Water System Study

Village of Arena
Iowa County, WI
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EXECUTIVE SUMMARY

This study analyzes the current and future water system capabilities, evaluates the options for increasing system capacity, and provides recommendations for water system improvements.

To strengthen the existing water system capabilities, the Village of Arena is in need of adding a second water supply well to improve system reliability and increase overall water system capacity. The need for this project has been identified in past Wisconsin Department of Natural Resources (WDNR) sanitary surveys. Specifically, the 2020 Survey included the following recommendation: "It is highly recommended that the Village of Arena obtain an additional well to increase system reliability and fire protection. Given the amount of water used in the system and the number of residential, commercial, and industrial facilities that rely on municipal water, another well capable of supplying enough water for normal and peak demand would be beneficial to the Village. Well pumps do occasionally break down. Having another well in addition to the elevated storage will ensure an uninterrupted supply of water to customers."

Since the construction of a new well requires a significant cost and planning, this report is meant to help guide the Village with prioritization of water system improvements projects over the next five years.

Table 5.1 on page 18 of this report shows a summary of the recommend water system projects in the next five years, as well as preliminary project cost estimates.

CHAPTER 1 – EXISTING WATER SYSTEM DATA

The Village of Arena is located in Iowa County and has a population of approximately 829 people. The Village Water System was started in 1965 for fire protection and general use. The system includes one well (including chemical addition equipment for the addition of chlorine, fluoride, and polyphosphate), one 150,000 gallon elevated tank built in 2004, and a water distribution system.

The location of the existing well and elevated tank are shown on the water system map, **Appendix A**.

1.1 WATER DISTRIBUTION SYSTEM

According to the Village of Arena 2019 Public Service Commission annual report, the existing water system consists of 31,720 feet (6.0 miles) of total mains ranging from 2-inch to 8-inch diameters.

Table 1.1 Watermain by Size Table

Pipe Size (inches)	Pipe Length (feet)	% of System
2	404	1.3
4	284	0.9
6	17,329	54.6
8	13,703	43.2
Total	**31,720**	**100.0**

There is a minimal amount (2.2%) water main smaller than the current WDNR NR 811 code minimum of 6 inches. This amount totals to 688 linear feet.

According to the 2019 Wisconsin Public Service Commission Water Utility Report, there are 352 residential, 12 commercial, 2 industrial, 10 public authority, 12 multi-family residential metered customers of water, which is a total of 388 metered water services. The system also includes 67 fire hydrants, and 109 water valves. **Appendix A-1** shows the layout of the existing water system, and identifies all watermain less than 6 inches in diameter.

1.2 WELLS

Well #1 is located on Hwy 14 and adjacent to the existing elevated storage tank. Well #1 construction was completed in 1965 to an overall depth of 415. The well is currently producing water from the Dresbach sandstone aquifer from a depth of 316 feet to 415 feet. The outer 16-inch casing (50 feet deep) appears to be the only grouted casing, and does not meet the current NR 811.12 code, which requires a minimum of 60 feet of grouted protective casing. A 10-inch casing is present from 3 feet above ground surface to 170 feet deep, and an 8-inch casing is present from 162 feet deep to 316 feet deep.

In April 2014, the Village replaced the vertical turbine pump, motor and column piping. The vertical turbine well pump is powered by a 40 horsepower, 480-volt three-phase electric motor. The pump is set at 130 feet deep. The static water level was recorded as flowing on the original well

construction report, and as 0 feet in the 2014 pump replacement data. The pumping water level was recorded at 44 feet deep while pumping 381 gpm, which results in a specific capacity of 8.66 gpm/ft. The vertical turbine well pump has an approximate maximum capacity of 500 gpm. The DNR approved capacity for this well is 280 gpm.

In January 2020, the mag meter was calibrated. At that time it was observed that the mag meter was reading 8% higher than actual.

The wellhouse for Well #1 has back-up power provided by a natural gas generator set and operated by a manual transfer switch. The wellhouse has one chemical room that houses three different chemicals (sodium hypochlorite, hydrofluorosilicic acid, and blended phosphate). None of the three chemicals have secondary containment, and the fluoride is not directly vented to the outside. Chemical injection of the fluoride occurs upstream of the last shut-off valve on the process pipe.

