STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF WATER RESOURCES
Memphis Environmental Field Office
8383 Wolf Lake Drive
Bartlett, TN 38133
Phone 901-371-3000 Statewide 1-888-891-8332 Fax 901-371-3170

October 28, 2022

The Honorable Dwayne Cole
Mayor Town of Munford
1397 Munford Avenue
Munford, TN 38058

RE: Performance Audit Inspection
Munford Wastewater Treatment System
NPDES Permit No. TN0062499
Tipton County

Dear Mayor Cole:

On Monday, October 24, 2022, Mr. Eddy Bouzeid with the Tennessee Department of Environment and Conservation, Division of Water Resources, Memphis Environmental Field Office (DWR/MEFO), conducted a Performance Audit Inspection (PAI) of the Munford Wastewater Treatment System (WWTS) in Munford, Tipton County. Upon arrival, Mr. Bouzeid met with Mr. Mark Walker, the certified wastewater operator, and Mr. Tye Young, the WWTS laboratory technician, and stated that the purpose of the inspection was to evaluate the facility's compliance with its National Pollutant Discharge Elimination System (NPDES) permit. This was accomplished by reviewing the facility's self-monitoring records, sampling practices, flow measurement records and analytical procedures performed at the WWTS laboratory, and subsequently conducting a walkthrough inspection of the facility. A copy of the PAI report and associated photo document is enclosed for your reference. The followings are items to note regarding the inspection:

1. The Munford treatment system reported twenty-five (25) exceedances of its permit limits for the period from November 2020 through September 2022. To address these exceedances, Munford has initiated preliminary planning discussions with the Nashville Central Office to expand the capacity of the existing treatment system.
2. The Munford wastewater treatment system is required to conduct semi-annual (summer/winter) biomonitoring (LCS0 on Ceriodaphnia and Pimephales) of its effluent at Outfall 001. All the tests met the values set in the NPDES permit for the evaluation period from November 2020 through October 2022.
3. At the time of the inspection, a hand-held jug was being utilized to collect the grab effluent samples at the weir of the lagoon. Mr. Bouzeid recommended to Mr. Walker and Mr. Young to utilize a stainless-steel container to collect the effluent samples at the weir and that the container needs to be cleaned 24-hours prior to sampling and stored inside.
4. The Outfall at the Mississippi River was inspected. The effluent was clear and the sign was posted at the Outfall. The information on the sign was consistent with the requirements of the permit.
5. The analytical procedures conducted at the WWTS were reviewed during the inspection. It appeared that the analytical procedures were conducted properly.
6. The sludge level in the complete mix cell of the aerated lagoon was last determined in the summer of 2020. Mr. Bouzeid recommended to Mr. Walker to have the sludge level checked

annually.

7. Munford reported no sanitary sewer overflows for the evaluation period from November 2020 through October 2022.

As noted in the attached PAI report, the Town appears to be successfully submitting Discharge Monitoring Reports (DMRs) electronically via NetDMR. Mr. Walker and Mr. Young time and assistance during the inspection was very much appreciated. If there are factors regarding this matter that need further discussion, please contact me 901-371-3023 or at eddy.bouzeid@tn.gov.

Sincerely,

Eddy Bouzeid
Environmental Protection Specialist
Division of Water Resources
Memphis Environmental Field Office

Enclosures: Performance Audit Inspection Report, Photographs

cc: TDEC/DWR/MEFO – File

ec: Mark Walker- Munford Public Works

TENNESSEE DEPARTMENT OF ENVIRONMENT AND CONSERVATION

Division of Water Resources

Memphis Environmental Field Office, 8383 Wolf Lake Drive, Bartlett, TN 38133

1-888-891-8332 (TDEC)

Compliance Inspection for Individual NPDES Permit

Facility Name: Munford Sewer Department Lagoon	**NPDES Tracking Number:** TN0062499
Permit Effective Date: January 1, 2021	**Permit Expiration Date:** December 31, 2025
Date and Time of Inspection: 10/24/2022	**Inspector Name:** Eddy Bouzeid

Official Contact Person Name: Dwayne Cole, Mayor of Munford	
Address: 1397 Munford Avenue, Munford, TN 38058	**Phone Number:** (901) 837-5974
	Email: dcole@munford.com

