Missouri Department of NATURAL RESOURCES
dnr.mo.gov
Michael L. Parson, Governor
Carol S. Comer, Director

September 26, 2019

Mr. Bob Hembrock, P.E., Executive Director
Northeast Public Sewer District
1041 Gravois Road
Fenton, MO 63026

RE: C295684-05 Biosolids Improvements – Northeast Public Sewer District Interim Saline Creek WWTF, MO-0128490, Construction Permit No. CP0002088, Jefferson County

Dear Mr. Hembrock:

The Missouri Department of Natural Resources' Water Protection Program has reviewed and approved the plans and specifications submitted by Horner Shifrin for the Northeast Public Sewer District. Please find enclosed Construction Permit No. CP0002088 and 1 set of approved plans and specifications. You must maintain these with your official project file for a minimum of 4 years following completion of the project.

This permit will terminate 24 months from the date of issuance. In accordance with 10 CSR 20-6.010(5)(J), the Department may grant an extension. If you believe that an extension is necessary, you must submit a request and a justification in writing for the extension at least 30 days prior to the permit expiration date.

This construction permit does not supersede any requirements of the operating permit or enforcement actions. Nothing in this permit removes any obligations to comply with county or other local ordinances or restrictions.

If you were adversely affected by this decision, you may be entitled to an appeal before the Administrative Hearing Commission (AHC) pursuant to Section 621.250, RSMo. To appeal, you must file a petition with the AHC within 30 days after the date this decision was mailed or the date it was delivered, whichever date was earlier. If any such petition is sent by registered mail or certified mail, it will be deemed filed on the date it is mailed; if it is sent by any method other than registered mail or certified mail, it will be deemed filed on the date it is received by the AHC. Contact information for the AHC is: Administrative Hearing Commission, United States Post Office Building., Third Floor, 131 West High Street, P.O. Box 1557, Jefferson City, MO 65102, Phone: 573-751-2422, Fax: 573-751-5018, and Website: ahc.mo.gov/.

If you have any questions concerning this matter, please contact me at 573-751-1402, or Department of Natural Resources, Water Protection Program, P.O. Box 176, Jefferson City, MO 65102-0176.

Thank you for your efforts to help ensure clean water in Missouri.

Sincerely,

WATER PROTECTION PROGRAM

Conrad Blume, P.E., Clean Water Engineering Unit Chief
Financial Assistance Center

CB/ng

Enclosures

c: Mr. James E. McCleish, P.E., Horner Shifrin
St. Louis Regional Office
Mr. Kurtis Cooper, Water Protection Program, Financial Assistance Center

Permit No. CP0002088

STATE OF MISSOURI

DEPARTMENT OF NATURAL RESOURCES

MISSOURI CLEAN WATER COMMISSION

CONSTRUCTION PERMIT

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

Northeast Public Sewer District
1041 Gravois Road
Fenton, MO 63026

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.

September 26, 2019
Effective Date

Edward B. Galbraith

Edward B. Galbraith, Director, Division of Environmental Quality

September 25, 2021
Expiration Date

Chris Wieberg

Chris Wieberg, Director, Water Protection Program

CONSTRUCTION PERMIT

I. CONSTRUCTION DESCRIPTION

The project conists of the construction of a new aerobic digester system, waste activated sludge screen building, permeate pump building, decant pump station, a secondary clarifier, installation of new digester blowers, and upgrade to the control 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 Horner Shifrin on June 21, 2019 and signed and sealed by Mr. James McCleish, P.E. on June 14, 2019, and approved by the Department on September 26, 2019.

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 St. Louis 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 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. Upon completion of construction:

   A. The Northeast Public Sewer District 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). 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 district is upgrading the treatment facility for biological nutrient removal in anticipation of future nutrient permit limits. This, along with future anticipated growth, will increase the amount of sludge produced by the facilitiy. The proposed biodolids improvements will allow the facility to adequately handle the increased sludge production. The construction of a third clarifier will help the facility treat up to the new design flow of 5.25 million gallons per day (MGD).