1.3 STORAGE FACILITIES

The Village of Arena has one water storage tank. The 150,000 gallon steel spheroid elevated tank was built in 2004 and is located on Hwy 14. The storage tank has not been repainted since its original construction in 2004.

The latest inspection completed on this storage tank was completed in 2019. (See Appendix D) This inspection report noted the tank interior platforms should be blasted and coated as soon as possible. Additionally, some minor rust spots on the exterior and wet interior were noted. A tank mixer is recommended based on the observed ice damage to the wet interior coating. The report noted that the tank exterior could be overcoated within the next few years. If rusting is not addressed, the exterior would need full removal and replacement, which would cost significantly more than overcoating.

1.4 SCADA SYSTEM CONTROLS AND OPERATION

During normal operation elevated storage tank level controls the pump on/off cycle. Well #1 cannot be monitored remotely The SCADA at the well is a simple dialer that can warn of power failures, high/low level alarm, building low temp, etc. There is not ability to monitor water levels, chemical levels, pump running without physically being in the wellhouse.

The operator noted the following operational levels in August 2020:

High Level Alarm =	(SCADA setting 29 ft.)
Pump Off =	(SCADA setting 28 ft)
Pump On =	(SCADA setting 20 ft.)
Low Level Alarm =	(SCADA setting 18 ft.)

1.5 WATER QUALITY

Well #1 raw water quality results for select parameters are summarized as follows:

- Iron results range between 0.3 and 1.6 mg/L (3 samples)
- Manganese results range between 18 and 25 ug/L (3 samples)
- Nitrate results range between 0 and 8.4 mg/L (25 samples)
- Combined Radium 226+228 results range between 2.45 and 4.65 pCi/L (6 samples)

- pH results range between 7.33 and 7.89 (3 samples)
- Total dissolved solids (TDS) results range between 290 and 480 mg/L (3 samples)
- Hardness results range between 280 and 280 mg/L (3 samples)
- Fluoride results range between 0 and 1.1 mg/L (9 samples)

A copy of the 2019 Consumer Confidence Report is included in Appendix E.

Water quality results from Well #1 appear to meet all primary standards for water quality. Except for the one high iron results (1.6 mg/L), all water quality results appears to meet all secondary aesthetic standards as well. Water quality results for iron, nitrate, TDS and fluoride show significant variability.

CHAPTER 2 – WATER SUPPLY AND STORAGE ANALYSIS

2.1 DEFINITIONS AND GUIDELINES

Average Day Pumpage is the total amount of water pumped by the utility in any year, divided by 365 days per year (or 366 days in a leap year).

Maximum Day Pumpage is the highest volume of water pumped over any one day throughout a year. This generally represents the worst case non-fire flow consumption by the system.

Peak Hourly Pumpage is the highest volume of water pumped in any one hour of a day. The peak hourly pumpage is assumed to be full Well #1 pump capacity, which equals the Average Day Pumpage times a 9.1 peaking factor.

Effective Storage is the total volume capable of providing minimum pressure requirements of the system.

Dead Storage the volume below a certain level in a water reservoir where pressure delivered to some customers falls below minimum pressure requirements for the system.

Pressure Requirements are set forth in the Wisconsin Administrative Code and Public Service Commission Code as follows:

> *NR 811.66 (1) (b) Minimum and maximum pressures. The minimum and maximum pressure in service areas shall be 35 and 100 psi respectively at ground level.*
>
> *NR 811.70 (4) The system shall be designed and operated to maintain a minimum residual pressure of 20 psi at ground level at all points in the distribution system under all conditions of flow.*
>
> *PSC 185.82 Pressure standards. (1) Under conditions of normal heavy system demand the residual pressure at the meter outlet shall not be less than 20 p.s.i.g. This standard shall ordinarily require that the distribution main pressure at the corporation stop connection be at least 35 p.s.i.g. The utility is to establish minimum specifications for the service lateral to assure that excessive pressure drop does not occur in the lateral because of its length or for other cause. (2) The maximum pressure at the meter shall not exceed 125 p.s.i.g. The maximum pressure at the meter shall not exceed 100 p.s.i.g. for new systems and, to the extent practical, major additions to existing systems.*

