Village of Cassopolis

"A Friendly Lakeside Community"

Village of Cassopolis
Cass County, Michigan
Asset Management Program
Drinking Water System

FINAL REPORT
REVISED PER EGLE COMMENTS

November 2019

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TABLE OF CONTENTS

Executive Summary

An asset management program is a tool for community leaders and utility managers to proactively decide when to repair, replace, or rehabilitate assets and how those improvements will be funded to maintain a perpetual level of service. The program is organized into three components that answer the following questions:

Asset Management Program (AMP):

- What level of service will be provided?
- What improvements need to be made and when?
- What changes to operations need to be made?
- How will these improvements and changes be funded?
- How is the plan implemented?

Geographic Information System (GIS):

- What do we own, where is it, what is the condition, and what is the remaining life?
- What are the most critical assets?
- Where was maintenance performed and what was done?
- Where are improvements needed?

System User Manual:

- How will the asset management program tools be used?
- How will the asset management program be maintained and updated?
- Where are improvements needed?

System Description

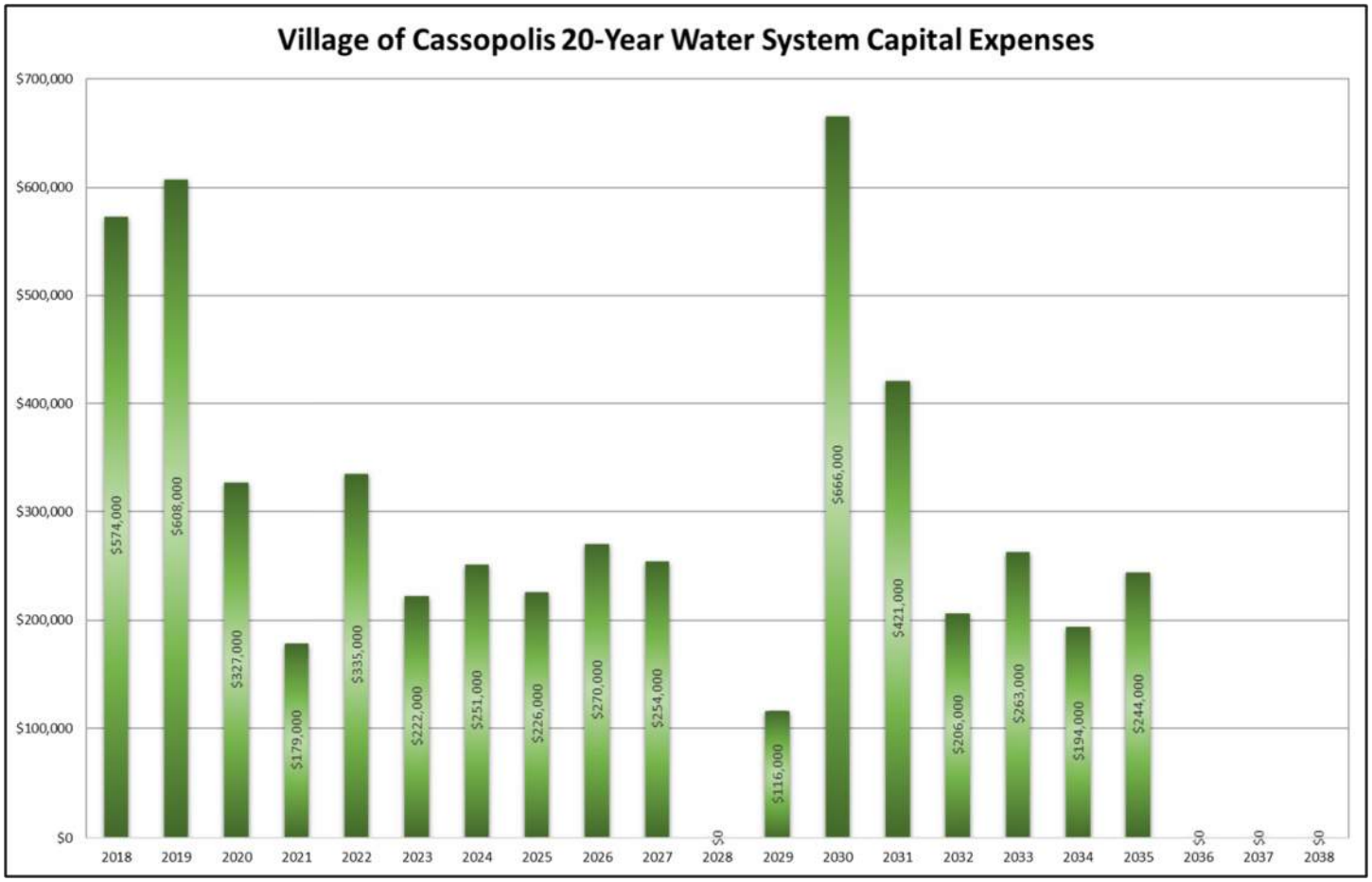
The Village of Cassopolis operates a water system consisting of two water supply wells, one elevated storage tank, and over 22 miles of piping and currently serves over 800 active water accounts. The wells have a total capacity of 1,500 gpm and a firm capacity of 750 gpm, while the elevated storage tank provides 400,000 gallons of storage for peak and fire demands. The system currently provides an average day demand of 218,000 gpd and a peak day demand of 431,000 gpd in 2017. The approximate replacement cost of the water supply, treatment, and distribution system is $25,500,000.

System Condition

The Village of Cassopolis's water assets are generally in fair to good condition and, with recommended operation, maintenance, and replacement procedures, will be able to provide the desired level of service. The condition ratings for the major components of the water system are based upon a numerical scale of 1 (very good condition) to 5 (very poor condition).

Capital Improvements

A capital improvement plan has been prepared to identify when critical assets should be improved. A list of the recommended improvements for the next 20 years is included in Section V.B of this report with additional details provided in Appendix D. The following chart identifies the estimated improvement costs for the next 20 years shown in future (adjusted for anticipated inflation) dollars.



System Operations

System operations were reviewed and the following recommendations were made to provide the desired level of service:

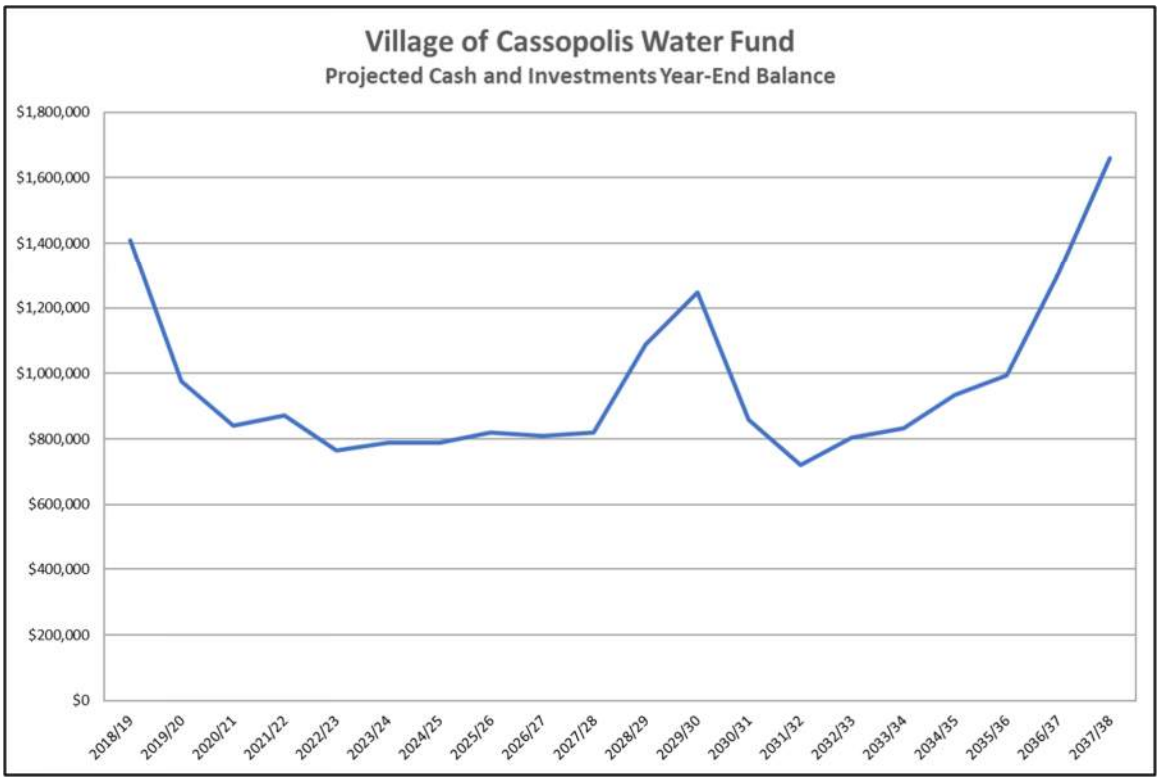
- Increase preventative maintenance operations to include a valve turning program, a water main flushing program, a hydrant painting program, and a program to replace lead and galvanized water services.
- Track operation and maintenance progress through the GIS-based work order system.
- Use the report generation features of the work order system to notify Village of Cassopolis officials and customers on the status of repairs and responses to complaints.
- Consistently update the GIS system as components of the water system are added, removed, repaired, or replaced.
- Attach updated Operation and Maintenance manuals and field drawings to assets within the GIS system.

Cash Flow and Rates

A long-term cash flow analysis was completed to determine the most cost-effective way to fund operations, capital improvements, and existing debt service. The analysis indicates that the current ready to serve rates, combined with a 5% annual increase in the commodity charges through the 2023/24 budget year, followed by a 2% (adjusted to match inflation) annual increase to the commodity charge

from the 2024/25 budget year through the 2038/39 budget year, could support annual operating costs, annual loan payments for the 1998 capital improvement projects, and a total of $4,631,000 ($5,356,000 adjusted for inflation) in additional capital improvements.

The cash flow rate and capital improvement plan recommendations will improve the water system condition and provide the funding necessary to sustain the desired level of service. The following graph shows the projected cash balance for the next 20 years assuming the recommended improvements are made and the rate increases already approved by the Village Council are implemented.



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I. Introduction, Team, and Mission Statement

A utility Asset Management Program (AMP) identifies the desired level of service for that utility at the lowest life cycle cost for rehabilitating, repairing, or replacing the assets associated with that utility system. By January 1, 2018, the State of Michigan Department of Environmental Quality (MDEQ[1]) is requiring all public water systems serving populations of 1,000 or greater to have an AMP developed for their drinking water system and on file with the MDEQ. To comply with this regulation, the Village of Cassopolis (Cassopolis) retained the services of Wightman to develop their drinking water system AMP. This report outlines the various components of the drinking water system AMP, including implementation recommendations.

The purpose of this report is as follows:

- Develop an inventory and location map of all drinking water assets.
- Evaluate the condition and remaining life of all drinking water assets.
- Determine the desired level of service.
- Assign criticality to all identified assets as they relate to the desired level of service.
- Develop a capital improvements program for the system, identifying the improvements necessary to maintain the desired level of service.
- Develop revenue systems that will support the desired level of service.
- Summarize methods to implement the AMP.

A useful AMP is a continually changing process and needs to be periodically updated to reflect changes in the goals of the utility and the ongoing deterioration of the assets. The initial AMP was developed by the following team of officials, staff, and consultants (the Asset Management Team):

The Village of Cassopolis:

- Emilie Sarratore: Village Manager
- Ben Anderson: Director of Public Works Superintendent
- Tonia Betty: Village Clerk

Wightman staff:

- Mickey Bittner, P.E.: Client Principal
- Jeff Edwards, P.E.: Project Engineer
- Ryan Miller: GIS Manager

The Asset Management Team came up with the following mission statement for the Cassopolis water system:

The Village of Cassopolis is committed to improving and maintaining protection of the environment, public health, and safety of the performance of our water utility system assets, while minimizing the long-term cost of operating those assets. We will strive to maintain the highest-quality customer service at the lowest life cycle cost possible.

[1] The MDEQ has subsequently been reorganized and rebranded as the State of Michigan Department of Environment, Great Lakes, and Energy (EGLE). All further references to MDEQ in this AMP report will be taken to imply the MDEQ, the EGLE, or both, as appropriate.

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II. Asset Inventory

The first step in developing an AMP is to identify and evaluate the equipment, infrastructure, personnel, tools, and anything else that comprises or services the utility in question.

A. Description

The Cassopolis water system consists of two water supply wells (Well #4 and Well #5), one elevated storage tank, and over 22 miles of 2-inch through 16-inch distribution piping. The wells are capable of supplying a total of 1,500 gpm of water with a firm capacity[2] of 750 gpm. The elevated storage tank helps maintain a steady pressure in the distribution system of 47 to 52 psi (as measured at the base of the tank), while providing a total of 400,000 gallons of storage to meet peak and fire demands. The system currently serves a total of 833 active accounts consisting of both single unit customers (individual houses) and multiple unit customers (condominiums, apartment buildings, commercial/industrial properties, schools, etc.). In 2017, the water system supplied an average day demand of 218,000 gpd and a peak day demand of 431,000 gpd[3].

The water from the wells is chemically treated to ensure the health and safety of the consumers. Each well house contains its own chemical feed systems for feeding phosphate, hypochlorite, and fluoride. The phosphate feed systems, each consisting of a 150-gallon day tank, tank mixer, and chemical injection pump, feed phosphates as a corrosion inhibitor to prevent metals (particularly lead and copper) from leaching into the water in the distribution system from pipes, joints, and fixtures. The hypochlorite feed systems, each consisting of a 45-gallon day tank, chemical transfer pump, and chemical injection pump, feed sodium hypochlorite as a disinfectant to prevent microbial growth within the water distribution system. The fluoride feed systems, each consisting of a 10-gallon day tank, chemical transfer pump, and chemical injection pump, feed fluoride as an additive to promote dental health.

With a thorough knowledge of the basic layout of the water supply, treatment, storage, and distribution system, a comprehensive inventory of all drinking water system assets was completed using as-built utility drawings, Village staff anecdotal information, and on-site Global Positioning System (GPS) field locations. Each asset was assigned a unique name and physical qualities about each asset such as size, material, expected useful life, installation year, and other information meeting the MDEQ requirements for the asset inventory were noted for entry into the asset database.

Using the data collected for the asset inventory, a detailed map and model of the water distribution system was prepared using Geographical Information System (GIS) software. All information about the assets from the database was added into this GIS model for tracking and updating as assets are maintained and replaced. The associated map was prepared using the state plane coordinate system, allowing the operator to obtain coordinates for and accurately locate system assets in the field utilizing handheld GPS equipment. The ability to accurately locate utility assets will allow for quicker responses to and resolution of service calls, ensuring the highest level of customer service and ongoing efficiency in labor usage.

Condition assessments (as described in Section II.C. below), available record/as-built drawings, maintenance records, photographs of existing conditions or locations, and other data were also included

[2] Firm capacity is defined as the rated capacity of a system with the largest unit of each type of equipment out of service. For the Cassopolis water supply system, Wells 4 and 5 are identically sized with a rated capacity of 750 gpm. Therefore, either one could be considered the largest unit and the firm capacity is based on the other well's capacity.

[3] A total of 870,000 gallons was recorded as being pumped on March 12, 2017. However, this volume is not reflected in the chemical usage numbers for that date and it is more than double the next highest recorded daily volume. As such, it was assumed that there was either an equipment failure that day resulting in an abnormally high volume of water being pumped or that there was an error in recording the value.

as fields for each asset in the GIS database. Adding all of this information into the GIS model discussed above will allow staff easy access to all records and information available for assets in the drinking water distribution system while in the field with a hand-held device. This will eliminate the need to return to the office to gather additional information, adding to efficiency in labor usage.

Table 1 contains a top-level summary of the classes/types of drinking water system assets identified.

Item	Quantity	Units
Water Main, 16-inch	6,676	LF
Water Main, 12-inch	19,995	LF
Water Main, 10-inch	14,725	LF
Water Main, 8-inch	31,710	LF
Water Main, 6-inch	27,383	LF
Water Main, 4-inch	15,864	LF
Water Main, 2-inch	76	LF
Gate Valve & Box, 16-inch	4	EA
Gate Valve & Box, 12-inch	49	EA
Gate Valve & Box, 10-inch	27	EA
Gate Valve & Box, 8-inch	57	EA
Gate Valve & Box, 6-inch	73	EA
Gate Valve & Box, 4-inch	31	EA
Hydrant w/ Gate Valve & Box	170	EA
Water Service, 2-inch and larger	44	EA
Water Service Pipe, 2-inch and larger	1,450	LF
Water Service, 1.5-inch	16	EA
Water Service Pipe, 1.5-inch	530	LF
Water Service, 1-inch and smaller	773	EA
Water Service Pipe, 1-inch and smaller	25,510	LF
Well 4 (rated capacity of 750 gpm) w/ VFD	1	EA
Well 5 (rated capacity of 750 gpm)	1	EA
Well 4 Pump/Treatment House	349	SF
Well 5 Pump/Treatment House	604	SF
Standby Generator, 180 kW Diesel	1	EA
Elevated Storage Tank (400,000 gal.)	1	EA
Chemical Feed System – Phosphate	2	EA
Chemical Feed System – Sodium Hypochlorite	2	EA
Chemical Feed System – Fluoride	2	EA
Well and Chemical Feed System Control	1	EA

Table 1 - Drinking water system assets

B. System Maps

Maps of the drinking water system are included in Appendix A showing pipe material, pipe age, and pipe size. Electronic versions of these maps are available at the Cassopolis Department of Public Works (DPW) Director's office and in the Cassopolis Village Office on dedicated computers as well as on several handheld tablets for ease of use in the field.

C. Asset Conditions

After completing the comprehensive inventory of the utility system assets, conditional assessments of select asset components were performed. The condition assessment provides the critical information needed to assess the physical condition and functionality of the assets in the water supply, treatment, storage, and distribution system and estimate their remaining service life. Wightman performed the conditional assessments beginning with a complete visual and physical inspection of all the treatment system and well house assets. The distribution system was assessed based upon the age and materials of the pipe along with a review of the water main break history. The wells and elevated storage tank were assessed based upon the most recent third-party inspections completed on those assets.

During the field inspections, any defects in the assets were noted and classified using a standard coding system. After the field inspections and record reviews were complete, overall asset conditions were assessed using a systematic method to produce consistent, useful information. This information was used to make estimates of each asset's remaining useful life and its long-term performance. Furthermore, the information was used to make decisions about asset rehabilitation, replacement, and/or the need for further inspections.

The conditional assessments for the drinking water system assets were based on a numerical grading system based upon the severity of observed defects or the condition of the asset. Condition ratings were assigned based on the conditions of the immediate defects, the overall condition of the asset, and the likelihood of further defect deterioration or asset failure. The numerical grading system uses numbers ranging from 1 to 5 as shown in Table 2 below.

Condition Rating	Condition Description	Defect/Deterioration Description
1	Very Good	New asset, no or minor defects
2	Good	Defects that have not begun to deteriorate
3	Fair	Moderate defects that will continue to deteriorate
4	Poor	Severe defects with significant deterioration
5	Very Poor	Defect requires immediate action

Table 2 - Numerical condition assessment system

As previously mentioned, the water treatment systems and well houses were inspected and assessed. These inspections included physical and visual inspection of the major components of the chemical feed systems (storage tanks, tank scales, mixers, pumps, tubing, and injection equipment), the standby generator, the well control system, and of the well houses themselves (well house structure, electrical service, HVAC equipment, and mechanical/process piping and valves). *Table 3* shows the condition of the individual components of the treatment systems.

Chemical Feed System	Day Tank	Scale	Mixer	Transfer Pump	Feed Pump	Tubing	Injector
Well 4 Phosphate	Fair	N/A	Good	N/A	Fair	Good	Good
Well 4 Hypochlorite	Good	Fair	N/A	Good	Good	Good	Fair
Well 4 Fluoride	Very Good	Fair	N/A	Good	Fair	Fair	Fair
Well 5 Phosphate	Fair	N/A	Fair	N/A	Fair	Good	Good
Well 5 Hypochlorite	Good	Good	N/A	Good	Fair	Good	Good
Well 5 Fluoride	Very Good	Fair	N/A	Good	Fair	Good	Good

Table 3 - Drinking water chemical treatment system condition ratings

The standby generator and transfer switch, housed in Well House 5, are both in good condition and the well control and elevated storage tank monitoring system (housed in Well House 5, but which controls both wells and their individual chemical feed systems and monitors the level of the elevated storage tank) is in fair condition. Table 4 shows the condition of the well house components.

Well House	Structure/ Floor	Roof	Ventillation	Heating	Electrical/ Lighting	Piping/ Valves	Safety Equipment[4]
Well 4	Fair	Fair	Fair	Good	Fair/Good	Fair/Good	Good
Well 5	Fair	Fair	Good	Good	Good	Good	Good

Table 4 - Well house condition ratings

The Village maintains a maintenance contract for the elevated storage tank with Suez Water Advanced Solutions (Suez), formerly Utility Service Group (USG). As a part of this maintenance contract, the tank is inspected every year on a rotational schedule with the exterior and dry interior inspected one year and the tank drained, cleaned, and completely inspected (interior and exterior) the next. If minor coating defects are found during the inspection, they are typically spot repaired and completely repaired during the inspection the following year. In addition, as part of the service contract, the exterior of the tank is recoated every 10-12 years and the wet interior of the tank is recoated every 12-14 years. Since these services are included in the existing contract with Suez, the costs for these tasks (which are sometimes considered as capital repairs) are included in the Village's projected operating expenses and, as such, are not included as projects in the Capital Improvement Plan in Section V of this report.

The elevated storage tank was last completely inspected in 2014 by USG. The results of this inspection were summarized in the tank inspection report dated August 4, 2014. The tank exterior and dry interior were last inspected in 2017 by Suez, with the results summarized in the tank inspection report dated October 24, 2017. Copies of both the 2014 and 2017 inspection reports are included in Appendix F, along with copies of the 2012 through 2013 and 2015 through 2016 inspection reports. All these reports were reviewed in detail to assess the condition of the elevated storage tank. Based upon these reports, the overall condition of the elevated storage tank was assessed to be "Good", though there are some minor defects in the exterior and dry interior coatings that need to be repaired and minor defects on the wet interior ladders that will be monitored. The defects needing repair will be addressed in 2018 by Suez (as part of the maintenance contract), when the exterior of the tank will be re-coated and the dry interior coatings will be touched up.

Prior to 2016, the Village had an annual agreement with Peerless Midwest, Inc. (Peerless) to perform well and pump inspections. In 2016, the Village entered into a maintenance contract with Suez to perform the annual inspections and maintenance for their wells. During this transition period Peerless was acquired by Suez, but well inspections were not completed for 2016 and 2017. As a part of this maintenance contract, the wells and pumps are inspected every year. If minor defects are found during these inspections, they are typically spot repaired. Additionally, chemical cleaning of the wells and overhauls of the well pumps are included as part of the maintenance contract. Since these services are included in the existing contract with Suez, the costs for these tasks (which are sometimes considered as capital repairs) are included in the Village's projected operating expenses and, as such, are not included as projects in the Capital Improvement Plan in Section V of this report.

The most recent well and pump inspection was performed in April of 2018, with the results summarized in the inspection report dated April 4, 2018. A copy of the 2014, 2015, and 2018 well and pump inspection reports as well as the 2015 well cleaning report for Well 5 are included in Appendix G. All these reports

[4] Safety equipment consists of a manual eyewash station and a utility sink.

were reviewed in detail to assess the condition of the supply wells. Based upon these reports, the overall condition of both Well 4 and Well 5 was assessed to be "Good".

The location, age, diameter, and materials for the water distribution system were determined based upon the most recent as-built drawings. Due to the age of some of the water distribution system, as-built drawings for some portions of the distribution system could not be found. Where possible, the ages of those water mains were estimated based on the casting dates of the fire hydrants in the general area and a note was added to the GIS model to indicate that the age was estimated. The diameters of those water mains were estimated based on the most recent hydraulic modeling (conducted in 1995 by Jones & Henry Engineers, Ltd.) where they could be determined, or left as unknown in the GIS model again with a note about the estimation where appropriate.

These water mains represent assets with "incomplete or low-confidence data"[5]. If additional as-built drawings are located or the mains are exposed for repair and additional data can be found on the pipe itself, the ages, materials, and/or sizes of the appropriate water mains will be adjusted in the GIS database correspondingly. Otherwise, as the water mains with estimated or unknown ages, materials, and/or sizes are replaced, the installation years, materials, and/or sizes will be updated in the GIS database to reflect the replacement date, material, and size of the new water main.

D. Remaining Useful Life

Remaining useful life estimation is another method commonly used to characterize the condition of assets – especially those assets that cannot be physically assessed or easily televised, such as buried pressure piping. Remaining useful life is defined as the duration of time remaining until an unacceptable condition exists or an asset no longer meets its primary function.

Remaining useful life for drinking water piping and appurtenances is heavily dependent on the materials used in construction. Drinking water pipe materials have evolved over the years. Early piping was generally constructed of lead, ceramics, and hollowed-out logs and transitioned over the years to steel, reinforced concrete, cast iron, and asbestos cement. Water mains constructed today are typically constructed from ductile iron and PVC piping. Figure 1 shows the percentages of the various pipe materials that are present in the Cassopolis water distribution system. The pipe materials are included as an attribute in each asset's entry in the electronic GIS mapping database.

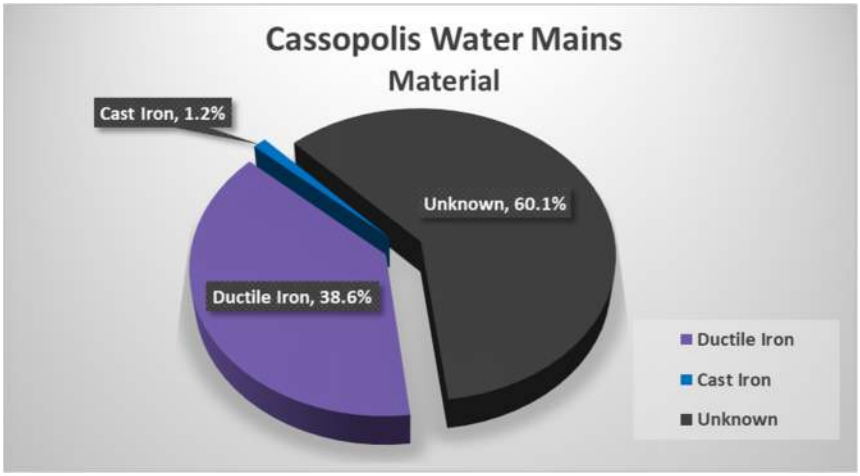

Figure 1 - Water distribution system pipe materials

[5] Terminology from the MDEQ Water AMP Review Checklist.

There are several methods utilized to estimate the remaining useful life of an asset:

- The simplest method uses a typical useful life table, which lists the estimated total life of an asset type from its first day of use to when it is estimated to fail to function. Based upon the actual age of the asset, the remaining useful life is calculated. This method does not consider the current condition of the asset or any other factors.
- A second method utilizes a typical useful life table as well. However, a factor is applied to the calculation based upon the current condition of the asset.
- A third method utilizes actual decay curves based upon the maintenance and failure experience of a specific asset or asset class for the utility in question. This is the most accurate method. However, most utilities do not have the historical data necessary to develop the decay curves.

Determining the useful life of an asset is as much art as it is science. The remaining useful life has been calculated using the second method discussed above – a typical useful life table modified by current condition factors. Table 5 presents the typical useful lives for the asset types included in the drinking water system.

Asset Type	Typical Useful Life (years)
Ductile Iron Water Main	100 +
Cast Iron Water Main	85 to 120
PVC Water Main	100 +
Asbestos-Cement Water Main	70 to 100
Fire Hydrants	40 to 60
Valves	35 to 40
Elevated Storage Tanks	100
Water Wells	50 +
Well Pumps	30
Electrical and Controls	20
Mechanical (Treatment Equipment, Pumps, Mixers, etc.)	30
Structural Components	50
Land	Unlimited

Table 5 - Typical useful lives for drinking water assets

These typical useful life values have been increased or decreased for each specific asset based upon industry-standard specifications for materials and components. Water mains with an unknown material of construction were assumed to be cast iron (with a useful life of 100 years) for the purposes of estimating remaining useful life.

The estimated remaining life of each asset in the drinking water system is included as an attribute for that asset in the GIS mapping database. The estimated remaining life of the pipe in the distribution system, in ten year increments, is shown in Figure 2 on the next page. The remaining useful life of the pipe was the primary factor in determining the condition of the water mains in the distribution system since they could not be physically inspected.

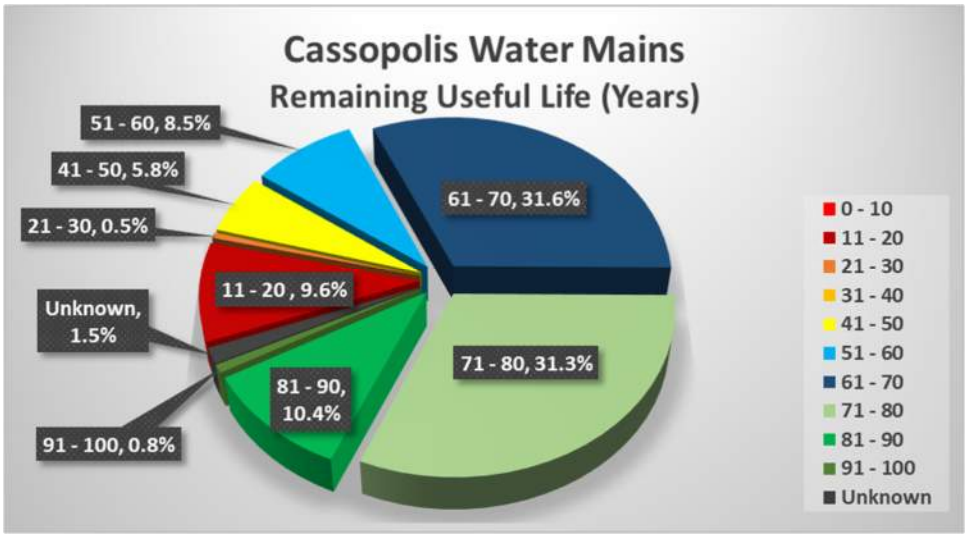

Figure 2 - Water distribution system remaining useful life

E. Replacement Value

The replacement value of an asset is the cost to replace the asset after it has exhausted its useful life. Obtaining exact costs for asset replacement is complex and can involve the development of detailed plans to aid in the development of the estimate. Developing a reasonable estimate of the replacement value of an asset utilizing average unit price construction costs is an adequate method and has been used for this report. The average unit prices and the quantities of the various system components used to develop the replacement costs are shown in Appendix B. The costs shown include engineering costs, construction contingencies, and restoration costs such as paving, gravel, lawn, etc. The quantities of the various components of each asset class were obtained from the GIS system. The estimated replacement value for the drinking water system is $25,500,000.

F. System Capacity

As previously mentioned, the supply wells have a firm capacity of 750 gpm or 1.08 million gallons per day (MGD). The 2017 average day demand was 0.218 MGD (20.2% of the firm capacity) and the 2017 maximum day demand was 0.431 MGD (39.9% of the firm capacity). When a water system's maximum day demand exceeds 80% of the firm capacity of the system, the municipality should begin planning to increase the system's capacity. Based on this criterion, the Cassopolis water system has sufficient supply (well) capacity for the foreseeable future. Since the treatment (chemical feed) systems are sized for the full volume of each well, the treatment systems also have sufficient capacity for the foreseeable future.

The distribution system's hydraulic capacity has not been fully modeled since the 1995 water system reliability study (titled "Water Distribution Study", completed by Jones & Henry Engineers, Ltd.). This distribution system model was updated in 1997 as a part of the feasibility study for the construction of Wells 4 and 5 and the elevated storage tank (titled "Engineering Report for Municipal Water System Improvements", completed by Wightman and Associates, Inc.). However, the update focused mainly on the effect of the two new wells and new transmission mains from the wells into the existing distribution system and the new elevated storage tank. The distribution system hydraulic model has not been updated since.

The 1995 reliability study pointed to several areas of the distribution system that were not able to provide sufficient flows for fire protection. While some of the improvements recommended in this reliability study

have been implemented, there are areas of the distribution system that are still known to be unable to provide sufficient fire protection flows. A full reliability study should be completed to help pinpoint distribution system improvements that can alleviate the remainder of these fire protection concerns and strengthen the distribution system as a whole.

III. Level of Service

The level of service defines the way in which the Owner desires the facility or utility to perform over the long term. The level of service should ensure that all regulatory requirements are met and should include any technical, managerial, health and safety, or financial components the Owner deems necessary to meet customer expectations. The level of service is a fundamental part in defining how the water system will be operated and maintained in the future. As with all components of the AMP, defining the desired level of service will be an ongoing process.

The Asset Management Team developed the statements in Table 6 to define the desired level of service for the Cassopolis water system:

Major Area	Goals and Objectives	Level of Service Statements
Safe Drinking Water	All federal and state water quality regulations will be complied with.	Perform all required monitoring.
Health and Safety	Provide a safe and injury free work place. Protect the public health.	Regular safety meetings – bi-monthly at a minimum. No MIOSHA safety violations.
Security	Secure all water installations from break ins and intrusions.	Maintain two barriers of security at all water installation sites.
Operator Certification	Provisions for appropriately credentialed and experienced operators.	Strive to ensure that all DPW employees are S-3 and D-3 certified. Maintain a minimum of two S-3 and D-3 certified DPW employees at all times. Ensure that renewals are staggered such that not all the same type of certifications expire on the same renewal cycle.
Customer Complaints	Provide excellent customer service.	Respond to customer complaints within 24 hours of notification of an issue and communicate through close of issue.
Response Time	Provide excellent customer service.	Respond to emergency calls within 15 minutes at all times and non-emergency calls within 24 hours during normal business hours. Customers will receive written notice three days in advance of any planned service interruption.

Table 6 - Level of service statements

Major Area	Goals and Objectives	Level of Service Statements
Administrative	Provide excellent customer service.	Produce accurate, timely billing on a monthly basis. Review all discrepancies in a timely manner on a monthly basis. Provide professional, courteous service at all times.
Regulatory Changes	Be aware of regulatory changes and be in position to comply with changes as they occur.	Attend continuing education programs. Route applicable correspondence from the MDEQ to all affected staff.
Rules and Regulations	Monitor and enforce all water ordinances.	Review water ordinances and policies periodically – annually at a minimum – including cross connection rules, site sampling plan, required lab analysis, Consumer confidence report, and safety program. Enforce provisions of water ordinances and policies.
Financial	Maintain a financial plan to generate sufficient revenue to operate and maintain the water system.	Confirm water revenues are sufficient to meet the water budget annually. Review water rates every year.
Operating Reserves	Maintain sufficient reserves to cover anticipated major expense and potential unexpected breakdowns.	Maintain a minimum of six months' operating expenses in reserve accounts.
Supply Water	Maintain all well related equipment. Focus on preventative maintenance to prevent unscheduled breakdown.	All wells will be inspected annually, and the wells will be serviced and chemically cleaned per the recommendations of the annual inspection. This service will be contracted. Document all maintenance performed.
Treatment Facility	Maintain all treatment and pumping equipment and facilities. Focus on preventative maintenance to prevent unscheduled breakdown. Provide high quality, safe, great tasting drinking water.	Maintain all mechanical equipment in accordance with manufacturer's recommendations. Implement regular preventative maintenance program outlined in Section VI of this report. Investigate the feasibility of a filtration plant to lower water hardness and eliminate the use of phosphate.