2. FACILITY DESCRIPTION

The existing Saline Creek WWTF is permitted at 4.0 MGD plant. The existing treatment plant includes an influent coarse bar screen, pump station, screening, and grit removal with a 10 MGD peak flow holding basin, a three channel oxidation ditch, secondary clarifiers, ultra violet (UV) disinfection and aerobic sludge digester. Biosolids are land applied. In conjunction with the new construction, the district is requesting a rerate of the treatment plant design flow to 5.25 MGD with a peak flow of 15. 75 MGD.

3. COMPLIANCE PARAMETERS

The proposed project is required to meet final effluent limits as established in the operating permit MO-0128490.

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

Parameter	Units	Monthly average limit
Biochemical Oxygen Demand$_5$	mg/L	30
Total Suspended Solids	mg/L	30
Ammonia as N-summer	mg/L	6.1
Ammonia as N-winter	mg/L	6.3
pH	SU	6.0-9.0
E. Coli	#/100mL	126

4. ANTIDEGRADATION

The Department has reviewed the antidegradation report for this facility and issued the Water Quality and Antidegradation Review dated August 20, 2019, due to request to rerate the treatment facility from 4.0 MGD to 5.25 MGD. See **APPENDIX – ANTIDEGRADATION.**

5. REVIEW OF MAJOR TREATMENT DESIGN CRITERIA

- **Third Secondary Clarifier**. The third clarifier will have a radius of 42.5 ft and a sidewater depth of 16.5 ft, which meets the requirements of 10 CSR 20-8.160(3)(A). The additional clarifier will have a surface loading rate at 11.91 MGD of 699.7 gpd/ft^2 and a solids loading rate of 26.8 lbs/day/ft^2.
- **Waste Activated Sludge (WAS) Fine Screen**. The screen will be an automatic multi-rake bar screen with a bar spacing of 1 millimeter and a max hydraulic flow of 150 gallons per minute (gpm). The screen will have a design concentration of 9,200 mg/l total solids. The compactor has a diameter of 6-inches with a wash water rate of 2 gpm. The compact motor will be 1/3 horse power (hp).
- **Membrane Thickener 1 (MBT1)**. Construction of 1 membrane thickener with dimensions of 12 feet by 12 feet, sidewater depth of 10 feet, and a volume of 10,772 gallons. Feed to MBT1 will be bulk sludge from Digester 1, which when in steady state operation will be held at approximately 2% total solids. Design flow to MBT1 is 332 gpm (478,080 gpd) via an air lift pump (recycle rate to MBT1 from Digester 1). Permeate flow (removed from MBT1) at the design condition is 76,408 gpd. The thickened sludge is returned to Aerobic Digester 1 by gravity.
- **Membrane Thickener 2 (MBT2)**. Construction of 1 membrane thickener with dimensions of 12 feet by 12 feet, sidewater depth of 10 feet, and a volume of 10,772 gallons. Feed to MBT2 will be bulk sludge from Digester 2 which, when in steady state operation, will be held at approximately 4% total solids. Design flow to MBT2 is designed for 119 gpm (171,360 gpd) via an air lift pump (recycle rate to MBT2 from Digester 2). Permeate flow (removed from MBT2) at the design condition is 24,997 gpd. The thickened sludge is returned to Digester 2 by gravity.
- **Membrane Thickener Blowers**. Construction of 3 blowers with a design flow of 200 standard cubic feet per minute (scfm) with 10 horsepower (hp) motors and a discharge pressure of 5 psi.
- **Membrane Thickener 1 Permeate Pumps**. Construction of 2 rotary lobe pumps with a design flow 106.1 gpm with 3 hp motors and a discharge pressure of 10 psi.
- **Membrane Thickener 2 Permeate Pumps**. Construction of 2 rotary lobe pumps with a design flow 34.7 gpm with 2 hp motors and a discharge pressure of 10 psi.
- **Aerobic Digester 1**. Construction of 1 digester with dimensions of 80 ft by 40 ft, a 24 ft sidewater depth, and a volume of 574,504 gallons. Installation of coarse bubble diffusers and draft shear tubes will provide aeration and mixing of the sludge to prevent anaerobic conditions. Two blowers with 200 hp motors are capable of providing a maximum air rate of 3,440 scfm at 8 psig. Aerobic Digester receives flow from MBT1 and the WAS fine screen, and discharges to Aerobic Digester 2.
- **Aerobic Digester 2**. Construction of 1 digester with dimensions of 80 ft by 40 ft, a 24 (minus minor headloss across overflow weir) ft sidewater depth, and a volume of 574,504 gallons. Installation of course bubble diffusers will provide aeration and mixing via draft shear tubes of the sludge to prevent anaerobic conditions. One blower with 120 HP motors (one of the blowers sized for Digester 1 will act as a swing capable of providing air to Digester 2) are capable of providing a maximum

