



*Where we're going: System Goals*



## **INTRODUCTION**

### **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. With input from decision makers and the community, we will maintain our AMP through a joint effort of our staff, administration, and elected officials. We will update before May 2022 and every five years afterwards 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.

### **Our Commitment**

Our wastewater system includes a complex set of components. We run and maintain them to processes our wastewater and reclaim fresh water from it before we recycle it back into the environment. Our wastewater system includes assets like collection sewers, manholes and lift stations. Each of our customers 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.

### **Asset Management Principals**

Infrastructure assets deteriorate with age and they require proactive management to operate, maintain, repair, and replace them. This progression over time from routine operation and maintenance through repairs and eventual replacement is the asset's life cycle. Waiting to do maintenance or make repairs can save money in the short term but may decrease an asset's life. Replacing an asset before it fails does not take full advantage of its value. It is this balance which places decisions for operations, maintenance, repair, and replacement at the heart of asset management.

Asset management determines actions considering an asset's condition, the consequences of its failure, and available alternatives. Asset management principles produce actions which provide the lowest life cycle cost at the desired Level of Service (LoS).

**CITY OF NORTON SHORES WASTEWATER ASSET MANAGEMENT PLAN  
MAY, 2017**

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

Our mission is to process our wastewater and recycle the fresh water in it for release into the environment. We will proactively manage our wastewater collection assets to meet our desired LoS goals.

Our community, as owners, must decide the LoS we want. Many factors play into this determination including: compliance with regulations, public health, aesthetics, service reliability, stable rates, etc. We have established these primary goals:

### **Goal 1: Meet Regulatory Requirements**

Our wastewater system 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 prevent damage to property and the environment from sewage overflows or backups.

### **Goal 2: Minimize Service Interruptions**

Service interruptions from sewer breaks, repairs, and asset replacements are an inevitable part of operating a wastewater system. But, by better managing and investing in our system, we can decrease how often these interruptions occur.

### **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. Sewer breaks/blockages may cause sewer backups which are a health concern and often damage property. We have 134 miles of sewer pipes. According to AWWA and other industry benchmarking studies, an optimized system has fewer than 5 sewer failures, overflows or sewage backup events per 100 miles of pipe. Our goal is to have fewer than 5 failures, overflows or sewage backup events a year.

To limit the potential damage from breaks and/or backups, we will keep staffing levels to allow emergency response services 24 hours per day, 7 days a week.

### **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 capacity. I/I reduces our capacity to collect and convey wastewater. It also increases our treatment costs from the County. We will find and cut out sources of I/I wherever it is cost-effective to meet the Federal EPA and State DEQ guidelines for I/I and to minimize the potential for sewer overflows and back-ups.

### **Goal 5: Provide Capacity for Community Growth**

We will maintain our wastewater assets to offer adequate capacity for existing development and will plan for improvements to allow growth. We will control expansion by balancing needs 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. This means we consider the full life cycle of each investment each time we look at making improvements. Short term fixes, while they may have low immediate costs, may not be the best long-term financial decision. Likewise, not spending money on maintenance and repairs can give short term cost savings but result in asset failure, increasing life-cycle costs. We will manage our system to pursue the lowest life-cycle cost possible for each asset.

### **Goal 7: Partner Communities**

Our wastewater system serves not only our residents, business owners and industries, but it can have an effect on the environment which impacts the Mona Lake Watershed and Lake Michigan. Our sewers flow into the Muskegon County Wastewater Management System (MCWMS). This makes us all co-owners. As co-owners, we must work together to manage our wastewater system. We will continue to foster good relationships with our utility partners to facilitate communications regarding O&M, capital improvements, and rates.

## **PART 2: INVENTORY - WHAT DO WE OWN?**

### **Our System**

Our waste water system includes assets such as collection sewers, interceptor sewers, and lift stations. 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. Clay pipes are brittle and may crack. Root intrusion at joints and sewer lateral connections is a significant problem. Concrete pipe succumbs to hydrogen sulfide corrosion over time under certain conditions. Both pipes come in short lengths and may leak at the joints.

In recent decades, plastic sewer pipe is common in new sewer construction. Although plastics have good corrosion resistance, they are vulnerable to poor installation practices.