Table 6 - Level of service statements (continued)

Major Area	Goals and Objectives	Level of Service Statements
Emergency Power Source	Provide adequate emergency power in necessary locations.	Well and treatment facilities shall have provisions for emergency power. Backup generators shall be provided at all wells. Generators shall be maintained under an annual maintenance contract.
Water Storage	Maintain water tower to prolong lifespan and provide high quality, great tasting drinking water.	Professionally inspect annually for integrity of coatings and general maintenance issues. Complete all maintenance as suggested in inspection reports. Ensure rates and budget are adequate to support the maintenance contract. All storage requirements will be met as indicated under MDEQ Reliability Study guidelines.
Distribution System	Provide high quality, great tasting drinking water. Maintain distribution system valves. Maintain fire hydrants. General system maintenance. Water loss will be maintained below 17%.	Dead end and other “low flow” mains will be flushed annually or as needed to address water quality issues. Implement a schedule for periodic flushing of water mains in accordance with Engineer developed flushing plan. Exercise all water distribution valves on rotating two-year program to ensure all valves are exercised every other year. Maintain documentation of valve exercising. Replace hydrants that leak. Ensure water rates and budget are adequate to provide manpower to perform all distribution system maintenance.
Cross-Connections	Monitor for and enforce cross-connection regulations	Protect the public water supply where cross-connections with the public water supply are deemed possible.

Table 6 - Level of service statements (continued)

As noted above, defining the desired level of service, as well as assessing how the Village is performing compared to the desired level of service will be an ongoing process. The Village will assess each level of service statement and adjust as necessary to meet their new current goals every time that the Asset Management Program is revised and updated. In addition, the Village will conduct periodic assessments of their operations and compare them to the level of service statements presented in Table 6 at least bi-annually.

IV. Criticality

Not all assets are equally important to a utility's operation. While some assets may have a high likelihood of failure, their failure may cause little to no disruption in the ability of the utility to meet their level of service. Correspondingly, some assets may be unlikely to fail but their failure may cause a catastrophic disruption to the utility's ability to meet their desired level of service. Criticality is a rating that is applied to the assets in an AMP that considers both the likelihood and the consequences of an asset failing.

Criticality is determined by multiplying the likelihood of failure by the consequence of failure and is a significant factor in prioritizing capital improvements. In general, the higher the criticality of an asset, the more resources that should be allocated to maintain the asset, or the higher the priority that repairs to that asset should take. However, criticality is only one tool that can be utilized to analyze and prioritize capital improvements and its use is subject to careful evaluation of the asset(s) in question and sound engineering judgement.

A. Likelihood of Failure

The likelihood of failure for all physically assessed treatment, supply, storage, and distribution assets or assets assessed via independent reports was determined based on the conditional rating of the asset with consideration given to the remaining asset life as shown below in Table 7. The methodology of examining the asset conditions and assigning conditional ratings to noted defects was discussed previously in Section II.C. The likelihood of failure for all other assets was determined according to the remining asset life in accordance with Table 7 below. The likelihood of failure for the Village water mains is summarized in Figure 3 on the next page.

Likelihood of Failure Rating	Asset Condition/ Description	Remaining Useful Life
1	Very Good	More than 90%
2	Good	60 to 89.9%
3	Fair	30 to 59.9%
4	Poor	10 to 29.9%
5	Very Poor	Less than 10%

Table 7 - Likelihood of failure assessment methodology

It should be noted, however, that the condition descriptions are carried over both in Figure 3 and in the GIS model as the likelihood of failure. In other words, if an asset's condition is rated as a "4" (Poor) or "5" (Very Poor), that same description carries over as the likelihood of failure indicating that the asset is in "Poor" or "Very Poor" condition rather than that the likelihood of failure is "Poor" or "Very Poor". The opposite applies as well, with assets whose condition is rated as a "1" (Very Good) or "2" (Good) showing a likelihood of failure of "Very Good" or "Good", again describing the condition of the asset rather than the likelihood that it will fail. Looking at Figure 3 for example, this means that 72.1% of the water main is in "Good" condition – not that 72.1% of the water main has a "Good" likelihood of failure.

It should also be noted that there were some water mains where estimated ages could not be determined by any of the means mentioned in Section II.C. These are represented in Figure 3 as having "Insufficient Information". Since the age of the water main could not be estimated, neither a remaining useful life or condition rating could be applied based on the age. For the purposes of criticality computation, any water main with an unknown age was assigned a likelihood of failure of "3" (Fair).

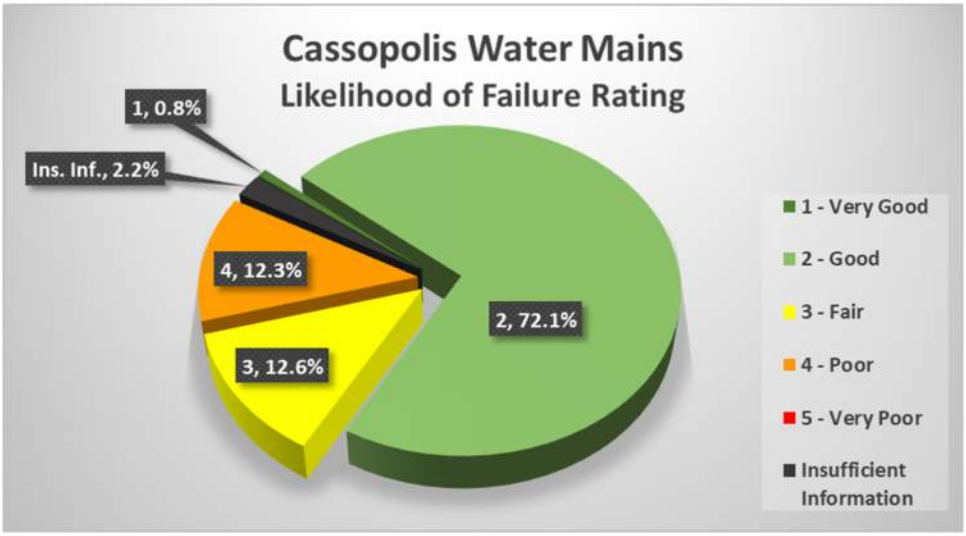

Figure 3 - Water main likelihood of failure based on remaining useful life

B. Consequence of Failure

To determine the consequence of failure, it is important to consider the significant costs of failure. These costs include not only the monetary cost of the repair, but could also include:

- Social costs associated with the failure of the asset.
- Repair/replacement costs related to collateral damage caused by the failure.
- Legal costs related to damage caused by the failure.
- Environmental costs (and possible environmental cleanup costs) created by the failure.
- Loss of business revenue to the community caused by the failure.
- Other miscellaneous costs associated with the asset failure.

The consequence of failure can be high if any one of these costs is significant or if the accumulation of several costs occurs due to a failure. In the case of the failure of a drinking water asset, the collateral damage to surface improvements can even exceed the cost of repairing the failure itself. The consequence of failure was assessed using the criteria presented in Table 8 on the next page.

Utilizing this ranking system, a thorough knowledge of the service area, and sound engineering judgement, a consequence of failure was assigned to each asset in the drinking water system. These consequence of failure values for each asset are included as an attribute for that asset in the GIS mapping database. A summary of the consequence of failure for the piping in the water distribution system is shown in Figure 4 on the following page.

Due to the redundancy offered by the remaining well and the firm capacity of the water supply, the consequence of failure for the supply wells was rated as “Minor”. Since each well has its own treatment system, thereby offering the same redundancy as the wells themselves, the consequence of failure for the treatment equipment was rated as “Minor” as well. The elevated storage tank’s consequence of failure was rated as “Major” since, while the supply wells can maintain system pressure on their own without the tank in service, the tank does provide storage to help provide additional water during times of peak demands or fire flows.

Consequence of Failure Rating	Social, Human, and Environmental Effects[6]	Collateral Damage Effects
1 (Insignificant)	< 10% loss of service, minimal property damage	Pipe/appurtenance outside of road right-of-way (ROW), no impact to traffic or other structures
2 (Minor)	10% to 24% loss of service, minimal property damage	Pipe/appurtenance located under the pavement or curb of a residential or minor local road
3 (Moderate)	25% to 49% loss of service, limited property damage, disruption to essential services/major industry	Pipe/appurtenance located under the pavement or curb of a major collector roadway
4 (Major)	50% to 89% loss of service, moderate property damage, disruption to multiple industries/essential services	Pipe/appurtenance located along state roadways, interstate highways, railroad ROW, or close enough to a building to cause collateral damage
5 (Catastrophic)	90+% loss of service, extensive property damage	Pipe/appurtenance located under the pavement or curb of state roadways or interstate highways, under railroad tracks, or underneath a building

Table 8 - Consequence of failure rating scheme for drinking water assets

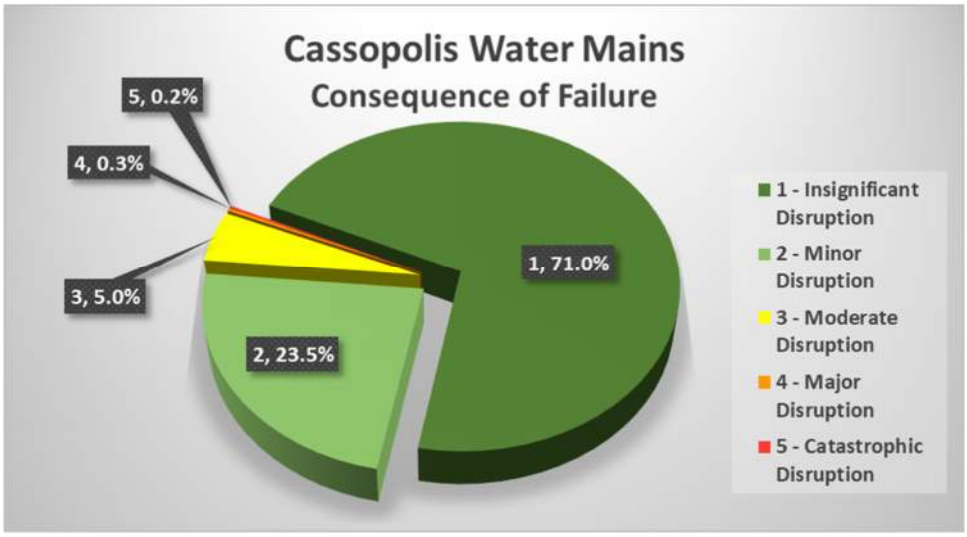

Figure 4 – Water main consequence of failure rating

C. Criticality Map

As previously discussed, the criticality of each asset was calculated by multiplying the likelihood of failure rating of the asset by the consequence of failure rating of the asset. As such, the range of criticality numbers that can be assigned to an asset is 1 to 25 with the criticality of the asset increasing the higher the number assigned to it, as shown in Table 9 on the next page. The resulting criticality of each asset in the distribution system is included as an attribute for that asset in the GIS mapping database. A map of the water distribution system showing asset criticality is included in Appendix C.

[6] Loss of service for the drinking water system refers to the number of service connections impacted due to a single failure.

Criticality Rating	Criticality Description
1 to 5	Very Low
6 to 10	Low
11 to 15	Moderate
16 to 20	High
21 to 25	Very High

Table 9 - Criticality rating descriptions

The average criticality ratings for wells, well houses, and each well's treatment system as well as the elevated storage tank is shown below in Table 10. The criticality ratings for the well houses and treatment systems are based on averaging the criticalities of all of the individual components of those systems that were assessed, as summarized previously in *Table 3* and Table 4.

Asset Description	Asset Criticality	Criticality Description
Well 4	4	Very Low
Well 4 well house	5	Very Low
Well 4 hypochlorite feed system	5	Very Low
Well 4 phosphate feed system	5	Very Low
Well 4 fluoride feed system	5	Very Low
Well 5	4	Very Low
Well 5 well house	4	Very Low
Well 5 hypochlorite feed system	4	Very Low
Well 5 phosphate feed system	5	Very Low
Well 5 fluoride feed system	4	Very Low
Elevated storage tank	8	Low

Table 10 - Likelihood of failure assessment methodology

While the criticality ratings provide a point of reference to help in determining issues that may need to be addressed, it is only a tool. Sound engineering judgement still needs to be applied to determine if there is an issue with an asset that needs to be addressed by a capital improvement project. A low criticality number does not necessarily mean that there is not an issue that should be addressed by a capital improvement project. For example, if an area of water main has had a history of recent breaks, it may be graded as a Level 5 defect with a likelihood of failure of Very Poor. If this defect occurred on a segment of pipe with a Level 1 consequence of failure, it would result in a criticality rating of 5, Very Low. That does not mean, however, that this issue does not need to be addressed. It may just be a lower priority for being addressed than other issues with higher criticality ratings.

V. Capital Improvement Plan

A. Description

Capital improvement projects are projects that a utility has an extended period of time to plan for and are typically projects that cover high-cost, non-recurring expenditures. To ensure that the desired level of service can be maintained, a long-term plan for required capital improvements, known as a Capital Improvement Plan (CIP), is required as part of an AMP. The CIP helps to ensure that the long-term reliability needs of the utility are met. The CIP is based upon planning for those capital improvements determined to be required or likely to be required due to the likelihood of failure of the assets and their criticality. The short-term planning period for a CIP is five years and the long-term planning period is 20 years to allow for the development of a rate structure adequate to finance those projects that can reasonably be predicted to be needed during those periods.

B. Recommended Water System Projects

Table 11 lists the recommended capital improvement projects as well as cyclical improvement projects (i.e. equipment replacement) over the next 20 years for the drinking water system. Detailed descriptions and cost estimates for each project listed can be found in Appendix D. Where appropriate, the estimated project costs shown in Table 11 include engineering, construction observation, and contingency costs, thus representing the total estimated cost for the project. All costs shown in Table 11 are in current costs (no inflation) unless otherwise noted.

Priority	CIP Year	Project Name	Estimated Cost
1	2018	Clean and paint exposed piping for Well 4	$ 3,000
2	2018	Planning for a new DPW building	$ 10,000
3	2018	Construction of a new DPW building – Phase 1	$ 375,000
4	2018	Hydrant replacement	$ 19,000
5	2018	New large service water meters	$ 80,000
6	2018	New water service meters	$ 20,000
7	2018	Replace long water services in areas that now have water main	$ 38,000
8	2018	Replacing inventory of spare parts	$ 5,000
9	2018	Update Reliability Study and develop a water main flushing program	$ 24,000
10	2019	Broadway St. water service transfer	$ 66,000
11	2019	Construction of a new DPW building - Phase 2	$ 375,000
12	2019	Replace chemical feed equipment - 2019	$ 31,000
13	2019	Replace the controls for the Wells and the Elevated Storage Tank	$ 75,000
14	2019	Replace the moling machine and air compressor	$ 35,000
15	2019	Replace the soft start for Well 5	$ 7,000
16	2019	Replace the VFD for Well 4	$ 7,000
17	2020	Clean and paint exposed piping for Well 5	$ 3,000
18	2020	Graham Street water main	$ 311,000
19	2021	South Rowland Street water main	$ 168,000
20	2022	North Rowland Street water main	$ 309,000
21	2023	North Fulton Street water main	$ 201,000
22	2024	East York Street water main	$ 177,000

Table 11 - Recommended water system capital improvement projects

Priority	CIP Year	Project Name	Estimated Cost
23	2024	Well house maintenance - new roof	$ 45,000
24	2025	North East Street water main - north half	$ 196,000
25	2026	Darwin Street water main	$ 230,000
26	2027	North East Street water main - south half	$ 212,000
27	2029	Replace backup generator for Wells 4 and 5	$ 83,000
28	2029	Replace chemical feed equipment - 2029	$ 10,000
29	2030	South East Street and Jefferson Street water main	$ 525,000
30	2031	Johnson Street, Maple Street, and Park Shore water main	$ 325,000
31	2032	School Street water main	$ 156,000
32	2033	North First Street water main	$ 195,000
33	2034	South Disbrow Street water main	$ 141,000
34	2035	Irving Street and Silver Street water main	$ 174,000
		Total Estimated Project Cost for 20 Year CIP (current dollars) =	$ 4,631,000
		Total Estimated Project Cost for 20 Year CIP (inflation adjusted[7] costs) =	$ 5,356,000

Table 11 - Recommended water system capital improvement projects (continued)

Once the above projects are completed, there are no other significant improvements anticipated to be required to maintain the desired level of service.

C. Water Quality Improvement

One area of concern for Cassopolis is to address the quality of the supply water from the wells. The hardness of the water, defined as the amount of dissolved calcium and magnesium in the water, is of particular concern. Hardness, while not a health concern, is a nuisance that can cause issues such as requiring more soap or detergent to get items clean, leave spots or film on clean dishes, and can cause buildup of calcium carbonate scale in hot water heaters and hot water pipes.

As surface or rain water moves through soil and rocks, it dissolves small amounts of naturally-occurring minerals and eventually carries them into the groundwater aquifers. The sub-surface geological makeup of Michigan (and the Midwest in general) makes high hardness levels in groundwater a typical occurrence. Based on raw water testing, the water in Cassopolis would be classified as very hard water with a hardness of 305 parts per million (ppm) as calcium carbonate.

Treatment for hardness, referred to as softening water, is typically accomplished by ion exchange or by lime softening. In an ion exchange process, the hard water is passed through a resin media high in monovalent cations (ions with a +1 charge) such as sodium or potassium. The calcium and magnesium ions, each with a +2 charge, bond with the resin which, in turn, releases 2 sodium or potassium ions to remain electrically neutral. When the ion exchange ability of the resin bed is used up, it is recharged by soaking the bed in a solution high in sodium or potassium (i.e. salt water). The resin will then release the calcium and magnesium and replace it with sodium or potassium. The used regeneration brine, high in calcium, magnesium, and sodium or potassium, can typically be discharged to the sewer system.

Lime softening is much more involved and results in sludge that must be dealt with, but it decreases the hardness of the water without increasing sodium or potassium levels in the treated water. It does so by

[7] Twenty-year inflation adjusted calculations assumed a compounded annual inflation rate of 2% per year.

introducing calcium hydroxide (limewater) or quicklime to the raw water, increasing the pH of the water and causing the carbonate equilibrium of the water to shift. Dissolved carbon dioxide changes first into bicarbonate ions, then into carbonate ions, which then combine with the calcium ions, causing calcium carbonate to precipitate (form a solid material from the dissolved ions, which will sink to the bottom of a settling basin). Magnesium is also precipitated through these reactions as magnesium hydroxide. The softened water is then recarbonated by adding carbon dioxide to shift the carbonate equilibrium back towards neutral and reduce the pH.

Since there are no health concerns with hard water, the decision about water softening ultimately comes down to an economic decision for Cassopolis and its residents. The Village must decide whether the nuisance of hard water out-weighs the capital on on-going O&M costs of a softening plant.

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VI. Operation and Maintenance

Consistent and thorough maintenance of the water supply, treatment, and distribution system will enable it to operate at the desired level of service for its expected life. Preventative maintenance is cited by most communities as being desirable but is often one of the first activities sacrificed when other DPW projects or budgetary shortfalls place manpower at a premium. The result is that preventative maintenance is seldom practiced to the necessary extent. O&M on an "emergency basis" becomes the usual procedure.

O&M of the water supply, treatment, and distribution system is performed by DPW staff. The Village Manager ultimately oversees the services completed by the DPW and reports to the Village Council on the activities of the DPW. Table 12 presents a complete summary of the current routine O&M practices throughout the water system.

Asset	Procedure	Frequency
Water Supply & Treatment System	Check and record water pumpage and chemical usage	Daily
	Fill chemical day tanks as required	Daily
	Adjust pumping rates for chemicals as required	Daily
	Test for chlorine, phosphate, and fluoride levels	Daily
	Change the chart in the chart recorder	Weekly
	Prepare the other well for use and swap lead/lag pumps	Monthly
	Required MDEQ testing	Annually
	Clean and tidy the well house	As Needed
	Manufacturer recommended equipment maintenance	As Needed
Elevated Storage Tank	Visit the site to visually verify that there are no apparent issues (unlocked door, tree limbs on fence, leaks, etc.)	Weekly
	Enter tower and inspect for anything broken or leaking	Monthly
Distribution System	Read water meters	Monthly
	Flush all the hydrants in the distribution system	Annually

Table 12 - Current O&M practices

The current O&M procedures were evaluated during the development of the AMP to determine if changes are needed to meet the desired level of service. The Cassopolis DPW has done a fair job of focusing on preventative maintenance. However, there are some preventative maintenance tasks that they have not been able to accomplish due to manpower shortages and the lack of an effective water main flushing plan. Recommended practices to continue to improve the preventative maintenance program include:

- Develop a regular valve exercise program whereby 1/2 of the valves are exercised every year (operate each valve in the water system at least once every other year).
- Transition the hydrant flushing program into an engineer designed water main flushing program that will result in scouring velocities being achieved in each water main.
- Paint 1/4 of the hydrants each year (repaint every hydrant at least once every 4 years).
- Replace lead and galvanized water services whenever road projects are completed or as required by new and evolving Lead and Copper rules.
- Take outside diameter measurements of ductile iron pipe when making taps or repairs for historical comparison
- Utilize the GIS-based online work order system to schedule and track all O&M activities.

In discussing the current and recommended O&M practices with Village officials, it is believed that the DPW currently has sufficient staff to accomplish all desired tasks. This belief should be carefully evaluated as the new procedures are developed and implemented to ensure that preventative maintenance receives the amount of attention necessary to continue meeting the desired level of service in the water system.

VII. Asset Management Financial Plan and Revenue Structure

A primary goal of Asset Management is to develop a long-term plan for revenue support of capital improvements, as well as operating cost. The following Asset Management Financial Plan (AMFP) is intended to help your community formulate policy in the areas of rate management, capital spending, and fund balance. ***The AMFP is a living document. It is most effective as a tool used annually for budget and user rate decisions.***

Our capital improvement and revenue forecasts are provided as a guide and are supporting analysis to our Asset Management Plans. Neither Wightman & Associates, Inc. nor any of its employees are licensed CPAs or certified financial advisors or provide legal, tax, or accounting advice. You should consult your legal and/or tax advisors before making any financial decisions. Should independent financing be considered, we recommend the hiring of professional advisors or registered accounting firms.

A. AMFP Methodology

A significant effort has been made by Cassopolis to inventory assets, evaluate the infrastructure, and determine asset criticality. The result is the identification of asset investment cost by project and by year. The AMFP covers an extended forecast period to take this asset evaluation into account. The AMFP is a four-step process:

1) Historical comparison with audits and budgets.
2) Development of a test year, or normalized budget year, along with inflation assumptions for the purposes of forecasting operation and maintenance tasks into the future.
3) Proof of rate to revenue for reliance on customer data.
4) Cash flow forecast including revenue, operating expense, capital spending, debt, and fund balance (i.e., actual cash and investment balance).

The analysis was conducted using a “cash basis” approach as described in the AWWA Manual of Rate Making Practices. From year to year, this AMFP may be used to implement policy regarding rate management and budgeting.

1. Audit Comparison

One key indicator of financial health is found in Appendix E in the Comparative Statement of Net Position of the Water Fund: “Cash and cash equivalents.” Cassopolis has maintained this cash and investment balance well for the size of their system. The cash and investments balance has increased steadily over the last 5 years from around 12 months to just under 24 months compared to operating expenditures. Management of the cash balance will be discussed further below under Forecast - Cash Balance. The Water Fund audited Revenues, Expenses and Changes in Net Position comparison reveals steady growth in annual revenues and corresponding annual operating expenses (other than one-time expenditures).

2. Budget Comparison / Test Year

The current year budget shows a comparable amount of expenditures in total compared to previous years (other than one-time expenditures). This has been utilized to develop the Test Year budget including expected percent inflation factors.

3. Proof of Rate to Revenue

Cassopolis bills its customers based on widely used and accepted methods. Customers are charged a meter equivalent unit rate plus a commodity rate based upon readings of their water meter. The amount

of meter equivalents billed and the commodity billed at the current rates tie out to the revenue reflected in the audit and budget, such that we can rely on the numbers in forecasting.

4. Forecast - Capital Cost

Annual cost has been forecasted based on an engineering evaluation of asset inventory, condition assessment, and criticality as discussed previously. The forecast reflects cash-funded capital costs not already included in the operating and maintenance budget. Given projected revenues and cash balance, as well as the dollar amount of anticipated capital spending, no new debt issuance was modeled for the base capital improvement plan.

5. Forecast - Cash Balance

Our standard minimum target of cash and investment to operating expenses (net of depreciation) is six months. It would not be advisable to bring the cash balance any lower than six months given the potential variation in the amount and timing of capital cost. The cash and investments balance is anticipated to stay well above the six-month target for the near future. Cassopolis has targeted maintaining the cash balance at or above a target level of six months.

6. Forecast - Rate Management

The projected revenue based on current rates and future rate increases already enacted by the Cassopolis Village Council supports operations, debt, and capital cost while solving to cash balance. The cash flow forecast demonstrates a rate track with 5% annual rate increases to the commodity charges through the 2023/24 budget year, followed by a 2% (adjusted to match inflation) annual rate increase beginning in the 2024/25 budget year and continuing for the remainder of the 20-year planning period. These potential rate increases will need to be reviewed in a few years to make sure all of the assumptions are remaining accurate.

7. Management Summary

Rates: 5% annual increase to the commodity charge through the 2023/24 budget year, followed by a 2% (adjusted to match inflation) annual increase to the commodity charge from the 2024/25 budget year through the 2038/39 budget year. Review in the next 3-5 years.

Cash Balance: Maintain cash balances above six months.

Capital Cost: A cash (as opposed to debt) approach as modeled in the cash flow.

B. Rate Setting Authority

According to the Village of Cassopolis Code of Ordinances Section 300-49 the water supply system for the Village shall be operated on a public utility basis with rates fixed to provide sufficient funds for administration, O&M, and to preserve the system in good repair and working order per Section 300-51. Section 300-50 places the water system under the control of the Village Council, who are empowered to establish rates by resolution in Section 300-53. In accordance with this rate setting authority, the Village Council passed Resolution 2014-05 establishing the current water rates for customers of the Village water system. Copies of Chapter 300 of the Village of Cassopolis Code of Ordinances and Resolution 2014-05 are included in Appendix H of this report.

VIII. Asset Management Program Implementation

AMPs are designed to provide a plan for effectively meeting level of service goals, which may change over time as new requirements are imposed by regulatory agencies and expectations from customers and communities change. The program is also intended to work in conjunction with the GIS component of the AMP to provide a reference for personnel who will become part of the Asset Management Team after implementation.

Implementation of the AMP involves maintaining the six month minimum cash balance outlined in the AMFP section (Section VII above), execution of the CIP projects identified in Section V, and sustaining the current level of system O&M while adding in the valve turning program, implementing the water main flushing program, adding the hydrant painting program, and replacing lead and galvanized service pipes as outlined in Section VI. While performing regular maintenance and routine replacement of components, the work order tracking system provided with the GIS software will allow the DPW and Cassopolis officials to monitor the progress of routine and preventative maintenance activities.

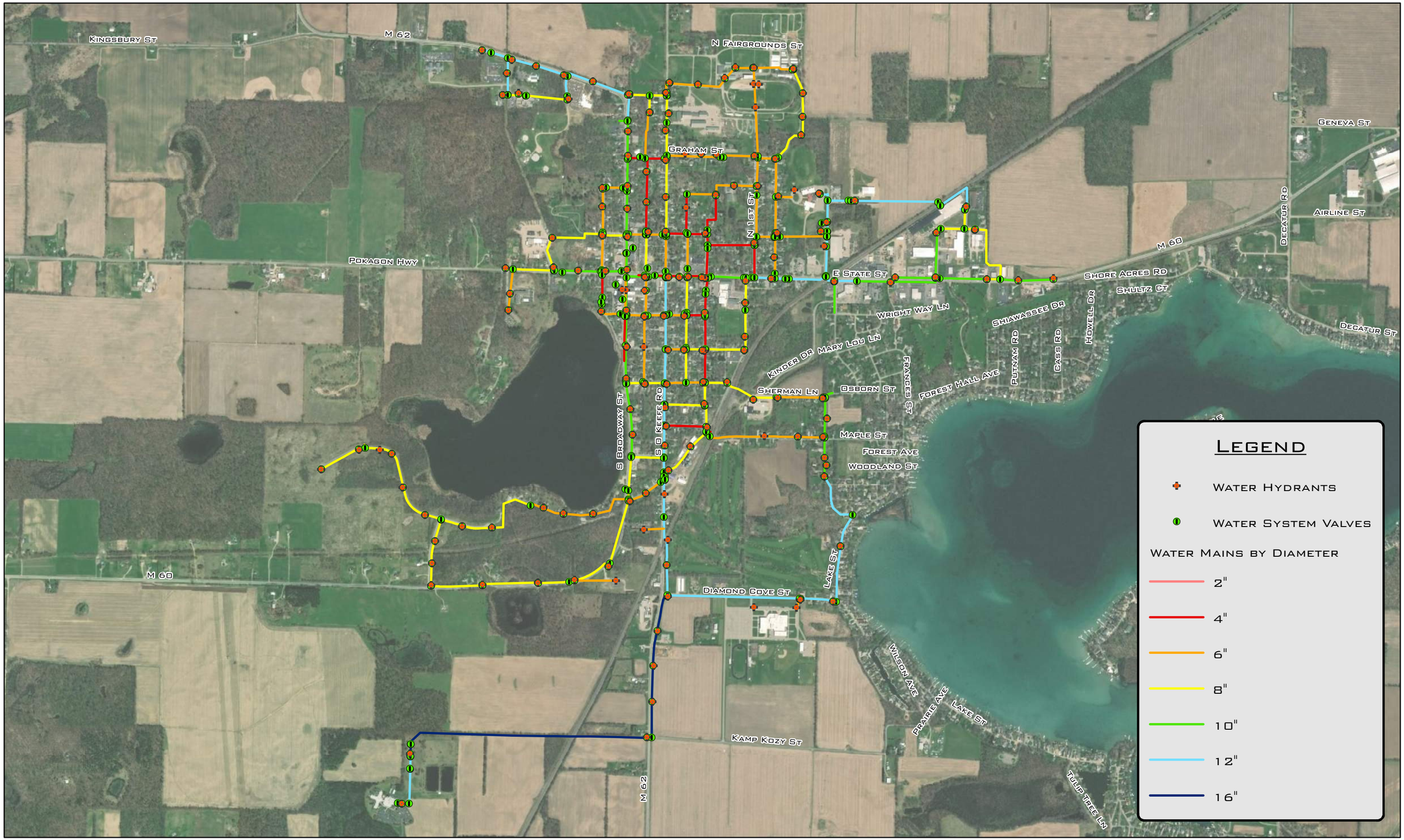
The GIS component of the AMP requires consistent updating to ensure that the most current information is available for DPW and Cassopolis staff/officials. This includes entering service lead information into the database to track new customer service lines, updating existing customer service lead information as their locations, materials, and diameters are verified, updating equipment information as it is replaced and/or upgraded, and tracking routine and non-routine maintenance activities. This information will be of use in determining if specific areas of the system require additional resources or repairs moving forward.

Completion of many of the projects within the CIP will require planning, design, permitting, and bidding services to be performed by an engineering services provider. Estimated costs for these activities are included in the project estimates for each project identified within the CIP (as appropriate). Community budgeting should also include the cost of maintenance of the GIS program, either using community staffing rates or through an annual maintenance agreement with a GIS consultant.

It will be important to review the system on a regular basis and anticipate upcoming projects as identified in the CIP and other improvements, repairs, or upgrades that may arise as the system ages. Cassopolis should look to begin planning two years ahead of a project's projected implementation date to allow time for budgeting, design, permitting, bidding, construction, and implementation.

