SAW Section 603 Report

September 30, 2017

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Stormwater, Asset Management, and Wastewater
Wastewater Asset Management Plan
Executive Summary

Intra-County Drainage Board for the Eight and One-Half Mile Relief Drain
23001 Nine Mile Road, St. Clair Shores, MI 48080
Brian Baker, Chief Deputy Macomb County Public Works Commissioner
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SAW Grant Project Number 1173-01

Executive Summary

The Macomb County Public Works Commissioner's Office (MCPWC), on behalf of the Eight and One-Half Mile Relief Drain Drainage District (District), was awarded a grant by the Michigan Department of Environmental Quality (MDEQ) under the Stormwater, Asset Management, and Wastewater (SAW) Program. The total eligible cost was $1,220,838, less a match of $138,543, for a total grant amount of $1,082,295. The grant was divided into three components: Design Engineering Costs, User Charge System Development Costs, and a Wastewater Asset Management Plan (AMP) cost. The AMP eligible cost was $1,171,503.

The objective of an AMP is to meet the required Level of Service (LOS) in the most cost-effective manner through the proper maintenance of the assets. For MCPWC this includes providing a summary of the condition of the assets within the District, a basis for prioritizing the rehabilitation/replacement of the assets, an updated Operation and Maintenance (O&M) Program to routinely maintain the assets, and an assessment of the effect of implementing these tasks on the rates. According to the requirements of the MDEQ, an AMP should include at a minimum the following five components:

1. Asset Inventory and Condition Assessment
2. Level of Service
3. Asset Criticality
4. Revenue Structure
5. Capital Improvement Plan

The approach for this AMP followed MDEQ's five core grant components, as well as additional items specifically requested by the MCPWC staff in the grant application. The work completed under the SAW Grant included the components described below.

Wastewater Asset Inventory

The District is organized under Chapter 20 of the Michigan Drain Code (Act 40 of 1956). Construction of the system began in 1960 with the 8 1/2 Mile Relief Drain, followed by the construction of the Chapaton Pumping Station and Storage Basin in 1964. In 1978, major upgrades to the basin occurred, including adding flushing and disinfection systems (Chapaton East). This converted the basin to a Retention Treatment Basin (RTB). Another major upgrade occurred in the early 2000s that added an aeration system and the treatment canal and control structure. Currently, the District is divided into six facilities:

1. 8 1/2 Mile Relief Drain (8DR)
2. 9 Mile Emergency Bypass (9EB)
3. Chapaton Pump Station (CHA-PS)
4. Chapaton Retention Treatment Basin (CHA-RTB)
5. Chapaton East Building (CHA-EB)
6. Chapaton Canal Control Structure (CHA-CCS)

The project effort to locate and identify the system's horizontal and vertical assets involved the following steps:

1. Collected 28 existing plans and record drawings of the system, scanned them, and incorporated them into the MCPWC inventory.
2. Developed an asset definition to determine which system components were valued as an asset.
3. Using the asset definition, developed a total of approximately 229 different asset classes to represent the District asset types, including sewer pipes; manholes; process equipment; structures; buildings; site utilities; electrical systems; and heating, ventilation, and air conditioning equipment. Developed corresponding attribute lists for each of the 229 asset classes. Of those 229 asset classes, 113 were used in the District.
4. Reviewed existing records and conducted site visits to develop an inventory of the District assets, including:
    a. 158 manholes
    b. 157 pipe segments and 5 box pipe segments
    c. 541 vertical assets
5. Developed a unique naming convention for the District assets that incorporated the facility and asset class.
6. The County purchased a new Computerized Maintenance Management System (CMMS) and AMP software called NEXGEN, to be used for storing all information County-wide.
7. Collected attribute information for the above assets, including equipment and process descriptions, critical attribute information, age, remaining useful life, and replacement costs. Incorporated the information into the NEXGEN Asset Management Database (AMD).
8. Developed process and instrumentation diagrams (P&IDs) of the system.
9. Developed one-line diagrams of the electrical system.
10. Generated a three-dimensional (3D) model of the facilities and developed updated reference drawings of the facilities that incorporated the new asset naming convention.

Condition Assessment

1. Manhole inspections were performed in 2012 on the majority of the manholes in the system. That information was scanned and updated using the current naming convention. The inspection forms, as well as the results of the inspection, were incorporated into the County's AMD.
2. Closed circuit television (CCTV) inspection of the sewers was performed in 2013. The results were converted to a Pipeline Assessment and Certification Program (PACP) rating as part of the SAW Grant Program. The inspection forms, and the results of the inspection, were incorporated into the County's AMD.
3. Site visits were conducted to visually inspect and assess the condition of each vertical asset, based on criteria established for each asset class. The condition assessment forms and resulting 1 through 5 condition ratings were incorporated into the County's AMD.
4. The results of the assessment indicated:
    a. The sewers are in good condition with only three segments that have a structural condition rating score above a 4.0.
    b. Only one manhole had a structural condition rating score above 3.5, and it was repaired in 2015. No manholes had an O&M condition rating score above 3.5.
    c. There were nine vertical assets (less than 2%) with an overall condition rating score of 3.5 or greater. The majority of these assets were lighting fixtures. The 18-inch high decorative north perimeter brick wall of the CHA-RTB is deteriorating and will need repair soon, but provides no structural importance.

Level of Service Determination

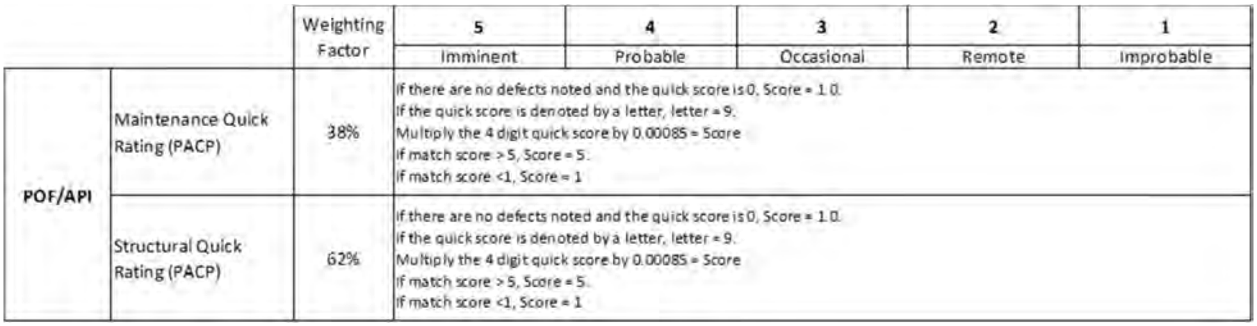
The MCPWC developed an LOS for the District based on commitments to their customers and the MDEQ, which included:

1. Safeguard public health and the environment.
2. Meet MDEQ requirements for effluent discharge loading limits.
3. Operate the system to ensure it has sufficient capacity to reduce the number of discharges to the minimum necessary.
4. Maintain the equipment and assets at a level that meets customer and regulatory needs and requirements.

Criticality of Assets

1. Assigned a Probability of Failure (POF) rating for each asset based on the condition of the asset, and its age or remaining life. The rating criteria was different for pipes, manholes, and vertical assets as follows:

Pipe Probability of Failure



		Weighting Factor	5	4	3	2	1
			Imminent	Probable	Occasional	Remote	Improbable
POF/API	Maintenance Quick Rating (PACP)	38%	If there are no defects noted and the quick score is 0, Score = 1.0. If the quick score is denoted by a letter, letter = 9. Multiply the 4 digit quick score by 0.00085 = Score If match score > 5, Score = 5. If match score <1, Score = 1				
	Structural Quick Rating (PACP)	62%	If there are no defects noted and the quick score is 0, Score = 1.0. If the quick score is denoted by a letter, letter = 9. Multiply the 4 digit quick score by 0.00085 = Score If match score > 5, Score = 5. If match score <1, Score = 1				

Manhole Probability of Failure

		Weighting Factor	5	4	3	2	1
			Imminent	Probable	Occasional	Remote	Improbable
POF/API	Maintenance Quick Rating (MACP)	38%	Calculated from a Level 1 Manhole Inspection Form				
	Structural Quick Rating (MACP)	62%	Calculated from a Level 1 Manhole Inspection Form				

Vertical Asset Probability of Failure

		Weighting Factor	5	4	3	2	1
			Imminent	Probable	Occasional	Remote	Improbable
POF/API	Condition Assessment or ACI	80%	Very Poor (ACI = 5)	Poor (ACI = 4)	Fair (ACI = 3)	Good (ACI = 2)	Very Good (ACI = 1)
	Useful Life Expended	20%	Percent of Useful Life Expended: 100%	Percent of Useful Life: 90-100%	Percent of Useful Life: 80-90%	Percent of Useful Life: 60-80%	Percent of Useful Life: <60%

2. Assigned a Consequence of Failure (COF) rating for each asset to reflect its importance to the system and the resulting disruption or difficulty of repair/replacement if failure occurs, based on the following criteria:

Consequence of Failure (All Assets)

		Weighting Factor	5	4	3	2	1
			Catastrophic Disruption	Major Disruption	Moderate Disruption	Minor Disruption	Insignificant Disruption
COF/All	Process Impact	20%	Mission Critical - Unable to accomplish mission	Process shutdown	Loss of redundancy	Potential process upset	No impact on process
	Financial Impact	16%	Major Cost (> $10Million)	Significant Cost ($1,000,000-$10,000,000)	Moderate Cost ($500,000-$1,000,000)	Minor Cost ($10,000-$500,000)	Insignificant ($1-$10,000)
	Safety	16%	Loss of Life	Severe Injury to employees or public	Minor injury requiring treatment off-site or lost time	Minor injury requiring no medical treatment with no lost time	No injury
	Environmental / Regualtory Impact	16%	Enforcement action with fines or ACO	Violation with minor enforcement action	Techincal violation, but no enforcement action	Localized and minimal impact on the environment and ecosystem	100% compliance with permits
	Disruption to the Community	16%	Long term impact; area-wide disruption	Short term impact but substantial disruption	Sporadic service disruptions	Minor Disruption	No disruption
	Required Response Time	16%	1/2 hour	1/2 hour to 2 hours	2 to 4 hours	4 to 8 hours	>8 hours

3. Multiplied the POF and the COF to compute the Business Risk Exposure (BRE) score for each asset, representing the asset's criticality on a scale of 1 to 25. The BRE score serves as a tool for prioritizing repair/replacement.

There were only two assets that had a BRE score greater than 16 and those were pipe segments. One pipe segment had spalling at the joint and the other included some visible reinforcement at the joint. The MCPWC will monitor the condition of the two pipe segments during the next round of sewer televising.

The highest score for a vertical asset was the CHA PS 800 Amp Breaker Electrical Sub Station with a BRE of 11.65, followed by the Motor Control Center at the pump station with a BRE of 11.04.

Operation and Maintenance Strategies

1. Reviewed current preventative maintenance history and system operations.
2. Identified gaps in the Preventative Maintenance Program and in system operations.
3. Developed a revised Preventative Maintenance Program outlining tasks by asset, and incorporated the program into the County's AMD for scheduling and recording work orders.
4. Reviewed current staffing plan and updated it based on the hours and staff needed to comply with the revised Preventative Maintenance Program.
5. Updated the O&M Manual for the District to include new assets and updated operational procedures.

Green Infrastructure

1. Assessed whether installing green infrastructure components in the District would alleviate runoff in excess of the 1-year, 1-hour storm in attempt to reduce the load on the CHA-RTB and subsequently the discharges to Lake St. Clair.
2. Determined which GI methods would be appropriate in the District.

Energy Audit

1. Reviewed the energy studies performed over the last 10 years.
2. Determined that no additional recommendations for energy savings should be implemented.

Revenue Considerations

The District is organized under Chapter 20 of the Michigan Drain Code (Act 40 of 1956) and the costs associated with operating and maintaining the drainage system are apportioned to the following agencies:

City of St. Clair Shores: 25.12872%
City of Eastpointe: 54.33467%
County of Macomb: 4.49975%
State of Michigan: 16.03686%
Total 100.00000%

Since the apportionment has already been agreed on and the District Board annually approves the budget as is, there are no gaps in the funding of each year's budget. As a result, a rate analysis was not needed for the system to identify any gaps in the funding.

Capital Improvement Plan

Working in the AMD and using the BRE, remaining useful life, previous CIPs, and repair/replacement costs, developed 5-year and a 20-year CIPs that include:

1. Grouping projects based on the type of work and asset classes.
2. A schedule for the repair/replacement projects through the year 2037.
3. Anticipated project costs and annual system costs through the year 2037.

Major projects anticipated to begin in the next few years are:

- Study – Disinfection System Improvements
- Study – Canal Stabilization
- Study – Basin Segmentation
- Design – Heating, Ventilation, and Air Conditioning (HVAC) Upgrade Program
- Design – Accumulator System "A" Upgrade
- Installing a Flow Metering System
- Updating the Canal Sampling System (Based on new National Pollutant Discharge Elimination System [NPDES] requirements)
- Pumping and Screening Improvements at the CHA-PS
- Updating Security Fence Structures Around Gate Actuators

List of Major Assets

As listed earlier, the District is divided into six facilities:

1. 8 1/2 Mile Relief Drain (8DR)
2. 9 Mile Emergency Bypass (9EB)
3. Chapaton Pump Station (CHA-PS)
4. Chapaton Retention Treatment Basin (CHA-RTB)
5. Chapaton East Building (CHA-EB)
6. Chapaton Canal Control Structure (CHA-CCS)

Within these facilities are:
1. 158 manholes
2. 157 pipe segments and 5 box pipe segments
3. 541 vertical assets

A copy of the major vertical assets is attached.

8 ½ MILE RELIEF DRAIN DRAINAGE DISTRICT
Vertical Asset Inventory Summary

No.	AssetName	Description	CategoryName	ClassName
1	8DR-LS-20	8DR LS-20 Level Sensor @ Rosedale	Ultrasonic Level Instrument	SCADA
2	9EB-ACCMSYS-D	9EB Hydraulic Accumulator System D (Effluent Gates)	Hydraulic Pressure Accumulator	9EB
3	9EB-BARSCN-EF	9EB Bar Screen - Effluent Bar Rack	Bar Screen	Screens
4	9EB-CP-ACC-D	9EB Accumulator D - Control Panel	Control Panel	SCADA
5	9EB-G-9M-DW	9EB 9 Mile Bypass Dewatering Gate	Sluice Gate	Gates
6	9EB-GA-9M-DW	9EB 9 Mile Bypass Dewatering Gate - Actuator	Electric Actuator	Gates
7	9EB-GA-EF1	9EB Effluent Gate 1 - Actuator	Hydraulic Actuator	Gates
8	9EB-GA-EF2	9EB Effluent Gate 2 - Actuator	Hydraulic Actuator	Gates
9	9EB-GA-IN1	9EB Influent Gate 1 - Actuator	Hydraulic Actuator	Gates
10	9EB-GA-IN2	9EB Influent Gate 2 - Actuator	Hydraulic Actuator	Gates
11	9EB-G-EF1	9EB Effluent Gate 1	Sluice Gate	Gates
12	9EB-G-EF2	9EB Effluent Gate 2	Sluice Gate	Gates
13	9EB-G-IN1	9EB Influent Gate 1	Sluice Gate	Gates
14	9EB-G-IN2	9EB Influent Gate 2	Sluice Gate	Gates
15	9EB-GMOT-9M-DW	9EB 9 Mile Bypass Dewatering Gate - Actuator Motor	Motor	Gates
16	9EB-LS-9METG	9EB LS-9METG Level Sensor E of Tide Gates	Ultrasonic Level Instrument	SCADA
17	9EB-P-ACCMD-1	9EB Hydraulic Accumulator D - Gear Pump 1	Gear Pump	Pumps
18	9EB-P-ACCMD-2	9EB Hydraulic Accumulator D - Gear Pump 2	Gear Pump	Pumps
19	9EB-PMOT-ACCMD-1	9EB Hydraulic Accumulator D - Gear Pump 1 - Motor	Motor	Pumps
20	9EB-PMOT-ACCMD-2	9EB Hydraulic Accumulator D - Gear Pump 2 - Motor	Motor	Pumps
21	9EB-SECFNC-1	9EB Security Fence Structure - around 9M Influent Gate Actuators	Fence	Gates
22	9EB-SECFNC-2	9EB Security Fence Structure - around 9M Effluent Gate Actuators 1 and 2	Fence	Gates
23	9EB-SECFNC-3	9EB Security Fence Structure - around 9M dewatering gate	Fence	Gates
24	CHA-CCS-BLDG	CHA-CCS Building	Small Building	Building
25	CHA-CCS-COMP	CHA-CCS Air Compressor - Outfall Sampling	Reciprocating Compressor	Building
26	CHA-CCS-CP-GATE	CHA-CCS Sluice Gate Interface Panel	Local Control Panel	SCADA
27	CHA-CCS-DM	CHA-CCS Motorized Damper	Damper/Louver	HVAC
28	CHA-CCS-FAN	CHA-CCS Exhaust Fan	Fan	HVAC
29	CHA-CCS-GA-OUT1	CHA-CCS Outfall Gate 1 - Actuator	Electric Actuator	Gates
30	CHA-CCS-GA-OUT2	CHA-CCS Outfall Gate 2 - Actuator	Electric Actuator	Gates
31	CHA-CCS-GA-OUT3	CHA-CCS Outfall Gate 3 - Actuator	Electric Actuator	Gates
32	CHA-CCS-GA-OUT4	CHA-CCS Outfall Gate 4 - Actuator	Electric Actuator	Gates
33	CHA-CCS-GA-OUT5	CHA-CCS Outfall Gate 5 - Actuator	Electric Actuator	Gates
34	CHA-CCS-GMOT-OUT1	CHA-CCS Outfall Gate 1 - Actuator Motor	Motor	Gates
35	CHA-CCS-GMOT-OUT2	CHA-CCS Outfall Gate 2 - Actuator Motor	Motor	Gates
36	CHA-CCS-GMOT-OUT3	CHA-CCS Outfall Gate 3 - Actuator Motor	Motor	Gates
37	CHA-CCS-GMOT-OUT4	CHA-CCS Outfall Gate 4 - Actuator Motor	Motor	Gates
38	CHA-CCS-GMOT-OUT5	CHA-CCS Outfall Gate 5 - Actuator Motor	Motor	Gates
39	CHA-CCS-G-OUT1	CHA-CCS Outfall Gate 1 - Discharge	Sluice Gate	Gates
40	CHA-CCS-G-OUT2	CHA-CCS Outfall Gate 2 - Discharge	Sluice Gate	Gates
41	CHA-CCS-G-OUT3	CHA-CCS Outfall Gate 3 - Flushing	Sluice Gate	Gates
42	CHA-CCS-G-OUT4	CHA-CCS Outfall Gate 4 - Discharge	Sluice Gate	Gates
43	CHA-CCS-G-OUT5	CHA-CCS Outfall Gate 5 - Discharge	Sluice Gate	Gates
44	CHA-CCS-LAUNCH	CHA-CCS Boat Launch	Boat Launch	Building
45	CHA-CCS-LP-1A	CHA-CCS Lighting Panel (LP-1A)	Distribution Panel	Lighting
46	CHA-CCS-LS-BS	CHA-CCS LS-BS Level Sensor - Basin Side (Canal)	Ultrasonic Level Instrument	SCADA
47	CHA-CCS-LS-LS	CHA-CCS LS-LS Level Sensor - Lake Side	Ultrasonic Level Instrument	SCADA
48	CHA-CCS-LT-EX	CHA-CCS Exterior Lighting - Building Mounted and Light Posts	Outside Lighting	Lighting
49	CHA-CCS-LT-IN	CHA-CCS Interior Lighting	Inside Lighting	Lighting
50	CHA-CCS-LUV	CHA-CCS Louver - CS Building	Damper/Louver	HVAC
51	CHA-CCS-PLT	CHA-CCS Access Platform + Guardrail	Platform	Control Structure
52	CHA-CCS-PP-A	CHA-CCS Power Panel (PP-A)	Distribution Panel	Power
53	CHA-CCS-P-SUMP	CHA-CCS Outfall Sample Pump	Submersible Centrifugal Pump	Pumps
54	CHA-CCS-RTNWALL	CHA-CCS Seawall Sheeting - Canal & Control Structure	Retaining Wall	Canal
55	CHA-CCS-TRNF	CHA-CCS Distribution Transformer	Transformer	Power
56	CHA-CCS-UH	CHA-CCS Electric Unit Heater	Heater	HVAC
57	CHA-CCS-V-BFP	CHA-CCS Backflow Preventer (BFPD)	Backflow Device	Building
58	CHA-EB-AERDIFF	CHA-EB Aeration Diffusers - Weir Overflow	Diffuser	Diffusers
59	CHA-EB-ARROW-505	CHA-EB Arrow Board	Arrow Board	Miscellaneous
60	CHA-EB-BARSCN	CHA-EB Flushing Intake Screen	Bar Screen	Screen
61	CHA-EB-BASK	CHA-EB Basket Strainers - Chem Feed (1, 2, 3, 4, 5)	Filter/Strainer	Piping
62	CHA-EB-BLOW-1	CHA-EB Aeration Blower 1	Positive Displacement Blower	Blowers
63	CHA-EB-BLOW-2	CHA-EB Aeration Blower 2	Positive Displacement Blower	Blowers
64	CHA-EB-BLOW-3	CHA-EB Aeration Blower 3	Positive Displacement Blower	Blowers
65	CHA-EB-BLOW-FP	CHA-EB Flushing Pit Exhaust Fan	Centrifugal Blower	HVAC
66	CHA-EB-BLOW-RTB-N	CHA-EB RTB Ventilation Blower - N	Centrifugal Blower	RTB Ventilation Blowers
67	CHA-EB-BLOW-RTB-S	CHA-EB RTB Ventilation Blower - S	Centrifugal Blower	RTB Ventilation Blowers
68	CHA-EB-BMOT-1	CHA-EB Aeration Blower Motor 1	Motor	Blowers
69	CHA-EB-BMOT-2	CHA-EB Aeration Blower Motor 2	Motor	Blowers
70	CHA-EB-BMOT-3	CHA-EB Aeration Blower Motor 3	Motor	Blowers
71	CHA-EB-BMOT-RTB-N	CHA-EB RTB Ventilation Blower - N - Motor	Motor	RTB Ventilation Blowers
72	CHA-EB-BMOT-RTB-S	CHA-EB RTB Ventilation Blower - S - Motor	Motor	RTB Ventilation Blowers
73	CHA-EB-CHMDIFF-9EB	CHA-EB Chem Diffusers - 9EB	Diffuser	Piping
74	CHA-EB-CHMDIFF-SWP	CHA-EB Chem Diffusers - SWP	Diffuser	Piping
75	CHA-EB-COMP-1	CHA-EB Air Compressor - 1	Reciprocating Compressor	Miscellaneous
76	CHA-EB-COMP-RTB-DIF	CHA-EB Air Compressor - RTB Aeration Diffusers	Reciprocating Compressor	Miscellaneous
77	CHA-EB-CP-2	CHA-EB Chem Feed Control Panel 2 (CP-2)	Local Control Panel	Controls
78	CHA-EB-CP-200	CHA-EB Aeration Blower Control Panel (CP-200)	Local Control Panel	Controls
79	CHA-EB-CP-3	CHA-EB Chem Feed Control Panel (CP-3)	Local Control Panel	Controls
80	CHA-EB-CP-FLSH	CHA-EB Flushing Pump Control Panel	Local Control Panel	Controls
81	CHA-EB-CP-INST	CHA-EB OIT Station - Main Control Center	Screen-OIT	Controls
82	CHA-EB-CP-KEYSC	CHA-EB Keyscan Control Panel	Local Control Panel	Controls
83	CHA-EB-CP-SCADA	CHA-EB SCADA Interface Panel	Local Control Panel	Controls
84	CHA-EB-CP-V-BF	CHA-EB Controls for Blower Blow Off Isolation Valve Actuators (combination starters)	Local Control Panel	Controls
85	CHA-EB-CRANE-CHM	CHA-EB Crane - Chem Room	Crane	Buildings/Structures
86	CHA-EB-DM-AB-01	CHA-EB Motorized Damper - Aeration Room (AD-1)	Damper/Louver	HVAC
87	CHA-EB-DM-AB-02	CHA-EB Motorized Damper - Aeration Room (AD-2)	Damper/Louver	HVAC
88	CHA-EB-DM-AB-03	CHA-EB Motorized Damper - Electrical Room (AD-3)	Damper/Louver	HVAC
89	CHA-EB-DM-AB-04	CHA-EB Motorized Damper - Aeration Room	Damper/Louver	HVAC
90	CHA-EB-DM-AB-05	CHA-EB Motorized Damper - Electrical Room	Damper/Louver	HVAC
91	CHA-EB-DR-GLS	CHA-EB Swing Doors - Glass/Aluminum	Door	Buildings/Structures
92	CHA-EB-DR-MTL	CHA-EB Swing Doors - Metal	Door	Buildings/Structures
93	CHA-EB-ELECART	CHA-EB Electric Cart	Electric Cart	Miscellaneous
94	CHA-EB-EMSH-CHM	CHA-EB Emergency Shower/Eyewash Station - Chem Room	Eyewash/Shower	Plumbing
95	CHA-EB-EMSH-ENT	CHA-EB Emergency Shower/Eyewash Station - Entry	Eyewash/Shower	Plumbing
96	CHA-EB-EXTWALL-AB	CHA-EB Exterior Walls - Aeration Building	Exterior Walls	Buildings/Structures
97	CHA-EB-EXTWALL-CORR	CHA-EB Exterior Walls - Corridor	Exterior Walls	Buildings/Structures
98	CHA-EB-EXTWALL-EB	CHA-EB Exterior Walls - East Building	Exterior Walls	Buildings/Structures
99	CHA-EB-EYEWSH	CHA-EB Eyewash Station	Eyewash/Shower	Plumbing
100	CHA-EB-FAN-A1	CHA-EB Roof Exhaust Fan - Aeration Room (RF-4)	Fan	HVAC
101	CHA-EB-FAN-A2	CHA-EB Roof Exhaust Fan - Electrical Room (RF-5)	Fan	HVAC
102	CHA-EB-FAN-B1	CHA-EB Blower Exhaust Fan - Aeration Room (RF-1)	Fan	HVAC
103	CHA-EB-FAN-B2	CHA-EB Blower Exhaust Fan - Aeration Room (RF-2)	Fan	HVAC
104	CHA-EB-FAN-B3	CHA-EB Blower Exhaust Fan - Aeration Room (RF-3)	Fan	HVAC
105	CHA-EB-FAN-E1	CHA-EB Flushing Pit Exhaust Fan	Fan	HVAC
106	CHA-EB-FAN-E2	CHA-EB Chem Feed Room Exhaust Fan	Fan	HVAC
107	CHA-EB-FAN-E3	CHA-EB Ceiling Exhaust Fans	Fan	HVAC
108	CHA-EB-FE-9M	CHA-EB Chem Flow Meter - Basin Gates (Pumps 4-5)	Magnetic Meter	Instrumentation
109	CHA-EB-FE-CT	CHA-EB Chem Flow Meter - Chemical Storage Tanks	Magnetic Meter	Instrumentation
110	CHA-EB-FE-SWP	CHA-EB Chem Flow Meter - SWPs (Pumps 1-3)	Magnetic Meter	Instrumentation
111	CHA-EB-FMOT-A1	CHA-EB Roof Exhaust Fan - Aeration Room (RF-4) - Motor	Motor	HVAC

8 ½ MILE RELIEF DRAIN DRAINAGE DISTRICT
Vertical Asset Inventory Summary

No.	AssetName	Description	CategoryName	ClassName
112	CHA-EB-FMOT-A2	CHA-EB Roof Exhaust Fan - Electrical Room (RF-5) - Motor	Motor	HVAC
113	CHA-EB-FMOT-B1	CHA-EB Blower Exhaust Fan - Aeration Room (RF-1) - Motor	Motor	HVAC
114	CHA-EB-FMOT-B2	CHA-EB Blower Exhaust Fan - Aeration Room (RF-2) - Motor	Motor	HVAC
115	CHA-EB-FMOT-B3	CHA-EB Blower Exhaust Fan - Aeration Room (RF-3) - Motor	Motor	HVAC
116	CHA-EB-FNSH-CEIL	CHA-EB East Building Drop Ceiling	Finish	Buildings/Structures
117	CHA-EB-FNSH-TILE	CHA-EB East Building Quarry Tile Floor	Finish	Buildings/Structures
118	CHA-EB-FOUND-AB	CHA-EB Building Foundation - Aeration Building (New Section)	Foundation	Buildings/Structures
119	CHA-EB-FOUND-EB	CHA-EB Building Foundation - East Building (Old Section)	Foundation	Buildings/Structures
120	CHA-EB-FURN	CHA-EB Dual Furnace	Furnace	HVAC
121	CHA-EB-GRNDS	CHA-EB Grounds Maintenance	Landscape	Miscellaneous
122	CHA-EB-LP-1	CHA-EB Lighting Panel 1	Distribution Panel	Lighting
123	CHA-EB-LP-1-10	CHA-EB Lighting Panel (LP-1-10)	Distribution Panel	Lighting
124	CHA-EB-LP-A	CHA-EB Lighting Panel A	Distribution Panel	Lighting
125	CHA-EB-LP-B	CHA-EB Lighting Panel B	Distribution Panel	Lighting
126	CHA-EB-LS-270	CHA-EB LS-270 Chemical Storage Tank 1 - Level Sensor (and Transmitter)	Ultrasonic Level Instrument	Instrumentation
127	CHA-EB-LS-280	CHA-EB LS-280 Chemical Storage Tank 2 - Level Sensor	Ultrasonic Level Instrument	Instrumentation
128	CHA-EB-LS-290	CHA-EB LS-290 Chemical Storage Tank 3 - Level Sensor	Ultrasonic Level Instrument	Instrumentation
129	CHA-EB-LS-C1	CHA-EB LS-C1 Head Tank 1 - Level Sensor	Ultrasonic Level Instrument	Instrumentation
130	CHA-EB-LS-C2	CHA-EB LS-C2 Head Tank 2 - Level Sensor	Ultrasonic Level Instrument	Instrumentation
131	CHA-EB-LT-EX	CHA-EB Exterior Lighting (East & Aeration Buildings)	Outside Lighting	Lighting
132	CHA-EB-LT-IN	CHA-EB Interior Lighting (East & Aeration Buildings)	Inside Lighting	Lighting
133	CHA-EB-LT-XP	CHA-EB Interior Lighting - Explosion Proof	Inside Lighting	Lighting
134	CHA-EB-LUV-AB-03	CHA-EB Louver - Electrical Room	Damper/Louver	HVAC
135	CHA-EB-LUV-AB-12	CHA-EB Louver - Aeration Room	Damper/Louver	HVAC
136	CHA-EB-MCC-AB	CHA-EB MCC-1 Aeration Building	Motor Control Center	MCCs
137	CHA-EB-MCC-EB	CHA-EB MCC East Building	Motor Control Center	MCCs
138	CHA-EB-MOW-2	CHA-EB Walk-Behind Deck Mower (Gravely)	Mower	Miscellaneous
139	CHA-EB-MOW-36	CHA-EB Riding Deck Mower (Kut Kwick)	Mower	Miscellaneous
140	CHA-EB-MUS-B1	CHA-EB Motor Starter - Blower 1	Motor Starter	MCCs
141	CHA-EB-MUS-B2	CHA-EB Motor Starter - Blower 2	Motor Starter	MCCs
142	CHA-EB-MUS-B3	CHA-EB Motor Starter - Blower 3	Motor Starter	MCCs
143	CHA-EB-MVSW-1	CHA-EB MVUS-1 - Switch 1	Switch	Power Distribution
144	CHA-EB-MVSW-2	CHA-EB MVUS-1 - Switch 2	Switch	Power Distribution
145	CHA-EB-OHD-AB-102	CHA-EB Overhead Door - Aeration Room	Overhead Door	Buildings/Structures
146	CHA-EB-OHD-EB-104	CHA-EB Overhead Door - Chem Storage Room	Overhead Door	Buildings/Structures
147	CHA-EB-OHDMOT-AB-102	CHA-EB Overhead Door - Aeration Room - Motor	Motor	Buildings/Structures
148	CHA-EB-OHDMOT-EB-104	CHA-EB Overhead Door - Chem Storage Room - Motor	Motor	Buildings/Structures
149	CHA-EB-P-CF1	CHA-EB Chem Feed Pump 1	Diaphragm Pump	Pumps
150	CHA-EB-P-CF2	CHA-EB Chem Feed Pump 2	Diaphragm Pump	Pumps
151	CHA-EB-P-CF3	CHA-EB Chem Feed Pump 3	Diaphragm Pump	Pumps
152	CHA-EB-P-CF4	CHA-EB Chem Feed Pump 4	Diaphragm Pump	Pumps
153	CHA-EB-P-CF5	CHA-EB Chem Feed Pump 5	Diaphragm Pump	Pumps
154	CHA-EB-P-CT-1	CHA-EB Chem Transfer Pump 1	Horizontal Centrifugal Pump	Pumps
155	CHA-EB-P-CT-2	CHA-EB Chem Transfer Pump 2	Horizontal Centrifugal Pump	Pumps
156	CHA-EB-P-CT-3	CHA-EB Chem Transfer Pump 3	Horizontal Centrifugal Pump	Pumps
157	CHA-EB-P-CT-4	CHA-EB Chem Recovery Pump 4	Horizontal Centrifugal Pump	Pumps
158	CHA-EB-P-F1	CHA-EB Flushing Pump 1	Vertical Centrifugal Pump	Pumps
159	CHA-EB-P-F2	CHA-EB Flushing Pump 2	Vertical Centrifugal Pump	Pumps
160	CHA-EB-PIPE-B1	CHA-EB Blower 1 Inlet Pipe	Process Piping	Piping
161	CHA-EB-PIPE-B2	CHA-EB Blower 2 Inlet Pipe	Process Piping	Piping
162	CHA-EB-PIPE-B3	CHA-EB Blower 3 Inlet Pipe	Process Piping	Piping
163	CHA-EB-PIPE-B4	CHA-EB Blower Discharge Piping	Process Piping	Piping
164	CHA-EB-PIPE-CF	CHA-EB Chem Distribution Piping, Valves, Filters	Process Piping	Piping
165	CHA-EB-PIPE-CS	CHA-EB Chem Storage Tank Piping and Isolation Valves	Process Piping	Piping
166	CHA-EB-PMOT-CF1	CHA-EB Chem Feed Pump 1 - Motor	Motor	Pumps
167	CHA-EB-PMOT-CF2	CHA-EB Chem Feed Pump 2 - Motor	Motor	Pumps
168	CHA-EB-PMOT-CF3	CHA-EB Chem Feed Pump 3 - Motor	Motor	Pumps
169	CHA-EB-PMOT-CF4	CHA-EB Chem Feed Pump 4 - Motor	Motor	Pumps
170	CHA-EB-PMOT-CF5	CHA-EB Chem Feed Pump 5 - Motor	Motor	Pumps
171	CHA-EB-PMOT-F1	CHA-EB Flushing Pump 1 - Motor	Motor	Pumps
172	CHA-EB-PMOT-F2	CHA-EB Flushing Pump 2 - Motor	Motor	Pumps
173	CHA-EB-P-SAMP-WEIR	CHA-EB Basin Weir Sample Pump	Horizontal Centrifugal Pump	Sampling Equipment
174	CHA-EB-P-SUMP-F	CHA-EB Sump Pump - Flushing Pit	Submersible Centrifugal Pump	Pumps
175	CHA-EB-ROOF-AB	CHA-EB Roof - Aeration Building and Corridor	Roof	Buildings/Structures
176	CHA-EB-ROOF-AB-SIDE	CHA-EB Roof Siding - Aeration Building and Corridor	Roof	Buildings/Structures
177	CHA-EB-ROOF-EB	CHA-EB Roof - East Building	Roof	Buildings/Structures
178	CHA-EB-ROOF-EB-SIDE	CHA-EB Roof Siding - East Building	Roof	Buildings/Structures
179	CHA-EB-RUD-EB-107	CHA-EB Rollup Door - Chem Storage Room	Overhead Door	Buildings/Structures
180	CHA-EB-RUD-EB-116	CHA-EB Rollup Door - Blower B (North) Room	Overhead Door	Buildings/Structures
181	CHA-EB-SAMP-1	CHA-EB Canal Sampler	Sampler	Sampling Equipment
182	CHA-EB-SB	CHA-EB Electrical Switchboard	Distribution Panel	Power Distribution
183	CHA-EB-SERV	CHA-EB Security System Server(s)	Server	Controls
184	CHA-EB-SWTC	CHA-EB Primary Switches - Power Distribution	Switch	Power Distribution
185	CHA-EB-TANK-C1	CHA-EB Chem Storage Tank 1	Tank	Tanks
186	CHA-EB-TANK-C2	CHA-EB Chem Storage Tank 2	Tank	Tanks
187	CHA-EB-TANK-C3	CHA-EB Chem Storage Tank 3	Tank	Tanks
188	CHA-EB-TANK-H1	CHA-EB Chem Head Tank 1	Tank	Tanks
189	CHA-EB-TANK-H2	CHA-EB Chem Head Tank 2	Tank	Tanks
190	CHA-EB-TRNF-225K	CHA-EB 225 kVa Transformer - Aeration Building	Transformer	Power Distribution
191	CHA-EB-TRNF-30K	CHA-EB 30 kVa Transformer - Aeration Building	Transformer	Power Distribution
192	CHA-EB-TRNF-750K	CHA-EB 750 kVa Transformer - Exterior	Transformer	Power Distribution
193	CHA-EB-TRNF-75K	CHA-EB 75 kVa Transformer - Mech Room	Transformer	Power Distribution
194	CHA-EB-UH-AB-1	CHA-EB Gas Unit Heater - Aeration Room - 1	Heater	HVAC
195	CHA-EB-UH-AB-2	CHA-EB Gas Unit Heater - Aeration Room - 2	Heater	HVAC
196	CHA-EB-UH-AB-3	CHA-EB Gas Unit Heater - Electrical Room	Heater	HVAC
197	CHA-EB-UH-AB-4	CHA-EB Gas Unit Heater - Corridor	Heater	HVAC
198	CHA-EB-UH-BA	CHA-EB Unit Heaters - Blower A - South	Heater	HVAC
199	CHA-EB-UH-BB	CHA-EB Unit Heater - Blower B - North	Heater	HVAC
200	CHA-EB-UH-CS	CHA-EB Unit Heaters - Chem Storage Room	Heater	HVAC
201	CHA-EB-VA-BF-4	CHA-EB Blower 1 Blow Off Isolation Valve - Actuator	Electric Actuator	Valves
202	CHA-EB-VA-BF-5	CHA-EB Blower 2 Blow Off Isolation Valve - Actuator	Electric Actuator	Valves
203	CHA-EB-VA-BF-6	CHA-EB Blower 3 Blow Off Isolation Valve - Actuator	Electric Actuator	Valves
204	CHA-EB-VA-F-16	CHA-EB Flushing Pump 1 - Intake Valve 16 Actuator	Electric Actuator	Valves
205	CHA-EB-VA-F-18	CHA-EB Flushing Pump 2 - Intake Valve 18 Actuator	Electric Actuator	Valves
206	CHA-EB-VA-F-21	CHA-EB Flushing Pump 1 - Discharge Valve Actuator	Electric Actuator	Valves
207	CHA-EB-VA-F-22	CHA-EB Flushing Pump 2 - Discharge Valve Actuator	Electric Actuator	Valves
208	CHA-EB-V-BF-1	CHA-EB Blower 1 Isolation Valve	Butterfly Valve	Valves
209	CHA-EB-V-BF-2	CHA-EB Blower 2 Isolation Valve	Butterfly Valve	Valves
210	CHA-EB-V-BF-3	CHA-EB Blower 3 Isolation Valve	Butterfly Valve	Valves
211	CHA-EB-V-BF-4	CHA-EB Blower 1 Blow Off Isolation Valve	Butterfly Valve	Valves
212	CHA-EB-V-BF-5	CHA-EB Blower 2 Blow Off Isolation Valve	Butterfly Valve	Valves
213	CHA-EB-V-BF-6	CHA-EB Blower 3 Blow Off Isolation Valve	Butterfly Valve	Valves
214	CHA-EB-V-BFP	CHA-EB Backflow Preventer	Backflow Device	Plumbing
215	CHA-EB-V-BV-1	CHA-EB Chemical Head Tank 1 Inlet Valve	Ball Valve	Piping
216	CHA-EB-V-BV-2	CHA-EB Chemical Head Tank 2 Inlet Valve	Ball Valve	Piping
217	CHA-EB-V-DC-1	CHA-EB Blower 1 - Discharge Check Valve	Check Valve	Valves
218	CHA-EB-V-DC-2	CHA-EB Blower 2 - Discharge Check Valve	Check Valve	Valves
219	CHA-EB-V-DC-3	CHA-EB Blower 3 - Discharge Check Valve	Check Valve	Valves
220	CHA-EB-V-F-16	CHA-EB Flushing Pump 1 - Intake Valve 16	Knife Gate Valve	Valves
221	CHA-EB-V-F-18	CHA-EB Flushing Pump 2 - Intake Valve 18	Knife Gate Valve	Valves
222	CHA-EB-V-F-19	CHA-EB Flushing Pump 1 - Check Valve	Check Valve	Valves

8 ½ MILE RELIEF DRAIN DRAINAGE DISTRICT
Vertical Asset Inventory Summary

No.	AssetName	Description	CategoryName	ClassName
223	CHA-EB-V-F-20	CHA-EB Flushing Pump 2 - Check Valve	Check Valve	Valves
224	CHA-EB-V-F-21	CHA-EB Flushing Pump 1 - Discharge Valve	Knife Gate Valve	Valves
225	CHA-EB-V-F-22	CHA-EB Flushing Pump 2 - Discharge Valve	Knife Gate Valve	Valves
226	CHA-EB-V-PRV-1	CHA-EB Blow Off Valve 1	Pressure Regulating Valve	Valves
227	CHA-EB-V-PRV-2	CHA-EB Blow Off Valve 2	Pressure Regulating Valve	Valves
228	CHA-EB-V-PRV-3	CHA-EB Blow Off Valve 3	Pressure Regulating Valve	Valves
229	CHA-EB-WH-1	CHA-EB Water Heater (Mechanical Room)	Water Heater	Plumbing
230	CHA-PS-AC-1	CHA-PS Air Cooled Condensing Unit 1	Package AC Unit	HVAC
231	CHA-PS-AC-2	CHA-PS Air Cooled Condensing Unit 2	Package AC Unit	HVAC
232	CHA-PS-AC-3	CHA-PS Air Cooled Condensing Unit 3	Package AC Unit	HVAC
233	CHA-PS-ACCMSYS-A	CHA-PS Hydraulic Accumulator System A	Hydraulic Pressure Accumulator	CHA-PS
234	CHA-PS-ACCMSYS-B	CHA-PS Hydraulic Accumulator System B	Hydraulic Pressure Accumulator	CHA-PS
235	CHA-PS-ACCMSYS-C	CHA-PS Accumulator System C - SWP Pitch Control	Hydraulic Pressure Accumulator	CHA-PS
236	CHA-PS-AIRHNDL	CHA-PS Station Air Handler Roof Unit (Greenheck)	Air Handler	HVAC
237	CHA-PS-ATS1	CHA-PS Generator Automatic Transfer Switch	Automatic Transfer Switch	Power Distribution
238	CHA-PS-AUTOCLV-1	CHA-PS Autoclave 1	Autoclave	Lab & Sampling Equipment
239	CHA-PS-AUTOCLV-2	CHA-PS Autoclave 2	Autoclave	Lab & Sampling Equipment
240	CHA-PS-BACKHOE	CHA-PS Backhoe	Wheeled Heavy Equipment	Fleet
241	CHA-PS-BARSCRN-N	CHA-PS Trash Rack - North	Bar Screen	Trash Rack
242	CHA-PS-BARSCRN-S	CHA-PS Trash Rack - South	Bar Screen	Trash Rack
243	CHA-PS-BLOW-RTB-N	CHA-PS RTB Ventilation Blower - N	Centrifugal Blower	Ventilation Blowers
244	CHA-PS-BLOW-RTB-S	CHA-PS RTB Ventilation Blower - S	Centrifugal Blower	Ventilation Blowers
245	CHA-PS-BLOW-WW	CHA-PS Ventilation Blower - Wet Well/Trash Rack	Centrifugal Blower	Ventilation Blowers
246	CHA-PS-BMOT-RTB-N	CHA-PS RTB Ventilation Blower - N - Motor	Motor	Ventilation Blowers
247	CHA-PS-BMOT-RTB-S	CHA-PS RTB Ventilation Blower - S - Motor	Motor	Ventilation Blowers
248	CHA-PS-BMOT-WW	CHA-PS Ventilation Blower Motor - Wet Well/Trash Rack Room	Motor	Ventilation Blowers
249	CHA-PS-BOAT	CHA-PS Boat	Boat	Fleet
250	CHA-PS-BOIL	CHA-PS Boiler System	Boiler	HVAC
251	CHA-PS-BRK-800A	CHA-PS 800A Breaker - Electrical Substation	Disconnect	Power Distribution
252	CHA-PS-COMP-A1	CHA-PS Accumulator A Compressor 1	Reciprocating Compressor	CHA-PS
253	CHA-PS-COMP-A2	CHA-PS Accumulator A Compressor 2	Reciprocating Compressor	CHA-PS
254	CHA-PS-COMP-LUB	CHA-PS Air Compressor - SWP lube system	Reciprocating Compressor	Miscellaneous
255	CHA-PS-COMP-SRV	CHA-PS Air Compressor - Service Garage	Reciprocating Compressor	Miscellaneous
256	CHA-PS-CP-ACC-A	CHA-PS Accumulator System A Control Panel (CP-ACC-A)	Local Control Panel	Controls
257	CHA-PS-CP-ACC-B	CHA-PS Accumulator System B Control Panel (CP-ACC-B)	Local Control Panel	Controls
258	CHA-PS-CP-ACC-C1	CHA-PS Accumulator C Control Panel 1 (Pump A)	Local Control Panel	Controls
259	CHA-PS-CP-ACC-C2	CHA-PS Accumulator C Control Panel 2 (Pump B)	Local Control Panel	Controls
260	CHA-PS-CP-ATS	CHA-PS Generator/ATS SCADA Interface Panel	Local Control Panel	Controls
261	CHA-PS-CP-DIVGATE	CHA-PS Jefferson Emergency Diversion Gate Controls - Outside	Local Control Panel	Controls
262	CHA-PS-CP-FIRE	CHA-PS Fire and Alarm Control Panel	Local Control Panel	Controls
263	CHA-PS-CP-P1	CHA-PS Dry Weather Pump 1 Control Panel (CP-P1)	Local Control Panel	Controls
264	CHA-PS-CP-P2	CHA-PS Intermediate Pump 2 Control Panel (CP-P2)	Local Control Panel	Controls
265	CHA-PS-CP-P3	CHA-PS Intermediate Pump 3 Control Panel (CP-P3)	Local Control Panel	Controls
266	CHA-PS-CP-SCADA	CHA-PS SCADA Interface Panel - Control Room	Local Control Panel	Controls
267	CHA-PS-CP-SWP-1	CHA-PS SWP 1 Trabon Lubrication System Control Panel	Local Control Panel	Controls
268	CHA-PS-CP-SWP-2	CHA-PS SWP 2 Trabon Lubrication System Control Panel	Local Control Panel	Controls
269	CHA-PS-CP-SWP-3	CHA-PS SWP 3 Trabon Lubrication System Control Panel	Local Control Panel	Controls
270	CHA-PS-CP-VLV	CHA-PS Jefferson/Basin Valve Control Panel	Local Control Panel	Controls
271	CHA-PS-CRANE-RTB	CHA-PS RTB Equipment Access Crane - Exterior	Crane	Miscellaneous
272	CHA-PS-CRANE-SWP	CHA-PS SWP Crane	Crane	Miscellaneous
273	CHA-PS-CRANE-WW-N	CHA-PS Stop Log Hoist - North Wet Well	Crane	Miscellaneous
274	CHA-PS-CRANE-WW-S	CHA-PS Stop Log Hoist - South Wet Well	Crane	Miscellaneous
275	CHA-PS-DR-GLS	CHA-PS Swing Doors - Glass/Aluminum	Door	Pump Station Building
276	CHA-PS-DR-MTL	CHA-PS Swing Doors - Metal	Door	Pump Station Building
277	CHA-PS-DR-SRV	CHA-PS Service Garage Swing Doors	Door	Service Garage
278	CHA-PS-DSC-SRV	CHA-PS Electrical Disconnect - Service Garage	Disconnect	Power Distribution
279	CHA-PS-DUCT-PS-B1	CHA-PS Vent Duct - Basement 1	Ductwork	HVAC
280	CHA-PS-DUCT-PS-B2	CHA-PS Vent Duct - Basement 2	Ductwork	HVAC
281	CHA-PS-DUCT-PS-B3	CHA-PS Vent Duct - Basement 3	Ductwork	HVAC
282	CHA-PS-DUCT-PS-B4	CHA-PS Vent Duct - Basement 4	Ductwork	HVAC
283	CHA-PS-DUCT-PS-M1	CHA-PS Vent Duct - Main Level	Ductwork	HVAC
284	CHA-PS-DUCT-RTB	CHA-PS RTB Ventilation Duct	Ductwork	Ventilation Blowers
285	CHA-PS-ELEV	CHA-PS Elevator	Elevator	Pump Station Building
286	CHA-PS-ELVMOT	CHA-PS Elevator Motor	Gear Drive	Miscellaneous
287	CHA-PS-EMSH-LAB	CHA-PS Emergency Shower - Lab	Eyewash/Shower	Plumbing
288	CHA-PS-EXTWALL-PS	CHA-PS Exterior Walls - Pump Station	Exterior Walls	Pump Station Building
289	CHA-PS-EXTWALL-SER	CHA-PS Exterior Walls - Service Garage	Exterior Walls	Service Garage
290	CHA-PS-EXTWALL-WIND	CHA-PS Entry - Exterior Window Walls	Exterior Walls	Pump Station Building
291	CHA-PS-FAN-PS	CHA-PS Pump Station Ventilator Fan	Fan	HVAC
292	CHA-PS-FAN-SRV	CHA-PS Service Garage Exhaust Fan	Fan	HVAC
293	CHA-PS-FE-12	CHA-PS Flow Meter - Pumps 1/2	Magnetic Meter	Instrumentation
294	CHA-PS-FE-3	CHA-PS Flow Meter - Pump 3	Magnetic Meter	Instrumentation
295	CHA-PS-FMOT-AIRHNDL	CHA-PS Station Air Handler Roof Unit - Motor	Motor	HVAC
296	CHA-PS-FMOT-PS	CHA-PS Pump Station Ventilator Fan - Motor	Motor	HVAC
297	CHA-PS-FNSH-CEIL	CHA-PS Pump Station Crew Qtr Drop Ceiling	Finish	Pump Station Building
298	CHA-PS-FNSH-TILE	CHA-PS Motor Room Quarry Tile	Finish	Pump Station Building
299	CHA-PS-FOUND-PS	CHA-PS Bldg Foundation - Pump Station	Foundation	Pump Station Building
300	CHA-PS-FOUND-SRV	CHA-PS Bldg Foundation - Service Garage	Foundation	Service Garage
301	CHA-PS-FRCAIR-1	CHA-PS Forced Air Handler 1 (Office)	Air Handler	HVAC
302	CHA-PS-FRCAIR-2	CHA-PS Forced Air Handler 2 (Control Room)	Air Handler	HVAC
303	CHA-PS-FRCAIR-3	CHA-PS Forced Air Handler 3 (Lab/Crew Quarters)	Air Handler	HVAC
304	CHA-PS-FUEL	CHA-PS Diesel Fuel Storage	Tank	Miscellaneous
305	CHA-PS-G-9M-STA	CHA-PS 9 Mile Station Sluice Gate	Sluice Gate	Gates
306	CHA-PS-GA-9M-STA	CHA-PS 9 Mile Station Sluice Gate - Actuator	Hydraulic Actuator	Gates
307	CHA-PS-GA-CONT	CHA-PS Accm. Sys. A - Versa Valve Actuator Manifold for 9EB Influent, 9M Basin & 9M Station Gates	Hydraulic Actuator	Valves
308	CHA-PS-GA-JEF-DIV	CHA-PS Jefferson Emergency Diversion Gate - Actuator	Hydraulic Actuator	Gates
309	CHA-PS-GEN	CHA-PS Generator	Generator	Generator
310	CHA-PS-G-JEF-DIV	CHA-PS Jefferson Emergency Diversion Gate	Sluice Gate	Gates
311	CHA-PS-GRNDS	CHA-PS Grounds Maintenance - West	Landscape	Miscellaneous
312	CHA-PS-G-WW-N	CHA-PS Wet Well Stop Log Gate - North	Stop Log	Gates
313	CHA-PS-G-WW-S	CHA-PS Wet Well Stop Log Gate - South	Stop Log	Gates
314	CHA-PS-HTC-JEF	CHA-PS Jefferson Emergency Diversion Gate Access	Hatch	Pump Station Building
315	CHA-PS-HTC-TR-1	CHA-PS Trash Rack Equipment Access Hatch	Hatch	Pump Station Building
316	CHA-PS-HTC-TR-2	CHA-PS Trash Rack Manway Hatch 1	Hatch	Pump Station Building
317	CHA-PS-HTC-TR-3	CHA-PS Trash Rack Manway Hatch 2	Hatch	Pump Station Building
318	CHA-PS-HTC-WW-1	CHA-PS Wet Well Hatch	Hatch	Wet Well
319	CHA-PS-HTC-WW-2	CHA-PS Wet Well Manway	Hatch	Wet Well
320	CHA-PS-INCUB-1	CHA-PS Lab - Sample Incubator	Incubator	Lab & Sampling Equipment
321	CHA-PS-INCUB-2	CHA-PS Lab - Hotwater Bath	Incubator	Lab & Sampling Equipment
322	CHA-PS-LABDI	CHA-PS Lab - DI Water System	Deionized Water System	Lab & Sampling Equipment
323	CHA-PS-LP-A	CHA-PS Lighting Panel A	Distribution Panel	Lighting
324	CHA-PS-LP-B	CHA-PS Lighting Panel B	Distribution Panel	Lighting
325	CHA-PS-LP-C	CHA-PS Lighting Panel C	Distribution Panel	Lighting
326	CHA-PS-LP-D	CHA-PS Lighting Panel D	Distribution Panel	Lighting
327	CHA-PS-LP-E	CHA-PS LP-E HVAC upper level	Distribution Panel	Lighting
328	CHA-PS-LP-Q	CHA-PS LP-Q Control Room	Distribution Panel	Lighting
329	CHA-PS-LP-SRV	CHA-PS Lighting Panel - Service Garage	Distribution Panel	Lighting
330	CHA-PS-LS-WWN	CHA-PS Wet Well Bubbler - North	Bubbler Level Instrument	Instrumentation
331	CHA-PS-LS-WWR	CHA-PS Wet Well Radar Level	Radar Unit Level Instrument	Instrumentation
332	CHA-PS-LS-WWS	CHA-PS Wet Well Bubbler - South	Bubbler Level Instrument	Instrumentation
333	CHA-PS-LT-EX	CHA-PS PS/SRV Exterior Lights	Outside Lighting	Lighting

8 ½ MILE RELIEF DRAIN DRAINAGE DISTRICT
Vertical Asset Inventory Summary

No.	AssetName	Description	CategoryName	ClassName
334	CHA-PS-LT-IN	CHA-PS Interior Lighting (Pump Station & Service Garage)	Inside Lighting	Lighting
335	CHA-PS-LT-XP	CHA-PS Interior Lighting - Explosion Proof	Inside Lighting	Lighting
336	CHA-PS-LUV-TR	CHA-PS Louver - Wet Well Ventilation Intake	Damper/Louver	Ventilation Blowers
337	CHA-PS-MCC-1	CHA-PS MCC-1	Motor Control Center	MCCs
338	CHA-PS-MOW-1	CHA-PS Riding Lawn Mower	Mower	Miscellaneous
339	CHA-PS-MOW-2	CHA-PS Deck Mower Attachment	Mower	Miscellaneous
340	CHA-PS-MSTRT-SWP-1	CHA-PS SWP-1 Starter	Motor Starter	MCCs
341	CHA-PS-MSTRT-SWP-2	CHA-PS SWP-2 Starter	Motor Starter	MCCs
342	CHA-PS-MSTRT-SWP-3	CHA-PS SWP-3 Starter	Motor Starter	MCCs
343	CHA-PS-MVSG-B1-09	CHA-PS Medium Volt Switch Gear - Pump Station (B1-09)	Medium Voltage Switchgear	Power Distribution
344	CHA-PS-MVSG-B1-11	CHA-PS Medium Volt Switch Gear - East Building (B1-11)	Medium Voltage Switchgear	Power Distribution
345	CHA-PS-MVSG-MAIN-1	CHA-PS 4.8KV Switch Gear Unit 1 - SWP 1	Medium Voltage Switchgear	Power Distribution
346	CHA-PS-MVSG-MAIN-2	CHA-PS 4.8KV Switch Gear Unit 2 - SWP 2	Medium Voltage Switchgear	Power Distribution
347	CHA-PS-MVSG-MAIN-3	CHA-PS 4.8KV Switch Gear Unit 3 - Main Breaker 1	Medium Voltage Switchgear	Power Distribution
348	CHA-PS-MVSG-MAIN-4	CHA-PS 4.8KV Switch Gear Unit 4 - Metering/Relay	Medium Voltage Switchgear	Power Distribution
349	CHA-PS-MVSG-MAIN-5	CHA-PS 4.8KV Switch Gear Unit 5 - Metering/Relay	Medium Voltage Switchgear	Power Distribution
350	CHA-PS-MVSG-MAIN-6	CHA-PS 4.8KV Switch Gear Unit 6 - Main Breaker 2	Medium Voltage Switchgear	Power Distribution
351	CHA-PS-MVSG-MAIN-7	CHA-PS 4.8KV Switch Gear Unit 7 - SWP 3	Medium Voltage Switchgear	Power Distribution
352	CHA-PS-MVSG-MAIN-8	CHA-PS 4.8KV Switch Gear Unit 8 - Breaker for B1 Substation	Medium Voltage Switchgear	Power Distribution
353	CHA-PS-OHD-GAR	CHA-PS Overhead Door - Pump Station Garage	Overhead Door	Pump Station Building
354	CHA-PS-OHD-SRV	CHA-PS Overhead Doors (3) - Service Garage	Overhead Door	Service Garage
355	CHA-PS-OHD-SWP	CHA-PS Overhead Door - SWP Access	Overhead Door	Pump Station Building
356	CHA-PS-P-ACCMA-T1	CHA-PS Accumulator A Transfer Pump 1	Vane Pump	Pumps
357	CHA-PS-P-ACCMA-T2	CHA-PS Accumulator A Transfer Pump 2	Vane Pump	Pumps
358	CHA-PS-P-ACCMB-T1	CHA-PS Accumulator B - Transfer Pump 1	Vane Pump	Pumps
359	CHA-PS-P-ACCMB-T2	CHA-PS Accumulator B - Transfer Pump 2	Vane Pump	Pumps
360	CHA-PS-P-ACCMC-A	CHA-PS Accumulator C - Pump A (SWP Hydraulic Pitch Control)	Gear Pump	Pumps
361	CHA-PS-P-ACCMC-B	CHA-PS Accumulator C - Pump B (SWP Hydraulic Pitch Control)	Gear Pump	Pumps
362	CHA-PS-P-BOIL	CHA-PS Hydronic - Boiler Circulation Pump	Horizontal Centrifugal Pump	HVAC
363	CHA-PS-P-DW-1	CHA-PS Dryweather Pump 1	Vertical Centrifugal Pump	Pumps
364	CHA-PS-P-HHWS	CHA-PS Inline Circulating Pump - Heating Hot Water Return	Vane Pump	Pumps
365	CHA-PS-P-INT-2	CHA-PS Intermediate Pump 2	Vertical Centrifugal Pump	Pumps
366	CHA-PS-P-INT-3	CHA-PS Intermediate Pump 3	Vertical Centrifugal Pump	Pumps
367	CHA-PS-PIPE-BUB-1	CHA-PS Bubbler Flushing Pipe - North	Process Piping	Process Piping
368	CHA-PS-PIPE-BUB-2	CHA-PS Bubbler Flushing Pipe - South	Process Piping	Process Piping
369	CHA-PS-PIPE-BUB-N	CHA-PS Bubbler Stilling Well - North	Process Piping	Process Piping
370	CHA-PS-PIPE-BUB-S	CHA-PS Bubbler Stilling Well - South	Process Piping	Process Piping
371	CHA-PS-PIPE-JEF	CHA-PS Dry/Int Pump Discharge Pipe	Process Piping	Process Piping
372	CHA-PS-PIPE-P1-1	CHA-PS Inlet Piping 1	Process Piping	Process Piping
373	CHA-PS-PIPE-P12	CHA-PS Common Discharge Piping 1/2	Process Piping	Process Piping
374	CHA-PS-PIPE-P1-2	CHA-PS Discharge Piping 1	Process Piping	Process Piping
375	CHA-PS-PIPE-P2-1	CHA-PS Inlet Piping 2	Process Piping	Process Piping
376	CHA-PS-PIPE-P2-2	CHA-PS Discharge Piping 2	Process Piping	Process Piping
377	CHA-PS-PIPE-P3-1	CHA-PS Inlet Piping 3	Process Piping	Process Piping
378	CHA-PS-PIPE-P3-2	CHA-PS Discharge Piping 3	Process Piping	Process Piping
379	CHA-PS-PIPE-RTBD	CHA-PS RTB Exterior Drain Pipe	Process Piping	Process Piping
380	CHA-PS-PIPE-TRVAC	CHA-PS Wet Well Vactor Suction Pipe	Process Piping	Process Piping
381	CHA-PS-PLOW-1	CHA-PS Snow Plow - Large	Snow Plow	Miscellaneous
382	CHA-PS-PLOW-2	CHA-PS Snow Plow - Small	Snow Plow	Miscellaneous
383	CHA-PS-PMOT-ACCMA-T1	CHA-PS Accumulator A Transfer Pump 1 - Motor	Motor	Pumps
384	CHA-PS-PMOT-ACCMA-T2	CHA-PS Accumulator A Transfer Pump 2 - Motor	Motor	Pumps
385	CHA-PS-PMOT-ACCMB-T1	CHA-PS Accumulator B - Transfer Pump 1 - Motor	Motor	Pumps
386	CHA-PS-PMOT-ACCMB-T2	CHA-PS Accumulator B - Transfer Pump 2 - Motor	Motor	Pumps
387	CHA-PS-PMOT-ACCMC-A	CHA-PS Accumulator C - Pump A Motor	Motor	Pumps
388	CHA-PS-PMOT-ACCMC-B	CHA-PS Accumulator C - Pump B Motor	Motor	Pumps
389	CHA-PS-PMOT-DW-1	CHA-PS Dryweather Pump 1 - Motor	Motor	Pumps
390	CHA-PS-PMOT-INT-2	CHA-PS Intermediate Pump 2 - Motor	Motor	Pumps
391	CHA-PS-PMOT-INT-3	CHA-PS Intermediate Pump 2 - Motor	Motor	Pumps
392	CHA-PS-PMOT-SAMP-IN	CHA-PS Influent Sample Pump - Motor	Motor	Pumps
393	CHA-PS-PP-B1	CHA-PS RP-B1 (Power Panel)	Distribution Panel	Power Distribution
394	CHA-PS-PP-B1-12	CHA-PS Panelboard B1-12 for MCC-1	Distribution Panel	Power Distribution
395	CHA-PS-PP-SRV	CHA-PS Distribution Panelboard - Service Garage	Distribution Panel	Power Distribution
396	CHA-PS-P-SAMP-IN	CHA-PS Influent Sample Pump	Horizontal Centrifugal Pump	Pumps
397	CHA-PS-QTS	CHA-PS Quanti-Tray Sealer	Quanti-Tray Sealer	Lab & Sampling Equipment
398	CHA-PS-RAIN	CHA-PS Rain Gauge	Rain Gauge	Instrumentation
399	CHA-PS-ROOFCV	CHA-PS Roof Cover w/ Drains	Roof	Service Garage
400	CHA-PS-ROOF-PS	CHA-PS Pump Station - Low and High Roofs	Roof	Pump Station Building
401	CHA-PS-ROOF-PS-SIDE	CHA-PS Roof Siding - Pump Station Building	Roof	Pump Station Building
402	CHA-PS-ROOF-SRV	CHA-PS Roof - Service Garage	Roof	Service Garage
403	CHA-PS-ROOF-SRV-SIDE	CHA-PS Roof Siding - Service Garage	Roof	Service Garage
404	CHA-PS-RUD-SWP	CHA-PS Rollup Door - Motor Room	Overhead Door	Pump Station Building
405	CHA-PS-SAMP-1	CHA-PS Influent Composite Sampler	Sampler	Lab & Sampling Equipment
406	CHA-PS-SCADA-SFTWR	CHA-PS SCADA Software	Miscellaneous	Controls
407	CHA-PS-SECCAM	CHA-PS Building Security Cameras	Security Camera	Miscellaneous
408	CHA-PS-SFTST-P2	CHA-PS Soft Start - Intermediate Pump 2	Motor Starter	MCCs
409	CHA-PS-SFTST-P3	CHA-PS Soft Start - Intermediate Pump 3	Motor Starter	MCCs
410	CHA-PS-SLAB-B1	CHA-PS Floor Slab - Basement 1	Floor Slab	Pump Station Building
411	CHA-PS-SLAB-B2	CHA-PS Floor Slab - Basement 2	Floor Slab	Pump Station Building
412	CHA-PS-SLAB-MR	CHA-PS Floor Slab - Main Floor	Floor Slab	Pump Station Building
413	CHA-PS-SNO-1	CHA-PS Snow Blower - Medium	Snow Blower	Miscellaneous
414	CHA-PS-SNO-2	CHA-PS Snow Blower - Large	Snow Blower	Miscellaneous
415	CHA-PS-SWP-1	CHA-PS Storm Weather Pump 1	Chapaton Pump Propeller	Storm Weather Pumps
416	CHA-PS-SWP-2	CHA-PS Storm Weather Pump 2	Chapaton Pump Propeller	Storm Weather Pumps
417	CHA-PS-SWP-3	CHA-PS Storm Weather Pump 3	Chapaton Pump Propeller	Storm Weather Pumps
418	CHA-PS-SWP-EXC-1	CHA-PS SWP-1 Motor Exciter	Chapaton Motor Exciter	Storm Weather Pumps
419	CHA-PS-SWP-EXC-2	CHA-PS SWP-2 Motor Exciter	Chapaton Motor Exciter	Storm Weather Pumps
420	CHA-PS-SWP-EXC-3	CHA-PS SWP-3 Motor Exciter	Chapaton Motor Exciter	Storm Weather Pumps
421	CHA-PS-SWP-STA-1	CHA-PS SWP-1 Motor Stator	Chapaton Motor Stator	Storm Weather Pumps
422	CHA-PS-SWP-STA-2	CHA-PS SWP-2 Motor Stator	Chapaton Motor Stator	Storm Weather Pumps
423	CHA-PS-SWP-STA-3	CHA-PS SWP-3 Motor Stator	Chapaton Motor Stator	Storm Weather Pumps
424	CHA-PS-TRAC-33	CHA-PS Ford Tractor	Wheeled Heavy Equipment	Fleet
425	CHA-PS-TRAC-34	CHA-PS John Deere Tractor #34	Wheeled Heavy Equipment	Fleet
426	CHA-PS-TRAILER-348	CHA-PS Trailer #348	Trailer	Miscellaneous
427	CHA-PS-TRNF-500	CHA-PS 500 kVA Transformer (B1)	Transformer	Power Distribution
428	CHA-PS-TRNF-GAR	CHA-PS 15 kVa Transformer (Pump Station Garage) to B1-12 distribution panel	Transformer	Power Distribution
429	CHA-PS-TRNF-LPA	CHA-PS 45 kVa Transformer (B1) to LP-A, LP-B and LP-C	Transformer	Power Distribution
430	CHA-PS-TRNF-LPD	CHA-PS 45 kVa Transformer #3 (B2) to LP-D and control room	Transformer	Power Distribution
431	CHA-PS-TRNF-LPE	CHA-PS Transformer (above control room) to LP-E	Transformer	Power Distribution
432	CHA-PS-TRNF-RPB1	CHA-PS 15 kVa Transformer (B1) - to RP-B1 panel	Transformer	Power Distribution
433	CHA-PS-TRNF-SRV	CHA-PS Transformer	Transformer	Power Distribution
434	CHA-PS-TRUCK-345	CHA-PS Pickup Truck 1	Truck	Fleet
435	CHA-PS-TRUCK-346	CHA-PS Dump Truck	Truck	Fleet
436	CHA-PS-TRUCK-347	CHA-PS Pickup Truck 2	Truck	Fleet
437	CHA-PS-TRUCK-359	CHA-PS Pickup Truck 3	Truck	Fleet
438	CHA-PS-TRUCK-368	CHA-PS Pickup Truck 4	Truck	Fleet
439	CHA-PS-UH-GAR	CHA-PS Electric Unit Heaters - Pump Station Garage	Heater	HVAC
440	CHA-PS-UH-PS	CHA-PS Electric Unit Heaters - Main Level	Heater	HVAC
441	CHA-PS-UH-SRV	CHA-PS Gas Unit Heaters - Service Garage (2)	Heater	HVAC
442	CHA-PS-UH-TR	CHA-PS Gas Unit Heaters - Trash Rack	Heater	HVAC
443	CHA-PS-UPS	CHA-PS Station Battery - TSSVR1	Uniterruptible Power Supply	Power Distribution
444	CHA-PS-VA-KG-JEF	CHA-PS Jefferson Interceptor Valve - Actuator	Electric Actuator	Valves

8 ½ MILE RELIEF DRAIN DRAINAGE DISTRICT
Vertical Asset Inventory Summary

No.	AssetName	Description	CategoryName	ClassName
445	CHA-PS-VA-KG-RTB	CHA-PS RTB Valve - Actuator	Electric Actuator	Valves
446	CHA-PS-V-BFD-1	CHA-PS NPW Auto Valves (back flow prevention)	Backflow Device	Plumbing
447	CHA-PS-V-BV-1	CHA-PS Ball Valve - RTB Exterior Drain	Ball Valve	Valves
448	CHA-PS-V-CV-1	CHA-PS Check Valve - Dry Pump 1	Check Valve	Valves
449	CHA-PS-V-CV-2	CHA-PS Check Valve - Int. Pump 2	Check Valve	Valves
450	CHA-PS-V-CV-3	CHA-PS Check Valve - Int. Pump 3	Check Valve	Valves
451	CHA-PS-V-G-1	CHA-PS Gate Valve - Dry Pump 1 - Discharge	Gate Valve	Valves
452	CHA-PS-V-G-2	CHA-PS Gate Valve - Dry Pump 1 - Isolation	Gate Valve	Valves
453	CHA-PS-V-G-3	CHA-PS RTB Exterior Drain Valve	Gate Valve	Valves
454	CHA-PS-V-KG-1	CHA-PS Knife Gate Valve - Dry Pump 1 - Suction	Knife Gate Valve	Valves
455	CHA-PS-V-KG-2	CHA-PS Knife Gate Valve - Int. Pump 2 - Suction	Knife Gate Valve	Valves
456	CHA-PS-V-KG-3	CHA-PS Knife Gate Valve - Int. Pump 2 - Discharge	Knife Gate Valve	Valves
457	CHA-PS-V-KG-4	CHA-PS Knife Gate Valve - Dry/Int. Pumps 1/2 Isolation	Knife Gate Valve	Valves
458	CHA-PS-V-KG-5	CHA-PS Knife Gate Valve - Int. Pump 3 - Suction	Knife Gate Valve	Valves
459	CHA-PS-V-KG-6	CHA-PS Knife Gate Valve - Int. Pump 3 - Discharge	Knife Gate Valve	Valves
460	CHA-PS-V-KG-7	CHA-PS Knife Gate Valve - Int. Pump 3 - Isolation	Knife Gate Valve	Valves
461	CHA-PS-V-KG-JEF	CHA-PS Jefferson Interceptor Valve	Knife Gate Valve	Valves
462	CHA-PS-V-KG-RTB	CHA-PS RTB Valve	Knife Gate Valve	Valves
463	CHA-PS-VLT-9M-STA	CHA-PS Station Gate Structure Vault	Vault	Pump Station Building
464	CHA-PS-VLT-JEF	CHA-PS Jefferson Emergency Diversion Gate Structure	Vault	Pump Station Building
465	CHA-PS-V-PV-N	CHA-PS Plug Valve - Bubbler Isolation - North	Plug Valve	Valves
466	CHA-PS-V-PV-S	CHA-PS Plug Valve - Bubbler Isolation - South	Plug Valve	Valves
467	CHA-PS-V-RPZ-1	CHA-PS RPZ	Pressure Regulating Valve	Plumbing
468	CHA-PS-V-RPZ-2	CHA-PS Boiler Feed RPZ	Backflow Device	Plumbing
469	CHA-PS-V-SWP-C1	CHA-PS SWP #2 Drain Check Valve 1	Check Valve	Valves
470	CHA-PS-V-SWP-C2	CHA-PS SWP #2 Drain Check Valve 2	Check Valve	Valves
471	CHA-PS-WH-1	CHA-PS Water Heater - Basement 1	Water Heater	Plumbing
472	CHA-PS-WH-2	CHA-PS Water Heater - Service Garage	Water Heater	Plumbing
473	CHA-PS-WND-1	CHA-PS Exterior Window - Large	Window	Pump Station Building
474	CHA-PS-WND-2	CHA-PS Exterior Window - Small	Window	Pump Station Building
475	CHA-PS-WND-3	CHA-PS Exterior Window - Large Double Hung	Window	Pump Station Building
476	CHA-PS-WND-4	CHA-PS Interior Window - Lab	Window	Pump Station Building
477	CHA-PS-WTANK-BOIL	CHA-PS Boiler Expansion Tanks (2)	Water Tank	HVAC
478	CHA-PS-WW	CHA-PS Pump Station Wet Well	Wet Well	Wet Well
479	CHA-RTB-CRANE-C	CHA-RTB 1/2 Ton Crane Hoist (Flushing Chamber C)	Crane	Miscellaneous
480	CHA-RTB-CRANE-D	CHA-RTB 1/2 Ton Crane Hoist (Flushing Chamber D)	Crane	Miscellaneous
481	CHA-RTB-FENC	CHA-RTB Brick Wall - North Side	Fence	Miscellaneous
482	CHA-RTB-FLSH-NOZ	CHA-RTB Flushing Nozzles	Diffuser	Piping
483	CHA-RTB-G-9M-B1	CHA-RTB 9 Mile Basin Gate 1	Sluice Gate	Gates
484	CHA-RTB-G-9M-B2	CHA-RTB 9 Mile Basin Gate 2	Sluice Gate	Gates
485	CHA-RTB-GA-9M-B1	CHA-RTB 9 Mile Basin Gate 1 - Actuator	Hydraulic Actuator	Gates
486	CHA-RTB-GA-9M-B2	CHA-RTB 9 Mile Basin Gate 2 - Actuator	Hydraulic Actuator	Gates
487	CHA-RTB-HTC-EQP	CHA-RTB Equipment Access Hatch at PS	Hatch	Structure/Chamber
488	CHA-RTB-HTC-GATE	CHA-RTB Access Hatch to Dewatering Gate	Hatch	Structure/Chamber
489	CHA-RTB-LP-E	CHA-RTB Lighting Panel E (Chamber C)	Distribution Panel	Electrical
490	CHA-RTB-LP-F	CHA-RTB Lighting Panel F (Chamber D)	Distribution Panel	Electrical
491	CHA-RTB-LS-220	CHA-RTB LS-220 RTB Level Sensor	Ultrasonic Level Instrument	SCADA
492	CHA-RTB-LT-EX-FC	CHA-RTB Exterior Lighting - Flushing Chambers C, D	Outside Lighting	Electrical
493	CHA-RTB-LT-XP-FC	CHA-RTB Explosion Proof Lighting - Flushing Chambers A, B, C, D	Inside Lighting	Electrical
494	CHA-RTB-PIPE-FLSH-16	CHA-RTB Flushing Pipe - 16"	Process Piping	Piping
495	CHA-RTB-PIPE-FLSH-20	CHA-RTB Flushing Pipe - 20"	Process Piping	Piping
496	CHA-RTB-P-SUMP-A	CHA-RTB Sump Pump - Flushing Chamber A	Submersible Centrifugal Pump	Pumps
497	CHA-RTB-P-SUMP-B	CHA-RTB Sump Pump - Flushing Chamber B	Submersible Centrifugal Pump	Pumps
498	CHA-RTB-RTB	CHA-RTB Retention Treatment Basin	Retention Treatment Basin	Structure/Chamber
499	CHA-RTB-SECFNC-1	CHA-RTB Security Fence Structure - around 9M Dewatering Gate Actuator	Fence	Gates
500	CHA-RTB-SECGATE-1	CHA-RTB Security Gate to CCS - Opener	Gate/Door Opener	Miscellaneous
501	CHA-RTB-SECGATE-2	CHA-RTB East Security Gate to Deck - Opener	Gate/Door Opener	Miscellaneous
502	CHA-RTB-SECGATE-3	CHA-RTB West Security Gate to Deck - Opener	Gate/Door Opener	Miscellaneous
503	CHA-RTB-TRNF-LPE	CHA-RTB 9 kVa Transformer - LP-E (Flushing Chamber C)	Transformer	Electrical
504	CHA-RTB-TRNF-LPF	CHA-RTB 9 kVa Transformer - LP-F (Flushing Chamber D)	Transformer	Electrical
505	CHA-RTB-VA-DW	CHA-RTB Dewatering Gate - Actuator	Hydraulic Actuator	Valves
506	CHA-RTB-VA-F-01	CHA-RTB Flushing Valve 1 - Actuator	Electric Actuator	Valves
507	CHA-RTB-VA-F-02	CHA-RTB Flushing Valve 2 - Actuator	Electric Actuator	Valves
508	CHA-RTB-VA-F-03	CHA-RTB Flushing Valve 3 - Actuator	Electric Actuator	Valves
509	CHA-RTB-VA-F-04	CHA-RTB Flushing Valve 4 - Actuator	Electric Actuator	Valves
510	CHA-RTB-VA-F-05	CHA-RTB Flushing Valve 5 - Actuator	Electric Actuator	Valves
511	CHA-RTB-VA-F-06	CHA-RTB Flushing Valve 6 - Actuator	Electric Actuator	Valves
512	CHA-RTB-VA-F-07	CHA-RTB Flushing Valve 7 - Actuator	Electric Actuator	Valves
513	CHA-RTB-VA-F-08	CHA-RTB Flushing Valve 8 - Actuator	Electric Actuator	Valves
514	CHA-RTB-VA-F-09	CHA-RTB Flushing Valve 9 - Actuator	Electric Actuator	Valves
515	CHA-RTB-VA-F-10	CHA-RTB Flushing Valve 10 - Actuator	Electric Actuator	Valves
516	CHA-RTB-VA-F-11	CHA-RTB Flushing Valve 11 - Actuator	Electric Actuator	Valves
517	CHA-RTB-VA-F-12	CHA-RTB Flushing Valve 12 - Actuator	Electric Actuator	Valves
518	CHA-RTB-VA-F-13	CHA-RTB Flushing Valve 13 - Actuator	Electric Actuator	Valves
519	CHA-RTB-VA-F-14	CHA-RTB Flushing Valve 14 - Actuator	Electric Actuator	Valves
520	CHA-RTB-VA-F-9M	CHA-RTB Flushing Valve for 9EB - Actuator	Electric Actuator	Valves
521	CHA-RTB-V-DW	CHA-RTB Dewatering Gate	Knife Gate Valve	Valves
522	CHA-RTB-V-F-01	CHA-RTB Flushing Valve 1 (Chamber C)	Knife Gate Valve	Valves
523	CHA-RTB-V-F-02	CHA-RTB Flushing Valve 2 (Chamber C)	Knife Gate Valve	Valves
524	CHA-RTB-V-F-03	CHA-RTB Flushing Valve 3 (Chamber C)	Knife Gate Valve	Valves
525	CHA-RTB-V-F-04	CHA-RTB Flushing Valve 4 (Chamber D)	Knife Gate Valve	Valves
526	CHA-RTB-V-F-05	CHA-RTB Flushing Valve 5 (Chamber D)	Knife Gate Valve	Valves
527	CHA-RTB-V-F-06	CHA-RTB Flushing Valve 6 (Chamber A)	Knife Gate Valve	Valves
528	CHA-RTB-V-F-07	CHA-RTB Flushing Valve 7 (Chamber A)	Knife Gate Valve	Valves
529	CHA-RTB-V-F-08	CHA-RTB Flushing Valve 8 (Chamber A)	Knife Gate Valve	Valves
530	CHA-RTB-V-F-09	CHA-RTB Flushing Valve 9 (Chamber B)	Knife Gate Valve	Valves
531	CHA-RTB-V-F-10	CHA-RTB Flushing Valve 10 (Chamber B)	Knife Gate Valve	Valves
532	CHA-RTB-V-F-11	CHA-RTB Flushing Valve 11 (Chamber C)	Knife Gate Valve	Valves
533	CHA-RTB-V-F-12	CHA-RTB Flushing Valve 12	Knife Gate Valve	Valves
534	CHA-RTB-V-F-13	CHA-RTB Flushing Valve 13 (Chamber A)	Knife Gate Valve	Valves
535	CHA-RTB-V-F-14	CHA-RTB Flushing Valve 14 (Chamber B)	Knife Gate Valve	Valves
536	CHA-RTB-V-F-9M	CHA-RTB Flushing Valve for 9EB (Chamber A)	Knife Gate Valve	Valves
537	CHA-RTB-VLT-DW	CHA-RTB Dewatering Gate Access Vault	Vault	Structure/Chamber
538	CHA-RTB-VLT-FC-A	CHA-RTB Flushing Chamber A	Vault	Structure/Chamber
539	CHA-RTB-VLT-FC-B	CHA-RTB Flushing Chamber B	Vault	Structure/Chamber
540	CHA-RTB-VLT-FC-C	CHA-RTB Flushing Chamber C	Small Building	Structure/Chamber
541	CHA-RTB-VLT-FC-D	CHA-RTB Flushing Chamber D	Small Building	Structure/Chamber

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date August 14, 2017
(no later than 3 years from executed grant date)

The Intra-County Drainage Board for the Eight and One-Half Mile Relief Drain Drainage District *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1173-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: October 11, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: __________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on __________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Brian Baker at (586) 307-8210 brian.baker@macombgov.org
Name Phone Number Email

8-14-17
Signature of Authorized Representative (Original Signature Required) Date

Brian Baker, Chief Deputy Public Works Commissioner
Print Name and Title of Authorized Representative

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date May 2017
(no later than 3 years from executed grant date)

The City of Allegan *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1487-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Danielle Bird at 269-673-5511 dbird@cityofallegan.org
Name Phone Number Email

Danielle Bird May 31 2017
Signature of Authorized Representative (Original Signature Required) Date

Danielle Bird / Clerk
Print Name and Title of Authorized Representative

City of Allegan
Storm Water Asset Management Plan Summary

City of Allegan SAW Grant

112 Locust Street, Allegan, MI 49010

cityofallegan.org

Contact Information for the grantee:

Ms. Danielle Bird

Address: 112 Locust Street, Allegan, MI 49010

Phone: 269-673-2869

SAW Grant Project Number: 1487-01

Executive Summary

The City of Allegan received a SAW Grant in 2014 to prepare a Storm Water Asset Management Plan.

The Grant agreement indicated the following amounts:

Plan Cost	Grant Amount	Local Match
$302,025	$271,823	$30,202

The Key components in their Asset Management Plan include:

a. Asset Inventory and Condition Assessment
b. Level of Service
c. Criticality of Assets
d. Operation and Maintenance Strategies/Revenue Structure
e. Long-term Funding/Capital Improvement Plan

City of Allegan
Storm Water Asset Management Plan Summary

Asset Inventory

Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.

All assets that are functionally or financially significant to the waste water system have been inventoried.

- Collection system manholes, catch basins, and outlets were located using survey quality GPS.
- Detention basins and buildings were located using hand held GPS equipment.

Locations for all assets are recorded in GIS. Data regarding date of installation, material, and other physical characteristics for each asset is incorporated into the GIS geodatabase.
Location of non-pipe assets such as building components and other equipment is compiled in a package of inventory spreadsheets. These assets were not mapped in GIS.
The GIS and asset spreadsheets will be used to maintain asset data in the future.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

The condition of collection system piping was documented with either a pole mounted zoom camera (looking down each pipe from the manholes). The zoom camera method provided a very economical initial condition assessment of the pipes.

Using the zoom camera data, pipes were rated based on several factors such as joint conditions, wall corrosion, and infiltration. Composite Risk of Failure ratings of 1-5 (5 being the worst) were assigned to each pipe segment.

City of Allegan
Storm Water Asset Management Plan Summary

Percentage of mainline pipes within each rating category

1	2	3	4	5
58%	38%	3%	0.3%	1%

Manholes, catch basins, outlets, culverts, and detention basins were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, and structures.

Percentage of manholes within each rating category

1	2	3	4	5
92%	7%	1%	0%	0%

Percentage of catch basins within each rating category

1	2	3	4	5
92%	5%	2%	0%	0%

Level of Service Determination

Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.

We recognize that the people served by our system are more than customers, they are the system owners. Our staff acts as stewards of the system. We have held a series of public meetings and workshops to present the results of our condition assessments, review the costs for meeting various Levels of Service, and reviewed the budget impacts of those options. Based on the input received during those meetings, we have established the following Level of Service Goals:

1. Meet Regulatory Requirements
    a. Maintain a specified number of Certified Operators
    b. Continue our Illicit Discharge Program

2. Minimize Flooding and Public Hazards
    a. Staff/equip crews sufficiently to perform specific routine maintenance items
    b. Perform regularly scheduled monitoring and maintenance on all of our storm water system assets
    c. Adopt a baseline 10-year 24 hour design storm
3. Manage Storm Water Inflow and Ground Water Infiltration
    a. Monitor I/I and implement CIP projects to meet EPA guidelines
4. Provide Capacity for Community Growth
5. Minimize Life Cycle Costs
6. Maintain Active Water Quality
    a. Establish a street sweeping and catch basin cleaning program
    b. Maintain our Illicit Discharge Program

Criticality of Assets

Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions. The factors considered varied by the asset type and were tailored to identify both physical and functional deficiencies. For example, pipe ratings considered factors such as joint offsets and structural cracking while detention basin ratings considered factors such as sediment accumulation and remaining working volume.

Assets were given a Consequence of Failure (CoF) of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Serve schools/hospitals/major industry
- Are under major roads

- Are adjacent to waterways or significant wetlands

Consequence of Failure and Criticality should not be confused. Criticality is the product of as asset's Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset's action priority.

Criticality ratings were calculated and ranged from 1-25 (25 being the highest priority). We then ran a Jenks Optimization to create 5 primary groupings, each with a rank of 1-5 (5 being highest priority). The final Criticality ratings were considered when the comprehensive Capital Improvement Plan was generated.

Revenue Structure

Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.

The CIP provided refined cost projections for the first 10 years of the financial analysis. The Asset Management System identified the estimated asset investment cost by year for the remaining lifecycle of all assets. The annual investment cost was evaluated and demands on the City's Streets Fund were reviewed.

Based on that analysis, the CIP was adjusted and funding allocations in the Streets Fund were adjusted so that both O&M activities and CIP actions could be funded. Public meetings were held to convey the results of the asset evaluation (RoF and Criticality) along with the financial evaluation. We are moving forward with the budget adjustments required to provide our desired Level of Service.

City of Allegan
Storm Water Asset Management Plan Summary

Capital Improvement Plan

Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.

Once assets RoF ratings were assigned and actions prioritized using the Criticality ratings, action timelines were predicted for maintenance/repair/replacement. Because the storm water collection system assets share physical space with other asset systems such as waste water, roadway, and drinking water, it was imperative that the CIP process coordinated actions on these systems.

Scope of work and action timelines for the other asset systems were incorporated based on:

- Waste Water – based on Asset Management Plan work as part of SAW
- Roadway - based on roadway PASER (Pavement Surface Evaluation and Rating) evaluations
- Drinking Water – based on the Water Reliability Study.

Individual project scopes for the comprehensive CIP were created to maximize coordination of work on various assets and minimize overall costs. The CIP projects include improvements to the storm water system, waste water system (collection and treatment), drinking water system (distribution and treatment), and road system. The CIP costs were incorporated into the revenue structure review. A 10-year CIP document was created which will be available to the public once the final rate structure has been adopted.

List of the plan's major identified assets

- 63,500 feet of gravity sanitary sewer
    - Current replacement value of $7,620,000
- 384 manholes and 444 catch basins
    - Current replacement value of $2,484,000
- 4 detention basins
- 66 storm water outlets

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 2017
(no later than 3 years from executed grant date)

The City of Allegan *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1487-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: October 17, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: __________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on __________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Danielle Bird at 269 673 5511 dbird@cityofallegan.org
Name Phone Number Email

Danielle Bird May 31 2017
Signature of Authorized Representative (Original Signature Required) Date

Danielle Bird / Clerk
Print Name and Title of Authorized Representative

April 2017

City of Allegan
Waste Water Asset Management Plan Summary

City of Allegan SAW Grant
112 Locust Street, Allegan, MI 49010
cityofallegan.org

Contact Information for the grantee:
Ms. Danielle Bird
Address: 112 Locust Street, Allegan, MI 49010
Phone: 269-673-2869

SAW Grant Project Number: 1487-01

Executive Summary

The City of Allegan received a SAW Grant in 2014 to prepare a Waste Water Asset Management Plan.

The Grant agreement indicated the following amounts:

Plan Cost	Grant Amount	Local Match
$742,093	$667,884	$74,209

The Key components in their Asset Management Plan include:

a. Asset Inventory and Condition Assessment
b. Level of Service
c. Criticality of Assets
d. Operation and Maintenance Strategies/Revenue Structure
e. Long-term Funding/Capital Improvement Plan

City of Allegan
Waste Water Asset Management Plan Summary

Asset Inventory

Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.

All assets that are functionally or financially significant to the waste water system have been inventoried.

- Collection system manholes were located using survey quality GPS.
- Lift stations and buildings were located using hand held GPS equipment.
- Fixed assets within the waste water treatment plant (WWTP) were mapped based on plant schematic and record drawings.

Locations for assets that have fixed geographic locations such as pipes, manholes, buildings, and major fixed equipment are recorded in a GIS. Data regarding date of installation, material, and other physical characteristics for each asset is incorporated into the GIS geodatabase.
Location of non-pipe assets such as lift station components, WWTP components, building components, and other equipment is compiled in a package of inventory spreadsheets and CMMS database. These assets were not mapped in GIS.
The GIS, asset spreadsheets, and CMMS will all be used to maintain asset data in the future.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

The condition of collection system piping was documented with either a pole mounted zoom camera (looking down each pipe from the manholes) or with in-line closed circuit television (CCTV) from manhole to manhole. The zoom camera method provided a very economical initial condition assessment of the pipes. Pipes noted to have potentially significant deficiencies were flagged and follow-up inspections were performed with full in-line CCTV.

City of Allegan
Waste Water Asset Management Plan Summary

Using the zoom camera data, pipes were rated based on several factors such as joint conditions, wall corrosion, and infiltration. Composite Risk of Failure ratings of 1-5 (5 being the worst) were assigned to each pipe segment.

Pipes inspected with CCTV were rated using the PACP system (Pipeline Assessment Certification Program). The PACP ratings were then used to derive a composite Risk of Failure rating of 1-5 for each pipe.

Percentage of pipes within each rating category

1	2	3	4	5
32%	47%	15%	3%	3%

Manholes were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, and structures.

Percentage of manholes within each rating category

1	2	3	4	5
30%	51%	15%	3%	1%

Equipment within lift stations and the WWTP were rated on a scale of 1-5 based on factors relating to the service that the asset was in and the historical experience with failure for that service. Generally the lift station and WWTP equipment are currently in good condition with no major capital improvements needed at this time.

City of Allegan
Waste Water Asset Management Plan Summary

Level of Service Determination

Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.

We recognize that the people served by our system are more than customers, they are the system owners. Our staff acts as stewards of the system. We have held a series of public meetings and workshops to present the results of our condition assessments, review the costs for meeting various Levels of Service, and reviewed the rate impacts of those options. Based on the input received during those meetings, we have established the following Level of Service Goals:

1. Meet Regulatory Requirements
    a. Maintain a specified number of Certified Operators
    b. Maintain our in-house testing abilities
    c. Continue our Industrial Pretreatment Program
2. Minimize Service Interruptions
    a. Staff/equip crews sufficiently to perform specific routine maintenance items
    b. Repair/replace assets as required to limit emergency responses to 15 per year
3. Minimize Public Hazards
    a. Staff/equip emergency response services for 24 hour per day service and 90 minute response times
    b. Limit service interruptions to less than 6 hours
4. Manage Storm Water Inflow and Ground Water Infiltration
    a. Monitor I/I and implement CIP projects to meet EPA guidelines
5. Provide Capacity for Community Growth
6. Minimize Life Cycle Costs
7. Maintain Active Relationships with our Partner Communities

City of Allegan
Waste Water Asset Management Plan Summary

Criticality of Assets

Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions. The factors considered varied by the asset type and were tailored to identify both physical and functional deficiencies.

Assets were given a Consequence of Failure (CoF) of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Serve schools/hospitals/major industry
- Are under major roads
- Are adjacent to waterways or significant wetlands

Consequence of Failure and Criticality should not be confused. Criticality is the product of as asset's Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset's action priority.

Criticality ratings were calculated and ranged from 1-25 (25 being the highest priority). We then ran a Jenks Optimization to create 5 primary groupings, each with a rank of 1-5 (5 being highest priority). The final Criticality ratings were considered when the comprehensive Capital Improvement Plan was generated.

City of Allegan
Waste Water Asset Management Plan Summary

Revenue Structure

Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a "Test Year" was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.
The customer base was reviewed, including the number of billable customers and volumetric sales. Other operating and non-operating revenues were also evaluated. Prediction of customer and volume counts were made including trending in system utilization, projection of operating costs, and anticipated inflation by expense category. Refinancing and/or restructuring possibilities were also explored.
The CIP provided refined cost projections for the first 10 years of the financial analysis. The Asset Management System identified the estimated asset investment cost by year for the remaining lifecycle of all assets. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. Based on that analysis, rate adjustment options were identified. It was determined that the current rate structure was sufficient to cover O&M activities but increases were needed to fully implement the desired CIP. Public meetings were held to convey the results of the asset evaluation (RoF and Criticality) along with the financial evaluation. We are moving forward with the rate changes required to provide our desired Level of Service.

Capital Improvement Plan

Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.

Once assets RoF ratings were assigned and actions prioritized using the Criticality ratings, action timelines were predicted for maintenance/repair/replacement. Because the waste water collection system assets share physical space with other asset systems such as storm water, roadway, and drinking water, it was imperative that the CIP process coordinated actions on these systems.

Scope of work and action timelines for the other asset systems were incorporated based on:

- Storm Water – based on Asset Management Plan work as part of SAW
- Roadway - based on roadway PASER (Pavement Surface Evaluation and Rating) evaluations
- Drinking Water – based on the Water Reliability Study.

Individual project scopes for the comprehensive CIP were created to maximize coordination of work on various assets and minimize overall costs. The CIP projects include improvements to the waste water system (both collection and treatment), storm water system, drinking water system (distribution and treatment), and road system. The CIP costs were incorporated into the revenue structure review. A 10-year CIP document was created which will be available to the public once the final rate structure has been adopted.

List of the plan's major identified assets

- 1.2 MGD Average Daily Flow Waste Water Treatment Plant
    - Current replacement value of $18,385,000
- 14 lift stations
    - Current replacement t value of $3,170,000
- 12,300 feet of sanitary force main
    - Current replacement value of $1,640,000
- 186,300 feet of gravity sanitary sewer
    - Current replacement value of $24,800,000

STORMWATER, ASSET MANAGEMENT, AND WASTEWATER (SAW) SUMMARY REPORT
SAW GRANT PROJECT NO. 1049-01

CITY OF ALLEN PARK
WAYNE COUNTY, MI

PREPARED FOR:

CITY OF ALLEN PARK
16630 SOUTHFIELD ROAD, SUITE 3100
ALLEN PARK, MI 48045
TOM MURRAY, DPS DIRECTOR
313-928.0550

Prepared by:
Wade Trim Associates, Inc.
25251 Northline Road
Taylor, MI 48158
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May 31, 2017

1.0 Executive Summary

The City of Allen Park undertook the development of an Asset Management Program for the sanitary and stormwater systems owned and/or operated by the City. The City applied for and received a grant to develop a Program through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Wastewater and Asset Management (SAW) program. This grant provides between 75% and 100% grant funding for costs related to developing an asset management program. The City of Allen Park received full grant funding in the amount of $2,000,000; no funding match was required to be provided due to the City's status at the time of application. The SAW program was established by the MDEQ to help communities move toward financial sustainability in maintaining their wastewater and stormwater assets. Outside funding sources for wastewater and stormwater systems are typically no longer available and, therefore, the MDEQ is encouraging municipalities to move toward becoming self-sustaining enterprises for these utility systems.

What is an Asset Management Program?

The *International Infrastructure Management Manual* defines the goal of asset management as meeting a required level of service in the most cost-effective way through the creation, acquisition, operation, maintenance, rehabilitation, and disposal of assets to provide for present and future customers.

An Asset Management Program includes a set of procedures to manage assets based on principles of lifecycle costing implemented in a programmatic way. The intent of asset management is to verify the long-term sustainability of the utility. By helping a utility manager make better decisions on when it is most appropriate to repair, replace, or rehabilitate particular assets and by developing a long-term funding strategy, the utility can ensure its ability to deliver the required level of service perpetually.

Effective asset management implementation is comprehensive. It may involve integrating several tools along with other existing systems (accounting, financial reporting, purchasing and stores, payroll, etc.) to create a comprehensive information system that will support an integrated Asset Management Program. Properly practiced, it involves all parts of the organization and entails a living set of performance goals.

A good Program is not "done" and put on a shelf, but rather provides a framework of tools that may be continuously used for decision making. It is an active, on-going process that provides information to managers in order to make sound decisions about their capital assets and allows decision makers to better identify and manage needed investments in their utility's infrastructure. The Program tools may be used for tasks such as reviewing and establishing annual budgets, planning improvements, determining required staffing, and communicating performance with the public and regulatory agencies.

What is an Asset Management Plan?

An Asset Management Plan ("AMP") is a tool to help the utility implement its Asset Management Program. The purpose of this report is to focus on the AMP developed for the wastewater and stormwater systems with a focus on the next 20 years. The goal of the AMP is to provide the City with a cost-effective and results oriented program.

The AMP provides the City of Allen Park with a guide to continue to provide the desired level of service to the community at the lowest lifecycle costs for the wastewater and stormwater systems. This will be achieved by developing a strategic process to perform proactive maintenance and investment in the system, rather than just reacting to failures. The AMP will be re-visited at periodic intervals to confirm that priorities and objectives are being addressed and updated.

The scope of work for this AMP consists of addressing the five core components as described in the Michigan Department of Environmental Quality's (MDEQ) document, "Asset Management Guidance for Wastewater and Stormwater Systems." These include:

- Development of an Asset Inventory and Estimating Condition of Assets
- Identifying Critical Assets
- Identifying the Proposed Level of Service
- Capital Improvement Planning
- Establishing a Revenue Structure

Inventory of Assets and Condition Assessment

The assets that are the focus of this AMP include the sanitary sewer system and the storm water system, more specifically, the pipe networks, structures and pump stations associated with both systems. The primary means of condition assessment for enclosed sewers and manholes was to use criteria developed under the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP) and the Manhole Assessment Certification Program (MACP). These programs provide standards for defect identification and assessment using a consistent and repeatable method to identify, evaluate and manage pipelines and manholes.

The use of Closed-Circuit Televising (CCTV) for obtaining videos was used to allow the interior condition of enclosed pipes to be observed and defects noted. The use of NASSCO's PACP/MACP assessment program system identifies pipe and manhole features and defects using specific identifiers so that terms such as "crack" or "fracture" are used consistently by staff certified under the Program.

Defects that are found are weighted with scores on a severity scale of 1 to 5, with a "1" meaning the defect is minor and a "5" indicating the defect is significant. Defects are classified into two primary categories – Structural and Operation and Maintenance. Overall pipe grades are provided in several ways, including a "Quick Structural Rating" (QSR), a Quick Maintenance Rating (QMR), and an Overall Quick Rating (QPR). These ratings are scored as a four-digit number (i.e. 5Z5Z to 0000; the higher the rating the worse the condition).

CCTV data collected during assessments made by contractors was tracked using unique asset IDs. The unique asset IDs for each asset being assessed are used during the inspection process to ensure any collected data can be directly imported into the GIS geodatabase.

The NASSCO MACP program includes "Level 1" and "Level 2" inspections. Level 1 inspections are made by opening the manhole or structure and collecting limited data that is visible from the surface without entering the manhole. Level 2 inspections are similar to the pipeline CCTV in that defects and features are systematically cataloged along the length of the structure. This is usually done by entering the manhole or structure, typically under a confined space program, or by scanning the manhole with digital equipment. As part of Allen Park's Program, a "Level 1 plus" level of inspection form was developed. This inspection is performed from the surface, but includes additional data beyond MACP's typical Level 1 assessment that was used for condition assessment and overall evaluation of the structure.

The City, through its Contractor, Liquiforce, televised 146,256 linear feet of sanitary sewer and 66,000 linear feet of storm sewer. Further inspected by its Engineering Consultant, Wade Trim Associates, Inc., were 1,833 sanitary structures, 145 storm manholes and 279 storm inlets.

The City of Allen Park utilized their existing Geographic Information System (GIS) geodatabase as the foundation to implement the work scope approved through the SAW grant. GIS was the primary means to record and map the assets in each utility system. This geodatabase is part of the overall Allen Park GIS system, which was operated and maintained by the City's GIS consultant, Ritter GIS. The software used as the platform is ESRI ArcGIS. The geodatabase provides a means to record the attributes associated with each asset, such as installation date (age), size and material.

As part of the SAW grant, the existing GIS system was expanded upon by incorporating new structure and pipe data acquired through the inspection and videotaping of select sections of the City for both wastewater and stormwater. All relevant fields were populated and linked to the GIS system. With this information, City staff can quickly determine sizes, lengths, condition, location, etc. of the pipes or structures within the selected set areas.

Each run of pipe that was televised using Closed Circuit Television (CCTV) was categorized based on ID number, street/easement location and condition with feature classes for each as well as pipe diameter, lengths, etc. This information has been added to the City's GIS geodatabase and is in spreadsheet format as well. Approximately 26% of the sanitary system was televised along with 12% of the storm sewer system as a part of the SAW Grant.

Each manhole that was physically inspected was categorized based on ID number, street/easement location and condition with feature classes for each. This information has been added to the City's GIS geodatabase and is in spreadsheet format as well. Approximately 75% of the sanitary structures, 5.4% of the storm manholes and 6% of the storm inlets were inspected as a part of the Saw Grant.

The software package selected by the City is Cityworks, which syncs directly with the ArcGIS software to utilize the geodatabase of assets. This data has been and will continue to be used in determining asset criticality and for prioritizing short and long-term maintenance and replacement needs.

Level of Service Determination

As part of preparing the AMP, the City of Allen Park considered what an appropriate level of service should be for their sanitary sewer system. From a regulatory perspective, the expected performance criteria are that there not be any sanitary sewer overflows (SSOs) and that there not be excessive Inflow/Infiltration such that the system does not have the ability to transport and treat the wastewater. From a City of Allen Park resident perspective, the expected performance criteria are that they system works when needed (flush and it goes away) and that the cost of operating the system is as low as possible. In addition to these criteria the City has a basic obligation to prevent ground water or surface water contamination and to operate their system in a cost-effective manner. Basically, they need to be good stewards of the public interest and public funds.

It was determined to provide a capital improvement program and major maintenance program to correct issues noted during the televising of the sewer and inspection of manholes. It is important to note the City proactively corrected various areas of concern that were evident during inspection; this effort was not eligible for grant funding and was paid for directly by the City of Allen Park.

Criticality and Risk Evaluation

Not all assets are equally important to the utility's operation. Some assets are highly critical to maintaining operations, and others could be out of service for a period of time without negative consequences. Certain types of assets may be critical in one location, but not critical in another. For example, a pump station serving a very large commercial and residential area may be deemed more critical than a pump station servicing a small stormwater basin. A utility must examine its assets very carefully to determine which assets are critical and why.

In determining criticality, two questions are important. The first is how likely it is that the asset will fail and, the second is, what is the consequence of failure. By developing a scoring scale for these two measures, and then combining the two results, the overall risk of an individual asset can be quantified. Determining an asset's overall risk will allow a utility to manage its risk and aid in determining where to spend operation and maintenance dollars and plan capital expenditures.

Probability of Failure (POF)

To estimate the Probability of Failure (POF) of a given asset, the City of Allen Park looked at several factors such as asset age, condition of asset, failure history, historical knowledge, experiences with that type of asset in general, maintenance records, and other knowledge regarding how that type of asset is likely to fail. POF ratings were weighted using significant factors of that asset type with scoring values from 1 to 5, with "1" being the least likely to fail and "5" being the most likely to fail and assigned to each assessed asset (sanitary sewers, storm sewers, associated structures and pump stations).

Probability of failure typically increases as an asset ages or continues to operate. Risk associated with assets with high probabilities of failure may be reduced, if warranted, by increasing the level of maintenance, frequency of replacement, or by providing redundancy.

Consequence of Failure (COF)

To estimate the potential Consequence of Failure (COF) of a given asset, it is important to attempt to consider all potential costs associated with failure of that asset. These can include not only costs to repair and/or replace the asset, but also social costs associated with the loss of the asset, repair/replacement costs and legal costs related to collateral damage caused by the failure, environmental costs, loss of business revenue to the community, impacts to the public, and other types of losses. The consequence of failure can be high if any one of these costs is significant or the accumulation of several costs occur with a failure. The City of Allen Park used weighted COF ratings using significant factors of that asset type with scoring values from 1 to 5, with "1" having the lowest potential cost impacts due to failure and "5" having the highest potential cost impacts. Each asset type within the study group (sanitary sewer, storm sewer, associated structures and pump stations) was rated.

The consequence of failure typically is established when the asset is placed into operation and remains the same over the asset's lifecycle. Risk associated with assets with high consequences of failure is primarily managed by reducing the probability of sudden failure through increased maintenance and replacement.

Risk Evaluation

The assets that have the greatest probability of failure and the greatest consequences associated with the failure will be the assets that are the most critical. The Risk Evaluation score takes into account the POF and COF shown below. Adjustments are then made to take into account any redundancy available that would mitigate the consequence of failure.

$$Risk = POF \times COF$$

Assets with the highest Risk scores are likely candidates for immediate rehabilitation or replacement. Assets with lower scores should be analyzed to develop the best lifecycle strategy. If an asset's potential modes of failure and risks of failure are understood, it is possible to leverage use of the asset for a longer period and try to ensure the useful life is maximized before investing in replacement.

For some assets with a low consequence of failure, it may be most cost effective to operate in a "run to failure" mode where the asset is operated until it can no longer function. Preventive and predictive maintenance programs are most cost effective for assets with higher consequences of failure.

Risk should be managed in any decision-making process. The utility should analyze and document acceptable risk tolerance for all critical assets. The condition of the asset will change over time as will the consequences related to failure. It will be necessary to periodically review the criticality analysis and make adjustments to account for changes in the probability and consequence of any asset failures. As with all the components of the Asset Management Program, the criticality analysis is an on-going process.

Revenue Structure

The City of Allen Park has been proactive in adjusting sanitary rates dating back to 2014. It was recognized back then that rates had to be increased to cover necessary repairs and maintenance of the system. A five-year plan was implemented and began with a 13% increase in 2014, a 12.5% increase in both 2015 and 2016, and a scheduled 14% increase in both 2017 and 2018. These aggressive rate increases have put the City in a better position to address the recommended improvements that are a result of this report.

The City maximized the rate increases as much as possible while considering public reaction and the needs for the management of the wastewater system. Additional rate adjustments are being considered to meet anticipated future expenses following the planned 2018 adjustment. The SAW Grant does not require a review of stormwater system rate structures because most stormwater systems in Michigan do not have a dedicated source of revenue.

Capital Improvement Planning

Capital Improvement Plans (CIP) identify system upgrade, rehabilitation and replacement needs for the future, typically over a period of 20 years, with greater emphasis on the first five years of the plan. The improvements planned at this time were based on the inspection completed. As additional inspection is completed, the CIP may change to reflect new information. Included with this summary are the currently anticipated CIP projects for the next 20 years.

The CCTV inspection of the sanitary pipe network included the review of 173 pipe segments out of 2,540 existing segments. Of the 2,444 existing manholes, 1,833 were inspected. User rates are the primary funding source for addressing the sanitary sewer CIP plan findings.

The CCTV inspection of the storm sewer pipe network included the review of 525 pipe segments out of 6,826 existing segments. Of the 2,661 existing manholes, 145 were inspected. Of the 4,636 storm inlets, 279 were inspected. At this time, there is no funding mechanism in place for storm sewer maintenance and rehabilitation. Storm pipe and storm manhole rehabilitation are anticipated to continue to occur in conjunction with ongoing maintenance and reconstruction efforts associated with pavement rehabilitation and replacement.

Each of the eight sanitary sewer pump stations, along with one stormwater pump station, in the City of Allen Park, were also inspected. A summary report of these findings was prepared and is included with the overall report to remain on file with the City of Allen Park. It is important to emphasize that annual maintenance for both the sanitary and storm assets is budgeted and conducted by City staff independent of the CIP program.

List of Major Assets

The major assets that comprise the City of Allen Park Sanitary Sewer and Storm Water System consist of the following:

- 563,904 linear feet of sanitary sewer ranging from 8-inch to 54-inch diameter
- 2,444 sanitary manholes
- 8 sanitary pump stations
- 552,288 linear feet of storm sewer
- 2,661 storm manholes
- 4,636 storm inlets
- 1 storm pump station

For SAW Required Reporting

This AMP includes a certification of project completion for the MDEQ's SAW Grant Program. In addition, we understand a summary of this report will be posted on MDEQ's website and materials made available to the public upon request. We also understand the AMP shall be available for public review for 15 years from submission.

Attachments

Attachments for this summary report include summary maps detailing investigation locations and overall findings and the associated preliminary CIP.

Allen Park
SAW Grant Report 2017

PACP Inspections Final Status Map
Sanitary Gravity Mains

•	Sanitary Manholes
18"	Sanitary Gravity Mains (with diameter)
717	Sanitary Gravity Mains - PACP Inspected (with inspectionID)

Quantities:

Total Length of Sanitary Gravity Mains: 106.8 miles
Total Length of PACP Inspected Sanitary Gravity Mains: 27.7 miles

Total Sanitary Gravity Main Pipe Segments: 2,540
Total PACP Inspected Sanitary Gravity Main Pipe Segments: 665

City of Allen Park
WAYNE COUNTY, MICHIGAN

May
2017

WADETRIM

0 250 500 1,000
Feet

N

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Allen Park
SAW Grant Report 2017

PACP Inspection Condition Map
Storm Gravity Mains

Storm Gravity Mains (with diameter)

PACP Rating (Structural Quick Code)

🟦	0 - 3 (Good to Fair)
🟧	4 (Poor)
🟥	5 (Very Poor)

City of Allen Park
WAYNE COUNTY, MICHIGAN

May
2017

WadeTrim

0 250 500 1,000
Feet

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Allen Park
SAW Grant Report 2017

PACP Inspections Final Status Map
Storm Gravity Mains

●	Storm Manholes
18"	Storm Gravity Mains (with diameter)
717	Storm Gravity Mains - PACP Inspected (with inspection ID)

Quantities:

Total Length of Storm Gravity Mains: 104.6 miles
Total Length of PACP Inspected Storm Gravity Mains: 12.5 miles

Total Storm Gravity Main Pipe Segments: 6,826
Total PACP Inspected Storm Gravity Main Pipe Segments: 525

City of Allen Park
WAYNE COUNTY, MICHIGAN

May
2017

WADETRIM

0 250 500 1,000
Feet

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Allen Park
SAW Grant Report 2017

PACP Inspection Condition Map
Storm Gravity Mains

18" Storm Gravity Mains (with diameter)

PACP Rating (Structural Quick Code)

🟦	0 - 3 (Good to Fair)
🟧	4 (Poor)
🟥	5 (Very Poor)

City of Allen Park
WAYNE COUNTY, MICHIGAN

May
2017

WADETRIM

0 250 500 1,000
Feet

N

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Allen Park
SAW Grant Report 2017

MACP Inspections Final Status Map

Sanitary Manholes, Storm Manholes, and Storm Inlets

- ☒ Storm Manholes (2,661)
- ☒ Storm Manholes - NASSCO Surveyed (145)
- ☐ Storm Inlets (4,636)
- 🟩 Storm Inlets - NASSCO Surveyed (279)
- ○ Sanitary Manholes (2,444)
- ● Sanitary Manholes - NASSCO Surveyed (1,833)
- — Roads
- ▨ Allen Park City Limits

City of Allen Park
WAYNE COUNTY, MICHIGAN

May
2017

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Allen Park Saw Grant Program-Preliminary
20 Year Capital Improvement Project Plan
Years 1 - 5

Task	Estimated Cost	Section ID	Pipe Diameter	17/18	18/19	19/20	20/21	21/22	Funding
Maintenance and Rehabilitation Budget				**$200,000**	**$600,000**	**$206,000**	**$212,180**	**$218,545**	User Rates
CIPP Lining-Sanitary Sewer				**Estimated Cost**	**Estimated Cost**	**Estimated Cost**	**Estimated Cost**	**Estimated Cost**	
BELMONT/JONAS EASE.		109	24	$6,000					
HANFORD/CICOTTE EASE.		263	12	$8,322					
ALLEN RD. EASE.		627	24	$23,040					
ENGLEWOOD/CHAMPAIGNE EASE		1113	12	$7,105					
ALLEN RD. EASE.		45	24	$23,100					
ALLEN RD. EASE.		46	24	$24,640					
ALLEN RD. EASE.		60	24	$21,280					
COLLEGE/MORRIS		174	12	$7,938					
FOX AVE		244	12	$3,000					
GARFIELD/WHITE EASE.		258	18		$3,000				
MCLAIN/HARRISON EASE		361	12		$3,800				
MEYER/DASHER EASE. & SPOT		366	24		$22,320				
MORRIS		371	12		$11,270				
MORRIS		372	12		$11,564				
PARIS/MORRIS EASE.		408	12		$4,160				
REGINA/MCLAIN EASE		454	10		$4,028				
OSAGE/LARME EASE		1328	12			$2,338			
BUCKINGHAM/BALFOUR EASE		1330	21			$13,414			
ARLINGTON/WARWICK EASE		97	12			$11,466			
HARRISON/CLEVELAND EASE		287	12			$4,530			
KEPPEN/HANFORD EASE		330	12				$10,584		
MARKESE/REGINA EASE.		339	18				$11,200		
MEYER/DASHER EASE.		364	12				$16,260		
OCEANA/THOMAS EASE.		393	24				$5,600		
SOUTHFIELD/DASHER EASE.		528	12				$16,000		
SOUTHFIELD/MEYER EASE.		535	12					$16,856	
UNIVERSITY/PARIS EASE.		559	12					$14,504	
WARWICK/OCONNER EASE		589	15					$16,470	
LESLIE/RAY EASE		1117	12					$15,288	
WICK/GREY EASEMENT & SPOT		1190	12					$12,000	
Sanitary Sewer Replacement/Spot Repair									
ASTER/CHAMPAIGN EASE-SPOT		99	24	$12,000					
BELMONT/JONAS EASE.-SPOT		107	24	$8,000					
MCLAIN/HARRISON EASE.		359	10	$40,000					
ALLEN RD. EASE.		59	24		$94,320				
CHAMPAIGN/BELMONT EASE.-SPOT		139	18	$7,780					
HANFORD/CICOTTE EASE.		262	15			$119,200			
MCLAIN/HARRISON EASE-SPOT		349	12		$15,000				
PARIS/MORRIS EASE.-SPOT		409	12		$7,440				
REGINA/MCLAIN EASE-SPOT		441	12		$7,440				
THOMAS/MARKESE EASE.		545	15				$58,800		
RAY/HELEN EASE-SPOT		1125	15		$7,440				
BELMONT/JONAS EASE-SPOT		119	18			$14,880			
CICOTTE/UNIVERSITY EASE. SPOT		146	12			$7,440			
HANFORD/CICOTTE EASE. SPOT		265	15			$15,000			
HARRISON/CLEVELAND EASE SPOT		286	12			$7,400			
MARKESE/REGINA EASE.		338	10				$45,200		
MEYER/DASHER EASE.-SPOT		365	15				$22,320		
REGINA/MCLAIN EASE.		450	10					$100,800	
SOUTHFIELD/DASHER EASE.& SPOT		525	18				$7,440		
PHILOMENE/GARFIELD EASE &SPOT		1293	18				$7,440		
BUCKINGHAM/ROBINSON EASE & SPOT		1331	24					$13,000	
WINONA/OSAGE EASE		1390	12					$15,703	
Pump Station Rehabilitation									
Pump Station Rehab					$400,000				
Sanitary Structure Maintenance									
WT 1 REPAIRS*				$8,032					
WT 2 REPAIRS*					$12,000	$12,000	$12,000	$12,000	
*As Defined By WadeTrim									

Allen Park Saw Grant Program
20 Year Capital Improvement Project Plan-Preliminary
Years 6-10

Task	Section ID	Pipe Diameter	22/23	23/24	24/25	25/26	26/27	Funding
Maintenance and Rehabilitation Budget			**$225,102**	**$681,855**	**$238,810**	**$245,975**	**$253,354**	User Rates
CIPP Lining-Sanitary Sewer			**Estimated Cost**	**Estimated Cost**	**Estimated Cost**	**Estimated Cost**	**Estimated Cost**	
WICK/GREY EASEMENT	1192	12	$4,214					
ECORSE NORTH EASE	1306	12			$3,500			
Sanitary Sewer Replacement/Spot Repair								
ALLEN ROAD(WEST) EASE-SPOT	62	12	$6,563					
ANGELIQUE/OCEANA EASE	73	12	$124,800					
ANNE/ARLINGTON EASE	81	15	$7,440					
ARLINGTON/WARWICK EASE	90	15		$121,600				
HANFORD/CICOTTE EASE.-SPOT	264	18	$8,000					
MCLAIN/HARRISON EASE.-SPOT	358	10	$7,440					
OCEANA/THOMAS EASE.	397	15			$214,400			
OCEANA/THOMAS EASE.-SPOT	400	12	$22,320					
REGINA/MCLAIN EASE.-SPOT	445	10	$7,440					
SOUTHFIELD/DASHER EASE.	526	12				$101,600		
WALL/HARLOW EASE-SPOT	586	10	$7,440					
WALL/HARLOW EASE-SPOT	587	10	$7,440					
WARWICK/O'CONNER EASE	595	12		$43,600				
SOUTHFIELD/DASHER EASE.	621	15				$64,000		
WICK/GREY EASEMENT-SPOT	1192	12	$7,440					
WINONA/OSAGE EASE	1318	10		$59,600				
MCCLAIN/REGINA EASE	1296	12				$87,200		
BALFOUR/BUCKINGHAM EASE-SPOT	1305	12			$7,440			
OSAGE/LARME EASE	1320	10					$42,000	
ROBINSON(WEST) EASE	1337	18					$123,900	
SHENANDOAH/LUANA EASE	1412	12					$91,455	
Pump Station Rehabilitation								
Pump Station Rehab				$450,000				
Sanitary Structure Maintenance								
WT 1 REPAIRS*								
WT 2 REPAIRS*			$12,000	$12,000	$12,000			
*As Defined by WadeTrim								

Allen Park SAW Grant Program

20 Year Capital Improvement Project Plan-Preliminary

Years 10-20

Task	Section ID	Pipe Diameter	2027-2037	Funding
Maintenance and Rehabilitation Budget			**$4,041,553**	**User Rates**
Sanitary Sewer Replacement			**Estimated Cost**	
NORWOOD/LUANA EASE	1410	15	$104,280	
SHENANDOAH/LUANA EASE	1411	15	$118,500	
MARKESE/REGINA EASE	1431	12	$87,100	
ROBINSON(WEST) EASE	1375	15	$34,000	
Pump Station Rehabilitation				
Pump Station Rehab			$3,000,000	
Sanitary System Maintenance				
Cleaning			$200,000	
Spot lining/Spot repairs			$500,000	

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date May 8, 2017
(no later than 3 years from executed grant date)

The City of Allen Park *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1049-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Name	Phone Number	Email
Tom Murray	at 313.928.0550	TMurray@cityofallenpark.org

Signature of Authorized Representative (Original Signature Required)

5/30/17
Date

Tom Murray, DPS Director
Print Name and Title of Authorized Representative

June 2014

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 8, 2017
(no later than 3 years from executed grant date)

The City of Allen Park *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1049-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: November 9, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Tom Murray at 313.928.0550 TMurray@cityofallenpark.org
Name Phone Number Email

Tom Murray 5/30/17
Signature of Authorized Representative (Original Signature Required) Date

Tom Murray, DPS Director
Print Name and Title of Authorized Representative

April 2017

Prein&Newhof
Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

May 26, 2017
2130490

Mr. Eric Pocan, Project Manager
MDEQ
Office of Drinking Water and Municipal Assistance
P.O. Box 30241
Lansing, MI 48909-7741

RE: SAW Grant Project No. 1482-01
Wastewater Asset Management Plan
Alpine Township, Kent County

Dear Mr. Pocan:

In accordance with your letter dated April 20, 2017, we are submitting on behalf of Alpine Township the required SAW grant deliverables as follows:

1. Certification of Project Completeness form, signed by Mr. Greg Madura, Alpine Township Supervisor
2. Project executive summary as required under Section 603 of Public Act 84 of 2015, including contact information for the Township, a brief discussion of each of the five major components of the Asset Management Plan, and a list of the Township's major identified assets

The Township has completed the Asset Management Plan, and it will be available to the MDEQ upon request and available to the public for at least fifteen years.

We are submitting these documents prior to the May 31, 2017, grant deliverable deadline. Final grant-eligible expenses will be incurred prior to May 31, 2017, and final disbursement requests will be submitted by July 30, 2017 (60 days after grant end date). It is our understanding that this will complete the Township's obligations under the grant.

If you have any questions, please contact our office.

Sincerely,

Prein&Newhof

Mark R. Prein, P.E.

Enclosures

c. Mr. Greg Madura, Supervisor, Alpine Township
Ms. Leslie Sorensen, DEQ-Water Resources Division, Grand Rapids District Office

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 5/31/2017
(no later than 3 years from executed grant date)

The Alpine Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1482-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: 10/11/2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Greg Madura at (616) 784-1262
Name Phone Number Email

Greg Madura 5/26/17
Signature of Authorized Representative (Original Signature Required) Date

Greg Madura, Township Supervisor
Print Name and Title of Authorized Representative

April 2017

Memorandum

Date:	May 26, 2017
To:	Mr. Eric Pocan
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130490
Re:	Alpine Township SAW Grant Summary of Wastewater Asset Management Plan

Mr. Pocan:

This memorandum provides the summary of Alpine Township's SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

SAW Grant Project Number: 1482-01

Grantee:

Alpine Township
5255 Alpine Avenue NW
Comstock Park, MI 49312
http://alpinetwp.org/

Contact: Mr. Greg Madura, Township Supervisor
Phone: 616-784-1262

Executive Summary

Alpine Township received a SAW Grant in 2014 to prepare a Waste Water Asset Management Plan. The Grant agreement indicated the following amounts:

Project Cost	Grant Amount	Local Match
$608,000	$547,200	$60,800

The Key components in the Asset Management Plan include:

1. Asset Inventory and Condition Assessment

2. Level of Service
3. Criticality of Assets
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

Asset Inventory

"Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets."

Manhole, gravity sewer main, force main, and lift station locations were plotted in a Geographic Information System (GIS) using record drawings. Manhole and lift station locations were field verified and locations adjusted with Global Positioning System (GPS) coordinates.

Asset inventory data including year of installation, material, sizes, pipe inverts and manhole rim elevations were cataloged from record drawing and visually verified where needed. Asset inventory data is managed using GIS databases.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

Gravity Sewer Mains: Inspections were made using either a pole mounted zoom camera (looking up or down each pipe from the manholes) or with in-line closed circuit television (CCTV) cameras. For sewers with prior CCTV inspections (on file from historical operations records), file videos were reviewed and conditions were logged by PACP certified inspectors. New CCTV inspections were made for eligible sewers. Pipes inspected with zoom camera methods were rated considering any observable roots, deposits, joint conditions, pipe wall condition, infiltration, or other defect observations. Pipes inspected with CCTV were rated using the PACP system condition grading system. Composite Risk of Failure ratings of 1-5 were derived for each pipe.

Percentage of gravity sewer pipes in each rating category

1	2	3	4	5
62%	27%	9%	2%	<1%

Force Mains: Force main conditions were estimated using pipe age, material, and break history records. Alpine Township's force main data was compared with that of several other municipalities to establish a comparative reference. Alpine Township's force mains do not have any break history and their materials are relatively new.

Percentage of force main pipes in each rating category

1	2	3	4	5
100%	0%	0%	0%	0%

Manholes: Manholes were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, structures, and infiltration.

Percentage of manholes in each rating category

1	2	3	4	5
23%	72%	5%	0%	0%

Lift Stations: Visual inspection and performance testing were completed to evaluate asset condition. Lift station assets, including pumps, valves, piping, structures, electrical, controls, and other assets, were rated on a scale of 1-5. Composite ratings for the station as a whole were developed.

Number of lift stations in each rating category

1	2	3	4	5
0	1	1	0	0

Level of Service Determination

"Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined."

Alpine Township recognizes that the people served by the system are more than customers, they are the system owners. Township staff and system operators act as stewards of the system. The Township has held a series of public meetings and workshops with the Sewer Committee, which is made up of Township Board members, staff and members of the community. At these meetings, the results of the condition assessments were discussed, the costs for various OM&R strategies affecting the levels of service were reviewed along with potential rate impacts. Based on the input received during those meetings, the following Level of Service Goals have been established:

1. Meet Regulatory Requirements
2. Minimize Service Interruptions
3. Minimize Public Hazards
4. Manage Storm Water Inflow and Ground Water Infiltration
5. Provide Capacity for Community Growth
6. Minimize Life Cycle Costs

Criticality of Assets

"Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?"

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions as determined through condition assessments. Assets were given a Consequence of Failure (CoF) rating of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Serve schools/hospitals/major industry
- Are under major roads or are adjacent to other major utilities
- Are adjacent to waterways or significant wetlands

Criticality ratings were calculated as the product of an asset's RoF and CoF, producing criticality ratings ranging from 1-25 (25 being the most critical). The most critical assets were found to be gravity sewers primarily along Alpine Avenue, Lamoreaux Drive, and Mill Creek.

Revenue Structure

"Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a "Test Year" was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.

The customer base was reviewed, including the number of residential equivalent units in our system. Other operating and non-operating revenues were also evaluated. Prediction of customer connections was made including trending in system utilization, projection of operating costs, and anticipated inflation by expense category.

A forecasting system was developed and used to identify the estimated replacement investment for the remaining lifecycle of all assets, based on the asset inventory and condition assessment data. Project costs were estimated for capital improvements within the first six years. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. Based on that analysis, the Township board enacted a rate increase in January 2017. The Township expects the income from rates will be adequate to cover the system costs, using a combination of cash and debt financing to fund capital projects.

Capital Improvement Plan

"Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects."

A capital improvement plan showing project descriptions, cost estimates, and project timelines, was developed for the capital improvements needed within a six year planning period. The projects identified in the CIP are:

- Inflow and Infiltration Reduction Improvements (various locations)
- 4 Mile Road Manhole Lining
- Lift Station Upgrades
- Lamoreaux Drive & Private Easement Sewer Replacement
- 6 Mile Road Sewer Replacement

List of Major Assets

"Provide a general list of the major assets identified in the AMP."