air rate of 2,400 standard cubic feet per minute (scfm) at 8 psig. The aerobic digester receives flow from MBT2 and Aerobic Digester 1, and discharges to the existing sludge holding basins.

- **Decant Pump Station**. Construction of a decant pump station that will consist of 2 submersible pumps with a design flow of 50 gpm each at 27 ft total dynamic head and will have 1.5 hp motors.

6. OPERATING PERMIT

The facility rerate will be complete and the operating permit modified separate from the construction project The construction activities do not require a modification to the operating permit. It is expected that the facility owner will include a new facility description in their next operating permit renewal application to reflect the new construction.

Conrad Blume, P.E., Clean Water Engineering Unit Chief
Financial Assistance Center
conrad.blume@dnr.mo.gov

APPENDICES (Optional/as needed)

- **Antidegradation**
- **Rerating Request**

APPENDIX – ANTIDEGRADATION

Mr. Robert Hembrock, Executive Director
Northeast Public Sewer District
1041 Gravois Road, Fenton, MO
Fenton, MO 63026

RE: Antidegradation Applicability for NPSD-Interim Saline Creek WWTF, MO-0128490, Jefferson County

Dear Mr. Hembrock:

In accordance with the *Missouri Antidegradation Rule and Implementation Procedure (AIP)*, your proposed discharge is subject to an Antidegradation Review. The enclosed *Antidegradation Applicability* summarizes this preliminary determination based upon your *Antidegradation Review Report for Northeast Public Sewer District-Interim Saline Creek Wastewater Treatment Facility* dated February 2019, which proposed the facility be re-rated to 5.25 million gallons per day, plus the addition of a third clarifier for nutrient removal operations. Besides the new clarifier, no new treatment equipment or increased capacity is planned, neither is a new discharge location.

The attached determination contains the pertinent information on the existing facility, the 2011 Antidegradation Review, the 2019 Antidegradation Report, the proposed re-rating, and the proposed changes to allow the facility to operate as a biological nutrient removal facility in the future. It was developed in accordance with 10 CSR 20-7.031, the Clean Water Commission approved *Missouri Antidegradation Rule and Implementation Procedure* (AIP) dated July 13, 2016, U.S. Environmental Protection Agency (US EPA) guidance, the applicant-supplied antidegradation review documentation, and the State of Missouri's effluent regulations (10 CSR 20-7.015).

Based on the Missouri Department of Natural Resources (Department) initial review, preliminary determination is that the applicant-supplied antidegradation review documentation satisfies the requirements of the AIP. This WQAR/preliminary determination may be appealed within 30 days of this letter in accordance with the AIP Section II.F.4.

Mr. Robert Hembrock
Page 2

If you should have questions, please feel free to contact Ms. Leasue Meyers by telephone at 573-751-7906, by e-mail at leasue.meyers@dnr.mo.gov, or by mail at P.O. Box 176, Jefferson City, Missouri 65102-0176.

