CITY OF MARLIN

VOLUME II

SURFACE WATER TREATMENT PLANT ASSET MANAGEMENT PLAN

(FALLS COUNTY, TEXAS)

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INTRODUCTION

This report is Volume II of a three part study completed for the City of Marlin under a grant from the Heart of Texas Council of Governments. This study was initiated after discussions with city administration and operators who indicated that the water and wastewater treatment plants have significant annual expenses. The body of the report presents an overview of the findings from site visits and discussions with the operators, while the attachments and appendixes provide resources for regular use.

A. Study Authority

This study was completed under a grant from the Heart of Texas Council of Governments (HOTCOG). KSA Engineers was authorized to complete this work under Task Order No. MAR.043 City of Marlin Water and Wastewater Treatment Plant Efficiency Study, executed on February 19, 2015. This study will be incorporated into the larger grant project completed by HOTCOG.

B. Study Overview

The purpose of this study is to determine the following items as outlined in the EPA Best Practices Guide: the current state of the Marlin water system components, the required "sustainable" level of service, which assets are critical to sustained performance, the minimum life cycle costs, and the best long-term funding strategy. The components investigated under this Asset Management Plan include thirty six major surface water treatment assets:

1. Raw Water Intake
2. Raw Water Pump Station
3. Raw Water Meter Vault
4. Raw Water Splitter Box and Rapid Mixer
5. Solids Contact Clarifiers
6. Filter Feed Wet Well
7. Filter Feed Pump Station
8. Membrane Building
9. Membrane UF Feed Prefilters
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26. Sludge Thickener
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29. Reclaim Ponds
30. Decant Return Pump Station
31. Decant Return Meter
32. Sewer Lift Station and Sewer Collection System
33. Neutralization Tank
34. Generator
35. Water Treatment Controls
36. Old Plant Building and Other Unused Plant Items

This study was based on the Best Practices Guide by the Environmental Protection Agency (EPA). This guide outlines five core pieces of asset management: Current State of Assets, Level of Service, Critical Assets, Minimum Life Cycle Cost, and Long-Term Funding Plan, all of which were used in this study. Each section answers specific questions outlined by the EPA which are directed towards better asset management of the key components in the water system. The EPA document, *Asset Management: A Best Practices Guide* is provided in Appendix A for reference.

SECTION I
CURRENT STATE OF ASSETS

This section presents an overview of the existing assets owned and operated by Marlin at the water treatment plant (WTP). The best practices for this area of asset management includes the following:

- Preparing an asset inventory
- Developing a condition assessment and rating system
- Assessing remaining useful life by consulting projected-useful-life tables or decay curves
- Determining asset values and replacement costs

This section first outlines the approach used to investigate the current state of assets; the last section presents an overview of the findings. The detailed asset summary is included in Appendix B and should be consulted for full details on each asset. A summary of the findings is presented in this section.

A. Approach to Investigating Current State of the Assets

An inventory of assets was first completed by reviewing the WTP plans and completing a site visit to the plant. The assets were divided into thirty eight major asset groups. Each asset was further divided into major components. For the water treatment plant, each asset ID starts with “SW”. Each asset is given a number with sub-assets further divided out. An example of the numbering system is shown below.

5 – Solids Contact Clarifiers
5.1 – Clarifier 1
5.1.1 – Clarifier 1 Structure and Access Bridge

Some assets are considered as a whole, such as the solids contact clarifiers, while others were broken down into their components such as the clarifier 1 structure and access bridge. While this study divided the assets into major groups and their sub-assets, further divisions can be made at a later date. It is this study’s intent to identify the major asset components that have similar conditions, criticality, and remaining life.

Each asset is assessed based on condition, remaining useful life, and asset value/ replacement cost. A recommendation was given based on these factors.

Developing a Condition Assessment and Rating System

The condition assessment is based on the degree of deterioration and loss in functionality that each asset exhibits. The condition assigned to each asset is based on engineering judgement from site visits along with discussions with the operators. Due to the limited timeframe for this study, not all equipment was able to be observed in operation. These condition rates should not take the place of regular inspections but are intended to present an overall condition assessment that is useful for developing short-range goals and long-range plans. The rating system is outlined in Table 1.

Table 1. Condition Assessment Rating System

A - Excellent	No noticeable defects or problems, fully functional
B - Good	Minor deterioration, only slight deterioration in functionality
C - Fair	Partial deterioration, but function not greatly affected
D - Poor	Significant deterioration, function inadequate or failure potential
F - Failed	Partial or complete failure, asset not functional

The condition assessment is divided into five categories with an associated letter. The letter's A through F can is similar to a grade given in school. A-Excellent and B-Good are assigned to assets that are performing well in the field and do not need any immediate attention. Assets assigned a C-Fair and D-Poor have exhibited deterioration that affects performance. Repair or replacement may be necessary in the short term for assets with a fair or poor condition. A failed asset is completely non-functional and no longer used in operations.

Assessing Remaining Useful Life

The remaining useful life of each asset was determined using engineering judgement and knowledge on infrastructure life cycle. The water treatment plant is comprised of structures, pipes, mechanical equipment, buildings, and site improvements. The following are general comments on infrastructure life spans:

- *Mechanical Equipment*: Well-maintained mechanical equipment can last 15-20 years before it needs to be completely replaced.
- *Electrical and Controls*: Electrical and control systems typically have the same life cycle as the associated mechanical equipment (15-20 years). It is most efficient to replace the mechanical equipment and electrical and controls at the same time.

- *Concrete Structures*: Most concrete structures can be considered long-term assets as long as structural defects are addressed soon after discovery.
- *Buildings*: Most buildings may be as considered long-term assets if well maintained.

This report uses the term "Long-Term Asset" for any asset that has a life span greater than 30 years. For a long-term asset to truly last for the long term, regular maintenance activities must be completed. Failing to complete maintenance or addressing deficiencies may significantly shorten a long-term assets life span.

Determining Asset Values and Replacement Costs

Each asset is assigned an asset value and replacement/rehabilitation cost. This cost is not the asset construction cost but instead is the anticipated major expenditure required when the asset reaches the end of its useful life. For further details on the assigned cost, refer to the associated recommendations for unit. The costs presented in this study are based on engineering judgement and are intended for *long-term* planning purposes. Any projects that are recommended in the next three years should have a detailed opinion of probable project cost completed. These costs are presented in 2015 dollars and will need to be inflation adjusted as time progresses.

B. Water Treatment Plant Asset Inventory

The water treatment plant is located 1.7 miles from the intersection of FM Road 147 and State Highway 6 immediately south of the Dam for New Marlin City Lake and 1 mile east of the city. The plant was constructed in 1940 and has undergone a series of expansions and upgrades since then. The most recent upgrade for the plant was completed in 2009. As part of the construction, certain existing facilities were replaced with upgraded facilities and incorporated with additional treatment units. Table 2 shows the current condition assessment for the assets at the water treatment plant.

Table 2. Water Treatment Plant Inventory and Condition Assessment (Summary)

ID	Asset Name	Condition Rating	Estimated Remaining Life	Asset Value and Replacement/ Rehabilitation Cost
SW 1	Raw Water Intake	C - Fair	15 years	See asset sheet.
SW 2	Raw Water Pump Station	B - Good	15 years	$200,000
SW 3	Raw Water Meter Vault	B - Good	15 years	$30,000
SW 4	Raw Water Splitter Box and Rapid Mixer	B - Good	15 years	$88,000
SW 5	Solids Contact Clarifiers	D - Poor	5 years	See asset sheet.
SW 6	Filter Feed Wet Well	B - Good	50 years	Long term asset
SW 7	Filter Feed Pump Station	B - Good	15 years	$145,000
SW 8	Membrane Building	B - Good	50 years	Long term asset
SW 9	Membrane UF Feed Prefilters	B - Good	15 years	$53,000
SW 10	Membrane Filters	C - Fair	3 years	$750,000
SW 11	Membrane Clean In Place (CIP) Components	B - Good	15 years	$125,000
SW 12	Water Softener	B - Good	15 years	$10,000
SW 13	Membrane Chemical Dose Package	B - Good	15 years	$35,000
SW 14	Membrane Compressed Air Package	B - Good	15 years	$13,000
SW 15	Clearwell	B - Good	50 years	Long term asset
SW 16	High Service Pumps Station	B - Good	15 years	$190,000
SW 17	High Service Pump Meter Vault	B - Good	15 years	$9,000
SW 18	Backwash Pump	B - Good	15 years	$135,000
SW 19	Backwash Pump Metering Station	B - Good	15 years	$9,000
SW 20	Chemical Feed System - Chlorine	C - Fair	15 years	$90,000
SW 21	Chemical Feed System - Alum and Spare	B - Good	15 years	$22,000
SW 22	Chemical Feed System - Caustic	B - Good	15 years	$22,000
SW 23	Chemical Feed System - LAS	B - Good	15 years	$22,000
SW 24	Chemical Feed System - Fluoride	B - Good	15 years	$22,000
SW 25	Chemical Feed System - NaOCl and Citric Acid	B - Good	15 years	$36,000
SW 26	Sludge Thickener	B - Good	15 years	$140,000
SW 27	Sludge Pump Station	B - Good	15 years	$135,000
SW 28	Sludge Dewatering Centrifuge	B - Good	15 years	$390,000
SW 29	Reclaim Ponds	C - Fair	25 years	$75,000
SW 30	Decant Return Pump Station	B - Good	15 years	$90,000
SW 31	Decant Return Meter	B - Good	15 years	$10,000

ID	Asset Name	Condition Rating	Estimated Remaining Life	Asset Value and Replacement/ Rehabilitation Cost
SW 32	Sewer Lift Station and Sewer Collection System	B - Good	15 years	$100,000
SW 33	Neutralization Tank	B - Good	50 years	$36,200
SW 34	Generator	B - Good	15 years	$160,000
SW 35	Water Treatment Controls	C - Fair	15 years	$675,000
SW 36	Old Plant Building and Other Unused Plant Items	D - Poor	15 years	$113,000

Table 3. Water Treatment Plant Inventory and Condition Assessment (Detailed)

ID	Asset Name	Condition Rating	Estimated Remaining Life	Asset Value and Replacement/ Rehabilitation Cost
SW 1	**Raw Water Intake**	**C - Fair**	**15 years**	**See asset sheet.**
SW 1.1	Intake Structure - Reinforced Concrete	**C - Fair**	Long Term Asset	Long Term Asset
SW 1.2	Intake Structure Gates	**F - Failed**	0 years - Failed	>$200,000
SW 1.3	Intake Structure Pipe Conduit	**D - Poor**	Uncertain	See asset sheet.
SW 1.4	Intake Structure Ladder (inside and out)	**F - Failed**	0 years - Failed	~$20,000
SW 1.5	Dam Intake Area	**D - Poor**	15 years	$350,000
SW 2	**Raw Water Pump Station**	**B - Good**	**15 years**	**$200,000**
SW 2.1	Vertical Turbine Pump (2 pumps-2009)	**B - Good**	15 years	$75,000
SW 2.2	Vertical Turbine Pump (older)	**C - Fair**	15 years	$50,000
SW 2.3	Raw Water Sample Pump	**F - Failed**	0 years - Failed	$5,000
SW 2.4	Motor Control Center and Variable Frequency Drive (VFD)	**B - Good**	15 years	$30,000
SW 2.5	Raw Water Pump Station Controls	**B - Good**	15 years	$15,000
SW 3	**Raw Water Meter Vault**	**B - Good**	**15 years**	**$30,000**
SW 3.1	Raw Water Meters	**B - Good**	15 years	$7,500
SW 3.2	Raw Water Meter Piping	**B - Good**	30 years	$15,000
SW 3.3	Meter Vault Structure and Housing	**B - Good**	Long term asset	Long Term Asset
SW 4	**Raw Water Splitter Box and Rapid Mixer**	**B - Good**	**15 years**	**$88,000**
SW 4.1	Mechanical Mixers	**C - Fair**	15 years	$55,000
SW 4.2	Splitter Box Structure and Railing	**B - Good**	25 years	$12,000
SW 4.3	Wheel Operated Weir Gates	**B - Good**	30 years	$12,000
SW 4.4	Chemical Injection Piping	**B - Good**	15 years	$4,000
SW 4.5	Rapid Mix Controls	**C - Fair**	15 years	$5,000

ID	Asset Name	Condition Rating	Estimated Remaining Life	Asset Value and Replacement/ Rehabilitation Cost
SW 5	**Solids Contact Clarifiers**	**D - Poor**	**5 years**	**See asset sheet.**
SW 5.1	Clarifier 1	**D - Poor**	5 years	See asset sheet.
SW 5.1.1	Clarifier 1 Structure and Access Bridge	**C - Fair**	5 years	See asset sheet.
SW 5.1.2	Clarifier 1 Weirs	**D - Poor**	5 years	See asset sheet.
SW 5.1.3	Clarifier 1 Sludge Collector, Flights, and Squeegees	**C - Fair**	5 years	See asset sheet.
SW 5.1.4	Clarifier 1 Mixer	**F - Failed**	0 years - Failed	See asset sheet.
SW 5.1.5	Clarifier 1 Mechanical Drive	**C - Fair**	5 years	See asset sheet.
SW 5.1.6	Clarifier 1 Sludge Valve Pneumatic Actuator	**F - Failed**	0 years – Failed	See asset sheet.
SW 5.2	Clarifier 2	**C - Fair**	5 years	See asset sheet.
SW 5.2.1	Clarifier 2 Structure and Access Bridge	**C - Fair**	5 years	See asset sheet.
SW 5.2.2	Clarifier 2 Weirs	**D - Poor**	5 years	See asset sheet.
SW 5.2.3	Clarifier 2 Sludge Collector, Flights, and Squeegees	**C - Fair**	5 years	See asset sheet.
SW 5.2.4	Clarifier 2 Mixer	**C - Fair**	5 years	See asset sheet.
SW 5.2.5	Clarifier 2 Mechanical Drive	**C - Fair**	5 years	See asset sheet.
SW 5.2.6	Clarifier 2 Sludge Valve Pneumatic Actuator	**F - Failed**	0 years – Failed	See asset sheet.
SW 5.3	Clarifier Controls	**C - Fair**	5 years	$50,000
SW 6	**Filter Feed Wet Well**	**B - Good**	**50 years**	**Long term asset**
SW 6.1	Filter Feed Wet Well Structure	**B - Good**	Long term asset	Long term asset
SW 6.2	Filter Feed Wet Well Appurtenances	**B - Good**	15 years	$5,000
SW 6.3	Filter Feed Chemical Injection Points	**B - Good**	15 years	$5,000
SW 6.4	Filter Feed Drain to Sewer	**B - Good**	Long term asset	Long term asset
SW 7	**Filter Feed Pump Station**	**B - Good**	**15 years**	**$145,000**
SW 7.1	Filter Feed Pumps	**B - Good**	15 years	$100,000
SW 7.2	Filter Feed Pumps Piping	**B - Good**	30 years	$20,000
SW 7.3	Filter Feed Sample Pump	**F - Failed**	0 years - Failed	$5,000
SW 7.4	Filter Feed Pump Controls	**C - Fair**	15 years	$20,000
SW 8	**Membrane Building**	**B - Good**	**50 years**	**Long term asset**
SW 8.1	Membrane Building Structure	**B - Good**	Long term asset	Long term asset
SW 8.2	Membrane Building Lab	**B - Good**	15 years	$75,000
SW 8.3	Membrane Building Trenches	**B - Good**	Long term asset	Long term asset
SW 9	**Membrane UF Feed Prefilters**	**B - Good**	**15 years**	**$53,000**
SW 9.1	UF Feed Prefilters	**B - Good**	15 years	$50,000
SW 9.2	Prefilters Piping	**B - Good**	15 years	$3,000
SW 10	**Membrane Filters**	**C - Fair**	**3 years**	**$750,000**
SW 10.1	Membranes	**D - Poor**	3 years	
SW 10.2	Membrane Control Valves	**B - Good**	15 years	$200,000
SW 10.3	Membrane Piping	**B - Good**	15 years	$350,000

ID	Asset Name	Condition Rating	Estimated Remaining Life	Asset Value and Replacement/ Rehabilitation Cost
SW 10.4	Membrane Controls	**C - Fair**	15 years	$200,000
SW 11	**Membrane Clean In Place (CIP) Components**	**B - Good**	**15 years**	**$125,000**
SW 11.1	CIP Station	**B - Good**	15 years	$100,000
SW 11.2	CIP Piping	**B - Good**	15 years	$25,000
SW 12	**Water Softener**	**B - Good**	**15 years**	**$10,000**
SW 12.1	Water Softener	**B - Good**	15 years	$10,000
SW 13	**Membrane Chemical Dose Package**	**B - Good**	**15 years**	**$35,000**
SW 13.1	Chemical Pumps	**B - Good**	15 years	$30,000
SW 13.2	Chemical Piping	**B - Good**	15 years	$5,000
SW 14	**Membrane Compressed Air Package**	**B - Good**	**15 years**	**$13,000**
SW 14.1	Air Compressor	**B - Good**	15 years	$8,000
SW 14.2	Air piping	**B - Good**	15 years	$5,000
SW 15	**Clearwell**	**B - Good**	**50 years**	**Long term asset**
SW 15.1	Clearwell Structure	**B - Good**	Long term asset	Long term asset
SW 15.2	Clearwell Appurtenances	**B - Good**	15 years	$30,000
SW 15.3	Clearwell Baffles	**B - Good**	Long term asset	Long term asset
SW 15.4	Clearwell Controls	**C - Fair**	15 years	$15,000
SW 16	**High Service Pumps Station**	**B - Good**	**15 years**	**$190,000**
SW 16.1	High Service Pumps Station	**B - Good**	15 years	$120,000
SW 16.2	High Service Pump Station Piping	**B - Good**	30 years	$40,000
SW 16.3	High Service Pump Electrical and Controls	**C - Fair**	15 years	$30,000
SW 17	**High Service Pump Meter Vault**	**B - Good**	**15 years**	**$9,000**
SW 17.1	High Service Pump Meter Vault concrete vault	**B - Good**	Long term asset	Long term asset
SW 17.2	High Service Pump Meter	**B - Good**	15 years	$4,000
SW 17.3	High Service Pump Meter Vault Controls	**C - Fair**	15 years	$5,000
SW 18	**Backwash Pump**	**B - Good**	**15 years**	**$135,000**
SW 18.1	Backwash Pump Piping	**B - Good**	15 years	$25,000
SW 18.2	Backwash Pumps	**B - Good**		$80,000
SW 18.3	Backwash Pumps Electrical and VFDs	**B - Good**	15 years	$25,000
SW 18.4	Backwash Pump Controls	**C - Fair**	15 years	$5,000
SW 19	**Backwash Pump Metering Station**	**B - Good**	**15 years**	**$9,000**
SW 19.1	Backwash Pump Meter Installation	**B - Good**	Long term asset	Long term asset.