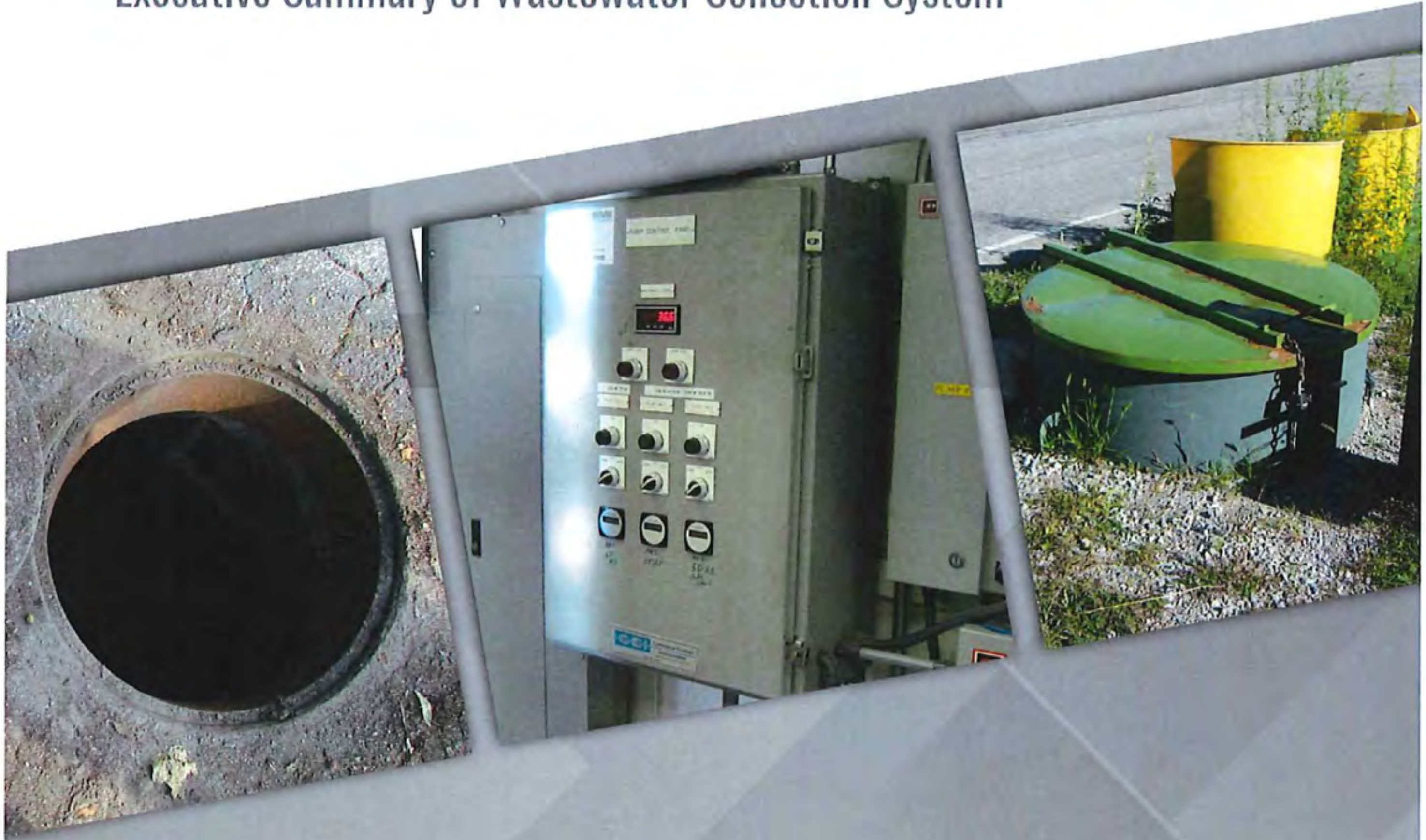
Alpine Township's major assets include:

- 2 lift stations
- 229,500 feet of 8" to 21" diameter gravity sewer
- 18,600 feet of 1.5" to 12" diameter force main
- 924 manholes

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Executive Summary of Wastewater Collection System



Prepared for:

City of Auburn

SAW Project No. 1041-01

113 E. Elm Street, Auburn, MI 48611
www.auburn.org
Lee Kilbourn – Mayor
989-662-6761

FINAL - May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for the Storm water, Asset Management, and Wastewater (SAW) Grant Program. In May 2014, the City of Auburn received a (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1041-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the City's publicly owned wastewater utility. The assets that comprise the utility include collection system piping and manholes, lift station/pump stations and force mains.

The SAW Grant amount awarded to The City of Auburn was $561,506.00
The Local Match provided by The City of Auburn was $62,390.00

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

Questions regarding the Asset Management Plan should be directed to:
Lee Kilbourn
Mayor
113 E. ELM St.
Auburn Mi,48611
989-662-6761
Email: mayorkilbourn@auburnmi.org

ASSET INVENTORY AND CONDITION ASSESSMENT

The wastewater collection system assets consist of approximately:

- Gravity Sewer (8 inch thru 18 Inch): 68,000 feet (12.9 miles)
- Force Main (12 inch): 1305 feet (0.25 miles)
- Manhole Structures: 232
- Sewer Lift Station (Can Type); 1 Each

These assets are in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The treatment of wastewater for The City of Auburn is provided by the Bay County Department of Water & Sewer. The wastewater collection system is operated and maintained by the City.

An Asset Management Plan for the West Bay County Regional Wastewater Treatment Plant is being completed through a separate SAW Grant (Year 2) and is not included within the City of Auburn's Asset Management Plan report.

Asset Identification and Location

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals, which included a review of the existing record drawings, field notes, staff knowledge, site visits and supplemented with field survey work.

Asset material, size and age were identified through the review of available historical record documents and Closed-Circuit Televising (CCTV) data.

Spatial orientation (pipe location), pipe depth and invert elevations were determined through survey grade GPS equipment and a comprehensive evaluation of the gravity system.

This information was organized into a new (GIS) database and piping network for archiving, mapping and future evaluation.

Condition Assessment and Expected Useful Life
A comprehensive evaluation of the collection system was performed.

NASSCO-MACP Level 1 manhole field based assessments were completed on 224 manhole structures that were assessible.

Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on 58,000 feet of the gravity sewer.

The condition of the collection system assets reviewed ranged from Good to Excellent, with only a few minor deficiencies. Three pipe segments were found to be in poor condition.

Capacity Analysis was modeled for average day and peak hour conditions in areas of concern.

Recommendations for short-term (1-5 year) and long term (6-20 year) system maintenance and improvements were identified. It is recommended to clean and televise the collection system on a 7 to 10-year rotating basis.

The condition of the assets at the lift station range from Fair to Good. Ongoing maintenance has upheld the condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems. The recommendations for short term and long term improvements are included in the CIP.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The City of Auburn Level of Service(LOS) goals as it relates to the wastewater system is summarized as follows:

LEVEL OF SERVICE STATEMENT

The overall objective of City of Auburn is to provide reliable wastewater collection services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system capacity for all service areas.
- Comply with local, state and federal regulations.
- Actively maintain collection system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment plant.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of the community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the City annually to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score X Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset

- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utility's ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

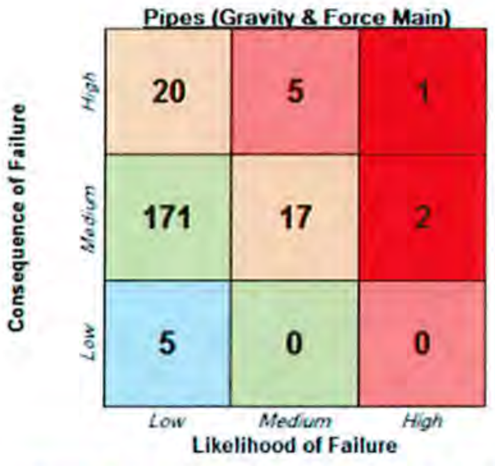
Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning template that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection system.

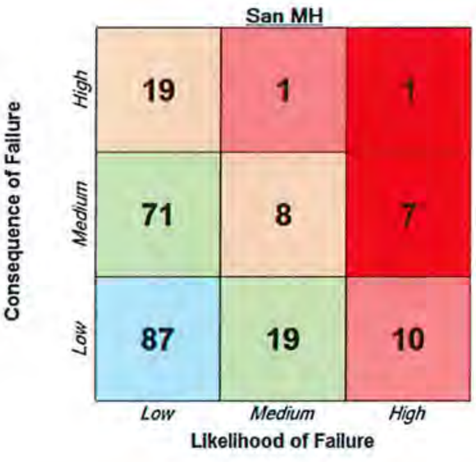
Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. Three pipe segments in the collection system has an extreme risk rating; all three have a void in the pipe, as well as plugged taps and dripping joints. The three pipe segments are Vitreous Clay Pipe (VCP). The voids in the VCP can be spot lined. The one pipe segment with the void also has taps that are plugged and this pipe section should be replaced. Much of the collection system's gravity pipes, 79 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes in relatively good condition.

Figure 2 provides the risk rating for the collection system manholes. Eight manholes are identified as extreme risk, and is recommended for replacement of the casting as the frame and cover are cracked on most of the eight. This replacement will be scheduled for 2018. Much of the collection system's manholes, 79 percent as shown in Figure 2, have a low to negligible risk rating and are indicative manholes in relatively good condition.



High	20	5	1
Medium	171	17	2
Low	5	0	0
	Low	Medium	High

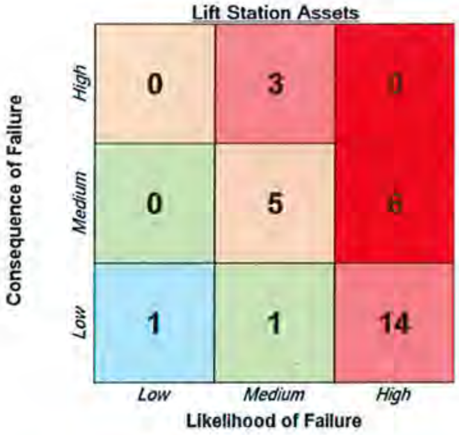
Figure 1. Business Risk Matrix (Risk Rating) by Number of Gravity and Force Main Pipes



High	19	1	1
Medium	71	8	7
Low	87	19	10
	Low	Medium	High

Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the lift station assets. Six assets are identified as extreme risk, most of which are due to being older than their expected useful life and may be prone to failure. The City has identified replacement/repairs/improvements to the lift station in the proposed CIP for system improvements.



Lift Station Assets

Consequence of Failure	High	0	3	0
	Medium	0	5	6
	Low	1	1	14
		Low	Medium	High
			Likelihood of Failure	

Figure 1. Business Risk Matrix (Risk Rating) by Number of Lift Station Assets

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the City of Auburn wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system, and pumping stations/force mains. From the BRE, a short-term (1-5 year) and long-term (6-20) CIP's were developed for the utility.

This AMP includes a detailed condition assessment of the collection system including televising of pipe, and field condition assessments of the assessible sanitary manholes and lift station. Even though 79% of the system has low to negligible risk ratings, the other 21% is in need of various system Improvements.

Based on the AMP condition assessment of the sanitary sewer system, the City has identified assets of the collection system and lift station for improvement. The City is in the process to select a funding source to complete the improvements identified in the Short Term and a portion of the Long Term CIP.

(1-5 Year) Capital Improvements include:

- Repair of 3 pipe segments as identified in the AMP
- Repair 8 manhole castings and cones in various sections of the City.
- Remove footing drains from the collection system
- Generator Replacement and Lift Station Improvements
- Pump 2 Replacement at Lift Station
- VFD Replacement at Lift Station
-

(6-20 Year) Capital Improvements include:

- General Lift Station Rehabilitation not completed in the (1-5 Year) CIP
- Flow Meter Replacement at Lift Station
- Motor 1 and Motor 3 Replacement at Lift Station
- Control Panel Replacement at Lift Station
- Remove footing drains from the collection system

OPERATIONS, MAINTENANCE AND REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the function of the collection system. By optimizing the performance, infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

An annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by City staff without bringing in an outside contractor. Existing disposable materials include, wear parts in pumps and motors, etc. The existing OM&R fund is sufficient for the current equipment and operations.

REVENUE STRUCTURE

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

The existing rates were determined to create sufficient funds to fulfill the day-to-day maintenance and operations of the sanitary collection system.

The MDEQ approved the City's rate methodology on November 16, 2016.

Department of Environmental Quality
SAW Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017

The City of Auburn certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No.**1041-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e (3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No

   If No - Date of the rate methodology approval letter: November 16, 2016

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ____________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Lee Kilbourn Mayor	989-662-6761	mayorkilbourn@auburnmi.org
Name	Phone Number	Email

5/31/2017

Signature of Authorized Representative (Original Signature Required) Date

Lee Kilbourn Mayor

Print Name and Title of Authorized Representative

ASSET MANAGEMENT PLAN

Executive Summary of Stormwater Collection System

Prepared for:

City of Auburn

SAW Project No. 1041-01

113 E. Elm Street, Auburn, MI 48611
www.auburn.org
Lee Kilbourn – Mayor
989-662-6761

FINAL - May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In 2014, The City of Auburn received a (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), Project no.1041-01 to provide financial assistance for the development of this asset management plan (AMP). This report provides the Asset Management Plan (AMP) for the City's Stormwater collection system. Working with City staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the Stormwater collection system.

The SAW Grant amount awarded to The City of Auburn was $421,849.00
The Local Match provided by The City of Auburn was $46,872.00

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

Questions regarding the Asset Management Plan should be directed to:
Lee Kilbourn
Mayor
113 E. ELM St.
Auburn Mi,48611
989-662-6761
Email: mayorkilbourn@auburnmi.org

ASSET INVENTORY AND CONDITION ASSESSMENT

The Stormwater collection system assets consist of approximately:

- Storm piping (8 inch thru 54 Inch): 50,500 feet (9.56 miles)
- Manhole and Catchbasins:762

Asset Identification and Location

A comprehensive Stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work.

Asset material, size and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data.

Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system.

This information was organized into a new, or updated (GIS) database and piping network for archiving, mapping for future evaluation.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system was performed.

NASSCO-MACP Level 1 manhole field based assessments were completed on 714 structures.

Based on discussions with the City DPW staff, there have not been any known capacity issues with the City owned stormwater system. Any flooding or drainage problems occur mainly when the County drains are elevated, thereby the collected stormwater cannot flow into the County drains through the City outfalls.

Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on 44,000 feet of the Storm piping.

The condition of the storm water system assets ranged from Poor to Good.

Recommendations for short-term (1-5 year) and long term (6-20 year) system maintenance and improvements were identified. It is recommended to clean and televise the system on a 7 to 10-year rotating basis.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The City of Auburn Level of Service (LOS) goals as it relates to the stormwater collection system is summarized as follows:

LEVEL OF SERVICE STATEMENT

The overall objective of City of Auburn is to provide reliable stormwater collection services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system capacity for all service areas.
- Comply with local, state and federal regulations.
- Actively maintain collection system assets in reliable working condition
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures, to ensure sound financial management of the stormwater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the City from annually to make sure they accurately reflect the desired operation of the utility.

MEASURING PERFORMANCE

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the Stormwater system. Criticality is based on two factors: 1) Likelihood (Probability) of Failure and 2) Consequence of Failure. Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, or environmental impact of failure of an asset and the utilities ability to convey and treat Stormwater. CoF categories of the Stormwater collection system include:

- Location of asset.
- Facilities served by asset.
- Size

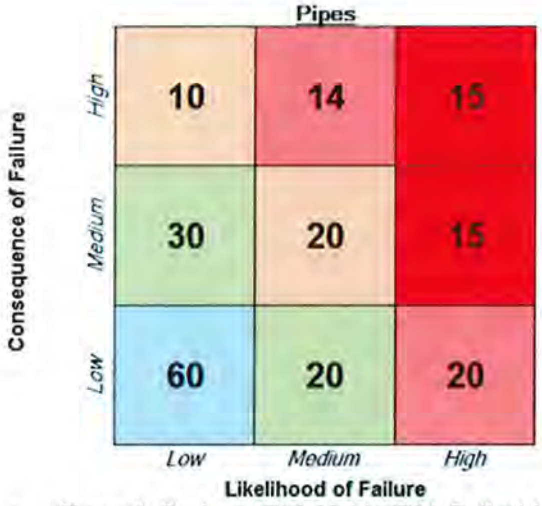
ASSESSING CRITICALITY

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset of The City of Auburn using an ArcGIS-based sewer asset management and capital planning template that will compile, analyze and assess Business Risk for each asset and develops a Capital Improvement Plan.

The Business Risk score, also known as Criticality, is calculated for each asset using the following equation.

Business Risk = Consequence of Failure Score X Likelihood of Failure Score

Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. 30 pipe segments in the Stormwater collection system have a high to extreme risk rating and are recommended to be replaced. This represents approximately 15% of the storm system. Approximately 54% of the collection system is in relatively good condition.

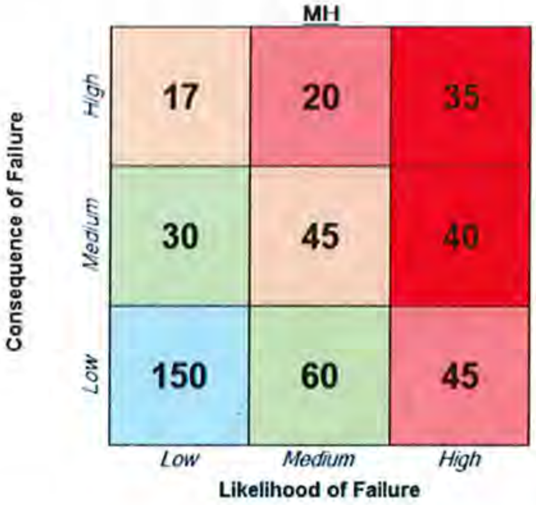


Pipes

	Low	Medium	High
High	10	14	15
Medium	30	20	15
Low	60	20	20

▪ *Figure 1: Business Risk Matrix (Risk Rating) by*
▪ *Number of Gravity Pipes*

Figure 2 provides the risk rating for the storm sewer structures. 75 structures are identified as a high to extreme risk rating, and are recommended for short term replacement or rehabilitation.



	Low	Medium	High
High	17	20	35
Medium	30	45	40
Low	150	60	45

Figure 2: Business Risk Matrix (Risk Rating) by Number of Structures

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan with recommendations was prepared for the City's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short-Term (1-5 year) and Long-Term (6-20-year) Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system.

The City is considering funding options to make the needed improvements that have been identified as a high or extreme risk within the Short Term (1-5 year) CIP.

(1-5 Year) Capital Improvements include:

- Manhole Reconstruction or Replacement
- Various sections of Storm Sewer to be replaced as identified in the AMP.
-

(6-20 Year) Capital Improvements include:

- Manhole Reconstruction or Replacement
- Catch basin reconstruction and frame and casting replacement
- Various sections of Storm Sewer to be replaced as identified in the AMP.

OPERATIONS AND MAINTENANCE

A preventative maintenance program to systematically clean and CCTV inspect pipelines to NASSCO-certified standards is critical for a sound Stormwater system. The process of cleaning and CCTV inspection of pipelines is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. For this reason, it is recommended that at a minimum, all pipelines be cleaned and televised every 7 to 10 years. Available budget will dictate the frequency or size of yearly projects.

REVENUE STRUCTURE

The revenue for storm sewer improvements will come from the City local and major street funds or the City General Fund.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The **City of Auburn** certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1041-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SW AMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Lee Kilbourn at 989-666-6761 mayorkilbourn@auburnmi.org
Name Phone Number Email

5/31/2017
Signature of Authorized Representative (Original Signature Required) Date

Lee Kilbourn Mayor
Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater (SAW)
Asset Management Plan Executive Summary Guidance

City of Auburn Hills – Department of Public Services
1500 Brown Road
Auburn Hills, MI 48326
http://www.auburnhills.org/
Contact: Jeff Herczeg, Deputy Director
248-364-6933
SAW Grant Project Number: 1436-01

Executive Summary

The Stormwater Asset Management Plan (AMP) summarizes the existing physical condition of the City's stormwater infrastructure and includes key recommendations for future funding levels and alternatives for funding mechanisms. This document was prepared using grant funding from the State of Michigan SAW Grant Program, with a total budget of $1,096,278 for the Stormwater AMP, which is inclusive of grant proceeds and local match.

The AMP was intended to accomplish the following key goals:

- Provide the City with a new framework for collecting, organizing, and storing data for their stormwater collection system using the latest available hardware and software.
- Survey key system components to augment the City's existing GIS database and to make it easier for future generations to access infrastructure data with greater ease.
- Add information for sewer material type, age, and depth to the GIS database.
- Physically evaluate the structural condition of all publicly-owned system components, including storm sewer pipes, manholes, catch basins, and outfalls, and to store the data in the City's GIS database.
- Analyze the flow capacity of the City's key storm sewer pipes and identify where pipes should be enlarged to minimize flood potential to a reasonable level.
- Identify other capital improvements that will allow the City to reduce annual flow volumes and pollutant loadings to Galloway Creek, Clinton River and Rouge River.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
    - Regularly-scheduled sewer inspection (televising), similar to what is done for wastewater infrastructure
    - Repair and rehabilitation to address structural problems resulting from aging infrastructure
- Provide recommendations on developing a sustainable funding source for stormwater, similar to that of enterprise funds that already exist for the City's water and wastewater systems.

Stormwater Asset Inventory

This AMP includes the stormwater collection system, including manholes, sewer pipes, catch basins, outfalls, and end-of-pipe treatment BMPs. Although the City had an existing geodatabase for its storm sewer system, this AMP included efforts to enhance the database with additional information on sewer rim/invert elevations, sewer size, sewer age, and structural condition.

Sewer sizes and invert elevations were verified during field survey and manhole inspections that were part of this AMP.

The City uses ArcGIS (ESRI) to maintain its inventory of storm sewer assets and to store asset condition data, manage work orders, and track work order status.

Condition Assessment

Over 11% of the sewer system was televised as part of this AMP. NASSCO PACP and MACP methodologies were used to assign structural and O&M conditions for inspected manholes and sewer segments. The PACP and MACP data were added to the GIS geodatabase.

For sewer pipes, the average age is approximately 24 years, the average overall pipe rating (structural and O&M) is 1.6, on a scale of 0 to 5. Approximately 20% of the system has a PACP structural score of 3 or greater, although this AMP focused primarily on the City's older sewers.

For manholes, the average age is approximately 33 years, the average structural rating is 1.9, on a scale of 0 to 5. Approximately 25% of the system has a MACP structural score of 3 or greater, although this AMP focused primarily on the City's older manholes.

Outfalls and BMPs were not evaluated for structural condition, although they were considered for identifying future funding needs.

Level of Service

The City's current stormwater ordinance (Chapter 66: Subdivisions and Land Division) mentions the City of Auburn Hills Construction Plan Ordinance (Chapter VII: Storm Sewer), which specifies the level of protection for its collection system as a 10-year recurrence interval event. The hydrologic/hydraulic analysis of the stormwater collection system flow capacity used the 10-year recurrence interval storm event.

The desired Level of Service for Auburn Hills' stormwater infrastructure has been, and will continue to be, a healthy mix of flood control and water quality enhancement. Adopting the Oakland County Water Resource Commission (OCWRC) stormwater rules will help to address water quality and channel protection, which will provide a solid foundation for the future health of the Clinton and Rouge Rivers. Addressing flood control and structural needs will provided for a high quality of life for residents and allow for continued economic development in the City

Criticality of Assets

Determining the assets most critical to system operation allows a community to manage risk, support Capital Improvement Plans (CIP), and efficiently allocate O&M funds. The two key factors used to determine criticality are Probability of Failure (PoF) and Consequence of Failure

Probability of Failure × Consequence of Failure = Business Risk Exposure

(CoF). PoF and CoF are multiplied to determine the Business Risk Exposure (BRE) as shown in the following figure.

PoF considers the physical condition or age of an asset and is often based on the Structural MACP or PACP Index Rating. If an asset was not inspected, remaining useful life can be used a proxy for condition. A standardized rating of one through five was assigned to each asset with a score of five indicating worst condition as shown in the following table.

Probability of Failure

Score	Description
1	Improbable
2	Remote, unlikely but possible
3	Possible
4	Probable, likely
5	Imminent, likely in near future

CoF encourages a focus on social, environmental, and economic cost impacts. The economic CoF encompasses the impacts of direct and indirect economic losses to the affected organization and third parties due to asset failure. The social consequence represents the impact of society due to asset failure and the environmental consequence of failure considers the impact to ecological conditions occurring as a result of asset failure.

The factors were rated on a one through five scale for each asset. If one factor is deemed more important, the weighting was skewed to give that factor more influence.

The following factors were combined to determine the final CoF:

- Relative Network Position – the sum of upstream sewers discharging to a structure
- Diameter/Size – the relative size of the asset with respect to the rest of the system
- Restoration Type/Accessibility – refers to the cost to restore the surface above the asset and if traffic control is needed
- Environment – proximity to sensitive environmental features like the Clinton River, Rouge River and Galloway Creek
- Critical Users – important system users (Fiat Chrysler, The Palace, Great Lake - Crossing, etc.) -

Revenue Structure

A Stormwater Advisory Group (SAG) was formed in 2016 and met four times to discuss the prospect of long term funding for the City's stormwater system. There is currently no dedicated funding source for Auburn Hills' stormwater system, unlike water and wastewater systems. A Funding Feasibility Study with revenue analysis was developed as part of this AMP. The results are described in the following paragraphs.

The total spent annually by the City for all stormwater-related activities is approximately $270,000. Any additional costs are generally taken from the City's General Fund or from the Streets budget if available. Existing funding is primarily linked to keeping the system clean, paying debt for County Drain projects, and emergency repairs. Any additional costs, such as repair or replacement of catch basins, and structural repair or replacement of manholes and sewers, are generally taken from the City's Streets budget. This creates unnecessary strain on the Streets budget, as that money is needed to repair and replace the City's roadways. This further underscores the need for a dedicated funding source for stormwater assets.

The inventory and condition assessment completed for this AMP include several new O&M and CIP costs that are crucial to meeting the City's goals of effective management and maintenance of stormwater infrastructure. As shown in the following table, there is a funding gap of $2.9 million between the $3.16 million proposed annually and the $270,000 currently allocated to stormwater in the City's current budget.

Proposed Budget Items	Annual Cost
O&M Expenditures	
Manhole Rehabilitation and Repair	$115,000
Catch Basin Cleaning	$85,000
Sewer system televising, cleaning	$880,000
Open Channel/Culvert Maintenance	$400,000
Detention Pond Inspection	$35,000
Water Quality Management (BMP Cleaning)	$50,000
Street Sweeping	$70,000
Personnel/Administrative & Other Costs	$385,000
O&M Subtotal	**$2,020,000**
CIP Expenditures	
Manhole Rehabilitation and Repair	$85,000
Catch Basin Replacement Program	$75,000
Sewer Replacement	$940,000
Stormwater Volume Control BMPs	$35,000
CIP Subtotal	**$1,135,000**
Annual Total	**$3,155,000**
Existing Stormwater Budget	**$270,000**
Funding Gap	**$2,885,000**

To address this funding gap, the SAG explored options, including additional taxes or dedicated revenue (i.e. stormwater utility).

Based on preliminary stormwater rate model, the City can generate approximately $504,000 for every one dollar per month charged to a typical single-family residential customer. In other words, a monthly charge of about $6-$7s per Equivalent Residential Unit (ERU) would close the stormwater infrastructure funding gap referenced in this document. A monthly charge of $7 per ERU should generate enough revenue to fully fund the recommended stormwater program. In this scenario, commercial/industrial sites would pay a higher fee in proportion to the total impervious area on their property.

Capital Improvement Plan

A Capital Improvement Plan (CIP) was developed using the Business Risk Exposure (BRE) described above. CIP tables are detailed in the Appendix of the AMP document. These tables include recommended projects for the first three years and include maintenance (i.e. heavy cleaning) and repair (i.e. lining or spot repair).

The CIP was developed with the first projects reflecting those with the highest BRE scores. Some projects were manually moved higher on the list if a known street project is expected to occur in the affected area or if a higher priority project were occurring immediately adjacent to the project (to reduce mobilization costs). The CIP tables are intended to be used for high level planning; the City will further evaluate the stormwater infrastructure before beginning the CIP design process.

It was assumed that the annual investment in the CIP would ramp up between Years 1-3, given that it will take some time to establish a new funding source and to be fully-engaged in a CIP program. The actual implementation of the CIP will depend on the establishment of an adequate funding source.

Recommendations

The recommendations in this AMP are to:

- Establish a dedicated funding source for stormwater management; ideally through a stormwater utility.
- Implement the capital improvements as recommended in the CIP.
- Continue the AMP process in future years through systematic system inspection and updates of the City's GIS data to re-prioritize projects in future years.
- Focus on water quality management, including reducing runoff volumes to the Galloway Creek and Clinton River, as part of the ongoing capital improvement efforts.

List of Major Assets

The major assets are simplified in the text below. The full AMP report contains additional detail on the distribution of sizes, ages, and conditions.

- *224 miles of storm sewer pipe, ranging from 4-inch to 108-inch diameter*
- *22 miles of open channel*
- *3,175 manholes*
- *7,500 catch basins*
- *30 major culverts/bridges*

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date April 27, 2017
(no later than 3 years from executed grant date)

The City of Auburn Hills *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1436-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Jeff Herczeg at 248-391-3777 jherczeg@auburnhills.org
Name Phone Number Email

Thomas A. Tanghe 4/27/17
Signature of Authorized Representative (Original Signature Required) Date

Thomas A. Tanghe, City Manager
Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater (SAW)
Asset Management Plan Executive Summary Guidance

City of Auburn Hills – Department of Public Services
1500 Brown Road
Auburn Hills, MI 48326
http://www.auburnhills.org/
Contact: Jeff Herczeg, Deputy Director
248-364-6933
SAW Grant Project Number: 1436-01

Executive Summary

The Wastewater Asset Management Plan (AMP) summarizes the existing physical condition of the City's wastewater infrastructure and includes key recommendations for future funding levels. This document was prepared using grant funding from the State of Michigan SAW Grant Program, with a total budget of $1,010,100 for the Wastewater AMP, which is inclusive of grant proceeds and local match.

The AMP was intended to accomplish the following key goals:

- Provide the City with a new framework for collecting, organizing, and storing data for their wastewater collection system using the latest available hardware and software.
- Survey key system components to augment the City's existing GIS database and to make it easier for future generations to access infrastructure data with greater ease.
- Add information for sewer material type, age, and depth to the GIS database.
- Physically evaluate the structural condition of all publicly-owned system components, including sanitary sewer pipes and manholes, and store the data in the City's GIS database.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
  - Regularly-scheduled sewer inspection (televising)
  - Repair and rehabilitation to address structural problems resulting from aging infrastructure
- Provide recommendations on future rate adjustments necessary to maintain the - recommended budget. -

Wastewater Asset Inventory

This AMP includes the wastewater collection system, including manholes and sewer pipes. Although the City had an existing geodatabase for its wastewater system, this AMP included efforts to enhance the database with additional information on sewer rim/invert elevations, sewer size, sewer age, and structural condition.

Sewer sizes and invert elevations were verified during field survey and manhole inspections that were part of this AMP.

The City uses ArcGIS (ESRI) to maintain its inventory of wastewater assets and to store asset condition data.

Condition Assessment

Approximately 31% of the sewer system was televised as part of this AMP. NASSCO PACP and MACP methodologies were used to assign structural and O&M conditions for inspected manholes and sewer segments. The PACP and MACP data were added to the GIS geodatabase.

For sewer pipes, the average age is approximately 37 years, the average overall pipe rating (structural and O&M) is 1.96, on a scale of 0 to 5. Approximately 6% of the system has a PACP structural score of 3 or greater.

For manholes, the average age is approximately 43 years, the average structural rating is 1.3, on a scale of 0 to 5. Approximately 9% of the system has a MACP structural score of 3 or greater.

In general, the City's wastewater collection system is in good shape, with most sewers well within their expected service lives. It would be expected that the City of Auburn Hills will require a significant increase in investment as large percentages of their system reach the end of their useful service lives, but this should not occur for another 20-25 years.

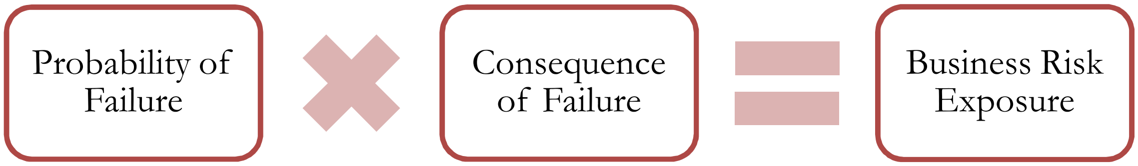
Level of Service Determination

The City's Level of Service criteria for its wastewater collection system are listed in the following table:

Key Service Criteria	Performance Indicator	Target Level of Service
Asset Condition Assessment	PACP & MACP Inspections Per Year*	• MACP inspect a minimum of 400 manholes per year • PACP inspect a minimum of 17 miles of sewer per year
Regulatory Compliance	Compliance with MDEQ Sanitary Sewer Overflow (SSO) Policy	Comply with the MDEQ SSO policy of no more than 10% of a chance of an SSO in any given year, excluding unusual natural events or man-made disasters
Service Delivery	• Response to Sanitary Sewer Complaints • Number of Basement Backups	• Respond to complaints and service outages efficiently • Eliminate basement backups
Cost Control	Provide Cost Effective Service to Minimize Rate Increases	Proactively inspect and maintain infrastructure to minimize repair costs

Criticality of Assets

Determining the assets most critical to system operation allows a community to manage risk, support Capital Improvement Plans (CIP), and efficiently allocate O&M funds. The two key factors used to determine criticality are Probability of Failure (PoF) and Consequence of Failure (CoF). PoF and CoF are multiplied to determine the Business Risk Exposure (BRE) as shown in the following figure.



PoF considers the physical condition or age of an asset and is often based on the Structural MACP or PACP Index Rating. If an asset was not inspected, remaining useful life can be used a proxy for condition. A standardized rating of one through five was assigned to each asset with a score of five indicating worst condition as shown in the following table.

Probability of Failure

Score	Description
1	Improbable
2	Remote, unlikely but possible
3	Possible
4	Probable, likely
5	Imminent, likely in near future

CoF encourages a focus on social, environmental, and economic cost impacts. The economic CoF encompasses the impacts of direct and indirect economic losses to the affected organization and third parties due to asset failure. The social consequence represents the impact of society due to asset failure and the environmental consequence of failure considers the impact to ecological conditions occurring as a result of asset failure.

The factors were rated on a one through five scale for each asset. If one factor is deemed more important, the weighting was skewed to give that factor more influence.

The following factors were combined to determine the final CoF:

- Relative Network Position – the sum of upstream sewers discharging to a structure
- Diameter/Size – the relative size of the asset with respect to the rest of the system
- Restoration Type/Accessibility – refers to the cost to restore the surface above the asset and if traffic control is needed

- Environment – proximity to sensitive environmental features like the Clinton River, Rouge River and Galloway Creek
- Critical Users – important system users (Fiat Chrysler, The Palace, Great Lake - Crossing, etc.) -

Revenue Structure

Although the City currently has an annual budget of approximately $7 million for its wastewater collection and treatment costs, the recommendations in this Asset Management Plan would result in an annual increase of 4.9%, adjusted each year. The primary reasons for this planned annual increase are:

1. - Increased investment in sewer/manhole rehabilitation, repair, and/or replacement for the City's aging infrastructure.
2. - Anticipated rate increases from GLWA for transport and treatment of Auburn Hills' wastewater discharge.
3. - Increased attention to sewer/manhole inspections and ongoing updates to this Asset Management Plan.
4. - Keep up with inflationary pressures by staying ahead of the Construction Cost Index (CCI) curve.
5. - Avoid larger rate hikes (i.e. 30%-40%) that are necessary when rates are held for 5-10 years.
6. - Maintain an adequate cash balance of at least 6 months of revenue.

An initial 10% rate increase is recommended for FY2018, after which 4.45% annual rate increases will provide a reasonable source of revenue for the City's wastewater system and should reduce the need for much larger rate increases that are often necessary when the rates are static for more than 5 years.

Capital Improvement Plan

The Capital Improvement Plan (CIP) focuses on projects that are known based on current structural conditions. This includes repairing the pipes and manholes in the system with structural ratings of 4, 5 or "end of life" indicating they have failed or are at risk of failing. These assets were ranked by their business risk exposure (BRE). The maps and tables for the CIP are in the Appendix of the AMP document. The CIP tables and maps are intended to be used for high level planning; the City will further evaluate the wastewater infrastructure before beginning the CIP design process.

The actual implementation of the CIP will depend on the implementation of user fee adjustments, as recommended above.

Recommendations

The recommendations in this AMP are to:

- Adjust user fees to keep the wastewater budget in line with inflation.
- Implement the capital improvements as recommended in the CIP.
- Continue the AMP process in future years through systematic system inspection and updates of the City's GIS data to re-prioritize projects in future years.

List of Major Assets

The major assets are simplified in the text below. The full AMP report contains additional detail on the distribution of sizes, ages, and conditions.

- *135 miles of sanitary sewer gravity main*
- *3,270 manholes*

The City discharges into the Clinton-Oakland Sewage Disposal System (COSDS), which ultimately discharges to the City of Detroit WWTP for treatment. As such, the City's assets are limited to local and collector gravity sewers.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date April 27, 2017
(no later than 3 years from executed grant date)

The City of Auburn Hills *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1436-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: October 11, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Jeff Herczeg at 248-391-3777 jherczeg@auburnhills.org
Name Phone Number Email

Thomas A. Tanghe 4/27/17
Signature of Authorized Representative (Original Signature Required) Date

Thomas A. Tanghe, City Manager
Print Name and Title of Authorized Representative

April 2017

Stormwater, Asset Management, and Wastewater (SAW)
Asset Management Plan Executive Summary Guidance

Village of Baldwin
620 Washington Street / http://www.villageofbaldwin.org
James Truxton, 231.745.3587
SAW Grant Project Number 1141-01

Executive Summary

The Village of Baldwin (Village) was awarded a grant by the Michigan Department of Environmental Quality (MDEQ) under the Stormwater, Asset Management, and Wastewater (SAW) Program. The Village's goal under the SAW program is to develop a wastewater Asset Management Program (AMP) for both horizontal and vertical assets in its Wastewater Collection and Treatment System. The AMP was developed by Fishbeck, Thompson, Carr & Huber, Inc. (FTCH) working closely with the Village staff.

The approach for this AMP followed MDEQ's original core SAW grant components as follows:

1. Asset Inventory and Condition Assessment
2. Level of Service
3. Asset Criticality
4. Revenue Structure
5. Capital Improvement Plan

As the first round of SAW Grants were being implemented, the MDEQ advised that the details of the AMP would be better administered by the MDEQ district offices under the applicant's NPDES or groundwater discharge permit for the Wastewater Treatment Plant (WWTP). Typical NPDES permit conditions were published by the MDEQ as a template to follow in which to reorganize the original five core components of the AMP. In the case of the Village, it has a groundwater discharge permit for its WWTP discharge and it is assumed the same published NPDES requirements will be included in the permit upon renewal.

The four requirements of an Operation, Maintenance and Replacement (OM&R)/ Asset Management Program under the typical NPDES permit requirements (and assumed under a groundwater discharge permit) shall address the following:

1. Maintenance Staff
2. Collection System Map
3. Inventory and Assessment of Fixed Assets
4. OM&R Budget and Rate Sufficiency for the Sewer System and Treatment Works. (Rate calculation demonstrating revenues to cover OM&R expenses.)

The organization of the AMP prepared for the Village follows the four requirements above and is outlined to meet the NPDES template published by the MDEQ.

A summary of the work performed under the SAW Grant is given below.

Wastewater and/or Stormwater Asset Inventory

The system components analyzed in the AMP generally include the Wastewater Collection System, Wastewater Pumping Stations, and Wastewater Treatment Plant (WWTP). The Village's wastewater collection system is relatively new compared to most municipal infrastructure. The oldest part of the collection system was constructed in 1995 with additional phases being constructed in 1997, 2000, and 2005. The Village owned portion of the sanitary sewer system is comprised of 199 manholes and 202 segments of PVC pipe installed between 1997 and 2005. The Village owns and operates two wastewater pumping stations (M-37 and US-10) and a Sequencing Batch Reactor (SBR) WWTP. The Village does not own but operates pumping stations in the adjacent Townships of Webber and Yates.

As with many small communities, staffing has historically been insufficient to meet the operation and maintenance needs of the overall wastewater collection and treatment system. The Village has recently contracted with a private operations firm to operate the WWTP, pumping stations, and collection system. Two full-time staff will be employed by the private firm to operate the wastewater collection system.

FTCH has been working with the Village throughout the term of the SAW grant to establish a comprehensive Geographic Information System (GIS) mapping system of the Village sewer system which also includes Webber and Yates Townships. A wastewater system data model was developed that uniquely identifies and stores asset information of sewer assets. The Village uses an interactive mapping software to view maps of the system, access asset descriptions, and access links to assessment records and documentation. GIS mapping includes areas in Webber and Yates Townships that are serviced by the WWTP.

Condition Assessment

The sewers in Baldwin were not inspected by Closed Circuit Television (CCTV) and Pipeline Assessment Certification Program (PACP) standards since all of the Village's pipes were less than 20 years old. All sewers are considered to be in good condition. Manhole inspections were completed in accordance with Manhole Assessment Certification Program (MACP) standards. The following is a summary of the manhole condition based on the Overall Probability of Failure (POF) analysis.

Manhole POF Summary		
POF	No. MHs	% of Inspected System
1	5.0	2.5%
2	13.0	6.5%
3	177.0	88.9%
4	4.0	2.0%
5	0.0	0.0%

Physical inspections of the Village's two pumping stations and WWTP were performed by personnel experienced in wastewater process, architectural, mechanical and electrical condition inspections. The vertical asset condition assessments involved site visits to inspect and document the condition of each major asset. An assessment form for each asset was filled out with all pertinent information for the asset, along with equipment tag numbers and serial numbers. Condition was ranked on a scale of 1-5, where 1 is “New or Excellent Condition” and 5 is an asset that is “Unserviceable”.

The overall POF analysis ranks the asset from 1-5 (Low to High) using additional factors beyond visual inspection such as age, O&M protocols, Repair History and Current Operational Status. A weighted average of all factors determines an overall POF ranking from 1-5 (Low to High).

The following is a summary of the pump station and WWTP POF analysis for all vertical assets inspected.

WWTP POF Summary		
POF	No. Assets	% of Inspected System
1	5	4.4%
2	58	50.9%
3	36	31.6%
4	11	9.6%
5	4	3.5%

Pump Station POF Summary		
POF	No. Assets	% of Inspected System
1	0	0.0%
2	6	22.2%
3	21	77.8%
4	0	0.0%
5	0	0.0%

Level of Service Determination

Level of Service (LOS) goals were discussed with the Village in order to develop a baseline for minimum operation and maintenance activities and corrective procedures. LOS discussions helped to set achievable objectives for operation and maintenance and aided in setting operations and capital replacement budgets. The LOS selected considers budgetary constraints customer expectations and operation staff available to the Village.

Criticality of Assets

The Consequence of Failure (COF) was also defined for each asset which determines its criticality to the overall system on a scale of 1-5 (low to high). The factors used to assess the COF include Process Impact, Financial Impact, Safety, Environmental Impact, Disruption to the Community and Ability to Respond. Each of these factors were given a priority of 1-5 and then averaged to determine an overall COF for a given asset.

A Business Risk Exposure (BRE) for each asset is then computed by multiplying together the POF value from the condition assessment analysis and the COF value. The calculated BRE was used in establishing priority of individual asset replacement along with its remaining useful life.

Revenue Structure

A rate study for the 2016 fiscal year analyzed revenue versus operating expenses for the Village’s Wastewater Collection and Treatment System and found revenues to be adequate for the current expenses. The rate methodology letter dated October 28, 2016, and report, were submitted to the MDEQ. The MDEQ approved the rate study in a letter dated November 9, 2017.

Capital Improvement Plan

A 20-year capital improvement plan was prepared to establish replacement funds for assets as they attain their useful life and to be used for future preparation of yearly submittal requirements under the NPDES Asset Management Program requirements.

It was recommended that the Village begin televising of sewers in 2017 and establish a fund for televising and cleaning going forward. There were only two manholes in the system that were classified as poor or had a POF of four or higher. These manholes will be addressed in the first five years.

The following priorities for vertical assets to be addressed over the next five years, or immediately under an established maintenance fund, include the following:

1. US-10 Pumping Station:
    a. Replace Pumps and VFD Drives
    b. Replace Standby generator
2. M-37 Pumping Station: Replace VFD's
3. WWTP:
    a. Replace make-up air unit
    b. Replace valve actuators
    c. Replace Equalization (EQ) tank mixing/aeration aspirators with diffused aeration
    d. Reline Sequencing Batch Reactor (SBR) tanks

Over the 20 year planning period, equipment replacement, based on useful life or recommended replacement, resulted in an average yearly capital outlay of $110,000.

List of Major Assets

The primary facilities in the Village's system are as follows:

1. Sequencing Batch Reactor (SBR) WWTP. The WWTP is capable of treating an average of 388,000 gallons per day (gpd).
2. M-37 Pumping Station: 725 gallons per minute (gpm) Duplex Pumping Station, 50 horsepower (hp) pumps.
3. US -10 Pumping Station: 700 gpm Duplex Pumping Station, 20 hp pumps.
4. 56,000 lineal feet of PVC sewer in sizes from 6 to 12 inches.
5. 23,000 lineal feet of force main in sizes from 8 to 10 inches.
6. 199 sewer manholes.
7. The Village operates and maintains, but does not own, the following facilities:
    - Webber Township Government Lake Pump Station: Duplex Pumping Station, 725 gpm pumps.
    - Yates Township: 3 Grinder Pump Stations, 75 - 200 gpm.
    - 9 small private grinder stations in the Village of Baldwin limits.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 8, 2017
(no later than 3 years from executed grant date)

The Village of Baldwin *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1141-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: November 9, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Jeff Brown, PE at 517.887.40416 jjbrown@ftch.com
Name Phone Number Email

5/24/2017
Signature of Authorized Representative (Original Signature Required) Date

Tara Lou Dickson Clerk
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Executive Summary of Wastewater Collection System

Prepared for:

Bangor Charter Township

SAW Project No. 1039-01

180 State Park Drive, Bay City, MI 48706
www.bangortownship.org
Glenn Rowley – Township Supervisor
989-684-8931

FINAL - May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for the Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In May 2014, the Township of Bangor received a (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1039-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Township's publicly owned wastewater utility. The assets that comprise the utility include collection system piping and manholes, lift station/pump stations and force mains.

The SAW Grant amount awarded to Bangor Township was $1,039,118
The Local Match provided by Bangor Township was $124,150

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

ASSET INVENTORY AND CONDITION ASSESSMENT

The wastewater collection system assets consist of approximately:

- Gravity Sewer (8 inch thru 27 Inch): 339,000 feet (64.2 miles)
- Force Main (2 inch thru 8 inch): 18,922 feet (3.58 miles)
- Manhole Structures: 1345
- Sewer Lift Stations (Submersible): 1 Each
- Sewer Lift Stations (Can Type); 2 Each

These assets are located in existing street rights-of-way, property or in easements dedicated for the assets use and maintenance.

The treatment of wastewater for Bangor Township is provided by the Bay County Department of Water & Sewer. The wastewater collection system is operated and maintained by the Bay County Department of Water & Sewer staff through a contract agreement.

An Asset Management Plan for the West Bay County Regional Wastewater Treatment Plant is being completed through a separate SAW Grant (Year 2) and is not included within the Bangor Asset Management Plan report.

Asset Identification and Location

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals, which included a review of the existing record drawings, field notes, staff knowledge, site visits and supplemented with field survey work.

Asset material, size and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data.

Spatial orientation (pipe location), pipe depth and invert elevations were determined through survey grade GPS equipment and a comprehensive evaluation of the gravity system.

This information was organized into a new (GIS) database and piping network for archiving, mapping and future evaluation purposes.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system was performed.

NASSCO-MACP Level 1 manhole field based assessments were completed on 1086 manhole structures that were assessible.

Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on approximately 90% of the gravity pipe.

The condition of the collection system assets reviewed ranged from Excellent to Good, with only a few minor deficiencies.

Capacity Analysis was modeled for average day and peak hour conditions in areas of concern. The Wilder Road Euclid Avenue was found to have system bottlenecks.

Recommendations for short-term (1-5 year) and long term (6-20 year) system maintenance and improvements were identified. It is recommended to clean and televise the collection system on a 7 to 10-year rotating basis.

The condition of the assets at the lift stations range from Good to Poor. Ongoing maintenance has upheld the condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems. The recommendations for short term and long term improvements are identified in the CIP.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The overall objective of Bangor Township as it relates to the Township's wastewater collection system is to establish the following Level of Service (LOS) goals:

LEVEL OF SERVICE STATEMENT

The overall objective of Bangor Township is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system capacity for all service areas.
- Comply with local, state and federal regulations.
- Actively maintain collection system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment plant.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of the community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the township annually to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score X Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utility's ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

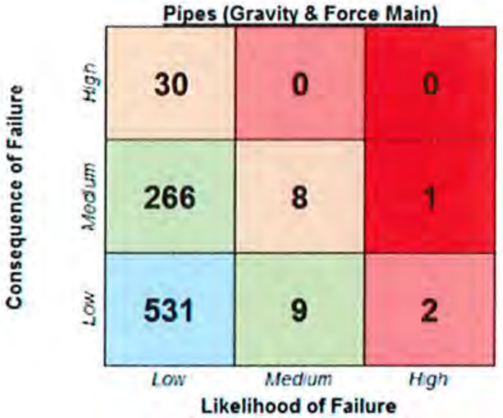
Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning template that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection system.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. The collection system has 3 pipe segments with an extreme high risk rating. Those areas were on Columbian Street, Sequin Drive and Castle Drive. Much of the collection system's gravity pipes, 95 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes in relatively good condition.

Figure 2 provides the risk rating for the collection system manholes. Seventeen manholes were found to have broken or cracked frames and castings. Much of the collection system's manholes, 65 percent as shown in Figure 2, have a low to negligible risk rating and are indicative of manholes in relatively good condition.

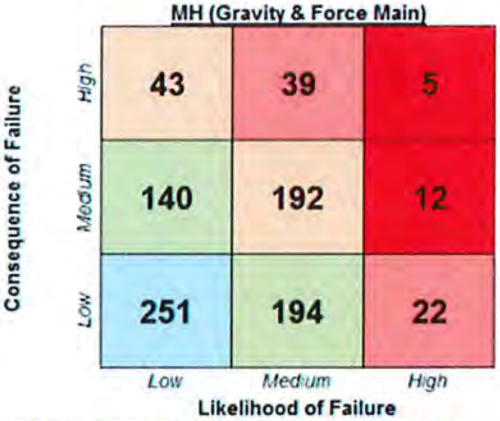


Pipes (Gravity & Force Main)

Consequence of Failure	Low	Medium	High
High	30	0	0
Medium	266	8	1
Low	531	9	2

Likelihood of Failure

Figure 1. Business Risk Matrix (Risk Rating) by Number of Pipe Segments



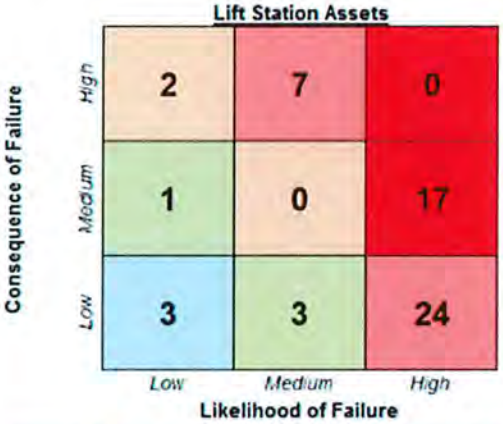
MH (Gravity & Force Main)

Consequence of Failure	Low	Medium	High
High	43	39	5
Medium	140	192	12
Low	251	194	22

Likelihood of Failure

Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the lift station assets. No assets were scored in the "Extreme Risk" category. Seventeen assets were scored in the high-risk category. These assets will be replaced within the 1-5 year CIP. The remaining assets will be replaced in the 6-20 year CIP.



Lift Station Assets

Consequence of Failure	Low	Medium	High
High	2	7	0
Medium	1	0	17
Low	3	3	24

Likelihood of Failure

Figure 1. Business Risk Matrix (Risk Rating) by Number of Lift Station Assets

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Bangor Township wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system and pumping stations/force mains. From the BRE, a short-term (1-5 year) and long-term (6-20 year) CIP's were developed for the utility.

This AMP included a detailed condition assessment of the collection system including televising of pipe, and field condition assessments of all accessible sanitary manholes and lift stations.

Based on the AMP condition assessment of the sanitary sewer system, the Township has identified assets of the collection system and lift stations for improvement. These improvements can be completed with funding from the Township's sewer reserve account or bonding.

(1-5 Year) Capital Improvements include:

- Raise and Inspect buried manhole structures.
- Replace the broken and cracked manhole castings.
- Make improvements to the collection system within the Wilder Rd./Euclid Avenue area to relieve the hydraulic bottleneck.
- SCADA/ Telemetry Upgrades at the sewer pumping stations.
- Bangor/Zimmer (LS-7) Rehabilitation Improvements.
- Infiltration/ Inflow removal within the older sections of the collection system.

(6-20 Year) Capital Improvements include:

- Ranch (LS-11) Lift Station Improvements.
- Westlawn (LS-10) Lift Station Improvements.
- Infiltration/ Inflow removal within the older sections of the collection system.

OPERATIONS, MAINTENANCE AND REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the function of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

An annual lift station equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by Bay County Department of Water & Sewer staff without bringing in an outside contractor. Existing disposable materials include, wear parts in pumps and motors, etc. The existing OM&R fund is sufficient for the current equipment and operations.

REVENUE STRUCTURE

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

The existing rates were determined to create sufficient funds to fulfill the day-to-day maintenance and operations of the entire sanitary collection system.

The MDEQ approved the Township's rate methodology on November 9, 2016.

Department of Environmental Quality
SAW Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017

The **Township of Bangor** certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No.**1039-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e (3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No

   If No - Date of the rate methodology approval letter: November 9, 2016

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ____________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Glenn Rowley, Township Supervisor	989-684-8931	glennrowley@bangortownship.org
Name	Phone Number	Email

5.31.2017

Signature of Authorized Representative (Original Signature Required) Date

Glenn Rowley – Supervisor

Print Name and Title of Authorized Representative

106 W. Allegan St. Suite 500
Lansing, MI 48933
O: 517.371.1200
www.c2ae.com

BATH CHARTER TOWNSHIP WASTEWATER ASSET MANAGEMENT PLAN EXECUTIVE SUMMARY

Bath Charter Township
14480 Webster Road
Bath, MI 48808
Supervisor, (517) 641-6728
SAW GRANT PROJECT NUMBER 1520-01

Executive Summary

The SAW agreement with the State of Michigan was signed in May 8, 2014 which began the overall SAW program.

Bath Charter Township partners with three other municipal entities to make up the Southern Clinton County Municipal Utility Authority (SCCMUA) which owns and operates a five million gallon per day (MGD) wastewater treatment facility which discharges to the Looking Glass River and is located in DeWitt Charter Township. Each of the partners in SCCMUA owns a portion of the treatment plant capacity and each owns their individual collection system.

Bath Charter Township's portion of the sanitary system consists of approximately 248,400 feet of sanitary sewer and force main, approximately 800 sanitary manholes and 21 lift stations.

Wastewater Asset Inventory

This item which initiated the work included:

- Identifying and locating all assets.
    - A list of all assets to be monitored was completed.
    - The GPS coordinates of the field assets were gathered.
    - An ESRI ArcGIS data set was completed to index the locations of assets.
    - Physical inspections were conducted for each asset.
    - The asset information was included in the Asset Management Spreadsheet (AMS).
    - The AMS was used to quantify and order the asset information.

Condition Assessment

Bath Charter Township's sanitary collection system is in fair overall condition with most of the system receiving an overall rating of good or fair in determining the probability of failure. Of the total of 247,414 feet of pipe evaluated through the condition assessment, 164,873 feet (66.7%) had a rating of good, 26,496 feet (10.8%) had a rating of fair while 56,045 feet (22.5%) received a rating of poor. The overall condition of the structures was rated in good condition. Of the 805 manholes inventoried, 773 (96.0%) received a rating of good, 22 (2.7%) received a rating of fair and only 10 (1.3%) received a rating of poor. Finally 17 lift stations were deemed as good, 4 were rated at fair and none were evaluated as being in poor condition.

- Structures assessment and inventories follow NASSCO MACP guidelines.
- Sewer pipe assessment and inventories follow NASSCO PACP guidelines.
- Wastewater lift stations condition assessments and inventory.
- Asset age and material data was collected using historical project drawings.

Level of Service Determination

- A SAW Team was created to discuss the wastewater system direction.
- The SAW Team met and discussed a mission statement and desired Level of Service statement.
- Specific goals were established in each of the following areas to:
  - Meet the customer needs.
  - Meet the basic system needs.
  - Prevent warnings and calls.
  - Properly test and maintain the system.
  - Meet the level of service requirements.

Criticality of Assets

- The AMS was used to organize the asset classes. Several parameters were used to determine asset consequence of failure and probability of failure, rating each on a 1 to 5 scale.
  - Redundancy: Does the unit have system backup?
  - Criticality of the asset to the system and what level of impact to the system occurs in the event that the asset fails
  - Location of the asset and surrounding service areas were incorporated in determining the criticality of the asset
  - Probability of failure based on its age and condition
  - These items together result in a parameter identified as Business Risk.
- The AMS was used to prioritize the need for short term repair or maintenance, short term replacement, or long term maintenance.

Revenue Structure

- Rate Methodology has been submitted previously to MDEQ and approved.
- A rate study was conducted reviewing the analysis of the Township's current financial position and proposed adjustments to incorporate the short term and long term maintenance and rehabilitation projects identified in the Capital Improvements Plan.
- It has been determined by H.J. Umbaugh and Associates that the Bath Charter Township's existing sewer rate structure does not generate sufficient funds to cover the short-term wastewater system capital improvement projects identified during the SAW Program. Therefore options for rate increases are being evaluated by the Township for implementation, which include:
  - One-Time rate increase plus inflationary increases
  - Step increases plus inflationary increases
- Furthermore, Bath Charter Township Board has authorized the use General Obligation Bonds to fund the initial wastewater system projects.

Capital Improvement Plan

- The asset management spreadsheet identifies capital improvement projects for the future.
- The long term projects may be achieved through grants or future public borrowings.
- An estimate of project year and financial cost is generated from each capital improvement project.
- A List of recommended projects to be completed within the next year are as follows:
    - *Sanitary Structure repairs with a Business Risk 12 or greater and Probability of Failure of 4 or Wall grade below "D" are to be lined.*
    - *18-inch sanitary interceptor with defect code of SAM or worse rehabilitation lining.*
    - *Additional 18-inch sanitary interceptor rehabilitation lining.*
    - *Park Lake Road dig-ups.*
    - *Lift Station force main lining at discharge manholes*
    - *Lift station 203 replacement and equalization.*
    - *Lift Station 501 Improvements.*
- Additional list of projects recommended in the next 2 to 5 years, 6 to 10 years, 11 to 20 years and 21 to 30 are included in the Capital Improvement Plan.

List of Major Assets

- Approximately 184,100 feet of sanitary sewer
- Approximately 64,300 feet of force main
- Approximately 800 sanitary manholes
- 21 lift stations.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The Bath Charter Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1520-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: December 22, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Jack Phillips at 517-641-6728
Name Phone Number Email

05/24/2017
Signature of Authorized Representative (Original Signature Required) Date

Jack Phillips, Township Supervisor
Print Name and Title of Authorized Representative

April 2017

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date: May 8, 2017
(no later than 3 years from executed grant date)

The Inter-County Drainage Board for Bear Creek Drain *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1407-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Brian Baker at 586-307-8210 brian.baker@macombgov.org

Name Phone Number Email

5-5-17

Signature of Authorized Representative (Original Signature Required) Date

BRIAN BAKER CHIEF DEPUTY PUBLIC WORKS

Print Name and Title of Authorized Representative

Inter-County Drainage Board for Bear Creek SAW Grant No. 1407-01
21777 Dunham
Clinton Township, MI 48036
(586) 469-5325
Brian Baker, brian.baker@macombgov.org
http://publicworks.macombgov.org/PublicWorks-Home

Managing existing infrastructure and growth, while preserving a quality of life consistent with serving the public health and welfare is a primary objective of the Board for the Bear Creek Inter-County Drainage District. The board wanted to take a proactive position in protecting the valued resources of the benefiting communities, residents and property owners so they initiated application and were awarded a grant through the Stormwater, Asset Management, and Wastewater (SAW) Program. The SAW grant consisted of $579,600 SAW grant amount and $64,400 local math amount, for a total of $644,000.

As a legally established District under the Michigan Drain Code of 1956 the District was awarded the SAW grant, within which two different tasks were to be completed. The first task was to compile a stormwater Asset Management Plan (AMP) which included conducting an asset inventory and asset condition assessment to determine the level of service of the district, designate criticality of assets, analyze long-term operation and maintenance (O&M) strategies, consider long-term capital improvement planning, and recommend an implementation schedule for the asset management program. The second task was to compile a Stormwater Management Plan which included developing and modifying applicable procedures for performing Illicit Discharge Elimination Program (IDEP) and Total Maximum Daily Load (TMDL) sampling.

In compiling the AMP an asset inventory was performed by means of examining construction plans, GPS location, and visual observation. The inventory verified that the Bear Creek Drain is composed of 2.41 miles of open channels, 8.66 miles of enclosed storm sewer ranging from 24 inch to 204 inch diameter, and 236 stormwater structures. The assets have been cataloged and stored in the OMCPWC Enterprise Geodatabase. This geodatabase serves as the data repository for all County owned storm sewer information, providing efficient and accurate means of maintaining and updating asset inventory and information, as well as providing for improved data dissemination across the organization. Database schemas have been reviewed and revised as part of this project, ensuring that the most relevant data pertaining to these storm system assets is accounted for in the database. Media such as manhole and CCTV video reports, photographs and sewer televising video files from the condition assessments have also been made easily accessible through the data housed in this geodatabase.

A condition assessment was performed for each asset, allowing the assignment of an overall asset, probability of failure, consequence of failure, and business risk evaluation score. The condition assessment for open channels and storm sewer structures was performed by means of visual assessment while enclosed sewer was assessed by means of closed circuit television (CCTV) investigation. Structural and O&M condition ratings were assigned to storm pipe and open channels. Ratings for stormwater structures such as catch basins and manholes were assigned an overall rating. The ratings range from 1 to 5 whereby 1 indicates new or excellent condition and 5 indicates failure or imminent failure. The assessment determined that 82.1%, 14.5%, and 3.4% of all assets were rated as good (1-2), fair (3-4), and poor (5), respectively.

Assets were then analyzed to determine their Probability of Failure (POF) and Consequence of Failure (COF). The POF takes into account two factors; the condition rating and the useful life expended. The COF takes into account four factors; process, financial, safety and environmental impacts. The POF and COF scores are then multiplied together resulting in the criticality score or the Business Risk Evaluation (BRE) score. The BRE score is used to prioritize what assets are most critically in need of repair. The MDEQ guidelines state that any asset with a BRE score of 16 or greater is considered critical. For Bear Creek the highest BRE score was found to be 13.2, therefore all assets fall below the MDEQ critical rating of 16. There were three (3) assets receiving the highest resulting BRE score of 13.2, all of which were 144 inch box culverts.

In reviewing the CCTV reports and videos, the visual inspection reports and the BRE analysis it was determined that; generally the system was in good condition and that only limited areas or sections of its assets were in a condition which required structural or O&M repairs. These locations were then examined further and prioritized for capital improvement and it was determined that none of the structural defects, regardless of rating, were severe enough or recurring enough to cause immediate failure or failure within the next 10 years. After reviewing the annual revenue generated and the current eligible funds the capital improvement plan consists of nine (9) storm sewer and eight (8) stormwater structure O&M repairs. It is the recommendation of the AMP that these locations be repaired or replaced as stated in the 5 year CIP so as to maintain the satisfactory level of service of the Bear Creek Drain for current and future use.

As part of the AMP scope, a Green Infrastructure Assessment was conducted. The Green Infrastructure Assessment looked at the Bear Creek District land uses, soil types, and amount of impervious surfaces to analyze various green infrastructure options such as infiltration basins, tree plantings, and other BMP's. Each option was analyzed to determine what benefit could be provided to the district and where in the district that option would be most efficient.

In compiling the stormwater management plan IDEP and TMDL procedures were examined for both the Office of Macomb County Public Works Commissioner (OMCPWC) and the Oakland County Water Resource Commissioner (WRC). The procedures included spill response, surface water pollution complaint, and dry and wet weather inspection procedures. The existing dry weather inspection form has been modified to include rainfall amount and rainfall duration so it may be used for both dry and wet weather inspections. The other response and complaint procedures were reviewed to ensure they provide the most useful and relevant data providing the highest benefit and efficiency to the district.

Inter-County Drainage Board for Bear Creek
21777 Dunham
Clinton Township, MI 48036
(586) 469-5325
Brian Baker, brian.baker@macombgov.org
http://publicworks.macombgov.org/PublicWorks-Home

SAW Grant No. 1407-01

This summary provides a brief overview of the evaluation and investigation and offers initial insight into the Bear Creek district, its assets, condition, operation and needs. A more comprehensive discussion can be found in the complete Stormwater Asset Management Plan, Stormwater Report, and Green Infrastructure Assessment Report.

May 2017

Department of Environmental Quality
SAW Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date April 30, 2017
(no later than 3 years from executed grant date)

Bedford Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. **1543-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant. The Department of Environmental Quality (DEQ) defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gap in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.

Attached to this certification is a summary of the AMP that identifies major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Paul Pirrone, Supervisor	at: (734) 224-7321	ppirrone@bedfordmi.org
Name	Phone Number	Email

Rate Methodology was submitted to DEQ on: December 5, 2016 (within 2 ½ years from date of executed grant)

An initial rate increase of 0% of a $0.00 gap was adopted on N/A

Paul Pirrone 5/25/17
Signature of Authorized Representative (Original Signature Required) Date

Paul Pirrone, Township Supervisor
Print Name and Title of Authorized Representative

Bedford Township
SAW Grant Project No. 1543-01

EXECUTIVE SUMMARY

Prepared by: **Spicer Group, Inc.**
125 Helle Blvd. Suite 2
Dundee, MI 48162

Owner: **Bedford Township**
8100 Jackman Road
Temperance, Michigan 48182
(734) 847-6791
Paul Pirrone, Supervisor

Operated by: **Monroe County Drain Commissioner**
1005 S Raisinville Road
Monroe, Michigan 48161
(734) 240-3101
David Thompson, Drain Commissioner

In May of 2014, Bedford Township entered an agreement with the Michigan Department of Environmental Quality and the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. Bedford received the follow grants:

Wastewater Asset Management Plan (WWAMP) – 100% Grant	***$1,036,600***
LESS Local Match	<u>($103,660)</u>
Total Grant Amount	$932,940

The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; May 2017.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Level of Service Determination
- Critical Assets (Risk)
- Capital Improvement Plan
- Revenue Structure
- Operation & Maintenance Strategies
- GIS & Mapping System

WASTEWATER ASSET INVENTORY AND CONDITION ASSESSMENT

The Township's wastewater system consists of three main components: The collection system (pipes and manholes), pump stations, and the wastewater treatment plant (WWTP).

For the collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire City, and used the survey information to develop a comprehensive Geographic Information System (GIS). This GIS is located online and is a detailed "smart" mapping system with databases, using the ArcGIS/Arc Online by ESRI platform. This system can be accessed and updated in the field by DPW staff from new iPads supplied as part of the SAW grant project. From the GIS, as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspections etc. can be accessed. This information can also be queried to provide specific lists and maps, and updated easily when future improvements are made.

The Township currently has around 130 miles of sanitary sewer pipes ranging in size from 8"-54" and 3,017 manholes serving a majority of the Township. All the manholes were inventoried and assessed by Spicer Inspectors trained in the NASSCO Manhole/Pipeline Assessment Certification Program (MACP/PACP). An inflow and infiltration (I&I) Study was performed for the Bedford wastewater system in 2012 to further understand where the high concentrations of I&I were. Four main areas were discovered to have high I&I; three residential and one industrial area. To narrow down the sources of inflow in the system, smoke testing was performed (as part of the SAW Grant) in the three residential areas. Results from the I&I Study, smoke testing and manhole field investigation, and input from the BWWTP staff were collaborated to determine the sewers that needed to be inspected. The selected sewers were then televised (TVed) using a subcontracted third party sewer televising company. The MACP/PACP system is used to standardize the scoring and to quantify the condition of the wastewater assets.

The second main component of the Township's wastewater system are the six pump stations located throughout the Township. Spicer Group completed an inspection and condition assessment for each station, and provided recommendations for future improvements to the Smith and Lewis, Smith and Douglas, and Monroe Road pump stations that are aging and have out of date configurations. The other three pump stations are operating adequately.

The third main component of the Township's wastewater system is the wastewater treatment plant (WWTP) located west of Telegraph on LaVoy Street. Spicer Group completed an inspection and assessment of the WWTP, and are recommending several improvements to the plant that are included in the resulting Capital Improvement Plan (CIP).

LEVEL OF SERVICE (LOS)

For the Level of Service, the Township prioritized projects in their CIP and rate structure based on the level of service that they feel is affordable. The levels of service have been ranked as low, medium and high, defined as:

- Low LOS, the project is the minimum needed to conform with applicable regulations etc.
- Medium LOS would be expanding the project to include work that is not critical to conform to regulations, but that makes sense for a long term sustainable result.

- High LOS includes total replacement of equipment or infrastructure that could be repaired instead.

MCDC set their target level of service as Medium Level of Service and implement the recommended 6% rate increase from the financial model. The pipe and manhole repairs identified from the inspections will be accomplished in Years 1 through 5. Many repairs are planned at the plant in Years 1 through 3. Three pump stations will also be repaired in Years 1 through 3.

CRITICALITY (RISK)

For each asset in the Township's wastewater system, a criticality/risk analysis was performed to determine and prioritize the Township's key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for every asset; including all pipes, manholes, pump stations, and WWTP components. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on the economic, social, and environmental consequences, if that asset had not already failed. Finally, the Criticality (Risk) score was calculated using:

RISK = LoF x CoF

For the collection system, there were 354 manholes identified with high risk scores, 805 with medium risk and 1,858 with a low risk score. Among the sanitary sewers that were televised (about 10% of the system), 22 were scored as a high risk, 92 medium, and 177 low risk. These scores and their locations were evaluated and incorporated into the resulting Capital Improvement Plan. For the pump stations, the Monroe Road, Smith & Lewis, and Smith & Douglas stations have high LoF, CoF, and Risk scores, and recommendations were made for improvements. For the Bedford WWTP, the highest risk calculated was 30 (out of 36). This was for several components in the chlorine room in the blower building that are close to the end of their service life, since they have such a high LoF. The risk and CoF were factors in determining the Capital Improvement Plan at the plant and pump stations.

CAPITAL IMPROVEMENT PLAN

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the wastewater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP. A 5-year CIP was developed that includes various collection system improvements including:

COLLECTION SYSTEM

- Year 1 – Repair 215 manholes and 38 sewers in the Temperance area ($178,000)
- Year 2 – Repair 297 manholes and 40 sewers between Summerfield and Jackman ($237,000)
- Year 3 – Repair 305 manholes and 39 sewers between Jackman and Lewis ($355,000)
- Year 4 – Repair 298 manholes and 49 sewers between Summerfield and Section ($251,000)
- Year 5 – Repair 318 manholes and 35 sewers south of Summerfield and east of Lewis ($254,000)

PUMP STATIONS

- Reconfiguration of Smith & Douglas Pump Station ($429,000)
- Reconfiguration of Smith & Lewis Pump Station ($307,000)

- Reconfiguration of Monroe Road Pump Station ($343,000)

WWTP

BWWTP PROJECT PRIORITY

Priority Level	Project	Cost
1a	Tertiary Treatment Improvements (Compressed Media Filter)	$2,108,000.00
1b	Tertiary Treatment Improvements (Replace Pressure Filter)	$2,365,000.00
2	Digester Heating Improvements	$395,400.00
3	Digester Gas Utilization	$484,000.00
4	Final Sampler Installation	$30,500.00
5	Blower Building Roof Improvements	$227,500.00
6	Sludge Recirculation Pump Installation	$20,500.00
7	Secondary Clarifiers Improvements (Weir And Trough Cleaning System)	$153,000.00
8	Washer Compactor For Fine Screen	$129,500.00
9	Digester No. 1 Maintenance	$202,000.00
10	Service Water System Improvements	$234,000.00
11	Disinfection Improvements	$1,256,000.00
12	Digested Sludge Pumping Improvements	$17,000.00
13	Bio-Solids Storage Tank Mixing Improvements	$88,600.00
14	Secondary Effluent Pump Removal	$33,000.00
15	Miscellaneous Equipment And Piping Removal	$110,300.00
16	Plant Drain Improvements	$381,000.00
17	Primary Sludge Pumps Replacement	$379,000.00
18	Sludge Dewatering System	$824,000.00
19	Primary Settling Tanks Bypass	$207,000.00
20	Miscellaneous Plant Concrete Repair	$90,200.00
21	Final Flow Meter Improvements	$177,000.00
22	Grit Building Modifications	$27,000.00
23	Reduce Sound In Blower Building Phase 1	$34,600.00
24	Reduce Sound In Blower Building Phase 2	$42,500.00
25	Tunnel Ventilation	$29,800.00
26	Administration Building Remodel	$346,875.00
27	Replace Waste Gas Burner	$192,000.00
	Option 1a Total Cost	**$8,220,275.00**
	Option 1b Total Cost	**$8,477,275.00**

REVENUE STRUCTURE/LONG TERM FUNDING

Spicer Group engaged Municipal Analytics for the Sewer Rate Gap Analysis for the AMP. Wastewater account balances, expenditures, revenues, etc. were reviewed and input into Municipal Analytics financial software to determine if there were any deficiencies in the rates. The Township's current sewer rates will provide sufficient revenue to meet its ongoing debt service, capital, operating, and reserve requirements over a multi-year projection period.

In recognition of anticipated cost increases to fund nearly $12 million in capital improvement in the next 20 years, the Township has begun a multi-year rate adjustment plan, which will result in a nearly 45% increase in rates over three years. The first 15% increase was approved and implemented January 1, 2017.

OPERATION & MAINTENANCE STRATEGIES

Wastewater treatment plants and their collection systems need constant maintenance to keep them functioning. The recommended operation and maintenance strategies include the following:

COLLECTION SYSTEM

Routine Cleaning – Bedford Township preforms routine cleaning of the sewer lines in the collection system a minimum of once every two (2) years, with an average of 345,500 feet per year. Routine cleaning should also include removing the roots in system. We are recommending that Bedford WWTP also uses root killing solutions along with their current method for handling roots.

Routine Television Inspections – Bedford Township currently utilizes closed-circuit television (CCTV) for inspecting their sanitary sewer collection system. 10 percent of the system should be CCTVed every year to keep up on maintenance needs.

Routine Manhole Inspections – Spicer Group completed manhole inspections on Bedford's entire system in 2015. Routine manhole inspections are necessary to be completed a minimum of every ten years. To make this task feasible for Bedford's WWTP to be able to complete approximately 10 percent of the system or 300 manholes will be targeted each year. This cycle of manhole inspections will correspond to the CCTV inspection cycle that Bedford will be completing. Manholes located in high problem areas should be inspected every 4 years, and will be outlined in the Hot Spot Locations and Procedures Section.

Routine Smoke Testing – In the year 2015 Spicer Group completed Smoke Testing in areas of Bedford Township that were designated with high infiltration and inflow. Routine smoke testing is to be completed for all newly constructed buildings and homes.

All these strategies should be tracked stored in the GIS database provided as part of the SAW Grant.

PUMP STATIONS

Each of Bedford's pump stations have an O&M manual that is stored onsite. Maintenance is performed as needed. This system will be continued after the pump stations are all converted to aboveground configurations.

WWTP

The O&M program at the plant mainly consists of preventive maintenance. The BWWTP staff follow a program for daily checks on equipment. The program will be updated and kept for use after the improvements are installed at the BWWTP. All the O&M needs for all new equipment installed at the plant will be entered into the system. All equipment removed from the plant will be removed from the program as well. The new O&M manuals will be filed at the plant.

GIS & MAPPING SYSTEM

A Geographical Information System (GIS) was created for the Bedford Township collection system in 2014 as part of the SAW Grant. The system was created by mapping all the manholes using the Mobile Mapping Pegasus unit, from which data can be collected. The Mobile Mapping data was input into ESRI ArcGIS where all the manholes and sewer mains where plotted and all necessary as-built information, such as age, inverts, material, size, etc. was added.

Once a preliminary model was developed, field crews preformed existing condition assessments. Manhole inspections were performed and certain sewers in areas of concern were televised. The results of both were uploaded to the GIS database. The map can be updated in the future with more inspections or reports. This provides Bedford Township with an interactive view of the entire collection system.

CONCLUSION

Bedford Township's wastewater system is a typical, aging municipal infrastructure system. The MCDC and WWTP staff have completed routine operation and maintenance of the components, and the system is a relatively fair shape. There are many areas that need immediate attention (over the next 5 years), and there are a few areas that can be monitored and left alone for years to come. The Township's current rate structure is sufficient to cover costs for these improvements.

In accordance with the SAW Grant requirements, the Township's Wastewater Asset Management Plan (WWAMP) needs to be kept available for citizen review for 15 years. The WWAMP should be reviewed annually, and the components updated and included in the Township's annual budget process.

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Executive Summary

Prepared for:

Bedford Charter Township

FINAL
May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In May 2014, The Township received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1629-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Township's publicly owned wastewater utility. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for Bedford Charter Township AMP is:

Adam Heikkila, Township Supervisor
115 S. Uldriks Drive
Battle Creek, MI 49037
Phone number: 269.968.6917
Email: supervisor@bedfordchartertwp.com

ASSET INVENTORY AND CONDITION ASSESSMENT

A list of the major assets in the Township's wastewater system, described further below, include:

- Collection system piping system and manholes
- Sanitary sewer lift stations in the collection system

The wastewater collection system assets consist of approximately 47,959 feet (9.08 miles) of sanitary sewers (gravity pipe and force mains) and 179 wastewater manholes connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

There are17 sanitary sewer lift stations located throughout the wastewater collection system. The stations are either submersible style stations or residential grinder style stations.

The Township does not have its own treatment system, and is currently under contract with the City of Battle Creek for treatment and discharge of its sewage.

Asset Identification and Location

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals included a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new, or updated (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes over 171 lift station assets and 379 collection system assets.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field based assessments were completed on 95% manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on 99% of the gravity pipe. Smoke Testing performed on 100% of system to disclose location of inflow or infiltration and Capacity Analysis was modeled for average day and peak hour conditions to identify capacity concerns. Recommendations for short-term (1-5 year) and long term (6-20 year) identified the need for maintenance with 5.9% of the system was tagged for inspection and/or cleaning. Rehabilitation accounted for 12% of the system identifying the need for point repairs and lining. The remaining 82.1% of assets were placed in the 20+ year category.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The overall objective of the Township Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the following Level of Service (LOS) goals are proposed:

WASTEWATER UTILITY - LEVEL OF SERVICE STATEMENT

The overall objective of Bedford Charter Township's Wastewater Department is to provide reliable wastewater collection and ensure treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and ensure treatment capacity for all service areas.
- Ensure collection system assets are in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to meet MDEQ-acceptable levels.
- Ensure rapid and effective emergency response services to customers.
- Regularly review projected capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Township from time to time to make sure they accurately reflect the desired operation of the utility.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

The lift station categories for CoF are:

- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. Two pipe segments in the collection system have an extreme risk rating and are recommended to undergo point repairs in the next 1-2 years.

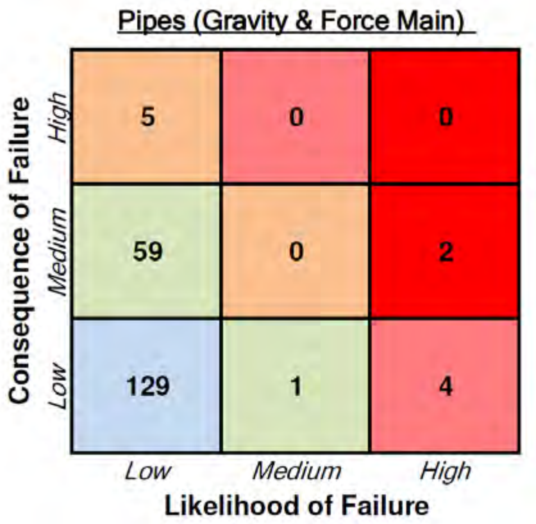


Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes

Figure 2 provides the risk rating for the collection system manholes. 25 manholes are identified as extreme risk, 24 are recommended for cleaning, lining and/or repair in the next 1-2 years. One manhole needs to be replaced in the next 1-2 years. Many manholes are at low to medium risk and recommended to be included in a long-term rehabilitation strategy (71 percent).

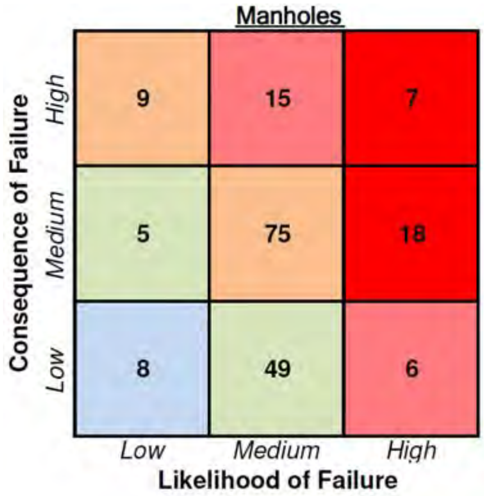


Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the lift station assets. No assets are identified as extreme risk. The 72 assets with high risk ratings should be inspected at regular intervals.

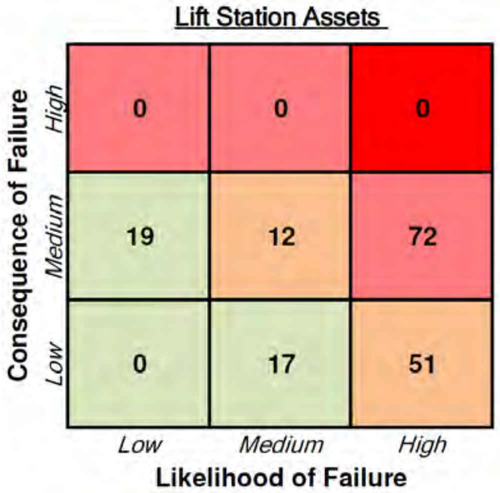


Figure 3. Business Risk Matrix (Risk Rating) for Lift Station assets

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection and treatment systems.

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Township's wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system, lift stations, and force mains. From the BRE, a short-term (1-5 year CIP) and long-term (6-20 year CIP) was developed for the utility. Table 4 shows a detailed recommendations of the collection system assets needing rehabilitation in the short-term CIP.

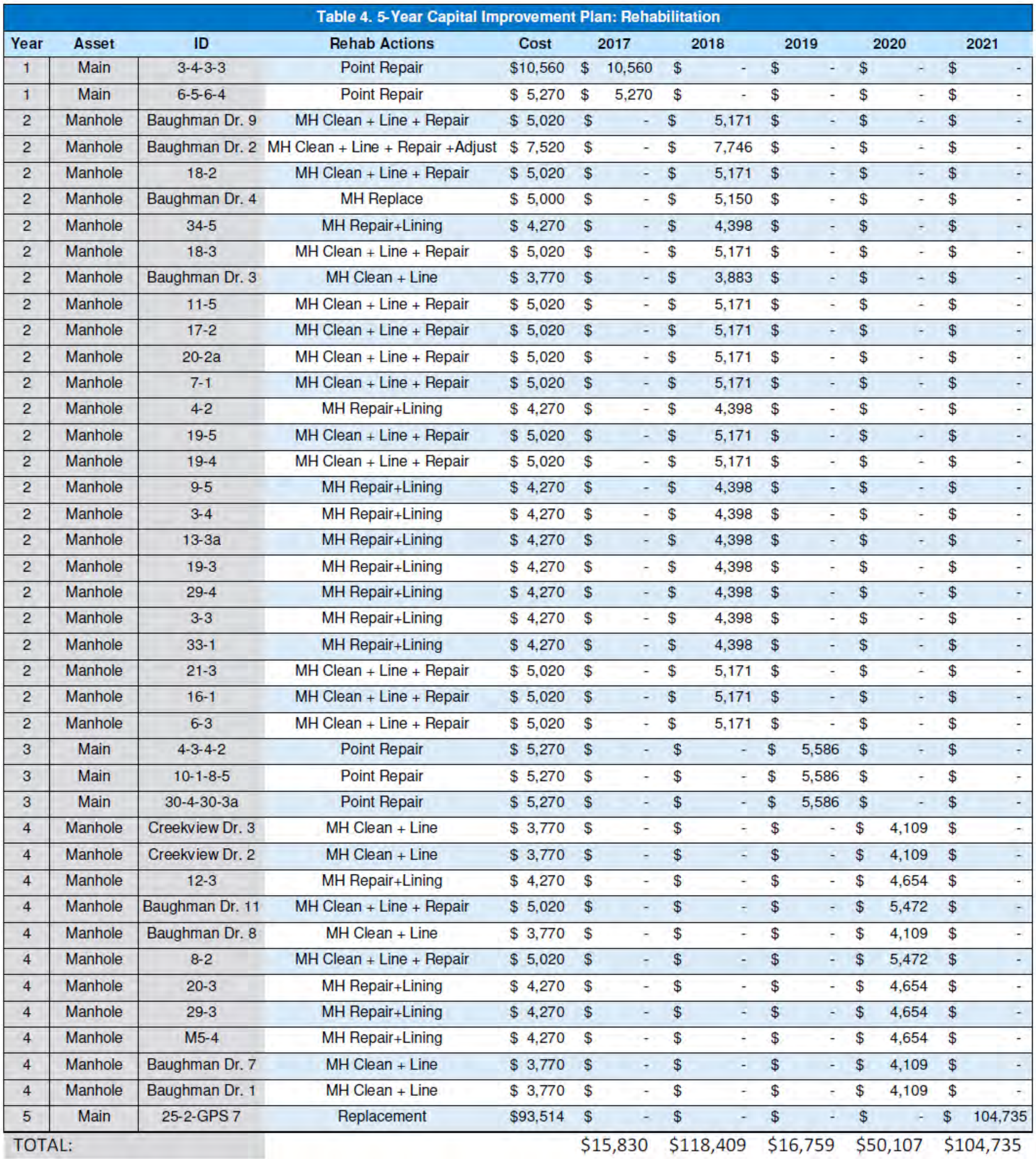


Table 4. 5-Year Capital Improvement Plan: Rehabilitation

Year	Asset	ID	Rehab Actions	Cost	2017	2018	2019	2020	2021
1	Main	3-4-3-3	Point Repair	$10,560	$ 10,560	$ -	$ -	$ -	$ -
1	Main	6-5-6-4	Point Repair	$ 5,270	$ 5,270	$ -	$ -	$ -	$ -
2	Manhole	Baughman Dr. 9	MH Clean + Line + Repair	$ 5,020	$ -	$ 5,171	$ -	$ -	$ -
2	Manhole	Baughman Dr. 2	MH Clean + Line + Repair +Adjust	$ 7,520	$ -	$ 7,746	$ -	$ -	$ -
2	Manhole	18-2	MH Clean + Line + Repair	$ 5,020	$ -	$ 5,171	$ -	$ -	$ -
2	Manhole	Baughman Dr. 4	MH Replace	$ 5,000	$ -	$ 5,150	$ -	$ -	$ -
2	Manhole	34-5	MH Repair+Lining	$ 4,270	$ -	$ 4,398	$ -	$ -	$ -
2	Manhole	18-3	MH Clean + Line + Repair	$ 5,020	$ -	$ 5,171	$ -	$ -	$ -
2	Manhole	Baughman Dr. 3	MH Clean + Line	$ 3,770	$ -	$ 3,883	$ -	$ -	$ -
2	Manhole	11-5	MH Clean + Line + Repair	$ 5,020	$ -	$ 5,171	$ -	$ -	$ -
2	Manhole	17-2	MH Clean + Line + Repair	$ 5,020	$ -	$ 5,171	$ -	$ -	$ -
2	Manhole	20-2a	MH Clean + Line + Repair	$ 5,020	$ -	$ 5,171	$ -	$ -	$ -
2	Manhole	7-1	MH Clean + Line + Repair	$ 5,020	$ -	$ 5,171	$ -	$ -	$ -
2	Manhole	4-2	MH Repair+Lining	$ 4,270	$ -	$ 4,398	$ -	$ -	$ -
2	Manhole	19-5	MH Clean + Line + Repair	$ 5,020	$ -	$ 5,171	$ -	$ -	$ -
2	Manhole	19-4	MH Clean + Line + Repair	$ 5,020	$ -	$ 5,171	$ -	$ -	$ -
2	Manhole	9-5	MH Repair+Lining	$ 4,270	$ -	$ 4,398	$ -	$ -	$ -
2	Manhole	3-4	MH Repair+Lining	$ 4,270	$ -	$ 4,398	$ -	$ -	$ -
2	Manhole	13-3a	MH Repair+Lining	$ 4,270	$ -	$ 4,398	$ -	$ -	$ -
2	Manhole	19-3	MH Repair+Lining	$ 4,270	$ -	$ 4,398	$ -	$ -	$ -
2	Manhole	29-4	MH Repair+Lining	$ 4,270	$ -	$ 4,398	$ -	$ -	$ -
2	Manhole	3-3	MH Repair+Lining	$ 4,270	$ -	$ 4,398	$ -	$ -	$ -
2	Manhole	33-1	MH Repair+Lining	$ 4,270	$ -	$ 4,398	$ -	$ -	$ -
2	Manhole	21-3	MH Clean + Line + Repair	$ 5,020	$ -	$ 5,171	$ -	$ -	$ -
2	Manhole	16-1	MH Clean + Line + Repair	$ 5,020	$ -	$ 5,171	$ -	$ -	$ -
2	Manhole	6-3	MH Clean + Line + Repair	$ 5,020	$ -	$ 5,171	$ -	$ -	$ -
3	Main	4-3-4-2	Point Repair	$ 5,270	$ -	$ -	$ 5,586	$ -	$ -
3	Main	10-1-8-5	Point Repair	$ 5,270	$ -	$ -	$ 5,586	$ -	$ -
3	Main	30-4-30-3a	Point Repair	$ 5,270	$ -	$ -	$ 5,586	$ -	$ -
4	Manhole	Creekview Dr. 3	MH Clean + Line	$ 3,770	$ -	$ -	$ -	$ 4,109	$ -
4	Manhole	Creekview Dr. 2	MH Clean + Line	$ 3,770	$ -	$ -	$ -	$ 4,109	$ -
4	Manhole	12-3	MH Repair+Lining	$ 4,270	$ -	$ -	$ -	$ 4,654	$ -
4	Manhole	Baughman Dr. 11	MH Clean + Line + Repair	$ 5,020	$ -	$ -	$ -	$ 5,472	$ -
4	Manhole	Baughman Dr. 8	MH Clean + Line	$ 3,770	$ -	$ -	$ -	$ 4,109	$ -
4	Manhole	8-2	MH Clean + Line + Repair	$ 5,020	$ -	$ -	$ -	$ 5,472	$ -
4	Manhole	20-3	MH Repair+Lining	$ 4,270	$ -	$ -	$ -	$ 4,654	$ -
4	Manhole	29-3	MH Repair+Lining	$ 4,270	$ -	$ -	$ -	$ 4,654	$ -
4	Manhole	M5-4	MH Repair+Lining	$ 4,270	$ -	$ -	$ -	$ 4,654	$ -
4	Manhole	Baughman Dr. 7	MH Clean + Line	$ 3,770	$ -	$ -	$ -	$ 4,109	$ -
4	Manhole	Baughman Dr. 1	MH Clean + Line	$ 3,770	$ -	$ -	$ -	$ 4,109	$ -
5	Main	25-2-GPS 7	Replacement	$93,514	$ -	$ -	$ -	$ -	$ 104,735
TOTAL:					$15,830	$118,409	$16,759	$50,107	$104,735

Table 5 shows a detailed recommendations for the lift station system assets needing rehabilitation in the short-term CIP

Table 5. 5-Year Capital Improvement Plan for Lift Stations

Year	Project Description	Cost	2017	2018	2019	2020	2021
1	Pump Replacement Budget	$80,000	$82,000	-	-	-	-
3	Grinder Station Rehabilitation	$35,000	-	-	-	$39,000	-
Total			$82,000	-	-	$39,000	-

OPERATIONS, MAINTENANCE AND REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

An annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by staff without bringing in an outside contractor. Existing disposable materials include chemicals, wear parts in pumps and motors, laboratory instruments, etc. The existing OM&R fund is sufficient for the current operations.

REVENUE STRUCTURE

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

A study was conducted by an independent municipal financial advisor (Utility Financial Solutions, LLC) to develop a 5-year financial projection to meet the Michigan Department of Environmental Quality SAW Grant requirements.

The rate methodology required by the MDEQ for SAW Grant Asset Management Plans requires an analysis of the current budget on a cash basis to determine if there is a revenue gap. The analysis performed by UFS showed that no revenue gap exists for current utility operations.

However, after compiling the Township's short-term CIP, a revenue gap was projected. The Township Board approved a resolution on March 16, 2017 for a $1.85 increase per 5/8" meter equivalent in each year 2017-2024. This increase will enable the Township to fund their short-term CIP, while keeping the recommended minimum cash on hand of 120-days or approximately $100,000.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The Charter Township of Bedford *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1629-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No
   If No - Date of the rate methodology approval letter: October 24, 2016.
2) Significant Progress Made: NA
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: NA.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on NA.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Joyce Feraco – Township Clerk at (269) 965-1999 joyce@bedfordchartertwp.com
Name Phone Number Email

5-31-17
Signature of Authorized Representative (Original Signature Required) Date

Adam Heikkila – Township Supervisor
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

for Stormwater Collection Sytem

Prepared for:

Village of Bellaire

VILLAGE OF BELLAIRE
EST. 1891

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

May 2017

1.0 EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In April 2014, the Village of Bellaire received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ) Project No. 1564-01. The grant provided 90% funding (10% local match) based on the SAW grant application submitted in December 2013.

This report provides the Asset Management Plan (AMP) for the Village's stormwater collection system. Working with Village staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the stormwater collection system.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Village of Bellaire AMP is:

David Schulz, Village President
202 N. Bridge Street
P.O. Box 557
Bellaire, Michigan 49615
Phone number: 231.533.8213
Email: vlgpres.dschulz@bellairemichigan.com

ASSET INVENTORY AND CONDITION ASSESSMENT

The stormwater collection system assets consist of approximately 10,837 feet (2.05 miles) of storm sewers and 160 stormwater structures connecting the gravity pipe. The village stormwater system consists of 138 manholes/catch basin structures and 22 outfall structures. Fifty-nine percent of the system was initially install in the 1960's, eighty-three percent of the stormwater collection system is 12 inch and Reinforced Concrete Pipe (RCP) comprises approximately 97% of the existing system. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

ASSET IDENTIFICATION AND LOCATION

A comprehensive stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits; supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new, or updated (GIS) database and piping network for archiving, mapping and further evaluation purposes.

CONDITION ASSESSMENT AND EXPECTED USEFUL LIFE

For the Village of Bellaire, a comprehensive evaluation of the collection system manholes was performed. NASSCO-MACP structure field based assessments were performed on 157 of the total 160 identified structures. The grant did not include Underground Infrastructure Condition Assessment using Closed Circuit Televising (CCTV), because CCTV was not done, the project relied upon existing local knowledge and historical information. Based on discussions with the stormwater system operations staff, there have not been any known capacity issues with the Village-owned stormwater system, however, flooding or ponding problems occur at two village owned drywells.

Recommendations for short-term (1-5 year) and long term (6-20 year) identifies the need for maintenance - 69% of the system was tagged for inspection and/or cleaning. Rehabilitation accounted for 8% of the of the system identifying the need for point repairs and lining. The remaining assets 23%, were placed in the beyond 20-year planning category.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic or environmental impact of failure of an asset and on the utility's ability to convey stormwater. CoF categories of the stormwater collection system include:

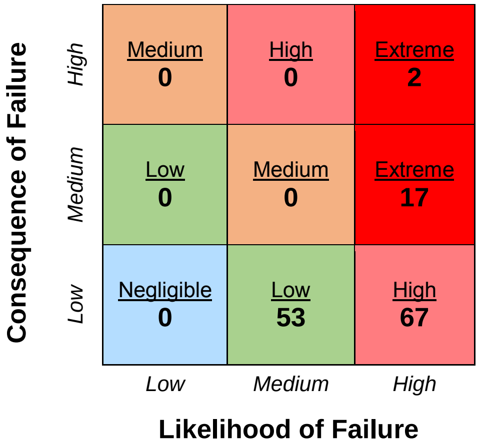
- Location of asset
- Facilities served by asset
- Size

CRITICALITYRESULTS

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

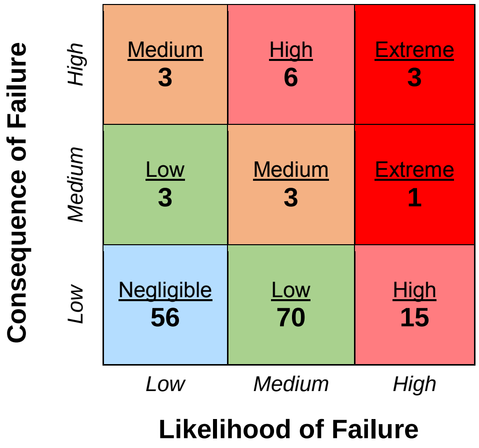
Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. 19 pipe segments in the stormwater collection system have an extreme risk rating. The likelihood of failure accounts for service history since CCTV was not included in this grant all pipe segments have been identified for CCTV, due to the potential impact of failure moved these assets into the extreme risk rating.

Figure 2 provides the risk rating for the storm sewer structures. 4 structures are identified as extreme risk, and are recommended for replacement or rehabilitation. These manholes are included in the 1-2 year CIP recommending cleaning, lining and repair.



Consequence of Failure				
	High	Medium **0**	High **0**	Extreme **2**
	Medium	Low **0**	Medium **0**	Extreme **17**
	Low	Negligible **0**	Low **53**	High **67**
		Low	*Medium*	*High*
		Likelihood of Failure		

Figure 1: Business Risk Matrix (Risk Rating) by Number of Gravity Pipes



Consequence of Failure				
	High	Medium **3**	High **6**	Extreme **3**
	Medium	Low **3**	Medium **3**	Extreme **1**
	Low	Negligible **56**	Low **70**	High **15**
		Low	*Medium*	*High*
		Likelihood of Failure		

Figure 2: Business Risk Matrix (Risk Rating) by Number of Structures

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the stormwater collection system.

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan with recommendations was prepared for the Village's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short-Term 1-5 year and Long-Term 6-20 year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system. The 5-year CIP rehabilitation total is $85,340.

OPERATIONS AND MAINTENANCE

A preventative maintenance program to systematically clean and CCTV inspect pipelines to NASSCO-certified standards is critical for a sound stormwater system. The process of cleaning and CCTV inspection of pipelines either with equipment owned by the community or contracted is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. For this reason, it is recommended that at a minimum, all pipelines be cleaned and televised every five years, or that 20% of the system be cleaned and televised annually. Available budget will dictate the frequency or size of yearly projects. The 5-year CIP maintenance total is $107,700.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date May 31, 2017
(no later than 3 years from executed grant date)

The **Village of Bellaire** *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. **1564-01** have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Cathy Odom at 231.533.8213 vlgbellaire@bellairemichigan.com
Name Phone Number Email

05/18/17
Signature of Authorized Representative (Original Signature Required) Date

David Schulz, Village President
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Executive Summary of Wastewater Treatment System

Prepared for:

Village of Bellaire

FINAL
May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In April 2014, the Village of Bellaire received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ) Project No. 1564-01. The grant provided 100% funding based on the SAW grant application submitted in December 2013.

This report, prepared by Fleis & VandenBrink (F&V) addresses the five core components of an Asset Management Plan:

- Asset Inventory
- Level of Service
- Critical Assets
- Capital Improvement Plan (CIP)
- Revenue and Rate Structure

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Village of Bellaire AMP is:
David Schulz, Village President
202 N. Bridge Street
P.O. Box 557
Bellaire, Michigan 49615
Phone number: 231.533.8213
Email: vlgpres.dschulz@bellairemichigan.com

ASSET INVENTORY AND CONDITION ASSESSMENT

A list of the major assets in the Village's wastewater system, described further below, include:

- Collection system piping and manholes
- Wastewater Treatment Facility (WWTF)
- Sanitary sewer lift stations in the collection system

The wastewater collection system assets consist of approximately 56,322 feet (10.7 miles) of 6-inch, 8-inch and 10-inch sanitary sewer pipe (gravity pipe and force mains) and 206 wastewater manholes connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The WWTF currently includes the following treatment processes:

- coarse screening
- aerated lagoons
- secondary clarification with polymer addition
- rapid sand filtration
- wetlands irrigation system

Treated effluent is seasonally discharged to wetlands adjacent to the Intermediate River in accordance with NPDES permit No. MI0044873. The design capacity of the WWTF is 0.27 million gallons per day (mgd). The current annual average flow received by the facility is approximately 0.13 mgd.

There are 7 sanitary sewer lift stations located throughout the wastewater collection system, including Lift Station No. 1 located at the WWTF. The stations are either wet well/dry well style or submersible style stations.

Asset Identification and Location

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals included a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new, or updated (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes over 200 WWTF assets, 67 Lift Station Assets, and 413 Collection System Assets.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field based assessments were completed on all 205 manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on 20% of the gravity pipe. Smoke Testing performed on 100% of system to disclose location of inflow or infiltration and Capacity Analysis was modeled for average day and peak hour conditions to identify capacity concerns. Recommendations for short-term (1-5 year) and long term (6-20 year) identified the need for maintenance with 53% of the system was tagged for inspection and/or cleaning. Rehabilitation accounted for 12% of the system identifying the need for point repairs and lining. The remaining 35% of assets were placed in the 20+ year category.

Overall, the condition of the assets at the WWTF range from good to poor. Ongoing repairs have helped to maintain the condition of many assets while some assets that were installed during the 1989 expansion and the 1999 expansion and have not been replaced are now near the end of their useful life due to age or deterioration caused by harsh conditions associated with wastewater treatment.

The condition of the assets at the lift stations range from good to poor. Ongoing maintenance has upheld the condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems. The recommendations for short- and long-term improvements are relatively extensive.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The overall objective of the Village's Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the following Level of Service (LOS) goals are proposed:

LEVEL OF SERVICE STATEMENT

The overall objective of the Village of Bellaire Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the Wastewater Treatment Facility (WWTF).
- Actively maintain collection and treatment system assets in reliable working condition.
- Reduce peak flow volumes through inflow/infiltration (I/I) controls to MDEQ acceptable levels.
- Provide rapid and effective emergency response services to customers.
- Operations staff are properly certified.
- Health and safety of operations staff will be addressed at least annually to determine if any changes or additional resources are needed.
- Annually review and adjust user rates to address the above LOS goals.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village from time to time to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

In order to assure that LOS goals are met performance measurements may need to be implemented. During the LOS review with the community the need for performance measurements was discussed.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

The WWTF and Lift Station categories for CoF are:

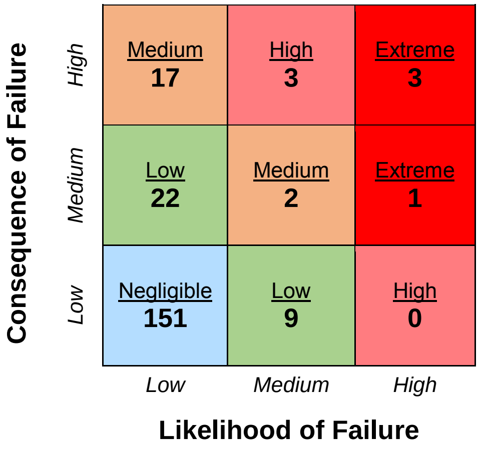
- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. Four pipe segments in the collection system has an extreme risk rating; one pipe segment is recommended for replacement; two pipe segments are recommended for full lining; and one pipe segment is requiring no action at this time. The Village has plans for system improvements in 2018 the three pipes requiring action are included in the improvement plan. Much of the collection system's gravity pipes, 88 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes or manholes in relatively good condition.

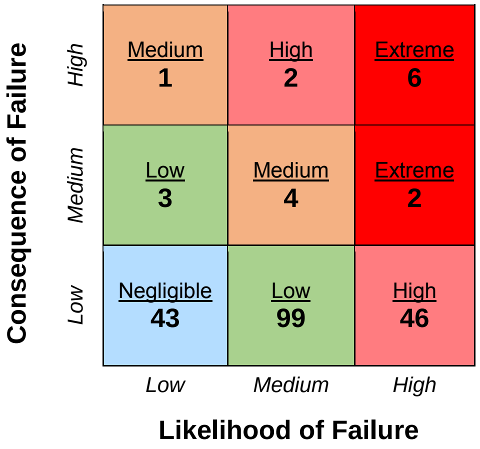
Figure 2 provides the risk rating for the collection system manholes. Eight manholes are identified as extreme risk, and are recommended for cleaning, repair, lining and/or adjusting. The Village has plans for system improvements in 2018. Much of the collection system's manholes, 70 percent as shown in Figure 2, have a low to negligible risk rating and are indicative of pipes or manholes in relatively good condition.



Consequence of Failure	Low	Medium	High
High	Medium 17	High 3	Extreme 3
Medium	Low 22	Medium 2	Extreme 1
Low	Negligible 151	Low 9	High 0

Likelihood of Failure

Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes



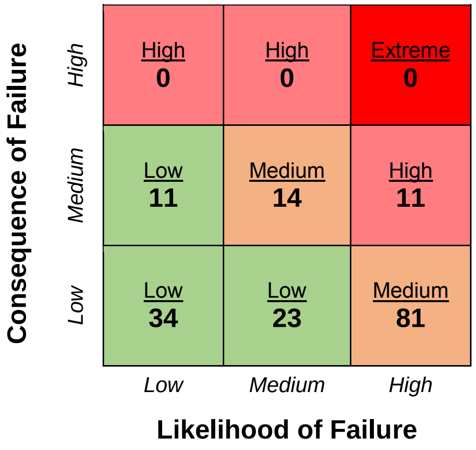
Consequence of Failure	Low	Medium	High
High	Medium 1	High 2	Extreme 6
Medium	Low 3	Medium 4	Extreme 2
Low	Negligible 43	Low 99	High 46

Likelihood of Failure

Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

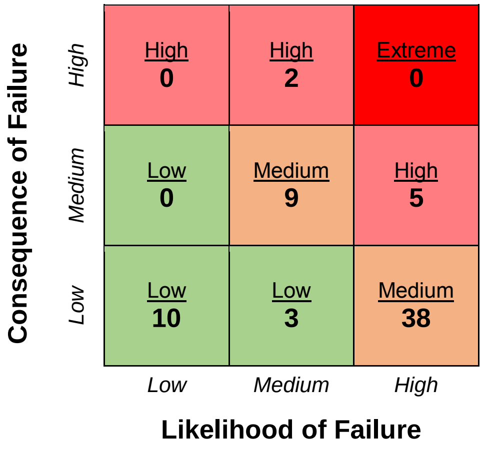
Figure 3 provides the risk ratings for the WWTF assets. No assets are identified as extreme risk. The eleven assets with high risk ratings should be inspected at regular intervals. The Village has identified replacement/repairs/improvements of WWTF assets in the proposed plans for system improvements

Figure 4 provides the risk ratings for the lift station assets. No assets are identified as extreme risk. The seven assets with high risk ratings should be inspected at regular intervals. The Village has identified replacement/repairs/improvements to four of the lift stations in the proposed plans for system improvements



High	High 0	High 0	Extreme 0
Medium	Low 11	Medium 14	High 11
Low	Low 34	Low 23	Medium 81
	Low	Medium	High

Figure 3. WWTF Assets by Risk Rating



High	High 0	High 2	Extreme 0
Medium	Low 0	Medium 9	High 5
Low	Low 10	Low 3	Medium 38
	Low	Medium	High

Figure 4. Lift Station Assets by Risk Rating

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection and treatment systems.

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Village's wastewater utility assets based on the Business Risk evaluation. CIP recommendations are provided for the collection system, wastewater treatment facility and pumping stations/force mains. From the BRE, a short-term (1-5 year CIP) and long-term (6-20 year CIP) was developed for the utility.

This AMP included a detailed condition assessment of the collection system and wastewater treatment facility including televising, system wide smoke testing, field condition assessments of all sanitary manholes and lift stations, and a field condition assessment of the WWTF. With the exception of construction of the Craven Park Lift Station and the polishing lagoon there have not been any major improvement projects or expansions to the system since 1989. Most of the mechanical equipment at the WWTF is approaching 30 years old and a majority of the lift station equipment is 46 years old.

Based on the AMP condition assessment of the sanitary sewer system, the Village has identified assets of the collection system, treatment facility and lift stations for improvement. Due to the large scope and needs of the system, the Village of Bellaire has decided to pursue funding through USDA Rural Development. A proposed system improvement project is being planned for spring of 2018. The USDA project will improve five gravity main pipes (1294 feet), eleven manhole structures, rehabilitation of 4 lift stations, along with treatment plant improvements and lagoon repairs.

OPERATIONS, MAINTENANCE AND REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

As part of this SAW grant 10,194 feet (20 percent) of the village collection system was cleaned and CCTV inspected. It is recommended that the Village clean and CCTV inspect the remaining 41,412 feet of the remaining pipeline assets.

An annual equipment replacement fund was developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by WWTF staff without bringing in an outside contractor. Existing disposable materials include chemicals, wear parts in pumps and motors, laboratory instruments, etc. The existing OM&R fund is sufficient for the current operations.

REVENUE STRUCTURE

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

A study was conducted by an independent municipal financial advisor (Michigan Rural Water Association) to develop a 5-year financial projection to meet the Michigan Department of Environmental Quality SAW Grant requirements, the rate methodology did not identify a gap in funding.

The letter dated November 9,2016 from the Michigan Department of Environmental Quality, states, the Village of Bellaire has fulfilled the significant progress requirement and complies with section 5204e(3)(a), Part 52, Clean water Assistance, of the Natural Resource and Environmental Protection Act, 1994 PA 451, as amended.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The **Village of Bellaire** *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. **1564-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No

   If No - Date of the rate methodology approval letter: November 9, 2016.

2) Significant Progress Made: N/A

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: N/A.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on N/A.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Cathy Odom at 231.533.8213 vlgbellaire@bellairemichigan.com
Name Phone Number Email

05/18/17
Signature of Authorized Representative (Original Signature Required) Date

David Schulz, Village President
Print Name and Title of Authorized Representative

April 2017

SAW Grant Executive Summary

City of Benton Harbor

200 East Wall St.
Benton Harbor, Michigan 49022
Mr. Darwin Watson, City Manager
269-927-8400 ex. 1165
Grant No. 1140-01

Executive Summary Introduction

The City of Benton Harbor was awarded a Stormwater, Asset Management, and Wastewater (SAW) Grant in the amount of $1,999,218 from the Michigan Department of Environmental Quality (MDEQ) in May 2014. The grant provides for the creation of an Asset Management Program (AMP) for its stormwater drainage system as well as its wastewater collection system. The intent of the asset management process is to maintain a desired level of service at the lowest life cycle cost for the defined infrastructure asset.

Asset Inventory

The City manages approximately 256,000 feet of gravity pipe, over 12,000 feet of force main, 988 manholes, and 13 lift stations in the wastewater system. Since the City does not operate the wastewater treatment plant, the assets associated with that are not included in this plan. The City manages approximately 243,000 feet of gravity pipe, 910 manholes, and 1,786 catch basins in the stormwater system which discharges to St. Joseph River, Paw Paw River, and Ox Creek, ultimately leading to Lake Michigan.

At the beginning of the project, existing information on the conditions of the assets was very limited. To obtain condition information on the gravity sewers, Closed Circuit Television (CCTV) work was performed to allow for the review and evaluation of the network. Approximately 8.5% of the sewer system was newly assessed based on established budgets. To obtain condition information of manholes and catch basins, assessment was performed by field inspectors, noting the details and conditions of each structure. Approximately 81% of structures were inspected.

Criticality of Assets

Criticality and business risk were evaluated for each asset. Assets that have the greatest Probability of Failure (POF) and the greatest Consequence of Failure (COF) associated with them are the most critical assets and are the most likely candidates for immediate action of rehabilitation or replacement. Assets with lower scores should be analyzed to develop the best life cycle strategy. A significant portion of pipes are shown to have a POF of 7.5 or greater. Thirty-three percent (33%) of stormwater structures and 35% of wastewater manholes have a POF of 7.5 or greater. However, the COF for these pipes may not necessarily be as high leading to a significant portion of assets falling below a Business Risk Evaluation (BRE) score of 50 and into lower levels of risk.

Level of Service Determination

The Level of Service (LOS) defines the way in which utility stakeholders want the utility to perform over a period of time. Goals were outlined within the report such as cleaning and inspecting structures over a 10-year period, responding to 80% of reported problems within an hour, and having less than 3 flooding instances per year. Measurable data will be collected and reviewed to determine if the goals are being met. These goals will be reviewed annually to determine if they are still relevant or need to be updated and whether changes in the system have resulted in the need to add, delete, or modify goals.

Revenue Structure

The annual operation and maintenance (O&M) budget includes typical costs associated with operating and maintaining the system for a year. It is recommended that the City continue cleaning and televising wastewater and stormwater sewers on an annual basis and budget for the work accordingly. Additionally, the rate methodology includes a replacement schedule for short-lived assets. The breakdown identifies items owned by the City that have a useful life of 20 years or less and contain moving parts. These replacement funds are set aside annually and saved until needed. Once a particular item fails, money is drawn from the replacement fund to replace the failed item without having to disrupt the normal operating budget.

Capital Improvement Plan

Excluded from the normal operating budget are any major capital improvements that are needed to increase capacity or replace items with a useful life of more than 20 years. Capital Improvement Plan (CIP) projects are proposed within the report. The projects are prioritized by BRE score and scale. They are divided into three (3) timelines: Years 1 – 5, Years 6 – 10, and Years 11 – 20. Years 1 - 5 have a BRE score greater than 50 and Years 6 -20 have a BRE score between 40 and 50. A cost estimate is provided for each project, amounting to approximately $1 million per year.

List of Major Assets

Wastewater:

- 256,889 feet of sewer pipe
- 988 manholes
- 13 lift stations
- 12,720 feet of force main

Stormwater:

- 243,679 feet of sewer pipe
- 910 manholes
- 1,786 catch basins

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 30, 2017
(no later than 3 years from executed grant date)

The City of Benton Harbor *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1140-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: march 2017.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Darwin Watson at 269-927-8400 dwatson@cityofbentonharbormi.gov
Name Phone Number Email

Darwin Watson 5/30/17
Signature of Authorized Representative (Original Signature Required) Date

Darwin Watson, City Manager
Print Name and Title of Authorized Representative

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date May 30, 2017
(no later than 3 years from executed grant date)

The City of Benton Harbor *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1140-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Name		Phone Number	Email
Darwin Watson	at	269-927-8400	dwatson@cityofbentonharbormi.gov

Darwin W Watson
Signature of Authorized Representative (Original Signature Required)

5/30/17
Date

Darwin Watson, City Manager
Print Name and Title of Authorized Representative

City of Berkley, Michigan
Asset Management Plan – SAW Grant No. 1287-01
Wastewater Collection System

The total award amount of $669,047 was provided to the City of Berkley to complete a Wastewater Asset Management Plan, with the City responsible for $66,905 in match funding. The final amount spent will not be available until the last disbursement request, after the May 31, 2017 deadline. The actual costs will be equal to the approved award amount.

Asset Inventory and Condition Assessment:

With the assistance of HRC, the City built a Geographic Information Systems (GIS) inventory, purchased the necessary hardware and software, and received training. The GIS includes fields to record the required criticality factors and hyperlinks to scanned utility plans.

The City of Berkley owns approximately 364,000 lft, or 69 miles, of gravity combined sewer. The City sewers have been constructed over time as Berkley has grown with the oldest combined sewers currently in use being over 70 years old. Most of the combined sewers were constructed prior to 1960. The City has consistently been able to clean and televise their combined sewer system for over two (2) decades. In addition, the City has had an ongoing annual sewer maintenance program for over two (2) decades and utilizes the data collected to develop annual sewer rehabilitation projects to address the issues found during the City's televising and cleaning operations. As of 2017, the City has lined approximately 25% of their combined sewer system. Since the award of the SAW grant, the City has used their own forces from their Department of Public Works to clean and televise approximately 53% of the City's remaining combined sewer lines (which exceeded the original goal of televising 50% of the remaining combined sewers 8 inches and larger that are over 50 years of age).

Representatives from HRC were physically able to assess approximately 100% of the City's combined manhole structure (there may have been a few manholes that were buried under pavement, landscaping and/or whose location was not known) and catch basin (which discharge into the combined system) inventory. In all, there were 1,074 manholes and 1,535 catch basins inspected under the SAW grant.

The City of Berkley is currently part of the regional Southeast Oakland Sewage Disposal System (George W Kuhn Drainage District). The City-owned sewers connect to County Interceptors and ultimately to a City of Detroit interceptor. The sewage is ultimately treated at the Detroit Water and Sewerage Department (DWSD) Wastewater Treatment Plant (WWTP).

In all, approximately 3,161 individual assets including pipe segments, manholes, and catch basins that discharge into the combined sewers were examined as part of this work. The breakdown of the assets investigated in this Study is as follows:

Asset Name/Class	Number of Unique Assets
Combined Sewer Manholes	1,074
Combined Sewer Gravity Mains	552 (30 miles)
Catch Basins (drain to combined sewers)	1,535

Level of Service:

The City adopted a mission statement as part of the AMP as follows:

For over two (2) decades, the City of Berkley has maintained and is committed to maintaining the performance of our combined collection system to meet applicable local, state and federal regulations and to protect public health and the environment. We strive to develop, operate and maintain this system in the most cost-effective way to provide sustainable systems for present and future customers.

The City of Berkley choose to implement its mission statement as the defined Level of Service. The City's mission statement considers the impacts to public health and the system's ability to comply with regulations. The current procedures and ongoing operations of the City have successfully fulfilled this mission and will continue to be implemented. Because the level of service provided to date has been adequate, public works leaders choose to continue their ongoing processes rather than defining specific goals to track at this time. The City will review the mission statement and ongoing system activities annually to determine if the mission is not being successfully fulfilled and further measurement of the stated goals is necessary.

Criticality of Assets:

Factors were developed to determine how some assets are more critical than others. A Probability of Failure (POF) was estimated for assets with inspection data based on condition, age, and other factors using the PACP/MACP methodology, which City staff were trained to utilize. A Consequence of Failure (COF) was determined by several attributes of the asset. These attributes include diameter, depth, location, surface type, and critical users. The product of these factors is the overall Business Risk Evaluation (BRE). Fifty-four percent (54%) of the City's combined sewer lines investigated had a BRE score less than 5 while approximately ninety-seven (97%) of the sewer lines had a BRE score less than 10 (essentially, 7 or less) on a scale of 1 to 25, with 1 being lowest risk. The majority of the BRE scores above 10 were determined based on the depth and diameter of the sewers and the connection of the house sanitary lead to the main sewer, and in some instances, the actual condition of the sewer main pipes. Of the 1,083 manhole structures inspected by HRC, approximately forty-four percent (44%) were considered "Good", seven percent (7%) were poor and the remaining structures were considered "Fair", however not in imminent risk of failure. Of the 1,535 catch basins inspected by HRC, approximately twenty-five percent (25%) were considered "Good", twenty-seven percent (27%) were poor and the remaining structures were considered "Fair", however not in imminent risk of failure.

Operation and Maintenance Strategies/Revenue Structure:

The City of Berkley employed Plante Moran to conduct the City's rate methodology study on October 18th, 2016, which MDEQ approved on November 9th, 2016. Plante Moran demonstrated that current revenues, with the existing annual sewer maintenance budget and the scheduled sewer rate increase, are sufficient to meet anticipated expenses.

Long-term Funding/Capital improvement Plan

As sewer issues were discovered during the sewer televising and cleaning operations over the last three (3) year grant period, the City would utilize the services of their contracted sewer maintenance contractor, LiquiForce to perform the necessary sewer repairs, e.g. lining, grouting, etc. This has been the City's practice for well over 20 years now. Periodically, the City would request statements of qualifications from experienced firms with the objective of awarding a three (3) year Sewer Maintenance Service Contract to one (1) contractor who would be expected to provide sewer televising, cleaning, grouting, and lining, and chemical treatment of roots, as required. Each time the contract is awarded with the City's option to renew annually or to extend for an additional three (3) year period, depending on funding and Contractor performance. In the last three (3) years, the City budgeted a total of $700,000 ($200,000 in fiscal year 2015 and $250,000 in fiscal years 2016 and 2017) in sewer rehabilitation projects completed by LiquiForce. This annual Sewer Maintenance Service Contract budget will be increased to $300,000 for fiscal year 2018 and is proposed to increase by at least $50,000 every two (2) years through fiscal year 2024. In addition to the annual Sewer Maintenance Service Contract budget increase, the City is planning on budgeting another $100,000 each year for "SAW Grant Construction Commitment" through fiscal year 2024 and have approved an 8.6% water and sewer rate increase for fiscal year 2018 with annual rate increases planned through fiscal year 2021.

Typically, the City promptly plans and completes rehabilitation of sewer sections found to be have deficiencies as they find them, whether the probability of failure is imminent or rehabilitation is warranted due to other infrastructure projects proposed in the area. The City intends on continuing this practice. The City has also maintained approximately three (3) year sewer televising and cleaning cycle in which all of the sewers in the City are investigated.

There are several locations that have been identified in the combined sewer system for immediate repair or rehabilitation (point repairs, full line pipe replacement) with a total estimated cost of $250,000. These projects will be completed over the next two (2) years and paid for using the City's annual sewer maintenance and SAW construction budgets and the newly-approved annual sewer rate increases. In addition, there were several locations in the combined sewer system that will require sewer grouting and/or lining over the next 5-10 years with a total estimated cost of $1,100,000 that will be paid for by the same funding sources listed above. The proposed combined sewer budget also includes the cost to clean and televise the City's combined sewer system once every three (3) years. This will assist the City to identify areas for necessary capital improvements.

A signed Certification of Project Completeness form is enclosed. Contact information for the grantee including name, address, and phone number is included below:

Grantee: City of Berkley, Michigan

3338 Coolidge Hwy
Berkley, MI 48072
Phone: 248-658-3300

City Hall Hours:
Monday - Friday: 8:30am-5:00pm
Closed from 1-2 pm every day.
Closed on Holidays.

Matthew Baumgarten, City Manager
Phone: (248) 658-3350
E-mail: mbaumgarten@berkleymich.net

Derrick Schueller, Director, Public Works
Phone: (248) 658-3490
E-mail: dschueller@berkleymich.net

Edward Zmich, Consulting Engineer
Hubbell, Roth & Clark, Inc.
Phone: 248-454-6302
E-mail: ezmich@hrcengr.com

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date MAY 31, 2017
(no later than 3 years from executed grant date)

The CITY OF BERKLEY *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1287-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: NOVEMBER 9, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

MATTHEW BAUMGARTEN at 248-658-3350 MBAUMGARTEN@BERKLEYMICH.NET
Name Phone Number Email

5/26/17
Signature of Authorized Representative (Original Signature Required) Date

Matt Baumgarten, City Manager
Print Name and Title of Authorized Representative

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date April 24, 2017
(no later than 3 years from executed grant date)

The Bessemer Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1271-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]

   If No - Date of the rate methodology approval letter: October 27, 2016.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: n/a.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on n/a

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Jeffrey Randall at 906-667-0423 btsuper ~~grwa~~@bessemertwp.com
Name Phone Number Email

4-24-17
Signature of Authorized Representative (Original Signature Required) Date

Jeffrey Randall, Supervisor
Print Name and Title of Authorized Representative

c2ae 50
architecture + engineering

1211 Ludington St.
Escanaba, MI 49829
O: 906.233.9360
www.c2ae.com

BESSEMER TOWNSHIP ASSET MANAGEMENT SYSTEM
PROJECT CLOSING SUMMARY
MEETING THE SAW REQUIREMENTS

The SAW agreement with the State of Michigan was signed in May, 2013 which began the overall SAW program.

Bessemer Township's sanitary system is split into two parts. One part resides west of the City of Bessemer and includes 2 pump stations, 1.45 miles of forcemain, and 0.9 miles of sewer. This system discharges to the BASA for treatment.

The part of the system east of the City of Bessemer about includes 14 pump stations, 1.25 miles of forcemain, and 6.5 miles of sewer. Treatment is provided by a lagoon owned by the system.

Five items of focus were completed.

1. **Asset Inventory:** This item which initiated the work included.
    a. Identifying and locating all assets.
        i. A list of all assets to be monitored was completed.
        ii. The GPS co-ordinates of the field assets were identified.
        iii. A GIS system was completed to index the locations.
        iv. The identified assets were inspected for making a condition assessment.
        v. The asset information was included in the Asset Management Spreadsheet (AMS).
        vi. The spreadsheet was used to quantify and order the asset information.

2. **Level of Service:**
    a. A SAW Team was created to discuss the wastewater system direction.
    b. The SAW Team met and discussed a mission statement and desired Level of Service statement.
    c. The Level of Service Statement was included in the User Charge System report.

3. **Criticality of Assets:**
    a. The AMS was used to organize the asset classes, several parameters were used to determine asset viability, rating each on a 1 to 5 scale.
        i. Redundancy, does the unit have system backup.
        ii. Criticality is the asset to critical to the system and to what degree.
        iii. Probability of failure based on its age and condition.

    iv. These items together result in a parameter identified as business risk.

  b. The AMS was the used to prioritize the need for short term repair or maintenance, short term replacement, or long term maintenance.

4. **O&M Strategies:**
   a. The AMS has a worksheet for working with the system's operating budget.
   b. The current budget information was included.
   c. Additional budget items were added to the budget to incorporate the financial needs identified above.
      i. Short term needs under five years were included and identified as replacement.
      ii. Long term need under in line labeled capital.
   d. These items are identified as system reserve needs and are intended to grow over time. Both asset management system identified reserves and borrower required reserves are listed.
   e. The current reserve set aside is compared with the asset management system calculated required set aside.
   f. If additional set-aside is necessary a rate increase is recommended.
   g. A User Charge System summary report is included detailing the information.
   h. This user charge report and the asset management spreadsheet are identified as the Rate Methodology and have been submitted previously to MDEQ.

5. **Capital Improvements:**
   a. The asset management spreadsheet identifies capital improvement projects for the future.
   b. The long term projects are identified as future public barrowings. Therefore the cost for application preparation for future funding is budgeted in the current budget.
   c. An estimate of project year and financial size is generated from an asset's AMS business risk and the asset's remaining useful life.

The system deliverables therefore are:

1. The indexing GIS system hardware and software
2. System maps
3. Asset management spreadsheet or database
4. User Charge Summary Report
5. GIS system filing system including all data collected and available for system use

The system concludes that the enterprise fund is setting aside sufficient funds for meeting the reserve set aside needs annually. The Township should consider changing to annual funding of accumulating depreciation. Finally the data for the $ 1.2 million dollar project funded by USDA RD and the MDEQ S 2 grant just completed has been incorporated into the asset management system.

For more information contact:

Bessemer Township Supervisor
N10338 Mill St.
Ramsay, MI. 49959
906-667-0423

Village of Beverly Hills
SAW Grant No. 1292-01
Wastewater and Combined System

May 31, 2017

The Village of Beverly Hills applied for and received a grant to further develop its Asset Management Plan for its sanitary and combined systems through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Wastewater and Asset Management (SAW) program. The Village of Beverly Hills was awarded an MDEQ Stormwater, Asset Management, Wastewater (SAW) Grant in "Round 1" of the Program for a total amount of $2,327,375 with the Village of Beverly Hills responsible for $415,177 in match funding. As of December 31, 2016, the approved total amount used is $1,043,524.17 with the Village of Beverly Hills matching $104,352.42. The final amount spent will not be available until the last disbursement request after May 31, 2017. Because the SAW program was funded through monies appropriated for surface water quality, other related infrastructure systems, such as drinking water, were not eligible for funding through the grant.

The Village of Beverly Hills sanitary and combined sewer systems are operated and maintained under the jurisdiction of the Oakland County Water Resources Commissioner (WRC). The Village of Beverly Hills has a contract with the office of the Oakland County Water Resources Commissioner (WRC) for operation and maintenance of its sanitary and combined systems. The WRC has various tools used to manage the assets it owns or maintains, including a GIS geodatabase, collaborative asset management system, hydraulic models, condition assessment methods, risk/prioritization models, capacity studies, asset deterioration models, and an operating and capital improvement project prioritization model. These tools are used to guide the short and long-term strategies for WRC to maintain the various systems in a sustainable manner that meets the required level of service, with a focus on prioritizing assets that are most critical and being cost-effective.

The WRC "Common to All" approach was generally followed with in development of the asset management plan for this system. The following is a summary of the AMP, as required by the grant, which includes a brief discussion of the five major AMP components, a list of the plan's major identified assets, and contact information for the grant.

A. Asset Inventory and Condition Assessment:

WRC uses its existing Geographic Information System (GIS) geodatabase as the primary means to inventory and map the assets in the system. The geodatabase provides a means to record the attributes associated with each asset, such as installation date (age), size, material, along with other information needed for a given asset type. The geodatabase is synced with WRC's Collaborative Asset Management System (CAMS) so that maintenance history and costs can be tracked on an asset and/or fund level.

Condition assessment tools and protocols were developed by WRC to allow for efficient and consistent recording of asset condition. For sanitary, combined, and stormwater sewer assets, a NASSCO-compliant software program stores data collected during sewer televising. The data stored can be shared with the existing CAMS system. Inspection work orders in the CAMS system are used for evaluation of other types of assets, such as manholes and other collection system structures, and for most vertical asset types, such as pumps, valves, structures, etc.

As part of the grant for Village of Beverly Hills, the GIS geodatabase inventory was reviewed for completeness and to ensure critical attributes were populated. Approximately 169,516 lineal feet of sanitary and 66,245 lineal feet of combined sewer underwent condition assessment via closed-circuit televising (CCTV). In addition, approximately 1,961 manholes and other related structures were evaluated using the ArcGIS Collector Application before importing into the CAMS System.

