



Where we're going: System Goals



**CITY OF KALAMAZOO
WASTEWATER ASSET MANAGEMENT PLAN**

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INTRODUCTION

Our Mission

Our community, the City of Kalamazoo, Michigan, is committed to supporting public health and safety, and to protecting property and the environment, through responsible and effective management of three infrastructure systems: our water supply system, our wastewater system, and our stormwater system. These three systems affect each other and together they all affect public health, safety, property, and the environment. We strive to manage both three infrastructure systems in a coordinated approach to provide these essential public services for our citizens in a sustainable way. We plan to pursue this mission by implementing asset management.

Asset Management Principals

Asset management is the way to achieve sustainable infrastructure. All infrastructure deteriorates with age and requires proactive management to operate, maintain, repair, and eventually replace each physical component, or asset. This progression over time, from routine operation and maintenance through repairs and eventual replacement, is the asset's life cycle. Waiting to perform maintenance or make repairs can save money in the short term but may shorten the life cycle of an asset. On the other hand, replacing an asset before it fails may not take full advantage of the asset's value. It is this balance which puts the decisions for operations, maintenance, repair, and replacement actions at the heart of asset management.

Asset management is an evaluation of needed actions after considering the condition of an asset, the consequences of an asset failure, and the action alternatives available. The solution that provides the lowest life cycle cost at the desired Level of Service (LoS) is implemented.

Our Wastewater System

The City of Kalamazoo's wastewater system is comprised of collection pipes, manholes, and lift stations that collect wastewater from homes and businesses. These discharge to sewers within the City of Kalamazoo's wastewater collection system, where it is ultimately transported to the City of Kalamazoo's Reclamation Plant for treatment and recycled back into the environment.

About this Document

This document is our Wastewater Asset Management Plan (AMP). It defines the goals and guiding principles for running our wastewater system at its lowest life-cycle cost. Each of us pays to operate, maintain and replace those assets through our utility rates. In effect, each of us is an owner of the wastewater system. As owners, we commit to manage our assets and make decisions based on long term life cycle cost. With input from the community, we will maintain our AMP through a joint effort of our staff, administration, and elected officials. We will update it as needed to ensure its relevancy and effectiveness.

A companion document, our Wastewater Asset Management Program, shows how we will apply the principles of asset management to achieve the goals outlined in this AMP.

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PART 1: DEFINING OUR GOALS—WHAT IS OUR DESIRED LEVEL OF SERVICE?

As a community, we determine the level of service we want from our wastewater system. Defining these goals has an effect on the cost of the service. Many factors play into this determination including public health, safety, compliance with regulations, aesthetics, odors, service reliability and stable rates. To this end, we have established the following primary goals for our wastewater system:

Goal 1: Meet Regulatory Requirements

The water quality of our discharge is an important value for our community to minimize potential health and environmental effects. Our wastewater treatment plant processes our wastewater in a way which meets or exceeds regulations established in the Federal Clean Water Act and State of Michigan Statutes/Rules. Our operators test our process products and water discharged to the environment according to Federal and State laws. We strive to achieve continued compliance with environmental regulations and produce the cleanest, safest treated water achievable with the treatment facilities we have.

Goal 2: Minimize Service Interruptions

Service interruptions are an inevitable part of operating a wastewater system and can be caused by many factors such as equipment failure, power outages, clogging, excessive flows, repairs, and replacement operations. Our goal is to minimize service interruptions by proactively managing and investing in our system.

Goal 3: Minimize Public Hazards

Sewer breaks can cause significant damage, not only to the streets above them but also to adjacent utilities and property. Additionally, sewer breaks and blockages may result in sewer backups which raise health concerns and can cause property damage.

Our goal is to minimize sewer breaks and backups. To minimize the potential for backups, we will continue to fund / perform regular cleaning of sewer as part of routine operations and maintenance. To minimize the potential for breaks, sewers at risk will be improved or replaced as part of our capital improvement program. To minimize the potential for damage from breaks and/or backups, we will continue to coordinate with the City of Kalamazoo to provide emergency response services 24 hours per day, 7 days per week. This also includes emergency response to our partner community with wastewater service agreements.

Goal 4: Manage Storm Water Inflow and Ground Water Infiltration

Storm water inflow through sources like roof drains and catch basins can cause sewer overflows and backups. Groundwater infiltration, if severe enough, can cause backups. Both inflow and infiltration (I/I) take up flow/treatment capacity in the system which reduces the amount of actual wastewater our system can manage and increases our transport/treatment costs.

We will identify and eliminate sources of I/I wherever practical to meet the Federal EPA guidelines for I/I and to reduce the potential for sewer overflows and back-ups.

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Goal 5: Provide Capacity for Community Growth

We will design and maintain our wastewater assets to provide adequate capacity for community development, and we will plan for system improvements that allow our sewer service area to develop based on long range future land use plans. We will responsibly control system expansion by balancing requirements for community redevelopment/infill and desires for new development.