ID	Asset Name	Condition Rating	Estimated Remaining Life	Asset Value and Replacement/ Rehabilitation Cost
SW 19.2	Backwash Pump Metering Station	**B - Good**	15 years	$4,000
SW 19.3	Backwash Pump Metering Station Controls	**C - Fair**	15 years	$5,000
SW 20	**Chemical Feed System - Chlorine**	**C - Fair**	**15 years**	**$90,000**
SW 20.1	Chlorine Containers	**B - Good**	15 years	$5,000
SW 20.2	Chlorine Injector	**C - Fair**	15 years	$60,000
SW 20.3	Chorine Detectors	**F - Failed**	0 years - Failed	$3,000
SW 20.4	Chlorine Gas Masks	**B - Good**	15 years	$2,000
SW 20.5	Chlorine Gas Feed Controls	**C - Fair**	15 years	$20,000
SW 21	**Chemical Feed System - Alum and Spare**	**B - Good**	**15 years**	**$22,000**
SW 21.1	Alum Storage	**B - Good**	15 years	$12,000
SW 21.2	Alum Metering Pumps	**B - Good**	15 years	$4,000
SW 21.3	Spare Storage	**B - Good**	15 years	$2,000
SW 21.4	Alum Controls	**C - Fair**	15 years	$4,000
SW 22	**Chemical Feed System - Caustic**	**B - Good**	**15 years**	**$22,000**
SW 22.1	Caustic Storage	**B - Good**	15 years	$12,000
SW 22.2	Caustic Metering Pumps	**B - Good**	15 years	$4,000
SW 22.3	Caustic Injection Point	**B - Good**	15 years	$2,000
SW 22.4	Caustic Controls	**C - Fair**	15 years	$4,000
SW 23	**Chemical Feed System - LAS**	**B - Good**	**15 years**	**$22,000**
SW 23.1	LAS Storage	**B - Good**	15 years	$12,000
SW 23.2	LAS Metering Pumps	**B - Good**	15 years	$4,000
SW 23.3	LAS Injection Point	**B - Good**	15 years	$2,000
SW 23.4	LAS Controls	**C - Fair**	15 years	$4,000
SW 24	**Chemical Feed System - Fluoride**	**B - Good**	**15 years**	**$22,000**
SW 24.1	Fluoride Storage	**B - Good**	15 years	$12,000
SW 24.2	Fluoride Metering Pumps	**B - Good**	15 years	$4,000
SW 24.3	Fluoride Injection Point	**B - Good**	15 years	$2,000
SW 24.4	Fluoride Controls	**C - Fair**	15 years	$4,000
SW 25	**Chemical Feed System - NaOCl and Citric Acid**	**B - Good**	**15 years**	**$36,000**
SW 25.1	Fluoride Metering Pumps	**B - Good**	15 years	$4,000
SW 25.2	NaOCl Storage	**B - Good**	15 years	$12,000
SW 25.3	Citric Acid Storage	**B - Good**	15 years	$12,000
SW 25.4	Fluoride Metering Pumps	**B - Good**	15 years	$4,000
SW 25.5	NaOCL and Citric Acid Controls	**C - Fair**	15 years	$4,000
SW 26	**Sludge Thickener**	**B - Good**	**15 years**	**$140,000**
SW 26.1	Sludge Thickener Structure/ Basin	**B - Good**	Long term asset	Long term asset

ID	Asset Name	Condition Rating	Estimated Remaining Life	Asset Value and Replacement/ Rehabilitation Cost
SW 26.2	Sludge Thickener Sludge Rake and Mechanical Drive	**B - Good**	15 years	$120,000
SW 26.3	Sludge Thickener Piping	**B - Good**	Long term asset	Long term asset
SW 26.4	Sludge Thickener Telescoping Valve	**B - Good**	20 years	$4,000
SW 26.5	Sludge Thickener Dewatering Manhole	**B - Good**	15 years	$6,000
SW 26.6	Sludge Thickener Controls	**C - Fair**	15 years	$10,000
SW 27	**Sludge Pump Station**	**B - Good**	**15 years**	**$135,000**
SW 27.1	Sludge Pump Station Building	**B - Good**	Long term asset	Long term asset
SW 27.2	Sludge Pump Station Pumps	**B - Good**	15 years	$80,000
SW 27.3	Sludge Pump Station Sludge Grinder	**B - Good**	15 years	$35,000
SW 27.4	Sludge Pump Station Piping	**B - Good**	15 years	$10,000
SW 27.5	Sludge Pump Station Controls	**C - Fair**	15 years	$10,000
SW 28	**Sludge Dewatering Centrifuge**	**B - Good**	**15 years**	**$390,000**
SW 28.1	Centrifuge Equipment	**B - Good**	15 years	$300,000
SW 28.2	Centrifuge Building	**B - Good**	Long term asset	Long term asset
SW 28.3	Centrifuge Knifegate	**B - Good**	15 years	$40,000
SW 28.4	Centrifuge Polymer System	**B - Good**	15 years	$25,000
SW 28.5	Centrifuge Hoist and Trolley	**B - Good**	30 years	$5,000
SW 28.6	Centrifuge Controls	**C - Fair**	15 years	$20,000
SW 29	**Reclaim Ponds**	**C - Fair**	**25 years**	**$75,000**
SW 29.1	Reclaim Ponds	**C - Fair**	15 years	$50,000
SW 29.2	Reclaim Pond Hydraulic Structures and Associated Piping	**C - Fair**	30 years	$25,000
SW 30	**Decant Return Pump Station**	**B - Good**	**15 years**	**$90,000**
SW 30.1	Decant Return Pump Station Structure	**B - Good**	Long term asset	Long term asset
SW 30.2	Decant Return Pump Station	**B - Good**	15 years	$80,000
SW 30.3	Decant Return Pump Station Controls	**C - Fair**	15 years	$10,000
SW 31	**Decant Return Meter**	**B - Good**	**15 years**	**$10,000**
SW 31.1	Decant Return Meter Vault concrete vault	**B - Good**	Long term asset	Long term asset
SW 31.2	Decant Return Meter	**B - Good**	15 years	$5,000
SW 31.3	Decant Return Meter Controls	**B - Good**	15 years	$5,000
SW 32	**Sewer Lift Station and Sewer Collection System**	**B - Good**	**15 years**	**$100,000**
SW 32.1	Sewer Lift Station Pumps	**B - Good**	15 years	$60,000

ID	Asset Name	Condition Rating	Estimated Remaining Life	Asset Value and Replacement/ Rehabilitation Cost
SW 32.2	Sewer Lift Station Electrical	**B - Good**	15 years	$10,000
SW 32.3	Sewer Lift Station Valve Vault	**B - Good**	30 years	$15,000
SW 32.4	Sewer Lift Station Controls	**B - Good**	15 years	$15,000
SW 32.5	Sewer Collection System	**B - Good**	Long term asset	Long term asset
SW 33	**Neutralization Tank**	**B - Good**	**50 years**	**$36,200**
SW 33.1	Neutralization Tank Structure	**B - Good**	Long term asset	Long term asset
SW 33.2	Neutralization Tank Mixer	**B - Good**	15 years	$25,000
SW 33.3	Neutralization Tank PH Meters	**B - Good**	15 years	$1,200
SW 33.4	Neutralization Tank Solenoid Control Valve	**B - Good**	30 years	$5,000
SW 33.5	Neutralization Tank Controls	**B - Good**	15 years	$5,000
SW 34	**Generator**	**B - Good**	**15 years**	**$160,000**
SW 34.1	Generator	**B - Good**	15 years	$150,000
SW 34.2	Generator Fuel Tank	**B - Good**	15 years	$10,000
SW 35	**Water Treatment Controls**	**C - Fair**	**15 years**	**$675,000**
SW 35.1	SCADA System Computer and Controls	**C - Fair**	15 years	$400,000
35.2	Koch Membrane Controls	**C - Fair**	15 years	$200,000
35.3	Distribution System SCADA controls	**C - Fair**	15 years	$75,000
SW 36	**Old Plant Building and Other Unused Plant Items**	**D - Poor**	**15 years**	**$113,000**
SW 36.1	Old Plant Building	**D - Poor**	15 years	$100,000
SW 36.2	Powdered Activated Carbon Building	**D - Poor**	15 years	-$2,000
SW 36.3	Old Clearwell	**D - Poor**	15 years	$10,000
SW 36.4	Old High Service Pump Station	**D - Poor**	15 years	$5,000

C. Commentary from Inventory Assessment

The inventory assessment reveals that the water treatment plant has multiple components that must be managed and tracked. Many of the existing assets were installed in 2009 and are still at the beginning of their lifespan. With the exception of the controls, the components installed in 2009 are listed in good condition. The assets that were not replaced or rehabilitated in 2009 are the assets that need the most attention such as the Raw Water Intake (SW 1) and the Solids Contact Clarifiers (SW2).

The membrane filters need to be addressed in the short term because the filters they no longer have the capacity they had when at their initial installation. Please refer to Volume I for further details on the membrane performance.

The plant controls were marked as fair condition due to the operator's inability to fully access the SCADA controls. According to the operators, this plant is currently run manually through turning pumps on and off. Further commentary on the controls is contained in Volume I of this report.

Some condition ratings are marked low due to changes that were made to the plant by operations staff after the initial construction. For example the chlorine feed system was changed to a system that no longer regulates injection off flow. While the current system is operating within regulations, the chemical injection rates are dependent on a constant flow.

SECTION II
LEVEL OF SERVICE

This section presents an overview of the existing level of service needed to properly maintain the treatment plant and serve the community with efficient and cost-effective water treatment. The best practices for this section include the following:

- Analyzing current and anticipated customer demand and satisfaction with the system
- Understanding current and anticipated regulatory requirements
- Using level of service standards to track system performance over time

A. Approach for Investigating Current Level of Service

The level of service includes the manner that the infrastructure must be operated to satisfy customer demands. The level of service at a water treatment plant should include the following:

1. WTP operations should meet or exceed all State and Federal regulations, rules, and permits.
2. The WTP should be run in a cost-efficient manner that minimizes the costs to produce a gallon of water.
3. The WTP should operate in a safe manner.

This asset management study approaches level of service from a holistic plant perspective along with stating the level of service needed for each major asset. Performance measures and targets are recommended for the city to track key items. By tracking specific measures, deficiencies can be identified.

B. General Customer Satisfaction Level of Service

From the level of service aims listed above, performance metrics were developed. It is recommended that the city track these items on an annual basis to monitor overall plant performance. The treatment plant level of service performance metrics are recommended as follows.

- *Cost per million gallons water produced:* Cost per million gallons to produce water
- *Maintenance cost per year:* Cost per year spent on maintenance at the WTP
- *Chemical cost per year:* Amount spent in chemicals per year at the WTP

- *Operator safety events per year:* Number of times per year that operators are subjected to unsafe events
- *Hours of overtime per year due to treatment plant emergencies:* The number of hours of overtime needed each year to have the distribution system working properly
- *Number of Boil Water Notices:* Number of times per year a boil water notice must go out due to WTP operations.

Each major asset was given a specific level of service. Since all units are important for the treatment plant operations, the level of service for many of the assets is stated as the requirement to keep the asset operational at all times. Table 4 shows the level of service for each asset.

Table 4. Asset Group Level of Service

ID	Asset Name	Level of Service
SW 1	Raw Water Intake	The raw water intake must be capable of delivering water from the lake to the plant. Only a brief temporary outage may be allowed under emergency conditions.
SW 2	Raw Water Pump Station	The Raw water pump station must have at least two pumps operational at all times. One pump may be out of service for repair or maintenance for brief periods of time.
SW 3	Raw Water Meter Vault	The raw water meter vault needs to remain operational at all time to properly maintain pump controls. Meters may be taken out of service for brief periods of time for annual calibration and repair.
SW 4	Raw Water Splitter Box and Rapid Mixer	The raw water splitter box needs to remain operational at all times.
SW 5	Solids Contact Clarifiers	Solids contact clarifiers shall remain in service at all times.
SW 6	Filter Feed Wet Well	The filter feed well must remain in service 100% of the time to feed the membrane filters.
SW 7	Filter Feed Pump Station	The filter feed pump station must remain in service at all times to feed the membrane filters.
SW 8	Membrane Building	The membrane building shall be kept in clean working order.
SW 9	Membrane UF Feed Prefilters	The prefilters shall remain in service at all times to prevent poor quality water being sent to the membranes.
SW 10	Membrane Filters	The membranes shall remain operational at all times.
SW 11	Membrane Clean In Place (CIP) Components	The CIP shall remain in operation for regularly scheduled CIP cleaning cycle.
SW 12	Water Softener	The water softener shall be operational for the CIP cleaning cycle.
SW 13	Membrane Chemical Dose Package	The membrane chemical dose package shall be operational at all times.

ID	Asset Name	Level of Service
SW 14	Membrane Compressed Air Package	The Membrane Compressed Air Package shall be operational at all times.
SW 15	Clearwell	The Clearwell shall be operational at all times with the ability to send water to the distribution network.
SW 16	High Service Pumps Station	The High Service Pumps Station shall be operational at all times.
SW 17	High Service Pump Meter Vault	The High Service Pump Meter Vault shall be operational at all times. Times when this unit is non-operation should be limited.
SW 18	Backwash Pump	The Backwash Pump shall be operational at all times.
SW 19	Backwash Pump Metering Station	The Backwash Pump Metering Station shall be operational at all times. Times when this unit is non-operation should be limited.
SW 20	Chemical Feed System - Chlorine	The Chemical Feed System - Chlorine shall be operational at all times.
SW 21	Chemical Feed System - Alum and Spare	The Chemical Feed System - Alum and Spare shall be operational at all times.
SW 22	Chemical Feed System - Caustic	The Chemical Feed System - Caustic shall be operational at all times.
SW 23	Chemical Feed System - LAS	The Chemical Feed System - LAS shall be operational at all times.
SW 24	Chemical Feed System - Fluoride	The Fluoride injection should remain in service as deemed necessary by the city.
SW 25	Chemical Feed System - NaOCl and Citric Acid	The Chemical Feed System - NaOCl and Citric Acid shall be operational at all times.
SW 26	Sludge Thickener	The Sludge Thickener shall be operational at all times.
SW 27	Sludge Pump Station	Since this unit is not primarily being used, the sludge pump station needs to remain operational through periodic operations.
SW 28	Sludge Dewatering Centrifuge	Since this unit is not primarily being used, the centrifuge needs to remain operational through periodic operations.
SW 29	Reclaim Ponds	The Reclaim Ponds shall be operational at all times.
SW 30	Decant Return Pump Station	The raw water meter vault needs to remain operational at all time to properly maintain pump controls. This unit may be taken out of service for brief periods of time for annual calibration and repair.
SW 31	Decant Return Meter	The raw water meter vault needs to remain operational at all time to properly maintain pump controls. This unit may be taken out of service for brief periods of time for annual calibration and repair.
SW 32	Sewer Lift Station and Sewer Collection System	The Sewer Lift Station and Sewer Collection System shall be operational at all times.
SW 33	Neutralization Tank	The Neutralization Tank shall be operational at all times.
SW 34	Generator	The Generator shall be operational at all times.

ID	Asset Name	Level of Service
SW 35	Water Treatment Controls	The Water Treatment Controls shall be operational at all times.
SW 36	Old Plant Building and Other Unused Plant Items	The existing unused plant items need to be up kept to ensure they do not harbor vectors.

SECTION III
CRITICAL ASSETS

This section presents an overview of the criticality ratings given to each asset. These ratings were determined based on how important the asset is to plant operations and performance. The best management practices for this section include listing assets according to how critical they are to system operations, analyzing failure risk and consequences, and reviewing and updating the system's vulnerability assessment.

The detailed asset summary is included in Appendix B and should be consulted for full details on each asset's criticality. A summary of the findings is presented in this section.

A. Developing a Criticality Assessment Rating System

A system has been developed to determine how critical each asset is to the overall treatment plant operations. By using this rating system, the city can determine the unit's importance to the overall treatment scheme. In general, non-essential assets are available to benefit the operations, but the plant will remain functional without these components or units. Highly critical assets are required for treatment plant operations and have major consequences if they do not remain operational. The criticality of each asset was determined using a 1-5 rating system as outlined in Table 5.

Table 5. Criticality Assessment Rating System

1 - Non-Essential	Operation for the facility could continue on indefinitely without this unit
2 - Essential	While the facility would be able to operate without this unit, the unit's non-operation would place stress on other treatment components (no loss in production)
3 - Highly Essential	While the facility would be able to operate without this unit, the unit's non-operation would place stress on other treatment components (loss in production)
4 - Critical	Failure of this unit would result in regulation non-compliance, water can still be produced
5 - Highly Critical	Failure of this unit would result in regulation non-compliance, customers cannot be served

The criticality rating is intended to be used along with the condition rating system developed in the asset inventory. The color coding indicates the importance of the condition; criticality with red is shown as the most important and green as the least. In the case that an orange condition rating (D-Poor) is paired with a red criticality (5-Highly Critical), the asset should be flagged for repairs or upgrades. The criticality rating can also be used in regular operations to help prioritize competing activities.

When assigning criticality ratings, redundancy is taken into account. When multiple units are available for operations, one unit may become non-functional and removed from service without affecting the plant operations. A lower criticality rating is given for units that have redundancy. When redundancy exists, it is still necessary for the unit to be repaired in a timely manner to reduce the risk of multiple units being out of service at the same time.

B. Water Treatment Plant Criticality

Table 6 shows the criticality assessment for the assets at the WTP. For full criticality comments, refer to the asset sheets contained in Appendix B.

Table 6. Surface Water Treatment Plant Criticality Assessment (Summary)

ID	Asset Name	Condition Rating	Criticality Rating	Estimated Remaining Life
SW 1	Raw Water Intake	C - Fair	5 - Highly Critical	15 years
SW 2	Raw Water Pump Station	B - Good	3 - Highly Essential	15 years
SW 3	Raw Water Meter Vault	B - Good	2 - Essential	15 years
SW 4	Raw Water Splitter Box and Rapid Mixer	B - Good	3 - Highly Essential	15 years
SW 5	Solids Contact Clarifiers	D - Poor	5 - Highly Critical	5 years
SW 6	Filter Feed Wet Well	B - Good	5 - Highly Critical	50 years
SW 7	Filter Feed Pump Station	B - Good	5 - Highly Critical	15 years
SW 8	Membrane Building	B - Good	4 - Critical	50 years
SW 9	Membrane UF Feed Prefilters	B - Good	3 - Highly Essential	15 years
SW 10	Membrane Filters	C - Fair	5 - Highly Critical	3 years
SW 11	Membrane Clean In Place (CIP) Components	B - Good	4 - Critical	15 years
SW 12	Water Softener	B - Good	4 - Critical	15 years
SW 13	Membrane Chemical Dose Package	B - Good	4 - Critical	15 years
SW 14	Membrane Compressed Air Package	B - Good	4 - Critical	15 years
SW 15	Clearwell	B - Good	5 - Highly Critical	50 years
SW 16	High Service Pumps Station	B - Good	5 - Highly Critical	15 years
SW 17	High Service Pump Meter Vault	B - Good	2 - Essential	15 years
SW 18	Backwash Pump	B - Good	5 - Highly Critical	15 years
SW 19	Backwash Pump Metering Station	B - Good	5 - Highly Critical	15 years
SW 20	Chemical Feed System - Chlorine	C - Fair	4 - Critical	15 years
SW 21	Chemical Feed System - Alum and Spare	B - Good	4 - Critical	15 years

ID	Asset Name	Condition Rating	Criticality Rating	Estimated Remaining Life
SW 22	Chemical Feed System - Caustic	B - Good	4 - Critical	15 years
SW 23	Chemical Feed System - LAS	B - Good	4 - Critical	15 years
SW 24	Chemical Feed System - Fluoride	B - Good	1 - Non-Essential	15 years
SW 25	Chemical Feed System - NaOCl and Citric Acid	B - Good	4 - Critical	15 years
SW 26	Sludge Thickener	B - Good	3 - Highly Essential	15 years
SW 27	Sludge Pump Station	B - Good	1 - Non-Essential	15 years
SW 28	Sludge Dewatering Centrifuge	B - Good	1 - Non-Essential	15 years
SW 29	Reclaim Ponds	C - Fair	3 - Highly Essential	25 years
SW 30	Decant Return Pump Station	B - Good	2 - Essential	15 years
SW 31	Decant Return Meter	B - Good	2 - Essential	15 years
SW 32	Sewer Lift Station and Sewer Collection System	B - Good	4 - Critical	15 years
SW 33	Neutralization Tank	B - Good	2 - Essential	50 years
SW 34	Generator	B - Good	4 - Critical	15 years
SW 35	Water Treatment Controls	C - Fair	4 - Critical	15 years
SW 36	Old Plant Building and Other Unused Plant Items	D - Poor	1 - Non-Essential	15 years

Table 7. Surface Water Treatment Plant Criticality Assessment (Detailed)

ID	Asset Name	Condition Rating	Criticality Rating	Estimated Remaining Life
SW 1	**Raw Water Intake**	**C - Fair**	**5 - Highly Critical**	**15 years**
SW 1.1	Intake Structure - Reinforced Concrete	**C - Fair**	**5 - Highly Critical**	Long Term Asset
SW 1.2	Intake Structure Gates	**F - Failed**	**2 - Essential**	0 years - Failed
SW 1.3	Intake Structure Pipe Conduit	**D - Poor**	**5 - Highly Critical**	Uncertain
SW 1.4	Intake Structure Ladder (inside and out)	**F - Failed**	**1 - Non-Essential**	0 years - Failed
SW 1.5	Dam Intake Area	**D - Poor**	**2 - Essential**	15 years
SW 2	**Raw Water Pump Station**	**B - Good**	**3 - Highly Essential**	**15 years**
SW 2.1	Vertical Turbine Pump (2 pumps-2009)	**B - Good**	**3 - Highly Essential**	15 years
SW 2.2	Vertical Turbine Pump (older)	**C - Fair**	**3 - Highly Essential**	15 years
SW 2.3	Raw Water Sample Pump	**F - Failed**	**1 - Non-Essential**	0 years - Failed
SW 2.4	Motor Control Center and Variable Frequency Drive (VFD)	**B - Good**	**3 - Highly Essential**	15 years
SW 2.5	Raw Water Pump Station Controls	**B - Good**	**2 - Essential**	15 years
SW 3	**Raw Water Meter Vault**	**B - Good**	**2 - Essential**	**15 years**
SW 3.1	Raw Water Meters	**B - Good**	**2 - Essential**	15 years
SW 3.2	Raw Water Meter Piping	**B - Good**	**3 - Highly Essential**	30 years

ID	Asset Name	Condition Rating	Criticality Rating	Estimated Remaining Life
SW 3.3	Meter Vault Structure and Housing	**B - Good**	**2 - Essential**	Long term asset
SW 4	**Raw Water Splitter Box and Rapid Mixer**	**B - Good**	**3 - Highly Essential**	**15 years**
SW 4.1	Mechanical Mixers	**C - Fair**	**3 - Highly Essential**	15 years
SW 4.2	Splitter Box Structure and Railing	**B - Good**	**3 - Highly Essential**	25 years
SW 4.3	Wheel Operated Weir Gates	**B - Good**	**2 - Essential**	30 years
SW 4.4	Chemical Injection Piping	**B - Good**	**3 - Highly Essential**	15 years
SW 4.5	Rapid Mix Controls	**C - Fair**	**3 - Highly Essential**	15 years
SW 5	**Solids Contact Clarifiers**	**D - Poor**	**5 - Highly Critical**	**5 years**
SW 5.1	Clarifier 1	**D - Poor**	**3 - Highly Essential**	5 years
SW 5.1.1	Clarifier 1 Structure and Access Bridge	**C - Fair**	**3 - Highly Essential**	5 years
SW 5.1.2	Clarifier 1 Weirs	**D - Poor**	**3 - Highly Essential**	5 years
SW 5.1.3	Clarifier 1 Sludge Collector, Flights, and Squeegees	**C - Fair**	**3 - Highly Essential**	5 years
SW 5.1.4	Clarifier 1 Mixer	**F - Failed**	**3 - Highly Essential**	0 years - Failed
SW 5.1.5	Clarifier 1 Mechanical Drive	**C - Fair**	**3 - Highly Essential**	5 years
SW 5.1.6	Clarifier 1 Sludge Valve Pneumatic Actuator	**F - Failed**	**1 - Non-Essential**	0 years - Failed
SW 5.2	Clarifier 2	**C - Fair**	**3 - Highly Essential**	5 years
SW 5.2.1	Clarifier 2 Structure and Access Bridge	**C - Fair**	**3 - Highly Essential**	5 years
SW 5.2.2	Clarifier 2 Weirs	**D - Poor**	**3 - Highly Essential**	5 years
SW 5.2.3	Clarifier 2 Sludge Collector, Flights, and Squeegees	**C - Fair**	**3 - Highly Essential**	5 years
SW 5.2.4	Clarifier 2 Mixer	**C - Fair**	**3 - Highly Essential**	5 years
SW 5.2.5	Clarifier 2 Mechanical Drive	**C - Fair**	**3 - Highly Essential**	5 years
SW 5.2.6	Clarifier 2 Sludge Valve Pneumatic Actuator	**F - Failed**	**1 - Non-Essential**	0 years - Failed
SW 5.3	Clarifier Controls	**C - Fair**	**2 - Essential**	5 years
SW 6	**Filter Feed Wet Well**	**B - Good**	**5 - Highly Critical**	**50 years**
SW 6.1	Filter Feed Wet Well Structure	**B - Good**	**5 - Highly Critical**	Long term asset
SW 6.2	Filter Feed Wet Well Appurtenances	**B - Good**	**4 - Critical**	15 years
SW 6.3	Filter Feed Chemical Injection Points	**B - Good**	**4 - Critical**	15 years
SW 6.4	Filter Feed Drain to Sewer	**B - Good**	**1 - Non-Essential**	Long term asset
SW 7	**Filter Feed Pump Station**	**B - Good**	**5 - Highly Critical**	**15 years**
SW 7.1	Filter Feed Pumps	**B - Good**	**3 - Highly Essential**	15 years
SW 7.2	Filter Feed Pumps Piping	**B - Good**	**3 - Highly Essential**	30 years
SW 7.3	Filter Feed Sample Pump	**F - Failed**	**1 - Non-Essential**	0 years - Failed
SW 7.4	Filter Feed Pump Controls	**C - Fair**	**3 - Highly Essential**	15 years
SW 8	**Membrane Building**	**B - Good**	**4 - Critical**	**50 years**
SW 8.1	Membrane Building Structure	**B - Good**	**4 - Critical**	Long term asset
SW 8.2	Membrane Building Lab	**B - Good**	**4 - Critical**	15 years