Vertical assets, including pump stations and storage and treatment facilities, were inventoried using a WRC hierarchy template and condition assessment data was collected and input into the CAMS system.

B. Level of Service:

WRC developed an overall level of service goal that will be used as a starting point for each fund, including the Village of Beverly Hills. Considerations into the level of service included compliance to regulations, operation, impact to the public and environment, safety and security, and are included in the overall business risk evaluation.

	WRC Base Level of Service Goals	Measurables
Financial Viability and Impact	Emergency were not eligible for funding through the grant repairs can be repaired within Utility Reserve Budgets of the system	Exceedances of reserve budgets
Public Confidence / System Service Impact	Minimal to some loss of service or impact on other services for less than four hours. No sewer system or basement backups. Minor disruption (e.g., traffic, dust, noise).	Number of service interruptions, complaints, and backups
Regulatory Compliance	No state permit violations. Comply with all MDEQ policies.	Number of violations
Safety of Public and Employees	Non-reportable injuries, no lost-time injuries or medical attention required. No impact to public health	Number of injuries and any public health advisories
Redundancy	Comply with Ten State Standards	Number of violations
BRE score	70% of assets have a BRE less than 15	System risk score
Staffing	Staffing levels and training are maintained to meet level of service	Number of open positions, annual training hours

C. Criticality of Assets:

WRC uses an asset optimization software (Power plan formally known as RIVA) to assist with prioritization of cost-effective maintenance strategies and capital improvement planning. The software syncs with both the GIS geodatabase and the WRC CAMS software packages.

Baseline Probability of Failure (POF) and Consequence of Failure (COF) factors that WRC configured into the Power Plan software as part of the "Common to All" approach were used to estimate the overall risk of the wastewater system asset. The average Business Risk Evaluation (BRE) for the entire sanitary sewer system is 3.38 on a scale of 25. The average BRE for the entire combined sewer system is 9.04 on a scale of 25. For pump stations and storage and treatment facilities, individual assets were reviewed by staff as part of the grant work, and POF and COF factors determined and input into the software.

D. O&M Strategies and Revenue Structure:

O&M strategies for the system were reviewed against the "Common to All" approach developed by WRC. These include determining future sewer cleaning and televising frequency and inspection and maintenance procedures for pump stations and storage and treatment facilities. Costs required to implement the selected strategies were estimated and incorporated into the rate review process for the system. The Village of Beverly Hills submitted a rate methodology on November 7, 2016 which was approved by the MDEQ on December 20, 2016.

The WRC worked with Oakland County's Fiscal Services staff to determine if the current rate structures were sufficient to meet the current needs for the management of the wastewater and stormwater systems, and to plan for any adjustments that may be required to meet anticipated future expenses. The Power Plan software provides estimated annual maintenance and capital needs for each fund, which is then reviewed by WRC staff and the local community.

E. Long Term Funding/Capital Improvement Plan:

Capital Improvement Plans identify system upgrades and rehabilitation and replacement needs for the future, typically over a period of 20 years, with greater emphasis on the first five years of the plan. Power Plan was used to model asset deterioration and assist with identifying capital improvement needs for the near and long term. Costs for anticipated capital projects in the near term are also incorporated into the rate process. During inspection of the combined and sanitary sewer system, the village developed a multi-year rehabilitation project for the near future to repair a significant amount of the poorly rated pipe segments. For the more distant future, the Village of Beverly Hills plans do more preventative work by cleaning and televising more linear feet per year thru their maintenance contract with the WRC.

F. Contact Information:

A signed Certification of Project Completeness form is enclosed. Contact information for the grantee including name, address, and phone number is included below:

Primary Contact and System Manager
Village of Beverly Hills
Chris Wilson
cwilson@villagebeverlyhills.org

Tom Meszler
tmeszler@villagebeverlyhills.com

WRC Project Manager
Rick DeVisch, P.E.
devischr@oakgov.com

Consultant Name
Hubbell, Roth & Clark, Inc.
Brad Shepler, P.E., CCCA, LEED® AP BD+C
bshepler@hrcengr.com

SUMMARY OF ASSETS IN THE VILLAGE OF BEVERLY HILLS:

Collection System Sewers:

Sewer Assets by Material	Length (FT)	Segment Count
ABS Truss	286	1
Asbestos Cement	4,489	18
Cast Iron	42	2
Clay or VCP	86,410	405
Concrete	80	1
Ductile Iron	579	14
Non-Reinf Concrete	88,216	417
PVC	12,242	69
Reinforced Concrete	95,443	475
Unknown	8,609	35
Grand Total	**296,395**	**1,437**

Collection System Sewers:

Sewer Assets by Diameter	Length (FT)	Segment Count
Non-Circular	27	2
Unknown	638	10
6”	1,041	5
8”	134,194	670
10”	23,163	128
12”	67,185	305
15”	23,960	101
18”	16,517	69
21”	3,547	18
24”	5,167	30
27”	923	3
30”	3,790	20
36”	4,345	28
42”	638	2
48”	2,152	8
54”	3,497	15
72”	3,911	16
78”	1,701	7
Grand Total	**296,395**	**35,478**

Collection System Structures:

Structure Type			
Combined	**Count**	**Sanitary**	**Count**
Manhole	612	LiftStation	3
Inlet	495	Access Point	1
		SystemValve	1
		Manhole	864
Grand Total			**1976**

Vertical Assets:

Asset Class	Count
Electrical Equipment	6
Facility Meters	7
Generators	2
Instrumentations	9
Pumps	7
Structures	5
Wet Wells	3
Grand Total	**39**

Prepared By:
Hubbell, Roth & Clark, Inc.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 5-31-17
(no later than 3 years from executed grant date)

The Village of Beverly Hills *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1292-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: December 20, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

CHRIS WILSON at 248.646.6404 cwilson@villagebeverlyhills.com
Name Phone Number Email

05/25/17
Signature of Authorized Representative (Original Signature Required) Date

CHRIS WILSON VILLAGE MANAGER
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report

Prepared for:

Village of Bloomingdale

SAW Project No. 1619-01

FINAL
May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Storm water, Asset Management, and Wastewater (SAW) Grant Program. In May 2014, The Village of Bloomingdale received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1619-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Village's publicly owned wastewater utility. The assets that comprise the utility include collection system piping and manholes, a wastewater treatment facility, lift station/pump stations and force mains.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The Village of Bloomingdale has executed the "Certification of Project Completeness" for the wastewater asset management plan and a copy has been provided at the end of this Executive Summary.

The contact person for the Village of Bloomingdale AMP is:

Mr. Tom Rock, Village President
109 East Kalamazoo Street
Bloomingdale, MI 49026-0236
Phone Number: 269-521-3222 ext. 3
e-mail: bdalepres@btc-bci.com.

ASSET INVENTORY AND CONDITION ASSESSMENT

A list of the major assets in the Village's wastewater system, described below, include:

- Wastewater collection system piping and manholes
- Two wastewater lift stations with associated force mains
- Wastewater Treatment Facility

The wastewater collection system assets consist of 56,606 feet (10.7 miles) of sanitary sewers (gravity pipe and force mains) and 205 wastewater manholes connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The WWTF currently includes the following treatment processes:

- Fine screening
- Moving bed biofilm reactor (MBBR) system
- Secondary clarification
- Phosphorus control
- Solids pumping
- Effluent pumping

Treated effluent is discharged to the Great Bear Drain in accordance with NPDES permit No. MI0058842. The design capacity of the WWTF is 0.2 million gallons per day (mgd).

There are two sanitary sewer lift stations located in the wastewater collection system; this does not include the influent and effluent pump stations located at the WWTF. The stations are submersible style stations.

ASSET IDENTIFICATION AND LOCATION

The poor drainage of soil in the Village makes private septic systems impractical for small homeowner lots. The Village sewer system is critical for the residents public health.

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals included a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new geographic information systems (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes 171 WWTF assets, 20 Lift Station Assets, and 413 Collection System Assets.

CONDITION ASSESSMENT AND EXPECTED USEFUL LIFE

For the Village of Bloomingdale, a comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field based assessments were completed on all 205 manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on 20% of the gravity pipe. Smoke Testing performed on the entire system to disclose location of inflow or infiltration. A hydraulic capacity analysis of the system was not included as there are no records of surcharging of the Villages' sewer collection system.

The assets of the collection system are in good to excellent condition. Recommendations for short-term (1-5-year) and long term (6-20-year) rehabilitation have identified the need for continued maintenance - 53% of the system was tagged for inspection and/or cleaning. Rehabilitation recommendations for 12% of the collection system were identified included point repair and CIPP Lining. The remaining assets (35%) were identified for rehabilitation in the future, beyond 5 years.

The assets at the WWTF were in good to excellent condition. The mechanical components of the facility were commissioned in 2013 and therefore have many years of remaining useful life. The assets at the facility were also in good to excellent condition because of current operational practices including routine preventive maintenance and corrective maintenance.

The assets at the collection system lift stations were in excellent condition. Both stations were renovated in 2005 and the assets still have more than 50% remaining useful life. Routine preventive maintenance and corrective maintenance by staff helps to keep both stations in good working order.

The Village of Bloomingdale maintains a very active operations and maintenance program for its utility and has proactively performed rehabilitation by CIPP lining several segments of critical collection system piping. A summary of those improvements is as follows:

- CIPP lining of sanitary sewers near the high school to lower known I/I contributing to the wastewater system was performed in 2015.
- CIPP lining of the older primary interceptor upstream of the WWTP was performed in 2015. This interceptor to reduce I/I and to address structural concerns with this section of sanitary sewer.

Funding for these rehabilitation improvements have been made possible due to the Village's O&M savings program.

LEVEL OF SERVICE

DEFINING THE EXPECTED LEVEL OF SERVICE (LOS)

Level of Service (LOS) defines the way in which the utility stakeholders want the utility to perform over the long term and is an MDEQ required component of an AMP. The LOS can include any technical, managerial, or financial components the utility wishes, if all regulatory requirements are met. Throughout the development of this AMP, F&V worked with the Village of Bloomingdale staff to develop the following LOS statement and goals.

WASTEWATER UTILITY - LEVEL OF SERVICE STATEMENT

To provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed for the Village of Bloomingdale.

- *Provide adequate collection system and treatment capacity for all service areas.*
- *Comply with all local, state and federal regulations always for treated effluent from the WWTP.*
- *Actively maintain collection and treatment system assets in reliable working condition.*
- *Reduce Infiltration to meet MDEQ-acceptable levels.*
- *Provide rapid and effective emergency response services to customers.*
- *Ensure operations staff are properly certified.*
- *Health and Safety of operations staff will be addressed at least annually to determine if any changes or additional resources are needed.*
- *Annually review and adjust user rates to address the above LOS goals.*

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village of Bloomingdale from time to time to make sure they accurately reflect the desired operation of the utility.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score X Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status.

Consequence of Failure (CoF) is a measure of the social, economic or environmental impact of failure of an asset and on the utility's ability to convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset

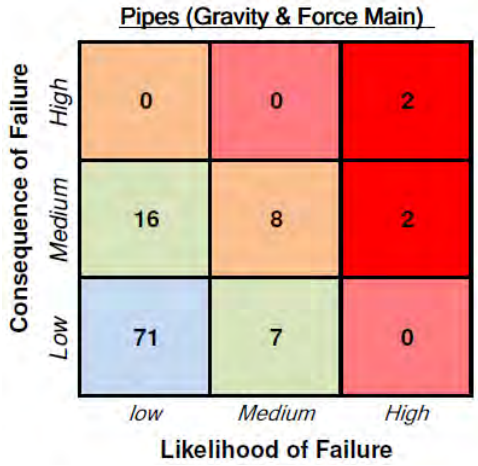
The WWTF and Lift Station categories for CoF are:

- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond.

CRITICALITY RESULTS

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

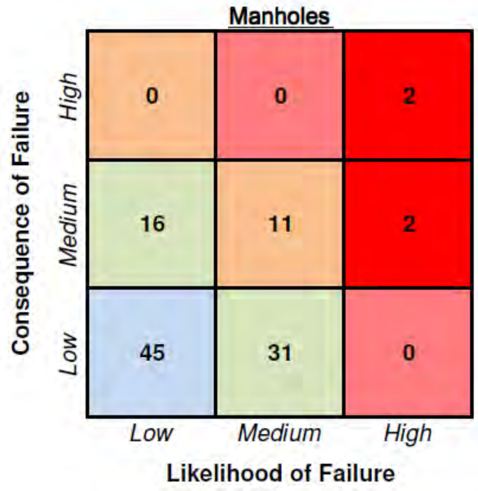
Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. Four pipe segments in the collection system has an extreme risk rating and are recommended to be replaced. The Village has plans to replace these pipes as part of a large street reconstruction project in the spring of 2017. Much of the collection system's gravity pipes, 90 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes or manholes in relatively good condition.



	low	Medium	High
High	0	0	2
Medium	16	8	2
Low	71	7	0

Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes

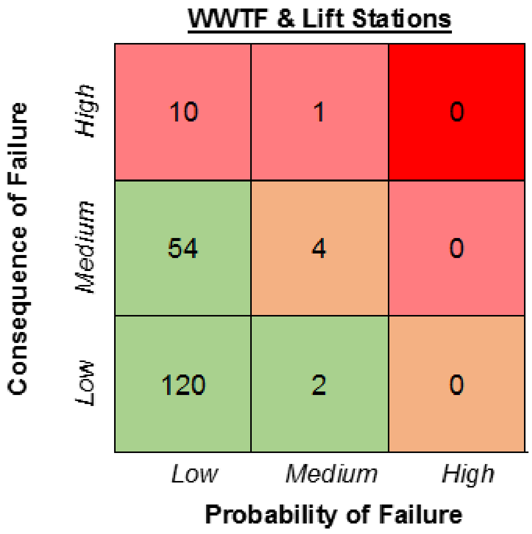
Figure 2 provides the risk rating for the collection system manholes. Four manholes are identified as extreme risk, and are recommended for replacement. The Village plans to replace these manholes during a street reconstruction project in the spring of 2017.Many manholes are at low to medium risk and recommended to be included in a long-term 6-20-year rehabilitation strategy (96 percent).



	Low	Medium	High
High	0	0	2
Medium	16	11	2
Low	45	31	0

Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the WWTF and lift station assets. No assets are identified as extreme risk. The eleven assets with high risk ratings should be inspected at regular intervals.



WWTF & Lift Stations

Consequence of Failure	Low	Medium	High
High	10	1	0
Medium	54	4	0
Low	120	2	0

Probability of Failure

Figure 3. Business Risk Matrix (Risk Rating) for WWTF and Lift Station assets

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan with recommendations was prepared for the Village's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short Term 1-5 year and Long Term 6-20-year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system.

CIP DEVELOPMENT

The Village of Bloomingdale identifies assets of $5,000 or more to be capital expenditures. Collection System assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2017 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Opinions of probable project costs, for the WWTF and Lift Station assets were prepared and are based on conceptual layouts of new facilities, or price quotes from material and equipment representatives. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The CIP was developed by assigning each project to a CIP year (1-5) based on several factors. In addition to Risk Rating, other factors used to assign CIP year include:

- Asset rehabilitation grouping (i.e. the type of repair/construction recommended)
- Coordination with two large street reconstruction projects in the Spring of 2017:
    - E Kalamazoo Street Reconstruction
    - 2016 ICE Grant
- Coordination with other planned projects to achieve economies of scale or limiting disruption (an example is a street reconstruction project where identified utility recommendations can be included)

The 5-Year CIP must also consider project cost when assigned to a CIP year to balance capital requirements with generated utility revenues. The recommended 5-Year Capital Improvement Plan for the wastewater collection system is included in Table 4 below. The 5-Year CIP for the WWTF and pump stations is included in Table 5 below.

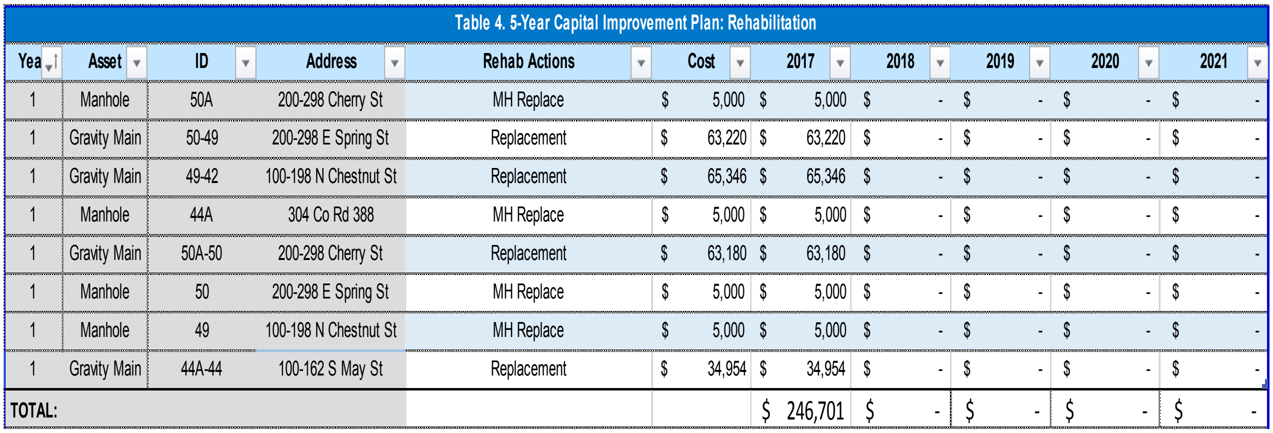


Table 4. 5-Year Capital Improvement Plan: Rehabilitation

Yea	Asset	ID	Address	Rehab Actions	Cost	2017	2018	2019	2020	2021
1	Manhole	50A	200-298 Cherry St	MH Replace	$ 5,000	$ 5,000	$ -	$ -	$ -	$ -
1	Gravity Main	50-49	200-298 E Spring St	Replacement	$ 63,220	$ 63,220	$ -	$ -	$ -	$ -
1	Gravity Main	49-42	100-198 N Chestnut St	Replacement	$ 65,346	$ 65,346	$ -	$ -	$ -	$ -
1	Manhole	44A	304 Co Rd 388	MH Replace	$ 5,000	$ 5,000	$ -	$ -	$ -	$ -
1	Gravity Main	50A-50	200-298 Cherry St	Replacement	$ 63,180	$ 63,180	$ -	$ -	$ -	$ -
1	Manhole	50	200-298 E Spring St	MH Replace	$ 5,000	$ 5,000	$ -	$ -	$ -	$ -
1	Manhole	49	100-198 N Chestnut St	MH Replace	$ 5,000	$ 5,000	$ -	$ -	$ -	$ -
1	Gravity Main	44A-44	100-162 S May St	Replacement	$ 34,954	$ 34,954	$ -	$ -	$ -	$ -
TOTAL:						$ 246,701	$ -	$ -	$ -	$ -

TABLE 4

Table 5. Recommended Capital Improvements for WWTF and Lift Stations					
Asset Description	**Year Installed**	**Expected Useful Life (Years)**	**Anticipated Year of Replacement**	**Replacement Cost (2017 Dollars)**	**Replacement Cost (Inflated 3%/yr.)**
5-YEAR CIP PROJECTS					
Walnut and Chestnut Station Pump No. 1	2005	15	2020	$10,500	$11,800
Walnut and Chestnut Station Pump No. 2	2005	15	2020	$10,500	$11,800
Van Buren Street Station Pump No. 1	2005	15	2020	$6,500	$7,300
Van Buren Street Station Pump No. 2	2005	15	2020	$6,500	$7,300

TABLE 5

OPERATIONS, MAINTENANCE AND REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system. A short-term maintenance plan has been developed for the Villages collection system which includes additional CCTV inspection and manhole cleaning and condition assessment.

An annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by WWTF staff without bringing in an outside contractor. Existing disposable materials include chemicals, wear parts in pumps and motors, laboratory instruments, etc. The existing OM&R fund is sufficient for the current operations.

REVENUE STRUCTURE (MINIMUM LIFE CYCLE COSTS)

The MDEQ requires that a rate study be performed to assure that there is sufficient revenue to cover current operation, maintenance and replacement costs of the wastewater utility. For the Village of Bloomingdale, the rate study report was prepared by the Village and submitted on October 21, 2016. It was subsequently approved by the MDEQ on November 16, 2016 showing that no revenue gap exists for current utility operations.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 2·21·2017
(no later than 3 years from executed grant date)

The VILLAGE OF BLOOMINGDALE *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1619-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: November 16, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: N/A.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on N/A.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Tom Rock at 269-521-3222 EXT 3
Name Phone Number Email bdalepres@btc-bci.Comm

Tom R Rock 4/27/17
Signature of Authorized Representative (Original Signature Required) Date

TOM ROCK - VILLAGE PRESIDENT
Print Name and Title of Authorized Representative

April 2017

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Stormwater Executive Summary Report

Prepared for:

Village of Bloomingdale

SAW Project No. 1619-01

FINAL
May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

1.0 EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In 2014, The Village of Bloomingdale received a SAW Grant from the Michigan Department of Environmental Quality (MDEQ) to provide financial assistance for the development of this Asset Management Plan (AMP). This report provides the Asset Management Plan (AMP) for the Village's stormwater collection system. Working with Village staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the stormwater collection system.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The Village of Bloomingdale has executed the "Certification of Project Completeness" for the storm water asset management plan and a copy has been provided at the end of this Executive Summary.

The contact person for the Village of Bloomingdale AMP is:

Mr. Tom Rock, Village President
109 East Kalamazoo Street
Bloomingdale, MI 49026-0236
Phone Number: 269-521-3222 ext. 3
e-mail: bdalepres@btc-bci.com.

ASSET INVENTORY AND CONDITION ASSESSMENT

A list of the major assets in the Village's wastewater system, described below, include:

- Storm water collection system piping and manholes.
- Catch basin and inlet structures and pipe outfalls to open drainage courses.

The stormwater collection system assets consist of 19,078 feet (3.61 miles) of storm sewers, 202 structures including 15 outfalls. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

ASSET IDENTIFICATION AND LOCATION

Bloomingdale is located in a low wet area. Storm water management is critical to keep water out of residents' basements and mitigate road flooding.

A comprehensive stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits; supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the collection system. This information was organized into a new, or updated (GIS) database and piping network for archiving, mapping and further evaluation purposes.

The purchase of GIS/GPS equipment provided with the SAW grant program will greatly enhance the Village's ability to physically locate defects in storm water system assets

CONDITION ASSESSMENT AND EXPECTED USEFUL LIFE

For the Village of Bloomingdale, a comprehensive evaluation of the collection system was performed. NASSCO-MACP structure field based assessments were completed on 171 of 202 structures (85%). Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on 19% of the gravity pipe. Based on discussions with the stormwater system operations staff, there have not been any known capacity issues with the Village-owned stormwater system. For this reason, a capacity analysis was not completed for the Village of Bloomingdale.

The assets of the storm water collection system are in fair to good shape. Recommendations for short-term (1-5 year) and long term (6-20 year) rehabilitation have identified the need for continued maintenance - 51% of the system was tagged for maintenance inspection and/or cleaning. Rehabilitation accounted for 20% of the of the collection system were identified including point repairs and some CIPP lining. The remaining assets (29%) were identified for rehabilitation in the future, beyond 5 years.

The Village of Bloomingdale maintains an active operations and maintenance program for its storm water utility and has proactively performed rehabilitation by CIPP lining several segments of critical collection system piping. During this asset evaluation, the following defects were found and repaired:

- Repairs due to a gas line which was found to have penetrated a storm line at Kalamazoo /Pine.
- Repair due to a large rod which had penetrated a storm line near the Post Office on Chestnut.
- CIPP lining in 2015 of pipeline deterioration found on Spring between Cherry & Chestnut.

LEVEL OF SERVICE

DEFINING THE EXPECTED LEVEL OF SERVICE (LOS)

Level of Service (LOS) defines the way in which the Village stakeholders want the storm water system to perform over the long term and is an MDEQ required component of an AMP. The LOS can include any technical, managerial, or financial components the Village wishes, if all regulatory requirements are met. Throughout the development of this AMP, F&V worked with the Village of Bloomingdale staff to develop the following LOS statement and goals. The Village provides sewer water service to approximately 98% of her residences, a School, and a fruit processing plant outside of the Village limits.

STORMWATER - LEVEL OF SERVICE STATEMENT

To provide appropriate stormwater collection, diversion, and conveyance at a minimum cost, consistent with applicable environmental regulations. To achieve this the following Level of Service (LOS) goals are proposed for the Village of Bloomingdale:

- *Provide adequate stormwater collection and conveyance capacity for all service areas*
- *Actively maintain stormwater collection and conveyance system assets in reliable working condition.*
- *Provide rapid and effective emergency response services to customers.*
- *Maintenance and operations staff are to be properly trained.*

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village of Bloomingdale from time to time to make sure they accurately reflect the desired operation of the storm water system.

MEASURING PERFORMANCE

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score X Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

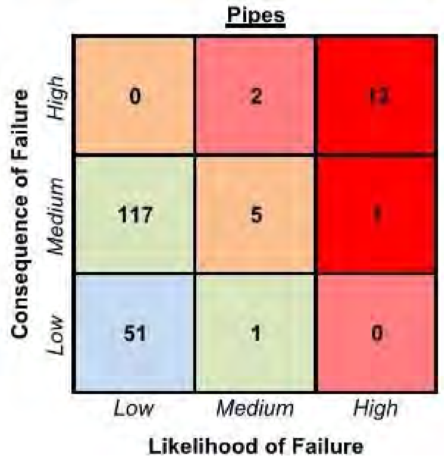
Consequence of Failure (CoF) is a measure of the social, economic or environmental impact of failure of an asset and on the utility's ability to convey stormwater. CoF categories of the stormwater collection system include:

- Location of asset
- Facilities served by asset
- Size

CRITICALITY RESULTS

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. 13 pipe segments in the stormwater collection system have an extreme risk rating and are recommended to be for near-term rehabilitation or replacement.

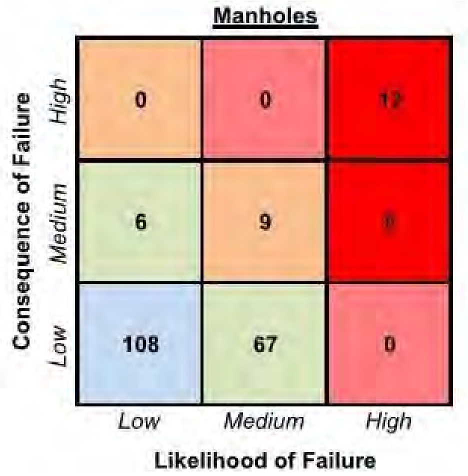


Pipes

Consequence of Failure	Low	Medium	High
High	0	2	12
Medium	117	5	1
Low	51	1	0

Figure 1: Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

Figure 2 provides the risk rating for the storm sewer structures. 12 structures are identified as extreme risk, and are recommended for replacement or rehabilitation.



Manholes

Consequence of Failure	Low	Medium	High
High	0	0	12
Medium	6	9	0
Low	108	67	0
	Likelihood of Failure		

Figure 2: Business Risk Matrix (Risk Rating) by Number of Structures

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan with recommendations was prepared for the Village's storm water assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short Term 1-5 year and Long Term 6-20-year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system.

CIP DEVELOPMENT

The Village of Bloomingdale identifies assets of $5,000 or more to be capital expenditures. Collection System assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2017 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The CIP was developed by assigning each project to a CIP year (1-5) based on several factors. In addition to Risk Rating, other factors used to assign CIP year include:

- Asset rehabilitation grouping (i.e. the type of repair/construction recommended)
- Coordination with two large street reconstruction projects in the Spring of 2017:
    - E Kalamazoo Street Reconstruction
    - 2016 ICE Grant
- Coordination with other planned projects to achieve economies of scale or limiting disruption (an example is a street reconstruction project where identified utility recommendations can be included)

The Village has been actively setting aside funds for storm sewer repairs. The Village recently contracted in excess of $150,000 on cured-in-place lining to repair underground storm piping. The Village will preplan storm drain improvements and incorporate those improvements into street projects instead of cutting into streets and patching them.

The recommended 5-Year Capital Improvement Plan for the Village-owned storm water collection system is included in Table 4 below.

Table 4: 5-Year Capital Improvement Plan: Village Rehabilitation

Rehab Action	Total Cost	Year 1	Year 2	Year 3	Year 4	Year 5
MH Replace	$ 35,000	$ 35,000	$ -	$ -	$ -	$ -
Storm Sewer Replacement	$ 117,901	$ 48,949	$ -	$ -	$ -	$ 68,952
Total	**$ 152,901**	**$ 83,949**	**$ -**	**$ -**	**$ -**	**$ 68,952**

OPERATIONS AND MAINTENANCE

A preventative maintenance program to systematically clean and CCTV inspect pipelines to NASSCO-certified standards is critical for a sound stormwater system. The process of cleaning and CCTV inspection of pipelines either with equipment owned by the community or contracted is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. For this reason, it is recommended that at a minimum, all pipelines be cleaned and televised every five years, or that 20% of the system be cleaned and televised annually. Available budget will dictate the frequency or size of yearly projects. The 5-year CIP maintenance total is $62,909 for the Village-owned stormwater system.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date FEBRUARY 21, 2017
(no later than 3 years from executed grant date)

The VILLAGE OF BLOOMINGDALE *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1619-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Tom R. Rock at 269-521-3222 Ext. 3 bdalepres@btc-bci.com
Name Phone Number Email

Tom R Rock 5/16/17
Signature of Authorized Representative (Original Signature Required) Date

Tom R. Rock Village President
Print Name and Title of Authorized Representative

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The Board of County Road Commissioners, County of Ottawa, MI *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1492-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: November 9, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Patrick J. Staskiewicz, P. E. at 616-850-7208 pstaskiewicz@ottawaocrc.com
Name Phone Number Email

Patrick J. Staskiewicz 5/31/17
Signature of Authorized Representative (Original Signature Required) Date

Patrick J. Staskiewicz, P.E., Public Utilities Director, Ottawa County Road Commission
Print Name and Title of Authorized Representative

April 2017

Prein&Newhof
Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

Memorandum

Date:	May 31, 2017
To:	Ms. Jaclyn Merchant
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130422
Re:	Board of County Road Commissioners, Ottawa County, SAW Grant Summary of Wastewater Asset Management Plan for West Central Ottawa Waste Water System

This memorandum provides the summary of Ottawa County Road Commission's SAW grant activities required under Section 603 of Public Act 84 of 2015. This SAW grant is for the West Central Ottawa Waste Water System. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

SAW Grant Project Number: 1492-01

Grantee:
Board of County Road Commissioners, County of Ottawa
14110 Lakeshore Drive
Grand Haven, MI 49417
www.ottawacorc.com

Contact: Mr. Patrick J. Staskiewicz, Public Utilities Director, Ottawa County Road Commission

Phone: 616-850-7208

Executive Summary

The Ottawa County road Commission (OCRC) received a SAW Grant in 2014 to prepare a Waste Water Asset Management Plan. The Grant agreement indicated the following amounts:

Project Cost	Grant Amount	Local Match
$312,961	$281,665	$31,296

The Key components in the Asset Management Plan include:

1. Asset Inventory and Condition Assessment
2. Level of Service
3. Criticality of Assets
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

Asset Inventory

"Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets."

All assets that are functionally or financially significant to the waste water system have been inventoried.

- Collection system manholes were located using survey quality GPS.
- Lift stations and buildings were located using hand held GPS equipment.
- Fixed assets within the waste water treatment plant (WWTP) were mapped based on plant schematic and record drawings.

Manhole, gravity sewer main, force main, and lift station locations were plotted in a Geographic Information System (GIS) using record drawings. Manhole, lift station and waste water treatment plant locations were field verified and locations adjusted with Global Positioning System (GPS) coordinates.

Data regarding date of installation, material, and other physical characteristics for each asset is incorporated into the GIS geodatabase. Location of non-pipe assets such as lift station components, WWTP components, building components, and other equipment is compiled in a package of inventory spreadsheets tied to the GIS database.

The GIS and asset spreadsheets will all be used to maintain asset data in the future.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

Gravity Sewer Mains: Because the West Central Ottawa waste water system is fairly new, screening inspections only were made to evaluate conditions. These were made using either a pole mounted zoom camera (looking up or down each pipe from the manholes approximately 50 to 100 feet depending on field conditions). Pipes inspected with zoom camera methods were rated considering any observable roots, deposits, joint conditions, pipe wall condition, infiltration, or other defect observations. Composite Risk of Failure ratings of 1-5 were derived for each pipe.

Percentage of gravity sewer pipes in each rating category

1	2	3	4	5
66%	30%	4%	0%	0%

Force Mains: Force main conditions were estimated using pipe age, material, and break history records. West Central Ottawa's force mains do not have any break history and their materials are relatively new.

Percentage of force main pipes in each rating category

1	2	3	4	5
0%	100%	0%	0%	0%

Manholes: Manholes were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, structures, and infiltration.

Percentage of manholes in each rating category

1	2	3	4	5
98%	2%	0%	0%	0%

Lift Stations: Visual inspection and performance testing were completed to evaluate asset condition. Lift station assets, including pumps, valves, piping, structures, electrical, controls, and other assets, were rated on a scale of 1-5. Composite ratings for the station as a whole were developed.

Number of lift stations in each rating category

1	2	3	4	5
0	0	25%	50%	25%

Wastewater Treatment Plant (WWTP): Equipment within the WWTP were rated on a scale of 1-5 based on factors relating to physical condition and operating condition and major asset classes including structural, electrical, mechanical systems. Generally, the WWTP is operating adequately but there are certain processes that need rehabilitation. A summary of the ratings for the treatment plant assets is as follows:

Number of WWTP processes in each rating category

1	2	3	4	5
6%	23%	53%	12%	6%

Level of Service Determination

"Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined."

The OCRC recognizes that the people served by the system are more than customers, they are the system owners. OCRC staff and system operators act as stewards of the system. The OCRC works with the townships and major customers served by the system.

The Public Utilities staff meet regularly with the Board of County Road Commissioners and the Board has been informed of the AMP. The results of the condition assessments were discussed along with the costs for various operation and maintenance strategies affecting the levels of service and the potential rate impacts.

The Board will decide in the future how to engage additional stakeholders as they move forward with plans to make system improvements.

Based on this review, the following general level of service goals have been defined.

1. *Meet Regulatory Requirements*
2. *Minimize Service Interruptions*
3. *Minimize Public Hazards*
4. *Manage Storm Water Inflow and Ground Water Infiltration*
5. *Provide Capacity for Community Growth*
6. *Minimize Life Cycle Costs*

More details are provided in the AMP.

Criticality of Assets

"Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?"

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions as determined through condition assessments. Assets were given a Consequence of Failure (CoF) rating of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, the surrounding property and the environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- *Provide service to a significant portion of the system*
- *Serve schools/hospitals/major industry/County jail and admin. complex*
- *Are under major roads or are adjacent to other major utilities*
- *Are adjacent to waterways or significant wetlands*

Criticality ratings were calculated as the product of an asset's RoF and CoF, producing criticality ratings ranging from 1-25 (25 being the most critical). The most critical assets were found to be force mains, lift stations, and certain treatment plant processes.

Revenue Structure

"Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a "Test Year" was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.

The customer base was reviewed, including the number of residential equivalent units in our system. Other operating and non-operating revenues were also evaluated. Prediction of customer connections was made including trending in system utilization, projection of operating costs, and anticipated inflation by expense category.

A forecasting system was developed and used to identify the estimated replacement investment for the remaining lifecycle of all assets, based on the asset inventory and condition assessment data. Project costs were estimated for capital improvements within the first ten years. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. The OCRC expects the income from rates will be adequate to cover the system costs, using a combination of cash and debt financing to fund capital projects.

Capital Improvement Plan

"Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects."

A capital improvement plan showing project descriptions, cost estimates, and project timelines, was developed for the capital improvements needed within a ten year planning period. The projects identified in the CIP are:

Planned Year (1)	**Category**	**Project Title**	**Total Est. Cost**
2018	WWTP	Pretreatment Improvements	$795,000 (2)
2018	WWTP	Waste Activated Sludge Pump Replacement	$ 87,000 (2)
2018	WWTP	Decant Lift Station Replacement	$212,500 (2)
2018	WWTP	Clarifier No. 1 Improvements	$219,000 (2)
2018	WWTP	Return Activated Sludge Pump Replacement	$85,000 (2)
2023	Lift Station	2nd Ave Lift Station Improvements	$181,500 (2)
2023	Lift Station	136th Ave Lift Station Improvements	$181,500 (2)
2023	Lift Station	Fillmore Complex Lift Station Improvements	$30,000 (2)

Notes:

(1) Unplanned repairs may necessitate adjustments in priority.

(2) All costs estimated in 2017 dollars and include engineering, contingency and legal allowance.

List of Major Assets

"Provide a general list of the major assets identified in the AMP."

The major assets in the West Central Ottawa Waste Water System major assets include:

- *4 lift stations*
- *22,187 feet (4.2 miles) of 8" to 12" diameter gravity sewer*
- *68,328 feet (8.7 miles) of 6" to 12" diameter force main*
- *92 manholes*
- *Waste Water Treatment Plant with groundwater discharge, 0.14 million gallon per day capacity. 0.30 million gallon per day maximum capacity*

Deliverables/Reports Prepared

Information and reports prepared and provided under this grant include:

1. *GIS mapping and database and Arc Reader Files*
2. *Asset management pipe spreadsheet*
3. *Asset management non-pipe spreadsheet*
4. *Sewer Flow Study – Wastewater Collection System Capacity Analysis and Inflow/Infiltration Analysis*
5. *Wastewater System Evaluation*
6. *Wastewater Treatment Plant Capacity Analysis*
7. *Capital Improvement Plan (including Financial Analysis)*
8. *Waste Water Asset Management Plan*

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Collection System

Prepared for:

Village of Breckenridge

SAW Project No. 1031-01

104 E. Saginaw St., Breckenridge, MI 48615
www.breckenridgemi.com
Jeff Ostrander – Village Manager
989-842-3109

FINAL - May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for the Storm water, Asset Management, and Wastewater (SAW) Grant Program. In May 2014, the Village of Breckenridge received a (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1031-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Village's publicly owned wastewater utility. The assets that comprise the utility include collection system piping and manholes, lift station/pump stations and force mains.

The SAW Grant amount awarded for the wastewater AMP to the Village was $616,347.00
There was no local match because the Village was determined to be disadvantaged.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

Questions regarding the Asset Management Plan should be directed to:
Jeff Ostrander – Village Manager
Village of Breckenridge
104 E. Saginaw St., Breckenridge, MI 48615
Web Site: www.breckenridgemi.com
989-842-3109

ASSET INVENTORY AND CONDITION ASSESSMENT

The wastewater collection system assets consist of approximately:

- Gravity Sewer (8 inch thru 12 Inch): 39,000 feet (7.4 miles)
- Force Main (4 inch thru 10 inch): 12,500 feet (2.3 miles)
- Manhole Structures: 147
- Sewer Lift Stations (Vertical Suction): 4 Each
- Sewer Lift Station (Submersible): 1 Each
- Wastewater Stabilization Lagoons (20 Acres)

These assets are located in existing street rights-of-way, in easements or property owned or dedicated for the assets use and maintenance.

The Wastewater Stabilization Lagoons for the treatment of wastewater is owned and operated by the Village.

Asset Identification and Location

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals, which included a review of the existing record drawings, field notes, staff knowledge, site visits and supplemented with field survey work.

Asset material, size and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data.

Asset inventory was completed on the 5 lift stations within the system.

Asset Inventory was completed on the Wastewater Stabilization Lagoons

Spatial orientation (pipe location), pipe depth and invert elevations were determined through survey grade GPS equipment and a comprehensive evaluation of the gravity system.

This information was organized into a new (GIS) database and piping network for archiving, mapping and future evaluation purposes.

Condition Assessment and Expected Useful Life
A comprehensive evaluation of the collection system, lift stations and wastewater treatment stabilization lagoons was performed.

NASSCO-MACP Level 1 manhole field based assessments were completed on 140 manhole structures that were assessible. The manhole structure assets ranged from Fair to Excellent. There were seven manholes that were not accessible due to being buried or under pavement. The Village DPW will locate and raise these manholes as part of the short term capital improvements plan.

Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on the gravity pipe. The condition of the collection system assets ranged from Fair to Excellent. There were a multiple sections of gravity pipe where Infiltration was observed.

The Village field located over 40% of the sewer laterals using survey grade GPS equipment to identify the depth and physical locations.

The condition of the waste stabilization lagoon assets are in excellent condition. The Village recently completed a total reconstruction of the facility in 2013.

The Village is currently replacing 6,200 LF. of 10-inch diameter force main from the main lift station to the waste stabilization lagoons.

Capacity Analysis was modeled for average day and peak hour conditions in areas of concern.

Recommendations for short-term (1-5 year) and long term (6-20 year) system maintenance and improvements were identified. It is recommended to visual inspect the collection system on an annual basis and clean and televise sections found to be restricting flows.

The condition of the assets at the lift stations range from Excellent to Good. Ongoing maintenance has upheld the condition of many assets.

The Village is currently making improvements to Lift Station 3. Lift Station 1 & 2 were totally rebuilt in 2014. Lift Station 4 was built in 2013. Lift Station 5 was built in 2016.

The recommendations for short term and long term improvements are to continue to provide routine maintenance.

The Wastewater Stabilization Lagoons assets are in Excellent condition.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The overall objective of the Village of Breckenridge, as it relates to their wastewater system, is to adopt the following Level of Service (LOS) goals:

LEVEL OF SERVICE STATEMENT

The overall objective of the Village of Breckenridge is to provide reliable wastewater collection services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with local, state and federal regulations.
- Actively maintain collection system and treatment assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of the wastewater stabilization lagoons.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of the community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village annually to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

To assure that LOS goals are met, performance measurements may need to be implemented. During the LOS review with the community the need for performance measurements was discussed.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system and treatment facility include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning templates that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection system and treatment facility.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. Twenty pipe segments in the collection system have been identified with a high risk rating. These segments will be repaired as soon as funding can be obtained. Much of the collection system's gravity pipes, 66 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes in relatively good condition.

Figure 2 provides the risk rating for the collection system manholes. There were Fourteen manhole frames, castings and chimney's that have been identified as a high risk are in need of rehabilitation and replacement. This work will be scheduled over the next 5 years as funding becomes available. Much of the collection system's manholes, 66 percent as shown in Figure 2, have a low to negligible risk rating and are indicative of manholes in relatively good condition.

Figure 1. Business Risk Matrix (Risk Rating) by Number of Gravity and Force Main Pipes

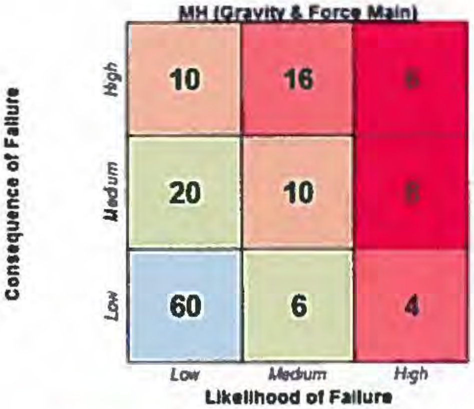
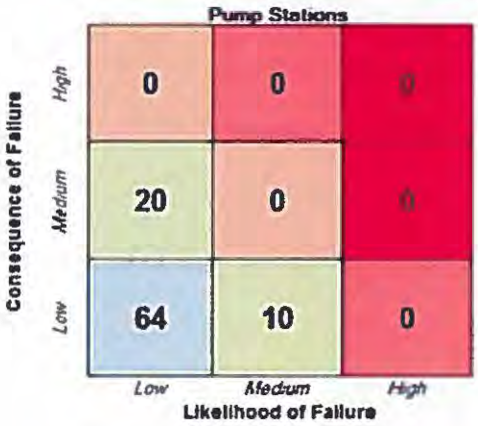


Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the lift station assets. The lift station assets are in good to excellent condition.



Consequence of Failure / Likelihood of Failure	Low	Medium	High
High	0	0	0
Medium	20	0	0
Low	64	10	0

Figure 3. Business Risk Matrix (Risk Rating) by Number of Lift Station Assets

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Village's wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system, treatment facility, pumping stations and force mains. From the BRE, a short-term (1-5 year) and long-term (6-20 year) CIP's were developed for the utility.

This AMP included a detailed condition assessment of the collection system including televising of pipe, and field condition assessments of all accessible sanitary manholes, treatment facility and lift stations.

Based on the AMP condition assessment of the sanitary sewer system, the Village has identified assets of the collection system, treatment facility, force mains and lift stations for improvement. The minor improvements can be completed with funding from the Village sewer reserve account. However, the major capital improvements will have to be completed thru Government bonding programs such as the MDEQ SAW Program for disadvantaged communities, USDA Rural Development or the State Revolving Loan Program.

(1-5 Year) Capital Improvements include:

- Raise and inspect the buried manhole structures.
- Repair segments of pipe where infiltration and pipe defects have been discovered.
- Reconstruct and Replace broken manhole frames and castings.
- Disconnect residential sump pumps from the wastewater collection system and connect to the storm drainage collection system.

(6-20 Year) Capital Improvements include:

- Continue to disconnect residential sump pumps from the wastewater collection system and connect to the storm drainage collection system.

OPERATIONS, MAINTENANCE AND REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system and treatment facilities. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the function of the collection system. By optimizing the performance, infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system and treatment facility.

An annual lift station equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds.

Existing disposable materials include, wear parts in pumps and motors, etc. The existing OM&R fund is sufficient for the current equipment and operations.

REVENUE STRUCTURE

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

The existing rates were determined to create sufficient funds to fulfill the day-to-day maintenance and operations of the entire sanitary collection system.

The MDEQ approved the Village's rate methodology on October 24, 2016.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date: May 31,2017
(no later than 3 years from executed grant date)

The **Village of Breckenridge** certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No.**1031-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant. Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No

   If No - Date of the rate methodology approval letter: October 24, 2016

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Jeff Ostrander, Village Manager	989-842-3109	manager@breckenridgemi.com
Name	Phone Number	Email

5·30·17

Signature of Authorized Representative (Original Signature Required) Date

Jeff Ostrander, Village Manager

Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Stormwater Collection Sytem

Prepared for:

Village of Breckenridge

SAW Project No. 1031-01

104 E. Saginaw St., Breckenridge, MI 48615
www.breckenridgemi.com
Jeff Ostrander – Village Manager
989-842-3109

FINAL - May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for the Storm water, Asset Management, and Stormwater (SAW) Grant Program. In May 2014, the Village of Breckenridge received a (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1031-01, to provide financial assistance for the development of a stormwater asset management plan (AMP) for the Village's publicly owned stormwater utility. The assets that comprise the utility include collection system piping, catch basins and manholes

The SAW Grant amount awarded for the stormwater AMP to the Village was $446,334
The Village 10% local match for the stormwater portion was $49,593

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

Questions regarding the Asset Management Plan should be directed to:
Jeff Ostrander – Village Manager
Village of Breckenridge
104 E. Saginaw St., Breckenridge, MI 48615
Web Site: www.breckenridgemi.com
989-842-3109

ASSET INVENTORY AND CONDITION ASSESSMENT

The stormwater collection system assets consist of approximately:

- Gravity Sewer (6 inch thru 24 Inch): 52,600 feet (9.9 miles)
- Manhole and Catch Basin Structures: 440

These assets are located in existing street rights-of-way, in easements or property owned or dedicated for the assets use and maintenance.

The stormwater from the Village discharges into drains owned and maintained by the Gratiot County Drain Commissioner.

Asset Identification and Location

A comprehensive stormwater system asset inventory was developed from operation and maintenance manuals, which included a review of the existing record drawings, field notes, staff knowledge, site visits and supplemented with field survey work.

Asset material, size and age were identified through the review of available historical record documents and limited Closed Circuit Televising (CCTV) data.

Spatial orientation (pipe location), pipe depth and invert elevations were determined through survey grade GPS equipment and a comprehensive evaluation of the gravity system.

This information was organized into a new (GIS) database and piping network for archiving, mapping and future evaluation purposes.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the stormwater collection system was performed.

NASSCO-MACP Level 1 manhole field based assessments were completed on 440 manhole structures. The condition of the manhole structures and catch basins ranged from Excellent to Poor.

Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on portions of the gravity pipe. The condition of the collection system assets ranged from Excellent to Fair.

Recommendations for short-term (1-5 year) and long term (6-20 year) system maintenance and improvements were identified. It is recommended to visual inspect the stormwater collection system on an annual basis and clean and televise sections found to be restricting flows.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The overall objective of the Village of Breckenridge, as it related to their stormwater system, is to adopt the following Level of Service (LOS) goals:

LEVEL OF SERVICE STATEMENT

The overall objective of the Village of Breckenridge is to provide reliable stormwater collection services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide an adequate collection system for all service areas.
- Comply with local, state and federal regulations.
- Actively maintain collection system assets in reliable working condition.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures to ensure sound financial management of the stormwater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village annually to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

To assure that LOS goals are met, performance measurements may need to be implemented. During the LOS review with the community the need for performance measurements was discussed.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the stormwater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat stormwater. CoF categories of the collection system and treatment facility include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning template that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection system and treatment facility.

Figure 1 provides the risk rating for gravity pipe by number of pipe segments. Much of the collection system's gravity pipes, 54 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes in relatively good condition. There are sections of storm sewers both main line and catch basin leads that are in the high risk range that will need to be replaced over time as funding becomes available.

Figure 2 provides the risk rating for the collection system manholes and catch basins. There are many manhole frames and castings that are in need of replacement. This work will be scheduled over the next 5 to 7 years. Much of the collection system's manholes, 54 percent as shown in Figure 2, have a low to negligible risk rating and are indicative of manholes in relatively good condition.

Figure 1. Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes and Catch Basins

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Village's stormwater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system. From the BRE, a short-term (1-5 year) and long-term (6-20 year) CIP's were developed for the utility.

This AMP included a detailed condition assessment of the collection system including the televising of pipe, and field condition assessments of all accessible stormwater manholes and catch basins.

Based on the AMP condition assessment of the stormwater system, the Village has identified assets of the collection system for improvement. These improvements can be completed with funding from the Village Street funds or thru bonding from USDA Rural Development or other public funding agencies.

(1-5 Year) Capital Improvements include:

- Rebuild or reconstruct 10 manhole and catch basin structures each year.
- Replace certain sections of storm sewer and catch basin leads each year.

(6-20 Year) Capital Improvements include:

- Continue to connect residential sump pumps to the storm sewer collection system.
- Replace certain sections of storm sewer and catch basin leads each year.

OPERATIONS, MAINTENANCE AND REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a stormwater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the performance of the stormwater collection system.

REVENUE STRUCTURE

The revenue for storm sewer improvements will come from the Village local and major street funds.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date: May 31, 2017
(no later than 3 years from executed grant date)

The **Village of Breckenridge** certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. **1031-01** have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Jeff Ostrander at_989-842-3109 Manager@breckenridgemi.com
Name Phone Number Email

5.30.17
Signature of Authorized Representative (Original Signature Required) Date

Print Name and Title of Authorized Representative

CITY OF CARSON CITY
SAW Grant Project No. 1080-01

EXECUTIVE SUMMARY

Prepared by: **SPICER GROUP, INC.**
1400 Zeeb Drive
St. John's MI, 48879

Owner: **CITY OF CARSON CITY**
123 E. Main Street
P.O Box 340
Carson City MI, 48811
(989) 584-3515
Jean Southward, City Administrator

On March 14, 2014, the City of Carson City entered into an agreement with the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The City received the follow grants:

Stormwater Asset Management Plan (WWAMP) – 90% Grant	***$278,261***
Stormwater Asset Management Plan (SWAMP) – 90% Grant	$330,803
Eligible Cost Subtotal	$609,064
LESS Local Match	($60,906)
Total Grant Amount	$548,158

The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; May 2017.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Level of Service Determination
- Critical Assets (Risk)
- Revenue Structure
- Capital Improvement Plan

Part 1: Storm Water Asset Inventory and Condition Assessment

For the City's storm water collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire City, and used the survey information to develop a comprehensive Geographic Information System (GIS) including all storm water assets (manholes, catch basins, culvert outlets, etc.). The GIS information is located on a new computer in the DPW office, and is a detailed "smart" mapping system with databases, using the ArcMap software by ESRI. This system can be accessed and updated in the field by DPW staff from new iPads supplied as part of the SAW grant project. From the GIS, as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspections, ownership information etc. can be accessed. This information can also be queried to provide specific lists and maps, and updated easily when future improvements are made.

The City owned and operated storm water collection system is approximately 7.5 miles in length and consists of storm sewer pipes ranging in diameter size from 4"- 48". The storm sewer pipes consist of mainline sewer, catch basin leads, and culverts. In addition, the City has approximately 574 structures consisting of manholes, catch basins, and outlets. The City's storm sewers discharge into several sewer systems owned by MDOT (M-57) and the County (Bollinger Drain) before ultimately discharging in Fish Creek which runs along the west City limits. Summary tables are listed below for city owned and operated structures and pipes.

Table ES-1: City-Owned Storm Water Pipes by Diameter and Material

Diameter	Number of Pipes	Percent	Length(ft)
4"	2	0.54%	35.41
6"	25	6.74%	2100.95
8"	10	2.70%	1649.19
10"	15	4.04%	1458.87
12"	210	56.60%	14699.91
15"	13	3.50%	2101.48
18"	29	7.82%	3849.51
21"	1	0.27%	24.45
24"	51	13.75%	8507.79
30"	1	0.27%	58.59
36"	13	3.50%	2160.05
48"	1	0.27%	51.32
TOTAL	371	100.00%	36697.52

Table ES-2: City-Owned Storm Water Structures by Type

Structure Type	Number
Catch Basin	370
Manhole	196
Outlet	8
TOTAL	574

Every pipe and structure owned and operated by the City could not be investigated/inventoried due to budget constraints. Emphasis was placed on performing condition assessments for the mainline sewers and mainline manholes. Catch basin structures and their associated leads (pipes) will be evaluated in the future.

Plummer's Environmental Services (PES) located in Byron Center, MI completed a cleaning and televising program of approximately 38% the City owned storm sewer pipes. PES also performed comprehensive inspection for all of the City's mainline storm water manholes. The NASSCO Manhole/Pipeline Assessment Certification Program (MACP/PACP) standards was used to identify and code defects, and apply standardized grading/scoring to provide overall condition ratings of the storm water assets.

Part 2: Level of Service (LOS)

The next phase of the AMP is a Level of Service determination. What level of storm water service does the City want to provide to its residents? How are projects going to be prioritized and included in the CIP? What cost is the City willing to endure to provide that level of service? These are all questions that were discussed as a part of the overall asset management plan. The City's Level of Service Statement/Goals are as follows:

> *The City of Carson City strives to maintain a basic storm water collection system that addresses the residents' wants and needs and upholds the local, State, and Federal regulatory requirements at a minimum cost to our residents.*

LOS - Basic Goals:

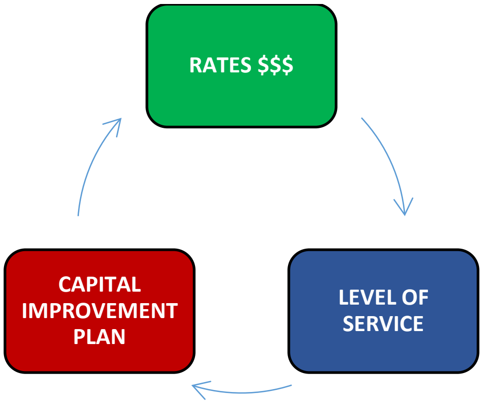
- Operate and maintain the storm water system to minimize flooding and property damage.
- Review the condition of storm water assets as a part of other infrastructure construction projects.
- Seek a funding source for operation & maintenance and repair/replacement of storm water assets.
- Review the maintenance and capital improvement plans/projects annually to determine the lowest cost options for our residents.

- Level of Service criteria includes the following categories:
  - "**MINIMUM**" Level of Service – Address resident complaints as they come in.
  - "**MEDIUM**" Level of Service – Point repairs to the existing system that have been identified. Mainly projects that the cleaning and televising crew had to abandon the inspection due to obstructions, collapses, holes etc.
  - "**HIGH**" Level of Service – Lining or replacement projects to be completed with other infrastructure improvement projects.

Generally, the "high" level of service projects will have a higher construction/initial cost, but would provide a better long-term or life cycle cost for the City. The "minimum" level of service projects address the immediate concerns that residents bring to the City's attention.

Typically, as a part of the asset management process, the City would go through an exercise to determine a desired Level of Service, select the capital improvement projects that are needed to achieve that Level of Service, then review how those projects effect the City's finances to determine if possible rate increases may be required. Below is a diagram of the process.

ES-3: Asset Management Plan Evaluation Process



Michigan has not created a climate which would allow municipalities to create either an enterprise fund or a utility fee system for storm water asset improvements. As such, funding is currently only available from the City's general fund. Act 51 monies received from the State for street/road improvements could also be used for storm water improvements that affect the street projects directly. However, Act 51 funding is limited.

Since there is no real funding mechanism for storm water assets, the City has been maintaining a *Minimum* Level of Service. This has resulted in a reactionary operation and maintenance practice. Until a funding mechanism for storm water improvements is found, the City is forced to continue this reactionary policy.

Part 3: Criticality (Risk)

For each asset in the City's storm water system, a criticality/risk analysis was performed to determine and prioritize the City's key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for every asset; including pipes, manholes, and drainage structures, etc. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on the economic, social, and environmental consequences. Finally, the Criticality (Risk) score was calculated using:

RISK = LoF x CoF

For the City's storm water collection system, there were 2 pipe locations and 1 structure location identified with a high CoF score along with 10 pipe locations and 12 structure locations with high LoF scores. These scores were evaluated and incorporated into the resulting Capital Improvement Plan.

Part 4: Revenue Structure

Spicer Group teamed with Burton & Associates/MWH-Hawksley Consulting/Stantec (Burton) for the revenue structure analysis for the AMP. The Capital Improvement Plan (CIP) projects were evaluated and allocated to various years of completion within the Stantec financial model, utilizing the City's General Funds. The financial review found that the City can be sustainably funded by the City's General Fund without outside resources and within the confines of the current millage rate and revenue.

Part 5: Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the storm water system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP. The resulting CIP plan includes the following projects:

1. Complete cleaning and televising activities for remaining sewers not performed in SAW.
2. Complete investigation and condition assessment for remaining structures not performed in SAW.
3. Replacement of sewer on Elm Street between Miner and Abbott ($165,000)
4. Replacement of sewer in Parking Lot Sewer on Division between Main and Elm ($160,000)
5. Replacement of sewer on Maple between Mercantile and Miner ($106,000)
6. Misc. Sewer Repairs, Root removals, Spot Liners Project for entire city ($114,000)
7. Misc. Sewer Cured in Place Lining (CIPP) Project ($161,000)

Conclusion

The City of Carson City's storm water system is a typical, aging municipal infrastructure system. Since there has been no funding mechanism for storm water assets, the City had been maintaining a Minimum Level of Service for its residents. Recent tax revenues from the DTE power plant have made it possible for the City to potentially undertake those projects identified in the CIP plan. At this time, the CIP projects have not been included into the current fiscal year budget, or forecasted in future FY's. The City will evaluate where these projects should be included during the next planning cycle.

In accordance with the SAW Grant requirements, the City's Storm Water Asset Management Plan (SWAMP) needs to be kept available for citizen review for 15 years. The SWAMP should be reviewed annually, and the components updated and included in the City's annual budget process.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date May 30, 2017
(no later than 3 years from executed grant date)

The City of Carson City*(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1080-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Jean Southward, City Administrator at 989-584-3515, jean.southward@carsoncitymi.com
Name Phone Number Email

Jean Southward 5-18-17
Signature of Authorized Representative (Original Signature Required) Date

Jean Southward, City Administrator
Print Name and Title of Authorized Representative

CITY OF CARSON CITY
SAW Grant Project No. 1080-01

EXECUTIVE SUMMARY

Prepared by: SPICER GROUP, INC.
1400 Zeeb Drive
St. John's MI, 48879

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Eligible Cost Subtotal	$609,064
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The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; May 2017.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Level of Service Determination
- Critical Assets (Risk)
- Revenue Structure
- Capital Improvement Plan

Wastewater Asset Inventory and Condition Assessment

The City's wastewater system consists of three main components: The collection system (pipes and manholes), a pumping facility, and the wastewater treatment facility (WWTF).

For the collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire City, and used the survey information to develop a comprehensive Geographic Information System (GIS). This GIS is located on a new computer in the City Hall office. It is considered a detailed "smart" mapping system with databases, utilizing the ArcGIS/Arc Online platform by ESRI (Environmental Systems Research Institute). This system can be accessed and updated in the field by DPW staff from new iPads supplied as part of the SAW grant project. From the GIS, as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV (closed circuit television) pipe inspections etc. can be accessed. This information can also be queried to provide specific lists and maps, and updated easily when future improvements are made.

The City has approximately 9.5 miles of sanitary sewer pipes ranging in size from 6"-18", and 178 manholes, serving a total of 520 customers. Plummer's Environmental Services (PES), located in Byron Center MI, completed a comprehensive cleaning and televising program of the sanitary sewer pipes, and

Spicer Group, Inc. completed a comprehensive inspection of the manholes using NASSCO (National Association of Sewer Service Companies) Manhole/Pipeline Assessment Certification Program (MACP/PACP) standards to identify and code the observations/defects. The MACP/PACP system is used to standardize the scoring and to quantify the condition of the wastewater assets.

The second main component of the City's wastewater system is the main pumping station, located at the intersection of S. West Street and W. Walnut Street. Spicer Group, Inc. completed an inspection and condition assessment for the station, and provided recommendations to the City for future improvements. Based on age, condition, and criticality/risk of this station, Spicer Group recommends that the station be replaced in its entirety.

The third main component of the City's wastewater system is the wastewater treatment facility (WWTF) located on Garlock Road between E. Boyer Road and Carson City Road (M-57). Spicer Group completed an inspection and assessment of the WWTF, and are recommending several improvements to the facility. The recommended improvement projects are that are included in the Capital Improvement Plan (CIP).

Level of Service (LOS)

The next phase of the AMP is a Level of Service determination. What level of service does the City want to provide to its wastewater customers? How are projects going to be prioritized and included in the CIP? What cost is the City willing to endure to provide that level of service? These are all questions that were discussed as a part of the overall asset management plan. The City's Level of Service Statement/Goals are as follows:

> *Carson City is committed to improving and maintaining the public health protection and performance of our wastewater system, while minimizing the long-term cost of operating those assets. We strive to make the most cost-effective renewal and replacement investments and provide the highest-quality customer service possible to ensure that residents and the public can continue to "Live, Work, Play, and Learn" in Carson City.*

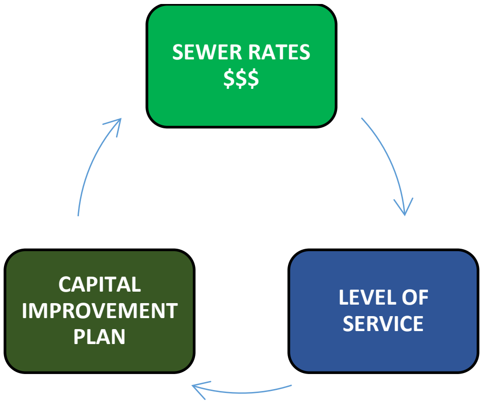
One of the basic goals is to review the capital improvement projects to determine the best value options for the City's customers based on life cycle costs and overall benefits to the community:

- "**MINIMUM**" Level of Service – Priority projects to meet the minimum local, State, and/or Federal regulations. Typically to be completed within the next 5 years.
- "**MEDIUM**" Level of Service – Projects that will need to be done eventually; typically when other infrastructure projects are happening or if monies become available eariler than anticipated.
- "**HIGH**" Level of Service – Projects that are forecasted long range, some of which the current asset may have a considerable amount of useful life. Some projects may be a "want" from the client, but not necessarily a "need."

Generally, the "high" level of service projects will have a higher construction/initial cost, but would provide a better long-term or life cycle cost for the City. The "minimum" level of service projects would have a lower initial cost, but would also have a shorter life span and higher overall life cycle costs.

As the AMP progressed, different scenarios were evaluated, to determine the City's desired Level of Service based on project costs, associated LOS, and the implication to current and future sewer rates.

Asset Management Plan Evaluation Process



The resulting capital improvement plan (CIP) and revenue structure was one that met the City's goals, addressed the improvements that needed to be made, and established a sustainable rate structure for the City's customers.

Criticality (Risk)

For each asset in the City's wastewater system, a criticality/risk analysis was performed to determine and prioritize the City's key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for every asset; including pipes, manholes, pumping station, and WWTF components. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on the economic, social, and environmental consequences, if that asset failed. Finally, the Criticality (Risk) score was calculated using:

RISK = LoF x CoF

For the collection system, there were 6 pipe locations identified with medium LoF scores, while the remaining pipes were in the low risk category. Risk scores for manholes were also determined. All risk scores were evaluated and incorporated into the resulting Capital Improvement Plan. For the main pump station, having a very high CoF score and LoF score, a recommendation was made to remove and replace the station. For the WWTF, electrical and instrumentation equipment for the lagoon transfer pump station had a calculated Risk score of 15, on the edge of Medium to High Risk. This equipment is beyond its service life and has a high consequence of failure. The Risk computed for all the lagoon berms, all of the lagoon structures, and all of the buried piping at the facility was a 10, on the border of Low to Medium Risk. This is mainly due to the high consequence of failure scores they received. The calculated Risk for all other assets at the plant were below 10 in the Low Risk zone. Capital improvement projects were established for these specific items and evaluated/prioritized by the City.

Revenue Structure

Spicer Group teamed with Burton & Associates/MWH-Hawksley Consulting/Stantec (Burton) for the revenue structure analysis for the AMP. Wastewater account balances, expenditures, revenues, etc. were reviewed and inputted into Burton's financial software to determine if there were any deficiencies in the rates. The City's current rate structure was found to have no deficiencies.

Next, the Capital Improvement Plan (CIP) projects were evaluated and allocated to various years of completion, and the rate structure to support those improvements was determined. Many iterations/scenarios were performed to come up with a rate structure that met the City's Level of Service goals, completed the CIP projects that are needed, and had sustainable rates for the City's customers. The result was a recommendation for an annual increase of 3% to the City's sanitary sewer rates. This should be reviewed annually as a part of the City's normal budgeting process.

Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the wastewater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP. Various degrees of Level of Service and the associated CIP projects were evaluated and plugged into the Revenue Structure model, and the resulting sewer rates for that set of scenarios were reviewed. If the projected rates were too high, a lower LOS was chosen and those CIP projects were plugged into the Revenue Structure model and the resulting rates were then reviewed. The process then continued with different CIP projects at varying LOS's until an acceptable rate structure, level of service, and capital improvement plan was developed.

A 5-year and 10-year CIP was developed that includes various collection system improvements including:

Collection System

- Sewer Rehabilitation ($480,000)
- Manhole repairs/replacements and lining ($130,000)

Pumping Station

- Replacement of main pump station. ($700,000)

WWTF

- Replacement of effluent flow meter ($50,000)

Operations and Maintenance

- Annual budget line item for $14,000, which includes:
    - Cleaning and televising the sewer system (5year cycle)
    - Evaluation of lagoon cell sludge depths
    - Maintenance and revision of the GIS system
    - Meter calibration for the WWTF, pump station, and lagoon effluent flow meter
    - Training and development of City staff

Conclusion

The City of Carson City's wastewater system is a typical, aging municipal infrastructure system. The DPW staff have completed routine operation and maintenance of the components, and the system is in relatively good shape. There are a few areas that need immediate attention (over the next 5 years), and there are many areas that can be monitored and left alone for years to come. A 3% annual rate increase is recommended to cover the planned operating expenses, capital improvement projects, and inflation for the next five years. This will need to be reviewed annually during the City's normal budgeting process.

In accordance with the SAW Grant requirements, the City's Wastewater Asset Management Plan (WWAMP) needs to be kept available for citizen review for 15 years. The WWAMP should be reviewed annually, and the components updated and included in the City's annual budget process.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 30, 2017
(no later than 3 years from executed grant date)

The City of Carson City *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1080-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: [✓ Yes] or No

   If No - Date of the rate methodology approval letter: ___________.

2) Significant Progress Made: [✓ Yes] or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: November 4, 2016.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on April 19, 2016.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Jean Southward, City Administrator at 989-584-3515, jean.southward@carsoncitymi.com
Name Phone Number Email

Jean Southward 5-15-17
Signature of Authorized Representative (Original Signature Required) Date

Jean Southward, City Administrator
Print Name and Title of Authorized Representative

Prein&Newhof
Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

Memorandum

Date:	May 30, 2017
To:	Ms. Izabel Hartman
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130593
Re:	City of Coopersville SAW Grant: Summary of Stormwater Asset Management Plan

Ms. Hartman:

This memorandum provides the summary of the City of Coopersville's SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

City of Coopersville SAW Grant

298 Danforth Street, Coopersville, MI 49404-1204

cityofcoopersville.com

Contact Information for the grantee:

Mr. Steven Patrick

Address: 298 Danforth Street, Coopersville, MI 49404-1204

Phone: 616-997-9731

Email: spatrick@cityofcoopersville.com

SAW Grant Project Number: 1470-01

Executive Summary

The City of Coopersville received a SAW Grant in 2014 to prepare a Storm Water Asset Management Plan. The Grant agreement indicated the following amounts:

Plan Cost	Grant Amount	Local Match
$396,012	$356,410.80	$39,601.20

The Key components in their Asset Management Plan include:

a. Asset Inventory and Condition Assessment
b. Level of Service
c. Criticality of Assets
d. Operation and Maintenance Strategies/Revenue Structure
e. Long-term Funding/Capital Improvement Plan

Asset Inventory

"Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets."

All assets that are functionally or financially significant to the storm water system have been inventoried.

- Collection system manholes, catch basins, and outlets were located using survey quality GPS.
- Detention basins and buildings were located using hand held GPS equipment.

Locations for all assets are recorded in a GIS. Data regarding date of installation, material, and other physical characteristics for each asset is incorporated into the GIS geodatabase.
Location of non-pipe assets such as building components and other equipment is compiled in a package of inventory spreadsheets. These assets were not mapped in GIS. The final stages of CMMS software selection will be finalized in the upcoming months.

The GIS, asset spreadsheets, and CMMS will all be used to maintain asset data in the future.

Condition Assessment

"Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category."

The condition of collection system piping was documented with either a pole mounted zoom camera (looking down each pipe from the manholes) or with in-line closed circuit television (CCTV) from manhole to manhole. The zoom camera method provided a very economical initial condition assessment of the pipes. Pipes noted to have potentially significant deficiencies were flagged and follow-up inspections were performed with full in-line CCTV.

Using the zoom camera data, pipes were rated based on several factors such as joint conditions, wall corrosion, and infiltration. Composite Risk of Failure ratings of 1-5 (5 being the worst) were assigned to each pipe segment.

Pipes inspected with CCTV were rated using the PACP system (Pipeline Assessment Certification Program). The PACP ratings were then used to derive a composite Risk of Failure rating of 1-5 for each pipe.

Percentage of pipes within each rating category

1	2	3	4	5
41%	39%	10%	3%	7%

Manholes, catch basins, outlets, culverts, and detention basins were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, and structures.

Percentage of manholes/catch basins within each rating category

1	2	3	4	5
79%	18%	3%	<1%	0%

Level of Service Determination

"Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined."

We recognize that the people served by our system are more than customers, they are the system owners. Our staff acts as stewards of the system. We presented SAW results at public meetings to present the results of our condition assessments, reviewed the costs for meeting various Levels of

Service with staff, and reviewed the budget impacts of those options. Based on the input received from staff, we have established the following Level of Service Goals:

1. Meet Regulatory Requirements
2. Minimize Flooding and Public Hazards
    a. Staff/equip crews sufficiently to perform specific routine maintenance items
    b. Perform regularly scheduled monitoring and maintenance on all of our storm water system assets
    c. Adopt a baseline 10-year 24 hour design storm
3. Manage Storm Water Inflow and Ground Water Infiltration
    a. Monitor I/I and implement CIP projects to meet EPA guidelines
4. Provide Capacity for Community Growth
5. Minimize Life Cycle Costs
6. Maintain Active Water Quality
7. Maintain a relationship with the Ottawa County Water Resources Commission involved with the local drain districts.

Criticality of Assets

"Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?"

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions. The factors considered varied by the asset type and were tailored to identify both physical and functional deficiencies. For example, pipe ratings considered factors such as joint offsets and structural cracking while detention basin ratings considered factors such as sediment accumulation and remaining working volume.

Assets were given a Consequence of Failure (CoF) of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Serve school /major industry
- Are under major roads

- Are adjacent to waterways or significant wetlands

Consequence of Failure and Criticality should not be confused. Criticality is the product of as asset's Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset's action priority.

Criticality ratings were calculated and ranged from 1-25 (25 being the highest priority). We then ran a Jenks Optimization to create 5 primary groupings, each with a rank of 1-5 (5 being highest priority). The final Criticality ratings were considered when the comprehensive Capital Improvement Plan was generated.

Revenue Structure

"Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

The CIP provided refined cost projections for the first 10 years of the financial analysis. The Asset Management System identified the estimated asset investment cost by year for the remaining lifecycle of all assets. The annual investment cost was evaluated and demands on the Cities' General Fund were reviewed.

Based on that analysis, the CIP was adjusted and funding allocations in the General Fund were adjusted so that both O&M activities and CIP actions could be funded. Public meetings were held to convey the results of the asset evaluation (RoF and Criticality) along with the financial evaluation. We are moving forward with the budget adjustments required to provide our desired Level of Service.

Capital Improvement Plan

"Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects."

Once assets RoF ratings were assigned and actions prioritized using the Criticality ratings, action timelines were predicted for maintenance/repair/replacement. Because the storm water collection system assets share physical space with other asset systems such as waste water, roadway, and drinking water, it was imperative that the CIP process coordinated actions on these systems.

Scope of work and action timelines for the other asset systems were incorporated based on:

- Waste Water – based on Asset Management Plan work as part of SAW
- Roadway - based on roadway PASER (Pavement Surface Evaluation and Rating) evaluations
- Drinking Water – based on the Water Reliability Study.

Individual project scopes for the comprehensive CIP were created to maximize coordination of work on various assets and minimize overall costs. The CIP projects include improvements to the storm water system , waste water system (collection and treatment), drinking water system (distribution and treatment), and road system. The CIP costs were incorporated into the revenue structure review. A 10-year CIP document was created which will be available to the public once the final rate structure has been adopted.

The projects identified in the CIP are:

- **East Street and Campus Drive Storm Sewer**
- **Danforth at Mill Storm Sewer**
- **Storm Sewer Point Repair**
- **Mechanic Street Improvements**
- **Grove/Pine/Church Street Improvements**
- **Spring Street Improvements**
- **Harrison Street Strom Sewer Repair**
- **Detention Pond 3 Spillway Repair**

List of Major Assets

"Provide a general list of the major assets identified in the AMP"

City of Coopersville's major assets include:

- 114,045 feet of gravity sewer
- 1,096 feet of Storm Culvert
- 309 storm manholes
- 787 storm catch basins
- 5 detention basins
- 40 storm water outlets

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date **May 31, 2017**
(no later than 3 years from executed grant date)

The City of Coopersville *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1470-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Steven Patrick	at (616) 997-9731	spatrick@cityofcoopersville.com
Name	Phone Number	Email

	5-23-17
Signature of Authorized Representative (Original Signature Required)	Date

Steven Patrick, City Manager
Print Name and Title of Authorized Representative

Prein&Newhof
Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

Memorandum

Date: May 30, 2017
To: Ms. Izabel Hartman
Company: Michigan Department of Environmental Quality
From: Prein&Newhof
Project #: 2130593
Re: City of Coopersville SAW Grant: Summary of Wastewater Asset Management Plan

Ms. Hartman:

This memorandum provides the summary of the City of Coopersville's SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

City of Coopersville SAW Grant

298 Danforth Street Coopersville, MI 49404-1204

cityofcoopersville.com

Contact Information for the grantee:

Mr. Steven Patrick

Address: 298 Danforth Street Coopersville, MI 49404-1204

Phone: 616-997-9731

Email: spatrick@cityofcoopersville.com

SAW Grant Project Number: 1470-01

Executive Summary

The City of Coopersville received a SAW Grant in 2014 to prepare a Waste Water Asset Management Plan. The Grant agreement indicated the following amounts:

Plan Cost	Grant Amount	Local Match
$641,818	$577,636	$64,182

The Key components in their Asset Management Plan include:

a. Asset Inventory and Condition Assessment
b. Level of Service
c. Criticality of Assets
d. Operation and Maintenance Strategies/Revenue Structure
e. Long-term Funding/Capital Improvement Plan

Asset Inventory

“Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.”

All assets that are functionally or financially significant to the waste water system have been inventoried.

- Collection system manholes were located using primarily survey quality GPS with some use of handheld GPS, and field witnessing.
- Lift stations were located using survey quality GPS.
- Fixed assets within the waste water treatment plant (WWTP) were mapped based on plant schematic and record drawings.

Locations for assets that have fixed geographic locations such as pipes, manholes, buildings, and major fixed equipment are recorded in a GIS. Data regarding date of installation, material, and other physical characteristics for each asset is incorporated into the GIS geodatabase.

Location of non-pipe assets such as lift station components, WWTP components, building components, and other equipment is compiled in a package of inventory spreadsheets and CMMS database. These assets were not mapped in GIS. CMMS software options in the final stages of selection.

The GIS, asset spreadsheets, and CMMS will all be used to maintain asset data in the future.

Condition Assessment

“Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.”

The condition of collection system piping was documented with either a pole mounted zoom camera (looking down each pipe from the manholes) or with in-line closed circuit television (CCTV) from manhole to manhole. The zoom camera method provided a very economical initial condition assessment of the pipes. Pipes noted to have potentially significant deficiencies were flagged and follow-up inspections were performed with full in-line CCTV.

Using the zoom camera data, pipes were rated based on several factors such as joint conditions, wall corrosion, and infiltration. Composite Risk of Failure ratings of 1-5 (5 being the worst) were assigned to each pipe segment.

Pipes inspected with CCTV were rated using the PACP system (Pipeline Assessment Certification Program). The PACP ratings were then used to derive a composite Risk of Failure rating of 1-5 for each pipe. Force main conditions were estimated using pipe age, material, and break history records.

Percentage of pipes within each rating category

1	2	3	4	5
36%	50%	7%	5%	2%

Manholes were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, and structures.

Percentage of manholes within each rating category

1	2	3	4	5
64%	29%	6%	1%	<1%

Visual inspection and performance testing of lift stations were completed to evaluate asset condition. Lift station assets, including pumps, valves, piping, structures, electrical, controls, and other assets were rated on a scale of 1-5. Generally the East Street and Main lift stations are currently in good condition with some minor structure repairs needed. The East Street Lift Station was indicated as in need of replacement with some mechanical work needed at the Main Lift Station. Grinder Pumps were identified as in need of upgrades.

Percentage of Lift Stations within each rating category

1	2	3	4	5
0%	29%	0%	71%	0%

Equipment within the WWTP was rated on a scale of 1-5 based on factors relating to physical condition and operating condition. Composite ratings for each station as a whole were developed. Generally the WWTP equipment is currently in good condition with some minor structure repairs needed

Percentage of WWTP Asset Components within each rating category

1	2	3	4	5
10%	30%	50%	0%	10%

Level of Service Determination

"Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined."

We recognize that the people served by our system are more than customers, they are the system owners. Our staff act as stewards of the system. We have held a series of public to present the results of our condition assessments, review the costs for meeting various Levels of Service, and reviewed the rate impacts of those options. Based on the input received during those meetings, we have established the following Level of Service Goals:

1. Meet Regulatory Requirements
    a. Maintain a specified number of Certified Operators
    b. Maintain our in-house testing abilities
    c. Continue our Industrial Pretreatment Program
2. Minimize Service Interruptions
    a. Staff/equip crews sufficiently to perform specific routine maintenance items
    b. Repair/replace assets as required to limit emergency responses to 10 per year

3. Minimize Public Hazards
    a. Staff/equip emergency response services for 24 hour per day service and 60 minute response times
    b. Limit service interruptions to less than 6 hours
4. Manage Storm Water Inflow and Ground Water Infiltration
    a. Monitor I/I and implement CIP projects to meet EPA guidelines
5. Provide Capacity for Community Growth
6. Minimize Life Cycle Costs

Criticality of Assets

"Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?"

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions. The factors considered varied by the asset type and were tailored to identify both physical and functional deficiencies. For example, pipe ratings considered factors such as joint offsets and structural cracking while lift station pumps considered factors such as design pumping rate vs actual pumping rate.

Assets were given a Consequence of Failure (CoF) of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Serve schools/major industry
- Are under major roads
- Are adjacent to waterways or significant wetlands

Consequence of Failure and Criticality should not be confused. Criticality is the product of as asset's Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset's action priority.

Criticality ratings were calculated and ranged from 1-25 (25 being the highest priority). The final Criticality ratings were considered when the comprehensive Capital Improvement Plan was generated.

Revenue Structure

"Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a "Test Year" was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.
The customer base was reviewed, including the number of billable customers and volumetric sales. Other operating and non-operating revenues were also evaluated. Prediction of customer and volume counts were made including trending in system utilization, projection of operating costs, and anticipated inflation by expense category. Refinancing and/or restructuring possibilities were also explored.

The CIP provided refined cost projections for the first 10 years of the financial analysis. The Asset Management System identified the estimated asset investment cost by year for the remaining lifecycle of all assets. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. Based on that analysis, rate adjustment options were identified. It was determined that the current rate structure was sufficient to cover O&M activities but increases were needed to fully implement the desired CIP. Public meetings were held to convey the results of the asset evaluation (RoF and Criticality) along with the financial evaluation. We are reviewing rate changes required to provide our desired Level of Service.

Capital Improvement Plan

"Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects."

Once assets RoF ratings were assigned and actions prioritized using the Criticality ratings, action timelines were predicted for maintenance/repair/replacement. Because the waste water collection system assets share physical space with other asset systems such as storm water, roadway, and drinking water, it was imperative that the CIP process coordinated actions on these systems.

Scope of work and action timelines for the other asset systems were incorporated based on:

- Storm Water – based on Asset Management Plan work as part of SAW
- Roadway - based on roadway PASER (Pavement Surface Evaluation and Rating) evaluations
- Drinking Water – based on the Water Reliability Study.

Individual project scopes for the comprehensive CIP were created to maximize coordination of work on various assets and minimize overall costs. The CIP projects include improvements to the waste water system (both collection and treatment), storm water system, drinking water distribution system, and road system. The CIP costs were incorporated into the revenue structure review. A 10-year CIP document was created which will be available to the public once the final rate structure has been adopted.

The projects identified in the CIP are:

- **Center Street and Cleveland Flush Station Improvements**
- **Sunset and Greenfield Sanitary Sewer and Street Improvements**
- **Sanitary Sewer Point Repairs, Manhole Improvements,**
- **Grove and East Street Sanitary Point Repairs**
- **WWTP Structure I&C Improvements**
- **East Street Lift Station Improvements**
- **Randall Street at Deer Creek Improvements**
- **Main Lift Station Mechanical Improvements**
- **Grinder Station Upgrades**
- **Deer Creek Trunkline Improvements**
- **West Randall Sanitary Improvements**
- **River Street Sanitary Improvements**

List of Major Assets

"Provide a general list of the major assets identified in the AMP"

City of Coopersville's major assets include:

- Waste Water Treatment Plant
- 7 lift stations
- 21 grinder stations
- 54,304 feet of sanitary force main
- 108,070 feet of gravity sanitary sewer
- 429 Sanitary Manholes

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date __**May 31, 2017**__
(no later than 3 years from executed grant date)

The City of Coopersville *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1470-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: ~~Yes~~ or **No**
   If No - Date of the rate methodology approval letter: October 11, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Steven Patrick	at (616) 997-9731	spatrick@cityofcoopersville.com
Name	Phone Number	Email

5-23-17
Signature of Authorized Representative (Original Signature Required) Date

Steven Patrick, City Manager
Print Name and Title of Authorized Representative

April 2017

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architecture • engineering

106 W. Allegan St. Suite 500
Lansing, MI 48933
O: 517.371.1200
www.c2ae.com

CITY OF DURAND STORMWATER ASSET MANAGEMENT PLAN
EXECUTIVE SUMMARY

City of Durand
215 West Clinton Street
Durand, MI 48429
City Manager, (989) 288-3113
SAW GRANT PROJECT NUMBER 1523-01

Executive Summary

The SAW agreement with the State of Michigan was signed in May 8, 2014 which began the overall SAW program.

The City of Durand is located in Shiawassee County in south central Michigan, along I-69 just south of the interchange with M-71. Durand's storm sewer collection system includes approximately 86,200 feet of storm sewer and 760 storm manholes, catch basins and outfalls, with some in-system detention.

Stormwater Asset Inventory

This item, which initiated the work included:

- Identifying and locating all assets.
    - A list of all assets to be monitored was obtained using a combination of historical system records, field data collection.
    - The GPS coordinates of the field assets were gathered.
    - An ESRI ArcGIS data set was completed to index the locations and attributes of assets.
    - Physical inspections were conducted for each asset.
    - The asset information was included in the Asset Management Spreadsheet (AMS).
    - The AMS is used to quantify and sort the system asset information.

Condition Assessment

- Structure assessment and inventory follows NASSCO MACP guidelines.
- Sewer pipe assessment and inventory follows NASSCO PACP guidelines.
- Asset age and material data was collected using historical project drawings.

Level of Service Determination

- A SAW Team was created to discuss the storm system direction.
- The SAW Team met and discussed a mission statement and desired Level of Service statement.

Criticality of Assets

- The AMS was used to organize the asset classes. Several parameters were used to determine asset consequence of failure and probability of failure, rating each on a 1 to 5 scale.
    - Redundancy: Does the unit have system backup?
    - Criticality of the asset to the system and what level of impact to the system occurs in the event that the asset fails
    - Location of the asset and surrounding service areas were used in determining the criticality of the asset

  - Probability of failure based on age and condition
  - These items together resulted in a parameter identified as Business Risk.
- The AMS was used to prioritize the need for short term repair or maintenance, short term replacement, or long term maintenance.

Revenue Structure

- The City drainage system is operated and maintained using City street funds.

Capital Improvement Plan

- The AMS identifies capital improvement projects for the future.
- The long term projects may be achieved through grants or future public borrowings.
- An estimate of project year and financial cost is generated for each capital improvement project.
- Projects to be completed within the next three to five years and additional projects recommended in the next six to ten years and eleven to twenty years are included in the Capital Improvement Plan.

List of Major Assets

- 86,200 feet of Storm Sewer
- 760 Storm Structures

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date May 31, 2017

The City of Durand certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1523-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Lisa David at (989) 224-5837 ldavid@durandmi.com
Name Phone Number Email

Lisa David 5/31/2017
Signature of Authorized Representative (Original Signature Required) Date

Lisa David, Treasurer/Clerk
Name and Title of Authorized Representative

106 W. Allegan St. Suite 500
Lansing, MI 48933
O: 517.371.1200
www.c2ae.com

CITY OF DURAND WASTEWATER ASSET MANAGEMENT PLAN
EXECUTIVE SUMMARY

City of Durand
215 West Clinton Street
Durand, MI 48429
City Manager, (989) 288-3113
SAW GRANT PROJECT NUMBER 1523-01

Executive Summary

The SAW agreement with the State of Michigan was signed in May 8, 2014, which began the overall SAW program.

The City of Durand is located in Shiawassee County in south central Michigan, along I-69 just south of the interchange with M-71. The City operates a wastewater collection and treatment system, which services the City of Durand as well as several Vernon Township customers adjacent to the City limits. The wastewater collection system consists of approximately 83,200 feet of 6-inch through 24-inch diameter gravity sanitary sewers with 320 manholes and four pump stations with approximately 4,400 feet of force main, which discharge to the City of Durand Wastewater Treatment Facility (WWTF), with a 0.80 million gallons per day average design flow, and then post-treatment to the Shiawassee River.

Wastewater Asset Inventory

This item, which initiated the work included:

- Identifying and locating all assets.
    - A list of all assets to be monitored was completed.
    - The GPS coordinates of the field assets were gathered.
    - An ESRI ArcGIS data set was completed to index the locations and attributes of assets.
    - Physical inspections were conducted for each asset.
    - The asset information was included in the Asset Management Spreadsheet (AMS).
    - The AMS is used to quantify and sort the system asset information.

Condition Assessment

- Structure assessment and inventory follows NASSCO MACP guidelines.
- Sewer pipe assessment and inventory follow NASSCO PACP guidelines.
- WWTF equipment site condition assessment and inventory.
- Wastewater pump stations condition assessments and inventory.
- Asset age and material data was collected using historical project drawings.

Level of Service Determination

- A SAW Team was created to discuss the wastewater system direction.
- The SAW Team met and discussed a mission statement and desired Level of Service statement.

Criticality of Assets

- The AMS was used to organize the asset classes. Several parameters were used to determine asset consequence of failure and probability of failure, rating each on a 1 to 5 scale.

  - Redundancy: Does the unit have system backup?
  - Criticality of the asset to the system and level of impact to the system in the event the asset fails
  - Location of the asset and surrounding service areas were used in determining the criticality of the asset
  - Probability of failure based on age and condition
  - These items together resulted in a parameter identified as Business Risk.
- The AMS was used to prioritize the need for short term repair or maintenance, short term replacement, or long term maintenance.

Revenue Structure

- The user charge report and the asset management spreadsheet are identified as the Rate Methodology and were submitted previously to MDEQ and approved.
- The Rate Methodology was updated to forecast future budgeting needs. The current budget information is included.

Capital Improvement Plan

- The AMS identifies capital improvement projects for the future.
- The long term projects may be achieved through grants or future public borrowings.
- An estimate of project year and financial cost is generated for each capital improvement project.
- A list of recommended projects to be completed within the next three to five years and additional projects recommended in the next six to ten years and eleven to twenty years are included in the Capital Improvement Plan.

List of Major Assets

- 83,200 feet of sanitary sewer
- 4,400 feet of force main
- 320 sanitary manholes
- 4 pump stations.
- Wastewater Treatment Facility

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017

The City of Durand certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1523-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No

   If No - Date of the rate methodology approval letter: November 18, 2016.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Lisa David	at	(989) 288-3113	ldavid@durandmi.com
Name		Phone Number	Email

Lisa David 5/31/2017

Signature of Authorized Representative (Original Signature Required) Date

Lisa David, Treasurer/Clerk

Print Name and Title of Authorized Representative

ASSET MANAGEMENT PLAN

Executive Summary of Wastewater Collection System

Prepared for:

City of East Tawas

SAW Project No. 1026-01

760 Newman Street, PO BOX 672, East Tawas, MI 48730
www.easttawas.com
Blinda Baker – City Manager
989-362-6161

FINAL - May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In May 2014, the City of East Tawas received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1026-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the City's publicly owned wastewater utility. The assets that comprise the utility include collection system piping and manholes, lift station/pump stations and force mains.

The SAW Grant amount awarded to City of East Tawas was $768,900.00
The Local Match provided by City of East Tawas was $76,890

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

Questions regarding the Asset Management Plan should be directed to:
Blinda Baker – City Manager
City of East Tawas
760 Newman Street, PO BOX 672, East Tawas, MI 48730-0672
Web Site: www.easttawas.com
989-362-6161

ASSET INVENTORY AND CONDITION ASSESSMENT

The wastewater collection system assets consist of approximately:

- Gravity Sewer (8 inch thru 18 inch): 122,914 feet (23.3 miles)
- Force Main (4 inch thru 8 inch): 10,776 feet (2.0 miles)
- Manhole Structures: 384
- Sewer Lift Stations (Submersible): 4 Each
- Sewer Lift Stations (Can Type); 2 Each

These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The treatment of wastewater for the City of East Tawas is provided by a Wastewater Treatment Plant owned and operated by the Tawas Utilities Authority (TUA). An AMP for the WWTP has been completed through a separate document and will not be included in the report.

Asset Identification and Location

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals, which included a review of the existing record drawings, field notes, staff knowledge, site visits and supplemented with field survey work.

Asset material, size and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data.

Asset inventory was completed on the six lift stations within the system.

Spatial orientation (pipe location), pipe depth and invert elevations were determined through survey grade GPS equipment and a comprehensive evaluation of the gravity system.

This information was organized into a new (GIS) database and piping network for archiving, mapping and further evaluation purposes.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system and lift stations was performed.

NASSCO-MACP manhole field based assessments were completed on 365 of the 384 manhole structures.

Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on 116,376 of gravity pipe. A majority of this system has reached its life expectancy. Replacement or lining of the existing pipes are listed in the 6-20 year CIP.

Smoke Testing was performed on approximately 5% of system to disclose location of inflow or infiltration. Capacity Analysis was modeled for average day and peak hour conditions to identify capacity concerns.

Recommendations for short-term (1-5 year) and long-term (6-20 year) system maintenance and improvements were identified. It is recommended to clean and televise the collection on a 7 to 10-year rotating basis.

The condition of the assets at the lift stations range from **Good to Poor**. Ongoing maintenance has upheld the condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems. The recommendations for short-term improvements are the rehabilitation of the Lakewood Dr., Maple Dr., Green Rd, and Rainbow Dr. lift stations. The long-term improvements are rehabilitation of the Tawas Beach Rd, and Bay St. lift stations.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The overall objective of the City of East Tawas, as it relates to their wastewater system, is to adopt the following Level of Service (LOS) goals:

LEVEL OF SERVICE STATEMENT

The overall objective of the City of East Tawas is to provide reliable wastewater collection services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system capacity for all service areas.
- Comply with local, state and federal regulations.
- Actively maintain collection system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment plant.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the City annually to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

In order to assure that LOS goals are met, performance measurements may need to be implemented. During the LOS review with the community the need for performance measurements was discussed.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

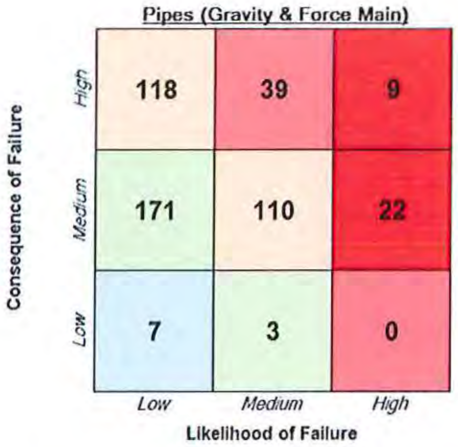
Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a sewer asset management and capital planning template that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection system.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. Thirty-one pipe segments in the collection system have an extreme risk rating; of these, 12 are listed to be repaired/ replaced in the 1-5 year CIP. The City will need to monitor the remaining segments and may require occasional cleaning of the pipe. A small portion of the collection system's gravity pipes, 38% as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes in an aged system.

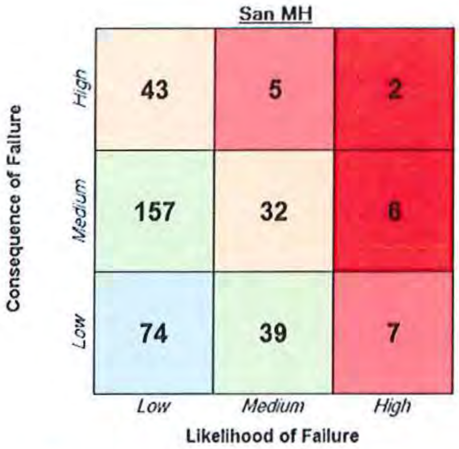
Figure 2 provides the risk rating for the collection system manholes. Eight manholes are identified as extreme risk, and are recommended for replacement of the castings as the frames and covers are cracked. This replacement will be scheduled for the fall of 2017. Much of the collection system's manholes, 74% as shown in Figure 2, have a low to negligible risk rating and are indicative of manholes in relatively good condition.



Pipes (Gravity & Force Main)

High	118	39	9
Medium	171	110	22
Low	7	3	0
	Low	Medium	High

Figure 1. Business Risk Matrix (Risk Rating) by Number of Gravity and Force Main Pipes

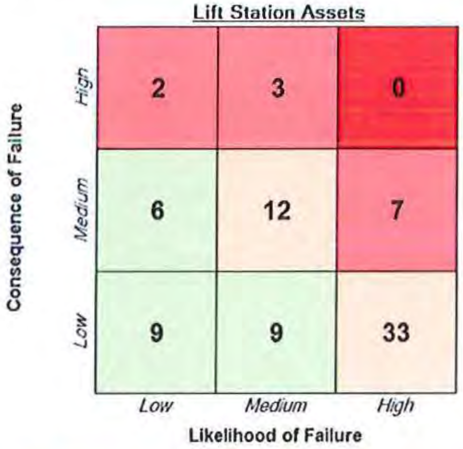


San MH

High	43	5	2
Medium	157	32	6
Low	74	39	7
	Low	Medium	High

Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the lift station assets. Zero assets are identified as extreme risk. The twelve assets with high risk ratings should be inspected at regular intervals. The City has identified replacement/repairs/improvements to three of the lift stations in the 1-5 year CIP.



Lift Station Assets

High	2	3	0
Medium	6	12	7
Low	9	9	33
	Low	Medium	High

Figure 3. Business Risk Matrix (Risk Rating) by Number of Lift Station Assets

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the City of East Tawas's wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system and pumping stations/force mains. From the BRE, a short-term (1-5 year) and long-term (6-20 year) CIP were developed for the utility.

Based on the AMP condition assessment of the sanitary system, the City has identified assets for improvement. The repair/replacement of the aging sewer piping will have to be completed through Government grant/loan programs such as USDA Rural Development or the State Revolving Loan Program.

1-5 year Capital Improvements include:

- Reconstruct and replace broken castings on manholes.
- Repair/replace segments of pipe that are in immediate need or correction.

- Replace/repair/improve three of the six lift stations.
- Disconnect residential sump pumps from the wastewater collection system and connect to the stormwater collection system.

6-20 year Capital Improvements include:

- Repair/replace segments of pipe that need attention based on additional monitoring of the system
- Replace/repair/improve the remaining three lift stations.
- Continue to reduce inflow through disconnecting residential sump pumps from the wastewater collection system and connect to the stormwater collection system.

OPERATIONS, MAINTENANCE AND REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance, infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

An annual lift station replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by City staff without bringing in an outside contractor. Existing disposable materials include wear parts in pumps and motors, etc. The existing OM&R fund is sufficient for the current operations.

REVENUE STRUCTURE

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

The existing rates were determined to create sufficient funds to fulfill day-to-day maintenance and operations of the entire sanitary collection system.

The MDEQ approved the City's rate methodology on November 16, 2016.

Department of Environmental Quality
SAW Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017

The **City of East Tawas** *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No.**1026-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e (3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No

   If No - Date of the rate methodology approval letter: November 16, 2016

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Ms. Blinda Baker	989-362-6161	bbaker@easttawas.com
Name	Phone Number	Email

Blinda A. Baker 5/31/17

Signature of Authorized Representative (Original Signature Required) Date

Blinda Baker – City Manager

Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Executive Summary of Stormwater Collection System

Prepared for:

City of East Tawas

SAW Project No. 1026-01

760 Newman Street, PO BOX 672, East Tawas, MI 48730
www.easttawas.com
Blinda Baker – City Manager
989-362-6161

FINAL - May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In 2014, the City of East Tawas received a (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1026-01, to provide financial assistance for the development of this asset management plan (AMP). This report provides the Asset Management Plan (AMP) for the City's Stormwater collection system. Working with City staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the Stormwater collection system.

The SAW Grant Amount awarded to the City of East Tawas was $500,943.00
The Local Match provided by the City of East Tawas was 50,094.30

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

Questions regarding the Asset Management Plan should be directed to:
Blinda Baker – City Manager
City of East Tawas
760 Newman Street, PO BOX 672, East Tawas, MI 48730-0672
Web Site: www.easttawas.com
989-362-6161

ASSET INVENTORY AND CONDITION ASSESSMENT

The Stormwater collection system assets consist of approximately 62,481 feet (11.8 miles) of storm sewers and 640 stormwater structures connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

Asset Identification and Location

A comprehensive Stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new (GIS) database and piping network for archiving, mapping and further evaluation purpose.

Condition Assessment and Expected Useful Life

For the City of East Tawas, a comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field based assessments were completed on 766 structures. Based on discussions with the DPW staff, there have been limited capacity issues with the City-owned Stormwater system. For this reason, a capacity analysis was only completed for areas with known issues. Recommendations for short-term (1-5 year) and long-term (6-20 year) system maintenance and improvements identified the need for maintenance with 5% of the system tagged for inspection and/or cleaning. Rehabilitation accounted for 23% of the system identified for point repairs and lining. The remaining 77% of assets were placed in the 20+ year planning category.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The LOS for the City Stormwater system is stated as follows:

STORMWATER- LEVEL OF SERVICE STATEMENT

To provide appropriate Stormwater collection, diversion, and conveyance at a minimum cost, consistent with applicable environmental regulations. To achieve this the following Level of Service (LOS) goals are proposed for the City of East Tawas:

- Provide adequate Stormwater collection system and conveyance capacity for all service areas.
- Actively maintain Stormwater collection and conveyance system assets in reliable working conditions.
- Provide rapid and effective emergency response services to customers.
- Maintenance and operations staff are to be properly trained.

MEASURING PERFORMANCE

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the Stormwater system. Criticality is based on two factors: 1) Likelihood (Probability) of Failure and 2) Consequence of Failure. Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, or environmental impact of failure of an asset and the utilities ability to convey and treat Stormwater. CoF categories of the Stormwater collection system include:

- Location of asset.
- Facilities served by asset.
- Size

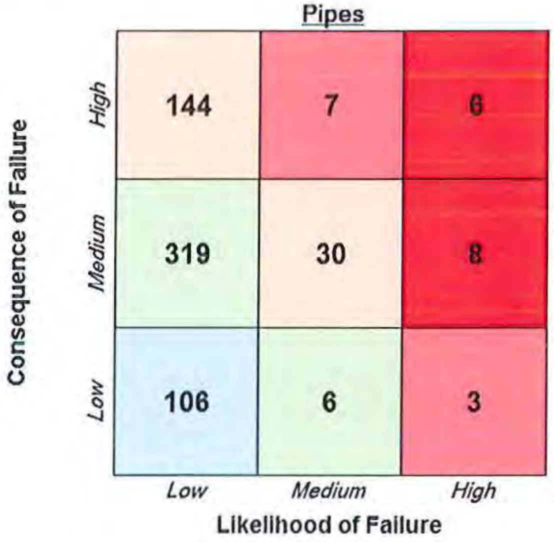
ASSESSING CRITICALITY

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset of the City of East Tawas using an ArcGIS-based storm sewer asset management and capital planning template that will compile, analyze and assess Business Risk for each asset and develop a Capital Improvement Plan.

The Business Risk score, also known as Criticality, is calculated for each asset using the following equation.

Business Risk = Consequence of Failure Score X Likelihood of Failure Score

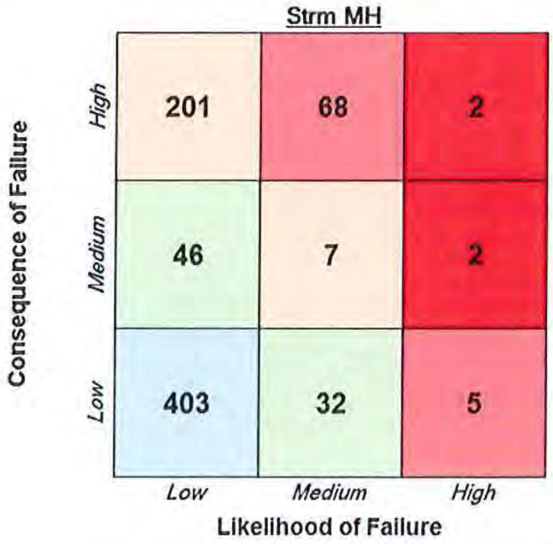
Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. Fourteen pipe segments in the Stormwater collection system have an extreme risk rating. Only five of these are recommended for rehabilitation or replacement in the 1-5 year CIP due to holes and cracks. The remaining nine pipe segments having an extreme risk rating are mostly due to sags and are not an immediate concern, but are included on a list of assets to be periodically reviewed.



High	144	7	6
Medium	319	30	8
Low	106	6	3
	Low	Medium	High

Figure 1: Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

Figure 2 provides the risk rating for the storm sewer structures. Four structures are identified as "Extreme Risk", with two having broken frame castings that are included in the 1-5 year CIP, and two having leakage around the frame that are included in the 6-20 year CIP.



Strm MH

Consequence of Failure	Low	Medium	High
High	201	68	2
Medium	46	7	2
Low	403	32	5

Likelihood of Failure

Figure 2: Business Risk Matrix (Risk Rating) by Number of Structures

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the Stormwater collection system.

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan with recommendations was prepared for the City's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short-term (1-5 year) and long-term (6-20 year) Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system.

1-5 year Capital Improvements include:

- Spot line pipe segments that have holes in them.
- Replace CMP pipe that is corroded (Park Street storm sewer is included in a street rehabilitation project starting this summer).
- Replace and reset broken frames and castings.

6-20 year Capital Improvements include:

- Various sections of storm sewer to be replaced as identified in the AMP.
- Continue to monitor known issues and incorporate into street projects as funding allows.

CIP DEVELOPMENT

The City of East Tawas identifies assets of $5,000 or more to be capital expenditures. Collection system assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2017 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The CIP was developed by assigning each project to a CIP year (1-5) based on several factors. In addition to Risk Rating, other factors used to assign CIP year include:

- Asset rehabilitation grouping (i.e. the type of repair/construction recommended)
- Coordination with other planned projects to achieve economies of scale or limiting disruption (an example is a street reconstruction project where identified utility recommendations can be included)

The City is considering funding options to make the needed improvements that have been identified as an "Extreme Risk" in the 1-5 year CIP. The City will preplan storm drain improvements and incorporate those improvements into street projects instead of cutting into streets and patching them.

OPERATIONS AND MAINTENANCE

A preventative maintenance program to systematically clean and CCTV inspect pipelines to NASSCO-certified standards is critical for a sound Stormwater system. The process of cleaning and CCTV inspection of pipelines, either with equipment owned by the community or contracted, is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. For this reason, it is recommended that at a minimum, all pipelines be cleaned and televised every 7-10 years. Available budget will dictate the frequency or size of yearly projects.

REVENUE STRUCTURE

The revenue for storm sewer maintenance currently comes from the City's Major and Local Street Funds or the City's General Fund.

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The **City of East Tawas** certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1026-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SW AMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Blinda Baker at 989-362-6161 bbaker@easttawas.com
Name Phone Number Email

Blinda A. Baker 5/31/17
Signature of Authorized Representative (Original Signature Required) Date

Ms. Blinda Baker – City Manager
Print Name and Title of Authorized Representative

June 2014

SAW Grant No. 1213-01

EGELSTON TOWNSHIP, MICHIGAN

WASTEWATER ASSET MANAGEMENT PLAN

EXECUTIVE SUMMARY

APRIL 2017

Johnson&Anderson

Johnson & Anderson, Inc.
1060 W. Norton Ave., Ste. 7
Muskegon, Michigan 49441

PN: 17589

EXECUTIVE SUMMARY

INTRODUCTION

Egelston Township applied and was subsequently awarded a SAW Grant from the Michigan Department of Environmental Quality (MDEQ) for the purposes of development and implementation of a wastewater Asset Management Plan (AMP). A Grant Agreement was entered into on May 8, 2014 with an effective grant period from April 2014 to April 2017. An AMP team consisting of Township elected officials, pertinent Township staff, and engineering and financial consultants assumed the mission to develop and implement an AMP. The final AMP report was placed on file at the Township Office and made available to the public in April 2017.

The wastewater system consists of gravity mains, pressure mains, manholes, service laterals, and pump stations. The system was generally constructed in the late 1970's in conjunction with the expansion of the Muskegon County Regional Wastewater System. The Township's system sends collected wastewater to the Muskegon County Wastewater system for treatment. The Township does not own or operate any treatment facilities.

BACKGROUND

The AMP is the framework for providing the best overall strategy for providing wastewater service for the community. The AMP was developed in conjunction with the MDEQ SAW grant program and outlines a 20-year plan presenting the Township's approach to providing a high level of service and cost effective management of the wastewater system.

The five core components of the AMP outlined in this summary are as follows:

I. Asset Inventory
II. Level of Service
III. Critical Assets
IV. Revenue Structure
V. Capital Improvement Project Plan

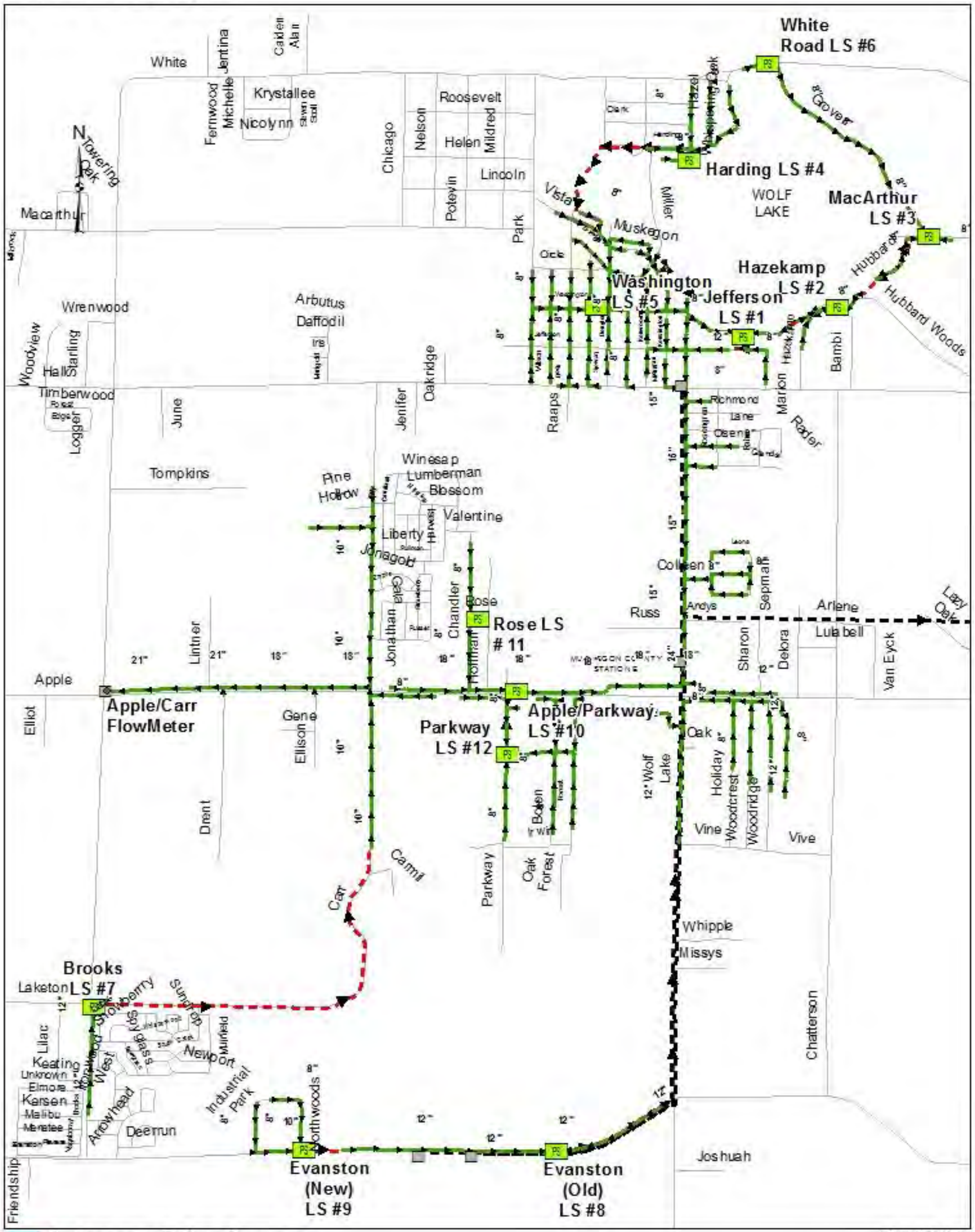
I. Asset Inventory

The assets were inventoried and located with a Global Positioning System and Robotic Total Station to establish State Plane Coordinates (northing, easting, and elevation). These locations were incorporated into a Geographic Information System (GIS) to create a database for the development of an asset inventory. Base layer information for the GIS was provided by the Muskegon County GIS department. Asset data was merged into a real-time software utility smart network system (i.e. SEDARU®), to map and analyze system data. See Table 1 for an asset inventory of the major system assets. See Figure 1 for the overall system mapping.

Table 1 – Asset Inventory

System Asset	Quantity	Unit
Gravity Main - 8 inch	74,630	Ft
Gravity Main - 10 inch	7,192	Ft
Gravity Main - 12 inch	14,536	Ft
Gravity Main - 15 inch	5,212	Ft
Gravity Main - 18 inch	7,784	Ft
Gravity Main - 21 inch	2,015	Ft
Gravity Main - 24 inch	412	Ft
Manholes	387	Ea
Service Laterals	1,271	Ea
Pressure Main - 2 inch	45	Ft
Pressure Main - 4 inch	4,352	Ft
Pressure Main - 6 inch	11,736	Ft
Pressure Main - 8 inch	7,805	Ft
Pump Stations	12	Ea

Figure 1 - Overall System



Johnson&Anderson

NOVEMBER 2016
PN:17589

Condition/Remaining Useful Life

To perform a condition assessment, the gravity mains and manholes were inspected using the guidelines of the National Association of Sewer Service Companies (NASSCO) Pipe/Manhole Assessment and Certification Program (PACP and MACP) standards. Gravity mains older than 20 years of age were inspected using closed-circuit television (CCTV) equipment. Manholes were field-inspected using a NASSCO Level 2 inspection, photographs were taken and manhole characteristics and defects were recorded. Pump stations were evaluated and scored with critical input and historical information provided by Department of Public Works personnel. Ratings of pipes, manholes and pump stations were catalogued into a master data base. See Table 2 for the NASSCO rating system used for the pipes and manholes.

Table 2 – NASSCO Condition Grades

Condition Grade	Definition
5	Most significant defect grade
4	Significant defect grade
3	Moderate defect grade
2	Minor to moderate defect grade
1	Minor defect grade

The estimated remaining useful life is different for every type of asset. An asset reaches the end of its useful life when it is physically non-functioning, no longer performs as it was intended, and/or is no longer the most cost effective solution to maintain a certain level of performance. For the purposes of evaluating the gravity mains and manholes were estimated to have a useful life of approximately 80 years. Many of the pump stations are running with the equipment original to the station (10 of 12 stations were installed in the late 1970s, one installed in the 1990s and one installed in the 2000s). Most of these components have reached and exceeded their useful lives.

Replacement Cost

The replacement cost of the system assets was determined by multiplying the total quantity of each system asset by an estimated replacement unit cost for each asset. The estimated replacement unit cost for each asset were derived from local bids and estimated cost of materials. The total replacement cost for all of system assets were estimated to be approximately $39 million. See Table 3 for a Summary of Asset Replacement Costs.

Table 3 – Summary of Asset Replacement Costs

System Asset	Quantity	Unit	Replacement Unit Cost (estimated)	Replacement Cost (estimated)
Gravity Main - 8 inch	74,630	Ft	$ 208.00	$ 15,522,977.96
Gravity Main - 10 inch	7,192	Ft	$ 260.00	$ 1,869,930.47
Gravity Main - 12 inch	14,536	Ft	$ 312.00	$ 4,535,236.12
Gravity Main - 15 inch	5,212	Ft	$ 390.00	$ 2,032,648.00
Gravity Main - 18 inch	7,784	Ft	$ 468.00	$ 3,642,711.08
Gravity Main - 21 inch	2,015	Ft	$ 546.00	$ 1,100,322.66
Gravity Main - 24 inch	412	Ft	$ 624.00	$ 257,283.80
Manholes	393	Ea	$ 5,000.00	$ 1,965,000.00
Service Laterals*	1,271	Ea	$ 2,500.00	$ 3,177,500.00
Pressure Main - 2 inch	45	Ft	$ 30.00	$ 1,361.10
Pressure Main - 4 inch	4,352	Ft	$ 60.00	$ 261,095.02
Pressure Main - 6 inch	11,736	Ft	$ 90.00	$ 1,056,218.20
Pressure Main - 8 inch	7,805	Ft	$ 120.00	$ 936,642.75
Pump Stations - Small	1	Ea	$ 100,000.00	$ 100,000.00
Pump Stations - Medium	6	Ea	$ 200,000.00	$ 1,200,000.00
Pump Stations - Large	5	Ea	$ 300,000.00	$ 1,500,000.00
Total				**$ 39,158,927.17**

Notes: 1) Replacement unit cost of gravity main estimated at $26 per inch diameter per lineal foot
2) Replacement cost of pressure main estimated at $15 per inch diameter per lineal foot
3) *Includes service laterals located along east side of Brooks Road

II. Level of Service

A Level of Service (LOS) plan was developed by AMP team members and defines how the Township wants the wastewater system to perform over the long term. The LOS standards and goals were developed by the AMP team members. The framework for the LOS is a triple bottom line approach with three parts: Social, Environmental and Economic. The Social part was divided into four strategic areas: customer service, reliability, health and safety, and administration organizational development. The Environmental part was divided into two strategic areas: environmental stewardship and regulatory compliance. The Economic part was placed into a single strategic area: financial. The LOS impetus was determined to be either self, customer or regulatory driven. The current and future targets were identified with their respective performance measures, data, and reporting procedure. A rating system was developed to identify strategic areas that are acceptable or need improvements.

III. Critical Assets

The criticality of system assets was examined regarding the importance to the overall operation of the system. To determine the criticality of system assets a Business Risk Evaluation (BRE) was performed by analyzing the Consequence of Failure (COF) and Probability of Failure (POF) of each asset.

The COF was determined for the gravity mains and manholes using the following factors:

- Economic Impacts (Diameter of Asset, Depth of Asset, and Surface Type)
- Regulatory Compliance (Distance to Surface Water)
- Community Disruption (Number of Customers)

The COF of the pump stations were determined by analyzing the overall effect in the event a pump station was out of service. Each gravity main, manhole and pump station was assigned an overall COF rating of 1 to 5. A rating of 1 being a slight effect to 5 being a severe disruption to the system.

The POF was determined for the gravity mains and manholes using the following factors:

- Structural Condition
- Operation & Maintenance Performance

The POF for the gravity mains, manholes and pump stations were determined to be directly related to the structural condition and operation and maintenance performance. Gravity mains and manholes with structural problems such as breaks, holes, chemical surface spalling, or fractures are most in danger of failure. Structural ratings contribute 60% of determining the POF. Operational and maintenance problems contribute 40% to determining the POF of a gravity main failure. As part of the pump station POF, the project team reviewed the age and existing condition of each pump station component. An overall POF rating of 1 to 5 was assigned to each gravity main, manhole and pump station. A rating of 1 being excellent condition to 5 being unserviceable.

To develop a total BRE score, the COF total score and POF total score were multiplied to achieve an overall total BRE score. The BRE score was used to rank system assets, determine areas of concern and to guide the projects and timing of the Capital Improvement Project (CIP) plan.

IV. Revenue Structure

The revenue structure of the system was reviewed by project team financial consultant, H.J. Umbaugh. The review included revenue and expenditures to provide a comprehensive analysis of historical and current financials. The historical operating expenses were reviewed using audit and budget information. A test year was developed to reflect a baseline of operating costs. The customer base was reviewed to identify the number of billing customers and volumetric sales. As required by the Michigan Department of Environment Quality (MDEQ), a 2½ year Rate Methodology was submitted and approved. Forecasting of customer and volume counts were derived in addition to projected future operating costs. The existing annual debt service from the County was reviewed and scenarios were developed for funding the 20-year Capital Improvement Projects.

For the size and operations of the system, H.J. Umbaugh recommended the Township retain six to twelve months of expenses in their fund balance. In order to fund the capital improvements suggested through this SAW grant, maintain a fund balance, and continue operating, Umbaugh projected the Township would need to increase rates to users at a rate of 2.5% for the next ten years. For years 10-20, the Township would need to increase user rates 0.25% per year.

V. Capital Improvement Project Plan

A Capital Improvement Plan (CIP) was developed to outline operation, system maintenance, repairs, replacement and rehabilitation of pipes, manholes, and pump stations for a period of 20 years. Individual project cost information was determined using bid tabulations and local project information. A description of each asset and year for potential improvement was developed using the BRE, historical knowledge of the assets, and input from Township personnel. See Table 4 for a brief summary of the CIP projects.

Table 4 – Capital Improvement Projects

Item Description	Cost	
Pipe Repairs	$	8,400.85
Pump Replacement	$	792,000.00
Gravity Main Cleaning	$	85,000.00
SCADA Installation	$	119,000.00
Pump Station Refurbishment	$	1,272,000.00
Manhole Repairs	$	75,360.00
Portable Generator	$	25,000.00
Total	**$**	**2,346,760.85**

SUMMARY

Overall the system gravity mains and manholes are in good condition with few repairs needed. The pump stations however need ongoing maintenance and future refurbishment. The pump station future refurbishments accounts for over half of the projected CIP costs.

The project team developed the Township's wastewater AMP as the framework for providing the best overall wastewater service to the community. The AMP has five components: Asset Inventory, LOS, Critical Assets, Revenue Structure, and a CIP plan. The asset inventory and condition assessment was based on as-built information and supplemented with field inspection information. The LOS goals and objectives were identified and included social, environmental, and economic impacts. A BRE was based on the COF and POF which include economic impacts, regulatory compliance, community disruption, operational condition and structural condition. A comprehensive 20-year CIP was developed to provide a high level of service and cost effective management of the wastewater system. The Township plans to periodically maintain the AMP so it can be used as an effective planning tool for operating, maintaining, and upgrading assets in a cost-effective manner.

CONTACT INFORMATION

Mr. John Holter, Supervisor
Egelston Township
5428 East Apple Avenue
Muskegon, Michigan 49442
Phone: (231) 788-2308

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date April 30, 2017
(no later than 3 years from executed grant date)

The Egelston Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1213-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: October 11, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

John Holter, Supervisor at (231)788-2308 jholter@egelston.org
Name Phone Number Email

5/4/17
Signature of Authorized Representative (Original Signature Required) Date

John Holter Supervisor
Print Name and Title of Authorized Representative

April 2017

CHAPTER 1: EXECUTIVE SUMMARY

1.0 INTRODUCTION

Ferris State University (FSU) is developing an Asset Management Program (“Program”) for its sanitary sewerage and stormwater collection system. Beginning in 2013, the Michigan Department of Environmental Quality (MDEQ) started to include requirements for establishing an Asset Management Program in new and renewed National Pollutant Discharge Elimination System (NPDES) wastewater permits. Ferris State University (FSU) applied for and received a grant to develop an Asset Management Program through a MDEQ Stormwater and Wastewater Asset Management (SAW) Grant. The FSU SAW grant provides 90% grant funding for costs related to developing a SAW Asset Management Program. The SAW program was established by the MDEQ in order to help communities and other public entities utilities move toward financial sustainability. Outside funding sources for wastewater systems are typically no longer available, and therefore the MDEQ is encouraging state agencies, municipalities and utilities to move toward becoming self-sustaining enterprises.

1.0.1 What is an Asset Management Program?

The *International Infrastructure Management Manual* defines the goal of asset management as meeting a required level of service in the most cost-effective way through the creation, acquisition, operation, maintenance, rehabilitation, and disposal of assets to provide for present and future customers.

An Asset Management Program includes a set of procedures to manage assets based on principles of life cycle costing implemented in a programmatic way. The intent of asset management is to ensure the long-term sustainability of the wastewater or stormwater utility. By helping a utility manager make better decisions when it is most appropriate to repair, replace, or rehabilitate particular assets and by developing a long-term funding strategy, the utility can ensure its ability to deliver the required level of service perpetually.

Effective asset management implementation is comprehensive. It may involve integrating a number of tools along with other existing systems (accounting, financial reporting, purchasing and stores, payroll, etc.) to create a comprehensive information system that will support an integrated Asset Management Program. Properly practiced, it involves all parts of the organization and entails a living set of performance goals.

A good asset management program is not “done” and put on a shelf, but rather provides a framework of tools that may be continuously utilized for decision making. It is an active, on-going process that provides information to managers in order to make sound decisions about their capital assets and allows decision makers to better identify and manage needed investments in their utility’s infrastructure. The Program tools may be used for tasks such as to review and establish annual budgets, plan improvements, determine required staffing, and communicate performance with the public and regulatory agencies.

1.0.2 What is an Asset Management Plan?

An Asset Management Plan (“Plan”) is a tool to help the University implement its Asset Management Program. The purpose of this report is to provide a long-term Plan that will assist Ferris State University in planning for the short and long-term needs of its wastewater and stormwater system, with a focus on the next 20 years. The goal of the Plan is to provide Ferris State University with the information required that will allow the University to continue providing a desired level of service to its students and faculty at the lowest life cycle costs. This will be achieved by developing a strategic process to perform proactive maintenance and investment in the system, rather than reacting to failures.

The Plan consists of the five core components as described in the Michigan Department of Environmental Quality's (MDEQ) document, "Asset Management Guidance for Wastewater and Stormwater Systems." These include:

- Asset Inventory
- Critical Assets
- Level of Service
- Capital Improvement Planning
- Revenue Structure

The plan will be re-visited at periodic intervals to confirm that priorities and objectives are being addressed and updated.

1.1 SCOPE OF WORK

The scope of work outlined in the SAW Grant Application (see Appendix H) for development of this Asset Management Plan was prepared for FSU by Hubbell, Roth & Clark (HRC) and included review of the sanitary sewerage system, stormwater system, and related structures and facilities including pumping stations, and detention ponds.

Approximately 1,800 individual assets including pipe segments, manholes, catch basins etc., were examined as part of this work. There are a total of (see Appendix B) :

- 33,234 feet of sanitary sewer (8" and larger)
- 217 sanitary manholes
- 71,792 feet of storm sewer (8" and larger)
- 201 storm manholes, 766 storm catch basins
- Three (3) pumping stations (see Appendix D)
- Andrews Pond Regional Stormwater Detention Basin included in this effort.

Approximately 74% of the sanitary sewer and 74% of the storm sewer in the FSU system 8 inches and larger were televised as part of this effort. Each asset was categorized, given a monetary value and assessed for condition and criticality. In some cases, these determinations were made by review of record documents on file for the asset, while most assets included detailed field inspections.

To develop inventories of the systems' assets, HRC utilized a spreadsheet, and the University's Geographic Information System (GIS). We developed system's Level of Service goals and a Mission Statement with staff input. We generated a replacement schedule for the system assets having a remaining useful life of 20 years or less, and we recommended equipment replacement fund values for the next 20-year cycle. A capital improvement plan was developed for rehabilitation and/or replacement of assets, facilities and structures and recommendations were made for funding these improvements.

1.2 CONCLUSIONS

The University's GIS has been updated to reflect a more consistent naming convention. Many previously unknown assets have been found and/or field located. Attributes for sanitary and storm sewer and manhole assets have been added to the GIS in collaboration with F.S.U. See Chapter 3, Asset Inventory for more detailed information.

Through this SAW grant, F.S.U was able to perform and inventory and to inspect 74% of both its sanitary and storm sewer systems in order to develop an up-to-date condition assessment of its linear assets. This far exceeds the average for communities conducting asset management plans through the SAW grants program. Appendix B contains a summary of the Sanitary Sewer, Storm Sewer and Manhole Inventory.

The University's sanitary and storm utility assets were evaluated for the Probability of Failure (PoF), the Consequence of Failure (CoF) and the Business Risk Evaluation (BRE) (see Appendix C) which is a product of the two factors. Based on this analysis, the costs estimated to rehab, repair or replace, over the next 20 years, defective assets identified under this SAW Program are as follows:

A summary of the valuation of the system's assets is provided in the following table:

Table 1.2: Asset Summary

Asset Name/Class	**Year 1 5 Recommended replacement cost/rehab/repair (Pipes rated 5000)**
Sanitary Sewer	$221,404
Storm Sewer	$505,170
Pump Station	$134,000
Total 1-5 Years	**$860,574**
Years 1-5 Yearly Recommended set aside cost to fund	**$172,115**
Asset Name/Class	**Year 6 20 Recommended replacement cost/rehab/repair (Pipes rated 4000-2000)**
Sanitary Sewer	$387,744
Storm Sewer	$1,094,508
Total 6-20 Years	**$1,482,252**
Years 6-20 Yearly Recommended set aside cost to fund	**$98,817**

Table 1.3: Replacement Value Summary

Asset Name/Class	**Total 2016 Replacement Value**
Sanitary Sewer	$6.7 Million
Storm Sewer	$17.5 Million
Pump Station	$480,000
Total	**$24.7 Million**

The current value of the FSU sanitary sewer and manhole assets is estimated to be approximately $6,700,000. This is the cost it would take to replace all of the sanitary sewers and manholes in 2016 dollars.

The current value of the FSU storm sewer and manhole assets is estimated to be approximately $17,500,000. This is the cost it would take to replace all of the storm sewers and manholes in 2016 dollars.

The current value of the FSU storm and sanitary pump station assets is estimated to be approximately $480,000. This is the cost it would take to replace all of the pump stations in 2016 dollars.

1.3 RECOMMENDATIONS

The University staff should continue to verify the location of those sanitary and storm structures not covered through the SAW grant AMP and perform manhole inspection on the same.

The University staff should continue to televise those sections of sanitary and storm sewers not covered under this SAW grant program.

The University should continue to support the maintenance of its GIS system to capture new records of assets and their condition.