Goal 6: Minimize Life Cycle Costs

The best financial decisions are those which achieve the lowest life cycle costs while still meeting the desired level of service. This means we consider the full life cycle of each investment each time we evaluate improvements to our system. We recognize that short term fixes, while they may have the lowest immediate costs, may not be the best long term financial decision. Likewise, not spending money on maintenance and repairs can provide short term cost savings, but may result in asset failure, ultimately increasing life cycle costs. We intend to manage our system to always pursue the lowest life cycle cost possible for each system asset while maintaining our desired level of service.

Goal 7: Partner Communities

Our wastewater system serves not only our residents but also the communities of Village of Augusta, Brady Township, Charleston Township, Comstock Township, Cooper Township, City of Galesburg, Kalamazoo Township, City of Parchment, Pavilion Township, City of Portage, Richland Township, Village of Richland, Ross Township, Schoolcraft Township, Texas Township, and the Village of Vicksburg. This makes us all partners. As community partners, we must work together to manage our wastewater system. We will work with our community partners to facilitate communications regarding O&M, capital improvements, and rates.

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PART 2: INVENTORY - WHAT DO WE OWN?

Our System

Our City of Kalamazoo wastewater system includes assets such as collection sewer mains, sewer services from the main to the right-of-way line, manholes, lift stations and metering stations that discharge to sewers in the City of Kalamazoo's wastewater collection system. A variety of materials including vitrified clay pipe (heat-treated clay) and concrete pipe were the main choices for collection sewers in North America for many decades.

We have over 256 miles of sewer pipes within the City of Kalamazoo and over 73 miles of sewer pipes in the partner communities that are multi-jurisdictional (interceptors) that the City of Kalamazoo is responsible to maintain. There are also seven (7) lift stations within the City and 54 lift stations in the partnering communities is responsible to maintain.

The majority of our collection sewers were built before the 1970's and dates back to the late 1800s. Most of these pipes are clay pipe. The remaining pipes from that era are either concrete or cast iron. Most pipes installed after 1980 are typically plastic.

All of the wastewater collected is treated at a City owned Wastewater Treatment Plant (WWTP). The City of Kalamazoo owns and operates a 54 million gallon per day tertiary wastewater reclamation plant to service the greater Kalamazoo metropolitan area. The KWRP main processes include screening, grit removal, primary sedimentation, secondary biological nutrient removal, clarification, disinfection, dechlorination, sludge processing, bio solid processing and sludge storage. The system currently serves approximately 200,000 individual connections/customers.

A detailed summary of our wastewater system assets are in our Wastewater Evaluation Report and in a detailed asset inventory maintained by our Department of Public Service (DPS). The DPS keeps a list of non-pipe assets which includes purchase date, original cost, inspection reports, repair history, maintenance schedule, and specifications.

Our Plan

We will keep our system inventory current by storing records of our wastewater system in our Geographic Information System (GIS) and our Computerized Maintenance Management Systems (CMMS). The GIS contains maps of all our collection system assets, our lift stations and force mains. The City of Kalamazoo will keep an inventory of non-pipe assets (equipment, buildings, etc.) and asset data pertinent to Operations, Maintenance, and Replacement in the CMMS.

PART 3: RISK OF FAILURE—WHAT ARE THE CONDITIONS OF OUR ASSETS?

Our System

To understand how long each of our assets may last, we must track their condition and potential failure risk. An asset condition rating system has been developed for each type of asset in the system inventory. All assets are rated on a scale of 1-5 with 5 representing the worst condition, or highest risk of failure. Sewer pipes and manhole ratings are based on inspections of the assets. Force main ratings are estimated from the pipe age, break history, and material inventory. Lift station ratings and treatment plant components are based on visual inspection and performance testing. Condition rating information is incorporated into the GIS with the asset inventory.

Our Plan

We will keep our condition assessments current using periodic asset inspections at intervals frequent enough to document reasonably expected condition changes. The inspection intervals will vary by asset type and its expected life. We will score each asset on its likelihood or risk of failure (RoF) ratings on a scale of 1-5.

PART 4: CONSEQUENCE OF FAILURE—WHAT HAPPENS WITH A FAILURE?

Our System

It is important we understand the severity of consequences which may occur if any asset in our system fails. In a sewer system, if part of the system fails, the consequences would most commonly be a wastewater backup into basements, a discharge of untreated wastewater to the environment, or a pipe collapse with a sink hole in the street or other places.

Functional failure consequences can occur when pumps stop working, valves cannot open or close, and when sewers become broken or blocked with sediment, debris, or roots. Physical failure consequences can occur when we have sewer main breaks or catastrophic equipment failures.