Summary of Findings and Comments

On Monday, October 24, 2022, Eddy Bouzeid with the Division of Water Resources, Memphis Environmental Field Office (DWR/MEFO}, conducted a Performance Audit Inspection (PAI) at the Munford Wastewater Treatment System (WWTS) located in Munford, Tipton County, Tennessee. He met with Mr. Mark Walker, the certified wastewater operator, and Mr. Tye Young, the WWTS laboratory technician. Monitoring records, sampling practices, flow measurement records and analytical procedures performed at the WWTS were reviewed. The following is a summary of Mr. Bouzeid's findings and observations during and after the inspection:

I. Permit

The NPDES permit for the Munford Sewer Department Lagoon with tracking number TN0062499 expires on December 31, 2025. A copy of the current NPDES permit was in a binder at the facility's laboratory.

The NPDES permit authorizes the discharge of treated domestic wastewater to the Mississippi River at mile 761.

The design capacity of the treatment system is 2 Million Gallons per Day (MGD). From November 2020 through September 2022, the average effluent flow from the treatment system was 1.18 MGD and the maximum flow was 2.11 MGD, recorded in April 2022.

The Munford treatment system discharge effluent characteristic and monitoring requirements are as follow:

- BOD - three per week grab
- Total Suspended Solids (TSS) - three per week grab

- Total Nitrogen - quarterly composite
- Total Phosphorus - quarterly composite
- E. Coli - three per week grab
- Settleable Solids - five per week grab
- Dissolved Oxygen - five per week grab
- pH -five per week grab
- Flow - daily continuous
- LC50 - semi-annual

II. Records/Reports

Site records and reports for the treatment system were observed and appeared to be maintained as required by the NPDES permit. Sampling and analytical data, including flow records, Industrial Waste Survey, Discharge Monitoring Reports (DMRs) and Monthly Operation Reports (MORs) for the period from November 2020 through September 2022 were reviewed and appeared to be complete. As of the date of the inspection, the Munford facility was reporting their DMRs via NetDMR successfully.

III. Facility Site Review

The Munford treatment system consists of a multi-cellular aerated lagoon. A total of 14 floating brush aerators are installed at the plant. Nine aerators are designated for the complete mix cell, two aerators are designated for each of the two partial mix cells, and one aerator is for the polishing cell. All aerators were operating at the time of the inspection. There was no duckweed in the lagoon cells (photo 1). From the polishing cell, the effluent is chlorinated using sodium hypochlorite (photo 2), then pumped approximately 13 miles to the Mississippi River.

The Munford treatment system reported twenty-five (25) exceedances of its permit limits for the period from November 2020 through September 2022. The exceedances were reported as follows:

- May 2021: two (2) BOD exceedances.
- October 2021: three (3) E. Coli exceedances.
- November 2021: three (3) BOD exceedances.
- December 2021: one (1) BOD exceedance.
- February 2022: three (3) BOD exceedances.
- March 2022: four (4) BOD exceedances.
- May 2022: one (1) BOD exceedance.
- August 2022: three (3) E. Coli exceedances.
- September 2022: five (5) BOD exceedances.

Explanation of the exceedances was not submitted with the MORs/DMRs as required by Section 2.3.2 (b) of the NPDES permit.

A Notice of Violation was issued on May 25, 2022, for the exceedances that occurred in November and December 2021, and in February and March 2022. A response for the NOV was received on May 26, 2022.

The Munford wastewater treatment system is required to conduct semi-annual (summer/winter) biomonitoring (LC50 Static Acute Toxicity on Ceriodaphnia and Pimephales) of its effluent at Outfall 001. The biomonitoring tests were conducted in December 2020, May 2021, September 2021, and June 2022. All the tests met the values set in the NPDES permit.

IV. Effluent/Receiving Waters

There was a discharge at the Outfall at the Mississippi River and the discharge appeared to be clear (photo 3). The sign was posted at the Outfall and the information on the sign was consistent with the requirements of the permit (photo 4).

V. Flow Measurement

The lagoon has three flow measurement devices. Two devices are digital: one was a newly installed meter for the influent (photo 5) and one for the effluent (photo 6). The other flow measurement device for the influent uses two influent hourly pumps (photo 7). The two influent devices measure the flow from different areas of Munford and were functioning at the time of the inspection.

Munford also receives influent from the Towns of Atoka and Brighton. The Towns have separate agreements with the City of Munford to treat their wastewater, and they both have digital flow meter devices at the tie-in point to the Munford sewer system. The influents from both Towns are recorded daily by Munford personnel from the digital flow meters at the tie-in point.