ID	Asset Name	Condition Rating	Criticality Rating	Estimated Remaining Life
SW 8.3	Membrane Building Trenches	B - Good	5 - Highly Critical	Long term asset
SW 9	**Membrane UF Feed Prefilters**	**B - Good**	**3 - Highly Essential**	**15 years**
SW 9.1	UF Feed Prefilters	B - Good	3 - Highly Essential	15 years
SW 9.2	Prefilters Piping	B - Good	3 - Highly Essential	15 years
SW 10	**Membrane Filters**	**C - Fair**	**5 - Highly Critical**	**3 years**
SW 10.1	Membranes	D - Poor	5 - Highly Critical	3 years
SW 10.2	Membrane Control Valves	B - Good	5 - Highly Critical	15 years
SW 10.3	Membrane Piping	B - Good	5 - Highly Critical	15 years
SW 10.4	Membrane Controls	C - Fair	5 - Highly Critical	15 years
SW 11	**Membrane Clean In Place (CIP) Components**	**B - Good**	**4 - Critical**	**15 years**
SW 11.1	CIP Station	B - Good	4 - Critical	15 years
SW 11.2	CIP Piping	B - Good	4 - Critical	15 years
SW 12	**Water Softener**	**B - Good**	**4 - Critical**	**15 years**
SW 12.1	Water Softener	B - Good	4 - Critical	15 years
SW 13	**Membrane Chemical Dose Package**	**B - Good**	**4 - Critical**	**15 years**
SW 13.1	Chemical Pumps	B - Good	4 - Critical	15 years
SW 13.2	Chemical Piping	B - Good	4 - Critical	15 years
SW 14	**Membrane Compressed Air Package**	**B - Good**	**4 - Critical**	**15 years**
SW 14.1	Air Compressor	B - Good	4 - Critical	15 years
SW 14.2	Air piping	B - Good	4 - Critical	15 years
SW 15	**Clearwell**	**B - Good**	**5 - Highly Critical**	**50 years**
SW 15.1	Clearwell Structure	B - Good	5 - Highly Critical	Long term asset
SW 15.2	Clearwell Appurtenances	B - Good	4 - Critical	15 years
SW 15.3	Clearwell Baffles	B - Good	4 - Critical	Long term asset
SW 15.4	Clearwell Controls	C - Fair	3 - Highly Essential	15 years
SW 16	**High Service Pumps Station**	**B - Good**	**5 - Highly Critical**	**15 years**
SW 16.1	High Service Pumps Station	B - Good	3 - Highly Essential	15 years
SW 16.2	High Service Pump Station Piping	B - Good	3 - Highly Essential	30 years
SW 16.3	High Service Pump Electrical and Controls	C - Fair	3 - Highly Essential	15 years
SW 17	**High Service Pump Meter Vault**	**B - Good**	**2 - Essential**	**15 years**
SW 17.1	High Service Pump Meter Vault concrete vault	B - Good	2 - Essential	Long term asset
SW 17.2	High Service Pump Meter	B - Good	2 - Essential	15 years
SW 17.3	High Service Pump Meter Vault Controls	C - Fair	3 - Highly Essential	15 years
SW 18	**Backwash Pump**	**B - Good**	**5 - Highly Critical**	**15 years**
SW 18.1	Backwash Pump Piping	B - Good	3 - Highly Essential	15 years
SW 18.2	Backwash Pumps	B - Good	3 - Highly Essential	
SW 18.3	Backwash Pumps Electrical and VFDs	B - Good	5 - Highly Critical	15 years

ID	Asset Name	Condition Rating	Criticality Rating	Estimated Remaining Life
SW 18.4	Backwash Pump Controls	C - Fair	4 - Critical	15 years
SW 19	**Backwash Pump Metering Station**	**B - Good**	**5 - Highly Critical**	**15 years**
SW 19.1	Backwash Pump Meter Installation	B - Good	5 - Highly Critical	Long term asset
SW 19.2	Backwash Pump Metering Station	B - Good	5 - Highly Critical	15 years
SW 19.3	Backwash Pump Metering Station Controls	C - Fair	5 - Highly Critical	15 years
SW 20	**Chemical Feed System - Chlorine**	**C - Fair**	**4 - Critical**	**15 years**
SW 20.1	Chlorine Containers	B - Good	4 - Critical	15 years
SW 20.2	Chlorine Injector	C - Fair	4 - Critical	15 years
SW 20.3	Chorine Detectors	F - Failed	2 - Essential	0 years - Failed
SW 20.4	Chlorine Gas Masks	B - Good	4 - Critical	15 years
SW 20.5	Chlorine Gas Feed Controls	C - Fair	4 - Critical	15 years
SW 21	**Chemical Feed System - Alum and Spare**	**B - Good**	**4 - Critical**	**15 years**
SW 21.1	Alum Storage	B - Good	4 - Critical	15 years
SW 21.2	Alum Metering Pumps	B - Good	4 - Critical	15 years
SW 21.3	Spare Storage	B - Good	1 - Non-Essential	15 years
SW 21.4	Alum Controls	C - Fair	3 - Highly Essential	15 years
SW 22	**Chemical Feed System - Caustic**	**B - Good**	**4 - Critical**	**15 years**
SW 22.1	Caustic Storage	B - Good	4 - Critical	15 years
SW 22.2	Caustic Metering Pumps	B - Good	4 - Critical	15 years
SW 22.3	Caustic Injection Point	B - Good	4 - Critical	15 years
SW 22.4	Caustic Controls	C - Fair	3 - Highly Essential	15 years
SW 23	**Chemical Feed System - LAS**	**B - Good**	**4 - Critical**	**15 years**
SW 23.1	LAS Storage	B - Good	4 - Critical	15 years
SW 23.2	LAS Metering Pumps	B - Good	4 - Critical	15 years
SW 23.3	LAS Injection Point	B - Good	4 - Critical	15 years
SW 23.4	LAS Controls	C - Fair	3 - Highly Essential	15 years
SW 24	**Chemical Feed System - Fluoride**	**B - Good**	**1 - Non-Essential**	**15 years**
SW 24.1	Fluoride Storage	B - Good	1 - Non-Essential	15 years
SW 24.2	Fluoride Metering Pumps	B - Good	1 - Non-Essential	15 years
SW 24.3	Fluoride Injection Point	B - Good	1 - Non-Essential	15 years
SW 24.4	Fluoride Controls	C - Fair	3 - Highly Essential	15 years
SW 25	**Chemical Feed System - NaOCl and Citric Acid**	**B - Good**	**4 - Critical**	**15 years**
SW 25.1	Fluoride Metering Pumps	B - Good	4 - Critical	15 years
SW 25.2	NaOCl Storage	B - Good	4 - Critical	15 years
SW 25.3	Citric Acid Storage	B - Good	4 - Critical	15 years
SW 25.4	Fluoride Metering Pumps	B - Good	4 - Critical	15 years
SW 25.5	NaOCL and Citric Acid Controls	C - Fair	3 - Highly Essential	15 years

ID	Asset Name	Condition Rating	Criticality Rating	Estimated Remaining Life
SW 26	**Sludge Thickener**	**B - Good**	**3 - Highly Essential**	**15 years**
SW 26.1	Sludge Thickener Structure/ Basin	**B - Good**	**3 - Highly Essential**	Long term asset
SW 26.2	Sludge Thickener Sludge Rake and Mechanical Drive	**B - Good**	**3 - Highly Essential**	15 years
SW 26.3	Sludge Thickener Piping	**B - Good**	**3 - Highly Essential**	Long term asset
SW 26.4	Sludge Thickener Telescoping Valve	**B - Good**	**3 - Highly Essential**	20 years
SW 26.5	Sludge Thickener Dewatering Manhole	**B - Good**	**2 - Essential**	15 years
SW 26.6	Sludge Thickener Controls	**C - Fair**	**3 - Highly Essential**	15 years
SW 27	**Sludge Pump Station**	**B - Good**	**1 - Non-Essential**	**15 years**
SW 27.1	Sludge Pump Station Building	**B - Good**	**1 - Non-Essential**	Long term asset
SW 27.2	Sludge Pump Station Pumps	**B - Good**	**1 - Non-Essential**	15 years
SW 27.3	Sludge Pump Station Sludge Grinder	**B - Good**	**1 - Non-Essential**	15 years
SW 27.4	Sludge Pump Station Piping	**B - Good**	**1 - Non-Essential**	15 years
SW 27.5	Sludge Pump Station Controls	**C - Fair**	**1 - Non-Essential**	15 years
SW 28	**Sludge Dewatering Centrifuge**	**B - Good**	**1 - Non-Essential**	**15 years**
SW 28.1	Centrifuge Equipment	**B - Good**	**1 - Non-Essential**	15 years
SW 28.2	Centrifuge Building	**B - Good**	**2 - Non-Essential**	Long term asset
SW 28.3	Centrifuge Knifegate	**B - Good**	**3 - Non-Essential**	15 years
SW 28.4	Centrifuge Polymer System	**B - Good**	**1 - Non-Essential**	15 years
SW 28.5	Centrifuge Hoist and Trolley	**B - Good**	**1 - Non-Essential**	30 years
SW 28.6	Centrifuge Controls	**C - Fair**	**1 - Non-Essential**	15 years
SW 29	**Reclaim Ponds**	**C - Fair**	**3 - Highly Essential**	**25 years**
SW 29.1	Reclaim Ponds	**C - Fair**	**3 - Highly Essential**	15 years
SW 29.2	Reclaim Pond Hydraulic Structures and Associated Piping	**C - Fair**		30 years
SW 30	**Decant Return Pump Station**	**B - Good**	**2 - Essential**	**15 years**
SW 30.1	Decant Return Pump Station Structure	**B - Good**	**2 - Essential**	Long term asset
SW 30.2	Decant Return Pump Station	**B - Good**	**2 - Essential**	15 years
SW 30.3	Decant Return Pump Station Controls	**C - Fair**	**2 - Essential**	15 years
SW 31	**Decant Return Meter**	**B - Good**	**2 - Essential**	**15 years**
SW 31.1	Decant Return Meter Vault concrete vault	**B - Good**	**2 - Essential**	Long term asset
SW 31.2	Decant Return Meter	**B - Good**	**2 - Essential**	15 years
SW 31.3	Decant Return Meter Controls	**B - Good**	**2 - Essential**	15 years
SW 32	**Sewer Lift Station and Sewer Collection System**	**B - Good**	**4 - Critical**	**15 years**

ID	Asset Name	Condition Rating	Criticality Rating	Estimated Remaining Life
SW 32.1	Sewer Lift Station Pumps	**B - Good**	**3 - Highly Essential**	15 years
SW 32.2	Sewer Lift Station Electrical	**B - Good**	**3 - Highly Essential**	15 years
SW 32.3	Sewer Lift Station Valve Vault	**B - Good**	**3 - Highly Essential**	30 years
SW 32.4	Sewer Lift Station Controls	**B - Good**	**3 - Highly Essential**	15 years
SW 32.5	Sewer Collection System	**B - Good**	**3 - Highly Essential**	Long term asset
SW 33	**Neutralization Tank**	**B - Good**	**2 - Essential**	**50 years**
SW 33.1	Neutralization Tank Structure	**B - Good**	**2 - Essential**	Long term asset
SW 33.2	Neutralization Tank Mixer	**B - Good**	**2 - Essential**	15 years
SW 33.3	Neutralization Tank PH Meters	**B - Good**	**2 - Essential**	15 years
SW 33.4	Neutralization Tank Solenoid Control Valve	**B - Good**	**2 - Essential**	30 years
SW 33.5	Neutralization Tank Controls	**B - Good**	**2 - Essential**	15 years
SW 34	**Generator**	**B - Good**	**4 - Critical**	**15 years**
SW 34.1	Generator	**B - Good**	**4 - Critical**	15 years
SW 34.2	Generator Fuel Tank	**B - Good**	**4 - Critical**	15 years
SW 35	**Water Treatment Controls**	**C - Fair**	**4 - Critical**	**15 years**
SW 35.1	SCADA System Computer and Controls	**C - Fair**	**4 - Critical**	15 years
35.2	Koch Membrane Controls	**C - Fair**	**5 - Highly Critical**	15 years
35.3	Distribution System SCADA controls	**C - Fair**	**4 - Critical**	15 years
SW 36	**Old Plant Building and Other Unused Plant Items**	**D - Poor**	**1 - Non-Essential**	**15 years**
SW 36.1	Old Plant Building	**D - Poor**	**1 - Non-Essential**	15 years
SW 36.2	Powdered Activated Carbon Building	**D - Poor**	**1 - Non-Essential**	15 years
SW 36.3	Old Clearwell	**D - Poor**	**1 - Non-Essential**	15 years
SW 36.4	Old High Service Pump Station	**D - Poor**	**1 - Non-Essential**	15 years

After completing the criticality assessment, the following conclusions can be drawn:

1. The membranes are at the heart of the plant and are therefore one of the most critical components at the plant. Therefore, since the membranes are listed as a highly critical asset in poor condition, the city needs to undertake plans to replace the filters.

2. The intake structure is another major area of concern because the asset is listed as highly critical and in fair condition. The intake condition needs to be closely monitored.

3. As discussed in Volume I of this report, the solids contact clarifiers are a poor condition highly critical asset that require attention.

4. Some assets are listed as failed non-essential assets due to other means that the city has means to complete the task the failed asset is intended to complete.

5. Because the city uses sludge land application as the primary means to dispose water treatment plant sludge, the sludge pump station and centrifuge are non-essential. In the event that the sludge land application permit is not renewed this equipment will become critical.

6. As discussed in Volume I, the water treatment plant controls need modified to allow operator access.

SECTION IV
MINIMUM LIFE CYCLE COSTS

This section presents an overview of the existing minimum life cycle costs for the assets studied. The best practices for this section include: moving from reactive maintenance to predictive maintenance, knowing the costs and benefits of rehabilitation versus replacement, looking at lifecycle costs (especially for critical assets), deploying resources based on asset conditions, and analyzing the causes of asset failure to develop specific response plans.

A. Current Treatment Plant Expenditures

In order to arrive at a minimum life cycle cost for the WTP, the current expenditures were analyzed. From the accounting software, the city was able to provide a list of expenditures based on the budgeted items. This review studies the actual expenditures. On average, the city has been spending $918,000 per year on the water treatment plant expenditures. Table 8 and Figure 1 reveal the major expenditures at the WTP and sewer system. Table 9 presents the detailed budgeted items.

Table 8. Sewer Expenditures Overview (2011-2014)

Budget Item	Average (2010-2014)	Percent Total
Personnel	$225,115	24.5%
Chemicals	$153,058	16.7%
Electricity	$126,557	13.8%
Water Rights Brazos	$69,548	7.6%
Vehicles, Building, Equipment Repairs + Machinery/Equip	$40,037	4.4%
Other	$303,758	33.1%
Total	*$918,073*	*100.00%*

Figure 1. Water Treatment Expenditures (2011-2014)

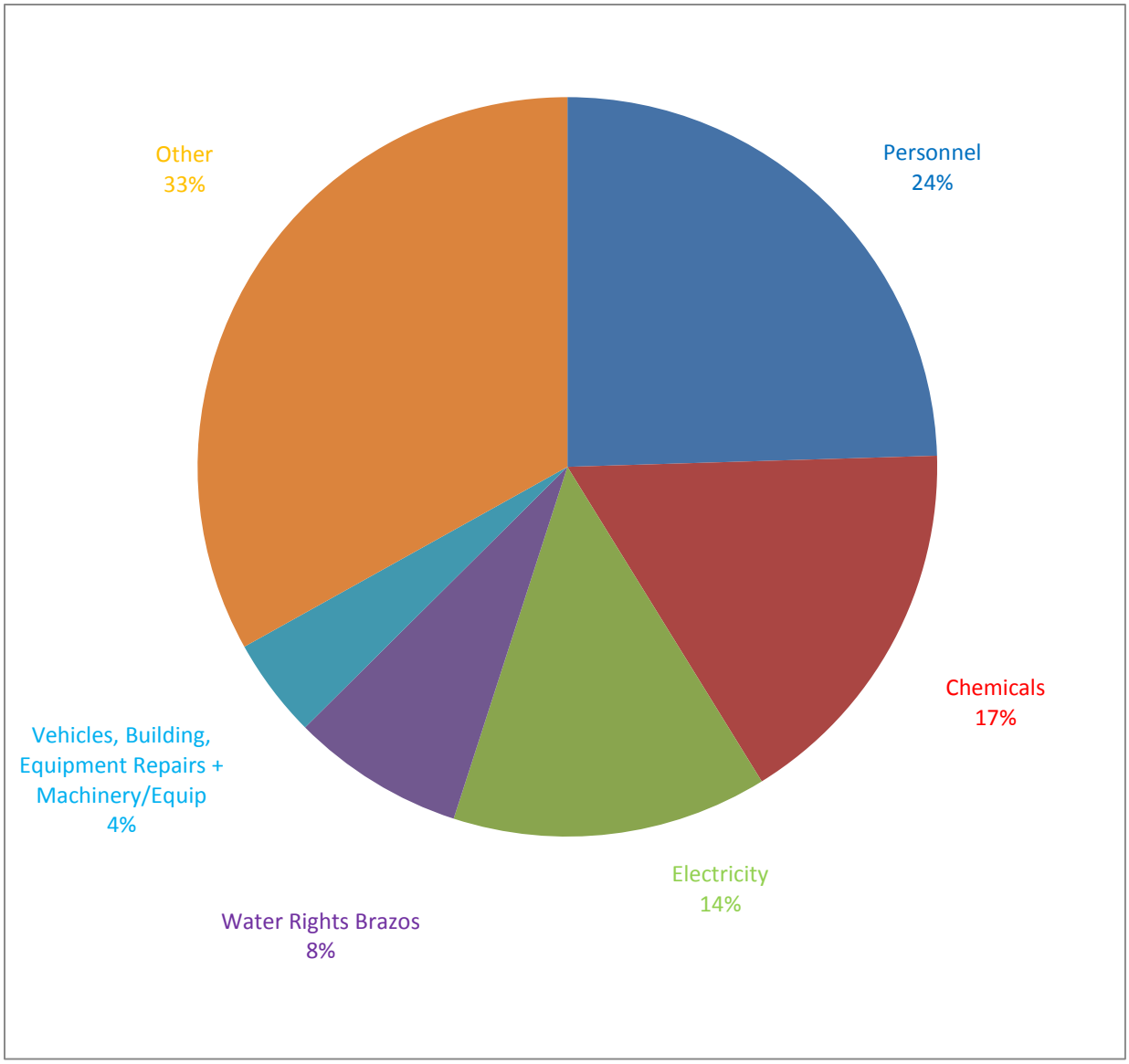


Table 9. Water Treatment Expenditures Overview

Budget Item	2010 Cost ($)	2011 Cost ($)	2012 Cost ($)	2013 Cost ($)	2014 Cost ($)	Average	Percent Total
Personnel	267,263	269,138	238,377	207,344	205,527	225,115	24.5%
Office Supplies/Postage	440	390	171	412	789	487	0.1%
Chemicals	189,450	301,104	89,806	118,326	133,826	153,058	16.7%
Gas & Oil	3,679	5,492	3,736	1,715	1,213	3,083	0.3%
General Supplies	2,880	7,655	3,339	3,729	2,241	4,330	0.5%
Uniforms	281	1,919	1,658	1,046	796	1,133	0.1%
Advertising	472	51	101	1,057	768	463	0.1%
Contractual Services	975	2,815	3,426	50,884	6,217	16,392	1.8%
Engineering	12,728	5,159	5,148	17,619	0	6,059	0.7%
Personnel Training	1,428	2,251	735	1,556	907	1,862	0.2%
Dues	1,510	1,250	127	820	315	769	0.1%
Telephone	2,447	2,035	2,167	2,594	2,227	2,189	0.2%
Electricity	127,878	142,033	152,481	120,277	131,772	126,557	13.8%
Vehicle Repair	388	1,074	134	1,463	29	755	0.1%
Building Repair	592	541	730	3,106	500	1,327	0.1%
Equipment Repair	8,279	7,758	36,389	24,491	44,979	22,550	2.5%
Sample Testing Fees	14,542	12,306	7,696	15,539	19,181	12,889	1.4%
Water Rights Brazos	66,074	76,500	76,551	78,154	82,369	69,548	7.6%
Administrative	876	3,214	1,674	1,474	9,279	2,755	0.3%
Agreed Order	47,534	14,616	14,202	1,217	0	11,966	1.3%
Building & Grounds	33,921	28,264	12,550	14,421	6,906	14,265	1.6%
Machinery/Equip	2,522	23,598	25,617	12,181	13,046	15,405	1.7%
Total	*1,053,419*	*1,178,301*	*915,190*	*886,770*	*868,415*	*918,073*	*100.0%*

After reviewing the 2011-2014 expenditures, the following can be concluded:

1. Personnel, electricity, and chemicals are over half the annual sewer expenditures. Cost reduction through increased efficiencies in these areas has the greatest ability to reduce annual costs.