The University's sanitary and storm sewer performance record should be reviewed annually by the Board of Trustee's for the University. The University's staff will be provided guidance by the Trustee's on the Level of Service goals to provide reliable service to its faculty and staff.

The University should continue to annually review the condition assessment of its utilities and budget for repair, rehabilitation and replacement of those assets in a systematic fashion.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date April 4, 2017
(no later than 3 years from executed grant date)

The Ferris State University *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1344-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Mr. Jerry Scoby, Vice President	at (231) 591-2164	scobyj@ferris.edu
Name	Phone Number	Email

Jerry L Scoby 4/5/17
Signature of Authorized Representative (Original Signature Required) Date

Mr. Jerry Scoby, Vice President
Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater (SAW) Asset Management Plan Executive Summary

Forsyth Township
186 W Flint Street
Gwinn, MI 49841
Lynn Rodgers, (906) 346-9217
1265-01

Executive Summary

Forsyth Township was awarded the SAW Grant in 2014. Work immediately began on the televising and mapping of the existing sanitary sewer system. During the review of the televising data performed in the Gwinn area it was discovered that the existing sewer infrastructure was over 100 years old and in poor condition. This led to the development of the USDA RD Sewer Project that replaced this existing sewer main.

The SAW grant re-initiated after the Sewer project was completed in 2016. The SAW Grant consisted of 40,330' of sewer main and 163 man holes. The review also included a lift station and the treatment lagoons. All of this information was gathered and put into ESRI mapping/GIS system. It was also included in the Asset Management Database along with capital improvements, maintenance, replacement, and budget planning.

The final project total was $220,308.72 with a 90% DEQ grant amount of $180,277.85 and local match of $20,030.87.

Wastewater and/or Stormwater Asset Inventory

The system components included in the asset management include the 40,330' of sanitary sewer and 163 man holes. It also includes the single system lift stations and treatment lagoons. All system components were gathered in the field using surveying methods. That information was then drafted using AutoCAD then exported into the GIS mapping system for use by Forsyth Township. Televising and manhole inspection information was then linked to the various components in the GIS system.

The GIS mapping system is then linked to the Asset Management database, a program developed by UPEA to meet the specific needs of Forsyth Township. The program is easily updated and modified by Forsyth Township staff when changes are made to the system. The database also includes budget information, replacement plans, capital improvement plans, and maintenance plans.

Condition Assessment

The condition assessment was completed by reviewing the televising and manhole inspection reports that were provided to UPEA by Tunnelvision. This information was sufficient to assess the condition of the system components. Analysis was then performed on the location and criticality of the components so a failure criticality rating could be designated for each component. Overall the system is in good condition with the following percentage of components in good (35%), fair (60%) and poor (5%)

Level of Service Determination

Forsyth Township desires to meet all DEQ requirements in regards to level of service expected from a Municipal Sewer Collection and Treatment System. The goal is to provide a system that effectively transmits and treats all of the sewage within the system. This is achieved by preventing direct discharges of untreated sewage into the environment. By completing the recent upgrade project in Forsyth Township, they have taken a huge step in ensuring this goal is obtained. Numerous discussions with the public and board has taken place during this project.

Criticality of Assets

The criticality level of the assets was determined by reviewing the entire collection system and determining the consequences for each individual failure. This review required a strong understanding of the existing sewer system, which we had developed during our review of the system information throughout the course of the SAW grant project. The single lift station serves as the most critical piece of infrastructure, since its failure results in an immediate need of bypass pumping to transmit all of the system sewage to the treatment lagoons.

Revenue Structure

Rates, charges, expenditures, capital improvements, replacement costs, maintenance cost and debt payments are all taken into consideration in the asset management database that was developed by UPEA. This information was then shared with a financial consultant who reviewed and updated the current and projected necessary revenues.

Capital Improvement Plan

Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.

5-Year Capital Improvements Plan

• Gwinn Lift Station	
o Replace Sacrificial Anodes	$30,000
• Gwinn Lagoons	
o Replace Sluice Gate	$15,000
o Replace Flow Meter	$10,000
▪ **Total**	**$55,000**

20-Year Capital Improvements Plan

• Austin	
o Lagoon Upgrade	$75,000
▪ **Total**	**$75,000**

Recommendations

Forsyth Township was lucky enough to identify and immediately react to the largest need they had with their sewer system, the removal and replacement of sewer main in Gwinn. By solving that need immediately, Forsyth Township was able to greatly reduce the items that needed to be included in the 5-year and 20-year capital improvements plan. The implementation of the GIS mapping and Asset Management Database will greatly improvement the capabilities of Forsyth Township to monitor, maintain, and plan for its Sewer Collection and Treatment System.

We recommend the continued use of the GIS mapping and Asset Management Database. These items should be useful tools for everyone involved with the sewer system. The systems should be updated as aspects of the sewer system changes.

List of Major Assets

Below is a general list of the major assets identified in the AMP.

- *40,330 feet of 6-12 inch pipe*
- *163 manholes*
- *736 sewer service lines*
- *1 pump stations*
- *4 treatment lagoons*

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date **April 28, 2017**
(no later than 3 years from executed grant date)

Forsyth Township certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. **1265-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or **No**
   If No - Date of the rate methodology approval letter: **November 9, 2016.**
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Paula Sirois at 906-346-9217 Paula@forsythtwpmi.org
Name Phone Number Email

27 APR 17
Signature of Authorized Representative (Original Signature Required) Date

Joseph Boogren, Forsyth Township Supervisor
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Executive Summary of Wastewater Collection System

Prepared for:

Frankenlust Township

SAW Project No. 1040-01

2401 Delta Road, Bay City, Michigan 48706
www.frankenlust.com
Ron Campbell – Township Supervisor
989-686-5300

FINAL - May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for the Storm water, Asset Management, and Wastewater (SAW) Grant Program. In May 2014, the Township of Frankenlust received a SAW Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1040-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Township's publicly owned wastewater utility. The assets that comprise the utility include collection system piping and manholes, lift station/pump stations and force mains.

The SAW Grant amount awarded to Frankenlust Township was $471,785.00
The Local Match provided by Frankenlust Township was $52,421.00

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

Questions regarding the Asset Management Plan should be directed to:
Mr. Ron Campbell
Supervisor
Frankenlust Towhship
2401 Delta Road
Bay City, Michigan 48706-9340
989-686-5300
Email: rwc_supervisor@frankenlust.com

ASSET INVENTORY AND CONDITION ASSESSMENT

The wastewater collection system assets consist of approximately:

- Gravity Sewer (8 inch thru 24 Inch): 119,000 feet (22.5 miles)
- Force Main (6 inch thru 12 inch): 22,000 feet (4.2 miles)
- Manhole Structures: 486
- Sewer Lift Stations (Submersible): 3 Each
- Sewer Lift Stations (Can Type); 1 Each

These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The treatment of wastewater for Frankenlust Township is provided by the Bay County Department of Water & Sewer. The wastewater collection system is operated and maintained by the Bay County Department of Water & Sewer staff through a contract agreement.

An Asset Management Plan for the West Bay County Regional Wastewater Treatment Plant is being completed through a separate SAW Grant (Year 2) and is not included within the Frankenlust Asset Management Plan report.

Asset Identification and Location

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals, which included a review of the existing record drawings, field notes, staff knowledge, site visits and supplemented with field survey work.

Asset material, size and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data.

Spatial orientation (pipe location), pipe depth and invert elevations were determined through survey grade GPS equipment and a comprehensive evaluation of the gravity system.

This information was organized into a new (GIS) database and piping network for archiving, mapping and future evaluation purposes.

Condition Assessment and Expected Useful Life
A comprehensive evaluation of the collection system was performed.

NASSCO-MACP Level 1 manhole field based assessments were completed on 330 manhole structures that were assessible.
Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on approximately 82,000 LF of the gravity pipe.

The condition of the collection system assets reviewed ranged from Excellent to Good, with only a few minor deficiencies.

Capacity Analysis was modeled for average day and peak hour conditions in areas of concern.

Recommendations for short-term (1-5 year) and long term (6-20 year) system maintenance and improvements were identified. It is recommended to clean and televise the collection system on a 7 to 10-year rotating basis.

The condition of the assets at the lift stations range from Excellent to Fair. Ongoing maintenance has upheld the condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems. The recommendations for short term and long term improvements are relatively minor.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The overall objective of Frankenlust Township as it relates to their wastewater collection system is to adopt the following Level of Service (LOS) goals:

LEVEL OF SERVICE STATEMENT

The overall objective of Frankenlust Township is to provide reliable wastewater collection services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with local, state and federal regulations.
- Actively maintain collection system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment plant.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of the community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the township annually to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

To assure that LOS goals are met, performance measurements may need to be implemented. During the LOS review with the community the need for performance measurements was discussed.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score X Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset

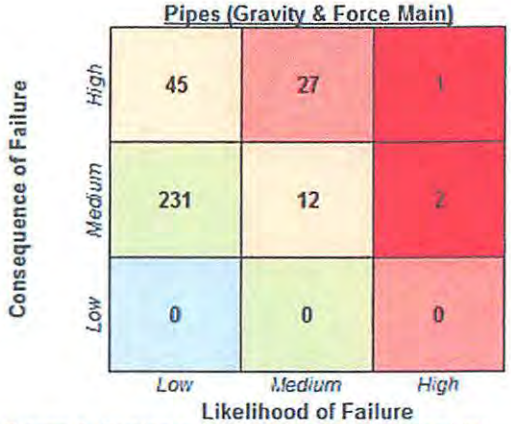
Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning template that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection system.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. Three pipe segments in the collection system have been identified with a high risk rating. All three are sags in the pipe. The Bay County Department of Water & Sewer will need to monitor these specific locations and may require occasional cleaning of the pipe. Much of the collection system's gravity pipes, 73 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes in relatively good condition.

Figure 2 provides the risk rating for the collection system manholes. There was 1 manhole frame and casting that needs to be replaced based upon the field assessment. This work will be scheduled for the fall of 2017. In addition, there were 156 manholes that are buried and need to be field located and have the manhole castings raised for future maintenance. Much of the collection system's manholes, 78 percent as shown in Figure 2, have a low to negligible risk rating and are indicative of manholes in relatively good condition.



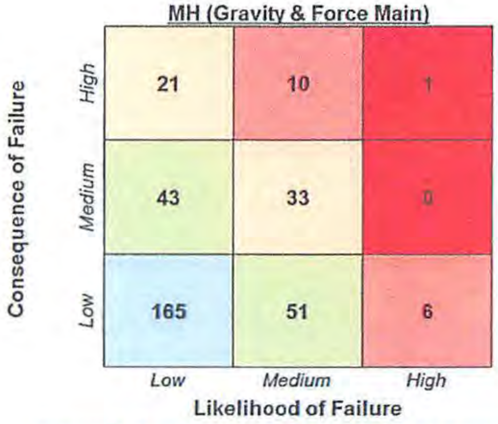
Pipes (Gravity & Force Main)

Consequence of Failure

	Low	Medium	High
High	45	27	1
Medium	231	12	2
Low	0	0	0

Likelihood of Failure

Figure 1. Business Risk Matrix (Risk Rating) by Number of Gravity and Force Main Pipes



MH (Gravity & Force Main)

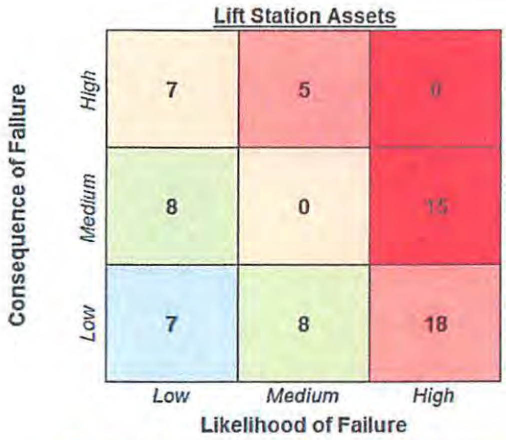
Consequence of Failure

	Low	Medium	High
High	21	10	1
Medium	43	33	0
Low	165	51	6

Likelihood of Failure

Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the lift station assets. Fifteen assets are identified as a high risk, most of which are due to being installed over 30 years ago. The fifteen assets with the high risk ratings will be replaced within the next 5 years.



Lift Station Assets

Consequence of Failure	Low	Medium	High
High	7	5	0
Medium	8	0	15
Low	7	8	18

Likelihood of Failure

Figure 3. Business Risk Matrix (Risk Rating) by Number of Lift Station Assets

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Township's wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system, pumping stations and force mains. From the BRE, a short-term (1-5 year) and long-term (6-20 year) CIP's were developed for the utility.

This AMP included a detailed condition assessment of the collection system including televising of pipe, and field condition assessments of all accessible sanitary manholes and lift stations.

Based on the AMP condition assessment of the sanitary sewer system, the Township has identified assets of the collection system and lift stations for improvement. These improvements can be completed with funding from the Township's sewer reserve account.

(1-5 Year) Capital Improvements include:

- Raise and inspect buried manhole structures
- SCADA/ Telemetry Upgrades at all the lift stations
- Pump replacement/rehabilitation improvements at Hotchkiss Lift Station (LS-8)
- Electrical system upgrades at various stations
- Lift Station Assets with a high risk rating

(6-20 Year) Capital Improvements include:

- Michigan Lift Station (LS-29) Rehabilitation Improvements

OPERATIONS, MAINTENANCE AND REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the function of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

An annual lift station equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement

(OM&R) funds and can be replaced by Bay County Department of Water & Sewer staff without bringing in an outside contractor. Existing disposable materials include, wear parts in pumps and motors, etc. The existing OM&R fund is sufficient for the current equipment and operations.

REVENUE STRUCTURE

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

The existing rates were determined to create sufficient funds to fulfill the day-to-day maintenance and operations of the entire sanitary collection system.

The MDEQ approved the Township's rate methodology on November 16, 2016.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date: May 31,2107
(no later than 3 years from executed grant date)

The **Township of Frankenlust** *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No.**1040-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e (3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No

   If No - Date of the rate methodology approval letter: November 16, 2016

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Ronald Campbell, Township Supervisor	989-686-5300	rwc_supervisor@frankenlust.com
Name	Phone Number	Email

5/30/17

Signature of Authorized Representative (Original Signature Required) Date

RONALD CAMPBELL SUPERVISOR

Print Name and Title of Authorized Representative

Prein&Newhof
Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

Memorandum

Date:	May 30, 2017
To:	Ms. Cindy Clendenon
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130411
Re:	Grand Haven-Spring Lake Sewer Authority SAW Grant: Summary of Wastewater Asset Management Plan

Ms. Clendenon,

This memorandum provides the summary of the Grand Haven-Spring Lake Sewer Authority's SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from recent MDEQ guidance.

Grand Haven – Spring Lake Sewer Authority SAW Grant

1525 Washington Avenue Grand Haven, MI 49417

Grandhaven.org

Contact Information for the grantee:

Mr. Dave Krohn, Superintendent; Steve Bruneau, Operations Supervisor

Address: 1525 Washington Avenue Grand Haven, MI 49417

Phone: 616-847-3486

Email: dkrohn@grandhaven.org

SAW Grant Project Number: 1478-01

Executive Summary

The Grand-Haven Spring Lake Sewer Authority received a SAW Grant in 2014 to prepare a Waste Water Asset Management Plan. The Grant agreement indicated the following amounts:

Plan Cost	Grant Amount	Local Match
$262,747	$236,472	$26,275

The Key components in their Asset Management Plan include:

a. Asset Inventory and Condition Assessment
b. Level of Service
c. Criticality of Assets
d. Operation and Maintenance Strategies/Revenue Structure
e. Long-term Funding/Capital Improvement Plan

Asset Inventory

"Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets."

All assets that are functionally or financially significant to the waste water system have been inventoried.

- Pump stations were located using survey quality GPS. Force Mains were included based on record plans.
- Fixed assets within the waste water treatment plant (WWTP) were mapped based on plant schematic and record drawings.

Locations for assets that have fixed geographic locations such as pipes, manholes, buildings, and major fixed equipment are recorded in a GIS. Data regarding date of installation, material, and other physical characteristics for each asset is incorporated into the GIS geodatabase.

Location of non-pipe assets such as pump station components, WWTP components, building components, and other equipment is compiled in a package of inventory spreadsheets and CMMS database. These assets were not mapped in GIS. CMMS software options in the final stages of selection. The GIS, asset spreadsheets, and CMMS will all be used to maintain asset data in the future.

Condition Assessment

"Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category."

Equipment within the WWTP was rated on a scale of 1-5 based on factors relating to physical condition and operating condition.

Percentage of WWTP Asset Components within each rating category

1	2	3	4	5
28%	42%	23%	6%	1%

Visual inspection and performance testing of pump stations and were completed to evaluate asset condition. Pump station assets, including pumps, valves, piping, structures, electrical, controls, and other assets were rated on a scale of 1-5.

Percentage of Pump Station Asset Components within each rating category

1	2	3	4	5
0%	33.3%	0%	33.3%	33.3%

Force main conditions were estimated using pipe age, material, and break history records, and were rated on a scale of 1-5.

Percentage of Force Main Asset Components within each rating category

1	2	3	4	5
0%	0%	60%	0%	40%

Level of Service Determination

"Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined."

We recognize that the people served by our system are more than customers, they are the system owners. Our staff acts as stewards of the system. We have held a series of meetings with treatment plant staff to present the results of our condition assessments, review the costs for meeting various Levels of Service, and reviewed the rate impacts of those options. This information was then presented to the Sewer Authority Board through separate meetings. Based on the input received during those meetings, we have established the following Level of Service Goals:

1. Meet Regulatory Requirements
    a. Maintain a specified number of Certified Operators
    b. Maintain our in-house testing abilities
    c. Continue our Industrial Pretreatment Program
2. Minimize Service Interruptions
    a. Staff/equip crews sufficiently to perform specific routine maintenance items
    b. Repair/replace assets as required to limit emergency responses to 5 per year
3. Minimize Public Hazards
    a. Staff/equip emergency response services for 24 hour per day service and 30 minute response times
    b. Limit service interruptions to less than 6 hours
4. Provide Capacity for Community Growth
5. Minimize Life Cycle Costs

Criticality of Assets

"Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?"

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions. The factors considered varied by the asset type and were tailored to identify both physical and functional deficiencies. For example, pipe ratings considered factors such as joint offsets and structural cracking while pump station pumps considered factors such as design pumping rate vs actual pumping rate.

Assets were given a Consequence of Failure (CoF) of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Are under major roads
- Are adjacent to waterways or significant wetlands

- Impacted the major treatment processes and restricted the plant from meeting permit limits.

Consequence of Failure and Criticality should not be confused. Criticality is the product of as asset's Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset's action priority. Criticality ratings were calculated and ranged from 1-25 (25 being the highest priority). The final Criticality ratings were considered when the comprehensive Capital Improvement Plan was generated.

Revenue Structure

"Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a "Test Year" was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.

The customer base was reviewed, including the number of billable customers and volumetric sales. Other operating and non-operating revenues were also evaluated. Prediction of customer and volume counts were made including trending in system utilization, projection of operating costs, and anticipated inflation by expense category. Refinancing and/or restructuring possibilities were also explored.

The CIP provided refined cost projections for the first 6 years of the financial analysis. The Asset Management System identified the estimated asset investment cost by year for the remaining lifecycle of all assets. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. Based on that analysis, rate adjustment options were identified. It was determined that the current rate structure was sufficient to cover O&M activities but increases to the plant modification fund may be needed to fully implement the desired CIP. Public meetings of the Sewer Authority Board were held to convey the results of the asset evaluation (RoF and Criticality) along with the financial evaluation. We are reviewing plant modification fund increases to provide our desired Level of Service.

Capital Improvement Plan

"Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects."

Once assets RoF ratings were assigned and actions prioritized using the Criticality ratings, action timelines were predicted for maintenance/repair/replacement.

Individual project scopes for the comprehensive CIP were created to maximize coordination of work on various assets and minimize overall costs. The CIP projects include improvements to the waste water system (both pump station/force main, and treatment). The CIP costs were incorporated into the revenue structure review. A 6-year CIP document was created which will be available to the public once the final rate structure has been adopted.

The projects identified in the CIP are:

- **Headworks Replacement**
- **Primary Sludge Pumps Replacement**
- **Grand Haven Pump Station Improvements**
- **Spring Lake Pump Station Improvements and Force Main Replacement**
- **Turbo Blower Replacement**
- **RAS Pumps Replacement**
- **Bioreactor Mixers**
- **Sludge Pump MCC Switch Replacement**

List of Major Assets

"Provide a general list of the major assets identified in the AMP"

Grand Haven-Spring Lake Sewer Authority major assets include:

- Waste Water Treatment Plant
- 3 pump stations
- 13,415 feet of sanitary force main

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 5/31/2017
(no later than 3 years from executed grant date)

The Grand Haven-Spring Lake Sewer Authority *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1478-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: ~~Yes~~ or **No**

   If No - Date of the rate methodology approval letter: October 11, 2016 .

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Steve Bruneau
sbruneau@grandhaven.org at Grand Haven.org 616-842-3215
Name Phone Number Email

5-25-17
Signature of Authorized Representative (Original Signature Required) Date

STEVE P BRUNEAU OPERATION SUPERVISOR
Print Name and Title of Authorized Representative

City of Grandville
15 Baldwin, Jenison MI 49428 – www.cityofgrandville.com
Mr. Todd Wibright, Superintendent – (616)457-0720
SAW Grant # 1078-01

Summary of Asset Management Plan

The City of Grandville's S! W Grant included asset inventory, condition assessment, criticality rating, and business risk determination of the collection system and treatment plant assets. The total grant amount was $303,903.00, of which the City paid for 10% with a local match. Overall, the system was in "good health" and the City successfully collects and treats wastewater from their community and the wholesale customer communities to within NPDES permit limits. The City maintains adequate staffing to appropriately manage the plant operations, maintenance, and laboratory functions to an above average level. The rates that the City currently charges the users are adequate to maintain the system and continue to perform modest capital upgrades to continue to improve the system.

Asset Inventory

The major task in the S! W Grant was reviewing and updating an inventory of the City's assets and rating their condition. Below is a summary of the collection and treatment plant assets and ratings.

Clean Water Plant Asset Inventory

The asset management inventory for the CWP contains all assets at the plant that have a value of over $1,000. The assets were organized by process or building, and include year installed, condition, and a variety of other attributes. The assets were inventoried with the use of plant as-built drawings and through coordination with the plant staff and their computerized maintenance management software, AllMax.

Collection System Inventory

The asset management spreadsheet for the collections system includes the gravity collection system, the lift stations, and the force mains. The spreadsheet was created with the use of GIS as-built records, and coordination with plant and DPW Staff. The condition rating of the collection infrastructure was done by a person with PACP/MACP certification. The lift stations were evaluated in the same manner as the CWP mechanical system assets.

Criticality of Assets

The rating of "Criticality" demonstrates how important the asset is to maintain a functioning system, and what would be the consequence of a failure of that asset. The performance rating for the consequence of failure is determined with consideration for social safety, economic and financial implications, and environmental impacts that would be affected if the asset were to fail. The assets were rated on a 1 to 5 scale based on criteria from MDEQ SAW Grant guidance.

Level of Service Determination

The Grandville Staff and Engineers had multiple discussions about the Level of Service Below is a summary of the Level of Service for the Grandville System:

1. THE PROTECTION OF PUBLIC HEALTH AND THE ENVIRONMENT
2. MAINTAIN A SUSTAINABLE SYSTEM
3. COMMUNICATE THE VALUE OF WATER RESOURCES

Revenue Structure

It was determined that the revenue structure was adequate to support the operations and maintenance, as well as capital improvements planned through the SAW analysis. The ordinances are in place to support this structure, and no immediate rate increases were required.

Capital Improvement Plan

Several processes in the Clean Water Plant have assets that have been flagged for replacement based on age or for improvement based on the business risk. While plant operations function properly at this time, capital improvements will proactively ensure treatment continues to operate and produce the desired LOS to the customer.

Summary of Major CWP Capital Improvement Projects

- Control Building Blower Improvements
- Blower Building Blower and Process Improvements
- Control Building Basement Mechanical Improvements
- Primary Tank and Final Clarifier Improvements
- UV and Outfall Improvements
- Gas Storage Building Drainage
- Super Tube and East RAS Improvements
- Screen #1 and #2 Improvements

Summary of Major Collection Systems Capital Improvements Projects

- Clean and Televise Collection System Lines (10% per year)
- CIPP Line Buck Creek Trunk Sewer
- CIPP Line Sewers based on hotspot map priority
- Replace several forcemains in critical areas.
- Replace gravity sewers in critical areas (if street project planned)

List of Major Assets:

Treatment Plant

- Screening Buildings and appurtances (2)
- Raw Sewage Pumps (4)
- Grit Removal Systems (2)
- Primary Collection Tanks (8)
- Aeration Tanks (9)
- Final Clarification Tanks (8)
- Ultraviolet Disinfection System (2 channels)
- Egg Shaped Anaerobic Digester
- Sieve Drum Concentrators (2)
- Rotary Fan Press
- Sludge Storage Tank (2.5 MG)

Collection System

- 327,527 lft of 8”-12” Gravity Piping
- 29,303 lft of 15”-18” Gravity Piping
- 14,045 lft of 18”-30” Gravity Piping
- Lift Stations (6)
- 686 lft of 6” Forcemain
- 1900 lft of 8” Forcemain
- 681 lft of 10” Forcemain
- 13,780 lft of 20” Forcemain

RECEIVED
MAR 16 2017
MOORE & BRUGGINK

DEQ

Department of Environmental Quality
SAW Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date April 2017
(no later than 3 years from executed grant date)

The City of Grandville (legal name of grantee) certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1078-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant. The Department of Environmental Quality (DEQ) defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gap in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.

Attached to this certification is a summary of the AMP that identifies major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Brian Hannon
Moore & Bruggink at 616-363-9801 bhannon@mbce.com
Name Phone Number Email

Rate Methodology was submitted to DEQ on: November 18-2016
(within 2 ½ years from date of executed grant)

An initial rate increase of 0 % of a $ N/A gap was adopted on N/A

Kenneth D. Krombeen 3/14/17
Signature of Authorized Representative (Original Signature Required) Date

Kenneth D. Krombeen
Print Name and Title of Authorized Representative

June 2014

GLWA
Great Lakes Water Authority

Financial Services Group
Public Finance
735 Randolph Street, Suite 1601
Detroit, Michigan 48226
Phone: 313-964-9201

May 31, 2017

Ms. Sonya T. Butler, Section Manager
Revolving Loan Section
Drinking Water & Municipal Assistance Division
Michigan Department of Environmental Quality
P.O. Box 30241
Lansing, Michigan 48909-7741

Attention: Ms. Cindy Clendenon:

Dear Ms. Butler:

RE: Stormwater, Asset Management, and Wastewater (SAW) Grant No. 1512-01

Attached hereto please find the Wastewater Asset Management Plan and Certificate of Project Completeness for the cited SAW Grant Project. It is our understanding that these documents fulfil the SAW Grant requirements.

Should you need additional information, please feel free to contact me at (313) 964-9489.

Sincerely,

Francine Duncan-Martin

Francine Duncan-Martin, MA
Professional Administrative Analyst
Public Finance

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 8, 2017
(no later than 3 years from executed grant date)

The Great Lakes Water Authority/Detroit Water & Sewerage Department *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1512-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No NO GAP

   If No - Date of the rate methodology approval letter: December 2, 2016 .

2) Significant Progress Made: Yes or No (Not Applicable)

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: (Not Applicable) .

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on (Not Applicable) .

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Michelle Zdrodowski (Public Request), Chief Public Affairs Officer, 313.224.4739, Michelle.Zdrodowski@glwater.org

Daniel Alford (DEQ Request), Maintenance & Engineering Director, 313.297.5910, daniel.alford@glwater.com

William M Wolfson for 5-19-17

Signature of Authorized Representative (Original Signature Required) Date

William M. Wolfson for

Sue McCormick , Chief Executive Officer

Print Name and Title of Authorized Representative

GLWA

Great Lakes Water Authority

SAW Grant Project Number 1512-01
Project Completion Report

May 8, 2017

Contents

Preface

SAW Grant Project Number 1512-01 funded two significant projects:

- Tucker Young Contract CS-1432A-Task 33 provided an inventory, condition assessments, and a Scheduled Replacement Program (SRP) for CSO and sewage pumping station assets
- EMA Contract CS-1596- Phase V-Tracks 1 to 3 provided maintenance and asset management Standard Business Processes (SBPs); criticality, reliability and Business Risk Exposure (BRE) ratings for 359[1] critical Water Resource Recovery Facility (WRRF) assets; and Streamlined Reliability Centered Maintenance analyses/PM Optimization for those 359 critical WRRF assets.

Additional progress toward a complete Asset Management Program for the Wastewater Operations Group (WWOG) has been reported to MDEQ in the Asset Management Program Implementation Annual Reports, submitted by October 1 each of the past 3 years.

Also, of significant progress to the overall Asset Management Program at GLWA, is the development of the Enterprise Asset Management Group and the development of a more formal Asset Management Strategic Organization governance structure.

Goal

The goal of the SAW Grant for an Asset Management Program is to develop a data-driven rate structure that meets the O&M and CIP revenue needs of the enterprise. To achieve this, the following elements must be included in an Asset Management Program:

1. Asset Inventory and Condition Assessment – Complete an inventory and condition assessment for the major WRRF, CSO and the Sewage Pumping Station assets.
2. Level of Service – Define Levels of Service for use in determining the criticality of assets.
3. Criticality and Business Risk Exposure – Rate the criticality of assets and develop a Business Risk Exposure (BRE) map identifying assets whose criticality and condition dictate improved O&M strategies, rehabilitation or replacement.
4. Operation and Maintenance Strategies/Revenue Structure – Review/update practices and procedures to lessen the likelihood of asset failure and calculate the cost of those strategies.
5. Long-Term Funding and Capital Improvement Planning – Design a rate structure to meet O&M expenses and CIP funding.

Progress in meeting the five objectives are reported in the following sections. Each section begins with the level of achievement for each objective as of November 26, 2013, when the SAW grant application was drafted; is followed by the evaluation of the current level of achievement; and concludes with a discussion of the ongoing work to achieve a complete and comprehensive program.

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[1] The 359 critical assets are actually comprised of 926 assets. One critical INCINERATOR asset, for example, is a collection of 12 individually managed assets within WAM

Asset Inventory and Condition Assessment

As of 11/26/2013: *ASSET INVENTORY AND CONDITION ASSESSMENT (APPROXIMATELY 80% COMPLETE)*

Current Level of Achievement:

Based on several completed and on-going audits, an estimated 96% WWOG vertical assets are in WAM. The numbers of vertical assets currently in WAM is shown in Table 1. The process used in developing the current inventory and condition assessments is summarized below:

- The WWOG vertical asset inventory was migrated to WAM in June 2014.
- The WRRF major process equipment inventory was completed in September 2014.
- New WRRF assets have been added and obsolete ones retired.
- An in-house audit of WRRF assets is on-going and has revealed some missing assets, predominantly HVAC and other support system assets.
- An inventory of Sewage Pumping Station and CSO assets in conjunction with the Scheduled Replacement Program (SRP) was completed in March of 2015. A subsequent notice of Completion was sent to MDEQ.
- Condition assessments were completed for the 359 WRRF critical assets in October 2014.
- The Asset Hierarchy was completed for all WWOG vertical assets in September 2015.
- Condition assessment and valuation of approximately 75% of the assets at the CSO facilities and Sewage Pumping Stations were completed by Duff and Phelps in the fall of 2016.

Table 1: Pumping Station, CSO and WRRF Assets in WAM

Sewage Pumping Stations	**No.**
Conner	105
Fairview	83
Freud	100
Northeast	116
Oakwood	31
Pumping Station Sub Total	**435**
CSO and Screening/Disinfection Facilities	**No.**
Oakwood	110
Baby Creek	125
Conner Creek	356
Hubbell Southfield	185
Leib	81
Puritan Fenkell	104
7 Mile Shiawassee	83
St Aubin	68
CSO Sub Total	**1112**
WRRF Process Areas	**No.**
Pump Stations	277
Preliminary Treatment	206
Primary Chemical Addition	74
Primary Sedimentation	351
Scum Handling	170
Secondary Aeration	380
Secondary Clarification	343
Process Water/Outfall	67
Chlorination/De-Chlorination	273
Sludge Processing	173
Dewatering	343
Incineration/Ash Handling	830
Central Offloading	62
Plant Control Center	44
Central Air Compressors/Boilers	101
Facilities	877
WRRF Sub Total	**4571**
Wastewater Operations Group Total	**6118**

Ongoing Efforts

Our ongoing efforts emphasize using WAM as the repository for asset data and the primary tool for asset management tasks. To achieve that, additional foundational work needs to be completed, particularly the development of key code tables and templates. Once completed, data that had been collected in spreadsheets will be uploaded into WAM.

- Continue development of WAM elements to facilitate better data collection, maintenance, and reporting.
- Continue to update WAM asset and maintenance data based on newly collected or found information.
- Develop means for WAM to communicate with other applications to improve asset data & coordination of asset work.

Level of Service

As of 11/26/2013: *LEVEL OF SERVICE (0% Complete)*

Current Level of Achievement: Environmental Levels of Service are based on NPDES Permit No. MI0022802 requirements.

Table 2: Levels of Service

Key Performance Indicators	Target LoS	Measured by
ENVIRONMENTAL		
Meet all effluent quality standards of NPDES Permit No. MI0022802, % of time	100%	Laboratory results
Maintain 1,700 MGD primary treatment storm event capacity, % of time	100%	Recorded flow
Maintain 930 MGD secondary treatment storm event capacity, % of time	100%	Recorded flow
Maintain storm event design capacities of all CSO/S&D facilities, % of time	100%	Recorded flow
Maintain dewatering capacity of 500 dtpd (average) and 850 dtpd (peak), % of time	100%	Calculated weight

Ongoing Efforts

- Develop, adopt and formalize Levels of Service at GLWA for the Wastewater Collection System.

Criticality and Business Risk Exposure

As of 11/26/2013: *CRITICALITY OF ASSETS (APPROXIMATELY 50% COMPLETE)*

Current Level of Achievement:

- A Standard Business Process (SBP) to rate an asset's Consequence of Failure (CoF) and Likelihood of Failure (LoF) was drafted.
- The criticality, or CoF, of the 359 critical WRRF assets was re-evaluated and used with the LoF (determined during the condition assessments) to arrive at Business Risk Exposure (BRE) scores. BRE analyses for the 359 critical WRRF assets was completed in September 2014.
- A CIP project prioritization model and accompanying guidance document was developed in May 2016 and used in the development of the 2018 5-year CIP. The model uses 8 weighted criteria (Condition, Performance, Regulatory, O&M, Public Health & Safety, Public Benefit, Financial and Efficiency) to rank overall CIP projects against each other.

Ongoing Efforts:

- Continue to develop and refine programs which will aid in the determination of criticality and business risk exposure.
- Continue to identify criticality and BRE for GLWA wastewater assets.

Operation and Maintenance Strategies/Revenue Structure

As of 11/26/2013: *OPERATION AND MAINTENANCE STRATEGIES & REVENUE STRUCTURE (0% Complete)*

Current Level of Achievement:

- A Standard Business Process, with illustrated Job Aid, for Maintenance Management was completed in August 2014. The SBP identifies the steps to follow, from initiating a Work Request to entry of failure, repair and cost data during job closeout.
- Streamlined Reliability Centered Maintenance (SRCM) analysis of the 359 critical WRRF assets was completed and a Notice of Completion submitted to MDEQ on March 11, 2015.
- Results of vibration analyses for the 359 critical, and many less critical pieces of process equipment at the WRRF and CSO facilities, began being rated within WAM in November 2015.
- Based on the SRCM analyses, targeted Preventive and Predictive Maintenance procedures and schedules were developed and a Notice of Completion submitted to MDEQ on March 22, 2016.
- The Preventive and Predictive Maintenance procedures were incorporated in WAM and a Notice of Completion submitted to MDEQ on October 17, 2016.

- Master Specifications (including templates for entering asset, spare parts, and maintenance data for upload to WAM) were implemented for asset rehabilitation/replacement contract data in May 2016.
- The rate methodology was submitted to MDEQ, and subsequently approved on December 2, 2016.

Ongoing Efforts

- Continue assessing wastewater assets for proper maintenance and failure modes and implement practices/maintenance programs to mitigate findings.
- Continue collection of maintenance data in WAM for analysis and refinement of asset maintenance practices.

Long-term Funding and Capital Improvement Planning

As of 11/26/2013: *LONG-TERM FUNDING & CAPITAL IMPROVEMENT PLANNING (NOT APPROXIMATED)*

Current Level of Achievement:

- CIP development still relies heavily on: Needs Assessments conducted every 3 years, the Scheduled Replacement Program forecasts with a 5 year horizon, and the results of the long-term master planning efforts.
- A more robust, transparent and customer partnering CIP process has been developed that utilize concepts of CoF and LoF to prioritize projects and ultimate funding.
- For the 359 critical WRRF assets, capital needs have been projected out 20 years using the WERF's Asset Renewal and Valuation Forecasting tool.
- The GLWA Fiscal Year 2017 Sewer System rate structure includes CIP revenue to fund ongoing and new CIP projects.

Ongoing Efforts

- Continue an annual CIP planning process and as asset management data and trends become available, use this data to drive the CIP.

HRC
HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915

HUBBELL, ROTH & CLARK, INC.
OFFICE: 555 Hulet Drive
Bloomfield Hills, MI 48302-0360
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Bloomfield Hills, MI 48303-0824
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WEBSITE: www.hrcengr.com
EMAIL: info@hrcengr.com

May 31, 2017

Michigan Department of Environmental Quality
Constitutional Hall
525 West Allegan Street
P.O. Box 30473
Lansing, Michigan 48909-7973

Attn: JoAnn Kalemkiewicz, Project Manager

Re: Stormwater, Asset Management, Wastewater (SAW) HRC Job No. 20130664
SAW Grant Project Number 1346-01
Wastewater Asset Management Plan
City of Grosse Pointe Farms, Wayne County, Michigan

Dear Ms. Kalemkiewicz:

On behalf of the City of Grosse Pointe Farms, Hubbell, Roth, & Clark, Inc. is pleased to submit the deliverables required for the City of Grosse Pointe Farm's Wastewater AMP. A brief discussion of each of the five major components is included along with a list of the plan's major identified assets. The signed Certification of Project Completeness form is included for the Wastewater AMP.

The City's Wastewater AMP will be available to the Department of Environmental Quality (DEQ) upon request, and a copy of the plan will be available to the public for at least 15 years. The City of Grosse Pointe Farms is reviewing the publication method, and it will be either uploaded to the city's website, emailed as requested, or copies made available at City Hall.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Jesse B. VanDeCreek

Jesse VanDeCreek, P.E.
Vice President

Edward Zmich
Project Manager

EDZ/edz
Attachment
cc: City of Grosse Pointe Farms; Shane Reeside, Terry Brennan, Scott Homminga
DEQ-WRD; SE MI District Office; C. Bennett
HRC; K. Stickel, S. Duffy, File

City of Grosse Pointe Farms, Michigan
Asset Management Plan – SAW Grant No. 1346-01
Wastewater Collection System

The total award amount of $514,232 was provided to the City of Grosse Pointe Farms to complete a Wastewater Asset Management Plan, with the City responsible for $51,423 in match funding. The final amount spent will not be available until the last disbursement request, after the May 31, 2017 deadline. The actual costs will be equal to the approved award amount.

Asset Inventory and Condition Assessment:

With the assistance of HRC, the City built a Geographic Information Systems (GIS) inventory, purchased the necessary hardware and software, and received training. The GIS includes fields to record the required criticality factors and hyperlinks to scanned utility plans. Representatives from HRC were physically able to assess 28% of the City's combined/sanitary manhole structure inventory. The City used their own forces from their Department of Public Works in conjunction with a contract with Art Tucker Excavating Co. to clean and televise approximately 25% of the City's eligible sanitary and/or combined sewer lines that were installed before 1960.

The City of Grosse Pointe Farms owns approximately 21 miles, or 111,000 lft, of gravity combined sewer in the Inland Sewer District and approximately 18 miles, or 95,000 lft, of gravity "wet" sanitary sewer in the Lakeside Sewer District. Nearly all of the combined sewers in the Inland District were constructed prior to 1960 and approximately 50,000 lft of the combined sewer had been cleaned and televised prior to the SAW grant award. Nearly all of the formerly-combined sewers in the Lakeside District which now serve as "wet" sanitary sewers (since the homes' footing drains are still connected) were also constructed prior to 1960 and approximately 25,000 lft of the "wet" sanitary sewer has been cleaned and televised in the last five (5) years. As mentioned above, approximately 25% of the remaining combined sewers in the Inland District as well as approximately 6% of the remaining "wet" sanitary sewers in the Lakeside District were investigated as part of the City's SAW program, which slightly exceeded the original scope of work for the grant (which proposed to televise and clean 15% of combined sewers in Inland District and 5% of sanitary sewers in Lakeside District).

In addition, the City inspected a total of 392 combined and "wet" sanitary sewer manholes on its system.

The breakdown of the assets investigated in this Study are as follows:

Asset Name/Class	Number of Unique Assets
Combined Sewer Manholes	143
Combined Sewer Gravity Mains	187 (7.9 miles)
Sanitary Manholes	249
Sanitary Gravity Mains	47 (1.8 miles)

Level of Service:

The City adopted a mission statement as part of the AMP as follows:

The City of Grosse Pointe Farms is committed to maintaining the performance of our combined and sanitary collection systems to meet applicable local, state and federal regulations and to protect public health and the environment. We strive to develop, operate and maintain these systems in the most cost-effective way to provide sustainable systems for present and future customers.

The City of Grosse Pointe Farms chose to implement its mission statement as the defined Level of Service. The City's mission statement considers the impacts to public health and the system's ability to comply with regulations. The current procedures and ongoing operations of the City have successfully fulfilled this mission and will continue to be implemented. Because the level of service provided to date has been adequate, public works leaders choose to continue their ongoing processes rather than defining specific goals to track at this time. The City will review the mission statement and ongoing system activities annually to determine if the mission is not being successfully fulfilled and further measurement of the stated goals is necessary.

Criticality of Assets:

Factors were developed to determine how some assets are more critical than others. A Probability of Failure (POF) was estimated for assets with inspection data based on condition, age, and other factors using the PACP/MACP methodology, which City staff were trained to utilize. A Consequence of Failure (COF) was determined by several attributes of the asset. These attributes include diameter, depth, location, surface type, and critical users. The product of these factors is the overall Business Risk Evaluation (BRE). Nearly one hundred percent (100%) of the City's combined/sanitary sewer lines investigated had a BRE score less than 10 on a scale of 1 to 25, with 1 being lowest risk. Even though the BRE scores are theoretically designed to be all-encompassing, this does not mean that there aren't individual sections of sewer requiring some level of rehabilitation, and ultimately, visual inspection data via sewer videos was utilized in order to justify those sections of sewer that would require rehabilitation. Further, another explanation for the low BRE scores would be that there were high quick rating scores (poor condition pipe) that occurred on low criticality pipes.

Of the 392 structures inspected by HRC, approximately fifty percent (50%) were considered "Good", seven percent (7%) were poor and the remaining structures were considered "Fair", however not in imminent risk of failure.

Operation and Maintenance Strategies/Revenue Structure:

The City of Grosse Pointe Farms conducted their own rate methodology study on October 12th, 2016, which MDEQ approved on October 17th, 2016. The City demonstrated that current revenues, with the existing sewer and water municipal bonds and annual sewer rate increases that have already been implemented, are sufficient to meet anticipated expenses.

Long-term Funding/Capital improvement Plan

Based on sewer issues discovered during the sewer televising and cleaning operations over the last three (3) year grant period, several sewer rehabilitation projects were bid and completed in that time, which included primarily sewer lining and a small amount of point repairs being performed. In the last five (5) years, the City has funded sewer rehabilitation projects by a combination of bond sales (municipal and SRF) and annual sewer rate increases (increases in each of the last 5 years) which ultimately pays the principal and interest on the bonds. The bonds and increased sewer rates have allowed the City to fund approximately $1.56 million in sewer rehabilitation between fiscal years 2014 and 2017 with $400,000 already budgeted for fiscal year 2018. The 2018 budget is in accordance with the average annual expenditures over the last four (4) years, as indicated above, as the City's Sewer Rehabilitation Budget is prepared annually based on known/scheduled projects and past history of normal repairs.

Typically, the City promptly plans and completes rehabilitation of sewer sections found to be have deficiencies as they find them, whether the probability of failure is imminent or rehabilitation is warranted due to other infrastructure projects proposed in the area. The City intends on continuing this practice.

There are several locations that have been identified in the combined sewer system (Inland District) as well a couple in the sanitary sewer system (Lakeside District) for repair or rehabilitation (point repairs, full line pipe replacement) that will be required in the near future with a total estimated cost of $260,000. These projects will be completed over the next two (2) years and paid for using the City's existing sewer bonds and the annual sewer rate increases. In addition, there were several locations in both the combined and sanitary sewer systems that will require sewer grouting and/or lining over the next 5-10 years with a total estimated cost of $1,800,000. The annual sewer operating budget also includes the cost to clean and televise the City combined sewer (Inland) and sanitary sewer (Lakeside) systems once every ten (10) years – a schedule that the City has typically been able to adhere to. This will assist the City to identify areas for necessary capital improvements.

A signed Certification of Project Completeness form is enclosed. Contact information for the grantee including name, address, and phone number is included below:

Grantee: City of Grosse Pointe Farms, Michigan

90 Kerby Road
Grosse Pointe Farms, MI 48236
Phone: 313-885-6600

City Hall Hours:
Monday - Friday: 8:30am-4:30pm
Closed on Holidays.

Shane Reeside, City Manager
Phone: (313) 885-6600
E-mail: sreeside@grossepointefarms.org

Terry Brennan, Director Public Services
Phone: (313) 885-6600
E-mail: tbrennan@grossepointefarms.org

Edward Zmich, Consulting Engineer
Hubbell, Roth & Clark, Inc.
Phone: 248-454-6302
E-mail: ezmich@hrcengr.com

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date MAY 31, 2017
(no later than 3 years from executed grant date)

The CITY OF GROSSE POINTE FARMS *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1346-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: OCTOBER 17, 2017.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

SHANE REESIDE at 313-885-6600 SREESIDE@GROSSEPOINTEFARMS.ORG
Name Phone Number Email

5/26/17
Signature of Authorized Representative (Original Signature Required) Date

Shane Reeside, City Manager
Print Name and Title of Authorized Representative

GROVENBURG AND MENGER CONSOLIDATED DRAIN DRAINAGE DISTRICT
SAW Grant Project No. 1063-01

EXECUTIVE SUMMARY

Prepared by: **SPICER GROUP, INC.**
416 N. Homer, Ste. 109
Lansing, MI 48912
(989) 513-4494
Max Clever, P.E., P.S., Project Manager

Owner: **GROVENBURG AND MENGER CONSOLIDATED DRAIN DRAINAGE DISTRICT**
707 Buhl Ave.
Mason, MI 48854
(517) 676-8395
Patrick Lindemann, Drain Commissioner

On May 8, 2014, the Grovenburg and Menger Consolidated Drain Drainage District entered into an agreement with the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The District received the follow grant:

Stormwater Asset Management Plan (SWAMP) – 90% Grant	***$737,240***
Eligible Cost Subtotal	$737,240
LESS Local Match	($73,724)
Total Grant Amount	$663,516

The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; May 2017.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Level of Service Determination
- Critical Assets (Risk)
- Revenue Structure
- Capital Improvement Plan

Part 1: Stormwater Asset Inventory and Condition Assessment

For the District's stormwater collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire City, and used the survey information to develop a comprehensive Geographic Information System (GIS) including all stormwater assets (manholes, catchbasins, culvert outlets, etc.). The GIS information is utilized via iPads and desktop computers in the Drain Office office, and is a detailed “smart” mapping system, using the ArcMap software by ESRI. This system can be accessed and updated in the field by DPW staff from new iPads supplied as part of the SAW grant project. From the GIS, as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspections, ownership information etc. can be accessed. This information can also be queried to provide specific lists, maps, and reports. It is updated easily when future improvements are made.

The District owned and operated stormwater collection system is approximately 24 miles in length and includes approximately 13 miles of storm sewer pipes ranging in diameter size from 4”- 72”. The collection system consists of mainline sewer, catchbasin leads, and culverts. In addition, the District has approximately 520 structures consisting of manholes, catchbasins, cleanouts, and outlets. The District’s storm sewers discharge into several detention basins before ultimately discharging into the Grand River. Summary tables are listed below for District owned and operated structures and pipes.

Table 1: PIPE DIAMETER BY LENGTH

Diameter	**Length (ft)**	**Percent**	**Length (miles)**
4”	1,435	2.08	0.27
6”	1,563	2.27	0.30
8"	4,380	6.35	0.83
10"	1,315	1.91	0.25
12"	21,043	30.50	3.99
15"	6,993	10.13	1.32
18”	5,483	7.95	1.04
21”	814	1.18	0.15
24”	8,463	12.27	1.60
27”	487	0.71	0.09
30”	205	0.30	0.04
36”	1,134	1.64	0.21
48”	611	0.89	0.12
72”	49	0.07	0.01
Unknown	15,026	21.78	2.85
TOTAL	**69,001**	**100%**	**13.07**

Table 2: Structure Types

Structure Type	**Number**
Catchbasins	270
Manholes	160
Cleanouts	31
Outlets	59
TOTAL	520

Not every pipe and structure owned and operated by the District could be investigated/inventoried due to perpetual water in the system and access limitations. Emphasis was placed on performing condition assessments for the mainline sewers and mainline manholes and catchbasins.

The Drain Office Staff completed a cleaning and televising program on approximately 373 of the storm pipe segments in the collection system. Spicer Group performed comprehensive inspection for all of the District's mainline stormwater manholes and catchbasins. The NASSCO Manhole/Pipeline Assessment Certification Program (MACP/PACP) standards were used to identify and code defects, and apply standardized grading/scoring to provide overall condition ratings of the stormwater assets.

Part 2: Level of Service (LOS)

The next phase of the AMP is a Level of Service determination. What level of stormwater service does the Drain Office want to provide to its customers? How are projects going to be prioritized and included in the CIP? What cost is the District willing to endure to provide that level of service? These are all questions that were discussed as a part of the overall asset management plan.

The Drain Commissioner has published *Rules of the Ingham County Drain Commissioner*, which provide the standards required for engineering of storm sewer systems. Supplemental standards were also developed for these rules through this SAW Grant. The stormwater conveyance section of the rule book was applied in rating the hydraulics of the pipes in the system. The following rules were the key requirements in the rulebook for evaluating the enclosed drainage systems:

- Enclosed storm drain systems will be sized to accommodate the 10-year storm, with the hydraulic gradient kept below the top of the pipe.
- For residential developments and commercial projects smaller than 10 acres in size, a time of concentration of 15 minutes shall be used. Other situations may require that the time of concentration be calculated using TR-55 or equivalent method.

Maintenance is also scheduled so that all catchbasins are cleaned every 3 years on average. Storm pipes are cleaned out as determined needed by maintenance staff and on a complaint basis. Also, there are maintenance agreements between the Drain Office and landowners for maintenance of private drainage systems that outlet into the County Drain.

Part 3: Criticality (Risk)

For each asset in the District's stormwater collection system, a criticality/risk analysis was performed to determine and prioritize the District's key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for assets; including pipes, manholes, and drainage structures, etc. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on the economic and hydraulic impacts. Finally, the Criticality (Risk) score was calculated using:

$$\textbf{RISK} = \textbf{LoF} \times \textbf{CoF}$$

For the District's stormwater collection system, there was 1 pipe and 3 structure locations identified with a high CoF score. Also, 11 pipes and 24 structure locations with high LoF scores. These scores were evaluated and incorporated into the resulting Capital Improvement Plan.

Part 4: Revenue Structure

Yearly Maintenance Budget

The yearly maintenance budget of county drains is established from Section 280.196 Subsection 4 of the Drain Code of 1956 as $5,000 per mile of drain. The Grovenburg and Menger Consolidated Drain contains 24 maintenance miles of drain. Therefore, in a given year, the Drainage District is able to assess a maximum of $120,000 to the assessment roll on record for work defined as maintenance under said section of the Drain Code.

Equipment Costs

Non-personnel related costs are recorded on a per unit basis of use during maintenance and inspection activities in order to recoup costs. This includes vehicles, excavators, cleaning trucks and televising equipment.

Part 5: Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the stormwater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP. The Drain Office is limited to maintenance and inspection activities by the Drain Code of 1956. It should be noted that there are areas of the storm sewer with high risk scores that present a problem that can only be resolved with a petition to the Drain Office.

This results in the CIP plan including the following projects:

1. Complete investigation and condition assessment for remaining structures not performed in SAW.
2. Misc. Catchbasin and Manhole Repairs ($7,000)
3. Misc. Sewer Repairs, Root removals, Spot Liners Projects for approximately 1,000 feet. ($4,000)

Conclusion

The Grovenburg and Menger Consolidated Drain Drainage District stormwater system is relatively new with an average remaining life of approximately 50 years on most of the storm sewer. Since its establishment it has been regularly maintained and therefore most pipes and structures in the system are in good condition.

In accordance with the SAW Grant requirements, the District's Stormwater Asset Management Plan (SWAMP) needs to be kept available for citizen review for 15 years. The SWAMP should be reviewed annually, and the components updated and included in the District's annual budget process.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date **May 31, 2017**
(no later than 3 years from executed grant date)

The Grovenburg and Menger Consolidated Drain Drainage District *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1063-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Patrick Lindemann, Drain Commissioner at (517) 676-8395 patricklindemann@me.com
Name Phone Number Email

5-31-2017
Signature of Authorized Representative (Original Signature Required) Date

PATRICK E. LINDEMANN - INGHAM COUNTY DRAIN COMMISSIONER
Print Name and Title of Authorized Representative

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The Gull Lake Sewer & Water Authority *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1489-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No] NO FUNDING GAP
   If No - Date of the rate methodology approval letter: October 17, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Richard Pierson at 269-731-4595 piersonr@glswa.org
Name / Phone Number / Email

May 31, 2017
Signature of Authorized Representative (Original Signature Required) / Date

Richard Pierson, Executive Director, Gull Lake Sewer & Water Authority
Print Name and Title of Authorized Representative

April 2017

Gull Lake Sewer & Water Authority
7722 N. 37th Street
Richland, Michigan 49083
Phone: (269) 731-4595
Fax: (269) 731-2596
www.glswa.org

May 31, 2017 DEQ Project #: 1489-01

SAW – Asset Management Summary of Asset Management Plan plus List of Major Assets

Summary of Asset Management Plan:

The Gull Lake Sewer + Water Authority deals primarily with Sanitary Sewer Collection pipes, pump stations and ancillary equipment. Wastewater is pumped to Kalamazoo's Regional Facility. The Authority has significantly completed its Asset Management Plan per the SAW Grant requirements in the three year period ending May 31, 2017. The Authority performed much of the work in-house with internal staff in order to maximize the benefit to the staff and to the organization as a whole. The Authority evaluated all of its critical assets, reviewed its operations and maintenance techniques, determined the criticality (0-25 with 25 being highest) of each Functionally and Financially Significant Asset, determined when to replace or rehabilitate the asset and the cost, including a 2% per year inflationary factor on price increase. The Authority used a 50-year time frame for the evaluation and most everything is contained in that time frame.

Although no gap existed per the October 17, 2016 evaluation by Umbaugh & Associates, there is no mandatory rate increase; however, based on follow-up recommendations by Umbaugh, the Authority is considering rate increases on April 1, 2018 to fund its upcoming capital program and increase the sustainability of the sewer system assets.

The Authority is appreciative of the opportunity to participate in the SAW grant program and intends to update its Asset Management Plan annually.

List of Major Assets:

Description	Additional Descriptor	Numbering Range	Appr #	Year(s) installed	Criticality Range
Air Release Valves	Force Main AR Valves	AR01001 – AR42002	35	1982 to present	4
Clean Outs	Force Main Clean Outs	CO01001 – CO42004	106	1982 to present	4
Gravity Clean Outs	Gravity Main Clean Outs	CO99001 – CO99015	15	1982 to present	4
Force Mains	Pressurized force mains	FM01063 – FM42091	36	1982 to present	1-20
Force Main Valves	FM Isolation Valves	FV30001 – FV34018	21	1982 to present	10
Gravity Mains	Gravity Sewer Pipes	GM00011 – GM01428	1223	1982 to present	2-20
Grinder Pumps	Individual Household	GP00001 – GP00236	70	1982 to present	9
Manholes	Manholes	MH00000 – MH01422	1221	1982 to present	5
Meter Pit	Vault containing Meter	MP34001 – MP41001	2	2000 to present	2-6
Pumping Stations	Pumping Stations	PS01001 – PS42009	36	1982 to present	1-16
Generators	Permanent/Portable	GN01001 – GN42021	23	1992 to present	5-9
Trucks / Vehicles	Rolling Stock	TR00001 – VH00009	14	2000 to present	1-3
Equipment	Equipment	EQ00100 – EQ00200	11	2000 to present	1-5
Office Building	Office / Pole Buildings	OB01001 – OB01002	2	1985 to present	1-5

Prepared by: R. Pierson, Director on May 31, 2017: ____________________

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The Charter Township of Harrison *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1054-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: November 18, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ________________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Kenneth J. Verkest, Supervisor	at 586-466-1446	kverkest@harrison-township.org
Name	Phone Number	Email

	May 31, 2017
Signature of Authorized Representative (Original Signature Required)	Date

Kenneth J. Verkest, Supervisor
Print Name and Title of Authorized Representative

STORMWATER, ASSET MANAGEMENT, AND WASTWATER (SAW) REPORT

PROJECT 1054-01

PREPARED FOR:

CHARTER TOWNSHIP OF HARRISON
38151 L'ANSE CREUSE
HARRISON TOWNSHIP, MI 48045
KENNETH J. VERKEST, SUPERVISOR
586-466-1446

Prepared by:
Wade Trim Associates, Inc.
25251 Northline Road
Taylor, MI 48158
(734) 947-2690

May 31, 2017

1.0 Executive Summary

Harrison Township undertook the development of an Asset Management Program for the sanitary sewer system owned and/or operated by the Township. The Township applied for and received a grant to develop a Program through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Wastewater and Asset Management (SAW) program. The grant provides up to $1,366,594.00 in grant funding with a local match of $233,309.00. These funds can be used for costs related to developing an asset management program, and for design engineering for two projects that were identified in the grant application. Documentation for the construction projects as required by the grant has been provided to the MDEQ under separate cover. The SAW Asset Management Program was established by the MDEQ in order to help communities move toward financial sustainability in maintaining their wastewater assets. Outside funding sources for wastewater systems are typically no longer available and, therefore, the MDEQ is encouraging municipalities to move toward becoming self-sustaining enterprises for their utility systems.

What is an Asset Management Program?

The *International Infrastructure Management Manual* defines the goal of asset management as meeting a required level of service in the most cost-effective way through the creation, acquisition, operation, maintenance, rehabilitation, and disposal of assets to provide for present and future customers.

An Asset Management Program includes a set of procedures to manage assets based on principles of lifecycle costing implemented in a programmatic way. The intent of asset management is to ensure the long-term sustainability of the utility. By helping a utility manager make better decisions on when it is most appropriate to repair, replace, or rehabilitate particular assets and by developing a long-term funding strategy, the utility can ensure its ability to deliver the required level of service perpetually.

Effective asset management implementation is comprehensive. It may involve integrating a number of tools along with other existing systems (accounting, financial reporting, purchasing and stores, payroll, etc.) to create a comprehensive information system that will support an integrated Asset Management Program. Properly practiced, it involves all parts of the organization and entails a living set of performance goals.

A good Program is not "done" and put on a shelf, but rather provides a framework of tools that may be continuously used for decision making. It is an active, on-going process that provides information to managers in order to make sound decisions about their capital assets and allows decision makers to better identify and manage needed investments in their utility's infrastructure. The Program tools may be used for tasks such as reviewing and establishing annual budgets, planning improvements, determining required staffing, and communicating performance with the public and regulatory agencies.

What is an Asset Management Plan?

An Asset Management Plan ("AMP") is a tool to help the utility implement its Asset Management Program. The purpose of this report is to focus on the AMP developed for the wastewater system with a focus on the next 20 years. The goal of the AMP is to provide the Township with a cost-effective and results oriented program.

The AMP provides Harrison Township with a guide to continue to provide the desired level of service to the community at the lowest lifecycle costs for the wastewater system. This will be achieved by developing a strategic process to perform proactive maintenance and investment in the system, rather than just reacting to failures. The AMP will be re-visited at periodic intervals to confirm that priorities and objectives are being addressed and updated.

The scope of work for this AMP consists of addressing the five core components as described in the Michigan Department of Environmental Quality's (MDEQ) document, "Asset Management Guidance for Wastewater and Stormwater Systems." These include:

- Development of an Asset Inventory and Estimating Condition of Assets
- Identifying Critical Assets
- Identifying the Proposed Level of Service
- Capital Improvement Planning
- Establishing a Revenue Structure

Wastewater Asset Inventory

The assets that are the focus of this AMP include the sanitary sewer system, more specifically, the pipe networks, structures and pump stations. The Township owns and maintains 435,924 feet of sanitary sewer, 2038 sanitary manholes and 18 sanitary pump stations. Under the SAW Grant the Township televised 310,985 linear feet of sanitary sewer ranging in diameter from 8-inch to 36-inch, which represents 71% of the sanitary sewer system. 1,671 structures were inspected representing 82% of the manholes, and all the pump stations were inspected.

Harrison Township utilized their existing Geographic Information System (GIS) geodatabase as the platform to implement the work scope approved through the SAW grant. GIS was the primary means to record and map the assets in each utility system. This geodatabase is part of the overall Township GIS system, which is operated and maintained by Township with assistance from Macomb County and/or a consultant as need dictates. The software used as the platform is ESRI ArcGIS. The geodatabase provides a means to record the attributes associated with each asset, such as installation date (age), size and material.

As part of the SAW grant, the existing GIS system was expanded upon by incorporating new structure and pipe data acquired through the inspection and videotaping of select sections of the Township wastewater system. All relevant fields were populated and linked to the GIS system. With this information, the Township can quickly determine sizes, lengths, condition, location, etc. of the pipes or structures within the system.

Condition Assessment

The primary means of condition assessment for enclosed sewers, manholes and leads was to use criteria developed under the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP), Manhole Assessment Certification Program (MACP) and the Lead Assessment Certification Program (LACP). These programs provide standards for defect identification and assessment using a consistent and repeatable method to identify, evaluate and manage pipelines, manholes and leads.

The use of Closed-Circuit Televising (CCTV) for obtaining videos was used to allow the interior condition of enclosed pipes to be observed and defects noted. The use of NASSCO's PACP/MACP assessment program system identifies pipe and manhole features and defects using specific identifiers so that terms such as "crack" or "fracture" are used consistently by staff certified under the Program.

Defects that are found are weighted with scores on a severity scale of 1 to 5, with a "1" meaning the defect is minor and a "5" indicating the defect is significant. Defects are classified into two primary categories – Structural and Operation and Maintenance. Overall pipe grades are provided in several ways, including a "Quick Structural Rating" (QSR), a Quick Maintenance Rating (QMR), and an Overall Quick Rating (QPR). These ratings are scored as a four-digit number from 5Z5Z to 0000; the higher the rating the worse the condition.

CCTV data collected during assessments made by contractors was tracked using unique asset IDs. The unique asset IDs for each asset being assessed are used during the inspection process to ensure any collected data can be directly imported into the GIS geodatabase.

The NASSCO MACP program includes "Level 1" and "Level 2" inspections. Level 1 inspections are made by opening the manhole or structure and collecting some limited data that is visible from the surface without entering the manhole. Level 2 inspections are similar to the pipeline CCTV in that defects and features are systematically cataloged along the length of the structure. This is usually done by entering the manhole or structure, typically under a confined space program, or by scanning the manhole with digital equipment. Harrison Township implemented a "Level 1 plus" level of inspection. This inspection is performed from the surface, but includes additional data beyond MACP's typical Level 1 assessment that will be used for condition assessment and overall evaluation of the structure.

Each run of pipe that was televised using Closed Circuit Television (CCTV) was categorized based on ID number, street/easement location and condition with feature classes for each as well as pipe diameter, lengths, etc. This information has been added to the Township's GIS geodatabase and is in spreadsheet format as well. The following table shows the pipe sizes and condition of the pipes that were inspected.

Pipe Size	Length Inspected (feet)	Length in Good Condition	Percent in Good Condition
8-inch	8,417	8,251	98%
10-inch	122,529	111,022	91%
12-inch	110,141	100,840	92%
14-inch	7,456	7,456	100%
15-inch	26,827	22,930	85%
18-inch	23,057	20,992	91%
21-inch	1,814	1,502	83%
27-inch	3,212	2,960	92%
30-inch	7,297	7,297	100%
36-inch	235	235	100%
Total	310,985	283,485	91%

Each manhole that was physically inspected was categorized based on ID number, street/easement location and condition with feature classes for each. This information has been added to the Township's GIS geodatabase and is in spreadsheet format as well.

Level of Service Determination

As part of preparing the AMP Harrison Township considered what an appropriate level of service should be for their sanitary sewer system. From a regulatory perspective, the expected performance criteria are that there not be any sanitary sewer overflows (SSOs) and that there not be excessive Inflow/Infiltration such that the system does not have the ability to transport and treat the wastewater. From a Harrison Township resident perspective, the expected performance criteria are that they system works when needed (flush and it goes away) and that the cost of operating the system is as low as possible. In addition to these criteria the Township has a basic obligation to prevent ground water or surface water contamination and to operate their system in a cost-effective manner. Basically they need to be good stewards of the public interest and public funds.

Based on these criteria Harrison Township has adopted a pass/fail system for level of service as it pertains to the sanitary sewer system. It seemed as through a graduated scale for level of service did not match well with the expectations. Those expectations tend to require that either the either the system works or it does not work. A partially functioning system either functions enough to allow flow to go through (pass) or it is causing back-ups (fail).

The baseline Level of Service was established for manholes and pipe segments based on a model of the sanitary sewer system. This model was created in SewerGEMS as part of the scope of the SAW Grant. The model was calibrated based on actual metered flows as measured at strategic locations in the system. The modeling results showed that all of the pipes in the sanitary sewer system was adequate for current flow requirements, however there are two pump stations that will need increased capacity to accommodate future demands. Approximately 71% of the sewer system has been cleaned and televised and found to be functioning (pass). Eight locations were found with structural failures that require capital investment to repair, however none would cause SSOs or back-ups into private residences.

Criticality of Assets

Not all assets are equally important to the utility's operation. Some assets are highly critical to maintaining operations, and others could be out of service for a period of time without negative consequences. Certain types of assets may be critical in one location, but not critical in another. For example, a pump station serving a very large commercial and residential area may be deemed more critical than a pump station servicing a small stormwater basin. A utility must examine its assets very carefully to determine which assets are critical and why.
In determining criticality, two questions are important. The first is how likely it is that the asset will fail and, the second is, what is the consequence of failure. By developing a scoring scale for these two measures, and then combining the two results, the overall risk of an individual asset can be quantified. Determining an asset's overall risk will allow a utility to manage its risk and aid in determining where to spend operation and maintenance dollars and plan capital expenditures.

Probability of Failure (POF)

To estimate the Probability of Failure (POF) of a given asset, Harrison Township looked at a number of factors such as asset age, condition of asset, failure history, historical knowledge, experiences with that type of asset in general, maintenance records, and other knowledge regarding how that type of asset is likely to fail. POF ratings were weighted using significant factors of that asset type with scoring values from 1 to 5, with "1" being the least likely to fail and "5" being the most likely to fail and assigned to each asset (sanitary sewers, storm sewers, associated structures and pump stations).

Probability of failure typically increases as an asset ages or continues to operate. Risk associated with assets with high probabilities of failure may be reduced, if warranted, by increasing the level of maintenance, frequency of replacement, or by providing redundancy.

Consequence of Failure (COF)

To estimate the potential Consequence of Failure (COF) of a given asset, it is important to consider all potential costs associated with failure of that asset. These can include not only costs to repair and/or replace the asset, but also social costs associated with the loss of the asset, repair/replacement costs and legal costs related to collateral damage caused by the failure, environmental costs, loss of business revenue to the community, impacts to the public, and other types of losses. The consequence of failure can be high if any one of these costs is significant or the accumulation of several costs occur with a failure. Harrison Township used weighted COF ratings using significant factors of that asset type with scoring values from 1 to 5, with "1" having the lowest potential cost impacts due to failure and "5" having the highest potential cost impacts. Each asset type within the study group (sanitary sewer, storm sewer, associated structures and pump stations) was rated.

The consequence of failure typically is established when the asset is placed into operation and remains the same over the asset's lifecycle. Risk associated with assets with high consequences of failure is primarily managed by reducing the probability of sudden failure through increased maintenance and replacement.

Risk Evaluation

The assets that have the greatest probability of failure and the greatest consequences associated with the failure will be the assets that are the most critical. The Risk Evaluation score takes into account the POF and COF shown below. Adjustments are then made to take into account any redundancy available that would mitigate the consequence of failure.

$$Risk = POF \times COF$$

Assets with the highest Risk scores are likely candidates for immediate rehabilitation or replacement. Assets with lower scores should be analyzed to develop the best lifecycle strategy. If an asset's potential modes of failure and risks of failure are understood, it is possible to leverage use of the asset for a longer period and ensure the useful life is maximized before investing in replacement.

For some assets with a low consequence of failure, it may be most cost effective to operate in a "run to failure" mode where the asset is operated until it can no longer function. Preventive and predictive maintenance programs are most cost effective for assets with higher consequences of failure.

Risk should be managed in any decision-making process. The utility should analyze and document acceptable risk tolerance for all critical assets. The condition of the asset will change over time as will the consequences related to failure. It will be necessary to periodically review the criticality analysis and make adjustments to account for changes in the probability and consequence of any asset failures. As with all the components of the Asset Management Program, the criticality analysis is an on-going process.

Revenue Structure

Harrison Township has been proactive in adjusting sanitary rates to keep pace with the cost of transport and treatment costs as well as capital and preventive maintenance. The Township Board has a standing policy to automatically pass on any increase in transport or treatment costs from either Macomb County or the Great Lakes Water Authority (GLWA) to the system users. The township portion of the rates are reviewed annually with the budget to ensure that costs for operating and maintaining the system are accounted for in the user rates.

In order to keep the Harrison Township Sanitary Sewer System sustainable into the future, it will require a funding mechanism that can provide for all of the anticipated operation, maintenance and capital improvement costs over the short and long-term. A budget for the sewer system was prepared and a demonstration of rate sufficiency was submitted and subsequently approved the MDEQ as part of the SAW Grant requirements on November 18, 2016.

Capital Improvement Plan

Capital Improvement Plans (CIP) identify system upgrade, rehabilitation and replacement needs for the future, typically over a period of 20 years, with greater emphasis on the first five years of the plan. For purposes of the CIP pipe and manhole inspection defect ratings were divided into two categories; those requiring physical repairs were classified as capital expenditures. All others were classified as maintenance and on-going monitoring. Similarly pipe defects requiring capital investment were identified and all other defects were classified as maintenance.

The CCTV inspection of the sanitary pipe network showed that a total of 242 pipe segments were found to have issues that needed to be repaired or cleaned and re-televised. Of these 242 pipe segments only 8 had structural defects that will require capital investment. Of the 1,671 manholes that were inspected 257 (15%) were found to need repair. The majority of these manholes only require replacement of missing mortar or sealing. Most of the sanitary pump stations are in need of replacement due to their age and the high consequence of failure. The following projects have been identified in the Capital Improvement Plan:

<u>Manhole Rehabilitation Project, Phase 1 and Phase 2</u>

The asset inspections showed a total of 258 manholes were found to have defects. The estimated cost to address these defects is $104,775. The Township plans to approach this project in two phases completing roughly 50% of the repairs each year.

<u>Pipeline Repairs</u>

During inspection eight pipe sections were found to have structural defects requiring repair. The estimated cost for the structural pipe repair work is $22,875.

<u>Pipeline Cleaning/Televising</u>

CCTV inspection of the sanitary sewer resulted in 234 pipe sections requiring cleaning and reinspection. The estimated cost for cleaning and televising is $240,00. The Township plans to do this work over a period of 4 years with approximately $60,00 budgeted each year.

Pump Station Rehabilitation

The majority of the Township CIP for the sanitary sewer system is to rebuild or replace sanitary pump stations. The following pump stations will be rebuilt or replaced:

Coleridge Pump Station	$1,400,000
Prentiss Pump Station	$1,000,000
Catfish Channel Pump Station	$400,000
North River Road Pump Station	$400,000
Crocker/Jefferson Pump Station	$650,000

List of Major Assets

The major assets that comprise the Harrison Township Sanitary Sewer System consist of the following:

- 435,924 feet of sanitary sewer ranging from 8-inch to 36-inch diameter
- 2038 sanitary manholes
- 18 sanitary pump stations

For SAW Required Reporting

This AMP includes a certification of project completion for the MDEQ's SAW Grant Program. In addition, we understand a summary of this report will be posted on MDEQ's website and materials made available to the public upon request. We also understand the AMP shall be available for public review for 15 years from submission.

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Stormwater Executive Summary Report

Prepared for:

Village of Hopkins

SAW Project No. 1620-01

FINAL
May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

1.0 EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In 2014, The Village of Hopkins received a SAW Grant from the Michigan Department of Environmental Quality (MDEQ) to provide financial assistance for the development of this Asset Management Plan (AMP). This report provides the Asset Management Plan (AMP) for the Village's stormwater collection system. Working with Village staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the stormwater collection system.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The Village of Hopkins has executed the "Certification of Project Completeness" for the storm water asset management plan and a copy has been provided at the end of this Executive Summary.

The contact person for the Village of Hopkins AMP is:

Ms. Mary Howard, Village President
128 S. Franklin Street
P.O. Box 337
Hopkins, Michigan 49328-0337
Phone Number: 269-793-7433
e-mail: village.of.hopkins@gmail.com

ASSET INVENTORY AND CONDITION ASSESSMENT

A list of the major assets in the Village's wastewater system, described below, include:

- Storm water collection system piping and manholes.
- Catch basin and inlet structures and pipe outfalls to open drainage courses.

The stormwater collection system assets consist of approximately 16,670 feet (3.16 miles) of storm sewers and 205 stormwater structures including outfalls and culvert ends. System outfalls are primarily located along the three (3) County Drains in the Village, the Bear Swamp Drain, the Hopkins Station Drain, and the Krug Drain. There are also eight culverts along the County drains located within Village limits that are owned and maintained by the Village.

The Village of Hopkins is located in a low wet area. The Bear Swamp Drain, an Allegan County Drain bisects the Village flowing south to north. The drain has a significant regulated floodplain that encompasses portions of the Village's commercial and residential properties. The Village's storm sewers and surface drains discharge to the Bear Swamp Drain. Periodic flooding conditions that exist along the Bear Swamp Drain negatively impact the operation of the Village's storm drainage system and are a frequent cause of roadway and residential basement flooding.

All Village-owned assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

ASSET IDENTIFICATION AND LOCATION

A comprehensive stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits; supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new, or updated (GIS) database and piping network for archiving, mapping and further evaluation purposes.

The purchase of GIS/GPS equipment provided with the SAW grant program will greatly enhance the Village's ability to physically locate defects in storm water system assets

CONDITION ASSESSMENT AND EXPECTED USEFUL LIFE

For the Village of Hopkins, a comprehensive evaluation of the collection system was performed. NASSCO-MACP structure field based assessments were completed on all 205 structures. Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on 78% of the piping system. Based on discussions with system operations staff, there have not been any known capacity issues with the Village-owned system. Flooding or drainage problems occur mainly when County drains are elevated and collected stormwater cannot flow into the County drains through the outfalls. Because capacity issues exist in the Bear Swamp Drain a separate capacity analysis was not completed for the Village of Hopkins.

The assets of the collection system are in good condition. Recommendations for short-term (1-5-year) and long term (6-20-year) rehabilitation have identified the need for continued maintenance - 26% of the system was tagged for inspection and/or cleaning. Rehabilitation recommendations for 26% of the collection system were identified included point repair and CIPP Lining. The remaining assets (48%) were identified for rehabilitation in the future, beyond the 5-year horizon.

LEVEL OF SERVICE

DEFINING THE EXPECTED LEVEL OF SERVICE (LOS)

Level of Service (LOS) defines the way in which the Village stakeholders want the storm water system to perform over the long term and is an MDEQ required component of an AMP. The LOS can include any technical, managerial, or financial components the Village wishes, if all regulatory requirements are met. Throughout the development of this AMP, F&V worked with the Village of Hopkins staff to develop the following LOS statement and goals.

STORMWATER - LEVEL OF SERVICE STATEMENT

To provide appropriate stormwater collection, diversion, and conveyance at a minimum cost, consistent with applicable environmental regulations. To achieve this the following Level of Service (LOS) goals are proposed for the Village of Hopkins:

- *Provide adequate stormwater collection and conveyance capacity for all service areas*
- *Actively maintain stormwater collection and conveyance system assets in reliable working condition.*
- *Provide rapid and effective emergency response services to customers.*
- *Maintenance and operations staff are to be properly trained.*

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village of Hopkins from time to time to make sure they accurately reflect the desired operation of the storm water system.

MEASURING PERFORMANCE

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score X Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic or environmental impact of failure of an asset and on the utility's ability to convey stormwater.CoF categories of the stormwater collection system include:

- Location of asset
- Facilities served by asset
- Size

CRITICALITY RESULTS

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. 22 pipe segments have a high risk and are recommended for short-term rehabilitation or replacement.

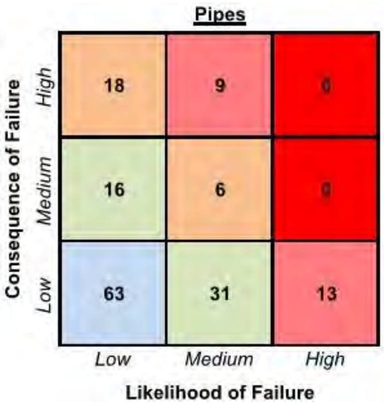
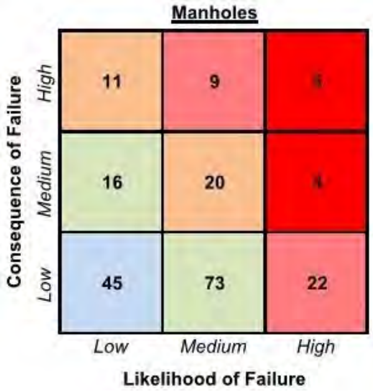


Figure 1: Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

Figure 2 provides the risk rating for the storm sewer structures. Nine (9) structures are identified as extreme risk, and are recommended for immediate or short-term replacement or rehabilitation.



Manholes

Consequence of Failure			
High	11	9	5
Medium	16	20	4
Low	45	73	22
	Low	Medium	High
	Likelihood of Failure		

Figure 2: Business Risk Matrix (Risk Rating) by Number of Structures

CAPITAL IMPROVEMENT PLAN

The Village of Hopkins does not have a separate revenue based utility for storm water improvements and operations and maintenance (O&M). Budget for routine O&M are included in the Village's general fund for street maintenance and work is done on an "as needed" basis and carried out by the Village's DPW crews. The Village does not currently budget to perform stormwater capital improvement projects. The full AMP report includes a discussion on options for funding stormwater projects.

A Capital Improvement Plan (CIP) with recommendations was prepared for the Village's storm water assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short Term 1-5 year and Long Term 6-20-year CIP was prepared to address the projected needs for each asset in the system.

CIP DEVELOPMENT

In order to prepare a CIP, collection system assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2017 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The CIP was developed by assigning each project to a CIP year (1-5) based on several factors. In addition to Risk Rating, other factors used to assign CIP year include:

- Asset rehabilitation grouping (i.e. the type of repair/construction recommended)
- Coordination with other planned projects to achieve economies of scale or limiting disruption (an example is a street reconstruction project where identified utility recommendations can be included)

The recommended 5-Year Capital Improvement Plan for the Village-owned stormwater collection system is included in Table 4 below.

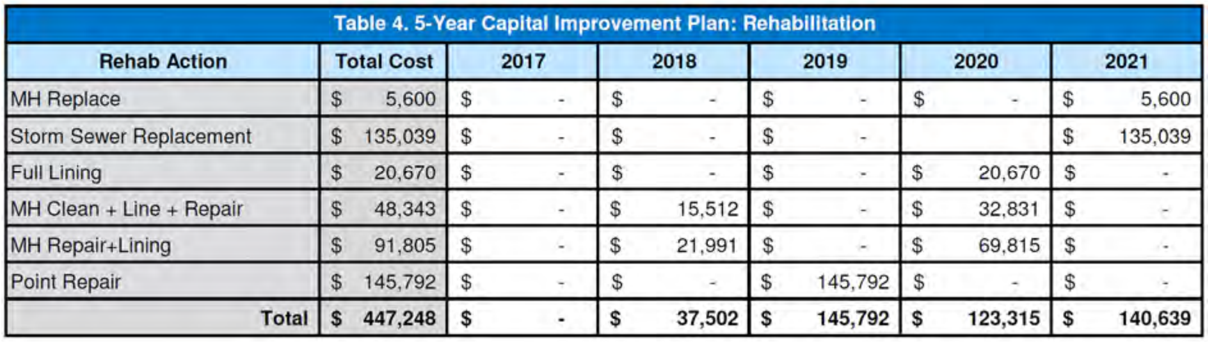


Table 4. 5-Year Capital Improvement Plan: Rehabilitation

Rehab Action	Total Cost	2017	2018	2019	2020	2021
MH Replace	$ 5,600	$ -	$ -	$ -	$ -	$ 5,600
Storm Sewer Replacement	$ 135,039	$ -	$ -	$ -		$ 135,039
Full Lining	$ 20,670	$ -	$ -	$ -	$ 20,670	$ -
MH Clean + Line + Repair	$ 48,343	$ -	$ 15,512	$ -	$ 32,831	$ -
MH Repair+Lining	$ 91,805	$ -	$ 21,991	$ -	$ 69,815	$ -
Point Repair	$ 145,792	$ -	$ -	$ 145,792	$ -	$ -
Total	**$ 447,248**	**$ -**	**$ 37,502**	**$ 145,792**	**$ 123,315**	**$ 140,639**

OPERATIONS AND MAINTENANCE

A preventative maintenance program to systematically clean and CCTV inspect pipelines to NASSCO-certified standards is critical for a sound stormwater system. The process of cleaning and CCTV inspection of pipelines either with equipment owned by the community or contracted is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. For this reason, it is recommended that at a minimum, all pipelines be cleaned and televised every five years, or that 20% of the system be cleaned and televised annually. To meet this goal approximately $10,000 will need to be set aside yearly for continued cleaning and CCTV of storm sewer pipelines. Available Village budget to accomplish those goals will dictate the frequency or size of yearly projects.

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date 3-13-17
(no later than 3 years from executed grant date)

The **Village of Hopkins** *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in **SAW Grant No. 1620-01** have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Ms. Mary Howard, Village President	at 269.793.7316	maryhowa@att.net
Name	Phone Number	Email

Mary Howard 3-13-17
Signature of Authorized Representative (Original Signature Required) Date

Mary Howard, Village President
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report

Prepared for:

Village of Hopkins

SAW Project No. 1620-01

FINAL
May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In May 2014, The Village of Hopkins received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1620-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Village's publicly owned wastewater utility. The assets that comprise the utility include collection system piping and manholes, a wastewater treatment facility, lift station/pump stations and force mains.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The Village of Hopkins has executed the "Certification of Project Completeness" for the wastewater asset management plan and a copy has been provided at the end of this Executive Summary.

The contact person for the Village of Hopkins AMP is:

Mary Howard, Village President
128 S. Franklin Street
P.O. Box 337
Hopkins, Michigan 49328-0337
Phone Number: 269-793-7433
e-mail: village.of.hopkins@gmail.com

ASSET INVENTORY AND CONDITION ASSESSMENT

A list of the major assets in the Village's wastewater system, described below, include:

- Wastewater collection system piping and manholes
- Wastewater lift station with associated force main
- Wastewater Stabilization Lagoons (WWSL)

The wastewater collection system assets consist of 22,474 feet (4.26 miles) of sanitary sewers (gravity pipe and force mains) and 83 wastewater manholes connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The WWSL is a facultative lagoon system. Waste stabilization is accomplished by physical settling and a combination of aerobic, anaerobic, and facultative bacteria. Treatment includes solids removal, reduction of biochemical oxygen demand, and reduction of fecal coliform. Lagoon Nos. 1 and 2 were constructed in 1969 and Lagoon No. 3 was constructed in 2011. Treated effluent is seasonally discharged to Herlan Drain in accordance with NPDES General Permit No. MIG580000 and Certificate of Coverage (COC) No. MIG580301. The design capacity of the WWSL is 80,000 gallons per day (gpd). The current annual average flow received by the facility is approximately 56,000 gpd.

There is one sanitary sewer lift station that pumps the flow from the wastewater collection system to the WWSL. The station is a can style station. The station was rehabilitated in 2011.

Asset Identification and Location

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals included a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new geographic information systems (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes 56 WWSL and Lift Station assets and 167 Collection System Assets.

Condition Assessment and Expected Useful Life

For the Village of Hopkins, a comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field based assessments were completed on all 83 manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on 90% of the gravity pipe. Smoke Testing was performed on 100% of system to disclose location of inflow or infiltration. A hydraulic capacity analysis of the system was not included as there are no records of surcharging of the Villages' sewer collection system.

The assets of the collection system are in fair to excellent condition. Recommendations for short-term (1-5 year) and long term (6-20 year) rehabilitation have identified the need for continued maintenance - 10% of the system was tagged for inspection and/or cleaning. Rehabilitation recommendations for 32% of the collection system were identified including point repairs and CIPP lining. The remaining assets (58%) were identified for rehabilitation in the future, beyond five years.

Overall, the condition of the assets at the WWSL and lift station range from poor to excellent. The lift station was rehabilitated and Lagoon No. 3 was constructed in 2011. The assets associated with that project are in good to excellent condition. The remainder of the assets were installed in 1969 and are in good to poor condition due to age or deterioration caused by harsh conditions associated with wastewater treatment.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

Level of Service (LOS) defines the way in which the utility stakeholders want the utility to perform over the long term and is an MDEQ required component of an AMP. The LOS can include any technical, managerial, or financial components the utility wishes, if all regulatory requirements are met. F&V worked with Village staff to develop the draft LOS statement and goals/objectives. This statement was presented to the Village Council and approved for submittal with this AMP report.

WASTEWATER UTILITY - LEVEL OF SERVICE STATEMENT

To provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed for the Village of Hopkins.

- *Provide adequate collection system and treatment capacity for all service areas.*
- *Comply with all local, state and federal regulations at all times for treated effluent from the WWSL.*
- *Actively maintain collection and treatment system assets in reliable working condition.*
- *Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment plant.*
- *Provide rapid and effective emergency response services to customers.*
- *Ensure operations staff are properly certified.*
- *Regularly review health and safety procedures for operations staff to provide proper worker safety.*
- *Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.*

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village of Hopkins from time to time to make sure they accurately reflect the desired operation of the utility.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score X Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status.

Consequence of Failure (CoF) is a measure of the social, economic or environmental impact of failure of an asset and on the utility's ability to convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset

The WWSL and Lift Station categories for CoF are:

- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond.

CRITICALITY RESULTS

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. Eight pipes in the collection system have an extreme risk rating and are recommended for rehabilitation in the short term. Identified defects include separated joints, grease build-up, broken sections of piping and pipe sags that will require differing types of rehabilitation. Much of the collection system's gravity pipes, 54.2 percent have a low to negligible risk rating and are indicative of pipes or manholes in relatively good condition.

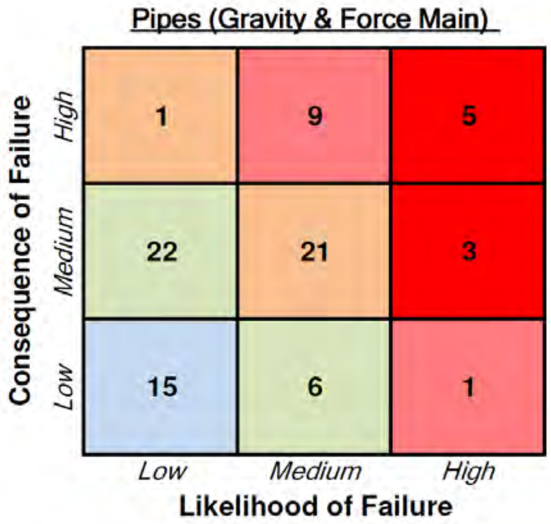


Figure 1. Business Risk Matric (Risk Rating) by - Number of Gravity and Force Main Pipes -

Figure 2 provides the risk rating for the collection system manholes. Seven manholes are identified as extreme risk and are recommended for rehabilitation in the short term. Many manholes are at negligible to medium risk and recommended to be included in a long-term rehabilitation strategy (63 percent).

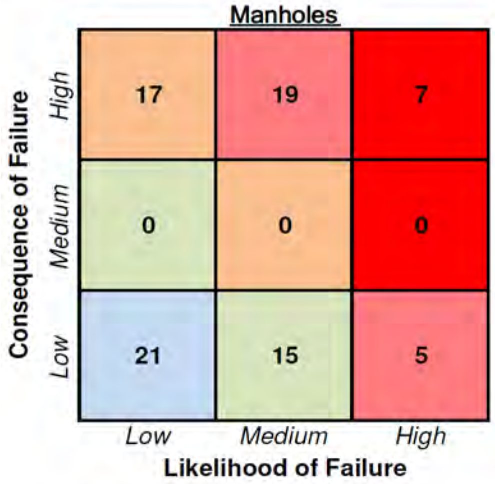


Figure 2. Business Risk Matrix (Risk Rating) by - Number of Manholes -

Figure 3 provides the risk ratings for the WWSL and lift station assets. Two assets identified as high risk ratings require a plan for asset renewal or risk mitigation.

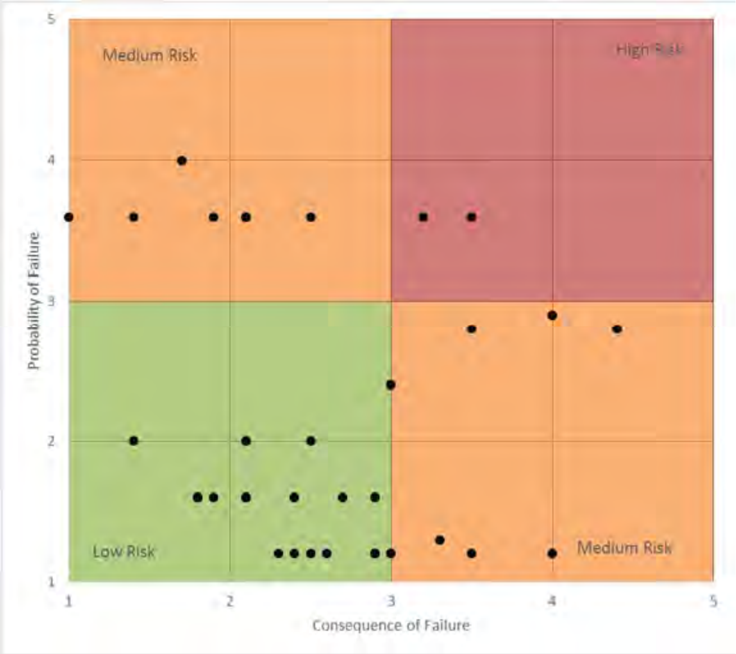


Figure 3. Business Risk Matrix (Risk Rating) for WWSL and Lift Station assets

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan with recommendations was prepared for the Village's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. Short Term 1-5 year and Long Term 6-20-year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system.

CIP DEVELOPMENT

Collection System assets were grouped by strategy and assigned costs from a unit database. This database includes unit construction values in 2017 construction dollars based on a survey of recent projects in Michigan and includes engineering and administrative rates where applicable. Opinions of probable project costs for the WWSL and Lift Station assets were prepared and are based on conceptual layouts of new facilities, or price quotes from material and equipment representatives. Assets were categorized and prioritized by year based on risk rating and criticality score to develop the CIP.

The CIP was developed by assigning each project to a CIP year (1-5) based on several factors. In addition to Risk Rating, other factors used to assign CIP year include:

- Asset rehabilitation grouping (i.e. the type of repair/construction recommended)
- Coordination with other planned projects to achieve economies of scale or limiting disruption (an example is a street reconstruction project where identified utility recommendations can be included)

The 5-Year CIP must also consider project cost when assigned to a CIP year to balance capital requirements with generated utility revenues. The recommended 5-Year Capital Improvement Plan for the wastewater collection system and the 5-Year CIP for the WWSL and lift station is included in Table 4A & 4B.

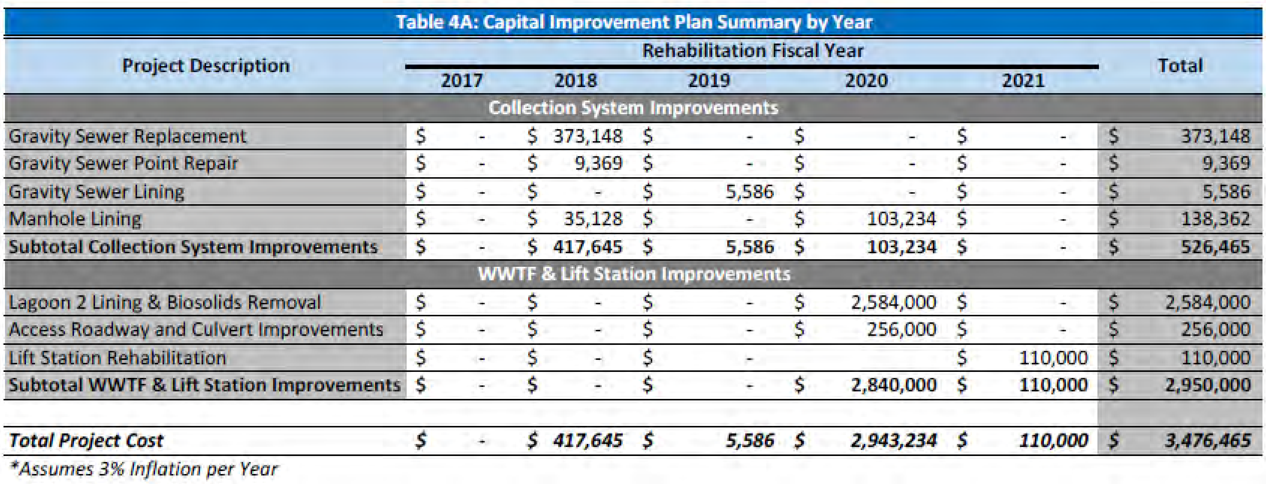


Table 4A: Capital Improvement Plan Summary by Year

Project Description	Rehabilitation Fiscal Year 2017	2018	2019	2020	2021	Total
Collection System Improvements						
Gravity Sewer Replacement	$ -	$ 373,148	$ -	$ -	$ -	$ 373,148
Gravity Sewer Point Repair	$ -	$ 9,369	$ -	$ -	$ -	$ 9,369
Gravity Sewer Lining	$ -	$ -	$ 5,586	$ -	$ -	$ 5,586
Manhole Lining	$ -	$ 35,128	$ -	$ 103,234	$ -	$ 138,362
Subtotal Collection System Improvements	**$ -**	**$ 417,645**	**$ 5,586**	**$ 103,234**	**$ -**	**$ 526,465**
WWTF & Lift Station Improvements						
Lagoon 2 Lining & Biosolids Removal	$ -	$ -	$ -	$ 2,584,000	$ -	$ 2,584,000
Access Roadway and Culvert Improvements	$ -	$ -	$ -	$ 256,000	$ -	$ 256,000
Lift Station Rehabilitation	$ -	$ -	$ -		$ 110,000	$ 110,000
Subtotal WWTF & Lift Station Improvements	**$ -**	**$ -**	**$ -**	**$ 2,840,000**	**$ 110,000**	**$ 2,950,000**
Total Project Cost	***$ -***	***$ 417,645***	***$ 5,586***	***$ 2,943,234***	***$ 110,000***	***$ 3,476,465***

**Assumes 3% Inflation per Year*

TABLE 4A

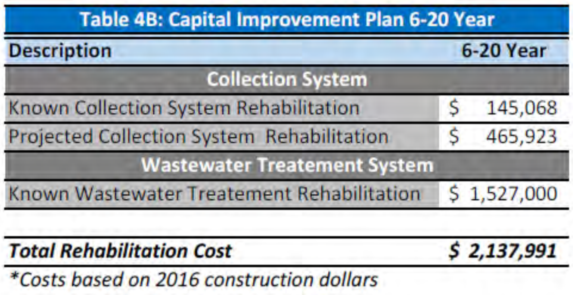


Table 4B: Capital Improvement Plan 6-20 Year

Description	6-20 Year
Collection System	
Known Collection System Rehabilitation	$ 145,068
Projected Collection System Rehabilitation	$ 465,923
Wastewater Treatement System	
Known Wastewater Treatement Rehabilitation	$ 1,527,000
Total Rehabilitation Cost	***$ 2,137,991***

**Costs based on 2016 construction dollars*

TABLE 4B

OPERATIONS, MAINTENANCE AND REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system. A short-term maintenance plan has been developed for the Village's collection system which includes additional CCTV inspection and manhole cleaning and condition assessment.

An annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by WWSL staff without bringing in an outside contractor. Existing disposable materials include chemicals, wear parts in pumps and motors, laboratory instruments, etc. The existing OM&R fund is sufficient for the current operations.

REVENUE STRUCTURE (MINIMUM LIFE CYCLE COSTS)

The MDEQ requires that a rate study be performed to assure that there is sufficient revenue to cover current operation, maintenance and replacement costs of the wastewater utility. For the Village of Hopkins, the rate study report was prepared by the Village and submitted on October 10, 2016. It was subsequently approved by the MDEQ on November 9, 2016 showing that no revenue gap exists for current utility operations.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 5/1/2017
(no later than 3 years from executed grant date)

The VILLAGE OF HOPKINS *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1620-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: November 9, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: N/A.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on N/A.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

__________ at __________
Name Phone Number Email

Mary Howard May 9, 2017
Signature of Authorized Representative (Original Signature Required) Date

Mary Howard, Village President
Print Name and Title of Authorized Representative

April 2017

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date: **May 8, 2017**
(no later than 3 years from executed grant date)

The **CITY OF IMLAY CITY** *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. **1229-01** have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

THOMAS YOUATT, MANAGER	at	(810) 724-2135	tyouatt@imlaycity.org
Name		Phone Number	Email

Signature of Authorized Representative (Original Signature Required)

4/24/17
Date

Thomas Youatt, Manager
Print Name and Title of Authorized Representative

CITY OF IMLAY CITY
SAW Grant Project No. 1229-01

EXECUTIVE SUMMARY

Prepared by: **SPICER GROUP, INC.**
230 S. Washington
Saginaw, MI 48607

Owner: **CITY OF IMLAY CITY**
150 N. Main Street
Imlay City, MI 48444
(810) 724-2135
Thomas Youatt, City Manager

On May 8, 2014, the City of Imlay City entered into an agreement with the Michigan Department of Environmental Quality and the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The City received the follow grants:

Wastewater Asset Management Plan (WWAMP) – 100% Grant	$457,910*
Stormwater Asset Management Plan (SWAMP) – 90% Grant	***$412,188***
Eligible Cost Subtotal	$870,098
LESS Local Match	($41,219)
Total Grant Amount	$828,879

*Disadvantage community status for the wastewater asset management plan

The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; May 2017.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Level of Service Determination
- Critical Assets (Risk)
- Revenue Structure
- Capital Improvement Plan

Part 1: Storm Water Asset Inventory and Condition Assessment

Imlay City's storm water collection system consists of a series of 4", 6", 8", 10", 12", 15", 18", 24", 36", 48" and 60" pipes. These pipes or "storm sewers" collect storm water from "catch basins", "curb inlets", footing drains/sump systems (sump leads), open inlets, roadside drainage, roof drains, groundwater infiltration and other open storm conveyance systems. The overall storm system also collects runoff from private commercial and industrial districts, who own their private storm systems which contribute their storm water runoff to the municipal, county, or MDOT storm systems.

There are several County Drains within the City limits which are owned, operated, and maintained by a distinct Drainage District through the Lapeer County Drain Commissioner's (LCDC) office. These County Drains benefit the residents within each respective drainage district, but are not considered to be City-owned storm water assets. The County Drains are as follows:

- Imlay City Branch of the Belle River
- Bigelow Drain
- Newark Road Branch of the Belle River

All of the storm water in the City eventually drains to the North Branch of the Belle River, which surrounds the City on the north and east sides. The Belle River meanders toward the south east through Lapeer and St. Clair Counties, and discharges to the St. Clair River in Marine City; just north of Lake St. Clair.

For the City's storm water collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire City, and used the survey information to develop a comprehensive Geographic Information System (GIS). This GIS is located on a new computer in the DPW office, and is a detailed "smart" mapping system with databases, using the ArcGIS/Arc Online by ESRI platform. This system can be accessed and updated in the field by DPW staff from new iPads supplied as part of the SAW grant project. From the GIS, as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspections, ownership information etc. can be accessed. This information can also be queried to provide specific lists and maps, and updated easily when future improvements are made.

The City currently has around 9.0 miles of storm sewer pipes ranging in size from 4"-60". Below is a table showing the diameter and materials of the storm water piping:

Table ES-1: City-Owned Storm Water Pipes by Diameter and Material

	CMP	PE	PVC	RCP	VCP	UNKOWN	TOTAL
4"		71	341	10	62		484
6"		171	395	142	416		1,124
8"		171	984	776	5,701	27	7,659
10"	101		1,461	689	3,475	276	6,003
12"	1,525	326	850	11,069	1,464	712	15,945
15"		110		3,376	155		3,641
18"	644	219		2,557	177	10	3,608
24"	47	515		3,230	365	371	4,527
36"				1,179		60	1,239
48"				3,076			3,076
60"				94			94
TOTAL (ft):	**2,317**	**1,583**	**4,032**	**26,199**	**11,814**	**1,455**	**47,399**
Percent by Material:	**4.9%**	**3.3%**	**8.5%**	**55.3%**	**24.9%**	**3.1%**	**100.0%**

Michigan Pipe Inspection, Inc. from Port Huron completed a cleaning and televising program of approximately 50% the storm sewer pipes, focusing mainly on the northern/older area of the City, and Spicer Group, Inc. completed a comprehensive inspection of all the storm water structures. The NASSCO Manhole/Pipeline Assessment Certification Program (MACP/PACP) standards were used to identify and code the defects and was used to standardize the scoring and quantify the condition of the storm water assets.

The City has storm water structure assets that include catch basins, curb inlets, manholes, outlets etc. Below is a listing of those assets:

Table ES-2: City-Owned Storm Water Structures by Type

Structure Type	Number
Catch Basin	255
Curb Inlet	234
Manhole	138
Outlet	12

Part 2: Level of Service (LOS)

The next phase of the AMP is a Level of Service determination. What level of storm water service does the City want to provide to its residents? How are projects going to be prioritized and included in the CIP? What cost is the City willing to endure to provide that level of service? These are all questions that were discussed as a part of the overall asset management plan. The City's Level of Service Statement/Goals are as follows:

> *The City of Imlay City strives to maintain a basic storm water collection system service that addresses the residents' wants and needs and upholds the local, State, and Federal regulatory requirements at a minimum cost to our residents.*

LOS - Basic Goals:

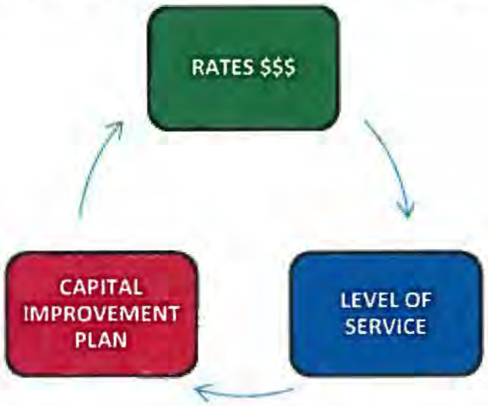
- Operate and maintain the storm water system to minimize flooding and property damage.
- Provide rapid and effective emergency response service.
- Review the condition of storm water assets as a part of other infrastructure construction projects.
- Seek a funding source for operation & maintenance and repair/replacement of storm water assets.
- Review the maintenance and capital improvement plans/projects annually to determine the lowest cost options for our residents:
    - "**MINIMUM**" Level of Service – Address resident complaints as they come in.
    - "**MEDIUM**" Level of Service – Point repairs to the existing system that have been identified. Mainly projects that the cleaning and televising crew had to abandon the inspection due to obstructions, collapses, holes etc.
    - "**HIGH**" Level of Service – Lining or replacement projects to be completed with other infrastructure improvement projects.

Generally, the "high" level of service projects will have a higher construction/initial cost, but would provide a better long-term or life cycle cost for the City. The "minimum" level of service projects address the immediate concerns that residents bring to the City's attention.

Typically, as a part of the asset management process, the City would go through an exercise to determine a desired Level of Service, determine the Capital Improvement projects that are needed to reach that

Level of Service, then review how that CIP reflects the rates the customers pay. Below is a diagram of the process:

ES-3: Asset Management Plan Evaluation Process



Since Michigan has not created a climate which would allow municipalities to create either an enterprise fund or a utility fee for storm water asset improvements, funding comes from the City's general fund. Act 51 monies received from the State for street/road improvements could also be used for storm water improvements that affect the street projects directly. However, Act 51 funding is very limited.

Since there is no real funding mechanism for storm water assets, the City has been maintaining a very low Level of Service. This has resulted in a reactionary operation and maintenance practice. When residents notify the City of flooding or drainage issues, the DPW will address the issue on a case-by-case basis. When the City has street resurfacing or replacement projects, the storm water system is inspected, evaluated, and appropriate repairs and/or replacement is done based on the funding available.

Until a funding mechanism for storm water improvements is found, the City is forced to continue this reactionary policy. The City would like to urge its State legislators to develop a plan to fund municipal storm water improvements, such as supporting HB 5991.

Part 3: Criticality (Risk)

For each asset in the City's storm water system, a criticality/risk analysis was performed to determine and prioritize the City's key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for every asset; including all pipes, manholes, drainage structures, etc. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on the economic, social, and environmental consequences, if that asset failed. Finally, the Criticality (Risk) score was calculated using:

RISK = LoF x CoF

For the City's storm water collection system, there were 15 pipe locations and 25 structure locations identified with high LoF scores; 3 pipe locations and 7 structure locations with high CoF scores; and 5 pipe locations and 11 structure locations with a "medium" or higher Risk score. These scores were evaluated and incorporated into the resulting Capital Improvement Plan.

Part 4: Revenue Structure

Spicer Group teamed with Burton & Associates/MWH-Hawksley Consulting/Stantec (Burton) for the revenue structure analysis for the AMP. Since Michigan has not created a climate which would allow municipalities to create either an enterprise fund or a utility fee for storm water asset improvements, funding comes from the City's general fund. Act 51 monies received from the State for street/road improvements could also be used for storm water improvements that affect the street projects directly. However, Act 51 funding is very limited. Another mechanism for funding large storm water improvements is through the Lapeer County Drain Commissioner's office, using the Drain Code, PA 40 of 1956.

The financial review found that the City's general fund does not have any excess monies to perform proactive storm water improvement projects, and does not have a mechanism to collect rates/fees to provide storm water collection services.

Part 5: Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the wastewater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP.

Until a funding mechanism for storm water improvements is found, the City is forced to continue its *reactionary* policy. In order to have some sort of financial mechanism for the City to *proactively* improve the storm water system, we recommended a minimal discretionary budgetary line item of $20,000 per year for the City to continue cleaning & televising, lining, root treatment, and misc. repairs. With this discretionary budget line item, many smaller "Low" Level of Service projects can be slowly completed. Below is a listing of the projects that are top priority. These projects had abandoned CCTV inspections due to obstructions, roots, offset joints, protruding taps etc.

- Continued cleaning & televising, root treatment, and misc. repairs
- Borland Road and Metcalf Drive Intersection (B.7-B.10 - 25 feet east of CB B.7)
- Borland Road - Between Metcalf Drive and Marry Anne Drive (B.19.1-B.39 - 119 feet west of MH B.39)
- Southeast of Wilcox Courtland 7th Street Intersection (ICN.17-ICN.21 - 2 feet south of CB ICN.21)
- 6th Street - West of Almont Avenue (IC.26-IC.25 - 26 feet north of CB IC.25)
- 4th Street- East of Handley Street (R.7-R.9 - 120 feet west of MH R.9)
- 4th Street - Between Handley Street and Caulkins Street (R.7-R.9 - 67 feet east of MH R.7)
- Borland Road - Between Blacks Corners Road and Metcalf Road (B.11-B.11OF - 150 feet west of MH B.11)
- 4th Street and Almont Avenue Intersection (R.1-IC.30 - 42 feet north of IN IC.30)
- 4th Street and Almont Avenue Intersection (IC.32-IC.31 - 10 Feet west of MH IC.31)
- 1st Street - Between Hunt Street and Almont Avenue (IC.183-IC.180 - 196 feet west of MH IC.180)
- Caulkins Street - North of 5th Street (IC.13-IC.23 - 38 Feet north of MH IC.13)
- North of Wilcox Court at 7th Street (ICN.19-ICN.19OF - 182 feet north of MH ICN.19)
- Cheney Street and Metcalf Drive Intersection (IC.243-IC.241 - 26 feet east of MH IC.241)
- Cheney Street - Between Melanie Boulevard and Marilyn Boulevard (IC.254-IC.247 - 36 feet west of CB IC.254)

- 4th Street and White Street Intersection (IC.72-IC.72.1 - 18 feet east of MH IC.72)
- 3rd Street - Between Pine Street and Caulkins Street (IC.85-IC.87 - 60 feet west of CB IC.87)
- Blacks Corners Road - South of Railroad Tracks (ICN.234-ICN.91 - 6 feet south of CB ICN.91)
- 6th Street - East of Caulkins Street (IC.22-IC.21 - 36 feet north of MH IC.21)
- Borland Road and Metcalf Drive Intersection (B.7-B.10 - 34 feet west of CB B.10 and 30 feet west of CB B.10)
- 4th Street - Between Handley Street and Caulkins (CB.18-R.9 - 6 feet north MH R.9)

Conclusion

The City of Imlay City's storm water system is a typical, aging municipal infrastructure system. Since there is no real funding mechanism for storm water assets, the City has been maintaining a very low Level of Service for its residents. This has resulted in a reactionary operation and maintenance practice. When residents notify the City of flooding or drainage issues, the DPW will address the issue on a case-by-case basis. When the City is planning for street resurfacing or replacement projects, the storm water system is inspected, evaluated, and appropriate repairs and/or replacement is done based on the funding available.

In order to have some sort of financial mechanism for the City to proactively improve the storm water system, we recommended a minimal discretionary budgetary line item of $20,000 per year for the City to continue cleaning & televising, lining, root treatment, and misc. repairs.

Until a funding mechanism for storm water improvements is found, the City is forced to continue this reactionary policy. The City should continue to urge its State legislators to develop a plan to fund municipal storm water improvements, such as supporting HB 5991.

In accordance with the SAW Grant requirements, the City's Storm Water Asset Management Plan (SWAMP) needs to be kept available for citizen review for 15 years. The SWAMP should be reviewed annually, and the components updated and included in the City's annual budget process.

Department of Environmental Quality
SAW Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date: April 4, 2017
(no later than 3 years from executed grant date)

The **CITY OF IMLAY CITY** *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. **1229-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant. The Department of Environmental Quality (DEQ) defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gap in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.

Attached to this certification is a summary of the AMP that identifies major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Thomas Youatt, City Manager	at: (810) 724-2135	tyouatt@imlaycity.org
Name	Phone Number	Email

Rate Methodology was submitted to DEQ on: November 4, 2016 (within 2 ½ years from date of executed grant)

An initial rate increase of 0% of a $ 0.00 gap was adopted on: N/A

4/24/17

Signature of Authorized Representative (Original Signature Required) Date

Thomas Youatt, Manager
Print Name and Title of Authorized Representative

June 2014

CITY OF IMLAY CITY
SAW Grant Project No. 1229-01

EXECUTIVE SUMMARY

Prepared by: **SPICER GROUP, INC.**
230 S. Washington
Saginaw, MI 48607

Owner: **CITY OF IMLAY CITY**
150 N. Main Street
Imlay City, MI 48444
(810) 724-2135
Thomas Youatt, City Manager

On May 8, 2014, the City of Imlay City entered into an agreement with the Michigan Department of Environmental Quality and the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The City received the follow grants:

Wastewater Asset Management Plan (WWAMP) – 100% Grant	*$457,910**
Stormwater Asset Management Plan (SWAMP) – 90% Grant	$412,188
Eligible Cost Subtotal	$870,098
LESS Local Match	($41,219)
Total Grant Amount	$828,879

*Disadvantage community status for the wastewater asset management plan

The Asset Management Plans (AMPs) needed to be completed within three years of the date of agreement; May 2017.

Each AMP has the following key components:

- Asset Inventory and Condition Assessment
- Level of Service Determination
- Critical Assets (Risk)
- Revenue Structure
- Capital Improvement Plan

Wastewater Asset Inventory and Condition Assessment

The City's wastewater system consists of three main components: The collection system (pipes and manholes), pumping facilities, and the wastewater treatment plant (WWTP).

For the collection system, Spicer Group, Inc. completed a mobile mapping LiDAR survey of the entire City, and used the survey information to develop a comprehensive Geographic Information System (GIS). This GIS is located on a new computer in the DPW office, and is a detailed "smart" mapping system with databases, using the ArcGIS/Arc Online by ESRI platform. This system can be accessed and updated in the field by DPW staff from new iPads supplied as part of the SAW grant project. From the GIS, as-built plans, pipe/manhole condition ratings, materials, year installed, inspection records, CCTV video inspections etc. can be accessed. This information can also be queried to provide specific lists and maps, and updated easily when future improvements are made.

The City currently has around 17.1 miles of sanitary sewer pipes ranging in size from 6"-15", 372 manholes, and 1,738 sewer service lines, serving a total of 1,267 customers. Michigan Pipe Inspection, Inc. from Port Huron completed a comprehensive cleaning and televising program of the sanitary sewer pipes, and Spicer Group, Inc. completed a comprehensive inspection of the manholes using the NASSCO Manhole/Pipeline Assessment Certification Program (MACP/PACP) standards to identify and code the defects. The MACP/PACP system is used to standardize the scoring and to quantify the condition of the wastewater assets.

The second main component of the City's wastewater system are the three pumping stations located at Almont/Newark Road, the Industrial Park, and Reek Road (at Newark Road). Spicer Group completed an inspection and condition assessment for each station, and provided recommendations for future improvements to the Almont/Newark Road pumping station that is aging. The Industrial Park and Reek Road pumping stations are both operating adequately.

The third main component of the City's wastewater system is the wastewater treatment plant (WWTP) located east of M-53 and north of 1st Street. Spicer Group completed an inspection and assessment of the WWTP, and are recommending several improvements to the plant that are included in the resulting Capital Improvement Plan (CIP).

Table ES-1 – Wastewater System Major Asset Inventory

<u>Pipe</u>	
6"	649
8"	54,354
10"	12,689
12"	8,881
15"	13,478
Service Leads	1,738
Manholes	372
Pumping Stations	3
WWTP	1

Level of Service (LOS)

The next phase of the AMP is a Level of Service determination. What level of service does the City want to provide to its wastewater customers? How are projects going to be prioritized and included in the CIP? What cost is the City willing to endure to provide that level of service? These are all questions that were discussed as a part of the overall asset management plan. The City's Level of Service Statement/Goals are as follows:

> *The City of Imlay City strives to develop a financially stable, high performing wastewater collection, pumping and treatment service that addresses the customer's wants and needs and upholds the local, State, and Federal regulatory requirements at a minimum cost to our customers.*

One of the basic goals is to review the capital improvement projects to determine the best value options for the City's customers based on life cycle costs and overall benefits to the community:

- "**MINIMUM**" Level of Service – Priority projects to meet the minimum local, State, and/or Federal regulations. Typically to be completed within the next 5 years.
- "**MEDIUM**" Level of Service – Projects that will need to be done eventually; typically when other infrastructure projects are happening.
- "**HIGH**" Level of Service – Projects that are on the long range radar or make sense to do now.

Generally, the "high" level of service projects will have a higher construction/initial cost, but would provide a better long-term or life cycle cost for the City. The "minimum" level of service projects would have a lower initial cost, but would also have a shorter life span and higher overall life cycle costs.

As the AMP progressed, different scenarios were evaluated, to provide the City's desired Level of Service, the costs of the capital improvement projects associated with that LOS, and the effect on sewer rates.

Asset Management Plan Evaluation Process

The resulting capital improvement plan and revenue structure was one that met the City's goals, addressed the improvements that need to be made, and is a sustainable rate structure for the City's customers.

Criticality (Risk)

For each asset in the City's wastewater system, a criticality/risk analysis was performed to determine and prioritize the City's key components. Based on the condition assessments and the field inspections, the Likelihood of Failure (LoF) was calculated for every asset; including all pipes, manholes, pumping stations, and WWTP components. Next, the Consequence of Failure (CoF) was calculated and scored for each asset based on the economic, social, and environmental consequences, if that asset failed. Finally, the Criticality (Risk) score was calculated using:

RISK = LoF x CoF

For the collection system, there were 21 locations identified with high LoF scores, three locations with high CoF scores, and one location (M-53 from the RR viaduct to 1st Street) as a very high risk score.

These scores were evaluated and incorporated into the resulting Capital Improvement Plan. For the pumping stations, the Almont/Newark pumping station has high LoF, CoF, and Risk scores, and recommendations were made for improvements. The WWTP had two components with a high LoF, being the aeration blowers and the grit removal system/aeration system in the grit building. There were many components in the WWTP that had a high Consequence of Failure that would cause a major disruption if they failed, and five locations with a High-Risk score including:

- Influent building – Channel monster comminutor (15)
- Influent building – Auger monster (15)
- Sludge thickening building – Grit tank blower assembly (20)
- Sludge thickening building – Air compressor assemblies #1 & #2 (20)
- Control Building Disinfection Room – UV disinfection bank #2 (20)

Revenue Structure

Spicer Group teamed with Burton & Associates/MWH-Hawksley Consulting/Stantec (Burton) for the revenue structure analysis for the AMP. Wastewater account balances, expenditures, revenues, etc. were reviewed and inputted into Burton's financial software to determine if there were any deficiencies in the rates. The City's current rate structure was found to have no deficiencies.

Next, the Capital Improvement Plan (CIP) projects were evaluated and allocated to various years of completion, and the rate structure to support those improvements was determined. Many iterations/scenarios were performed to come up with a rate structure that met the City's Level of Service goals, completed the CIP projects that are needed, and had sustainable rates for the City's customers. The result was a recommendation for an annual increase of 3% to the City's sanitary sewer rates. This should be reviewed annually as a part of the City's normal budgeting process.

Capital Improvement Plan

The Capital Improvement Plan (CIP) is the culmination of all the parts of the Asset Management Plan (AMP). Reviewing the results of the wastewater system Inventory & Condition Assessment, Level of Service (LOS) determination, Criticality (Risk), Revenue Structure, and preliminary CIP project lists, a process was worked through to categorize and prioritize the final CIP. Various degrees of Level of Service and the associated CIP projects were evaluated and plugged into the Revenue Structure model, and the resulting sewer rates for that set of scenarios were reviewed. If the projected rates were too high, a lower LOS was chosen and those CIP projects were plugged into the Revenue Structure model and the resulting rates were then reviewed. The process then continued with different CIP projects at varying LOS's until an acceptable rate structure, level of service, and capital improvement plan was developed.

A 5-year CIP was developed that includes various collection system improvements including:

Collection System

- Easement – 1st Street to 2nd Street – Pipe collapsed. Phase I competed in 2016.
- Replacing the sanitary sewer along M-53 from 4th Street to 1st Street, and lining through the cement plant to 1st Street ($1 million)
- Several small replacements/repairs ($30,000 - $60,000 per year for 5 years)
- Budget line item of $50,000 per year for continued cleaning & televising, cured-in-place lining, root treatment and misc. repairs of the pipes
- Budget line item of $20,000 per year for misc. manhole repairs/replacements and lining

Pumping Stations

- Rehabilitation of the Almont/Newark Pumping Station ($200,000)

WWTP

- Replacement of the aeration blowers #1 and #2 ($150,000)
- Upgrade the grit removal system and aeration system at the grit building ($350,000)
- Replace Walkway and Stairs on Oxidation Ditch No. 1 ($75,000)
- Replace Sludge Pumps 1 and 2 in Clarifier Building ($200,000)
- Replace Chlorine Gas Feed System ($150,000)
- Replace Drive Mechanisms on Final Clarifiers No. 1, 2, 3 ($250,000)
- Replace Return Sludge Pump No. 1, 2, 3 in the Clarifier Building ($250,000)
- Rehab the sand filters ($500,000)

Conclusion

The City of Imlay City's wastewater system is a typical, aging municipal infrastructure system. The DPW and WWTP staff have completed routine operation and maintenance of the components, and the system is a relatively good shape. There are a few areas that need immediate attention (over the next 5 years), and there are many areas that can be monitored and left alone for years to come. A 3% annual rate increase is recommended to cover the planned operating expenses, capital improvement projects, and inflation for the next five years. This will need to be reviewed annually during the City's normal budgeting process.

In accordance with the SAW Grant requirements, the City's Wastewater Asset Management Plan (WWAMP) needs to be kept available for citizen review for 15 years. The WWAMP should be reviewed annually, and the components updated and included in the City's annual budget process.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 04-17-17
(no later than 3 years from executed grant date)

The Charter Township of Ironwood *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1090-1 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: [✓ Yes] or No

   If No - Date of the rate methodology approval letter: ____________.

2) Significant Progress Made: [✓ Yes] or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: October 26, 2016.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on April 17, 2017.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Steve Boyd; Supervisor	(906) 932-5800	supervisor@ironwoodtownship.com
Name	Phone Number	Email

Steve Boyd 4-17-17

Signature of Authorized Representative (Original Signature Required) Date

Steve Boyd Supervisor

Print Name and Title of Authorized Representative

The sewer rates recommended are shown in Table 8.

Table 8: Recommended Service Rates

	Residential	Revenue	Commercial	Revenue
Readiness to Serve	$24.40	$93,110	$37.35	$82,917
Commodity	$8/1000	$54,645*	$8/1000	$46,719
Total		$147,755		$129,636
Total				$277,391

*Adjusted for gallonage removed for watering: residential flow 6,830,576, Commercial flow 5,839,836.

The MDEQ as part of the SAW program expects the grant recipient to eliminate any deficit in five years. The AM Workbook also forecasts what the costs will be at the end of that 5 year period calculated at a 1.5% inflation rate.

The current annual deficit is $24,888. If the inflation factor is added in, the deficit is $30,888. The Township should close the **current gap** and consider the possibility of an annual escalator for inflation. The SAW program requires closing the **current gap** in 5 years; 10% the first year, then the remaining 90% over the next four years.

It is recommended that the Township **at minimum** implement the SAW program 5 year rule for rate increases as follows:

Table 9: MDEQ Implementation Schedule

	Residential	Revenue	Commercial	Revenue
2017				
Readiness to Serve	$22.15		$35.25	
Commodity	$7.30/1000		$7.30/1000	
2018				
Readiness to Serve	$22.71		$35.75	
Commodity	$7.50/1000		$7.50/1000	
2019				
Readiness to Serve	$23.27		$36.30	
Commodity	$7.65/1000		$7.65/1000	
2020				
Readiness to Serve	$23.85		$36.80	
Commodity	$7.85/1000		$7.85/1000	
2021				
Readiness to Serve	24.40		$37.35	
Commodity	$8/1000		$8/1000	

1211 Ludington St.
Escanaba, MI 49829
O: 906.233.9360
www.c2ae.com

IRONWOOD TOWNSHIP ASSET MANAGEMENT SYSTEM
PROJECT CLOSING SUMMARY
MEETING THE SAW REQUIREMENTS
SAW Grant 1090-01

The SAW agreement with the State of Michigan was signed in May, 2013 which began the overall SAW program.

Ironwood Township's sanitary sewer system includes 6 pump stations, 2.2 miles of forcemain, and 6.5 miles of sewer. Treatment is provided by the Gogebic Iron Wastewater Authority.

Five items of focus were completed.

1. **Asset Inventory:** This item which initiated the work included.
    a. Identifying and locating all assets.
        i. A list of all assets to be monitored was completed.
        ii. The GPS co-ordinates of the field assets were identified.
        iii. A GIS system was completed to index the locations.
        iv. The identified assets were inspected for making a condition assessment.
        v. The asset information was included in the Asset Management Spreadsheet (AMS).
        vi. The spreadsheet was used to quantify and order the asset information.

2. **Level of Service:**
    a. A SAW Team was created to discuss the wastewater system direction.
    b. The SAW Team met and discussed a mission statement and desired Level of Service statement.
    c. The Level of Service Statement was included in the User Charge System report.

3. **Criticality of Assets:**
    a. The AMS was used to organize the asset classes, several parameters were used to determine asset viability, rating each on a 1 to 5 scale.
        i. Redundancy, does the unit have system backup.
        ii. Criticality is the asset to critical to the system and to what degree.
        iii. Probability of failure based on its age and condition.
        iv. These items together result in a parameter identified as business risk.
    b. The AMS was the used to prioritize the need for short term repair or maintenance, short term replacement, or long term maintenance.

4. **O&M Strategies:**
    a. The AMS has a worksheet for working with the system's operating budget.
    b. The current budget information was included.
    c. Additional budget items were added to the budget to incorporate the financial needs identified above.
        i. Short term needs under five years were included and identified as replacement.
        ii. Long term need under in line labeled capital.
    d. These items are identified as system reserve needs and are intended to grow over time. Both asset management system identified reserves and borrower required reserves are listed.
    e. The current reserve set aside is compared with the asset management system calculated required set aside.
    f. If additional set-aside is necessary a rate increase is recommended.
    g. A User Charge System summary report is included detailing the information.
    h. This user charge report and the asset management spreadsheet are identified as the Rate Methodology and have been submitted previously to MDEQ.

5. **Capital Improvements:**
    a. The asset management spreadsheet identifies capital improvement projects for the future.
    b. The long term projects are identified as future public borrowings. Therefore the cost for application preparation for future funding is budgeted in the current budget.
    c. An estimate of project year and financial size is generated from an asset's AMS business risk and the asset's remaining useful life.

The system deliverables therefore are:

1. The indexing GIS system hardware and software
2. System maps
3. Asset management spreadsheet or database
4. User Charge Summary Report
5. GIS system filing system including all data collected and available for system use

The system indicated that Ironwood Township's operating budget was slightly in deficit even though sufficient funds were being placed in the reserve accounts so a rate increase was recommended. The details can be found in the User Charge Report.

A caution is included here. An investigation currently underway by Michigan Department of Treasury may generate findings that will nullify this recommendation.

For more information contact:

Charter Township of Ironwood, Supervisor

N10892 Lake Road Ironwood, MI. 49938

906 932 8447

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date May 31, 2017
(no later than 3 years from executed grant date)

The Kalamazoo County Drain Commissioner *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1348-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Patricia A.S. Crowley	at (269) 384-8117	pacrow@kalcounty.com
Name	Phone Number	Email

Signature of Authorized Representative (Original Signature Required)

5/31/17
Date

Patricia A.S. Crowley - Kalamazoo County Drain Commissioner
Print Name and Title of Authorized Representative

June 2014

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Executive Summary Report

Prepared for the:

Office of the Kalamazoo County Drain Commissioner

KALAMAZOO COUNTY GOVERNMENT

FINAL
May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

1.0 EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In 2014, the Office of the Kalamazoo County Drain Commissioner (Drain Office) received a SAW Grant from the Michigan Department of Environmental Quality (MDEQ) to provide financial assistance for the development of this Asset Management Plan (AMP). This report provides the Asset Management Plan (AMP) for the stormwater collection system(s). Working with Drain Office staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the stormwater collection system(s).

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The Drain Office has executed the "Certification of Project Completeness" for the storm water asset management plan and a copy has been provided at the end of this Executive Summary.

The contact person for the Drain Office AMP is:

Patricia A.S. Crowley – Drain Commissioner
201 W. Kalamazoo Avenue
Kalamazoo, MI 49007
Phone number: 269.384.8117
Email: pacrow@kalcounty.com

ASSET INVENTORY AND CONDITION ASSESSMENT

The Drain Office identified 8 county drains with enclosed pipe networks needing to be cleaned, televised, and inspected. F&V assessed pipe networks within the State Ditch Drain, Zantman Drain, Lester House Drain, Parchment Drain, Davis Olmstead Drain, Comstock Road Drain, Cramer Drain, and East Branch Cramer Drain

In addition to the pipes, 99 storm water detention/retention basins were visually inspected to identify safety, structural, and operational concerns.

ASSET IDENTIFICATION AND LOCATION

The Drain Office has enclosed drains all across Kalamazoo County. Each drain is unique in its size, length, configuration and capacity.

A comprehensive stormwater system asset inventory was developed from available record drawings, field notes, Drain Office staff knowledge, and site visits; supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new, or updated (GIS) database and piping network for archiving, mapping and further evaluation purposes.