Appendix A

Water Distribution System Maps



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VILLAGE OF CASSOPOLIS

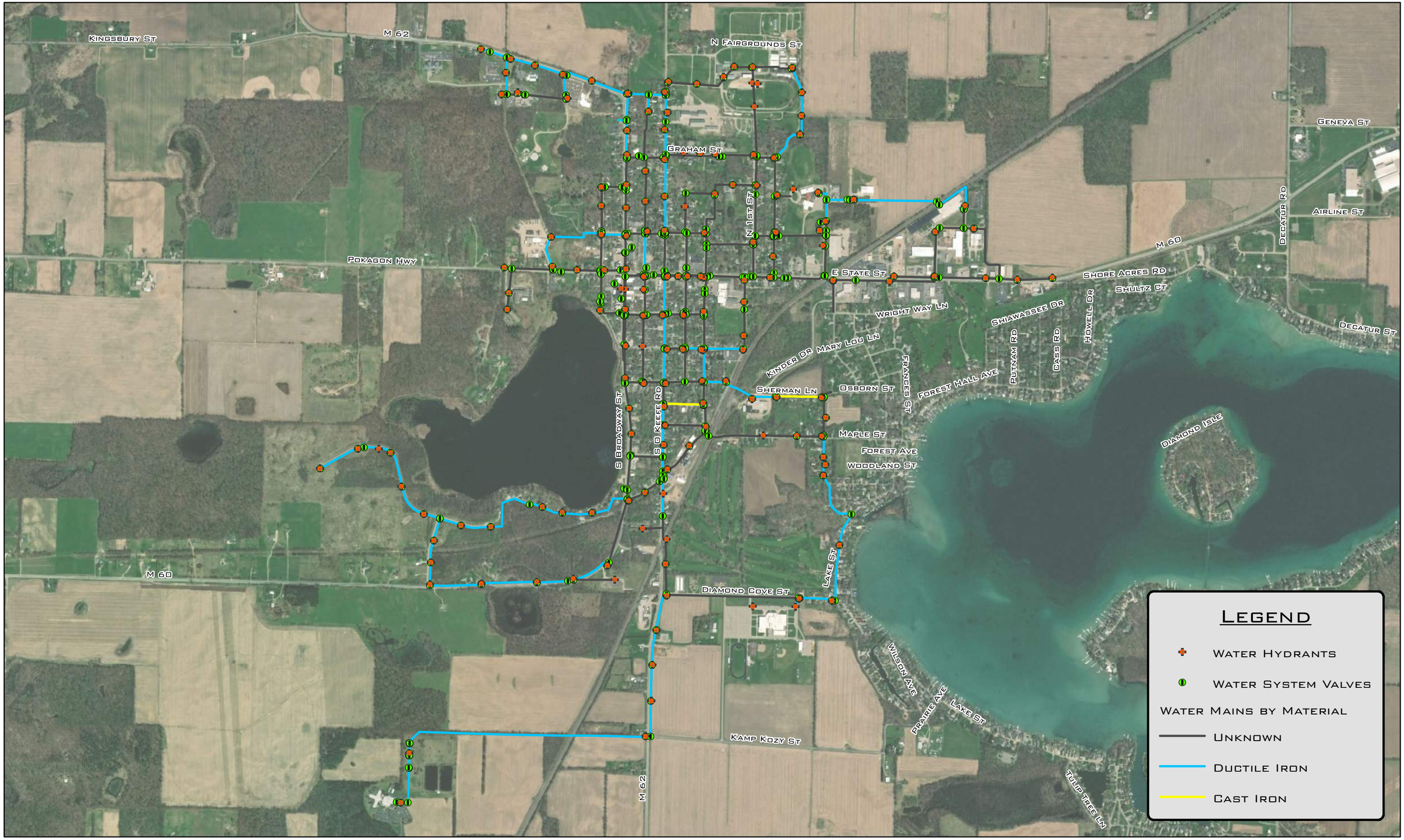
WATER ASSET MANAGEMENT PLAN

0 350 700 1,400 2,100 2,800

1 inch = 1400 Feet

WATER MAIN DIAMETER MAP

8/1/2018



Legend

- Water Hydrants
- Water System Valves

Water Mains by Material

- Unknown
- Ductile Iron
- Cast Iron

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VILLAGE OF CASSOPOLIS

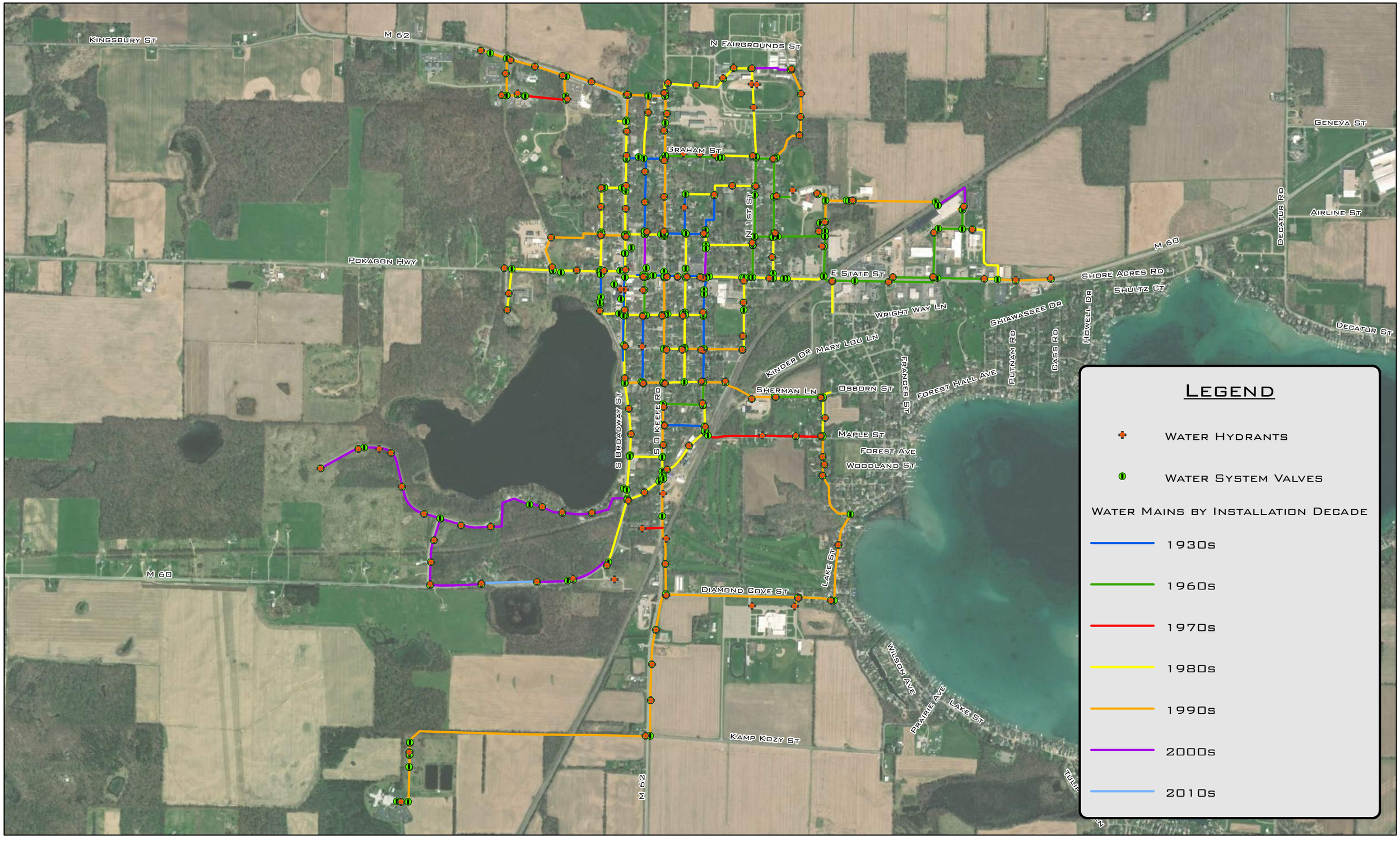
WATER ASSET MANAGEMENT PLAN

0 350 700 1,400 2,100 2,800

1 inch = 1400 Feet

WATER MAIN MATERIAL MAP

8/1/2018



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VILLAGE OF CASSOPOLIS

WATER ASSET MANAGEMENT PLAN

0 350 700 1,400 2,100 2,800

1 inch = 1400 Feet

WATER MAIN INSTALLATION DECADE

8/1/2018

Appendix B

Replacement Values

REPLACEMENT COST ESTIMATE

PROJECT: **Drinking Water Asset Management Program**

CLIENT: **Village of Cassopolis, Cass County, Michigan**

DATE: August, 2017

Estimated Water Treatment, Storage, and Distribution System Replacement Value

Quantity	Unit of Measure	Item		Unit Price *		Subtotal
6,676	LF	Water Main, 16-inch	@	$ 210	$	1,402,000
19,995	LF	Water Main, 12-inch	@	$ 185	$	3,699,000
14,725	LF	Water Main, 10-inch	@	$ 175	$	2,577,000
31,710	LF	Water Main, 8-inch	@	$ 150	$	4,757,000
27,383	LF	Water Main, 6-inch	@	$ 145	$	3,971,000
15,864	LF	Water Main, 4-inch	@	$ 135	$	2,142,000
76	LF	Water Main, 2-inch	@	$ 80	$	6,000
4	EA	Gate Valve and Box, 16-inch	@	$ 5,750	$	23,000
49	EA	Gate Valve and Box, 12-inch	@	$ 4,310	$	211,000
27	EA	Gate Valve and Box, 10-inch	@	$ 3,595	$	97,000
57	EA	Gate Valve and Box, 8-inch	@	$ 2,590	$	148,000
73	EA	Gate Valve and Box, 6-inch	@	$ 2,300	$	168,000
31	EA	Gate Valve and Box, 4-inch	@	$ 1,440	$	45,000
170	EA	Hydrant w/ Gate Valve and Box	@	$ 4,240	$	721,000
44	EA	Water Service, 2-inch and larger	@	$ 1,440	$	63,000
1,450	LF	Water Service Pipe, 2-inch and larger	@	$ 80	$	116,000
16	EA	Water Service, 1.5-inch	@	$ 1,295	$	21,000
530	LF	Water Service Pipe, 1.5-inch	@	$ 70	$	37,000
773	EA	Water Service, 1-inch and smaller	@	$ 1,150	$	889,000
25,510	LF	Water Service Pipe, 1-inch and smaller	@	$ 65	$	1,658,000
1	EA	Well 4 (rated capacity of 750 gpm) w/ VFD	@	$ 128,000	$	128,000
1	EA	Well 5 (rated capacity of 750 gpm)	@	$ 108,000	$	108,000
349	SF	Well 4 Pump/Treatment House	@	$ 370	$	129,000
604	SF	Well 5 Pump/Treatment House	@	$ 370	$	223,000
1	EA	Standby Generator, 180 kW Diesel	@	$ 87,000	$	87,000
1	EA	Elevated Storage Tank (400,000 gallons)	@	$ 1,980,000	$	1,980,000
2	EA	Chemical Feed System - Phosphate	@	$ 8,200	$	17,000
2	EA	Chemical Feed System - Sodium Hypochlorite	@	$ 14,200	$	29,000
2	EA	Chemical Feed System - Fluoride	@	$ 13,200	$	27,000
1	EA	Well and Chemical Feed Control System	@	$ 20,000	$	20,000

ESTIMATED WATER DISTRIBUTION SYSTEM REPLACEMENT VALUE = $ 25,500,000

** Note - Unit prices include construction and restoration costs, engineering fees, and construction contingencies.*

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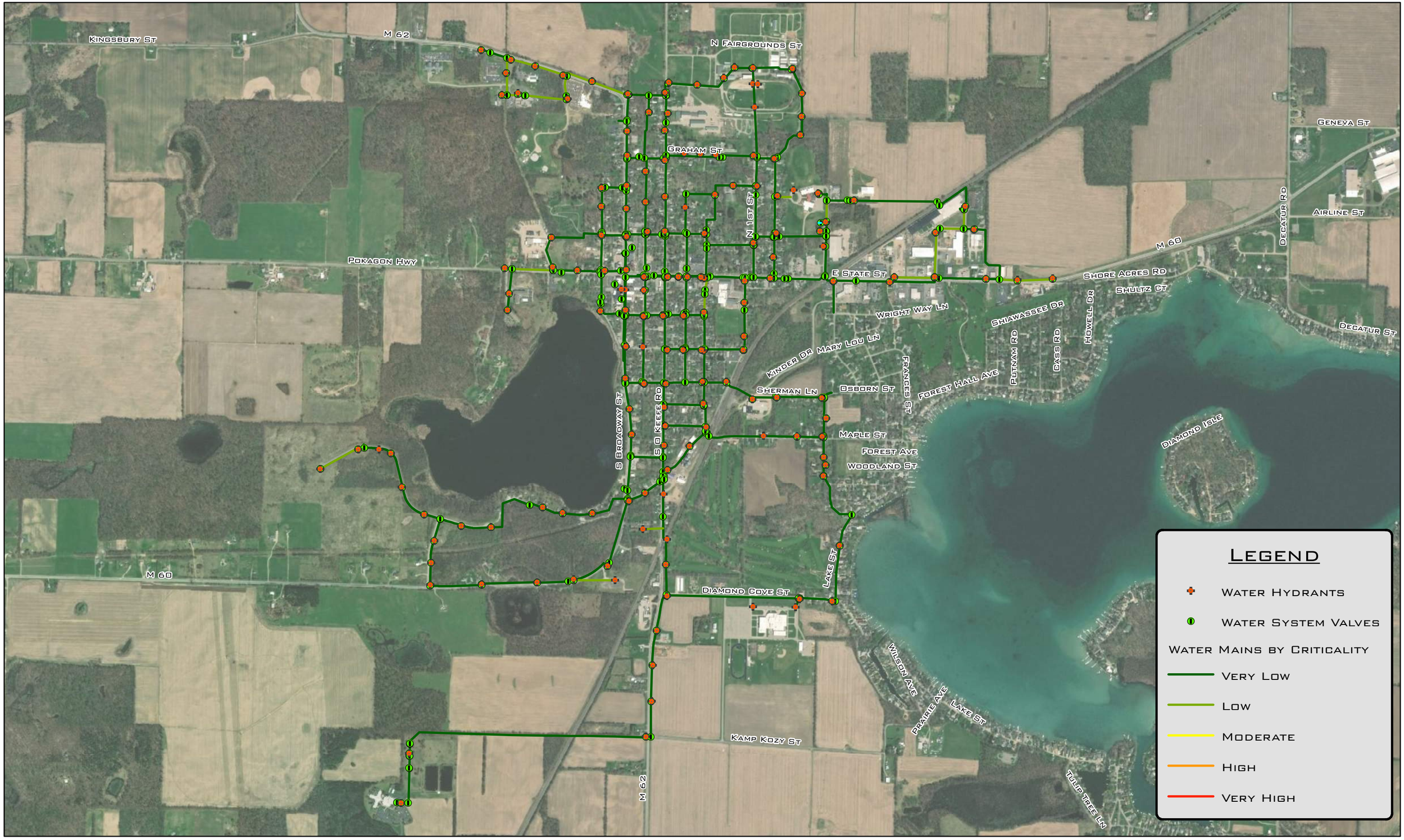
Appendix C

Water Distribution System Criticality Map



Wightman & Associates, Inc.

182013

VILLAGE OF CASSOPOLIS
WATER ASSET MANAGEMENT PLAN

0 350 700 1,400 2,100 2,800
1 inch = 1400 Feet

WATER MAIN CRITICALITY MAP
8/1/2018

Appendix D

Water System CIP Project Descriptions and Cost Estimates

Summary of Water Capital Improvement Projects

Village of Cassopolis

Year	Project Name	Estimated Cost
2018	Planning for a new DPW building	$10,000
2018	Clean and paint exposed piping for Well 4	$3,000
2018	Construction of a new DPW Building - Phase 1	$375,000
2018	Hydrant replacement	$19,000
2018	New large service water meters	$80,000
2018	New water service meters	$20,000
2018	Replace long water services in areas that now have water main	$38,000
2018	Replacing inventory of spare parts	$5,000
2018	Update Reliability Study and develop a water main flushing program	$24,000
2019	Broadway St. water service transfer	$66,000
2019	Construction of a new DPW Building - Phase 2	$375,000
2019	Replace chemical feed equipment - 2019	$31,000
2019	Replace the controls for the Wells and the Elevated Storage Tank	$75,000
2019	Replace the moling machine and air compressor	$35,000
2019	Replace the soft start for Well 5	$7,000
2019	Replace the VFD for Well 4	$7,000
2020	Clean and paint exposed piping for Well 5	$3,000
2020	Graham Street water main	$311,000
2021	South Rowland Street water main	$168,000
2022	North Rowland Street water main	$309,000
2023	North Fulton Street water main	$201,000
2024	East York Street water main	$177,000
2024	Well house maintenance - new roof	$45,000
2025	North East Street water main - north half	$196,000
2026	Darwin Street water main	$230,000
2027	North East Street water main - south half	$212,000
2029	Replace backup generator for Wells 4 and 5	$83,000
2029	Replace chemical feed equipment - 2029	$10,000
2030	South East Street and Jefferson Street water main	$525,000
2031	Johnson Street, Maple Street, and Park Shore water main	$325,000
2032	School Street water main	$156,000
2033	North First Street water main	$195,000
2034	South Disbrow Street water main	$141,000

Capital Improvement Project List Continued On Next Page

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Summary of Water Capital Improvement Projects (cont.)

Village of Cassopolis

Year	Project Name	Estimated Cost
2035	Irving Street and Silver Street water main	$174,000

Total Estimated Project Cost for Twenty Year Water CIP =	**$4,631,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2018**
Total Project Cost:	**$10,000**

Project Title: Planning for a new DPW building

System: Water

Project Description

Development of plans for the construction of a new Department of Public Works (DPW) building to house offices, maintenance areas, and vehicle storage. The cost of the new DPW building will be shared among the various Village funds that will benefit from the new facility.

Project Justification/Benefit

The existing Department of Public Works building is undersized and it has served its purpose and is at the end of its useful life. A new building will provide the necessary space for the current DPW staff and provide room for them to grow into the future. It will also eliminate the ongoing maintenance and upkeep costs to continually fix issues that appear with the existing building.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	10,000
TOTAL	**$**	**10,000**

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Project Title: Planning for a new DPW building

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1	LS	Water system portion of new DPW Building	$ 10,000	$ 10,000

Project Costs		
Construction Costs (Subtotal)		$ 10,000
Engineering	0 %	$ -
Construction Observation	0 %	$ -
Contingency	0 %	$ -
TOTAL		**$ 10,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2018**
Total Project Cost:	**$3,000**

Project Title: Clean and paint exposed piping for Well 4

System: Water

Project Description

Sand blast and recoat the exposed process piping at Well 4.

Project Justification/Benefit

A portion of the exposed process piping in the Well 4 well-house was replaced recently due to corrosion issues. The replacement piping has not been coated yet. In addition, the coating on the remaining exposed process piping and valves is beginning to deteriorate. Sand blasting and recoating all of the exposed process piping in the well-house will protect the pipe and add to its useful life.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	3,000
TOTAL	**$**	**3,000**

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Project Title: Clean and paint exposed piping for Well 4

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1	LS	Blast and recoat Well 4 process piping	$ 2,300	$ 2,300

Project Costs		
Construction Costs (Subtotal)		$ 2,300
Engineering	0 %	$ -
Construction Observation	0 %	$ -
Contingency	25 %	$ 600
TOTAL		**$ 3,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2018**
Total Project Cost:	**$375,000**

Project Title: Construction of a new DPW Building - Phase 1

System: Water

Project Description

The first phase (of two) of the construction of a new Department of Public Works (DPW) building to house offices, maintenance areas, and vehicle storage. The cost of the new DPW building will be shared among the various Village funds that will benefit from the new facility and those costs will be spread out over the two budget years construction is anticipated to take.

Project Justification/Benefit

The existing Department of Public Works building is undersized and it has served its purpose and is at the end of its useful life. A new building will provide the necessary space for the current DPW staff and provide room for them to grow into the future. It will also eliminate the ongoing maintenance and upkeep costs to continually fix issues that appear with the existing building.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	375,000
TOTAL	**$**	**375,000**

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Project Title: Construction of a new DPW Building - Phase 1

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1	LS	DPW Building Construction - water system share	$ 375,000	$ 375,000

Project Costs			
Construction Costs (Subtotal)		$	375,000
Engineering	0 %	$	-
Construction Observation	0 %	$	-
Contingency	0 %	$	-
TOTAL		**$**	**375,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2018**
Total Project Cost:	**$19,000**

Project Title: Hydrant replacement

System: Water

Project Description

Various hydrants throughout the Village water distribution system will be replaced. The hydrants to be replaced are unreliable or inoperable hydrants that are not slated to be replaced as part of an upcoming water main project.

Project Justification/Benefit

Water hydrants have a typical lifespan of 40 to 60 years. Water mains have a typical lifespan of 70 to 100 years. Therefore, it is sometimes necessary to replace some of the hydrants independantly of a water main project. There are several hydrants throughout the Village's water distribution system that have become maintenance headaches with mechanical issues such as leaking valves and nuts, or are no longer in an operable state. There are also older-model hydrants that lack modern pumper head connections. This project will replace these unreliable or inoperable hydrants with new hydrants.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	19,000
TOTAL	**$**	**19,000**

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Project Title: Hydrant replacement

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1	LS	Hydrant replacement	$ 15,000	$ 15,000

Project Costs		
Construction Costs (Subtotal)	$	15,000
Engineering 0 %	$	-
Construction Observation 0 %	$	-
Contingency 25 %	$	3,800
TOTAL	**$**	**19,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2018**
Total Project Cost:	**$80,000**

Project Title: New large service water meters

System: Water

Project Description

Replacement of existing large (3-inch in diameter and larger) customer service water service meters with new, remote read-out capable water meters.

Project Justification/Benefit

The existing customer service water meters are at or beyond their useful life, resulting in errors or failures in metering the water usage. In addition, they require additional labor to read the meters every month since they must be read manually, rather than being able to be read remotely. New customer service water meters will reduce the labor used each month to read the water meters and improve accuracy in billing and water usage data.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	80,000
TOTAL	**$**	**80,000**

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Project Title: New large service water meters

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1	LS	Replace large customer service water meters	$ 80,000	$ 80,000

Project Costs			
Construction Costs (Subtotal)		$	80,000
Engineering	0 %	$	-
Construction Observation	0 %	$	-
Contingency	0 %	$	-
TOTAL		**$**	**80,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2018**
Total Project Cost:	**$20,000**

Project Title: New water service meters

System: Water

Project Description

Replacement of existing customer service water service meters with new, remote read-out capable water meters.

Project Justification/Benefit

The existing customer service water meters are at or beyond their useful life, resulting in errors or failures in metering the water usage. In addition, they require additional labor to read the meters every month since they must be read manually, rather than being able to be read remotely. New customer service water meters will reduce the labor used each month to read the water meters and improve accuracy in billing and water usage data.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	20,000
TOTAL	**$**	**20,000**

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Project Title: New water service meters

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1	LS	Replace customer service water meters	$ 20,000	$ 20,000

Project Costs		
Construction Costs (Subtotal)		$ 20,000
Engineering	0 %	$ -
Construction Observation	0 %	$ -
Contingency	0 %	$ -
TOTAL		**$ 20,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2018**
Total Project Cost:	**$38,000**

Project Title: Replace long water services in areas that now have water main

System: Water

Project Description

Replace water services in areas where water main has been added but services haven't been transferred over.

Project Justification/Benefit

There are areas of the existing water distribution system where services were run to customers from distant water mains because there was not a closer water main. Since that point, closer mains have been installed, but the customers are still being served by their old service lines. Abandoning those old services and connecting a new service to a closer water main will help to eliminate some of the older services in the Village that are prone to failure and may contain materials no longer used in water distribution system construction while helping to reduce the potential for compaints of "stale" or "stagnant" water from water sitting in the services for extended periods of time.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	38,000
TOTAL	**$**	**38,000**

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Project Title: Replace long water services in areas that now have water main

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1	LS	Replace long water services	$ 30,000	$ 30,000

Project Costs		
Construction Costs (Subtotal)		$ 30,000
Engineering	0 %	$ -
Construction Observation	0 %	$ -
Contingency	25 %	$ 7,500
TOTAL		**$ 38,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2018**
Total Project Cost:	**$5,000**

Project Title: Replacing inventory of spare parts

System: Water

Project Description

Replacing and replenishing the spare parts maintained by the Village for maintenance and upkeep of the water distribution system.

Project Justification/Benefit

Some of the spare parts the Village has in their inventory no longer meet current water distribution system design standards. Replacing these parts will allow the Village to have the proper items on hand to conduct routine maintenance and emergency repairs on the water distribution system

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	5,000
TOTAL	**$**	**5,000**

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Project Title: Replacing inventory of spare parts

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1	LS	Spare parts inventory replacement	$ 5,000	$ 5,000

Project Costs		
Construction Costs (Subtotal)		$ 5,000
Engineering	0 %	$ -
Construction Observation	0 %	$ -
Contingency	0 %	$ -
TOTAL		**$ 5,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2018**
Total Project Cost:	**$24,000**

Project Title: Update Reliability Study and develop a water main flushing program

System: Water

Project Description

Engage and engineering firm to update the Water System Reliability Study for the Village, including development of a new computerized water distribution system model and to use the model to develop a water main flushing program for the Village water system.

Project Justification/Benefit

The MDEQ suggests that a water system updates their reliability study every 5 years. It has been almost 20 years since a full reliability study has been done for the Village water system. The model developped as a part of this project will help to better prioritize the water distribution system projects suggested in this Asset Management Plan and may point to other areas of the distribution system that could be upgraded to strengthen the system as a whole.

A properly designed water main flushing program will allow the DPW staff to effectively flush the water system, removing accumulated sediments and eliminating complaints stemming from "stale" or "stagnant" water that has been sitting in the distribution system for an extended period of time. The model developped during the reliability study can be used as a tool in the development of a water main flushing program for the Village.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	24,000
TOTAL	**$**	**24,000**

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Project Title: Update Reliability Study and develop a water main flushing program

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1	LS	Water Reliability Study update	$ 17,500	$ 17,500
1	LS	Water main flushing program development	$ 6,500	$ 6,500

Project Costs		
Construction Costs (Subtotal)		$ 24,000
Engineering	0 %	$ -
Construction Observation	0 %	$ -
Contingency	0 %	$ -
TOTAL		**$ 24,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2019**
Total Project Cost:	**$66,000**

Project Title: Broadway St. water service transfer

System: Water

Project Description

Transfer all services from the old 4-inch water main on S. Broadway Street from Jefferson St. south to the dead end of the water main south of Water Street to the newer 10-inch parallel water main and abandon the old 4-inch water main. Transfer all services from the old 6-inch water main on S. Broadway Street from Jefferson St. north to State Street and on N. Broadway Street from State Street north to the dead end of the water main to the newer 10-inch parallel water main and abandon the old 6-inch water main.

Project Justification/Benefit

The old 4-inch and 6-inch water main on Broadway Street was replaced by a new 10-inch water main running parallel to it. However, several customer services are still run from the old 4-inch and 6-inch water mains. Abandoning those old services and connecting a new service to the new 10-inch main will help to eliminate some of the older services in the Village that are prone to failure and may contain materials no longer used in water distribution system construction while helping to reduce the potential for compaints of "stale" or "stagnant" water from water sitting in the dead end 4-inch and 6-inch water mains. Once these services have been removed from the 4-inch and 6-inch water mains, there is no reason for them to remain in service.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	66,000
TOTAL	**$**	**66,000**

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Project Title: Broadway St. water service transfer

Quantity	Unit of Measure	Item	Unit Price	Subtotal
17	EA	Water service	$ 3,000	$ 51,000
1	EA	Cut and plug existing 4-inch water main	$ 450	$ 450
2	EA	Cut and plug existing 6-inch water main	$ 600	$ 1,200

Project Costs		
Construction Costs (Subtotal)	$	52,700
Engineering 0 %	$	-
Construction Observation 0 %	$	-
Contingency 25 %	$	13,200
TOTAL	**$**	**66,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2019**
Total Project Cost:	**$375,000**

Project Title: Construction of a new DPW Building - Phase 2

System: Water

Project Description

The second phase (of two) of the construction of a new Department of Public Works (DPW) building to house offices, maintenance areas, and vehicle storage. The cost of the new DPW building will be shared among the various Village funds that will benefit from the new facility and those costs will be spread out over the two budget years construction is anticipated to take.

Project Justification/Benefit

The existing Department of Public Works building is undersized and it has served its purpose and is at the end of its useful life. A new building will provide the necessary space for the current DPW staff and provide room for them to grow into the future. It will also eliminate the ongoing maintenance and upkeep costs to continually fix issues that appear with the existing building.

Project Funding Source		
Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	375,000
TOTAL	**$**	**375,000**

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Project Title: Construction of a new DPW Building - Phase 2

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1	LS	DPW Building Construction - water system share	$ 375,000	$ 375,000

Project Costs			
Construction Costs (Subtotal)		$	375,000
Engineering	0 %	$	-
Construction Observation	0 %	$	-
Contingency	0 %	$	-
TOTAL		**$**	**375,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2019**
Total Project Cost:	**$31,000**

Project Title: Replace chemical feed equipment - 2019

System: Water

Project Description

Replace the fluoride feed pumps, the phosphate system day tank mixers, the hypochlorite transfer pumps, the fluoride transfer pumps, the hypochlorite day tank scales, and the fluoride day tank scales at both well houses (Well 4 and Well 5).

Project Justification/Benefit

All of the components listed in the project description have an expected useful life of approximately 20 years when used in water service. Planning for replacement of these components, though they are not in need of replacement now, will ensure that sufficient capital exists when replacement becomes necessary.

Project Funding Source		
Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	31,000
TOTAL	**$**	**31,000**

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Project Title: Replace chemical feed equipment - 2019

Quantity	Unit of Measure	Item	Unit Price	Subtotal
2	EA	Chemical feed pumps - fluoride system	$ 1,000	$ 2,000
2	EA	Day tank mixer - phosphate system	$ 500	$ 1,000
2	EA	Chemical transfer pumps - hypochlorite system	$ 1,300	$ 2,600
2	EA	Chemical transfer pumps - fluoride system	$ 1,300	$ 2,600
2	EA	Day tank scales - hypochlorite system	$ 4,000	$ 8,000
2	EA	Day tank scales - fluoride system	$ 4,000	$ 8,000

Project Costs		
Construction Costs (Subtotal)	$	24,200
Engineering 0 %	$	-
Construction Observation 0 %	$	-
Contingency 25 %	$	6,100
TOTAL	**$**	**31,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2019**
Total Project Cost:	**$75,000**

Project Title: Replace the controls for the Wells and the Elevated Storage Tank

System: Water

Project Description

Replace the aging analog controls and out-dated dialer system with digital controls and a Supervisory Control And Data Acquisition (SCADA) system.

Project Justification/Benefit

Electrical components used in controls for water service have an expected useful life of approximately 20 years. Planning for replacement of the controls, though they are not in need of replacement now, will ensure that sufficient capital exists when replacement becomes necessary. In addition to concerns with useful life, the existing analog controls are dated and finding replacement parts is becoming more difficult and costly. Replacing the controls with new, state-of-the-art digital controls will eliminate this issue. The existing dialer and alarm system is also dated. Replacement of the dialer and alarms system by a new SCADA system will make operation of the water system easier, more labor efficient, and will allow for better logging of system operation and equipment usage.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	75,000
TOTAL	**$**	**75,000**

(269) 673-8465 1670 Lincoln Road, **Allegan, MI**
(269) 927-0100 2303 Pipestone Road, **Benton Harbor, MI**
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Village of Cassopolis

Project Title: Replace the controls for the Wells and the Elevated Storage Tank

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1	LS	Well and elevated storage tank control replacement	$ 50,000	$ 50,000

Project Costs		
Construction Costs (Subtotal)		$ 50,000
Engineering	10 %	$ 5,000
Construction Observation	10 %	$ 5,000
Contingency	25 %	$ 15,000
TOTAL		**$ 75,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2019**
Total Project Cost:	**$35,000**

Project Title: Replace the moling machine and air compressor

System: Water

Project Description

Replace the existing moling machine and tow-behind air compressor.

Project Justification/Benefit

The existing moling machine and tow-behind air compressor are beyond their useful lives and finding replacement parts to keep them running is becoming difficult and costly. Replacement of these pieces of equipment will allow the Village to have reliable equipment to use for installing water services under existing roadways without disturbing the pavement and eliminate the excessive maintenance costs required by the existing equipment.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	35,000
TOTAL	**$**	**35,000**

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(269) 927-0100 2303 Pipestone Road, **Benton Harbor, MI**
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Village of Cassopolis

Project Title: Replace the moling machine and air compressor

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1	LS	3-inch diameter basic moling machine package	$ 8,000	$ 8,000
1	LS	Tow-behind air compressor	$ 20,000	$ 20,000

Project Costs		
Construction Costs (Subtotal)	$	28,000
Engineering 0 %	$	-
Construction Observation 0 %	$	-
Contingency 25 %	$	7,000
TOTAL	**$**	**35,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2019**
Total Project Cost:	**$7,000**

Project Title: Replace the soft start for Well 5

System: Water

Project Description

Replace the soft start for Well 5 with a new Variable Frequence Drive (VFD).

Project Justification/Benefit

Soft motor starters used in water service have an expected useful life of approximately 20 years. Planning for replacement of the soft start, though it is not in need of replacement now, will ensure that sufficient capital exists when replacement becomes necessary. Since the price between a soft start and a VFD is negligible, and a VFD allows for more functionality within the system, it is recommended to replace the soft start with a VFD to match the equipment at Well 4.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	7,000
TOTAL	**$**	**7,000**

(269) 673-8465 1670 Lincoln Road, **Allegan, MI**
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Project Title: Replace the soft start for Well 5

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1	EA	Well 5 VFD	$ 5,000	$ 5,000

Project Costs		
Construction Costs (Subtotal)		$ 5,000
Engineering	0 %	$ -
Construction Observation	0 %	$ -
Contingency	25 %	$ 1,300
TOTAL		**$ 7,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2019**
Total Project Cost:	**$7,000**

Project Title: Replace the VFD for Well 4

System: Water

Project Description

Replace the Variable Frequency Drive (VFD) for Well 4.

Project Justification/Benefit

VFDs used in water service have an expected useful life of approximately 20 years. Planning for replacement of the VFD, though it is not in need of replacement now, will ensure that sufficient capital exists when replacement becomes necessary.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	7,000
TOTAL	**$**	**7,000**

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Village of Cassopolis

Project Title: Replace the VFD for Well 4

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1	EA	Well 4 VFD	$ 5,000	$ 5,000

Project Costs		
Construction Costs (Subtotal)		$ 5,000
Engineering	0 %	$ -
Construction Observation	0 %	$ -
Contingency	25 %	$ 1,300
TOTAL		**$ 7,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2020**
Total Project Cost:	**$3,000**

Project Title: Clean and paint exposed piping for Well 5

System: Water

Project Description

Sand blast and recoat the exposed process piping at Well 5.

Project Justification/Benefit

The coating on the exposed process piping and valves is beginning to deteriorate in the well-house for Well 5. Sand blasting and recoating all of the exposed process piping in the well-house will protect the pipe and add to its useful life.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	3,000
TOTAL	**$**	**3,000**

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Village of Cassopolis

Project Title: Clean and paint exposed piping for Well 5

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1	LS	Blast and recoat Well 4 process piping	$ 2,300	$ 2,300

Project Costs		
Construction Costs (Subtotal)		$ 2,300
Engineering	0 %	$ -
Construction Observation	0 %	$ -
Contingency	25 %	$ 600
TOTAL		**$ 3,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2020**
Total Project Cost:	**$311,000**

Project Title: Graham Street water main

System: Water

Project Description

Replace the existing 6-inch water main running along and under Graham Street from O'Keefe Street to First Street with 8-inch water main.

Project Justification/Benefit

This segment of water main has had a series of recent breaks. Replacing the water main will allow the conditions leading to the breaks to be addressed, reducing the likelihood of further water main breaks.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	311,000
TOTAL	**$**	**311,000**

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Village of Cassopolis

Project Title: Graham Street water main

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1,500	LF	8-inch water main (including restoration)	$ 105	$ 157,500
3	EA	8-inch valve and valve box	$ 1,800	$ 5,400
2	EA	Cut and cap existing 4-inch water main	$ 450	$ 900
1	EA	Connect to existing 6-inch water main	$ 1,800	$ 1,800
1	EA	Connect to existing 8-inch water main	$ 2,300	$ 2,300
4	EA	Hydrant, 6-inch service, 6-inch valve and valve box	$ 3,750	$ 15,000
11	EA	Water service	$ 3,000	$ 33,000

Project Costs		
Construction Costs (Subtotal)	$	215,900
Engineering 7 %	$	15,200
Construction Observation 8 %	$	17,300
Contingency 25 %	$	62,100
TOTAL	**$**	**311,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2021**
Total Project Cost:	**$168,000**

Project Title: South Rowland Street water main

System: Water

Project Description

Replace the existing water main running along and under South Rowland Street from Jefferson Street to Water Street with 8-inch water main.

Project Justification/Benefit

There is uncertainty as to the size of this water main with some records indicating 6-inch diameter and other records indicating 4-inch diameter. The minimum water main size allowed in the current version of the Ten States Standards for Water Works in water systems providing fire protection is 6-inch. If it is confirmed that this water main is 4-inch in diameter, replacing the existing 4-inch water main with 8-inch water main will help to increase the water flow rate for fire fighting efforts and can, in conjunction with other projects identified in the most recent Water Reliability Study, help to lower the Insurance Service Office (ISO) rating for the Village, which could lower insurance rates for Village residents.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	168,000
TOTAL	**$**	**168,000**

Village of Cassopolis

Project Title: South Rowland Street water main

Quantity	Unit of Measure	Item	Unit Price	Subtotal
560	LF	8-inch water main (including restoration)	$ 105	$ 58,800
2	EA	8-inch valve and valve box	$ 1,800	$ 3,600
2	EA	Cut and cap existing 4-inch water main	$ 450	$ 900
2	EA	Connect to existing 6-inch water main	$ 1,800	$ 3,600
3	EA	Hydrant, 6-inch service, 6-inch valve and valve box	$ 3,750	$ 11,250
9	EA	Water service	$ 3,000	$ 27,000

Project Costs		
Construction Costs (Subtotal)	$	105,200
Engineering 15 %	$	15,800
Construction Observation 12 %	$	12,700
Contingency 25 %	$	33,500
TOTAL	**$**	**168,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2022**
Total Project Cost:	**$309,000**

Project Title: North Rowland Street water main

System: Water

Project Description

Replace the existing 4-inch water main running along and under North Rowland Street from York Street to School Street with 8-inch water main.