2. Equipment repairs at the water treatment plant and lift stations are less than 5% of the total expenditures. There is a low cost allotted for equipment repairs.

3. Major capital expenses completed through TWDB loans are located in separate budget categories.

B. Minimum Life Cycle Costs Based on Asset Condition and Criticality

In reviewing the summary condition and criticality charts, the following recommendations should be used as a guide to arrive at a minimum life cycle cost:

1. The process to replace the membranes will need to begin to ensure the plant flow capacity does not decrease to an unacceptable level. As discussed in

Volume I of this report, discussions with TCEQ on membrane replacement will need to begin as soon as possible to allow for sufficient time for the regulatory approval process.

2. Since chemicals are a major expenditure, completing flow paced chemical injection has the ability to reduce chemical consumption. See Volume I for further commentary on chemical usage.

3. Electrical consumption is a major expense at the treatment plant. Electrical usage for each plant component needs to be closely monitored to ensure equipment is operating efficiently.

4. The water treatment plant controls are currently set for manual operation. Completing the controls recommendations in Volume I will allow the operators to automate certain units.

5. As discussed in earlier items, short term project should be scheduled to allow the plant to gain operational efficiencies. The city should use the concepts of condition, criticality and lifespan to complete improvement projects along with consulting Volume I of this report. Short term projects for consideration should include:
    a. Controls improvements
    b. Chemical flow pacing
    c. Clarifier upgrades
    d. Intake structure

6. The city should continue to maintain sludge land application permit while also intermittently operating the sludge pump station and centrifuge. By using the sludge land application permit, the city reduces electrical consumption and chemical use. The sludge pump station and centrifuge need to be operated to remain functional.

7. The city will need to anticipate an increased expenses in mechanical repairs due to aging assets. Most likely, the lower machinery equipment repair costs are due to the plant undergoing a major replacement in 2009. As the equipment installed in 2009 ages, the costs for repairs will increase. Deferred maintenance will result in higher long term costs and decreased plant production and/or efficiencies.

8. Long-term assets must be maintained to ensure their life spans do not prematurely decrease. The long-term assets at the plant include tank, concrete structures, and buildings.

9. Long-range financial planning should anticipate major expenditures at the plant to replace equipment installed in 2009 in about 15 years. By keeping accurate records on equipment performance now, the equipment replacement may be correctly prioritized.

SECTION V
LONG TERM FUNDING PLANNING

This section presents an overview of the existing long-term funding planning. This report takes the approach that the city must ultimately develop the most appropriate funding strategy based on local considerations and constraints. Therefore, this section does not present a funding plan but instead provides commentary for the city to develop such a plan. The strategies the EPA has suggested to consider for this section are: revising the rate structure, funding a dedicated reserve from current revenues (i.e. creating an asset annuity), financing asset rehabilitation, repair, and replacement through borrowing or other financial assistance.

A. Strategies Available for Long-Term Funding

The previous four sections culminate with a long-term funding plan. This plan will need to address both efficiency recommendations to optimize operations and large capital expenses needed to complete upgrades. The previous section on minimum life cycle costs provides the optimal recommendations for lowering WTP costs. In the case that upgrades are delayed or maintenance is deferred, the WTP may be at additional risk for infrastructure failure.

The EPA identifies considerations that city should entertain when developing a long-term funding plan. These include revising the rate structure, funding a dedicated reserve fund, and pursing financial assistance. Each of these strategies are outlined below for consideration. Since the long-term funding plan must be developed by the city, these strategies are intended to be presented objectively and are for reference only.

Revise the Rate Structure

By revising the water rate structure, the city may receive additional revenue to fund improvements. Revising the rate structure is most appropriate when items are underfunded. When completing any revisions to the rate structure, it is best to use a rate consultant to fully understand the potential revenue impact.

Funding a Dedicated Reserve Fund

A dedicated reserve fund can be used as an emergency fund in case a large, unforeseen capital expense occurs. In order to properly develop a dedicated reserve fund, the fund must be allowed to grow over a period of time. If budget items are underfunded, the reserve fund tends to be used as a regular funding source and reserve fund is not allowed to grow. Rules for a dedicated fund should be clearly established for the fund to properly grow.

Pursuing Financial Assistance or Other Financing

There are a variety of financial assistance programs available from governmental entities. Since the City of Marlin has median income lower than the state average, the city has qualified for grant funding in the past. Since financial assistance takes time to acquire, the planning process should begin as soon as possible to meet anticipated timelines. The associated grant rules and requirements must be considered when determining if the funding is appropriate. Financial assistance for the WTP may available through the following sources:

- *Texas Department of Agriculture (TDA):* The TDA offers small grants through the TxCDBG program. This program will not allow for sludge removal projects.
- *Texas Water Development Board (TWDB):* The TWDB offers financial assistance in the form of loan forgiveness with the Clean Water State Revolving Fund. In the past, Marlin has received 30% loan forgiveness (grant) for disadvantaged community status and a 15% green grant for completing project elements that conform with the EPA green requirements.
- *US Department of Agriculture (USDA):* Through Rural Development, the USDA offers loans and grants for infrastructure improvements. The USDA funding timeline may be longer than other institutions.
- *Local Banks and Other Financial Institutions:* The city may consider taking out a loan from a local bank.
- *Other Grants and Assistance Programs:* Other grants may be available such as the grant that was used to fund this project. Engineers and grant consultants often track available funding sources. Also, involvement through local government may reveal other potential funding sources.

B. Recommendations to Maintain Asset Management Plan

This asset management plan is intended to be a living document that is updated on at least an annual basis. By maintaining the asset management plan, the city may continue to consult condition, criticality, and remaining life when prioritizing projects.

Appendix A:
Asset Management: A Best Practices Guide by EPA

EPA
United States
Environmental Protection
Agency

Asset Management: A Best Practices Guide

Introduction

Purpose	This guide will help you understand: • What asset management means. • The benefits of asset management. • Best practices in asset management. • How to implement an asset management program.
Target Audience	This guide is intended for owners, managers, and operators of water systems, local officials, technical assistance providers, and state personnel.

Asset Management

Asset management is maintaining a desired level of service for what you want your assets to provide at the lowest life cycle cost. Lowest life cycle cost refers to the best appropriate cost for rehabilitating, repairing or replacing an asset. Asset management is implemented through an **asset management program** and typically includes a written **asset management plan**.

Challenges faced by Water Systems

- Determining the best (or optimal) time to rehabilitate/repair/replace aging assets.
- Increasing demand for services.
- Overcoming resistance to rate increases.
- Diminishing resources.
- Rising service expectations of customers.
- Increasingly stringent regulatory requirements.
- Responding to emergencies as a result of asset failures.
- Protecting assets.

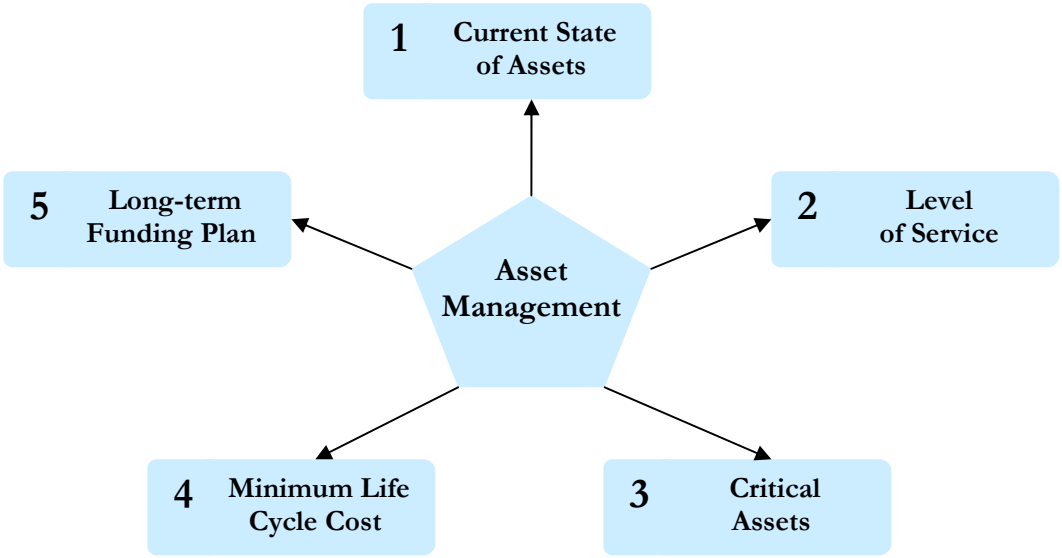
Benefits of Asset Management

- Prolonging asset life and aiding in rehabilitate/repair/replacement decisions through efficient and focused operations and maintenance.
- Meeting consumer demands with a focus on system sustainability.
- Setting rates based on sound operational and financial planning.
- Budgeting focused on activities critical to sustained performance.
- Meeting service expectations and regulatory requirements.
- Improving response to emergencies.
- Improving security and safety of assets.

Implementing Asset Management: Five Core Questions Framework

A good starting point for any size water system is the five core questions framework for asset management. This framework walks you through all of the major activities associated with asset management and can be implemented at the level of sophistication reasonable for a given system. These five core framework questions provide the foundation for many asset management best practices. Several asset management best practices are listed for each core question on the following pages. Keep in mind that these best practices are constantly being improved upon.

Flow Chart: The Five Core Questions of Asset Management Framework



This flow chart shows the relationships and dependencies between each core framework question.

1. What is the current state of my system's assets?

The first step in managing your assets is knowing their current state. Because some of this information may be difficult to find, you should use estimates when necessary. Over time, as assets are rehabilitated, repaired or replaced, your inventory will become more accurate.

You should ask:

- What do I own?
- Where is it?
- What is its condition?
- What is its useful life?
- What is its value?

Best practices include:

- Preparing an asset inventory and system map.
- Developing a condition assessment and rating system.
- Assessing remaining useful life by consulting projected-useful-life tables or decay curves.
- Determining asset values and replacement costs.

2. What is my required "sustainable" level of service?

Knowing your required "sustainable" level of service will help you implement an asset management program and communicate to stakeholders what you are doing. Quality, quantity, reliability, and environmental standards are elements that can define level of service and associated system performance goals, both short- and long-term. You can use information about customer demand, data from utility commissions or boards, and information from other stakeholders to develop your level of service requirements. Your level of service requirements can be updated to account for changes due to growth, regulatory requirements, and technology improvements.

You should ask:

- What level of service do my stakeholders and customers demand?
- What do the regulators require?
- What is my actual performance?
- What are the physical capabilities of my assets?

Best practices include:

- Analyzing current and anticipated customer demand and satisfaction with the system.
- Understanding current and anticipated regulatory requirements.
- Writing and communicating to the public a level of service "agreement" that describes your system's performance targets.
- Using level of service standards to track system performance over time.

3. Which assets are critical to sustained performance?

Because assets fail, how you manage the consequences of failure is vital. Not every asset presents the same failure risk, or is equally critical to your water system's operations. Therefore, it is important to know which assets are required to sustain your water system's performance. Critical assets are those you decide have a high risk of failing (old, poor condition, etc.) and major consequences if they do fail (major expense, system failure, safety concerns, etc.). You can decide how critical each asset is and rank them accordingly. Many water systems may have already accomplished this type of analysis in vulnerability assessments.

You should ask:

- How can assets fail?
- How do assets fail?
- What are the likelihoods (probabilities) and consequences of asset failure?
- What does it cost to repair the asset?
- What are the other costs (social, environmental, etc.) that are associated with asset failure?

Best practices include:

- Listing assets according to how critical they are to system operations.
- Conducting a failure analysis (root cause analysis, failure mode analysis).
- Determining the probability of failure and listing assets by failure type.
- Analyzing failure risk and consequences.
- Using asset decay curves.
- Reviewing and updating your system's vulnerability assessment (if your system has one).

4. What are my minimum life cycle costs?

Operations and maintenance (O&M), personnel, and the capital budget account for an estimated 85 percent of a typical water system's expenses. Asset management enables a system to determine the lowest cost options for providing the highest level of service over time. You want to optimize the work O&M crews are doing, where they are doing it, and why. An asset management program helps make risk-based decisions by choosing the right project, at the right time, for the right reason.

You should ask:

- What alternative strategies exist for managing O&M, personnel, and capital budget accounts?
- What strategies are the most feasible for my organization?
- What are the costs of rehabilitation, repair, and replacement for critical assets?

Best practices include:

- Moving from reactive maintenance to predictive maintenance.
- Knowing the costs and benefits of rehabilitation versus replacement.
- Looking at lifecycle costs, especially for critical assets.
- Deploying resources based on asset conditions.
- Analyzing the causes of asset failure to develop specific response plans.

5. What is my best long-term funding strategy?

Sound financial decisions and developing an effective long-term funding strategy are critical to the implementation of an asset management program. Knowing the full economic costs and revenues generated by your water system will enable you to determine your system's financial forecast. Your system's financial forecast can then help you decide what changes need to be made to your system's long-term funding strategy.

You should ask:

- Do we have enough funding to maintain our assets for our required level of service?
- Is our rate structure sustainable for our system's long-term needs?

Some strategies to consider:

- Revising the rate structure.
- Funding a dedicated reserve from current revenues (i.e., creating an asset annuity).
- Financing asset rehabilitation, repair, and replacement through borrowing or other financial assistance.

Implementing Asset Management: Follow-up and Continuing Steps

The five core questions framework for asset management is the starting point for asset management. Beyond planning, asset management should be implemented to achieve continual improvements through a series of "plan, do, check, act" steps.

- Plan: Five core questions framework (short-term), revise asset management plan (long-term).
- Do: Implement asset management program.
- Check: Evaluate progress, changing factors and new best practices.
- Act: Take action based on review results.

For additional information: Call the Safe Drinking Water Hotline at 1-800-426-4791, visit the EPA Web site at http://www.epa.gov/safewater/smallsystems or contact your state drinking water representative.

Appendix B:
Asset Management Summary Sheets

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Raw Water Intake**
Asset ID	**SW 1**
Year Constructed:	1948
Condition Rating:	**C - Fair**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	15 years
Description:	The raw water intake takes in water from the New Marlin Lake and transfers raw water under the dam and to the raw water pumps
Level of Service:	The raw water intake must be capable of delivering water from the lake to the plant. Only a brief temporary outage may be allowed under emergency conditions.
Condition Comments:	The intake structure is in an overall FAIR condition. While there are components that are either in poor or failed conditions, the intake is properly operating.
Criticality Rating:	The intake structure is critical to the WTP because it flows water from the lake to the plant.
Asset Value and Replacement Cost:	Long Term Asset with some components that will require rehabilitation and replacement. Total rehabilitation costs could easily exceed $750,000
Recommendations for Unit:	Include upgrades to the Raw Water Intake into a capital improvements plan (CIP).

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Intake Structure - Reinforced Concrete**
Asset ID	**SW 1.1**
Year Constructed:	1948
Condition Rating:	**C - Fair**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	Long Term Asset
Description:	The raw water intake is a concrete structure that is located in the New Marlin Lake. The structure is comprised of three gates that allow water into the structure. Water is then transferred from the intake to the water treatment plant through a concrete conduit that is located under the dam.
Condition Comments:	The intake structure is in FAIR condition and is exhibiting normal deterioration for a concrete structure constructed in 1948. These condition comments are based off observing the intake structure from the dam. It is recommended that a more through inspection be completed by boat to observe any close defects.
Criticality Rating:	The intake structure is critical for transferring the water from the lake to the WTP. It is critical that the concrete remain in good condition.
Asset Value and Replacement Cost:	Long Term Asset
Recommendations for Unit:	Complete needed repairs as a part of a raw water intake/ conduit project.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Intake Structure Gates**
Asset ID	**SW 1.2**
Year Constructed:	1948
Condition Rating:	**F - Failed**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	0 years - Failed
Description:	Three gates are located inside the intake structure. These gates are currently not in operation and are in a permanently open position. Inlet control is not required for the WTP operation, therefore their inoperability is not detrimental to the plant operation. Trash rakes are noted on the original 1948 plans.
Condition Comments:	The gates are FAILDED and are not able to be operated. The trash rakes were not inspected as a part of this study.
Criticality Rating:	The gates purpose is to allow the operators to control the flow from the intake structure to the plant. Since the flow into the plant can be controlled by other means, the gates operation is not critical. The gates operation would be important in the case that the flow from the intake would need to be cut off in the case of major seeps in the conduit. It is recommended that the plant develop emergency procedures for being able to cut off flow since the gates are not operational.
Asset Value and Replacement Cost:	>$200,000
Recommendations for Unit:	Replace gates as a part of a raw water intake/ conduit project.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Intake Structure Pipe Conduit**
Asset ID	**SW 1.3**
Year Constructed:	1948
Condition Rating:	**D - Poor**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	Uncertain - Need to perform inspection to determine actual condition.
Description:	The intake structure conduit is an 18" concrete pipe with collars that transfers the water from the intake to the WTP.
Condition Comments:	The pipe condition is listed as POOR because the a leak has been observed and fixed on the water treatment plant side. Through working with the city on the leak, KSA has recommended completing a camera survey to determine the conduit's condition.
Criticality Rating:	The pipe is critical to the water treatment plant operation. A failure in this Condit could result in water eroding part of the dam leading to its failure.
Asset Value and Replacement Cost:	Conduit Rehabilitation could range from $300,000 to over $500,000 depending on conduit condition
Recommendations for Unit:	Complete a camera investigation to determine the actual condition of the conduit.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Intake Structure Ladder (inside and out)**
Asset ID	**SW 1.4**
Year Constructed:	1948
Condition Rating:	**F - Failed**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	0 years - Failed
Description:	There is an inside and outside ladder permanently attached to the intake structure.
Condition Comments:	Both the ladders are FAILED and unsafe for to climb.
Criticality Rating:	The ladders are important for inspection purposes, but are not critical to the operation of the intake.
Asset Value and Replacement Cost:	~$20,000
Recommendations for Unit:	Since the ladder are a non-critical unit, this item can remain a lower priority for replacement.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Dam Intake Area**
Asset ID	**SW 1.5**
Year Constructed:	1948
Condition Rating:	**D - Poor**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	15 years before dam intake area slits in.
Description:	The area surrounding the intake structure allows for the water to enter into the gates.
Condition Comments:	Significant sedimentation causes the area around the intake structure to be in POOR condition because water cannot enter into the lowest gate. The highest gate often does not let water into the intake due to lower water levels in the lake. Therefore, the intake structure heavily relies on the middle gate allowing water to enter into the intake..
Criticality Rating:	A slight deterioration in intake operability is observed since the lowest intake is covered in sediment. It is critical that the middle intake remain open and free from sediment.
Asset Value and Replacement Cost:	$350,000
Recommendations for Unit:	As outlined in the 2006 SWTP plans, complete dredging directly around the intake area.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Raw Water Pump Station**
Asset ID	**SW 2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	When water is pumped, raw water is collected in the raw water pump station's vertical turbine pumps. Two new vertical turbine pumps were installed with the improvements to the water treatment plant that were completed in 2009. The third vertical turbine pump was existing on site prior to these improvements. The pumps were installed so that two can operate in parallel while one provides backup in case one pump fails. Valves have been installed so that a third pump can act as a backup pump for either of the other two pumps. All three pumps have a rated capacity of 2.88 MGD (2,000 gpm). The rated capacity of the pump station is such that 5.76 MGD is deliverable with two pumps operating.
Level of Service:	The Raw water pump station must have at least two pumps operational at all times. One pump may be out of service for repair or maintenance for brief periods of time.
Condition Comments:	The Raw Water Pump Station is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	In the event that any one pump malfunctions, it can be taken out of service without loss of firm capacity and another can be used to replace it until the malfunctioning pump is repaired. Loss of two or more pumps will limit flow to the plant. It is possible to bypass the raw water pump station in the event that the water level in the lake is high enough for gravity flow.
Asset Value and Replacement Cost:	$200,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Vertical Turbine Pump (2 pumps-2009)**
Asset ID	**SW 2.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The two (2) new pumps are rated at 2,000 gpm (2.88 MGD) at 22' total dynamic head (TDH) and have 25 Hp motors each.
Condition Comments:	The Vertical Turbine Pumps (2 pumps-2009) are in EXCELLENT condition and are operating with no noticeable deterioration in service.
Criticality Rating:	Since the loss of one pump will not result in operations, it is acceptable for one pump to go down. In the event that one pump becomes inoperable, it is important that it receive repairs within a reasonable timeframe to reduce the time that only two pumps are operable.
Asset Value and Replacement Cost:	$75,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Vertical Turbine Pump (older)**
Asset ID	**SW 2.2**
Year Constructed:	~1985
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The existing vertical turbine pump is also rated at 2,000 gpm (2.88 MGD) at 24' TDH and a 25 Hp motor.
Condition Comments:	The Vertical Turbine Pump (older) is in FAIR because the pump is over 20 years old.
Criticality Rating:	Since the loss of one pump will not result in lost operations, it is acceptable for one pump to go down. In the event that one pump becomes inoperable, it is important that it receive repairs within a reasonable timeframe to reduce the time that only two pumps are operable.
Asset Value and Replacement Cost:	$50,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Raw Water Sample Pump**
Asset ID	**SW 2.3**
Year Constructed:	2009
Condition Rating:	**F - Failed**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	0 years - Failed
Description:	Raw water is pumped to the lab via a sample pump
Condition Comments:	The raw water sample pump has failed and is no longer in operation.
Criticality Rating:	The raw water sample pump has been out of operation and is no longer used. Operators must go to the site to directly take the sample.
Asset Value and Replacement Cost:	$5,000
Recommendations for Unit:	Replace to allow for automated sampling (optional).