CONDITION ASSESSMENT AND EXPECTED USEFUL LIFE

A comprehensive evaluation of the collection system was performed for the Drain Office. NASSCO-MACP structure field based assessments were completed on 95 structures. Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on 84 section of pipe totaling 26,415 feet of the gravity pipe. Based on discussions with the Drain Office staff, there have not been any known capacity issues with the Drain Office-managed stormwater system(s). Capacity analysis was not completed for the Drain Office drains.

The assets of the storm water collection system(s) are in fair to good shape. Defects in the drains were identified and listed in the Asset Management Plan (AMP) Report. Due to the responsive nature of Drain Code procedure, a Capital Improvement Plan was not created. Most projects are either done by petition, or under maintenance.

LEVEL OF SERVICE

DEFINING THE EXPECTED LEVEL OF SERVICE (LOS) GOAL

Level of Service (LOS) defines the way in which the Kalamazoo County stakeholders want the storm water system(s) to perform over the long term and is an MDEQ required component of an AMP. The LOS can include any technical, managerial, or financial components the Drain Office wishes, if all regulatory requirements are met. Throughout the development of this AMP, F&V worked with Drain Office staff to develop the following LOS statement and goals.

STORMWATER – LEVEL OF SERVICE STATEMENT

To provide appropriate stormwater collection, diversion, and conveyance at a minimal cost, consistent with applicable Drain Code requirements. To achieve this the following Level of Service (LOS) goals are proposed for the Office of the Kalamazoo County Drain Commissioner:

- *Provide adequate stormwater collection system(s) and conveyance capacity for all drainage districts.*
- *Maintain stormwater collection and conveyance system(s) assets in reliable working condition.*
- *Provide rapid and effective emergency response services to customers.*

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of the County change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Drain Office from time to time to make sure they accurately reflect the desired operation of the storm water system(s).

MEASURING PERFORMANCE

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors: 1) Likelihood (Probability) of Failure and 2) Consequence of Failure. Defining an asset’s Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic or environmental impact of failure of an asset and on the utility’s ability to convey stormwater. CoF categories of the stormwater collection system(s) include:

- Location of asset
- Facilities served by asset
- Size

ASSESSING CRITICALITY

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset of the drain.

The Business Risk score, also known as Criticality, is calculated for each asset using the following equation:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Figure 1 provides the risk rating for storm sewer pipes by number of pipe segments. One pipe segment in the stormwater collection system(s) has an extreme risk rating and is recommended for near-term rehabilitation or replacement.

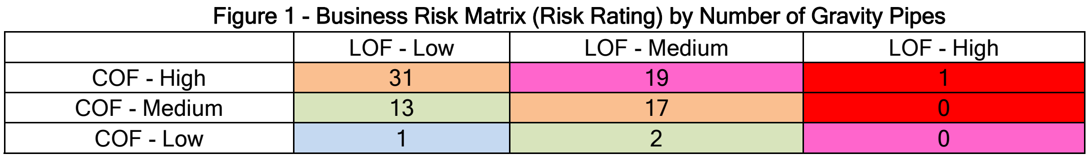


Figure 1 - Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

	LOF - Low	LOF - Medium	LOF - High
COF - High	31	19	1
COF - Medium	13	17	0
COF - Low	1	2	0

Figure 1: Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

CAPITAL IMPROVEMENT PLAN

Due to the responsive nature of Drain Code procedure, a Capital Improvement Plan was not created. Most projects are either done by petition, or under maintenance.

OPERATIONS AND MAINTENANCE

County Drain Commissioners are created and governed by state statutes. The Drain Code of 1956 is the primary statute governing operations and maintenance for each drain. Per statute, the Drain Office is authorized to expend up to $5,000 per linear mile for maintenance per each drainage district. Expending more than the authorized rate needs additional review and a petition by a municipalities and/or landowners.

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Collection Executive Summary Report

Prepared for:

Kalamazoo Lake Sewer and Water Authority

SAW Project No. 1560-01

FINAL
May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In 2014, the Kalamazoo Lake Sewer and Water Authority (KLSWA) received a SAW Grant from the Michigan Department of Environmental Quality (MDEQ) to provide financial assistance for the development of this Asset Management Plan (AMP) for the KLSWA publicly owned wastewater utility. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Kalamazoo Lake Sewer and Water Authority AMP is:

Daryl VanDyke, KLSWA Manager
P.O. Box 789
Saugatuck, MI 49453
Phone number: 269.857.2709
Email: daryl@klswa.com.

ASSET INVENTORY AND CONDITION ASSESSMENT

The wastewater collection system assets consist of approximately 205,803 feet (39.0 miles) of sanitary sewers (gravity pipe and force mains), 20 pump stations, and 738 wastewater manholes connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The KLSWA WWTP currently includes the following treatment processes: Grit removal, aerated lagoons, ferric chloride addition for phosphorus control, secondary clarification and disinfection with sodium hypochlorite, followed by dechlorination time in a polishing/storage pond to meet residual chlorine limits. Treated effluent is discharged to the Kalamazoo River in batches in accordance with the NPDES permit. The design capacity of the WWTP is 1.0 million gallons per day (mgd). The current annual average flow received by the plant is approximately 0.35 mgd.

ASSET IDENTIFICATION AND LOCATION

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals included a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes 159 WWTP assets, 266 Lift Station assets, and 1507 Collection System assets.

CONDITION ASSESSMENT AND EXPECTED USEFUL LIFE

For the KLSWA, a comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field based assessments were completed on most of the 738 manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on 18% of the gravity pipe. Recommendations for short-term (1-5 year) and long term (6-20 year) identifies the need for maintenance 49% of the system was tagged for inspection and/or cleaning. Rehabilitation accounted for 8% of the of the system identifying the need for point repairs and lining. The remaining assets (43%) were placed in the 20+ year category.

Overall, the condition of the assets at the WWTP range from good to fair. The recent (2012) renovation project improved the condition of many assets. Some assets that were not included in the State Revolving Fund (SRF) project are now near the end of their useful life due to age or deterioration caused by harsh conditions associated with wastewater treatment.

Overall, the condition of the assets at the lift stations are good. The recent renovation project improved the condition of many assets. Some stations that were added to the system in the 2000s were not included in the SRF project; most of the assets in these stations are in good to fair condition. The recommendations for short-term improvements are relatively minor.

LEVEL OF SERVICE

DEFINING THE EXPECTED LEVEL OF SERVICE (LOS)

The overall objective of the KLSWA is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. Since the member communities of the KLSWA including the Cities of Saugatuck and Douglas, Saugatuck Township and Laketown Township each own their respective portion of the sanitary collection system a Level of Service partnership is required. Each entity must act responsibly for their portion of the collection system. To that end, the KLSWA commits itself to the following Level of Service goals as they relate to those responsibilities within KLSWA control.

To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate treatment capacity for all current service areas and assist its member communities in supporting collection system capacity and treatment capacity for additional service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWTP.
- Actively operate and maintain collection and treatment system assets in reliable working condition. Communicate with the appropriate member community when portions of the collection system are no longer maintainable and assist the member community in their solution.
- Monitor the currently low inflow/infiltration (I/I) flow and communicate findings to member communities to mitigate potential for sanitary overflows, water in basements, and overloading of treatment plant.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Ensure proper environmental and safety protocol which does not jeopardize the public or property.
- Regularly review projected O&M and capital expenditures. Adjust KLSWA base user rates as necessary to ensure sound financial management of wastewater system and assist member communities in their development of surcharge user rates.

MEASURING PERFORMANCE

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset’s Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

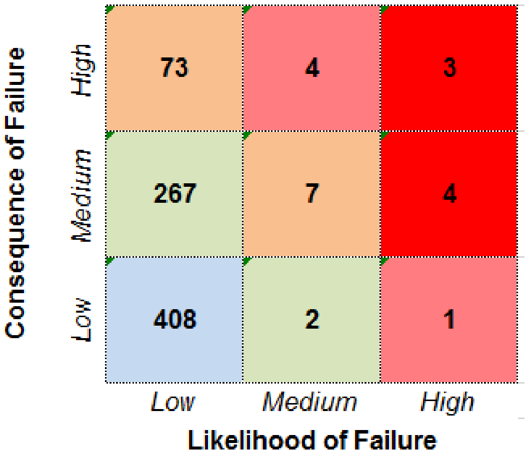
Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

CRITICALITY RESULTS

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

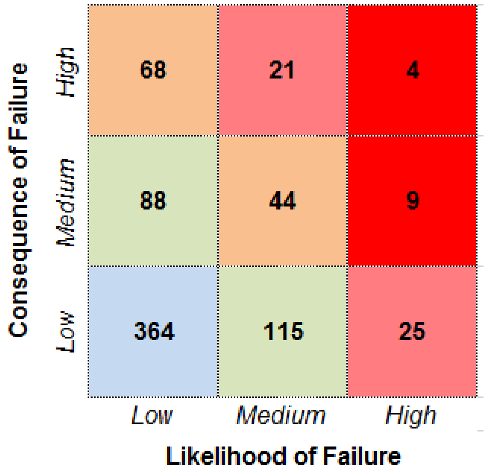
Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. Seven pipe segments in the collection system have an extreme risk rating and are recommended to be replaced or lined in the next 1-2 years. Much of the collection system's pipes (88 percent) have a low to negligible risk rating and are indicative of pipes in relatively good condition.



Consequence of Failure	Low	Medium	High
High	73	4	3
Medium	267	7	4
Low	408	2	1
	Likelihood of Failure		

Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes

Figure 2 provides the risk rating for the collection system manholes. Thirteen manholes are identified as extreme risk and are recommended for lining and repair in the next 1-2 years. Many manholes are low to negligible risk (77 percent).



High	68	21	4
Medium	88	44	9
Low	364	115	25
	Low	Medium	High

Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk rating for the WWTP by number of assets. Two assets have been identified with a high risk, the Sludge Lagoon No. 2 and rapid mixer. Note that some of the assets have the same score and the points lie on top of one another.

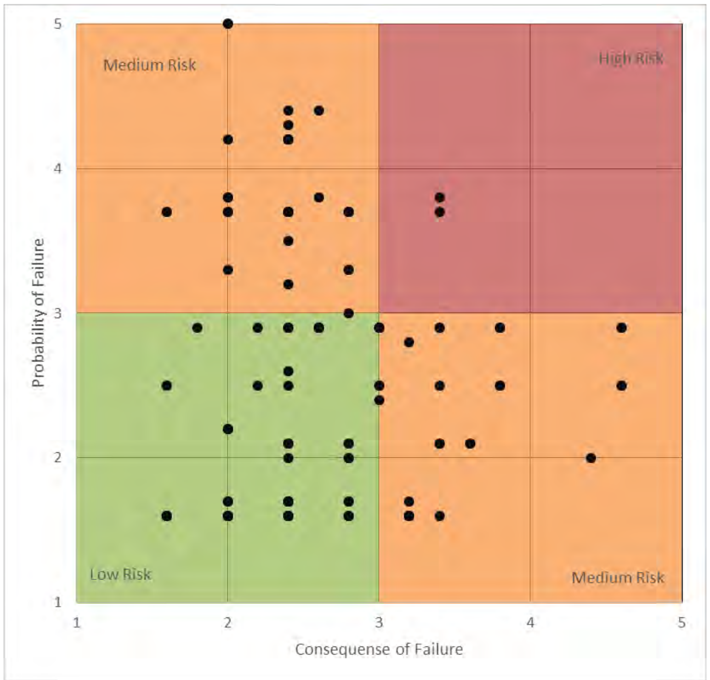


Figure 3. Business Risk Matric (Risk Rating) for WWTP

Figure 4 provides the risk rating for the lift stations. One asset has been identified with a high risk, the control system at Clearbrook lift station. As noted above some of the assets have the same score and the points lie on tip of one another.

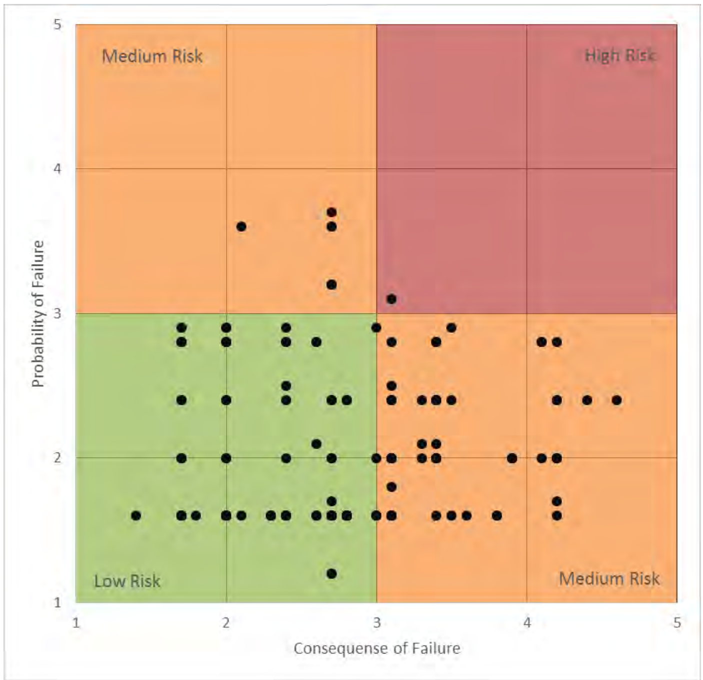


*Figure 4. Business Risk Matric (Risk Rating)
for Lift Stations*

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan with recommendations was prepared for the KLSWA's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets. A Short-Term 1-5 year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system. A Long-Term 6-20 year CIP was also prepared and included in the full AMP report.

The 5 year CIP must also consider project cost when assigned to a CIP year to balance capital requirements with generated utility revenues. The recommended 5 year CIP for the wastewater collection system is included in Table 1 below. The 5 year CIP for the WWTP and lift stations are shown in Table 2. A 3% inflation per year has been assumed.

Table 1. Collection System 5 Year CIP

CIP Action	Total Cost (2017 Dollars)	2017	2018	2019	2020	2021
MH Clean + Line + Repair	$ 105,420	$ -	$ 36,194	$ -	$ 76,605	$ -
Full Lining	$ 104,060	$ -	$ 67,045	$ -	$ 42,476	$ -
Replacement	$ 61,779	$ -	$ 63,632	$ -	$ -	$ -
MH Repair + Line	$ 85,400	$ -	$ 21,991	$ -	$ 69,815	$ -
MH Clean + Line	$ 18,850	$ -	$ -	$ -	$ 20,547	$ -
MH Replace	$ 10,000	$ -	$ 5,150	$ -	$ -	$ 5,600
MH Repair + Line + Adjust Rim	$ 13,540	$ -	$ -	$ -	$ 14,759	$ -
MH Clean + Line + Adjust Rim	$ 6,270	$ -	$ -	$ -	$ 6,834	$ -
Total	***$ 405,319***	***$ -***	***$ 194,011***	***$ -***	***$ 231,035***	***$ 5,600***

Table 2. WWTP and LS 5 Year CIP

Project Description	Replacement Fiscal Year	Project Cost (in 2017 Dollars)	Project Cost
WWTP Sludge Lagoon Work	2017	$201,000	$201,000
WWTP Utility Building No. 1 Rehabilitation	2018	$64,300	$66,000
WWTP Lift Station Rehabilitations	2019	$193,300	$205,000

OPERATIONS, MAINTENANCE AND REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

Table 3 summarizes the recommended the collection system preventative maintenance inspections to be considered in the short term (1-5 years) with recommended cost over the 5-year period. A 3% inflation per year has been assumed.

Table 3. Operation and Maintenance Action Summary by Year

Maintenance Action	Total Cost (2017 Dollars)	2017	2018	2019	2020	2021
Manhole Assessment	$ 65,500	$ 500	$ -	$ -	$ 77,227	$ -
Manhole Cleaning	$ 27,750	$ 3,000	$ -	$ -	$ -	$ 31,046
CCTV	$ 241,050	$ -	$ -	$ 270,844	$ -	$ -
CCTV - Heavy Cleaning	$ 385,377	$ -	$ -	$ 433,010	$ -	$ -
Total	***$ 719,677***	***$ 3,500***	***$ -***	***$ 703,854***	***$ 77,227***	***$ 31,046***

An evaluation was conducted for WWTF staffing and it was determined that the current staffing of KLSWA is one person less than what is sufficient to plan and perform maintenance and conduct all required operations of the plant. An annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by WWTF staff without bringing in an outside contractor. Existing disposable materials include chemicals, wear parts in pumps and motors, laboratory instruments, etc. The existing OM&R fund is sufficient for the current operations.

REVENUE STRUCTURE

The revenue and rate methodology is an instrument to determine rates and charges that will provide sufficient revenues to cover operation, maintenance, replacement, capital improvement projects, and debt costs.

An inventory list was developed of the assets for the KLSWA. Each asset was located and assessed for condition, then graded on the Likelihood of Failure and the Consequence of Failure. This data was evaluated for criticality (Business Risk) then categorized based on the Business Risk Score for replacement, rehabilitation, or ongoing inspection and/or cleaning. Asset recommendations and the Business Risk Score was used to determine urgency in prioritizing the time frame for completing projects.

A study was conducted by an independent municipal financial advisor, H.J. Umbaugh & Associates, to develop a 5-year financial projection to meet the Michigan Department of Environmental Quality SAW Grant requirements.

The rate methodology required by the MDEQ for SAW Grant Asset Management Plans requires an analysis of the current budget on a cash basis to determine if there is a revenue gap. The analysis performed by H.J. Umbaugh & Associates shows there to be no revenue gap. A letter from the MDEQ was received October 11, 2016 approving the rate methodology.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The Kalamazoo Lake Sewer and Water Authority *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1560-1 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No
   If No - Date of the rate methodology approval letter: October 11, 2016
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Daryl VanDyke	at (269)857-2709	daryl@klswa.com
Name	Phone Number	Email

	5/31/2017
Signature of Authorized Representative (Original Signature Required)	Date

Daryl VanDyke, Manager
Print Name and Title of Authorized Representative

April 2017

Stormwater Asset Management and Wastewater (SAW)
Sanitary Sewer System Asset Management Plan Summary

City of Kingsford
305 South Carpenter Avenue
Kingsford, MI 49802
http://cityofkingsford.com/

Mr. Anthony D. Edlebeck, City Manager
Phone: (906) 774-3526

SAW Grant Project No. 1278-01

Executive Summary

The City of Kingsford (City) received $589,439 in funding through the Michigan SAW grant program in May of 2014 to develop an Asset Management Plan for their sanitary sewer system.

An Asset Management Plan is a long-range planning document used to provide a rational framework for understanding and documenting City-owned assets, service levels, risks and financial investments. The intent of asset management is to ensure the long-term sustainability of the City. By assisting the City to make better decisions when to repair, replace or rehabilitate particular assets and by developing a long-term funding strategy, the City can ensure its ability to deliver the required level of service perpetually.

The major components of the Asset Management Plan includes the following:

- Asset Inventory and Condition Assessment
- Level of Service
- Criticality (Consequence of Failure) of Assets
- Operation and Maintenance Strategies/Revenue Structure
- Long-term Funding/Capital Improvement Plan

Wastewater Asset Inventory

The City wastewater system components consist of the following:

- Collection System (forcemains, gravity pipes, manholes)
- Collection System Mechanical (lift stations)

The collection system assets were GPS located in the field and their location inserted on an aerial map to show the asset location in relation to easily referenced locations. Component specific information such as size, elevation, year constructed, material, condition rating, notes, etc. is located within the GIS system as well as in Excel spreadsheet format. Information modified or updated within the GIS system is readily available by users.

Asset components, such as lift station components, are located in Excel spreadsheets that are readily updated by the City.

While the City of Kingsford operates and maintains its own wastewater collection system, wastewater treatment is shared by the cities of Iron Mountain and Kingsford. The wastewater treatment plant is owned and operated by the Iron Mountain/Kingsford Joint Sewage Authority (Authority). Sewer rates within the cities of Iron Mountain and Kingsford are set based on treatment expenses of the Authority and the wastewater contribution of each city.

Condition Assessment

The majority of the sanitary sewer infrastructure was constructed by the Village of Kingsford in the mid-1920s to the early 1930s. Very little of the original system has been replaced. The excellent construction practices employed, quality of materials, combined with the well-drained soils found within the City has resulted in a sanitary sewer infrastructure that is still in good condition despite being in the ground for almost 100 years.

The sanitary sewer system asset condition was measured by the following ranking system:

Condition Rating	Description
5	Unserviceable
4	Significant Deterioration
3	Moderate Deterioration
2	Minor Deterioration
1	New or Excellent Condition

The condition of the sanitary sewer gravity pipe is based on televising, smoke testing and assumed condition. The assessed condition rating of City sanitary sewer gravity pipe within the collection system ranges from 1 to 5. The weighted average condition rating of the collection system gravity pipe is 2.8, indicating minor to moderate deterioration of sanitary sewer gravity pipe within the collection system.

The condition rating of sanitary sewer force main within the collection system is assumed to have a weighted condition rating of 2.1, indicating minor deterioration.

The sanitary sewer manholes were inspected by manhole inspectors certified under the Pipeline Assessment Certification Program (PACP) and the Manhole Assessment and Certification Program (MACP) by the National Association of Sewer Service Companies (NASSCO). Each of the manhole components were given a rating of 1 to 5 using the ranking system noted above. An overall rating was given to the manhole based on the worst rating of the components evaluated. The sanitary sewer manholes within the collection system ranged from 2 to 4, with an average condition rating of 3.0. This indicates an overall condition between minor deterioration and moderate deterioration. Considering the majority of the manholes were constructed in the 1920s, the condition of the manholes constructed in this era is very good. It is assumed that the quality of materials and workmanship employed along with the well-drained soil conditions have all contributed to the current manhole condition.

Sanitary system mechanical or lift station condition was ranked by individual components rather than the lift station as a whole, since lift station individual components are replaced or reconditioned at different timeframes. A spreadsheet listing the individual component ratings is included in the report. The weighted condition rating of the lift station assets is 2.4 indicating minor to moderate deterioration.

Level of Service Determination

Level of service defines the way in which the utility owners, managers and operators want the utility to perform over the long-term. The level of service includes technical, managerial and financial components. The level of service is a fundamental part of how the utility is operated.

The level of service needs to be evaluated and adjusted with time to match system performance, funding and changes in regulations.

The level of service statement is as follows:

- Comply with all State and Federal regulatory requirements at all times.
- Maintain proper operator certification.
- Provide for the health and safety of all employees and customers.
- Provide for regular operator training to be made aware of new regulations, take advantage of advances in new technology and system troubleshooting.
- Provide for staff to attend workshops that will educate and present grant opportunities available to the City.
- Customers will receive written notice 24 hours in advance of any planned work that will affect service or access.
- Keep spare pumps and parts available at all times for critical assets.
- Respond to customer complaints within 24 hours of receipt 95% of the time.
- Track customer complaints and locations to identify trouble spots.
- Rates will be reviewed and raised on an annual basis to keep rates in line with inflation and to avoid steady declines in revenue followed by massive rate increases.
- Make preventive maintenance a priority.
- Identify areas of high infiltration and inflow (I&I) on a yearly basis by evaluating lift station data, flow monitoring, and/or televising. Follow-up with projects to reduce I&I.

Criticality (Consequence of Failure) of Assets

To determine the consequence of failure, all possible costs must be considered. These costs include: cost of repair, social cost associated with loss of the asset, repair/replacement costs related to collateral damage caused by the failure, legal costs related to additional damage caused by failure, environmental costs created by the failure, loss of business revenue to the community and other associated costs or asset losses. The consequence of failure can be high if any one of these costs are significant or the accumulation of several costs occur with failure.

Consequence of failure levels found in the table below shows the ranking system used for the consequence of failure. The description shown for each consequence will be a best fit of one of the items noted. Not all of the description items need to apply.

Consequence	Level	Description
Catastrophic disruption	5	Massive failure, severe health affect, or persistent and extensive damage
Major disruption	4	Major effect, major loss of system capacity, major health effects, major costs or important level of service compromised
Moderate disruption	3	Moderate effect, moderate loss of system capacity, moderate health effects or moderate costs, but important level of service still achieved
Minor disruption	2	Minor effect, minor loss of system capacity, minor health effects or minor costs
Insignificant disruption	1	Slight effect, slight loss of system capacity or slight health effects

Assessing business risk requires examination of the probability of failure, the consequence of the failure and redundancy. The assets that have the greatest probability of failure and the greatest consequences associated with the failure will be the assets that have the most business risk. An analysis of different assets will reveal which asset has the highest business risk and, therefore, which asset will require the most attention for either repair or replacement.

Business risk is the multiplication of the Probability of Failure number to the Consequence of Failure number and to the Redundancy Factor. The resulting number provides a numeric value to business risk. Typically, an asset falling in the range of 1 to 8 would be considered low risk. An asset falling in the business risk range of 9 to 16 will be medium risk. An asset above 16 would be considered high risk.

A summary of business risk for each of the asset groups is shown in the table below:

	Risk Level		
Asset Group	Low Risk	Medium Risk	High Risk
Gravity Pipe	77.5%	22.4%	0.1%
Force Main	82%	18%	-
Manholes	73%	27%	-
Lift Stations	0%	100%	-
Sanitary Sewer System	75.3%	24.6%	0.1%

As can be seen in the table, only a small amount of the value of the system contains any asset components that are considered high risk, with the majority of the system in the low risk category.

Revenue Structure

A funding projection worksheet was developed to evaluate current and future projections based on operating income, operating expenses, non-operating income, non-operating expenses (including principal and interest payments, bond reserve payments and restricted fund payments), planned project dedicated fund expenditures and existing fund balances. It was determined that the current rate structure provides sufficient funds to cover operation, maintenance, replacement and debt costs.

Capital Improvement Plan

The following table shows the City's proposed capital improvement projects:

Project	Planned Project Year	Estimated Replacement Cost	Yearly Reserve Cost
MH 1541 - MH 15052 Pipe Replacement	2018	$105,000	*
MH 2865 - MH 4033 Pipe Replacement	2018	$45,000	*
North River Pointe Lift Station Valve Vault Construction	2019	$35,000	*

* Internally funded with unrestricted funds

List of Major Assets

The City's sanitary sewer system major assets consist of the following:

- Sanitary Sewer Gravity Pipe Total: 192,000 feet
- Sanitary Sewer Forcemain: 3,300 feet
- Sanitary Sewer Manholes: 770

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 8, 2017
(no later than 3 years from executed grant date)

The City of Kingsford *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1278-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]

   If No - Date of the rate methodology approval letter: 12/2/2016.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ____________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Anthony D. Edlebeck, City Manager at 906-774-3526 citymgr@cityofkingsford.com
Name Phone Number Email

5/24/2017
Signature of Authorized Representative (Original Signature Required) Date

Anthony D. Edlebeck, City Manager
Print Name and Title of Authorized Representative

106 W. Allegan St. Suite 500
Lansing, MI 48933
O: 517.371.1200
www.c2ae.com

CITY OF LAINGSBURG STORMWATER ASSET MANAGEMENT PLAN
EXECUTIVE SUMMARY

City of Laingsburg
114 North Woodhull Street
Laingsburg, MI 48848
Treasurer, (517) 651-6101
SAW GRANT PROJECT NUMBER 1514-01

Executive Summary

The SAW agreement with the State of Michigan was signed in May 8, 2014 which began the overall SAW program.

The City of Laingsburg is located in Shiawassee County in south central Michigan, approximately seven miles north of I-69. Laingsburg's storm sewer collection system has approximately 48,600 feet of storm sewer and approximately 420 storm structures (manholes, catch basins and outfalls).

Stormwater Asset Inventory

The items which initiated the work included:

- Identifying and locating all assets.
    - A list of all assets to be monitored was obtained using a combination of historical system records, field data collection.
    - The GPS coordinates of the field assets were gathered.
    - An ESRI ArcGIS data set was completed to index the locations and attributes of assets, including preset mapping of items such as Probability of Failure, Criticality, and Business Risk.
    - Physical inspections were conducted for each asset.
    - The asset information was included in the Asset Management Spreadsheet (AMS).
    - The AMS is used to quantify and sort the system asset information.

Condition Assessment

Overall, the system was in serviceable condition. A number of reaches were found to be laid at very flat grades using very small diameter pipe. The stormwater system outfall to the Looking Glass River was found to be in poor condition and stifles the final flow of the system due to over vegetation, and bank erosion causing too much wandering of the channel. Also, fifty-six pipe segments and four structures were found to be in need of short-term repair or replacement.

- Structures assessment and inventories follow NASSCO MACP guidelines.
- Sewer pipe assessment and inventories follow NASSCO PACP guidelines.
- Asset age and material data was collected using historical project drawings.

Level of Service Determination

- A SAW Team was created from staff to discuss the storm system direction.
- The SAW Team met and discussed a mission statement and desired Level of Service statement, which was then converted to a succinct list of items to follow for the future.
- The SAW Team will meet once a year to assess the system's service record and recommend improvements to the Level of Service Statement, if needed.

Criticality of Assets

- The AMS was used to organize the asset classes. Several parameters were used to determine asset consequence of failure and probability of failure, rating each on a 1 to 5 scale.
  - Redundancy: Does the unit have system backup?
  - Criticality of the asset to the system and what level of impact to the system occurs in the event that the asset fails
  - Location of the asset and surrounding service areas were incorporated in determining the criticality of the asset
  - Probability of failure based on its age and condition
  - These items together result in a parameter identified as Business Risk.
- The AMS was used to prioritize the need for short term repair or maintenance, short term replacement, or long term maintenance.

Revenue Structure

- The City drainage system is operated and maintained using City street funds. The current funding consists of a combination of Act 51 state tax funds and a local millage. The future will require extension of millage and strategic pursuit of state and federal grant funds to continue system improvements.

Capital Improvement Plan

- The AMS identifies capital improvement projects for the future.
- The long term projects may be achieved through grants or future public borrowings.
- An estimate of project year and financial cost is generated from each capital improvement project.
- Projects to be completed within the next zero (0) to fifteen (15) years and additional projects recommended in the next sixteen (16) to thirty (30) years are included in the Capital Improvement Plan.
  - Four storm structures are identified for short-term replacement at an estimate cost of $8,000
  - Fifty-six segments of storm sewer are identified for short-term replacement, in conjunction with the City's street improvement plan, at an estimated cost of $290,000.

List of Major Assets

- 48,600 feet of Storm Sewer
- 420 Storm Structures

106 W. Allegan St. Suite 500
Lansing, MI 48933
O: 517.371.1200
www.c2ae.com

CITY OF LAINGSBURG WASTEWATER ASSET MANAGEMENT PLAN
EXECUTIVE SUMMARY

City of Laingsburg
114 North Woodhull Street
Laingsburg, MI 48848
Treasurer, (517) 651-6101
SAW GRANT PROJECT NUMBER 1514-01

Executive Summary

The SAW agreement with the State of Michigan was signed in May 8, 2014 which began the overall SAW program.

The City of Laingsburg is located in Shiawassee County in south central Michigan, approximately seven miles north of I-69. The City owns and operates a three lagoon Wastewater Treatment Facility with a total combined volume capacity of 33.2 million gallons. The treatment system discharges to the Looking Glass River. Laingsburg's sanitary collection system has approximately 46,500 feet of sanitary sewer and force main, approximately 160 sanitary manholes and 3 lift stations that provides sewer services to the City.

Wastewater Asset Inventory

The items which initiated the work included:

- Identifying and locating all assets.
    - A list of all assets to be monitored was completed.
    - The GPS coordinates of the field assets were gathered.
    - An ESRI ArcGIS data set was completed to index the locations and attributes of assets.
    - Physical inspections were conducted for each asset.
    - The asset information was included in the Asset Management Spreadsheet (AMS).
    - The AMS is used to quantify and sort the system asset information.

Condition Assessment

The City of Laingsburg's sanitary collection system is in good condition overall, mostly due to the system improvements performed in the timeframe between 1980 and the early 2000's and the continuous maintenance efforts performed by the City. Several of the sanitary sewers were built to separate the combined sewers that were once part of the collection system. Furthermore, the wastewater lagoon system is in good condition as a result of the large improvements project that was performed in the last 10 years, so there are no programmed capital improvements projects related to the lagoon for the next 30 years.

- Structures assessment and inventories follow NASSCO MACP guidelines.
- Sewer pipe assessment and inventories follow NASSCO PACP guidelines.
- WWTP equipment site condition assessment and inventory.
- Wastewater lift stations condition assessments and inventory.
- Asset age and material data was collected using historical project drawings.

Level of Service Determination

- A SAW Team was created to discuss the wastewater system direction.
- The SAW Team met and discussed a mission statement and desired Level of Service statement.

Criticality of Assets

- The AMS was used to organize the asset classes. Several parameters were used to determine asset consequence of failure and probability of failure, rating each on a 1 to 5 scale.
  - Redundancy: Does the unit have system backup?
  - Criticality of the asset to the system and what level of impact to the system occurs in the event that the asset fails
  - Location of the asset and surrounding service areas were incorporated in determining the criticality of the asset
  - Probability of failure based on its age and condition
  - These items together result in a parameter identified as Business Risk.
- The AMS was used to prioritize the need for short term repair or maintenance, short term replacement, or long term maintenance.

Revenue Structure

- The user charge report and the asset management spreadsheet are identified as the Rate Methodology and have been submitted previously to MDEQ and approved.
- The Rate Methodology was updated to forecast future budgeting needs. The current budget information is included in the AMP Report.

Capital Improvement Plan

There are no short-term needs identified for the City's wastewater system.

- The AMS identifies capital improvement projects for the future.
- The long term projects may be achieved through grants or future public borrowings.
- An estimate of project year and financial cost is generated from each capital improvement project.
- A List of recommended projects to be completed with the next sixteen (16) to thirty (30) years includes only a manhole repair/lining program, at an estimated cost of $55,000.

List of Major Assets

- 40,900 feet of sanitary sewer
- 5,600 feet of and force main
- 160 sanitary manholes
- 3 lift stations.
- Lagoon Wastewater Treatment Facility

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017

The City of Laingsburg certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1514-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No

   If No - Date of the rate methodology approval letter: November 18, 2016.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Paula Willoughby at 517-651-6101 treasurer@laingsburg.us

Name Phone Number Email

Paula Willoughby 5-31-17

Signature of Authorized Representative (Original Signature Required) Date

Paula Willoughby, Treasurer

Print Name and Title of Authorized Representative

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date May 31, 2017

The City of Laingsburg certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1514-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Paula Willoughby, Treasurer at (517) 651-6101 treasurer@laingsburg.us
Name Phone Number Email

Paula Willoughby 5-31-17
Signature of Authorized Representative (Original Signature Required) Date

Paula Willoughby, Treasurer
Name and Title of Authorized Representative

City of Linden Michigan
Asset Management Plan – SAW Grant No. 1670-01
Wastewater Collection System

The total award amount of $529,000 was provided to the City of Linden to complete a Wastewater Asset Management Plan, with the City responsible for $52,900 in match funding. The final amount spent will not be available until the last disbursement request, after the May 31, 2017 deadline. The actual costs were well below the approved award amount.

A. Asset Inventory and Condition Assessment:

The City built a Geographic Information Systems (GIS) inventory, purchase the necessary hardware and software, and receive training. The GIS includes fields to record the required criticality factors and hyperlinks to scanned utility plans. Representatives from HRC were physically able to assess 85 percent of the City's sanitary manhole structure inventory. The City contracted with United Resources LLC. to clean and televise most the City's eligible sanitary sewer lines that were installed before 1993.

Asset Name/Class	Number of Unique Assets
Sanitary Manholes	452
Sanitary Gravity Mains	437 (18 miles)
Sanitary Pump Stations	4

B. Level of Service:

The City developed a mission statement as part of the AMP as follows:

The City of Linden is committed to maintaining the performance of our sanitary and stormwater collection systems to meet applicable local, state and federal regulations and to protect public health and the environment. We strive to develop, operate and maintain these systems in the most cost-effective way to provide sustainable systems for present and future customers.

The City of Linden choose to implement its mission statement as the defined Level of Service. The City's mission statement considers the impacts to public health and the system's ability to comply with regulations. The current procedures and ongoing operations of the City have successfully fulfilled this mission and will continue to be implemented. Because the level of service provided to date has been adequate, public works leaders choose to continue their ongoing processes rather than defining specific goals to track at this time. The City will review the mission statement and ongoing system activities annual to determine if the mission is not being successfully fulfilled and further measurement of the stated goals is necessary

C. Criticality of Assets:

Factors were developed to determine how some assets are more critical than others. A Probability of Failure (POF) was estimated for assets with inspection data based on condition, age, and other factors using the PACP/MACP methodology, which City staff were trained to utilize. A Consequence of Failure (COF) was determined by several attributes of the asset. These attributes include diameter, depth, location, surface type, and critical users. The product of these factors is the overall Business Risk Evaluation (BRE). 95 percent of the City's sanitary sewer lines and 80 percent of sanitary manholes had a

BRE score of 5 or less on a scale of 1 to 25, with 1 being lowest risk. The sanitary pump stations were also inspected and found to be in good condition, which is further documented in the AMP report.

D. Operation and Maintenance Strategies/Revenue Structure:

H.J. Umbaugh & Associates submitted a rate methodology study for the City on September 16th, 2016, which MDEQ approved on October 11, 2016. The City demonstrated that current revenues, with a slight rate increase that has already been implemented, is sufficient to meet anticipated expenses.

E. Long-term Funding/Capital improvement Plan

Pump station improvement projects have been recommended over the next 20 years with a total estimated cost of $150,000. The estimated cost for each project has been included in the proposed budget for the estimated year of completion. Five locations have been identified in the sanitary sewer collection system for immediate repair or rehabilitation with a total estimated cost of $50,000. These projects will be completed over the next two (2) years and paid for using the capital improvements account. The proposed sanitary sewer budget includes the cost to clean and televise the City sanitary sewer system once every ten (10) years. This will assist the City to identify areas for necessary capital improvements.

A signed Certification of Project Completeness form is enclosed. Contact information for the grantee including name, address, and phone number is included below:

Grantee: City of Linden Michigan

132 E. Broad St.
Linden, MI 48451
Phone: 810-735-7980

City Hall Hours:
Monday - Thursday: 8:00am-5:00pm
Closed for Lunch: 12:30pm-1:30pm
Friday 8:00am-1:00pm
Closed on Holidays.

Paul Zelenak, City Manager
Phone: (810) 735-7980
E-mail: manager@linden.mi.us

Scott Fairbanks, Director Public Works
Phone: (810) 735-7980
E-mail: dpw@linden.mi.us

Karyn Stickel, Consulting Engineer
Hubbell, Roth & Clark, Inc.
Phone: 248-454-6566
E-mail: kstickel@hrc-engr.com

City of Linden Michigan
Asset Management Plan – SAW Grant No. 1670-01
Stormwater Collection System

The total award amount of $347,800 was provided to the City of Linden to complete a Stormwater Asset Management Plan, with the City responsible for $34,780 in match funding. The final amount spent will not be available until the last disbursement after the May 31, 2017 deadline. The actual costs were well below the approved award amount.

A. Asset Inventory and Condition Assessment:

The City built a Geographic Information Systems (GIS) inventory, purchase the necessary hardware and software, and receive training. The GIS includes fields to record the required criticality factors and hyperlinks to scanned utility plans. Representatives from HRC were physically able to assess 85 percent of the City's stormwater system structure inventory. The City contracted with United Resources LLC. to clean and televise most the City's eligible storm sewer lines that were installed before 1993.

Asset Name/Class	Number of Unique Assets
Storm Manholes/Inlets	914
Storm Gravity Mains	895 (12.9 miles)

B. Level of Service:

The City developed a mission statement as part of the AMP as follows:

The City of Linden is committed to maintaining the performance of our sanitary and stormwater collection systems to meet applicable local, state and federal regulations and to protect public health and the environment. We strive to develop, operate and maintain these systems in the most cost-effective way to provide sustainable systems for present and future customers.

The City of Linden choose to implement its mission statement as the defined Level of Service. The City's mission statement considers the impacts to public health and the system's ability to comply with regulations. The current procedures and ongoing operations of the City have successfully fulfilled this mission and will continue to be implemented. Because the level of service provided to date has been adequate, public works leaders choose to continue their ongoing processes rather than defining specific goals to track at this time. The City will review the mission statement and ongoing system activities annual to determine if the mission is not being successfully fulfilled and further measurement of the stated goals is necessary

C. Criticality of Assets:

Factors were developed to determine how some assets are more critical than others. A Probability of Failure (POF) was estimated for assets with inspection data based on condition, age, and other factors using the PACP/MACP methodology, which City staff were trained to utilize. A Consequence of Failure (COF) was determined by several attributes of the asset. These attributes include diameter, depth, location, surface type, and critical users. The product of these factors is the overall Business Risk Evaluation (BRE). 93 percent of the City's storm sewer lines and 91 percent of storm manholes had a BRE score of 5 or less on a scale of 1 to 25 with 1 being lowest risk.

D. Operation and Maintenance Strategies/Revenue Structure:

The SAW Grant does not require a review of the stormwater system rate structure because most stormwater systems in Michigan, including the City, do not have a dedicated source of revenue. The estimated costs for improvements are presented in the report for budgetary purposes.

E. Long-term Funding/Capital improvement Plan

The stormwater sewer system was found to be in good condition with the highest BRE score being just above 10 located along Bridge Street. Broken pipe, deposits, and an external utility were observed in the video; however, the pipe appears to be stable and functional. This area is located in downtown Linden, where it would be disruptive and difficult to repair the pipe. The City should monitor this area during rain events and note any flooding, specifically if flooding increases between similar rain events indicating further degradation of the pipe. No capital improvement projects are needed in the stormwater sewer system at this time.

A signed Certification of Project Completeness form is enclosed. Contact Information for the grantee including name, address, and phone number is included below:

Grantee: City of Linden Michigan

132 E. Broad St.
Linden, MI 48451
Phone: 810-735-7980

City Hall Hours:
Monday - Thursday: 8:00am-5:00pm
Closed for Lunch: 12:30pm-1:30pm
Friday 8:00am-1:00pm
Closed on Holidays.

Paul Zelenak, City Manager
Phone: (810) 735-7980
E-mail: manager@linden.mi.us

Scott Fairbanks, Director Public Works
Phone: (810) 735-7980
E-mail: dpw@linden.mi.us

Karyn Stickel, Consulting Engineer
Hubbell, Roth & Clark, Inc.
Phone: 248-454-6566
E-mail: kstickel@hrc-engr.com

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The Paul Zelenak *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1670-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: **Yes** or No
   If No - Date of the rate methodology approval letter: ____________________.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

PAUL C ZELENAK at 810 735-7990 MANAGER@LINDENMI.US
Name Phone Number Email

5/5/17
Signature of Authorized Representative (Original Signature Required) Date

PAUL C. ZELENAK, CITY MANAGER
Print Name and Title of Authorized Representative

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date May 31, 2017
(no later than 3 years from executed grant date)

The Paul Zelenak *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1670-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

PAUL C. ZELENAK at 810-735-7980 MANAGER@LINDENMI.US

Name Phone Number Email

5/5/17

Signature of Authorized Representative (Original Signature Required) Date

PAUL C ZELENAK, CITY MANAGER

Print Name and Title of Authorized Representative

CITY OF LIVONIA

Sanitary Sewer System
ASSET MANAGEMENT PLAN

Funded by SAW Grant 1441-01

April 2017

OHM
Advancing Communities®

ARCHITECTS. ENGINEERS. PLANNERS.

ASSET MANAGEMENT PROGRAM DOCUMENTATION

I. Introduction & Executive Summary

In December of 2013, the City of Livonia applied for a Stormwater, Asset Management, and Wastewater (SAW) grant from the Michigan Department of Environmental Quality (MDEQ) in order to develop an asset management program for the City sanitary sewer system. The City received SAW Grant 1441-01 of $1,838,582.00, which required a City matching contribution of $390,639.00, for a project total of $2,229,221.00. This report summarizes the progress and findings of the sanitary sewer asset management program.

The International Infrastructure Management Manual defines the goal of an asset management program as meeting a required level of service in the most cost-effective way through the creation, acquisition, operation, maintenance, rehabilitation, and disposal of assets to provide for present and future customers. Such a program entails several components, which are detailed in this report, along with the means by which the City addressed these components.

One important element to an asset management program is a mission statement, which identifies the overarching purpose of the City's asset management program.

Mission Statement

The purpose of the City's asset management program is summarized by the following mission statement:

We are committed to providing and maintaining high quality sanitary sewer collection services to our existing and future customers in a cost effective manner while protecting human health and the environment.

Asset Management Team Leaders

The team leaders listed in Figure 1 are committed to the asset management mission statement and were instrumental in the progress made and findings outlined in this report. Further questions on the City's asset management program can be directed to those team members who work at the City of Livonia Department of Public Works (DPW).

Don Rohraff

- Director, Public Works
- (734) 466-2655
- 12973 Farmington Rd, Livonia, MI 48150

Tom Wilson

- Supervisor, Water & Sewer
- (734) 466-2655
- 12973 Farmington Rd, Livonia, MI 48150

Todd Zilincik

- City Engineer, Engineering
- (734) 466-2571
- 3300 Civic Center Drive, Livonia, MI 48154

Figure 1. Asset Management Team Leaders

Infrastructure Technology & Know-How

The City has made investments in technological upgrades in order to more effectively manage its sanitary sewer infrastructure assets. These upgrades include the following:

- Development of a geographic information system (GIS) based asset infrastructure database and upgrade of associated software
- Upgrade of the City's computerized maintenance management system (CMMS) to not only house work order and call request information but also infrastructure condition information
- Acquisition of plotter and scanners to digitize relevant asset documents
- Acquisition of mobile devices to improve field access to real-time asset information
- Acquisition of additional sanitary sewer flow meters and upgrading these meters with current technology for automated data collection and system monitoring

In addition, two City of Livonia personnel were recently certified with the National Association of Sanitary Sewer Companies (NASSCO) for MACP and PACP so that ongoing inspections can be performed by City staff. The intention is for several more staff to be trained in the future. As part of the current infrastructure assessment program through the State SAW program, the City worked with NASSCO certified contractors in collecting and assessing its infrastructure assets as well as associating this information with the City's CMMS system for future reference.

Asset Inventory

An asset inventory is a list of the city's assets and their attributes. The City inventoried and digitized nearly 99% of its sanitary sewer infrastructure, including manholes and sanitary sewers. In addition, all sanitary sewer as-built information has been scanned and converted to a digital format. The City is continuing to populate the attributes of the inventory using both as-built data as well as observations in the field while performing condition assessment. This inventory resides in the City GIS system and is also connected to the City's CMMS program.

Condition Assessment & Deterioration Forecasting

Through a methodical sampling procedure outlined in this report, a representative sample of the City's sanitary sewer infrastructure (sanitary sewer pipes and manholes) has been assessed. The condition of the infrastructure is based on NASSCO's "Condition Grading System", which uses a scale of zero to five. Zero indicates the infrastructure is in very good condition, while five indicates the infrastructure is in very poor condition or has already failed.

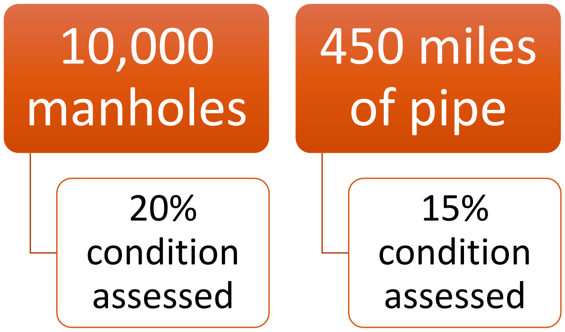


Figure 2. Portion of system assessed

About 20% of the approximately 10,000 structure manhole network and about 15% of the approximately 450 miles of sanitary sewer pipe infrastructure has been condition assessed (Figure 2).

It was also observed that, as illustrated in Figure 3:

- The average structural rating of the manhole infrastructure was approximately one, with an estimated life of 80 years before reaching a poor state identified by a structural rating of four.
- The average structural rating of the sewer pipe infrastructure was approximately 1.2, with an estimated life of 60 years before reaching a poor state identified by a structural rating of four.
- The infrastructure will continue to degrade over time, as discussed further in the Remaining Useful Life section of the report in Chapter III. For example, even though the average condition of the manhole infrastructure is 1.0 per 2015 assessment data, a small percent of the infrastructure has a condition rating of 5; this percent will grow over time (see Chapter III of the full report). Therefore, asset condition assessment was identified as a level of service criteria (Table 1) to locate and fix infrastructure before it reaches poor condition. The level of service rates balance inspection costs and deferred cost to fix deteriorated infrastructure.

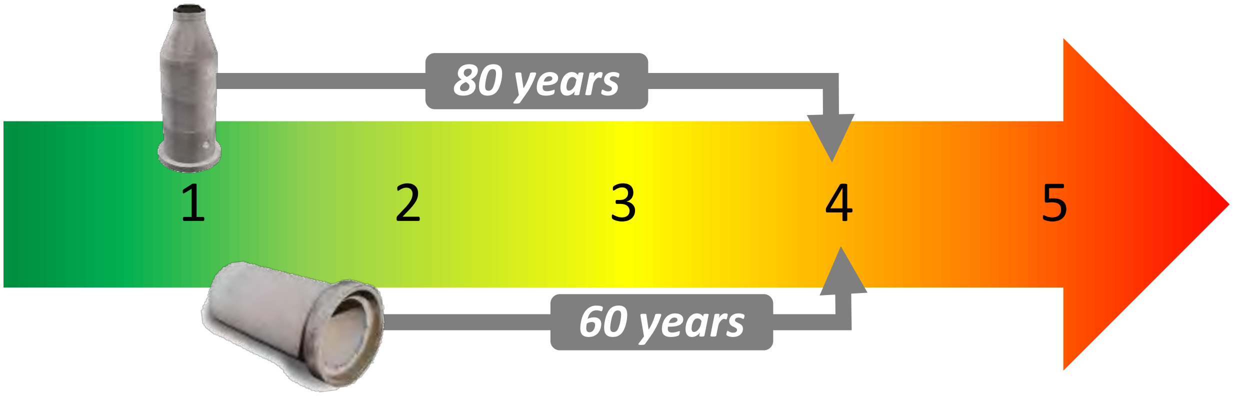


Figure 3. Remaining time to structural rating of four

Metering & Modeling

As part of developing a numerical sanitary sewer model to aid in the asset management plan, 13 temporary meters were installed to augment the existing six permanent meters; two have been kept on and are now permanent. One (1) rain gauge was added to augment two existing rain gauges; all three are permanent. These meters and rain gauges were used to determine design event flows that the sanitary sewer system would likely experience. A design event flow is defined as the peak flow rate that the

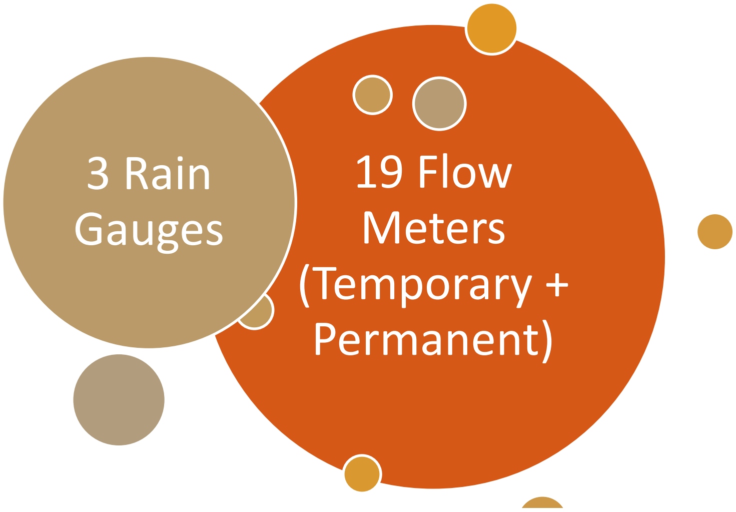


Figure 4. Three rain gauges and 19 flow meters

system would experience with an annual exceedance probability of 10% in any given year (also referred to as the 10-year frequency flow). These projected flow rates were subsequently used in the City sanitary sewer interceptor numerical model, which consisted of sewers 12 inches and larger. The model helped identify sanitary sewer pipes that may be at or close to pipe capacity during a design storm event. Finally, flow metering data was compared against several areas in Southeast Michigan in order to assess the level of wetness of these areas. Following the metering program, the City increased its number of permanent meters to eight and the number of permanent rain gauges to three. The results of this metering and modeling exercise are summarized below:

- Metering districts LV-04, along with LV-14, LV-15, and LV-16 in particular, showed high wetness conditions. The locations of these districts can be seen in the map on page 19 of the full report.
- For the most part, the Livonia interceptor system was able to contain the 10-year frequency design event peak flow rate. A small stretch of sanitary sewer downstream of meter LV-04 was observed to show capacity limitations.

Criticality

The investigation leading to the identification of critical sewer infrastructure involved the determination of risk, which is identified as the combination of the probability of the infrastructure failing as well as the consequence of its failure. Sanitary sewer pipes larger than 18 inches in diameter have a very high consequence of failure, as they collect sanitary sewer from large portions of the City system and tend to be located near major road or highway corridors. In addition, condition evaluation showed more wear on large diameter sewers (larger than 18 inches) than smaller diameter sewers. For example, the average structural rating of the large diameter sewers in the system is approximately three (3), whereas the smaller diameter sewer average structural rating is less than one. Therefore, sanitary sewers with diameters larger than 18 inches have been identified as critical infrastructure in the system.

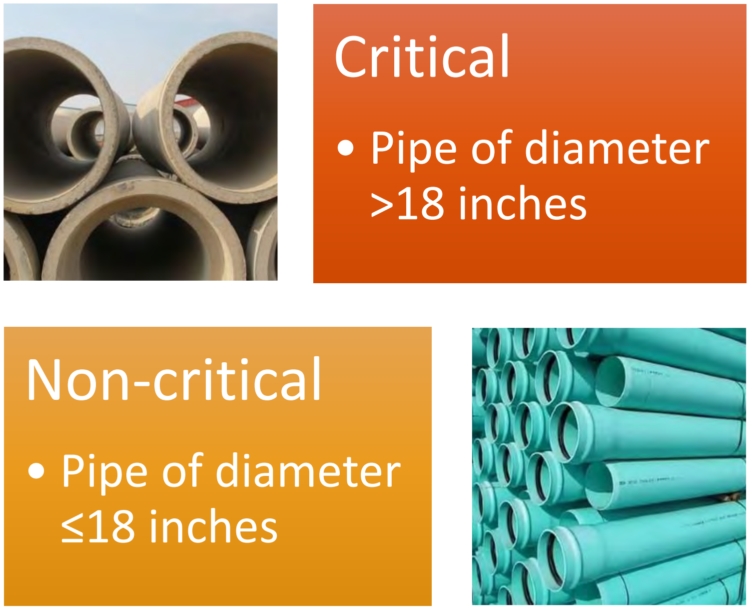


Figure 5. Critical pipes

Level of Service

The City, in line with its mission statement outlined earlier, adopted level of service criteria, which it plans on using as guidelines to manage the sanitary sewer asset infrastructure. These level of service criteria are summarized in Table 1 on the next page.

Table 1. Summary of Level of Service Criteria

Key Service Criteria	Performance Indicator	Target Level of Service
Asset Condition Assessment	PACP & MACP Inspections Per Year*	• MACP inspect a minimum of 500 manholes per year • PACP inspect a minimum of 50 miles of sewer per year
Flow Capacity	Active flow monitoring of the majority of the system (by service area), and Excessive Flow Removal from Sewer System	In 2016 and 2017, disconnect 50-60 homes with footing drains from the system; also maintain and, as needed, increase flow monitors
Regulatory Compliance	Compliance with MDEQ Sanitary Sewer Overflow (SSO) Policy	Comply with the MDEQ SSO policy of no more than 10% of a chance of SSO in any given year, excluding unusual natural events or man-made disasters
Service Delivery	Response to Sanitary Sewer Complaints	Reduce response time to sanitary sewer complaint to less than 6 hours from the time of the call
O&M Optimization	Allocation of Operation & Maintenance (O&M) Budget per Year	Allocation of approximately 5% of annual operating budget to O&M activities

* Pipe Assessment Certification Program (PACP), to assess sanitary sewer condition
Manhole Assessment Certification Program (MACP), to assess manhole condition

Summary of Findings

Overall, the following observations were made:

- Overall, the sanitary sewer system is in good to fair condition, with an average structural rating in 2015 of 1.0 for manholes and 1.2 for pipes
- Overall, the Livonia interceptor collector system is capable of carrying the 10-year frequency design event flow rates.
- Removal of footing drain flows is planned to reduce wet weather flows.
- The system is aging and is in need of routine inspection and associated rehabilitation activities.
- Given the current condition of the system as well as anticipated rate of deterioration, the following operation and maintenance schedules were developed:
    - Inspect 500 manholes per year, resulting in the overall system being inspected at least four times before an overall condition of poor has been reached in the next 80 years

    - Inspect 50 miles of the sanitary sewer system per year, which would result in the overall system being inspected at least four times before an overall condition of poor has been reached in the next 60 years

Revenue Structure and Capital Improvement Project Plan

The revenue structure analysis is detailed in a separate document and can be made available to the public upon request. It was submitted to and approved by the MDEQ, as shown in the attached letter. As part of the capital improvement project plan and outlined in the Level of Service table above, the City identified a footing drain disconnection program and adjusted its operating budget to inspect 500 manholes and 50 miles of sanitary sewer each year.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 4/29/17
(no later than 3 years from executed grant date)

The City of Livonia *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1441-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: December 2, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Todd J. Zilincik, P.E. at (734) 466-2561 tzilincik@ci.livonia.mi.us
Name Phone Number Email

Todd J. Zilincik 5/31/17
Signature or Authorized Representative (Original Signature Required) Date

Todd J. Zilincik, P.E., City Engineer
Print Name and Title of Authorized Representative

Loch Alpine Sanitary Authority
Asset Management Plan
Executive Summary

Loch Alpine Sanitary Authority of Webster and Scio Townships
827 N. Zeeb Road
Ann Arbor, MI 48103

M. Jack Knowles, 734.369-9400, jknowles@sciotownship.org
SAW Grant Project Number: 1316-01

Executive Summary

The Asset Management Plan (AMP) focused on the Loch Alpine Sanitary Authority (Authority) sanitary collection and wastewater treatment plant.

The AMP is an extension of the general operating practices of the Authority. A Sanitary Sewer Evaluation Study (SSES) was conducted in 2006. Since that time, the Authority has regularly cleaned and televised portions of the collection system, completing a review of the system every 8 to 10 years. Problems within the sanitary collection system have been regularly addressed since that time.

The AMP allows the Authority to:

- Capture institutional knowledge
- Help maintain compliance with NPDES requirements
- Identify and correct system deficiencies.

Cost summary

Total Project	$151,675
Grant Amount	$135,508
Local Match	$15,167

The key components of the asset management plan include:

- Inventory and condition assessment listing of WWTP and pump station equipment
- Inventory and condition assessment of approximately 28,300 feet of sanitary sewer
- GIS Application of Collection system on tablet computers giving users access to CCTV records and scanned drawings
- User charge review (November 2016)
- Capital Improvement Program.

Asset Inventory:

Asset inventory included in the following:

- Survey locations of existing sanitary sewer collection components (manholes)
- Review of existing as built drawings
- Closed circuit televising (CCTV) of sanitary sewers to find and verify location of manholes

- Discussion with Authority staff regarding storm water conveyance system
- Component listing of major process components at the Wastewater Treatment Plant.
- Development of GIS mapping for wastewater collection.

Condition Assessment

- CCTV of portions of the sanitary collection system installed prior to 1993 and not cleaned in the last 5 years (about 20% of the system) to review condition of piping and discussion with staff.
- CCTV assessed the condition and scored each asset using the Pipeline Assessment and Certification Program (PACP) industry coding standard.
- Review of components of the WWTP and discussion with operators.

The assets were rated on a scale of 1 to 5 both for Condition and probability of Failure as listed below

Rating	Condition Assessment	Probability of Failure
1	New or Excellent Condition - Only normal maintenance required	Improbable - So unlikely, it can be assumed occurrence may not be experienced
2	Minor Deterioration - Minor maintenance required (5%)	Remote - Unlikely but possible to occur in the life of an item
3	Moderate deterioration - Significant maintenance required (10 - 20%)	Occasional - Likely to occur sometime in the life of an item
4	Significant deterioration - significant renewal/upgrade required (20 -40%)	Probable - Will occur several times in the life of an item
5	Asset Unserviceable - Over 50% of asset requires replacement	Imminent - Likely to occur in the life of the item

In general, the wastewater treatment plant, although aged, is in good condition with excellent maintenance practices, and proactive equipment replacement.

Of the CCTV surveyed sewer collection system:

Good Condition	88% (represented by peak PACP score of 0, 1, or 2)
Fair Condition	11% (represented by peak PACP score of 3 or 4)
Bad Condition	1% (represented by a peak PACP score of 5 or more)

Level of Service

The Authority is committed to improving and maintaining the public health protection and performance of our wastewater plant, sanitary collection system while minimizing the long-term cost of operating those assets. We strive to make the most cost-effective renewal and replacement investments and provide the highest quality customer service possible.

The components of the AMP were programmed and developed in conjunction with Authority Staff, including the Manager, Operating Committee and Operators, and WWTP Superintendent. The AMP is intended to be a simple living document allowing the Authority to make informed decisions about improvements, and allow operators to quickly find information during emergencies. The Authority Board reviews and approves budgets as part of the normal process.

Criticality of Assets

The criticality of the assets were rated on a scale of 1 to 5 as listed below:

Rating	Criticality of Asset
1	Insignificant Disruption
2	Minor Disruption
3	Moderate Disruption
4	Major Disruption
5	Catastrophic Disruption

The ratings for the wastewater treatment plant and pump stations considered the following:

- Consequence of failure (if equipment fails, what percent of the treatment capacity is diminished or impacted? What impact on customers or environment?)
- Redundancy of the equipment (is there an installed and operational backup system or equipment?)
- Availability of replacement (how long to procure a replacement? At what cost?)

The ratings for the sanitary collection system considered the following:

- Consequence of failure
- Impact to commercial or industrial customers
- Number of residents impacted by a sewer failure
- The location of the sewer

The criticality factor was multiplied by the probability of failure (or PACP condition for the collection system) and assigned a Business Risk score between 1 and 25. Any Business Risk score greater than 16 was included in the Capital Improvement Program.

The most critical assets include:

- Wastewater Treatment Plant
- 12” Sanitary Sewer on the southern portion of East Loch !l pine
- 12” Sanitary Sewer on the southern portion of West Loch !l pine

Revenue Structure

The Authority has used the Michigan Rural Water Association Rate Program to review and set rates over the last decade. The current rate structure was reviewed and found adequate to cover system operation, maintenance, replacement, capital improvement, and debt costs.

Capital Improvement Plan

The AMP did not identify any long term capital improvement projects.

List of Major Assets

- Wastewater Treatment Plant
- 282 manholes
- 58,762 feet of 6 to 12” sewer pipe

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The Loch Alpine Sanitary Authority of Webster and Scio Townships *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1316-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: November 16, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Dan Geyer at 734.476.2461 dan.geyer@magnumps.com
Name Phone Number Email

M Jack Knowles 5/31/17
Signature of Authorized Representative (Original Signature Required) Date

M. Jack Knowles, Chair
Print Name and Title of Authorized Representative

April 2017

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 5, 2017
(no later than 3 years from executed grant date)

The Charter Township of Lyon *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1016-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: October 6, 2016.
2) Significant Progress Made: Yes or No N/A
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: N/A.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on N/A.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Name		Phone Number	Email
John Dolan	at	(248)-437-2240	jdolan@lyontwp.org

5/2/17
Signature of Authorized Representative (Original Signature Required) Date

John Dolan, Township Supervisor
Print Name and Title of Authorized Representative

April 2017

Wastewater System
Asset Management Plan Summary

For:

The Charter Township of Lyon

MDEQ SAW Grant # 1016-01
May 2017

Prepared by:

Giffels Webster
1025 East Maple
Suite 100
Birmingham, MI 48009

OVERVIEW

Giffels Webster (GW) applied for and received a grant on behalf of The Charter Township of Lyon to develop an Asset Management Plan (AMP) for its sanitary sewer system through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Wastewater and Asset Management (SAW) program. The SAW grant was also used to pay for 90% of the design of the recent 14 completed 0.5 MGD wastewater treatment plant expansion.

The scope of work performed as part of the Lyon Township SAW grant included reviewing and updating the inventory of assets; establishing the baseline condition of the assets; prioritizing assets by estimating the overall risk associated with each asset; developing level of service goals and performance measures for the system; developing a capital improvement plan and major maintenance plan; and developing a financial plan for the system.

A budget for the Lyon Township system was prepared and a demonstration of rate sufficiency was submitted and approved by the MDEQ as part of the SAW Grant requirements in October 2016.

A summary of the sanitary assets owned by Lyon Township that were inventoried as a part of the SAW Grant Project are provided in Table 1-1 and 1-2.

Table 1-1: Asset Inventory

Delivered Feature Classes	Number of Records/Assets
Sewage Lift Station	16
Sewage Treatment Facility	1
Sewer Fitting	114
[1]Sewer Gravity Main	248,513 LF
Sewer Manhole	1,187
[1]Sewer Non-Gravity Main	110,692 LF

See Table 1-2 for inventory of sewer gravity mains, and sewer non-gravity mains.

Table 1-2: Inventory of Gravity Sewer & Sewer Forcemains

Pipe Diameter (in)	Gravity Pipe Length by Material (ft)						Total			Force Main Length (ft)			Total		
	ABS Truss	DIP	HDPE	PVC SDR	PVC Truss	RCP	(ft)	(mi)	(%)	DIP	HDPE	PVC	(ft)	(mi)	(%)
2	-	-	-	-	-	-	-	-	0%	-	2,234	-	2,234	0.42	2%
3	-	-	-	-	-	-	-	-	0%	24	11,232	-	11,256	2.13	10%
4	-	-	-	-	-	-	-	-	0%	-	4,285	-	4,285	0.81	4%
6	-	-	-	95	-	-	95	0.02	0%	4,775	6,506	-	11,281	2.14	10%
8	4,445	-	159	52,413	51,877	-	108,894	20.62	48%	3,383	2,728	-	6,111	1.16	6%
10	9,916	12	445	22,293	19,121	-	51,787	9.81	23%	6,298	5,356	-	11,654	2.21	11%
12	3,977	-	-	2,830	2,224	-	9,031	1.71	4%	30,176	-	-	30,176	5.72	27%
14	-	-	-	-	-	-	-	-	0%	-	14,869	-	14,869	2.82	13%
15	10,551			11,941	4,500		26,992	5.11	12%	-	-	-	-	-	0%
16	-	-	75	-	-	-	75	0.01	0%	25	3,202	-	3,227	0.61	3%
18	-	-	-	13,865	-	5,098	18,963	3.59	8%	-	-	-	-	-	0%
20	-	-	-		-	-	-	-	0%	-	15,599	-	15,599	2.95	14%
21	-	-	-	9,320	-	60	9,380	1.78	4%	-	-	-	-	-	0%
24	-	-	-	2,004	-	-	2,004	0.38	1%	-	-	-	-	-	0%
30	-	-	-	-	-	309.0		-	0%	-	-	-	-	-	0%
36	-	40	-	1,252	-	-	1,292	0.24	1%	-	-	-	-	-	0%
Total (ft)	28,889	52	679	116,013	77,722	5,467	228,513		100%	44,681	66,011	-	110,692		100%
Total (mi)	5.47	0.01	0.13	21.97	14.72	1.04		43.28		8.46	12.50	-		20.96	
Total (%)	12.6%	0%	0.3%	51%	34.0%	2%				40%	60%	0%			

SUMMARY

Giffels Webster developed an Asset Management Plan for the sanitary system owned by Lyon Township and operated by Highland Treatment, Inc. (HTI). Giffels Webster applied for and received a grant to develop an asset management plan through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Wastewater and Asset Management (SAW) program. This grant provided 90% funding for costs related to developing an asset management plan and for the design costs related to the 0.5 MGD Wasterwater Treatment Plant that completed construction in 2016.

The SAW program was established by the MDEQ in order to help communities move toward financial sustainability. Outside funding sources for wastewater and stormwater systems are typically no longer available, and therefore the MDEQ is encouraging utilities to move toward becoming self-sustaining enterprises. Lyon Township prepared a GAP Analysis that showed their system is self-sustaining. A budget for the Lyon Township wastewater system was prepared and a demonstration of rate sufficiency was submitted and approved by the MDEQ as part of the SAW Grant requirements in October 2016.

This summary includes Program elements related to Lyon Township's wastewater system which was the focus of this SAW Grant. A full report with all backup documentation is currently available and will remain on file with Lyon Township for 15 years.

What is an Asset Management Program?

The International Infrastructure Management Manual defines the goal of asset management as meeting a required level of service in the most cost-effective way through the creation, acquisition, operation, maintenance, rehabilitation, and disposal of assets to provide for present and future customers.

An Asset Management Program includes a set of procedures to manage assets based on principles of life cycle costing implemented in a programmatic way. The intent of asset management is to ensure the long-term sustainability of the utility. By helping a utility manager make better decisions on when it is most appropriate to repair, replace, or rehabilitate particular assets and by developing a long-term funding strategy, the utility can ensure its ability to deliver the required level of service perpetually.

Effective asset management implementation is comprehensive. It may involve integrating a number of tools along with other existing systems (accounting, financial reporting, purchasing and stores, payroll, etc.) to create a comprehensive information system that will support an integrated Asset Management Program. Properly practiced, it involves all parts of the organization and entails a living set of performance goals.

A good Program is not "done" and put on a shelf, but rather provides a framework of tools that may be continuously used for decision making. It is an active, on-going process that provides information to managers in order to make sound decisions about their capital assets and allows decision makers to better identify and manage needed investments in their utility's infrastructure. The Program tools may be used for tasks such as reviewing and establishing annual budgets, planning improvements, determining required staffing, and communicating performance with the public and regulatory agencies.

What is an Asset Management Plan?

An Asset Management Plan ("AMP") is a tool to help the utility implement its Asset Management Program. The purpose of this summary is to focus on the AMP developed for Lyon Township, which is operated and maintained by HTI, with a focus on the next 20 years. A goal of the AMP is to provide sufficient funding for ongoing capital, operations, and maintenance costs, while providing excellent wastewater services and being fiscally responsible.

The AMP provides Lyon Township with the information to deliver the desired level of service to the community at the lowest life cycle costs. This will be achieved by developing a strategic process to perform proactive maintenance and investment in the system, rather than just reacting to failures. The AMP should be re-visited at periodic intervals to confirm that priorities and objectives are being addressed and updated.

The scope of work for this AMP consists of addressing the five core components as described in the Michigan Department of Environmental Quality's (MDEQ) document, "Asset Management Guidance for Wastewater and Stormwater Systems." These include:

- Development of an Asset Inventory and Estimating Condition of Assets
- Identifying Critical Assets
- Identifying the Proposed Level of Service
- Capital Improvement Planning
- Establishing a Revenue Structure

SCOPE OF WORK

The specific work performed as part of the grant included the following:

Inventory of Assets and Condition Assessment

The Lyon Township AMP utilizes an updated Geographic Information System (GIS) geodatabase, as the primary means to record and map the sanitary sewer system assets. This GIS system is a computer based map of the sewer system that graphically shows each asset including pipe segments, manholes, valves, pump stations, and wastewater treatment plant. For each asset, there is a database of attributes associated with the asset, such as installation date (age), size, and material. As part of the SAW grant, Giffels Webster migrated information from the previous shapefile based GIS to a new geodatabase GIS. Giffels Webster also reviewed and updated the existing inventory to ensure that all system assets were included with the important GIS attributes.

The software used is ESRI ArcGIS. Although not currently in use by HTI, there are programs available to generate work orders and track maintenance of individual assets. These programs sync directly with the ArcGIS software to utilize the geodatabase of assets. The system could capture costs and frequency of repairs and maintenance for critical assets. This data could be used in determining asset criticality and for prioritizing short and long-term maintenance and replacement needs. The geodatabase can also be synced with hydraulic modeling software that might be used for a sewer capacity study.

The Asset Management Plan includes a detailed inventory of horizontal assets (gravity sewers, manholes, forcemains & valve structures), and a listing of vertical assets (pump stations and wastewater treatment plant). In the future, the Township may wish to expand the inventory of vertical assets to include such assets as pumps, blowers, PLC controllers etc.

Because the majority of Lyon Township's wastewater system is less than 20 years old the SAW grant did not provide funding for physical inspections and detailed condition assessments of the sewer system. Therefore, the initial condition assessments were based on available information including existing manhole inspection reports and attribute data stored in the geodatabase such as pipe age, material, and depth.

Criticality and Risk Evaluation

Once the asset inventory was updated in the GIS geodatabase then the criticality of the asset was evaluated. In determining criticality, two questions are important. The first is how likely it is that the asset will fail; and the second is, what is the consequence of failure. By developing a scoring scale for these two measures, and then combining the two results, the overall risk of an individual asset can be quantified. Determining an asset's overall risk will allow a utility to manage its risk and aid in determining where to spend operation and maintenance dollars and plan capital expenditures.

Level of Service Determination

In general Lyon Township has a relatively new sewer system and the Township would like to provide a relatively high level of service to its customers. Level of Service was broken down into the following broad categories: Safety of Employees and the Public; Financial Impact; Public Confidence; and Regulatory Compliance. The level of service becomes the basis for evaluating the consequence of failure for a particular asset, and thus it is a component of the criticality evaluation. Additional detail on the level of service categories can be found in the final report.

Capital Improvement Planning

A 20-year Capital Improvement Plan was developed that identifies capital improvements that will be needed in order to serve additional customers, and capital improvements that will be needed to rehabilitate the system as it ages. Over the first 5 years the plan includes approximately $6 million dollars of capital improvements, however, one project (redundant forcemain system) accounts for $5.3 million dollars of the plan. It may be possible to delay construction of the redundant forcemain system, and it is recommended that a sanitary sewer system capacity study be performed to better assess the required implementation dates for each project.

A Major Maintenance Plan was also developed for Lyon Township's wastewater system. The system is relatively new and there has been little need for major maintenance work on the system. However, the system is reaching an age where major maintenance will become necessary and the Township should begin budgeting for it. Major maintenance includes pump replacements, wastewater treatment plant equipment replacements, manhole adjustments, and sewer system inspection programs.

It should be understood that major maintenance is somewhat unpredictable. In some years, there may be little spent on major maintenance, but in other years, significant maintenance will be required. The recommended budget for major maintenance starts out at $264,000 in 2017, and increases to $450,000 by year 2022. After year 2022, it should be relatively constant and the budget should be periodically updated based on operational experience.

Revenue Sufficiency Determination and Revenue Structure

In order to keep the Lyon Township system sustainable into the future, a funding mechanism will be required that can provide for all of the anticipated operation, maintenance and capital improvement costs over the short and long-term. A budget for the Lyon Township system was prepared and a demonstration of rate sufficiency was submitted and approved the MDEQ as part of the SAW Grant requirements in October 2016.

Umbaugh and Associates prepared a rate study for the sanitary sewer utility. Their study was based on the Capital Improvement and Major Maintenance Plan along with other information supplied by the Township. A copy of the rate study is included with the Lyon Township Asset Management Plan Report.

SAW Required Reporting

This AMP includes a certification of project completion for the MDEQ's SAW Grant Program. In addition, we understand a summary of this report will be posted on MDEQ's website and materials made available to the public upon request. We also understand the AMP shall be available for public review for 15 years from submission.

Conclusions and Recommendations

1. A comprehensive asset inventory and condition assessment is the foundation of a good asset management plan. Through the SAW grant and the development of this AMP the asset inventory was moved from a shapefile GIS format to a file geodatabase GIS format. As described in Chapter 4 of the full report, a geodatabase GIS system will be more efficient and has several advantages over the shapefile GIS format. This geodatabase needs to be updated and maintained on a regular basis as projects are constructed and as new data becomes available. It should be noted that projects constructed over the last 3 years have not yet been added to the GIS system. It is recommended that the GIS geodatabase be maintained by GIS professionals who have experience working with geodatabases.
2. Lyon Township has a set of quarter section maps that are based on the GIS shapefiles. As the GIS system is updated, the quarter section maps should also be updated to source data from the geodatabase in order to reflect current field conditions.
3. The GIS system is a tool that can be used by the operator, engineers, and administrative staff through user-friendly applications. The Township should consider setting up the GIS system in a manner where all of these stakeholders have access to view this data. ArcGIS Online would likely be the most cost-effective platform for the Township at this time.
4. The SAW grant did not provide funding for a full asset inventory of the wastewater treatment plant. An inventory of major equipment at the WWTP could help the Township track equipment history, costs, condition assessments, useful life, and other information. The Township should consider developing a database inventory of major WWTP assets in the future.
5. The Township should develop a plan to regularly inspect the sanitary sewer system using criteria developed under the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment Certification Program (PACP), Manhole Assessment Certification Program (MACP) and the Lead Assessment Certification Program (LACP.) These programs provide standards for defect identification and assessment using a consistent and repeatable method to identify, evaluate and manage pipelines, manholes and leads. Data from these inspections should be input into the GIS geodatabase. The process can be designed so that the data provided by the NASSCO certified inspection can be easily uploaded into the geodatabase.
6. It is important that all sewer system stakeholders understand the Level of Service goals as summarized in Chapter 5 of the full report. The Township should review these goals on an annual basis with the various stakeholders and revise these goals as necessary.
7. Business Risk: As recommended in the MDEQ's asset management plan guidance documents, a Business Risk grade was established for gravity sewers, manholes, forcemains, and pump stations. These Business Risk scores can be used as a tool to prioritize and schedule capital improvements.
8. Gravity Sewers: An Excel spreadsheet was developed through this AMP that uses data from the GIS geodatabase to assign an Likelihood of Failure(LOF), Consequence of Failure(COF), and Business Risk grade to the gravity sewer segments. For this tool to be useful, the GIS geodatabase and Excel spreadsheet need to be kept up to date.

9. Manholes: 78% of the manholes have been recently inspected, and those manholes with a high Risk have either been rehabilitated or are scheduled to be rehabilitated. Therefore, the current Business Risk is considered to be small. A simple Business Risk Excel spreadsheet has been developed for the manholes. In the future, as the Township moves towards MACP-based inspections, the Township may want to update the Business Risk spreadsheet formulas.
10. Pump Stations: As described in Chapter 6 of the full report, the Business Risk evaluation for the pump stations was kept quite simple. Tables 6.3 & 6.4 in the full report provide a summary of this evaluation. These tables should be updated on a regular basis as inspections are performed.
11. Wastewater Treatment Plant: A Business Risk evaluation should be developed for the WWTP.
12. Chapter 7 of the full report, provides a recommended capital improvement and major maintenance plan for Lyon Township's sanitary sewer system. The Township should carefully review and update this plan annually.
13. A Sanitary Sewer System Capacity Study should be performed to determine the maximum capacity of specific sewer segments and to better predict when other planned capacity improvements will be needed.
14. Due to the SAW program being funded through monies appropriated for water quality, it could not be used to develop an asset management plan for Lyon Township's public water system. The MDEQ will require an AMP for the water system by January 1, 2018. The Township should begin this task.
15. The Township's financial consultant, Umbaugh and Associates, has prepared a financial plan (See Appendix A of the full report) for the sanitary sewer system. The Township should review this plan with Umbaugh and Associates and if necessary, adjust the Township's Fee Ordinance.

This summary provides a brief overview of the Asset Management Plan in accordance with the required end of grant deliverables. A detailed report has been prepared and will be available at Lyon Township before May 31st, 2017.

For more information on the detailed Asset Management Plan report, please contact:

Mr. John Dolan, Township Supervisor
Ph: (248) 437-2240
jdolan@lyontwp.org
Charter Township of Lyon
58000 Grand River Avenue
New Hudson, MI 48165

MACOMB COUNTY PUBLIC WORKS COMMISSIONER

CANDICE S. MILLER

MACOMB COUNTY WASTEWATER DISPOSAL DISTRICT

MCWDD SAW GRANT STUDIES
ASSET MANAGEMENT CONTACT INFORMATION

MDEQ SAW Grant No. 1130-01

MACOMB COUNTY PUBLIC WORKS COMMISSIONER'S OFFICE
21777 Dunham Road
Clinton Township, MI 48036

Brian Baker, Chief Deputy Macomb County Public Works Commissioner
586-307-8210

giffels webster

Macomb County Wastewater Disposal District Asset Management Plan Summary

To:	The Office of Macomb County Public Works Commissioner Candice S. Miller	Date:	May 25, 2017
From:	Giffels Webster	Project:	MCWDD AMP and SAW Grant Studies
RE:	Executive Summary	SAW Grant No.:	1130-01

The Macomb County Wastewater Disposal District (MCWDD), an agency operated under the Office of Macomb County Public Works Commissioner (OMCPWC) Candice S. Miller, received the Stormwater, Asset Management, and Wastewater (SAW) Grant through the Michigan Department of Environmental Quality (MDEQ) during the first round of funding in 2014. Eligible costs for the MCWDD SAW Grant totaled $2,490,811; with $2 million in grant money with a local match of $490,811. The SAW Grant provided the MCWDD with the resources to accurately evaluate the condition of the wastewater system assets maintained by the MCWDD and to develop a comprehensive Asset Management Plan (AMP).

An AMP is a strategic plan for managing an organizations infrastructure and other assets to provide a chosen level of service. The development of an AMP will assist the MCWDD in prolonging asset life and aide in rehabilitation decisions through efficient and effective operations and maintenance strategies. The core components of the AMP include:

- An inventory and condition assessment of the assets
- An evaluation of the level of service
- Assigning priority of assets based on the risk associated with that asset
- Operation and Maintenance (O&M) strategies for assets as well verifying all revenues cover the expenditures of these practices
- Long-term funding and capital improvement planning

Wastewater Asset Inventory

The MCWDD wastewater collection system consists of horizontal and vertical assets, which includes interceptors, metering facilities, odor control systems, and gate structures. Prior to the SAW Grant, the MCWDD asset data was unreliable or incomplete. Under this Grant, necessary research and document assembly was required for gathering information as well as performing field surveys to GPS locate all available sanitary manholes, meters, valves, and other wastewater structures for integration into the GIS database. The MCWDD asset inventory is stored on NEXGEN Asset Management software that will be used to add and update data as required.

Condition Assessment

In the Macomb County wastewater system, the conditions of the assets are based entirely on a physical evaluation. The assets are assigned a condition score 1 through 5, with 1 being new or excellent condition, and 5 being an extremely poor condition. The tools used for evaluating an assets' condition depends on its asset group, and even further on a subgroup level. Vertical assets are evaluated using condition assessment procedures developed under this Grant for asset management. The condition score for horizontal assets are determined by NASSCO rating methodologies. Macomb County adopted the NASSCO Pipe Assessment

Certification Program (PACP) as the condition assessment that will be performed on buried pipes, and created their own condition assessment based on NASSCO practices for horizontal asset structures.

Under this SAW Grant, metering facilities, drop shafts, and connecting sewers were evaluated using the appropriate asset groups' condition assessment procedure. The investigations concluded that the metering facilities were all in good condition, and that majority of the drop shafts and connecting sewers are in fair condition, with about 20% in good condition and 20% in poor condition. For all other assets that were not evaluated under this Grant, the most recent inspection data and available repair information was used along with engineering judgement to provide condition ratings. It should be mentioned that the County was also awarded SAW Grant No. 1128-01 to facilitate the inspection, condition assessment, and reporting of a select portion of the system. Under SAW Grant No. 1128-01, there is a task dedicated to updating the asset inventory with more representative condition information to be used in future risk analysis.

Overall, the vertical assets in the MCWDD received good to fair condition ratings. Majority of the vertical assets were constructed or rehabilitated within the last few years and are mostly in good condition. Horizontal asset conditions varied between good to fair with few poorly rated assets. Past rehabilitation projects focused resources on repairing the assets with the greatest defects. Thus, the available data indicated no poorly rated horizontal assets. Condition assessments will be performed on a given schedule throughout an assets useful life to keep the inventory up to date so managers can make informed decisions. The condition assessments and schedules are provided in NEXGEN for consistency in performing future condition assessments.

Level of Service Determination

Macomb County established a work group that consisted of internal staff and consultants to evaluate the level of service (LOS). While determining the LOS for the MCWDD, the utility operations, maintenance, customer satisfaction, billing rates, and compliance with regulations were reviewed to see where the deficiencies currently lie in the utility. The review of those factors aided in creating LOS goals for the MCWDD. The MCWDD is committed to improving and maintaining the public health protection and performance of the wastewater utility assets, while minimizing the long-term cost of operating those assets. The MCWDD strives to make the most cost-effective rehabilitation and replacement investments and provide the highest-quality level of service as possible. The AMP is a tool that will be used to guide the MCWDD in accomplishing these goals.

Criticality of Assets

The same work group mentioned above also devised a plan to evaluate the criticality of the assets. Asset criticality was determined by two factors: consequence of failure (COF) and probability of failure (POF). These factors require two questions to be asked: what is the likelihood of failure, and what is the consequence of that asset's failure? The COF is the range of impacts imposed on the community, MCWDD, and customers when an asset fails. The POF is the likelihood that an asset will fail. To determine both of these variables, a number between 1 and 5 was calculated with 1 being the lowest probability or consequence of failure, and 5 being the highest probability or consequence of failure.

The COF rating is based off the process impact, financial impact, safety, environmental/regulatory impact, disruption to the community, and required response time by the MCWDD if the asset should fail. The POF of an MCWDD asset relies on the condition score of that asset; with small variations on this determination between the horizontal and vertical assets. Assets with high COF and POF scores indicate that the MCWDD's attention and efforts should be focused on those assets. The tool that was used to assess the criticality of an asset is known as the Business Risk Factor (BRF). The BRF is found by multiplying the COF by the POF, giving a range of numbers between 1 and 25, with again, 1 representing a low criticality number, and 25 representing a highly critical asset. The most critical assets found in the MCWDD were the buried pipes, as they rendered a higher BRF number than any other asset.

Revenue Structure

During the SAW Grant, the rates, charges, and revenues were evaluated to determine if a funding gap exists. As required, a rate methodology was submitted and approved that showed sufficient revenues to cover operation, maintenance, replacement, capital improvement projects, and debt costs for the MCWDD.

Capital Improvement Plan

The Capital Improvement Plan (CIP) for the MCWDD was developed by anticipating the needs for the future by considering asset repair/replacement, system expansion, system dynamics, and the level of service. After review of the system needs, level of service, and asset conditions, the following improvement projects were identified:

- Drop Shaft and Connecting Sewer Rehabilitation
- Corrosion Control Facility
- Macomb Interceptor Drain (MID) Rehabilitation Project
- Ventilation Project

List of Major Assets

Assets that are an integral part of the MCWDD system were assessed and a comprehensive plan was developed for maintaining them as well as creating an environment which promotes long-term asset and operational sustainability, including sound financial planning. The major assets in the MCWDD include:

- 136,795 linear feet of buried pipe
- 30 Metering facilities
- 1 Biofilter Ventilation System
- 3 Gate structures

The work performed under the SAW Grant has provided the MCWDD with the tools to accurately manage their wastewater assets and to assist with the decisions on maintaining these aging assets.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The Macomb County Wastewater Disposal District *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1130-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No

   If No - Date of the rate methodology approval letter: December 2, 2016

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Brian Baker at 586-307-8210 Brian.baker@macombgov.org
Name Phone Number Email

5-25-17
Signature of Authorized Representative (Original Signature Required) Date

Brian Baker, Chief Deputy Macomb County Public Works Commissioner
Print Name and Title of Authorized Representative

April 2017

Village of Manchester
Asset Management Plan
Executive Summary

Village of Manchester, Michigan
912 City Road
Manchester, MI 48158
www.vil-manchester.org

Contact: Jeff Wallace, 734.428.7877, wallacej@vil-manchester.org
SAW Grant Project Number: 1191-01

Executive Summary
The Asset Management Plan (AMP) focused on the Village of Manchester (Village) sanitary collection, storm water system and wastewater treatment plant.

In general, the AMP is an extension of the general operating practices of the Villages. Problems are addressed or planned for as they are identified by citizens, operators or staff. The collection system and wastewater treatment plant are actively managed and generally in good condition.

The AMP allows the Village to:

- Move from reactive to predictive maintenance and minimize the risk of critical components failing
- Capture institutional knowledge
- Help maintain compliance with NPDES requirements
- Identify and correct system deficiencies.

Cost summary

Total Project	$280,700
Grant Amount	$252,630
Local Match	$28,070

The key components of the asset management plan include:

- Inventory and condition assessment listing of WWTP and pump station equipment
- Inventory and condition assessment of approximately 40,000 feet of sanitary sewer
- GIS Application of Collection system on tablet computers giving users access to CCTV records and scanned drawings
- User charge review (November 2016)
- Capital Improvement Program.

Asset Inventory

Asset inventory included in the following:

- Survey locations of existing sanitary sewer collection components (manholes, pump station)
- Survey locations of existing storm water conveyance components (manholes, catch basins, outlets)
- Review of existing as built drawings
- Closed circuit televising (CCTV) of sanitary sewers to find and verify location of manholes
- Discussion with Village staff regarding storm water conveyance system
- Component listing of major process components at the Village of Wastewater Treatment Plant.
- Development of GIS mapping for wastewater collection and storm water conveyance systems.

Condition Assessment

- CCTV of portions of the sanitary collection system installed prior to 1993 to review condition of piping and discussion with Public Works staff.
- CCTV assessed the condition and scored each asset using the Pipeline Assessment and Certification Program (PACP) industry coding standard.
- Review of components of the WWTP and discussion with operators.

The assets were rated on a scale of 1 to 5 both for Condition and probability of Failure as listed below:

Rating	Condition Assessment	Probability of Failure
1	New or Excellent Condition - Only normal maintenance required	Improbable - So unlikely, it can be assumed occurrence may not be experienced
2	Minor Deterioration - Minor maintenance required (5%)	Remote - Unlikely but possible to occur in the life of an item
3	Moderate deterioration - Significant maintenance required (10 -20%)	Occasional - Likely to occur some- time in the life of an item
4	Significant deterioration - significant renewal/upgrade required (20 -40%)	Probable - Will occur several times in the life of an item
5	Asset Unserviceable - Over 50% of asset requires replacement	Imminent - Likely to occur in the life of the item

In general, the wastewater treatment plant and pump stations, although aged, are in good condition with excellent maintenance practices, and proactive equipment replacement.

Of the CCTV surveyed sewer collection system:

Good Condition	50% (represented by peak PACP score of 0, 1, or 2)
Fair Condition	35% (represented by peak PACP score of 3 or 4)
Bad Condition	15% (represented by a peak PACP score of 5 or more)

Level of Service

The Village of Manchester is committed to improving and maintaining the public health protection and performance of our wastewater plant, sanitary collection system and stormwater conveyance system while minimizing the long-term cost of operating those assets. We strive to make the most cost-effective renewal and replacement investments and provide the highest quality customer service possible.

The components of the AMP were programmed and developed in conjunction with Village Staff, including the Manager, DPW director and WWTP Superintendent. The AMP is intended to be a simple living document allowing the Village to make informed decisions about improvements, and allow operators to quickly find information during emergencies. The Village Council reviews and approves budgets as part of the normal process of the Village Government

Criticality of Assets

The criticality of the assets were rated on a scale of 1 to 5 as listed below:

Rating	Criticality of Asset
1	Insignificant Disruption
2	Minor Disruption
3	Moderate Disruption
4	Major Disruption
5	Catastrophic Disruption

The ratings for the wastewater treatment plant and pump stations considered the following:

- Consequence of failure (if equipment fails, what percent of the treatment capacity is diminished or impacted? What impact on customers or environment?)
- Redundancy of the equipment (is there an installed and operational backup system or equipment?)
- Availability of replacement (how long to procure a replacement? At what cost?)

The ratings for the sanitary collection system considered the following:

- Consequence of failure
- Impact to commercial or industrial customers

- Number of residents impacted by a sewer failure
- The location of the sewer (on M-52, or local street)

The criticality factor was multiplied by the probability of failure (or PACP condition for the collection system) and assigned a Business Risk score between 1 and 25. Any Business Risk score greater than 16 was included in the Capital Improvement Program.

The most critical assets include:

- Wastewater Treatment Plant
- Riverside lift station and force main
- Sanitary Sewer on Vernon between Wolverine and the Wastewater Treatment Plant

Revenue Structure
The Village has used the Michigan Rural Water Association Rate Program to review and set rates over the last decade. The current rate structure was reviewed and found adequate to cover system operation, maintenance, replacement, capital improvement, and debt costs.

Capital Improvement Plan
The AMP did not identify any long-term capital improvement projects at the Wastewater Treatment Plant.

The attached projects were identified in the sanitary collection system.

List of Major Assets

- Wastewater Treatment Plant
- 4 pump stations
- 356 manholes
- 70,687 feet of 6 to 30” sewer pipe
- 271 storm manholes
- 407 storm catch basins

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The Village of Manchester, Michigan *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1191-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: November 14, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Dan Geyer at 734.476.2461 Geyerd@vil-manchester.org
Name Phone Number Email

Patricia Valliencourt 5/31/17
Signature of Authorized Representative (Original Signature Required) Date

Patricia Valliencourt, President
Print Name and Title of Authorized Representative

Stormwater Asset Management and Wastewater (SAW)
Storm Sewer System Asset Management Plan Summary

City of Manistique
300 N. Maple Street
P.O. Box 515
Manistique, MI 49854
https://cityofmanistique.org/

Ms. Sheila Aldrich, City Manager
Phone: (906) 341-2290

SAW Grant Project No. 1399-01

Executive Summary

The City of Manistique (City) received $103,205 in funding through the Michigan SAW grant program in April of 2014 to develop an Asset Management Plan for their storm sewer system.

An Asset Management Plan is a long-range planning document used to provide a rational framework for understanding and documenting City-owned assets, service levels, risks and financial investments. The intent of asset management is to ensure the long-term sustainability of the City. By assisting the City to make better decisions when to repair, replace or rehabilitate particular assets and by developing a long-term funding strategy, the City can ensure its ability to deliver the required level of service perpetually.

The major components of the Asset Management Plan includes the following:

- Asset Inventory and Condition Assessment
- Level of Service
- Criticality (Consequence of Failure) of Assets
- Operation and Maintenance Strategies/Revenue Structure
- Long-term Funding/Capital Improvement Plan

Storm Sewer Asset Inventory

The City storm sewer system components consist of the following:

- Storm Sewer Pipe
- Catch Basins
- Manholes

The collection system assets were GPS located in the field and their location inserted on an aerial map to show the asset location in relation to easily referenced locations. Component specific information such as size, elevation, year constructed, material, condition rating, notes, etc. is located within the GIS system as well as in Excel spreadsheet format. Information modified or updated within the GIS system is readily available by users.

Condition Assessment

The storm sewer system asset condition was measured by the following ranking system:

Condition Rating	Description
5	Unserviceable
4	Significant Deterioration
3	Moderate Deterioration
2	Minor Deterioration
1	New or Excellent Condition

The assessed condition rating of City storm sewer pipe within the system ranges from 1 to 4. The weighted average condition rating of the storm sewer system pipe is 1.6, indicating excellent condition or minor deterioration of storm sewer pipe. The condition is based primarily on assumed condition. Assumed condition is based on other pipes with similar material, age and underground conditions.

The storm sewer manholes were inspected by manhole inspectors certified under the Pipeline Assessment Certification Program (PACP) and the Manhole Assessment and Certification Program (MACP) by the National Association of Sewer Service Companies (NASSCO). Each of the manhole components were given a rating of 1 to 5 using the ranking system noted above. An overall rating was given to the manhole based on the worst rating of the components evaluated. The storm sewer manholes within the collection system ranged from 1 to 4, with an average condition rating of 2.3. This indicates an overall condition between minor deterioration and moderate deterioration.

The storm sewer catch basins within the collection system ranged from 1 to 5, with an average condition rating of 2.6. This indicates an overall condition between minor deterioration and moderate deterioration.

Level of Service Determination

Level of service defines the way in which the utility owners, managers and operators want the utility to perform over the long-term. The level of service includes technical, managerial and financial components. The level of service is a fundamental part of how the utility is operated.

The level of service needs to be evaluated and adjusted with time to match system performance, funding, and changes in regulations.

The City’s level of service statement is as follows:

- Comply with all State and Federal regulatory requirements at all times.
- Provide for the health and safety of all employees and customers.
- Provide for staff to attend workshops that will educate and present grant opportunities available to the City.
- Customers will receive written notice 24 hours in advance of any planned work that will affect service or access.
- Keep spare components and repair materials available at all times for critical assets.
- Respond to customer complaints within 24 hours of receipt 95% of the time.
- Track customer complaints and locations to identify trouble spots.

Criticality (Consequence of Failure) of Assets

To determine the consequence of failure, all possible costs must be considered. These costs include: cost of repair, social cost associated with loss of the asset, repair/replacement costs related to collateral damage caused by the failure, legal costs related to additional damage caused by failure, environmental costs created by the failure, loss of business revenue to the community and other associated costs or asset losses. The consequence of failure can be high if any one of these costs are significant or the accumulation of several costs occur with failure.

Consequence of failure levels found in the table below shows the ranking system used for the consequence of failure. The description shown for each consequence will be a best fit of one of the items noted. Not all of the description items need to apply.

Consequence	Level	Description
Catastrophic disruption	5	Massive failure, severe health affect, or persistent and extensive damage
Major disruption	4	Major effect, major loss of system capacity, major health effects, major costs or important level of service compromised
Moderate disruption	3	Moderate effect, moderate loss of system capacity, moderate health effects or moderate costs, but important level of service still achieved
Minor disruption	2	Minor effect, minor loss of system capacity, minor health effects or minor costs
Insignificant disruption	1	Slight effect, slight loss of system capacity or slight health effects

Assessing business risk requires examination of the probability of failure, the consequence of the failure and redundancy. The assets that have the greatest probability of failure and the greatest consequences associated with the failure will be the assets that have the most business risk. An analysis of different assets will reveal which asset has the highest business risk and, therefore, which asset will require the most attention for either repair or replacement.

Business risk is the multiplication of the Probability of Failure number to the Consequence of Failure number and to the Redundancy Factor. The resulting number provides a numeric value to business risk. Typically, an asset falling in the range of 1 to 8 would be considered low risk. An asset falling in the business risk range of 9 to 16 will be medium risk. An asset above 16 would be considered high risk.

A summary of business risk for each of the asset groups is shown in the table below:

	Risk Level		
Asset Group	Low Risk	Medium Risk	High Risk
Pipe	96.8%	3.2%	-
Catch Basins	99.8%	0.2%	-
Manholes	100%	-	-
Storm Sewer System	**97.3%**	**2.7%**	**-**

As can be seen in the table, none of the system contains any asset components that are considered high risk, with the majority of the system in the low risk category.

Revenue Structure

In order to provide for long-term sustainability of storm sewer system, a viable funding structure must be developed. City funding must be structured to provide adequate income to cover operation, maintenance, replacement, capital improvement projects and debt costs.

All maintenance, repairs and replacement of components of the storm sewer system is completed within the Streets Department. As such, no separate assessment, user fee or specific fund is setup for maintenance, repairs or replacement of only the storm sewer system. All work associated with the storm sewer system is considered part of the City streets.

Typically, when storm sewer components are replaced, it is completed in conjunction with a road project or sanitary sewer separation project and road funds or sanitary sewer funds are used to pay for storm sewer system work. The storm sewer system is essentially treated as a component of the roadway and follows that same funding mechanism as a road. Money needed for storm sewer system repair, rehabilitation or replacement is budgeted in the local streets fund or major streets fund and typically is derived from taxes levied by the City.

Funding of storm sewer replacement projects may also come from MDOT Local Agency Program for local streets. These projects are typically 80% funded by MDOT and 20% by the City.

Additionally, when sewer separation projects are completed in an effort to separate combined sanitary sewer and storm sewer, sanitary sewer department funds and typically Rural Development grant and loan funds are used.

Capital Improvement Plan

The following capital improvement projects are planned over the next 15 years:

Project	Planned Project Year	Estimated Replacement Cost	Funding Source
Phase I - 2018 Sewer Separation Project	2018	$3,068,600	USDA-RD
Phase II - 2019 Sewer Separation Project	2019	$2,336,550	USDA-RD
Phase III & IV Sewer Separation Projects	2022 - 2027	$3,998,940	USDA-RD

The first project is proposed to encompass Oak Street from Range Street to Potter Street, Arbutus Street from Range Street to Cattaraugus Street, Cherry Street from Range Street to Steuben Street and Range Street from Walnut Street to Oak Street. Phase I alone, will add approximately 5,000 feet of storm sewer pipe. The phases beyond 2018 will address combined sewers in other areas within the system.

List of Major Assets

The City's storm sewer system major assets consist of the following:

- Storm Sewer Pipe Total: 59,831 Feet
- Storm Sewer Catch Basins: 515
- Storm Sewer Manholes: 143

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date **May 8, 2017**
(no later than 3 years from executed grant date)

The City of Manistique *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1399-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Name		Phone Number	Email
Sheila Aldrich, City Manager	at	906-341-2090	saldrich@chartermi.net

Sheila Aldrich

Signature of Authorized Representative (Original Signature Required)

5/24/17

Date

Sheila Aldrich, City Manager

Print Name and Title of Authorized Representative

Stormwater Asset Management and Wastewater (SAW)
Sanitary Sewer System Asset Management Plan Summary

City of Manistique
300 N. Maple Street
P.O. Box 515
Manistique, MI 49854
https://cityofmanistique.org/

Ms. Sheila Aldrich, City Manager
Phone: (906) 341-2290

SAW Grant Project No. 1399-01

Executive Summary

The City of Manistique (City) received $611,832 in funding through the Michigan SAW grant program in April of 2014 to develop an Asset Management Plan for their sanitary sewer system.

An Asset Management Plan is a long-range planning document used to provide a rational framework for understanding and documenting City-owned assets, service levels, risks and financial investments. The intent of asset management is to ensure the long-term sustainability of the City. By assisting the City to make better decisions when to repair, replace or rehabilitate particular assets and by developing a long-term funding strategy, the City can ensure its ability to deliver the required level of service perpetually.

The major components of the Asset Management Plan includes the following:

- Asset Inventory and Condition Assessment
- Level of Service
- Criticality (Consequence of Failure) of Assets
- Operation and Maintenance Strategies/Revenue Structure
- Long-term Funding/Capital Improvement Plan

Wastewater Asset Inventory

The City wastewater system components consist of the following:

- Collection System (forcemains, gravity pipes, manholes)
- Collection System Mechanical (lift stations)
- Wastewater Treatment Plant (WWTP)
- Mobile Assets

The collection system assets were GPS located in the field and their location inserted on an aerial map to show the asset location in relation to easily referenced locations. Component specific information such as size, elevation, year constructed, material, condition rating, notes, etc. is located within the GIS system as well as in Excel spreadsheet format. Information modified or updated within the GIS system is readily available by users.

Asset components, such as lift station components, WWTP asset components and mobile assets are located in Excel spreadsheets that are readily updated by the City.

Condition Assessment

The sanitary sewer system asset condition was measured by the following ranking system:

Condition Rating	Description
5	Unserviceable
4	Significant Deterioration
3	Moderate Deterioration
2	Minor Deterioration
1	New or Excellent Condition

The condition of the sanitary sewer gravity pipe is based on televising, smoke testing, flow metering and assumed condition. The assessed condition rating of City sanitary sewer gravity pipe within the collection system ranges from 1 to 5. The weighted average condition rating of the collection system gravity pipe is 2.4, indicating minor to moderate deterioration of sanitary sewer gravity pipe within the collection system.

The condition rating of sanitary sewer forcemain within the collection system is assumed to have a condition rating of 1, indicating new or excellent condition. Based on pipe material and age, the life expectancy of the HDPE forcemain and PVC forcemain, an assumed condition of 1 was made since all pipe has been installed since 2000.

The sanitary sewer manholes were inspected by manhole inspectors certified under the Pipeline Assessment Certification Program (PACP) and the Manhole Assessment and Certification Program (MACP) by the National Association of Sewer Service Companies (NASSCO). Each of the manhole components were given a rating of 1 to 5 using the ranking system noted above. An overall rating was given to the manhole based on the worst rating of the components evaluated. The sanitary sewer manholes within the collection system ranged from 1 to 4, with an average condition rating of 2.7. This indicates an overall condition between minor deterioration and moderate deterioration.

Sanitary system mechanical or lift station condition was ranked by individual components rather than the lift station as a whole since lift station individual components are replaced or reconditioned at different timeframes. A spreadsheet listing the individual component ratings is included in the report. The weighted condition rating of the lift station assets is 2.4 indicating minor to moderate deterioration.

WWTP condition was ranked by individual components rather than the WWTP as a whole since individual components are replaced or reconditioned at different timeframes. A spreadsheet listing the individual component ratings is included in the report. The condition rating and business risk was used to determine the repair, replacement and capital improvement projects. The weighted condition rating of the WWTP assets is 2.1 indicating minor to moderate deterioration.

A spreadsheet listing the individual component ratings of the mobile assets is included in the report. The weighted condition rating of the mobile assets is 2.0 indicating minor deterioration.

Level of Service Determination

Level of service defines the way in which the utility owners, managers and operators want the utility to perform over the long-term. The level of service includes technical, managerial and financial components. The level of service is a fundamental part of how the utility is operated.

The level of service needs to be evaluated and adjusted with time to match system performance, funding, and changes in regulations.

The City's level of service statement is as follows:

- Comply with all State and Federal regulatory requirements at all times.
- Maintain proper operator certification.

- Provide for the health and safety of all employees and customers.
- Provide for regular operator training to be made aware of new regulations, take advantage of advances in new technology and system troubleshooting.
- Provide for staff to attend workshops that will educate and present grant opportunities available to the City.
- Customers will receive written notice 24 hours in advance of any planned work that will affect service or access.
- Keep spare pumps and parts available at all times for critical assets.
- Respond to customer complaints within 24 hours of receipt 95% of the time.
- Track customer complaints and locations to identify trouble spots.
- Rates will be reviewed and raised on an annual basis to keep rates in line with inflation and to avoid steady declines in revenue followed by massive rate increases.
- Identify areas of high infiltration and inflow (I&I) on a yearly basis by evaluating lift station data, flow monitoring, and/or televising. Follow-up with projects to reduce I&I.

Criticality (Consequence of Failure) of Assets

To determine the consequence of failure, all possible costs must be considered. These costs include: cost of repair, social cost associated with loss of the asset, repair/replacement costs related to collateral damage caused by the failure, legal costs related to additional damage caused by failure, environmental costs created by the failure, loss of business revenue to the community, and other associated costs or asset losses. The consequence of failure can be high if any one of these costs are significant or the accumulation of several costs occur with failure.

Consequence of failure levels found in the table below shows the ranking system used for the consequence of failure. The description shown for each consequence will be a best fit of one of the items noted. Not all of the description items need to apply.

Consequence	Level	Description
Catastrophic disruption	5	Massive failure, severe health affect, or persistent and extensive damage
Major disruption	4	Major effect, major loss of system capacity, major health effects, major costs or important level of service compromised
Moderate disruption	3	Moderate effect, moderate loss of system capacity, moderate health effects or moderate costs, but important level of service still achieved
Minor disruption	2	Minor effect, minor loss of system capacity, minor health effects or minor costs
Insignificant disruption	1	Slight effect, slight loss of system capacity or slight health effects

Assessing business risk requires examination of the probability of failure, the consequence of the failure and redundancy. The assets that have the greatest probability of failure and the greatest consequences associated with the failure will be the assets that have the most business risk. An analysis of different assets will reveal which asset has the highest business risk and, therefore, which asset will require the most attention for either repair or replacement.

Business risk is the multiplication of the Probability of Failure number to the Consequence of Failure number and to the Redundancy Factor. The resulting number provides a numeric value to business risk. Typically, an asset falling in the range of 1 to 8 would be considered low risk. An asset falling in the business risk range of 9 to 16 will be medium risk. An asset above 16 would be considered high risk.

A summary of business risk for each of the asset groups is shown in the table below:

	Risk Level		
Asset Group	Low Risk	Medium Risk	High Risk
Gravity Pipe	62.8%	25.8%	11.4%
Forcemain	100.0%	-	-
Manholes	68.9%	31.1%	-
Lift Stations	42.1%	57.9%	-
WWTP	75.9%	24.0%	0.10%
Mobile Assets	100.0%	0%	-
Sanitary Sewer System	68.4%	25.0%	6.6%

As can be seen in the table, the majority of the sanitary sewer system in the low risk category.

Revenue Structure

A funding projection worksheet was developed to evaluate current and future projections based on operating income, operating expenses, non-operating income, non-operating expenses (including principal and interest payments, bond reserve payments and restricted fund payments), planned project dedicated fund expenditures and existing fund balances. It was determined that the current rate structure provides sufficient funds to cover operation, maintenance, replacement and debt costs. The City has implemented annual sewer rate inflation adjustments based on the consumer price index that will take place on a yearly basis to keep pace with operating expenses. Future capital improvement projects will be funded through USDA-Rural Development. The City will be increasing rates as required for future planned USDA-RD wastewater capital improvement projects. A full rate analysis will be required by USDA-RD for any future projects.

Capital Improvement Plan

The following capital improvement projects are planned over the next 15 years:

Project	Planned Project Year	Estimated Replacement Cost	Funding Source
Phase I - 2018 Sewer Separation Project	2018	$3,068,600	USDA-RD
Phase II - Siphon Replacement	2019	$1,762,250	USDA-RD
Phase II - WWTP Headworks Screening & RS Pumping	2019	$3,135,000	USDA-RD
Phase II - 2019 Sewer Separation Project	2019	$2,336,550	USDA-RD
Phase III & IV Sewer Separation Projects	2022 - 2027	$3,998,940	USDA-RD
WWTP Settling Tank Domes & Electrical Upgrades	2022	$984,000	USDA-RD
WWTP Building & Plant Upgrades	2030	$3,307,082	USDA-RD

List of Major Assets

The City's sanitary sewer system major assets consist of the following:

- Sanitary Sewer Gravity Pipe: 103,910 Feet
- Sanitary Sewer Forcemain: 7,219 Feet
- Sanitary Sewer Siphon Lines: 1,256 Feet
- Sanitary Sewer Manholes: 350
- Lift Stations: 5
- Wastewater Treatment Plant: 1.5 MGD Activated Sludge Plant

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 8, 2017
(no later than 3 years from executed grant date)

The City of Manistique *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1399-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: 12/2/2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Name		Phone Number	Email
Sheila Aldrich, City Manager	at	906-341-2090	saldrich@chartermi.net

Sheila Aldrich — 5/24/17
Signature of Authorized Representative (Original Signature Required) — Date

Sheila Aldrich, City Manager
Print Name and Title of Authorized Representative

Stormwater Asset Management and Wastewater (SAW)
Sanitary Sewer System Asset Management Plan Summary

Township of Marenisco
314 Hall St.
P.O. Box 198
Marenisco, MI 49947
http://marenisco.org/

Mr. Richard Bouvette, Township Supervisor
Phone: (906) 787-2463

SAW Grant Project No. 1264-01

Executive Summary

The Township of Marenisco (Township) received $122,395 in funding through the Michigan SAW grant program in May of 2014 to develop an Asset Management Plan for their sanitary sewer system.

An Asset Management Plan is a long-range planning document used to provide a rational framework for understanding and documenting Township-owned assets, service levels, risks and financial investments. The intent of asset management is to ensure the long-term sustainability of the Township. By assisting the Township to make better decisions when to repair, replace or rehabilitate particular assets and by developing a long-term funding strategy, the Township can ensure its ability to deliver the required level of service perpetually.

The major components of the Asset Management Plan includes the following:

- Asset Inventory and Condition Assessment
- Level of Service
- Critical Assets
- Revenue Structure
- System Maintenance
- Long-term Funding/Capital Improvement Plan

Wastewater Asset Inventory

The Township wastewater system components consist of the following:

- Collection System (forcemains, gravity pipes, manholes)
- Collection System Mechanical (lift stations)
- Water Stabilization Lagoons (WSL)
- Mobile Assets

The collection system assets were GPS located in the field and their location inserted on an aerial map to show the asset location in relation to easily referenced locations. Component specific information such as size, elevation, year constructed, material, condition rating, notes, etc. is located within the GIS system as well as in Excel spreadsheet format. Information modified or updated within the GIS system is readily available by users.

Asset components, such as lift station components, WSL asset components and mobile assets are located in Excel spreadsheets that are readily updated by the Township.

Condition Assessment

The sanitary sewer system asset condition was measured by the following ranking system:

Condition Rating	Description
5	Unserviceable
4	Significant Deterioration
3	Moderate Deterioration
2	Minor Deterioration
1	New or Excellent Condition

The condition of the sanitary sewer gravity pipe is based on televising, smoke testing, and assumed condition. The assessed condition rating of Township sanitary sewer gravity pipe within the collection system ranges from one to five. The weighted average condition rating of the collection system gravity pipe is 2.1, indicating minor deterioration of sanitary sewer gravity pipe within the collection system.

The condition rating of sanitary sewer forcemain within the collection system is assumed to have a condition rating of 2, indicating minor deterioration. Based on pipe material and age, the life expectancy of the CI forcemain and PVC forcemain, an assumed condition of 2 was made since all pipe was installed in or prior to 1989, however the pipe types have a long life span.

The sanitary sewer manholes were inspected by manhole inspectors certified under the Pipeline Assessment Certification Program (PACP) and the Manhole Assessment and Certification Program (MACP) by the National Association of Sewer Service Companies (NASSCO). Each of the manhole components were given a rating of 1 to 5 using the ranking system noted above. An overall rating was given to the manhole based on the worst rating of the components evaluated. The sanitary sewer manholes within the gravity collection system ranged from 2 to 5, with a weighted average condition rating of 3.3. This indicates an overall condition of moderate deterioration. The sanitary sewer manholes within the forcemain collection system ranged from 2 to 3, with a weighted average condition rating of 2.6. This indicates an overall condition of minor to moderate deterioration.

Sanitary system lift station condition was ranked by individual components rather than the lift station as a whole since lift station individual components are replaced or reconditioned at different timeframes. A spreadsheet listing the individual component ratings is included in the report. The weighted condition rating of the Industrial Park Duplex Lift Station assets is 2.1 indicating minor deterioration. The weighted condition rating of the MTSS Lift Station assets is 1 indicating new or excellent condition.

WSL condition was ranked by individual components rather than the WSLs as a whole since individual components are replaced or reconditioned at different timeframes. A spreadsheet listing the individual component ratings is included in the report. The condition rating and business risk was used to determine the repair, replacement and capital improvement projects. The weighted condition rating of the WSL assets is 2 indicating minor deterioration.

A spreadsheet listing the individual component ratings of the mobile assets is included in the report. The weighted condition rating of the mobile assets is 2.0 indicating minor deterioration.

Level of Service Determination

Level of service defines the way in which the utility owners, managers and operators want the utility to perform over the long-term. The level of service includes technical, managerial and financial components. The level of service is a fundamental part of how the utility is operated.

The level of service needs to be evaluated and adjusted with time to match system performance, funding, and changes in regulations.

The Township's level of service statement is as follows:

- Regularly inspect all components of the sanitary sewer system to ensure proper operation and maintenance.
- Include a System Maintenance budgetary item which will cover routine maintenance, repair and replacement of existing sanitary sewer system components.
- Include a Capital Improvement Fund in the budget to allow for total system replacement in the future.
- Require that all new development which is located within the service area shall comply with applicable County, State and Federal design and construction standards and the level of service present in the Asset Management Plan.

Criticality (Consequence of Failure) of Assets

To determine the consequence of failure, all possible costs must be considered. These costs include: cost of repair, social cost associated with loss of the asset, repair/replacement costs related to collateral damage caused by the failure, legal costs related to additional damage caused by failure, environmental costs created by the failure, loss of business revenue to the community, and other associated costs or asset losses. The consequence of failure can be high if any one of these costs are significant or the accumulation of several costs occur with failure.

Consequence of failure levels found in the table below shows the ranking system used for the consequence of failure. The description shown for each consequence will be a best fit of one of the items noted. Not all of the description items need to apply.

Consequence	Level	Description
Catastrophic disruption	5	Massive failure, severe health affect, or persistent and extensive damage
Major disruption	4	Major effect, major loss of system capacity, major health effects, major costs or important level of service compromised
Moderate disruption	3	Moderate effect, moderate loss of system capacity, moderate health effects or moderate costs, but important level of service still achieved
Minor disruption	2	Minor effect, minor loss of system capacity, minor health effects or minor costs
Insignificant disruption	1	Slight effect, slight loss of system capacity or slight health effects

Assessing business risk requires examination of the probability of failure, the consequence of the failure and condition. The assets that have the greatest probability of failure and the greatest consequences associated with the failure will be the assets that have the most business risk. An analysis of different assets will reveal which asset has the highest business risk and, therefore, which asset will require the most attention for either repair or replacement.

Business risk is the multiplication of the Probability of Failure number to the Consequence of Failure number and to the Condition of the asset. The resulting number provides a numeric value to business risk. Typically, an asset falling in the range of 1 to 41 would be considered low risk. An asset falling in the business risk range of 42 to 83 will be medium risk. An asset above 84 would be considered high risk. All of the components of the MTSSS fall within the low risk range.

Revenue Structure

A funding projection worksheet was developed to evaluate historic and future projections based on operating revenues, operating expenses, non-operating revenues, administrative expenses, and non-operating expenses (including principal and interest payments), repairs and maintenance expenses and capital improvement fund and existing fund balances. It was determined that the current rate structure provides sufficient funds to cover operation, maintenance, replacement and debt costs. The Township operates with a surplus and this trend will continue assuming no change in population. The township does not intend to implement a rate increase, but may want to investigate an increase based on inflation in the future. Potential future capital improvement projects will be funded through USDA-Rural Development or similar loan.

Capital Improvement Plan

The Township does not plan to perform any Capital Improvement Project within the next twenty years, however the following potential projects have been identified should the need arise or funding become available:

Project	Estimated Replacement Cost
Forcemain System Improvements	$47,000
Gravity Sewer System Improvements	$788,400
Gravity Sanitary Sewer System Grouting and Replacement	$101,900
Lift Station Upgrades	$75,000

List of Major Assets

The Township's sanitary sewer system major assets consist of the following:

- Sanitary Sewer Gravity Pipe: 25,170 Feet
- Sanitary Sewer Forcemain: 7,549 Feet
- Sanitary Sewer Gravity Manholes: 100
- Lift Stations: 2
- Wastewater Stabilization Lagoons: 1.8 MCF Total Volume Treatment (2 cells)

Department of Environmental Quality
SAW Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 30, 2016
(no later than 3 years from executed grant date)

The Marenisco Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1264-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant. The Department of Environmental Quality (DEQ) defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gap in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.

Attached to this certification is a summary of the AMP that identifies major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Richard Bouvette, Supervisor at (906)787-2463 supervisor@marenisco.org
Name Phone Number Email

Rate Methodology was submitted to DEQ on: May 30, 2016
(within 2 ½ years from date of executed grant)

An initial rate increase of 0.0 % of a $ 0.00 gap was adopted on N/A

5/23/16
Signature of Authorized Representative (Original Signature Required) Date

Richard Bouvette, Supervisor
Print Name and Title of Authorized Representative

c2ae architecture • engineering

1211 Ludington St.
Escanaba, MI 49829
O: 906.233.9360
www.c2ae.com

MASONVILLE TOWNSHIP ASSET MANAGEMENT SYSTEM
PROJECT CLOSING SUMMARY
MEETING THE SAW REQUIREMENTS

Masonville Township
10574 N. Main St.
Rapid River, MI. 49878
Contact: Pete Brock 906 241 3306
SAW Grant Project Number: 1088-01

The SAW agreement with the State of Michigan was signed in May, 2013 which began the overall SAW program. Masonville Township completed the WAMP by evaluating the items below and completing the MDEQ recommended Asset Management spreadsheet. A user charge report was prepared and delivered to MDEQ in August of 2016 and it concluded that sufficient funds were currently being set aside at the existing rate structure.

Five items of focus were completed.

1. **Asset Inventory:** This item which initiated the work included.
    a. Identifying and locating all assets.
        i. A list of all assets to be monitored was completed.
        ii. The GPS co-ordinates of the field assets were identified.
        iii. A GIS system was completed to index the locations.
        iv. The identified assets were inspected for making a condition assessment.
        v. The asset information was included in the Asset Management Spreadsheet (AMS).
        vi. The spreadsheet was used to quantify and order the asset information.

2. **Condition Assessment:**
    a. The Masonville system is less than 10 years old therefore it is easy to quantify when it comes to age. When considering all assets the highest business risk out of a numerical system of 1 to 25 is an 11. These are the major pump stations where criticality is high and skews the business risk higher for these assets.

    b. Overall as stated above the condition of all the assets in the system is good the operating systems, ie. pump stations require regular maintenance but we do not see major capital expenditures on these or any other part of the system necessary for at least 15 years.

3. **Level of Service:**
    a. A SAW Team was created to discuss the wastewater system direction. The team intends to meet once a year. The intent is to update the spreadsheet and to determine if an adjustment in the next annual budget should be considered. This is also an opportunity to consider the approach of future capital improvement projects highlighted in the asset management system in order to be planning and the applying for necessary funding of the project.
    b. The SAW Team met and discussed a mission statement and desired Level of Service statement.
    c. The Level of Service Statement was included in the User Charge System report.

4. **Criticality of Assets:**
    a. The AMS was used to organize the asset classes, several parameters were used to determine asset viability, rating each on a 1 to 5 scale.
        i. Redundancy, does the unit have system backup.
        ii. Criticality is the asset to critical to the system and to what degree.
        iii. Probability of failure based on its age and condition.
        iv. These items together result in a parameter identified as business risk.
    b. The AMS was the used to prioritize the need for short term repair or maintenance, short term replacement, or long term maintenance.
    c. As stated in condition of assets above the business risk calculation which includes the criticality assessments indicate the system is in good condition.

5. **O&M Strategies:**
    a. The AMS has a worksheet for working with the system’s operating budget.
    b. The current budget information was included.
    c. Additional budget items were added to the budget to incorporate the financial needs identified above.
        i. Short term needs under five years were included and identified as replacement.
        ii. Long term need under in line labeled capital.
    d. These items are identified as system reserve needs and are intended to grow over time. Both asset management system identified reserves and borrower required reserves are listed.
    e. The current reserve set aside is compared with the asset management system calculated required set aside.
    f. If additional set-aside is necessary a rate increase is recommended.
    g. A User Charge System summary report is included detailing the information.

h. This user charge report and the asset management spreadsheet are identified as the Rate Methodology and have been submitted previously to MDEQ.
i. . A user charge report was prepared and delivered to MDEQ in August of 2016 and it concluded that sufficient funds were currently being generated at the existing rate structure to support O & M, capital charges (debt), required reserves, short term replacement needs, and revenues necessary for acquiring funding for future long term capital projects.

6. **Capital Improvements:**
    a. The asset management spreadsheet identifies capital improvement projects for the future. There are two project discussed both over twenty years in the future although the system attempts to capture sufficient funds to applying for these projects probably through USDA RD at that time. Project 1 focuses on the smaller pump stations and manhole rehabilitation. Project 2 focuses on the major pump stations and sewer line rehabilitation.
    b. The long term projects are identified as future public barrowings. Therefore the cost for application preparation for future funding is budgeted in the current budget.
    c. An estimate of project year and financial size is generated from an asset's AMS business risk and the asset's remaining useful life.

The system deliverables therefore are:

1. The indexing GIS system hardware and software
2. System maps
3. Asset management spreadsheet or database
4. User Charge Summary Report
5. GIS system filing system including all data collected and available for system use

A list of the major assets include

- 14,500 feet of 8 inch main
- 33,500 feet of 2 to 10 inch force main
- 70 sanitary manholes
- 34 force main related structures
- 14 pump stations

The Township transmits its sewage to the City of Gladstone for treatment.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date March 14, 2017
(no later than 3 years from executed grant date)

Masonville Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1088-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]

   If No - Date of the rate methodology approval letter: 10-17-16.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Peter Brock at 906 241 3306 **masonvilletownshipsupervisor@charter.net**
Name — Phone Number — Email

Peter F. Brock 5/30/2017
Signature of Authorized Representative (Original Signature Required) — Date

Peter Brock, Masonville Township Supervisor
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Wastewater Executive Summary Report

Prepared for:

Village of Mendon

Final
May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In May 2014, The Village received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1661-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Village's publicly owned wastewater utility. This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the Village of Mendon AMP is:

John Hyden, Village Manager
206 West Main Street
Mendon, MI 49072
Number: 269.496.4395
jhnhyden@yahoo.com

ASSET INVENTORY AND CONDITION ASSESSMENT

A list of the major assets in the Village's wastewater system, described further below, include:

- Collection system piping system and manholes
- Wastewater Stabilization Lagoons (WWSL)
- Sanitary sewer pump stations in the collection system

The wastewater collection system assets consist of approximately 54,171 feet (10.3 miles) of sanitary sewers (gravity pipe and force mains) and 201 wastewater manholes connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The WWSL is a facultative lagoon system. Waste stabilization is accomplished by physical settling and a combination of aerobic, anaerobic, and facultative bacteria. Treatment includes solids removal, reduction of biochemical oxygen demand, and reduction of fecal coliform bacteria. Three of the four ponds were completed in 1996 and the fourth pond was completed in 1997.

The WWSL currently includes the following major components:

- Four earthen dike ponds with 40 millimeter PVC liners
- Five cast-in-place concrete flow control structures
- Approximately 2,800 feet of 15 inch PVC gravity effluent sewer

Treated effluent is seasonally discharged to Little Portage Creek in accordance with general NPDES permit No. MIG580000 and Certificate of Coverage (COC) No. MIG580101. The design capacity of the WWSL is 0.144 million gallons per day (mgd).

There are three sanitary sewer pump stations located throughout the wastewater collection system. The stations are submersible style stations. Pump Station No. 1 pumps all of the flow from the collection system to the WWSL.

Asset Identification and Location

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals included a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new, or updated (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes 47 WWSL assets, 41 pump station assets, and 387 collection system assets.

Condition Assessment and Expected Useful Life

Existing local knowledge and historical information is an important resource and interviews of DPW staff were held to gather this information. The DPW staff reported no issues with breaks within the system, and additional condition assessments of the manholes and gravity sewer was not necessary based on the age of the system.

Overall, the assets in the WWSL and pump station were found to be in good condition. Some assets were in good condition due to relatively recent installation and others were near the end of their useful life due to age or deterioration caused by harsh conditions associated with treating wastewater.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The overall objective of the Village Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this, the following Level of Service (LOS) goals are proposed:

WASTEWATER UTILITY - LEVEL OF SERVICE STATEMENT

The overall objective of the Village of Mendon Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWSL.
- Actively maintain collection and treatment system assets in reliable working condition.
- Reduce infiltration to meet MDEQ-acceptable levels.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the Village from time to time to make sure they accurately reflect the desired operation of the utility.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset’s Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

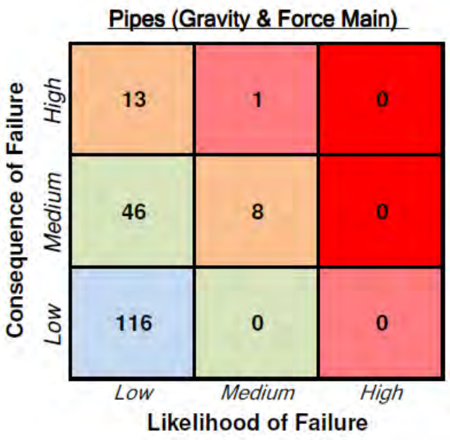
The WWSL and pump station categories for CoF are:

- Process
- Financial Impact
- Safety
- Environmental Impact
- Disruption to the Community
- Ability to Respond

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

Figure 1 provides the risk rating for gravity and force main pipe by number of pipe segments. One pipe segment (656 Feet) in the collection system has an extreme risk rating. The pipe is a force main with a high consequence of failure. Much of the collection system’s pipes, 94.6 percent as shown in Figure 1, have a low to negligible risk rating.



Consequence of Failure	Low	Medium	High
High	13	1	0
Medium	46	8	0
Low	116	0	0

Figure 1. Business Risk Matric (Risk Rating) by Number of Gravity and Force Main Pipes

Figure 2 provides the risk rating for the collection system manholes. Six manholes are identified as extreme risk. Many manholes are at low to medium risk and recommended to be included in a long-term rehabilitation strategy (95.1 percent).

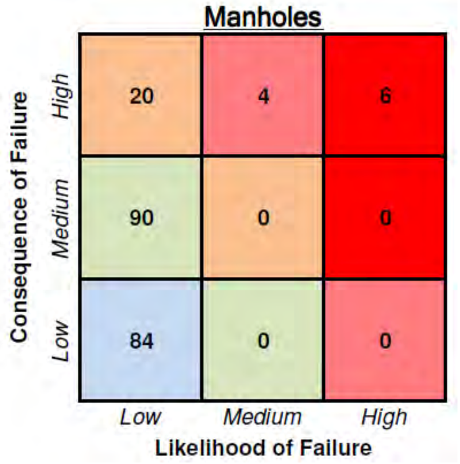


Figure 2. Business Risk Matrix (Risk Rating) by Number of Manholes

Figure 3 provides the risk ratings for the WWSL and pump station assets. No assets are identified as extreme risk. The fourteen assets with high risk ratings should be inspected at regular intervals.

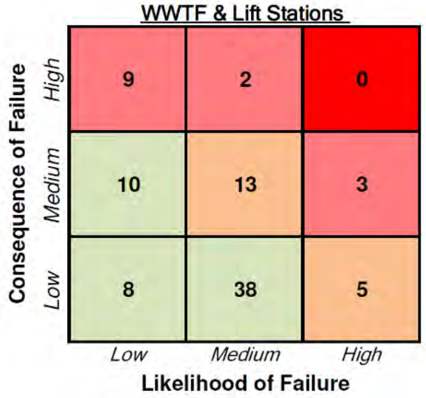


Figure 3. Business Risk Matrix (Risk Rating) for WWSL and pump station assets

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection and treatment systems.