Project Justification/Benefit

The minimum water main size allowed in the current version of the Ten States Standards for Water Works in water systems providing fire protection is 6-inch. Increasing the existing 4-inch water main to 8-inch water main will help to increase the water flow rate for fire fighting efforts and can, in conjunction with other projects identified in the most recent Water Reliability Study, help to lower the Insurance Service Office (ISO) rating for the Village, which could lower insurance rates for Village residents.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	309,000
TOTAL	**$**	**309,000**

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Village of Cassopolis

Project Title: North Rowland Street water main

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1,255	LF	8-inch water main (including restoration)	$ 105	$ 131,775
3	EA	8-inch valve and valve box	$ 1,800	$ 5,400
2	EA	Cut and cap existing 4-inch water main	$ 450	$ 900
2	EA	Connect to existing 8-inch water main	$ 2,300	$ 4,600
4	EA	Hydrant, 6-inch service, 6-inch valve and valve box	$ 3,750	$ 15,000
19	EA	Water service	$ 3,000	$ 57,000

Project Costs		
Construction Costs (Subtotal)	$	214,700
Engineering 7 %	$	15,100
Construction Observation 8 %	$	17,200
Contingency 25 %	$	61,800
TOTAL	**$**	**309,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2023**
Total Project Cost:	**$201,000**

Project Title: North Fulton Street water main

System: Water

Project Description

Replace the existing 4-inch water main running under North Fulton Street from York Street north to where York Street dead ends and the water main turns to the east and becomes 6-inch running through a right-of-way to Avenue J with 8-inch water main.

Project Justification/Benefit

The minimum water main size allowed in the current version of the Ten States Standards for Water Works in water systems providing fire protection is 6-inch. Increasing the existing 4-inch water main to 8-inch water main will help to increase the water flow rate for fire fighting efforts and can, in conjunction with other projects identified in the most recent Water Reliability Study, help to lower the Insurance Service Office (ISO) rating for the Village, which could lower insurance rates for Village residents.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	201,000
TOTAL	**$**	**201,000**

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Village of Cassopolis

Project Title: North Fulton Street water main

Quantity	Unit of Measure	Item	Unit Price	Subtotal
680	LF	8-inch water main (including restoration)	$ 105	$ 71,400
2	EA	8-inch valve and valve box	$ 1,800	$ 3,600
2	EA	Cut and cap existing 4-inch water main	$ 450	$ 900
1	EA	Connect to existing 6-inch water main	$ 1,800	$ 1,800
1	EA	Connect to existing 8-inch water main	$ 2,300	$ 2,300
2	EA	Hydrant, 6-inch service, 6-inch valve and valve box	$ 3,750	$ 7,500
13	EA	Water service	$ 3,000	$ 39,000

Project Costs		
Construction Costs (Subtotal)	$	126,500
Engineering 15 %	$	19,000
Construction Observation 12 %	$	15,200
Contingency 25 %	$	40,200
TOTAL	**$**	**201,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2024**
Total Project Cost:	**$177,000**

Project Title: East York Street water main

System: Water

Project Description

Replace the existing 4-inch water main running under East York Street from O'Keefe Street to East Street with 8-inch water main.

Project Justification/Benefit

The minimum water main size allowed in the current version of the Ten States Standards for Water Works in water systems providing fire protection is 6-inch. Increasing the existing 4-inch water main to 8-inch water main will help to increase the water flow rate for fire fighting efforts and can, in conjunction with other projects identified in the most recent Water Reliability Study, help to lower the Insurance Service Office (ISO) rating for the Village, which could lower insurance rates for Village residents.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	177,000
TOTAL	**$**	**177,000**

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Village of Cassopolis

Project Title: East York Street water main

Quantity	Unit of Measure	Item	Unit Price	Subtotal
675	LF	8-inch water main (including restoration)	$ 105	$ 70,875
5	EA	8-inch valve and valve box	$ 1,800	$ 9,000
2	EA	Cut and cap existing 4-inch water main	$ 450	$ 900
1	EA	Connect to existing 6-inch water main	$ 1,800	$ 1,800
3	EA	Connect to existing 8-inch water main	$ 2,300	$ 6,900
1	EA	Hydrant, 6-inch service, 6-inch valve and valve box	$ 3,750	$ 3,750
6	EA	Water service	$ 3,000	$ 18,000

Project Costs		
Construction Costs (Subtotal)	$	111,300
Engineering 15 %	$	16,700
Construction Observation 12 %	$	13,400
Contingency 25 %	$	35,400
TOTAL	**$**	**177,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2024**
Total Project Cost:	**$45,000**

Project Title: Well house maintenance - new roof

System: Water

Project Description

Replace the existing asphalt shingle roof on the well houses for Well 4 and Well 5 with standing seam metal roofing.

Project Justification/Benefit

Asphalt shingle roofs have an expected useful life of 20 to 30 years. Planning for replacement of the roof, though it is not in need of replacement now, will ensure that sufficient capital exists when replacement becomes necessary. Standing seam metal roofing has an expected useful life of at least 50 years. Replacing the asphalt shingle roofing with standing seam metal roofing will decrease the frequency with which the roofing must be replaced to keep the well houses in satisfactory condition.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	45,000
TOTAL	**$**	**45,000**

(269) 673-8465 1670 Lincoln Road, **Allegan, MI**
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Project Title: Well house maintenance - new roof

Quantity	Unit of Measure	Item	Unit Price	Subtotal
2	EA	Standing seam metal roofs	$ 15,000	$ 30,000

Project Costs			
Construction Costs (Subtotal)		$	30,000
Engineering	10 %	$	3,000
Construction Observation	8 %	$	2,400
Contingency	25 %	$	8,900
TOTAL		**$**	**45,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2025**
Total Project Cost:	**$196,000**

Project Title: North East Street water main - north half

System: Water

Project Description

Replace the existing 4-inch water main running along and under North East Street from York Street north to the curve towards Avenue J, continuing east to Avenue J, and then north under Avenue J to the dead end to where the water main becomes 6-inch diameter as it loops west across the right-of-way towards North Fulton Street with 8-inch water main.

Project Justification/Benefit

The minimum water main size allowed in the current version of the Ten States Standards for Water Works in water systems providing fire protection is 6-inch. Increasing the existing 4-inch water main to 8-inch water main will help to increase the water flow rate for fire fighting efforts and can, in conjunction with other projects identified in the most recent Water Reliability Study, help to lower the Insurance Service Office (ISO) rating for the Village, which could lower insurance rates for Village residents.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	196,000
TOTAL	**$**	**196,000**

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Village of Cassopolis

Project Title: North East Street water main - north half

Quantity	Unit of Measure	Item	Unit Price	Subtotal
810	LF	8-inch water main (including restoration)	$ 105	$ 85,050
3	EA	8-inch valve and valve box	$ 1,800	$ 5,400
1	EA	Cut and cap existing 4-inch water main	$ 450	$ 450
1	EA	Connect to existing 6-inch water main	$ 1,800	$ 1,800
1	EA	Connect to existing 8-inch water main	$ 2,300	$ 2,300
1	EA	Hydrant, 6-inch service, 6-inch valve and valve box	$ 3,750	$ 3,750
8	EA	Water service	$ 3,000	$ 24,000

Project Costs		
Construction Costs (Subtotal)	$	122,800
Engineering 15 %	$	18,500
Construction Observation 12 %	$	14,800
Contingency 25 %	$	39,100
TOTAL	**$**	**196,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2026**
Total Project Cost:	**$230,000**

Project Title: Darwin Street water main

System: Water

Project Description

Replace the existing 4-inch water main running under Darwin Street from East Street to First Street with 8-inch water main.

Project Justification/Benefit

The minimum water main size allowed in the current version of the Ten States Standards for Water Works in water systems providing fire protection is 6-inch. Increasing the existing 4-inch water main to 8-inch water main will help to increase the water flow rate for fire fighting efforts and can, in conjunction with other projects identified in the most recent Water Reliability Study, help to lower the Insurance Service Office (ISO) rating for the Village, which could lower insurance rates for Village residents.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	230,000
TOTAL	**$**	**230,000**

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Village of Cassopolis

Project Title: Darwin Street water main

Quantity	Unit of Measure	Item	Unit Price	Subtotal
815	LF	8-inch water main (including restoration)	$ 105	$ 85,575
2	EA	8-inch valve and valve box	$ 1,800	$ 3,600
2	EA	Cut and cap existing 4-inch water main	$ 450	$ 900
2	EA	Connect to existing 8-inch water main	$ 2,300	$ 4,600
2	EA	Hydrant, 6-inch service, 6-inch valve and valve box	$ 3,750	$ 7,500
17	EA	Water service	$ 3,000	$ 51,000

Project Costs		
Construction Costs (Subtotal)	$	153,200
Engineering 10 %	$	15,400
Construction Observation 10 %	$	15,400
Contingency 25 %	$	46,000
TOTAL	**$**	**230,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2027**
Total Project Cost:	**$212,000**

Project Title: North East Street water main - south half

System: Water

Project Description

Replace the existing 4-inch water main running along and under North East Street from York Street to State Street with 8-inch water main. Transfer all of the services from the old 4-inch water main on East State Street east of North East Street to the newer 10-inch water main running parallel to it and abandon the 4-inch water main under East State Street.

Project Justification/Benefit

The minimum water main size allowed in the current version of the Ten States Standards for Water Works in water systems providing fire protection is 6-inch. Increasing the existing 4-inch water main to 8-inch water main will help to increase the water flow rate for fire fighting efforts and can, in conjunction with other projects identified in the most recent Water Reliability Study, help to lower the Insurance Service Office (ISO) rating for the Village, which could lower insurance rates for Village residents.

The old 4-inch water main on E. State Street was replaced by a new 10-inch water main running parallel to it. However, several customer services are still run from the old 4-inch water main. Abandoning those old services and running a new service to the 10-inch main will help eliminate some older services in the Village that are prone to failure and may contain materials no longer used in water distribution system construction while helping to reduce the potential for compaints of "stale" or "stagnant" water. Once these services have been removed from the 4-inch water main, there is no reason for it to remain in service.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	212,000
TOTAL	**$**	**212,000**

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Village of Cassopolis

Project Title: North East Street water main - south half

Quantity	Unit of Measure	Item	Unit Price	Subtotal
700	LF	8-inch water main (including restoration)	$ 105	$ 73,500
4	EA	8-inch valve and valve box	$ 1,800	$ 7,200
2	EA	Cut and cap existing 4-inch water main	$ 450	$ 900
2	EA	Connect to existing 8-inch water main	$ 2,300	$ 4,600
1	EA	Connect to existing 10-inch water main	$ 4,250	$ 4,250
1	EA	Hydrant, 6-inch service, 6-inch valve and valve box	$ 3,750	$ 3,750
11	EA	Water service	$ 3,000	$ 33,000
2	EA	Relocated water services	$ 3,000	$ 6,000

Project Costs		
Construction Costs (Subtotal)	$	133,200
Engineering 15 %	$	20,000
Construction Observation 12 %	$	16,000
Contingency 25 %	$	42,300
TOTAL	**$**	**212,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2029**
Total Project Cost:	**$83,000**

Project Title: Replace backup generator for Wells 4 and 5

System: Water

Project Description

Replace the permanently installed backup generator at Well 5 that provides backup power to both Well 4 and Well 5.

Project Justification/Benefit

Permanently installed backup generators used in water service and exercised regularly per the manufacturer's instructions have an expected useful life of approximately 30 years. Planning for replacement of the generator, though it is not in need of replacement now, will ensure that sufficient capital exists when replacement becomes necessary.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	83,000
TOTAL	**$**	**83,000**

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Village of Cassopolis

Project Title: Replace backup generator for Wells 4 and 5

Quantity	Unit of Measure	Item	Unit Price	Subtotal
1	EA	Diesel backup generator - 180 kW	$ 60,000	$ 60,000

Project Costs			
Construction Costs (Subtotal)		$	60,000
Engineering	8 %	$	4,800
Construction Observation	2 %	$	1,200
Contingency	25 %	$	16,500
TOTAL		**$**	**83,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2029**
Total Project Cost:	**$10,000**

Project Title: Replace chemical feed equipment - 2029

System: Water

Project Description

Replace the phosphate system day tanks, the hypochlorite system day tanks, the phosphate feed pumps, and the hypochlorite feed pumps at both well houses (Well 4 and Well 5).

Project Justification/Benefit

All of the day tanks listed in the project description have an expected useful life of approximately 30 years when used in water service, while the pumps listed in the project description have an expected useful life of approximately 20 years when used in water service. Planning for replacement of these components, though they are not in need of replacement now, will ensure that sufficient capital exists when replacement becomes necessary.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	10,000
TOTAL	**$**	**10,000**

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Village of Cassopolis

Project Title: Replace chemical feed equipment - 2029

Quantity	Unit of Measure	Item	Unit Price	Subtotal
2	EA	Day tank - phosphate system	$ 1,400	$ 2,800
2	EA	Day tank - hypochlorite system	$ 600	$ 1,200
2	EA	Chemical feed pumps - phosphate system	$ 1,000	$ 2,000
2	EA	Chemical feed pumps - hypochlorite system	$ 1,000	$ 2,000

Project Costs		
Construction Costs (Subtotal)	$	8,000
Engineering 0 %	$	-
Construction Observation 0 %	$	-
Contingency 25 %	$	2,000
TOTAL	**$**	**10,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2030**
Total Project Cost:	**$525,000**

Project Title: South East Street and Jefferson Street water main

System: Water

Project Description

Replace the existing 4-inch water main running under South East Street from State Street to South Street and the 4-inch water main running under Jefferson Street from Fulton Street to East Street with 8-inch water main.

Project Justification/Benefit

The minimum water main size allowed in the current version of the Ten States Standards for Water Works in water systems providing fire protection is 6-inch. Increasing the existing 4-inch water main to 8-inch water main will help to increase the water flow rate for fire fighting efforts and can, in conjunction with other projects identified in the most recent Water Reliability Study, help to lower the Insurance Service Office (ISO) rating for the Village, which could lower insurance rates for Village residents.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	525,000
TOTAL	**$**	**525,000**

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Village of Cassopolis

Project Title: South East Street and Jefferson Street water main

Quantity	Unit of Measure	Item	Unit Price	Subtotal
		---------- South East Street water main ----------		
1,755	EA	8-inch water main (including restoration)	$ 105	$ 184,275
6	EA	8-inch valve and valve box	$ 1,800	$ 10,800
6	EA	Cut and cap existing 4-inch water main	$ 450	$ 2,700
6	EA	Connect to existing 8-inch water main	$ 1,800	$ 10,800
1	EA	Connect to existing 10-inch water main	$ 4,250	$ 4,250
4	EA	Hydrant, 6-inch service, 6-inch valve and valve box	$ 3,750	$ 15,000
25	EA	Water service	$ 3,000	$ 75,000
		---------- Jefferson Street water main ----------		
330	EA	8-inch water main (including restoration)	$ 105	$ 34,650
2	EA	8-inch valve and valve box	$ 1,800	$ 3,600
2	EA	Cut and cap existing 4-inch water main	$ 450	$ 900
2	EA	Connect to existing 8-inch water main	$ 2,300	$ 4,600
6	EA	Water service	$ 3,000	$ 18,000

Project Costs		
Construction Costs (Subtotal)	$	364,600
Engineering 7 %	$	25,600
Construction Observation 8 %	$	29,200
Contingency 25 %	$	104,900
TOTAL	**$**	**525,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2031**
Total Project Cost:	**$325,000**

Project Title: Johnson Street, Maple Street, and Park Shore water main

System: Water

Project Description

Replace the existing 4-inch water main running under Johnson Street from S. O'Keefe Street to Maple Street with 8-inch water main. Transfer all remaining services from the old 4-inch water main on Maple Street to the newer 8-inch water main paralleling it and abandon the old 4-inch water main. Replace the existing 2-inch water main running under the railroad viaduct from Maple Street to Park Shore Drive with 8-inch water main.

Project Justification/Benefit

The minimum water main size allowed in the current version of the Ten States Standards for Water Works in water systems providing fire protection is 6-inch. Increasing the existing 2-inch and 4-inch main to 8-inch water main will help to increase the water flow rate for fire fighting efforts and can, in conjunction with other projects identified in the most recent Water Reliability Study, help to lower the Insurance Service Office (ISO) rating for the Village, which could lower insurance rates for Village residents.

The old 4-inch water main on Maple Street was replaced by a new 8-inch water main running parallel to it. There may still be customer services run from the old 4-inch water main. Abandoning those old services and running a new service to the 8-inch main will help eliminate some older services in the Village that are prone to failure and may contain materials no longer used in water distribution system construction while helping to reduce the potential for compaints of "stale" or "stagnant" water. Once these services have been removed from the 4-inch water main, there is no reason for it to remain in service.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	325,000
TOTAL	**$**	**325,000**

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Village of Cassopolis

Project Title: Johnson Street, Maple Street, and Park Shore water main

Quantity	Unit of Measure	Item	Unit Price	Subtotal
		---------- Johnson Street water main ----------		
700	LF	8-inch water main (including restoration)	$ 105	$ 73,500
2	EA	8-inch valve and valve box	$ 1,800	$ 3,600
2	EA	Cut and cap existing 4-inch water main	$ 450	$ 900
1	EA	Connect to existing 8-inch water main	$ 2,300	$ 2,300
1	EA	Connect to existing 12-inch water main	$ 5,000	$ 5,000
2	EA	Hydrant, 6-inch service, 6-inch valve and valve box	$ 3,750	$ 7,500
14	EA	Water service	$ 3,000	$ 42,000
2	EA	Relocated water services	$ 3,000	$ 6,000
		---------- Water main crossing viaduct ----------		
220	LF	Open cut 8-inch water main (including restoration)	$ 105	$ 23,100
80	LF	Bore & Jack casing plus 8-inch water main	$ 500	$ 40,000
2	EA	8-inch valve and valve box	$ 1,800	$ 3,600
2	EA	Cut and cap existing 4-inch water main	$ 450	$ 900
1	EA	Connect to existing 6-inch water main	$ 1,800	$ 1,800
1	EA	Connect to existing 8-inch water main	$ 2,300	$ 2,300
1	EA	Hydrant, 6-inch service, 6-inch valve and valve box	$ 3,750	$ 3,750

Project Costs			
Construction Costs (Subtotal)		$	216,300
Engineering	10 %	$	21,700
Construction Observation	10 %	$	21,700
Contingency	25 %	$	65,000
TOTAL		**$**	**325,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2032**
Total Project Cost:	**$156,000**

Project Title: School Street water main

System: Water

Project Description

Replace the existing 4-inch water main running under and along School Street from Broadway Street to O'Keefe Street with 8-inch water main.

Project Justification/Benefit

The minimum water main size allowed in the current version of the Ten States Standards for Water Works in water systems providing fire protection is 6-inch. Increasing the existing 4-inch water main to 8-inch water main will help to increase the water flow rate for fire fighting efforts and can, in conjunction with other projects identified in the most recent Water Reliability Study, help to lower the Insurance Service Office (ISO) rating for the Village, which could lower insurance rates for Village residents.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	156,000
TOTAL	**$**	**156,000**

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Village of Cassopolis

Project Title: School Street water main

Quantity	Unit of Measure	Item	Unit Price	Subtotal
645	LF	8-inch water main (including restoration)	$ 105	$ 67,725
4	EA	8-inch valve and valve box	$ 1,800	$ 7,200
2	EA	Cut and cap existing 4-inch water main	$ 450	$ 900
1	EA	Connect to existing 6-inch water main	$ 1,800	$ 1,800
2	EA	Connect to existing 8-inch water main	$ 2,300	$ 4,600
1	EA	Connect to existing 10-inch water main	$ 4,250	$ 4,250
3	EA	Water service	$ 3,000	$ 9,000

Project Costs		
Construction Costs (Subtotal)	$	95,500
Engineering 17 %	$	16,300
Construction Observation 13 %	$	12,500
Contingency 25 %	$	31,100
TOTAL	**$**	**156,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2033**
Total Project Cost:	**$195,000**

Project Title: North First Street water main

System: Water

Project Description

Replace the existing 4-inch water main running under and along North First Street from York Street to State Street with 8-inch water main.

Project Justification/Benefit

The minimum water main size allowed in the current version of the Ten States Standards for Water Works in water systems providing fire protection is 6-inch. Increasing the existing 4-inch water main to 8-inch water main will help to increase the water flow rate for fire fighting efforts and can, in conjunction with other projects identified in the most recent Water Reliability Study, help to lower the Insurance Service Office (ISO) rating for the Village, which could lower insurance rates for Village residents.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	195,000
TOTAL	**$**	**195,000**

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Village of Cassopolis

Project Title: North First Street water main

Quantity	Unit of Measure	Item	Unit Price	Subtotal
675	LF	8-inch water main (including restoration)	$ 105	$ 70,875
4	EA	8-inch valve and valve box	$ 1,800	$ 7,200
2	EA	Cut and cap existing 4-inch water main	$ 450	$ 900
1	EA	Connect to existing 6-inch water main	$ 1,800	$ 1,800
1	EA	Connect to existing 8-inch water main	$ 2,300	$ 2,300
1	EA	Connect to existing 12-inch water main	$ 5,000	$ 5,000
2	EA	Hydrant, 6-inch service, 6-inch valve and valve box	$ 3,750	$ 7,500
9	EA	Water service	$ 3,000	$ 27,000

Project Costs		
Construction Costs (Subtotal)	$	122,600
Engineering 15 %	$	18,400
Construction Observation 12 %	$	14,800
Contingency 25 %	$	39,000
TOTAL	**$**	**195,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2034**
Total Project Cost:	**$141,000**

Project Title: South Disbrow Street water main

System: Water

Project Description

Replace the existing 4-inch water main running under and along South Disbrow Street from State Street south to the existing 6-inch water main north of Jefferson Street with 8-inch water main.

Project Justification/Benefit

The minimum water main size allowed in the current version of the Ten States Standards for Water Works in water systems providing fire protection is 6-inch. Increasing the existing 4-inch water main to 8-inch water main will help to increase the water flow rate for fire fighting efforts and can, in conjunction with other projects identified in the most recent Water Reliability Study, help to lower the Insurance Service Office (ISO) rating for the Village, which could lower insurance rates for Village residents.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	141,000
TOTAL	**$**	**141,000**

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Village of Cassopolis

Project Title: South Disbrow Street water main

Quantity	Unit of Measure	Item	Unit Price	Subtotal
485	LF	8-inch water main (including restoration)	$ 105	$ 50,925
2	EA	Cut and cap existing 4-inch water main	$ 450	$ 900
2	EA	Connect to existing 6-inch water main	$ 1,800	$ 3,600
1	EA	Hydrant, 6-inch service, 6-inch valve and valve box	$ 3,750	$ 3,750
8	EA	Water service	$ 3,000	$ 24,000

Project Costs		
Construction Costs (Subtotal)	$	83,200
Engineering 20 %	$	16,700
Construction Observation 15 %	$	12,500
Contingency 25 %	$	28,100
TOTAL	**$**	**141,000**

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Capital Improvement Plan

Village of Cassopolis

Project Year:	**2035**
Total Project Cost:	**$174,000**

Project Title: Irving Street and Silver Street water main

System: Water

Project Description

Construct an 8-inch water main along Irving Street starting at Depot Street and proceeding east to Silver Street. Continue constructing the 8-inch water main east along Silver Street to where it curves and joins State Street. Connect the new 8-inch water main to the 12-inch water main on State Street and the 8-inch water main on Depot Street. Abandon the existing 1-inch service lines stretching to Irving Street and Silver Street from State Street and run new services from the new water main.

Project Justification/Benefit

This will help to loop the water distribution system better in the vicinity of the elevated storage tank and will help reduce the potential for compaints of "stale" or "stagnant" water from water sitting in these long services for extended periods of time.

Project Funding Source

Drinking Water Revolving Fund Loan		
Bonds/Grants/Other Financing Source		
Assessments		
Water Fund	$	174,000
TOTAL	**$**	**174,000**

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Village of Cassopolis

Project Title: Irving Street and Silver Street water main

Quantity	Unit of Measure	Item	Unit Price	Subtotal
810	LF	8-inch water main (including restoration)	$ 105	$ 85,050
2	EA	8-inch valve and valve box	$ 1,800	$ 3,600
1	EA	Connect to existing 8-inch water main	$ 2,300	$ 2,300
1	EA	Connect to existing 12-inch water main	$ 5,000	$ 5,000
2	EA	Hydrant, 6-inch service, 6-inch valve and valve box	$ 3,750	$ 7,500
2	EA	Water service	$ 3,000	$ 6,000

Project Costs		
Construction Costs (Subtotal)	$	109,500
Engineering 15 %	$	16,500
Construction Observation 12 %	$	13,200
Contingency 25 %	$	34,800
TOTAL	**$**	**174,000**

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Year	Project	Total	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
2018	Clean and paint exposed piping for Well 4	$3,000	$ 3,000											
2018	Construction of a new DPW Building - Phase 1	$375,000	$ 375,000											
2018	Hydrant replacement	$19,000	$ 19,000											
2018	New large service water meters	$80,000	$ 80,000											
2018	New water service meters	$20,000	$ 20,000											
2018	Planning for a new DPW building	$10,000	$ 10,000											
2018	Replace long water services in areas that now have water mai	$38,000	$ 38,000											
2018	Replacing inventory of spare parts	$5,000	$ 5,000											
2018	Update Reliability Study and develop a water main flushing pro	$24,000	$ 24,000											
2019	Broadway St. water service transfer	$66,000		$ 67,320										
2019	Construction of a new DPW Building - Phase 2	$375,000		$ 382,500										
2019	Replace chemical feed equipment - 2019	$31,000		$ 31,620										
2019	Replace the controls for the Wells and the Elevated Storage T	$75,000		$ 76,500										
2019	Replace the moling machine and air compressor	$35,000		$ 35,700										
2019	Replace the soft start for Well 5	$7,000		$ 7,140										
2019	Replace the VFD for Well 4	$7,000		$ 7,140										
2020	Clean and paint exposed piping for Well 5	$3,000			$ 3,121									
2020	Graham Street water main	$311,000			$ 323,564									
2021	South Rowland Street water main	$168,000				$ 178,283								
2022	North Rowland Street water main	$309,000					$ 334,472							
2023	North Fulton Street water main	$201,000						$ 221,920						
2024	East York Street water main	$177,000							$ 199,331					
2024	Well house maintenance - new roof	$45,000							$ 50,677					
2025	North East Street water main - north half	$196,000								$ 225,142				
2026	Darwin Street water main	$230,000									$ 269,482			
2027	North East Street water main - south half	$212,000										$ 253,360		
2029	Replace backup generator for Wells 4 and 5	$83,000												$ 103,200
2029	Replace chemical feed equipment - 2029	$10,000												$ 12,434
2030	South East Street and Jefferson Street water main	$525,000												
2031	Johnson Street, Maple Street, and Park Shore water main	$325,000												
2032	School Street water main	$156,000												
2033	North First Street water main	$195,000												
2034	South Disbrow Street water main	$141,000												
2035	Irving Street and Silver Street water main	$174,000												
	Subtotal of Non-Inflated Costs =		$ 574,000	$ 596,000	$ 314,000	$ 168,000	$ 309,000	$ 201,000	$ 222,000	$ 196,000	$ 230,000	$ 212,000	$ -	$ 93,000
	Inflation Adjusted Subtotal =		$ 574,000	$ 607,920	$ 326,686	$ 178,283	$ 334,472	$ 221,920	$ 250,008	$ 225,142	$ 269,482	$ 253,360	$ -	$ 115,634
	Total CIP =		**$ 574,000**	**$ 608,000**	**$ 327,000**	**$ 179,000**	**$ 335,000**	**$ 222,000**	**$ 251,000**	**$ 226,000**	**$ 270,000**	**$ 254,000**	**$ -**	**$ 116,000**

Assumptions:

1) Inflation Factor:	2.0%	1.00000	1.02000	1.04040	1.06121	1.08243	1.10408	1.12616	1.14869	1.17166	1.19509	1.21899	1.24337

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CAPITAL IMPROVEMENT PLAN

Year	Project	Total	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	Totals
2018	Clean and paint exposed piping for Well 4	$3,000											$ 3,000
2018	Construction of a new DPW Building - Phase 1	$375,000											$ 375,000
2018	Hydrant replacement	$19,000											$ 19,000
2018	New large service water meters	$80,000											$ 80,000
2018	New water service meters	$20,000											$ 20,000
2018	Planning for a new DPW building	$10,000											$ 10,000
2018	Replace long water services in areas that now have water mai	$38,000											$ 38,000
2018	Replacing inventory of spare parts	$5,000											$ 5,000
2018	Update Reliability Study and develop a water main flushing pro	$24,000											$ 24,000
2019	Broadway St. water service transfer	$66,000											$ 67,320
2019	Construction of a new DPW Building - Phase 2	$375,000											$ 382,500
2019	Replace chemical feed equipment - 2019	$31,000											$ 31,620
2019	Replace the controls for the Wells and the Elevated Storage T	$75,000											$ 76,500
2019	Replace the moling machine and air compressor	$35,000											$ 35,700
2019	Replace the soft start for Well 5	$7,000											$ 7,140
2019	Replace the VFD for Well 4	$7,000											$ 7,140
2020	Clean and paint exposed piping for Well 5	$3,000											$ 3,121
2020	Graham Street water main	$311,000											$ 323,564
2021	South Rowland Street water main	$168,000											$ 178,283
2022	North Rowland Street water main	$309,000											$ 334,472
2023	North Fulton Street water main	$201,000											$ 221,920
2024	East York Street water main	$177,000											$ 199,331
2024	Well house maintenance - new roof	$45,000											$ 50,677
2025	North East Street water main - north half	$196,000											$ 225,142
2026	Darwin Street water main	$230,000											$ 269,482
2027	North East Street water main - south half	$212,000											$ 253,360
2029	Replace backup generator for Wells 4 and 5	$83,000											$ 103,200
2029	Replace chemical feed equipment - 2029	$10,000											$ 12,434
2030	South East Street and Jefferson Street water main	$525,000	$ 665,827										$ 665,827
2031	Johnson Street, Maple Street, and Park Shore water main	$325,000		$ 420,422									$ 420,422
2032	School Street water main	$156,000			$ 205,839								$ 205,839
2033	North First Street water main	$195,000				$ 262,444							$ 262,444
2034	South Disbrow Street water main	$141,000					$ 193,563						$ 193,563
2035	Irving Street and Silver Street water main	$174,000						$ 243,642					$ 243,642
	Subtotal of Non-Inflated Costs =		$ 525,000	$ 325,000	$ 156,000	$ 195,000	$ 141,000	$ 174,000	$ -	$ -	$ -	$ -	$ 4,631,000
	Inflation Adjusted Subtotal =		$ 665,827	$ 420,422	$ 205,839	$ 262,444	$ 193,563	$ 243,642	$ -	$ -	$ -	$ -	$ 5,348,643
	Total CIP =		**$ 666,000**	**$ 421,000**	**$ 206,000**	**$ 263,000**	**$ 194,000**	**$ 244,000**	**$ -**	**$ -**	**$ -**	**$ -**	**$ 5,356,000**

Assumptions:

1) Inflation Factor:	2.0%	1.26824	1.29361	1.31948	1.34587	1.37279	1.40024	1.42825	1.45681	1.48595	1.51567

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Appendix E

Detailed Rate Analysis

Village of Cassopolis (Michigan) Water Fund

Comparative Statement of Net Position

	As of				
	6/30/2013	6/30/2014	6/30/2015	6/30/2016	6/30/2017
	(---------- Per Audit ----------)				
Assets					
Current Assets					
Cash and cash equivalents	$ 329,414	$ 401,300	$ 423,292	$ 541,916	$ 659,811
Accounts receivable	$ 33,795	$ 44,807	$ 40,583	$ 45,892	$ 37,355
Due from State	$ -	$ -	$ -	$ -	$ -
Due from Federal	$ -	$ -	$ -	$ -	$ -
Due from other governments	$ -	$ -	$ -	$ -	$ -
Prepaid expenses	$ -	$ -	$ 2,769	$ 3,417	$ 3,342
Total Current Assets	*$ 363,209*	*$ 446,107*	*$ 466,644*	*$ 591,225*	*$ 700,508*
Noncurrent Assets					
Restricted Cash	$ 64,370	$ 64,419	$ 64,467	$ 64,486	$ 64,564
Capital assets - Nondepreciating	$ 34,483	$ 34,483	$ 34,483	$ 34,483	$ 34,483
Capital assets - Depreciating	$ 1,922,432	$ 1,840,913	$ 1,755,154	$ 1,671,973	$ 1,589,272
Total Noncurrent Assets	*$ 2,021,285*	*$ 1,939,815*	*$ 1,854,104*	*$ 1,770,942*	*$ 1,688,319*
Total Assets	***$ 2,384,494***	***$ 2,385,922***	***$ 2,320,748***	***$ 2,362,167***	***$ 2,388,827***
Liabilities					
Current Liabilities					
Accounts payable	$ 2,132	$ 8,621	$ 2,548	$ 23,197	$ 3,370
Accrued liabilities	$ 2,164	$ 3,295	$ -	$ 2,702	$ 2,067
Deposits payable	$ 18,029	$ 19,589	$ 19,523	$ 20,355	$ 15,555
Interest payable	$ 19,575	$ 18,405	$ 17,978	$ 17,978	$ 17,066
Due to other funds	$ -	$ -	$ -	$ -	$ -
Total Current Liabilities	*$ 41,900*	*$ 49,910*	*$ 40,049*	*$ 64,232*	*$ 38,058*
Noncurrent Liabilities					
Installment purchase agreements due 1 yr.	$ -	$ -	$ -	$ -	$ -
Bonds payable - Due within 1 year	$ 18,000	$ 20,000	$ 20,000	$ 21,000	$ 22,000
Bonds payable - Due in more than 1 year	$ 743,000	$ 723,000	$ 703,000	$ 682,000	$ 660,000
Vested employee benefits	$ 4,354	$ 5,752	$ -	$ -	$ -
Vested emp. benefits - Due within 1 year	$ -	$ -	$ 2,450	$ 3,000	$ 2,000
Vested emp. benefits - Due in > 1 year	$ -	$ -	$ 4,900	$ 768	$ 574
Total Noncurrent Liabilities	*$ 765,354*	*$ 748,752*	*$ 730,350*	*$ 706,768*	*$ 684,574*
Total Liabilities	***$ 807,254***	***$ 798,662***	***$ 770,399***	***$ 771,000***	***$ 722,632***
Net Position					
Net Investment in Capital Assets	$ 1,195,915	$ 1,132,396	$ 1,066,637	$ 1,003,456	$ 941,755
Restricted for Debt Service	$ 64,370	$ 64,419	$ 64,467	$ 64,486	$ 64,564
Unrestricted	$ 316,955	$ 390,445	$ 419,245	$ 523,225	$ 659,876
Total Net Position	**$ 1,577,240**	**$ 1,587,260**	**$ 1,550,349**	**$ 1,591,167**	**$ 1,666,195**

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Village of Cassopolis (Michigan) Water Fund