Volume Requirements are set forth in the Wisconsin Administrative Code as follows:

> *NR 811.62 (1): VOLUME REQUIREMENTS. A sufficient quantity of water, as determined from engineering studies, shall be maintained in elevated storage when only one pumping unit to the distribution system is available to serve the water system. This shall be at least an average−day supply under normal operating conditions. When more than one distribution pump is available, the storage shall be in accordance with standard engineering practice. Standard engineering practice is based upon an engineering review of existing and future water supply needs including: type of service and population served; average day, maximum day, peak hour and fire flow demands and durations; water source quality, availability and treatment, pump capacities, auxiliary power, storage capacity, water distribution and costs.*

2.2 POPULATION

Historical census data and future population projections were obtained from the State of Wisconsin Department of Administration (DOA), Demographics Service Center According to the DOA population projections (produced in 2019), the Village is expected to continue to increase from the current year estimate (895). Projections from DOA are:

2025	955
2030	1,010
2035	1,040
2040	1,045

This analysis shows that the population is expected to increase by 16% over the next 20 years.

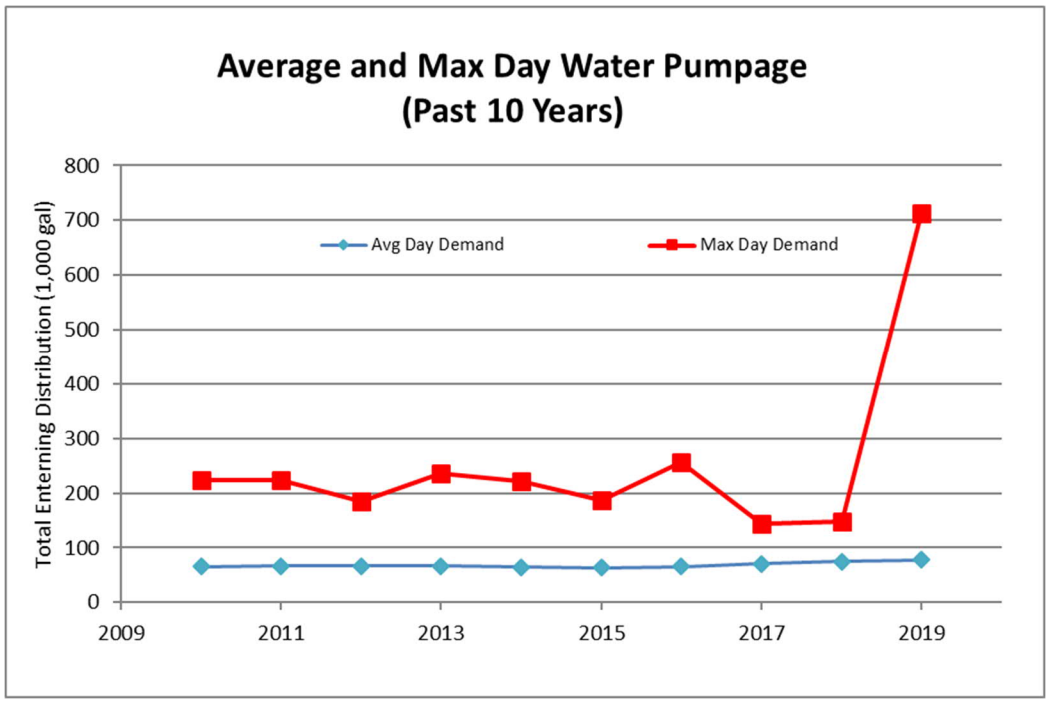
2.3 WATER USAGE

Over the past ten years, the Village's average daily pumpage has been approximately 70,000 gallons per day based on Public Service Commission Reports (PSC). In the same time period, the minimum day pumpage was 0 gallons on November 10, 2019. The maximum day pumpage was 713,000 gallons on December 30, 2019 and was due to water tower maintenance. Figure 3.1 summarizes the water usage over the past 10 years. Table 2.1 shows the annual average and maximum days graphically.

