary clarification, and controlled release of hydrogen sulfide. Aeration equipment associated with the MBBR will also mitigate hydrogen sulfide issues. Further, all metal within the MBBR will be corrosion resistant Stainless Steel.

Ultraviolet Disinfection

UV Disinfection and selection included manufacture proposals, cost comparisons, site visits, and owner input on operational considerations. A manufacture was designated as the Basis of Design and multiple manufactures will be considered for construction bids on a performance basis. Manufactures will need to meet or exceed design parameters listed below in the Enaqua design proposal.

UV dosage is based on Average Daily Flow, where peak hour flows will be equalized by a combination of upstream lagoon surface area and hydraulics between the lagoons, UV Disinfection, flow and level control structure, and outfall piping. Hydraulic modeling using Visual Hydraulics confirms that the MDF of 250,000 gpd can be maintained through the UV channel while maintaining freeboard on the lagoons.

As a facility with a design average flow of less than one hundred thousand gallons per day (<100,000 gpd) and have seasonal bacterial effluent limits, one (1) stored spare module for maintenance will be provided.

The details of the UV design criteria, process configuration, and UV reactor are provided in the following tables.

Influent Limits		
Peak Disinfection Flow Rate	0.27/188	MGD/ GPM
Average Daily Flow Rate	.067/47	MGD/ GPM
Target Indicator Organism	Escherichia Coli (E. Coli)	
UV Transmittance (min)	55.0	% UVT Minimum
Influent Maximum*	100,000	CFU/100 ml
Effluent Limits		
Total Suspended Solids*	30	mg/l weekly average
Total $CBOD_5$*	30	mg/l weekly average
Mean Particle Size*	30	Microns
Total Iron*	0.3	mg/l
Effluent Turbidity*	5.0	NTU
Biological Treatment Process	NITROX Lagoon, Clarification	
UV Performance Standards		
Effluent Permit Criteria	206	CFU/100 ml of E. Coli (30 – day geomean)
UV Dose (manufacturer calculated)	30.0	Minimum UV dose of 30.0 mJ/cm^2. After applying certified Lamp End of Lamp Life (EOLL) of .87, Fouling Factor of .89.

Reactor model number	M5.03021
Reactor type	In-Pipe
Installation notes	Indoor/ Outdoor – Covered Installation
Process connection	6.00" ø CL 150 Flange
Reactor configuration	Standard
UV Lamps - Enaqua part #: 001.0617045 XUV60L	145-Watt LPHO Non-Amalgam Smart Lamps
UV Lamp output at 253.7 nm (Nominal Watts)	55.00 Watts
Ballasts - Enaqua part #: 502.5V2427M	145-Watt Enlight High Efficiency Ballast
Non-Contact Reactor Material	C-Series AFP840 Tube
Material of Construction	304 SS

UV REACTOR(S)	
# of proposed UV reactors	1
# of banks per reactor	1
# of AFP tubes per reactor	6
# of lamp racks per bank	3
# of lamps per lamp rack	5
Total # of lamps per bank	15
Total # of ballasts per bank	15
Total #of lamps per reactor	15

CONTROLS & ELECTRICAL	
ADRX-Local Control Panel with LCD Screen, HOA Switch, and UV Status and Alarm Indictors.	1
SENSORS	
UV intensity sensor - Enaqua part number: 560.601902	1

As is shown in these design basis calculations, the proposed facultative lagoons, MBBR, and UV Disinfection can adequately meet and exceed NPDES permit limits. Preceding discussions within this memo and the Queen City FP also demonstrate that this proposed treatment plant will provide operational efficiencies and be able to be modified efficiently to meet anticipated future effluent goals if required.

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: SRF Project #: C295865-01

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 Previously Submitted July 2022 Amendment

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
Queen City Wastewater System Improvements

2.2 ESTIMATED PROJECT CONSTRUCTION COST
$ 2,154,000

2.3 PROJECT DESCRIPTION
Rehabilitation of the wastewater treatment facility including but not limited to the stabilization of the earthen lagoon berms, pipe and manhole structure replacements and the addition of ammonia and UV treatment.