The effluent flow meter were last calibrated by an independent contractor, Rye Engineering, on September 1, 2022.

VI. Self-Compliance Program

According to Mr. Walker, Mr. Tye Young, Munford's laboratory technician, collects composite samples (aliquot samples) of the influent and grab samples of the effluent for analysis as mandated by its NPDES permit. The analyses for BOD, settleable solids, total suspended solids and E. Coli, are conducted at the on-site laboratory except for the nutrient constituents (Total Nitrogen and Total Phosphorous) which are shipped to Pace Analytical Laboratory in Mount Juliet, Tennessee.

Dissolved oxygen (DO), temperature and pH are effluent parameters routinely measured by Mr. Young at the time of sample collection. The E. Coli sample is collected further down in the discharge line (approximately 3-4 miles) since access to the River is restricted. The BOD effluent sample is collected before disinfection to eliminate the need to seed the sample prior to being analyzed.

A review of the chain-of custodies revealed that the samples shipped to Pace Analytical Laboratory in the cooler were maintained below the 6 degrees Celsius as required by 40 CFR, Part 136.

VII. Compliance Schedule

The treatment system is not under any compliance schedule at this time, with the exception of the permit requirements.

VIII. Laboratory

- The 23rd edition Standard Methods for Water and Wastewater Analyses was on hand at the WWTS laboratory.

- Laboratory instruments are calibrated yearly by LabtronX. Last service calibration was on May 9, 2022.

pH

A Hach HQ 440d pH probe was calibrated according to manufacturer recommendations using three buffers (4, 7, and 10) in order to bracket the sample. The buffers were within expiration dates. Effluent grab samples are collected at the weir of the WWTS lagoon with a hand-held plastic jug and are typically analyzed in the WWTS laboratory within 15 minutes of sample collection as required by the NPDES permit. The hand-held jug is hung on a metal pole by the weir after the effluent samples are collected. It was recommended to Mr. Walker and Mr. Young during the inspection to utilize a stainless-steel container to collect the effluent samples at the weir and that the container needs to be cleaned 24-hours prior to sampling and stored inside.

DO

A Hach HQ 440d DO meter was calibrated according to manufacturer recommendations. The meter is allowed to equilibrate for at least 15 minutes. Barometric pressure for the calibration was obtained from the meter. The USGS DO Table https://water.usgs.gov/water-resources/software/DOTABLES/ was used to confirm the instrument's DO calibration using temperature and barometric pressure. According to Mr. Walker the membrane of the DO probe is replaced once a year according to the manufacturer recommendations.

E. Coli

IDEXX's Colilert method was used to analyze the effluent samples for E. Coli. An approximate 10 ml effluent sample was collected in a sterile sample container after disinfection. Reagent is poured directly into the wastewater sample container and shaken until the reagent is dissolved. The approximate 100 ml sample and reagent mixture are then poured into a 97-well Quanti-Tray and taped to release air bubbles. The sample is then placed in the rubber insert and sealed with the Quanti-Tray Sealer 2X. The sealed tray is placed in a Quincy Lab 12-140 E incubator set to approximately 35°C ± 0.5°C for 24 hours before being analyzed.

After incubation, the trays are viewed under a UV light. Tray wells that fluoresce are positive for E. Coli and are counted. A Most Probable Number (MPN) table provided by IDESS Quanti-Tray is used to quantify the number of E. Coli in the sample. Results are recorded on a bench sheet with units of MPN/100ml. It appears that calculations for E. Coli analysis are being performed correctly.

Settleable Solids

Grab sample is collected from the effluent for settleable solids analysis. The grab sample was stirred in separate container and 1 L was poured into an individual Imhoff cone and allowed to settle for 45 minutes. After the initial settling, the sample volume in the cone was stirred with one slow revolution without having the stirring pipet touch the inner wall of the Imhoff cone. The sample is then allowed to settle for an additional 15 minutes before the measurements are read off the graduations on the side of the cone. The measurements of the effluent sample are then recorded on bench sheets. The lowest reading on the Imhoff cone is 0.1 ml. It appears that calculations for settleable solids analysis are being performed correctly.