The majority of our collection sewers were built before 1982, making the majority of our system over 35 years old. Most of these pipes are plastic. The few pipes installed prior to 1969 are typically clay or cast iron.

A detailed summary of our wastewater system assets is in our Wastewater Evaluation Report and in a detailed asset inventory maintained by our Department of Public Works (DPW).

The DPW 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 wastewater system construction in our Geographic Information System (GIS). A GIS contains maps of all collection system assets, lift stations, and asset data pertinent to Operations, Maintenance, and Replacement.

## **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. A functional asset failure is the primary consideration for Risk of Failure (RoF). However, we also must evaluate the risk of a physical asset failure for pipes, manholes, and lift stations. We will use break, overflow and backup history, maintenance records, corrosion, and age to rate their condition.

### Our Plan

We will keep our condition assessments current using periodic asset inspections at intervals frequent enough to document reasonably expected condition changes based on past experience with individual assets. The inspection intervals will vary by asset type and its expected life. Next, we will score each asset on its likelihood or risk of failure. RoF ratings are on a scale of 1-5 with 5 being the highest RoF.

## **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. Functional failure consequences can occur when pumps stop working and when sewers become broken or blocked. Physical failure consequences can occur when we have sewer main breaks or catastrophic equipment failures.

### Our Plan

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. All CoF ratings will be on a scale of 1-5 with 5 being the highest 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. Consequence of Failure and Criticality should not be confused. Criticality is the product of an asset's Risk of Failure (RoF) and Consequence of Failure (CoF). 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

Our system must meet service demands both now and into the future based on current and future land use. Over time, flows fluctuate with changes in property use and population. System analysis shows we are currently meeting peak flow needs but we must make improvements to meet estimated future flows. A detailed analysis of our system capacity is in our Sewer Flow Study report.

### Our Plan

We will maintain our waste water assets to provide adequate capacity for existing development and will plan for system improvements which allow our community to grow. We will manage system expansion by balancing needs for community redevelopment/infill and desires for new development or re-development.

## **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 GIS and a Computerized Maintenance Management System (CMMS) 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 with a maximum overtime goal of 15%.
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 and contractors when we need specialized technical or equipment capabilities.

## **PART 8: CAPITAL IMPROVEMENTS—CONTINUING SYSTEM RENEWAL**

### **Our System**

Improvement recommendations for our Waste Water System are in our Sewer Flow Study and Waste Water System Evaluation Reports. These reports identify the scope and priorities of proposed waste water system improvements such as sewer pipe replacements, equipment replacements, and major O&M activities.

### **Our Plan**

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 5 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 or when adjacent utilities or streets are replaced. We will maintain and update our comprehensive CIP every year.

## **PART 9: FINANCIAL STRATEGY—RATE PLANNING AND STABILITY**

### **Our System**

Our wastewater billings cover our costs. We break our wastewater bills into two categories: Debt Service charges and Commodity charges. Debt Service charges pay for our investment in physical assets including our collection system, and lift stations. We need these assets in-place before to collect and transport wastewater. We must maintain them regardless of the amount of wastewater is conveyed. The Commodity charge is based on water usage and it reflects the cost to collect, pump and treat wastewater. It is the smaller of the two cost categories. User categories like residential, commercial, industrial, etc. pay for the amount and type of wastewater they generate.

Our wastewater billings also support O&M, make any utility bond payments (borrowed money), or match any grants received to fund major improvements.

### **Our Plan**

We will maintain a life cycle forecast of expected costs, income from rates, and cash balances. We will use this forecast to fix sustainable and stable utility rates. This helps our residential, business, and industrial owners in their long-term financial planning.

We will fund O&M using cash from rates and will keep a minimum cash balance equal to 150% of the total wastewater budget from the previous year in unrestricted funds. This allows us to pay cash for emergency repairs and minor unanticipated asset repairs or replacements. We may borrow (bond) for significant expenditures to manage rates and keep appropriate cash balances.

## **SUMMARY**

Our Asset Management Program outlines how we will achieve our Asset Management Plan goals. We will adjust it 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 waste water system, we can meet our desired Level of Service goals at the lowest possible long-term cost.