Sincerely,

WATER PROTECTION PROGRAM

Refaat Mefrakis, P.E., Chief
Engineering Section

RM:lmn

Enclosure

c: Mr. Sean Mickey, Horner & Shifrin
Mr. Stephen Randolph, P.E., Horner & Shifrin
Mr. Tim Bull, Water Protection Program

Missouri Department of Natural Resources
Water Protection Program
Water Pollution Control Branch
Engineering Section

Antidegradation Applicability Review

Facility Information

FACILITY NAME: NPSD-Interim Saline Creek WWTF PERMIT #: MO-0121827

COUNTY: Jefferson
UTM COORDINATES: X= 725447, Y= 4260518
12-DIGIT HUC: 07140102-1004
LEGAL DESCRIPTION: Land Grant 664
EDU*: Ozark Meramec Drainage
ECOREGION: Eastern Ozark Border

*Ecological Drainage Unit

Outfall Characteristics

OUTFALL	DESIGN FLOW (CFS)	TREATMENT LEVEL	EFFLUENT TYPE	DISTANCE TO CLASSIFIED SEGMENT (MI)
001	8.14	Secondary/Tertiary	Municipal/domestic	0.0

Receiving Waterbody Information

WATERBODY NAME: Meramec River (WBID 2183) CLASS: P

PROJECT INFORMATION

DESCRIPTION: The existing Saline Creek WWTF is a permitted 4.0 MGD plant. The existing treatment plant includes an influent course bar screen, pump station, screening, and grit removal with a 10 MG peak flow holding basin, 3 channel oxidation ditch, secondary clarifiers, UV disinfection and aerobic sludge digester for land application of biosolids. With the Antidegradation request, the facility submitted a request to rerate the treatment plant to a design average flow of 5.25 MGD

PROPOSAL: Horner & Shifrin prepared, on behalf of Northeast Public Sewer District, the *Antidegradation Report for Saline Creek Regional WWTF dated February 2019. The Antidegradation Report* was submitted at the same time as the rerating request was received by the Department. In the re-rating request, the applicant provided design calculations and performance data to demonstrate the existing treatment plant could handle an increase in the design average flow to 5.25 MGD. In the Antidegradation Report, the facility assumed the discharge was significantly degrading and performed an alternatives analysis, which are summarized below.

- Alternative #1 was a no discharge land application system, which was determined to not be practical as the facility would need 1,200 acre-ft lagoon to meet the minimum storage requirements and would need a minimum of 1,960 acres for application to occur on. It was estimated to cost $41 million.

- Alternative #2 was alternative discharge location, which does not exist because the discharge was moved in the early 2000's due to a TMDL off from Saline Creek.

- Alternative #3 was re-rating the existing oxidation ditch system "as-is," which was modeled and provided but does not address the future nutrient and ammonia limits the facility expects to need to meet. There is no construction cost for this alternative.
- Alternative #4 was to upgrade the treatment plant for biological nutrient removal by reprograming the controls and instrumentation, and adding new aerobic digestion system, sludge processing building, waste activated sludge (WAS) fine screen building, a third secondary clarifier, and sludge holding basin decant transfer station. The expected total nitrogen effluent is 8 mg/L and the total phosphorus is 1 mg/L. The solids handling portion has already been submitted to the State Revolving Fund as a project. The present worth for the project is $18, 567,418.
- Alternative #5 was the addition of a vertical loop reactor to convert the facility to a biological nutrient removal facility. The expected total nitrogen effluent would be 5 mg/L and the total phosphorus of 1 mg/L. The present worth of the project is $25,298,322.
- Alternative #6 was the addition of tertiary filtration and chemical feed system which would give an expected total nitrogen effluent of 5 mg/L and total phosphorus of 0.5 mg/L. The present worth of the project is $24,500,722.

The preferred alternative is alternative #4 which is upgrading the treatment facility for biological nutrient removal with new solids handling equipment and a third secondary clarifier. For the discharge to the Meramec River, on August 31, 2008, the Saline Creek WWTF had a permitted discharge of 5.25 MGD, which is the same as the re-rating request.

Within Section II B 1. of the AIP, discussion of the potential for discharge to a regional wastewater collection system is mentioned. Northeast Public Sewer District is the regional treatment authority and the Saline Creek WWTF is their regional treatment plant in northern Jefferson County.

