

Sewer Asset Inventory & Assessment and Asset Management Plan

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Prepared for:

Prepared by:

TIA REGISTER, PE

Project Manager

City of Lenoir

801 West Avenue NW, Lenoir, NC 28645

Phone: 828.757.2200

McGill Project No. 23.01116

McGill Associates, PA

1240 19th Street Lane NW, Hickory, NC 28601

Phone: 828.328.2024

Firm License: # C-0495

1 Executive Summary

1.1 Introduction

The City of Lenoir, with the assistance of McGill Associates (McGill), developed an Asset Inventory and Analysis (AIA) for its wastewater system, which includes an Asset Management Plan (AMP) and an updated 10-year Capital Improvement Projects plan (CIP). The project was funded through the North Carolina Department of Environmental Quality (NCDEQ) Division of Water Infrastructure (DWI) AIA grant program.

1.2 Objectives

The purpose of this AIA and AMP is to deliver a long-term roadmap for the continuation of proactive management of the City's wastewater assets. The AMP will deliver data-driven insights to the City, empowering them to make informed capital planning decisions for future improvements. This approach will maximize the value of existing infrastructure in a cost-effective way, all while maintaining service levels for residents and business owners.

The AIA and AMP report consists of four key components:

1. Asset inventory (including mapping of all vertical and linear assets)
2. Assessment of the condition of all inventoried infrastructure
3. Capital improvements plan (CIP) with preliminary opinions of probable costs
4. Operations and maintenance (O&M) plan

McGill assisted the City with the inventory and assessment process, system analysis and testing, and update of the 10-year CIP to guide the City with scheduling and financing the capital projects and equipment purchases necessary to maintain and improve the wastewater treatment plant, sewer lift stations and force mains, and the gravity sewer lines. Prioritized wastewater system infrastructure projects, including preliminary opinions of probable costs, are included in long-term planning based on findings of this AIA. The City’s 10-year CIP will continue to allow the City to annually update its rate setting model to estimate future revenue and expenses, capital outlay, indebtedness, and overall health of the sewer system enterprise fund reserves.

1.3 AMP Components

1.3.1 Asset Inventory

The AIA began with the City and McGill meeting to review the project scope and proposed schedule, identify areas of concern, and obtain contact information for City maintenance personnel. Following this meeting, McGill conducted numerous site visits to collect geographic information system (GIS) data and evaluate critical point and linear assets within the City's wastewater system. This information, along with input from the City, was utilized to create a detailed database of the City's wastewater system by providing more detailed information about all system assets. This database, which includes asset identification labels, attributes, and conditions data, created the framework for the wastewater system maps included in this report.

1.3.2 Condition Assessment and System Evaluation

The City's wastewater collection system consists of approximately 240 miles of gravity sewer and sixteen sewer lift stations. The City owns and operates two Wastewater Treatment Plants (WWTPs), Gunpowder Creek WWTP (NC0023736) with a permitted capacity of 2.0 MGD, and Lower Creek WWTP (NC0023981) with a permitted capacity of 6.0 MGD.

Over the course of this study, McGill, accompanied by City staff, conducted site visits to the City's collection system and treatment facilities to evaluate system components. Site visit evaluations included visual inspections of each point asset, condition assessment of all equipment and systems, criticality assessment of each asset, and recording of performance observations reported by City staff. This information was utilized to evaluate the system and update system maps. Record drawings from previous system upgrades and expansions were also studied and utilized in the system evaluation.

1.3.3 Capital Improvement Plan (CIP)

McGill assisted the City with the inventory and assessment process, system analysis and testing, and the updating of its 10-year CIP to guide the City with scheduling and financing the capital projects and equipment purchases necessary to maintain and improve the collection and treatment systems.

Throughout the system evaluation McGill utilized multiple data collection methods to identify needs in the system. These data collection methods are detailed in Section 5. Documentation and

analysis of all identified operational needs within the system were detailed in Section 6 based on information collected during the system evaluation and from consultation with City staff. McGill developed a risk assessment for each asset in the system and recommendations for rehabilitation and replacement (R&R) projects. Wastewater system infrastructure projects, including preliminary opinions of probable costs, are included in this report for long-term planning. .

1.3.4 O&M Plan

Lenoir currently has a robust O&M program; however, it is important to implement a strategy of continuous improvement to maintain the level of service objectives detailed in Section 2.5. Best practices for operation and maintenance of a municipal wastewater utility, most of which are being performed by City staff, include but are not limited to:

1. System mapping and GIS updates for all infrastructure should continue on a regular basis in support of maintaining accurate system mapping and informing O&M schedules. Data collection including lift station run times, occurrences of high-water alarms, and record of maintenance are recommended to be collected and updated in the system GIS database.
2. Preventative maintenance to extend the useful service life of equipment, document needs and make replacements/repairs before failures occur.
3. Routine inspections and record of findings on wastewater system infrastructure in support of O&M as well as identifying areas of concerns for future rehabilitation/replacement projects.
4. Maintaining activity records of O&M and repair work, including equipment costs, manpower time, and any other resources.
5. Review customer complaint records to document types/frequency of customer complaints, response time, and follow-up information.

1.4 Summary of Results

1.4.1 Condition Assessment

Almost half of the City's gravity sewer system was installed in the 1960s and almost 80% of the system is more than 40 years old. Coinciding with the age of installation, the majority of the gravity sewer pipes are made of vitrified clay. Based on the age and material of the collection system, compliance with Federal and State regulations, current design standards, and documented operational status, the condition assessment considered the expected useful service life of

components in determination of rating. Overall, the City's wastewater collection and treatment system is in fair condition.

1.5 Recommendations

1.5.1 Capital Improvement Plan

Based on the information compiled throughout the asset inventory and condition assessment, preliminary opinions of probable costs were developed for each project. The City had previously identified many of these project needs in its 10-year CIP. Other identified projects will be placed on the long-term planning list. A summary of future project needs with approximate costs is shown in Table 1.

Table 1: Wastewater System Capital Improvements Projects

Proposed Project	Probable Project Costs
Collection System Improvements CIP	$ 49,100,000
Wastewater Treatment Plant CIP	$ 55,400,000
Lift Station Improvements CIP	$ 500,000
TOTAL	**$ 105,000,000**

1.5.2 Operation and Maintenance (O&M) Plan

Maintenance strategies for utility systems usually fall into three separate categories based on capability and available funding for the system. These categories include preventative, reactive (or emergency), and deferred maintenance. Lenoir's utility staff diligently works to perform proactive maintenance and to limit reactive maintenance to emergency situations. In order to ensure that the sewer assets continue to be maintained and managed effectively and efficiently, O&M guidelines were updated to enhance preventative maintenance