Our Plan

A rating system has been developed to establish a way for comparing the severity of potential consequences of sewer system failures. All assets are rated on a scale of 1-5 with 5 representing the most severe consequences. We will evaluate the CoF of each asset, from both a functional and physical failure perspective. We will maintain redundancy on assets with a high CoF.

PART 5: CRITICALITY—HOW DO WE PRIORITIZE OUR ACTIONS?

Our System

We must prioritize our actions to meet our Level of Service (LoS) goals while managing our work loads, utility rates, and minimizing life cycle costs. Criticality ratings (otherwise known as Business Risk Factors in some asset management programs) are compiled for all assets in our wastewater system. Each assets “Risk of Failure” rating (1-5) is multiplied by its “Consequence of Failure” rating (1-5) to establish its Criticality rating (1-25). Criticality drives an asset’s action priority.

Our Plan

Criticality ratings help us prioritize improvements and with development of our Capital Improvement Plan. Criticality of assets within our system will be determined by multiplying each asset’s RoF (1-5) by its CoF (1-5).

PART 6: CAPACITY—DO WE HAVE ENOUGH, NOW AND FOR THE FUTURE?

Our System

Planning for future capacity needs is an essential part of our asset management program. Sewer pipes should last for many decades, so decisions about pipe capacity and system improvements require a very long term view. Over time, flows fluctuate with changes in property use and population. System analysis shows we are currently meeting peak flow and our estimated future flows. A detailed analysis of our system capacity is in our Kalamazoo Metropolitan Area Wastewater System Strategic Plan, February 2003.

Our Plan

We will maintain our wastewater assets to provide adequate capacity for existing development and will plan for system improvements which will allow our community to grow. We plan to monitor land use for compatibility with the sewer system capacity master plan. As land development and new customer connections occur, we plan to continue monitoring the system flows.

We plan to coordinate any needed capacity improvements with sewer rehabilitation/replacement projects to maximize the life cycle of our existing assets and ensure long term capacity needs are met with the construction of any replacement assets.

PART 7: OPERATIONS AND MAINTENANCE—KEEPING UP WITH ROUTINE WORK

Our System

Certain portions of our system need routine, on-going service to continue functioning. Our system Operations and Maintenance (O&M) demands are stable and we will manage the system to maintain stability. We will use CMMS tools to maintain asset inventories and schedule regular O&M activities.

Our Plan

We have established the following O&M goals:

1. Maintain staffing and equipment levels so in-house staff can perform routine O&M activities.
2. Use in-house staff to verify proper function of all system assets such as valves, pumps, motors, and other mechanical equipment.
3. We will hire outside consultants when we need specialized technical or equipment capabilities.
4. We will hire outside consultants or utilize the City of Kalamazoo crews to perform sewer pipe cleaning and root cutting.

PART 8: CAPITAL IMPROVEMENTS—CONTINUING SYSTEM RENEWAL

Our System

Our condition assessments have revealed certain assets which are near the end of their life cycle and are in need of rehabilitation or replacement. Improvement recommendations for our wastewater system are in the Kalamazoo Metropolitan Area Wastewater System Strategic Plan and Wastewater System Evaluation Report. These reports identify the scope and priorities of proposed wastewater system improvements such as sewer pipe replacements, equipment replacements, and major O&M activities.

Our Plan

Planning for capital improvements is a continual management process. We will incorporate the recommendations of the sewer reports into a comprehensive CIP which will document the major projects we plan to complete within the next 10 years. Criticality ratings set the order and timing of projects. Project timing often is driven by the availability of outside funding such as loans and grants. We will maintain and update our comprehensive CIP every year.

PART 9: FINANCIAL STRATEGY–RATE PLANNING AND STABILITY

Our System

We will fund our system costs through our wastewater system billings. We break our wastewater bills into two categories: Readiness to Serve (RTS) charges and Commodity charges.

Our Plan

Financial goals and strategies will be detailed in a regularly updated rate study compiled in collaboration with our partner communities. We will maintain a life cycle forecast of estimated costs, income from rates, and cash balances. We will use this forecast in the rate study to establish sustainable and stable utility rates. This helps our residential, business, and industrial owners in their long term financial planning and is an economic development advantage when recruiting new employers.

We will fund system O&M as defined in the rate study. This will also allow us to pay cash for emergency repairs and minor unanticipated asset replacements.

We will pay cash for planned system repairs and replacements with a stable rate structure.

SUMMARY

Asset management is a collection of best management practices to which we will adhere in order to continue providing reliable wastewater service for our community. Our Asset Management Plan outlines our goals. The specific details of how we implement asset management may be adjusted from time to time as new/improved tools, software, and evaluation techniques are developed. Regardless of those changes, we will incorporate asset management into our everyday activities, including system improvements and master planning. By proactively managing our wastewater system through asset management, we can ensure reliable and sustainable wastewater service at the lowest life cycle cost for our community.