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Village's wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system, wastewater treatment facility and pumping stations/force mains. From the BRE, a short-term (1-5 year CIP) and long-term (6-20 year CIP) was developed for the utility and are included in Table 4 below..

Table 4: Recommended Capital Improvements for WWSL and Pump Stations

Asset Description	Anticipated Year of Replacement	Replacement Cost (Inflated 3%/yr)
5-YEAR CIP PROJECTS		
Storage Building Roof	2021	$11,600
6-20-YEAR CIP PROJECTS		
Pump Station Piping and Valve Painting[1]	2022	$20,300
Pump Station No. 3 Pad Replacement[1]	2022	$19,100
Primary Pond Cell No. 1 Biosolids Removal[1]	2022-2027	$221,000
Primary Pond Cell No. 2 Biosolids Removal[1]	2022-2027	$221,000
Pump Station Electrical and Control Upgrade[1]	2026	$151,000

OPERATIONS, MAINTENANCE AND REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the proper functioning of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

An annual equipment replacement fund should be developed to replace disposable equipment. These are items that can be financially accounted for through operation, maintenance and replacement (OM&R) funds and can be replaced by WWSL staff without bringing in an outside contractor. Existing disposable materials include chemicals, wear parts in pumps and motors, laboratory instruments, etc. The existing OM&R fund is sufficient for the current operations.

REVENUE STRUCTURE

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs. The MDEQ requires that a rate study be performed to assure that there is sufficient revenue to cover current operation, maintenance and replacement costs of the wastewater utility. For the Village of Mendon, the rate study report was prepared by the Village and submitted on November 7, 2016. It was subsequently approved by the MDEQ on December 20, 2016 showing that no revenue gap exists for current utility operations.

Department of Environmental Quality (DEQ) Stormwater, Asset Management, and Wastewater (SAW) Grant Wastewater Asset Management Plan Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The Village of Mendon *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1661-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No

   If No - Date of the rate methodology approval letter: December 20, 2016.

2) Significant Progress Made: NA

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: NA.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on NA.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Name		Phone Number	Email
John Hyden – Village Manager	at	(269)496-4395	jhnhyden@yahoo.com

(BS) John Hyden 5-30-17
Signature of Authorized Representative (Original Signature Required) Date

John Hyden – Village Manager
Print Name and Title of Authorized Representative

DEQ

Department of Environmental Quality
SAW Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 05/30/2017
(no later than 3 years from executed grant date)

The Charter Township of Monitor *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1079-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant. The Department of Environmental Quality (DEQ) defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gap in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.

Attached to this certification is a summary of the AMP that identifies major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Cindy Kowalski, Township Clerk at 989-684-3883 clerk@monitortwp.org
Name Phone Number Email

Rate Methodology was submitted to DEQ on: 11/4/2016
(within 2 ½ years from date of executed grant)

An initial rate increase of ____% of a $ 0 gap was adopted on N/A - not deficient in 2.5 yr Gap Analysis

5/25/17
Signature of Authorized Representative (Original Signature Required) Date

Kenneth Malkin, Township Supervisor
Print Name and Title of Authorized Representative

Certificate of Project Completeness Summary

Charter Township of Monitor
2483 E. Midland Road
Bay City, MI 48706
989-684-7203

SAW Grant Project No. 1079-01

On May 8, 2014, Charter Township of Monitor entered into an agreement with the Department of Environmental Quality and the Michigan Finance Authority for grant funds issued under Public Act No. 511 of 2012 for the *Stormwater, Asset Management, and Wastewater (SAW)* program. The Township received the following:

Wastewater Asset Management Plan (WWAMP) Project Cost	\$710,000
LESS Local Match – 10%	(\$71,000)
Total Grant Amount – 90% Grant	\$639,000

Wastewater Asset Inventory

The Township's wastewater collection system has been inventoried, including 229,000 feet of gravity sewer and force main, 832 manholes, and 11 pump stations, serving 4,195 customers. The Township does not operate a wastewater treatment system. The Township's collection system is part of a regional system that flows to Bay County Water Resource Recovery Facility, which is owned and operated by Bay County.

Each asset was identified and accounted for using existing as-built information that was provided by the Township. These assets can be located using the ESRI GIS base map that has been created as part of the Asset Management Plan. This base map was populated using survey grade geospatial data which shows structures, pump stations, and pipelines in the Michigan State Plane coordinate system. In addition to the geospatial data, each asset was populated with asset management information based on field observations of existing conditions. The Township will be able to facilitate an asset management program by updating the asset information as repairs and maintenance activities take place.

Using this data, the total replacement value in 2017 dollars is estimated at \$56 million dollars.

Condition Assessment

Topographic survey, field inspections, and condition assessments were performed on the manholes, pipelines, and pump stations. Manholes, cleanouts, and air relief valves were inspected using NASSCO's MACP standards for field inspections. A third-party sewer televising company was subcontracted by Bay County to televise the sewers and perform a condition assessment of the pipes to identify defects and obvious issues. All pipe lines were televised using NASSCO's PACP standards for pipeline inspections. Using the inspection data, spreadsheets were created to document and perform condition assessment calculations using NASSCO's MACP/PACP Quick Rating System.

For manholes and pipelines, the quick rating system is the sum of all defect grades divided by the number of defects. This quick rating is broken down into two categories: structural and operation and maintenance. The two scores are then combined to generate a Combined quick rating, which was then used to calculate the Likelihood of Failure for the risk assessment.

Overall, most of the Township's manholes are in good condition, having either low severity defect(s) or no defects. At this time, the greatest need within the system is for pump station improvements and within the piping network for defects such as collapsed/partially collapsed pipe, cracked pipe, and inflow/infiltration.

The results of the condition assessment are summarized in the following tables:

MANHOLE OVERALL DEFECTS	
Defect Category	Number of Manholes
Structural	260
O&M	124

MANHOLE COMBINED DEFECTS		
Combined Quick Rating	Number of Manholes	Percent of System (%)
High - Grade 5	22	3
Medium - Grade 3-4	121	15
Low - Grade 1-2	208	25
No Defects	481	58
Total	**832**	**100**

The inventory and condition assessment of the Township's system is the base of the entire AMP. It was used to determine a current need for repair, the priority of repair projects, and a future O&M plan. The inventory, as-built data, and condition assessments were used to create an ESRI ArcGIS base map. The pump station data inventory and condition assessment was used to generate a system flow model which is separate from the base map. Flow data taken from the various pump stations was used to calibrate the model and an average dry weather day was modeled in Autodesk Storm and Sanitary Analysis (SSA) sanitary sewer model.

Level of Service Determination

For the Level of Service, the Township prioritized projects in their CIP and rate structure based on the level of service that they feel is affordable and achieves their Mission Statement:

> *Monitor Charter Township has committed to operate the sanitary sewer system in a safe, efficient, environmentally responsible, and cost-effective manner through effective budgeting and capital improvement planning to provide the community with reliable service while minimizing service interruptions.*

Based on a Rate Methodology Decision Meeting held on January 20, 2017, the Township chose a level of service that they felt best fit the Township's needs from both a risk management standpoint and rate standpoint. Various degrees of Level of Service and the associated CIP projects were evaluated and entered into the Revenue Structure model, and the resulting sewer rates for that set of scenarios were reviewed. If the projected rates were too high, a lower LOS was chosen and those CIP projects were entered into the Revenue Structure model and the resulting rates were then reviewed. The process then continued with different CIP projects at varying LOS's until an acceptable rate structure, level of service, and capital improvement plan was developed.

Monitor Township set their target level of service as Low Level of Service and implement the recommended a 6% rate increase from the financial model. The pipe and manhole repairs identified from the inspections will be accomplished in years 1 through 5. The Township chose to spread each of the pump station projects annually and plan for one project per year.

Criticality (Risk)

For each asset in the Township's wastewater system, a criticality/risk analysis was developed. The calculation that determined overall risk was defined as:

Likelihood of Failure (LoF) * Consequence of Failure (CoF) = Risk

The LoF for sewer and manhole assets is primarily based on the physical condition of the asset as inspected in the field. Using the quick rating developed from NASSCO standards, a value between 1 and 5 was found for each sewer and manhole asset. The LoF for pump station assets was developed by assessing the age of the asset, performing a visual inspection, interviewing operators for maintenance records, and performing flow rate tests on the overall pump station. These factors were then reviewed and a score between 1 and 5 was assigned to each component of the 11 pump stations. The following table shows the scale definitions for all assets throughout the Township:

Likelihood of Failure (LoF)		
Description	Grade	Failure of Asset
Immediate	5	Pipe has failed or will likely fail within 5 years
Poor	4	Pipe will probably fail in 5-10 years
Fair	3	Pipe may fail in 10-20 years
Good	2	Pipe unlikely to fail for at least 20 years
Excellent	1	Failure unlikely in foreseeable future

The Consequence of Failure (CoF) is aggregating the empirical value associated with failure of an asset as it directly and indirectly pertains to social, environmental, and cost implications. A percentage of the carried weight between the social, environment, and cost factors must be assigned by the Owner and Engineer. The factors established are for this system evaluation, and are not finite. The underlying components contributing to the social, environmental, and cost factors are described below. One (1) has the least CoF implications, where six (6) has the highest.

Factors:

1. Position of Pipe/Sewer/Manhole Relative to System Network
    a. Position of main trunk / interceptor sewers have greater CoF as opposed to small tributary sewers.
    b. Weighting can be population based or service area based.

2. Pipe Diameter
    a. Generally larger diameter sewers carry larger amounts of flow and typically constitute trunk sewers.
    b. Weighting is relative to the system's range of pipe diameter sizes.

3. Depth of Sewer/Manhole
    a. Sewers constructed at deeper elevations typically require more costs to excavate and repair/replace.
    b. Weighting is relative to the system's range of depths.

4. Locations of Sewer/Manhole
    a. Location will have social, economic, and environmental impacts.
    b. Factors have been established on PACP criteria.
    c. Example, a sewer in a resident's "yard" will carry less CoF for the same sewer in a "Major Highway" such as an MDOT trunk line.

5. Proximity to a Waterway.
    a. This is primarily an environmental consideration.
    b. Failure directly or indirectly to environmentally sensitive areas like rivers, lakes, streams, and or wetlands are associated with this factor.

6. Accessibility Standards
    a. Ease of access is vital to timely repairs.

b. Impacts include cost, social, and potentially environmental

The following table summarizes the CoF scale definitions:

Consequence of Failure (CoF)		
Description	Grade	Failure of Asset
Catastrophic Disruption	6	Massive system failure - severe health effect, extensive damages, LOS severely compromised
Major Disruption	5	Major effect - major capacity loss, health effects, and costs, LOS compromised
Moderate to Major Disruption	4	Major effect - moderate to major loss of system capacity, costs, and health effects, LOS may be compromised
Moderate Disruption	3	Moderate effect - moderate loss of system capacity, health effects, and costs, LOS still achieved
Minor Disruption	2	Minor effect - minor capacity loss, costs, and health effects
Insignificant Disruption	1	Slight effect - slight loss of system capacity, minor health effects, minor costs

Using the before mentioned formula, the risk for each asset was calculated. The assets were ranked based on the nature of the defects found and the CoF. The results for Monitor Township were 20 manholes, 26 pipe segments, and 4 pump stations were found to be high risk assets in the system. Using this information, a capital improvement plan (CIP) was developed to reduce the overall risk of the system. The CIP involves a systematic approach to address all assets in the system over the span of the next 10-20 years.

Revenue Structure

Wastewater account balances, expenditures, revenues, etc. were reviewed and entered into a financial software model. The model was used initially to determine if there was a gap the operating funds compared to generated revenue. After reviewing the financial data, rate structure, and operating budgets, the Township was found to have no deficiencies in the 2.5-year gap analysis.

Following the 2.5-year gap analysis, the capital improvement plan (CIP) was evaluated and added to the financial model. By reviewing the Township's reserve funds, current rate structure, and cost estimates for the CIP, various rate structure iterations were developed. The result was a recommendation for an annual increase of 6% to the Township's sanitary sewer rates in a 10-year planning period, for which the first rate resolution was adopted by the Township Board on March 13, 2017.

Capital Improvement Plan

The Capital Improvement Plan is a prioritized list of all the projects that need to be completed to meet the level of service goals of the system. The asset inventory, condition assessment, critical assets and level of service sections were taken into consideration to form the capital improvement plan. After selecting the desired level of service for each scope of work, the total cost of manhole repairs is approximately $265,000 over the next 5 years, the total cost of pipe repairs is approximately $470,000 over the next 5 years, and the total cost of the pump stations improvements is approximately $2.4M over the next 15-20 years.

OVERALL MANHOLE REHABILITATION		
Rehabilitation Year	Number of Manholes	Cost of Rehabilitation
1	50	$50,000
2	42	$53,000
3	52	$53,000
4	95	$53,000
5	106	$51,000

OVERALL SEWER REHABILITATION			
Rehabilitation Year	Number of Pipes	Footage of Pipes	Cost of Rehabilitation - Minimum Level of Service
1	10	3,700	$95,000
2	32	10,300	$95,000
3	**34**	**8,800**	**$95,000**
4	38	11,800	$95,000
5	**55**	**17,100**	**$91,000**

Pump Station Project Priority			
Station	Cost Minimum LOS - Selected by Township	Cost Medium LOS	Cost High LOS
16	$205,000	$247,000	$298,000
23	$115,000	$157,000	$219,000
17	**$250,000**		$788,000
18	$220,000	$263,000	$400,000
19	**$245,000**		$745,000
22	$215,000	$257,000	$543,000
20	**$200,000**	$242,000	$348,000
21	$230,000		$670,000
27	**$270,000**	$313,000	$553,000
31	$350,000	$393,000	$685,000
36	**$195,000**	$238,000	$262,000
Totals	$2,495,000	$2,110,000	$5,511,000

List of Major Assets

The following is a breakdown of the assets of Monitor Township's sanitary sewer collection system:

- 229,000' of pipe
    - 162,000' of 8"
    - 35,000' of 10"
    - 2,700' of 12"
    - 11,500' of 15"
    - 8,500' of 18"
    - 9,000' of 21"
    - 1,500' of 24"
- 832 manholes
- 11 pump stations

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Executive Summary of Stormwater Collection System

Prepared for:

City of Mt. Pleasant

SAW Project No. 1024-01

320 W. Broadway, Mt. Pleasant, MI 48858
www.mtpleasant.org
John Zang - DIrector of Public Works
989-779-5402

FINAL - May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for the Storm water, Asset Management, and Wastewater (SAW) Grant Program. In May 2014, The City of Mt Pleasant received a (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1024-01, to provide financial assistance for the development of a Stormwater asset management plan (AMP) for the City's publicly owned Stormwater utility. The assets that comprise the utility include collection system piping and manholes and catch basins, lift station/pump stations and gravity mains.

The SAW Grant amount awarded to The City of Mt Pleasant was $820,576.00
The City was determined as disadvantaged and no Local Match was required.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

Questions regarding the Asset Management Plan should be directed to:
Mr. John Zang
Director of Public Works
1303 N. Franklin Street
Mt. Pleasant, Michigan 48858
989-779-5402
Email: jzang@mt-pleasant.org

ASSET INVENTORY AND CONDITION ASSESSMENT

The Stormwater collection system assets consist of approximately:

- Storm Piping (8 inch thru 84 Inch): 329,700 feet (62.4 miles)
- Manholes: 1192
- Catch basins/Inlets: 1905

These assets are in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

Asset Identification and Location

A comprehensive stormwater system asset inventory was developed with the assistance of City Staff, operation and maintenance manuals, existing GIS data, review of the existing record drawings, field notes, staff knowledge, site visits and supplemented with field survey work.

Asset material, size and age were identified through the review of available historical record documents, existing GIS data and Closed-Circuit Televising (CCTV) data.

Spatial orientation (pipe location), pipe depth and invert elevations were determined through survey grade GPS equipment.

This information was used to update the existing GIS data base currently maintained by the City.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system was performed on approximately 60% of the system.

Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on 197,003 feet of the storm system.

The condition of the collection system assets reviewed ranged from Good to Excellent, with small percentage of major deficiencies discovered.

Recommendations for short-term (1-5 year) and long term (6-20 year) system maintenance and improvements were identified. It is recommended to clean the collection system on a 7 to 10-year rotating basis and the catch basins on a 5 year rotating basis.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The City of Mt Pleasant Level of Service(LOS) goals as it relates to the Stormwater system is summarized as follows:

LEVEL OF SERVICE STATEMENT

The overall objective of City of Mt Pleasant is to provide reliable Stormwater collection services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system capacity for all service areas.
- Comply with local, state and federal regulations.
- Actively maintain collection system assets in reliable working condition.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of Stormwater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of the community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the City annually to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the Stormwater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score X Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utility's ability to respond, convey and treat Stormwater. CoF categories of the collection system include:

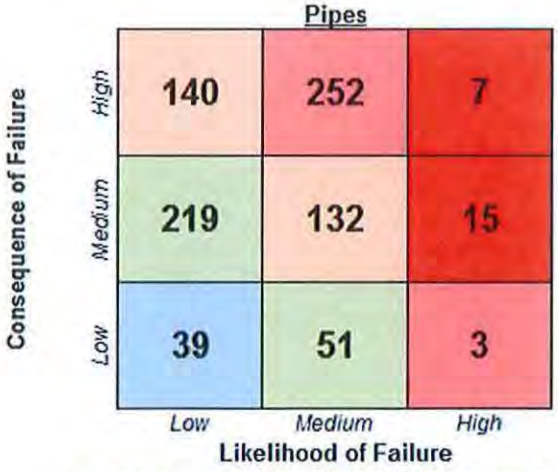
- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning template that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection system.

Figure 1 provides the risk rating for gravity pipe by number of pipe segments. 7 pipe segments in the collection system has an extreme risk rating and 15 pipe segments have a high-risk rating. These pipe segments will be repaired or replaced as part of the short-term Capital Improvements Plan. A majority of these pipe segments are Vitreous Clay Pipe (VCP) and Concrete Pipe. 36 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes in relatively good condition.



Pipes

Consequence of Failure	Low	Medium	High
High	140	252	7
Medium	219	132	15
Low	39	51	3

Figure 1. Business Risk Matrix (Risk Rating) by Number of Gravity and Force Main Pipes

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan with recommendations was prepared for the City's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. The information was also used to schedule inspections to evaluate the condition of high business risk assets.

Short-Term 1-5 year and Long-Term 6-20-year Capital Improvement Plan (CIP) was prepared to address the projected needs for each asset in the system.

(1-5 Year) Capital Improvements include:

- Replace or reline the pipe segments that have been identified as an extreme risk and high risk rating.
- Reconstruct structures and catch basins that have been identified as an extreme risk rating.

(6-20 Year) Capital Improvements include:

- Replace or reline the pipe segments that have been identified as a medium high-risk rating.
- Reconstruct structures and catch basins that have been identified as a high-risk rating.

OPERATIONS, MAINTENANCE AND REPLACEMENT

A preventative maintenance program to systematically clean and CCTV inspect pipelines to NASSCO-certified standards is critical for a sound Stormwater system. The process of cleaning and CCTV inspection of pipelines either with equipment owned by the community or contracted is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. For this reason, it is recommended that at a minimum, all pipelines an be cleaned every 7 to 10 years on a rotating basis. Catch Basins should be cleaned every 5 years on a rotating basis. Available budget will dictate the frequency or size of yearly projects.

REVENUE STRUCTURE

The revenue for storm sewer improvements will come from the City local and major street funds or the City General Fund.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The **City of Mt. Pleasant** certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1024-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SW AMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

JOHN ZANG at 989-779-5402 JZang@Mt-Pleasant.org
Name Phone Number Email

John Zang 5-31-2017
Signature of Authorized Representative (Original Signature Required) Date

John Zang – Director of Public Works
Print Name and Title of Authorized Representative

June 2014

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Executive Summary of Wastewater Collection System

Prepared for:

City of Mt. Pleasant

SAW Project No. 1024-01

320 W. Broadway, Mt. Pleasant, MI 48858
www.mtpleasant.org
John Zang - Director of Public Works
989-779-5402

FINAL - May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Storm water, Asset Management, and Wastewater (SAW) Grant Program. In May 2014, The City of Mt Pleasant received a Storm water, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1024-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the City's publicly owned wastewater utility. The assets that comprise the utility include collection system piping and manholes, lift station/pump stations and force mains.

The SAW Grant amount awarded to The City of Mt Pleasant was $1.176,150.00.
The community was disadvantage therefor no local match was required.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

Questions regarding the Asset Management Plan should be directed to:
Mr. John Zang
Director of Public Works
1303 N. Franklin Street
Mt. Pleasant, Michigan 48858
989-779-5402
Email: jzang@mt-pleasant.org

ASSET INVENTORY AND CONDITION ASSESSMENT

The wastewater collection system assets consist of approximately:

- Gravity Sewer (8 inch thru 24 Inch): 422,000 feet (79.9 miles)
- Manhole Structures: 668 Each
- Sewer Lift Stations: 15 Each
- Waste Water Treatment Plant (WWTP): 661 Assets

These assets are located in existing street rights-of-way, property owned by the City or in easements dedicated for the assets use and maintenance.

Asset Identification and Location

A comprehensive wastewater system asset inventory was developed with the assistance of City Staff, operation and maintenance manuals, existing GIS data, review of the existing record drawings, field notes, staff knowledge, site visits and supplemented with field survey work.

Asset material, size and age were identified through the review of available historical record documents, existing GIS data and Closed-Circuit Televising (CCTV) data.

Spatial orientation (pipe location), pipe depth and invert elevations were determined through survey grade GPS equipment.

This information was used to update the existing GIS data base currently maintained by the City.

Condition Assessment and Expected Useful Life

Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on approximately 144,000 LF thru the SAW Grant. This represents 34% of the collection system. The SAW funding was not used to clean or televise any PVC pipe or pipe segments that had been previously lined

The condition of the collection system assets that were reviewed under the SAW Grant ranged from excellent to good. Only a small percentage of pipe segments were discovered to have major deficiencies.

Recommendations for short-term (1-5 year) and long term (6-20 year) system maintenance and improvements were identified. It is recommended to clean and televise the collection system on a 7 to 10-year rotating basis.

The condition of the assets at the lift stations range from good to fair condition, with one smaller pump station (Fisher) in poor condition. Ongoing maintenance has upheld the condition of many assets while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems. The recommendations for short term and long-term improvements are relatively minor.

Overall, the condition of the WWTP is in good to fair condition. Like most WWTPs, some assets are in excellent condition due to relatively recent installation and others are near the end of their useful life due to age or deterioration caused by harsh conditions associated with treating wastewater.

LEVEL OF SERVICE

Defining the Expected Level of Service (LOS)

The City of Mt Pleasant Level of Service (LOS) goals as it relates to the wastewater collection and treatment system is summarized as follows:

LEVEL OF SERVICE STATEMENT

The overall objective of The City of Mt Pleasant is to provide reliable wastewater collection services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with local, state and federal regulations.
- Actively maintain collection system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment plant.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from annually as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the City annually to make sure they accurately reflect the desired operation of the utility.

Measuring Performance

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

Criticality Results

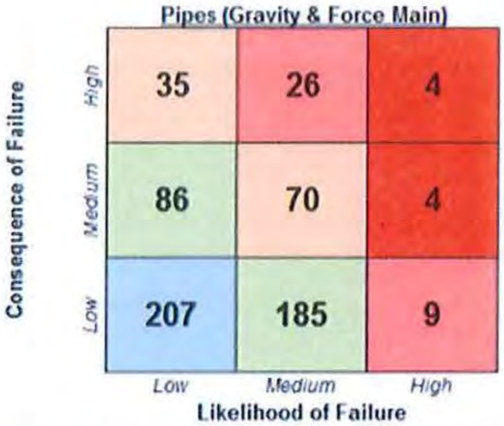
Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection system.

Figure 1 provides the risk rating for gravity pipe by the number of pipe segments. Only eight pipe segments in the collection system were identified to have an extreme risk rating. Much of the collection system's gravity pipes, 76 percent as shown in Figure 1, have a low to negligible risk rating and are indicative of pipes in relatively good condition. The pipes where an extreme risk rating has been identified will be repaired or rehabilitated in the (1-5 year) short term goals.

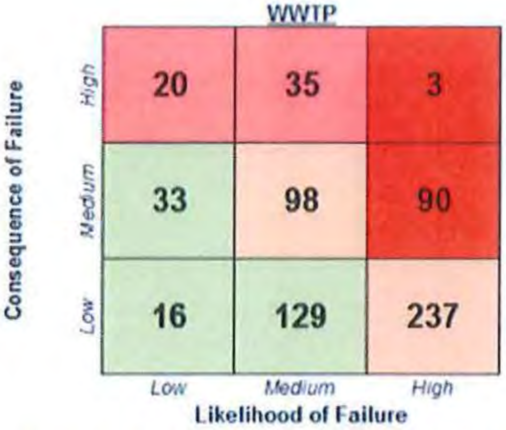
Figure 2 provides the risk rating for WWTP assets. 93 assets (less than 8%) are identified as extreme risk, most of which are due to being installed over 30 years ago. Some of the WWTP assets, (27 percen)t as shown in Figure 2, have a low to negligible risk rating and are indicative of assets in good condition.

The WWTP has established a short term and long term CIP to repair and replace the assets that would have a high or extreme risk rating. These assets will be reviewed yearly by the WWTP staff, who will make recommendations as to which assets need to be replaced each year.



	Low	Medium	High
High	35	26	4
Medium	86	70	4
Low	207	185	9

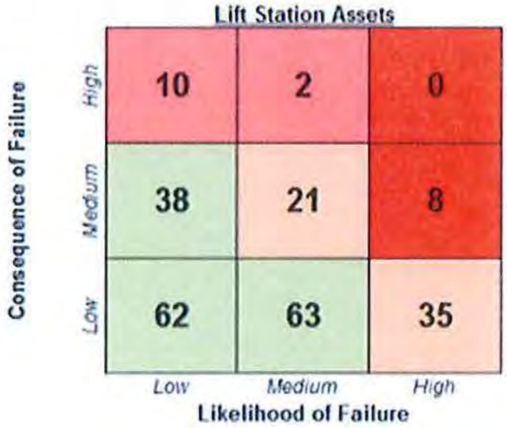
Figure 2. Business Risk Matrix (Risk Rating) by Number of Gravity and Force Main Pipes



	Low	Medium	High
High	20	35	3
Medium	33	98	90
Low	16	129	237

Figure 1. Business Risk Matrix (Risk Rating) by Number of WWTP Assets

Figure 3 provides the risk ratings for the lift station assets. Eight assets are identified as extreme risk, most of which are due to being installed over 30 years ago. The eight assets with high risk ratings should be inspected at regular intervals. The City will repair or replace the extreme risk assets in the short term goals.



	Low	Medium	High
High	10	2	0
Medium	38	21	8
Low	62	63	35

Figure 3. Business Risk Matrix (Risk Rating) by Number of Lift Station Assets

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the City's wastewater utility assets based on the Business Risk evaluation. The CIP recommendations are provided for the collection system, pumping stations and force mains. From the BRE, a short-term (1-5 year CIP) and long-term (6-20 year CIP) was developed for the utility.

This AMP included a detailed condition assessment of the collection system including televising of pipe, and field condition assessments of all lift stations and the wastewater treatment facilities.

Based on the AMP condition assessment of the sanitary sewer system, the City has identified assets of the collection system, wastewater treatment plant and lift stations for improvement. These improvements can be completed with funding from the City's Capital Improvement Budget.

(1-5Year) Capital Improvements include:

- Repair or replace the major deficiencies that have been identified as an extreme risk in the collection system, treatment plant and lift stations.
- Rebuild Fisher Lift Station
- New standby generator at the Oak Street Lift Station
- Upgrade remaining Multritude control panels to Multismart
- New standby generator at the Pickard Street Lift Station
- Replace pumps at various lift stations
- Sludge tank A roof replacement at WWTP
- Rebuild east digester at WWTP
- Replace WWTP plant generator
- Replace overflow basin liner at WWTP
- Clay tile sewer relining in various locations

(6-20 Year) Capital Improvements Include:

- Repair or replace the major deficiencies that have been identified as a high risk in the collection, system, treatment plant and lift stations after an updated assessment is completed in Year 5.
- Collection system relining
- Manhole relining

OPERATIONS, MAINTENANCE AND REPLACEMENT

Regular operation, maintenance and replacement (OM&R) is essential in the management of a wastewater collection system. The collection system is subject to a variety of operational problems and can suffer from clogging, scour, corrosion, and collapse. Inspection, cleaning, and rehabilitation are important for optimizing the function of the collection system. By optimizing the performance infiltration/inflow are reduced and sanitary sewer overflows (SSO) are minimized or eliminated preserving the substantial investment the community has in its collection system.

A reserve fund has been established for the wastewater treatment plant and lift stations. This fund was developed to replace equipment that may prematurely fail.

The existing OM&R fund is sufficient for the current equipment and operations.

REVENUE STRUCTURE

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

The existing rates were determined to create sufficient funds to fulfill the day-to-day maintenance and operations of the entire sanitary collection system.

The MDEQ approved the City's rate methodology on November 9, 2016.

DEQ

Department of Environmental Quality
SAW Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017

The City of Mt Pleasant certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No.1024-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e (3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: No

   If No - Date of the rate methodology approval letter: November 9, 2016

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________________.

4) An initial rate increases to meet a minimum of 10 percent of the funding gap identified was adopted on ______________________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

John Zang
Name

989-779-5402
Phone Number

jzang@-mt.pleasant.org
Email

John Zang
Signature of Authorized Representative (Original Signature Required)

5-31-2017
Date

Mr. John Zang – Director of Public Works
Print Name and Title of Authorized Representative

Prein&Newhof
Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

Memorandum

Date:	June 30, 2017
To:	Mr. David Worthington
Company:	Michigan Department of Environmental Quality
From:	Barbara E. Marczak, P.E., Prein&Newhof
cc:	Mohammed Al-Shatel, P.E., Director of Public Works, City of Muskegon
Re:	City of Muskegon, Muskegon County, SAW Grant Summary of Waste Water System Asset Management Plan

This memorandum provides the summary of the City of Muskegon's SAW grant activities required under Section 603 of Public Act 84 of 2015. This SAW grant is for the City of Muskegon Waste Water System. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

City of Muskegon
933 Terrace Street
Muskegon, MI 49440
www.muskegon-mi.gov

Contact Information for the grantee:

Mohammed Al-Shatel, Director of Public Works
933 Terrace Street
Muskegon, MI 49440

Phone: 231-724-6944

SAW Grant Project Number: 1510-01

Executive Summary

The City of Muskegon received a SAW Grant in 2014 to prepare a Waste Water Asset Management Plan. The grant agreement indicated the following amounts:

	Plan Cost	Grant Amount	Local Match
Waste Water AMP	$1,480,000	$1,480,000	$0

The Key components in their Asset Management Plan include:

a. Asset Inventory and Condition Assessment
b. Level of Service
c. Criticality of Assets
d. Operation and Maintenance Strategies/Revenue Structure
e. Long-term Funding/Capital Improvement Plan

Asset Inventory

Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.

Manhole, gravity sewer main, force main, and lift station locations were plotted in a Geographic Information System (GIS) using record drawings. Manhole and lift station locations were field verified and locations adjusted with Global Positioning System (GPS) coordinates.

Asset inventory data including year of installation, material, sizes, pipe inverts and manhole rim elevations were cataloged from record drawing and visually verified where needed. Asset inventory data is managed using GIS databases.

The GIS and asset spread will be used to maintain asset data in the future.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

The condition of collection system piping was documented with either a pole- mounted zoom camera (looking down each pipe from the manholes) or with in-line closed circuit television (CCTV) from manhole to manhole. The zoom camera method provided a very economical initial condition assessment of the pipes. Some pipes noted to have potentially significant deficiencies were flagged and follow-up inspections were performed with full in-line CCTV.

Using the zoom camera data, pipes were rated based on several factors such as joint conditions, wall corrosion, and infiltration. Composite Risk of Failure ratings of 1-5 (5 being the worst) were assigned to each pipe segment.

Pipes inspected with CCTV were rated using the PACP system (Pipeline Assessment Certification Program). The PACP ratings were then used to derive a composite Risk of Failure rating of 1-5 for each pipe.

Percentage of length of pipe within each rating category

1	2	3	4	5
34%	42%	20%	3%	1%

Manholes were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, and structures.

Percentage of manholes within each rating category

1	2	3	4	5
71%	18%	6%	3%	1%

Equipment within 22 lift stations were rated on a scale of 1-5 based on factors relating to physical condition and operating condition. Generally the lift station equipment is currently in good to fair condition with no major capital improvements needed at this time.

Percentage of lift stations within each rating category

1	2	3	4	5
0	71%	29%	0	0

Level of Service Determination

Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.

The City has established the following basic Level of Service Goals:

- *Meet Regulatory Requirements*
- *Minimize Service Interruptions*
- *Minimize Public Hazards*
- *Manage Storm Water Inflow and Ground Water Infiltration*
- *Maintain Some Capacity for Community Growth*
- *Minimize Life Cycle Costs*
- *Assure adequate financial reserves*
- *Review Asset Management Plan every*

Criticality of Assets

Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions. The factors considered varied by the asset type and were tailored to identify both physical and functional deficiencies. For example, pipe ratings considered factors such as joint offsets and structural cracking while lift station pumps considered factors such as design pumping rate vs actual pumping rate.

Assets were given a Consequence of Failure (CoF) of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- *Provide service to a significant portion of the system*
- *Serve schools/hospitals/major industry*
- *Are under major roads*
- *Are adjacent to waterways or significant wetlands*

Consequence of Failure and Criticality should not be confused. Criticality is the product of as asset's Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset's action priority.

Criticality ratings were calculated and ranged from 1-25 (25 being the highest priority). We then ran a Jenks Optimization to create 5 primary groupings, each with a rank of 1-5 (5 being highest priority). The final Criticality ratings were considered when the comprehensive Capital Improvement Plan was generated.

Revenue Structure

Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a "Test Year" was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.

The customer base was reviewed, including the number of billable customers and volumetric sales. Other operating and non-operating revenues were also evaluated. Prediction of customer and volume counts were made including trending in system utilization, projection of operating costs, and anticipated inflation by expense category. Refinancing and/or restructuring possibilities were also explored.

The Capital Improvement Plan (CIP) provided refined cost projections for the first 10 years of the financial analysis. The Asset Management System identified the estimated asset investment cost by year for the remaining lifecycle of all assets. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. Based on that analysis, rate adjustment options were identified. It was determined that the current rate structure was sufficient to cover Operation &Maintenance (O&M) activities but increases were needed to fully implement the desired CIP. The asset inventory, condition assessment, and CIP information was presented to the City Commission in a public meeting along with the financial evaluation. The city is moving forward with rate changes recommended.

Capital Improvement Plan (CIP)

Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.

Once RoF ratings for the assets were assigned and actions prioritized using the Criticality ratings, action timelines were predicted for maintenance/repair/replacement. Because the waste water collection system assets share physical space with other asset systems such as storm water, roadway, and drinking water, it was imperative that the CIP process coordinated actions on these systems.

Individual project scopes for the comprehensive CIP were created to maximize coordination of work on various assets and minimize overall costs. The CIP projections include improvements to the waste water system (both collection and treatment), storm water system, and road system. At this time no improvements to systems other than waste water are considered, however. The CIP costs were incorporated into the revenue structure review.

The following capital improvements planned for the next 10 years include:

CIP Implementation Timeline

Planned Year (1)	Project Title	Total Est. Cost from Sewer Fund (2)
2018	Sanitary Sewer Cleaning & Televising	$319,000
2018	S2 Grant Project-Oak Grove Sanitary Lining, Beidler Trunk Lining	$124,000
2018	Sanitary Sewer Pipe Lining	$758,000
2018	Sanitary Sewer Reconstruction—Fair Ave.	$50,000
2018	Sanitary Sewer and Road Reconstruction—9th St. reroute	$504,000
2018	Sanitary Sewer Reconstruction— 6th St. & 8th St.	$226,000
2018	Sanitary Sewer Spot Repairs	$434,000
2018	Sanitary Sewer, Watermain, and Road Improvements —Amity Ave. (Fork to Getty), Fork St. (Orchard to Amity)	$1,365,000
2018	Lift Station Repairs	$107,000

2018 Total		**$3,884,000**
2019	Sanitary Sewer Cleaning & Televising	$326,000
2019	Beidler Trunk Sanitary Sewer Reconstruction—Phase 1	$855,000
2019	Sanitary Sewer Forcemain and Watermain Reconstruction—Lakeshore Dr.	$385,000
2019	Sanitary Sewer Reconstruction— United Church of Christ	$320,000
2019	Watermain & Sanitary Sewer Improvements—Morton Ave (Lincoln to Denmark)	$209,000
2019	Watermain & Sanitary Sewer Improvements—Dale Ave (Park to Sanford)	$332,000
2019	Smoke Testing--South Clay Hill Neighborhood	$10,000
2019	Lift Station Repairs	$64,000
2019 Total		**$2,461,000**
2020	Sanitary Sewer Cleaning & Televising	$332,000
2020	Sanitary Sewer Improvements—Frye & Cain Trunk	$1,745,000
2020	Lift Station Repairs	$198,000
2020 Total		**$2,275,000**
2021	Sanitary Sewer Cleaning & Televising	$339,000
2021	South Clay Hill Neighborhood Sanitary Sewer Improvements—Crowley St.	$644,000
2021	Lift Station Repairs	$38,000
2021	Additional Sanitary Sewer and Road Projects—as determined by inline televising and road conditions	$1,663,000

2021 Total		**$2,683,000**
2022	Sanitary Sewer Cleaning & Televising	$346,000
2022	South Clay Hill Neighborhood Sanitary Sewer Improvements—Kinsey St.	$626,000
2022	Additional Sanitary Sewer and Road Projects—as determined by inline televising and road conditions	$1,663,000
2022 Total		**$2,634,000**
2023	Sanitary Sewer Cleaning & Televising	$352,000
2023	South Clay Hill Neighborhood Sanitary Sewer Improvements—Hudson St.	$639,000
2023	Lift Station Repairs	$99,000
2023	Additional Sanitary Sewer and Road Projects—as determined by inline televising and road conditions	$1,663,000
2023 Total		**$2,752,000**
2024	Sanitary Sewer Cleaning & Televising	$359,000
2024	South Clay Hill Neighborhood Sanitary Sewer Improvements—Dowd St.	$654,000
2024	Lift Station Repairs	$117,000
2024	Additional Sanitary Sewer and Road Projects—as determined by inline televising and road conditions	$1,663,000
2024 Total		**$2,792,000**
2025	Sanitary Sewer Cleaning & Televising	$367,000
2025	South Clay Hill Neighborhood Sanitary Sewer Improvements—Franklin St.	$667,000
2025	Watermain & Sanitary Sewer Improvements—Madison St. (Laketon to Isabella)	$86,000

2025	Lift Station Repairs	$152,000
2025	Additional Sanitary Sewer and Road Projects—as determined by inline televising and road conditions	$1,663,000
2025 Total		**$2,933,000**
2026	Sanitary Sewer Cleaning & Televising	$374,000
2026	South Clay Hill Neighborhood Sanitary Sewer Improvements—Nevada St.	$680,000
2026	Sanitary & Storm Improvements—Spring St. Reroute	$945,000
2026	Lift Station Repairs	$173,000
2026	Additional Sanitary Sewer and Road Projects—as determined by inline televising and road conditions	$1,663,000
2026 Total		**$3,834,000**
2027	Sanitary Sewer Cleaning & Televising	$381,000
2027	Sanitary Sewer Forcemain Replacement—Getty St.	$64,000
2027	Beidler Trunk Sanitary Sewer Reconstruction—Phase 2 (Lift Station)	$1,032,000
2027	Additional Sanitary Sewer and Road Projects—as determined by inline televising and road conditions	$1,663,000
2027 Total		**$3,139,000**

Notes:

(1) Unplanned repairs may necessitate adjustments in priority.

(2) All costs estimated in 2017 dollars and rounded up to closest $1000.

The Capital Improvement Plan should be reviewed annually and adjusted based on current information and priorities.

List of the plan's major identified assets:

- 22 lift stations
- 21,500 feet of sanitary force main
- 889,950 feet of gravity sanitary sewer
- 3,778 manholes

Deliverables/Reports Prepared

Information and reports prepared and provided under this grant include:

1. *GIS mapping and database and Arc Reader Files*
2. *Utility maps for City of Muskegon's website*
3. *Asset Management pipe spreadsheet*
4. *Asset Management non-pipe spreadsheet (lift stations)*
5. *Temporary flow meter I&I analysis spreadsheet and flow district map*
6. *Lift station and county meter I&I analysis spreadsheet and REU map*
7. *Sewer Flow Study – Wastewater Collection System Capacity Assessment and Inflow/Infiltration Analysis*
8. *Wastewater System Evaluation*
9. *Capital Improvement Plan (including Financial Analysis)*
10. *Waste Water Asset Management Plan*

Prein&Newhof
Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

Memorandum

Date:	June 30, 2017
To:	Mr. David Worthington
Company:	Michigan Department of Environmental Quality
From:	Barbara E. Marczak, P.E., Prein&Newhof
cc:	Mohammed Al-Shatel, P.E., City Engineer
Re:	City of Muskegon, Muskegon County, SAW Grant Summary of Storm Water System Asset Management Plan

This memorandum provides the summary of the City of Muskegon's SAW grant activities required under Section 603 of Public Act 84 of 2015. This SAW grant is for the City of Muskegon Storm Water System. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

City of Muskegon
933 Terrace Street
Muskegon, MI 49440
www.muskegon-mi.gov

Contact Information for the grantee:

Mohammed Al-Shatel, Director of Public Works
933 Terrace Street
Muskegon, MI 49440

Phone: 231-724-6944

SAW Grant Project Number: 1510-01

Executive Summary

The City of Muskegon received a SAW Grant in 2014 to prepare a Storm Water Asset Management Plan. The grant agreement indicated the following amounts:

	Plan Cost	Grant Amount	Local Match
Storm Water AMP	$520,000	$520,000	$0

The Key components in their Asset Management Plan include:

a. Asset Inventory and Condition Assessment
b. Level of Service
c. Criticality of Assets
d. Operation and Maintenance Strategies/Revenue Structure
e. Long-term Funding/Capital Improvement Plan

Asset Inventory

Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.

Manhole, catch basin, sewer pipe, culvert, and open channel locations were plotted in a Geographic Information System (GIS) using record drawings, aerial imagery, and land contours. A portion of the system locations were field verified using handheld GPS equipment and survey quality GPS and locations adjusted with Global Positioning System (GPS) coordinates.

Asset inventory data for storm sewers and culverts, including year of installation, material, and sizes, were cataloged from record drawing and visually verified where needed. Asset inventory data is managed using GIS databases.

The GIS and asset spreadsheets will all be used to maintain asset data in the future.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

The condition of approximately 50% of the collection system piping was documented with a pole mounted zoom camera (looking down each pipe from the manholes). The zoom camera method provided a very economical initial condition assessment of the pipes. Condition assessment of the rest was assumed based on age and condition assessment of similar pipes. No in-line closed-circuit televising (CCTV) was conducted on the storm system.

Using the zoom camera data, pipes were rated based on several factors such as joint conditions, observed roots, deposits, wall corrosion, infiltration, or other defect observations. Composite Risk of Failure ratings of 1-5 (5 being the worst) were assigned to each pipe segment.

Percentage of length of pipe within each rating category

1	2	3	4	5
38%	55%	5%	1%	1%

Manholes and catch basins were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, and structures.

Percentage of manholes/catch basins within each rating category

1	2	3	4	5
83%	14%	2%	<1%	<1%

Level of Service Determination

Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.

The City of Muskegon recognizes that the people served by the system are more than customers, they are the system owners. The City staff act as stewards of the system who strive to maintain the best system possible with the finances available. This is challenging because there is no dedicated revenue for storm water. The results of inventory and assessments have been discussed at council meetings and with staff. Based on the input received during those meetings, the following Level of Service Goals were determined:

1. *Meet Regulatory Requirements*
2. *Minimize Flood Risk*
3. *Minimize Public Hazards*

4. *Minimize Storm Water Discharges to Waste Water system*
5. *Maintain Water Quality*
6. *Minimize Life Cycle Costs*

Criticality of Assets

Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions. The factors considered varied by the asset type and were tailored to identify both physical and functional deficiencies. For example, pipe ratings considered factors such as joint offsets and structural cracking as well as root intrusions.

Assets were given a Consequence of Failure (CoF) of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- *Provide service to a significant portion of the system*
- *Serve schools/hospitals/major industry*
- *Are under major roads*
- *Are adjacent to waterways or significant wetlands*

Consequence of Failure and Criticality should not be confused. Criticality is the product of as asset’s Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset’s action priority.

Criticality ratings were calculated and ranged from 1-25 (25 being the highest priority). We then ran a Jenks Optimization to create 5 primary groupings, each with a rank of 1-5 (5 being highest priority).

Revenue Structure

Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not *sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.*

The City of Muskegon has no specific revenue structure for storm water. Storm water projects are handled by the General Fund as needed. Projects or maintenance needed will be evaluated during the City's yearly budget cycle in order to continue the desired level of service.

Capital Improvement Plan (CIP)

Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.

The City of Muskegon has a large storm water system. 51 defects in the storm sewer system were identified that can be remedied with spot repairs. No other major capital improvements were identified as being needed in the short term. As projects involving other utilities and roads in proximity to storm water assets are identified, such as road replacement, consideration should be given to assessment, rehabilitation, and replacement as needed. The RoF and Criticality ratings should be used in prioritizing actions. Because the storm water collection system assets share physical space with other asset systems such as waste water, roadway, and drinking water, it is imperative that any CIP process coordinate actions with other utility systems.

List of the major identified assets

- 768,500 feet of gravity storm sewer
- 3,617 manholes and 5,363 catch basins
- 100 storm water outlets

Deliverables/Reports Prepared

Information and reports prepared and provided under this grant include:

1. *GIS mapping and database and Arc Reader files*
2. *Utility maps for City website*
3. *Asset Management pipe spreadsheet*
4. *Sewer Flow Study – Storm Water Collection System and Capacity Analysis*
5. *Ryerson Creek Stormwater Study*

6. *Capital Improvement Plan (including financial analysis)*
7. *Storm Water System Evaluation*
8. *Storm Water Asset Management Plan*

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date June 30, 2017
(no later than 3 years from executed grant date)

The City of Muskegon, Muskegon County, MI *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1510-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Mohammed Al-Shatel at 231-724-6955 mohammed.al-shatel@shorelinecity.com
Name Phone Number Email

Mohammed alShatel 6-27-17
Signature of Authorized Representative (Original Signature Required) Date

Mohammed Al-Shatel, P.E., City Engineer
Print Name and Title of Authorized Representative

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date June 30, 2017
(no later than 3 years from executed grant date)

The City of Muskegon, Muskegon County, MI *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1510-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: October 11, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Mohammed Al-Shatel at 231-724-6944 mohammed.al-shatel@shorelinecity.com
Name Phone Number Email

Mohammed Al Shatel 6-27-17
Signature of Authorized Representative (Original Signature Required) Date

Mohammed Al-Shatel, P.E., City Engineer
Print Name and Title of Authorized Representative

April 2017

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 5/31/2017
(no later than 3 years from executed grant date)

The Muskegon County Board of Public Works *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1499-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: 10/24/2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Dave Johnson at (231) 724-3464 johnsonda@co.muskegon.mi.us
Name Phone Number Email

Susie Hughes 5-25-2017
Signature of Authorized Representative (Original Signature Required) Date

Susie Hughes, Chair
Print Name and Title of Authorized Representative

Memorandum

Date:	May 31, 2017
To:	Mr. David J. Worthington
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130376
Re:	Muskegon County: Summary of Wastewater Asset Management Plan

Mr. Worthington:

This memorandum provides the summary of the Muskegon County wastewater asset management plan SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

SAW Grant Project Number: 1499-01

Grantee:

Muskegon County Board of Public Works
990 Terrace St. 4th Floor
Muskegon, MI 49442
http://co.muskegon.mi.us/wastewater/

Contact: Dave Johnson, Director
Muskegon County Wastewater Management System
Phone: 231-724-3464

Executive Summary

Muskegon County received a SAW Grant in 2014 to prepare a Waste Water Asset Management Plan. The Grant agreement indicated the following amounts:

Project Total	Grant Amount	Local Match
$1,041,726	$937,553	$104,173

The Key components in the Asset Management Plan include:

1. Asset Inventory and Condition Assessment
2. Level of Service
3. Criticality of Assets
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

Asset Inventory

"Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets."

Manhole, gravity sewer main, force main, meter, and lift station locations were plotted in a Geographic Information System (GIS) using record drawings. Manhole and lift station locations were field verified and locations adjusted with Global Positioning System (GPS) coordinates. An inventory of wastewater treatment plant assets was compiled from site visits and available documentation including bases of design, record plans, operations and maintenance manuals, and maintenance records. The treatment plant was divided into processes to organize the inventory and subsequent condition assessment data.

Collection system asset inventory data, including year of installation, material, sizes, pipe inverts and manhole rim elevations, were cataloged from record drawings and visually verified where needed. Lift station and treatment asset inventory information, including size, capacity, manufacturer, model number, serial number etc. was compiled from available documentation.

Asset inventory data is managed using GIS databases and spreadsheet tables.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

Condition assessments were made using a variety of methods to develop a Risk of Failure rating for each asset. All ratings were made on a scale of 1-5, with 5 representing the worst condition. The assessment methods and results are described below.

Gravity Sewer Mains: Inspections were made using either a pole mounted zoom camera (looking up or down each pipe from the manholes) or with in-line closed circuit television (CCTV) cameras. Pipes inspected with zoom camera methods were rated considering any observable roots, deposits, joint conditions, pipe wall condition, infiltration, or other defect observations. Pipes inspected with CCTV were rated using the PACP system condition grading system. Composite ratings were derived for each pipe.

Percentage of gravity sewer pipes in each rating category

1	2	3	4	5
88%	9%	2%	<1%	<1%

Force Mains: Force main conditions were estimated using pipe age, material, and break history records. Muskegon County's force main data was compared with that of several other municipalities to establish a comparative reference. Ratings were developed for each force main, and in some cases force mains were segmented based on changes in pipe age and/or material.

Percentage of force main pipes in each rating category

1	2	3	4	5
67%	0%	6%	27%	<1%

Manholes: Manholes were visually inspected and rated based on factors related to the condition of castings, steps, structures, and infiltration.

Percentage of manholes in each rating category

1	2	3	4	5
5%	48%	23%	15%	9%

Meters: Meters and meter stations were visually inspected and rated based on mechanical, structural, electrical, controls, and other factors.

Number of meters in each rating category

1	2	3	4	5
5	18	4	2	0

Lift Stations: Lift stations were broken down into an inventory of assets including individual pumps, valves, piping, structures, instrumentation/controls, electrical, etc. The number of assets per lift station varies from 22 assets at the smallest lift station to 139 assets at the largest station. Visual inspection, performance testing, and discussions with maintenance staff were completed to rate the asset conditions.

Percentage of lift station assets in each rating category

1	2	3	4	5
76%	15%	7%	2%	<1%

Wastewater Treatment Plant: The treatment plant was broken down into an inventory of 4,899 assets and the assets were grouped by 33 treatment process . Visual inspection, performance testing, and discussions with maintenance staff were completed to rate the asset conditions.

Percentage of treatment plant assets in each rating category

1	2	3	4	5
18%	29%	32%	14%	8%

Level of Service Determination

"Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined."

The Muskegon County Wastewater System is governed by a master contract between the County and the 15 local government units (cities and townships) which are parties to the contract. The parties have collectively considered their goals for the system, the levels of service they desire, and have agreed upon the terms and conditions to the master contract. The master contract serves as the level of service determination for the County wastewater system.

Criticality of Assets

"Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?"

Assets were given a Consequence of Failure (CoF) rating of 1-5 (5 being the worst) based on potential social, economic, and environmental impacts which can result from wastewater system failures. Collection system lines (gravity sewers and force mains) were rated based the size of the lines and potential impacts to transportation infrastructure. Lift stations were rated based on average day flow rates and the available time to respond to an emergency condition prior to a wastewater overflow. Treatment plant assets were rated based how an asset failure might affect the overall process.

Criticality ratings were calculated as the product of an asset's RoF and CoF, producing criticality ratings ranging from 1-25 (25 being the most critical). The most critical manholes in the Northern interceptor located along the north end of Whitehall Rd. The most critical gravity sewer is the Clayhill branch over Ruddiman Lagoon. The most critical force main is the Colby Road portion of the W station line. The most critical treatment plant processes are the aerated settling cells, aeration/mixing cells, rapid infiltration pump station and basins, south irrigation pump station, and irrigation.

Revenue Structure

"Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

A forecasting system was developed and used to identify the estimated replacement investment for the remaining lifecycle of all assets, based on the asset inventory and condition assessment data. Project costs were estimated for capital improvements within the first six years. Recent budget information was analyzed to determine there is no gap in the current rate methodology for current system costs. A financial projection and rate track was developed, including possible rate adjustments, debt coverage ratios, cash reserves, and target operating income levels. Annual rate adjustments are made as needs are addressed.

Capital Improvement Plan

"Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects."

A Capital Improvement Plan showing needed projects, cost estimates, and project timelines was developed for improvements within a six year planning period. The CIP is attached for reference.

List of Major Assets

"Provide a general list of the major assets identified in the AMP."

The County's major collection system assets include:

- 16 miles of 12-inch to 72-inch diameter gravity sewer
- 13 pump stations with firm capacities ranging from 425 gpm to 38,500 gpm
- 27 miles of 6-inch to 60-inch diameter force main
- 29 flow meters

The County's major treatment plant processes include:

- Two 10-acre complete-mix aeration cells
- Two 21-acre aerated settling cells
- Two 835-acre storage lagoons
- Rapid infiltration pump station and 37 basins

- 3 irrigation pump stations and 53 irrigation fields
- Ferric chloride feed system
- 11 sludge drying beds
- 32 miles of interception ditches with 2 pump stations
- Farm operations center
- Farm equipment

MUSKEGON COUNTY WASTEWATER MANAGEMENT SYSTEM

6-Year Capital Improvement Plan Projects

ANNUAL RECURRING PROJECTS

Description
Ag Equipment Roll-Over Program
Vehicle Replacement
Grain Center Upgrade
Irrigation Rig Replacement
Electronic Systems
Monitoring Well Replacement
Northern Interceptor Manhole Rehab

ONE-TIME PROJECTS

Description	Year
Shop Hoist	2017
Used Off-Road Truck	2017
Flume Screen	2017
RI Screens	2017
RI System Overhaul	2017
No-Till Drill	2018
Discrete Analyzer	2018
Swanson Rd Improvements	2018
SCADA Upgrade	2018
Cell 3 Improvements	2018
Lab Cabinets and Countertops	2018
Admin Building Improvements (LS & Plumbing)	2018
Culvert F Replacement	2018
Culvert Q Replacement	2018
Admin Building Parking Lot Paving	2018
Cell West Ramp Paving	2018
Fertigation Pumps and Nurse Tanks	2019
Sprayer	2019
PS A Improvements	2019
PS A to PS C Force Main Replacement	2019
Muskegon Twp to PS A Gravity Replacement	2019
Culvert S Replacement	2019
Cell Access Road Paving	2019
South Irrigation Station Upgrade	2020
Cell 1 Improvements	2020
Interception Ditch Cleaning	2020

MUSKEGON COUNTY WASTEWATER MANAGEMENT SYSTEM

6-Year Capital Improvement Plan Projects

ONE-TIME PROJECTS (CONT.)

Description	**Year**
PS J Improvements	2021
PS W Force Main Replacement	2021
PS 3 Improvements	2021
PS J Force Main Replacement	2021
PS L Improvements	2021
PS D Improvements	2021
PS D Gravity Replacement	2021
Abandon PS D Force Main	2021
Outlet Lagoon Improvements	2021
Ferric Chloride Feed System Improvements	2021
Influent Sampling Improvements	2021
PS G to PS C Force Main Replacement	2022
Laketon Station Improvements	2022
Field 30 Underdrain Replacement	2022
PS Q to PS G Force Main Replacement	2023
Irrigation Force Main Improvements	2023
Outfall Access Road Paving	2023
Cell 4 Improvements	2023

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date 5-31-17
(no later than 3 years from executed grant date)

The Village of Nashville *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1641-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Scott Decker, Director of Public Works	at 517-852-9571	nashvillewtp@yahoo.com
Name	Phone Number	Email

	5-25-17
Signature of Authorized Representative (Original Signature Required)	Date

Mike Kenyon, Village President
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

for Stormwater Collection Sytem

Prepared for:

Village of Nashville

SAW Project No. 1641-01

NASHVILLE
EST 1869
MICHIGAN

FINAL
May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

1.0 EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In 2014, The Village of Nashville received a SAW Grant from the Michigan Department of Environmental Quality (MDEQ), Project No. 1641-01 to provide financial assistance for the development of this Asset Management Plan (AMP). This report provides the Asset Management Plan (AMP) for the Village's stormwater collection system. Working with Village staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning of the stormwater collection system.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

ASSET MANAGEMENT TEAM

Table 1 Asset Management Team

Village of Nashville

203 N. Main Street P.O. Box 587	Nashville	MI	49073
517-852-9544	clerknashville@yahoo.com		

Contact Person	Department/Role	Title	Email	Phone Number
Mike Kenyon	Village Council	President	clerknashville@yahoo.com	517-977-4022
Scott Decker	Public Works	Director	nashvillewtp@yahoo.com	517-852-9571

ASSET INVENTORY AND CONDITION ASSESSMENT

The stormwater collection system assets consist of approximately 18,730 feet (3.5 miles) of storm sewers and 209 stormwater structures connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets' use and maintenance.

ASSET IDENTIFICATION AND LOCATION

A comprehensive stormwater system asset inventory was developed from available record drawings, field notes, staff knowledge, and site visits; supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new (GIS) database and piping network for archiving, mapping and further evaluation purposes.

CONDITION ASSESSMENT AND EXPECTED USEFUL LIFE

For the Village of Nashville, a comprehensive evaluation of the collection system was performed. NASSCO-MACP structure field based assessments were completed on 144 structures, 69% of the structures. Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on 43% of the gravity pipe. Based on discussions with the stormwater system operations staff, there have been known capacity issues with the Village-owned stormwater system. Recommendations for short-term (1-5 year) and long term (6-20 year) identifies the need for rehabilitation.

LEVEL OF SERVICE

DEFINING THE EXPECTED LEVEL OF SERVICE (LOS)

The LOS for the Village stormwater system is stated as follows:

> *"To provide appropriate stormwater collection, diversion, and conveyance at a minimum cost, consistent with applicable environmental regulations. The Level of Service (LOS) goals are:*
>
> - *Provide adequate stormwater collection system and conveyance capacity for all service areas*
> - *Actively maintain stormwater collection and conveyance system assets in reliable working condition.*
> - *Provide rapid and effective emergency response services to customers.*
> - *Maintenance and operations staff are to be properly trained.*

MEASURING PERFORMANCE

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors: 1) Likelihood (Probability) of Failure and 2) Consequence of Failure. Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic or environmental impact of failure of an asset and on the utility's ability to convey stormwater. CoF categories of the stormwater collection system include:

- Location of asset
- Facilities served by asset
- Size

ASSESSING CRITICALITY

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset of the Village of Nashville using Innovyze-InfoMaster software. InfoMaster is an ArcGIS-based sewer asset management and capital planning software that will compile, analyze and assess Business Risk for each asset and develops a Capital Improvement Plan.

The Business Risk score, also known as Criticality, is calculated for each asset using the following equation:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the stormwater collection system.

OPERATIONS AND MAINTENANCE

A preventative maintenance program to systematically clean and CCTV inspect pipelines to NASSCO-certified standards is critical for a sound stormwater system. The process of cleaning and CCTV inspection of pipelines either with equipment owned by the community or contracted is a relatively inexpensive maintenance effort when compared to rehabilitation efforts. For this reason, it is recommended that at a minimum, all pipelines be cleaned and televised every five years, or that 20% of the system be cleaned and televised annually. Available budget will dictate the frequency or size of yearly projects.

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan with recommendations was prepared for the Village's assets based on the Business Risk evaluation. Data-driven information from the business risk assessment and condition assessment was used to identify and prioritize the capital improvement projects. Short-Term 1-5 year and Long-Term 6-20 year Capital Improvement Plan (CIP) were prepared to address the projected needs for each asset in the system. The 5-year CIP rehabilitation total is $2,455,400.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 5-31-17
(no later than 3 years from executed grant date)

The Village of Nashville *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1641-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: February 2, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Scott Decker, Director of Public Works at 517-852-9571 nashvillewtp@yahoo.com
Name Phone Number Email

5-25-17
Signature of Authorized Representative (Original Signature Required) Date

Mike Kenyon, Village President
Print Name and Title of Authorized Representative

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

for Wastewater System

Prepared for:

Village of Nashville

SAW Project No. 1641-01

EST 1869

FINAL
May 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

Public Act 562 of 2012 authorized money for Stormwater, Asset Management, and Wastewater (SAW) Grant Program. In June 2014, The Village of Nashville received a Stormwater, Asset Management, and Wastewater (SAW) Grant from the Michigan Department of Environmental Quality (MDEQ), project no. 1641-01, to provide financial assistance for the development of a wastewater asset management plan (AMP) for the Village's publicly owned wastewater utility. The assets that comprise the utility include collection system piping and manholes, a wastewater treatment plant, lift station/pump stations and force mains.

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

ASSET MANAGEMENT TEAM

Table 1 Asset Management Team

Village of Nashville			
203 N. Main Street P.O. Box 587	Nashville	MI	49073
517-852-9544	clerknashville@yahoo.com		

Contact Person	Department/Role	Title	Email	Phone Number
Mike Kenyon	Village Council	President	clerknashville@yahoo.com	517-977-4022
Scott Decker	Public Works	Director	nashvillewtp@yahoo.com	517-852-9571

DESIGN

As part of the SAW grant funding, financial assistance was provided for the design phase of the 2016 Wastewater System Improvements Project including the development of the project plan, construction plans and specifications, and revenue system. The revenue system was approved by MDEQ on February 2, 2016. The project plan was approved on March 7, 2016 and plans and specifications were approved on March 21, 2016. Notices to proceed were issued on July 14, 2016

ASSET INVENTORY AND CONDITION ASSESSMENT

The wastewater collection system assets consist of approximately 51,852 feet (9.8 miles) of sanitary sewers (gravity pipe and force mains) and 195 wastewater manholes connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the assets use and maintenance.

The Village of Nashville WWTP currently includes the following treatment processes: one aerated lagoon, two storage/polishing lagoons, and a field irrigation system. Treated effluent is collected in field underdrains and discharged to the Thornapple River in accordance with the NPDES permit. Biosolids settle in the two polishing/storage lagoons for stabilization prior to land application. The average design capacity of the WWTP is 0.159 million gallons per day (mgd). The current annual average flow received by the treatment plant is approximately 0.140 mgd.

There are 4 sanitary sewer lift stations located throughout the wastewater collection system, including the Main Lift Station located at the Department of Public works garage. The stations are either wet well/dry well style or submersible style stations.

ASSET IDENTIFICATION AND LOCATION

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals included a review of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new (GIS) database and piping network for archiving, mapping and further evaluation purposes. The inventory includes over 70 WWTP assets, 90 Lift Station Assets, and 394 Collection System Assets.

CONDITION ASSESSMENT AND EXPECTED USEFUL LIFE

For the Village of Nashville, a comprehensive evaluation of the collection system was performed. NASSCO-MACP manhole field based assessments were completed on 183 manhole structures. Pipeline cleaning and NASSCO-PACP CCTV field based inspections were conducted on 95% of the gravity pipe. Capacity Analysis was modeled for average day and peak hour conditions to identify capacity concerns.

Overall, the condition of the pipes and manholes were in excellent to fair condition. Some of the assets in the collection system are nearly 100 years old while others have been recently installed

Overall, the condition of the assets at the WWTP and Lift Stations range from excellent to fair. Ongoing repairs have helped to maintain the condition of many assets while some assets that were installed during the 1981 construction have not been replaced are now near the end of their useful life due to age or deterioration caused by harsh conditions associated with wastewater treatment.

The major concerns have been addressed during the 2016 SRF project. The remaining deficiencies will be addressed during the long term 6-20 year category.

LEVEL OF SERVICE

DEFINING THE EXPECTED LEVEL OF SERVICE (LOS)

The overall objective of the Village of Nashville Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost, consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWTP.
- Actively maintain collection and treatment system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment plant.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

MEASURING PERFORMANCE

Performance measurements are specific metrics designed to assess whether Level of Service objectives are being met. Evaluations of goals should be completed at least annually to determine if, the provided resources are being used appropriately. Level of Service requirements can be updated to account for changes due to growth, regulatory requirements, and technology.

CRITICAL ASSETS

DETERMINING CRITICALITY

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail:

- Condition of the asset
- Remaining useful life (Age)
- Service History
- Operational status

Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include:

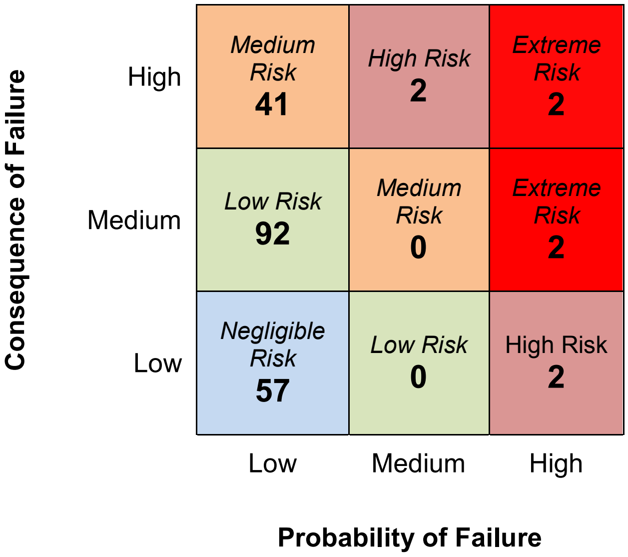
- Proximity to critical environmental features
- Location (Zoning District) of asset
- Facilities served by asset
- Size and location of asset within the utility network
- Type of asset.

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection and treatment systems.

In the Village of Nashville collection system, 8 pipes were identified as High or Extreme risk and should be addressed in the 6-20 Year CIPs. The Collection System AMP Report contains details regarding the rehabilitation strategy for Extreme and High risk pipes.



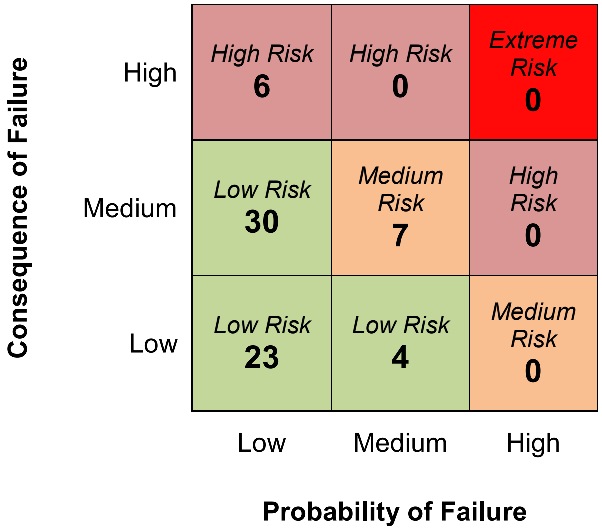
Consequence of Failure

High	*Medium Risk* **41**	*High Risk* **2**	*Extreme Risk* **2**
Medium	*Low Risk* **92**	*Medium Risk* **0**	*Extreme Risk* **2**
Low	*Negligible Risk* **57**	*Low Risk* **0**	High Risk **2**
	Low	Medium	High

Probability of Failure

Figure 1. Business Risk Matrix (Risk Rating) by Number of Gravity Pipes

A summary of the WWTP asset risk ratings is provided in Figure 2. There are no extreme risk items at the WWTP. There are six items that have a high consequence of failure and a low probability of failure and should be closely monitored. These items include the three lagoons, large flow control structure, irrigation underdrains, and aeration diffusers



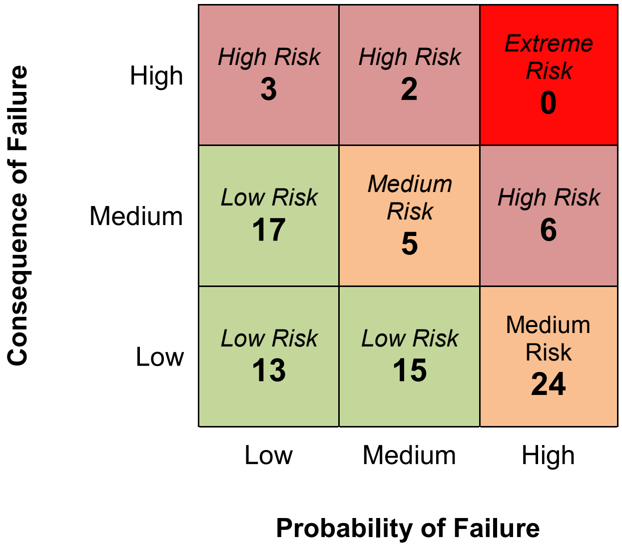
High	*High Risk* **6**	*High Risk* **0**	*Extreme Risk* **0**
Medium	*Low Risk* **30**	*Medium Risk* **7**	*High Risk* **0**
Low	*Low Risk* **23**	*Low Risk* **4**	*Medium Risk* **0**
	Low	Medium	High

Consequence of Failure

Probability of Failure

Figure 2. Business Risk Matrix (Risk Rating) for WWTP Assets

Similarly, a summary of the risk ratings for the lift station assets is provided in Figure 3. None of the lift station assets scored in the "Extreme Risk" rating. Assets with a high-risk rating are addressed in the lift station Capital Improvement Plan.



High	*High Risk* **3**	*High Risk* **2**	*Extreme Risk* **0**
Medium	*Low Risk* **17**	*Medium Risk* **5**	*High Risk* **6**
Low	*Low Risk* **13**	*Low Risk* **15**	Medium Risk **24**
	Low	Medium	High

Consequence of Failure

Probability of Failure

Figure 3. Business Risk Matrix (Risk Rating) for Lift Station Assets

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the Village's wastewater utility assets based on the Business Risk evaluation. CIP recommendations are provided for the collection system, WWTP and lift stations. From the BRE, a short-term (1-5 year CIP) and long-term (6-20 year CIP) was developed.

The Village of Nashville CIP addressed critical assets in a short-term 1-5 year plan with the 2016 SRF Project, and assets to a lesser degree of criticality in a long-term (6-20) year plan.

Table 2 Recommended Wastewater System Capital Improvement Plan for 5 Year Horizon

Project Description	Rehabilitation Fiscal Year					Total
	2016/17	2018	2019	2020	2021	
Collection System Improvements						
2016 Collection System Improvements - SRF Project	$234,000					**$234,000**
Gravity Sewer Replacement						
Gravity Sewer Full Lining						
Manhole Replacement						
WWTF & Lift Station Improvements						
2016 WWTP and LS Improvements - SRF Project	$1,950,000					**$1,950,000**
WWTP						
New Diffused Aeration System						
New Control Structures, Process Piping, and Valves						
Irrigation System Rehabilitation - Building Roof, Pumps and Valves						
Lift Stations						
Main Lift Station - New Pumps, VFDs, Controls, and HVAC						
Lentz St. - New Controls and onsite generator						
School St. - New Controls, pumps and onsite generator						
Kellogg St. - New Controls, pumps and onsite generator						
					Total	**$2,184,000**

Table 3 Recommended Wastewater System Capital Improvement Plan for 6 20 Year Horizon

Project Description	6-20 Year
Collection System Improvements	
Collection Sytem Rehabilitation	**$ 174,400**
WWTF & Lift Station Improvements	
WWTP & LS Rehabilitation	**$ 1,606,000**
Total	**$ 1,780,400**

OPERATIONS, MAINTENANCE AND REPLACEMENT

The Village currently employs a cleaning program to systematically clean all of the gravity sewers and manholes on an annual basis. Ninety-five percent of the Village's collection system was cleaned and CCTV inspected in the preparation of this Asset Management Plan the remaining 5% were newer sewers that were not eligible for SAW funding. Beyond the initial 5 year period, the Village is encouraged to develop an ongoing preventative maintenance program for CCTV inspection meeting NASSCO-certified standards. Pipelines should be cleaned and CCTV inspected on a periodic basis to better ensure that proper operating conditions exist and to plan proactive maintenance where needed. Available budget will dictate the frequency or size of yearly projects.

In addition to the cleaning program described above the Village has annual equipment replacement budget for operating pieces of equipment that have a useful life of 20 years or less.

REVENUE STRUCTURE

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs.

A rate study was conducted as part of the 2016 SRF project. The new rate structure that was adopted on March 10, 2016 meets the Michigan Department of Environmental Quality requirements.

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date May 31, 2017
(no later than 3 years from executed grant date)

The City of Norton Shores *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1502-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

James Murphy, PE at 231.799.6803 or james@nortonshores.org
Name Phone Number Email

5/23/17
Signature of Authorized Representative (Original Signature Required) Date

Gary Nelund, Mayor
Print Name and Title of Authorized Representative

City of Norton Shores
Storm Water Asset Management Plan Summary

City of Norton Shores SAW Grant

4814 Henry Street, Norton Shores, MI 49441

www.nortonshores.org

Contact Information for the grantee:

Mr. Gary L. Nelund, Mayor

Address: 4814 Henry Street, Norton Shores, MI 49441

Phone: 231.798.4391

SAW Grant Project Number: 1502-01

Executive Summary

The City of Norton Shores received a SAW Grant in 2014 to prepare a Storm Water Asset Management Plan (AMP). The Grant agreement indicated the following amounts:

Plan Cost	Grant Amount	Local Match
$975,000	$801,788	$173,212

The Key components in their Asset Management Plan include:

a. Asset Inventory and Condition Assessment

b. Level of Service

c. Criticality of Assets

d. Operation and Maintenance Strategies/Revenue Structure

e. Long-term Funding/Capital Improvement Plan

City of Norton Shores
Storm Water Asset Management Plan Summary

Asset Inventory

Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.

All assets that are functionally or financially significant to the storm water system have been inventoried.

- Collection system manholes, catch basins, and outlets were located using survey quality GPS.
- Detention basins and culverts were located using hand held GPS equipment.

Locations for all assets are recorded in a Geographic Information System (GIS). Data regarding date of installation, material, and other physical characteristics for each asset is incorporated into the GIS geodatabase.
Location of non-pipe assets such as lift station components and other equipment is compiled in a package of inventory spreadsheets and Computerized Maintenance Management System (CMMS) database. These assets were not mapped in GIS.
The GIS, asset spreadsheets, and CMMS will all be used to maintain asset data in the future.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

The condition of collection system piping was documented with either a pole mounted zoom camera (looking down each pipe from the manholes) or with in-line closed circuit television (CCTV) from manhole to manhole. The zoom camera method provided a very economical initial condition assessment of the pipes. Pipes noted to have potentially significant deficiencies were flagged and follow-up inspections were performed with full in-line CCTV.

City of Norton Shores
Storm Water Asset Management Plan Summary

Using the zoom camera data, pipes were rated based on several factors such as joint conditions, wall corrosion, and infiltration. Composite Risk of Failure ratings of 1-5 (5 being the worst) were assigned to each pipe segment.

Pipes inspected with CCTV were rated using the PACP system (Pipeline Assessment Certification Program). The PACP ratings were then used to derive a composite Risk of Failure rating of 1-5 for each pipe.

Percentage of pipes within each rating category

5	4	3	2	1	0*
1.8%	1.3%	6.5%	22.3%	63.0%	5.0%

*Some pipes into/from leaching basins or minor catch basin leads were not rated

Manholes, catch basins, outlets, culverts, and detention basins were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, and structures.

Percentage of manholes/catch basins within each rating category

5	4	3	2	1	0*
0.2%	1.5%	3.5%	46.0%	35.3%	13.5%

*Many inlet structures with no incoming pipes and leaching basins were not rated.

Level of Service Determination

Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What is the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.

We recognize that the people served by our system are more than customers, they are the system owners. Our staff acts as stewards of the system. We have held meetings with our City Council and presented the results of our condition assessments. We have reviewed the costs for meeting various Levels of Service, and reviewed the budget impacts of those options. Based on the input received during those meetings, we have established the following Level of Service Goals:

City of Norton Shores
Storm Water Asset Management Plan Summary

1. Meet Regulatory Requirements
    a. Continue our Illicit Discharge Program
2. Minimize Flooding and Public Hazards
    a. Staff/equip crews sufficiently to perform specific routine maintenance items
    b. Perform regularly scheduled monitoring and maintenance on all of our storm water system assets
    c. Adopt a baseline 10-year 24 hour design storm
3. Provide Capacity for Community Growth
    a. Perform Site Plan Reviews
4. Minimize Life Cycle Costs
    a. Maintain the system so that no more than 5% of our assets are in Poor (RoF – 4) or Failed (RoF – 5) condition (RoF).
5. Maintain Water Quality
    a. Continue our street sweeping and catch basin cleaning program
    b. Maintain our Illicit Discharge Program
    c. Perform regular maintenance on detention basins and outlets to ensure proper function.
    d. Maintain a relationship with community partners such as the Mona Lake Watershed Council, Muskegon County Drain Commissioner's Office, Muskegon Conservation District and Mona Lake Improvement Association along with neighboring communities and utilities.

Criticality of Assets

Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions. The factors considered varied by the asset type and were tailored to identify both physical and functional deficiencies. For example, pipe ratings considered factors such as joint offsets and structural cracking while detention basin ratings considered factors such as sediment accumulation and remaining working volume.

Assets were given a Consequence of Failure (CoF) of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Serve schools/hospitals/major industries/major retail/city buildings
- Are under major roads/freeways/rail lines/airport
- Are adjacent to waterways or significant wetlands

Consequence of Failure and Criticality should not be confused. Criticality is the product of as asset's Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset's action priority.

Criticality ratings were calculated and ranged from 1-25 (25 being the highest priority). We then ran a Jenks Optimization to create 5 primary groupings, each with a rank of 1-5 (5 being highest priority). The final Criticality ratings were considered when the comprehensive Capital Improvement Plan was generated.

Revenue Structure

Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.

The CIP provided refined cost projections for the first 5 years of the financial analysis. The Asset Management System identified the estimated asset investment cost by year for the remaining lifecycle of all assets. The annual investment cost was evaluated and demands on the City's Street and Capital Improvement Funds were reviewed.

Based on that analysis, the CIP was adjusted and funding allocations in the General Fund were adjusted so that both O&M activities and CIP actions could be funded. Presentations to City Council were held to convey the results of the asset evaluation (RoF and Criticality). Funding allocations will be made to provide our desired Level of Service.

Capital Improvement Plan

Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.

Once assets RoF ratings were assigned and actions prioritized using the Criticality ratings, action timelines were predicted for maintenance/repair/replacement. Because the storm water collection system assets share physical space with other asset systems such as wastewater, roadway, and drinking water, it was imperative that the CIP process coordinated actions on these systems.

Scope of work and action timelines for the other asset systems were incorporated based on:

- Wastewater – based on Asset Management Plan work as part of SAW
- Roadway - based on roadway PASER (Pavement Surface Evaluation and Rating) evaluations
- Drinking Water – based on the Water Reliability Study and ongoing Water Asset Management Plan (WAMP)

Individual project scopes for the comprehensive CIP were created to maximize coordination of work on various assets and minimize overall costs. The CIP projects include improvements to the storm water system, wastewater system, drinking water system, and road system. The CIP costs were incorporated into the budget review. A 5-year CIP document was created which will be available to the public.

List of the plan's major identified assets

- 240,200 feet of gravity storm sewer
- 700 manholes and 1,300 catch basins
- 182,800 feet of open drains/major road ditches
- 18 detention basins
- 100 storm water outlets

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date **May 31, 2017**
(no later than 3 years from executed grant date)

The City of Norton Shores, Michigan*(legal name of grantee)* certifies that all wastewater asset management plan (AMP)activities specified in SAW Grant No. 1502-01have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended,are being met. Section 5204e(3)requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]

   If No - Date of the rate methodology approval letter:October 11, 2016.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQor the public upon requestby contacting:

James Murphy, PE at231.799.6803 or james@nortonshores.org
Name Phone Number Email

5/22/17
Signature of Authorized Representative (Original Signature Required) Date

Gary Nelund, Mayor
Print Name and Title of Authorized Representative

City of Norton Shores
Wastewater Asset Management Plan Summary

City of Norton Shores SAW Grant

4814 Henry Street, Norton Shores, MI 49441

www.nortonshores.org

Contact Information for the grantee:

Mr. Gary L. Nelund, Mayor

Address: 4814 Henry Street, Norton Shores, MI 49441

Phone: 231.798.4391

SAW Grant Project Number: 1502-01

Executive Summary

The City of Norton Shores received a SAW Grant in 2014 to prepare a Wastewater Asset Management Plan (AMP). The Grant agreement indicated the following amounts:

Plan Cost	Grant Amount	Local Match
$1,328,720	$1,092,669	$236,051

The Key components in their Asset Management Plan include:

- a. Asset Inventory and Condition Assessment
- b. Level of Service
- c. Criticality of Assets
- d. Operation and Maintenance Strategies/Revenue Structure
- e. Long-term Funding/Capital Improvement Plan

City of Norton Shores
Wastewater Asset Management Plan Summary

Asset Inventory

Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.

All assets that are functionally or financially significant to the wastewater system have been inventoried.

- Collection system manholes were located using survey quality GPS.
- Lift stations and appurtenances were located using hand held GPS equipment.
- Individual sanitary sewer services from the main to the Right-of-Way line have been mapped from in-line televising records, record drawings, or individual customer service records.

Locations for assets that have fixed geographic locations such as pipes, manholes, lift stations and major fixed equipment are recorded in a Geographic Information System (GIS). Data regarding date of installation, material, and other physical characteristics for each asset is incorporated into the GIS geodatabase.

Location of non-pipe assets such as lift station components and other equipment is compiled in a package of inventory spreadsheets and Computerized Maintenance Management System (CMMS) database. These assets were not mapped in GIS.

The GIS, asset spreadsheets, and CMMS will all be used to maintain asset data in the future.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

The condition of collection system piping was documented with either a pole mounted zoom camera (looking down each pipe from the manholes) or with in-line closed circuit television (CCTV) from manhole to manhole. The zoom camera method provided a very economical initial condition assessment of the pipes. Pipes noted to have potentially significant deficiencies were flagged and follow-up inspections were performed with full in-line CCTV.

City of Norton Shores
Wastewater Asset Management Plan Summary

Using the zoom camera data, pipes were rated based on several factors such as joint conditions, wall corrosion, and infiltration. Composite Risk of Failure ratings of 1-5 (5 being the worst) were assigned to each pipe segment.

Pipes inspected with CCTV were rated using the PACP system (Pipeline Assessment Certification Program). The PACP ratings were then used to derive a composite Risk of Failure rating of 1-5 for each pipe.

Percentage of pipes within each rating category

5	4	3	2	1	0
0.6%	1.9%	2.3%	24.0%	71.1%	0.0%

Manholes were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, and structures.

Percentage of manholes within each rating category

5	4	3	2	1	0
0.1%	0.2%	1.3%	9.5%	85.7%	3.1%

Equipment within lift stations were rated on a scale of 1-5 based on factors relating to physical condition and operating condition. Generally, the lift station equipment is currently in good condition with no major capital improvements needed at this time.

Percentage of Lift Stations within each rating category

5	4	3	2	1
2.3%	46.5%	44.2%	7.0%	0.0%

City of Norton Shores
Wastewater Asset Management Plan Summary

Level of Service Determination

Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.

We recognize that the people served by our system are more than customers, they are the system owners. Our staff act as stewards of the system. We have held meetings with our City Council and presented the results of our condition assessments. We have reviewed the costs for meeting various Levels of Service, and reviewed the rate impacts of those options. Based on the input received during those meetings, we have established the following Level of Service Goals:

1. Meet Regulatory Requirements
    a. Minimize opportunities for Sanitary Sewer Overflows
2. Minimize Service Interruptions
    a. Staff/equip crews sufficiently to perform specific routine maintenance items
    b. Repair/replace assets as required to limit emergency responses to less than 12 per year
3. Minimize Public Hazards
    a. Staff/equip emergency response services for 24 hour per day service and 30 minute response times
    b. Limit service interruptions to less than 6 hours
    c. Minimize Sanitary Sewer Failures, Overflows or Backups to no more than 5 per 100 miles of pipe. With 134 miles of pipe in our system, we still want to keep it to no more than 5 Sewer Failure, Overflow or Backup Events.
4. Manage Storm Water Inflow and Ground Water Infiltration
    a. Monitor I/I and implement CIP projects to meet MDEQ/EPA guidelines
5. Provide Capacity for Community Growth
6. Minimize Life Cycle Costs
7. Foster Good Working Relationships with the Cities of Muskegon and Muskegon Heights, Fruitport Charter Township and the Muskegon County Wastewater Management System.

City of Norton Shores
Wastewater Asset Management Plan Summary

Criticality of Assets

Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions. The factors considered varied by the asset type and were tailored to identify both physical and functional deficiencies. For example, pipe ratings considered factors such as joint offsets and structural cracking while lift station pumps considered factors such as design pumping rate vs actual pumping rate.

Assets were given a Consequence of Failure (CoF) of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Serve schools/hospitals/major industries/major retail/city buildings
- Are under major roads/freeways/rail lines/airport
- Are adjacent to waterways or significant wetlands

Consequence of Failure and Criticality should not be confused. Criticality is the product of as asset's Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset's action priority.

Criticality ratings were calculated and ranged from 1-25 (25 being the highest priority). We then ran a Jenks Optimization to create 5 primary groupings, each with a rank of 1-5 (5 being highest priority). The final Criticality ratings were considered when the comprehensive Capital Improvement Plan was generated.

City of Norton Shores
Wastewater Asset Management Plan Summary

Revenue Structure

Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a "Test Year" was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.

The customer base was reviewed, including the number of billable customers and volumetric sales. Other operating and non-operating revenues were also evaluated. Prediction of customer and volume counts were made including trending in system utilization, projection of operating costs, and anticipated inflation by expense category. Refinancing and/or restructuring possibilities were also explored.

The CIP provided refined cost projections for the first 5 years of the financial analysis. The Asset Management System identified the estimated asset investment cost by year for the remaining lifecycle of all assets. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. Based on that analysis, rate adjustment options were identified. It was determined that the current rate structure was sufficient to cover O&M activities and to fully implement the desired Capital Improvement Plan (CIP). Presentations to City Council were held to convey the results of the asset evaluation (RoF and Criticality).

Capital Improvement Plan

Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.

Once assets RoF ratings were assigned and actions prioritized using the Criticality ratings, action timelines were predicted for maintenance/repair/replacement. Because the wastewater collection system assets share physical space with other asset systems such as storm water, roadway, and drinking water, it was imperative that the CIP process coordinated actions on these systems.

Scope of work and action timelines for the other asset systems were incorporated based on:

- Storm Water – based on Asset Management Plan work as part of SAW
- Roadway - based on roadway PASER (Pavement Surface Evaluation and Rating) evaluations
- Drinking Water – based on the Water Reliability Study and ongoing Water Asset Management Plan (WAMP)

Individual project scopes for the comprehensive CIP were created to maximize coordination of work on various assets and minimize overall costs. The CIP projects include improvements to the wastewater system, storm water system, drinking water system, and road system. The CIP costs were incorporated into the revenue structure review. A 5-year CIP document was created which will be available to the public.

List of the plan’s major identified assets

- 43 lift stations
    - Current replacement t value of $16,820,000
- 11 Miles (58,239 feet) of sanitary force main
    - Current replacement value of $3,000,000
- 134 Miles (707,555 feet) of gravity sanitary sewer
    - Current replacement value of $189,570,000

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 05 / 31 / 2017
(no later than 3 years from executed grant date)

The The County of Oakland *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1100-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: 11 / 09 / 2017 .
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Carrie Cox P.E.	at 1-(248)-470-1314	coxc@oakgov.com
Name	Phone Number	Email

5-10-17

Signature of Authorized Representative (Original Signature Required) Date

MICHAEL GINGELL, CHAIRPERSON, OAKLAND COUNTY BOARD OF COMMISSIONERS

Print Name and Title of Authorized Representative

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date 05 / 31 / 2017
(no later than 3 years from executed grant date)

The The County of Oakland *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1100-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Jim Wineka P.E.	at 1-(248)-858-1901	winekaj@oakgov.com
Name	Phone Number	Email

5-10-17
Signature of Authorized Representative (Original Signature Required) Date

MICHAEL GINGELL, CHAIRPERSON, OAKLAND COUNTY BOARD OF COMMISSIONERS
Print Name and Title of Authorized Representative

Oakland County Water Resources Commissioner
Common to All, SAW Grant No. 1100-01
Wastewater and Stormwater Systems Asset Management Program

Oakland County's office of the Water Resources Commissioner (WRC) owns several systems/facilities and also contracts to operate and/or maintain additional systems on behalf of individual Cities, Villages, and Townships (CVTs). Each entity has a separate fund established to receive any revenues and pay for any expenses that is managed by Oakland County's Fiscal Services department. WRC currently manages 485 separate funds.

WRC applied for and received a grant to further develop its Asset Management Program for its sanitary, combined, and stormwater systems through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Wastewater and Asset Management (SAW) program. Because the SAW program was funded through monies appropriated for water quality, other WRC infrastructure systems, such as drinking water, were not eligible for funding through the grant.

The individual systems owned and/or operated by WRC received grant funding to develop individual asset management plans specific to a given community/system. The report includes work performed under WRC's Common to All Program grant, which includes a strategic framework to provide standards, guidelines, templates, workflows and other materials for the individual asset management plans. It is also designed to be robust and scalable to allow for drinking water, lake level and other types of systems to be eventually incorporated into the Program through other funding sources.

The WRC has various tools used to manage its assets, including a GIS geodatabase, collaborative asset management system, hydraulic models, condition assessment methods, risk/prioritization models, capacity studies, asset deterioration models, and an operating and capital improvement project prioritization model. These tools are used to guide the short and long-term strategies for WRC to operate the various systems in a sustainable manner that meets the required level of service, with a focus on prioritizing assets that are most critical and being cost-effective.

The following is a summary as required by the grant and includes a brief discussion of the five major AMP components, a list of the plan's major identified assets, and contact information for the grant.

A. Asset Inventory and Condition Assessment:

WRC utilized its existing Geographic Information System (GIS) geodatabase as the primary means to inventory and map the assets in each fund. The geodatabase records the attributes associated with each asset, such as installation date (age), size, material, along with other information need for a given asset type. As part of WRC's Common to All SAW grant, the overall schema of the GIS geodatabase was reviewed and modified to reflect the level of data granularity and attribution required for additional analysis. The geodatabase is part of WRC's Collaborative Asset Management System (CAMS) that allows for maintenance history and costs to be tracked on an asset and/or fund level.

Condition assessment tools and protocols were developed to allow for efficient and consistent recording of asset condition. For sanitary, combined, and stormwater sewer assets, a NASSCO-compliant software program was purchased to store data collected during sewer televising. The data stored can be shared with the existing CAMS system. Inspection work orders were created in the CAMS system to assist with collection and storage of condition assessment data for other types of assets, such as manholes and other collection system structures, and for most vertical asset types, such as pumps, valves, structures, etc.

B. Level of Service:

WRC developed an overall level of service goal that will be used as a starting point for each fund. Considerations into the level of service included compliance to regulations, operation, impact to the public and environment, safety and security, and are included in the overall business risk evaluation.

Common to All Level of Service Goals

	WRC Base Level of Service Goals	Measurables
Financial Viability and Impact	Emergency repairs can be repaired within Utility Reserve Budgets of the system	Exceedances of reserve budgets
Public Confidence/ System Service Impact	Minimal to some loss of service or impact on other services for less than four hours. No sewer system or basement backups. Minor disruption (e.g., traffic, dust, noise).	Number of service interruptions, complaints, and backups
Regulatory Compliance	No state permit violations. Comply with All MDEQ policies.	Number of violations
Safety of Public and Employees	Non-reportable injuries. No lost-time injuries or medical attention required. No impact to public health	Number of injuries and any public health advisories
Redundancy	Comply with 10 State Standards	Number of violations
BRE score	70% of assets have a BRE less than 15	System risk score
Staffing	Staffing levels and training maintained to meet level of service	Number of open positions, annual training hours

The Probability of Failure (POF) and Consequence of Failure (COF) scoring matrices used in the criticality and risk analysis were developed using the strategic LOS guidance. Progress toward the goals are measured through the CAMS analytic data, and is reviewed as part of the annual Long-Range Planning (LRP) process with WRC and its customers.

The level of service work performed as part of the Common to All Program included several other tasks relevant to the strategic operation of the office of the WRC as it relates to optimizing maintenance strategies and management of its various infrastructure systems.

C. Criticality of Assets:

WRC purchased and implemented a new software package (Power Plan AMP, formerly known as Riva) as part of the grant work to assist with prioritization of cost-effective maintenance strategies and capital improvement planning. The software syncs with both the GIS geodatabase and the CAMS systems.

The Decision Support portion of Power Plan uses the asset attribution and maintenance history to estimate the probability of failure and consequence of failure of individual assets, model future asset deterioration, and make recommendations for treatment strategies to cost-effectively extend asset life. The Capital Planning portion of Power Plan provides for creation of projects for rehabilitation and/or replacement of assets in order to manage the overall Business Risk Evaluation (BRE).

The grant work included developing specification sheets for each asset type to define features such as useful life, anticipated failure type, replacement cost, etc. and decision trees that are used to develop maintenance and replacement strategies and evaluate risk against the desired level of service.

D. O&M Strategies and Revenue Structure:

The OCWRC worked with Oakland County's Fiscal Services staff to determine if the current rate structures were sufficient to meet the current needs for the management of the wastewater and stormwater systems, and to plan for any adjustments that may be required to meet anticipated future expenses. The Power Plan software provides estimated annual maintenance and capital needs for each fund, which is then reviewed by WRC staff and the local community. The SAW Grant does not require a review of stormwater system rate structures because most stormwater systems in Michigan do not have a dedicated source of revenue. However, estimated costs are presented for WRC budgetary purposes.

In order to keep the WRC Asset Management Program sustainable into the future, it will require staff time and incur other expenses, such as software licensing. Therefore each fund that participates in the Program will be charged a small annual fee. A budget for the Program was prepared and a demonstration of rate sufficiency was submitted and approved the MDEQ as part of the SAW Grant requirements in October 2016.

E. Long Term Funding/Capital Improvement Plan:

Capital Improvement Plans identify system upgrade, rehabilitation and replacement needs for the future, typically over a period of 20 years, with greater emphasis on the first five years of the plan. Power Plan will be used to model asset deterioration and assist with identifying capital improvement needs for each fund in the near and long term.

F. Contact Information:

A signed Certification of Project Completeness form is enclosed. Contact information for the grantee including name, address, and phone number is included below:

Michael Gingell 1200 North Telegraph Rd Pontiac, MI 48341 248-858-0581	Tim Prince, P.E. 1 Public Works Drive Waterford, MI 48328 248-858-0958	Carrie Cox, P.E. 1 Public Works Drive Waterford, MI 48328 248-858-0958	Dan Mitchell, P.E. 555 Hulet Drive Bloomfield Hills, MI 48302 248-454-6300

G. Grant Amount:

The total amount of the SAW application was $2,350,000
With a total SAW grant amount of $1,929,167
With a match amount provided by Oakland County of $420,833

Summary of Assets Owned or Managed by OCWRC included in the Common to All AMP:

Act 342 Systems

- Pontiac Sewage Disposal System (Pontiac SDS)
- Walled Lake-Novi (WLN) WWTP
- Evergreen Farmington Sewage Disposal System (EFSDS)
- Huron Rouge Sewage Disposal System (HRSDS)
- Clinton-Oakland Sewage Disposal System (COSDS)

Chapter 20 Drainage Districts

- Clinton River Water Resource Recovery Facility (CRWRRF) Drainage District
- George W. Kuhn Retention Treatment Facility (GWK RTF) Drainage District
- Birmingham Retention Treatment Basin (RTB) Drainage District
- Acacia Park Retention Treatment Basin (RTB) Drainage District
- Bloomfield Village Retention Treatment Basin (RTB) Drainage District
- Pontiac Clinton Relief Drain #1 Drainage District (PCR #1)
- Augusta Drain Drainage District
- Henry Graham Drain Drainage District
- Edwards Relief Drain Drainage District

City, Village and Township (CVT) Systems

The followings systems are local systems that serve an individual CVT. WRC has entered into contracts with the local community to operate and/or maintain these systems. WRC acts as a contractor to the CVT for management of these local systems.

- City of Walled Lake
- Village of Beverly Hills
- City of Orchard Lake Village
- City of Novi
- City of Bingham Farms
- Oxford Township
- City of Keego Harbor
- Village of Franklin
- Royal Oak Township
- Oakland Township
- City of Farmington Hills
- Commerce Township

Additional Systems

The following systems are under the jurisdiction of other chapters of the Drain Code, or other regulatory authorities.

- Oakland-Macomb Interceptor Drainage District (OMID.)
- Oakland County Campus Facilities
- Other WRC Drains

The following is a summary of sanitary, storm and combined sewerage system assets currently in the OCWRC GIS geodatabase. While the inventory of collection system assets (sanitary, storm and combined sewers and associated structures) is nearly complete, it is anticipated the count of vertical assets (located at facilities such as pumping stations, RTBs and treatment plants) will increase as those inventories are completed as part of the individual systems' asset management plans:

SUMMARY OF ASSETS IN OCWRC GIS GEODATABASE:

Collection System Sewers by Material:

Sewer Assets by Material	Length (FT)	Segment Count
ABS Truss	122,853	686
Asbestos Cement	4,489	18
Brick or Block	8,221	33
C-14	116,753	544
Cast Iron	11,876	64
Clay or VCP	1,523,320	7,011
Concrete	34,856	149
Corrugated Metal	8,747	20
Ductile Iron	155,410	707
HDPE	473,961	2,584
Non-reinf Concrete	240,816	1,143
PVC	876,920	4,621
Reinforced Concrete	970,005	4,038
Truss	156,516	786
Unknown	2,902,626	13,074
Grand Total	**7,607,368**	**35,478**

Collection System Sewers by Diameter:

Sewer Assets by Diameter	Length (FT)	Segment Count
Non-Circular	30,546	87
Unknown	6,789	68
8" or less	3,844,699	19,984
10" to 15"	1,960,713	9,354
16" to 22"	534,871	2133
24" to 36"	563,614	2188
39" to 48"	268,552	810
54" to 72"	237,917	614
78" to 96"	65,794	127
101" to 120"	47,680	53
132" to 153"	46,193	60
Grand Total	**7,607,368**	**35,478**

Collection System Structures:

Structure Type			
Combined	**Count**	**Sanitary**	**Count**
AccessPoint	59	AccessPoint	1,009
Cleanout	14	Cleanout	1,111
FlowRegulator	5	FlowRegulator	22
LiftStation	1	LiftStation	146
Manhole	1,359	Manhole	29,757
Inlet	159	SystemValve	1,373
		GrinderPumpStation	2,596
Grand Total	**37,611**		

Vertical Assets:

Asset Class	Count
Building & Support Total	535
Electrical and I&C Equip Total	1,284
Piping System Total	71
Treatment Plant Equip Total	1,672
Valve Total	319
Grand Total	**3,881**

Paw Paw Lake Area WWTP
Asset Management Plan
Summary as required under Section 603 of Public Act 84 of 2015

Prepared for:

PAW PAW LAKE AREA WWTP
COLOMA, MICHIGAN
BERRIEN COUNTY
PPLWWTP@ATT.NET

Prepared by:

JONES & HENRY ENGINEERS, LTD.

Date:
MAY 23, 2017

Prepared using:

1 Asset Inventory and Condition Assessment

The Asset Management Plan for the Paw Paw Lake Area (PPLA) Wastewater Treatment Plant (WWTP) included an Asset Inventory and Condition Assessment for all of the facilities, infrastructure, and equipment that provide the framework for the processes of the wastewater system. The Asset Management Team of wastewater operators from the PPLA WWTP and engineers from Jones & Henry Engineers, Ltd. (J&H) identified the major components of the wastewater system and collected information on each of them to establish an Asset Inventory including what assets the Utility owns, where they are located, when they were constructed, and what improvements or changes have been made to them. The Team went on to evaluate the state of all of the assets to establish their condition, what their remaining useful life is, and what their current replacement value.

The inventory and condition assessment were recorded using Catch Up Program for Small Systems (CUPSS), asset management software developed by the US Environmental Protection Agency. The PPLA WWTP Critical Asset Inventory is summarized in Table 1-1 and includes both the Asset Inventory and Condition Assessment in accordance with CUPSS guidelines. The Condition rating ranks each asset based on age and physical functionality and the Consequence of Failure estimates the degree of impact on utility service if the asset should fail. These two ratings are compared in a matrix to establish the Risk assessment and ultimately the Capital Improvement Plan.

Table 1-1. Paw Paw Lake Area WWTP Critical Asset Inventory

Asset	Asset Type	Year Installed	Condition	CoF	Capacity	Risk	Scheduled Replacement Date
Final Clarifiers (2)	Treatment Equipment	06/01/1973	Fair (Average)	Moderate	Oversized	High Risk – Immediate Attention	12/31/2018
MCC	Motor Controls / Drives	01/01/1975	Fair (Average)	Major	Fullsized	High Risk – Immediate Attention	12/31/2020
Main Building	Buildings	01/01/1975	Fair (Average)	Minor	Oversized	Medium Risk – Aggressive Monitoring	12/31/2020
Chlorine Contact Chamber	Treatment Equipment	01/01/1975	Fair	Major	Fullsized	High Risk – Immediate Attention	12/31/2022
Pump Buildling A	Pumping Equipment	01/01/1975	Fair (Average)	Catastrophic	Oversized	High Risk – Immediate Attention	12/31/2022

Asset	Asset Type	Year Installed	Condition	CoF	Capacity	Risk	Scheduled Replacement Date
Flow Balancing Manhole A	Sewers	06/01/1973	Fair (Average)	Moderate	Fullsized	High Risk – Immediate Attention	12/31/2022
Flow Balancing Manhole B	Sewers	06/01/1973	Fair (Average)	Moderate	Fullsized	High Risk – Immediate Attention	12/31/2022
Lime System	Solid Waste Handling & Disposal	01/12/2008 (Updated)	Fair (Average)	Major	Fullsized	Medium Risk – Aggressive Monitoring	12/31/2026
Sludge Pump	Pumping Equipment	01/01/1975	Fair (Average)	Moderate	Fullsized	High Risk – Immediate Attention	12/31/2028
Sludge Supernatant Pipe	Sewers	06/01/1973	Fair (Average)	Moderate	Fullsized	High Risk – Immediate Attention	12/31/2028
Sludge Thickener	Dewatering Equipment	06/01/1975	Excellent	Minor	Fullsized	Medium Risk – Aggressive Monitoring	12/31/2040
Trickling Filters	Treatment Equipment	06/01/1973	Fair (Average)	Moderate	Oversized	High Risk – Immediate Attention	12/31/2032
Pump Building C	Pump Housing	01/01/1975	Fair (Average)	Major	Fullsized	Medium Risk – Aggressive Monitoring	12/31/2028
Pump Building B	Pump Housing	01/01/1975	Fair (Average)	Major	Fullsized	Medium Risk – Aggressive Monitoring	12/31/2028
SW Primary Settling Tank	Treatment Equipment	01/01/1975	Fair (Average)	Moderate	Oversized	Medium Risk – Aggressive Monitoring	12/31/2040
Headworks	Treatment Equipment	06/01/1973 and 12/31/2010	Good	Moderate	Fullsized	Medium Risk – Aggressive Monitoring	12/31/2034

Asset	Asset Type	Year Installed	Condition	CoF	Capacity	Risk	Scheduled Replacement Date
Collection System	Sewers	06/01/1973	Fair (Average)	Major	Oversized	Medium Risk – Aggressive Monitoring	12/31/2036
Plant Sewer System	Sewers	06/01/1973	Fair (Average)	Moderate	Fullsized	Medium Risk – Aggressive Monitoring	12/31/2036
Backup Generator	Generators	08/01/2008	Excellent	Moderate	Fullsized	Medium Risk – Aggressive Monitoring	12/31/2048
SE Primary Settling Tank	Treatment Equipment	06/01/1973	Fair (Average)	Moderate	Oversized	Medium Risk – Aggressive Monitoring	12/31/2055

The Michigan American Water Works Association and Michigan Water Environment Association have teamed up to provide a similar ranking system for determining the “Risk” associated with each asset, calling it instead the Business Risk Score. This evaluation takes the “Probability of Failure,” “Criticality,” and “Redundancy” to establish the Business Risk and ultimately the need for improvement for each asset. The Business Risk Evaluation for PPLA WWTP is provided in Appendix A.

2 Level of Service Agreement

The mission statement defines the goals of the PPLA WWTP and is the guide for its level of service agreements. The Paw Paw Lake Area WWTP mission statement is as follows:

We commit to improving and maintaining the public health protection and performance of our wastewater plant and collection system utility assets, while minimizing the long-term cost of operating those assets. We strive to make the most cost-effective renewal and replacement investments and provide the highest-quality customer service possible.

The goal of the PPLA WWTP is to confirm wastewater is treated effectively and efficiently by providing services that meet or exceed customer expectations and comply with federal regulations. This section describes the Utility's Level of Service goals and the key performance targets for each of the level of service goals for present and future performance. The level of service describes the characteristics of the utility's performance such as "how much," "of what nature," and "how frequently" about the service, and the performance target defines how each level of service will be measured. The utility's progress toward meeting those goals will be reported annually.

The levels of service determine the amount of funding that is required to maintain, renew, and upgrade the wastewater infrastructure to provide the customers with the levels of service specified. The Level of Service goals are defined across the four service areas identified below and a performance target is defined for each goal as a measure for the Level of Service goal. Changes to the levels of service goals and how the utility addresses the issues will affect funding requirements and how well the utility can provide the proper service to the community. The target levels of service that the utility has chosen to meet are presented in Table 2-1. This table lists the Level of Service goals and measures the success of each goal.

Table 2-1. Level of Service Goals

Service Area	Levels of Service		Achieved
	Goal	Performance Targets	
NPDES Permit and MIOSHA compliance	No permit violations, notices, or orders.	Minor permit limit violations only.	Regular NPDES Permit and MIOSHA compliance.
Operation and maintenance program execution	Performance recordkeeping, preventative maintenance, appearance.	No record system, preventative maintenance ongoing, Plant well maintained.	Regular operation and maintenance performed as scheduled and in accordance with O&M Manual.
Wastewater training	Operator in Charge with Level B Operator licence. Meet licensing training requirements.	Superintendent and one Operator with B license. Meeting training requirements.	Wastewater training requirements met.
Revenues and expenses adequate to perform O&M and CIP needs and requirements	Maintain emergency funds equivalent to 6 months operating expenses. Balanced budget, and operate within budget. Adequate funding for CIP.	Balanced budget, performing O&M within budget, and adequate funds available for minimal CIP.	Revenues and expenses adequate to perform O&M and CIP needs and requirements. Will need rate increase to accommodate future CIP.

3 Criticality of Assets

Some assets are more important than others in making sure that wastewater is treated effectively. Therefore, the asset management team used the CUPSS software to identify and prioritize critical assets and to improve practices used for routine operation and maintenance. This process includes reviewing all assets and recording their conditions (likelihood of failure), criticality to the utility (consequence of failure), and redundancy (the number of back-up assets to help support each asset). This process will ensure that the utility delivers the level of service described in the previous section. Table 3-1 lists assets critical to maintain the performance of the utility.

Table 3-1. Paw Paw Lake Area WWTP Critical Asset Inventory

Asset	Asset Type	Year Installed	Condition	CoF	Capacity	Risk	Scheduled Replacement Date
Final Clarifiers (2)	Treatment Equipment	06/01/1973	Fair (Average)	Moderate	Oversized	High Risk – Immediate Attention	12/31/2018
MCC	Motor Controls / Drives	01/01/1975	Fair (Average)	Major	Fullsized	High Risk – Immediate Attention	12/31/2020
Main Building	Buildings	01/01/1975	Fair (Average)	Minor	Oversized	Medium Risk – Aggressive Monitoring	12/31/2020
Chlorine Contact Chamber	Treatment Equipment	01/01/1975	Fair	Major	Fullsized	High Risk – Immediate Attention	12/31/2022
Pump Buildling A	Pumping Equipment	01/01/1975	Fair (Average)	Catastrophic	Oversized	High Risk – Immediate Attention	12/31/2022
Flow Balancing Manhole A	Sewers	06/01/1973	Fair (Average)	Moderate	Fullsized	High Risk – Immediate Attention	12/31/2022
Flow Balancing Manhole B	Sewers	06/01/1973	Fair (Average)	Moderate	Fullsized	High Risk – Immediate Attention	12/31/2022
Lime System	Solid Waste Handling & Disposal	01/12/2008 (Updated)	Fair (Average)	Major	Fullsized	Medium Risk – Aggressive Monitoring	12/31/2026

Asset	Asset Type	Year Installed	Condition	CoF	Capacity	Risk	Scheduled Replacement Date
Sludge Pump	Pumping Equipment	01/01/1975	Fair (Average)	Moderate	Fullsized	High Risk – Immediate Attention	12/31/2028
Sludge Supernatant Pipe	Sewers	06/01/1973	Fair (Average)	Moderate	Fullsized	High Risk – Immediate Attention	12/31/2028
Sludge Thickener	Dewatering Equipment	06/01/1975	Excellent	Minor	Fullsized	Medium Risk – Aggressive Monitoring	12/31/2040
Trickling Filters	Treatment Equipment	06/01/1973	Fair (Average)	Moderate	Oversized	High Risk – Immediate Attention	12/31/2032
Pump Building C	Pump Housing	01/01/1975	Fair (Average)	Major	Fullsized	Medium Risk – Aggressive Monitoring	12/31/2028
Pump Building B	Pump Housing	01/01/1975	Fair (Average)	Major	Fullsized	Medium Risk – Aggressive Monitoring	12/31/2028
SW Primary Settling Tank	Treatment Equipment	01/01/1975	Fair (Average)	Moderate	Oversized	Medium Risk – Aggressive Monitoring	12/31/2040
Headworks	Treatment Equipment	06/01/1973 and 12/31/2010	Good	Moderate	Fullsized	Medium Risk – Aggressive Monitoring	12/31/2034
Collection System	Sewers	06/01/1973	Fair (Average)	Major	Oversized	Medium Risk – Aggressive Monitoring	12/31/2036
Plant Sewer System	Sewers	06/01/1973	Fair (Average)	Moderate	Fullsized	Medium Risk – Aggressive Monitoring	12/31/2036
Backup Generator	Generators	08/01/2008	Excellent	Moderate	Fullsized	Medium Risk – Aggressive Monitoring	12/31/2048
SE Primary Settling Tank	Treatment Equipment	06/01/1973	Fair (Average)	Moderate	Oversized	Medium Risk – Aggr. Monit.	12/31/2055

4 Operation and Maintenance Strategies/Revenue Structure

O&M consists of preventive and emergency/reactive maintenance. In this section, the strategy for O&M varies by the asset, criticality, condition, and operating history. The risk matrix in My Check Up Asset Report (part of the CUPSS software package) provides the utility's assets and identifies the risk value for each asset and is used as the basis for establishing a maintenance program as a way to make sure that the utility addresses the highest risk assets. In addition, a maintenance program addresses the level of service performance objectives to ensure that the utility is running at a level acceptable to the customer.

Unexpected incidents could require changing the maintenance schedule for some assets. This is because corrective action must be taken in response to unexpected incidents, including those found during routine inspections and O&M activities. Utility staff will record condition assessments when maintenance is performed, at established intervals, and during scheduled inspections. Assets rated at the top of the priority ranking are presented below with the maintenance strategies. As an asset is repaired or replaced, its condition will improve and therefore can reduce the overall risk of the asset failing. The maintenance strategy will be revisited annually.

Preventive maintenance is the day-to-day work necessary to keep assets operating properly, which includes the following:

1. Regular and ongoing annual tasks necessary to keep the assets at their required service level.
2. Day-to-day and general upkeep designed to keep the assets operating at the required levels of service.
3. Tasks that provide for the normal care and attention of the asset including repairs and minor replacements.

Preventive maintenance is carried out because of a planned maintenance program (such as regularly scheduled asset repairs) and historically problematic operations (such as blockages and root infestation). Equipment must be maintained according to manufacturer's recommendations to achieve maximum return on investment. By simply following the manufacturer's suggested preventive maintenance, the useful life of equipment can be increased 2 to 3 times when compared to running until failure. Communities that have eliminated preventive maintenance practices from their operating budget can achieve positive returns from a relatively small additional investment.

Equipment maintenance and lubrication schedules are set up based on best management practices and manufacturer's recommended servicing intervals. The PPLA WWTP has historically performed all of its required maintenance and has not deferred any tasks because of inadequate funding or staffing. If there were O&M responsibilities that had to be deferred or will have to be deferred in the future, the required staffing, equipment, and other requirements must be projected into future operating budgets to achieve life expectancy projected by the manufacturer or engineer.

Reactive maintenance is often carried out because of customer requests or sudden asset failures. The required service and maintenance to fix the customer's issue(s) is identified by staff inspection.

Deferred maintenance is any maintenance, repair, restoration, or replacement work that should have been accomplished before now, and that has not been performed. Generally, PPLA performs its required preventative and emergency maintenance on a regular basis and as needed. Valve/gate operation and maintenance could be improved, however. There are also several upgrades to equipment, facilities, and infrastructure that are delayed until failure to reduce overall costs. Waiting on these upgrades may increase emergency costs.

Staff does an excellent job of maintaining equipment beyond its life expectancy. Additional funds could be allocated to maintenance to accommodate for exceeding the design life of these items and literally living on the edge by keeping old capital items in service. This additional expenditure could reduce the need for emergency repairs and may actually offset that budget. Six months operating expenses should be reserved for emergencies. If that amount is maintained in reserve, as it has been historically, the additional maintenance budget annually would not be necessary.

The PPLA WWTP submitted a Rate Methodology to the Michigan Department of Environmental Quality. It provides the projected annual revenues and expenses for the Utility with the objective of presenting a balanced budget with no funding gap. If there are not adequate revenues to meet expenses, the utility has provide a financial plan for alleviating the funding gap with a rate analysis and schedule for eliminating the deficit. This is especially important to consider with the development of O&M requirements and a Capital Improvement Plan (CIP) through the Asset Management Plan that has been prepared for PPLA WWTP.The Rate Methodology for PPLA WWTP is shown in Appendix B.

5 Capital Improvement Plan/Long-term Funding

The Paw Paw Lake Area WWTP capital improvement program (CIP) plan is the description of future capital projects. Capital improvement projects generally create a new asset that previously did not exist or they upgrade and improve an existing capacity. The projects can result from growth or environmental needs, such as the following:

1. Expenditure that purchases or creates a new asset or in any way improves an asset beyond its original design capacity.
2. Upgrades that increase the capacity of the asset.
3. Construction designed to produce an improvement in the standard operation of the asset beyond its present capacity.

In addition to capital improvement projects, the asset management team has reviewed and is establishing a renewal (or rehabilitation) strategy. Renewal expenditure is anything that does not increase the asset's design capacity but restores an existing asset to its original capacity. Any improvement projects that require more than simply restoring an asset to its original capacity are deemed to be a renewal project, such as the following:

1. Activities that do not increase the capacity of the asset (i.e., upgrade and enhance the assets restoring them to their original size, condition, and capacity).
2. Rehabilitation involving improvements and realignment or restores the assets to a new or fresh condition.

In making renewal decisions, the utility considered several categories other than the normally recognized physical, failure or breakage. Such renewal decisions include the following:

1. Structural.
2. Capacity.
3. Level of service failures.
4. Outdated functionality.
5. Cost or economic impact.

The utility staff and management know of potential assets that need to be repaired or rehabilitated. Reminders in the CUPSS task calendar let the staff members know when the condition of an asset begins to decline according to the manufacturer's life cycle recommendations of assets. The CUPSS Check Up Reports also have provided recommendations (replace, repair, or rehabilitate) for each asset. The utility staff members have taken these reminders and recommendations into account.

A summary of the current Capital Improvement Plan is presented in Table 5-1 and annual total costs in Table 5-2. Because the expected needs of the utility will change each year, the CIP plan will be updated annually to reflect those changes.

A Business Risk Evaluation that has been prepared and discussed earlier in this report analyzes the condition, criticality, and redundancy of each process component to arrive at a Business Risk Score. Each BRS is compared to a Work Priority Matrix for prioritizing the importance of each wastewater system asset. These priorities weighed in to the development of the Capital

Improvement Plan. The Business Risk Evaluation is presented in Appendix A.

Table 5-1. Paw Paw Lake Area WWTP Capital Improvement Projects

Capital Improvement Project	Total Cost	Annual Savings	Type of Capital Improvement Project	Year to Conduct
Final Clarifiers (2)	$650,000	$5000	Rehab/Replace	2018
Recirc. Pumps (2) Building B	$50,000	$2000	Rehab/Replace	2020
Blower 1	$30,000	$1000	Rehab/Replace	2020
MCC	$60,000	$1000	Rehab/Replace	2020
Main Building	$100,000	$2000	Rehab/Replace	2020
Lab Ventilation	$30,000	$500	Rehab/Replace	2020
Pump Building A	$100,000	$5000	Rehab/Replace	2022
Chlorine Contact Chamber	$160,000	$1000	Rehab/Replace	2022
Flow Balancing Manhole A	$20,000	$500	Rehab/Replace	2022
Flow Balancing Manhole B	$20,000	$500	Rehab/Replace	2022
Solids Handling Tank	$200,000	$1000	Rehab/Replace	2024
Recirculation Pipe A	$50,000	$1000	Rehab/Replace	2026
Recirculation Pipe B	$50,000	$1000	Rehab/Replace	2026
Lime System	$50,000	$10,000	Rehab/Replace	2026
Sludge Pump	$40,000	$500	Rehab/Replace	2028-2037
Pump Building C	$70,000	$2500	Rehab/Replace	2028-2037
Pump Building B	$50,000	$2500	Rehab/Replace	2028-2037
Sludge Supernatant Pipe	$50,000	$1,163	Rehab/Replace	2028-2037
Sludge Pipe B - C	$50,000	$500	Rehab/Replace	2028-2037
W. Primary Clarifier	$530,000	$20,000	Rehab/Replace	2028-2037
Parking/Roads	$200,000	$500	Rehab/Replace	2028-2037
Blower 2	$30,000	$1000	Rehab/Replace	2028-2037
E. 1st Stage Trickling Filter	$120,000	$2500	Rehab/Replace	2028-2037
W. 1st Stage Trickling Filter	$120,000	$2500	Rehab/Replace	2028-2037
SE 2nd Stage Trickling Filter	$120,000	$2500	Rehab/Replace	2028-2037
SW 2nd Stage Trickling Filter	$120,000	$2500	Rehab/Replace	2028-2037
Grit Collector	$230,000	$1000	Rehab/Replace	2028-2037
Spiral Screen	$150,000	$1000	Rehab/Replace	2028-2037
Plant Sewer System	$500,000	$10,000	Rehab/Replace	2028-2037

Capital Improvement Project	Total Cost	Annual Savings	Type of Capital Improvement Project	Year to Conduct
Collection System (Partial)	$1,300,000	$50,000	Rehab/Replace	2028-2037
Standby Generator	$100,000	$10,000	Rehab/Replace	2038-2047
Ferric Chloride Storage Tank	$100,000	$0	Rehab/Replace	2038-2047
MUA Unit	$100,000	$2000	Rehab/Replace	2038-2047
Blower 3	$30,000	$1000	Rehab/Replace	2038-2047
Headworks Trough	$20,000	$0	Rehab/Replace	2038-2047
E. Primary Clarifier	$530,000	$20,000	Rehab/Replace	2038-2047

Table 5-2. Paw Paw Lake Area WWTP Capital Improvement Project Totals

Year(s)	Total Cost
2018	$650,000
2020	$270,000
2022	$300,000
2024	$200,000
2026	$150,000
2028-2037	$3,680,000
2038-2047	$880,000

A Rate Study was prepared as part of the Stormwater, Asset Management, and Wastewater (SAW) Grant the PPLA WWTP received from the MDEQ. Excerpts of the Rate Study follow as a summary of the recommendations for future rates to provide adequate revenues for anticipated expenses.

The objective of the Wastewater System Rate Study is to develop equitable wastewater rates which will generate sufficient revenue to meet operations, maintenance, replacement, capital improvement and debt service expenses of the PPLA WWTP. The Authority provides the Coloma and Watervliet regional area with wastewater treatment services.

A rate model has been developed and is intended to help PPLA WWTP monitor wastewater rates on an on-going basis. The rate model may be updated based on actual revenues and expenses, changes in metered wastewater flow, capital improvement plans, and other factors.

Supplemental rate adjustments may become necessary in the event that revenues and/or expenses differ significantly from projections. Wastewater revenues and expenses fluctuate for a variety of reasons. The capital cost, funding source, method of financing, and projected year-end fund balance would need to be considered in determining if a supplemental rate adjustment is needed.

The rate model recommends 6.0% annual rate increases in each of the next 10 years to meet projected operations, maintenance, replacement, capital improvement, and debt service expenses. The projected increases provide for implementation of the asset management plan developed through the SAW grant from the MDEQ. The projected increases are intended to maintain reserves for unforeseen operating and capital expenses and to help avoid large rate fluctuations. The increases will allow the PPLA WWTP to continue to operate the wastewater system in a sustainable manner.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date April 30, 2017
(no later than 3 years from executed grant date)

The Paw Paw Lake Area WWTP *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1546-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or No
   If No - Date of the rate methodology approval letter: November 2, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

PPLA WWTP	at 269-468-7888	pplwwtp@att.net
Name	Phone Number	Email

Lloyd Tay 5-24-17
Signature of Authorized Representative (Original Signature Required) Date

Lloyd Taylor Superintendent
Print Name and Title of Authorized Representative

April 2017

Deliverables SAW Grant Number 1073-01

Pennfield Charter Township, Battle Creek, MI

Contents

Introduction

Civil Engineers, Inc., the consultants who developed this AMP, used software provided by the USEPA titled 'CUPSS', or Check Up Program for Small Systems. The use of this software insures that all of the elements of the AMP meet the standard requirements of the USEPA for asset management plans for municipal systems. The AMP report was generated in draft form by the CUPSS program and then edited for the municipality. For this submittal, the raw spreadsheet data is included for the inventories of manholes, sewers, laterals, lift stations and force mains. The entire asset inventory has been entered into the CUPSS database for easy reference, updating and retrieval.

Asset Inventory and Condition of Assessment

The asset inventories and condition of assessment are found in Appendix G of the AMP. The parameters in the inventories include at a minimum:

- Asset Name (The name of the technology or equipment that is used for the system to properly function. If there are many assets of the same name, they may be differentiated with a letter or a number so that they can be told apart.)
- Location (Where the asset is within the collection system)
- Asset Category (such as collection or treatment)
- Asset Type (Collection mains, pumping equipment, etc.)
- Condition (
    - Excellent
    - Good
    - Fair Poor
    - Very Poor
- Consequence of Failure (Consequence of Failure (CoF) estimates the degree of impact on utility service should the asset fail. Includes impacts on regulatory compliance, local government, customers, and the community)
- Redundancy (Values indicate what percentage of the asset's functionality is duplicated by other assets)

- Asset Status
  - Active
  - Inactive
- Capacity (
  - Undersized (under capacity)
  - full sized (adequate capacity)
  - oversized (has excess capacity)
- Installation Date
- Expected Useful Life (Years)
- Replacement Cost (Dollars)

Pennfield's entire wastewater inventory was field surveyed on Michigan state plane coordinates and NAVD 88 elevation datum. Every manhole was located and all pipe inverts in the manholes were measured for diameter and elevation. Each manhole was evaluated for condition using a standardized rating system.

The rating scale is:

- Excellent
- Good
- Fair
- Poor
- Very Poor

Every sewer line was inspected by video. These videos show the condition of each and every section of sewer between the manholes. Each fault was logged and rated by its type and the urgency of needed repairs. The videos also show the distance from the manhole to each sewer lateral (sewer lead). These videos have been indexed according to the sewer numbers and provided to the Township in digital form.

The year of construction of each asset, its life expectancy and whether the asset is maintained according to the manufacturer's recommendation are entered into the inventories to determine the asset's risk of failure.

Level of Service.

Level of service is found in Section 3 of the AMP. The goal of the Pennfield Wastewater Utility is to confirm wastewater is collected and transported effectively and efficiently by providing services that meet or exceed customer expectations and comply with federal regulations. This section describes the utility's Level of Service goals and the key performance targets for each of the level of service goal for present and future performance. The level of service describes the characteristics of utility's performance such as "how much", "of what nature", and "how frequently" about the service and the performance target define how each level of service will be measured. The utility's progress toward meeting those goals will be reported every 5 years.

The levels of service determine the amount of funding that is required to maintain, renew and upgrade the water infrastructure to provide the customers with the levels of service specified. The Level of Service goals are defined across the four service areas identified below and a performance target is defined for each goal as a measure for the Level of Service goal. Changes to the levels of service goals and how the utility addresses the issues will affect funding requirements and how well the utility can provide the proper service to the community. The target levels of service that the utility has chosen to meet are presented in Table 3-1 of the AMP. This table lists the Level of Service goals and measures the success of each goal.

Criticality of Assets

Using the asset inventory information and the number of customers served by each asset, the consequence of failure (CoF) for every asset was determined. The five CoF ratings are:

- Insignificant
- Minor
- Moderate
- Major
- Catastrophic.

This information is crucial because it provides the utility managers with a concise overview of the state of each of the utility's critical assets, including information on the condition of the asset, the asset's consequence of failure, the risk associated with the asset, and the asset's targeted replacement date. The critical asset assessments were conducted using the parameters in the My Inventory module within CUPSS. [1]

From these factors a risk matrix is constructed for the wastewater collection system. The high risk assets are in the AMP Section 9, Action Plan. Note that the Pennfield wastewater system has no assets in the high risk category requiring immediate attention

The assets that are most critical to the wastewater collection system are the seven lift stations. These stations serve from 31 to 590 REUs (residential equivalent units) each. Consequences of failure range from minor to major. These stations are inspected once every week by the City of Battle Creek Wastewater Division. The cost of these inspections, and the maintenance of them, is paid to the City from the RTS or ready-to-serve fees assessed to the Township and paid by wastewater customers as a portion of their monthly bill.

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[1] https://www.epa.gov/sites/production/files/2015-10/documents/cupssusersguide.pdf

Operation and Maintenance Strategies/Revenue Structure

The operation and maintenance strategies are found in Section 5 of the AMP. Financial management is found in Section 8 of the AMP.

Operation and Maintenance

O&M consists of preventive and emergency/reactive maintenance. In this section, the strategy for O&M varies by the asset, criticality, condition and operating history. The risk matrix in the AMP provides the utility's assets and identifies the risk value for each asset. This risk matrix and Section 4.0 of the AMP were used as the basis for establishing the maintenance program as a way to make sure that the utility addresses the highest risk assets. In addition, the maintenance program addresses the level of service performance objectives to ensure that the utility is running at a level acceptable to the customer.

Unexpected incidents could require changing the maintenance schedule for some assets. This is because corrective action must be taken in response to unexpected incidents, including those found during routine inspections and O&M activities. Utility staff will record condition assessments when maintenance is performed, at established intervals, or during scheduled inspections. As an asset is repaired or replaced, its condition will improve and therefore can reduce the overall risk of the asset failing. The maintenance strategy will be revisited every 5 years or as needed.

Preventive maintenance is the day-to-day work necessary to keep assets operating properly, which includes the following:

1. Regular and ongoing tasks necessary to keep the assets at their required service level

2. Day-to-day and general upkeep designed to keep the assets operating at the required levels of service

3. Tasks that provide for the normal care and attention of the asset including repairs and minor replacements

Preventive maintenance is carried out because of a planned maintenance program (such as regularly scheduled asset repairs) and historically problematic operations (such as blockages and root infestation). Equipment must be maintained according to manufacturer's recommendations to achieve maximum return on investment. By simply following the manufacturer's suggested preventive maintenance the useful life of equipment can be increased 2 to 3 times when compared to run till failure[2]

Financial Management Strategy

Section 8 of the AMP describes the Pennfield Wastewater Utility's financial condition and its strategy for future financing. Expenses greater than those set forth in the Intergovernmental Wastewater Treatment Services Contract are considered capital costs. Capital costs are one-time expenses used to replace or upgrade, because of capacity, a part of the utility. Capital costs do not include any O&M costs.

If large expenses are required for expansion or upgrades, the Pennfield Wastewater Utility plans to pay for the improvements through cash reserves or from user fees. The utility estimates that it could spend on average about $70,000 per year on wastewater over the next 10 years to accommodate system expansion within the township. Compliance with state and federal regulations may require some unforeseen improvements. A detailed financial summary for the next 10 years is presented in Table 8-1 of Section 8 of the AMP.[3]

Detailed budgets for income and expenses are given in Appendices C and D of the AMP. The present monthly user bill of $42.52 is expected to remain in effect for the next five years. At the end of that period it is expected to increase to $48.50 per month. At these rates the wastewater utility will average an annual surplus of $24,737. The financial projection summary is presented graphically below.