DISCUSSION:

In reviewing the submittal by Horner and Shifrin, the Department reviewed the facility history and key dates in relation to treatment plant operations and design flow, which are summarized below. The Department also evaluated the facility's performance, which has been in compliance with their effluent limits.

- May 17, 2006, the Ron-Rog and Highway 141 operating permits were terminated as the facility discharged with the Saline Creek plant in a combined discharge to the Meramec River. The Saline Creek plant was initially permitted a design average flow of 5.25 MGD with the flows divided with 4.0 MGD at the Ron Rog facility and 1.25 MGD at the Highway 141 facility.
- February 2011, an Antidegradation Report was submitted for the expansion to 6.75 MGD with the proposal of no degradation effluent limits and the report included the discussion of eliminating 17 treatment plants. The Antidegradation Report approved the plan and ideas, not the number of treatment components present. While the Antidegradation Report was approved in May 2011, the facility did not construct the proposed project.
- The February 2013 operating permit modification request included a request for re-rating, but that modification was never finalized.

- September 2013 had the Highway 141 plant eliminated with the installation of a pump station conveying all flows to the Saline Creek treatment plant.
- The February 2014 Biosolids Facility plan discusses the future plans for nutrient removal at the Saline Creek Plant
- September 2016, the operating permit was renewed with a design average flow of 4.0 MGD.
- February 15, 2019, an updated biosolids facility plan was submitted to the State Revolving Fund for improvements to the biosolids handling system. This does not impact the capacity of the biological treatment train. This project is currently on the 2019 Intended Use Plan.
- February 26, 2019- Antidegradation and Rerating request received. The addition of a third clarifier in the treatment train does not change the overall treatment capacity of the system, the oxidation ditch, screening, and ultraviolet disinfection system are all designed to handle 5.25 MGD.

DETERMINATION: The Department determined based on the information provided in the 2011 Antidegradation Report, the 2013 operating permit application, the 2019 Antidegradation Report, the 2019 Rerating Request, and reviewed the facility's discharge monitoring reports to determine that the facility was designed and constructed to meet the final effluent limits in the effective permit at the higher design average flow. In a review of the alternatives, the fundamental assumptions of the original Antidegradation Report are still applicable-the facility is serving as a regional treatment plant and since 2010, multiple treatment plants in the watershed have been removed and are now served by the Saline Creek WWTF. The facility currently provides a level of treatment higher than its effluent limits and the original assumptions of the regional treatment plant discharging to the Meramec River are still valid. For the discharge to the Meramec River, on August 31, 2008, the Saline Creek WWTF had a permitted discharge of 5.25 MGD, which is the same amount as the re-rating request. The facility's foresight to start planning for nutrient removal with minor changes to the facility is being cost effective of the resources available.

Per the requirements of the AIP, the effluent limits in this review were developed to be protective of beneficial uses and to attain the highest statutory and regulatory requirements. The Department has determined that the submitted review is sufficient and meets the requirements of the AIP. The increase in design flow does not trigger the requirements of Antidegradation.

Reviewer: Leasue Meyers, EI
Date: May 9, 2019
Unit Chief: John Rustige, P.E.

APPENDIX – RERATING REQUEST

Mr. Robert Hembrock, Executive Director
Northeast Public Sewer District
1041 Gravois Road, Fenton, MO
Fenton, MO 63026

RE: Rerating for NPSD-Interim Saline Creek WWTF, MO-0128490, Jefferson County

Dear Mr. Hembrock:

The Missouri Department of Natural Resources has reviewed the rerating request report for the Interim Saline Creek WWTF submitted by Horner and Shifrin on behalf of Northeast Public Sewer District on February 26, 2019. The report and subsequent information supplied by Northeast Public Sewer District and Horner and Shifrin on April 16, 2019, provided details and calculations, which are summarized in the attached document, to rerate the Interim Saline Creek WWTF from 4.0 MGD to 5.25 MGD.

For questions related to technical issues such as the preliminary engineering report, construction permit, or plans and specifications, please contact Ms. Leasue Meyers, review engineer, by phone at 573-751-7906, by email at leasue.meyers@dnr.mo.gov or by mail at Department of Natural Resources, P.O. Box 176, Jefferson City, MO 65102. Thank you.