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Motor Control Center and Variable Frequency Drive (VFD)**
Asset ID	**SW 2.4**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The VFDs are housed in a motor control center constructed inside the old filter building. Utility power is backed up by the on-site stand by generator capable of running 1 raw water pump.
Condition Comments:	The Vertical Turbine Pump (older) is in EXCELLENT condition and is operating with no noticeable deterioration in service.
Criticality Rating:	With the temporary loss of utility power, the ATS and generator will automatically provide power for one raw water pump.
Asset Value and Replacement Cost:	$30,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Raw Water Pump Station Controls**
Asset ID	**SW 2.5**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	15 years
Description:	Control of the vertical turbine raw water pumps is provided through the plant's SCADA system. The raw water pumps will be SCADA controlled. Pumps will be alternated by the SCADA system. Additionally, the speed of the pumps will be SCADA adjusted and flow-paced with the filter feed pumps. The SCADA system will allow the operator to monitor the speed of the pump, the flow rate, and run time of each pump.
Condition Comments:	The Raw Water Pump Station Controls is in EXCELLENT condition and is operating with no noticeable deterioration in service.
Criticality Rating:	The raw water pumps can be operated by hand in the case that the SCADA system is not operating. In the case that the controls are not functioning the operators will have to manually observe the incoming flow to ensure it is not being overloaded.
Asset Value and Replacement Cost:	$15,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Raw Water Pump Station**
Asset ID	**SW 2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	When water is pumped, raw water is collected in the raw water pump station's vertical turbine pumps. Two new vertical turbine pumps were installed with the improvements to the water treatment plant that were completed in 2009. The third vertical turbine pump was existing on site prior to these improvements. The pumps were installed so that two can operate in parallel while one provides backup in case one pump fails. Valves have been installed so that a third pump can act as a backup pump for either of the other two pumps. All three pumps have a rated capacity of 2.88 MGD (2,000 gpm). The rated capacity of the pump station is such that 5.76 MGD is deliverable with two pumps operating.
Level of Service:	The Raw water pump station must have at least two pumps operational at all times. One pump may be out of service for repair or maintenance for brief periods of time.
Condition Comments:	The Raw Water Pump Station is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	In the event that any one pump malfunctions, it can be taken out of service without loss of firm capacity and another can be used to replace it until the malfunctioning pump is repaired. Loss of two or more pumps will limit flow to the plant. It is possible to bypass the raw water pump station in the event that the water level in the lake is high enough for gravity flow.
Asset Value and Replacement Cost:	$200,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Raw Water Meters**
Asset ID	**SW 3.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	15 years
Description:	Two 10" Mag meters are installed in the meter vault.
Condition Comments:	The Raw Water Meters are in GOOD condition.
Criticality Rating:	The meter is needed to properly adjust the raw water pump speed. In the case that the meter becomes non-operational, the flow to the plant must be closely monitored.
Asset Value and Replacement Cost:	$7,500
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Raw Water Meter Piping**
Asset ID	**SW 3.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	30 years
Description:	Ductile iron piping is installed in the vault. The piping includes spool pieces, 10" gate valves, and reducers.
Condition Comments:	The Raw Water Meter Piping is in GOOD condition.
Criticality Rating:	Since there is no bypass around the meter vault, the piping is critical to the plant flow schematic. A failure in the piping will result in a clarifier having to be taken offline.
Asset Value and Replacement Cost:	$15,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Meter Vault Structure and Housing**
Asset ID	**SW 3.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	Long term asset
Description:	The raw water meters are housed in a 7 foot deep vault that is covered by a metal housing. The vault contains a drain that is connected to the plant sewer system.
Condition Comments:	The Meters Vault Structure and Housing is in GOOD condition.
Criticality Rating:	The structure is needed to house the meters and keep them in an environment they can be operated in.
Asset Value and Replacement Cost:	Long Term Asset
Recommendations for Unit:	Continue to ensure the structure is in acceptable condition.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Raw Water Splitter Box and Rapid Mixer**
Asset ID	**SW 4**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The raw water splitter box receives pumped raw water from the raw water pump station.
Level of Service:	The raw water splitter box needs to remain operational at all times.
Condition Comments:	The Raw Water Splitter Box and Rapid Mixer is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	In the event of a malfunction of one or both mixers, the mixer(s) should be repaired and returned to service as soon as possible. Theoretically, the affected clarifier can remain operational and in service since the clarifiers can provide sufficient mixing energy under normal raw water conditions due to the nature of the clarifiers. A failure of a mixer will reduce the treatment capability or cause the associated clarifier to be taken out of service.
Asset Value and Replacement Cost:	$88,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Mechanical Mixers**
Asset ID	**SW 4.1**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	Two (2) 10 Hp turbine mixers are used in providing rapid mixing of the raw water and coagulant.
Condition Comments:	The Mechanical Mixers are in FAIR condition with one mixer showing a bent shaft. Once the mixer's shaft is repaired the mixers will return to a GOOD condition rating.
Criticality Rating:	Since each mechanical mixer delivers water to an associated clarifier, if a mixer goes down the clarifier will then have reduced treatment capability. The clarifier will either have to rely on the mixer that is in the clarifier, or the clarifier will have to be taken out of service as the mixer is fixed.
Asset Value and Replacement Cost:	$55,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Splitter Box Structure and Railing**
Asset ID	**SW 4.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	25 years for railing and gratting. Sturture is a long term asset.
Description:	The box includes one inlet chamber (13'-2" x 4' inside dimensions) and two outlet chambers (6' x 4' inside dimensions). The top of the structure is at elevation 386.0 and top of the bottom slab is at elevation 370.0. The water then flows out of the outlet chamber into two 16" C905 PVC pipes to the clarifiers for flocculation and sedimentation
Condition Comments:	The Splitter Box Structure and Railing is in GOOD condition and is operating with no noticeable deterioration in service.
Criticality Rating:	Splitter Box Structure and Railing is critical to the Raw Water Splitter Box and Rapid Mixer operation and needs to remain functional for proper treatment.
Asset Value and Replacement Cost:	$12,000
Recommendations for Unit:	Maintain structure.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Wheel Operated Weir Gates**
Asset ID	**SW 4.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	30 years
Description:	Flow is split into the two outlet boxes via hand wheel operated weir gates with a 3' weir length. The weirs are set at elevation 383.50.
Condition Comments:	The Wheel Operated Weir Gates are in GOOD condition and are operating with no noticeable deterioration in service.
Criticality Rating:	Wheel Operated Weir Gates are critical to the Raw Water Splitter Box and Rapid Mixer operation and need to remain functional for proper treatment.
Asset Value and Replacement Cost:	$12,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Chemical Injection Piping**
Asset ID	**SW 4.4**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	Coagulant (Alum) and caustic injection points are provided in each of the two outlet. A spare line also runs to each of these outlet chambers.
Condition Comments:	The Chemical Injection Piping is in GOOD condition.
Criticality Rating:	Chemical Injection Piping is critical to the Raw Water Splitter Box and Rapid Mixer operation and needs to remain functional for proper treatment.
Asset Value and Replacement Cost:	$4,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Rapid Mix Controls**
Asset ID	**SW 4.5**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	Both rapid mix units are installed complete with a VFD to allow the operator the most flexibility in mixing energy applied to the water. The rapid mixers will have a hand-off-auto (HOA) selector switch. Speed of the rapid mixers can be locally manually controlled by hand indicating controller. When the switch is in the auto position, the rapid mixer will be controlled from the plant's SCADA system through the central computer.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	Rapid Mix Controls are critical to the Raw Water Splitter Box and Rapid Mixer operation and needs to remain functional for proper treatment.
Asset Value and Replacement Cost:	$5,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Solids Contact Clarifiers**
Asset ID	**SW 5**
Year Constructed:	~1980
Condition Rating:	**D - Poor**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	5 years
Description:	The plant uses two upflow clarifiers in its treatment process. The purpose of the solids contact clarifier is to remove settleable and suspended solids in the raw water.
Level of Service:	Solids contact clarifiers shall remain in service at all times.
Condition Comments:	The Solids Contact Clarifiers are in POOR condition. The Clarifiers' main deficiencies include a mixer that is not operational on Clarifier 1 and non-adjusted weirs. Corrosion is seen on the weirs and other structural components. The clarifier mechanism was not inspected because it was under water.
Criticality Rating:	One of the two clarifiers can be taken out of service while the plant is operating. Since dual clarifiers are provided, a single failure will only reduce plant capacity by one-half and not cause complete plant shutdown. Another emergency condition can arise if the motor driving the rake arm fails in which case the unit should be repaired as soon as possible. All applicable alarms with regards to the clarifier rake arm and sludge blow down valve are signaled by the SCADA system.
Asset Value and Replacement Cost:	Rehab cost - $ Replacement - $
Recommendations for Unit:	Complete a clarifier rehabilitation project that addresses the deficient items. Clarifier 1 is in need of immediate repair to allow it to operate efficiently.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clarifier 1**
Asset ID	**SW 5.1**
Year Constructed:	~1980
Condition Rating:	**D - Poor**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	5 years
Description:	Clarifier 1 is the smaller clarifier located next to the old plant building.
Condition Comments:	Clarifier 1 is in POOR condition because the mixer is not in operation. This causes the clarifier to not be able to clarify water efficiently. Therefore, a smaller flow is allowed to pass through this clarifier.
Criticality Rating:	Clarifier 1 has redundancy for operation with Clarifier 2. Therefore Clarifier 1 can be temporarily taken out of service but plant water production will be reduced.
Asset Value and Replacement Cost:	Rehab cost - $ Replacement (structure and mechanical)- $400,000
Recommendations for Unit:	Complete rehabilitation to mixers and adjust weir elevations. Complete replacement as funds allow.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clarifier 1 Structure and Access Bridge**
Asset ID	**SW 5.1.1**
Year Constructed:	~1980
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	5 years
Description:	One clarifier has a diameter of 56', a side water depth of 12', and a normal water surface elevation of 381.77'. The top of clarifier wall is at elevation 382.8.
Condition Comments:	The Clarifier 1 Structure and Access Bridge is in FAIR condition and exhibits corrosion.
Criticality Rating:	The structure is required to access the clarifier weirs and mechanical drive. Without access to these components, the operators are unable to view the clarifier operations and maintain the equipment.
Asset Value and Replacement Cost:	Rehab cost - $ Replacement - $350,000
Recommendations for Unit:	Recoat structure and complete replacement as funds allow.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clarifier 1 Weirs**
Asset ID	**SW 5.1.2**
Year Constructed:	~1980
Condition Rating:	**D - Poor**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	5 years
Description:	The weirs collect the clarified water from the top of the clarifier and delivers it to the outlet box.
Condition Comments:	The Clarifier 1 Weirs are in POOR Condition and show deficiencies because they are not properly balanced. Therefore flow in the clarifier is uneven. The portion of the weirs above the water line show corrosion.
Criticality Rating:	The weirs are required for the clarifier to properly operate. In the event the weirs become inoperable, the clarifier must be taken out of operation.
Asset Value and Replacement Cost:	Adjustment cost - $5,000 Replacement - $100,000
Recommendations for Unit:	Adjust the clarifier weirs to allow for even flow in the clarifier. Complete replacement as funds allow.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clarifier 1 Sludge Collector, Flights, and Squeegees**
Asset ID	**SW 5.1.3**
Year Constructed:	~1980
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	5 years
Description:	The sludge collector is rotates and collects sludge at the bottom of the clarifier. This mechanism is located under water.
Condition Comments:	The Clarifier 1 Sludge Collector, Flights, and Squeegees are in FAIR condition and appear to be operating properly. No detailed inspection was completed on this item
Criticality Rating:	The sludge collector, flights, and squeegees are required for the clarifier to properly operate. In the event these components become inoperable, the clarifier must be taken out of operation.
Asset Value and Replacement Cost:	Rehab cost - $5,000 Replacement - $250,000
Recommendations for Unit:	Inspect unit when taken out of operation. Complete replacement as funds allow.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clarifier 1 Mixer**
Asset ID	**SW 5.1.4**
Year Constructed:	~1980
Condition Rating:	**F - Failed**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	0 years - Failed
Description:	Chemical coagulants are added prior to the clarifiers in rapid mix chambers but the primary mixing zone in the clarifiers eliminate the need for separate flocculation facilities. Flocculation occurs in the secondary mixing zone prior to sedimentation.
Condition Comments:	The Clarifier 1 Mixer in a FAILED condition and has not been operational since at least 2009.
Criticality Rating:	The mixer is needed for the water to undergo proper coagulation and calculation. Without this component, the clarifier's efficiency significantly deteriorates placing stress on the downstream units.
Asset Value and Replacement Cost:	Replacement - $15,000
Recommendations for Unit:	Replace clarifier mixer 1.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clarifier 1 Mechanical Drive**
Asset ID	**SW 5.1.5**
Year Constructed:	~1980
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	5 years
Description:	The clarifier rake drive motor is controlled manually through a remote-off-run selector switch. The drive rotates the sludge collector.
Condition Comments:	The Clarifier 1 Mechanical Drive is in FAIR condition.
Criticality Rating:	The mechanical drive is required for the clarifier to operate. In the event the drive becomes inoperable, the clarifier must be taken out of operation.
Asset Value and Replacement Cost:	Replacement - $75,000
Recommendations for Unit:	Continue to maintain unit. Complete replacement as funds allow.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clarifier 1 Sludge Valve Pneumatic Actuator**
Asset ID	**SW 5.1.6**
Year Constructed:	~1980
Condition Rating:	**F - Failed**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	0 years - Failed
Description:	The sludge collected in the sludge hoppers or concentrators are discharged via pneumatic operated sludge blowdown valves located at the side of the basins.
Condition Comments:	The Clarifier 1 Sludge Valve Pneumatic Actuator in a FAILED condition because it was removed from plant operation.
Criticality Rating:	Currently the city has a workaround and no longer uses the automated valve actuator.
Asset Value and Replacement Cost:	Replacement - $5,000
Recommendations for Unit:	Reinstall pneumatic actuator to allow automatic operation (optional).

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clarifier 2**
Asset ID	**SW 5.2**
Year Constructed:	~1980
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	5 years
Description:	Clarifier 2 is the larger of the two clarifiers.
Condition Comments:	Clarifier 2 s in FAIR condition and is operating all components operational.
Criticality Rating:	Clarifier 2 has redundancy for operation with Clarifier 1. Therefore Clarifier 2 can be temporarily taken out of service but plant water production will be reduced.
Asset Value and Replacement Cost:	Rehab cost - $ Replacement (structure and mechanical)- $400,000
Recommendations for Unit:	Readjust clarifier weirs to allow for even flow over the weirs. Complete replacement as funds allow.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clarifier 2 Structure and Access Bridge**
Asset ID	**SW 5.2.1**
Year Constructed:	~1980
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	5 years
Description:	The other clarifier has a diameter of 68', a side water depth of 13', and a normal water surface elevation of 381.93'. The top of clarifier wall is at elevation 382.85.
Condition Comments:	The Clarifier 2 Structure and Access Bridge is in FAIR condition and exhibits normal corrosion for a unit this age.
Criticality Rating:	The structure is required to access the clarifier weirs and mechanical drive. Without access to these components, the operators are unable to view the clarifier operations and maintain the equipment.
Asset Value and Replacement Cost:	Adjustment cost - $5,000 Replacement - $100,000
Recommendations for Unit:	Recoat structure and complete replacement as funds allow.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clarifier 2 Weirs**
Asset ID	**SW 5.2.2**
Year Constructed:	~1980
Condition Rating:	**D - Poor**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	5 years
Description:	The weirs collect the clarified water from the top of the clarifier and delivers it to the outlet box.
Condition Comments:	The Clarifier 2 Weirs are in POOR Condition and show deficiencies because the weirs are not balanced. There is uneven flow in the clarifiers due to the weirs not being balanced. Corrosion above the weir line is significant.
Criticality Rating:	The weirs are required for the clarifier to properly operate. In the event the weirs become inoperable, the clarifier must be taken out of operation.
Asset Value and Replacement Cost:	Adjustment cost - $5,000 Replacement - $100,000
Recommendations for Unit:	Adjust the clarifier weirs to allow for even flow in the clarifier. Complete replacement as funds allow.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clarifier 2 Sludge Collector, Flights, and Squeegees**
Asset ID	**SW 5.2.3**
Year Constructed:	~1980
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	5 years
Description:	The sludge collector is rotates and collects sludge at the bottom of the clarifier. This mechanism is located under water.
Condition Comments:	The Clarifier 2 Sludge Collector, Flights, and Squeegees are in FAIR condition and appear to be operating properly. No detailed inspection was completed on this item
Criticality Rating:	The sludge collector, flights, and squeegees are required for the clarifier to properly operate. In the event these components become inoperable, the clarifier must be taken out of operation.
Asset Value and Replacement Cost:	Rehab cost - $ Replacement - $
Recommendations for Unit:	Inspect unit when taken out of operation. Complete replacement as funds allow.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clarifier 2 Mixer**
Asset ID	**SW 5.2.4**
Year Constructed:	~1980
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	5 years
Description:	Chemical coagulants are added prior to the clarifiers in rapid mix chambers but the primary mixing zone in the clarifiers eliminate the need for separate flocculation facilities. Flocculation occurs in the secondary mixing zone prior to sedimentation.
Condition Comments:	The Clarifier 2 Mixer is in FAIR condition and appears to be operating properly but over 20 years old.
Criticality Rating:	The mixer is needed for the water to undergo proper coagulation and calculation. Without this component, the clarifier's efficiency significantly deteriorates placing stress on the downstream units.
Asset Value and Replacement Cost:	Replacement - $15,000
Recommendations for Unit:	Continue to maintain unit. Complete replacement as funds allow.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clarifier 2 Mechanical Drive**
Asset ID	**SW 5.2.5**
Year Constructed:	~1980
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	5 years
Description:	The clarifier rake drive motor is controlled manually through a remote-off-run selector switch. When set on remote, the rake drive motor is controlled via the plant's SCADA system.
Condition Comments:	The Clarifier 2 Mechanical Drive is in FAIR condition and but over 20 years old.
Criticality Rating:	The mechanical drive is required for the clarifier to operate. In the event the drive becomes inoperable, the clarifier must be taken out of operation.
Asset Value and Replacement Cost:	Replacement - $75,000
Recommendations for Unit:	Continue to maintain unit. Complete replacement as funds allow.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clarifier 2 Sludge Valve Pneumatic Actuator**
Asset ID	**SW 5.2.6**
Year Constructed:	2009
Condition Rating:	**F - Failed**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	0 years - Failed
Description:	The sludge collected in the sludge hoppers or concentrators are discharged via pneumatic operated sludge blowdown valves located at the side of the basins.
Condition Comments:	The Clarifier 2 Sludge Valve Pneumatic Actuator in a FAILED condition because it was removed from plant operation.
Criticality Rating:	Currently the city has a workaround and no longer uses the automated valve actuator.
Asset Value and Replacement Cost:	Replacement - $5,000
Recommendations for Unit:	Reinstall pneumatic actuator to allow automatic operation (optional).