Table 2.1 Summary of Water Pumpage Table

Year	Avg. Day Pumpage (000's Gal.)	Min. Day Pumpage (000's Gal.)	Max. Day Pumpage (000's Gal.)	Percent of Real & Apparent Loss
2010	66	25	223	6%
2011	67	37	223	13%
2012	67	39	185	12%
2013	66	40	235	15%
2014	65	28	221	7%
2015	64	29	187	4%
2016	66	42	**256**	7%
2017	71	41	143	16%
2018	75	32	149	15%
2019	**78**	**0**	713	14%
Avg.	**68**	**31**	**254**	**11%**

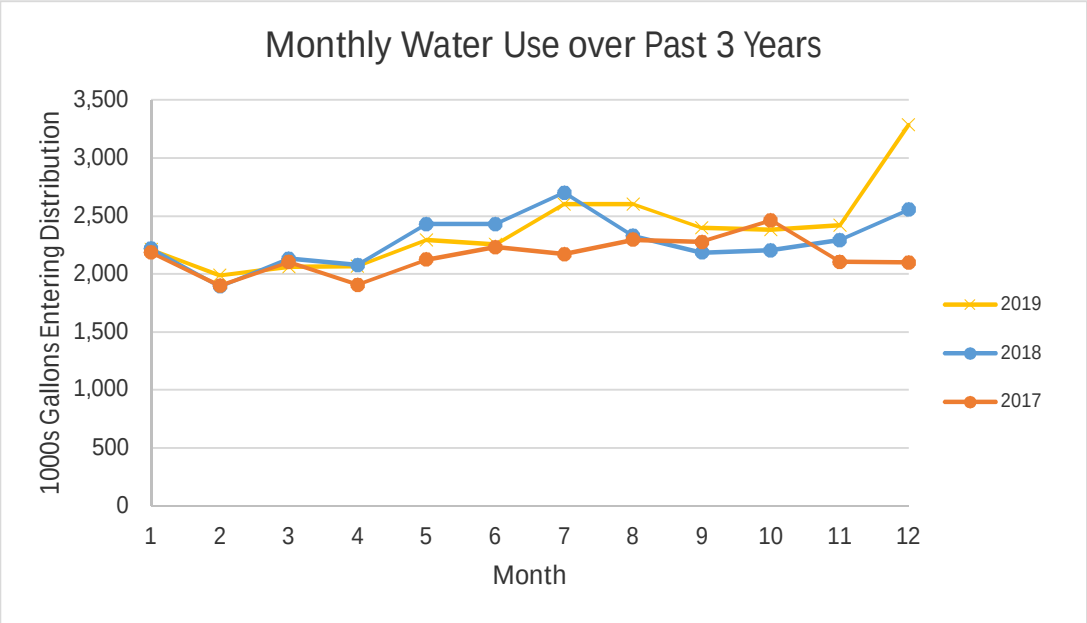
Figure 1 - Average and Maximum Day Water Pumpage (Past 10-Years) Graph



Water pumpage by month is graphed in Figure 2. Over the past three years, the lowest water use months have been January, February, March and April. There appears to be a slight rise in water

use during the summer months. Water use during December appears to be highly dependent upon watermain breaks and elevated water tank maintenance, which was most recently completed in December 2019.