Sincerely,

WATER PROTECTION PROGRAM

Refaat Mefrakis

Refaat Mefrakis, P.E., Design/Development/ Survey Manager
Engineering Section

RM:lmn

c: Mr. Sean Mickey, Horner & Shifrin
Mr. Stephen Randolph, P.E., Horner & Shifrin
Mr. Joe Blume, P.E., Financial Assistance Center

MISSOURI DEPARTMENT OF NATURAL RESOURCES
ENGINEERING SECTION

ENGINEERING REVIEW
NPSD INTERIM SALINE CREEK WWTF
JEFFERSON COUNTY
MAY 13, 2019

On February 26, 2019, the Missouri Department of Natural Resources, Water Protection Program, Engineering Section received a request to increase the permitted dry weather capacity of the Northeast Public Sewer District (NPSD) Interim Saline Creek WWF, MO-0128490.

7. BACKGROUND

The Saline Creek WWTF submitted a request to increase the capacity of the treatment plant in February 2019. The existing plant is currently rated for 4.0 MGD.

The Saline Creek WWTF was constructed in two phases with the headworks and overflow basin completed in 2004, and the remainder of the existing facility including lab building, oxidation ditch, clarifiers and UV disinfection system completed in 2009. The WWTF was constructed adjacent to the old Ron Rog plant, which itself was converted to an aerobic digester for the Saline Creek WWTF. In the table below is a summary of the last five years of discharge monitoring reports.

Horner & Shifrin completed a BioWin analysis on the existing treatment plant to determine the capacity of the treatment system.

Parameter	Units	Average Monthly Effluent Limit	Average Performance from 2013-2018 DMRs
Flow	MGD	*	2.5
BOD	mg/L	30	4.5
BOD % removal	%	85	96.6%
TSS	mg/L	30	2.6
TSS % removal	%	85	97.3%
pH	SU	6.0-9.0	7.0
Ammonia as N-summer	mg/L	6.1	1.4
Ammonia as N-winter	mg/L	6.3	2.5
Oil & Grease	mg/L	10	1.7
Cadmium, TR	µg/L	*	1.6
Copper, TR	µg/L	*	3.1
Zinc, TR	µg/L	*	42.9
Total Phosphorus	mg/L	*	3.7
Total Nitrogen	mg/L	*	7.2

*monitoring only

8. ANTIDEGRADATION CONSIDERATIONS

The Saline Creek WWTF had a permitted with a design flow of 5.25 MGD on August 31, 2008. The Interim Saline Creek WWTF received an antidegradation review dated May 2011, which had the proposed design average flow of 6.75 MGD. With the closure of the Highway 141 facility in 2013, the permitted design flow was reduced to 4.0 MGD in the 2016 operating permit renewal. With the rerating request, an updated Antidegradation review was completed by Horner and Shifrin. The updated Antidegradation review reevaluated the options at the 5.25 MGD and selected as the cost-effective option was the rerating, along with the addition of a third clarifier to allow the facility to operate as a nutrient removal facility in the future.

See the updated Antidegradation review.

9. REVIEW of MAJOR TREATMENT DESIGN CRITERIA

Once flow arrives at the Saline Creek WWTF, treatment occurs through different components, which are summarized below. Flows are measured with influent and effluent 24" Parshall flumes, which have the ability to measure flows up to 21.4 MGD.

- **Influent Headworks**. Influent Headworks includes screenings removal, compactor, and grit removal. The headworks were originally designed and constructed based on an 8 MGD plant.
  - The automatic bar screen is a Huber ¼" perforated plate automatic belt screen and reaches a maximum hydraulic capacity of 12 MGD. At which point, it overflows into the manually cleaned bar screen.
  - The grit removal system is a 2 train Smith and Loveless Pistagrit system designed for 10 MGD per train (20 MGD total capacity).

- **Peak Flow Holding Basin**. The Peak Flow Holding Basin has a design volume of 10 MG.