2.4 SLUDGE HANDLING, USE AND DISPOSAL DESCRIPTION
Sludge disposal is not in the scope of this project. Accumulated sludge has been surveyed and determined to be a candidate for biological sludge treatment prior to construction.

2.5 DESIGN INFORMATION

A. Current population: 562; Design population: 673

B. Actual Flow: 53k gpd; Design Average Flow: 67.3k gpd;
Actual Peak Daily Flow: 250k gpd; Design Maximum Daily Flow: 250k gpd; Design Wet Weather Event: 250k

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
Queen City Wastewater Treatment Facility	1-660-766-2735	cityofqueencity63561@gmail.com

ADDRESS (PHYSICAL)	CITY	STATE	ZIP CODE	COUNTY
0.25 mi SE of Chilly School rd. & Lincoln st	Queen City	MO	63561	Schuyler

Wastewater Treatment Facility: Mo- 0093785 (Outfall 001 Of 001)

3.1 Legal Description: SW ¼, NE ¼, SW ¼, Sec. 26, T 65N, R 15W
(Use additional pages if construction of more than one outfall is proposed.)

3.2 UTM Coordinates Easting (X): 538499 Northing (Y): 4472993
For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)

3.3 Name of receiving streams: North Fork Salt River

4.0 PROJECT OWNER

NAME	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
City of Queen City	1-660-766-2735	cityofqueencity63561@gmail.com

ADDRESS	CITY	STATE	ZIP CODE
P.O. Box 400	Queen City	MO	63561

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
Same as above		

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
C. Cameron Jones / Benton & Associates	217-245-4146	cjones@bentonassociates.com

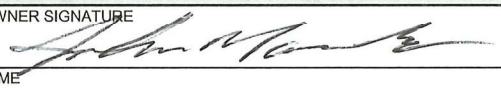
ADDRESS	CITY	STATE	ZIP CODE
2414 S Franklin St	Kirksville	MO	63501

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
John March	2-9-24

TITLE OR CORPORATE POSITION	TELEPHONE NUMBER WITH AREA CODE	E-MAIL ADDRESS
Mayor	660-341-1911	cityofqueencity63561@gmail.com

Mail completed copy to:

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM
P.O. BOX 176
JEFFERSON CITY, MO 65102-0176

END OF PART A.
REFER TO THE APPLICATION OVERVIEW TO DETERMINE WHETHER PART B NEEDS TO BE COMPLETE.

PART B – LAND APPLICATION ONLY
(Submit only if the proposed construction project includes land application of wastewater.)

8.0 FACILITY INFORMATION

8.1 Type of wastewater to be irrigated: ☐ Domestic ☐ State/National Park ☐ Seasonal business
☐ Municipal ☐ Municipal with a pretreatment program or significant industrial users
☐ Other (explain) _____

8.2 Months when the business or enterprise will operate or generate wastewater:
☐ 12 months per year ☐ Part of the year (list months): _____

8.3 This system is designed for:
☐ No-discharge.
☐ Partial irrigation when feasible and discharge rest of time.
☐ Irrigation during recreational season, April – October, and discharge during November – March.
☐ Other (explain) _____.

9.0 STORAGE BASINS

9.1 Number of storage basins: _____ (Use additional pages if greater than three basins.)

9.2 Type of basins: ☐ Steel ☐ Concrete ☐ Fiberglass ☐ Earthen ☐ Earthen with membrane liner

9.3 Storage basin dimensions at inside top of berm (feet). Report freeboard as feet from top of berm to emergency spillway or overflow pipe.
Basin #1: Length _____ Width _____ Depth _____ Freeboard _____ Depth _____ Safety _____ % Slope _____
Basin #2: Length _____ Width _____ Depth _____ Freeboard _____ Depth _____ Safety _____ % Slope _____
Basin #3: Length _____ Width _____ Depth _____ Freeboard _____ Depth _____ Safety _____ % Slope _____