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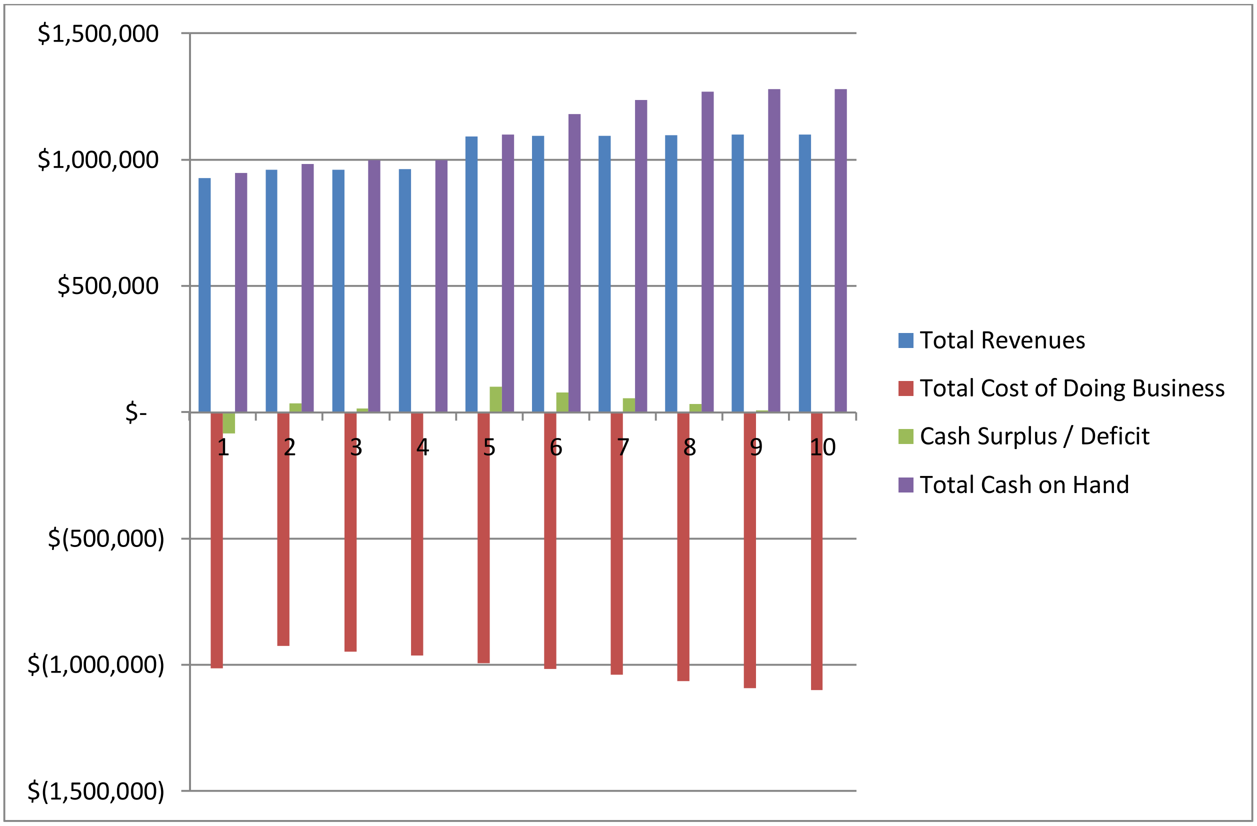
[2] Pennfield Wastewater Utility Asset Management Plan

[3] Ibid



Financial Projection Summary

RECEIVED

MAY 31 2017

MDEQ-ODWMA

RLS

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 5, 2017
(no later than 3 years from executed grant date)

The Pennfield Charter Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1673-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: 6/7/2017.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Dave Morgan at (269)968-8549 dmorgan@pennfieldtwp.com
Name Phone Number Email

5/31/17
Signature of Authorized Representative (Original Signature Required) Date

Dave Morgan - Supervisor - Pennfield Township Supervisor
Print Name and Title of Authorized Representative

April 2017

Prein&Newhof
Engineers • Surveyors • Environmental • Laboratory

May 26, 2017
2130407

Ms. Valorie White, Project Manager
MDEQ
Office of Drinking Water and Municipal Assistance
P.O. Box 30241
Lansing, MI 48909-7741

RE: SAW Grant Project No. 1450-01
Wastewater Asset Management Plan
Plainfield Charter Township, Kent County

Dear Ms. White:

In accordance with your letter dated April 25, 2017, we are submitting on behalf of Plainfield Charter Township the required SAW grant deliverables as follows:

1. Certification of Project Completeness form, signed by Mr. Cameron Van Wyngarden, Township Superintendent
2. Project executive summary as required under Section 603 of Public Act 84 of 2015, including contact information for the Township, a brief discussion of each of the five major components of the Asset Management Plan, and a list of the Township's major identified assets

The Township has completed the Asset Management Plan, and it will be available to the MDEQ upon request and available to the public for at least fifteen years.

We are submitting these documents prior to the May 31, 2017, grant deliverable deadline. Final grant-eligible expenses will be incurred prior to May 31, 2017, and final disbursement requests will be submitted by July 30, 2017 (60 days after grant end date). It is our understanding that this will complete the Township's obligations under the grant.

If you have any questions, please contact our office.

Sincerely,

Prein&Newhof

Mark R. Prein, P.E.

Enclosures

c. Mr. Cameron L. Van Wyngarden, Superintendent, Plainfield Charter Township
Ms. Leslie Sorensen, DEQ-Water Resources Division, Grand Rapids District Office

3355 Evergreen Drive NE Grand Rapids, MI 49525 t. 616-364-8491 f. 616-364-6955 www.preinnewhof.com

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 5/31/2017
(no later than 3 years from executed grant date)

The Plainfield Charter Township *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1450-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: 10/24/2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Cameron VanWyngarden at (616) 364-8466
Name Phone Number Email

5-25-17
Signature of Authorized Representative (Original Signature Required) Date

Cameron VanWyngarden, Superintendent
Print Name and Title of Authorized Representative

Memorandum

Date:	May 26, 2017
To:	Ms. Valorie White
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130407
Re:	Plainfield Charter Township SAW Grant Summary of Wastewater Asset Management Plan

Ms. White:

This memorandum provides the summary of Plainfield Charter Township's SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

SAW Grant Project Number: 1450-01

Grantee:

Plainfield Charter Township
6161 Belmont Ave NE
Belmont, MI 49306-9609
http://www.plainfieldmi.org/

Contact: Mr. Cameron L VanWyngarden, Superintendent
Phone: 616-364-8466

Executive Summary

Plainfield Charter Township received a SAW Grant in 2014 to prepare a Waste Water Asset Management Plan. The Grant agreement indicated the following amounts:

Project Cost	Grant Amount	Local Match
$1,570,920	$1,344,857	$226,063

The project cost was allocated to preparation of the Wastewater Asset Management Plan ($1,035,920) and to project planning and design engineering related to SRF Project No. 5584-01 ($535,000).

The Key components in the Asset Management Plan include:

1. Asset Inventory and Condition Assessment
2. Level of Service
3. Criticality of Assets
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

Asset Inventory

"Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets."

Manhole, gravity sewer main, force main, and lift station locations were plotted in a Geographic Information System (GIS) using record drawings. Manhole and lift station locations were field verified and locations adjusted with Global Positioning System (GPS) coordinates.

Asset inventory data including year of installation, material, sizes, pipe inverts and manhole rim elevations were cataloged from record drawing and visually verified where needed. Asset inventory data is managed using GIS databases.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

Gravity Sewer Mains: Inspections were made using either a pole mounted zoom camera (looking up or down each pipe from the manholes) or with in-line closed circuit television (CCTV) cameras. For sewers with prior CCTV inspections (on file from historical operations records), file videos were reviewed and conditions were logged by PACP certified inspectors. New CCTV inspections were made for eligible sewers. Pipes inspected with zoom camera methods were rated considering any observable roots, deposits, joint conditions, pipe wall condition, infiltration, or other defect observations. Pipes inspected with CCTV were rated using the PACP system condition grading system. Composite Risk of Failure ratings of 1-5 were derived for each pipe.

Percentage of gravity sewer pipes in each rating category

1	2	3	4	5
82%	9%	7%	1%	1%

Force Mains: Force main conditions were estimated using pipe age, material, and break history records. Plainfield's force main data was compared with that of several other municipalities to establish a comparative reference.

Percentage of force main pipes in each rating category

1	2	3	4	5
56%	6%	38%	0%	0%

Manholes: Manholes were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, structures, and infiltration.

Percentage of manholes in each rating category

1	2	3	4	5
92%	8%	1%	<1%	<1%

Lift Stations: Visual inspection and performance testing were completed to evaluate asset condition. Lift station assets, including pumps, valves, piping, structures, electrical, controls, and other assets, were rated on a scale of 1-5. Composite ratings for the station as a whole were developed.

Number of lift stations in each rating category

1	2	3	4	5
1	8	3	3	0

Level of Service Determination

"Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined."

Plainfield Charter Township recognizes that the people served by the system are more than customers, they are the system owners. Township staff and system operators act as stewards of the system. The Township has held many public meetings with the Infrastructure Committee, which is made up of Township Board members and staff, and is open to the public and regularly attended by Township employees, consultants and NKSA representatives. At these meetings, the results of the condition assessments were discussed, the costs for various OM&R strategies affecting the levels of service were reviewed along with potential rate impacts. Based on the input received during those meetings, the following Level of Service Goals have been established:

1. Meet Regulatory Requirements
2. Minimize Service Interruptions
3. Minimize Public Hazards
4. Manage Storm Water Inflow and Ground Water Infiltration
5. Provide Capacity for Community Growth
6. Minimize Life Cycle Costs

Criticality of Assets

"Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?"

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions as determined through condition assessments. Assets were given a Consequence of Failure (CoF) rating of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Serve schools/hospitals/major industry
- Are under major roads or are adjacent to other major utilities
- Are adjacent to waterways or significant wetlands

Criticality ratings were calculated as the product of an asset's RoF and CoF, producing criticality ratings ranging from 1-25 (25 being the most critical). The most critical assets were found to be 5 Mile Lift Station, the force mains of Northland Drive Lift Station and Belmont Lift Station, and sewers in Northville Drive, the Southerly Trunk and West River Drive as shown in the Waste Water System Evaluation Report.

Revenue Structure

"Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a "Test Year" was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.

The customer base was reviewed, including the number of residential equivalent units in our system. Other operating and non-operating revenues were also evaluated. Prediction of customer connections was made including trending in system utilization, projection of operating costs, and anticipated inflation by expense category.

A forecasting system was developed and used to identify the estimated replacement investment for the remaining lifecycle of all assets, based on the asset inventory and condition assessment data. Project costs were estimated for capital improvements within the first six years. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. Based on that analysis, the Township board enacted a rate increase in January 2017. The Township expects the income from rates will be adequate to cover the system costs, using a combination of cash and debt financing to fund capital projects.

Capital Improvement Plan

"Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects."

A capital improvement plan showing project descriptions, cost estimates, and project timelines, was developed for the capital improvements needed within a 10-year planning period. The projects identified in the CIP are:

- Inflow and Infiltration Reduction Improvements (various locations)
- Sewer pipe point repairs (various locations)
- Hills and Dales Phase 3: Lester Drive
- Willow Sewer Improvements Phase 1
- River Bank Sewer Improvements
- Northville Drive
- Willow Sewer Improvements Phase 2
- US131 Sewer Crossing
- Miscellaneous CIPP projects
- Hills and Dales Phase 4: Bell Ave and Chadwick Ave
- Belmont Force Main Improvements
- Bailey Park Lift Station
- Hills and Dales Phase 5: Costa Ave
- Leisure Village Mobile Home Park Extension
- Hills and Dales Phase 6: Hillsdale Ave
- Ketchel Drive
- Hills and Dales Phase 7: Lindberg Ave, Huntington Ave, Woodbury Ave
- Peak Lane Lift Station
- Grand River Lift Station
- Bell Lift Station
- Grand Oaks Lift Station
- Hills and Dales Phase 8: Ambrose Ave
- Hills and Dales Phase 9: Hunsberger Ave
- Hills and Dales Phase 10: Eldon St, Providence St and Trunk Sewer Rehab

List of Major Assets

"Provide a general list of the major assets identified in the AMP."

Plainfield Charter Township's major assets include:

- 15 lift stations
- 730,700 feet of 6" to 21" diameter gravity sewer
- 35,400 feet of 2" to 16" diameter force main
- 3,051 manholes

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date – May 31, 2017
(no later than 3 years from executed grant date)

The **City of Plymouth** *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. **1050-01** have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: ~~Yes~~ or **No**

   If No - Date of the rate methodology approval letter: **November 16, 2016**.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Chris Porman at **(734) 453-7737** **cporman@ci.plymouth.mi.us**
Name Phone Number Email

5/31/2017
Signature of Authorized Representative (Original Signature Required) Date

Paul J. Sincock, City Manager
Print Name and Title of Authorized Representative

April 2017

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date - May 31, 2017
(no later than 3 years from executed grant date)

The **City of Plymouth** *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. **1050-01** have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Chris Porman at **(734) 453-7737** **cporman@ci.plymouth.mi.us**
Name Phone Number Email

5/31/2017
Signature of Authorized Representative (Original Signature Required) Date

Paul J. Sincock, City Manager
Print Name and Title of Authorized Representative

City of Plymouth
Storm Water and Wastewater
Asset Management Plan

May 31, 2017

1825

City of Plymouth
Storm Water, Asset Management and Wastewater (SAW) Grant Program
SAW Grant Project Number 1050-01

Prepared by Wade Trim

WADETRIM

Summary Overview of Asset Management Plan Sections

The City of Plymouth's Asset Management Plan (AMP) for its Wastewater and Storm Water systems has been completed using the funding made available through the SAW Grant Program (Grant No. 1050-01). The City's AMP is a snapshot in time as of May 31, 2017. The AMP provides a summary of each task completed during the SAW Grant program (May 2014 through May 2017). Asset Management Plans are intended to be updated regularly, to evolve as additional data is collected and to be a reminder that Asset Management is a continuous practice that doesn't end with a report. Recommendations have been included in each section for future evolution of the plan, specifically addressing the 5 major components of an AMP.

Persons interested in viewing the complete Asset Management Plan and all the attachments should contact:

Mr. Chris Porman, Director of Municipal Services for the City of Plymouth
City of Plymouth Department of Municipal Services
1231 Goldsmith
Plymouth, Michigan 48170
Phone: (734) 453-7737
Email: cporman@ci.plymouth.mi.us

The following is a summary of the various sections of the City of Plymouth Asset Management Plan.

1. Introduction
    - This section includes a review of the timeline of the SAW Grant project, the details of the grant award ($$, date, etc) and introduces the 5 major components of the AMP that were completed.
2. Asset Inventory
    - This section provides a description of the project team effort to create an updated Geographic Information System for wastewater and storm water systems
    - A system description, summary of assets (by pipe size) and major assets are included in this section.
    - Please note that the City also created a geodatabase for their public water supply system as a parallel effort. This effort is formally acknowledged in this AMP even though it was not eligible under the SAW Grant program.
    - The City of Plymouth considers all of its 18-inch, 24-inch and 30-inch sanitary sewer to be major assets of the wastewater collection system.
    - The City of Plymouth considers the enclosed portion of the Tonquish Creek (84-iinch in diameter) to be the major asset of the storm water collection system.
    - Recommendations for maintaining the Asset Inventory are included in this section also.
3. Condition Assessment

- This section provides a description of the MACP manhole condition assessment that was completed on the wastewater collection system.
- This section provides a written description of the PACP pipeline condition assessment that was completed on the large diameter sanitary sewers (i.e. most critical assets) and some of the smaller diameter sanitary and storm sewers.
- Additional condition assessments are described here along with the City's plan for condition assessment going forward.

4. Level of Service
    - A brief discussion on level of service for the wastewater collection system, water distribution system (not grant eligible), storm water collection system and street network is included in this section.
5. Criticality of Assets
    - This section includes a discussion on the Consequence of Failure maps that were prepared for the City's storm water and wastewater collection systems.
    - This section also includes a discussion on the probability of failure of assets and the City's historical (i.e. last 20 years) approach to condition assessment of its sanitary and storm sewer system.
6. Operation and Maintenance Strategies
    - This section outlines several of the City's key operation and maintenance strategies that apply to the wastewater and storm water collection systems.
    - The City selected Dude Solutions (Mobile 311) as their vendor to provide a work flow management (CMMS) tool.
7. Review of Revenue Structure
    - This section discusses the rate structure and revenue/expenditure review that was completed by financial analyst Umbaugh (Tom Traciak) on the City's wastewater collection system.
8. Long Term Funding & Capital Improvement Plan
    - This section includes a discussion of the City's Annual Infrastructure Improvement Program and how it is organized.
9. Conclusion and Final Recommendations
    - Presentation of the Certificate of Completeness
    - Final Asset Management Plan recommendations
10. Attachments

Section 1 – Introduction

On December 2, 2013, the City of Plymouth submitted a complete Storm Water, Asset Management, and Wastewater (SAW) Grant application along with supporting documents to the Michigan Department of Environmental Quality (MDEQ). On March 14, 2014, the MDEQ notified the City of Plymouth that the application was administratively complete and that the City was eligible to receive grant assistance. On May 8, 2014, the City and MDEQ executed the grant agreement and on June 24, 2014, the City of Plymouth grant period was extended until May 2017.

The City of Plymouth was approved for a SAW Grant (#1050-01T) in the amount of $360,000 plus $40,000 in City match for a project total of $400,000. The grant was provided for the creation of Wastewater and Storm Water Asset Management Plans. This Asset Management Plan (AMP) document has been created through the funding provided by the grant and matching funds.

Asset Management is defined as a systematic ongoing process of operating, maintaining and upgrading assets. This AMP is intended to be a continuously evolving document. This version dated May 31, 2017 provides a summary of all tasks completed under the SAW grant program, with specific attention to the 5 major required components of an AMP (and the sections of this AMP that cover each component):

1. Asset Inventory and Condition Assessment (Sections 2 and 3)
2. Level of Service (Section 4)
3. Criticality of Assets (Section 5)
4. Operation and Maintenance Strategies/Revenue Structure (Sections 6 and 7)
5. Long Term Funding/Capital Improvement Plan (Section 8)

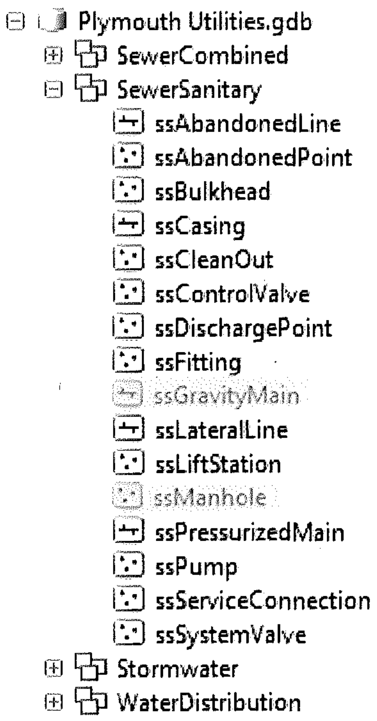
Additional information and recommendations have been included in this plan to document all the effort and time that the City has invested to create this plan. Over time, the AMP will evolve as additional data is collected on the condition of each system.

Section 2 – Asset Inventory

As part of the SAW Grant project, the City of Plymouth created a modern Geographic Information System (GIS) for its wastewater and storm water collection systems. ESRI ArcGIS products were used to create the GIS. The local government model was selected and used to establish each of the geodatabases. Each pipe segment, manhole, and lift station was given a unique facility identification number. Record drawings, old system maps and other City information was used to populate system attributes within each database.

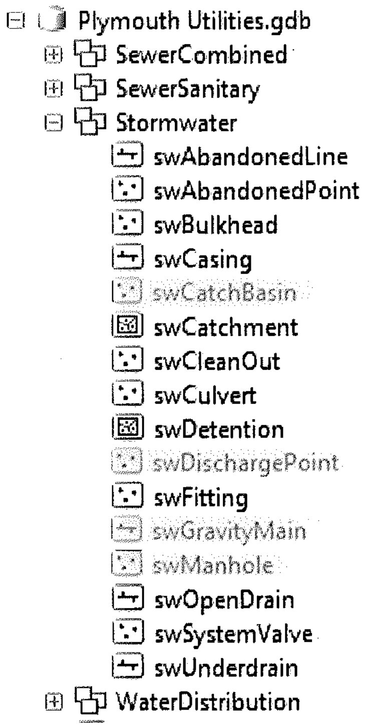
An existing Geographic Information System (GIS) provided the framework for the asset inventory for the City of Plymouth's wastewater and storm water collection systems. The existing framework was incomplete, but provided a general context of where the pipe systems were located. To update the location data, an initial inventory of available record drawings and as-builts completed in the City of Plymouth was collected and organized. This included infrastructure projects as well as road reconstruction projects. Project information was available in PDF form, and sometimes CADD drawings were available as well. These items were rubersheeted (i.e. stretched to fit) into GIS, and the system was updated to accurately locate pipes and utility connections. Aerial photography was used to confirm the locations of above ground structures, including manholes and catch basins.

In addition to updating location data, attribute information was also collected as part of the inventory. The Esri local government model was selected to determine which attributes to include as part of the geodatabase. All information was entered in the Plymouth Utilities geodatabase, as part of a feature dataset. Sanitary gravity mains and manholes were recorded as individual feature classes within the Sewer Sanitary feature dataset. Storm water catch basins, manholes, discharge points, and gravity mains were recorded as individual feature classes within the Storm water feature dataset (See Figure 1 and Figure 2).



- Plymouth Utilities.gdb
  - SewerCombined
  - SewerSanitary
    - ssAbandonedLine
    - ssAbandonedPoint
    - ssBulkhead
    - ssCasing
    - ssCleanOut
    - ssControlValve
    - ssDischargePoint
    - ssFitting
    - ssGravityMain
    - ssLateralLine
    - ssLiftStation
    - ssManhole
    - ssPressurizedMain
    - ssPump
    - ssServiceConnection
    - ssSystemValve
  - Stormwater
  - WaterDistribution

Figure 1: Plymouth Utilities Geodatabase Framework (Sanitary)



- Plymouth Utilities.gdb
  - SewerCombined
  - SewerSanitary
  - Stormwater
    - swAbandonedLine
    - swAbandonedPoint
    - swBulkhead
    - swCasing
    - swCatchBasin
    - swCatchment
    - swCleanOut
    - swCulvert
    - swDetention
    - swDischargePoint
    - swFitting
    - swGravityMain
    - swManhole
    - swOpenDrain
    - swSystemValve
    - swUnderdrain
  - WaterDistribution

Figure 2: Plymouth Utilities Geodatabase Framework (Storm)

Each asset was assigned a unique facility identification. Four quadrants of the City were assigned letters A-D, and the quadrant the asset was in determined the first letter of the ID number (See Figure 3). Each asset has its own Utility Code. For the sanitary system, the utility code for gravity mains is 'SSM' and the code for manholes is 'SSMH'. For the sewer system, the utility code for gravity mains is 'STM'; the code for manholes is 'STMH'; the code for catch basins is 'STCB'; and the code for discharge points is 'STDB'. The quadrant letter and utility code are followed by a number, giving each asset a unique ID.

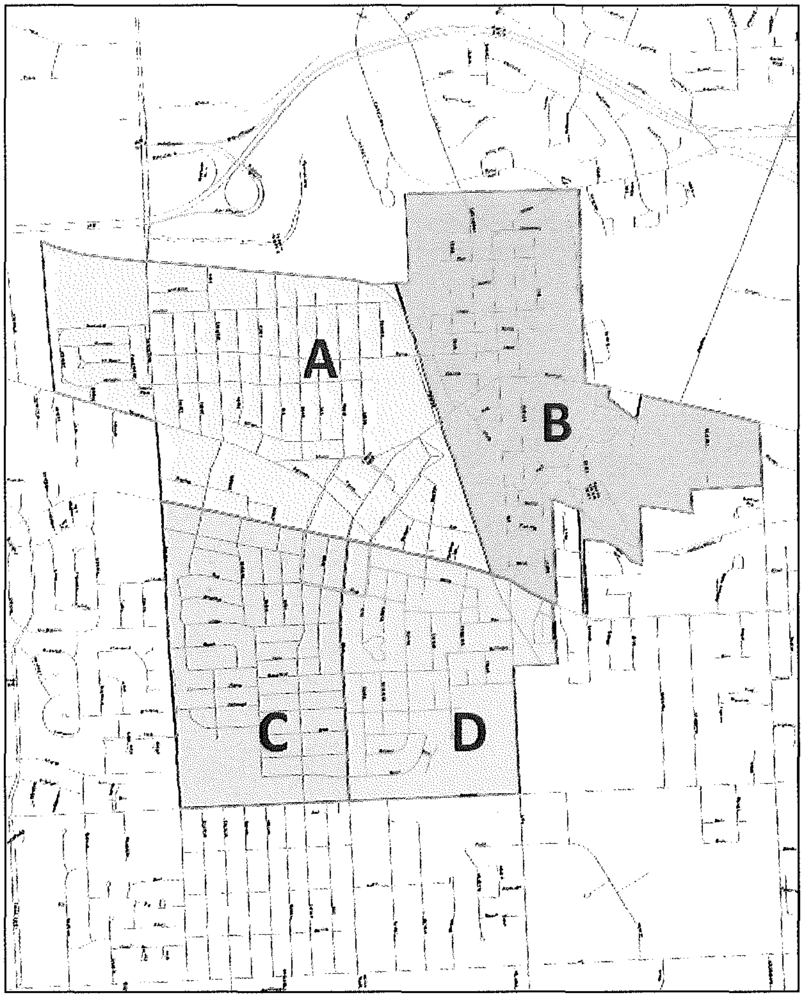
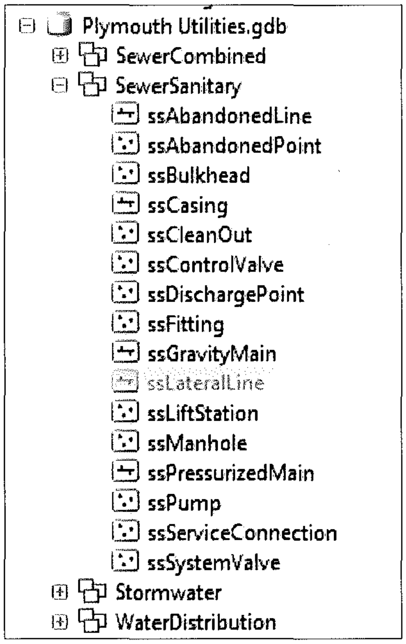


Figure 3: City of Plymouth Utility Quadrants

Attribute data collected for pipes included the installation date, material, diameter, and what manholes the pipes are connected to. Attribute data collected for manholes included the installation date, rim elevation, and invert elevations. The DATA_SOURCE attribute varies by asset. All assets that were part of the existing framework were assigned 'System Drawings' as the source. As the assets were updated, the data source reflects where these changes originated from. When a record drawing provided information, the data source was updated, and a link to the pdf was entered in the 'PROJECTLINK' attribute. The 'OTHER_NOTES' attribute was also updated with the project name and year. The data source may also be recorded as 'Aerials' for above ground structures, and 'GPS' was the source for storm sewer discharge points.

The City of Plymouth maintains cards that document the location of sanitary sewer leads. These leads are pipe segments that connect homes and businesses to the larger sanitary mains. Sanitary sewer lead cards were individually scanned and organized into folders by street name. Bear in mind, sheets that recorded an application for sewer service were not scanned.

Using information from the sewer card, lateral lines were drawn in GIS. The information was entered as a feature class within the Plymouth Utilities Geodatabase, as part of the Sewer Sanitary feature dataset. This framework was used as part of the Esri local government model, and is shown in Figure 1. Sewer leads were assumed to be perpendicular to the sewer mains, unless otherwise noted on the sewer card (See Figure 2). The lines were drawn from the sewer main to the edge of the right of way. The exception to this rule is when mains are located within the property line; in these cases, leads were drawn directly from the structure to the main. Sewer leads were not entered for properties that do not include a structure.



- Plymouth Utilities.gdb
  - SewerCombined
  - SewerSanitary
    - ssAbandonedLine
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    - ssBulkhead
    - ssCasing
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    - ssFitting
    - ssGravityMain
    - ssLateralLine
    - ssLiftStation
    - ssManhole
    - ssPressurizedMain
    - ssPump
    - ssServiceConnection
    - ssSystemValve
  - Stormwater
  - WaterDistribution

Figure 1: Plymouth Utilities Geodatabase Framework

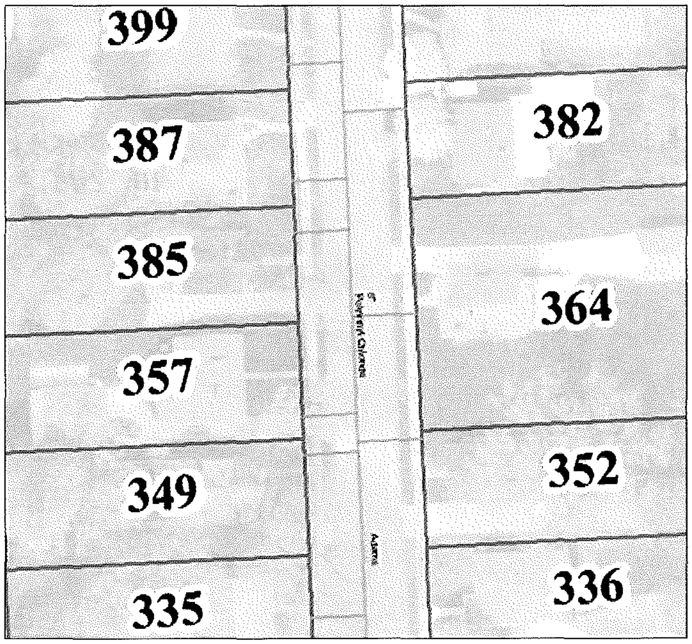


Figure 2: Sanitary Sewer Lead Connections

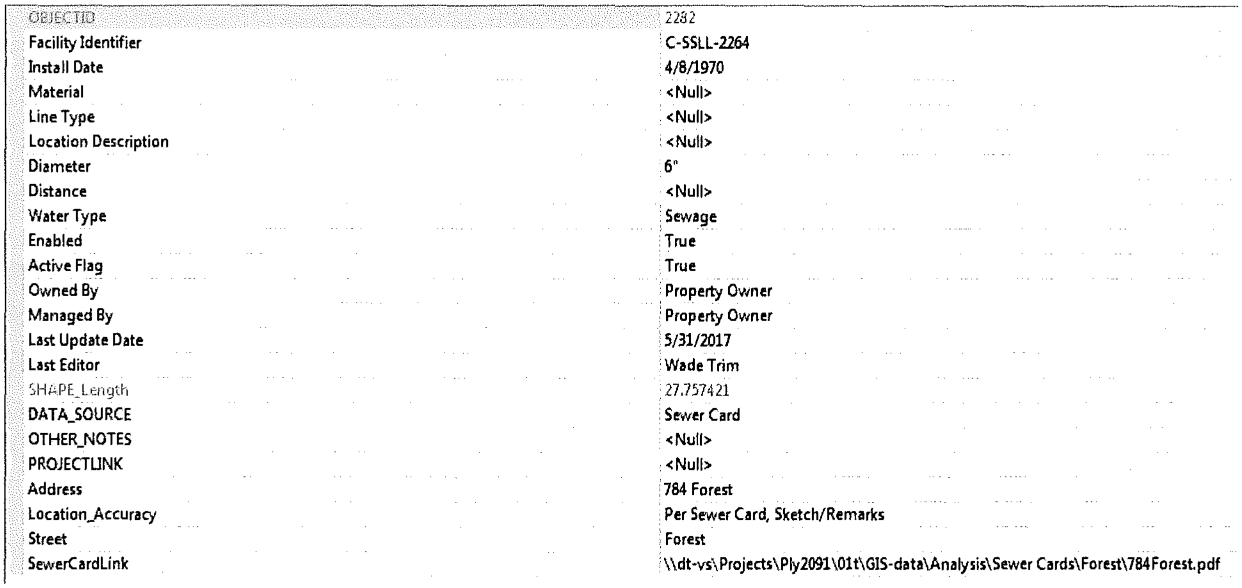
The amount of data available varied by sewer card. Due to this variability, the attribute 'LocationAccuracy', records how the sewer lead's location was determined.

> 'Per Record Drawing': These lines were drawn using information from record drawings or as-built drawings. This information was typically available for more recently completed projects.
>
> 'Per Sewer Card, Sketch/Remarks': These lines were drawn using information from the sewer card. This could be a sketch, a description, or clearly defined dimension lines.

'Per Sewer Card – NO REMARKS': These lines were drawn from the midpoint of the parcel edge, perpendicular to the sewer main. In this case, a sewer card does exist for the parcel, but it does not provide any information on where the lead is located.

'Unknown': These lines were drawn from the midpoint of the parcel edge, perpendicular to the sewer main. In this case, no sewer card exists for the parcel.

When available, other information collected from the sewer cards included the installation date, the pipe diameter, the parcel address and street name. The information was entered in corresponding attribute fields in GIS. If a sewer card was available as reference, a direct link to the pdf scan was entered in the attribute "SCardLink". When record drawings were available, additional data, such as pipe material were recorded. All sanitary sewer lead segments were given a facility ID number using the Quadrant and Utility Code 'SSLL'. Figure 3 shows an example of data entry for a sanitary lead.



OBJECTID	2282
Facility Identifier	C-SSLL-2264
Install Date	4/8/1970
Material	<Null>
Line Type	<Null>
Location Description	<Null>
Diameter	6"
Distance	<Null>
Water Type	Sewage
Enabled	True
Active Flag	True
Owned By	Property Owner
Managed By	Property Owner
Last Update Date	5/31/2017
Last Editor	Wade Trim
SHAPE_Length	27.757421
DATA_SOURCE	Sewer Card
OTHER_NOTES	<Null>
PROJECTLINK	<Null>
Address	784 Forest
Location_Accuracy	Per Sewer Card, Sketch/Remarks
Street	Forest
SewerCardLink	\\dt-vs\Projects\Ply2091\01t\GIS-data\Analysis\Sewer Cards\Forest\784Forest.pdf

Figure 3: Sanitary Sewer Lead Attributes

The attributes for Enabled and Active Flag were both noted as True and the Water Type was updated as Sewage. Per the City's ordinance, the property owner is responsible for the lead and tap to the main, and this is reflected in the 'Owned By' and 'Managed By' Attributes. Wade Trim completed updates on May 31, 2017. All the streets in the City of Plymouth were completed: all cards were scanned and data entry was performed. However, there were ultimately many cases that did not clearly fit the parameters listed above. In each Street folder, where the scanned sewer cards are located, there is a text document that lists parcels with discrepancies or other questions. This text document also lists addresses for which we have a sewer card, but the current parcel information does not show the address as existing. Many of these discrepancies occur in commercial areas where phases of new development have occurred over time. The best continuation of this project would be to review the text documents associated with each street to resolve issues of concern.

Wastewater Collection System Description

The City of Plymouth wastewater collection system is tributary to Wayne County's Rouge Valley Disposal System. The wastewater collection system is predominantly a gravity system consisting of 35.9 miles of sanitary sewer, 794 manholes and one small sanitary lift station. The City is responsible for operating and maintaining the collection system. A detailed summary of the City's wastewater collection system by pipe size is presented below:

Size (Inches)	No. of Segments	Total Length (Feet)
4	1	50
6	13	595
8	432	84,925
10	104	23,745
12	216	45,895
15	30	7,170
18	42	9,600*
24	35	7,350*
30	24	5,450*
Unknown	30	4,640
Total	**927**	**189,420**

- = considered major assets

The Major Wastewater Assets that are part of the City's wastewater collection system include approximately 22,400 linear feet of 18-inch, 24-inch and 30-inch sanitary sewer that serve as the backbone for the majority of the wastewater collection system.

Storm Water Collection System Description

The City of Plymouth storm water collection system is tributary to the Middle Rouge River via the Tonquish Creek, the Byron Drain and direct outlets to the Middle Branch of the Rouge River along Hines Park. The Tonquish Creek Drainage District is an established Drainage District under the Michigan Drain Code. The City's storm water collection system is a gravity system consisting of 34.6 miles of storm sewer, 754 manholes and 191 outlets to natural drainage courses and waters of the State of Michigan. A detailed summary of the City's storm water system (along with other storm water owners within the City boundary) by pipe size is presented below:

Size (Inches)	No. of Segments	Total Length (Feet)
4	3	80
6	17	850
8	50	5540
10	53	2185
12	778	79750
15	72	15960
18	88	17930
21	17	3770
24	53	10535

27	6	940
30	22	4625
33	12	3010
36	27	7120
42	6	1340
48	6	1350
Unknown	499	16170
Wayne County	45	5630
MDOT	27	6000
Total	**1781**	**182,785**

The Major Storm water Assets within the City of Plymouth include the 84-inch diameter storm sewer along the Tonquish Creek through downtown Plymouth. This enclosed section of storm sewer is part of the Tonquish Creek Drainage District maintained by Wayne County, however it is considered a major asset because of its unique location through downtown and the City's regular attention to keeping it clear from debris that get washed downstream.

The following recommendations are presented as part of the Asset Management Plan for maintaining the Asset Inventory for the wastewater and storm water collection systems:

1. The City should continue to maintain a unique facility ID for each of its pipe segments, manholes, lift stations and other elements, which are part of, or may become part of the wastewater or storm water collection systems.
2. The City should update the Asset Inventory annually (or more frequently as appropriate) as part of its Annual Infrastructure Improvement Program.
3. The City should continue its efforts to identify the ownership and pipe sizes of the unknown pipe segments on the wastewater and storm water collection systems.
4. The City should program software training of GIS software as part of its operation and maintenance activities. By incorporating frequent training of GIS software, key staff will be more inclined to use the GIS system on a regular basis. Frequent use of the GIS system will help it become a foundational tool for ongoing operation and maintenance of the collection systems.
5. For security reasons, detailed system maps will be maintained "in house" on the City server and will not be shown online or on website platforms.

Section 3 – Condition Assessment

The City of Plymouth utilized the SAW Grant funding to complete a full condition assessment on 788 of the 794 sanitary sewer manholes on its wastewater collection system. The SAW Grant funding was also used to perform television inspection along approximately 10,692 linear feet of its largest diameter (24-inch and 30-inch) sanitary sewer and approximately 55,400 linear feet of smaller diameter sanitary sewer and storm sewer pipe segments. The Level 2 manhole condition assessment (MACP) and all sewer television condition assessment (PACP) was performed in accordance with NASSCO requirements. The attribute data collected during the evaluations has been incorporated into the City's GIS system and is available for use as part of the City's ongoing Asset Management Program. Due to funding limitations, the City was unable to complete a full condition assessment on all wastewater and storm water pipe segments.

A summary of the MACP manhole condition assessment and PACP pipe condition assessments is shown in separate Exhibits. These exhibits will be updated regularly as part of the Asset Management Program as additional condition data is collected.

Annual Infrastructure Improvement Program

The City of Plymouth has completed an Annual Infrastructure Improvement Program each year since 1996. As a part of each annual program, the City completes a television inspection of the sanitary sewer segments and storm sewer segments within the project areas. The television inspections are reviewed during the design process. Structural and O&M deficiencies are noted and the appropriate repairs, rehabilitation, and/or replacement is typically incorporated into the Annual Infrastructure Improvement Program. Since 1996, approximately 40% of the City's wastewater and storm water collection systems have been inspected as part of the Annual Infrastructure Improvement Program.

Section 4 – Level of Service

The City of Plymouth has discussed their level of service for more than 20 years as it relates to its public infrastructure. In the mid 1990's, the City residents passed a public millage to invest in the repair and replacement of the City's street network. This initial decision by the City residents was the initial phase of the City's journey to maintain a high level of service related to its street network. Since that time, the City and City Commission has been committed to a comprehensive Annual Infrastructure Improvement Program that covers not only roads, but the three primary public utilities - water, sewer and storm sewer. Water & Sewer funds have been dedicated to water system and sanitary sewer system improvements.

Recent infrastructure programs have been designed to continuously maintain and update the essential utility systems (i.e. wastewater, water and storm water) and street network that are used by the residents, businesses and visitors each day in the City of Plymouth. All four of these asset classes contribute the public health, safety and welfare of the City of Plymouth.

To that end, the City has defined its Level of Service for each of the 4 major public asset classes as follows:

Street Network

- The City roads shall be safe and passable for all users, including residents, visitors and emergency vehicles.
- The City recognizes that a well-maintained street network contributes to the public good, facilitates the distribution of goods and services, and helps people move around safely in their daily travels.

- The City recognizes that a well-maintained street network contributes to a high quality of life and has a positive effect on property values, community pride and public confidence.
- The City strives for its street network to be in accordance with the latest standards for safe turning movements, pedestrian activity and vehicle capacity.
- The City will strive to rate its road network every 3 years to maintain data on the condition of the roadway network.

Storm Sewer Collection System

- The City storm sewer collection system shall be maintained to the extent possible (i.e. acknowledging that Mother Nature sometimes cannot be predicted) to provide for the safe collection and transport of storm water runoff to the neighboring streams and water ways.
- The City recognizes the importance of storm water management and its effect on the environment.
- The City recognizes that water quality and water quantity are two important factors that contribute to a healthy and safe environment.
- With the understanding that it is very costly to televise the storm sewer system frequently, the City strives to televise those storm sewer segments that are a part of each year's annual infrastructure improvement program.

Wastewater Collection System

- The City wastewater collection system shall be maintained in a safe and sound condition to provide safe collection and transport of wastewater from City users.
- The City recognizes the importance of having a properly functioning wastewater collection system and the corresponding effect it can have on the environment.
- The City recognizes that maintaining a properly functioning wastewater collection system is a priority requirement in the best interest of the public, health and welfare of the community.
- With the understanding that it is very costly to televise the sanitary sewer system frequently, the City strives to televise those sanitary sewer segments that are a part of each year's annual infrastructure improvement program.
- The City shall budget to allow proper certifications to be maintained and regular training to occur so that City staff are properly certified and trained.
- The City shall continue to educate the public and enforce its Sewer Use Ordinance.

Water Distribution System

- The City water distribution system shall be maintained in a safe and sound condition to provide safe and reliable distribution of potable water to all residents, businesses, and visitors in the City.
- In accordance with Rule 1606 of Act 399, the City shall prepare and implement an Asset Management program for the water system by January 1, 2018.
- The City recognizes the importance of providing adequate fire flows for the protection of property. The City's 2017 Water Reliability Study makes recommendations for system improvements. The system improvements should form the basis for the City's Capital Improvement Plan.
- The City shall budget to allow proper certifications to be maintained and regular training to occur so that City staff are properly certified and trained.
- The City shall continue to educate the budget and enforce its water use ordinance.

The City shall review (and revise if necessary) their Level of Service goals each year as a reminder of their importance and as part of their ongoing Asset Management Plan.

Section 5 – Criticality of Assets

Criticality is determined by analyzing two factors – the Consequence of Failure and the Probability of Failure. The City of Plymouth created consequence of failure maps for its wastewater (sanitary sewer) and storm water collection system. (It should be noted that the City also created a consequence of failure map for its water distribution system, though this effort is not SAW Grant eligible). In determining the consequence of failure for each pipe segment asset on its wastewater and storm water collection systems, the City considered factors that affect system capacity, public health, environment, damage to property and others, such as:

- Size and capacity of the pipe
- Number of users
- Difficulty/Cost of the repair
- Collateral damage related to potential damage
- Environmental impact/cost created by the failure

For the most part, the City's larger sized pipe segments and outlet pipes were determined to have the highest consequence of failure. Most smaller pipes or pipes only serving a small percentage of the users on the system were determined to have a lower consequence of failure. The City is consistently residential throughout its 2-square mile area with a downtown business district.

The probability of failure was also assessed as a part of the City's analysis of Criticality. While the City was unable to televise all of the smaller pipe segments during the SAW Grant program, the City was able to televise most of the larger diameter sanitary sewers (i.e. major assets) that are considered to be the main interceptors of the City's wastewater system. These large diameter sanitary sewers are partially located in less accessible locations along the Tonquish Creek and Byron Drain and all are very deep relative to the rest of the system. Overall, the City used SAW Grant funding to get a full condition assessment on approximately 10,400 linear feet of large diameter sanitary sewers (nearly half of the total major wastewater assets).

Since 1997, the City has been proactive in televising its existing sanitary sewers and storm sewers as part of its annual infrastructure improvement program. It is estimated that the City has televised nearly 40% of its smaller diameter sanitary and storm sewer systems over the past 20 years. While most of these inspections may not have met todays current NASSCO standards, the coding of defects was similar and the inspections provided a condition assessment that allowed for a probability of failure determination. While many small structural repairs have been made on the City's system as part of the annual infrastructure improvement program, it should be noted that the clear majority of the City's sanitary sewer and storm sewer system was found to be in fair or better condition (i.e. Performance Rating of 1, 2 or 3). All structural deficiencies leading to poor performance ratings (i.e. Performance Ratings of 3, 4 or 5) were addressed as part of each annual infrastructure improvement program.

It should be noted that the condition of most assets will change over time. It is also possible that the consequence of failure of some assets will change over time. The City should regularly review the criticality analysis to account for any changes in condition or consequence of failure.

A copy of the CCTV review of the City's major sanitary sewer assets is included as a separate exhibit.

Section 6 – Operation and Maintenance Strategies

The following is a list of operation and maintenance strategies discussed and recommended for the City's wastewater collection system:

- The City shall flush all known flat sewers 12 times each year to prevent buildup of fats, oils and grease (FOG) and prevent blockages. The City shall continue to work with the business community (i.e. especially restaurants) to reinforce the importance of grease traps and to minimize the impact of FOG's on the collection system.
- The City shall regularly inspect sanitary manholes, especially along the larger collection system segments, to make sure there is proper flow within the sewer and that no backups or unusual flow levels are observed.
- The City shall regularly inspect its one sanitary lift station. The inspection should make sure that both pumps are working to ensure that redundancy is available in case on pump needs service.
- As part of its Annual Infrastructure Improvement Program, the City shall televise and review the video of all sanitary sewers within the planned capital project areas. All coding during the television inspections should be completed in accordance with the NASSCO Pipeline Assessment Certification Program (PACP) and Manhole Assessment Certification Program (MACP). All structural or O&M defects should be noted and assigned to the unique facility ID for that asset.

The following is a list of operations and maintenance strategies discussed and recommended for the City's storm water collection system:

- The City shall regularly clear debris from the grate at the entrance to the enclosed portion of the Tonquish Creek. While the enclosed large diameter storm sewer pipe is technically part of the Wayne County Drain system, it is in the City's best interest to remove debris and prevent debris from blocking the drain and/or getting into the "tube". Regular debris removal will help prevent flooding in the downtown area.
- The City should regularly inspect the open channel portions of the Tonquish Creek and Byron Drain for fallen logs, tree damage, bank erosion and potential blockages.
- The City should pay close attention to the numerous road culverts along the Tonquish Creek. Keeping these culverts clear of debris will help prevent flooding during large rain events.
- The City should continue to perform dry weather screening at all outfalls to the Tonquish Creek and Byron Drain. Dry weather screening is a proven technique for noticing and tracking unusual or excessive flow in the storm sewer system during dry weather.
- The City should sweep streets regularly to keep leaves, twigs and unwanted debris from entering the storm inlets and catch basins. Regular street sweeping and proper disposal of surface debris keeps the storm sewers from getting clogged and keeps unwanted pollutants out of the receiving streams.
- As part of its Annual Infrastructure Improvement Program, the City shall televise and review the video of all storm sewers within the planned capital project areas. All coding during the television inspections should be completed in accordance with the NASSCO Pipeline Assessment Certification Program (PACP) and Manhole Assessment Certification Program (MACP). All structural or O&M defects should be noted and assigned to the unique facility ID for that asset.

In addition to the O&M strategies specifically mentioned above, the City of Plymouth has implemented the use of Mobile311 Software from Dude Solutions as its computerized maintenance management system (CMMS). Mobile311 is a GIS centric, online CMMS. The CMMS includes and allows for the creation of work orders, inspection, maintenance and inventory tracking. Mobile311 will be utilized by all members of the City Department of Municipal Services and others in City Administration to centralize the maintenance activities and streamline the work order process. The CMMS will also track cost data to assist the City in budgeting and Capital Improvement planning.

Section 7 – Review of Revenue Structure (Wastewater)

The City of Plymouth retained the services of Umbaugh, a Certified Public Accounting firm, to complete a review of the City's revenue structure that supports its wastewater collection system. The City of Plymouth provided a comparative detail of operating expenses for fiscal years' ending June 2015, June 2016 and June 2017. Fiscal Year June 2017 was used as the test year in the analysis of the rate structure. Net expenses supported by Sewer Rates totaled $2,105,586.

Rate revenue consisting of a ready to serve charge and commodity rate revenue was calculated for the City's sewer system. Based on 10,217 meter equivalents that were billed, the annual ready to serve revenue for the system totaled $274,014. The commodity rate revenue based on amount of billable flow (in 1,000 gallons) totaled $1,843,487. The combined Rate Revenue calculated for the City's wastewater (sewer) collection system is $2,117,501. Thus, there is no GAP in the City's current structure.

This information was submitted to the MDEQ in October 2016 in accordance with the SAW Grant requirements. On November 16, 2016, the MDEQ completed their review of the rate structure and provided a letter indicating that the City has demonstrated and fulfilled the significant progress requirement of the SAW Grant.

Section 8 – Long Term Funding & Capital Improvement Plan

For over 20 years, the City of Plymouth has taken a pro-active approach to maintaining its infrastructure. The City has had a long-term funding plan in place for capital investments required to repair and/or replace public infrastructure (i.e. water, sanitary sewer, roads and storm sewer). Looking ahead over the next 5 years, the City has budgeted the following available funds for capital improvement projects:

	FY 2017-2018	FY 2018-2019	FY 2019-2020	FY 2020-2021	FY 2021-2022
Streets					
Fund 202	$625,000	$540,000	$500,000	$437,500	$337,500
Fund 203	$150,000	$187,500	$250,000	$250,000	$250,000
Fund 470	$123,782				
Water/Sewer					
Fund 476					
Fund 560	$580,000	$400,600	$400,400	$400,200	$400,200
Parking					
Fund 475	$76,916				
Fund 405	$25,050	$25,050	$25,050	$100,050	$100,050

Specific projects per year have not yet been assigned, however they will be programmed consistent with the City's past protocol. The City uses street condition and water system reliability (i.e. # of water main breaks, reliability study recommendations, etc...) as the two primary guiding criteria for focusing their infrastructure improvements. Each year the program is evaluated based on observations for improving water system reliability and street condition. Once an area is suggested, the City televises the sanitary sewers and storm sewers in these areas to determine the condition of these local assets. Comprehensive repairs are made to all 3 utility systems and the roadway network at the same time. The City has found success in completing these programs in this manner because it minimizes disruption to residents, addresses deficient conditions and allows for programming flexibility.

In 2017, Byron Street between Main Street and Ross Street and Ross Street between Byron and Dewey were selected for the City's annual comprehensive infrastructure improvement program.

5-Year infrastructure improvement project areas are likely to be:

- Simpson (Dewey to Ross)
- Dewey (Ross to Byron)
- Carol and Evergreen (Linden to McKinley)
- McKinley (Ross to Byron)
- Ann Arbor Road
- Ann Arbor Trail (Sheldon to McKinley)

20-year infrastructure improvement project areas are likely to be:

- Plymouth Riverside park – water main replacement
- Hamilton (Ann Arbor Trail to Maple) – street and utilities
- Arthur (Junction to Goldsmith) – street and utilities
- Fairground, south of Hartsough and Hartsough, west of Fariground – streets and utilities
- New England Subdivision – water system and potentially sewer system upgrades
- Main Street (Union to Mill) – streets and utilities
- Industrial Drive and Haggerty – street improvements and utility upgrades
- Burroughs, west of Coolidge – water system loop
- Rebuild water system meter pits

The above lists are not comprehensive and will continue to be modified and updated as part of the City's Annual Infrastructure Improvement program as new condition data is collected.

Section 9 – Conclusion & Final Recommendations

Asset management is a continuous ongoing culture. When properly in place, it can provide a very purposeful and meaningful approach to managing community assets. This initial wastewater and storm water asset management plan establishes the framework for ongoing growth and evolution of Asset Management. In accordance with the requirements of the SAW Grant program, the City of Plymouth has submitted the appropriately signed Certification of Project Completeness forms for Wastewater Asset Management Plan and Storm Water Asset Management Plan, along with a summary of all tasks completed under the SAW Grant.

The City of Plymouth should continue to review the "Asset Management Guidance for Wastewater and Storm Water Systems" document and update this plan regularly.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The Pontiac Sewage Disposal System *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1225-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: 10-11-2016.
   Copy attached
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: __________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on __________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Ben L. Lewis at 248-858-1539 lewisbe@oakgov.com
Name Phone Number Email

5/24/17
Signature of Authorized Representative (Original Signature Required) Date

Jim Nash Oakland County Water Resources Commissioner
Print Name and Title of Authorized Representative

April 2017

Oakland County Water Resources Commissioner
Pontiac Sewage Disposal System, SAW Grant No. 1225-01
Wastewater System Asset Management Program

The Oakland County's Water Resource Commissioner/Pontiac Sewage Disposal System applied for and received a grant to further develop its Asset Management Plan for its sanitary system through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Wastewater and Asset Management (SAW) program. Because the SAW program was funded through monies appropriated for water quality, other related infrastructure systems, such as drinking water, were not eligible for funding through the grant.

The Pontiac Sewage Disposal System is operated under the jurisdiction of the Oakland County Water Resources Commissioner (WRC), which owns, operates and maintains the sanitary system. The WRC has various tools used to manage the assets it owns or maintains, including a GIS geodatabase, Computer Maintenance Management System (Cityworks), hydraulic models, condition assessment methods, risk/prioritization models, capacity studies, asset deterioration models, and an operating and capital improvement project prioritization model. These tools are used to guide the short and long-term strategies for WRC to operate the various systems in a sustainable manner that meets the required level of service, with a focus on prioritizing assets that are most critical and being cost-effective.

The WRC "Common to All" approach was generally followed with in development of the asset management plan for this system. The following is a summary of the AMP, as required by the grant, which includes a brief discussion of the five major AMP components, a list of the plan's major identified assets, and contact information for the grant.

A. Asset Inventory and Condition Assessment:

WRC uses its existing Geographic Information System (GIS) geodatabase as the primary means to inventory and map the assets in the system. The geodatabase provides a means to record the attributes associated with each asset, such as installation date (age), size, material, along with other information need for a given asset type. The geodatabase is integral to WRC's Collaborative Asset Management System (CAMS,) which allows for maintenance history and costs can be tracked on an asset and/or fund level.

Condition assessment tools and protocols were developed by WRC to allow for efficient and consistent recording of asset condition. For sanitary, combined, and storm water sewer assets, a NASSCO-compliant software program stores data collected during sewer televising. The data stored can be shared with the existing CAMS system. Inspection work orders in the CAMS system are used for evaluation of other types of assets, such as manholes and other collection system structures, and for most vertical asset types, such as pumps, valves, structures, etc.

As part of the grant for Pontiac Sewage Disposal System, the GIS geodatabase inventory was reviewed for completeness and to ensure critical attributes were populated. Approximately 250,000 lineal feet of sanitary underwent condition assessment via televising. In addition, approximately 619 manholes and other related structures were evaluated using the CAMS inspection work orders. Out of the 619 manholes, 366 were identified for potential repair, rehabilitation or replacement. From the 250,000 lft of sewer televised, approximately 53,000 lft was prioritized for major maintenance and approximately 6,000 lft for capital projects. (Note that use of NASSCO scores should only be used to flag or identify pipe that may require further review.

The project's scope included additional analysis of individual defects and review of the consequence of failure to identify recommendations for the first five year projects.)

Vertical assets, including pump stations, were inventoried using a WRC hierarchy template and condition assessment data was collected and input into the CAMS system. In general, most of the pump stations are in good condition, with certain assets requiring replacement in the near term.

B. Level of Service:

WRC developed an overall level of service goal that will be used as a starting point for each fund. Considerations into the level of service included compliance to regulations, operation, impact to the public and environment, safety and security, and are included in the overall business risk evaluation.

Level of Service Goals

	WRC Base Level of Service Goals	Measurables
Financial Viability and Impact	Emergency repairs can be repaired within Utility Reserve Budgets of the system	Exceedances of reserve budgets
Public Confidence/ System Service Impact	Minimal to some loss of service or impact on other services for less than four hours. No sewer system or basement backups. Minor disruption (e.g., traffic, dust, noise).	Number of service interruptions, complaints, and backups
Regulatory Compliance	No state permit violations. Comply with All MDEQ policies.	Number of violations
Safety of Public and Employees	Non-reportable injuries. No lost-time injuries or medical attention required. No impact to public health	Number of injuries and any public health advisories
Redundancy	Comply with 10 State Standards	Number of violations
BRE score	At this time, approximately 25% of the system has been inspected, so no overall score can be determined	System risk score
Staffing	Staffing levels and training maintained to meet level of service	Number of open positions, annual training hours

The Probability of Failure (POF) and Consequence of Failure (COF) scoring matrices used in the criticality and risk analysis were developed using the strategic LOS guidance. Progress toward the goals are measured through the CAMS analytic data, and is reviewed as part of the annual Long-Range Planning (LRP} process with WRC and its customers.

C. Criticality of Assets:

WRC uses asset optimization software (Power Plan AMP) to assist with prioritization of cost-effective maintenance strategies and capital improvement planning. The software syncs with both the GIS geodatabase and the Cityworks software packages.

Base line Probability of Failure (POF} and Consequence of Failure (COF) factors that WRC configured into the Power Plan software as part of the "Common to All" approach was used to estimate the overall risk of the wastewater collection system assets. For pump stations, individual assets were reviewed by staff as part of the grant work, and POF and COF factors determined and input into the software.

The assets that have the greatest probability of failure and the greatest consequences associated with the failure will be the assets that are the most critical. Assets with the highest risk scores are likely candidates for immediate rehabilitation or replacement. Assets with lower scores should to be analyzed to develop the best life cycle strategy. The Business Risk Evaluation (BRE or Risk) score is the product of the POF and COF, as shown below:

$$BRE\ (Risk)\ =\ POF \times COF$$

Using the WRC Common to All approach, the POF scoring factors for sanitary sewers (from highest to lowest weight) are the NASSCO Quick Structural Rating (QSR), NASSCO Quick Maintenance Rating (QMR), and the percent of useful life remaining, based on age and material. Pipes not inspected use only age and material as a preliminary score. Therefore, sewers with defects found during inspection and the oldest sewers will have the highest POF scores. Because only a portion of the sewerage system has been inspected, the final POF scores are still being developed.

Using the WRC Common to All approach similarly for the COF, the scoring factors for sanitary sewers (from highest to lowest weight) are the depth, diameter, water table (based on NASSCO infiltration defects found during televising) and proximity to a flood zone and major roadway. Therefore, sewers with the highest COF scores would be the larger, deeper sewers, particularly those located in floodplains, high water, or under roads.

By multiplying the POF and COF, the produce becomes the Business Risk Evaluation score, or BRE. Therefore, the most “critical” sewers, or those with highest risk, would be the larger diameter pipes that have been televised with defects found, and that are deep.

The vertical assets, in this case the pump stations were scored for POF based on the asset’s physical condition (60%), O&M protocols (25%), and performance (15%). The COF scores were based on the safety of the public and employee (25%), financial impact (15%), public confidence (10%), regulatory compliance (30%), and firm capacity (20%). Therefore, the most “critical” pump stations are those that have a lower physical condition and have higher firm capacities or more regulatory issues.

D. O&M Strategies and Revenue Structure:

O&M strategies for the system were reviewed against the "Common to All" approach developed by WRC. These include determining future sewer cleaning and televising frequency and inspection and maintenance procedures for pump stations. Costs required to implement the selected strategies were estimated and incorporated into the rate review process for the system. The OCWRC worked with Oakland County's Fiscal Services staff to determine if the current rate structures were sufficient to meet the current needs for the management of the wastewater system, and to plan for any adjustments that may be required to meet anticipated future expenses. The Power Plan software provides estimated annual maintenance and capital needs for each fund, which is then reviewed by WRC staff and the local community.

E. Long Term Funding/Capital Improvement Plan:

Capital Improvement Plans identify system upgrade, rehabilitation and replacement needs for the future, typically over a period of 20 years, with greater emphasis on the first five years of the plan. Power Plan was used to model asset deterioration and assist with identifying capital improvement needs for the near and long term. Costs for anticipated capital projects in the near term are also incorporated into the rate process.

- Approximately $360,000 of capital projects were recommended over the next five years, which includes additional inspection of sewers that were televised as part of this project.
- Approximately $469,000 of major maintenance projects were recommended over the next three years.
- Capital projects for years 5 to 20 will be identified after the additional inspection takes place. The WRC asset optimization software is currently budgeting for additional projects based on age alone, and prioritizing them based on consequence of failure. The proposed major maintenance and CIP projects will continue to be reviewed on an annual basis as more condition data is collected.

F. Contact Information:

A signed Certification of Project Completeness form is enclosed. Contact information for the grantee including name, address, and phone number is included below:

Primary Contact Name	**System Manager**	**WRC Project Manager**	**Consultant Name**
Mr. Jim Nash Water Resources Commissioner One Public Works Drive Building 95 West Waterford, Ml 48328 248.858.0958	Mr. Ben Lewis, PE Manager WRC Office One Public Works Drive Building 95 West Waterford, Ml 48328 248.858.1539	Mr. Ben Lewis, PE Manager WRC Office One Public Works Drive Building 95 West Waterford, Ml 48328	Mr. Andrew McCune, PE Wade Trim 25251 Northline Road Taylor, Ml 48180 734.947.9700 248.858.1539

G. Grant Amounts:

The original grant amount awarded to the Pontiac Sewage Disposal System was:

- $2,000,000, with a match amount of $0 (City of Pontiac is classified as a disadvantaged community) for completion of an asset management plan for the wastewater system.
- $0, with a match amount of $0 for completion of an asset management plan for the storm water system.
- $0, with a match amount of $0 for planning and design costs related to the project.
- Final, actual costs spent as part of the grant will be available after the last disbursement request.

SUMMARY OF ASSETS IN PONTIAC SEWAGE DISPOSAL SYSTEM:

See attached summary.

WRC
WATER RESOURCES COMMISSIONER

ASSET SUMMARY
Pontiac Sewer

Structures

Asset Type	Count
SewageLiftStation	11
SewerAccessPoint	2
SewerCleanout	3
SewerManhole	6,129
Total Structure Assets:	6,145

Pipe Materials

Material	Length (FT)	Segment Count
ABS Truss	3,570	22
Brick or Block	8,221	33
Cast Iron	11,051	12
Clay or VCP	1,111,112	5,013
Concrete	31,994	134
Corrugated Metal	6,598	8
Ductile Iron	3,949	22
HDPE	2,209	8
Non-reinforced Concrete	889	3
PVC	77,363	393
Reinforced Concrete	104,934	462
Truss	94,928	477
Unknown	237	4

Total Length (FT): **1,457,056** **Total Segments:** **6,591**

Pipe Diameters

Pipe Diameter	Length (FT)	Segment Count
Non-Circular	90	1
4	2,238	13
6	6,086	40
8	875,349	3,987
10	148,623	736
12	122,139	572

14	188	1
15	75,324	319
16	1,392	6
18	65,238	294
20	9,693	16
21	24,499	88
22	3,007	10
24	30,155	142
27	11,494	50
30	24,964	84
36	34,628	133
42	7,060	33
48	3,601	15
54	1,187	5
60	1,914	14
66	4,598	19
72	2,672	9
78	916	4

Total Length (FT): **1,457,056** **Total Segments:** **6,591**

Vertical Assets

Asset Type	Count
ANTENNASTRUCTURENS	11
COMMINUTORGRINDERNS	2
ELECTRICEQUIPMENTNS	65
FACILITYMETERNS	12
GENERALEQUIPMENTNS	6
GENERATORNS	10
HEATINGANDCOOLINGNS	9
INSTRUMENTATIONNS	66
PIPINGNS	20
PLANTVALVENS	26
PUMPNS	24
SCREENNS	2
STRUCTURENS	8

VARIABLESPEEDCONTROLN	7
VENTILATIONNS	11
Total Vertical Assets:	279

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date April 19, 2017
(no later than 3 years from executed grant date)

The Powderhorn Area Utility District *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1062-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]

   If No - Date of the rate methodology approval letter: October 24, 2016.

2) Significant Progress Made: Yes or No

   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)

3) Date of rate methodology review letter identifying the gap: ______________________.

4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ~~4-19-17~~.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

G. Jean Verbos	at	906-667-0465	grwa@bessemertwp.com
Name		Phone Number	Email

G. Jean Verbos 4-19-17
Signature of Authorized Representative (Original Signature Required) Date

G Jean Verbos Administrator
Print Name and Title of Authorized Representative

1211 Ludington St.
Escanaba, MI 49829
O: 906.233.9360
www.c2ae.com

POWDERHORN AREA UTILITY DISTRICT ASSET MANAGEMENT SYSTEM
PROJECT CLOSING SUMMARY
MEETING THE SAW REQUIREMENTS
SAW GRANT 1062-01

The SAW agreement with the State of Michigan was signed in May, 2013 which began the overall SAW program.

PAUD's sanitary sewer system includes 17 pump stations, 3.25 miles of forcemain, and 8.32 miles of sewer. Treatment is provided by the Bessemer Area Sewer Authority.

Five items of focus were completed.

1. **Asset Inventory:** This item which initiated the work included.
    a. Identifying and locating all assets.
        i. A list of all assets to be monitored was completed.
        ii. The GPS co-ordinates of the field assets were identified.
        iii. A GIS system was completed to index the locations.
        iv. The identified assets were inspected for making a condition assessment.
        v. The asset information was included in the Asset Management Spreadsheet (AMS).
        vi. The spreadsheet was used to quantify and order the asset information.

2. **Level of Service:**
    a. A SAW Team was created to discuss the wastewater system direction.
    b. The SAW Team met and discussed a mission statement and desired Level of Service statement.
    c. The Level of Service Statement was included in the User Charge System report.

3. **Criticality of Assets:**
    a. The AMS was used to organize the asset classes, several parameters were used to determine asset viability, rating each on a 1 to 5 scale.
        i. Redundancy, does the unit have system backup.
        ii. Criticality is the asset to critical to the system and to what degree.
        iii. Probability of failure based on its age and condition.
        iv. These items together result in a parameter identified as business risk.

   b. The AMS was the used to prioritize the need for short term repair or maintenance, short term replacement, or long term maintenance.

4. **O&M Strategies:**
   a. The AMS has a worksheet for working with the system's operating budget.
   b. The current budget information was included.
   c. Additional budget items were added to the budget to incorporate the financial needs identified above.
      i. Short term needs under five years were included and identified as replacement.
      ii. Long term need under in line labeled capital.
   d. These items are identified as system reserve needs and are intended to grow over time. Both asset management system identified reserves and borrower required reserves are listed.
   e. The current reserve set aside is compared with the asset management system calculated required set aside.
   f. If additional set-aside is necessary a rate increase is recommended.
   g. A User Charge System summary report is included detailing the information.
   h. This user charge report and the asset management spreadsheet are identified as the Rate Methodology and have been submitted previously to MDEQ.

5. **Capital Improvements:**
   a. The asset management spreadsheet identifies capital improvement projects for the future.
   b. The long term projects are identified as future public borrowings. Therefore the cost for application preparation for future funding is budgeted in the current budget.
   c. An estimate of project year and financial size is generated from an asset's AMS business risk and the asset's remaining useful life.

The system deliverables therefore are:

1. The indexing GIS system hardware and software
2. System maps
3. Asset management spreadsheet or database
4. User Charge Summary Report
5. GIS system filing system including all data collected and available for system use

The system concludes that the enterprise fund is setting aside sufficient funds for meeting the reserve set aside needs annually.

For more information contact:

PAUD Administrator
N10338 Mill St. PO Box 445
Ramsay, MI. 49959
906-667-0465

Stormwater Asset Management and Wastewater (SAW)
Sanitary Sewer System Asset Management Plan Summary

Village of Powers
3990 3rd Street
Powers, MI 49874

Ms. Carol Welch, Village President
Phone: (906) 341-2290

SAW Grant Project No. 1282-01

Executive Summary

The Village of Powers (Village) received $188,904 in funding through the Michigan SAW grant program in May of 2014 to develop an Asset Management Plan for their sanitary sewer system.

An Asset Management Plan is a long-range planning document used to provide a rational framework for understanding and documenting Village-owned assets, service levels, risks and financial investments. The intent of asset management is to ensure the long-term sustainability of the Village. By assisting the Village to make better decisions when to repair, replace or rehabilitate particular assets and by developing a long-term funding strategy, the Village can ensure its ability to deliver the required level of service perpetually.

The major components of the Asset Management Plan includes the following:

- Asset Inventory and Condition Assessment
- Level of Service
- Criticality (Consequence of Failure) of Assets
- Operation and Maintenance Strategies/Revenue Structure
- Long-term Funding/Capital Improvement Plan

Wastewater Asset Inventory

The Village wastewater system components consist of the following:

- Collection System (forcemains, gravity pipes, manholes)
- Collection System Mechanical (lift stations)
- Wastewater Treatment Plant (WWTP)
- Mobile Assets

The collection system assets were GPS located in the field and their location inserted on an aerial map to show the asset location in relation to easily referenced locations. Component specific information such as size, elevation, year constructed, material, condition rating, notes, etc. is located within the GIS system as well as in Excel spreadsheet format. Information modified or updated within the GIS system is readily available by users.

Asset components, such as lift station components, WWTP asset components and mobile assets are located in Excel spreadsheets that are readily updated by the Village.

Condition Assessment

The sanitary sewer system asset condition was measured by the following ranking system:

Condition Rating	Description
5	Unserviceable
4	Significant Deterioration
3	Moderate Deterioration
2	Minor Deterioration
1	New or Excellent Condition

The condition of the sanitary sewer gravity pipe is based on televising, smoke testing and assumed condition. The assessed condition rating of Village sanitary sewer gravity pipe within the collection system ranges from 1 to 5. The weighted average condition rating of the collection system gravity pipe is 2.9, indicating minor to moderate deterioration of sanitary sewer gravity pipe within the collection system.

The condition rating of sanitary sewer forcemain within the collection system is assumed to have a condition rating of 2.8, indicating minor to moderate deterioration of the forcemain pipe within the collection system.

The sanitary sewer manholes were inspected by manhole inspectors certified under the Pipeline Assessment Certification Program (PACP) and the Manhole Assessment and Certification Program (MACP) by the National Association of Sewer Service Companies (NASSCO). Each of the manhole components were given a rating of 1 to 5 using the ranking system noted above. An overall rating was given to the manhole based on the worst rating of the components evaluated. The sanitary sewer manholes within the collection system ranged from 1 to 4, with an average condition rating of 2.8. This indicates an overall condition between minor deterioration and moderate deterioration.

Sanitary system mechanical or lift station condition was ranked by individual components rather than the lift station as a whole since lift station individual components are replaced or reconditioned at different timeframes. A spreadsheet listing the individual component ratings is included in the report. The weighted condition rating of the lift station assets is 1.9 indicating excellent to minor deterioration.

WWTP condition was ranked by individual components rather than the WWTP as a whole since individual components are replaced or reconditioned at different timeframes. A spreadsheet listing the individual component ratings is included in the report. The condition rating and business risk was used to determine the repair, replacement and capital improvement projects. The weighted condition rating of the WWTP assets is 2.3 indicating minor to moderate deterioration.

A spreadsheet listing the individual component ratings of the mobile assets is included in the report. The weighted condition rating of the mobile assets is 2.0 indicating minor deterioration.

Level of Service Determination

Level of service defines the way in which the utility owners, managers and operators want the utility to perform over the long-term. The level of service includes technical, managerial and financial components. The level of service is a fundamental part of how the utility is operated.

The level of service needs to be evaluated and adjusted with time to match system performance, funding and changes in regulations.

The Village's level of service statement is as follows:

- Comply with all State and Federal regulatory requirements at all times.
- Maintain proper operator certification.
- Provide for the health and safety of all employees and customers.

- Provide for regular operator training to be made aware of new regulations, take advantage of advances in new technology and system troubleshooting.
- Provide for staff to attend workshops that will educate and present grant opportunities available to the Village.
- Customers will receive written notice 24 hours in advance of any planned work that will affect service or access.
- Keep spare parts available at all times for critical assets.
- Respond to customer complaints within 24 hours of receipt 95% of the time.
- Track customer complaints and locations to identify trouble spots.
- Rates will be reviewed and raised on an annual basis to keep rates in line with inflation and to avoid steady declines in revenue followed by massive rate increases.
- Make preventive maintenance a priority.
- Identify areas of high infiltration and inflow (I&I) on a yearly basis by evaluating lift station data, flow monitoring and/or televising. Follow-up with projects to reduce I&I.

Criticality (Consequence of Failure) of Assets

To determine the consequence of failure, all possible costs must be considered. These costs include: cost of repair, social cost associated with loss of the asset, repair/replacement costs related to collateral damage caused by the failure, legal costs related to additional damage caused by failure, environmental costs created by the failure, loss of business revenue to the community and other associated costs or asset losses. The consequence of failure can be high if any one of these costs are significant or the accumulation of several costs occur with failure.

Consequence of failure levels found in the table below shows the ranking system used for the consequence of failure. The description shown for each consequence will be a best fit of one of the items noted. Not all of the description items need to apply.

Consequence	Level	Description
Catastrophic disruption	5	Massive failure, severe health affect, or persistent and extensive damage
Major disruption	4	Major effect, major loss of system capacity, major health effects, major costs or important level of service compromised
Moderate disruption	3	Moderate effect, moderate loss of system capacity, moderate health effects or moderate costs, but important level of service still achieved
Minor disruption	2	Minor effect, minor loss of system capacity, minor health effects or minor costs
Insignificant disruption	1	Slight effect, slight loss of system capacity or slight health effects

Assessing business risk requires examination of the probability of failure, the consequence of the failure and redundancy. The assets that have the greatest probability of failure and the greatest consequences associated with the failure will be the assets that have the most business risk. An analysis of different assets will reveal which asset has the highest business risk and, therefore, which asset will require the most attention for either repair or replacement.

Business risk is the multiplication of the Probability of Failure number to the Consequence of Failure number and to the Redundancy Factor. The resulting number provides a numeric value to business risk. Typically, an asset falling in the range of 1 to 8 would be considered low risk. An asset falling in the business risk range of 9 to 16 will be medium risk. An asset above 16 would be considered high risk.

A summary of business risk for each of the asset groups is shown in the table below:

	Risk Level		
Asset Group	Low Risk	Medium Risk	High Risk
Gravity Pipe	94%	6%	-
Force Main	100%	0%	-
Manholes	98%	2%	-
Lift Stations	0%	100%	-
WWTP	83%	17%	-
Mobile Assets	100%	0%	-
Sanitary Sewer System	80%	20%	-

As can be seen in the table, none of the system contains any asset components that are considered high risk, with the majority of the system in the low risk category.

Revenue Structure

A funding projection worksheet was developed to evaluate current and future projections based on operating income, operating expenses, non-operating income, non-operating expenses (including principal and interest payments, bond reserve payments and restricted fund payments), planned project dedicated fund expenditures and existing fund balances. It was determined that the current rate structure provides sufficient funds to cover operation, maintenance, replacement and debt costs. The Village has implemented annual sewer rate inflation adjustments at a rate of 2.3% effective March 1st each year that will keep pace with operating expenses. Future capital improvement projects will be funded through USDA-Rural Development or through the State Revolving Loan Fund. The Village will be increasing rates as required for future planned wastewater capital improvement projects. A full rate analysis will be required by the funding agency for any future projects.

Capital Improvement Plan

The following capital improvement projects are planned over the next 20 years:

Project	Remaining Useful Life in Years	Planned Project Year	Estimated Replacement Cost
Aeration System Replacement	5	2020	$331,000
Lift Station #4 Rehabilitation	5	2020	$125,000
Clay Pipe Replacement	7	2020	$155,000
Lift Station No. 2 & No. 5 Rehabilitation	18	2033	$452,000

List of Major Assets

The Village's sanitary sewer system major assets consist of the following:

- Sanitary Sewer Gravity Pipe: 35,126 Feet
- Sanitary Sewer Forcemain: 11,127 Feet
- Sanitary Sewer Manholes: 134
- Lift Stations: 6
- Wastewater Treatment Plant: Aerated Lagoon

Department of Environmental Quality
SAW Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date November 3, 2016
(no later than 3 years from executed grant date)

The Village of Powers *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1282-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant. The Department of Environmental Quality (DEQ) defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gap in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.

Attached to this certification is a summary of the AMP that identifies major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Scott Nowack	at	(906) 774-3440	snowack@coleman-engineering.com
Name		Phone Number	Email

Rate Methodology was submitted to DEQ on: October 12, 2016
(within 2 ½ years from date of executed grant)

An initial rate increase of 149% of a $20,121 gap was adopted on December 15, 2015

Carol Welch 11/29/16
Signature of Authorized Representative (Original Signature Required) Date

Carol Welch, Village President
Print Name and Title of Authorized Representative

Prein&Newhof
Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

Memorandum

Date:	May 31, 2017
To:	Mr. Clarence Jones
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130401
Re:	Village of Ravenna, Muskegon County, SAW Grant Summary of Storm Water System Asset Management Plan

This memorandum provides the summary of the Village of Ravenna's SAW grant activities required under Section 603 of Public Act 84 of 2015. This SAW grant is for the Village of Ravenna Storm Water System. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

Village of Ravenna
12090 Crockery Creek Drive
Ravenna, MI 49451
www.ravennami.com/village

Contact Information for the grantee:

Ms. Dee Dee Hazen, Village Clerk
12090 Crockery Creek Drive
Ravenna, MI 49451

Phone: 231-853-2360

SAW Grant Project Number: 1453-01

Executive Summary

The Village of Ravenna received a SAW Grant in 2014 to prepare a Waste Water Asset Management Plan. The grant agreement indicated the following amounts:

	Plan Cost	Grant Amount	Local Match
Storm Water AMP	$198,784.00	$178,905.60	$19,878.40

The Key components in their Asset Management Plan include:

a. Asset Inventory and Condition Assessment
b. Level of Service
c. Criticality of Assets
d. Operation and Maintenance Strategies/Revenue Structure
e. Long-term Funding/Capital Improvement Plan

Asset Inventory

Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.

All assets that are functionally or financially significant to the waste water system have been inventoried.

- Collection system manholes, catch basins, and outlets were located using survey quality GPS.
- Detention basins and buildings were located using satellite imagery and record drawings.

Locations for all assets are recorded in a GIS. Data regarding date of installation, material, and other physical characteristics for each asset is incorporated into the GIS geodatabase. These assets were not mapped in GIS.

The GIS and asset spreadsheets will all be used to maintain asset data in the future.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

The condition of collection system piping was documented with a pole mounted zoom camera (looking down each pipe from the manholes). The zoom camera method provided a very economical initial condition assessment of the pipes. The initial condition assessment of the pipes provided satisfactory results; therefore follow-up inspections with full in-line closed-circuit televising (CCTV) were not required in the storm system.

Using the zoom camera data, pipes were rated based on several factors such as joint conditions, wall corrosion, and infiltration. Composite Risk of Failure ratings of 1-5 (5 being the worst) were assigned to each pipe segment.

Percentage of length of pipe within each rating category

1	2	3	4	5
28%	59%	11%	1%	1%

Manholes, catch basins, outlets, culverts, and detention basins were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, and structures.

Percentage of manholes/catch basins within each rating category

1	2	3	4	5
67%	25%	4%	4%	0%

Level of Service Determination

Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.

The village of Ravenna recognizes that the people served by the system are more than customers, they are the system owners. The village staff act as stewards of the system who strive to maintain the best system possible with the finances available. This is challenging because there is no dedicated revenue for storm water. However, the storm system in Ravenna is fairly small. The results of inventory and assessments have been discussed at council meetings and with staff. Based on the input received during those meetings, the following Level of Service Goals:

1. Meet Regulatory Requirements
    a. No current regulatory requirements
    b. Be aware of illicit/dry weather discharges
2. Minimize Flooding and Public Hazards
    a. Staff/equip crews sufficiently to perform specific routine maintenance items
    b. Perform regularly scheduled monitoring and maintenance on all of our storm water system assets
    c. Follow Muskegon County Drain Commission guidelines
3. Review new connections and site plans in relation to system capacity
    a. Follow Muskegon County Drain Commission guidelines
    b. Enforce erosion control on construction sites
4. Minimize Life Cycle Costs
    a. Maintain the system to limit assets in our system with RoF ratings of 4 or 5.
5. Maintain Active Water Quality
    a. Continue a street sweeping and catch basin cleaning program
    b. Maintain a relationship with the Ravenna Township to protect Crockery Creek watershed including wetlands and drains
    c. Maintain detention basin outlets to ensure proper function
6. Review ownership and easements for all drains/assets
7. Prepare management plan for County drains serving Village
8. Review plan every 5 years

Criticality of Assets

Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions. The factors considered varied by the asset type and were tailored to identify both physical and functional deficiencies. For example, pipe ratings considered factors such as joint offsets and structural cracking while detention basin ratings considered factors such as sediment accumulation and remaining working volume.

Assets were given a Consequence of Failure (CoF) of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Serve schools/hospitals/major industry
- Are under major roads
- Are adjacent to waterways or significant wetlands

Consequence of Failure and Criticality should not be confused. Criticality is the product of as asset's Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset's action priority.

Criticality ratings were calculated and ranged from 1-25 (25 being the highest priority). We then ran a Jenks Optimization to create 5 primary groupings, each with a rank of 1-5 (5 being highest priority).

Revenue Structure

Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.

The Village of Ravenna has no specific revenue structure for storm water. Stormwater projects are handled by the General Fund as needed. Projects or maintenance needed will be evaluated during the Village's yearly budget cycle in order to continue the desired level of service.

Capital Improvement Plan (CIP)

Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.

The Village of Ravenna has a very limited storm water system. No specific failures or improvements were identified as being needed in the short term. As projects involving other utilities and roads in proximity to storm water assets are identified, such as road replacement, consideration should be given to assessment, rehabilitation, and replacement as needed. The RoF and Criticality ratings should be used in prioritizing actions. Because the storm water collection system assets share physical space with other asset systems such as waste water, roadway, and drinking water, it is imperative that any CIP process coordinate actions with other utility systems.

List of the major identified assets

- 18,283 feet of gravity storm sewer
    - Current replacement value of $2,200,000
- 16 manholes and 125 catch basins
    - Current replacement value of $700,000
- 5 detention basins
- 27 storm water outlets

Deliverables/Reports Prepared

Information and reports prepared and provided under this grant include:

1. *GIS mapping and database and Arc Reader files*
2. *Asset Management pipe spreadsheet*
3. *Sewer Flow Study – Storm Water Collection System and Capacity Analysis*
4. *Storm Water System Evaluation*
5. *Storm Water Asset Management Plan*

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date May 31, 2017
(no later than 3 years from executed grant date)

The Village of Ravenna, Michigan *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1453-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Dee Dee Hazen	at 231-853-2360	vravclerk@frontier.com
Name	Phone Number	Email

Dee Dee Hazen — 5-31-17

Signature of Authorized Representative (Original Signature Required) — Date

Dee Dee Hazen, Village Clerk

Print Name and Title of Authorized Representative

Prein&Newhof
Engineers ▪ Surveyors ▪ Environmental ▪ Laboratory

Memorandum

Date:	May 31, 2017
To:	Mr. Clarence Jones
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130401
Re:	Village of Ravenna, Muskegon County, SAW Grant Summary of Waste Water System Asset Management Plan

This memorandum provides the summary of the Village of Ravenna's SAW grant activities required under Section 603 of Public Act 84 of 2015. This SAW grant is for the Village of Ravenna Waste Water System. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

Village of Ravenna
12090 Crockery Creek Drive
Ravenna, MI 49451

www.ravennami.com/village

Contact Information for the grantee:

Ms. Dee Dee Hazen, Village Clerk
12090 Crockery Creek Drive
Ravenna, MI 49451

Phone: 231-853-2360

SAW Grant Project Number: 1453-01

Executive Summary

The Village of Ravenna received a SAW Grant in 2014 to prepare a Waste Water Asset Management Plan. The grant agreement indicated the following amounts:

	Plan Cost	Grant Amount	Local Match
Waste Water	$362,327.00	$326,094.30	$36,232.70

AMP			

The Key components in their Asset Management Plan include:

a. Asset Inventory and Condition Assessment
b. Level of Service
c. Criticality of Assets
d. Operation and Maintenance Strategies/Revenue Structure
e. Long-term Funding/Capital Improvement Plan

Asset Inventory

Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.

All assets that are functionally or financially significant to the waste water system have been inventoried.

- Collection system manholes were located using survey quality GPS.
- Lift stations and buildings were located using record drawings and satellite imagery.
- Fixed assets within the waste water treatment plant (WWTP) were mapped based on plant schematics and record drawings.

Locations for assets that have fixed geographic locations such as pipes, manholes, buildings, and major fixed equipment are recorded in a GIS. Data regarding date of installation, material, and other physical characteristics for each asset is incorporated into the GIS geodatabase. Location of non-pipe assets such as lift station components, WWTP components, building components, and other equipment is compiled in a package of inventory spreadsheets. These assets were not mapped in GIS.

The GIS, asset spreadsheets, and will all be used to maintain asset data in the future.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

The condition of collection system piping was documented with either a pole mounted zoom camera (looking down each pipe from the manholes) or with in-line closed circuit television (CCTV) from manhole to manhole. The zoom camera method provided a very economical initial condition assessment of the pipes. Pipes noted to have potentially significant deficiencies were flagged and follow-up inspections were performed with full in-line CCTV.

Using the zoom camera data, pipes were rated based on several factors such as joint conditions, wall corrosion, and infiltration. Composite Risk of Failure ratings of 1-5 (5 being the worst) were assigned to each pipe segment.

Pipes inspected with CCTV were rated using the PACP system (Pipeline Assessment Certification Program). The PACP ratings were then used to derive a composite Risk of Failure rating of 1-5 for each pipe.

Percentage of length of pipe within each rating category

1	2	3	4	5
41%	45%	13%	1%	0%

Manholes were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, and structures.

Percentage of manholes within each rating category

1	2	3	4	5
6%	88%	6%	0%	0%

Equipment within two lift stations and the WWTP were rated on a scale of 1-5 based on factors relating to physical condition and operating condition. Both lift stations are nearing the end of their useful lives and the Village is making plans for full replacement. Generally the WWTP equipment is currently in good condition with no major capital improvements needed at this time.

Level of Service Determination

Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.

The Village has established the following basic Level of Service Goals:

1. Meet Regulatory Requirements
    a. Maintain at least 2 Certified Operators
    b. Meet NPDES discharge requirements
    c. Minimize opportunities for Sanitary Sewer Overflows
2. Minimize Service Interruptions
    a. Staff/equip crews sufficiently to perform routine maintenance items
    b. Repair/replace assets as required to limit emergency responses
3. Minimize Public Hazards
    a. Staff/equip emergency response services for 24 hour per day service and 60 minute response times
    b. Limit service interruptions to less than 6 hours
    c. Minimize sanitary sewer failures or backups to no more than 2 per year
4. Manage Storm Water Inflow and Ground Water Infiltration
    a. Monitor I/I and implement CIP projects to reduce I/I
5. Maintain Some Capacity for Community Growth
6. Minimize Life Cycle Costs
7. Assure adequate financial reserves
    a. Review rates every year
8. Review Asset Management Plan annually

Criticality of Assets

Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions. The factors considered varied by the asset type and were tailored to identify both physical and functional deficiencies. For example, pipe ratings considered factors such as joint offsets and structural cracking while lift station pumps considered factors such as design pumping rate vs actual pumping rate.

Assets were given a Consequence of Failure (CoF) of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- *Provide service to a significant portion of the system*
- *Serve schools/hospitals/major industry*
- *Are under major roads*
- *Are adjacent to waterways or significant wetlands*

Consequence of Failure and Criticality should not be confused. Criticality is the product of as asset's Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset's action priority.

Criticality ratings were calculated and ranged from 1-25 (25 being the highest priority). We then ran a Jenks Optimization to create 5 primary groupings, each with a rank of 1-5 (5 being highest priority). The final Criticality ratings were considered when the comprehensive Capital Improvement Plan was generated.

Revenue Structure

Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not *sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.*

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a “Test Year” was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.

The customer base was reviewed, including the number of billable customers and volumetric sales. Other operating and non-operating revenues were also evaluated. Prediction of customer and volume counts were made including trending in system utilization, projection of operating costs, and anticipated inflation by expense category. Refinancing and/or restructuring possibilities were also explored.

The Capital Improvement Plan (CIP) provided refined cost projections for the first 10 years of the financial analysis. The Asset Management System identified the estimated asset investment cost by year for the remaining lifecycle of all assets. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. Based on that analysis, rate adjustment options were identified. It was determined that the current rate structure was sufficient to cover Operation &Maintenance (O&M) activities but increases were needed to fully implement the desired CIP. Public meetings were held to convey the results of the asset evaluation (RoF and Criticality) along with the financial evaluation. We are moving forward with the rate changes required to provide our desired Level of Service.

Capital Improvement Plan (CIP)

Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.

Once RoF ratings for the assets were assigned and actions prioritized using the Criticality ratings, action timelines were predicted for maintenance/repair/replacement. Because the waste water collection system assets share physical space with other asset systems such as storm water, roadway, and drinking water, it was imperative that the CIP process coordinated actions on these systems. No improvements in roadways are being planned at this time but if they are then other projects such as road and drinking water system work should be coordinated and considered in the process.

Individual project scopes for the comprehensive CIP were created to maximize coordination of work on various assets and minimize overall costs. The CIP projections include improvements to the waste water system (both collection and treatment), storm water system, and road system. At this time no improvements to systems other than waste water are considered, however. The CIP costs were incorporated into the revenue structure review. A 10-year CIP document was created which will be available to the public.

The following capital improvements planned for the next 10 years include:

CIP Implementation Timeline

Planned Year (1)	**Project Title**	**Total Est. Cost**	
2018	South Lift Station Replacement	$1,319,500	(2)
2018	North Lift Station Replacement	$474,500	(2)
2018	Wastewater Treatment Plant Improvements - Berm Repair and Control Structure Abandonment	$45,500	(2)
2026	Wastewater Treatment Plant - Sludge removal from Pond 1	$350,000	(3)

Notes:

(1) Unplanned repairs may necessitate adjustments in priority.

(2) All costs estimated in 2017 dollars and includes engineering, contingency and legal allowance.

(3) Cost includes inflation of 3% per year.

List of the plan's major identified assets

- 66 MGD Maximum Annual Flow Waste Water Treatment Plant
    - Current replacement value of $3,600,000
- 2 lift stations
    - Current replacement value of $1,800,000
- 9,900 feet of sanitary force main
    - Current replacement value of $1,200,000
- 47,300 feet of gravity sanitary sewer
    - Current replacement value of $5,700,000

Total current replacement value of $12,300,000

Deliverables/Reports Prepared

Information and reports prepared and provided under this grant include:

1. *GIS mapping and database and Arc Reader Files*
2. *Asset Management pipe spreadsheet*
3. *Asset Management non-pipe spreadsheet*
4. *Sewer Flow Study – Wastewater Collection System and Inflow/Infiltration Analysis*
5. *Wastewater System Evaluation*
6. *Smoke Testing Report*
7. *Capital Improvement Plan (including Financial Analysis)*
8. *Waste Water Asset Management Plan*

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The Village of Ravenna, Michigan *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1453-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: Oct. 11, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: __________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on __________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Dee Dee Hazen	at 231-853-2360	vravclerk@frontier.com
Name	Phone Number	Email

DeDe Hazen
Signature of Authorized Representative (Original Signature Required)

5-31-17
Date

Dee Dee Hazen, Village Clerk
Print Name and Title of Authorized Representative

April 2017

Prein&Newhof
Engineers■Surveyors■Environmental■Laboratory

May 30, 2017
2130421

Ms. Valorie White, Project Manager
MDEQ
Office of Drinking Water and Municipal Assistance
P.O. Box 30241
Lansing, MI 48909-7741

RE: SAW Grant Project No. 1460-01
Wastewater and Stormwater Asset Management Plans
City of Rockford, Kent County

Dear Ms. White:

In accordance with your letter dated April 25, 2017, we are submitting on behalf of the City of Rockford the required SAW grant deliverables as follows:

1. Certifications of Project Completeness (one stormwater and one wastewater), signed by Mr. David Jones, Rockford Interim City Manager
2. Project executive summaries (one stormwater and one wastewater) as required under Section 603 of Public Act 84 of 2015, including contact information for the City, a brief discussion of each of the five major components of the Asset Management Plan, and a list of the City's major identified assets

The City has completed the Asset Management Plans, which will be available to the MDEQ upon request and available to the public for at least fifteen years.

We are submitting these documents prior to the May 31, 2017, grant deliverable deadline. Final grant-eligible expenses will be incurred prior to May 31, 2017, and final disbursement requests will be submitted by July 30, 2017 (60 days after grant end date). It is our understanding that this will complete the City's obligations under the grant.

If you have any questions, please contact our office.

Sincerely,

Prein&Newhof

Mark R. Prein, P.E.

Enclosures

c. Mr. Jamie Davies, Director of Public Services, City of Rockford
Ms. Leslie Sorensen, DEQ-Water Resources Division, Grand Rapids District Office

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 8, 2017
(no later than 3 years from executed grant date)

The City of Rockford *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1460-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: October 11, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: __________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on __________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Name		Phone Number	Email
Jamie Davies	at	(616) 951-7503	jdavies@rockford.mi.us

Signature of Authorized Representative (Original Signature Required)

Date: 05.26.2017

David Jones, Interim City Manager
Print Name and Title of Authorized Representative

Memorandum

Date:	May 30, 2017
To:	Ms. Valorie White
Company:	Michigan Department of Environmental Quality
From:	Prein&Newhof
Project #:	2130421
Re:	City of Rockford SAW Grant: Summary of Wastewater Asset Management Plan

Mr. White:

This memorandum provides the summary of the City of Rockford wastewater asset management plan SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

SAW Grant Project Number: 1460-01

Grantee:

City of Rockford
7 S. Monroe St
Rockford, MI 49341
http://rockford.mi.us/

Contact: Mr. Jamie Davies, Director of Public Services
Phone: 616-825-5014

Executive Summary

The City of Rockford received a SAW Grant in 2014 to prepare a Waste Water and Storm Water Asset Management Plans. The Grant agreement indicated the following amounts:

Project Total	Grant Amount	Local Match
$937,189	$843,470	$93,719

Project Total	Wastewater Costs	Stormwater Costs
$937,189	$439,828	$497,361

The Key components in the Asset Management Plan include:

1. Asset Inventory and Condition Assessment
2. Level of Service
3. Criticality of Assets
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

Asset Inventory

"Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets."

Manhole, gravity sewer main, force main, and lift station locations were plotted in a Geographic Information System (GIS) using record drawings. Manhole and lift station locations were field verified and locations adjusted with Global Positioning System (GPS) coordinates.

Asset inventory data including year of installation, material, sizes, pipe inverts and manhole rim elevations were cataloged from record drawing and visually verified where needed. Asset inventory data is managed using GIS databases.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

Gravity Sewer Mains: Inspections were made using either a pole mounted zoom camera (looking up or down each pipe from the manholes) or with in-line closed circuit television (CCTV) cameras. Pipes inspected with zoom camera methods were rated considering any observable roots, deposits, joint conditions, pipe wall condition, infiltration, or other defect observations. Pipes inspected with CCTV were rated using the PACP system condition grading system. Composite Risk of Failure ratings of 1-5 were derived for each pipe.

Percentage of gravity sewer pipes in each rating category

1	2	3	4	5
62%	20%	7%	8%	3%

Force Mains: Force main conditions were estimated using pipe age, material, and break history records. Rockford's force main data was compared with that of several other municipalities to establish a comparative reference. Ratings of 1-5 were developed for each force main.

Percentage of force main pipes in each rating category

1	2	3	4	5
15%	81%	0%	0%	4%

Manholes: Manholes were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, structures, and infiltration.

Percentage of manholes in each rating category

1	2	3	4	5
5%	66%	15%	11%	3%

Lift Stations: Visual inspection and performance testing were completed to evaluate asset condition. Lift station assets, including pumps, valves, piping, structures, electrical, controls, and other assets, were rated on a scale of 1-5. Composite ratings for the station as a whole were developed.

Number of lift stations in each rating category

1	2	3	4	5
0	0	1	4	0

Level of Service Determination

"Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard,

safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined."

The City recognizes that the people served by the system are more than customers, they are the system owners. City staff act as stewards of the system. The City has held a series of public meetings and workshops with the City Council. At these meetings, the results of the condition assessments were discussed, the costs for various OM&R strategies affecting the levels of service were reviewed along with potential rate impacts. Based on the input received during these meetings, the following Level of Service Goals have been established:

1. Meet Regulatory Requirements
2. Minimize Service Interruptions
3. Minimize Public Hazards
4. Manage Storm Water Inflow and Ground Water Infiltration
5. Provide Capacity for Community Growth
6. Minimize Life Cycle Costs

Criticality of Assets

"Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?"

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions as determined through condition assessments. Assets were given a Consequence of Failure (CoF) rating of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Serve schools/hospitals/major industry
- Are under major roads or are adjacent to other major utilities
- Are adjacent to waterways or significant wetlands

Criticality ratings were calculated as the product of an asset's RoF and CoF, producing criticality ratings ranging from 1-25 (25 being the most critical). The most critical assets were found to be gravity sewers primarily along the Rogue River, near the downtown area, under Wolverine Boulevard.

Revenue Structure

"Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital

improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

Historical operating expenses were reviewed using current audit and budget information. Based on that information, a "Test Year" was developed that reflected a baseline cost. The baseline costs included currently budgeted expenses, debt service, and leveling for base operating cost.

The customer base was reviewed, including the number of residential equivalent units in our system. Other operating and non-operating revenues were also evaluated. Prediction of customer connections were made including trending in system utilization, projection of operating costs, and anticipated inflation by expense category.

A forecasting system was developed and used to identify the estimated replacement investment for the remaining lifecycle of all assets, based on the asset inventory and condition assessment data. Project costs were estimated for capital improvements within the first 10 years. The annual investment cost was evaluated and scenarios developed for cash funding and debt financing. Based on this analysis, it is expected that a combination of future rate increases and debt financing will be needed to fund capital projects.

Capital Improvement Plan

"Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects."

A capital improvement plan showing project descriptions, cost estimates, and project timelines, was developed for the capital improvements needed within a ten year planning period. The waste water system projects identified in the CIP are:

- Prospect Street
- West Bridge Street
- Rockview Drive Lift Station
- South Main Street
- Lincoln Street
- Peach Tree Lift Station Elimination
- Maple Street
- Krause Street
- Louise Street
- Freemont Street
- Monroe Street
- While Pine Trail Sewer

List of Major Assets

“Provide a general list of the major assets identified in the AMP.“

Rockford’s major assets include:

- 5 lift stations
- 164,200 feet of 6” to 21” diameter gravity sewer
- 12,300 feet of 4” to 16” diameter force main
- 709 manholes

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date May 8, 2017
(no later than 3 years from executed grant date)

The City of Rockford *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1460-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Jamie Davies	at (616) 951-7503	jdavies@rockford.mi.us
Name	Phone Number	Email

05.26.2017

Signature of Authorized Representative (Original Signature Required) Date

David Jones, Interim City Manager

Print Name and Title of Authorized Representative

Memorandum

Date: May 30, 2017

To: Ms. Valorie White

Company: Michigan Department of Environmental Quality

From: Prein&Newhof

Project #: 2130421

Re: City of Rockford SAW Grant: Summary of Storm Water Asset Management Plan

Mr. White:

This memorandum provides the summary of the City of Rockford storm water asset management plan SAW grant activities required under Section 603 of Public Act 84 of 2015. Headings and italicized quotes are from recent MDEQ guidance.

Grantee Information

SAW Grant Project Number: 1460-01

Grantee:

City of Rockford
7 S. Monroe St
Rockford, MI 49341
http://rockford.mi.us/

Contact: Mr. Jamie Davies, Director of Public Services
Phone: 616-825-5014

Executive Summary

The City of Rockford received a SAW Grant in 2014 to prepare a Waste Water and Storm Water Asset Management Plans. The Grant agreement indicated the following amounts:

Project Total	Grant Amount	Local Match
$937,189	$843,470	$93,719

Project Total	Wastewater Costs	Stormwater Costs
$937,189	$439,828	$497,361

The Key components in the Asset Management Plan include:

1. Asset Inventory and Condition Assessment
2. Level of Service
3. Criticality of Assets
4. Operation and Maintenance Strategies/Revenue Structure
5. Long-term Funding/Capital Improvement Plan

Asset Inventory

"Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets."

Manhole, catch basin, sewer pipe, culvert, open channel, and detention basin locations were plotted in a Geographic Information System (GIS) using record drawings, aerial imagery, and land contours. Locations were field verified and locations adjusted with Global Positioning System (GPS) coordinates.

Asset inventory data for storm sewers and culverts, including year of installation, material, and sizes, were cataloged from record drawing and visually verified where needed. Asset inventory data is managed using GIS databases.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

Storm Sewer Pipes and Culverts: Inspections were made using either a pole mounted zoom camera (looking up or down each pipe from the manholes) or with in-line closed circuit television (CCTV) cameras. Pipes inspected with zoom camera methods were rated considering any observable roots, deposits, joint conditions, pipe wall condition, or other defect observations. Pipes inspected with CCTV were rated using the PACP system condition grading system. Composite Risk of Failure ratings of 1-5 were derived for each pipe.

Percentage of gravity sewer pipes in each rating category

1	2	3	4	5
69%	24%	5%	<1%	2%

Manholes and Catch Basins: Manholes and catch basins were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, structures, and sediment.

Percentage of structures in each rating category

1	2	3	4	5
6%	84%	8%	1%	1%

Level of Service Determination

"Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined."

The City recognizes that the people served by the system are more than customers, they are the system owners. City staff act as stewards of the system. The City has held a series of public meetings and workshops with the City Council. At these meetings, the results of the condition assessments were discussed, the costs for various OM&R strategies affecting the levels of service were reviewed along with potential costs. Based on the input received during these meetings, the following Level of Service Goals have been established:

1. Meet Regulatory Requirements
2. Minimize Flood Risk
3. Minimize Public Hazards
4. Manage Storm Water Discharges into the Waste Water System
5. Support Community Growth and Development
6. Maintain Water Quality
7. Minimize Life Cycle Costs

Criticality of Assets

"Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?"

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions as determined through condition assessments. Assets were given a Consequence of Failure (CoF) rating of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment..

Criticality ratings were calculated as the product of an asset's RoF and CoF, producing criticality ratings ranging from 1-25 (25 being the most critical). The most critical assets were found to be storm sewers along Main Street, Bridge Street, Prospect Street, Spring Street, Summit Ave, Longview Drive.

Revenue Structure

"Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made."

Storm water system improvements are funded with street improvements through the City's general fund. Project costs were estimated for capital improvements within the first 10 years. Future costs beyond the 10 year capital improvement plan were projected using inventory and condition assessment data. Based on this analysis, the City is considering property tax millage rate increases to begin increasing general fund revenues.

Capital Improvement Plan

"Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects."

A capital improvement plan showing project descriptions, cost estimates, and project timelines, was developed for the capital improvements needed within a ten year planning period. The storm water system projects identified in the CIP are:

- Rollingwood Drive
- Donald Street
- Prospect Street
- West Bridge Street
- Summit Avenue
- South Main Street
- Lincoln Street

- Maple Street
- Krause Street
- Louise Street
- Freemont Street
- Monroe Street
- Kinross Drive and Kinross Court

List of Major Assets

"Provide a general list of the major assets identified in the AMP."

Rockford's major assets include:

- 103,200 feet of 4" to 48" diameter storm sewer
- 318 manholes
- 790 catch basins
- 12 culverts ranging from 12 inch diameter pipe up to a 5' rise by 20' span box culvert (Rockford's three bridges, located on Monroe Street, Main Street, and Bridge Street are not included in the storm water asset management plan)

To:	Village of Roscommon	Date:	May 23, 2017
From:	Adam Segerlind, P.E. Clyde Johnson, P.E.	Re:	SAW Grant Executive Summary
cc:	[Name]		

GRANTEE:	Village of Roscommon
GRANT NUMBER:	1236-01
AUTHORIZED REPRESENTATIVE:	Nicole Crespo, Administrative Assistant
PLAN LOCATION:	Village of Roscommon Offices 702 Lake Street P.O. Box 236 Roscommon, MI 48653
PHONE:	(989) 275-5743

1.0 INTRODUCTION

The Village of Roscommon was the recipient of a Stormwater, Asset Management and Wastewater (SAW) grant from the Michigan Department of Environmental Quality. An asset management plan (AMP) for the Village's sanitary sewer system was developed and is available for review by the public. The AMP was developed in accordance with the grant application and the requirements of the grant agreement. The following Scope of Work was proposed in the grant application:

1. Collection System Map
   - Compile and develop a map of the sewer collection system.
   - Field locate system components with GPS equipment for inclusion in a system GIS database.
   - Develop a new AM/Geographic Information System (GIS) system to manage the assets of the system, including mapping software, hardware and training
2. Inventory and assessment of fixed assets
   - Brief description of the asset, its required capacity, level of redundancy, and ID number
   - Location of the asset
   - Year the asset was installed (when available)
   - Complete an asset condition assessment (manhole inventory, cleaning and televising).

- Describe present condition of the asset (e.g. excellent, good, fair, poor)
- Depreciated value of the asset
- Current asset replacement cost
- Risk Evaluation that combines the probability of failure and criticality of the asset
- Force account costs associated with the direct implementation of the AMP/GIS software and hardware, including locating manholes, assistance during mapping and televising efforts, asset assessment and data entry.

3. OM&R Budget and Rate Sufficiency
   - Complete an assessment of user rates and replacement fund.
   - Technical, legal, and financial costs to develop a funding structure and implementation schedule necessary to implement an AMP.
4. Level of Service
   - Establishing a Level of Service guidance, including service agreement development, public meeting costs, and ordinance costs.

To complete this work, the Village of Roscommon was awarded a grant totaling $406,756.00, with zero ($0) local match due to their Disadvantaged Community Status. As required by the grant agreement, this summary report has been prepared to meet the requirements of Section 603 of Public Act 84 of 2015 and includes the following information:

1. Contact Information
2. Review of the five major AMP components
3. List of major assets

2.0 MAJOR AMP COMPONENTS

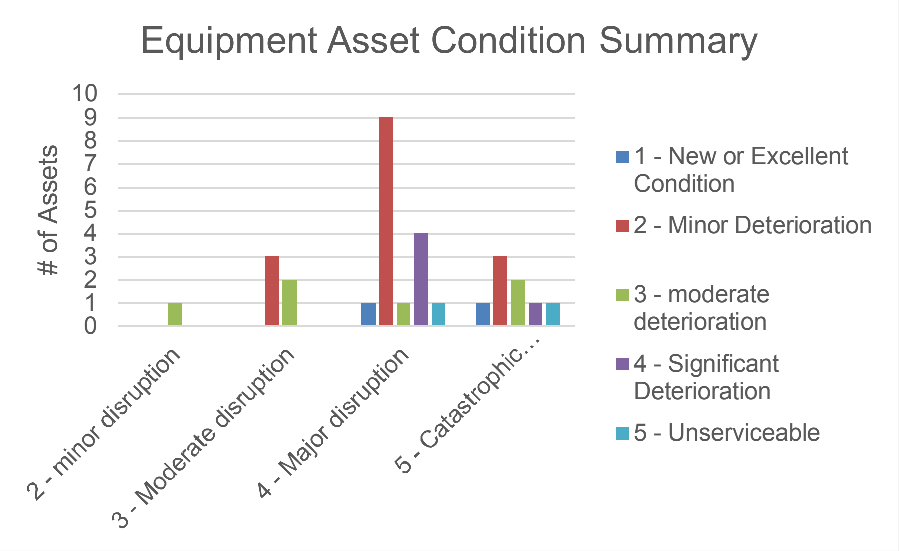
The Village of Roscommon elected to utilize a spreadsheet based AMP platform to record and track asset data. The AMP includes sanitary sewer system components utilized in the collection, treatment, and analysis of sanitary sewer flows and equipment utilized to maintain those systems. The five major components of the AMP, identified below, are summarized in the following subsections.

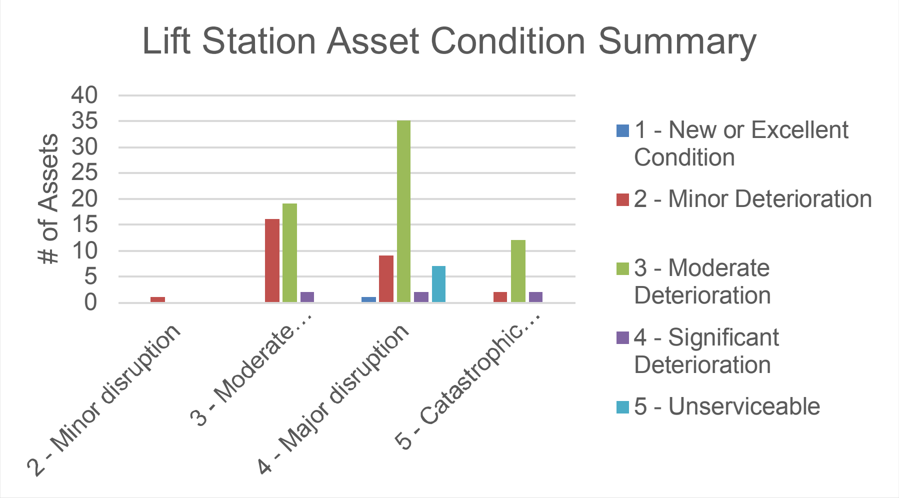
1. Asset Inventory and Condition Assessment
2. Level of Service
3. Criticality of Assets
4. Operation and Maintenance Strategies / Revenue Structure; and,
5. Long-term Funding / Capital Improvement Plan

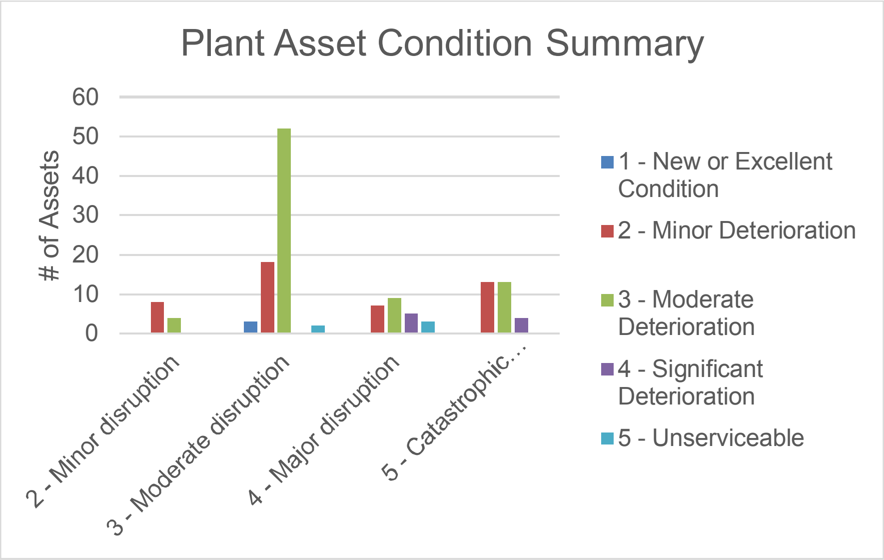
2.1 Asset Inventory and Condition Assessment

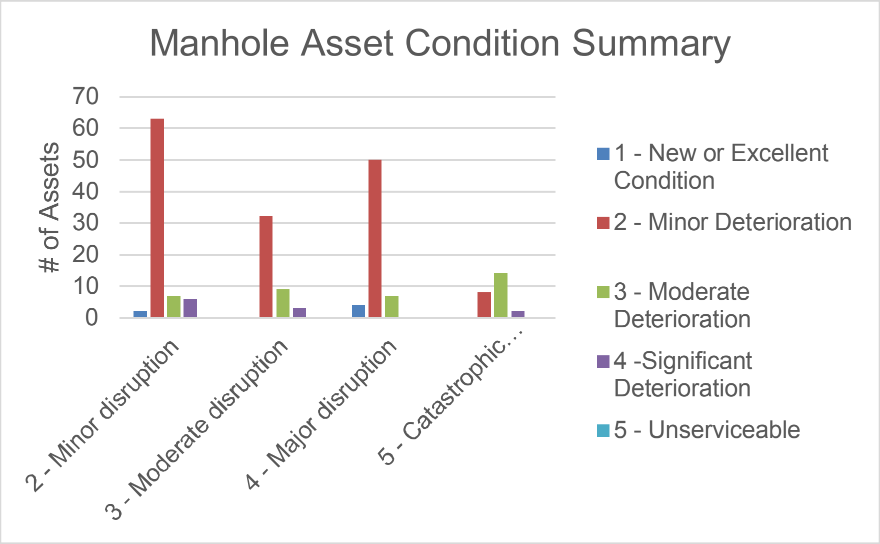
An asset inventory and condition assessments for the Village of Roscommon sewer system was compiled by Village and Gosling personnel. Collection and treatment assets were categorized as Equipment; Lift Station; Plant; Manhole; or, Pipe assets and populated into the AMP spreadsheet. Conditions were assigned on a 1 (very good) to 5 (very poor) rating scale based upon visual inspections and operational experience of the Village personnel. Qualifying gravity sewer pipes were inspected using CCTV techniques in accordance with the National Association of Sewer Service Companies (NASSCO) pipe standard. Manholes inspections were completed in accordance with the NASSCO level 1 standard.

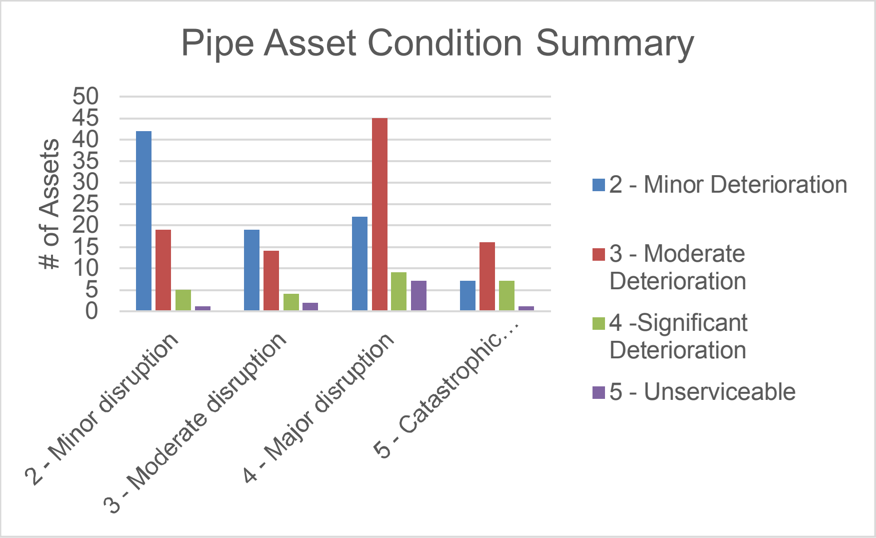
Condition and criticality for each asset category are summarized in the following charts.






Plant Asset Condition Summary
60
50
40
30
20
10
0
# of Assets
2 - Minor disruption
3 - Moderate disruption
4 - Major disruption
5 - Catastrophic…
1 - New or Excellent Condition
2 - Minor Deterioration
3 - Moderate Deterioration
4 - Significant Deterioration
5 - Unserviceable


Manhole Asset Condition Summary
70
60
50
40
30
20
10
0
# of Assets
2 - Minor disruption
3 - Moderate disruption
4 - Major disruption
5 - Catastrophic…
1 - New or Excellent Condition
2 - Minor Deterioration
3 - Moderate Deterioration
4 -Significant Deterioration
5 - Unserviceable


Pipe Asset Condition Summary
50
45
40
35
30
25
20
15
10
5
0
# of Assets
2 - Minor disruption
3 - Moderate disruption
4 - Major disruption
5 - Catastrophic…
2 - Minor Deterioration
3 - Moderate Deterioration
4 -Significant Deterioration
5 - Unserviceable

2.2 Level of Service

The Village of Roscommon's Infrastructure Committee established the Level of Service for the sewer utility. The Level of Service was presented to the Council, and members of the community, during an April 2017 Village Council work session.

Village of Roscommon

Level of Service Statement

March 1, 2017

The Village of Roscommon owns and operates a wastewater collection and treatment system and has developed a "Level of Service Statement" to guide the long term sustainability of this community asset. The goal of the Village is to provide a Level of Service that:

1. Meets all minimum State and Federal regulatory requirements and operates in a manner that is protective of the environment and public health.
2. Has adequate staffing to conduct routine operations and maintenance, as well as respond to emergency situations.
3. Has adequately trained staff with the proper certifications to keep the utility within regulatory compliance and conduct day to day operations safely.
4. Generates sufficient revenue to cover all costs, including operations and supplies, labor, training, and annual savings for future repair and replacement of equipment.
5. Generates sufficient revenue to fund periodic Capital Improvements to insure system assets have adequate capacity, redundancy, and are in proper working order.
6. Responds to customer questions, requests, and complaints in a prompt and professional manner.
7. Provides efficient operations and makes prudent decisions to keep user costs as low as possible while maintaining the Level of Service desired.

2.3 Criticality of Assets

The criticality of each asset was assigned based on how much disruption the assets failure may cause to the system. Criticality ratings were assigned on a scale of 1 (insignificant) to 5 (catastrophic). Factors considered during the criticality evaluations include:

1. Redundancy of asset
2. Proximity to surface waterbody
3. Proximity to sensitive populations (i.e. hospital, jail)
4. Current use status (i.e. backup or active)

2.4 Operation and Maintenance Strategies / Revenue Structure

A financial analysis of the 2016 budget was completed and it was determined that a funding gap did not exist based on their revenue and expenses. This analysis was submitted by H.J. Umbaugh and Associates at the 2.5-year mark of the grant. The MDEQ approved the rate methodology in a letter dated November 9, 2016.

Each asset in the AMP is classified as either a Capital or Repair, Replace and Improve (RRI) asset. The RRI assets are generally considered to be assets with less than a 20-year lifespan that are typically repaired or replaced with funds from the sewer fund. RRI cost projects for the next 20 years, based upon the anticipated replacement year, were added to the revenue structure review for consideration by the Village.

2.5 Long-term Funding / Capital Improvement Plan

Capital assets generally have a longer lifespan and may require the use of another funding source to implement repair or replacement. Potential capital improvement projects identified during preparation of the AMP include:

1. Replacing the vacuum truck
2. Resurfacing plant access roads
3. Rebuilding a lift station
4. Replacing fifteen sections of gravity sewer

Some potential long-term funding scenarios were presented to the Village Council for evaluation by H.J. Umbaugh and Associates. It is the Village's responsibility to review and evaluate the funding scenarios presented and determine the best course of action as it relates to user rates, capital and repair projects and the sewer fund cash balance.

3.0 MAJOR ASSETS

The major assets for each of the five asset categories are summarized in the following tables.

EQUIPMENT ASSETS
WWTP - Composite Sampler #1
WWTP - Composite Sampler #2
WWTP - Composite Sampler #3
WWTP - Garage Building
WWTP – Laboratory Equipment
WWTP – Main Building

LIFT STATION ASSETS
#1 – Main Lift
#2 – Lake Street
#3 – Brooks Street
#4 – Main Street
#5 – Boardwalk
#6 – Division Street
#7 – Robinson
#8 – South Line

PLANT ASSETS
Aeration Cell #1
Aeration Cell #2
Aeration Cell #3
Aeration Cell #4

PLANT ASSETS
Chlorination Building
Chlorination Chamber
Ferric Chloride System
Plant Piping
Pipe - Outfall
Polishing Pond
Structure #1 Valve Pit
Structure #1 Wet well
Structure #3
Structure #4
Structure #5 East
Structure #5 West
Structure #6
Valve EM1
Valve EM2
Valve EM3
Wetland 1-2 Structure
Wetland 3-4 Structure
WWTP - Access Roads

MANHOLE ASSETS
Gravity Sewer Manholes (183)
Force main Structures (7)
Lift Station Wet wells (8)
Lift Station Valve Chambers (8)

PIPE ASSETS
4” Force main (2,650’ +/-)
6” Gravity (1,100’ +/-)
8” Gravity (39,700’ +/-)
10” Gravity (7,250’ +/-)
12” Gravity (90’ +/-)
15” Gravity (890’ +/-)

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 5-26-17
(no later than 3 years from executed grant date)

The Village of Roscommon *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1236-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: **No**
   If No - Date of the rate methodology approval letter: November 9, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Nicole Crespo, Administrative Assistant at 989-275-5743 nicole@roscommonvillage.com
Name Phone Number Email

Nicole Crespo 5-26-17
Signature of Authorized Representative (Original Signature Required) Date

Nicole Crespo, Administrative Assistant
Print Name and Title of Authorized Representative

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date : May 8, 2017
(no later than 3 years from executed grant date)

The *City of St. Clair Shores* certifies that all storm water asset management plan (SWAMP) activities specified in SAW Grant No. 1595-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Michael Smith, City Manager	at 586-447-3340	Smithm@scsmi.net
Name	Phone Number	Email

	4-24-17
Signature of Authorized Representative (Original Signature Required)	Date

Michael Smith, City Manager
Print Name and Title of Authorized Representative

City of St. Clair Shores
27600 Jefferson Circle Drive
St. Clair Shores, MI 48081
(586) 447-3311

SAW Grant No. 1595-01

The City of St. Clair Shores is a lake front community with over 6 miles of Lake St. Clair shoreline. Their storm water system contains over 50 outfalls to the lake, and they have a vested interest in keeping Lake St. Clair as a valuable asset. Being strong stewards of the lake and storm water management, the City takes a proactive position in protecting the lake thereby benefiting residents and property owners. As such, the City Council applied for, and was awarded a grant through the Stormwater, Asset Management, and Wastewater (SAW) Program.

The City of St. Clair Shores was awarded a grant for $2,000,000, with a local match of $444,445.00 to investigate and evaluate the City's storm water assets. Specifically the S!W grant awarded was for investigating and developing a Stormwater Asset Management Plan and Stormwater Management Plan for the City. Through development and implementation of these plans, the insight and understanding of the system's storm sewer and assets has significantly improved, and a comprehensive investigation included inventory and inspection of storm sewer assets, condition assessment of assets, capital improvement needs, and enhancement of the existing Graphical Information System (GIS) which includes mapping, database and system information that was previously not available.

Recognizing the complexity of developing and implementing a comprehensive and viable Stormwater Asset Management, and Stormwater Management plan the City DPW staff and AEW proceeded with cataloging and evaluating the City's storm water assets. ! multi-phased approach was taken in which communication and interaction played a major role. This included a complex mixture of fact finding, criteria development, professional judgment, staff knowledge of the system, and common sense.

St. Clair Shores stormwater assets include over 200 miles of enclosed sewer, 11,731 stormwater structures, and 41 pump stations. Based on funding limitations, a condition assessment was performed on 25% of the storm sewers, 16% of the structures, and all of the pump stations. The evaluation results were utilized to project the condition of the remaining stormwater assets City wide. The condition assessment for the storm sewer was performed by means of closed circuit television (CCTV), while investigation of stormwater structures and pump stations were performed by means of visual assessment.

Assets were then analyzed to determine their Probability of Failure (POF) and Consequence of Failure (COF). The POF takes into account the condition rating, and the useful life expended while the COF takes into account financial, safety and environmental impacts. The POF and COF scores are then multiplied together resulting in the criticality score or the Business Risk Exposure (BRE) score. The BRE score is used to prioritize what assets are most critically in need of repair. The MDEQ guidelines state that any asset with a BRE score of 16 or greater is considered critical.

The St. Clair Shores storm water system has numerous storm sewers, structures and pump stations where the BRE scores exceed the MDEQ critical rating of 16. Based on the current assessments and projections, the following exceeds the BRE of 16:

- 80 storm sewer segments (320 projected)
- 23 storm structures (148 projected)
- 19 pump stations

The Stormwater AMP presents the methodology and findings of the condition assessment of the St. Clair Shores stormwater assets, including the five (5) criteria set forth as part of the MDEQ SAW Grant as follows:

1. Determined the level of service of the St. Clair Shores stormwater system.
2. Designated the criticality of all assets.
3. Performed a cost analysis associated with long term operation and maintenance (O&M) strategies and support of the assets management program.
4. Developed a long-term funding/capital improvement plan for stormwater assets.
5. Developed an implementation schedule for the asset management program.

Based on the Asset Management Plan and system evaluation, there are storm sewers, structures and pump stations currently in need of structural and O&M repairs to keep the system operating at its current level of service which was found to be satisfactory.

It is the recommendation of the AMP that the locations presented in the Capital Improvement Plan be repaired or replaced as follows:

Capital Improvement, Years 1 to 5

- Repair/replace storm sewers with a BRE score of 16 or higher.
- Repair/replace storm sewer structures with a BRE of 16 or higher.
- Repair/replace storm sewer pump stations with a BRE of 16 or higher.
- Assess storm sewer outfalls.
- Repair known problems with storm sewer outfalls.
- Develop a root control plan.

Capital Improvement, Years 6 to 10

- Replacements based on updated Asset Management Plan.
- Pump station O&M.
- Pump station Replacement.

In addition to the rehabilitation of assets determined in the Capital Improvement Plan the following are recommended:

- Continue with a CCTV program for the remainder of the storm sewer system over an 8 to 10 year period.
- Continue with a manhole and catch basin assessment program concurrent with the CCTV of the storm sewers.
- Update the Asset Management Plan on a yearly basis, incorporating newly collected data and yearly improvements.

- Evaluate and modify the St. Clair Shores stormwater utility ordinance and the user charge system as necessary to close the funding gap.
- Develop and adopt policies to assess repair, and/or replace storm sewer systems concurrent with road construction projects.

The capital improvements generated an annual cost of $2,417,400, currently the annual stormwater revenue generated is $1,677,629. After general expenses including wages, supplies, general services and other operating items have been accounted for the remaining balance is $922,500 for repairs and maintenance creating a deficit of $1,232,100 per year for the recommended capital improvements.

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date __May 8, 2017______
(no later than 3 years from executed grant date)

The __Village of Stevensville_________________________ *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. __1158-01__ have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Tiffany Moore at 269-429-1802 clerk@villageofstevensville.us
Name Phone Number Email

4-28-17
Signature of Authorized Representative (Original Signature Required) Date

__Steve Slavicek, Village Trustee_____________________________________
Print Name and Title of Authorized Representative

1.0 Executive Summary

The Village of Stevensville, Michigan is located in Berrien County and has a population of approximately 1,142 according to the 2010 Census. The Village owns and operates a storm sewer system consisting of approximately 32,500 feet of storm sewer ranging from 4-inch to 36-inch diameter and includes over 330 manhole, catch basin, and leaching basin structures. Most of the storm sewers discharge to Hickory Creek, located on the eastern side of the Village limits. Hickory Creek drains to the St. Joseph River, which ultimately discharges to Lake Michigan. Some of the Village sewer discharges to four County drains which also discharge to Hickory Creek. The three County drains located within the Village are Collins Lake #097, Kelly's Medo, and Lawrence Street #290. A fourth County drain, Schultz Branch #453, lies right outside the Village limits.

In May 2014, the Village was awarded a Stormwater, Asset Management, and Wastewater (SAW) grant from the Michigan Department of Environmental Quality (MDEQ). The Village has determined it to be in their best interest to implement an Asset Management Plan (AMP) for its storm sewer collection system. The scope of the AMP was to inventory, assess, and identify areas of deficiency in the system in order to develop recommendations for prioritizing and budgeting improvements and maintenance.

As a part of the Stormwater AMP, Level of Service (LoS) goals were established to assist the Village in developing a baseline for minimum operation and maintenance activities and corrective procedures in case of failures in the system. These goals were developed in order to set achievable objectives for operation and maintenance and capital improvement projects.

In order to identify areas of potential deficiency in the system, major components were inspected including catch basins, outfalls, storm manholes, and culverts. A representative portion of the total storm sewer system was televised and reviewed. Rating methods were developed to assess components based on their importance in the operation and reliability of the system and their current condition. Criticality and condition ratings were used in conjunction to prioritize component improvements.

In addition to the inventory and assessment of system components, a hydraulic model of the system was prepared to identify areas of concern or potential flooding issues. The model was also used to determine the ability of the system to handle existing flows and identify additional capacity available for expansion. Recommendations for upsizing components to alleviate flooding sources were made in response to the model results.

Based on the Village's desired LoS goals, it was determined that necessary improvements to defective sewers and manholes will be phased over the course of 5 years. Improvements to the system include sewer and manhole rehabilitation and upsizing portions of the sewer network to address some flooding issues experienced by the Village. A feasible maintenance schedule was established that aligns with the Village's needs and available resources. Catch basins will be cleaned on a 4-year basis and the remaining sewer to be televised will be completed within 10 years. In order to assist the Village with proper maintenance and operation of their system, the Geographic Information System (GIS) should be updated on an annual basis.

Protecting our Infrastructure Investment

ASSET MANAGEMENT PLAN

Executive Summary Report

Prepared for:

City of Sturgis

SAW Project No. 1574-01

FINAL
April 2017

FLEIS&VANDENBRINK
DESIGN. BUILD. OPERATE.

