

# REVISED CORRECTIVE ACTION PLAN

CAO LIS 18-046

## MENA WATER UTILITIES WASTEWATER TREATMENT PLANT

NPDES No. AR0036692 AFIN: 57-00423

CITY OF MENA  
ARKANSAS



HWEI PROJECT No. 2020024

SEPTEMBER 13, 2024

PREPARED BY



[www.hawkins-weir.com](http://www.hawkins-weir.com)

## 1.0 INTRODUCTION

### 1.1 Existing Facilities

Mena Water Utilities' (Utility) Wastewater Treatment Plant (WWTP) (AFIN 57-00423) is operated per the requirements of NPDES AR0036692. The WWTP, which was originally constructed in 1970, has been upgraded several times over its nearly 50-year operational life. The facility was originally constructed as a two-cell facultative lagoon. In 1986 sand filtration was added to the plant to improve effluent quality. A decade later fine bubble diffused aeration was installed in both lagoons to enhance biological treatment. In 2004, a coagulation basin was installed prior to filtration. Subsequently, a mechanically cleaned bar screen was added to the WWTP in 2011 and peracetic acid (PAA) disinfection was incorporated in 2020.

Seepage has been investigated on the outer slope of Lagoon No. 2's levee. The sand filters have exceeded their design life and are no longer serviceable by their manufacturer. Critical valve failures have limited the facility's flexibility for maintenance. The Utility has done a commendable job operating this facility for nearly half a century, but as a result of age and more restrictive permit requirements, improvements are needed to ensure consistent permit compliance.

### 1.2 Consent Administrative Order

The City of Mena entered into an amended Consent Administrative Order LIS 18-046-002 (CAO) with the Arkansas Department of Energy and Environment – Division of Environmental Quality (ADEQ) on June 11, 2024. In summary, the CAO was issued to address sanitary sewer overflows (SSOs) due to Infiltration/Inflow (I/I), an unpermitted bypass of the treatment process, and exceedances of permitted values for Total Suspended Solids (TSS), Dissolved Oxygen (DO), pH, Total Residual Chlorine (TRC), Peracetic Acid (PAA), and Total Recoverable Copper. One of the CAO requirements was that a Revised Corrective Action Plan (CAP) be submitted if the facility could not immediately comply with all permitted effluent limits.

### 1.3 Revised Corrective Action Plan

Hawkins-Weir Engineers, Inc. (HW) was retained by the Utility in January 2019 to assist with addressing the requirements of the original CAO and develop a Wastewater Treatment Masterplan (Plan) for the utility. After a review of the Utility's treatment facility and compliance history, HW with ADEQ's concurrence submitted a modified Corrective Action Plan on the Utilities behalf with an extended compliance schedule to allow the necessary time to obtain funding, design, and construct the required improvements. HW

assisted the Utility in obtaining funding from USDA RD to construct a new treatment facility and bid those proposed improvements in February 2024. The bid that was received greatly exceeded the funding available and prompted the Utility and HW to request additional time to achieve compliance and an amended CAO from ADEQ on March 29, 2024. The amended CAO was issued on June 20, 2024, and in addition to requiring continued quarterly progress reports, a Revised Corrective Action Plan was to be submitted by September 15, 2024.

## 2.0 COMPLIANCE CONCERNS

### 2.1 Lagoon Integrity

The Utility and ADEQ have noted what is believed to be areas of abnormally high moisture along the back slope of the Lagoon No. 2 levee in approximately six (6) locations. A Lagoon Levee Analysis Study was performed in August 2019 to identify the reason. This Study noted the lack of impervious soil or a membrane layer within the levee which could be contributing to the observed high moisture conditions on the back slope of the levees. HW is evaluating options as part of the proposed improvements to the existing WWTP that can be performed in-situ so that the treatment process can continue to operate.

### 2.2 Peak Flow

Not unlike most other cities in Arkansas and across the United States, the City of Mena's aging wastewater collection and treatment systems are subjected to peak flows resulting from inflow & infiltration (I/I) during wet weather periods. The Utility retained A.L. Franks Engineering to perform a Sanitary Sewer Evaluation and Survey (SSES) to identify potential problem areas in 2019 and has since retained HW to perform an update to that study which will identify future collection system improvements. The update to the original study includes additional flow monitoring in the collection system and the creation of a sewer system model. While the updated SSES is being prepared, the Utility has also been performing a series of smoke tests to identify defects in the collection system and notifying property owners of issues identified on the private side of the system. The Utility has also been repairing or replacing sanitary sewer line and services as major defects are located.