Comparative Statement of Revenues, Expenses, and Changes in Net Position

	Fiscal Year Ended				
	6/30/2013	6/30/2014	6/30/2015	6/30/2016	6/30/2017
	(---------- Per Audit ----------)				
Operating Income (Loss)					
Operating Revenues					
Charges for services	$ 395,898	$ 403,584	$ 419,008	$ 456,820	$ 491,699
Total operating revenues	*$ 395,898*	*$ 403,584*	*$ 419,008*	*$ 456,820*	*$ 491,699*
Operating Expenses					
Wages and fringes	$ 129,894	$ 134,996	$ 166,127	$ 147,668	$ 175,066
Operating expenses	$ 15,451	$ 23,130	$ 17,774	$ 16,481	$ 18,194
Repairs and maintenance	$ 369	$ 34,509	$ 34,586	$ 13,984	$ 13,633
Contracted services	$ 27,121	$ 23,420	$ 39,984	$ 57,841	$ 41,745
Utilities	$ 18,810	$ 20,876	$ 21,165	$ 21,140	$ 19,855
Insurance	$ 1,121	$ 1,121	$ 1,177	$ 1,340	$ 1,319
Vehicle Rental	$ 19,784	$ 21,941	$ 37,607	$ 20,775	$ 12,026
Depreciation	$ 99,858	$ 102,820	$ 104,549	$ 106,190	$ 106,611
Total operating expenses	$ 312,408	$ 362,813	$ 422,969	$ 385,419	$ 388,449
Net Operating Income (Loss)	***$ 83,490***	***$ 40,771***	***$ (3,961)***	***$ 71,401***	***$ 103,250***
Non-Operating Income (Expenses)					
Non-Operating Revenues					
Federal Grant	$ -	$ -	$ -	$ -	$ -
State Grant	$ -	$ -	$ -	$ -	$ -
Contributions from local units	$ -	$ -	$ -	$ -	$ -
Interest earned on investments	$ 2,535	$ 2,324	$ 58	$ 1,952	$ 2,502
Total non-operating revenues	*$ 2,535*	*$ 2,324*	*$ 58*	*$ 1,952*	*$ 2,502*
Non-Operating Expenses					
Interest expense	$ 35,055	$ 33,075	$ 33,008	$ 32,535	$ 30,724
Total non-operating revenues	*$ 35,055*	*$ 33,075*	*$ 33,008*	*$ 32,535*	*$ 30,724*
Net Non-Operating Income (Loss)	***$ (32,520)***	***$ (30,751)***	***$ (32,950)***	***$ (30,583)***	***$ (28,222)***
Income (Loss) Before Transfers	***$ 50,970***	***$ 10,020***	***$ (36,911)***	***$ 40,818***	***$ 75,028***
Transfers					
Transfers in	$ -	$ -	$ -	$ -	$ -
Transfers out	$ -	$ -	$ -	$ -	$ -
Total Transfers	$ -	$ -	$ -	$ -	$ -
Change in Net Position					
Total Change In Net Position	**$ 50,970**	**$ 10,020**	**$ (36,911)**	**$ 40,818**	**$ 75,028**
Net Position, Beginning of Year	**$ 1,526,270**	**$ 1,577,240**	**$ 1,587,260**	**$ 1,550,349**	**$ 1,591,167**
Prior Period Adjustment	*$ -*	*$ -*	*$ -*	*$ -*	*$ -*
Net Position, End of Year	**$ 1,577,240**	**$ 1,587,260**	**$ 1,550,349**	**$ 1,591,167**	**$ 1,666,195**

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Village of Cassopolis (Michigan) Water Fund

Schedule of 2017/18 Budgeted Operating Revenues and Expenses

		Fiscal Year Ended 6/30/2015 (Activity)	6/30/2016 (Activity)	6/30/2017 (Activity)	6/30/2018 (Budget)
Fund 591 - Water		(---------- Per Village ----------)			
Revenues					
Department 000 - Non-Departmentalized					
591-000-643.000	Connection Charges	$ 11,192	$ -	$ -	$ -
591-000-645.000	Water Revenue	$ 334,430	$ 381,472	$ 405,029	$ 400,000
591-000647.000	Water Penalties	$ 15,845	$ 17,863	$ 14,615	$ 17,000
591-000-648.000	Ready to Serve Fee	$ 55,390	$ 55,587	$ 56,393	$ 86,000
591-000-664.000	Interest on Investments	$ 58	$ 1,952	$ 2,502	$ 2,000
591-000-671.001	Miscellaneous	$ 2,151	$ 1,713	$ 9,432	$ 1,500
590-000-671.007	Sale of Supplies	$ -	$ 185	$ -	$ -
591-000-676.000	Reimbursements/Refunds	$ -	$ -	$ -	$ -
591-000-687.000	Insurance Refund	$ -	$ -	$ 6,230	$ -
591-000-699.000	Transfer in	$ -	$ -	$ -	$ -
Total for Department 000 - Non-Departmentalized		*$ 419,066*	*$ 458,771*	*$ 494,201*	*$ 506,500*
TOTAL REVENUES		**$ 419,066**	**$ 458,771**	**$ 494,201**	**$ 506,500**
Expenses					
Department 537 - Water					
591-537-702.000	Salaries: Department Head	$ 11,337	$ 11,713	$ 13,291	$ 12,900
591-537-703.000	Wages	$ 52,714	$ 52,702	$ 63,041	$ 53,072
591-537-707.000	Salary: Village Manager	$ 22,461	$ 10,516	$ 19,579	$ 22,500
591-537-708.000	Village Clerk Salary	$ 18,962	$ 16,026	$ 19,489	$ 20,000
591-537-715.000	Social Security	$ 6,867	$ 6,635	$ 9,094	$ 8,691
591-537-716.000	Health/Life Insurance	$ 46,134	$ 42,303	$ 39,468	$ 42,614
591-537-717.000	Short & Long Term Disability	$ 1,464	$ 1,909	$ 2,163	$ 2,379
591-537-720.000	Longevity Pay	$ 813	$ 812	$ 1,237	$ 775
591-537-721.000	Worker's Compensation	$ 1,987	$ 1,304	$ 2,544	$ 2,235
591-537-722.000	Retirement	$ 3,390	$ 3,748	$ 5,162	$ 5,011
591-537-727.000	Office Supplies	$ 4,703	$ 759	$ 1,100	$ 600
591-537-757.000	Operating Supplies	$ 7,275	$ 6,843	$ 7,092	$ 6,000
591-537-792.000	Gas & Oil	$ 373	$ 605	$ -	$ -
591-537-800.100	Bank Fees	$ -	$ -	$ -	$ -
591-537-802.000	Auditing Fee	$ 2,484	$ 2,986	$ 1,761	$ 1,800
591-537-804.000	Legal Fees	$ -	$ -	$ 58	$ 16,990
591-537-805.000	Dues/Entertainment	$ -	$ 193	$ 787	$ 200
591-537-806.000	Contracted Services	$ 21,405	$ 46,126	$ 40,145	$ 53,000
591-537-806.120	Well Head Protection Program	$ 4,250	$ -	$ -	$ -
591-537-807.000	Miss Dig	$ 115	$ 444	$ 183	$ 500
591-537-818.000	Liability and Bldg. Insurance	$ 1,177	$ 1,340	$ 1,319	$ 1,360
591-537-820.000	Uniform Service	$ 1,495	$ 1,142	$ 1,768	$ 1,500
591-537-826.000	Testing	$ 1,084	$ 993	$ 700	$ 1,000
591-537-831.000	Engineering Fees	$ 11,845	$ 8,511	$ -	$ 4,000
591-537-851.000	Telephone	$ 1,870	$ 1,934	$ 2,758	$ 3,500
591-537-852.000	Cell Phone	$ 1,293	$ 1,377	$ 1,415	$ 1,500
591-537-872.000	Travel Expenses	$ -	$ 1,594	$ 27	$ 200
591-537-901.000	Printing and Publications	$ -	$ -	$ 255	$ -
591-537-921.000	Electricity and Heat	$ 17,629	$ 17,224	$ 15,682	$ 15,000
591-537-933.000	Equipment Maintenance & Repair	$ 34,586	$ 13,984	$ 13,633	$ 29,994
591-537-940.000	Equipment Rental	$ 37,607	$ 20,775	$ 12,026	$ 22,578
591-537-956.000	Miscellaneous/Activities	$ 318	$ 718	$ 699	$ 500
591-537-959.000	Conferences and Conventions	$ 305	$ 440	$ 1,165	$ 1,000
591-537-959.100	Training	$ 1,351	$ 994	$ 1,082	$ 1,000
591-537-960.000	Postage	$ -	$ 1,878	$ 2,057	$ 1,800
591-537-963.000	Resource Management Fee	$ -	$ -	$ 1,279	$ 1,300
591-537-968.000	Depreciation of Fixed Assets	$ 104,549	$ 106,190	$ 106,611	$ 107,000
591-537-977.000	New Equipment	$ 1,128	$ 483	$ -	$ -
Totals for Department 537 - Water		*$ 422,969*	*$ 385,200*	*$ 388,668*	*$ 442,498*
Department 906 - Debt Service					
591-906-993.000	Rural Dev. Bond Principal Payment	$ -	$ -	$ -	$ 22,000
591-906-997.000	Rural Dev. Bond Interest Payment	$ 33,008	$ 32,535	$ 30,724	$ 33,165
Totals for Department 906 - Debt Service		*$ 33,008*	*$ 32,535*	*$ 30,724*	*$ 55,165*
TOTAL EXPENSES		**$ 455,977**	**$ 417,735**	**$ 419,391**	**$ 497,663**
Net Of Revenues/Expenses - Fund 591		**$ (36,911)**	**$ 41,036**	**$ 74,811**	**$ 8,837**
Beginning Fund Balance		$ 1,582,467	$ 1,550,349	$ 1,591,386	$ 1,666,198
Fund Balance Adjustments		$ 4,793	$ -	$ -	$ -
Ending Fund Balance		**$ 1,550,349**	**$ 1,591,386**	**$ 1,666,198**	**$ 1,675,035**

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Village of Cassopolis (Michigan) Water Fund

Schedule of 2017/18 Budgeted Operating Expenses and Test Year Adjustments

		2017/18 Budget (Per Village)	Adjustments (Per Village)		Test Year
Fund 591 - Water					
Operating Expenses					
Department 537 - Water					
591-537-702.000	Salaries: Department Head	$ 12,900	$ 387	[1]	$ 13,287
591-537-703.000	Wages	$ 53,072	$ 1,592	[1]	$ 54,664
591-537-707.000	Salary: Village Manager	$ 22,500	$ 675	[1]	$ 23,175
591-537-708.000	Village Clerk Salary	$ 20,000	$ 600	[1]	$ 20,600
591-537-715.000	Social Security	$ 8,691	$ -		$ 8,691
591-537-716.000	Health/Life Insurance	$ 42,614	$ 1,280	[2]	$ 43,894
591-537-717.000	Short & Long Term Disability	$ 2,379	$ 70	[2]	$ 2,449
591-537-720.000	Longevity Pay	$ 775	$ -		$ 775
591-537-721.000	Worker's Compensation	$ 2,235	$ (200)	[3]	$ 2,035
591-537-722.000	Retirement	$ 5,011	$ 570	[1]	$ 5,581
591-537-727.000	Office Supplies	$ 600	$ -		$ 600
591-537-757.000	Operating Supplies	$ 6,000	$ 1,000	[4]	$ 7,000
591-537-792.000	Gas & Oil	$ -	$ -		$ -
591-537-800.100	Bank Fees	$ -	$ -		$ -
591-537-802.000	Auditing Fee	$ 1,800	$ -		$ 1,800
591-537-804.000	Legal Fees	$ 16,990	$ (16,990)	[5]	$ -
591-537-805.000	Dues/Entertainment	$ 200	$ -		$ 200
591-537-806.000	Contracted Services	$ 53,000	$ -		$ 53,000
591-537-806.120	Well Head Protection Program	$ -	$ -		$ -
591-537-807.000	Miss Dig	$ 500	$ -		$ 500
591-537-818.000	Liability and Bldg. Insurance	$ 1,360	$ 41	[6]	$ 1,401
591-537-820.000	Uniform Service	$ 1,500	$ -		$ 1,500
591-537-826.000	Testing	$ 1,000	$ -		$ 1,000
591-537-831.000	Engineering Fees	$ 4,000	$ -		$ 4,000
591-537-851.000	Telephone	$ 3,500	$ (500)	[7]	$ 3,000
591-537-852.000	Cell Phone	$ 1,500	$ 500	[7]	$ 2,000
591-537-872.000	Travel Expenses	$ 200	$ -		$ 200
591-537-901.000	Printing and Publications	$ -	$ 50	[8]	$ 50
591-537-921.000	Electricity and Heat	$ 15,000	$ 3,000	[9]	$ 18,000
591-537-933.000	Equipment Maintenance & Repair	$ 29,994	$ (9,994)	[10]	$ 20,000
591-537-940.000	Equipment Rental	$ 22,578	$ 422	[11]	$ 23,000
591-537-956.000	Miscellaneous/Activities	$ 500	$ -		$ 500
591-537-959.000	Conferences and Conventions	$ 1,000	$ 500	[12]	$ 1,500
591-537-959.100	Training	$ 1,000	$ 500	[12]	$ 1,500
591-537-960.000	Postage	$ 1,800	$ 200	[13]	$ 2,000
591-537-963.000	Resource Management Fee	$ 1,300	$ -		$ 1,300
591-537-968.000	Depreciation of Fixed Assets	$ 107,000	$ (107,000)	[14]	$ -
591-537-977.000	New Equipment	$ -	$ -		$ -
Total Operation & Maintenance - Water		**$ 442,498**	**$ (123,297)**		**$ 319,201**

[1] Accounting for possible raises in salaries and benefits for 2018.
[2] To account for potential rate increases in December 2018.
[3] Received a substantial decrease in the 2018 renewal.
[4] 2017/18 was budgeted to be a low year for Operating Supplies. Should be closer to $7,000 per year on average.
[5] Had a litigation issue that has since been settled and should not be accounted for in the test year.
[6] 3% increase each year on average.
[7] To account for tablets and other field devices being on data plans, which were originally in the "Telephone" account.
[8] Village does publish things on occasion. They just didn't have any planned publications in 2017/18 budget year.
[9] Energy costs had decreased and the budget had been lowered. They have been increasing steadily the last few years.
[10] Extra equipment repair in the 2017/18 budget year to account for repairs to the vactor truck.
[11] Fluctuates year to year. $23,000 is the average for the last few years.
[12] The DPW is anticipating sending more employees to conferences and on-going training as they become licensed.
[13] Accounting for postage increases.
[14] Depreciation expenses are removed from this report as this study is performed on the cash basis.

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Village of Cassopolis (Michigan) Water Fund

Projected Operating Expenses

		Fiscal Year Ended 6/30/2015	6/30/2016	6/30/2017	Budgeted 2017/18		Test Year	Inflation Multiplier	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26
Fund 591 - Water			(---------- Per Village ----------)													
Operating Expenses																
Department 537 - Water																
591-537-702.000	Salaries: Department Head	$ 11,337	$ 11,713	$ 13,291	$ 12,900	[1]	$ 13,287	3.0%	$ 13,686	$ 14,096	$ 14,519	$ 14,955	$ 15,403	$ 15,865	$ 16,341	$ 16,832
591-537-703.000	Wages	$ 52,714	$ 52,702	$ 63,041	$ 53,072	[1]	$ 54,664	3.0%	$ 56,304	$ 57,993	$ 59,733	$ 61,525	$ 63,371	$ 65,272	$ 67,230	$ 69,247
591-537-707.000	Salary: Village Manager	$ 22,461	$ 10,516	$ 19,579	$ 22,500	[1]	$ 23,175	3.0%	$ 23,870	$ 24,586	$ 25,324	$ 26,084	$ 26,866	$ 27,672	$ 28,502	$ 29,357
591-537-708.000	Village Clerk Salary	$ 18,962	$ 16,026	$ 19,489	$ 20,000	[1]	$ 20,600	3.0%	$ 21,218	$ 21,855	$ 22,510	$ 23,185	$ 23,881	$ 24,597	$ 25,335	$ 26,095
591-537-715.000	Social Security	$ 6,867	$ 6,635	$ 9,094	$ 8,691		$ 8,691	3.0%	$ 8,952	$ 9,220	$ 9,497	$ 9,782	$ 10,075	$ 10,377	$ 10,689	$ 11,009
591-537-716.000	Health/Life Insurance	$ 46,134	$ 42,303	$ 39,468	$ 42,614	[2]	$ 43,894	3.0%	$ 45,211	$ 46,567	$ 47,964	$ 49,403	$ 50,885	$ 52,411	$ 53,984	$ 55,603
591-537-717.000	Short & Long Term Disability	$ 1,464	$ 1,909	$ 2,163	$ 2,379	[2]	$ 2,449	3.0%	$ 2,523	$ 2,598	$ 2,676	$ 2,756	$ 2,839	$ 2,924	$ 3,012	$ 3,102
591-537-720.000	Longevity Pay	$ 813	$ 812	$ 1,237	$ 775		$ 775	2.0%	$ 791	$ 806	$ 822	$ 839	$ 856	$ 873	$ 890	$ 908
591-537-721.000	Worker's Compensation	$ 1,987	$ 1,304	$ 2,544	$ 2,235	[3]	$ 2,035	2.0%	$ 2,076	$ 2,117	$ 2,160	$ 2,203	$ 2,247	$ 2,292	$ 2,338	$ 2,384
591-537-722.000	Retirement	$ 3,390	$ 3,748	$ 5,162	$ 5,011	[1]	$ 5,581	2.0%	$ 5,692	$ 5,806	$ 5,922	$ 6,041	$ 6,161	$ 6,285	$ 6,410	$ 6,539
591-537-727.000	Office Supplies	$ 4,703	$ 759	$ 1,100	$ 600		$ 600	2.0%	$ 612	$ 624	$ 637	$ 649	$ 662	$ 676	$ 689	$ 703
591-537-757.000	Operating Supplies	$ 7,275	$ 6,843	$ 7,092	$ 6,000	[4]	$ 7,000	2.0%	$ 7,140	$ 7,283	$ 7,428	$ 7,577	$ 7,729	$ 7,883	$ 8,041	$ 8,202
591-537-792.000	Gas & Oil	$ 373	$ 605	$ -	$ -		$ -	2.0%	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
591-537-800.100	Bank Fees	$ -	$ -	$ -	$ -		$ -	2.0%	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
591-537-802.000	Auditing Fee	$ 2,484	$ 2,986	$ 1,761	$ 1,800		$ 1,800	2.0%	$ 1,836	$ 1,873	$ 1,910	$ 1,948	$ 1,987	$ 2,027	$ 2,068	$ 2,109
591-537-804.000	Legal Fees	$ -	$ -	$ 58	$ 16,990	[5]	$ -	2.0%	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
591-537-805.000	Dues/Entertainment	$ -	$ 193	$ 787	$ 200		$ 200	2.0%	$ 204	$ 208	$ 212	$ 216	$ 221	$ 225	$ 230	$ 234
591-537-806.000	Contracted Services	$ 21,405	$ 46,126	$ 40,145	$ 53,000		$ 53,000	2.0%	$ 54,060	$ 55,141	$ 56,244	$ 57,369	$ 58,516	$ 59,687	$ 60,880	$ 62,098
591-537-806.120	Well Head Protection Program	$ 4,250	$ -	$ -	$ -		$ -	2.0%	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
591-537-807.000	Miss Dig	$ 115	$ 444	$ 183	$ 500		$ 500	2.0%	$ 510	$ 520	$ 531	$ 541	$ 552	$ 563	$ 574	$ 586
591-537-818.000	Liability and Bldg. Insurance	$ 1,177	$ 1,340	$ 1,319	$ 1,360	[6]	$ 1,401	3.0%	$ 1,443	$ 1,486	$ 1,531	$ 1,577	$ 1,624	$ 1,673	$ 1,723	$ 1,774
591-537-820.000	Uniform Service	$ 1,495	$ 1,142	$ 1,768	$ 1,500		$ 1,500	2.0%	$ 1,530	$ 1,561	$ 1,592	$ 1,624	$ 1,656	$ 1,689	$ 1,723	$ 1,757
591-537-826.000	Testing	$ 1,084	$ 993	$ 700	$ 1,000		$ 1,000	2.0%	$ 1,020	$ 1,040	$ 1,061	$ 1,082	$ 1,104	$ 1,126	$ 1,149	$ 1,172
591-537-831.000	Engineering Fees	$ 11,845	$ 8,511	$ -	$ 4,000		$ 4,000	2.0%	$ 4,080	$ 4,162	$ 4,245	$ 4,330	$ 4,416	$ 4,505	$ 4,595	$ 4,687
591-537-851.000	Telephone	$ 1,870	$ 1,934	$ 2,758	$ 3,500	[7]	$ 3,000	2.0%	$ 3,060	$ 3,121	$ 3,184	$ 3,247	$ 3,312	$ 3,378	$ 3,446	$ 3,515
591-537-852.000	Cell Phone	$ 1,293	$ 1,377	$ 1,415	$ 1,500	[7]	$ 2,000	2.0%	$ 2,040	$ 2,081	$ 2,122	$ 2,165	$ 2,208	$ 2,252	$ 2,297	$ 2,343
591-537-872.000	Travel Expenses	$ -	$ 1,594	$ 27	$ 200		$ 200	2.0%	$ 204	$ 208	$ 212	$ 216	$ 221	$ 225	$ 230	$ 234
591-537-901.000	Printing and Publications	$ -	$ -	$ 255	$ -	[8]	$ 50	2.0%	$ 51	$ 52	$ 53	$ 54	$ 55	$ 56	$ 57	$ 59
591-537-921.000	Electricity and Heat	$ 17,629	$ 17,224	$ 15,682	$ 15,000	[9]	$ 18,000	2.0%	$ 18,360	$ 18,727	$ 19,102	$ 19,484	$ 19,873	$ 20,271	$ 20,676	$ 21,090
591-537-933.000	Equipment Maintenance & Repair	$ 34,586	$ 13,984	$ 13,633	$ 29,994	[10]	$ 20,000	2.0%	$ 20,400	$ 20,808	$ 21,224	$ 21,648	$ 22,081	$ 22,523	$ 22,973	$ 23,433
591-537-940.000	Equipment Rental	$ 37,607	$ 20,775	$ 12,026	$ 22,578	[11]	$ 23,000	2.0%	$ 23,460	$ 23,929	$ 24,407	$ 24,896	$ 25,394	$ 25,901	$ 26,419	$ 26,948
591-537-956.000	Miscellaneous/Activities	$ 318	$ 718	$ 699	$ 500		$ 500	2.0%	$ 510	$ 520	$ 531	$ 541	$ 552	$ 563	$ 574	$ 586
591-537-959.000	Conferences and Conventions	$ 305	$ 440	$ 1,165	$ 1,000	[12]	$ 1,500	2.0%	$ 1,530	$ 1,561	$ 1,592	$ 1,624	$ 1,656	$ 1,689	$ 1,723	$ 1,757
591-537-959.100	Training	$ 1,351	$ 994	$ 1,082	$ 1,000	[12]	$ 1,500	2.0%	$ 1,530	$ 1,561	$ 1,592	$ 1,624	$ 1,656	$ 1,689	$ 1,723	$ 1,757
591-537-960.000	Postage	$ -	$ 1,878	$ 2,057	$ 1,800	[13]	$ 2,000	2.0%	$ 2,040	$ 2,081	$ 2,122	$ 2,165	$ 2,208	$ 2,252	$ 2,297	$ 2,343
591-537-963.000	Resource Management Fee	$ -	$ -	$ 1,279	$ 1,300		$ 1,300	2.0%	$ 1,326	$ 1,353	$ 1,380	$ 1,407	$ 1,435	$ 1,464	$ 1,493	$ 1,523
591-537-968.000	Depreciation of Fixed Assets	$ 104,549	$ 106,190	$ 106,611	$ 107,000	[14]	$ -	2.0%	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
591-537-977.000	New Equipment	$ 1,128	$ 483	$ -	$ -		$ -	2.0%	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Totals for dept 537-Operation & Maintenance		**$ 422,969**	**$ 385,200**	**$ 388,668**	**$ 442,498**		**$ 319,201**		**$ 327,266**	**$ 335,544**	**$ 344,039**	**$ 352,757**	**$ 361,705**	**$ 370,888**	**$ 380,314**	**$ 389,988**

[1] Accounting for possible raises in salaries and benefits for 2018.
[2] To account for potential rate increases in December 2018.
[3] Received a substantial decrease in the 2018 renewal.
[4] 2017/18 was budgeted to be a low year for Operating Supplies. Should be closer to $7,000 per year on average.
[5] Had a litigation issue that has since been settled and should not be accounted for in the test year.
[6] 3% increase each year on average.
[7] To account for tablets and other field devices being on data plans, which were originally in the "Telephone" account.
[8] Village does publish things on occasion. They just didn't have any planned publications in 2017/18 budget year.
[9] Energy costs had decreased and the budget had been lowered. They have been increasing steadily the last few years.
[10] Extra equipment repair in the 2017/18 budget year to account for repairs to the vactor truck.
[11] Fluctuates year to year. $23,000 is the average for the last few years.
[12] The DPW is anticipating sending more employees to conferences and on-going training as they become licensed.
[13] Accounting for postage increases.
[14] Depreciation expenses are removed from this report as this study is performed on the cash basis.

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Village of Cassopolis (Michigan) Water Fund

Projected Operating Expenses (cont.)

		2026/27	2027/28	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39	2039/40
Fund 591 - Water															
Operating Expenses															
Department 537 - Water															
591-537-702.000	Salaries: Department Head	$ 17,337	$ 17,857	$ 18,392	$ 18,944	$ 19,512	$ 20,098	$ 20,701	$ 21,322	$ 21,961	$ 22,620	$ 23,299	$ 23,998	$ 24,718	$ 25,459
591-537-703.000	Wages	$ 71,324	$ 73,464	$ 75,668	$ 77,938	$ 80,276	$ 82,684	$ 85,165	$ 87,720	$ 90,352	$ 93,062	$ 95,854	$ 98,730	$ 101,691	$ 104,742
591-537-707.000	Salary: Village Manager	$ 30,238	$ 31,145	$ 32,080	$ 33,042	$ 34,033	$ 35,054	$ 36,106	$ 37,189	$ 38,305	$ 39,454	$ 40,638	$ 41,857	$ 43,112	$ 44,406
591-537-708.000	Village Clerk Salary	$ 26,878	$ 27,685	$ 28,515	$ 29,371	$ 30,252	$ 31,159	$ 32,094	$ 33,057	$ 34,049	$ 35,070	$ 36,122	$ 37,206	$ 38,322	$ 39,472
591-537-715.000	Social Security	$ 11,340	$ 11,680	$ 12,030	$ 12,391	$ 12,763	$ 13,146	$ 13,540	$ 13,946	$ 14,365	$ 14,796	$ 15,239	$ 15,697	$ 16,168	$ 16,653
591-537-716.000	Health/Life Insurance	$ 57,271	$ 58,989	$ 60,759	$ 62,582	$ 64,459	$ 66,393	$ 68,385	$ 70,437	$ 72,550	$ 74,726	$ 76,968	$ 79,277	$ 81,655	$ 84,105
591-537-717.000	Short & Long Term Disability	$ 3,196	$ 3,291	$ 3,390	$ 3,492	$ 3,597	$ 3,704	$ 3,816	$ 3,930	$ 4,048	$ 4,169	$ 4,294	$ 4,423	$ 4,556	$ 4,693
591-537-720.000	Longevity Pay	$ 926	$ 945	$ 964	$ 983	$ 1,003	$ 1,023	$ 1,043	$ 1,064	$ 1,085	$ 1,107	$ 1,129	$ 1,152	$ 1,175	$ 1,198
591-537-721.000	Worker's Compensation	$ 2,432	$ 2,481	$ 2,530	$ 2,581	$ 2,632	$ 2,685	$ 2,739	$ 2,794	$ 2,849	$ 2,906	$ 2,965	$ 3,024	$ 3,084	$ 3,146
591-537-722.000	Retirement	$ 6,669	$ 6,803	$ 6,939	$ 7,078	$ 7,219	$ 7,363	$ 7,511	$ 7,661	$ 7,814	$ 7,970	$ 8,130	$ 8,292	$ 8,458	$ 8,627
591-537-727.000	Office Supplies	$ 717	$ 731	$ 746	$ 761	$ 776	$ 792	$ 808	$ 824	$ 840	$ 857	$ 874	$ 892	$ 909	$ 928
591-537-757.000	Operating Supplies	$ 8,366	$ 8,533	$ 8,704	$ 8,878	$ 9,055	$ 9,236	$ 9,421	$ 9,609	$ 9,802	$ 9,998	$ 10,198	$ 10,402	$ 10,610	$ 10,822
591-537-792.000	Gas & Oil	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
591-537-800.100	Bank Fees	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
591-537-802.000	Auditing Fee	$ 2,151	$ 2,194	$ 2,238	$ 2,283	$ 2,328	$ 2,375	$ 2,423	$ 2,471	$ 2,520	$ 2,571	$ 2,622	$ 2,675	$ 2,728	$ 2,783
591-537-804.000	Legal Fees	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
591-537-805.000	Dues/Entertainment	$ 239	$ 244	$ 249	$ 254	$ 259	$ 264	$ 269	$ 275	$ 280	$ 286	$ 291	$ 297	$ 303	$ 309
591-537-806.000	Contracted Services	$ 63,340	$ 64,607	$ 65,899	$ 67,217	$ 68,561	$ 69,932	$ 71,331	$ 72,758	$ 74,213	$ 75,697	$ 77,211	$ 78,755	$ 80,330	$ 81,937
591-537-806.120	Well Head Protection Program	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
591-537-807.000	Miss Dig	$ 598	$ 609	$ 622	$ 634	$ 647	$ 660	$ 673	$ 686	$ 700	$ 714	$ 728	$ 743	$ 758	$ 773
591-537-818.000	Liability and Bldg. Insurance	$ 1,828	$ 1,883	$ 1,939	$ 1,997	$ 2,057	$ 2,119	$ 2,182	$ 2,248	$ 2,315	$ 2,385	$ 2,456	$ 2,530	$ 2,606	$ 2,684
591-537-820.000	Uniform Service	$ 1,793	$ 1,828	$ 1,865	$ 1,902	$ 1,940	$ 1,979	$ 2,019	$ 2,059	$ 2,100	$ 2,142	$ 2,185	$ 2,229	$ 2,273	$ 2,319
591-537-826.000	Testing	$ 1,195	$ 1,219	$ 1,243	$ 1,268	$ 1,294	$ 1,319	$ 1,346	$ 1,373	$ 1,400	$ 1,428	$ 1,457	$ 1,486	$ 1,516	$ 1,546
591-537-831.000	Engineering Fees	$ 4,780	$ 4,876	$ 4,973	$ 5,073	$ 5,174	$ 5,278	$ 5,383	$ 5,491	$ 5,601	$ 5,713	$ 5,827	$ 5,944	$ 6,063	$ 6,184
591-537-851.000	Telephone	$ 3,585	$ 3,657	$ 3,730	$ 3,805	$ 3,881	$ 3,958	$ 4,038	$ 4,118	$ 4,201	$ 4,285	$ 4,370	$ 4,458	$ 4,547	$ 4,638
591-537-852.000	Cell Phone	$ 2,390	$ 2,438	$ 2,487	$ 2,536	$ 2,587	$ 2,639	$ 2,692	$ 2,746	$ 2,800	$ 2,856	$ 2,914	$ 2,972	$ 3,031	$ 3,092
591-537-872.000	Travel Expenses	$ 239	$ 244	$ 249	$ 254	$ 259	$ 264	$ 269	$ 275	$ 280	$ 286	$ 291	$ 297	$ 303	$ 309
591-537-901.000	Printing and Publications	$ 60	$ 61	$ 62	$ 63	$ 65	$ 66	$ 67	$ 69	$ 70	$ 71	$ 73	$ 74	$ 76	$ 77
591-537-921.000	Electricity and Heat	$ 21,512	$ 21,942	$ 22,381	$ 22,828	$ 23,285	$ 23,751	$ 24,226	$ 24,710	$ 25,204	$ 25,708	$ 26,223	$ 26,747	$ 27,282	$ 27,828
591-537-933.000	Equipment Maintenance & Repair	$ 23,902	$ 24,380	$ 24,867	$ 25,365	$ 25,872	$ 26,389	$ 26,917	$ 27,455	$ 28,005	$ 28,565	$ 29,136	$ 29,719	$ 30,313	$ 30,919
591-537-940.000	Equipment Rental	$ 27,487	$ 28,037	$ 28,597	$ 29,169	$ 29,753	$ 30,348	$ 30,955	$ 31,574	$ 32,205	$ 32,849	$ 33,506	$ 34,176	$ 34,860	$ 35,557
591-537-956.000	Miscellaneous/Activities	$ 598	$ 609	$ 622	$ 634	$ 647	$ 660	$ 673	$ 686	$ 700	$ 714	$ 728	$ 743	$ 758	$ 773
591-537-959.000	Conferences and Conventions	$ 1,793	$ 1,828	$ 1,865	$ 1,902	$ 1,940	$ 1,979	$ 2,019	$ 2,059	$ 2,100	$ 2,142	$ 2,185	$ 2,229	$ 2,273	$ 2,319
591-537-959.100	Training	$ 1,793	$ 1,828	$ 1,865	$ 1,902	$ 1,940	$ 1,979	$ 2,019	$ 2,059	$ 2,100	$ 2,142	$ 2,185	$ 2,229	$ 2,273	$ 2,319
591-537-960.000	Postage	$ 2,390	$ 2,438	$ 2,487	$ 2,536	$ 2,587	$ 2,639	$ 2,692	$ 2,746	$ 2,800	$ 2,856	$ 2,914	$ 2,972	$ 3,031	$ 3,092
591-537-963.000	Resource Management Fee	$ 1,554	$ 1,585	$ 1,616	$ 1,649	$ 1,682	$ 1,715	$ 1,750	$ 1,785	$ 1,820	$ 1,857	$ 1,894	$ 1,932	$ 1,970	$ 2,010
591-537-968.000	Depreciation of Fixed Assets	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
591-537-977.000	New Equipment	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Totals for dept 537-Operation & Maintenance		**$ 399,918**	**$ 410,111**	**$ 420,573**	**$ 431,312**	**$ 442,336**	**$ 453,652**	**$ 465,269**	**$ 477,194**	**$ 489,436**	**$ 502,005**	**$ 514,907**	**$ 528,154**	**$ 541,755**	**$ 555,718**

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Village of Cassopolis (Michigan) Water Fund

Cash Flow Analysis

	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
Rates and Assumptions											
Anticipated Annual Growth Rate:	*0.40%*										
Ready-To-Serve Charges											
5/8" Water Meter Accounts	717	720	723	726	729	731	734	737	740	743	746
Ready-To-Serve Charge (per month)	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00
Rate Increase	*N/A*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
1" Water Meter Accounts	29	29	29	29	29	30	30	30	30	30	30
Ready-To-Serve Charge (per month)	$ 11.00	$ 11.00	$ 11.00	$ 11.00	$ 11.00	$ 11.00	$ 11.00	$ 11.00	$ 11.00	$ 11.00	$ 11.00
Rate Increase	*N/A*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
1-1/2" Water Meter Accounts	16	16	16	16	16	16	16	16	17	17	17
Ready-To-Serve Charge (per month)	$ 19.00	$ 19.00	$ 19.00	$ 19.00	$ 19.00	$ 19.00	$ 19.00	$ 19.00	$ 19.00	$ 19.00	$ 19.00
Rate Increase	*N/A*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
2" Water Meter Accounts	35	35	35	35	36	36	36	36	36	36	36
Ready-To-Serve Charge (per month)	$ 27.00	$ 27.00	$ 27.00	$ 27.00	$ 27.00	$ 27.00	$ 27.00	$ 27.00	$ 27.00	$ 27.00	$ 27.00
Rate Increase	*N/A*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
3" Water Meter Accounts	6	6	6	6	6	6	6	6	6	6	6
Ready-To-Serve Charge (per month)	$ 39.00	$ 39.00	$ 39.00	$ 39.00	$ 39.00	$ 39.00	$ 39.00	$ 39.00	$ 39.00	$ 39.00	$ 39.00
Rate Increase	*N/A*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
4" Water Meter Accounts	2	2	2	2	2	2	2	2	2	2	2
Ready-To-Serve Charge (per month)	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00
Rate Increase	*N/A*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Commodity Charges											
First 4,000 gallons of water per month (flat monthly rate)											
Regular water usage accounts (number of accounts)	613	615	618	620	623	625	628	630	633	635	638
Commodity Charge (flat rate for first 4,000 gallons/month)	$ 20.12	$ 21.13	$ 22.19	$ 23.30	$ 24.47	$ 25.69	$ 26.97	$ 27.51	$ 28.06	$ 28.62	$ 29.19
Water usage X2 accounts (number of accounts)	15	15	15	15	15	15	15	15	15	16	16
Commodity Charge (flat rate for first 4,000 gallons/month)	$ 40.24	$ 42.26	$ 44.38	$ 46.60	$ 48.94	$ 51.38	$ 53.94	$ 55.02	$ 56.12	$ 57.24	$ 58.38
Water usage X2 X2 accounts (number of accounts)	2	2	2	2	2	2	2	2	2	2	2
Commodity Charge (flat rate for first 4,000 gallons/month)	$ 40.24	$ 42.26	$ 44.38	$ 46.60	$ 48.94	$ 51.38	$ 53.94	$ 55.02	$ 56.12	$ 57.24	$ 58.38
Village water usage accounts (number of accounts)	1	1	1	1	1	1	1	1	1	1	1
Commodity Charge (flat rate for first 4,000 gallons/month)	$ 17.38	$ 17.38	$ 17.38	$ 17.38	$ 17.38	$ 17.38	$ 17.38	$ 17.38	$ 17.38	$ 17.38	$ 17.38
Annual Commodity Charge Increase	*N/A*	*5.00%*	*5.00%*	*5.00%*	*5.00%*	*5.00%*	*5.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*
Excess 1,000's of gallons used annually (by category)											
Regular water usage accounts (excess 1,000 gallons annually)	41,365	41,530	41,697	41,863	42,031	42,199	42,368	42,537	42,707	42,878	43,050
Commodity Charge (per excess 1,000 gallons)	$ 5.87	$ 6.16	$ 6.47	$ 6.79	$ 7.13	$ 7.49	$ 7.86	$ 8.02	$ 8.18	$ 8.34	$ 8.51
Water usage X2 accounts (excess 1,000 gallons annually)	43	43	43	44	44	44	44	44	44	45	45
Commodity Charge (per excess 1,000 gallons)	$ 5.87	$ 6.16	$ 6.47	$ 6.79	$ 7.13	$ 7.49	$ 7.86	$ 8.02	$ 8.18	$ 8.34	$ 8.51
Water usage X2 X2 accounts (excess 1,000 gallons annually)	315	316	317	318	320	321	322	323	325	326	327
Commodity Charge (per excess 1,000 gallons)	$ 11.74	$ 12.32	$ 12.94	$ 13.58	$ 14.26	$ 14.98	$ 15.72	$ 16.04	$ 16.36	$ 16.68	$ 17.02
Village water usage accounts (excess 1,000 gallons annually)	262	263	264	265	266	267	268	269	270	271	272
Commodity Charge (per excess 1,000 gallons)	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60
Annual Commodity Charge Increase	*N/A*	*5.00%*	*5.00%*	*5.00%*	*5.00%*	*5.00%*	*5.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*

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Village of Cassopolis (Michigan) Water Fund

Cash Flow Analysis (cont.)