Total Suspended Solids

The composite (aliquot) influent and grab effluent samples are collected for analysis. Glass fiber filter disks were placed wrinkled side up in a filtration apparatus. A vacuum was applied and the disks were washed with reagent-grade water. The vacuum was removed after all traces of water were removed from the filter disk. The filters are then removed from the filtration apparatus and transferred to an inert aluminum weighing dish, dried in an oven between 103-105^{o}C for at least 1 hour and then allowed to cool in a desiccator for 30 minutes before being weighed. The weights of the filter and aluminum weighing dishes were recorded on bench sheets. After recording the initial weight, a re-dry and re-weigh steps, and the sample volume, the TSS calculations are determined using the formula:

$$TSS = \frac{[\text{Final weight (g)} - \text{Original weight (g)}] \times 1{,}000{,}000}{\text{Sample volume (ml)}}$$

It appears that calculations for Total Suspended Solids analysis are being performed correctly.

5-day Biochemical Oxygen Demand (BOD)

The composite (aliquot) influent and grab effluent samples are collected for analysis. The effluent sample is collected prior to disinfection thus, the seeding of the sample was unnecessary. Prior to analysis the temperature and pH of the influent and effluent samples is determined to ensure they are around 20^{o}C $\pm$ 3^{o}C and between 6.0-8.0 SU respectively.

Prepared dilution water was placed in clean 300 ml BOD bottles. The bottles were partly filled through a tube with the prepared dilution water. The influent and effluent samples were then stirred and volumetric pipet was used to add the desired wastewater sample volume to individual BOD bottles.

The bottles are then filled with enough dilution water so that an initial DO measurement can

be taken. The initial DO of each sample is determined and recorded on bench sheets. The DO probe is rinsed between determinations to prevent cross-contamination of samples. The bottles are then filled with enough dilution water to replace any displaced contents so that insertion of the stopper displaces all air, leaving no bubbles. The bottles are then placed in an incubator for 5 days at 20^{o}C. After 5 days the DO of the samples is determined and recorded on bench sheet. The BOD is then calculated and recorded on bench sheet.

Glucose-Glutamic Acid (GGA) checks are being performed 3 to 4 times a month as part of a proper QA/QC program. It appears that the calculations for the BOD analysis are being performed correctly.

IX. Operations and Maintenance

The treatment system appeared to be operating properly at the time of the inspection. No Sanitary sewer overflows were reported during the evaluation period from November 2020 through October 2022. A Sanitary Sewer Collection System Compliance Evaluation Inspection was conducted on October 3, 2022.

X. Sludge Handling/Disposal

The Munford treatment system consists of aerated lagoon cells which does not generate a significant amount of sludge. According to Mr. Walker, the sludge level is measured biannually. The last measurement was in the summer of 2020 and the sludge level was determined to be approximately one foot thick in the complete mix cell. During the inspection, Mr. Bouzeid recommended to Mr. Walker to have the sludge level checked annually.

Photographic Log

Facility Name:	Site Location:	Tracking No.:
Munford Wastewater Treatment System	Munford, Tipton County	TN0062499

Photo No.	Date
1	10-24-2022

Description
View of the Munford wastewater treatment system. No duckweed was observed.

Photo No.	Date
2	10-24-2022

Description
View of the sodium hypochlorite storage tank. Sodium hypochlorite is used to disinfect the effluent before discharging into the Mississippi River.

Photographic Log

Facility Name:	Site Location:	Tracking No.:
Munford Wastewater Treatment System	Munford, Tipton County	TN0062499

Photo No.	Date
3	10-24-2022

Description
View of the Outfall at the Mississippi River. There was a discharge at the time of the inspection and the discharge was clear.

Photo No.	Date
4	10-24-2022

Description
View of the sign at the Outfall on the Mississippi River. The information on the sign was consistent with the requirements of the permit. The same information is on the back of the sign facing the River.

Photographic Log

Facility Name:	Site Location:	Tracking No.:
Munford Wastewater Treatment System	Munford, Tipton County	TN0062499

Photo No.	Date
5	10-24-2022

Description
View of the one of the influent digital flow meters that measures the flow from one area of Munford. The flow meter was newly installed and appeared to be functioning properly.

Photo No.	Date
6	10-24-2022

Description
View of the other flow measurement device for the influent that uses two influent hourly pumps.

Photographic Log

Facility Name:	Site Location:	Tracking No.:
Munford Wastewater Treatment System	Munford, Tipton County	TN0062499

Photo No.	Date
7	10-24-2022

Description
View of the effluent flow meter. The device appeared to be functioning properly at the time of the inspection. The meter was calibrated by an independent contractor on September 1, 2022.