9.4 Storage Basin operating levels (report as feet below emergency overflow level).
Basin #1: Maximum operating water level _____ ft Minimum operating water level _____ ft
Basin #2: Maximum operating water level _____ ft Minimum operating water level _____ ft
Basin #3: Maximum operating water level _____ ft Minimum operating water level _____ ft

9.5 Design depth of sludge in storage basins.
Basin #1: _____ ft Basin #2: _____ ft Basin #3: _____ ft

9.6 Existing sludge depth, if the basins are currently in operation.
Basin #1: _____ ft Basin #2: _____ ft Basin #3: _____ ft

9.7 Total design sludge storage: _____ dry tons and _____ cubic feet

10.0 LAND APPLICATION SYSTEM

10.1 Number of irrigation sites _____ Total Acres _____ Maximum % field slopes _____
Location: _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres
Location: _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres
Location: _____ ¼, _____ ¼, _____ ¼, _____ Sec. _____ T _____ R _____ County _____ Acres
(Use additional pages if greater than three irrigation sites.)

10.2 Type of vegetation: ☐ Grass hay ☐ Pasture ☐ Timber ☐ Row crops
☐ Other (describe) _____

10.3 Wastewater flow (dry weather) gallons per day: Average annual _____ Seasonal _____ Off-season _____

10.4 Land application rate (design flow including 1-in-10 year storm water flows):
Design: _____ inches/year _____ inches/hour _____ inches/day _____ inches/week
Actual: _____ inches/year _____ inches/hour _____ inches/day _____ inches/week

10.5 Total irrigation per year (gallons): Design: _____ gal Actual: _____ gal

10.6 Actual months used for irrigation (check all that apply):
☐ Jan ☐ Feb ☐ Mar ☐ Apr ☐ May ☐ Jun ☐ Jul ☐ Aug ☐ Sep ☐ Oct ☐ Nov ☐ Dec

10.7 Land application rate is based on:
☐ Hydraulic Loading ☐ Other (describe) _____
☐ Nutrient Management Plan (N&P) If N&P is selected, is the plan included? ☐ YES ☐ NO

MISSOURI DEPARTMENT OF NATURAL RESOURCES
WATER PROTECTION PROGRAM

FORM B: APPLICATION FOR OPERATING PERMIT FOR FACILITIES THAT RECEIVE PRIMARILY DOMESTIC WASTE AND HAVE A DESIGN FLOW LESS THAN OR EQUAL TO 100,000 GALLONS PER DAY

FOR AGENCY USE ONLY	
CHECK NUMBER	
DATE RECEIVED	FEE SUBMITTED
JETPAY CONFIRMATION NUMBER	

READ THE ACCOMPANYING INSTRUCTIONS BEFORE COMPLETING THIS FORM

1. THIS APPLICATION IS FOR:

☐ An operating permit for a new or unpermitted facility. Construction Permit # _____
(Include completed antidegradation review or request for antidegradation review, see instructions)

☐ A new site-specific operating permit formerly general permit #MOG _____

☐ A site-specific operating permit renewal: Permit #MO- _____ Expiration Date _____

☑ A site-specific operating permit modification: Permit #MO- 0093785 Reason: Ammonia & UV Treatment Addition

☐ General permit (NON-POTWs) (MOGD –discharging < 50,000 GPD *or* MOG823 – Land Application of Domestic Wastewater):
Permit #MO- _____ Expiration Date _____

1.1 Is the appropriate fee included with the application (see instructions for appropriate fee)? ☑ YES ☐ NO

2. FACILITY

NAME		TELEPHONE NUMBER WITH AREA CODE	
Queen City Wastewater Treatment Facility		1-660-766-2735	
ADDRESS (PHYSICAL)	CITY	STATE	ZIP CODE
0.25 mi SE of Chilly School Rd and Lincoln St	Queen City	MO	63561