HW's scope is to recommend a plan for the Utility to accommodate the peak flows conveyed to their treatment facility. The WWTP's historical dry weather effluent flow ranges from 0.30 MGD to 0.80 MGD. The plant's monthly average and average peak day effluent flows were approximately 1.4 MGD and 2.7 MGD respectively. The current NPDES discharge permit (AR0036692) identified the design capacity of the WWTP to be 3.1 MGD and the treatment process is hydraulically limited by the existing tertiary filters to approximately 2.4 MGD.

The WWTP's peak influent flow is limited by the capacity of its Influent Pump Station to approximately 4.4 MGD. Wastewater volume in excess of that which can be pumped into the WWTP is stored in the collection system. After large rain events, the pump station will often operate at its maximum capacity for several days before returning to typical dry weather operational patterns. During periods when influent flow exceeds the WWTP's effluent capacity, the water level of the lagoons rises as the balance of the flow is stored. The stored volume is ideally processed through the WWTP after the peak flow period subsides. During the 1986 construction of the sand filters, a bypass option was incorporated into the treatment process. This enables the operator to divert partly treated flow around filtration and disinfection if the lagoons reach maximum capacity and risk breaching their levees. If this option were not available and the lagoons were allowed to overflow, the levees could be damaged rendering the treatment facility inoperable. The CAO defined the use of this bypass feature as a discharge from an unpermitted outfall. Increased pumping and treatment plant capacity is needed to mitigate collection system SSOs and eliminate the need for the use of the unpermitted outfall as an emergency measure.

## 2.3 Total Suspended Solids (TSS)

The CAO noted thirteen (13) exceedances of the WWTP's TSS limit from September 1, 2019 through April 30, 2024. These exceedances are believed to have resulted mainly from high flow due to I/I.

It is not unusual for wastewater lagoons to struggle with high TSS from algae growth or peak flows that can flush suspended solids from the basins. The sand filters installed downstream of Mena's lagoons were designed to help the facility cope with those common issues. During periods of extended peak flows, the filters become overwhelmed and solids breakthrough occurs resulting in permit violations. The sand filters at the WWTP have exceeded their design life and do not have sufficient capacity for the City's needs. The filters are also no longer supported by their manufacturer, so replacement parts are difficult to obtain. Treatment improvements such as the replacement of the existing filters with a high capacity filtration system suitable for lagoon effluent such as a Dissolved Air Flotation (DAF) or Suspended Air Flotation (SAF) system is required to address this issue.

## 2.4 Dissolved Oxygen (DO)

The CAO noted fourteen (14) exceedances of the WWTP's effluent Dissolved Oxygen (DO) limit from September 1, 2019 to April 30, 2024. These violations are likely due to algal respiration and/or increased oxygen demand from the accumulated sludge in the lagoons. Treatment improvements to the existing post-aeration system are likely needed to ensure effluent DO requirements are met. Removal of excess sludge stored in the treatment lagoons and repairs to the existing lagoon aeration system to increase oxygen transfer may also be required if sufficient improvements cannot be made at the post-aeration basin.

## 2.5 pH

The CAO noted nine (9) exceedances to the WWTP's pH limit from September 1, 2019 through April 30, 2024. The low pH of the WWTP's effluent is likely related to the usage of Alum as a coagulant in the filtration process and its subsequent discharge as filter waste into the treatment lagoons. Changes to the treatment process equipment to reduce the usage rate of alum and the removal of excess alum stored in Lagoon No. 1 will likely increase the pH of the effluent. A process change to add a chemical buffer such as lime or a chemical for pH adjustment to the effluent may be required if process changes are insufficient to address this issue.

## 2.6 Copper

The CAO noted five (5) exceedances of the WWTP's Total Recoverable Copper limit from September 1, 2019 through April 30, 2024, however only one (1) exceedance occurred since 2020. The Utility's WWTP NPDES Permit includes a limit for Total Recoverable Copper (Cu) of 10.5 ppb monthly average and 21 ppb 7-day average. Mena's WWTP was not designed to remove heavy metals such as copper. Any reduction achieved is likely due to algae uptake. Since alum, a necessary coagulant to aid filtration, is present in the filter backwash stream flowing to Lagoon No. 1, the pH in the lagoons is suppressed below the level where any significant precipitation of copper should be expected. The presence of ammonia in the lagoons would also inhibit copper precipitation. The Utility has observed increasing copper concentrations in the WWTP effluent. If that trend continues, permit exceedances could result. Treatment improvements that reduce the usage of alum and therefore increase the overall pH of the treatment process are being considered to lessen the likelihood of future occasional violations.