	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39
Rates and Assumptions											
Anticipated Annual Growth Rate: *0.40%*											
Ready-To-Serve Charges											
5/8" Water Meter Accounts	749	752	755	758	761	764	767	770	773	777	780
Ready-To-Serve Charge (per month)	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00	$ 7.00
Rate Increase	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
1" Water Meter Accounts	30	30	31	31	31	31	31	31	31	31	32
Ready-To-Serve Charge (per month)	$ 11.00	$ 11.00	$ 11.00	$ 11.00	$ 11.00	$ 11.00	$ 11.00	$ 11.00	$ 11.00	$ 11.00	$ 11.00
Rate Increase	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
1-1/2" Water Meter Accounts	17	17	17	17	17	17	17	17	17	17	17
Ready-To-Serve Charge (per month)	$ 19.00	$ 19.00	$ 19.00	$ 19.00	$ 19.00	$ 19.00	$ 19.00	$ 19.00	$ 19.00	$ 19.00	$ 19.00
Rate Increase	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
2" Water Meter Accounts	37	37	37	37	37	37	37	38	38	38	38
Ready-To-Serve Charge (per month)	$ 27.00	$ 27.00	$ 27.00	$ 27.00	$ 27.00	$ 27.00	$ 27.00	$ 27.00	$ 27.00	$ 27.00	$ 27.00
Rate Increase	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
3" Water Meter Accounts	6	6	6	6	6	6	6	6	6	6	7
Ready-To-Serve Charge (per month)	$ 39.00	$ 39.00	$ 39.00	$ 39.00	$ 39.00	$ 39.00	$ 39.00	$ 39.00	$ 39.00	$ 39.00	$ 39.00
Rate Increase	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
4" Water Meter Accounts	2	2	2	2	2	2	2	2	2	2	2
Ready-To-Serve Charge (per month)	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00	$ 75.00
Rate Increase	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*	*0.00%*
Commodity Charges											
First 4,000 gallons of water per month (flat monthly rate)											
Regular water usage accounts (number of accounts)	641	643	646	648	651	653	656	659	661	664	667
Commodity Charge (flat rate for first 4,000 gallons/month)	$ 29.77	$ 30.37	$ 30.98	$ 31.60	$ 32.23	$ 32.87	$ 33.53	$ 34.20	$ 34.88	$ 35.58	$ 36.29
Water usage X2 accounts (number of accounts)	16	16	16	16	16	16	16	16	16	16	16
Commodity Charge (flat rate for first 4,000 gallons/month)	$ 59.54	$ 60.74	$ 61.96	$ 63.20	$ 64.46	$ 65.74	$ 67.06	$ 68.40	$ 69.76	$ 71.16	$ 72.58
Water usage X2 X2 accounts (number of accounts)	2	2	2	2	2	2	2	2	2	2	2
Commodity Charge (flat rate for first 4,000 gallons/month)	$ 59.54	$ 60.74	$ 61.96	$ 63.20	$ 64.46	$ 65.74	$ 67.06	$ 68.40	$ 69.76	$ 71.16	$ 72.58
Village water usage accounts (number of accounts)	1	1	1	1	1	1	1	1	1	1	1
Commodity Charge (flat rate for first 4,000 gallons/month)	$ 17.38	$ 17.38	$ 17.38	$ 17.38	$ 17.38	$ 17.38	$ 17.38	$ 17.38	$ 17.38	$ 17.38	$ 17.38
Annual Commodity Charge Increase	*2.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*
Excess 1,000's of gallons used annually (by category)											
Regular water usage accounts (excess 1,000 gallons annually)	43,222	43,395	43,568	43,743	43,918	44,093	44,270	44,447	44,625	44,803	44,982
Commodity Charge (per excess 1,000 gallons)	$ 8.68	$ 8.85	$ 9.03	$ 9.21	$ 9.39	$ 9.58	$ 9.77	$ 9.97	$ 10.17	$ 10.37	$ 10.58
Water usage X2 accounts (excess 1,000 gallons annually)	45	45	45	45	46	46	46	46	46	47	47
Commodity Charge (per excess 1,000 gallons)	$ 8.68	$ 8.85	$ 9.03	$ 9.21	$ 9.39	$ 9.58	$ 9.77	$ 9.97	$ 10.17	$ 10.37	$ 10.58
Water usage X2 X2 accounts (excess 1,000 gallons annually)	329	330	331	333	334	335	337	338	339	341	342
Commodity Charge (per excess 1,000 gallons)	$ 17.36	$ 17.70	$ 18.06	$ 18.42	$ 18.78	$ 19.16	$ 19.54	$ 19.94	$ 20.34	$ 20.74	$ 21.16
Village water usage accounts (excess 1,000 gallons annually)	273	274	275	277	278	279	280	281	282	283	284
Commodity Charge (per excess 1,000 gallons)	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60	$ 4.60
Annual Commodity Charge Increase	*2.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*	*2.00%*

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Village of Cassopolis (Michigan) Water Fund

Cash Flow Analysis - Existing Rates (cont.)

	2017/18	2018/19	2019/20	2020/21	2021/22	2022/23	2023/24	2024/25	2025/26	2026/27	2027/28
Revenues											
Usage Charges											
Ready-To-Serve Charges	$ 83,652	$ 83,904	$ 84,156	$ 84,408	$ 84,984	$ 85,284	$ 85,536	$ 85,788	$ 86,268	$ 86,520	$ 86,772
Commodity Charges - First 4,000 gallons of water per month	$ 156,420	$ 164,919	$ 173,874	$ 183,292	$ 193,255	$ 203,691	$ 214,685	$ 219,855	$ 225,143	$ 230,550	$ 236,078
Commodity Charges - Excess 1,000's of gallons used annually	$ 247,960	$ 261,191	$ 275,372	$ 290,088	$ 305,771	$ 322,432	$ 339,652	$ 347,928	$ 356,263	$ 364,661	$ 373,556
Total Usage Charge Revenue	*$ 488,032*	*$ 510,014*	*$ 533,403*	*$ 557,787*	*$ 584,010*	*$ 611,407*	*$ 639,873*	*$ 653,570*	*$ 667,674*	*$ 681,731*	*$ 696,407*
Other Water Revenue Sources											
Connection Charges	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Penalties	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000
Interest on Investments	$ 7,200	$ 7,200	$ 7,200	$ 7,200	$ 7,200	$ 7,200	$ 7,200	$ 7,200	$ 7,200	$ 7,200	$ 7,200
Miscellaneous	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500
Total Other Revenue	*$ 22,700*	*$ 22,700*	*$ 22,700*	*$ 22,700*	*$ 22,700*	*$ 22,700*	*$ 22,700*	*$ 22,700*	*$ 22,700*	*$ 22,700*	*$ 22,700*
Total Revenues	***$ 510,732***	***$ 532,714***	***$ 556,103***	***$ 580,487***	***$ 606,710***	***$ 634,107***	***$ 662,573***	***$ 676,270***	***$ 690,374***	***$ 704,431***	***$ 719,107***
Typical 5/8" water meter bill (using 6,000 gallons per month)	*$ 38.86*	*$ 40.45*	*$ 42.13*	*$ 43.88*	*$ 45.73*	*$ 47.67*	*$ 49.69*	*$ 50.55*	*$ 51.42*	*$ 52.30*	*$ 53.21*
Typical 1" water meter bill (using 6,000 gallons per month)	*$ 42.86*	*$ 44.45*	*$ 46.13*	*$ 47.88*	*$ 49.73*	*$ 51.67*	*$ 53.69*	*$ 54.55*	*$ 55.42*	*$ 56.30*	*$ 57.21*
Expenditures											
Operation & Maintenance	$ 319,201	$ 327,266	$ 335,544	$ 344,039	$ 352,757	$ 361,705	$ 370,888	$ 380,314	$ 389,988	$ 399,918	$ 410,111
Cash Funded Capital Improvements	$ -	$ 574,000	$ 608,000	$ 327,000	$ 179,000	$ 335,000	$ 222,000	$ 251,000	$ 226,000	$ 270,000	$ 254,000
Debt Service Payments - 1998 Bond	$ 36,454	$ 44,518	$ 44,721	$ 44,874	$ 44,011	$ 45,131	$ 44,202	$ 45,255	$ 44,259	$ 44,263	$ 44,218
Other	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Expenditures	***$ 355,654***	***$ 945,784***	***$ 988,264***	***$ 715,913***	***$ 575,768***	***$ 741,836***	***$ 637,090***	***$ 676,569***	***$ 660,248***	***$ 714,182***	***$ 708,328***
Net Operating Revenue	**$ 155,078**	**$ (413,070)**	**$ (432,162)**	**$ (135,425)**	**$ 30,942**	**$ (107,729)**	**$ 25,483**	**$ (299)**	**$ 30,127**	**$ (9,751)**	**$ 10,779**
Cash & Investments Balance (beginning of year)	**$ 1,666,195**	**$ 1,821,273**	**$ 1,408,204**	**$ 976,042**	**$ 840,616**	**$ 871,558**	**$ 763,829**	**$ 789,313**	**$ 789,014**	**$ 819,140**	**$ 809,390**
Cash & Investments Balance (end of year)	***$ 1,821,273***	***$ 1,408,204***	***$ 976,042***	***$ 840,616***	***$ 871,558***	***$ 763,829***	***$ 789,313***	***$ 789,014***	***$ 819,140***	***$ 809,390***	***$ 820,168***

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Village of Cassopolis (Michigan) Water Fund

Cash Flow Analysis - Existing Rates (cont.)

	2028/29	2029/30	2030/31	2031/32	2032/33	2033/34	2034/35	2035/36	2036/37	2037/38	2038/39
Revenues											
Usage Charges											
Ready-To-Serve Charges	$ 87,348	$ 87,600	$ 87,984	$ 88,236	$ 88,488	$ 88,740	$ 88,992	$ 89,568	$ 89,820	$ 90,156	$ 91,008
Commodity Charges - First 4,000 gallons of water per month	$ 241,728	$ 247,582	$ 253,561	$ 259,665	$ 265,897	$ 272,257	$ 278,830	$ 285,535	$ 292,373	$ 299,429	$ 306,621
Commodity Charges - Excess 1,000's of gallons used annually	$ 382,518	$ 391,545	$ 401,081	$ 410,687	$ 420,363	$ 430,558	$ 440,828	$ 451,625	$ 462,502	$ 473,458	$ 484,952
Total Usage Charge Revenue	*$ 711,594*	*$ 726,727*	*$ 742,625*	*$ 758,588*	*$ 774,748*	*$ 791,555*	*$ 808,651*	*$ 826,729*	*$ 844,695*	*$ 863,043*	*$ 882,581*
Other Water Revenue Sources											
Connection Charges	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Water Penalties	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000	$ 14,000
Interest on Investments	$ 7,200	$ 7,200	$ 7,200	$ 7,200	$ 7,200	$ 7,200	$ 7,200	$ 7,200	$ 7,200	$ 7,200	$ 7,200
Miscellaneous	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500
Total Other Revenue	*$ 22,700*	*$ 22,700*	*$ 22,700*	*$ 22,700*	*$ 22,700*	*$ 22,700*	*$ 22,700*	*$ 22,700*	*$ 22,700*	*$ 22,700*	*$ 22,700*
Total Revenues	***$ 734,294***	***$ 749,427***	***$ 765,325***	***$ 781,288***	***$ 797,448***	***$ 814,255***	***$ 831,351***	***$ 849,429***	***$ 867,395***	***$ 885,743***	***$ 905,281***
Typical 5/8" water meter bill (using 6,000 gallons per month)	*$ 54.13*	*$ 55.07*	*$ 56.04*	*$ 57.02*	*$ 58.01*	*$ 59.03*	*$ 60.07*	*$ 61.14*	*$ 62.22*	*$ 63.32*	*$ 64.45*
Typical 1" water meter bill (using 6,000 gallons per month)	*$ 58.13*	*$ 59.07*	*$ 60.04*	*$ 61.02*	*$ 62.01*	*$ 63.03*	*$ 64.07*	*$ 65.14*	*$ 66.22*	*$ 67.32*	*$ 68.45*
Expenditures											
Operation & Maintenance	$ 420,573	$ 431,312	$ 442,336	$ 453,652	$ 465,269	$ 477,194	$ 489,436	$ 502,005	$ 514,907	$ 528,154	$ 541,755
Cash Funded Capital Improvements	$ -	$ 116,000	$ 666,000	$ 421,000	$ 206,000	$ 263,000	$ 194,000	$ 244,000	$ -	$ -	$ -
Debt Service Payments - 1998 Bond	$ 45,139	$ 44,010	$ 44,864	$ 44,669	$ 44,424	$ 45,146	$ 43,818	$ 44,473	$ 44,062	$ -	$ -
Other	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
Total Expenditures	***$ 465,712***	***$ 591,322***	***$ 1,153,200***	***$ 919,321***	***$ 715,693***	***$ 785,340***	***$ 727,254***	***$ 790,478***	***$ 558,970***	***$ 528,154***	***$ 541,755***
Net Operating Revenue	**$ 268,582**	**$ 158,105**	**$ (387,875)**	**$ (138,034)**	**$ 81,755**	**$ 28,915**	**$ 104,096**	**$ 58,951**	**$ 308,425**	**$ 357,588**	**$ 363,526**
Cash & Investments Balance (beginning of year)	**$ 820,168**	**$ 1,088,750**	**$ 1,246,855**	**$ 858,980**	**$ 720,947**	**$ 802,702**	**$ 831,617**	**$ 935,713**	**$ 994,664**	**$ 1,303,089**	**$ 1,660,677**
Cash & Investments Balance (end of year)	***$ 1,088,750***	***$ 1,246,855***	***$ 858,980***	***$ 720,947***	***$ 802,702***	***$ 831,617***	***$ 935,713***	***$ 994,664***	***$ 1,303,089***	***$ 1,660,677***	***$ 2,024,203***

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Appendix F

Elevated Storage Tank Inspection Reports

Village Of Cassopolis

CONDITION ASSESSMENT REPORT

Tank Name:
Cassopolis Water Tower

Location:
Wolfe Ave And Route 62

Tank Size and Style:
400,000 Pedisphere

Project Number:
119787

Inspection Date:
October 24, 2017

Inspected By:
Blake Iafollo

Village Of Cassopolis Contact Information:

Administrative:
Ben Anderson

Job:
Ben Anderson

Address:
117 South Broadway Suite 100
Cassopolis, MI 49031

Phone/Email:
269-445-8648

Utility Service Co., Inc.

Address
535 Courtney Hodges Blvd
PO Box 1350
Perry, GA 31069

Fax, Email and Website
Fax: 478.987.2529
Email: help@utilityservice.com
Website: www.utilityservice.com

Customer Service Information
Paula Jones
800.942.0722

Summary

A visual inspection was performed on the exterior condition. The tank is in good condition.

The interior coating was not fully inspected but will be at the next scheduled washout when the interior will be cleaned, inspected and disinfected.

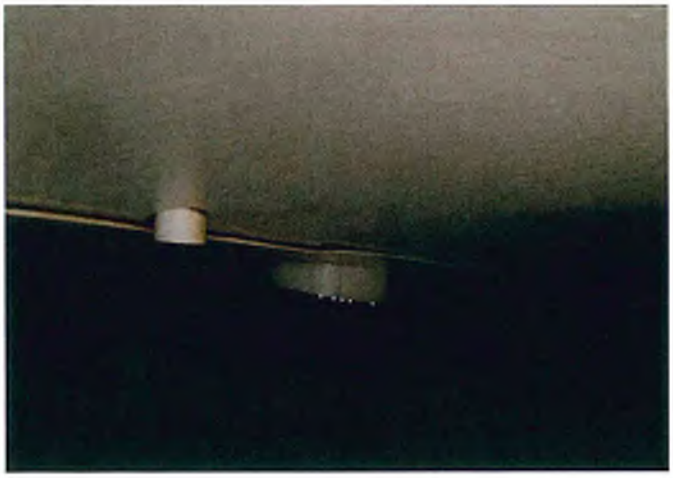
Interior roof and structure was partially inspected from hatch. Personnel are not allowed to enter the structure (i.e. "break the plane") when filled with water in order to maintain compliance with the OSHA 1926.1201 Confined Space for Construction Standard. However, based on this limited view no deficiencies were noted with roof trusses, rafters and their connections.

Work To Be Completed

- **Safety Climbing Devices:** Ladders are not equipped with safety climb devices. Installation of climb devices will be scheduled.
- **Sediments:** Sediment is present in bottom of tank. Tank will be cleaned at next scheduled washout.
- **Exterior Coating Condition:** Exterior coating has minor area where paint has flaked and corrosion is beginning to show. Renovation will be scheduled in the near future.
- **Dry Interior Condition:** Minor coating failure noted on dry interior including platform landing. Coating touch up will be scheduled. No other deficiencies noted.

Coating Type & Conditions

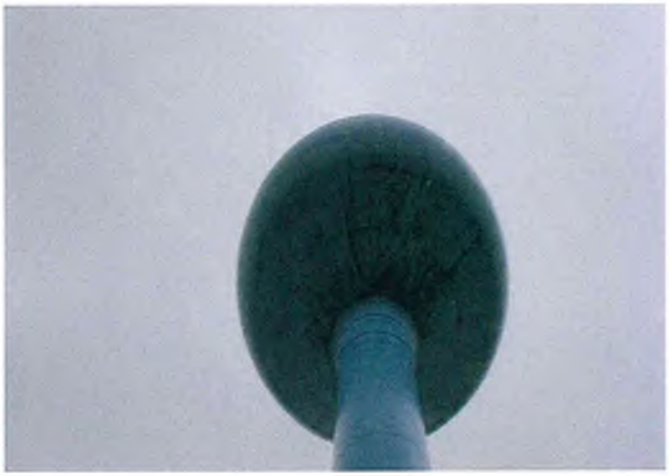
- **Interior Coating Condition:** Interior coating is in good condition and continues to protect the substrate.
- **Exterior Coating Condition:** Exterior coating has minor area where paint has flaked and corrosion is beginning to show. Renovation will be scheduled in the near future.
- **Logo Condition:** No deficiencies noted.
- **Dry Interior Condition:** Minor coating failure noted on dry interior including platform landing. Coating touch up will be scheduled. No other deficiencies noted.



Interior Coating Roof

Interior Coating Roof

Exterior Coating Logo



Exterior Coating

Exterior Coating

Exterior Coating

Exterior Coating Roof

Exterior Coating Roof

Exterior Coating Roof

Exterior Coating Roof

Dry Interior Coating Funnel

Dry Interior Coating Pedestal

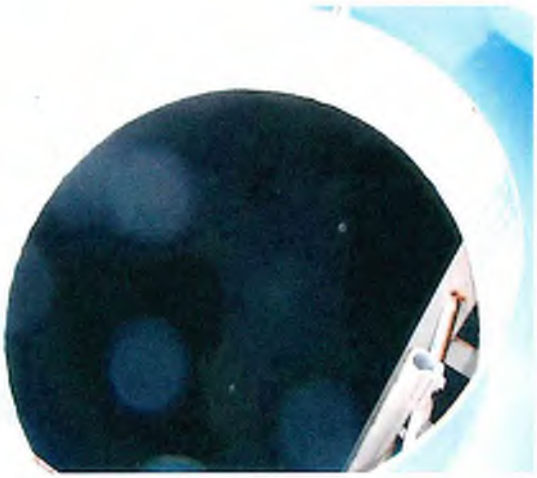
Dry Interior Coating Bowl

Dry Interior Coating Dry Riser

Safety

- **Safety Climbing Devices:** Ladders are not equipped with Rigid Rail climb devices. Installation of Cable climb devices will be scheduled.
- **Access Hatch1:** No deficiencies noted.
- **Access Hatch2:** Good
- **Access Hatch3:** No deficiencies noted

Safety Climb on Access Ladder



Access Hatch Open

Sanitary

- **Vent Screen:** No deficiencies noted with vent screen.
- **Overflow Pipe Screen Flapper:** Overflow pipe is equipped with screen. No deficiencies noted with screen.
- **Evidence Of Foreign Matter:** No evidence of foreign matter observed.
- **Sediments:** Sediment is present in bottom of tank. Tank will be cleaned at next scheduled washout.

Vent Screen

Overflow Screen

Security

- **Fence Around Site:** Tank is located inside a fenced-in area that is secure.
- **Ladder Gate/Access Door:** Tank has a door access to the interior dry ladder and the door was locked.
- **Access Hatch Locked:** Access hatch is locked and secured.
- **Evidence Of Vandalism:** No evidence of vandalism was found.

Tank Access Door Locked

Wet Interior Access Hatch Locked

Structural

- **Foundation:** Foundation appears in good condition and there is no erosion occurring around foundation.
- **Access Ladders:** No deficiencies noted for dry-side access ladder stiles, rungs and connections.
- **Anchor Bolts:** Anchor bolts are protected and show no rust or corrosion.
- **Watertight Conditions:** There are no visible leaks at the time of the inspection.
- **Interior Ladders:** Interior ladder partially inspected from hatch. Ladder is beginning to show minor corrosion. We will continue to closely monitor for the scheduling/planning of touch up/repairs.
- **Roof:** The interior roof does not have roof beams. No deficiencies noted.
- **Vents:** No deficiencies noted with vent.
- **Overflow Pipe:** No deficiencies noted. Overflow pipe extends to ground level.
- **Welds:** No deficiencies noted with weld seams.
- **Level Indicator:** Level indicator is in working condition with no deficiencies noted.

Exterior Base Structure

Exterior Base Funnel

Dry Interior Funnel

Dry Interior Funnel Landing

Dry Interior Bowl Landing

Wet Interior Boiler Manway

Exterior Roof Structure

Vent Structure

Steel Tanks

The determinations and recommendations made within this report with respect to the condition of the steel structure, integrity, or other surface defects are based upon visual observations made during the inspection. Extensive testing or investigation of the steel to determine the extent of the metal loss or capacity of the structure was not completed.

Village Of Cassopolis
ATTN: Ben Anderson
117 South Broadway Suite 100
Cassopolis, MI 49031

Village Of Cassopolis

CONDITION ASSESSMENT REPORT

Tank Name:

Cassopolis Water Tower

Location:

Wolfe Ave And Route 62

Tank Size and Style:

400,000 Pedisphere

Project Number:

119787

Inspection Date:

November 30, 2016

Inspected By:

Blake Iafollo

Village Of Cassopolis Contact Information:

Utility Service Co., Inc.

Address	Fax, Email and Website	Customer Service Information
535 Courtney Hodges Blvd	**Fax: 478.987.2529**	**Paula Jones**
PO Box 1350	**Email: help@utilityservice.com**	**800.942.0722**

Administrative:	Address:	Phone/Email:
Ben Anderson	**117 South Broadway Suite 100 Cassopolis, MI 49031**	**269-445-8648**

Job:

Ben Anderson

Utility Service Co., Inc.

Address	Fax, Email and Website	Customer Service Information
535 Courtney Hodges Blvd	**Fax: 478.987.2529**	**Paula Jones**
PO Box 1350	**Email: help@utilityservice.com**	**800.942.0722**

Summary

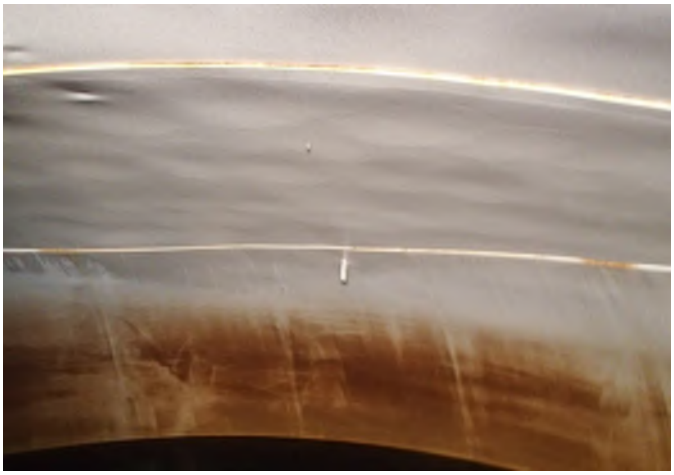
A visual inspection was performed on the exterior condition. The tank is in good condition. The interior coating was not fully inspected but will be at the next scheduled washout when the interior will be cleaned, inspected and disinfected. Interior roof and structure was partially inspected from hatch. Personnel are not allowed to enter the structure (i.e. "break the plane") when filled with water in order to maintain compliance with the OSHA 1926.1201 Confined Space for Construction Standard. However, based on this limited view no deficiencies were noted with roof trusses, rafters and their connections.

Work To Be Completed

- **:** The exterior coating will be scheduled to be renovated in 2018.
- **Safety Climbing Devices:** Ladders are not equipped with safety climb devices. Installation of climb devices will be scheduled with renovation.
- **Sediments:** Sediment is present in bottom of tank. Tank will be cleaned at next scheduled washout.

Coating Type & Conditions

- **Interior Coating Condition:** Interior coating is in good condition and continues to protect the substrate.
- **Exterior Coating Condition:** Exterior coating has minor area where paint has flaked and corrosion is beginning to show. Renovation is scheduled for 2018.
- **Logo Condition:** No deficiencies noted.
- **Dry Interior Condition:** No deficiencies noted in the dry interior coating.



Interior Coating Roof

Interior Coating Roof

Exterior Coating

Exterior Coating

Exterior Coating

Exterior Coating

Exterior Coating Pedestal

Exterior Coating Pedestal

Exterior Coating Funnel

Exterior Coating Funnel

Exterior Coating Roof

Exterior Coating Roof

Exterior Coating Roof

Exterior Coating Roof

Dry Interior Coating Funnel

Dry Interior Coating Pedestal

Dry Interior Coating Bowl

Dry Interior Coating Dry Riser

Safety

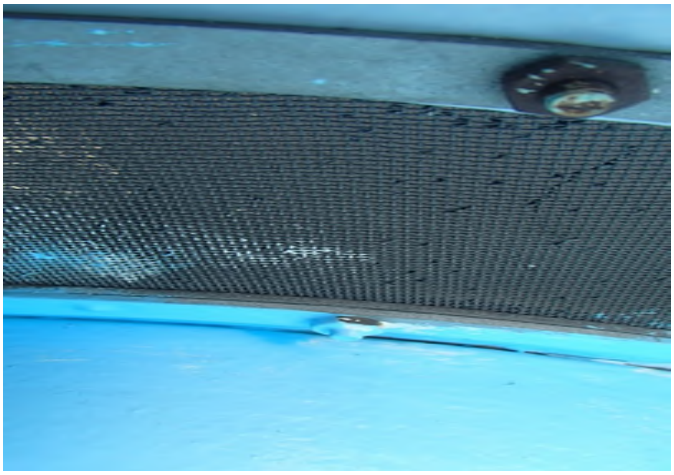
- **Safety Climbing Devices:** Ladders are not equipped with safety climb devices. Installation of climb devices will be scheduled.
- **Access Hatch1:** No deficiencies noted.
- **Access Hatch2:** Good
- **Access Hatch3:** No deficiencies noted

Rigid Rail on Access Ladder

Bolted Wet Interior Bolted Hatch

Sanitary

- **Vent Screen:** No deficiencies noted with vent screen.
- **Overflow Pipe Screen Flapper:** Overflow pipe is equipped with screen. No deficiencies noted with screen.
- **Evidence Of Foreign Matter:** No evidence of foreign matter observed.
- **Sediments:** Sediment is present in bottom of tank. Tank will be cleaned at next scheduled washout.



Vent Screen

Overflow Screen

Security

- **Fence Around Site:** Tank is located inside a fenced-in area that is secure.
- **Ladder Gate/Access Door:** Exterior ladder has a ladder gate installed and is locked.
- **Access Hatch Locked:** Access hatch is locked and secured.
- **Evidence Of Vandalism:** No evidence of vandalism was found.

Tank Access Door Locked

Wet Interior Access Hatch Locked

Structural

- **Foundation:** Foundation appears in good condition and there is no erosion occurring around foundation.
- **Access Ladders:** No deficiencies noted for dry-side access ladder stiles, rungs and connections.
- **Anchor Bolts:** Anchor bolts are protected and show no rust or corrosion.
- **Watertight Conditions:** There are no visible leaks at the time of the inspection.
- **Interior Ladders:** Interior ladders are beginning to show minor corrosion and will be scheduled for touch up.
- **Roof:** The interior roof does not have roof beams. No deficiencies noted.
- **Vents:** No deficiencies noted with vent.
- **Overflow Pipe:** No deficiencies noted. Overflow pipe extends to ground level.
- **Welds:** No deficiencies noted with weld seams.

Exterior Base Structure

Dry Interior Funnel Landing

Dry Interior Pedestal Landing

Aviation Lights

Steel Tanks
The determinations and recommendations made within this report with respect to the condition of the steel structure, integrity, or other surface defects are based upon visual observations made during the inspection. Extensive testing or investigation of the steel to determine the extent of the metal loss or capacity of the structure was not completed.

Village Of Cassopolis
Condition Assessment Report

Tank Information for Customer # 28871

- **Tank Name:** Cassopolis Water Tower
- **Tank Size/Style:** 400,000 Pedisphere
- **Tank Location:** Wolfe Ave And Route 62
- **Project Number:** 119787
- **Service Request:** 589573
- **Inspection Date:** June 15, 2015
- **Contact:** Paula Jones, 800-942-0722
- **Inspected By:** Jimmie Pelham

Customer Contact Information

- **Administrative:** Ben Anderson
- **Job:** Ben Anderson
- **Address:** 117 South Broadway Suite 100
  Cassopolis, MI 49031
- **Telephone:** 269-445-8648

Summary

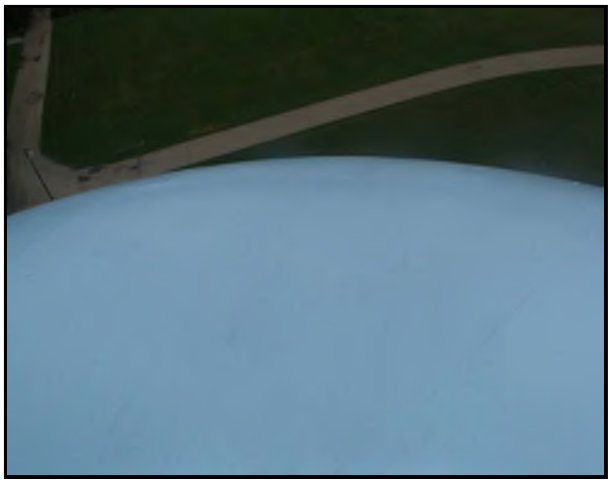
A visual inspection was performed on the exterior condition. The tank is in good condition. The interior coating was not inspected but will be at the next scheduled washout when the interior will be cleaned, inspected and disinfected.

Work To Be Completed

- Safety Climbing Devices: Ladders are not equipped with safety climb devices. Installation of climb devices will be scheduled.
- Exterior Coating Condition: Exterior coating has minor area where paint has flaked and corrosion is beginning to show. Exterior will be monitored.

Coating Type & Conditions

- Interior Coating Condition: The interior coatings were not inspected but will be at the next interior inspection.
- Exterior Coating Condition: Exterior coating has minor area where paint has flaked and will be monitored.
- Logo Condition: No deficiencies noted.
- Dry Interior Condition : No deficiencies noted in the dry interior coating.