2.1 Legal description: Sec. 26 , T 65N , R 15W County Schuyler

2.2 UTM Coordinates Easting (X): 538499 Northing (Y): 4472993
For Universal Transverse Mercator (UTM), Zone 15 North referenced to North American Datum 1983 (NAD83)

2.3 Name of receiving stream: North Fork Salt River

2.4 Number of outfalls: 1 Wastewater outfalls: 1 Stormwater outfalls: 0 Instream monitoring sites: 0

3. OWNER:

NAME	EMAIL ADDRESS	TELEPHONE NUMBER WITH AREA CODE	
City of Queen City	cityofqueencity63561@gmail	1-660-766-2735	
ADDRESS	CITY	STATE	ZIP CODE
PO Box 400	Queen City	MO	63561

3.1 Request review of draft permit prior to public notice? ☑ YES ☐ NO

3.2 Are you a publicly owned treatment works? ☑ YES ☐ NO
If yes, please attach the Financial Questionnaire. See: https://dnr.mo.gov/forms/780-2511-f.pdf

3.3 Are you a privately owned treatment works? ☐ YES ☑ NO

3.4 Are you a privately owned treatment facility regulated by the Public Service Commission? ☐ YES ☑ NO

4. CONTINUING AUTHORITY:

NAME	EMAIL ADDRESS	TELEPHONE NUMBER WITH AREA CODE	
Same as Owner			
ADDRESS	CITY	STATE	ZIP CODE

If the continuing authority is different than the owner, include a copy of the contract agreement between the two parties and a description of the responsibilities of both parties within the agreement.

5. OPERATOR

NAME	TITLE	CERTIFICATE NUMBER
Les True	Operator	6657
EMAIL ADDRESS		TELEPHONE NUMBER WITH AREA CODE
cityofqueencity63561		660-766-2735

6. FACILITY CONTACT

NAME		TITLE	
John March		Mayor	
EMAIL ADDRESS		TELEPHONE NUMBER WITH AREA CODE	
cityofqueencity63561@gmail.com		660-766-2735	
ADDRESS	CITY	STATE	ZIP CODE
PO Box 400	Queen City	MO	63561

7. DESCRIPTION OF FACILITY

7.1 Process Flow Diagram or Schematic: Provide a diagram showing the processes of the treatment plant. Show all of the treatment units, including disinfection (e.g. – chlorination and dechlorination), influents, and outfalls. Specify where samples are taken. Indicate any treatment process changes in the routing of wastewater during dry weather and peak wet weather. Include a brief narrative description of the diagram.

Attach sheets as necessary.

The Queen City sewer collection system flows by gravity to the Queen City Wastewater Treatment Facility by gravity into a manual bar screen, thru manhole #3, to manhole #2 where flow measured via V-notch weir and level transducer. From there sewage flows by gravity to proposed manhole #1, where flow can be directed into the primary facultative lagoon or into the primary cell bypass. Normal flow continues thru the treatment plant to the secondary facultative lagoon, third cell, proposed moving bed bio-reactor (MBBR), cell 4, proposed ultra-violet disinfection, proposed level control structure, and finally to Outfall 001.

Samples can be taken at the outfall or at the level control structure.

The proposed WWTP will be modified from a purely facultative lagoon with two (2) lagoons in series with an additional two (2) cells in parallel. The primary lagoon is approximately 4.1 acres at five-foot (5') of depth. The secondary lagoon is approximately 1.3 acres at five-foot (5') of depth, followed by 2 polishing cells of equal volume (1.2 acres) at eight-foot (8') of depth.

Treatment plant improvements include replacement of existing site piping with provisions for lagoon by-pass piping, hydraulic flow through capacity, and emergency overflow berm protection. Additionally, ammonia treatment required by MDNR NPDES Permitting will be accomplished using a Moving Bed Biological Reactor (MBBR). Typical flows will be routed through the first three (3) cells, followed by MBBR treatment, with BOD and TSS polishing in the fourth cell. Lastly, Ultraviolet Disinfection (UV Disinfection) will be used to inactivate E. coli bacteria before discharging into the North Fork Salt River.