EXECUTIVE SUMMARY

OVERVIEW

The City of Sturgis received a Stormwater, Asset Management, and Wastewater (SAW) grant (Project No. 1574-01) from the Michigan Department of Environmental Quality (MDEQ) in 2014 to provide financial assistance for the development of this Asset Management Plan (AMP). Working with City staff, Fleis and VandenBrink (F&V) provided technical assistance for asset identification, condition assessment, and capital improvement planning in the collection system and wastewater treatment plant (WWTP).

This AMP is intended to be a living document that is updated as assets continue to wear and age, and as additional inspection/condition results are found and incorporated into the plan.

The contact person for the City of Sturgis AMP is Barry Cox, City Engineer, 130 N. Nottawa, Sturgis, MI 49091; phone 269.659.7249; email BCox@Sturgismi.gov.

ASSET INVENTORY AND CONDITION ASSESSMENT

A list of the major assets in the City's wastewater system, described further below, include:

- Collection system piping system and manholes
- Wastewater Treatment Plant
- Sanitary sewer lift stations in the collection system

The wastewater collection system assets consist of approximately 334,117 feet (63.3 miles) of sanitary sewers (gravity pipe and force mains) and over 1,200 wastewater manholes connecting the gravity pipe. These assets are located in existing street rights-of-way or in easements dedicated for the asset's use and maintenance.

The WWTP currently includes the following treatment processes: fine screening, grit removal, primary clarification, ferrous chloride addition, trickling filters, solids contact basin, intermediate clarification, nitrification tower, final clarification, chlorine disinfection and a polishing pond. Treated effluent is discharged to the Fawn River in accordance with NPDES permit No. MI0020451. The design capacity of the WWTP is 2.8 million gallons per day (mgd). The current annual average flow received by the facility is approximately 1.7 mgd.

There are ten sanitary sewer lift stations located throughout the wastewater collection system. The stations are either wet well/dry well style or submersible style stations.

Asset Identification and Location

A comprehensive wastewater system asset inventory was developed from operation and maintenance manuals and included a review and collection of existing record drawings, field notes, staff knowledge, and site visits, supplemented with field survey work. Asset material, size and age were identified through the review of available historical record documents and Closed Circuit Televising (CCTV) data. Spatial orientation (pipe location), pipe depth and invert elevations were determined through GPS field survey and a comprehensive evaluation of the gravity system. This information was organized into a new, or updated GIS database and piping network for archiving, mapping and further evaluation purposes. The inventory includes over 700 WWTP assets, 200 lift station assets, and 2,490 collection system assets.

Condition Assessment and Expected Useful Life

A comprehensive evaluation of the collection system was performed. The National Association of Sewer Service Companies (NASSCO) Manhole Assessment and Certification Program (MACP) field-based assessments were completed on all manhole structures. Pipeline cleaning and NASSCO Pipeline Assessment and Certification Program (PACP) CCTV-based inspections were conducted on 86% of the gravity pipe. The remainder of pipe was not eligible for CCTV reimbursement because it was less than 20 years old. Smoke testing was performed in prioritized districts of the collection system to identify the location of any inflow or excessive infiltration. A capacity analysis was also conducted under average day and peak-hour conditions to identify potential capacity concerns in the collection system.

Overall, the condition of the pipes and manholes exhibited a wide range of NASSCO scores due to their age and harsh environment. Some of the assets in the collection system are over 100 years old.

Overall, the condition of the assets at the WWTP range from excellent to fair. The recent addition of the Headworks Building and new preliminary treatment equipment allowed for the replacement of some of the poorest condition equipment at the facility. Although many of the current assets are beyond their recommended useful life, the staff at the Sturgis WWTP are diligent in regards to maintenance and upkeep of equipment. Therefore, most of the assets at the treatment plant are in good condition in comparison to their age.

The condition of the assets at the lift stations range from excellent to poor. On-going maintenance has kept the condition of many assets serviceable while other assets have deteriorated due to age and the harsh conditions associated with typical wastewater collection systems. The lift station that was in the poorest condition (Market Street Lift Station) was replaced in 2017.

LEVEL OF SERVICE

Level of Service (LOS) defines the way in which the utility stakeholders want the utility to perform over the long term and is an MDEQ-required component of an AMP. The LOS can include any technical, managerial, or financial components the utility wishes, as long as all regulatory requirements are met. Throughout the development of this AMP, F&V worked with the City of Sturgis staff to develop the following LOS statement and goals. The LOS statement was resolved within the City's Engineering department.

LEVEL OF SERVICE STATEMENT

The overall objective of the City of Sturgis Wastewater Department is to provide reliable wastewater collection and treatment services at a minimum cost and consistent with applicable environmental and health regulations. To achieve this the following Level of Service (LOS) goals are proposed:

- Provide adequate collection system and treatment capacity for all service areas.
- Comply with all local, state and federal regulations at all times for treated effluent from the WWTP.
- Actively maintain collection and treatment system assets in reliable working condition.
- Reduce inflow/infiltration (I/I) flow volumes to mitigate potential for sanitary overflows, water in basements, and overloading of treatment plant.
- Provide rapid and effective emergency response services to customers.
- Ensure operations staff are properly certified.
- Regularly review health and safety procedures for operations staff to provide proper worker safety.
- Regularly review projected O&M and capital expenditures. Adjust user rates, as necessary, to ensure sound financial management of wastewater system.

The LOS goals may need to be adjusted from time to time as the utility ages, the needs of community change or new rules or regulations require a change in operation. For this reason, the LOS goals should be reviewed by the City from time to time to make sure they accurately reflect the desired operation of the utility.

CRITICAL ASSETS

Determining Criticality

Business Risk is the determination of criticality of each asset in the wastewater system. Criticality is based on two factors; Likelihood (Probability) of Failure and Consequence of Failure using the following formula:

Business Risk = Consequence of Failure Score x Likelihood of Failure Score

Defining an asset's Business Risk allows for management of risk and aids in decision making for where to allocate operation and maintenance and capital improvement funds.

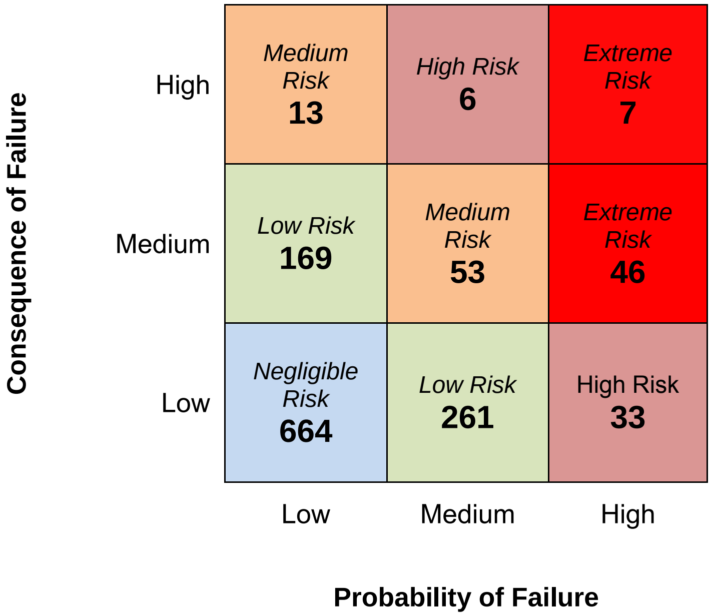
Likelihood of Failure (LoF) is a measure of how likely an asset is to fail. The following categories have been developed to quantify how likely an asset is to fail: 1) Condition of the asset; 2) Remaining useful life (age); 3) Service history; and, 4) Operational status. Consequence of Failure (CoF) is a measure of the social, economic, financial or environmental impact of failure of an asset and the utilities ability to respond, convey and treat wastewater. CoF categories of the collection system include: 10 Proximity to critical environmental features; 2) Location (Zoning District) of asset; 3) Facilities served by asset; 4) Size and location of asset within the utility network; and, 5) Type of asset.

Criticality Results

Using the strategy outlined above, a Business Risk Evaluation (BRE) was performed for each asset using a graphical ArcGIS-based sewer asset management and capital planning software that compiles, analyzes and assesses Business Risk for each asset and develops a Capital Improvement Plan. The results of the BRE are provided in easily understood tabular and graphical output.

A spreadsheet providing asset criticality for each utility asset has been included in the AMP detailed report for the collection and treatment systems.

Of the 1,252 pipes in the City of Sturgis collection, 92 were identified as High or Extreme risk (as shown in Figure 1) and will need to be addressed 1-5 Year CIPs. Section 5.0 of the Collection System AMP Report contains details regarding the rehabilitation strategy for Extreme and High risk pipes.



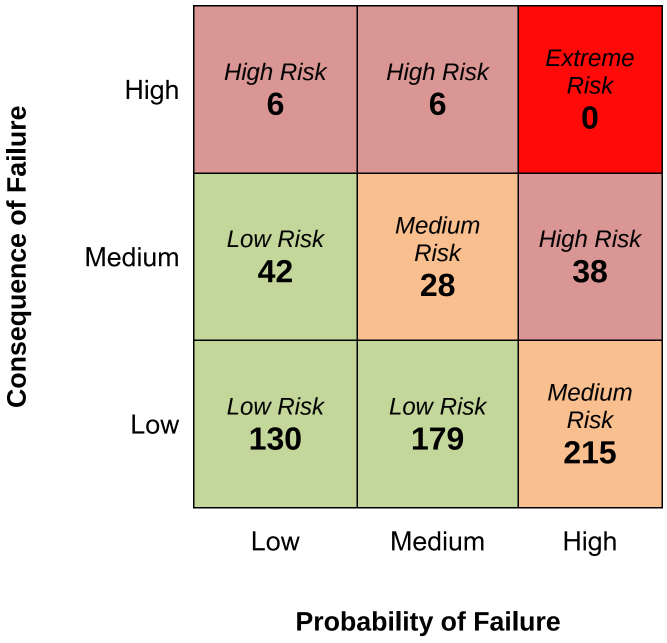
Consequence of Failure

	Low	Medium	High
High	*Medium Risk* **13**	*High Risk* **6**	*Extreme Risk* **7**
Medium	*Low Risk* **169**	*Medium Risk* **53**	*Extreme Risk* **46**
Low	*Negligible Risk* **664**	*Low Risk* **261**	High Risk **33**

Probability of Failure

Figure 1. Business Risk Matrix (Risk Rating) by Number of Gravity and Forcemain Pipes

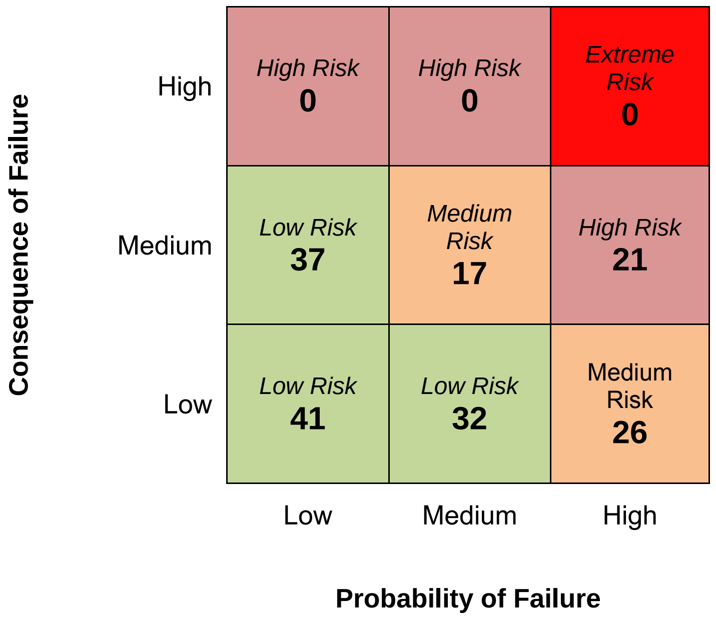
A summary of the WWTP asset risk ratings is provided in Figure 2. There are no extreme risk items at the WWTP. There are six items that have a high consequence of failure and a medium probability of failure. These items are included in the WWTP Capital Improvement Plan. Similarly, a summary of the risk ratings for the lift station assets is provided in Figure 3. None of the lift station assets scored in the "Extreme Risk" rating. Assets with a high-risk rating are addressed in the lift station Capital Improvement Plan.



Consequence of Failure	Low	Medium	High
High	*High Risk* **6**	*High Risk* **6**	*Extreme Risk* **0**
Medium	*Low Risk* **42**	*Medium Risk* **28**	*High Risk* **38**
Low	*Low Risk* **130**	*Low Risk* **179**	*Medium Risk* **215**

Probability of Failure

Figure 2. Business Risk Matrix (Risk Rating) for WWTP Assets



Consequence of Failure	Low	Medium	High
High	*High Risk* **0**	*High Risk* **0**	*Extreme Risk* **0**
Medium	*Low Risk* **37**	*Medium Risk* **17**	*High Risk* **21**
Low	*Low Risk* **41**	*Low Risk* **32**	Medium Risk **26**

Probability of Failure

Figure 3. Business Risk Matrix (Risk Rating) for Lift Station Assets

CAPITAL IMPROVEMENT PLAN

A Capital Improvement Plan (CIP) with rehabilitation recommendations was prepared for the City's wastewater utility assets based on the Business Risk evaluation. CIP recommendations are provided for the collection system, WWTP and lift stations. From the BRE, a short-term (1-5 year CIP) and long-term (6-20 year CIP) was developed.

The collection system CIP is presented in Table 1 for the 1-5 year horizon while Table 2 presents the CIP for the 6-20 year horizon. Because there is less certainty associated with the timing of the specific projects beyond the 5-year period, the rehabilitation was grouped into 5-year increments.

Table 1. Recommended Collection System Capital Improvement Plan for 5 Year Horizon

	Replacement Fiscal Year					
	2017	2018	2019	2020	2021	Total
Total Annual Cost	**$517,323**	**$355,182**	**$184,336**	**$800,396**	**$322,365**	**$2,179,602**

Table 2. Recommended Collection System Capital Improvement Plan for 6 20 Year Horizon

	Rehabilitation Period		
	6-10 Years	11-15 Years	16-20 Years
Total Annual Cost	**$1,224,507**	**$254,578**	**$281,731**

Similarly, CIPs were developed for the WWTP and lift stations for 1-5 years (see Table 3) and 6-10 years (see Table 4).

Table 3. Recommended WWTP & LS Capital Improvements for 5 Year Horizon

	Replacement Fiscal Year					
	2017	2018	2019	2020	2021	Total
Total Annual Cost	**$682,700**	**$916,300**	**$301,900**	**$185,500**	**$311,600**	**$2,398,000**

Table 4. Recommended WWTP & LS Capital Improvements for 6 10 Year Horizon

	Replacement Fiscal Year					
	2022	2023	2024	2025	2026	Total
Total Annual Cost	**$15,200**	**$88,800**	**$17,000**	**$906,000**	**$10,271,500**	**$11,298,500**

OPERATIONS, MAINTENANCE AND REPLACEMENT

A plan for recommended preventative maintenance inspections (pipeline cleaning and CCTV inspection) was developed. Most of the City's collection system was inspected during this project. Only pipes less than 20 years old were not included. Some of these pipes should be inspected in the next five years. Due to the relatively low cost of the recommended actions, they were not included in the 5-Year CIP. They are, however, important elements for continued operations and maintenance of the collection system.

REVENUE STRUCTURE

The revenue and rate methodology is an instrument to determine user rates and charges that will provide sufficient revenues to pay for utility operating costs. A study was conducted by an independent municipal financial advisor (Utility Financial Solutions, LLC) to develop a 5-year financial projection to meet the Michigan Department of Environmental Quality SAW Grant requirements.

The rate methodology required by the MDEQ for SAW Grant Asset Management Plans requires an analysis of the current budget on a cash basis to determine if there is a revenue gap. The analysis performed by UFS shows the revenue gap to be ($279,334) for 2016. A rate track is provided in the report to fully recover the revenue gap within four years using a 2.0% rate increase for the next four years. The City Commission approved a resolution on August 10, 2016 for 2.0% rate increases for 2017, 2018 and 2019.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date April 28, 2017
(no later than 3 years from executed grant date)

The City of Sturgis *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1574-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: [✓ Yes] or No
   If No - Date of the rate methodology approval letter: ______________.
2) Significant Progress Made: [✓ Yes] or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: September 12, 2016.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on August 10, 2016.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Name		Phone Number	Email
Barry Cox	at	269-659-7249	bcox@sturgismi.gov

Signature of Authorized Representative (Original Signature Required)

Date: 4-26-17

Michael Hughes, City Manager
Print Name and Title of Authorized Representative

Charter Township of Superior
3040 North Prospect Road
Ypsilanti, Michigan 48198
http://twp-superior.org/
Mr. Kenneth Schwartz, Supervisor
734-482-6099
SAW Grant Project Number: 1136-01

SUPERIOR TOWNSHIP

Asset Management Plan
Executive Summary

May 2017

OHM Advisors®

Executive Summary

Superior Township's primary wastewater sewer service area is contained within Sections 31 through 36. This area is bounded by Geddes Road to the north, Clark Road to the south, Superior Road to the west and Ridge Road to the east. The Township provides sanitary sewer within designated service areas under contract with the Ypsilanti Community Utilities Authority and the Township of Ann Arbor. While many of the sanitary sewers in the Township have been built over the past twenty years as part of newer subdivisions, there exists infrastructure built as far back as the Willow Run bomber plant in the 1950s. Recognizing the importance of preserving the integrity of the sewage disposal system, Superior Township initiated a comprehensive assessment of its wastewater infrastructure. The Township has initiated an Asset Management Program for their wastewater system using grant funding from the State of Michigan Stormwater Asset Management and Wastewater (SAW) Grant Program. This document was prepared using grant funding from the SAW Grant Program, with a total budget of $505,000 for the Wastewater AMP, which is inclusive of grant proceeds and local match.

Mission Statement

One important element to an asset management program is a mission statement, which identifies the overarching purpose of the City's asset management program. The purpose of the Township's asset management program is summarized by the following mission statement:

We are committed to providing and maintaining high quality sanitary sewer collection services to our existing and future customers in a cost effective manner while protecting human health and the environment.

Asset Management Team Leaders

The team leaders listed in Figure 1 are committed to the asset management mission statement and were instrumental in the progress made and findings outlined in this report. Further questions on the Township's asset management program can be directed to these team members.

Kenneth Schwartz

- Township Supervisor
- kenschwartz@superior-twp.org
- 734-482-6099

George Tsakoff

- OHM Advisors - Senior Project Manager
- George.Tsakoff@ohm-advisors.com
- 734-522-6711

Figure 1. Asset Management Team Leaders

Infrastructure Technology & Know-How

The Township has made investments in hardware and software upgrades in order to more effectively manage its sanitary sewer infrastructure assets. These upgrades include the following:

- Development of a geographic information system (GIS) based asset infrastructure database and upgrade of associated software to ArcGIS online
- Procurement of Lucity, a computerized maintenance management system (CMMS), to not only house work order and call request information but also infrastructure condition information
- Purchase of laptops, tablets, mobile devices, and a full scale plotter and scanner to improve access to real-time asset information and enhance field data collection
- Provide staff training on new hardware and software

Asset Inventory

An asset inventory is a list of the Township's assets and their attributes. The Township inventoried and digitized the majority of its sanitary sewer infrastructure, including manholes and sanitary sewers. In addition, available sanitary sewer record plans have been scanned and converted to a digital format. The Township is continuing to populate the attributes of the inventory using both as-built data as well as observations in the field while performing condition assessment. This inventory resides in the Township GIS system and will be connected to the Township's newly acquired CMMS program. The GIS framework was enhanced as part of this effort, making it easier for the Township to store critical data for the location, size, material, install date, and condition of each wastewater asset.

Condition Assessment

Figure 2: Portion of system assessed

Through a methodical sampling procedure, a representative sample of the Township's sanitary sewer infrastructure (sanitary sewer pipes and manholes) has been assessed. The condition of the infrastructure is based on the National Association of Sewer Service Companies (NASSCO) condition grading system, which uses a scale of zero to five. Zero indicates the infrastructure is in very good condition, while five indicates the infrastructure is in very poor condition or has already failed. About 40% of the approximately 1,100 structure manhole network and about 50% of the approximately 35 miles of sanitary sewer pipe infrastructure has been condition assessed (Figure 2).

It was also observed that:

- Manhole infrastructure exhibits age-appropriate wear with an average structural rating of approximately 0.7 and average O&M rating of 1.5. Structural manhole defects were predominately related to brickwork and inner wall cracking. O&M manhole issues were driven by deposits, roots, and infiltration.
- Sewer infrastructure has an average structural rating is 0.35 and average O&M rating of 1.36. The predominant structural defects as observed in the wastewater system are cracks or fractures, joints, and surface damage; the most common O&M defects in the surveyed system are root intrusion, soil/dirt/rock deposits, and infiltration.
- The infrastructure will continue to degrade over time, for example, even though the average condition of the manhole infrastructure seems relatively good per the 2015 assessment data, a small percent of the infrastructure has a condition rating of 5; this percentage will grow over time

Criticality and Risk

The investigation leading to the identification of critical sewer infrastructure involved the determination of risk, which is identified as the combination of the likelihood of the infrastructure failing as well as the consequence of its failure as shown in Figure 3.

Figure 3: Risk Equation

The likelihood of failure is related to the physical condition of an asset. The consequence of failure focuses on the economic losses and impacts to society due to an asset's failure. The following factors were combined to determine the consequence of failure:

- Network Position – the sum of upstream sewers discharging to a structure
- Diameter/Size – the relative size of the asset with respect to the rest of the system
- Location – refers to the cost to restore the surface above the asset and if traffic control is needed
- Top Users – important system users (St. Joseph's Hospital and Hyundai Plant)

Level of Service

The Township, in line with its mission statement outlined earlier, adopted level of service criteria's, which it plans on using as a guideline to manage the sanitary sewer asset infrastructure. These level of service criteria are summarized in Table 1.

Table 1: Summary of Level of Service Criteria

Key Service Criteria	Performance Indicator	Target Level of Service
Asset Condition Assessment	PACP & MACP Inspections Per Year*	• MACP inspect a minimum of 220 manholes per year, 20% of the System • PACP inspect a minimum of 7.5 miles of sewer per year, approximately 20 % of the system
Flow Capacity	Active Flow Monitoring of the YCUA Meter	Continue to be consistently below the contractual flow limit with YCUA
Regulatory Compliance	Compliance with MDEQ Sanitary Sewer Overflow (SSO) Policy and The Clean Water Act	Comply with the MDEQ SSO policy and The Clean Water Act
Service Delivery and Customer Communication	Implement and Utilize Lucity Software to Aide in Utility Management and Promote Customer Communication	Respond to customer complaints and requests efficiently.
O&M Optimization	Regular Cleaning and Maintenance of the Collection System	Clean and maintain 20% of the system per year

* Pipe Assessment Certification Program (PACP), to assess sanitary sewer condition
Manhole Assessment Certification Program (MACP), to assess manhole condition

Revenue Structure and Capital Improvement Plan

The condition assessment helped identify capital improvements that will allow the Township to operate at its maximum potential. Additional long-term operations and maintenance strategies will provide the means to maintain a sound structural condition into perpetuity, including:

- Regularly-scheduled sewer, manhole, and pump station inspection
- Repair and rehabilitation to address structural problems resulting from aging infrastructure

As communities like Superior Township have developed and aged, the buried infrastructure is deteriorating. Unless the Township begins to systematically repair, rehabilitate, and/or replace these aging components, Township residents and businesses will experience a decreased level of service which could result in the following:

- Increased threat of property damage , public health, and safety
- Increase potential for environmental damage
- Increased potential for impassable roadways due to failed infrastructure

The revenue structure analysis identified that an annual rate increase of 1.00% is needed to support the rising expenses over time. The revenue structure analysis and associated capital improvement projects and O&M strategies, which will continue the Township's Asset Management Program, are detailed in a separate document and can be made available to the public upon request.

List of Major Assets

The major assets are simplified in the text below. The full AMP report contains additional detail on the distribution of sizes, ages, and conditions.

- 1,098 manholes
- 35 miles of sanitary sewer gravity main
- 3 public pump stations and 3 private pump stations
- 1.15 miles of public force mains and 1.25 miles of private force mains

The Township discharges into the Ypsilanti Community Utilities Authority (YCUA) Disposal System.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date MAY 2017
(no later than 3 years from executed grant date)

The CHARTER TOWNSHIP OF SUPERIOR *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1136-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: NOVEMBER 18, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

KENNETH SCHWARTZ at 734-482-6099 KENSCHWARTZ@SUPERIOR-TWP.ORG
Name Phone Number Email

5/31/17
Signature of Authorized Representative (Original Signature Required) Date

Kenneth Schwartz Superior Township Supervisor
Print Name and Title of Authorized Representative

April 2017

HRC
HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915

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Keith D. McCormack
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May 30, 2017

Michigan Department of Environmental Quality
Constitutional Hall
525 West Allegan Street
P.O.Box 30473
Lansing, Michigan 48909-7973

Attn: Eric Pocan, Project Manager

Re: SAW Asset Management Plan HRC Job No. 20140225
City of Sylvan Lake SAW Grant No. 1095-01

Dear Mr. Pocan:

On behalf of the City of Sylvan Lake, Hubbell, Roth, & Clark, Inc. is pleased to submit the deliverables required for the City of Sylvan Lake's wastewater AMP and stormwater AMP. A brief discussion of each of the five major components is included along with a list of the plan's major identified assets. The signed Certification of Project Completeness form is included for both the stormwater AMP and the wastewater AMP.

Each of the City's AMPs will be available to the Department of Environmental Quality (DEQ) upon request, and a copy of the plan will be available to the public for at least 15 years. The City of Sylvan Lake is reviewing the publication method, and it will be either uploaded to the city's website, emailed as requested, or copies made available at City Hall.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

James F Burton
Nicole R. Selais

James F. Burton, P.E.
Vice President

Nicole R. Selais
Project Engineer

Attachment
cc: Sylvan Lake; J. Martin
HRC; file

Y:\201402\20140225\03_Studies\Report\MDEQ_deliverable.docx

CHAPTER 1: OVERVIEW

1.0 INTENT

The intent of this Section is to provide Michigan Department of Environmental Quality (MDEQ) with the necessary "overview" documentation required under the submittal of the City's Stormwater and Wastewater Asset Management (SAW) Grant.

1.1 SUMMARY

The City of Sylvan Lake owns, operates, and maintains its sanitary sewer collection system and storm sewer system. The City applied for and received a grant to further develop its Asset Management Program for its sanitary and stormwater systems through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Wastewater and Asset Management (SAW) program. A summary of the grant award follows:

Project #:	1095-01
Amount of Grant:	$959,386.00
Amount of Match:	$106,598.00
Project Total:	$1,065,984.00*

*Actual amount spent will be less than the total; but the final amount will not be known until after the final disbursement

Upon completion of the SAW Grant, the City now has various tools used to manage its assets, including a GIS geodatabase, condition assessment methods, risk/prioritization models, and capacity studies. These tools are used to guide the short and long-term strategies for the City to operate the various systems in a sustainable and cost-effective manner and focus on prioritizing assets that are most critical.

A summary of the sanitary and stormwater assets owned by Sylvan Lake is provided in Table 1-1:

TABLE 1-1:
ASSET SUMMARY

Asset Name/Class	Number of Unique Assets	Total Feet Sewer
Sanitary Manholes	165	
Sanitary Sewers	178	45,632
Sanitary Pump Stations	1	
Storm Manholes/Inlets	278	
Storm Yard Drains/Outfalls	167	
Storm Sewers	258	21,041
Enclosed Drainage	517	
Storm Pump Stations	1	

The scope of work for development of this Asset Management Plan included review of the City's sanitary sewerage system (sanitary sewers, manholes, pumping stations, force mains, etc.) and stormwater collection system (storm sewers, enclosed drainage, manholes, catch basins, inlets, etc.) The specific work performed as part of the grant included the following:

- Asset Inventory - A Geographic Information System (GIS) was developed to inventory all of the City-owned sanitary and storm sewer assets
- Condition Assessment - The inventory included a condition assessment of most assets through either visual inspections or televising efforts, and was incorporated into the GIS database.
- Criticality and Risk Evaluation – The probability of failure and consequence of failure were determined for assets and inventoried in the GIS database. These factors were then utilized to determine the overall Business Risk Evaluation (BRE). The Sylvan Lake sanitary and stormwater systems are in good condition with the highest BRE scores being less than 20, all other scores were less than 15 with most scores being less than 5.
- Capital Improvement Planning - The wastewater and stormwater systems were reviewed to determine what capital improvements may be required and at what time to assist with future budgeting.
- Revenue Structure – The City's revenue structure was reviewed in order to ensure the system remains sustainable and currently the City is able to meet its' financial obligations.

The following recommendations are presented for consideration to complete future anticipated maintenance repair/replacement/rehabilitation/capital improvement needs. The City should review future rate structures as necessary to fund selected projects.

- Maintenance recommendations – cleaning and televising sewers on more definitive schedule, also possibly implementing a FOG program to control oil and grease issues within the sanitary sewer system.
- Rehabilitation/repair recommendations – alleviate any system problems or failures through a defined sewer lining and/or repair/replacement program.
- Capital improvement recommendations – complete upgrades to the sanitary and storm pump stations.

1.2 REQUIRED REPORTING

This Plan includes a certification of project completion for the MDEQ's SAW Grant Program. This "Overview" will be available on MDEQ's website along with the certificate of project completion. The entire plan will be available for public review for 15 years from submission at Sylvan Lake's City Hall.

<u>AMP Contact Information</u>

John Martin, City Manager: Phone: (248) 682-1440, E-mail: citymanager@sylvanlake.org

Karyn Stickel, Consulting Engineer: Hubbell, Roth & Clark, Inc., Phone: (248) 454-6566
E-mail: KStickel@hrcengr.com

Nicole Selais, Consulting Engineer: Hubbell, Roth & Clark, Inc., Phone: (248) 454-6582
E-mail: NSelais@hrcengr.com

DEQ

Department of Environmental Quality
SAW Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The City of Sylvan Lake *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1095-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant. The Department of Environmental Quality (DEQ) defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gap in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.

Attached to this certification is a summary of the AMP that identifies major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

John Martin	at 248-682-1440	citymanager@sylvanlake.org
Name	Phone Number	Email

Rate Methodology was submitted to DEQ on: October 25, 2016
(within 2 ½ years from date of executed grant)

An initial rate increase of N/A% of a $ N/A gap was adopted on N/A

5/31/17
Signature of Authorized Representative (Original Signature Required) Date

John Martin, City Manager
Print Name and Title of Authorized Representative

June 2014

DEQ

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date May 31, 2017
(no later than 3 years from executed grant date)

The City of Sylvan Lake *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1095-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

John Martin at 248-682-1440 citymanager@sylvanlake.org
Name Phone Number Email

5/31/17
Signature of Authorized Representative (Original Signature Required) Date

John Martin, City Manager
Print Name and Title of Authorized Representative

TECUMSEH WASTEWATER ASSET MANAGEMENT PLAN
MDEQ SAW GRANT NO. 1203-01
SUMMARY
MAY 2017

Contact Information:

Mr. Todd Amstutz

Superintendent of Utilities

309 E. Chicago Blvd.

Tecumseh, MI 49286

(517) 423-0402

In 2014, the City of Tecumseh was awarded a State of Michigan Stormwater, Asset Management, and Wastewater (SAW) Grant to complete design and management services for the sanitary sewer system. The City's SAW Grant provided financial assistance for two completed wastewater projects:

- WWTP Trestle Pipe Replacement
- Union Street Pump Station Replacement

This Asset Management Plan (AMP) is the final item completed as part of the SAW. This AMP has been designed to provide the City with a proactive and sustainable long-term plan to help ensure the well-being of the community and environment.

The AMP approach centers on the following five core elements:

1. Asset Inventory
2. Level of Service
3. Criticality
4. Revenue Structure
5. Capital Improvement Plan

Asset Inventory and Condition Assessment

Existing City GIS information was used as a basis for the plan, and was augmented with survey data, detailed equipment and collection system asset inventories and cost development. To aid in this analysis, as well as simplify annual reporting needs, the system information has been integrated with Lucity^{TM} Asset Management Software (AMS) which was purchased and implemented as part of this program. The Lucity^{TM} software operates as an extension of the GIS and is primarily a work order and capital improvement planning tool aimed to help the City streamline administrative processes and simplify mandatory reporting.

The current value of the entire wastewater infrastructure exceeds $53.5 million. The current value of the City's sanitary sewer collection system is estimated at approximately $40.5 million, with approximately 88% of the system cost associated with gravity mains and manholes with the remaining cost attributed to pump station and force mains. Table summarizes the quantity and baseline system replacement value (in 2017 dollars).

The City's collection system was inventoried and the condition assessed through detailed manhole inspections and sewer cleaning/televising. Additionally, flow monitoring was performed and a computer model prepared that provided additional data regarding sewer capacity.

Table 1 – Collection System Asset Summary and Cost

System Component	Quantity (unit)	Baseline System Value (Current Replacement Cost)
Gravity Mains	255,641 feet	$25,780,000
Manholes	987 each	$9,703,000
Pressurized Mains	18,389 feet	$1,390,000
Pump Stations	10 each	$3,620,000
	Total	**$40,493,000**

The City's Wastewater Treatment Plant includes a collection of 343 assets that represent the total facility processes and are currently estimated at a value of approximately $13.0 million. Table summarizes the various WWTP elements and the associated replacement value of those assets (in 2017 dollars).

The City's wastewater treatment assets were inventoried and the condition assessed through a walkthrough of all assets and discussion with WWTP staff regarding their condition and maintenance history.

Table 2 - WWTP Asset Summary and Cost

Process Location	Assets	Baseline System Replacement Cost
Preliminary/Primary Treatment	47	$1,898,000
Equalization/Retention Basin	27	$3,036,000
Aeration System	82	$2,722,000
Final Settling Tanks	11	$788,000
Tertiary Filtration/UV Disinfection	44	$1,578,000
Sludge Treatment	120	$2,905,000
Chemical Feed System	12	$120,000
Total	**343**	**$13,047,000**

A list of the assets evaluated in this plan is attached to this summary.

Level of Service

A major factor in the quality of community life is the quality of the community's facilities, services and amenities. Level of Service is a measure of the amount and/or quality of the public facility which must be provided to meet that community's basic needs and expectations. The City developed a list of key performance indicators (KPIs) to hold as goals for the Level of Service for their sanitary sewer facilities, which can be seen below in Table 1. The City currently is meeting all of the listed performance goals and will focus on maintaining this high Level of Service.

Table 1 – Level of Service KPIs

Level of Service Key Performance Indicators
Reduce Basement Backups
Reduce Infiltration/Inflow rates and volumes
Capacity to Convey MDEQ design storm
Reduce Odor Complaints
Clean all sewers at least once in 5-year period
Replace underperforming pump stations
Meet requirement of NPDES permit
Implement Equipment Inventory and Maintenance Tracking System

Criticality

Criticality of assets is a step used to prioritize future improvements so that money is invested in the most needed projects. Criticality is quantified by use of a numerical score called Business Risk Evaluation (BRE).

BRE is defined as the product of probability of failure (POF) of an asset and the consequence of failure (COF) for that asset. That is, BRE = POF x COF, with numerical values assigned for both POF and COF.

POF is based on the condition of the asset. For this project, the age of each asset was identified and evaluated with additional information such as equipment records, staff observations and field condition analysis. In the case of the collection system, nearly all of the manholes and 48,000 feet of sewer were inspected to assign a condition rating to the assets.

COF is based on the consequence to the utility, public and environment of the asset failing. Numerical scores were assigned to each asset based on these factors.

A BRE was subsequently determined for each asset in the City’s system. These BRE ratings, combined with City Staff experience, were used to define a Capital Improvement Plan for the City of Tecumseh.

Operation and Maintenance/Revenue Structure/Long-Term Funding

The Tecumseh sewer and wastewater treatment systems are extraordinarily well maintained. The asset management software implemented for this project will assist in assessing assets that need more frequent maintenance.

The City has a goal of televising each sewer once every ten years. An annual budget was presented in the plan that will allow the City to achieve that goal.

The City completed a revenue structure evaluation that demonstrated the City’s wastewater utility generates sufficient revenue to fund the operation and maintenance at the wastewater utility. The SAW grant does not require the City to fund capital improvements through wastewater rates although Tecumseh, like most municipalities typically does. A separate report has been prepared to analyze the ability of the City’s rates to implement the CIP in this report.

Capital Improvement Plan

A 20-year capital improvement plan was developed for both the collection system and the WWTP using the results of the business risk evaluation conducted in this AMP. The capital improvement plan identifies areas in the collection system and specific parts of the WWTP processes where funding should be provided over the next 20 years. This capital improvement plan should be routinely updated to ensure that it includes short- and long-term needs. Events will occur and new knowledge will be gathered that will justify changes to this plan.

Table 2 - City of Tecumseh 20-Year Capital Improvement Plan (2017-2037)

Project Number	Description	Project Year	Project Cost
WWTP – 1	**Sludge Pump Replacement Ph 1**	**2018**	**$196,000.00**
CS - 1	**2018 Trunk Sewer Improvements**	**2018**	**$797,000.00**
CS - 2	**Country Club Pump Station Replacement**	**2018**	**$193,000.00**
WWTP - 2	**Transformer Replacement**	**2020**	**$299,000.00**
WWTP - 3	**Actuator Replacement**	**2020**	**$303,000.00**
CS - 3	**Grade 5 Defect Repairs Ph 1**	**2020**	**$259,000.00**
CS - 4	Cyl-Tec Pump Station Replacement	2023	$434,000.00
CS - 5	Evans Creek Trestle Pipe Rehabilitation	2023	$242,000.00
CS - 6	Grade 5 Defect Repairs Ph 2	2023	$239,000.00
WWTP - 4	Digester Demolition and Structural Improvements	2023	$789,000.00
WWTP - 5	Polymer System Replacement	2023	$180,000.00
CS - 7	Grade 5 Defect Repairs Ph 3	2024	$442,000.00
WWTP - 6	Sludge Pump Replacement Ph 2	2025	$540,000.00
CS - 8	Westhaven Pump Station Replacement	2026	$466,000.00
CS - 9	Grade 4 Defect Repairs (annual 2026-36)	2027	$662,000.00
WWTP - 7	Generator Replacement	2028	$2,851,000.00
WWTP - 8	Tank Mechanism Replacement	2028	$2,662,000.00
CS - 10	Grade 4 Defect Repairs (annual 2026-36)	2029	$695,000.00
WWTP - 9	Multi-stage Blower Replacement	2030	$483,000.00
WWTP - 10	PLC and SCADA Upgrades	2030	$341,000.00
CS - 11	Grade 4 Defect Repairs (annual 2026-36)	2031	$730,000.00
WWTP-11	Filter Media and UV Bulb Replacement	2032	$478,000.00
CS - 12	Grade 4 Defect Repairs (annual 2026-36)	2033	$767,000.00
CS - 13	Grade 4 Defect Repairs (annual 2026-36)	2035	$806,000.00
	5-year	**Subtotal**	**$2,047,000.00**
	Remaining	**Subtotal**	**$13,807,000.00**
		Total	**$15,854,000.00**

Future Steps

Beginning in 2013, any major municipal wastewater system in the state of Michigan whose permit expires on October 1, 2012 or after will be including an asset management program requirement. This requirement will accompany an updated set of reporting requirements associated with operating the City's WWTP and collection system. The Lucity^{TM} AMS is designed to provide detailed reports regarding specific performance measures which will be essential to completing annual MDEQ reporting requirements. The City will be required through their permit to submit reports including specific information regarding what capital improvement projects were completed, how much was spent on sewer cleaning, preventative maintenance, and other measures.

This AMP, inclusive of the GIS model of the sewer system and Lucity^{TM} AMS, are intended to be worked as a unit to assist City staff in operating, maintaining and upgrading the City's wastewater infrastructure efficiently and cost effectively. It will be a living set of documents that will require an on-going process of recording information to help Tecmumseh best manage the needs of the City's wastewater infrastructure.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 05/31/2017
(no later than 3 years from executed grant date)

The CITY OF TECUMSEH *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1203-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: 11/16/2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

MR TODD AMSTUTZ at (517)423-0402 tamstutz@tecumseh.mi.us
Name Phone Number Email

05/24/2017
Signature of Authorized Representative (Original Signature Required) Date

DANIEL E. SWALLOW CITY MANAGER
Print Name and Title of Authorized Representative

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 17, 2017
(no later than 3 years from executed grant date)

The City of Traverse City *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1442-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: January 9, 2017.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: date.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Lawrence J. LaCross . at 231-922-4900 ext.130 llacross@traversecitymi.gov .
Name Phone Number Email

May 17, 2017
Signature of Authorized Representative (Original Signature Required) Date

Martin Colburn , City Manager .
Print Name and Title of Authorized Representative

April 2017

Stormwater, Asset Management, and Wastewater (SAW)
Asset Management Plan Executive Summary Guidance

City of Traverse City – Department of Public Services
625 Woodmere Avenue
Traverse City, MI 49686
http://www.traversecitymi.gov/
Contact: Larry LaCross, GIS Coordinator
231-922-4900 ext. 130
SAW Grant Project Number: 1442-01

Executive Summary

The Wastewater Asset Management Plan (AMP) summarizes the existing physical condition of the City's wastewater infrastructure and includes key recommendations for future funding levels. This document was prepared using grant funding from the State of Michigan SAW Grant Program, with a total budget of $1,000,944 for the Wastewater AMP, which is inclusive of grant proceeds and local match.

The AMP was intended to accomplish the following key goals:

- Provide the City with a new framework for collecting, organizing, and storing data for their wastewater collection system using the latest available hardware and software.
- Survey key system components to augment the City's existing GIS database and to make it easier for future generations to access infrastructure data with greater ease.
- Add information for sewer material type, age, and depth to the GIS database.
- Physically evaluate the structural condition of all publicly-owned system components, including sanitary sewer pipes, manholes, pump stations, and force mains, and store the data in the City's GIS database.
- Evaluate the performance of the collection system under wet weather conditions to determine if excessive inflow/infiltration (I/I) is present, and, if so, where to focus future I/I reduction programs.
- Coordinate with the Wastewater Treatment Plant (WWTP) operator, CH2M, to integrate future WWTP facility costs into the AMP.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
    - Regularly-scheduled sewer inspection (televising)
    - Repair and rehabilitation to address structural problems resulting from aging infrastructure
- Provide recommendations on future rate adjustments necessary to maintain the recommended budget.

Wastewater Asset Inventory

This AMP includes the wastewater collection system, including manholes, sewer pipes, pump stations, and force mains. Although the City had an existing geodatabase for its wastewater system, this AMP included efforts to enhance the database with additional information on sewer rim/invert elevations, sewer size, sewer age, and structural condition.

Sewer sizes and invert elevations were verified during field survey and manhole inspections that were part of this AMP.

The City uses ArcGIS (ESRI) to maintain its inventory of wastewater assets and Lucity to store asset condition data, manage work orders, and track work order status.

Condition Assessment

Approximately 50% of the sewer system was televised as part of this AMP. NASSCO PACP and MACP methodologies were used to assign structural and O&M conditions for inspected manholes and sewer segments. The PACP and MACP data were added to the GIS geodatabase.

For sewer pipes, the average age is approximately 59 years, the average overall pipe rating (structural and O&M) is 2.0, on a scale of 0 to 5. Approximately 35% of the system has a PACP structural score of 3 or greater.

For manholes, the average age is approximately 57 years, the average structural rating is 1.75, on a scale of 0 to 5. Approximately 15% of the system has a MACP structural score of 3 or greater.

Force mains were not physically evaluated, due to concerns about specimen removal and the impacts on repairing the extracted sections. Instead, pipe material and age were used to assume physical condition. Several key segments of force main are older than 60 years and are therefore assumed to be at the end of their useful service lives.

Pump stations were inventoried by separate components, and the details of those inspections are included in the AMP report. In general, the pump stations are in fair working condition, although numerous components (i.e. electrical systems, motors, pumps) are reaching the end of their useful service lives.

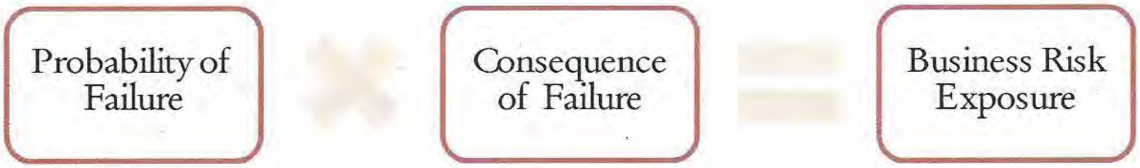
Level of Service Determination

The City's Level of Service criteria for its wastewater collection system are listed in the following table:

Key Service Criteria	Performance Indicator	Target Level of Service
Asset Condition Assessment	PACP & MACP Inspections Per Year	• MACP inspect a minimum of 380 manholes per year, approximately 20% of the system • PACP inspect a minimum of 14 miles of sewer per year, approximately 20 % of the system
Regulatory Compliance	Compliance with MDEQ Sanitary Sewer Overflow (SSO) Policy and The Clean Water Act	Continue to comply with the MDEQ SSO policy and The Clean Water Act
Service Delivery and Customer Communication	Utilize Lucity Software to Aid in Utility Management and Promote Customer Communication, Increase Effort to Reduce Number of Sewer Calls and Response Time	Respond to customer complaints and requests within one hour
O&M Optimization	Regular Cleaning and Maintenance of the Collection System	Clean and maintain 20% of the system per year

Criticality of Assets

Determining the assets most critical to system operation allows a community to manage risk, support Capital Improvement Plans (CIP), and efficiently allocate O&M funds. The two key factors used to determine criticality are Probability of Failure (PoF) and Consequence of Failure (CoF). PoF and CoF are multiplied to determine the Business Risk Exposure (BRE) as shown in the following figure.



PoF considers the physical condition or age of an asset and is often based on the Structural MACP or PACP Index Rating. If an asset was not inspected, remaining useful life can be used a proxy for condition. A standardized rating of one through five was assigned to each asset with a score of five indicating worst condition as shown in the following table.

Probability of Failure

Score	Description
1	Improbable
2	Remote, unlikely but possible
3	Possible
4	Probable, likely
5	Imminent, likely in near future

CoF encourages a focus on social, environmental, and economic cost impacts. The economic CoF encompasses the impacts of direct and indirect economic losses to the affected organization and third parties due to asset failure. The social consequence represents the impact of society due to asset failure and the environmental consequence of failure considers the impact to ecological conditions occurring as a result of asset failure.

The factors were rated on a one through five scale for each asset. If one factor is deemed more important, the weighting was skewed to give that factor more influence.

The following factors were combined to determine the final CoF:

- Relative Network Position – the sum of upstream sewers discharging to a structure
- Diameter/Size – the relative size of the asset with respect to the rest of the system
- Restoration Type/Accessibility – refers to the cost to restore the surface above the asset and if traffic control is needed
- Environment – proximity to sensitive environmental features like Boardman River, Kid's Creek, Grand Traverse Bay, etc.
- Critical Users – important system users (Munson Hospital)

Revenue Structure

Although the City currently has an annual budget of approximately $6 million for its wastewater collection and treatment system, the recommendations in this Asset Management Plan would result in a new annual budget of approximately $9 million. The primary reasons for this increase are:

1. Increased investment in sewer/manhole rehabilitation, repair, and/or replacement for the City's aging infrastructure.
2. Systematic replacement of older force mains, which have aged well beyond their typical service lives.
3. Additional investment at the Wastewater Treatment Plant, with multiple projects to be identified in the upcoming Facility Plan.
4. Upgrades to pump stations that will require higher flow capacities to serve growing areas.
5. Targeted replacement of undersized sanitary sewers, as identified in this report.

6. Increased attention to sewer/manhole inspections and ongoing updates to this Asset Management Plan.

The City Treasurer has reviewed the proposed level of investment for the collection system, pump stations, and the WWTP and has provided the following recommendations for rate increases to address the increased investment need:

- 2017-2018 Budget Year: Increase the base rate from $36.00 per the first 600 cubic feet to $37.00 per the first 600 cubic feet, and increase the next tier from $42.00 per 1,000 cubic feet to $43.00 per 1,000 cubic feet.
- 2018-2019 Budget Year: Increase the base rate from $37.00 per the first 600 cubic feet to $47.00 per the first 600 cubic feet, and increase the next tier from $43.00 per 1,000 cubic feet to $53.00 per 1,000 cubic feet

The recommended rate increases for the 2018-2019 Budget year are relatively large, and should be revisited as the WWTP Facility Plan is developed. Depending on the speed at which the City is able to mobilize the increased investment in the collection and treatment systems, the rate increases may be adjusted or delayed to subsequent years.

Capital Improvement Plan

A Capital Improvement Plan (CIP) was developed using the Business Risk Exposure (BRE) described above. CIP tables are detailed in the Appendix of the AMP document. These tables include recommended projects for the first three years and include maintenance (i.e. heavy cleaning), repair (i.e. lining or spot repair) and replacement for hydraulically-deficient sewers.

The CIP was developed with the first projects reflecting those with the highest BRE scores. Some projects were manually moved higher on the list if a known street project is expected to occur in the affected area or if a higher priority project were occurring immediately adjacent to the project (to reduce mobilization costs). The CIP tables are intended to be used for high level planning; the City will further evaluate the wastewater infrastructure before beginning the CIP design process.

The actual implementation of the CIP will depend on the implementation of user fee adjustments, as recommended above.

Recommendations

The recommendations in this AMP are to:

- Adjust user fees to expand the wastewater operating budget. Prior to final implementation of fee adjustments, coordinate with CH2M on the 2017/2018 Facility Plan and revisit cash flow needs.
- Implement the capital improvements as recommended in the CIP.
- Continue the AMP process in future years through systematic system inspection and updates of the City's GIS data to re-prioritize projects in future years.

List of Major Assets

The major assets are simplified in the text below. The full AMP report contains additional detail on the distribution of sizes, ages, and conditions.

- *81 miles of sanitary sewer gravity main*
- *4.7 miles of sanitary sewer force main*
- *1,900 manholes*
- *9 pump stations*

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date May 17, 2017
(no later than 3 years from executed grant date)

The City of Traverse City *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1442-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Lawrence J. LaCross	at 231-922-4900 ext.130	llacross@traversecitymi.gov
Name	Phone Number	Email

	May 17, 2017
Signature of Authorized Representative (Original Signature Required)	Date

Martin Colburn, City Manager
Print Name and Title of Authorized Representative

Stormwater, Asset Management, and Wastewater (SAW)
Asset Management Plan Executive Summary Guidance

City of Traverse City – Department of Public Services
625 Woodmere Avenue
Traverse City, MI 49686
http://www.traversecitymi.gov/
Contact: Larry LaCross, GIS Coordinator
231-922-4900 ext. 130
SAW Grant Project Number: 1442-01

Executive Summary

The Stormwater Asset Management Plan (AMP) summarizes the existing physical condition of the City's stormwater infrastructure and includes key recommendations for future funding levels and alternatives for funding mechanisms. This document was prepared using grant funding from the State of Michigan SAW Grant Program, with a total budget of $1,295,000 for the Stormwater AMP, which is inclusive of grant proceeds and local match.

The AMP was intended to accomplish the following key goals:

- Provide the City with a new framework for collecting, organizing, and storing data for their stormwater collection system using the latest available hardware and software.
- Survey key system components to augment the City's existing GIS database and to make it easier for future generations to access infrastructure data with greater ease.
- Add information for sewer material type, age, and depth to the GIS database.
- Physically evaluate the structural condition of all publicly-owned system components, including storm sewer pipes, manholes, catch basins, and outfalls. Store the data in the City's GIS database.
- Analyze the flow capacity of the City's storm sewer pipes and identify where pipes should be enlarged to minimize flood potential to a reasonable level.
- Identify other capital improvements that will allow the City to reduce annual flow volumes and pollutant loadings to Boardman Lake and Grand Traverse Bay.
- Identify long-term operations and maintenance strategies to maintain a reasonable structural condition into perpetuity, including:
    - Regularly-scheduled sewer inspection (televising), similar to what is done for wastewater infrastructure
    - Repair and rehabilitation to address structural problems resulting from aging infrastructure
- Provide recommendations on developing a sustainable funding source for stormwater, similar to that of enterprise funds that already exist for the City's water and wastewater systems.

Stormwater Asset Inventory

This AMP includes the stormwater collection system, including manholes, sewer pipes, catch basins, outfalls, and end-of-pipe treatment BMPs. Although the City had an existing geodatabase for its storm sewer system, this AMP included efforts to enhance the database with additional information on sewer rim/invert elevations, sewer size, sewer age, and structural condition.

Sewer sizes and invert elevations were verified during field survey and manhole inspections that were part of this AMP.

The City uses ArcGIS (ESRI) to maintain its inventory of storm sewer assets and Lucity to store asset condition data, manage work orders, and track work order status.

Condition Assessment

Over 60% of the sewer system was televised as part of this AMP. NASSCO PACP and MACP methodologies were used to assign structural and O&M conditions for inspected manholes and sewer segments. The PACP and MACP data were added to the GIS geodatabase.

For sewer pipes, the average age is approximately 55 years, the average overall pipe rating (structural and O&M) is 2.0, on a scale of 0 to 5. Approximately 35% of the system has a PACP structural score of 3 or greater.

For manholes, the average age is approximately 55 years, the average structural rating is 1.8, on a scale of 0 to 5. Approximately 15% of the system has a MACP structural score of 3 or greater.

Catch basins were evaluated based a simplified methodology to evaluate overall condition, with a scoring system consistent with the PACP/MACP scale. About two thirds of the catch basins evaluated were considered in marginal or poor condition (score of 3 or higher).

Outfalls and BMPs were not evaluated for structural condition, although they were considered for identifying future funding needs.

Level of Service Determination

For the hydrologic/hydraulic analysis of the stormwater collection system flow capacity, the 5-year recurrence interval storm event was chosen as the baseline Level of Service for storm sewer flow capacity, due to the hydraulic model results showing a disproportionately large fraction of the system that would be identified as undersized under the 10-year recurrence interval criteria. The 10-year storm can be used for individual scenarios should the City deem it necessary to provide an additional level of flood protection in critical areas.

As part of the AMP, the Stormwater Advisory Group (SAG) met four times to discuss stormwater issues, Level of Service, funding, and water quality issues. The SAG reviewed various flood control Level of Service scenarios. Based on feedback, some temporary flooding may be permissible within the street area, provided that the duration is relatively short, the maximum depth does not interfere with traffic, and there is no property damage. The following criteria were developed for desired flood control Level of Service:

- A maximum flooding depth of six inches on roadways will not negatively impact emergency response times
- The maximum duration of roadway flooding shall be 30 minutes for primary emergency routes (ADT>5,000)

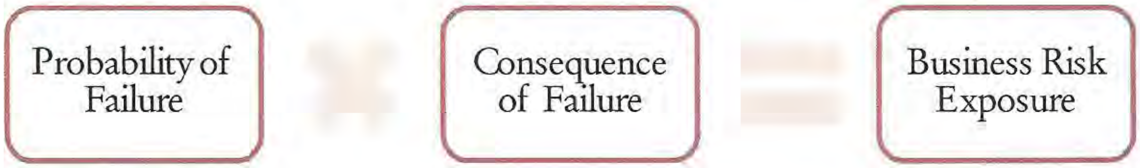
- The maximum duration of roadway flooding shall be 60 minutes for non-emergency routes (ADT between 2,000 and 5,000)
- The maximum duration of roadway flooding shall be 6 hours for low volume residential street (ADT<2,000)

Other key components of the Level of Service have emerged due to increased attention to Asset Management Planning, stormwater quality, and environmental sustainability. These components are as follows:

- Minimum water quality standards at the system outfalls, including maximum concentrations of known pollutants such as Nitrogen, Phosphorus, Total Suspended Solids (TSS), heavy metals, and E. coli (bacteria). Given the importance of the water quality in Grand Traverse Bay, this Level of Service is of utmost importance in Traverse City and was reinforced during the Stormwater Advisory Group (SAG) process. A reasonable goal for water quality would be to establish a maximum desired TSS concentration of 80 mg/L (80 parts per million) at the City's outfalls. This is consistent with new MDEQ guidelines for water quality in communities with NPDES stormwater permits.
- Regular cleaning and maintenance of the collection system is necessary to prevent backups due to clogged or structurally-failing sewers. A "televise first" strategy is recommended when cleaning and televising sewers to optimize cleaning budgets. This is done by televising sewers before jetting/cleaning, and only cleaning when necessary. Based on our experience, most sanitary sewers are self-cleaning. We recommend that the City inspect and clean sanitary sewer collection systems on an "80/20" schedule. This schedule involves cleaning 80% of the system every 20 years and the most critical or high maintenance 20% of the system every five years. The 20% of the system to be cleaned more frequently will be determined through the televising process and will generally consist of those sewers that are identified as those that are not self-cleaning. The baseline Level of Service for O&M purposes was a systematic storm sewer televising (inspection) program and an annual repair and rehabilitation program to maintain an average structural condition equal to that observed in 2016.

Criticality of Assets

Determining the assets most critical to system operation allows a community to manage risk, support Capital Improvement Plans (CIP), and efficiently allocate O&M funds. The two key factors used to determine criticality are Probability of Failure (PoF) and Consequence of Failure (CoF). PoF and CoF are multiplied to determine the Business Risk Exposure (BRE) as shown in the following figure.



PoF considers the physical condition or age of an asset and is often based on the Structural MACP or PACP Index Rating. If an asset was not inspected, remaining useful life can be used a proxy for condition. A standardized rating of one through five was assigned to each asset with a score of five indicating worst condition as shown in the following table.

Probability of Failure

Score	Description
1	Improbable
2	Remote, unlikely but possible
3	Possible
4	Probable, likely
5	Imminent, likely in near future

CoF encourages a focus on social, environmental, and economic cost impacts. The economic CoF encompasses the impacts of direct and indirect economic losses to the affected organization and third parties due to asset failure. The social consequence represents the impact of society due to asset failure and the environmental consequence of failure considers the impact to ecological conditions occurring as a result of asset failure.

The factors were rated on a one through five scale for each asset. If one factor is deemed more important, the weighting was skewed to give that factor more influence.

The following factors were combined to determine the final CoF:

- Relative Network Position – the sum of upstream sewers discharging to a structure
- Diameter/Size – the relative size of the asset with respect to the rest of the system
- Restoration Type/Accessibility – refers to the cost to restore the surface above the asset and if traffic control is needed
- Environment – proximity to sensitive environmental features like Boardman River, Kid's Creek, Grand Traverse Bay, etc.
- Critical Users – important system users (Munson Hospital)

Revenue Structure

A Stormwater Advisory Group (SAG) was formed in 2015 and met four times to discuss the prospect of long term funding for the City's stormwater system. There is currently no dedicated funding source for Traverse City's stormwater system, unlike water and wastewater systems. A Funding Feasibility Study with revenue analysis was developed as part of this AMP. The results are described in the following paragraphs.

The total spent annually by the City for all stormwater-related activities is approximately $750,000, with $360,000 dedicated from the General Fund and additional funding from the Streets budget if available. Existing funding is primarily linked to keeping the system clean, including leaf pickup, street sweeping, and catch basin cleaning. Any additional costs, such as repair or replacement of catch basins, and structural repair or replacement of manholes and sewers, are generally taken from the City's Streets budget. This creates unnecessary strain on the Streets budget, as that money is needed to repair and replace the City's roadways. This further underscores the need for a dedicated funding source for stormwater assets.

The inventory and condition assessment completed for this AMP include several new O&M and CIP costs that are crucial to meeting the City's goals of effective management and maintenance of stormwater infrastructure. As shown in the following table, there is a funding gap of $1.66 million between the $2.02 million proposed annually and the $360,000 currently allocated to stormwater in the City's current budget.

Proposed Budget Items	Annual Cost
O&M Expenditures	
Sewer Rehabilitation and Repairs	$310,000
Manhole Replacement Program (Repairs/Inspection/Cleaning)	$90,000
Sweeping and Leaf Collection	$285,000
Sewer System Inspection and Cleaning	$160,000
Boardman River Wall Maintenance	$65,000
Open Channel and Culvert Maintenance	$75,000
Administrative Costs and New Personnel	$150,000
Stormwater Utility Bill (City-owned facilities)	$50,000
O&M Subtotal	*$1,185,000*
CIP Expenditures	
Catch Basin Replacement Program (Inspection/Cleaning)	$100,000
Storm Sewer Replacement (Hydraulics)	$315,000
Infiltration BMPs (Volume and Pollutant Control)	$350,000
End of Pipe Treatment	$70,000
CIP Subtotal	*$835,000*
Annual Total Recommended Stormwater Program	**$2,020,000**
Existing Stormwater Budget (transfer from General Fund)	**$360,000**
Funding Gap	**$1,660,000**

To address this funding gap, the SAG explored options, including additional taxes or dedicated revenue (i.e. stormwater utility).

Based on preliminary stormwater rate model, the City can generate approximately $415,000 for every one dollar per month charged to a typical single-family residential customer. In other words, a monthly charge of about $6 per Equivalent Residential Unit (ERU) would close the stormwater infrastructure funding gap referenced in this document. A monthly charge of $7 per ERU should generate enough revenue to fully fund the $2.02 million recommended stormwater program. In this scenario, commercial/industrial sites would pay a higher fee in proportion to the total impervious area on their property.

Upon exploring the implications of fees and taxes, and understanding the findings of this AMP in the context of future Level of Service needs, the SAG determined that a stormwater utility (enterprise fund) would be the most equitable and reliable option to maintain the City's stormwater infrastructure.

Capital Improvement Plan

A Capital Improvement Plan (CIP) was developed using the Business Risk Exposure (BRE) described above. CIP tables are detailed in the Appendix of the AMP document. These tables include recommended projects for the first three years and include maintenance (i.e. heavy cleaning), repair (i.e. lining or spot repair) and replacement for hydraulically-deficient sewers.

The CIP was developed with the first projects reflecting those with the highest BRE scores. Some projects were manually moved higher on the list if a known street project is expected to occur in the affected area or if a higher priority project were occurring immediately adjacent to the project (to reduce mobilization costs). The CIP tables are intended to be used for high level planning; the City will further evaluate the stormwater infrastructure before beginning the CIP design process.

It was assumed that the annual investment in the CIP would ramp up between Years 1-3, given that it will take some time to establish a new funding source and to be fully-engaged in a CIP program. The actual implementation of the CIP will depend on the establishment of an adequate funding source.

Recommendations

The recommendations in this AMP are to:

- Establish a dedicated funding source for stormwater management; ideally through a stormwater utility.
- Implement the capital improvements as recommended in the CIP.
- Continue the AMP process in future years through systematic system inspection and updates of the City's GIS data to re-prioritize projects in future years.
- Focus on water quality management, including reducing runoff volumes to Grand Traverse Bay, as part of the ongoing capital improvement efforts.

List of Major Assets

The major assets are simplified in the text below. The full AMP report contains additional detail on the distribution of sizes, ages, and conditions.

- *65 miles of storm sewer pipe, ranging from 8-inch to 72-inch diameter*
- *1,220 manholes*
- *2,400 catch basins*
- *End-of-pipe treatment BMPs (approximately 35)*

HRC
HUBBELL, ROTH & CLARK, INC
CONSULTING ENGINEERS SINCE 1915

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May 26, 2017

Michigan Department of Environmental Quality
Constitution Hall
525 West Allegan Street
P.O.Box 30473
Lansing, Michigan 48909-7973

Attn: Eric Pocan, Project Manager

Re: Stormwater, Asset Management, Wastewater (SAW) HRC Job No. 20140465
City of Troy SAW Grant No. 1097-01

Dear Mr. Pocan:

On behalf of the City of Troy, Hubbell, Roth, & Clark, Inc. is pleased to submit the deliverables required for the City of Troy's Wastewater AMP and Stormwater AMP. A brief discussion of each of the five major components is included along with a list of the plan's major identified assets. A signed Certification of Project Completeness form is included for both the Stormwater AMP and the Wastewater AMP.

Each of the City's AMPs will be available to the Department of Environmental Quality (DEQ) upon request, and a copy of the plan will be available to the public for at least 15 years. The City of Troy is reviewing the publication method, and it will be either uploaded to the city's website or copies made available at City Hall.

If you have any questions or require any additional information, please contact the undersigned.

Very truly yours,

HUBBELL, ROTH & CLARK, INC.

Karyn Stickel

Michael MacDonald, P.E.
Vice President

Karyn Stickel, P.E.
Associate

MH
Attachment
cc: TROY; S. Vandette P.E., B. Kischnick, K.Bovensiep, P.Trosper
DEQ-WRD, SE MI District Office; D.Beauchamp
HRC; M.Hughes

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City of Troy Michigan
Asset Management Plan – SAW Grant No. 1097-01
Wastewater Collection System

The total award amount of $2,444,368 was awarded on May 8, 2014 to the City of Troy to complete stormwater and wastewater asset management plans. Troy was responsible for $444,425 in local match funding. The approved amount of $1,999,943, in addition to the local match, was used to prepare Troy's wastewater and stormwater collection asset management plans. The final amount spent will not be available until the last disbursement request after May 31, 2017. However, it is anticipated that the majority of the grant money will be spent.

The following information is a summary of the wastewater collection system asset management plan:

A. Asset Inventory and Condition Assessment:

The City was able to update its Geographic Information Systems (GIS) inventory and update the schema for required criticality factors. The City of Troy Department of Public Works was physically able to assess 23% of its sanitary sewer pipe inventory and 17% of its sanitary manhole structure inventory. The City contracted with United Resources LLC. to clean and assess approximately 13,920 feet of large diameter sanitary sewer.

City of Troy Wastewater Asset Summary

Asset Group	Facilities	Number of Assets	Total Length
Sanitary Gravity Mains		9,474*	396 miles*
Sanitary Manholes		9,337*	
Sewer Siphon		3	N/A**
Force Mains		7	332 ft. **
Lift Stations	7	304	
Sewer Cleaning Truck		1	
Sewer Inspection Truck		1	
Portable Generators		3	

*Source: Based on GIS Query February 13, 2017
**Assets not evaluated

B. Level of Service:

Because frequent maintenance, including preventative, and ongoing improvements are already part of the City's practices, the City choose to use their current Mission Statement as their level of service statement. The City uses robust GIS information, computerized maintenance management software, and several other tools to provide efficient and sustainable management of its wastewater infrastructure.

C. Criticality of Assets:

Factors were developed to determine why some assets are more critical than others. A Probability of Failure (POF) was estimated for assets with inspection data based on condition, age, and other factors. A Consequence of Failure (COF) was determined by several attributes of the asset. These attributes include diameter, depth, location, surface type, and critical users. The product of these factors is the overall Business Risk Evaluation (BRE). The average BRE is 0.79 for sanitary pipes assessed and 1.8 for sanitary manholes assessed, on a scale of one to 25. Therefore, the system is primarily in very good condition. Specific criticality factors were also generated for the pump stations overall and the individual components

D. Operation and Maintenance Strategies/Revenue Structure:

The City's Director of Financial Services submitted a rate methodology study on October 3, 2016 which was approved on October 11, 2016. The City demonstrated that current revenues are sufficient to meet current expenses. The City uses a GIS-centric computerized maintenance management system to efficiently process work orders and maintenance schedules. The GIS schema is being updated to implement condition scores and criticality ratings.

E. Long-term Funding/Capital improvement Plan

Based on the condition data assessed and risk, various improvements have been recommended, which includes $1.9 million in corrective maintenance to be performed in short term, up to as much as $18.8 million in possible future capital improvements (lining) on large diameter sanitary sewer pipe, and increased funding for condition assessment. Given the relatively low amount of work identified for manhole rehabilitation, the repairs can be incorporated into the current operating budget.

A signed Certification of Project Completeness form is enclosed. Contact information for the grantee including name, address, and phone number is included below:

Grantee: City of Troy Michigan

Brian Kischnick
City Manager
City of Troy Michigan
500 W. Big Beaver Rd.
Troy, MI 48084
Phone: (248) 524-3330
b.kishnick@troymi.gov

Kurt Bovensiep
Public Works Director
City of Troy Michigan
4693 Rochester Rd.
Troy, MI 48085
Phone: (248) 524-3489
k.bovensiep@troymi.gov

Karyn Stickel, P.E.
Consulting Engineer
Hubbell, Roth & Clark, Inc.
555 Hulet Dr.
Bloomfield Hills, MI
48302
Phone: (248) 454-6566
kstickel@hrcengr.com

City of Troy Michigan
Asset Management Plan – SAW Grant No. 1097-01
Stormwater Collection System

The total award amount of $2,444,368 was awarded on May 8, 2014 to the City of Troy to complete stormwater and wastewater asset management plans. Troy was responsible for $444,425 in local match funding. The approved amount of $1,999,943, in addition to the local match, was used to prepare Troy's wastewater and stormwater collection asset management plans. The final amount spent will not be available until the last disbursement request after May 31, 2017. However, it is anticipated that the majority of the grant money will be spent.

The following information is a summary of the stormwater collection system asset management plan:

A. Asset Inventory and Condition Assessment:

The City was able to update its Geographic Information Systems (GIS) inventory and update the schema for required criticality factors. The City of Troy was physically able to assess 1% of its storm sewer pipe inventory and 91% of its drainage structure inventory. Approximately 25,417 assets were assessed as a part of this grant. The City developed a more accurate storm utility geodatabase and collected over 45,000 condition assessment photographs. The city also collected information for surface drainage outfalls, pump stations, and detention ponds. Each of the City's pump stations were assessed. City staff cleaned and televised approximately 45,100 feet of storm sewer and unburied approximately 450 storm structures.

City of Troy Stormwater Asset Summary*

Asset Group	Facilities	Number of Assets	Total Length
Storm Sewer - Total		39,555	713 miles
Storm Sewer – City owned		29,254	525.8 miles
Storm Sewer – Other Owner**		10,301	187.2 miles
Manholes - Total		8,969	
Manholes - City Owned		6,409	
Manholes – Other Owner		2,560	
Inlet / Catch Basin - Total		24,712	
Inlet /Catch Basin – City Owned		17,849	
Inlet / Catch Basin – Other owner		6,863	
Outfall - Total		2,451	
Outfall – City Owned		2,162	
Outfall – Other Owner		289	
Detention Basin - Total	248		
Detention basins – City Owned	134		
Force Mains		11	283 feet.
Lift Stations	11	306	
Vactor Cleaning Truck		1	
Portable Generators		3	
Pump Station Service Truck		1	

*Source: Based on GIS Query March 14, 2017. Asset Counts can change
**Private Utility Information is still currently being added with continued updates

B. Level of Service:

Because frequent maintenance, including preventative and ongoing improvements are already part of the City's practices, the City choose to use their current Mission Statement as their level of service statement. The City uses robust GIS information, computerized maintenance management software, and several other tools to provide efficient and sustainable management of its stormwater infrastructure.

C. Criticality of Assets:

Factors were developed to determine how some assets are more critical than others. A Probability of Failure (POF) was estimated for assets with inspection data based on condition, age, and other factors. A Consequence of Failure (COF) was determined by several attributes of the asset. These attributes include diameter, depth, location, surface type, and critical users. The product of POF and COF is the overall Business Risk Evaluation (BRE). The average BRE is 2.29 for storm sewer pipes assessed and 2.86 for drainage structures assessed. Therefore the system is overall in good condition. Specific criticality factors were also generated for the pump stations overall and the individual components.

D. Operation and Maintenance Strategies/Revenue Structure:

The SAW Grant does not require a review of the stormwater system rate structure because most stormwater systems in Michigan do not have a dedicated source of revenue. The estimated costs for improvements are presented for budgetary purposes. The City uses a GIS-centric computerized maintenance management system to efficiently process work orders and maintenance schedules. The GIS schema is being updated to implement condition scores and criticality ratings.

E. Long-term Funding/Capital improvement Plan

Based on the condition data assessed and risk, capital improvements have been recommended. The plan includes approximately $7.1 million in immediate corrective maintenance and as much as $14.3 million for long term capital improvement based on the data available.

A signed Certification of Project Completeness form is enclosed. Contact Information for the grantee including name, address, and phone number is included below:

Grantee: City of Troy Michigan

Brian Kischnick
City Manager
City of Troy Michigan
500 W. Big Beaver Rd.
Troy, MI 48084
Phone: (248) 524-3330
b.kishnick@troymi.gov

Kurt Bovensiep
Public Works Director
City of Troy Michigan
4693 Rochester Rd.
Troy, MI 48085
Phone: (248) 524-3489
k.bovensiep@troymi.gov

Karyn Stickel, P.E.
Consulting Engineer
Hubbell, Roth & Clark, Inc.
555 Hulet Dr.
Bloomfield Hills, MI
48302
Phone: (248) 454-6566
kstickel@hrcengr.com

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 5-31-17
(no later than 3 years from executed grant date)

The City of Troy *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1097-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: October 11, 2016
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ——.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ——.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Paul Trosper at (248) 524-3392 P.Trosper@troymi.gov
Name Phone Number Email

5-11-17
Signature of Authorized Representative (Original Signature Required) Date

Brian Kischnick City Manager
Print Name and Title of Authorized Representative

April 2017

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date 5-31-17
(no later than 3 years from executed grant date)

The City of Troy *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1097-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Kurt Bovensiep at (248) 524-3489 K.Bovensiep@troymi.gov
Name Phone Number Email

5-11-17
Signature of Authorized Representative (Original Signature Required) Date

Brian Kischnick City Manager
Print Name and Title of Authorized Representative

WRC
WATER RESOURCES COMMISSIONER
Jim Nash

May 30, 2017

Michigan Department of Environmental Quality
Constitutional Hall
525 West Allegan Street
P.O.Box 30473
Lansing, Michigan 48909-7973

Attn: Karen Nickols, Project Manager

Re: Stormwater, Asset Management, Wastewater (SAW) Grant
The City of Walled Lake
Walled Lake SDS, SAW Grant No. 1288-01

Dear Ms. Nickols:

As you are aware, the City of Walled Lake was awarded an MDEQ Stormwater, Asset Management, Wastewater (SAW) Grant in "Round 1" of the Program. The grant included funding for work related to developing an Asset Management Plan (AMP) for the applicant's wastewater system.

The deliverables required to complete the grant work for the AMP for the wastewater system are attached to this letter, and were described in a letter from your office, dated April 20, 2017. They include the following:

- A signed Certification of Project Completion for the wastewater AMP.
- A summary as required by the grant, that includes a brief discussion of the five major AMP components, a list of the plan's major identified assets, and contact information for the grant.

In addition, a complete report describing the work performed as part of the grant, and the AMP for the wastewater system has been prepared. A copy of the AMP will be available for review by the MDEQ and/or the public for a period of at least 15 years and is available at the City of Walled Lake office and the Oakland County Water Resources Commissioner's Office. In addition, an electronic copy of the summary will be posted on the WRC's publications website.

If you have any questions or require any additional information, please contact the undersigned at 248-452-8645.

Very truly yours,

Kwarren

Karen L. Warren, P.E.
Oakland County Water Resources Commissioner's Office

enclosures
cc: L. Dennis Whitt, City Manager, City of Walled Lake

One Public Works Drive • Building 95 West • Waterford, MI 48328-1907
Phone: 248.858.0958 • Fax: 248.858.1066 • *www.oakgov.com/water*

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The City of Walled Lake *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1288-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: October 24, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ______.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ______.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Karen Warren, P.E.	at 248-452-8645	warrenk@oakgov.com
Name	Phone Number	Email

Dennis Whitt 5/17/2017
Signature of Authorized Representative (Original Signature Required) Date

L. Dennis Whitt, City Manager
Print Name and Title of Authorized Representative

City of Walled Lake
1499 East West Maple Road
Walled Lake, MI 48390
walledlake.us
Mr. L. Dennis Whitt, City Manager
Phone: 248-624-4847
SAW Grant Project Number 1288-01

EXECUTIVE SUMMARY

The City of Walled Lake (City) undertook the development of an asset management plan for the City's sanitary sewer system. The City contracts with the Oakland County Water Resources Commissioner's Office (WRC) to operate, maintain, and manage the sanitary sewer collection and disposal system. On behalf of the City, the WRC applied for a grant to develop the Asset Management Plan (AMP) for the City of Walled Lake Sewage Disposal System (SDS). The grant was funded through the Michigan Department of Environmental Quality's (MDEQ) Stormwater, Asset Management, and Wastewater (SAW) program. This grant provides between 100% and 75% grant funding for costs related to developing an asset management program. The SAW program was established by the MDEQ to help communities move toward financial sustainability and become self-sustaining enterprises. The City was awarded a grant in the amount of $670,090 with a 10% local match of $67,009.

WRC also received a grant to develop a separate Asset Management Program with a "Common to All" framework (***WRC Common to All Report***). This program provides the general workflows, templates, decision trees, specifications and other elements that can be incorporated into individual asset management plans for communities within Oakland County that WRC contracts with, like the City of Walled Lake.

The report includes program elements related to the City of Walled Lake's wastewater collection system. The Asset Management Plan provides the City of Walled Lake and the WRC with an understanding of the current and future infrastructure needs for the system, as well as evaluates the current and future operational/ maintenance and financial needs of the utility. The Asset Management Plan provides a guideline for the City and the WRC to follow to continue to provide the desired quality, level of service, and reliability of wastewater service to the community at the lowest rate possible. The Asset Management Plan was developed by evaluating multiple components of the system including: asset inventory, condition of assets, value of assets, evaluation of risks and failures of assets, capital improvement needs, and current and future financial needs.

The WRC also has the following tools available for use to manage the assets it maintains; GIS geodatabase, collaborative asset management system, condition assessment methods, risk/prioritization models, capacity studies, asset deterioration models and an operating and capital improvement project prioritization model. These various tools allow the WRC to evaluate the multiple components of the Walled Lake SDS and establish both short and long-term strategies for the operation of the SDS.

The following summary of the Walled Lake AMP provides basic information of the five major AMP components along with a list of the AMP's major identified assets.

ASSET INVENTORY AND CONDITION ASSESSMENT

The Walled Lake SDS consists of gravity sanitary sewers, manholes, lift stations, and force mains. As part of the contract with WRC, the City is able to utilize the existing WRC Geographic Information System (GIS) geodatabase as the primary means to record and map the assets. This geodatabase is part of the overall WRC GIS system, which is operated and maintained by the WRC along with Oakland County IT services. The software used is ESRI ArcGIS. The geodatabase provides a means to record the attributes associated with each asset, such as installation date (age), size, and material, along with other specific information for the given asset type. The geodatabase syncs with other WRC software packages and systems, including the WRC's Collaborative Asset Management System (Cityworks) software and the Riva software. These software systems provide asset maintenance planning and tracking, estimate likelihood of failure and consequence of failure using the asset attributions, risk/prioritization models, capacity studies, maintenance records, and capital improvement prioritizing strategies and capital planning.

The WRC has developed condition assessment methods and guidelines that allow for efficient and reliable recording of the asset conditions. The gravity sanitary sewer pipes are reviewed and evaluated to determine their condition utilizing National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) Standards. Similarly, the manholes are reviewed and evaluated using the Manhole Assessment and Certification Program (MACP) Standards. Vertical assets are inspected and evaluated using guidelines and information developed by the WRC and included in the ***WRC Common to All Report*** completed with the SAW Grant.

Over the course of the last year and a half, multiple asset management tasks were completed to further understand the current state and future needs of the system utilizing funding from the MDEQ SAW Grant Program. The condition of the gravity sanitary sewer assets was evaluated based on the video inspection, review, and evaluation of approximately 108,000 lineal feet of pipe. The conditions assessment of approximately 548 sanitary manholes, as well as the vertical assets including a total of four lift stations, were also inspected and inventoried.

The gravity sewer pipe conditions were evaluated using the NASSCO program's Quick Structural Rating (QSR) and a Quick Maintenance Rating (QMR) scoring method. The assessment of the gravity sanitary sewer pipe inspections showed that most of the pipes were in good condition. The sewer pipes with a QSR or QMR score greater than 4100 are considered in fair to poor condition. A total of approximately 10,900 feet (8.7%) of the pipe had a QSR greater than 4100 and approximately 6,960 feet (5.6%) had a QMR greater than 4100. The inspections of the sanitary manholes found that all the manholes were in good condition. The sanitary lift stations were also found to be in good condition based on more recent pump upgrades and equipment improvements.

The results of these assessment conditions were inputted into the existing software program to help further develop the inventory of the assets and evaluate the asset risks. The information and data within the software systems were then used to develop the Asset Management Plan for the City of Walled Lake SDS.

LEVEL OF SERVICE

The WRC has developed overall level of service goals that the Walled Lake SDS should provide. The level of service goal includes how the SDS should perform based on the technical, managerial, and financial operations of the system. The operation of the SDS shall, at a minimum, meet all state and federal regulations and requirements as well as meet all the WRC level of service goals including; customer communication, measure of its performance, determination of critical assets, setting goals and objectives, safety and security, public and environmental impacts, and financial management.

WRC sets the minimum standard for sewer pipes using the NASSCO scoring method. Generally, sewer pipes with QSR and QMR scores of less than 4100 are considered acceptable. This is a high level of service that has been discussed with and agreed upon by the City. The goal is to provide service that is proactive and not reactive. Specific areas of the system that are considered problematic are routinely monitored. All lift stations are on a regular maintenance schedule. Sanitary sewer overflows due to flaws in the system and major disruptions due to system failures are considered unacceptable. Maintaining this level of service requires consistent rate revenue and periodic rate increases. The City Manager interfaces directly with City Council to stress the importance of keeping the sanitary sewer system in good working order for the ultimate benefit to the community.

CRITICALITY OF ASSETS

The WRC utilizes their asset optimization software, Riva, to facilitate and prioritize both the maintenance and capital improvements plans of the system, considering both the risk and financial means. The optimization software works with both the GIS geodatabase and the Cityworks software to allow for all asset data and information to be considered. The WRC uses a scoring process, based on the measurement of two aspects of the asset, to determine the asset's overall risk. The Likelihood of Failure (LOF) and the Consequence of Failure (COF) scores are used to estimate the overall risk or the Business Risk Exposure (BRE) score. The WRC has configured the calculation of these risk scores, within the software system, based on the methods in the ***WRC Common to All Report.***

The inspection and evaluation of the gravity sanitary sewer and manhole assets were reviewed and the data included in the software to allow for a more accurate calculation of the risks. The lift stations were also inspected and evaluated as individual assets and the LOF and COF scores were determined and included in the software to estimate the overall risk score. Most of the assets, within the SDS, have low scores for both the LOF and COF, as well as the overall BRE score.

The gravity sanitary sewer includes approximately 95% of the assets with a low LOF and the remaining with a moderate LOF score. The COF scores for the gravity sewer pipes resulted in 98% of the assets being low, with the remaining 2% falling in the moderate and high categories.

The non-gravity sewer (force main) assets all have a low LOF. The COF scores for the force main sewer pipes are considerably higher based on the asset type. The force main pipes have only 18% in the low COF category with most of the force main, or 81%, having a moderate COF and only 1% with a high COF.

The inspections and evaluations of all four of the lifts stations resulted in each one of them having low scores for both the LOF and COF scores.

O&M STRATEGIES AND REVENUE STRUCTURE

The Operation and Maintenance (O&M) strategies for the Walled Lake SDS were evaluated based on the guidelines developed by the WRC in the ***WRC Common to All Report***. The O&M strategies include regulating the consistency of the sewer cleanings, televising frequency, inspection frequency, and maintenance procedures for the assets. The costs required to perform these strategies were estimated and included into the rate review process for the system.

The WRC works with the City to determine if the current rate structures are sufficient to meet the current management needs of the Walled Lake SDS. They also work together to make any required adjustments that are needed to plan for both the O&M costs as well as projected expenses that may develop in the future. The software system helps calculate the estimated annual maintenance and capital financial needs for the SDS.

The SDS currently operates on an as-needed basis therefore the current rate has not had a significant increase in many years. The SDS does not have a long-term maintenance plan and with the system just beginning to age, a maintenance and rehabilitation plan and budget is needed to prolong the lifetime of the system.

The SAW grant allowed for the inspection of the sewer assets and to help identify problem areas, immediate needs, and the establishment of a maintenance program. The results did not indicate any immediate needs or emergency repairs in the system. However, several rehabilitation maintenance projects were identified to be resolved soon. These maintenance activity costs could be spread out over multiple years to help reduce the financial impact on customers.

The current rate structure is sufficient to sustain the system and ensure the desired level of service. Future changes will need to be made to plan for proposed rehabilitation projects. The costs for the proposed projects were estimated and then used to determine the required funds needed for future projects. The finances to pay for these projects would then be funded through a future rate increase. The rate increase per Residential Equivalent Unit (REU) that would be required to meet the estimated project costs is approximately 8.5%, taking the monthly REU rate from $75.26 to $81.72.

LONG TERM FUNDING/CAPITAL IMPROVEMENT PLAN

The Capital Improvement Plan (CIP) provides a guide to identify the long-term needs, improvements, rehabilitation, and replacement needs for the utility for a period of 10 years or more. The CIP would have a more detailed plan for the first two years. The CIP will allow the utility to plan and budget for these expenditures and consider the anticipated project costs during the rate process.

Infrastructure improvement priorities have been developed based on the current evaluation of the system. The most immediate improvements, recommended to be completed within the two-year horizon, include sewer rehabilitation or replacement of 32 gravity sewer assets that will cost approximately $426,500.

The proposed improvement projects are summarized as follows:

Year One (Total of 21 sewer assets; rehabilitation cost of $267,500)

- Rehabilitation of approximately 4,400 lineal feet of 8" sanitary sewer.
- Rehabilitation of approximately 270 lineal feet of 12" sanitary sewer.
- Complete removal and replacement of approximately 320 lineal feet of 8" sanitary sewer and approximately 200 lineal feet of 15" sanitary sewer.

Year Two (Total of 11 sewer assets; rehabilitation cost of $159,000)

- Rehabilitation of approximately 2,900 lineal feet of 8" sanitary sewer.

WALLED LAKE SDS - SUMMARY OF ASSETS

Below is a summary of the horizontal and vertical assets within the Walled Lake SDS:

Gravity and Non-Gravity Sewer Assets by Material

Sewer Assets by Material	Gravity or Non-Gravity Sewer Pipe	Total Length (FT)	Number of Assets
ABS	Gravity	16,316	88
C-14	Gravity	65,842	316
Cast Iron	Non-Gravity	5,534	4
Clay or VCP	Gravity	8,032	39
Non-reinforced Concrete	Gravity	2,311	13
PVC	Gravity	7,444	44
Reinforced Concrete	Gravity	16,803	72
Truss	Gravity	7,815	40
Total		**130,097**	**616**

Gravity and Non-Gravity Sewer Assets by Size

Sewer Assets by Diameter	Total Length (FT)	Number of Assets
6"	2,661	3
8"	113,129	552
10"	10,147	41
12"	3,926	18
15"	234	2
Total	**130,097**	**616**

Additional Assets

Asset Description	Horizontal or Vertical	Number of Assets
Gravity Sewer Manhole	Horizontal	614
Sanitary Sewer Lift Station	Vertical	4

CONCLUSION WALLED LAKE SDS - SUMMARY OF ASSETS

The AMP is a document that summarizes the assets within the Walled Lake SDS. The AMP provides a resource to be used by the WRC, the City, utility managers, operation and maintenance staff, etc. to help make decisions regarding their assets. The AMP will provide guidance for determining any improvements, annual budgets, rate development, required staff, and public communication.

The City of Walled Lake Sanitary Disposal System is well maintained and operated. The planning and improvements that were completed over that last several years have enabled the City and the Oakland County WRC to provide reliable and high quality service to the community.

In general, the system is currently at a relatively low likelihood of failure with isolated areas that will require improvement in the near future. As the Walled Lake SDS is mostly built out, periodic evaluation and continued maintenance of the system's assets is key to reducing risks due to failure.

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date MAY 16, 2017
(no later than 3 years from executed grant date)

The CHARTER TOWNSHIP OF WASHINGTON *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1533-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: NOVEMBER 9, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

RICHARD AMORMINO, DPW DIRECTOR at 586.786.0010 AMORMINOR@WASHINGTONTWPMI.ORG
Name Phone Number Email

Kathy Bosh 5/19/2017
Signature of Authorized Representative (Original Signature Required) Date

KATHY BOSHEERS, TOWNSHIP CLERK
Print Name and Title of Authorized Representative

Memorandum -

To:	Kathy Bosheers, Township Clerk	Date:	May 30, 2017
From:	Mike Kozak, PE	Project:	Wastewater System AMP and SAW Grant Studies
RE:	SAW Grant – Executive Summary of Deliverables	Project Number:	17850.02
		SAW Grant Number:	1533-01
		SAW Grant Amount:	$994,410
		SAW Grant Match Amount:	$110,490

Introduction

As required under Section 603 of Public Act 84 of 2015, we have prepared the following executive summary of the major components of the Washington Township's completed Wastewater Asset Management Plan (WWAMP), a simplified list of the plan's major identified assets and contact information for the Township.

More specifically:

Wastewater Asset Inventory

A complete inventory (see below) of the Township assets was completed utilizing a combination of field survey data, as-built record drawings, and closed circuit televising (CCTV) reports. This information was compiled into a database format utilizing Microsoft Excel and then inputted into a newly created geographic information system (GIS) using Esri ArcGIS, for the Township. The ArcGIS database will act as a living document, updated as frequently as new information about existing assets becomes available (e.g. as more of the system is televised as it continues to age) and as new assets are added to the system via new development.

Condition Assessment

Once the assets were identified, located and subsequently mapped via the GIS, a structural as well as an operation & maintenance (O&M) condition assessment was performed for each asset based on a review of either CCTV footage/ratings or the relative age of the pipe and associated expected physical condition. Assets (manholes and pipes) were scored using NASSCO standards, from 1-5 (excellent to immediate attention). The following tables summarize these asset ratings for each category and for the major pipeline and manhole assets.

Structural Assessment - Manholes

Grade	Grade Description	# of Manholes	% of Total
5	Immediate Attention	0	0.00%
4	Poor	1	0.04%
3	Fair	19	0.83%
2	Good	293	12.82%
1	Excellent	1,972	86.30%

Structural Assessment – Sanitary Sewer -

Grade	Grade Description	Linear Feet	% of Total
5	Immediate Attention	578	0.13%
4	Poor	0	0.00%
3	Fair	16,283	3.66%
2	Good	55,443	12.46%
1	Excellent	372,607	83.75%

O&M Assessment - Manholes -

Grade	Grade Description	# of Manholes	% of Total
5	Immediate Attention	0	0.00%
4	Poor	5	0.22%
3	Fair	78	3.41%
2	Good	182	7.96%
1	Excellent	2,020	88.40%

O&M Assessment – Sanitary Sewer -

Grade	Grade Description	Linear Feet	% of Total
5	Immediate Attention	364	0.08%
4	Poor	4,187	0.94%
3	Fair	2,835	0.64%
2	Good	91,512	20.57%
1	Excellent	346,011	77.77%

Level of Service Determination

Using the above ratings, level of service goals were developed to ensure dependable sanitary sewer collection system services at an effective cost to the Township. A required level of service will help the implementation of a comprehensive asset management program and allow for effective communication of strategies to elected officials and Township residents. Quality and reliability are important elements that can define level of service and associated system performance goals, both short- and long-term. The level of service also incorporates strategies required for not only obtaining self-sustainability but also for maintaining the same level long-term. Together, elected officials, Township DPW staff, and Giffels Webster should do the following:

- *Ensure adequate system capacity for all sewers by analyzing current and anticipated customer satisfaction with the system.*
- *Establishing and communicating to the public a level of service "agreement" that describes the system performance targets.*
- *Perform routine cleaning and televising, and rehabilitation measures to eliminate system bottlenecks due to pipe blockages or other system defects.*
- *Track system performance over time utilizing current SCADA to reduce peak flow volumes through inflow/infiltration (I/I) and provide rapid and effect emergency response services.*
- *Secure sanitary sewer system facilities with up to date security measures to eliminate potential threats to sanitary sewer collection system assets.*

Continual communication between the Township elected officials, staff, residents, and Giffels Webster will assist in achieving the level of service goals as well as refine and develop new ones as new information is received and analyzed. As always, one of the hardest targets to establish is how much the Township should budget annually to insure the long-term viability of the wastewater assets while insuring a sufficiently high level of service. All stakeholders have worked together to identify and review the assets in need of immediate repair and developed an overall O&M budget to continue the CCTV analysis of younger assets and regular maintenance of the system.

Criticality of Assets

The criticality of each asset was established assessing the Probability of Failure (POF), Consequence of Failure (COF), Business Risk Exposure (BRE); and assigned a priority (good to poor) for manholes, and (low to critical) for sanitary sewer. POF looked at a number of factors including asset age, condition of asset, failure history, historical knowledge, experiences with that type of asset in general, maintenance records, and knowledge regarding how that type of asset is likely to fail. COF considered all of the possible costs of particular failure. These costs may include: cost of repair; social cost associated with the loss of the asset; repair/replacement costs related to collateral damage caused by the failure; legal costs related to additional damage caused by the failure; environmental costs created by the failure; loss of business revenue to the community; and any other associated costs or asset losses. The consequence of failure can be high if any one of these costs is significant or the accumulation of several costs occurs with a failure.

Assessing criticality required an examination of the probability of failure and the consequence of failure as discussed above. The assets that have the greatest probability of failure and the greatest consequences associated with the failure will be the assets that are the most critical.

Business Risk = Probability of Failure (POF) x Consequence of Failure (COF)

Typically, an asset falling in the BRE range of 1 to 8 will not be considered critical. An asset falling in the criticality range of 9 to 16 will be important, but not critical. An asset above 16 in the BRE range will be considered critical and a candidate to include as a Capital Improvement Project (CIP).

As of the year 2017, there is not a single known horizontal asset within Washington Township that has an estimated BRE score of 16 or higher. This is highly contributed to the relatively “new” age of the Township’s wastewater infrastructure and the Township’s overall commitment to maintenance of the system. Inherently, this would mean that there are no candidates for a Capital Improvement Project (CIP). However, in order to ensure the Township remains proactive in the upcoming years, additional criteria were developed in lieu of waiting for existing horizontal assets to deteriorate to a BRE of 16+.

Assets identified on the Poor and Critical range of the spectrum were then included in the first year of the proposed 5-year Capital Improvement Plan (CIP).

Priority - Manholes

Rating Description	# of Manholes	% of Total
Good	2,251	98.51%
Fair	28	1.23%
Poor	6	0.26%

Priority - Sanitary Sewer -

Rating Description	Linear Feet	% of Total
Low	373,856	84.03%
Medium	65,926	14.82%
High	4,187	0.94%
Critical	941	0.21%

Priority – Lift and Pump Station Assets
Both the Autumn Creek and Rudgate stations have a BRE rating of less than 8 which will not be considered critical. However, both Hayes Road and Jewell Road stations have a BRE rating higher than 8 which is approaching the next rating tier of important, but not critical. Because of this, the Township should work over the next 6-12 months to finalize programming and improvement plans for both of stations to insure they continue to operate optimally and provide adequate peak flow capacity to the system.

Revenue Structure

The existing sanitary system revenue structure and long-term funding was evaluated to determine if a funding gap exists between what work must be paid for and what monies have been allocated or are available from the rate payers. Based on the UFS Rate Methodology report dated October 20, 2016 there is not a revenue gap projected for 2017. The Township stakeholders evaluate these funding questions annually when setting rates. A two-year operating budget is created and all rate impacts are considered to insure that the system is adequately funded from both an operation and maintenance perspective as well as looking at the replacement costs associated with assets that are nearing the end of their useful life. This is of particular importance when considering the efficient operation of the Township's lift and pump stations.

Capital Improvement Plan

As previously mentioned, the assets deemed "poor" or "critical" in the criticality analysis will be repaired in the first year of the proposed capital improvement plan. Due to the amount of unknown information regarding the condition and ratings of the remaining Township sanitary sewer and manholes that have not been televised or physically inspected yet, Giffels Webster has proposed 5-year cleaning and televising program to jump start the Township into a yearly routine of scheduled cleaning and televising of sanitary sewer and manholes. The value of this program will help prepare a foundation to address all corrective, preventative, and predictive maintenance procedures for not just the assets already physically inspected, but also for the remaining pipe and manholes throughout the Township.

The proposed 5-year asset management program is as follows:

1st Year – 2017 ***(Approximate Hard Cost = $243,000)***
Rehabilitate sewer segments and structures as identified as "poor" or "critical" in this WWAMP in addition to cleaning and televising unseen assets in Township sections 15, 16, 22, and 23. Cleaning and televising video information will be documented and rated per current NASSCO ratings and descriptions and rehabilitation measures will be proposed.

2nd Year – 2018 ***(Approximate Hard Cost = $218,000)***
Perform rehabilitation procedures as needed from year one of plan, and clean and televise Township sections 21 and 28 sanitary sewer and manholes. Cleaning and televising video information will be documented and rated per current NASSCO ratings and descriptions and rehabilitation measures will be proposed for year three.

3rd Year – 2019 *(Approximate Hard Cost = $210,000)*
Perform rehabilitation procedures as needed from year two of plan, and clean and televise Township sections 26, 27, and 32 sanitary sewer and manholes. Cleaning and televising video information will be documented and rated per current NASSCO ratings and descriptions and rehabilitation measures will be proposed for year four.

4rd Year – 2020 *(Approximate Hard Cost = $205,000)*
Perform rehabilitation procedures as needed from year three of plan, and clean and televise Township sections 33 and 34 sanitary sewer and manholes. Cleaning and televising video information will be documented and rated per current NASSCO ratings and descriptions and rehabilitation measures will be proposed for year five.

5th Year – 2021 *(Approximate Hard Cost = $205,000)*
Perform rehabilitation procedures as needed from year four of plan, and clean and televise Township sections 35, 36 and Hayes Interceptor sanitary sewer and manholes. Cleaning and televising video information will be documented and rated per current NASSCO ratings and descriptions and rehabilitation measures will be proposed for year six.

Recommendations

In general, the Township owns and operates a wastewater collection system which is relatively new and for the majority in “excellent’ condition. Operation and Maintenance strategies of the Township are recommended to include an annual routine of cleaning and televising increasingly younger assets as well as regular inspection of all pump/lift stations, and the SCADA system. We are recommending that the Township utilize their yearly allocated O&M budget to maximize asset use for the longest period of time for the lowest cost possible to both the Township and its customers. From all of the above mentioned, we recommend the Township perform the following:

- Rehabilitate sewer segments and structures as identified as “poor” or “critical” in this WWAMP.
- Initiate proposed cleaning and televising plan this year as described in Chapter 7 in order to continue to collect sanitary asset information.
- Analyze data from each year of this program to improve sanitary asset investigation and data collection each year.
- Pursue newer sanitary assessment technologies as they become readily available to expedite sanitary asset investigation and data collection (e.g. laser scanning, ground penetrating radar, etc).
- Require asset inventory information be collected at time of new development project close out to alleviate having to double back after the project has long been constructed.

AMP Major Identified Assets

1. Pump/Lift Stations (4)
    a. Hayes Road Pump Station
    b. Jewell Road Lift Station
    c. Autumn Creek Pump Station
    d. Rudgate Lift Station
2. SCADA System
3. Sanitary Sewer Pipe [444,911 total linear feet (LF)]
   Note: All lengths are within ±1 LF

a.	6”	13,650 LF
b.	8”	28,425 LF
c.	10”	295,887 LF

d.	12”	38,045
e.	15”	11,631 LF
f.	18”	17,498 LF
g.	20”	3,229 LF
h.	21”	15,863 LF
i.	24”	17,755 LF
j.	36”	2,596 LF
k.	42”	332 LF
4.	Manholes	2,285 EA

Contact Information

The final AMP contains a separate contact sheet, but for completeness, the following shall serve as official contact information for the AMP:

Charter Township of Washington
Department of Public Works
Richard Amormino, DPW Director
57900 Van Dyke
Washington Twp., MI 48094
586-786-0010
http://www.washingtontownship.org/

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date May 31, 2017
(no later than 3 years from executed grant date)

The Western Michigan University *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1455-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Jan Van Der Kley at 269-387-4707 jan.vanderkley@wmich.edu
Name Phone Number Email

Jan Van D Kley
May 31, 2017
Signature of Authorized Representative (Original Signature Required) Date

Jan Van Der Kley - Treasurer
Print Name and Title of Authorized Representative

Western Michigan University
Storm Water Asset Management Plan Summary

Western Michigan University SAW Grant
1903 W. Michigan Avenue, Kalamazoo, MI 49008

Contact Information for the grantee:
Ms. Jan Van Der Kley
Address: 1903 W. Michigan Avenue, Kalamazoo, MI 49008
Phone: 269-387-4707
Email: jan.vanderkley@wmich.edu

SAW Grant Project Number: 1455-01

Executive Summary

Western Michigan University received a SAW Grant in 2014 to prepare a Storm Water Asset Management Plan. The Grant agreement indicated the following amounts:

Plan Cost	Grant Amount	Local Match
$573,401.00	$516,061	$57,340

The Key components in their Asset Management Plan include:

a. Asset Inventory and Condition Assessment
b. Level of Service
c. Criticality of Assets
d. Operation and Maintenance Strategies/Revenue Structure
e. Long-term Funding/Capital Improvement Plan

Western Michigan University
Storm Water Asset Management Plan Summary

Asset Inventory

Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.

All assets that are functionally or financially significant to the storm water system have been inventoried.

- Collection system manholes, catch basins, and outlets were located using survey quality GPS.
- Detention basins and underground retention system were located using hand held GPS equipment.

Locations for all assets are recorded in a GIS. Data regarding date of installation, material, and other physical characteristics for each asset is incorporated into the GIS geodatabase.
Location of non-pipe assets such as building components and other equipment is compiled in a package of inventory spreadsheets. These assets were not mapped in GIS. The GIS and asset spreadsheets will all be used to maintain asset data in the future.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

The condition of collection system piping was documented with either a pole mounted zoom camera (looking down each pipe from the manholes) or with in-line closed circuit television (CCTV) from manhole to manhole. The zoom camera method provided a very economical initial condition assessment of the pipes. Pipes noted to have potentially significant deficiencies were flagged and follow-up inspections were performed with full in-line CCTV.

Using the zoom camera data, pipes were rated based on several factors such as joint conditions, wall corrosion, and infiltration. Composite Risk of Failure ratings of 1-5 (5 being the worst) were assigned to each pipe segment.

Western Michigan University
Storm Water Asset Management Plan Summary

Pipes inspected with CCTV were rated using the PACP system (Pipeline Assessment Certification Program). The PACP ratings were then used to derive a composite Risk of Failure rating of 1-5 for each pipe.

Percentage of pipes within each rating category

1	2	3	4	5
27%	40%	27%	3%	3%

Manholes, catch basins, outlets, culverts, and detention / retention basins were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, and structures.

Percentage of manholes/catch basins within each rating category

1	2	3	4	5
63%	23%	10%	3%	1%

Level of Service Determination

Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.

Because we are a university community made up of staff and students, we operate differently than a municipality. Our staff and students tend to focus their energies on specific areas for expertise. Given this, our Campus Planning and Facilities Management departments are the focus of all of our storm water asset activities. These departments coordinate on a regular basis to act as stewards of the system. We have held a series of meetings and workshops to present the results of our condition assessments, review the costs for meeting various Levels of Service, and reviewed the budget impacts of those options. Based on the input received during those meetings, we have established the following Level of Service Goals:

1. Meet Regulatory Requirements
    a. Maintain a specified number of Certified Operators
2. Minimize Flooding and Public Hazards
    a. Staff/equip crews sufficiently to perform specific routine maintenance items
    b. Perform regularly scheduled monitoring and maintenance on all of our storm water system assets
    c. Adopt a baseline 10-year 24 hour design storm
3. Manage Storm Water Inflow and Ground Water Infiltration
    a. Monitor I/I and implement projects to meet EPA guidelines
4. Provide Capacity for University Growth
5. Minimize Life Cycle Costs
6. Maintain Active Water Quality
    a. Establish a street/parking lot sweeping and catch basin cleaning program
    b. Perform regular maintenance on detention basins, underground retention systems, and outlets
    c. Maintain a relationship with the Kalamazoo Area TMDL watershed group

Criticality of Assets

Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions. The factors considered varied by the asset type and were tailored to identify both physical and functional deficiencies. For example, pipe ratings considered factors such as joint offsets and structural cracking while detention basin ratings considered factors such as sediment accumulation and remaining working volume.

Western Michigan University
Storm Water Asset Management Plan Summary

Assets were given a Consequence of Failure (CoF) of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.
Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Are under major roads or adjacent to existing buildings
- Are adjacent to waterways or significant wetlands

Consequence of Failure and Criticality should not be confused. Criticality is the product of as asset's Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset's action priority.

Criticality ratings were calculated and ranged from 1-25 (25 being the highest priority). We then ran a Jenks Optimization to create 5 primary groupings, each with a rank of 1-5 (5 being highest priority). The final Criticality ratings were considered when the comprehensive Capital Improvement Plan was generated.

Revenue Structure

Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.

Because our utility work is funded through our Revolving Utility Account and not through a rate structure, we developed an Annual Needs Compilation (ANC) rather than a Capital Improvement Plan. Additionally, work on our stormwater system is usually driven by either a building project, site project, or work on steam lines. Given these considerations, our ANC identified potential actions and prioritized them based on Criticality. Improvements were then given potential action years based on upcoming building/site/steam projects. The ANC provided refined cost projections for the first 10 years of the financial analysis. The Asset Management System identified the estimated asset investment cost by year for the remaining lifecycle of all assets. The annual investment cost was evaluated and demands on the Revolving Utility Account.

Given that much of our asset work is driven by proposed building/site projects, we utilize our ANC to incorporate needed stormwater improvements into those campus projects. The annual funding allocations from our Revolving Utility Account are then adjusted to provide our desired Level of Service.

Capital Improvement Plan

Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.

Once assets RoF ratings were assigned and actions prioritized using the Criticality ratings, action timelines were predicted for maintenance/repair/replacement. As noted above, because our utility work is funded through our Revolving Utility Account and not through a rate structure, we developed an Annual Needs Compilation (ANC) rather than a Capital Improvement Plan.

Scope of work and action timelines for the other asset systems were incorporated based on:

- Wastewater – based on Asset Management Plan work as part of SAW
- Steam Line – based on Campus Facilities schedule of evaluations and replacement
- Roadway - based on roadway PASER (Pavement Surface Evaluation and Rating) evaluations
- Building Sites – Campus Planning schedule of improvements

Individual project scopes for the ANC were created to maximize coordination of work on various assets and minimize overall costs. The ANC costs were incorporated into the Revolving Utility Account structure.

List of the plan’s major identified assets

- 113,400 feet of gravity storm sewer
    - Current replacement value of $14,742,000

Western Michigan University
Storm Water Asset Management Plan Summary

- 325 manholes and 1,208 catch basins
  - Current replacement value of $5,365,000
- 34 detention /retention basins
- 70 storm water outlets

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The Western Michigan University *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1455-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: 12-2-2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: N/A.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on N/A.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Jan Van Der Kley at 269-387-4707 jan.vanderkley@wmich.edu
Name Phone Number Email

Jan Van D Kley May 31, 2017
Signature of Authorized Representative (Original Signature Required) Date

Jan Van Der Kley - Treasurer
Print Name and Title of Authorized Representative

April 2017

Western Michigan University
Wastewater Asset Management Plan Summary

Western Michigan University SAW Grant
1903 W. Michigan Avenue, Kalamazoo, MI 49008

Contact Information for the grantee:
Ms. Jan Van Der Kley
Address: 1903 W. Michigan Avenue, Kalamazoo, MI 49008
Phone: 269-387-4707
Email: jan.vanderkley@wmich.edu

SAW Grant Project Number: 1455-01

Executive Summary

Western Michigan University received a SAW Grant in 2014 to prepare a Wastewater Asset Management Plan. The Grant agreement indicated the following amounts:

Plan Cost	Grant Amount	Local Match
$267,948	$241,154	$26,794

The Key components in their Asset Management Plan include:

a. Asset Inventory and Condition Assessment
b. Level of Service
c. Criticality of Assets
d. Operation and Maintenance Strategies/Revenue Structure
e. Long-term Funding/Capital Improvement Plan

Western Michigan University
Wastewater Asset Management Plan Summary

Asset Inventory

Describe the system components included in the AMP. Discuss how they were located and identified, if applicable. Describe the platform used to develop and maintain the inventory of assets.

All assets that are functionally or financially significant to the wastewater system have been inventoried.

- Collection system manholes were located using survey quality GPS.

Locations for assets that have fixed geographic locations such as pipes, manholes, buildings, and major fixed equipment are recorded in a GIS. Data regarding date of installation, material, and other physical characteristics for each asset is incorporated into the GIS geodatabase.
Location of non-pipe assets such as building components, and other equipment is compiled in a package of inventory spreadsheets. These assets were not mapped in GIS. The GIS and asset spreadsheets will all be used to maintain asset data in the future.

Condition Assessment

Discuss the condition assessment process, including what methods were used. Summarize the results of the assessment for each asset category.

The condition of collection system piping was documented with either a pole mounted zoom camera (looking down each pipe from the manholes) or with in-line closed circuit television (CCTV) from manhole to manhole. The zoom camera method provided a very economical initial condition assessment of the pipes. Pipes noted to have potentially significant deficiencies were flagged and follow-up inspections were performed with full in-line CCTV.

Using the zoom camera data, pipes were rated based on several factors such as joint conditions, wall corrosion, and infiltration. Composite Risk of Failure ratings of 1-5 (5 being the worst) were assigned to each pipe segment.

Western Michigan University
Wastewater Asset Management Plan Summary

Pipes inspected with CCTV were rated using the PACP system (Pipeline Assessment Certification Program). The PACP ratings were then used to derive a composite Risk of Failure rating of 1-5 for each pipe.

Percentage of pipes within each rating category

1	2	3	4	5
22%	41%	20%	7%	10%

Manholes were visually inspected and rated on a scale of 1-5 based factors related to the condition of castings, steps, and structures.

Percentage of manholes within each rating category

1	2	3	4	5
40%	37%	19%	3%	1%

Level of Service Determination

Discuss the level of service the municipality has determined that it wants to provide its customers based on the municipality's ability to provide the service and customer expectations. Discuss the procedures used to involve stakeholders in the AMP discussion. What are the trade-offs for the service to be provided? This may include any technical, managerial, health standard, safety, or financial restraints, as long as all regulatory requirements are met. Discuss how this was determined.

Because we are a university community made up of staff and students, we operate differently than a municipality. Our staff and students tend to focus their energies on specific areas for expertise. Given this, our Campus Planning and Facilities Management departments are the focus of all of our wastewater asset activities. These departments coordinate on a regular basis to act as stewards of the system. We have held a series of meetings and workshops to present the results of our condition assessments, review the costs for meeting various Levels of Service, and reviewed the budget impacts of those options. Based on the input received during those meetings, we have established the following Level of Service Goals:

Western Michigan University
Wastewater Asset Management Plan Summary

1. Meet Regulatory Requirements
    a. Monitor building use and onsite facilities (maintenance facilities, art and science class rooms, food services, and other chemical and supply storage areas) to ensure only acceptable materials and domestic waste disposed up properly and not improperly dumped to the wastewater system
2. Minimize Service Interruptions
    a. Staff/equip crews sufficiently to perform specific routine maintenance items
    b. Repair/replace assets as required to limit emergency responses to 10 per year
3. Minimize Public Hazards
    a. Staff/equip emergency response services for 24 hour per day service and 120 minute response times
    b. Limit service interruptions to less than 8 hours
4. Manage Storm Water Inflow and Ground Water Infiltration
    a. Monitor I/I and implement projects to meet EPA guidelines
5. Provide Capacity for University Growth
6. Minimize Life Cycle Costs

Criticality of Assets

Provide a summary of the method used to assess the criticality of assets considering the likelihood and consequence of failure. Based on the condition of the assets, and the determined risk tolerance, how were the assets ranked? What assets were considered most critical?

Assets were given a Risk of Failure (RoF) rating of 1-5 (5 being the worst) based on factors related to both physical and functional conditions. The factors considered varied by the asset type and were tailored to identify both physical and functional deficiencies. For example, pipe ratings considered factors such as joint offsets and structural cracking while lift station pumps considered factors such as design pumping rate vs actual pumping rate.

Western Michigan University
Wastewater Asset Management Plan Summary

Assets were given a Consequence of Failure (CoF) of 1-5 (5 being the worst) based on potential damage to adjacent utilities, transportation network, and the surrounding property/environment. The magnitude of the potential service disruption was also a factor.

Assets with the higher rankings for Consequence of Failure were those that:

- Provide service to a significant portion of the system
- Are under major roads or adjacent to existing buildings
- Are adjacent to waterways or significant wetlands

Consequence of Failure and Criticality should not be confused. Criticality is the product of as asset's Risk of Failure (RoF) and Consequence of Failure (CoF). Criticality drives an asset's action priority.

Criticality ratings were calculated and ranged from 1-25 (25 being the highest priority). We then ran a Jenks Optimization to create 5 primary groupings, each with a rank of 1-5 (5 being highest priority). The final Criticality ratings were considered when the comprehensive Capital Improvement Plan was generated.

Revenue Structure

Discuss how the rates, charges, or other means of revenue were reviewed to determine if there will be sufficient funds to cover system operation, maintenance, replacement, capital improvement projects, and debt costs, identified in the AMP. If the current rate structure was not sufficient, discuss what increases were needed to ensure the desired level of service is sustainable and if any changes were made.

Because our utility work is funded through our Revolving Utility Account and not through a rate structure, we developed an Annual Needs Compilation (ANC) rather than a Capital Improvement Plan. Additionally, work on our wastewater system is usually driven by either a building project, site project, or work on steam lines. Given these considerations, our ANC identified potential actions and prioritized them based on Criticality. Improvements were then given potential action years based on upcoming building/site/steam projects. The ANC provided refined cost projections for the first 10 years of the financial analysis. The Asset Management System identified the estimated asset investment cost by year for the remaining lifecycle of all assets. The annual investment cost was evaluated and demands on the Revolving Utility Account.

Given that much of our asset work is driven by proposed building/site projects, we utilize our ANC to incorporate needed wastewater improvements into those campus projects. The annual funding allocations from our Revolving Utility Account are then adjusted to provide our desired Level of Service.

Capital Improvement Plan

Describe the long-term Capital Improvement Plan that was developed to address system needs identified in the AMP. Provide a list of the identified improvements/projects.

Once assets RoF ratings were assigned and actions prioritized using the Criticality ratings, action timelines were predicted for maintenance/repair/replacement. As noted above, because our utility work is funded through our Revolving Utility Account and not through a rate structure, we developed an Annual Needs Compilation (ANC) rather than a Capital Improvement Plan.

Scope of work and action timelines for the other asset systems were incorporated based on:

- Storm Water – based on Asset Management Plan work as part of SAW
- Steam Line – based on Campus Facilities schedule of evaluations and replacement
- Roadway - based on roadway PASER (Pavement Surface Evaluation and Rating) evaluations
- Building Sites – Campus Planning schedule of improvements

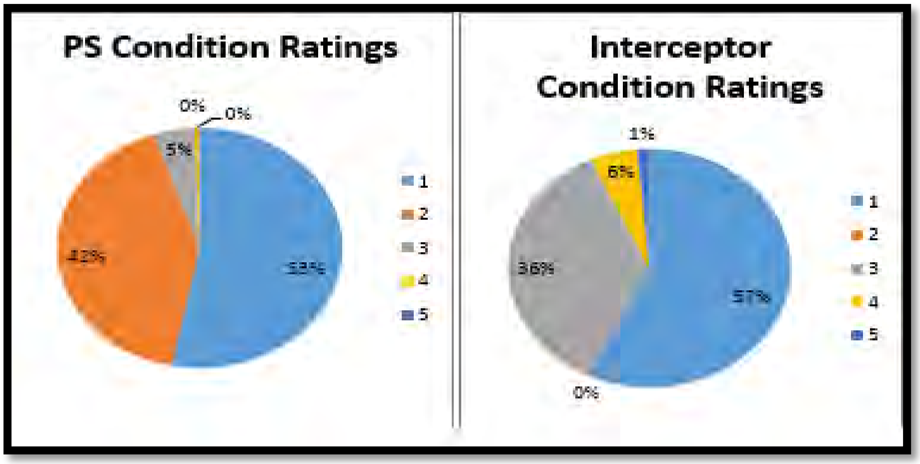
Individual project scopes for the ANC were created to maximize coordination of work on various assets and minimize overall costs. The ANC costs were incorporated into the Revolving Utility Account structure.

List of the plan's major identified assets

- 41,500 feet of gravity sanitary sewer
    - Current replacement value of $6,225,000

SAW Grant # 1353-01
Aaron Sprague
WTUA Director of Operations
40905 Joy Road
Canton, MI 48187
(734) 453-2793

1. **Asset Inventory and Condition Assessment:**
    a. WTUA, with the assistance of Stantec, reviewed the existing database of inventory assets (pump station components and interceptor sewers). This database was further developed, through the addition of components not previously tracked as well as addition of details to those components already contained in the inventory database.
    b. A series of field investigations were made by Stantec, with the accompaniment of WTUA operations staff, to assess the condition of the pump station facilities and equipment.
    c. CCTV inspection was performed on all of WTUA's interceptor sewers and manholes, per PACP and MACP standards.
    d. The results of the latter two (2) steps were used as a basis for condition assessment, and incorporated into WTUA's inventory database
    e. The condition assessment found that the WTUA facilities are in good to very good condition. See figures below:



2. **Criticality of Assets:**

    a. A multi-tiered Criticality Assessment Model was developed for the WTUA assets. This model rated each component (pump station facilities, pump station subsystem components, interceptors) in order to assign a criticality score (0-10) to each.

3. **Level of Service:**

    a. The criticality ratings developed above were utilized to develop a level of service categorization for each component. WTUA staff reviewed each component and assigned a secondary score that represents the desired Level of Service (scale of 1-3).

b. WTUA staff discussed the operational and financial ramifications of providing a low, medium and high level of service with the Township Technical staff, as well as the WTUA Board.

c. With the input garnered above, WTUA has selected to provide a Medium Level of Service for projection of asset management costs

4. Operation and Maintenance Strategies/Revenue Structure:

a. WTUA does not utilize "rates" for collection of Revenue; each of its member communities is assessed a portion of the Operation and Maintenance costs on a monthly basis. The communities utilize the WTUA Budget and Capital Improvement Plan in setting the rates for their users.

5. Long-term Funding/Capital Improvement Plan

a. The Condition Assessment, Criticality of Assets and Level of Service were incorporated into an Asset Management Supplemental Analysis Tool (AMSAT). The AMSAT is used to assess the long-term funding needs (both O&M and CIP) by predicting a component replacement timeframe and cost.

b. The CIP covers the expected expenditures for the next 20 years, and includes estimated costs for all components associated with a medium level of service. The Table below summarized the expected cash contribution by the Townships for WTUA's CIP:

Year	Budget	Year	Budget
2018	$800,000	**2029**	$750,000
2019	$800,000	**2030**	$700,000
2020	$800,000	**2031**	$700,000
2021	$800,000	**2032**	$700,000
2022	$800,000	**2033**	$700,000
2023	$800,000	**2034**	$700,000
2024	$800,000	**2035**	$800,000
2025	$1,000,000	**2036**	$800,000
2026	$1,000,000	**2037**	$800,000
2027	$1,000,000	**2038**	$800,000
2028	$1,000,000		

WTUA System Major Identified Assets:

- Two Pump Station/Equalization Basin facilities
- Two Collection System Pump Stations
- Approximately 26 Miles of Interceptor Sewers

DEQ

Department of Environmental Quality
SAW Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date 5/30/17
(no later than 3 years from executed grant date)

The Western Townships Utilities Authority *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1353-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant. The Department of Environmental Quality (DEQ) defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gap in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.

Attached to this certification is a summary of the AMP that identifies major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Aaron Sprague at (734) 453-2793 aaron@wtua.org
Name Phone Number Email

Rate Methodology was submitted to DEQ on: November 2016
(within 2 ½ years from date of executed grant)

An initial rate increase of ____% of a $__________ gap was adopted on ______________

5/30/17
Signature of Authorized Representative (Original Signature Required) Date

Aaron Sprague Director of Operations.
Print Name and Title of Authorized Representative

106 W. Allegan St. Suite 500
Lansing, MI 48933
O: 517.371.1200
www.c2ae.com

CITY OF WILLIAMSTON STORMWATER ASSET MANAGEMENT PLAN EXECUTIVE SUMMARY

City of Williamston
161 East Grand River Avenue
Williamston, MI 48808
Mayor, (517) 655-2774
SAW GRANT PROJECT NUMBER 1613-01

Executive Summary

The SAW agreement with the State of Michigan was signed in May 8, 2014 which began the overall SAW program.

The City of Williamston is located in the northeast portion of Ingham County in south central Michigan, approximately one mile north of I-96. Williamston's storm sewer collection system has approximately 62,100 feet of storm sewer and approximately 630 storm manholes, catch basins and outfalls.

Stormwater Asset Inventory

This item which initiated the work included:

- Identifying and locating all assets.
    - A list of all assets to be monitored was obtained using a combination of historical system records, field data collection.
    - The GPS coordinates of the field assets were gathered.
    - An ESRI ArcGIS data set was completed to index the locations and attributes of assets.
    - Physical inspections were conducted for each asset.
    - The asset information was included in the Asset Management Spreadsheet (AMS).
    - The AMS is used to quantify and sort the system asset information.

Condition Assessment

- Structures assessment and inventories follow NASSCO MACP guidelines.
- Sewer pipe assessment and inventories follow NASSCO PACP guidelines.
- Asset age and material data was collected using historical project drawings.

Level of Service Determination

- A SAW Team was created to discuss the storm system direction.
- The SAW Team met and discussed a mission statement and desired Level of Service statement.

Criticality of Assets

- The AMS was used to organize the asset classes. Several parameters were used to determine asset consequence of failure and probability of failure, rating each on a 1 to 5 scale.
    - Redundancy: Does the unit have system backup?
    - Criticality of the asset to the system and what level of impact to the system occurs in the event that the asset fails

  - Location of the asset and surrounding service areas were incorporated in determining the criticality of the asset
  - Probability of failure based on its age and condition
  - These items together result in a parameter identified as Business Risk.
- The AMS was used to prioritize the need for short term repair or maintenance, short term replacement, or long term maintenance.

Revenue Structure

- The City drainage system is operated and maintained using City street funds.

Capital Improvement Plan

- The AMS identifies capital improvement projects for the future.
- The long term projects may be achieved through grants or future public borrowings.
- An estimate of project year and financial cost is generated from each capital improvement project.
- The following is the recommended project to be completed within the next three (3) to five (5) years are as follow:
  - *Storm Structure repairs with a Business Risk greater than 16 or Probability of Failure of 4 or Wall, Cone, Chimney grade below "D" to be replaced*.
- Additional projects recommended in the next 6 to 10 years and 11 to 20 years are included in the Capital Improvement Plan.

List of Major Assets

- 62,100 feet of Storm Sewer
- 630 Storm Structures

Department of Environmental Quality
SAW Grant
Stormwater Asset Management Plan
Certification of Project Completeness

Completion Due Date May 31, 2017
(no later than 3 years from executed grant date)

The City of Williamston *(legal name of grantee)* certifies that all stormwater asset management plan (SWAMP) activities specified in SAW Grant No. 1613-01 have been completed and the SWAMP, prepared with the assistance of SAW Grant funding, is being maintained. Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, requires implementation of the SWAMP within 3 years of the executed grant (Section 5204e(3)).

Attached to this certification is a summary of the SWAMP that identifies major assets. Copies of the SWAMP and/or other materials prepared through SAW Grant funding will be made available to the Department of Environmental Quality or the public upon request by contacting:

Scott DeVries	at 517-655-2221	Scott.devries@williamston-mi.us
Name	Phone Number	Email

5-30-17

Signature of Authorized Representative (Original Signature Required) Date

Tammy Gilroy, Mayor

Print Name and Title of Authorized Representative

106 W. Allegan St. Suite 500
Lansing, MI 48933
O: 517.371.1200
www.c2ae.com

CITY OF WILLIAMSTON WASTEWATER ASSET MANAGEMENT PLAN
EXECUTIVE SUMMARY

City of Williamston
161 East Grand River Avenue
Williamston, MI 48808
Mayor, (517) 655-2774
SAW GRANT PROJECT NUMBER 1613-01

Executive Summary

The SAW agreement with the State of Michigan was signed in May 8, 2014 which began the overall SAW program.

The City of Williamston is located in the northeast portion of Ingham County in south central Michigan, approximately one mile north of I-96. The City owns and operates an activated sludge Wastewater Treatment Plant with a rated capacity of 0.65 million gallon per day (MGD) with a firm peak hour capacity of 2.7 MGD. The treatment plant discharges to the Red Cedar River. Williamston's sanitary collection system has approximately 139,400 feet of sanitary sewer and force main, approximately 510 sanitary manholes and 11 lift stations that provides sewer services to the City and portions of Williamstown and Wheatfield Townships.

Wastewater Asset Inventory

This item which initiated the work included:

- Identifying and locating all assets.
    - A list of all assets to be monitored was completed.
    - The GPS coordinates of the field assets were gathered.
    - An ESRI ArcGIS data set was completed to index the locations and attributes of assets.
    - Physical inspections were conducted for each asset.
    - The asset information was included in the Asset Management Spreadsheet (AMS).
    - The AMS is used to quantify and sort the system asset information.

Condition Assessment

- Structures assessment and inventories follow NASSCO MACP guidelines.
- Sewer pipe assessment and inventories follow NASSCO PACP guidelines.
- WWTP equipment site condition assessment and inventory.
- Wastewater lift stations condition assessments and inventory.
- Asset age and material data was collected using historical project drawings.

Level of Service Determination

- A SAW Team was created to discuss the wastewater system direction.
- The SAW Team met and discussed a mission statement and desired Level of Service statement.

Criticality of Assets

- The AMS was used to organize the asset classes. Several parameters were used to determine asset consequence of failure and probability of failure, rating each on a 1 to 5 scale.
    - Redundancy: Does the unit have system backup?
    - Criticality of the asset to the system and what level of impact to the system occurs in the event that the asset fails
    - Location of the asset and surrounding service areas were incorporated in determining the criticality of the asset
    - Probability of failure based on its age and condition
    - These items together result in a parameter identified as Business Risk.
- The AMS was used to prioritize the need for short term repair or maintenance, short term replacement, or long term maintenance.

Revenue Structure

- The user charge report and the asset management spreadsheet are identified as the Rate Methodology and have been submitted previously to MDEQ and approved.
- The Rate Methodology was updated to forecast future budgeting needs. The current budget information was included.

Capital Improvement Plan

- The AMS identifies capital improvement projects for the future.
- The long term projects may be achieved through grants or future public borrowings.
- An estimate of project year and financial cost is generated from each capital improvement project.
- A List of recommended projects to be completed within the next three (3) to five (5) years are as follow:
    - *Sanitary Structure repairs with a Business Risk greater than 16 or Probability of Failure of 4 or Wall grade below "D" to be lined.*
    - *Sanitary Structure repairs with a Business Risk greater than 16 or Probability of Failure of 4 or Wall, Cone, Chimney grade below "D" to be replaced.*
    - *Sanitary System Sewer Repairs with a Business Risk of 16+ or likely sewer collapse.*
    - *Sanitary Collection System Lift Station repairs for Lift Station 001 (Corwin Road), Lift Station 009 (Zimmer Road) and Lift Station 008 (Transfer Pump Station).*
    - *Improvements at the WWTP include replacement of the insulation on the outside of the Primary and Secondary Digesters and replacement of the final clarifiers' mechanisms.*
- Additional projects recommended in the next 6 to 10 years and 11 to 20 years are included in the Capital Improvement Plan.

List of Major Assets

- 119,600 feet of sanitary sewer
- 19,800 feet of and force main
- 510 sanitary manholes
- 11 lift stations.
- 0.65 MGD Wastewater Treatment Plant

Department of Environmental Quality (DEQ)
Stormwater, Asset Management, and Wastewater (SAW) Grant
Wastewater Asset Management Plan
Certification of Project Completeness

Completion Date May 31, 2017
(no later than 3 years from executed grant date)

The City of Williamston *(legal name of grantee)* certifies that all wastewater asset management plan (AMP) activities specified in SAW Grant No. 1613-01 have been completed and the implementation requirements, per Part 52 of the Natural Resources and Environmental Protection Act, 1994, PA 451, as amended, are being met. Section 5204e(3) requires implementation of the AMP and that significant progress toward achieving the funding structure necessary to implement the AMP be made within 3 years of the executed grant.

Please answer the following questions. If the answer to Question 1 is No, fill in the date of the rate methodology approval letter and skip Questions 2-4:

1) Funding Gap Identified: Yes or [✓ No]
   If No - Date of the rate methodology approval letter: November 29, 2016.
2) Significant Progress Made: Yes or No
   (The DEQ defines significant progress to mean the adoption of an initial rate increase to meet a minimum of 10 percent of any gain in revenue needed to meet expenses, as identified in a 5-year plan to eliminate the gap. A copy of the 5-year plan to eliminate the gap must be submitted with this certification.)
3) Date of rate methodology review letter identifying the gap: ____________________.
4) An initial rate increase to meet a minimum of 10 percent of the funding gap identified was adopted on ____________________.

Attached to this certification is a brief summary of the AMP that includes a list of major assets. Copies of the AMP and/or other materials prepared through SAW Grant funding will be made available to the DEQ or the public upon request by contacting:

Scott DeVries	at 517-655-2221	scott.devries@williamston-mi.us
Name	Phone Number	Email

	5-30-17
Signature of Authorized Representative (Original Signature Required)	Date

Tammy Gilroy, Mayor
Print Name and Title of Authorized Representative

April 2017