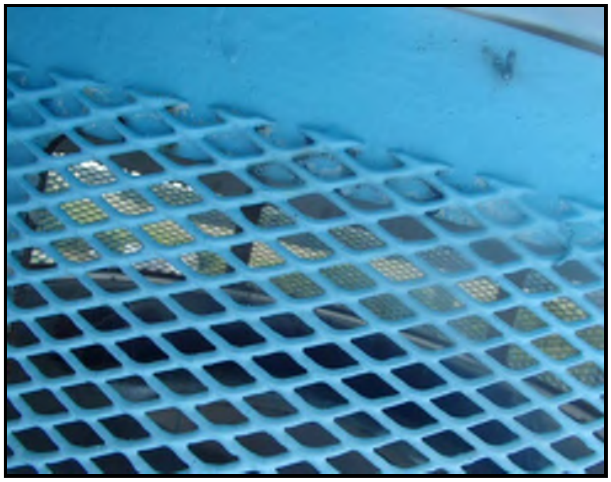


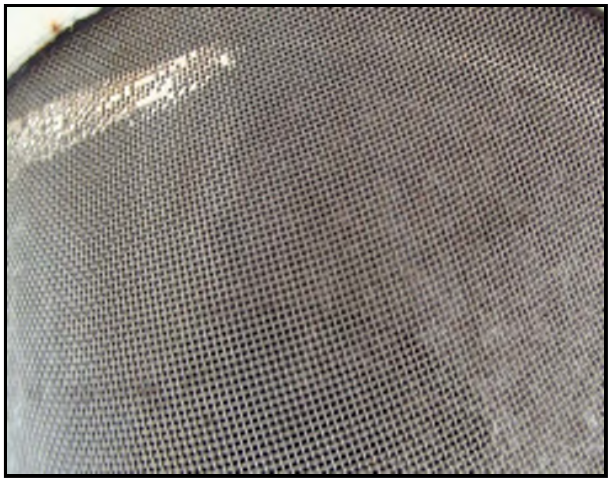
Safety

- Safety Climbing Devices: Ladders are not equipped with safety climb devices. Installation of climb devices will be scheduled.
- Access Hatch1: No deficiencies noted.
- Access-Hatch2: No deficiencies noted

Sanitary

- Vent Screen: No deficiencies noted with vent screen.
- Overflow Pipe Screen Flapper: Overflow pipe is equipped with screen. No deficiencies noted with screen.
- Evidence Of Foreign Matter: The interior was not inspected.
- Sediments: The interior was not inspected at this time.



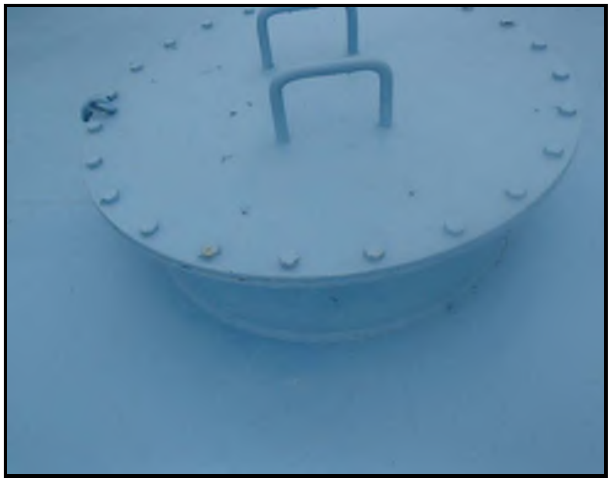


Security

- Fence Around Site: Tank is located inside a fenced-in area that is secure.
- Ladder Gate/Access Door: Exterior ladder has a ladder gate installed and is locked. Access door was locked after inspection.
- Access Hatch Locked: Access hatch is locked and secured.

- Evidence Of Vandalism: No evidence of vandalism was found.






Structural

- Foundation: Foundation appears in good condition and there is no erosion occurring around foundation.
- Access Ladders: No deficiencies noted for dry-side access ladder stiles, rungs and connections.
- Anchor Bolts: Anchor bolts are protected and show no rust or corrosion.
- Watertight Conditions: There are no visible leaks at manway, riser or legs.
- Interior Ladders: The interior was not inspected.
- Roof: Interior roof structure was not inspected at this time.
- Vents: No deficiencies noted with vent.

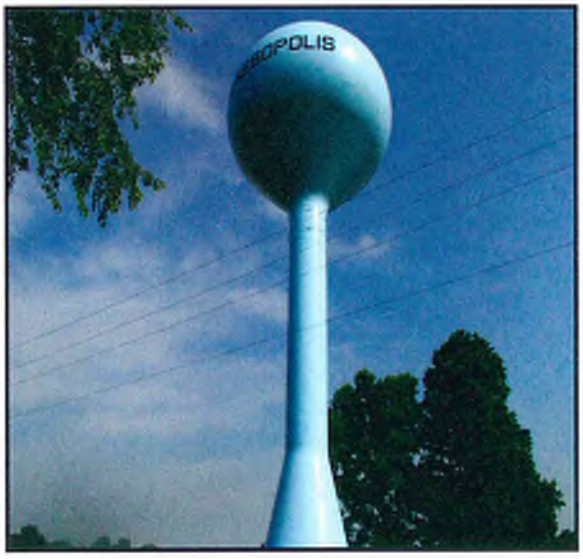
- Overflow Pipe: No deficiencies noted. Overflow pipe extends to ground level.
- Welds: No deficiencies noted with weld seams.

Utility Service Group

Village Of Cassopolis
Condition Assessment Report

Tank Information for Customer # 28871

- **Tank Name:** Cassopolis Water Tower
- **Tank Size/Style:** 400,000 Pedisphere
- **Tank Location:** Wolfe Ave And Route 62
- **Project Number:** 119787
- **Service Request:** 507717
- **Inspection Date:** August 4, 2014
- **Contact:** Paula Jones, 800-942-0722
- **Inspected By:** Brad Mclead



Customer Contact Information

- **Administrative:** Ben Anderson
- **Job:** Ben Anderson
- **Address:** 117 South Broadway Suite 100
  Cassopolis, MI 49031
- **Telephone:** 269-445-8648

Summary

The tank interior was cleaned, washed out, inspected and disinfected according to AWWA Standards Spray Method #2 and made ready for service. The tank will be scheduled for a Visual Inspection in 2015.

Work Completed During Inspection

- Access Hatch Locked: Access hatch was not locked but was repaired and locked during the inspection.
- Overflow Pipe Screen Flapper: Overflow pipe screen was installed at the inspection.
- Sediments: Light sediment in bottom of tank was cleaned out with pressure washing.
- Exterior Coating Condition: Exterior coating had minor areas where paint has flaked. Areas touched up during the inspection.

Work To Be Completed

- Safety Climbing Devices: Ladders are not equipped with safety climb devices. Installation of climb devices will be scheduled.

Coating Type & Conditions

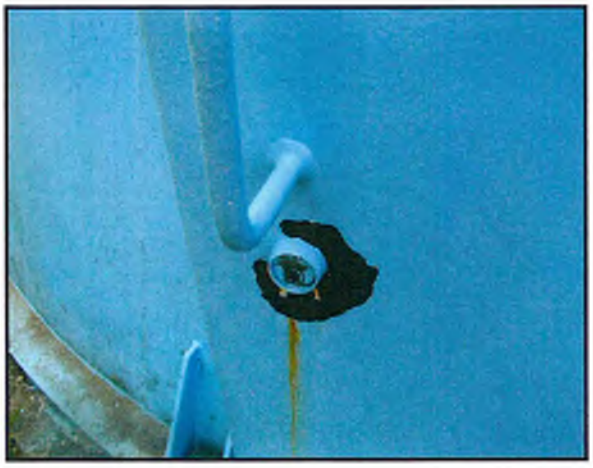
- Interior Coating Condition: Interior coating is in good condition and continues to protect the substrate.
- Exterior Coating Condition: Exterior coating had minor areas where paint has flaked. Areas touched up during the inspection. Touch ups will be scheduled to meet matching exterior color at next inspection.
- Logo Condition: No deficiencies noted.
- Dry Interior Condition : No deficiencies noted in the dry interior coating.

Interior Sidewall (Pre-Washout)

Interior Sidewall (Post-Washout)

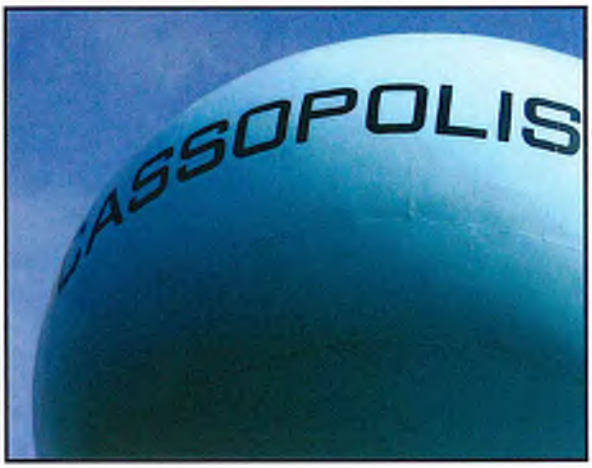
Interior Floor (Pre-Washout)

Interior Floor (Post-Washout)



Exterior Access Door
(Pre-Touch Up)

Exterior Access Door
(Post-Touch Up)



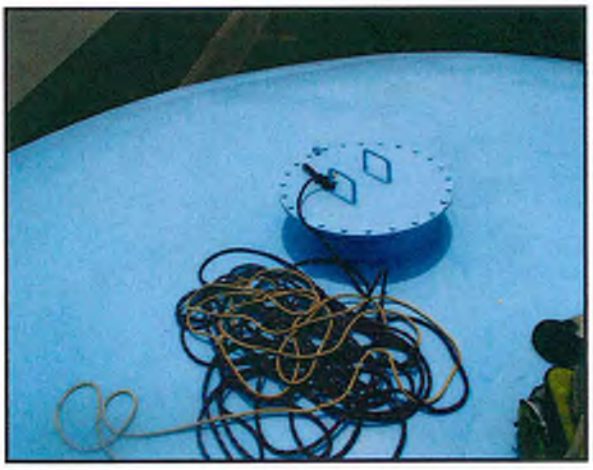
Exterior/Logo

Dry Interior

Safety

- Safety Climbing Devices: Ladders are not equipped with safety climb devices. Installation of climb devices will be scheduled.
- Access Hatch1: No deficiencies noted.
- Access-Hatch2: Good
- Access Hatch3: No deficiencies noted

Hatch 1&2

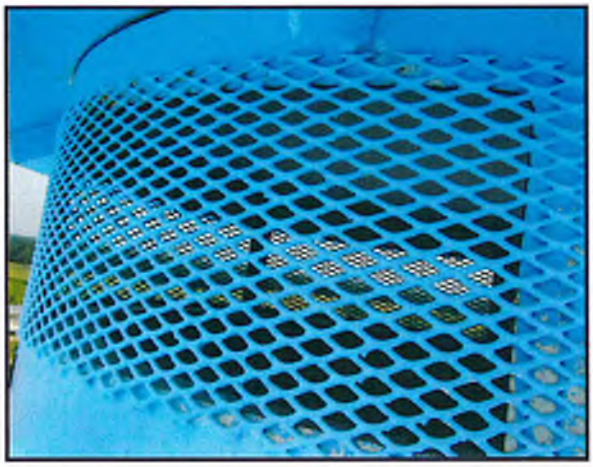


Hatch3

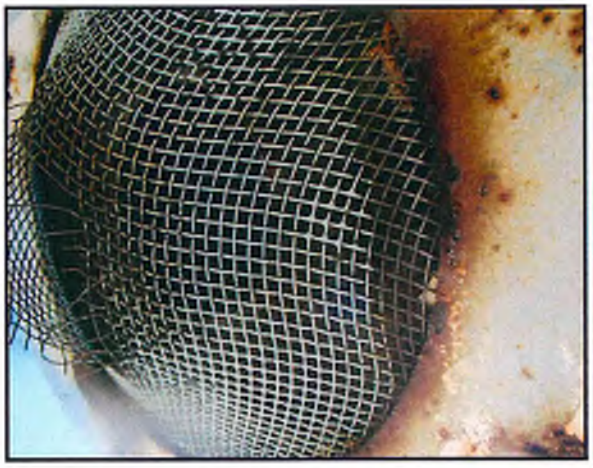
Sanitary

- Vent Screen: No deficiencies noted with vent screen.
- Overflow Pipe Screen Flapper: Overflow pipe screen was installed at the inspection.
- Evidence Of Foreign Matter: No evidence of foreign matter observed.

- Sediments: Light sediment in bottom of tank was cleaned out with pressure washing.



Vent Screen



Pre-Replacement Overflow Screen

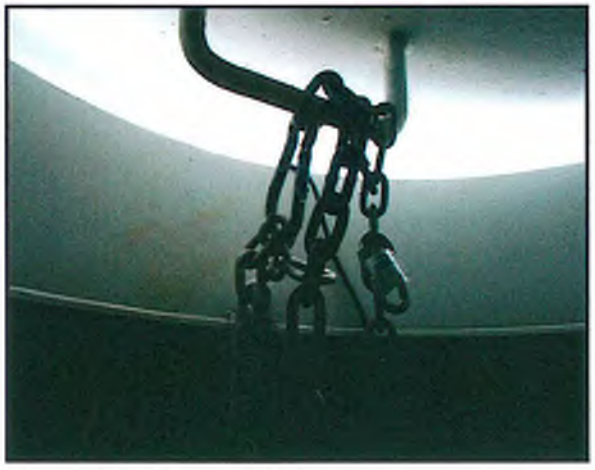
Overflow Screen Replaced

Security

- Fence Around Site: Tank is located inside a fenced-in area that is secure.
- Ladder Gate/Access Door: Ladders are located inside secured dry interior
- Access Hatch Locked: Access hatch was not locked but was repaired and locked during the inspection.
- Evidence Of Vandalism: No evidence of vandalism was found.

Locked Fence Gate

Locked Hatch



Secured Roof Access Hatch

Structural

- Foundation: Foundation appears in good condition and there is no erosion occurring around foundation.
- Access Ladders: No deficiencies noted for dry-side access ladder stiles, rungs and connections.
- Anchor Bolts: Anchor Bolts are protected and show no rust or corrosion.
- Watertight Conditions: There are no visible leaks at manway, riser or legs.
- Interior Ladders: No deficiencies noted for the interior ladder stiles, rungs and connections.
- Roof: The interior roof does not have roof beams.
- Vents: No deficiencies noted with vent.
- Overflow Pipe: No deficiencies noted. Overflow pipe extends to ground level.

- Welds: No deficiencies noted with weld seams.

Exterior Foundation and Anchor Bolts

Dry Interior Foundation

Access Ladder

Interior Ladder (Pre-Washout)

Roof Vent

Overflow Pipe

Manway

Utility Service Group

Village Of Cassopolis
Visual Inspection Report

Tank Information for Customer # 28871

- **Tank Name:** Cassopolis Water Tower
- **Tank Size/Style:** 400,000 Pedisphere
- **Tank Location:** Wolfe Ave And Route 62
- **Project Number:** 119787
- **Service Request:** 439475
- **Inspection Date:** May 2, 2013
- **Report Author:** Brad Etheridge
- **Inspected By:** Brad Mclead

Customer Contact Information

- **Administrative:** Ben Anderson
- **Job:** Ben Anderson
- **Address:** 117 South Broadway Suite 100
  Cassopolis, MI 49031
- **Telephone:** 269-445-8648

Summary

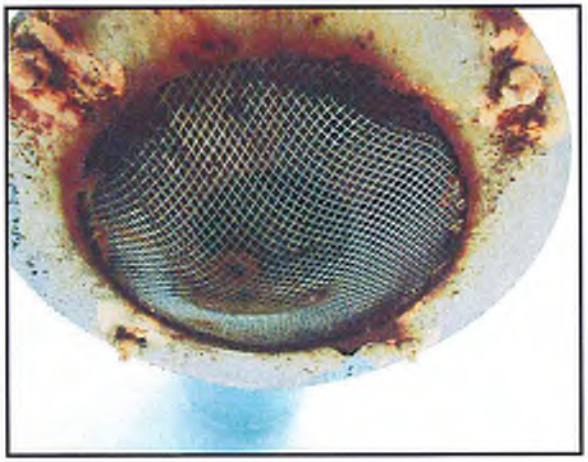
A visual inspection was performed on the exterior condition. The tank is in good condition. The exterior continues to be in good condition with no nonconforming items to report. The interior coating was not fully inspected but will be in 2014 when the interior will be cleaned, inspected and disinfected

Coating Type & Conditions

- Interior Coating Condition: The interior coatings were not fully inspected but will be at the next interior inspection, cleaning and disinfection.
- Exterior Coating Condition: Exterior coating is in good condition.
- Logo Condition: Good
- Dry Interior Condition : Interior lining is in good condition and continues to protect the substrate.

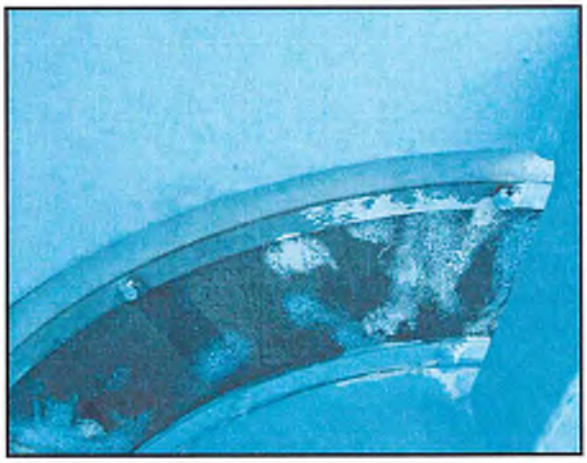
Safety & Sanitation

- Safety Climbing Devices: Ladders are equipped with secured safety climb devices.
- Access Hatch1: Good
- Access-Hatch2: Good
- Vent Screen: Vent screen is in good condition.
- Overflow Pipe Screen Flapper: Overflow pipe is equipped with screen and is in good condition.
- Evidence Of Foreign Matter: No evidence of foreign matter.
- Sediments: No sediment present.



Overflow is equipped with screen.

Access ladder equipped with safety climb.



Roof vent is equipped with screen.

Security

- Fence Around Site: Tank is located inside a fenced-in area.
- Ladder Gate/Access Door: Exterior ladder has a ladder gate installed and is locked.
- Access Hatch Locked: Access Hatch is Secured.
- Evidence Of Vandalism: There is not evidence of vandalism.

Shell manway is secure.

Structural

- Foundation: Foundation is in good condition and there is no erosion occurring around foundation.
- Access Ladders: No Dry-side access Ladder exists.
- Anchor Bolts: Anchor Bolts are protected and show no rust or corrosion.
- Watertight Conditions: There are no visible leaks at manway, riser or legs.
- Interior Ladders: Interior ladder stiles, rungs and connections are in good condition.
- Roof: The interior roof does not have roof beams.
- Vents: Vent is in Good Condition.
- Overflow Pipe: Overflow Pipe is in good condition.
- Welds: Weld Seams are in good condition.

UTILITY SERVICE
CUSTOMER SERVICE
535 COURTNEY HODGES BLVD
P.O. BOX 1350
PERRY, GA 31069
TEL 800-223-3695
FAX 478-987-2529
WWW.UTILITYSERVICE.COM

Village Of Cassopolis
Washout Inspection Report

Tank Information for Customer # 28871

- **Tank Name:** Cassopolis Water Tower
- **Tank Size/Style:** 400,000 Pedisphere
- **Tank Location:** Wolfe Ave And Route 62
- **Project Number:** 119787
- **Service Request:** 353545
- **Inspection Date:** August 14, 2012
- **Report Author:** Brad Etheridge
- **Inspected By:** Brad Mclead

Customer Contact Information

- **Administrative:** Ben Anderson
- **Job:** Ben Anderson
- **Address:** 117 South Broadway
  Suite 100
  Cassopolis, MI 49031
- **Telephone:** 269-445-8648

Summary

The tank interior was cleaned, washed out, inspected and disinfected according to AWWA Standards Spray Method #2 and made ready for service. The tank will be scheduled for a Visual Inspection in 2013.

Coating Type & Conditions

- Interior Coating Condition: Interior lining is in good condition and continues to protect the substrate.
- Exterior Coating Condition: Exterior coating is in good condition.
- Logo Condition: Good
- Dry Interior Condition : Interior lining is in good condition and continues to protect the substrate.

Interior area prior to washout.

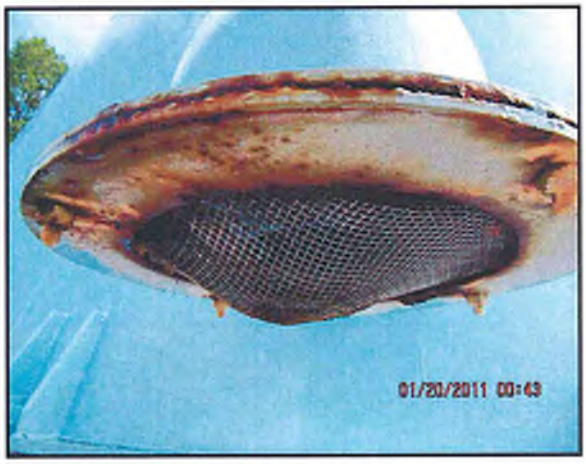
Interior area after washout.

Interior area after washout.

Interior area after washout.

Safety & Sanitation

- Safety Climbing Devices: Ladders are equipped with secured safety climb devices.
- Access Hatch1: Good
- Access-Hatch2: Good
- Access Hatch3: Good
- Vent Screen: Vent screen is in good condition.
- Overflow Pipe Screen Flapper: Overflow pipe is equipped with screen and is in good condition.
- Evidence Of Foreign Matter: No evidence of foreign matter.
- Sediments: Heavy sediment in bottom of tank was cleaned out and pressure washed. Some brown mineral stain still remains.



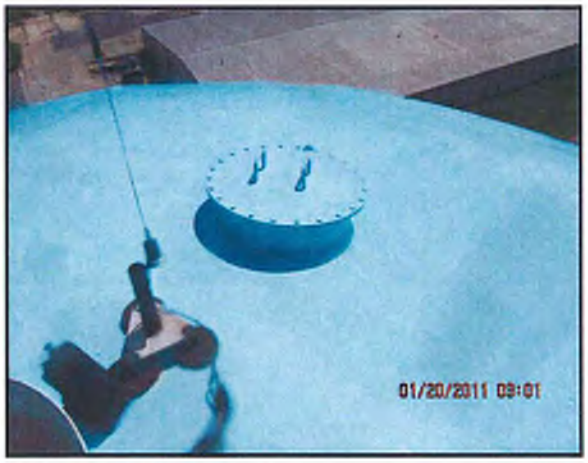
Overflow is equipped with screen.

Access ladder equipped with safety climb.

Roof vent is equipped with screen.

Security

- Fence Around Site: Tank is located inside a fenced-in area.
- Ladder Gate/Access Door: Exterior ladder has a ladder gate installed and is locked.
- Access Hatch Locked: Access Hatch is Secured.
- Evidence Of Vandalism: There is not evidence of vandalism.



Access hatch is secured.

Structural

- Foundation: Foundation is in good condition and there is no erosion occurring around foundation.
- Access Ladders: Dry-side access ladder styles, rungs and connections are in good

condition.

- Anchor Bolts: Anchor Bolts are protected and show no rust or corrosion.
- Watertight Conditions: There are no visible leaks at the time of the inspection.
- Interior Ladders: Interior ladder stiles, rungs and connections are in good condition.
- Roof: Roof Trusses, Rafters and their connections are sound and in good condition.
- Vents: Vent is in Good Condition.
- Overflow Pipe: Overflow Pipe is in good condition.
- Welds: Weld Seams are in good condition.
- Bolts And Rivets: Bolts and rivets are in good condition and no leaks are present.

Appendix G

Well Inspection Reports

April 4, 2018

Mr. Ben Anderson
Village of Cassopolis
Water Department
117 South Broadway
Cassopolis, MI 49031

Re: Annual Well and Pump Inspections

Dear Mr. Anderson:

Enclosed with this letter, please find the results of the well and pump inspections we recently performed. Please keep these with your permanent records.

Well #4 has a specific capacity of 21.9 gallons per foot of drawdown as compared to 21.2 during the 2015 test. This well is in stable condition and will not require any work in the form cleaning and redevelopment at this time. The pump in this well is showing normal wear having been last overhauled in 2010 and is currently operating 13.6% below rated design conditions when projected at full speed. No work is recommended on the pump or motor at this time.

Well #5 has a specific capacity of 15.4 gallons per foot of drawdown as compared to 14.4 during the 2015 test. This well is in stable condition and will not require any work in the form cleaning and redevelopment at this time. The pump and motor in this well were last pulled and overhauled in the fall of 2009 and are currently projected to be operating above the rated design point.

Thank you for this opportunity to be of service to you. Your business is most appreciated.

Sincerely,

PERRLESS MIDWEST, INC.

Joel A. Annable
Project Manager

JAA:alg
Enclosures

PEERLESS MIDWEST INC
55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Cassopolis City Cassopolis State MI

Location 1800' North of Hospital Street & 20' East of North Street (Extended); 200' South of Well #5

Well No. 4 Date Drilled 11/19/1997 Dia. 24" x 16" Depth 154' Type Well GW

Screen ID. 16" Screen Length 25' Depth to Top of Screen 129' Type Screen SSWW

Dates of Cleaning

Phone (269) 445-8098 Cell (269) 591-0423 Person to Contact Ben Anderson

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1997	42.66'	800	84.15'	-	19.3
AFTER LAST CLEANING						
AFTER LAST TEST	2015	51'	700	84'	60#	21.2
AT PUMPS RATED FLOW	2018	45.6'	769 Orifice 750 Meter	80.7'	43#	21.9
AT SYSTEM OPERATING PSI						

Test Completed Through Meter ___ Flange or Thread Size 4" Confined Space Entry? No

Motor HP 60 Make US Volts 460 RPM 1775 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required

Pump Mfg. Goulds Serial No. 897668 Airline Length 100'

Rated Capacity: 750 GPM 250' TDH Operating Pressure 61#

Total Setting 114' 6" Size of Packing 3/8" Date Installed 1998

Dates of Overhaul 2010, 2013(new motor)

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease X Repack Pump X Grease Pump ___

Pump is Presently Developing *810 **GPM** *200' **TDH** **Projected Curve Capacity** 750 **GPM** *216' **TDH**

Shut Off Pressure NDA PSI Rated Shut Off Head 314 ft. Calculated Shut Off Head NDA ft.

Electrical Data (With Pump in Operation): 480 V 51 / 54 / 55 Amps 74.3 @ 460 v Full Load Amps

Location of Power Lines Underground Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 12" Materials Needed to Clean Well Take out 10-1/2" long, 8" spool or turn pump. Need 8" x 6" reducer, 3 hoses to tank, and 100' to waste.

Need a Smeal to Raise Pump? * Remarks Orifice test. *Test ran at 1680 RPM, projected results at 1770 RPM. Pumping level taken with electronic probe, airline is likely plugged.

Maintenance: Meter or 8" x 4" threaded flange out wall, 1 fire hose to waste. Has VFD. Record RPM's.

*Need smeal if 8" elbow is longer than 10-1/2".

Inspected By Ron Mead Date Inspected April 3, 2018

PEERLESS MIDWEST INC
55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Cassopolis City Cassopolis State MI

Location 2000' North of Hospital Street & 75' East of North Street (Extended); 200' North of Well #4

Well No. 5 Date Drilled 12/10/1997 Dia. 24" x 16" Depth 151' Type Well GW

Screen ID. 16" Screen Length 25' Depth to Top of Screen 126' Type Screen SSWW

Dates of Cleaning 2004, 2009, 2015

Phone (269) 445-8098 Cell (269) 591-0423 Person to Contact Ben Anderson

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1997	43.61'	1016	91.3'	-	21.3
AFTER LAST CLEANING	2015	48'	750	95'	70#	15.9
AFTER LAST TEST	2015	49'	650	94'	72#	14.4
AT PUMPS RATED FLOW	2018	44'	769 Orifice 740 Meter	94'	72#	15.4
AT SYSTEM OPERATING PSI						

Test Completed Through Meter ___ Flange or Thread Size 4" Confined Space Entry? No

Motor HP 60 Make US Volts 460 RPM 1775 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required ___

Pump Mfg. Layne/Floway Serial No. No Tag Airline Length 100'

Rated Capacity: 750 GPM 245' TDH Operating Pressure 61#

Total Setting 114' 6" Size of Packing 3/8" Date Installed 1998

Dates of Overhaul 2009

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? Cla-Val Change Motor Oil & Grease X Repack Pump X Grease Pump ___

Pump is Presently Developing *765 **GPM** *258' **TDH** **Projected Curve Capacity** 750 **GPM** *259' **TDH**

Shut Off Pressure ___ PSI Rated Shut Off Head 314 ft. Calculated Shut Off Head *272 ft.

Electrical Data (With Pump in Operation): 489/490/491 V 69 / 64 / 67 Amps 74 @ 460 v Full Load Amps

Location of Power Lines Underground Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 12" Materials Needed to Clean Well Take out 12" long, 8" spool or turn pump. Need 3 hoses to tank and 100' to waste.

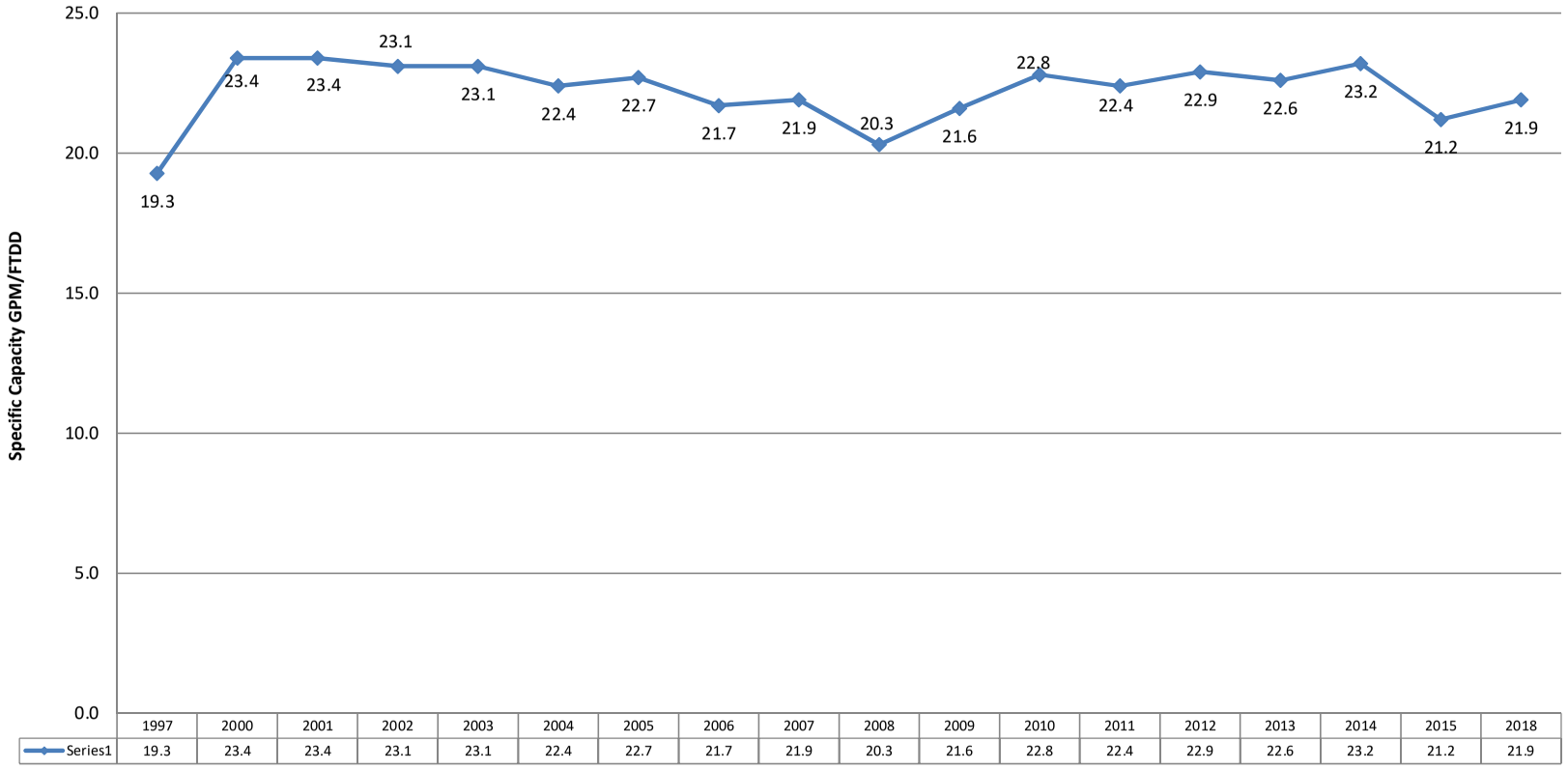
Need a Smeal to Raise Pump? No Remarks Orifice test. *Test ran at 1779 RPM, projected results at 1770 RPM.

Maintenance: Meter or 8" x 4" threaded flange out wall, 1 fire hose to waste. Take off outside cap, blow off read meter.