Proposed emergency overflow piping is included on the downstream of the primary cell, prior to the proposed MBBR, and from cell #4 to the level control structure.

Please see the attached flow diagram in plan sheets and Basis of Design Report.

7.2 Attach an aerial photograph or USGS topographic map showing the location of the facility and outfall.

Please see the following website:
https://modnr.maps.arcgis.com/apps/webappviewer/index.html?id=1d81212e0854478ca0dae87c33c8c5ce

See attached.

8. ADDITIONAL FACILITY INFORMATION

8.1 Number of people presently connected or population equivalent (P.E.) 562 Design P.E. 673

8.2 Connections to the facility: 237

Number of units presently connected: 237

Residential: 229 Commercial: 8 Industrial: 0

8.3 Design flow: 67,300 | Actual flow: 48,500

8.4 Will discharge be continuous through the year? ☑ Yes ☐ No

Discharge will occur during the following months: All 12

How many days of the week will discharge occur? 7

8.5 Is industrial wastewater discharged to the facility? ☐ Yes ☑ No

If yes, attach a list of the industries that discharge to your facility

8.6 Does the facility accept or process leachate from landfills? ☐ Yes ☑ No

8.7 Is wastewater land applied? ☐ Yes ☑ No

If yes, attach Form I. See: https://dnr.mo.gov/forms/780-1686-f.pdf

8.8 Does the facility discharge to a losing stream or sinkhole? ☐ Yes ☑ No

8.9 Has a wasteload allocation study been completed for this facility? ☐ Yes ☑ No

9. LABORATORY CONTROL INFORMATION

LABORATORY WORK CONDUCTED BY PLANT PERSONNEL

Lab work conducted outside of plant. ☑ Yes ☐ No

Push-button or visual methods for simple test such as pH, settlable solids. ☐ Yes ☑ No

Additional procedures such as dissolved oxygen, chemical oxygen demand, biological oxygen demand, titrations, solids, volatile content. ☐ Yes ☑ No

More advanced determinations, such as BOD seeding procedures, fecal coliform/*E. coli*, nutrients (including Ammonia), Oil & Grease, \ total oils, phenols, etc. ☐ Yes ☑ No

Highly sophisticated instrumentation, such as atomic absorption and gas chromatograph. ☐ Yes ☑ No

10. COLLECTION SYSTEM

10.1 Are there any municipal satellite collection systems connected to this facility? ☐ Yes ☑ No

If yes, please list all connected to this facility, contact phone number and length of each collection system

FACILITY NAME	CONTACT PHONE NUMBER	LENGTH OF SYSTEM (FEET OR MILES)
N/A		

10.2 Length of pipe in the sewer collection system? (If available, include totals from satellite collection systems)

40,000 Feet, or _____ Miles (either unit is appropriate)

10.3 Does significant infiltration occur in the collection system? ☐ Yes ☑ No

If yes, briefly explain any steps underway or planned to minimize inflow and infiltration:

11. BYPASSING

Does any bypassing occur in the collection system or at the treatment facility? ☐ Yes ☑ No

If yes, explain:

12. SLUDGE HANDLING, USE AND DISPOSAL

12.1 Is the sludge a hazardous waste as defined by 10 CSR 25? ☐ Yes ☑ No

12.2 Sludge production, including sludge received from others: N/A Design dry tons/year N/A Actual dry tons/year

12.3 Capacity of sludge holding structures:
Sludge storage provided: _____ cubic feet; _____ days of storage; _____ average percent solids of sludge;
☐ No sludge storage is provided. ☐ Sludge is stored in lagoon.