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clarifier Controls**
Asset ID	**SW 5.3**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	5 years
Description:	Sludge blowdown is also tied to the control panel timing and is adjustable by the operators via the SCADA system. The controls are monitored in the plant's SCADA system. The SCADA system monitors which components are operating and for any alarm conditions. Specifically, the sludge blow down valves can be controlled locally by a three position maintained contact open/close/remote selector switch installed near the valve. If set on remote, the operator can control the valve via the SCADA system. The operator can select manual control or automatic control. If set on automatic control, the operator can set the frequency and duration of the sludge blow down valve operation.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	The controls are needed to automate operations. In the event the controls go down, the operators must manually operate the system.
Asset Value and Replacement Cost:	$50,000
Recommendations for Unit:	Continue to maintain unit. Complete replacement as funds allow.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Filter Feed Wet Well**
Asset ID	**SW 6**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	50 years
Description:	The filter feed wet well acts as a storage buffer for clarified water so that the filter feed pumps can pump water into the membrane filters.
Level of Service:	The filter feed well must remain in service 100% of the time to feed the membrane filters.
Condition Comments:	The Filter Feed Wet Well is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The filter feed wet well is required to feed the membrane filters. Without the wet well, the membranes/ plant cannot produce water. There is no bypass around the filter feed wet well.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Filter Feed Wet Well Structure**
Asset ID	**SW 6.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	Long term asset
Description:	The filter feed wet well is a 20’ wide by 40’ long structure with inner baffling walls. The ground elevation is 377.0 while the bottom slab is at elevation 365’. The top of wall elevation is 384’ and the side water depth is 17’.
Condition Comments:	The Filter Feed Wet Well Structure is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	Since there is no bypass around the filter feed wet well, the structure is needed for the membranes to operate and the plant to produce water.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Continue to ensure the structure is in acceptable condition.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Filter Feed Wet Well Appurtenances**
Asset ID	**SW 6.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The well itself contains three intrabaffling walls to increase contact time of the water. Gate valves are provided on both the inlet and outlet pipes of the filter feed wet well. An ultrasonic level transducer which is connected to the SCADA system is provided to monitor the water level in the tank.
Condition Comments:	The Filter Feed Wet Well Appurtenances are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	These appurtenances are required for TCEQ compliance and controls.
Asset Value and Replacement Cost:	$5,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Filter Feed Chemical Injection Points**
Asset ID	**SW 6.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	An secondary disinfection point is located at the north end of the filter feed wet well and samples of settled water are pumped to the lab via a sample pump located on the south end next to the filter feed pumps. Chlorine, liquid ammonium sulfate (LAS), and caustic chemical diffusers are provided where water from the clarifier first enters. The chlorine and LAS chemical diffusers provide an optional disinfection point. The caustic is used for pH control.
Condition Comments:	The Filter Feed Chemical Injection Points are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The chemical injection point is required by TCEQ for proper disinfection and must remain in operation for the plant to produce acceptable quality water.
Asset Value and Replacement Cost:	$5,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Filter Feed Drain to Sewer**
Asset ID	**SW 6.4**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	Long term asset
Description:	A 6” drain line is provided and routes any drained water to the sludge thickener.
Condition Comments:	The Filter Feed Drain to Sewer is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	This component is needed to drain the filter feed wet well for temporary cleaning and inspection. In the event that the drain to sewer is inoperable, the filter feed wet well cannot be taken out of service.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Filter Feed Pump Station**
Asset ID	**SW 7**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	15 years
Description:	Three vertical turbine filter feed pumps provide feed water to the membrane filters in the Filter Building.
Level of Service:	The filter feed pump station must remain in service at all times to feed the membrane filters.
Condition Comments:	The Filter Feed Pump Station is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The filter feed pump station can operate with one pump out of service without losing any firm capacity. If two pumps were to go out of service, this would cut the firm capacity of the pump station in half, in which case the flow at the raw water station would be adjusted by the SCADA system to prevent overflow at the filter feed wet well.
Asset Value and Replacement Cost:	$145,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Filter Feed Pumps**
Asset ID	**SW 7.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	Three (3) vertical turbine pumps (2,200 gpm at 103' TDH with 100 Hp motors) are used to provide pressurized water for the membrane filters. The rated capacities of these pumps are such that 6.34 MGD is achieved with any two pumps operating.
Condition Comments:	The Filter Feed Pumps are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The Filter Feed Pumps must operate for the plant to produce water. Since there is redundancy with the pumps, one pump may temporarily be out of service without affecting plant production.
Asset Value and Replacement Cost:	$100,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Filter Feed Pumps Piping**
Asset ID	**SW 7.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	30 years
Description:	Water from the filter feed pumps flows through three (3) 12” lines.
Condition Comments:	The Filter Feed Pumps Piping is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The filter feed piping is needed for the pumps to operate. Piping issues may cause a pump or all pumps to be taken out of service.
Asset Value and Replacement Cost:	$20,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Filter Feed Sample Pump**
Asset ID	**SW 7.3**
Year Constructed:	2009
Condition Rating:	**F - Failed**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	0 years - Failed
Description:	Settled water is pumped to the lab via a sample pump located on the south end next to the filter feed pumps.
Condition Comments:	The filter feed pump has failed and is no longer in operation.
Criticality Rating:	The filter feed sample pump has been out of operation and is no longer used. Operators must go to the site to directly take the sample.
Asset Value and Replacement Cost:	$5,000
Recommendations for Unit:	Replace to allow for automated sampling (optional).

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Filter Feed Pump Controls**
Asset ID	**SW 7.4**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The pumps are installed with VFDs which are controlled by the Koch system and connected to the SCADA system. The level of water in the filter feed wet well is measured by an ultrasonic level transducer. This device transmits information to the SCADA computer where it is monitored. Low level alarm will sound when the water reaches a level just above pump cutoff. A high level alarm will sound when the water reaches a level just below overflow. Another low level alarm will sound when water reaches a level just below pump cutoff. These levels are adjustable and operator settable via the computer.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	The controls are needed to automate operations. In the event the controls go down, the operators must manually operate the system.
Asset Value and Replacement Cost:	$20,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Membrane Building**
Asset ID	**SW 8**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	50 years
Description:	The membrane building is used to house the membrane system, chemical feed systems, and laboratory building.
Level of Service:	The membrane building shall be kept in clean working order.
Condition Comments:	The Membrane Building is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The membrane building protects the equipment in the building and must remain in service for the plant to safely operate. The lab is required for plant operations.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Maintain building and prevent rust on structural steel.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Membrane Building Structure**
Asset ID	**SW 8.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	Long term asset
Description:	The building is a steel structure with concrete masonry. The building also includes aluminum doors.
Condition Comments:	The Membrane Building Structure is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The membrane building protects the equipment in the building and must remain in service for the plant to safely operate.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Maintain building and prevent rust on structural steel.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Membrane Building Lab**
Asset ID	**SW 8.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The lab houses the operator's water quality testing equipment and SCADA controls.
Condition Comments:	The Membrane Building Lab is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The lab is required to properly test the water and make adjustments in operations. Without the lab, the operators are unable to complete necessary tests.
Asset Value and Replacement Cost:	$75,000
Recommendations for Unit:	Replace lab equipment as needed.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Membrane Building Trenches**
Asset ID	**SW 8.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	Long term asset
Description:	Trenches are located in the building and are used to house the piping.
Condition Comments:	The Membrane Building Trenches are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The membrane building trenches care required to pipe water to and from the membrane filters. Piping defects may cause the membrane filters to go out of service.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Continue to ensure the structure is in acceptable condition.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Membrane UF Feed Prefilters**
Asset ID	**SW 9**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	Three prefilters have been installed to screen for contaminants and help prevent excessive fouling.
Level of Service:	The prefilters shall remain in service at all times to prevent poor quality water being sent to the membranes.
Condition Comments:	The Membrane UF Feed Prefilters are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The membrane prefilters are needed to ensure the membrane's receive high quality water. Running the treatment plant without this unit could shorten the membrane's lifespan.
Asset Value and Replacement Cost:	$53,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**UF Feed Prefilters**
Asset ID	**SW 9.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	When the filter system operates in production or filtrate mode, water is pumped from the filter feed wet well through the prefilters. Pressure indicators are located on both the inlet and outlet sides of the prefilters and throughout the membrane filtration system.
Condition Comments:	The UF Feed Prefilters are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The membrane prefilters are needed to ensure the membrane's receive high quality water. Running the treatment plant without this unit could shorten the membrane's lifespan.
Asset Value and Replacement Cost:	$50,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Prefilters Piping**
Asset ID	**SW 9.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The prefilters piping feeds the prefilters. A bypass around the prefilters is available.
Condition Comments:	The Prefilters Piping is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The prefilters piping is needed to feed water to and from the prefilters.
Asset Value and Replacement Cost:	$3,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Membrane Filters**
Asset ID	**SW 10**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	3 years
Description:	The City of Marlin SWTP utilizes the KOCH PMPWTM-10 Membrane. This is an ultrafiltration type membrane filter.
Level of Service:	The membrane's shall remain operational at all times.
Condition Comments:	The membrane filter components are used to filter the clarified water. The membrane filters have no longer are able to produce their rated capacity and need to be replaced.
Criticality Rating:	The membrane filters are a key component in the treatment scheme. The plan is unable to produce acceptable water quality without this unit.
Asset Value and Replacement Cost:	$750,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Membranes**
Asset ID	**SW 10.1**
Year Constructed:	2009
Condition Rating:	**D - Poor**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	3 years
Description:	Two (2) KMS Model HF-56 Potable Water UF Units each of which will consist of fifty-four (54) KMS, model V1072, UF membrane cartridges, fifty-four (54) pss kits with parts needed to connect V1072 cartridges to manifolds
Condition Comments:	The membranes are in poor condition and need to be replaced due to reduced capacity.
Criticality Rating:	The membranes are essential for water treatment and must be maintained properly to have their full lifespan.
Asset Value and Replacement Cost:	$0
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Membrane Control Valves**
Asset ID	**SW 10.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	15 years
Description:	Multiple control valves are used to feed the membranes and perform cleaning and backwash procedures.
Condition Comments:	The Membrane Control Valves are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The control valves direct flow throughout the membrane treatment skid and are required for the membrane operations.
Asset Value and Replacement Cost:	$200,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Membrane Piping**
Asset ID	**SW 10.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	15 years
Description:	Piping is located throughout the membrane system to deliver water to the membrane filters.
Condition Comments:	The Membrane Piping is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The membrane filter piping must be maintained to flow water to and from the filters. Piping failure may result in one or both skids having to be taken out of service.
Asset Value and Replacement Cost:	$350,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Membrane Controls**
Asset ID	**SW 10.4**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	15 years

Description:

Automatic control of the membrane filtration system is achieved by the membrane filter computer that has been provided and programmed by KOCH. The valves that control flow to the neutralization tank or reclaim pond are controlled via the SCADA system.

The membrane filter system consists of all units controlled by the membrane filter computer as well as the associated piping, valves, and electronic monitoring equipment. This includes all equipment between the filter feed wet well and the ground storage tank as well as the backwash pumps at the high service pump-station. The membrane filter system operates under various cycles and is controlled automatically via the membrane filter computer supplied by KOCH. The only exceptions are the valves that control whether filter waste flows to the neutralization tank or the filter feed pond. These valves are controlled by the SCADA computer.

Condition Comments: The membrane controls are actively controlling the membrane system. The controls are not fully understood by the operators.

Criticality Rating: The membrane controls are essential to the treatment operations and must be operational for to run the membrane filters. There are no manual controls for the membrane filters.