## 2.7 Disinfection

The CAO noted three (3) exceedances of the WWTP's Peracetic Acid (PAA) limit and five (5) exceedances of the Total Residual Chlorine (TRC) limit from September 1, 2019 through April 30, 2024. Chlorine disinfection was used to achieve compliance with the WWTP's fecal coliform permit limit until August 2020 when the permitted process was switched to using Peracetic Acid for disinfection. This switch eliminated the possibility of future TRC violations as chlorine is no longer used in the process.

The switch to PAA has resulted in violations of the PAA limit due to issues with the new the chemical feed equipment and variations in effluent volume. Treatment improvements that automate the chemical feed system and allow for flow based chemical feed pacing will reduce the likelihood for future violations.

## 3.0 REVISED CORRECTIVE ACTION PLAN

### 3.1 Masterplan

Mena Water Utilities retained the services of HW to develop a wastewater treatment masterplan. This Plan provided a recommendation of affordable improvements that will allow the Utility to consistently comply with their permit limits and better prepare them for future growth and/or more stringent permit conditions. The general outline of the Plan is as follows:

- A. Evaluate existing wastewater treatment facility
  - 1. Evaluate historical performance of WWTP
  - 2. Evaluate existing condition of WWTP
    - a. Coordinate additional influent, effluent, and solids testing as needed to current loadings and treatment efficiencies.
    - b. Document current condition and design life of existing WWTP equipment.
    - c. Evaluate applicability of existing equipment based on current permit requirements and available technology.
    - d. Evaluate the WWTP's SCADA controls and monitoring systems.
    - e. Evaluate the WWTP's current power and emergency power infrastructure.
    - f. Estimate remaining useful life of existing WWTP.
- B. Evaluate long-range wastewater treatment needs for the City of Mena.
- C. Evaluate WWTP improvement alternatives. Consider preliminary treatment improvements, alternate biological treatment alternatives, alternate disinfection alternatives such as UV and peracetic acid, and solids handling.
  - 1. Identify improvements required to the existing WWTP to provide consistent NPDES permit compliance over the planning period.
  - 2. Evaluate the option to install a new modern WWTP on the existing WWTP site while incorporating existing WWTP components.
  - 3. Evaluate the option to install a new modern WWTP on an alternate site.

The Master Plan was delivered to Mena Water Utilities in August of 2019 and submitted to ADEQ on August 21, 2019.

### 3.2 Proposed Improvements

Based on the improvements recommended in the Master Plan, Mena Water Utilities retained Hawkins-Weir to design a new treatment facility which was determined to be the preferred option. The new treatment facility was designed based on a Sequencing Batch Reactor (SBR) process and included a new Influent Lift Station, grit removal equipment, UV Disinfection, and a Post-Aeration Basin. The proposed treatment facility also included Tertiary Filtration as a deductive alternate that could be included should funding be available. These proposed improvements were designed and bid in February 2024 and the bids received were above the funding that Mena Water Utilities had available for construction.

To ensure that the requirements of the CAO were met, Mena Water Utilities has decided to proceed with a lower cost option that includes improvements to the existing Influent Pump Station to increase pump capacity to 5.8 MGD, replacement of the force main from the Influent Pump Station to the Lagoons, the replacement of the four (4) existing sand filters with two (2) Dissolved Air Floation (DAF) or Suspended Air Floation (SAF) filters each with a design capacity of 3 MGD for a total filtration capacity of 6 MGD, and improvements to the Post-Aeration Basin to increase effluent DO under peak conditions. The proposed improvements also will include levee repairs as needed and a limited SCADA system to monitor plant operations and better control the chemical feed systems.

To reduce the time required to achieve final compliance, Mena Water Utilities plans to utilize a Construction Manager at Risk (CMAR) to construct the proposed improvements. This will allow the construction contract to be awarded based on a Maximum Guaranteed Price (GMP) which will provide certainty that the project can be constructed within the funding available.

### 3.3 Interim Operation Plan

Excessive I & I has created wastewater influent flow rates above the 2.9 MGD hydraulic capacity of Mena's WWTP. Long rainfall events or periods of wet weather with multiple closely spaced periods of rain can exhaust the equalization storage capacity of the WWTP's lagoons. Without active intervention the lagoons would overflow their levees. This would result in severe property damage including the possibility of a total loss of the Utility's wastewater treatment ability. HW is currently developing a Plan that will recommend a long-term solution for this issue. The Plan's recommendation will also enable the Utility to consistently comply with its permit limits for TSS, Ammonia Nitrogen, and copper. This Interim Operation Plan (IOP) has been created to protect the Mena WWTP, neighboring property, and maximize Mena's ability to comply with the requirements of its NPDES permit until the point in time that the Plan recommendations can be implemented.