12.4 Type of Storage:
☐ Holding tank ☐ Building
☐ Basin ☑ Lagoon
☐ Concrete Pad ☐ Other (Describe) _____

12.5 Sludge Treatment:
☐ Anaerobic Digester ☑ Lagoon ☐ Composting
☐ Storage Tank ☐ Aerobic Digester ☐ Other (Attach description)
☐ Lime Stabilization ☐ Air or Heat Drying

12.6 Sludge Use or Disposal:
☐ Land Application ☐ Surface Disposal (Sludge Disposal Lagoon, Sludge held for more than two years)
☐ Contract Hauler ☐ Hauled to Another treatment facility
☐ Incineration ☐ Sludge Retained in Wastewater treatment lagoon
☐ Solid waste landfill

12.7 Person responsible for hauling sludge to disposal facility:
☐ By applicant ☐ By others (complete below)

NAME	EMAIL ADDRESS		
N/A			
ADDRESS	CITY	STATE	ZIP CODE
CONTACT PERSON	TELEPHONE NUMBER WITH AREA CODE	PERMIT NO.	
		MO-	

12.8 Sludge use or disposal facility
☐ By applicant ☐ By others (Complete below.)

NAME	EMAIL ADDRESS		
N/A			
ADDRESS	CITY	STATE	ZIP CODE
CONTACT PERSON	TELEPHONE NUMBER WITH AREA CODE	PERMIT NO.	
		MO-	

12.9 Does the sludge or biosolids disposal comply with federal sludge regulations under 40 CFR 503?
☐ Yes ☐ No (Explain)

N/A

13. ELECTRONIC DISCHARGE MONITORING REPORT (eDMR) SUBMISSION SYSTEM

Per 40 CFR Part 127, National Pollutant Discharge Elimination System (NPDES) Electronic Reporting Rule, reporting of effluent limits and monitoring shall be submitted by the permittee via an electronic system to ensure a timely, complete, accurate, and nationally- consistent set of data. One of the following options must be checked in order for this application to be considered complete. Visit https://dnr.mo.gov/env/wpp/edmr.htm to for information on the Department's eDMR system and how to register.

☐ I will register an account online to participate in the Department's eDMR system through the Missouri Gateway for Environmental Management (MoGEM) before any reporting is due, in compliance with the Electronic Reporting Rule.

☑ I have already registered an account online to participate in the Department's eDMR system through MoGEM.

☐ I have submitted a written request for a waiver from electronic reporting. See instructions for further information regarding waivers.

☐ The permit I am applying for does not require the submission of discharge monitoring reports.

14. JETPAY

Permit fees may be payed online by credit card or eCheck through a system called JetPay. Use the URL provided to access JetPay and make an online payment.

New Site Specific Permit: https://magic.collectorsolutions.com/magic-ui/payments/mo-natural-resources/591/

Construction Permits: https://magic.collectorsolutions.com/magic-ui/payments/mo-natural-resources/592/

Modification Fee: https://magic.collectorsolutions.com/magic-ui/payments/mo-natural-resources/596/

New General Domestic WW: https://magic.collectorsolutions.com/magic-ui/payments/mo-natural-resources/772/