Asset Value and Replacement Cost: $200,000

Recommendations for Unit: Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Membrane Clean In Place (CIP) Components**
Asset ID	**SW 11**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	When the system begins a cleaning cycle, a cleaning solution in the cleaning tank is pumped via a cleaning pump to the membrane filters. Both cleaning permeate and cleaning retentate return back to the CIP tank afterwards. The CIP tank drains to the neutralization tank.
Level of Service:	The CIP shall remain in operation for regularly scheduled CIP cleaning cycle.
Condition Comments:	The Membrane Clean In Place (CIP) Components are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The CIP components are required for a regular clean in place routine that must occur on a regularly scheduled basis.
Asset Value and Replacement Cost:	$125,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**CIP Station**
Asset ID	**SW 11.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The CIP station includes a 40 hp CIP pump, 3800 gallon CIP tank, one immersion heater, one tank mixer, a floor-mounted 100-micron bag filter with manual pump inlet
Condition Comments:	The CIP Station is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The CIP components are required for a regular clean in place routine that must occur on a regularly scheduled basis.
Asset Value and Replacement Cost:	$100,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**CIP Piping**
Asset ID	**SW 11.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	CIP piping includes an air-operated filter outlet valve for isolation, filter vent and drain valves.
Condition Comments:	The CIP Piping is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The CIP piping is needed to feed water to and from the CIP station
Asset Value and Replacement Cost:	$25,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Water Softener**
Asset ID	**SW 12**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The water softener is needed to reducing scaling and prolong the filter's lifespan.
Level of Service:	The water softener shall be operational for the CIP cleaning cycle.
Condition Comments:	The Water Softener is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The water softener is needed to provide soft water during the CIP process. If this unit is taken offline, the membrane life span may be reduced.
Asset Value and Replacement Cost:	$10,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Water Softener**
Asset ID	**SW 12.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The water softener is needed to reducing scaling and prolong the filter's lifespan.
Condition Comments:	The Water Softener is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The water softener is needed to provide soft water during the CIP process. If this unit is taken offline, the membrane life span may be reduced.
Asset Value and Replacement Cost:	$10,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Membrane Chemical Dose Package**
Asset ID	**SW 13**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	Koch membrane provides chemical dose packages for caustic and hypochlorite.
Level of Service:	The membrane chemical dose package shall be operational at all times.
Condition Comments:	The Membrane Chemical Dose Package is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The chemical dose package is used by the membranes system to pump chemicals for the membranes.
Asset Value and Replacement Cost:	$35,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Chemical Pumps**
Asset ID	**SW 13.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	Chemical dose pumps for caustic and hypochlorite are provided as a part of the Koch Membrane system.
Condition Comments:	The Chemical Pumps are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The chemical pumps are used to inject chemicals at key locations for the membranes. These pumps are required for proper membrane operations.
Asset Value and Replacement Cost:	$30,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Chemical Piping**
Asset ID	**SW 13.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The chemical piping distributes the chemical to the appropriate injection point.
Condition Comments:	The Chemical Piping is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The chemical piping is needed to feed water to and from the chemical tanks and pumps.
Asset Value and Replacement Cost:	$5,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Membrane Compressed Air Package**
Asset ID	**SW 14**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The compressed air package is used to operate the pneumatically controlled valves.
Level of Service:	The Membrane Compressed Air Package shall be operational at all times.
Condition Comments:	The Membrane Compressed Air Package is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The air compressor is used to operate the phonetically controlled air valves. Without the air compressor, the membrane valves cannot work.
Asset Value and Replacement Cost:	$13,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Air Compressor**
Asset ID	**SW 14.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	One (1) compressed air package consisting of duplex 7 1/2 –HP rotary screw air compressors with alternator, 400-gallon receiver with relief valve and condensate drain tap, duplex membrane air dryers with oil removal filters.
Condition Comments:	The Air Compressor is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The air compressor is used to operate the phonetically controlled valves. Without the air compressor, the membrane skids cannot operate.
Asset Value and Replacement Cost:	$8,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Air piping**
Asset ID	**SW 14.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The air piping connects the compressors to the pneumatic valves.
Condition Comments:	The Air piping is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The air piping is needed to feed water to and from the air compressors.
Asset Value and Replacement Cost:	$5,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clearwell**
Asset ID	**SW 15**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	50 years
Description:	The purpose of the clearwell is to store finished water for use during periods when the water treatment plant is not operating and also for the backwash water supply needed for the filters. The treated water clearwell provides the necessary equalizing capacity to allow high service pumping rates to exceed the treated water production rate. In addition, the clearwell provides water needed to backwash the filters.
Level of Service:	The Clearwell shall be operational at all times with the ability to send water to the distribution network.
Condition Comments:	The Clearwell is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The clearwell is required to store water for peak demands along with providing required treatment through its baffling. Failure in the tank would result in only having available water in the elevated storage tanks.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Perform annual tank inspections. Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clearwell Structure**
Asset ID	**SW 15.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	Long term asset
Description:	The tank is 85’ in diameter. It is completely above ground, and it has a capacity of 750,000 gallons (0.75 MG). The new clearwell contains the following appurtenances:
Condition Comments:	The Clearwell Structure is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The clearwell structure is required for treatment through its baffling and for storing water until it is sent into distribution.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Continue to ensure the structure is in acceptable condition.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clearwell Appurtenances**
Asset ID	**SW 15.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The clearwell contains the following appurtenances: • Two18” diameter inlet risers from the pipelines exiting the filters. • Two 18” diameter outlet pipes which routes to the high service and backwash pump station. These pipes leaves from the bottom of the clearwell and is are fitted with a stainless anti-vortex screen. • 10” diameter overflow line complete with flap valve. • 8” diameter drain line complete with concrete headwall and flap valve. • Interior access ladder to the clearwell floor. • Roof access hatch. • Sonic level transducer to monitor and record water level.
Condition Comments:	The Clearwell Appurtenances are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The clearwell appurtenances are required by TCEQ and are needed for tank inspection and operation. These must remain in operation at all times for compliance.
Asset Value and Replacement Cost:	$30,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clearwell Baffles**
Asset ID	**SW 15.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	Long term asset
Description:	Circular concrete masonry unit block walls which serve as baffles for the tank which provides a superior baffling rating (C = 0.7 used in calculating CT for the plant).
Condition Comments:	The Clearwell Baffles are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The clearwell baffles are needed for chlorine contact times required by TCEQ. These must remain in operation at all times for compliance.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Clearwell Controls**
Asset ID	**SW 15.4**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	No special controls are required for the clearwell. The SCADA system will indicate the level of the tank for the operator's information and use.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	The controls are needed to automate operations. In the event the controls go down, the operators must manually operate the system.
Asset Value and Replacement Cost:	$15,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**High Service Pumps Station**
Asset ID	**SW 16**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	15 years
Description:	The purpose of the high service pumping facilities at the water plant is to convey treated water from clearwell storage to the City's distribution system at useable pressures. The Marlin SWTP is designed to have a firm capacity of 7.49 MGD or nearly 150% of the plant's actual capacity.
Level of Service:	The High Service Pumps Station shall be operational at all times.
Condition Comments:	The High Service Pumps Station is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The High Service Pumps Station pumps must operate for the plant to deliver water to the distribution system. The pump station has redundancy with three pumps.
Asset Value and Replacement Cost:	$190,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**High Service Pumps Station**
Asset ID	**SW 16.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	Three (3) high service pumps (2,600 gpm at 226' TDH with 200 Hp) are used to pump treated water from the clearwell to the distribution system. The rated capacities of these pumps are such that 7.49 MGD is achieved with any two pumps operating. .
Condition Comments:	The High Service Pumps Station is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The High Service Pumps Station pumps must operate for the plant to deliver water to the distribution system. The pumps have redundancy with three pumps. One pump may be out of service without affecting delivered water.
Asset Value and Replacement Cost:	$120,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**High Service Pump Station Piping**
Asset ID	**SW 16.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	30 years
Description:	The discharge header from each pump (high service and backwash – 5 total) includes a12” check valve, 18” gate valve for isolation, combination air and vacuum release valve, and pressure gage. A surge anticipation valve is provided on each of the discharge headers for both the high service and backwash pumps.
Condition Comments:	The High Service Pump Station Piping is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The pump station piping is required to deliver. Piping issues my take one or more pumps out of service.
Asset Value and Replacement Cost:	$40,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**High Service Pump Electrical and Controls**
Asset ID	**SW 16.3**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	All pumps will alternate as the lead pump. The pumps are installed with VFDs. Control of the high service pumps will normally be automatic by setting the H O A selector switches on "A" at the panels located at the pump stations. The operator will also be capable of selecting automatic or manual control via the central computer for the SCADA system. One or two of the pumps will normally run to meet the demands at the Pump Station.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	The controls are needed to automate operations. In the event the controls go down, the operators must manually operate the system.
Asset Value and Replacement Cost:	$30,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**High Service Pump Meter Vault**
Asset ID	**SW 17**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	15 years
Description:	The High Service Pump Meter Vault measures water from the high service pumps/ water into the distribution system.
Level of Service:	The High Service Pump Meter Vault shall be operational at all times. Times when this unit is inoperation should be limited.
Condition Comments:	The High Service Pump Meter Vault is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The metering vault is used to control the flow into the distribution network and provides beneficial data for pump operations.
Asset Value and Replacement Cost:	$9,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**High Service Pump Meter Vault concrete vault**
Asset ID	**SW 17.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	Long term asset
Description:	The high service meter vault is located in a concrete vault.
Condition Comments:	The High Service Pump Meter Vault concrete vault is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The vault is necessary to protect the meter.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Continue to ensure the structure is in acceptable condition.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**High Service Pump Meter**
Asset ID	**SW 17.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	15 years
Description:	The high service pump meter is a XX inch mag meter.
Condition Comments:	The High Service Pump Meter is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The meter provides beneficial information for pump controls. The high service pumps may still be able to be operated without the metering vault.
Asset Value and Replacement Cost:	$4,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**High Service Pump Meter Vault Controls**
Asset ID	**SW 17.3**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	A SCADA connection is provided to the meter.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	The controls are needed to automate operations. In the event the controls go down, the operators must manually operate the system.
Asset Value and Replacement Cost:	$5,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Backwash Pump**
Asset ID	**SW 18**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	15 years
Description:	The station also includes two (2) vertical turbine pumps that alternate to provide filter backwash. Each pump is rated at 2,000 gpm at 95.0' TDH complete with 100 Hp motors.
Level of Service:	The Backwash Pump shall be operational at all times.
Condition Comments:	The Backwash Pump is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The backwash pumps are required for membrane operations. These pumps must remain in operation for the plant to properly produce water. The pumps have redundancy with one pump being able to not be in operation.
Asset Value and Replacement Cost:	$135,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Backwash Pump Piping**
Asset ID	**SW 18.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	Similarly, the backwash pumps takes suction from the clear well. The 18" discharge header delivers treated water to the filter for use in cleaning filter membranes
Condition Comments:	The Backwash Pump Piping is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The backwash piping is needed for the backwash operations. Piping failure may result in one or both pumps being out of operation.
Asset Value and Replacement Cost:	$25,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Backwash Pumps**
Asset ID	**SW 18.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The station also includes two (2) vertical turbine pumps that alternate to provide filter backwash. Each pump is rated at 2,000 gpm at 95.0' TDH complete with 100 Hp motors.
Condition Comments:	The Backwash Pumps are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The backwash pumps are needed for the backwash procedure. Redundancy is provided with two pumps. One pump may be temporarily taken out of service.
Asset Value and Replacement Cost:	$80,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Backwash Pumps Electrical and VFDs**
Asset ID	**SW 18.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	15 years
Description:	Both of these pumps were installed with VFDs and are controlled via the Koch ultrafiltration control panel through the SCADA system. Alarms and operating conditions of the pump are displayed on the central computer for the SCADA system. The VFDs are located in the climate controlled Motor Control Center in the Filter Building.
Condition Comments:	The Backwash Pumps Electrical and VFDs are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The backwash electrical system are needed to operate the pumps. In the event that the controls become inoperable, the backwash pumping cannot be completed.
Asset Value and Replacement Cost:	$25,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Backwash Pump Controls**
Asset ID	**SW 18.4**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The backwash pump is operated automatically via the ultrafiltration controls and the plant SCADA system. The VFDs will adjust to deliver the desired volume of water to the filter's underdrain for washing the filters. Potential problems with the pumps are similar to those previously listed.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	The backwash pump controls are needed to operate the pumps. In the event that the controls become inoperable, the backwash pumping cannot be completed.
Asset Value and Replacement Cost:	$5,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Backwash Pump Metering Station**
Asset ID	**SW 19**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	15 years
Description:	The backwash metering station measures flow used for backwash.
Level of Service:	The Backwash Pump Metering Station shall be operational at all times. Times when this unit is inoperation should be limited.
Condition Comments:	The Backwash Pump Metering Station is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The backwash meter provides essential data for the control system to operate the backwash pumps. If the meter were to go down, the controls cannot properly operate and water could not be produced.
Asset Value and Replacement Cost:	$9,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Backwash Pump Meter Installation**
Asset ID	**SW 19.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	Long term asset
Description:	The backwash pump meter is located in a concrete vault.
Condition Comments:	The Backwash Pump Meter Installation is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The vault is necessary to protect the meter.
Asset Value and Replacement Cost:	Long term asset.
Recommendations for Unit:	Continue to ensure the structure is in acceptable condition.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Backwash Pump Metering Station**
Asset ID	**SW 19.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	15 years
Description:	The backwash meter is a 12 inch mag meter
Condition Comments:	The Backwash Pump Metering Station is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The meter provides necessary data for the backwash procedure and is required to operate the membrane system.
Asset Value and Replacement Cost:	$4,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Backwash Pump Metering Station Controls**
Asset ID	**SW 19.3**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	15 years
Description:	A SCADA connection is provided to the meter.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	The backwash meter controls are needed to operate the membrane system.
Asset Value and Replacement Cost:	$5,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Chemical Feed System - Chlorine**
Asset ID	**SW 20**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The purpose of the chlorine handling facility is to take gaseous chlorine from the chlorine cylinders and make a chlorine solution with sufficient strength to disinfect the water and provide chlorine residual in the distribution system.
Level of Service:	The Chemical Feed System - Chlorine shall be operational at all times.
Condition Comments:	The Chlorine feed system is in FAIR condition because it has been modified from the original design. The current chlorine feed system does not have the ability to pace chlorine based off flow rates exiting the plant. Instead a constant feed rate is set by the operators. This manual setting could cause residual problems.
Criticality Rating:	The chlorine feed system is required for the produced water to meet TCEQ water quality requirements. This system must be operated in a manner that injects the correct amount of chlorine.
Asset Value and Replacement Cost:	$90,000
Recommendations for Unit:	Continue to use the recently installed system. Modifications may be needed if the injection rate does not produce water with the correct residual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Chlorine Containers**
Asset ID	**SW 20.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The chlorine gas is delivered in a liquid state in one ton containers
Condition Comments:	The Chlorine Containers are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The storage containers are shipped to the treatment plant. Multiple containers should be available for use.
Asset Value and Replacement Cost:	$5,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Chlorine Injector**
Asset ID	**SW 20.2**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	Chlorine is fed to the chlorinators as a gas under vacuum, and is mixed with potable water at an injector.
Condition Comments:	The chorine injector is in FAIR condition because it has been modified from its original design. Injection is no longer able to be flow paced.
Criticality Rating:	The chlorine injector must inject the correct chlorine amount to produce water within the TCEQ residual limits.
Asset Value and Replacement Cost:	$60,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Chorine Detectors**
Asset ID	**SW 20.3**
Year Constructed:	2009
Condition Rating:	**F - Failed**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	0 years - Failed
Description:	Two (2) Chlorine Detectors with 4-20 mA output for tie into SCADA (one mounted in chlorine room and one at CIP Station).
Condition Comments:	The Chorine Detectors are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	These detectors are needed to regulate the chlorine injection.
Asset Value and Replacement Cost:	$3,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Chlorine Gas Masks**
Asset ID	**SW 20.4**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	Two (2) air tank type gas mask with 30 minute air supply and one (1) spare tank. Two (2) dust tight cabinets for each mask are provided along with wall mounts for air supply tanks.
Condition Comments:	The Chlorine Gas Masks are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	Chlorine gas masks are required for operator safety and must always be in good working condition.
Asset Value and Replacement Cost:	$2,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Chlorine Gas Feed Controls**
Asset ID	**SW 20.5**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The chlorinator feed rate is controlled by and Hand-Off-Auto selector. When in the hand position, the chlorinator is controlled by the operator through a Hand Controller. When in the automatic position, the chlorinator is controlled through the SCADA computer either automatically or manually. If the chlorinators are set to be controlled automatically, the chlorinators are controlled based on the raw water flow rate. If manual, the operator may control the chlorinators via the SCADA computer.
Condition Comments:	The chlorine controls from the original project have been removed and are no longer control by the SCADA system as outlined in the description. Instead, a chlorine injection rate is set by the operators.
Criticality Rating:	The feed controls all for the gas to be injected at the proper feed rate to meet TCEQ requirements. The controls must operate so that chlorine residual requirements are met.
Asset Value and Replacement Cost:	$20,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Chemical Feed System - Alum and Spare**
Asset ID	**SW 21**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	Aluminum sulfate is used as the coagulant and is applied to the raw water at the at the splitter box.
Level of Service:	The Chemical Feed System - Alum and Spare shall be operational at all times.
Condition Comments:	The Chemical Feed System - Alum and Spare is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	Alum is required for water treatment and must be available and injected at the correct dosage. This system must remain operational to produce water within TCEQ water quality requirements.
Asset Value and Replacement Cost:	$22,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Alum Storage**
Asset ID	**SW 21.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	Alum is purchased and stored in liquid form as aluminum sulfate in two (2) 6,400 gallon bulk storage tanks and two (2) 300 gallon day tanks.
Condition Comments:	The Alum Storage is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	Chemical storage tanks are needed to store chemical for operations. The bulk storage and day tanks are used in conjunction. Without these tanks the chemical is not available for use.
Asset Value and Replacement Cost:	$12,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Alum Metering Pumps**
Asset ID	**SW 21.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The chemical solution is fed through two duplex metering pump to two rapid mix chambers.
Condition Comments:	The Alum Metering Pumps are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The metering pumps are the only method for delivering the chemical to the injection point. Therefore the chemical pumps must remain operational. The city currently has spare metering pumps available in the case that a pump goes down.
Asset Value and Replacement Cost:	$4,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Spare Storage**
Asset ID	**SW 21.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	A 550 gallon bulk storage tank is provided to allow future application of chemical to the rapid mix area. This could be used for polymers supplied in bulk or other future chemicals as tested by the City.
Condition Comments:	The Spare Storage is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The spare storage is available for an additional chemical. This storage can be used to replace a damaged tank in the event that a tank goes down.
Asset Value and Replacement Cost:	$2,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Alum Controls**
Asset ID	**SW 21.4**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The bulk tank level is monitored locally at the tank and via a level transducer tied to the SCADA system. The SCADA system does not monitor the level of the day tanks. The speed of the chemical feed pumps is automated based on raw water flow and desired chemical feed dosage. The dosage is also “trimmed” based on pH and fluoride meters located in the plant. The speed of the pumps can also be controlled locally.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	The controls are needed to automate operations.
Asset Value and Replacement Cost:	$4,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Chemical Feed System - Caustic**
Asset ID	**SW 22**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	Caustic is provided primarily for pH adjustment after the filters.
Level of Service:	The Chemical Feed System - Caustic shall be operational at all times.
Condition Comments:	The Chemical Feed System - Caustic is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	Caustic is required for water treatment and must be available and injected at the correct dosage. This system must remain operational to produce water within TCEQ water quality requirements.
Asset Value and Replacement Cost:	$22,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Caustic Storage**
Asset ID	**SW 22.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	Caustic is purchased and stored in liquid form in one (1) 6,400 gallon bulk storage tank and two (2) day tanks, one 300 gallon bulk storage, one 55 gallon bulk storage.
Condition Comments:	The Caustic Storage is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	Chemical storage tanks are needed to store chemical for operations. The bulk storage and day tanks are used in conjunction. Without these tanks the chemical is not available for use.
Asset Value and Replacement Cost:	$12,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Caustic Metering Pumps**
Asset ID	**SW 22.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The chemical is fed through five duplex metering pumps.
Condition Comments:	The Caustic Metering Pumps are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The metering pumps are the only method for delivering the chemical to the injection point. Therefore the chemical pumps must remain operational. The city currently has spare metering pumps available in the case that a pump goes down.
Asset Value and Replacement Cost:	$4,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Caustic Injection Point**
Asset ID	**SW 22.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	Application points include the splitter box, the filter feed wet well, the pipelines leading from the membrane filters, and the neutralization tank.
Condition Comments:	The Caustic Injection Point is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The injection point is required for proper chemical delivery. The chemical piping and points must be maintained for effective delivery and usage.
Asset Value and Replacement Cost:	$2,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Caustic Controls**
Asset ID	**SW 22.4**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The bulk tank level is monitored locally at the tank and via a level transducer tied to the SCADA system. The SCADA system does not monitor the level of the day tanks. The speed of the chemical feed pumps is automated based on raw water flow and desired chemical feed dosage. The dosage is also “trimmed” based on pH and fluoride meters located in the plant. The speed of the pumps can also be controlled locally.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	The controls are needed to automate operations.
Asset Value and Replacement Cost:	$4,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Chemical Feed System - LAS**
Asset ID	**SW 23**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	Liquid Ammonium Sulfate (LAS) is injected simultaneously with Chlorine to form Chloramines for disinfection.
Level of Service:	The Chemical Feed System - LAS shall be operational at all times.
Condition Comments:	The Chemical Feed System - LAS is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	LAS is required for water treatment and must be available and injected at the correct dosage. This system must remain operational to produce water within TCEQ water quality requirements.
Asset Value and Replacement Cost:	$22,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**LAS Storage**
Asset ID	**SW 23.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	LAS is stored in one (1) 6,400 bulk storage tank and one (1) 300 gallon day tank.
Condition Comments:	The LAS Storage is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	Chemical storage tanks are needed to store chemical for operations. The bulk storage and day tanks are used in conjunction. Without these tanks the chemical is not available for use.
Asset Value and Replacement Cost:	$12,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**LAS Metering Pumps**
Asset ID	**SW 23.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	LAS is fed by three metering pumps. One metering pump can feed the splitter box or filter feed wet well, but not both (primary point is the splitter box). The other two metering pumps are dedicated to the two effluent lines from the membrane filters.
Condition Comments:	The LAS Metering Pumps are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The metering pumps are the only method for delivering the chemical to the injection point. Therefore the chemical pumps must remain operational. The city currently has spare metering pumps available in the case that a pump goes down.
Asset Value and Replacement Cost:	$4,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**LAS Injection Point**
Asset ID	**SW 23.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	Injection points include the splitter box, the filter feed wet well, and the two effluent lines from the membrane filters.
Condition Comments:	The LAS Injection Point is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The injection point is required for proper chemical delivery. The chemical piping and points must be maintained for effective delivery and usage.
Asset Value and Replacement Cost:	$2,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**LAS Controls**
Asset ID	**SW 23.4**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The bulk tank level is monitored locally at the tank and via a level transducer tied to the SCADA system. The SCADA system does not monitor the level of the day tanks. The speed of the chemical feed pumps is automated based on raw water flow and desired chemical feed dosage. The dosage is also “trimmed” based on pH and fluoride meters located in the plant. The speed of the pumps can also be controlled locally.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	The controls are needed to automate operations.
Asset Value and Replacement Cost:	$4,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Chemical Feed System - Fluoride**
Asset ID	**SW 24**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	Fluoride is added as hydrofluosilicic acid and is added to the finished water.
Level of Service:	The Fluoride injection should remain in service as deemed necessary by the city.
Condition Comments:	The Chemical Feed System - Fluoride is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	Fluoride is an optional chemical for water treatment and must be available and injected at the correct dosage. This system can be operated at the discretion of the city.
Asset Value and Replacement Cost:	$22,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Fluoride Storage**
Asset ID	**SW 24.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	Fluoride is added as hydrofluosilicic acid that is stored in 2,000 gallon bulk tank and fed from a 55 gallon day tank
Condition Comments:	The Fluoride Storage is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	Chemical storage tanks are needed to store chemical for operations. The bulk storage and day tanks are used in conjunction. Without these tanks the chemical is not available for use.
Asset Value and Replacement Cost:	$12,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Fluoride Metering Pumps**
Asset ID	**SW 24.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	Fluoride is injected using a metering pump.
Condition Comments:	The Fluoride Metering Pumps are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The metering pumps are the only method for delivering the chemical to the injection point. Therefore the chemical pumps must remain operational. The city currently has spare metering pumps available in the case that a pump goes down.
Asset Value and Replacement Cost:	$4,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Fluoride Injection Point**
Asset ID	**SW 24.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	Fluoride is added into the filtered water prior to the clear well.
Condition Comments:	The Fluoride Injection Point is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The injection point is required for proper chemical delivery. The chemical piping and points must be maintained for effective delivery and usage.
Asset Value and Replacement Cost:	$2,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Fluoride Controls**
Asset ID	**SW 24.4**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The bulk tank level is monitored locally at the tank and via a level transducer tied to the SCADA system. The SCADA system does not monitor the level of the day tanks. The speed of the chemical feed pumps is automated based on raw water flow and desired chemical feed dosage. The dosage is also “trimmed” based on pH and fluoride meters located in the plant. The speed of the pumps can also be controlled locally.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	The controls are needed to automate operations.
Asset Value and Replacement Cost:	$4,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Chemical Feed System - NaOCl and Citric Acid**
Asset ID	**SW 25**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	Sodium hypochlorite is used in the cleaning process of the membrane filters. Citric acid is used in the cleaning process of the membrane filters and also at the neutralization tank.
Level of Service:	The Chemical Feed System - NaOCl and Citric Acid shall be operational at all times.
Condition Comments:	The Chemical Feed System - NaOCl and Citric Acid is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	Citric Acid and NaOCl is required for the membrane system upkeep and must be available and injected at the correct dosage. This system must remain operational for the membrane system to be properly maintained.
Asset Value and Replacement Cost:	$36,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Fluoride Metering Pumps**
Asset ID	**SW 25.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	Sodium Hypochlorite is fed to the filters by one (1) metering pump.
Condition Comments:	The Fluoride Metering Pumps are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The metering pumps are the only method for delivering the chemical to the injection point. Therefore the chemical pumps must remain operational. The city currently has spare metering pumps available in the case that a pump goes down.
Asset Value and Replacement Cost:	$4,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**NaOCl Storage**
Asset ID	**SW 25.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	Sodium Hypochlorite is stored in two (2) 200 gallon totes. One tote will be in use while the other is standby.
Condition Comments:	The NaOCl Storage is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	Chemical storage tanks are needed to store chemical for operations. The bulk storage and day tanks are used in conjunction. Without these tanks the chemical is not available for use.
Asset Value and Replacement Cost:	$12,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Citric Acid Storage**
Asset ID	**SW 25.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	Citric acid is stored in two (2) 200 gallon totes. One tote is in use while another is in standby.
Condition Comments:	The Citric Acid Storage is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	Chemical storage tanks are needed to store chemical for operations. The bulk storage and day tanks are used in conjunction. Without these tanks the chemical is not available for use.
Asset Value and Replacement Cost:	$12,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Fluoride Metering Pumps**
Asset ID	**SW 25.4**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	Two metering pumps feed citric acid to the membrane filters and the neutralization tank.
Condition Comments:	The Fluoride Metering Pumps are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The metering pumps are the only method for delivering the chemical to the injection point. Therefore the chemical pumps must remain operational. The city currently has spare metering pumps available in the case that a pump goes down.
Asset Value and Replacement Cost:	$4,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**NaOCL and Citric Acid Controls**
Asset ID	**SW 25.5**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The bulk tank level is monitored locally at the tank and via a level transducer tied to the SCADA system. The SCADA system does not monitor the level of the day tanks. The speed of the chemical feed pumps is automated based on raw water flow and desired chemical feed dosage. The dosage is also “trimmed” based on pH and fluoride meters located in the plant. The speed of the pumps can also be controlled locally.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	The controls are needed to automate operations.
Asset Value and Replacement Cost:	$4,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sludge Thickener**
Asset ID	**SW 26**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The sludge thickener receives drain water from the reclaim ponds and the filter feed wet well, decant water from the centrifuge, sludge blowdown from the two clarifiers and also the initial sludge/water mixture when a clarifier is drained.
Level of Service:	The Sludge Thickener shall be operational at all times.
Condition Comments:	The Sludge Thickener is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The sludge thickener is required sludge settling. The city currently uses this basin to remove sludge for land application.
Asset Value and Replacement Cost:	$140,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sludge Thickener Structure/ Basin**
Asset ID	**SW 26.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	Long term asset
Description:	The basin is 45’ diameter by 22’ deep (from top of wall). Max side water depth is 20’.
Condition Comments:	The Sludge Thickener Structure/ Basin is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The thickener basin is required to hold sludge. This basin must remain structurally sound for the thickener to operate properly.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Continue to ensure the structure is in acceptable condition.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sludge Thickener Sludge Rake and Mechanical Drive**
Asset ID	**SW 26.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The sludge thickener includes a sludge rake arm complete with vertical arms for sludge mixing.
Condition Comments:	The Sludge Thickener Sludge Rake and Mechanical Drive is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The mechanical equipment is required to properly process the sludge and must remain operational for the unit to operate.
Asset Value and Replacement Cost:	$120,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sludge Thickener Piping**
Asset ID	**SW 26.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	Long term asset
Description:	Lines entering the tank include: • One 8” sludge blowdown line which originates at the clarifiers and at the filter feed wet well. • One 8” Line for reclaim pond drain • One 6” centrifuge decant line.
Condition Comments:	The Sludge Thickener Piping is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The sludge thickener piping is required for proper sludge processing and must be maintained to distribute the processed sludge and water.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sludge Thickener Telescoping Valve**
Asset ID	**SW 26.4**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	20 years
Description:	Water is decanted off the top of the sludge thickener to the sewer lift station via a telescoping valve. This valve has 4'-6" of travel with the maximum "up" elevation of 370. Sludge is drawn off the bottom of the sludge thickener via one of two 6" lines to the sludge pump station.
Condition Comments:	The Sludge Thickener Telescoping Valve is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The telescoping valve is required to set the sludge thickener hydraulics and must remain operational for proper operations.
Asset Value and Replacement Cost:	$4,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sludge Thickener Dewatering Manhole**
Asset ID	**SW 26.5**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	15 years
Description:	The Groundwater Dewatering Manhole receives groundwater flow from the sludge thickener station subdrainage system. The design of the plant's structures included subdrainage systems to maintain groundwater levels below the units. This helps to prevent structural problems from groundwater uplift on a unit when it is completely drained.
Condition Comments:	The Sludge Thickener Dewatering Manhole is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The sludge dewatering manhole is only needed when the thickener is taken out of operations.
Asset Value and Replacement Cost:	$6,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sludge Thickener Controls**
Asset ID	**SW 26.6**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The level of water in the sludge thickener will be measured by a sonic level transducer and monitored by the SCADA system. Low and high level alarms will signal if the level of water reaches either extreme. The rake drive motor will be controlled manually through a remote-off-run selector switch. When set to remote, control input can be provided via the SCADA system.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	The controls are needed to automate operations. In the event the controls go down, the operators must manually operate the system.
Asset Value and Replacement Cost:	$10,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sludge Pump Station**
Asset ID	**SW 27**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	The purpose of the sludge pump station is to transfer sludge from the sludge thickener to the centrifuge for dewatering and ultimate disposal.
Level of Service:	Since this unit is not primarily being used, the sludge pump station needs to remain operational through periodic operations.
Condition Comments:	The Sludge Pump Station is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The sludge pump station is required to pump the sludge to the centrifuge. Since sludge land application is used, this equipment is not essential.
Asset Value and Replacement Cost:	$135,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sludge Pump Station Building**
Asset ID	**SW 27.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	Long term asset
Description:	The sludge pump station building is 20’ wide x 24’ long. This building is recessed into the ground.
Condition Comments:	The Sludge Pump Station Building is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The sludge pump station building is required to house and protect the sludge pumping equipment. Since sludge land application is used, this equipment is not essential.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Continue to ensure the structure is in acceptable condition.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sludge Pump Station Pumps**
Asset ID	**SW 27.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	The sludge pump station contains one 3 Hp grinder and two (2) 10 Hp progressive cavity pumps. Each pump is rated at 250 gallons per minute at 300 rpm.
Condition Comments:	The Sludge Pump Station Pumps are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The sludge pumps are required to pump the sludge from the thickener to the centrifuge. Since sludge land application is used, this equipment is not essential.
Asset Value and Replacement Cost:	$80,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sludge Pump Station Sludge Grinder**
Asset ID	**SW 27.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	A sludge grinder is located ahead of the pumps for protection of the pumps and centrifuge.
Condition Comments:	The Sludge Pump Station Sludge Grinder is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The sludge grinder is required to prepare the sludge for pumping. Since sludge land application is used, this equipment is not essential.
Asset Value and Replacement Cost:	$35,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sludge Pump Station Piping**
Asset ID	**SW 27.4**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	The station also includes piping and valves that feed the pumps.
Condition Comments:	The Sludge Pump Station Piping is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The sludge pump station piping is required for proper sludge processing and must be maintained to distribute the processed sludge and water.
Asset Value and Replacement Cost:	$10,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sludge Pump Station Controls**
Asset ID	**SW 27.5**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	The pump motors have variable frequency drives. The rates of sludge flow to the centrifuge are controlled as part of the centrifuge operation. Ultrasonic flowmeter on the sludge discharge line allows measurement of sludge wasted from the sludge thickener.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	The controls are needed to automate operations. In the event the controls go down, the operators must manually operate the system.
Asset Value and Replacement Cost:	$10,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sludge Dewatering Centrifuge**
Asset ID	**SW 28**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	The sludge dewatering centrifuge dewaters the sludge from the plant.
Level of Service:	Since this unit is not primarily being used, the centrifuge needs to remain operational through periodic operations.
Condition Comments:	The Sludge Dewatering Centrifuge is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The centrifuge is a method to produce treatment plant sludge cake for land application or delivery to a landfill. Since sludge land application is used, this equipment is not essential.
Asset Value and Replacement Cost:	$390,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Centrifuge Equipment**
Asset ID	**SW 28.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	The centrifuge is manufactured by Alfa-Laval Inc and includes a rotating bowl and screw conveyor. The centrifuge includes a 60 Hp main bowl drive and 20 Hp back drive.
Condition Comments:	The Centrifuge Equipment is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The centrifuge is required to dewater the sludge. Since sludge land application is used, this equipment is not essential.
Asset Value and Replacement Cost:	$300,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Centrifuge Building**
Asset ID	**SW 28.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Non-Essential**
Estimated Remaining Life:	Long term asset
Description:	0
Condition Comments:	The Centrifuge Building is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The building is required to protect and house the centrifuge equipment. Since sludge land application is used, this equipment is not essential.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Continue to ensure the structure is in acceptable condition.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Centrifuge Knifegate**
Asset ID	**SW 28.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	A knifegate is located on the solids discharge side of the centrifuge to allow initial centrifuge discharge to route back to the sludge thickener until a consistent cake is produced.
Condition Comments:	The Centrifuge Knifegate is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The knifegate is required to deliver the sludge to the container below. Since sludge land application is used, this equipment is not essential.
Asset Value and Replacement Cost:	$40,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Centrifuge Polymer System**
Asset ID	**SW 28.4**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	The polymer system at the Centrifuge Building is dedicated solely to the Centrifuge and is provided complete with a polymer drum, mixing wand, and polymer feed chemical pump and piping.
Condition Comments:	The Centrifuge Polymer System is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The polymer system is required to inject chemical that allows the sludge to be dewatered. Since sludge land application is used, this equipment is not essential.
Asset Value and Replacement Cost:	$25,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Centrifuge Hoist and Trolley**
Asset ID	**SW 28.5**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	30 years
Description:	A hoist and trolley is provided to move replacement parts from the Centrifuge Buildings' second floor to ground level.
Condition Comments:	The Centrifuge Hoist and Trolley is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The hoist is needed to move the equipment in the event that is must be repaired. Since sludge land application is used, this equipment is not essential.
Asset Value and Replacement Cost:	$5,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Centrifuge Controls**
Asset ID	**SW 28.6**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	The centrifuge can be controlled either locally from its control panel or drive window PC tool or externally via the I/O connections on the RMIO board or fieldbus connection to the RMIO board. The centrifuge run time is monitored by the SCADA system.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	The controls are needed to automate operations. In the event the controls go down, the operators must manually operate the system.
Asset Value and Replacement Cost:	$20,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Reclaim Ponds**
Asset ID	**SW 29**
Year Constructed:	~1980
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	25 years
Description:	The function of the reclaim ponds is to hold filter backwash water prior to return to the head of the plant for treatment. The reclaim ponds can also accept sludge through the sludge bypass line from the sludge pump station at the centrifuge building in the event of an emergency. When the reclaim ponds need cleaning, they can also drain into the sludge thickener.
Level of Service:	The Reclaim Ponds shall be operational at all times.
Condition Comments:	The reclaim ponds are in FAIR condition due to their age and the accumulation of sludge since they were last cleaned out in 2009.
Criticality Rating:	The reclaim ponds are required to process the backwash water. The ponds must have available capacity for the backwash water. In the event that sludge accumulates, sludge must be removed from the ponds.
Asset Value and Replacement Cost:	$75,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Reclaim Ponds**
Asset ID	**SW 29.1**
Year Constructed:	~1980
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The old reclaim ponds were converted to recycle water storage. Both ponds are 110' x 150' x 2' deep and can hold up to 493,800 gallons between the two of them.
Condition Comments:	The reclaim ponds are in FAIR condition due to their age and the accumulation of sludge since they were last cleaned out in 2009.
Criticality Rating:	The reclaim ponds are required to process the backwash water. The ponds must have available capacity for the backwash water. In the event that sludge accumulates, sludge must be removed from the ponds.
Asset Value and Replacement Cost:	$50,000
Recommendations for Unit:	Remove sludge as needed.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Reclaim Pond Hydraulic Structures and Associated Piping**
Asset ID	**SW 29.2**
Year Constructed:	~1980
Condition Rating:	**C - Fair**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	30 years
Description:	Equipment in the reclaim ponds consists of concrete inlet and outlet boxes, connecting pipes, and gates valves for draining.
Condition Comments:	The reclaim pond hydraulic structures and associated piping is in FAIR condition due to its age.
Criticality Rating:	The hydraulic structures are needed for the ponds to properly flow water and feed the decant return pump station.
Asset Value and Replacement Cost:	$25,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Decant Return Pump Station**
Asset ID	**SW 30**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	15 years
Description:	The purpose of the decant water return pump station is to return water from the reclaim pond to the head of the plant for treatment with the raw water at a rate of approximately 10% of the plant flow.
Level of Service:	The raw water meter vault needs to remain operational at all time to properly maintain pump controls. This unit may be taken out of service for brief periods of time for annual calibration and repair.
Condition Comments:	The Decant Return Pump Station is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The decant return pump station benefits the plant through recycling water to the head of the plant. Without this unit, the plant would be fed entirely through raw water.
Asset Value and Replacement Cost:	$90,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Decant Return Pump Station Structure**
Asset ID	**SW 30.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	Long term asset
Description:	The decant water return pump station consists of a two chambers which house the decant return pumps between the two reclaim ponds. Water is allowed into the chambers via 24" x 24' downward opening slide gates. The pumps are rated at 250 gpm.
Condition Comments:	The Decant Return Pump Station Structure is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The pump station structure is required to house the decant pumps. The structure is required to operate the pump station.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Continue to ensure the structure is in acceptable condition.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Decant Return Pump Station**
Asset ID	**SW 30.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	15 years
Description:	The existing pump station is a duplex submersible with pump control panel, level control, float switches and motor starters.
Condition Comments:	The Decant Return Pump Station is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The pumps are required to operate the decant return pump station.
Asset Value and Replacement Cost:	$80,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Decant Return Pump Station Controls**
Asset ID	**SW 30.3**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	15 years
Description:	The decant return pump station is a duplex submersible unit controlled by the existing motor starter. The pump operator may control the pump locally through the existing pump control panel or through the SCADA system.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	The controls are needed to automate operations. In the event the controls go down, the operators must manually operate the system.
Asset Value and Replacement Cost:	$10,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Decant Return Meter**
Asset ID	**SW 31**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	15 years
Description:	The Decant Return Meter measures water from the reclaim ponds.
Level of Service:	The raw water meter vault needs to remain operational at all time to properly maintain pump controls. This unit may be taken out of service for brief periods of time for annual calibration and repair.
Condition Comments:	The Decant Return Meter is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The decant return water meter is needed to measure the decant water.
Asset Value and Replacement Cost:	$10,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Decant Return Meter Vault concrete vault**
Asset ID	**SW 31.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	Long term asset
Description:	The decant return meter vault is located in a concrete vault.
Condition Comments:	The Decant Return Meter Vault concrete vault is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The vault is necessary to protect the meter.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Continue to ensure the structure is in acceptable condition.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Decant Return Meter**
Asset ID	**SW 31.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	15 years
Description:	The high service pump meter is a 3 inch mag meter.
Condition Comments:	The Decant Return Meter is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The decant return water meter is needed to measure the decant water.
Asset Value and Replacement Cost:	$5,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Decant Return Meter Controls**
Asset ID	**SW 31.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	15 years
Description:	A SCADA connection is provided to the meter.
Condition Comments:	The controls are currently used to automatically operate this unit. Since the operator's have difficulty fully accessing the SCADA system, modifications are necessary to allow for proper adjustments.
Criticality Rating:	The controls are needed to automate operations. In the event the controls go down, the operators must manually operate the system.
Asset Value and Replacement Cost:	$5,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sewer Lift Station and Sewer Collection System**
Asset ID	**SW 32**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The Sewer Lift Station is located just east of the Neutralization Tank. The lift station can receive the following: • Raw Sewage from Filter Feed Building • Sludge Thickener Decant • Centrifuge Bypass (emergency only)
Level of Service:	The Sewer Lift Station and Sewer Collection System shall be operational at all times.
Condition Comments:	The Sewer Lift Station and Sewer Collection System is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The sewer lift station and collection system is required to collect and deliver wastewater to the treatment plant.
Asset Value and Replacement Cost:	$100,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sewer Lift Station Pumps**
Asset ID	**SW 32.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The lift station is equipped with two (2) 40 HP submersible pumps furnished by Smith Pump Company. Both pumps are rated at 400 GPM at 140' TDH. These pumps are capable of handling raw, unscreened sewage.
Condition Comments:	The Sewer Lift Station Pumps are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The sewer lift station pumps are required to pump the wastewater to the treatment plant. Since there are two pumps, one may temporarily go down or be not available for service.
Asset Value and Replacement Cost:	$60,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sewer Lift Station Electrical**
Asset ID	**SW 32.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	The pump station is complete with a control panel for automatic operation of pumps in a Nema 4X stainless steel enclosure with inner door.
Condition Comments:	The Sewer Lift Station Electrical is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The lift station electrical is needed to power and run the lift station.
Asset Value and Replacement Cost:	$10,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sewer Lift Station Valve Vault**
Asset ID	**SW 32.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	30 years
Description:	The valve vault is 7'-6"x10' and contains a drain so that any water entering the vault will drain into the wet well.
Condition Comments:	The Sewer Lift Station Valve Vault is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The lift station valve vault is required for the lift station operation.
Asset Value and Replacement Cost:	$15,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sewer Lift Station Controls**
Asset ID	**SW 32.4**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	15 years
Description:	Float switches located in the wet well controls the raw sewage pumps. These floats operate in conjunction with the pump control panel. The Lift Station wet well level will be transmitted to the SCADA computer where it can be monitored. The various low and high levels associated with the pump station can be programmed into the SCADA system so that alarms will sound in the instance that either of these levels occur.
Condition Comments:	The Sewer Lift Station Controls are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The sewer lift station controls are required to operate the pumps.
Asset Value and Replacement Cost:	$15,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Sewer Collection System**
Asset ID	**SW 32.5**
Year Constructed:	2009 and Prior
Condition Rating:	**B - Good**
Criticality Rating:	**3 - Highly Essential**
Estimated Remaining Life:	Long term asset
Description:	Gravity collection lines gather wastewater from the plant to the sewer lift station
Condition Comments:	The Sewer Collection System are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The sewer collection system is required to move wastewater to a point where it can be sent to the treatment plant.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Neutralization Tank**
Asset ID	**SW 33**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	50 years
Description:	The neutralization tank receives backwash waste water. Its primary purpose is to hold backwash water and provide an area for pH adjustment before the water is sent to the sewer lift station.
Level of Service:	The Neutralization Tank shall be operational at all times.
Condition Comments:	The Neutralization Tank is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The neutralization tank is needed to properly treat the backwash wastewater.
Asset Value and Replacement Cost:	$36,200
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Neutralization Tank Structure**
Asset ID	**SW 33.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	Long term asset
Description:	The Neutralization Tank is a 40'x20" structure located on the east side of the Filter Building
Condition Comments:	The Neutralization Tank Structure is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The tank structure must remain in good structural condition to hold water.
Asset Value and Replacement Cost:	Long term asset
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Neutralization Tank Mixer**
Asset ID	**SW 33.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	15 years
Description:	The Neutralization Tank is equipped with one (1) 10 Hp axial flow impeller type rapid mixer near the inlet of the pipe to provide mixing energy for the caustic or citric acid injected at that point.
Condition Comments:	The Neutralization Tank Mixer is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The tank mixer is needed for proper treatment. While the tank can still operate without the mixer, the mixer should only remain non-operational for short periods of time.
Asset Value and Replacement Cost:	$25,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Neutralization Tank PH Meters**
Asset ID	**SW 33.3**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	15 years
Description:	Two pH meters are provided to analyze the pH of the water near the inlet and outlet of the pipe to determine if the pH has been adjusted properly.
Condition Comments:	The Neutralization Tank PH Meters are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The pH neutralization meters are needed to measure the tank pH and control water quality.
Asset Value and Replacement Cost:	$1,200
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Neutralization Tank Solenoid Control Valve**
Asset ID	**SW 33.4**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	30 years
Description:	An electric solenoid controlled pneumatically operated butterfly valve is provided on the 12” line leading to the effluent chamber.
Condition Comments:	The Neutralization Tank Solenoid Control Valve is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	This valve is required for proper hydraulic controls. Without this valve, flow control is not effective.
Asset Value and Replacement Cost:	$5,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Neutralization Tank Controls**
Asset ID	**SW 33.5**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**2 - Essential**
Estimated Remaining Life:	15 years
Description:	The rapid mixer will be manually controlled either locally or remotely. Local control is provided by a Run-Off-Remote selector switch. When the switch is in the remote position, the mixer will be controlled manually by software on the SCADA computer. The pH meters installed at the Neutralization Tank will also be linked to and monitored at the SCADA computer. The software will be used to set predetermined low and high pH levels. An alarm will signal if the pH falls below or rises above either point. The butterfly valve will be controlled manually either locally or remotely through the SCADA computer. Local control will be achieved through an open/close/remote selector switch. When in the remote position, operator control will be done through the SCADA computer.
Condition Comments:	The Neutralization Tank Controls are in GOOD condition and only exhibit minor deterioration.
Criticality Rating:	The controls are needed to automate operations. In the event the controls go down, the operators must manually operate the system.
Asset Value and Replacement Cost:	$5,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Generator**
Asset ID	**SW 34**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years