- A. During normal flow rates, WWTP staff will continue to operate the plant using the full treatment process shown as Exhibit A.

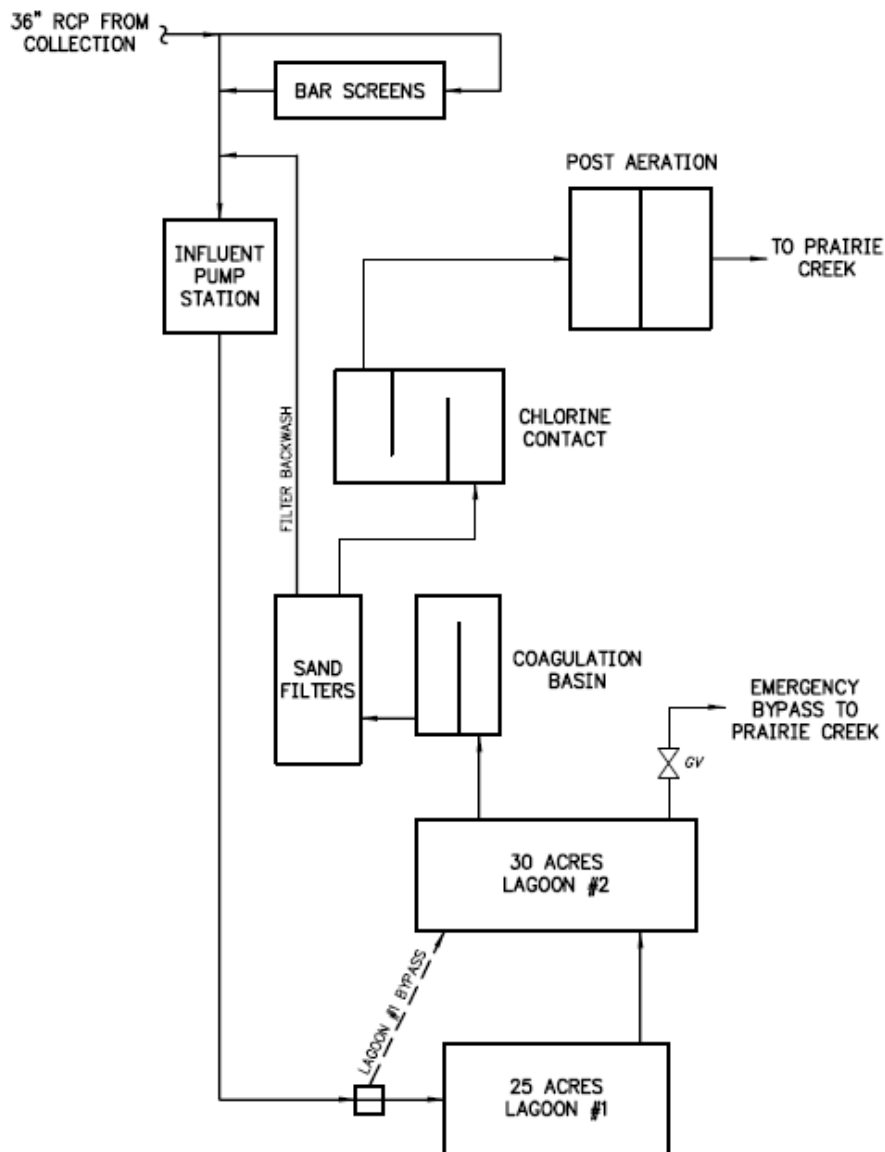


Exhibit A – Mena WWTP Process Diagram

- B. When the WWTP influent flow rate reaches a level that threatens to overflow the Lagoon No. 2 levee, threatening neighboring property and potentially causing catastrophic damage to the WWTP, the operator will open the existing emergency bypass valve depicted in Exhibit A. By opening that valve, partly treated wastewater will be discharged from Lagoon No. 2 to a point within approximately 50 feet of Outfall 001. During these uncontrollable events, WWTP staff will sample and record the total volume of emergency bypass flow. All samples and flow data will be reported to ADEQ. The emergency bypass valve will be closed as soon as the threat to the WWTP infrastructure has been alleviated.



### 3.4 Revised Milestone Schedule

A. Final Design Documents Complete	March 14, 2024
B. Receive GMP from the CMAR	June 27, 2025
C. Mena City Council Approval of the GMP	August 12, 2025
D. Execute Construction Contract	September 16, 2025
E. Notice to Proceed Issued for Construction	October 1, 2025
F. Construction Final Completion	November 1, 2026
G. Final Compliance Date	December 31, 2026

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Progress Reports will continue to be submitted in accordance with the requirements of the CAO.