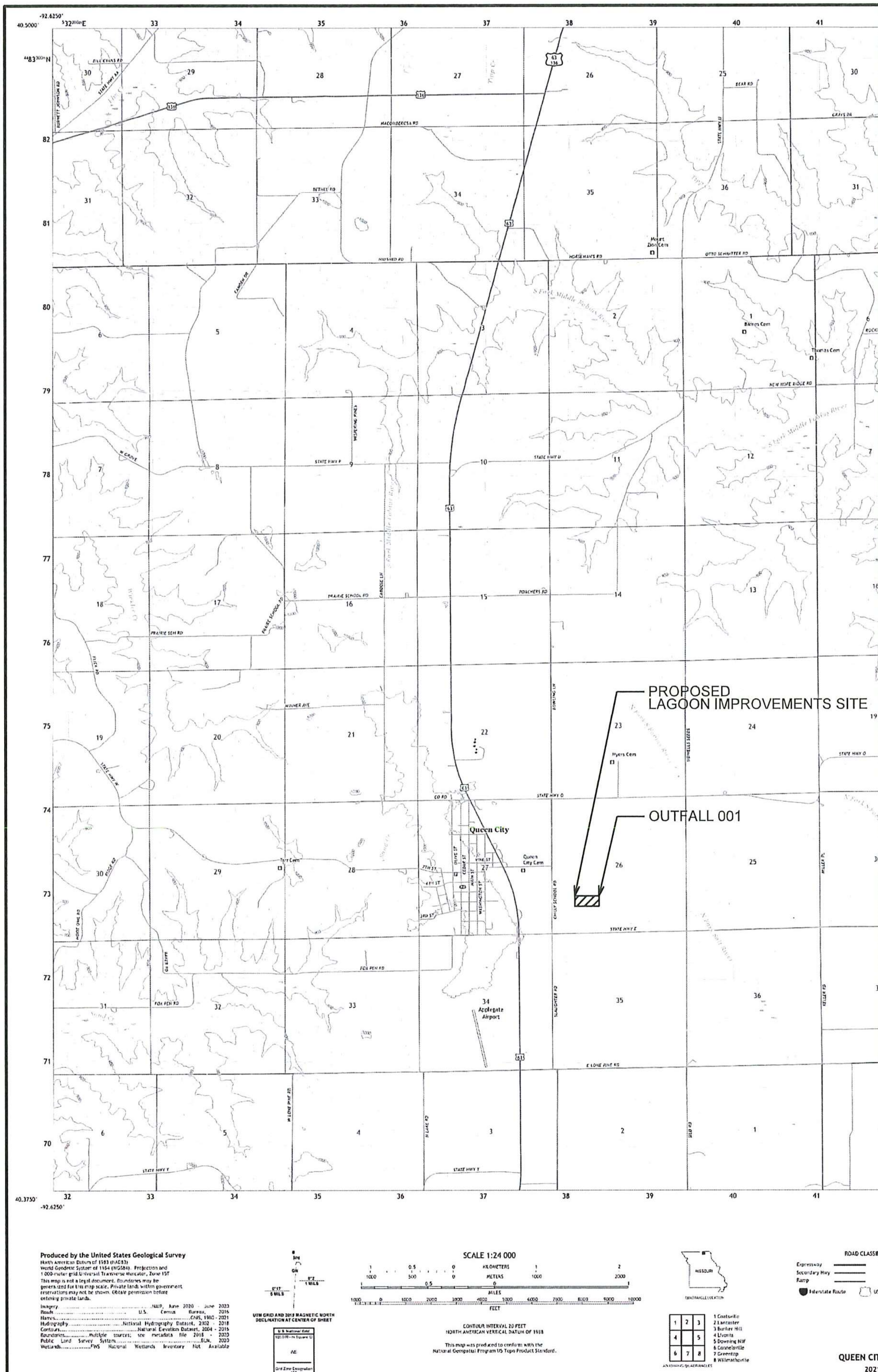
15. CERTIFICATION

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.

NAME (TYPE OR PRINT)	OFFICIAL TITLE	TELEPHONE NUMBER WITH AREA CODE
John March	Mayor	660-341-1911

SIGNATURE	DATE SIGNED
	2-9-24

MO 780-1512 (03-21)



BENTON & ASSOCIATES INC

Illinois Design Firm
Registration No. 184-000852

No.	Description	Date	Appr.

WASTEWATER TREATMENT FACILITY IMPROVEMENTS
QUAD MAP EXCERPT
EXHIBIT "C"

QUEEN CITY, MISSOURI

MACON, MISSOURI
JACKSONVILLE, ILLINOIS
MACOMB, ILLINOIS

BENTON & ASSOCIATES, INC.
713 N HIGH ST., KIRKSVILLE MISSOURI 63501
(660) 665-3575

Date: June 2022
Designed by: CCJ
Drawn by: XXX
Reviewed by: ELD
Approved by: CCJ

This Line is 2" Long on a 22x34 Sheet

Job No. 16E2914

EXHIBIT "C"

Sheet 1 of 1