Description:

The generator system serves the following in the case of power loss:
- 35 KW, 3-Phase Lighting Load
- Clarifier Rake Drives
- Clarifier Flocculators
- Sludge Thickener Rake Drive
- HVAC Compressor Units
- Raw Water Pump #1 #2
- Filter Feed Pump #1
- High Service Pump #1
- Plant Lift Pump #1
- Decant Return Pump #1

Level of Service: The Generator shall be operational at all times.

Condition Comments: The Generator is in GOOD condition and only exhibits minor deterioration.

Criticality Rating: The generator is required to operate the plant in the event of power loss. These must remain in operation at all times for compliance.

Asset Value and Replacement Cost: $160,000

Recommendations for Unit: Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Generator**
Asset ID	**SW 34.1**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The electrical system includes one generator rated at 277/480 volt, 3-phase, 4-wire, 600 KW, 750 KVA, 901 ampere unit system.
Condition Comments:	The Generator is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The generator is required to operate the plant in the event of power loss. These must remain in operation at all times for compliance.
Asset Value and Replacement Cost:	$150,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Generator Fuel Tank**
Asset ID	**SW 34.2**
Year Constructed:	2009
Condition Rating:	**B - Good**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The generator is diesel fueled and located south of the Filter Feed Building.
Condition Comments:	The Generator Fuel Tank is in GOOD condition and only exhibits minor deterioration.
Criticality Rating:	The generator fuel tank is needed to store fuel so the generator can operate for the correct period of time.
Asset Value and Replacement Cost:	$10,000
Recommendations for Unit:	Continue to maintain the unit per the operations and maintenance manual.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Water Treatment Controls**
Asset ID	**SW 35**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The water treatment plant is controlled through a SCADA system and controls implemented by Koch membrane. Through equipment control panels, the operators have the ability to disengage the automatic SCADA controls and either turn the equipment off or turn the equipment on by hand.
Level of Service:	The Water Treatment Controls shall be operational at all times.
Condition Comments:	The treatment plant controls are in FAIR condition because the operators do not have full access and understanding on how to use the system.
Criticality Rating:	The water treatment controls occur through SCADA and a control system that is operated by Koch membrane. These controls must properly operate for treatment to occur.
Asset Value and Replacement Cost:	$675,000
Recommendations for Unit:	Work with SCADA rep to ensure controls are properly configured for proper operator access.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**SCADA System Computer and Controls**
Asset ID	**SW 35.1**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	The SCADA computer is located in the Filter Building along with the Membrane Filter Monitor. In addition to the SCADA computer, the membrane filtration system is run by a separate computer. The membrane filtration computer controls all components of the membrane filters plus the filter feed pumps and the backwash pumps. While the SCADA system may not control these units, it can monitor them.
Condition Comments:	The treatment plant controls are in FAIR condition because the operators do not have full access and understanding on how to use the system.
Criticality Rating:	The SCADA system operates treatment units apart form the Koch membrane system. These SCADA controls can be taken offline and the units operated manually.
Asset Value and Replacement Cost:	$400,000
Recommendations for Unit:	Work with SCADA rep to ensure controls are properly configured for proper operator access.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Koch Membrane Controls**
Asset ID	**35.2**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**5 - Highly Critical**
Estimated Remaining Life:	15 years

Description:

The Koch membrane treatment system is directly controlled by a system developed by Koch. The Koch controls direct the components that are listed in the Koch membrane O&M manuals.

Automatic control of the membrane filtration system is achieved by the membrane filter computer that has been provided and programmed by KOCH. The valves that control flow to the neutralization tank or reclaim pond are controlled via the SCADA system.

The membrane filter system consists of all units controlled by the membrane filter computer as well as the associated piping, valves, and electronic monitoring equipment. This includes all equipment between the filter feed wet well and the ground storage tank as well as the backwash pumps at the high service pump-station. The membrane filter system operates under various cycles and is controlled automatically via the membrane filter computer supplied by KOCH. The only exceptions are the valves that control whether filter waste flows to the neutralization tank or the filter feed pond. These valves are controlled by the SCADA computer.

Condition Comments:

The treatment plant controls are in FAIR condition because the operators do not have full access and understanding on how to use the system.

Criticality Rating:

The Koch membrane controls are vital for properly operating the membrane system. These controls must remain in service for treatment to occur.

Asset Value and Replacement Cost:

$200,000

Recommendations for Unit:

Continue to maintain Koch controls through agreements with the Koch.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Distribution System SCADA controls**
Asset ID	**35.3**
Year Constructed:	2009
Condition Rating:	**C - Fair**
Criticality Rating:	**4 - Critical**
Estimated Remaining Life:	15 years
Description:	Controls were added to Depot and Royal tanks with the high service pump controlled by the level in the depot tank.
Condition Comments:	The treatment plant controls are in FAIR condition because the operators do not have full access and understanding on how to use the system.
Criticality Rating:	Without the distribution network connected to the SCADA system, the controls must be operated manually by the operators. The level sensors in the tanks allow the operators to respond to the tank levels.
Asset Value and Replacement Cost:	$75,000
Recommendations for Unit:	Work with SCADA rep to ensure controls are properly configured for proper operator access.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Old Plant Building and Other Unused Plant Items**
Asset ID	**SW 36**
Year Constructed:	2009
Condition Rating:	**D - Poor**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	There are unused plant building and tanks that are no longer in operation.
Level of Service:	The existing unused plant items need to be up kept to ensure they do not harbor vectors.
Condition Comments:	The old plant building and other unused plant items are in POOR condition due to their deteriorated and unusable condition.
Criticality Rating:	The old plant buildings do not harm the current plant operations but will continue to deteriorate.
Asset Value and Replacement Cost:	$113,000
Recommendations for Unit:	Remove equipment and structures as funds allow.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Old Plant Building**
Asset ID	**SW 36.1**
Year Constructed:	2009
Condition Rating:	**D - Poor**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	The old plant building remains including the old pumps, pipes, and filter beds.
Condition Comments:	The old plant building is in POOR condition due to its deteriorated nature.
Criticality Rating:	The old plant building does not harm the current plant operations but will continue to deteriorate.
Asset Value and Replacement Cost:	$100,000
Recommendations for Unit:	Remove equipment and building as funds allow.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Powdered Activated Carbon Building**
Asset ID	**SW 36.2**
Year Constructed:	2009
Condition Rating:	**D - Poor**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	The powdered activated carbon building houses unused equipment that was used with the old plant.
Condition Comments:	The activated carbon building is in POOR condition because it houses unused equipment and the building is no longer maintained. The building is still usable.
Criticality Rating:	The powdered activated carbon building does not harm the current plant operations but continue to deteriorate.
Asset Value and Replacement Cost:	($2,000)
Recommendations for Unit:	Remove Powdered activated carbon equipment through auction or sale. Building can be used for storage.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Old Clearwell**
Asset ID	**SW 36.3**
Year Constructed:	2009
Condition Rating:	**D - Poor**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	The old clearwell is unusable but remains onsite.
Condition Comments:	The old clearwell is unusable/ in POOR condition and can no longer hold water.
Criticality Rating:	The old clearwell carbon building does not harm the current plant operations but continue to deteriorate.
Asset Value and Replacement Cost:	$10,000
Recommendations for Unit:	Remove clearwell as funds allow.

City of Marlin, Texas
Surface Water Treatment Plant
Asset Management Plan (2015)

Asset Name:	**Old High Service Pump Station**
Asset ID	**SW 36.4**
Year Constructed:	2009
Condition Rating:	**D - Poor**
Criticality Rating:	**1 - Non-Essential**
Estimated Remaining Life:	15 years
Description:	The old high service pump station remains onsite and is not usable. Pumps, piping, and electrical remain.
Condition Comments:	The old high service pump station building is in POOR condition because the station is no longer operational. The building may be used for other purposes is the existing equipment is taken out.
Criticality Rating:	The old high service pump station does not harm the current plant operations but continue to deteriorate.
Asset Value and Replacement Cost:	$5,000
Recommendations for Unit:	Remove equipment from building and use space building for storage.