Inspected By Ron Mead Date Inspected April 3, 2018

Specific Capacity Trend Analysis

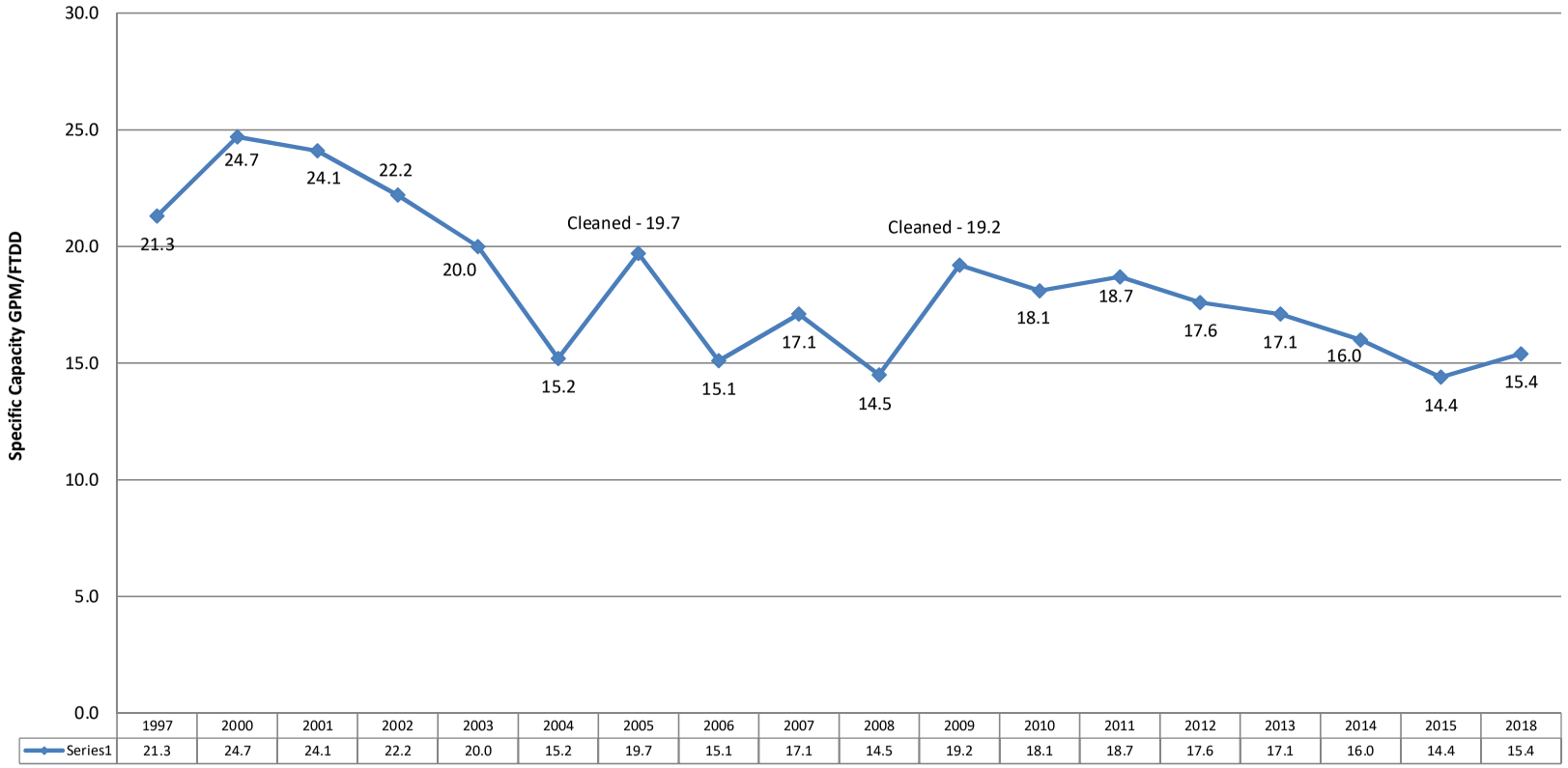
Village of Cassopolis
Well #4



	1997	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2018
Series1	19.3	23.4	23.4	23.1	23.1	22.4	22.7	21.7	21.9	20.3	21.6	22.8	22.4	22.9	22.6	23.2	21.2	21.9

Specific Capacity Trend Analysis

Village of Cassopolis
Well #5



	1997	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2018
Series1	21.3	24.7	24.1	22.2	20.0	15.2	19.7	15.1	17.1	14.5	19.2	18.1	18.7	17.6	17.1	16.0	14.4	15.4

PEERLESS MIDWEST INC

January 6, 2015

Mr. Ben Anderson
Village of Cassopolis
Water Department
117 South Broadway
Cassopolis, MI 49031

Re: Annual Well and Pump Inspections

Dear Mr. Anderson:

Enclosed with this letter, please find the results of the well and pump inspections we recently performed. Please keep these with your permanent records. In addition, we have enclosed a copy of our invoice to perform this service.

Well #4 has a specific capacity of 21.2 gallons per foot of drawdown as compared to 23.2 during last year's test. This well is in stable condition and will not require any work in the form of chemical cleaning and redevelopment at this time. The pump in this well remains in good condition having been last overhauled in 2010 and is currently operating just above rated design conditions when projected at full speed. No work is recommended on the pump or motor at this time.

Well #5 has a specific capacity of 14.4 gallons per foot of drawdown as compared to 16.0 during our test last year. This well was last chemically cleaned and redeveloped in the fall of 2009 and requires that service once again. As seen in the attached graph, we would hope to redevelop to 19.2 or more, a 25%+ increase in capacity. The pump and motor in this well were last pulled and overhauled in the fall of 2009 and are currently projected to operate right at the design point. However, this pump cannot be run at rated design, 750 GPM, because the well is no longer capable of this capacity. Our technician had to throttle the pump back in order to keep it on the airline. It is important that the well be cleaned to ensure that you are getting the most out of your system.

Thank you for this opportunity to be of service to you. Your business is most appreciated.

Sincerely,

PERRLESS MIDWEST, INC.

Joel A. Annable

Joel A. Annable
Project Manager

JAA:ftw
Enclosures

55860 Russell Industrial Pkwy., Mishawaka, IN 46545
574.254.9050 phone 574.254.9650 fax www.peerlessmidwest.com

PEERLESS MIDWEST INC
55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Cassopolis City Cassopolis State MI

Location 1800' North of Hospital Street & 20' East of North Street (Extended); 200' South of Well #5

Well No. 4 Date Drilled 11/19/1997 Dia. 24" x 16" Depth 154' Type Well GW

Screen ID. 16" Screen Length 25' Depth to Top of Screen 129' Type Screen SSWW

Dates of Cleaning

Phone (269) 445-8098 Cell (269) 591-0423 Person to Contact Ben Anderson

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1997	42.66'	800	84.15'	-	19.3
AFTER LAST CLEANING						
AFTER LAST TEST	2014	52'	720	83'	62#	23.2
AT PUMPS RATED FLOW						
AT SYSTEM OPERATING PSI	2015	51'	700	84'	60#	21.2

Test Completed Through Meter X Flange or Thread Size 4" Confined Space Entry? No

Motor HP 60 Make US Volts 460 RPM 1775 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required

Pump Mfg. Goulds Serial No. 897668 Airline Length 100'

Rated Capacity: 750 GPM 250' TDH Operating Pressure 61#

Total Setting 114' 6" Size of Packing 3/8" Date Installed 1998

Dates of Overhaul 2010, 2013(new motor)

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease X Repack Pump X Grease Pump

Pump is Presently Developing *752 **GPM** *257' **TDH** **Projected Curve Capacity** 750 **GPM** *258' **TDH**

Shut Off Pressure NDA PSI Rated Shut Off Head 314 ft. Calculated Shut Off Head NDA ft.

Electrical Data (With Pump in Operatior 480 V 54 / 53 / 56 Amps 74.3 @ 460 v Full Load Amps

Location of Power Lines Underground Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grad 12" Materials Needed to Clean Well Take out 10-1/2" long, 8" spool or turn pump. Need 8" x 6" reducer, 3 hoses to tank, and 100' to waste.

Need a Smeal to Raise Pump? * Remarks * Test Ran at 1652 RPM, Projected Results at 1775 RPM. Meter Test.

Maintenance: Meter or 8" x 4" threaded flange out wall, 1 fire hose to waste. Has VFD. Record RPM's.

*Need smeal if 8" elbow is longer than 10-1/2".

Inspected By John Kollar Date Inspected January 5, 2015

PEERLESS MIDWEST INC
55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Cassopolis City Cassopolis State MI

Location 2000' North of Hospital Street & 75' East of North Street (Extended); 200' North of Well #4

Well No. 5 Date Drilled 12/10/1997 Dia. 24" x 16" Depth 151' Type Well GW

Screen ID. 16" Screen Length 25' Depth to Top of Screen 126' Type Screen SSWW

Dates of Cleaning 2004, 2009

Phone (269) 445-8098 Cell (269) 591-0423 Person to Contact Ben Anderson

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1997	43.61'	1016	91.3'	-	21.3
AFTER LAST CLEANING	2009	46'	770	86'	63#	19.2
AFTER LAST TEST	2014	49'	750	96'	65#	16.0
AT PUMPS RATED FLOW						
AT SYSTEM OPERATING PSI	2015	49'	650	94'	72#	14.4

Test Completed Through Meter X Flange or Thread Size 4" Confined Space Entry? No

Motor HP 60 Make US Volts 460 RPM 1775 Phase 3

Gear Drive None HP - Ratio - RPM Meter Required

Pump Mfg. Layne/Floway Serial No. No Tag Airline Length 100'

Rated Capacity: 750 GPM 245' TDH Operating Pressure 61#

Total Setting 114' 6" Size of Packing 3/8" Date Installed 1998

Dates of Overhaul 2009

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? Cla-Val Change Motor Oil & Grease X Repack Pump X Grease Pump

Pump is Presently Developing 650 **GPM** 260' **TDH** **Projected Curve Capacity** 750 **GPM** 242' **TDH**

Shut Off Pressure 109 PSI Rated Shut Off Head 314 ft. Calculated Shut Off Head 301 ft.

Electrical Data (With Pump in Operation 480 V 66 / 66 / 65 Amps 74 @ 460 v Full Load Amps

Location of Power Lines Underground Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 12" Materials Needed to Clean Well Take out 12" long, 8" spool or turn pump. Need 3 hoses to tank and 100' to waste.

Need a Smeal to Raise Pump? No Remarks Meter Test. Used (1) 100' Airline Gauge.

Water Coming Out Under Head. HAD TO VALVE BACK TO KEEP ON AIRLINE.

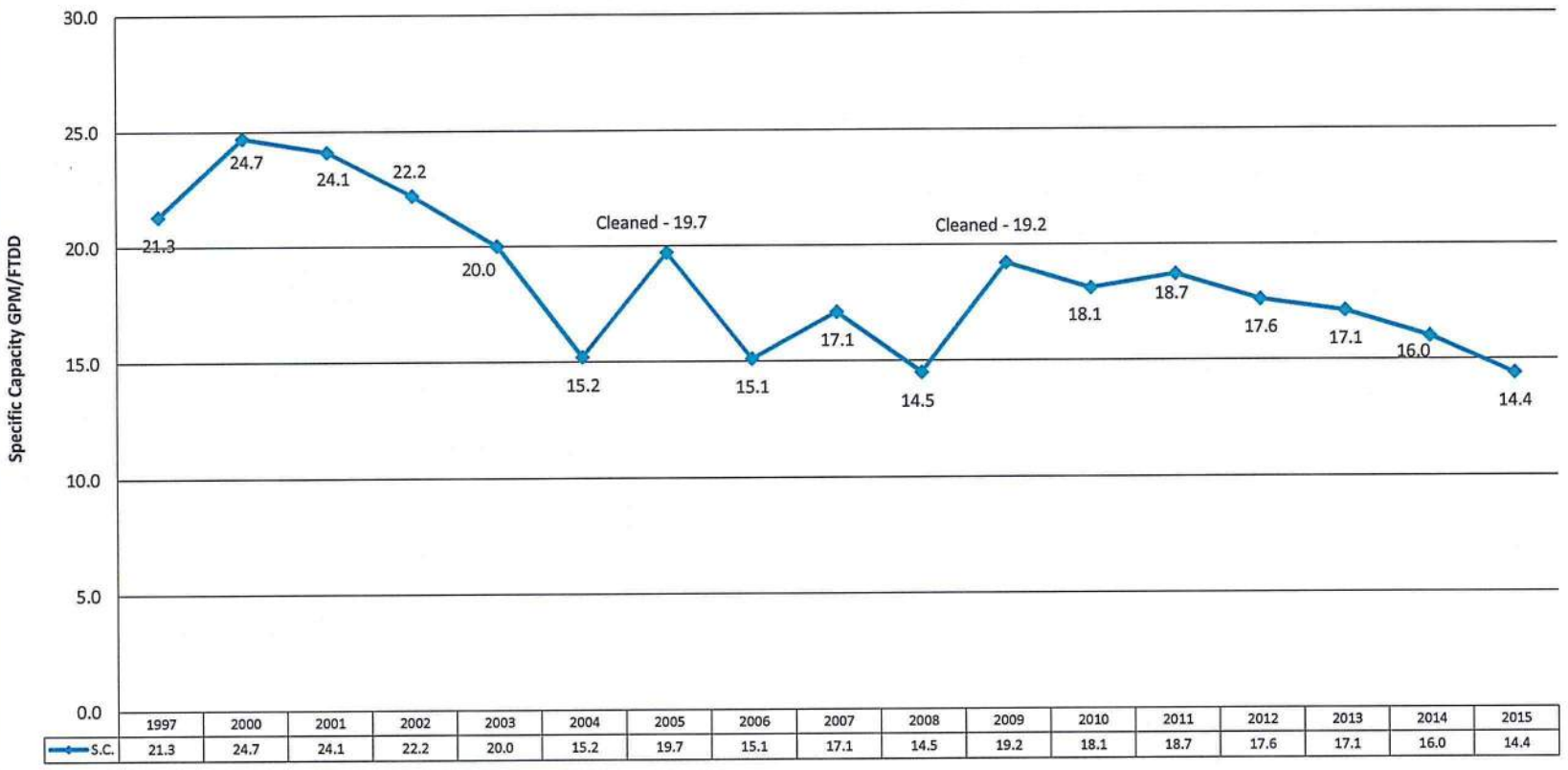
Maintenance: Meter or 8" x 4" threaded flange out wall, 1 fire hose to waste. Take off outside cap, blow off read meter.

Inspected By John Kollar Date Inspected January 5, 2015

Specific Capacity Trend Analysis

Village of Cassopolis
Well #5

PEERLESS MIDWEST INC.



	1997	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
S.C.	21.3	24.7	24.1	22.2	20.0	15.2	19.7	15.1	17.1	14.5	19.2	18.1	18.7	17.6	17.1	16.0	14.4

PEERLESS MIDWEST INC

April 29, 2015

Mr. Ben Anderson
Village of Cassopolis
Water Department
117 South Broadway
Cassopolis, MI 49031

Re: Updated Records From Recent Well Cleaning

Dear Mr. Anderson:

Please find enclosed the updated well history report and well cleaning report for Well #5. These records are important and should be inserted into your record book for future reference.

We appreciate the opportunity to be of service to you and the Village of Cassopolis. If you have any questions about this information, or if there is anything else we can do for you, please do not hesitate to contact us.

Sincerely,

PERRLESS MIDWEST, INC.

Joel A. Annable
Project Manager

JAA:ftw
Enclosures

55860 Russell Industrial Pkwy., Mishawaka, IN 46545
574.254.9050 phone 574.254.9650 fax www.peerlessmidwest.com

VILLAGE OF CASSOPOLIS
CASSOPOLIS, MICHGIAN

HISTORY OF WELL #5

1997 Drilled new – Static 43.61', pumped 1016 GPM @ 91.30' pumping level, specific capacity 21.3.

2004 Well cleaned. Before cleaning, static was 48', pumped 626 GPM at a pumping level of 100' with a specific capacity of 12.0. After cleaning, static water level was 48', pumped 737 GPM at a pumping level of 93' with a specific capacity of 16.3.

2009 Well cleaned. Before cleaning, static was 46', pumped 632 GPM at a pumping level of 94' with a specific capacity of 13.1. After cleaning, static water level was 46', pumped 770 GPM at a pumping level of 86' with a specific capacity of 19.2.

2015 Well cleaned. Before cleaning, static was 48', pumped 750 GPM at a pumping level of 99' with a specific capacity of 14.7. After cleaning, static water level was 48', pumped 750 GPM at a pumping level of 95' with a specific capacity of 15.9.

PEERLESS MIDWEST INC
55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

File #: 13920

WELL CLEANING

Our Job No. 28341 Date Started 2/23/2015

Customer No. _____ Date Finished 2/27/2015

Owner Village of Cassopolis City Cassopolis State MI

Well No. 5 Location N 41.88967 W 86.02493

Dia. 24"X16" Depth 151' Screen 16"SSWW0.025 Type Well G W

Dates of Cleaning 2004, 2009, 2015

Pump Mfg. Layne Serial No. _____ GPM 750 TDH 235

	Date	Static	GPM	Pumping Level	Pump Pressure	Specific Capacity
Original Performance	1997	43.61'	1016	91.3'		21.3
Test Before Cleaning	2/23/15	48'	750	99'	75#	14.7
Test After Cleaning	2/27/15	48'	750	95'	70#	16.0

TREATMENT

Date	Static	GPM	Pumping Level	Pump Pressure	Specific Capacity	Type Treatment
2/23/2015	48'	750	99'	75#	14.7	Test, 100# P6, 10# HTH in well, surge
						pump off, neutralize, test, 50# P6
2/23/2015	48'	750	99'	71#	14.7	10# HTH overnight
2/24/2015	48'	750	98'	68#	15.0	Pump off, test, 110 gal acid, surge,
						test, 25# HTH in well, surge,
						test, 10# HTH, 100# P6 overnight
2/25/2015	48'	750	97'	70#	15.3	Test, 100# sulfamic acid, surge, test,
						55 gal chlorine, 100# P6 overnight
2/26/2015	48'	750	96'	68#	15.6	Test, 110 gal acid, surge, test, 55 gal
						chlorine, 100# P6 overnight
2/27/2015	48'	750	95'	70#	15.9	Test, took sample, put back together

CHEMICALS REQUIRED

Sodium Tripolyphosphate 350 lbs. HCL Acid 220 gal. Dry Chlorine 55 lbs. Caustic _____ lbs.

Sodium Bicarbonate 100 lbs. Citric Acid _____ lbs. Potassium Permanganate _____ lbs. Sodium Metabisulfate 100 lbs.

Calcium Hypochlorite 110 gal. Sulfamic Acid 100 lbs. Others J. Rasmussen

Soda Ash _____ lbs. Wetting Agent _____ gal. Foreman A. Burks

PEERLESS MIDWEST INC

January 22, 2014

Mr. Ben Anderson
Village of Cassopolis
Water Department
117 South Broadway
Cassopolis, MI 49031

Re: Annual Well and Pump Inspections

Dear Mr. Anderson:

Enclosed with this letter, please find the results of the well and pump inspections we recently performed. Please keep these with your permanent records. In addition, we have enclosed a copy of our invoice to perform this service.

Well #4 has a specific capacity of 23.2 gallons per foot of drawdown as compared to 22.9 during last year's test. This well is in stable condition and will not require any work in the form of chemical cleaning and redevelopment at this time. The pump in this well is in excellent condition having been last overhauled in 2010 and is currently operating just above rated design conditions when projected at full efficiency. No work is recommended on the pump or motor at this time. new pump in 2013

Well #5 has a specific capacity of 16.0 gallons per foot of drawdown as compared to 17.2 during our test last year. This well was last chemically cleaned and redeveloped in the fall of 2009 and remains in satisfactory condition. The pump and motor in this well was last pulled and overhauled in the fall of 2009 and is currently operating right at its rated design condition at full efficiency. No work is recommended on the pump or motor at this time.

To summarize, your system remains in excellent shape and requires no work at this time.

Thank you for this opportunity to be of service to you. Your business is most appreciated.

Sincerely,

PERRLESS MIDWEST, INC.

Joel A. Annable

Joel A. Annable
Project Manager

JAA:ajw
Enclosures

55860 Russell Industrial Pkwy., Mishawaka, IN 46545
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PEERLESS MIDWEST INC
55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Cassopolis City Cassopolis State MI

Location 1800' North of Hospital Street & 20' East of North Street (Extended); 200' South of Well #5

Well No. 4 Date Drilled 11/19/1997 Dia. 24" x 16" Depth 154' Type Well GW

Screen ID. 16" Screen Length 25' Depth to Top of Screen 129' Type Screen SSWW

Dates of Cleaning

Phone (269) 445-8098 Cell (269) 591-0423 Person to Contact Ben Anderson

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1997	42.66'	800	84.15'	-	19.3
AFTER LAST CLEANING						
AFTER LAST TEST	2013	52'	*710	83'	58#	22.9
AT PUMPS RATED FLOW						
AT SYSTEM OPERATING PSI	2014	52'	*720	83'	62#	23.2

Test Completed Through Meter ___ Flange or Thread Size 4" Confined Space Entry? No

Motor HP 60 Make US Volts 460 RPM 1775 Phase 3

Gear Drive None HP - Ratio - RPM Meter Requirec

Pump Mfg. Goulds Serial No. 897668 Airline Length 100'

Rated Capacity: 750 GPM 250' TDH Operating Pressure 61#

Total Setting 114' 6" Size of Packing 3/8" Date Installed 1998

Dates of Overhaul 2010, 2013(new motor)

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? No Change Motor Oil & Grease No Repack Pump 3 Rings Grease Pump ___

Pump is Presently Developing 720 **GPM** 226' **TDH** **Projected Curve Capacity** 750 **GPM** 219' **TDH**

Shut Off Pressure NDC PSI Rated Shut Off Head 314 ft. Calculated Shut Off Head NDA ft.

Electrical Data (With Pump in Operatior 420/421/421 V 60 / 60 / 59 Amps 74.3 @ 460 v Full Load Amps

Location of Power Lines Underground Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grad 12" Materials Needed to Clean Well Take out 10-1/2" long, 8" spool or turn pump. Need 8" x 6" reducer, 3 hoses to tank, and 100' to waste.

Need a Smeal to Raise Pump? * Remarks *Tests were ran at 54Hz.

Maintenance: Meter or 8" x 4" threaded flange out wall, 1 fire hose to waste. Has VFD. Record RPM's.

*Need smeal if 8" elbow is longer than 10-1/2".

Inspected By Brent Williams Date Inspected January 17, 2014

PEERLESS MIDWEST INC

55860 Russell Industrial Parkway / Mishawaka, Indiana 46545 / 574.254.9050 / Fax 574.254.9650

WELL & PUMP SERVICE INSPECTION REPORT

Owner Village of Cassopolis City Cassopolis State MI

Location 2000' North of Hospital Street & 75' East of North Street (Extended); 200' North of Well #4

Well No. 5 Date Drilled 12/10/1997 Dia. 24" x 16" Depth 151' Type Well GW

Screen ID. 16" Screen Length 25' Depth to Top of Screen 126' Type Screen SSWW

Dates of Cleaning 2004, 2009

Phone (269) 445-8098 Cell (269) 591-0423 Person to Contact Ben Anderson

	DATE	STATIC	G.P.M.	PUMPING LEVEL	PRESSURE	SPECIFIC CAPACITY
ORIGINAL	1997	43.61'	1016	91.3'	-	21.3
AFTER LAST CLEANING	2009	46'	770	86'	63#	19.2
AFTER LAST TEST	2013	51'	740	94'	67#	17.2
AT PUMPS RATED FLOW	2014	49'	730	95'	68#	15.9
AT SYSTEM OPERATING PSI	2014	49'	750	96'	65#	16.0

Test Completed Through Meter ___ Flange or Thread Size 4" Confined Space Entry? No

Motor HP 60 Make US Volts 460 RPM 1775 Phase 3

Gear Drive None HP - Ratio - RPM Meter Requirec

Pump Mfg. Layne/Floway Serial No. No Tag Airline Length 100'

Rated Capacity: 750 GPM 245' TDH Operating Pressure 61#

Total Setting 114' 6" Size of Packing 3/8" Date Installed 1998

Dates of Overhaul 2009

THE FOLLOWING IS TO BE PERFORMED DURING EACH INSPECTION

Is Check Valve Leaking? Cla-Val Change Motor Oil & Grease X Repack Pump 6 Rings Grease Pump ___

Pump is Presently Developing 750 **GPM** 246' **TDH** **Projected Curve Capacity** 750 **GPM** 246' **TDH**

Shut Off Pressure 112 PSI Rated Shut Off Head 314 ft. Calculated Shut Off Head 308 ft.

Electrical Data (With Pump in Operation 491/493/494 V 67 / 66 / 65 Amps 74 @ 460 v Full Load Amps

Location of Power Lines Underground Can Electrical Box be Locked Out? Yes

Distance From Top of Pump Pedestal to Grade 12" Materials Needed to Clean Well Take out 12" long, 8" spool or turn pump. Need 3 hoses to tank and 100' to waste.

Need a Smeal to Raise Pump? No Remarks OCV valve is leaking from top of stem.

Maintenance: Meter or 8" x 4" threaded flange out wall, 1 fire hose to waste. Take off outside cap, blow off read meter.

Inspected By Brent Williams Date Inspected January 17, 2014

Appendix H

Water Rate Ordinance
and Current Rate Resolution

Village of Cassopolis, MI
Friday, August 30, 2019

Chapter 300. Sewers and Water

Article III. Operation of Water Supply and Sewage Disposal System; Rates

[Adopted 2-9-1998 by Ord. No. 216 (Ch. 54, Art. II, of the 2003 Code of Ordinances)]

§ 300-48. Definitions.

The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

REVENUE and NET REVENUE
Shall be understood to have the meanings as defined in Section 3 of Public Act No. 94 of 1933 (MCLA § 141.103).

SYSTEM
The complete water supply and sewage disposal system of the Village, including all wells, storage tanks, mains, lines, pumps, treatment facilities and all other facilities used or useful in the storage, supply and distribution of potable water, and the collection and treatment of sanitary sewage, including all appurtenances thereto, and including all extensions and improvements thereto, which may be acquired.

§ 300-49. System to be operated on public utility rate basis.

It is determined to be desirable and necessary for the public health, safety and welfare of the Village, that the water supply and sewage disposal system of the Village be operated by the Village on a public utility rate basis in accordance with the provisions of Public Act No. 94 of 1933 (MCLA § 141.101 et seq.).

§ 300-50. System to be controlled by Village Council.

The operation, maintenance, alteration, repair and management of the system shall be under the supervision and control of the Village Council. The Village Council may employ such persons in such capacities as it deems advisable to carry on the efficient management and operation of the system, and may make such rules, orders and regulations as it deems advisable and necessary to assure the efficient management and operation of the system.

§ 300-51. Rates fixed to provide sufficient funds.

The rates fixed are estimated to be sufficient to provide for the payment of the expenses of administration and operation of the system, for maintenance of the system, as are necessary to preserve it in good repair and working order, and to provide for such other expenditures and funds for

the system as this article may require. Such rates shall be fixed and revised from time to time as may be necessary to produce these amounts.

§ 300-52. No free service.

No free service shall be furnished by the system to any person, firm or corporation, public or private, or to any public agency or instrumentality.

§ 300-53. Rates established by resolution.

Rates to be charged for service furnished by the system shall be as established by resolution.

§ 300-54. Disconnection and reconnection charges.

If water is turned off for nonpayment of utility charges, a disconnection charge in the amount established by resolution shall be assessed which shall be paid prior to water service being reestablished to the premises.

§ 300-55. Hydrant rental.

For the use of water through fire hydrants and for the availability of such water, the Village shall pay from the general funds of the Village, annual hydrant rental in the amount established by resolution, which shall be paid in four quarterly installments with such installments coming due on the last day of the month of each quarter of the fiscal year established for the Village.

§ 300-56. Special rates.

For special services or in special circumstances, or where no water service is provided or no water meter installed, the Village Council shall establish by contract, resolution or ordinance, a special rate for water and/or sewer services.

§ 300-57. Billing.

Bills for service from the system shall be due and payable on the tenth of each month. All bills not paid when due shall be charged a penalty of 10%. In addition to other remedies for collection available, the Village shall have the right to shut off water to any premises when utility charges are not paid by the 20th of each month. Each premises shall pay for water and sewer service in accordance with rates established in this article.

§ 300-58. Enforcement; collection; lien.

Charges for services provided by the system shall constitute a lien on the property served, and if not paid within six months after they become due, the official in charge of the collection thereof shall, prior to April 1 of each year, certify to the Village assessing officer, the facts of such delinquency, whereupon the Village assessing officer shall enter such delinquent charges upon the next general Village tax roll as a charge against such premises. The charges shall be collected and the lien enforced in the same manner as general Village taxes against such premises are collected. The Village shall have such other and further remedies as have been established by Public Act No. 178 of 1939 (MCLA § 123.161

et seq.). All remedies are cumulative along with other actions, proceedings and remedies permitted by law.

Resolution 2014-05
Village of Cassopolis
Cass County, Michigan

A RESOLUTION APPROVING AN INCREASE IN WATER AND SEWAGE RATES AND MANAGEMENT AS PRESENTED:

WHEREAS; the Village of Cassopolis desires to update various water and sewage fees to reasonably reflect the Village's costs to provide these services to the citizens of the Village and Customer Communities:

WHEREAS: in order to continue to provide water and sewer service to the public, and to have the necessary funds to pay and maintain said service, and to meet the debt service obligations on the proposed improvements, certain rates, charges and fees need to be increased and management items need to be addressed

THEREFORE, the Village adopts the **Utility Rates** as follows:

FURTHERMORE, the Village hereby adopts the practice of Fee Adjustments reflecting inflation by the Consumer Price Index for All Urban Consumers (CPI-U) category **or** 5% per year: Water, Sewer, and Trash Collection Services, as published by the U.S. Department of Labor Statistics. The Village shall annually adjust the User Charge System, with the exception of any fixed debt service component.

FURTHERMORE, the Village adopts the following **Treated Water Rate Provision**:
Charges for all treated water consumed shall be made according to the following rate schedule:

(1) **Readiness-to-serve charge**: Flat monthly rate, based on meter size, as follows:

Meter Size (in.)	Monthly Charge
5/8	$ 4.00
1	$ 8.00
1 1/2	$ 16.00
2	$ 24.00
3	$ 36.00
4	$ 72.00

(2) **Usage charge** (to be adjusted annually by Council pursuant to CPI (above) as set forth herein): 1 to 4,000 gallons = $16.55 then $4.83 per 1,000 gallons thereafter.

FURTHERMORE, the Village adopts the following **Sewer Rate and Readiness-to-Serve Provision**:
The provisions of this section apply to all sewage disposal rates and charges made by the Village for sewer services provided hereunder.

(1) Generally, charges for sanitary sewer service shall be levied upon those customers with a sewer connection to the sanitary sewer, as follows:

a. **Readiness-to-serve charge**: Flat rate, based on meter size, as follows:

Meter Size (in.)	Monthly Charge
5/8	$ 12.00
1	$ 16.00
1 1/2	$ 24.00
2	$ 36.00
3	$ 72.00
4	$ 144.00

(2) **Usage charge** (to be adjusted annually by Council pursuant to CPI (above) as set forth herein):

a. Collection System $ 5.12 per 1,000 gallons of water consumed

FURTHERMORE, the Village hereby adopts the following **Temporary Service Provision**:
Temporary use of water and sewer facilities may be provided on approval of the Public Works Superintendent and Village Manager under such terms as may be directed by the Superintendent, which terms shall, in all instances, be sufficient to compensate the Village for all expense incurred and water used.

FURTHERMORE, the Village hereby adopts the following **Change of Ownership or Occupancy Provision**:
Whenever a customer ceases to use the facilities provided for in this chapter through a sale of property, a change of tenancy or otherwise, such customer shall notify the Village in writing of his or her termination of the use of such facilities. Failure of a customer to give such notice to the Village shall continue the contract between the Village and the customer, at the option of the Village, and the customer may be held liable for all of the services provided or furnished to the premises until such notice is properly given.

FURTHERMORE, the Village hereby adopts the following **Waste of Water Provision**:
Every customer shall at all times exercise due diligence to prevent the waste of water, and to this end the customer shall be charged with the immediate stopping of all leaks and the proper operation of all shut-off cocks included in his or her installations. At no time shall he or she allow a shut-off cock to remain open and unattended without good use being made thereof.

FURTHERMORE, the Village adopts the following **Emergency Restrictions Provision**:
If an emergency is created due to a shortage of water, the Village reserves the right to restrict the use of water from its mains to whatever degree is deemed necessary in the opinion of the Manager, in which event the Manager shall give notice of such restriction by publication, email, loudspeaker, newspaper, handbill or mail distribution.

FURTHERMORE, the Village adopts the following **Permit Requirement Provision**:
No person shall make or change an installation which may affect the Village water or sewer facilities, or tap into or use any such facility, without first obtaining a permit from the DPW Superintendent.

FURTHERMORE, the Village adopts the following **Meter Reading Provision**:
A meter required under this chapter shall be read by the Department at intervals designated by the Village Manager, and bills to customers shall be rendered in accordance with such reading and with charges as provided in this chapter by the Utility Clerk.

FURTHERMORE, the Village adopts the following **Meter Failure Provision**:
If any meter becomes faulty or fails to register, the customer will be charged at the average consumption rate as shown by the meter reading for the last four billings to such customer when the meter was accurately registering, provided the customer has been using water for such period; otherwise, a full-years' experience of usage on that meter is used to compute the billing.

FURTHERMORE, the Village adopts the following **Inaccessible Meter Provision**:
In cases where the meter reader is unable to gain access to read a meter, a billing shall be made on the basis of consumption or the average of the last four billings to such customer and adjusted upon the billing made for the next time a reading is obtained. If more than two consecutive billings lapse without a reading, the Utility Clerk shall notify the customer by first class mail as to the date and time when a representative will be present to read the meter. Failure to make permanent arrangements, satisfactory to the Department, to read such meter within sixty days of said notification, shall result in the service being discontinued in the same manner as provided for nonpayment of bills, and the aforesaid notice to the customer shall recite such fact.

FURTHERMORE, the Village adopts the following **Street Cut Deposit Provision**:
Where cutting and replacing of concrete or blacktop street surfaces is required, and additional deposit shall be made equal to the cost of making such permanent pavement repairs as are required.

Now, therefore, be it resolved that the Cassopolis Village Council hereby approves this action.

Upon a motion made by Councilmember Ash and supported by Councilmember McGrew the above and foregoing Resolution was duly resolved.

AYES: Johnson, Wagner, Ash, McGrew and Mallo.
NAYS: Sims
ABSENT: Beauchamp
ABSTAIN:

Resolved this 30th day of June 21014

Clare Mallo, Village President

Judith Hartman, Village Clerk

I hereby certify that the foregoing is a true and complete copy of a resolution adopted by the Village Council of the Village of Cassopolis, County of Cass, State of Michigan, at a meeting held on June 30, 2014, the original of which is on file in my office and available to the public. Public notice of said meeting was given pursuant to and in compliance the Open Meetings Act, Act No. 267 of the Public Acts of Michigan 1976, including the case of a special or rescheduled meeting, notice by posting at least 18 hours prior to the time set for said meeting.

Dated: June 30, 2014

Judith Hartman, Village Clerk

RESOLUTION 2017 – 09
VILLAGE OF CASSOPOLIS
A RESOLUTION APPROVING AN INCREASE IN WATER RATES AS PRESENTED

WHEREAS, the Village Council of the Village of Cassopolis may set fees as required under the Village Ordinances as expressly stated therein; and

WHEREAS, it is necessary to collect fees to continue to provide water service to the public, and to have the necessary funds to pay and maintain said service, and to meet the debt service obligations, certain rates, charges and fees need to be evaluated and adjusted; and

WHEREAS, the Village Council desires to increase the Ready to Serve Rate Schedule as follows:

Meter Size (in.)	Monthly Charge
5/8	$ 7.00
1	$ 11.00
1 1/2	$ 19.00
2	$ 27.00
3	$ 39.00
4	$ 75.00

NOW, THEREFORE, BE IT RESOLVED that the Village of Cassopolis by the affirmative vote of its Village Council, does hereby adopt the updated Ready to Serve Rate Schedule.

Upon a motion made by Council member Wagner and supported by Council member Yoder, the above and foregoing Resolution was duly resolved.

AYES: Williams, Sims, Wagner, Yoder, Parsons, Jackson-Ash and Johnson
NAYS:
ABSENT:
ABSTAIN:
Resolved this 12th day of June, 2017.

David L. Johnson, Village President

Tonia Betty, Village Clerk

I hereby certify that the foregoing is a true and complete copy of a resolution adopted by the Village Council of the Village of Cassopolis, County of Cass, State of Michigan, at a meeting held on June 12, 2017 the original of which is on file in my office and available to the public. Public notice of said meeting was given pursuant to and in compliance the Open Meetings Act, Act No. 267 of the Public Acts of Michigan 1976, including the case of a special or rescheduled meeting, notice by posting at least 18 hours prior to the time set for said meeting.

Dated: 6/12/2017

Tonia Betty, Village Clerk

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