- **Oxidation Ditch**. The three channel oxidation ditch has a 14 day SRT for nitrification, a 15.3 hr HRT, with a design MLSS of 4,600 mg/L at the proposed 5.25 MGD.
  - The overall dimensions for each Orbal Oxidation Ditch basin is 267.5 ft by 142.5 ft wide with 15 ft sidewater depth.
  - The dry weather peak flow has a peaking factor just under 3. With a peak design flow of 15.45 MGD, there is 5.3 hr HRT and at over 20 MGD, when utilizing the wet weather lagoon, the HRT is approximately 4.1 hr.
  - The actual oxygenation rate (AOR) with peak BOD is 36,796 lbs O_2/day based on 1.5 lbs O_2/lb cBOD and 4.6 lbs O_2/lb ammonia. This calculation does not factor in the ability of the oxidation ditch to do simultaneous nitrification/denitrification.
- **Secondary Clarifiers**. There are 2 secondary clarifiers currently with a radius of 42.5 ft and a sidewater depth of 16.5 ft, which meets the requirements of 10 CSR 20-8.160(3)(A).

- Using the documented peak flow from discharge monitoring reports of 11.91 MGD with the 2 existing clarifiers in operation, the surface overflow rate is 1,049.6 gpd/ft^2. Using the peak flow equation from 10 CSR 20-8.110, Equation 110-1, the peak flow would be 12.74 MGD, which would give a surface overflow rate of 1,123 gpd/ft^2, both of which meet the requirements of 10 CSR 20-8.160(3)(B).
    - The rerating report used 15.75 MGD peak flow projection in the calculation with 2 clarifiers, which would provide a surface loading rate of 1,387.7 gpd/ft^2, which is higher than the 1,200 gpd/ft^2 allowed in 10 CSR 20-8.160(3)(B), so the evaluation was recalculated using the documented actual peak flows at the facility.
- The solids loading rate at a peak flow of 11.91 MGD with 2 clarifiers is 40 lbs/day/ft^2 which meet the requirements of 10 CSR 20-8.160(3)(B).
- The weir loading rate is 6,553 gpd which meets the requirements of 10 CSR 20-8.160(3)(C).

- **RAS/WAS pump station.** The RAS/WAS pump station has 3 RAS and 2 WAS submersible pumps. The RAS pumps each have 1,389 gpm at 37.1 ft TDH for a total capacity of 4,167 gpm (6.0 MGD). The WAS pumps each have 81.1 gpm at 21.3 ft TDH for a total capacity of 162.2 gpm (0.233 MGD).

- **UV Disinfection.** The UV system was covered under CP0001316 issued in 2012.The UV disinfection system capable of treating a peak flow of 7.0 MGD while delivering a minimum UV intensity of 30 mJ/cm^2 with an expected ultraviolet transmissivity of 65% or greater. The UV system is a horizontally submerged bank with 20 modules and 8 lamps per module.

- **Solids Handling**. There is a project with the State Revolving Fund to upgrade the biosolids handling system at the treatment plant. Currently, the facility has aerobic sludge digestion followed by 2 sludge holding basins, then the biosolids are land applied.

10. REVIEW OF PROPOSED FACILITY CHANGES IN THE TREATMENT DESIGN

- **Secondary Clarifiers**. The facility has proposed as part of the project under review with the Financial Assistance Center to construct a third clarifier. The addition of the 3rd clarifier would have a surface loading rate at 11.91 MGD of 699.7 gpd/ft^2 and a solids loading rate of 26.8 lbs/day/ft^2.
    - As part of the rerating request, the facility evaluated higher peak flows with the 3rd clarifier based on potential growth and connection of additional facilities over a 30 year time frame, but with no change in design average flow of 5.25 MGD.
        - The estimated peak flow at 2045 is 15.75 MGD and based on the growth and connection of additional facilities over time in their service area.

- At 15. 75 MGD with 3 clarifiers, the surface overflow rate would be 925 gpd/ft^2 and the solids loading rate would be 35 lbs/day/ft^2 respectively, meeting the requirements of 10 CSR 20-8.160(3)(B).

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