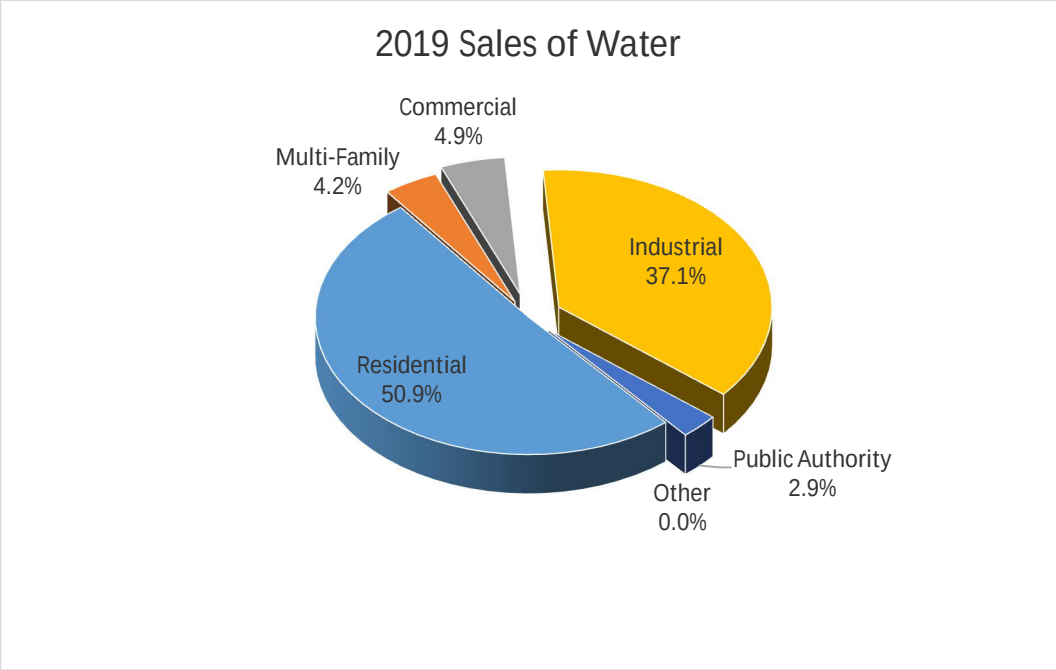
Figure 2 - Monthly Water Use over the Past 3 Years Graph



Water system loss was 14% in 2019, 15% in 2018, and 16% in 2017. Typically, losses greater than 10% are considered excessive by PSC standards and WDNR standards. The Village should remain committed to replacing leak prone segments of water main, as well as testing the existing and future water meters to verify their accuracy.

By analyzing a breakdown of water customers, the Village supplies approximately 55% of its water to residential users, and approximately 42% of its water to industrial and commercial users. See **Figure 3** below.

Figure 3 - 2019 Water Sales by Category



Water records from the ten largest users were obtained, and are detailed below in Table 2.2. The ten largest water users accounted for approximately 43% of the total pumpage in 2020. The largest water user accounted for approximately 35% of the total pumpage is 2020.

Table 2.2 - Ten Largest Water Users in 2019

Rank	Customer	Usage (gal)	% of Total Pumped
1	Hanson, Bill (Cheese Factory)	9,479,715	35.2%
2	B & B Laminates	437,981	1.6%
3	Arena Manor	389,840	1.4%
4	Forseth, David	335,290	1.2%
5	Olson, Jasmin	219,557	0.8%
6	Peoples State Bank	219,060	0.8%
7	Crook, Sean	152,873	0.6%
8	Grandma Mary's Café	140,768	0.5%
9	Affiliated, Century 21	132,110	0.5%
10	Sackett, Chad	126,486	0.5%
	TOTAL	**11,633,680**	**43.2%**

2.4 FUTURE CONDITIONS

Over the next 20 years, population is expected to increase by approximately 16% from 895 to 1,045 according to DOA projections.

For the purposes of the analysis contained in this report, the current design year average day pumpage is the highest value reported in the last five years, which is 78,000 gal (in 2019). The current design year maximum is also the highest value reported in the last five years (256,000 gal). The current design year minimum day pumpage is the lowest value reported in the last five years (0 gal).

The future design year (2040) average day and maximum day pumpage is assumed to be the current design year pumpage times 16% growth across all water users with the large population increase. The future design year minimum day pumpage is assumed to be the same as the current design year. The design assumptions for this report can be summarized as follows:

Table 2.3 - Current and Future Design Year Pumpage

Design Parameter	Current Design Year	Design Year (2040)
Average Day Pumpage (000's Gal.)	78	91
Minimum Day Pumpage (000's Gal.)	0	0
Maximum Day Pumpage (000's Gal.)	256	297
Population	895	1,045

2.5 ASSUMED FIRE FLOW EVENT

[According to the Insurance Services Office (ISO) recommendations for fire flow and duration will vary based on building size, type, location and density of development. Recommendations for fire flow in residential areas is generally 1,500 gpm for two hours. Recommendations for fire flow in commercial areas range from 2,500 gpm for two hours up to 10,000 gpm for four hours.

This study considers the following three fire flow events:

1,500 gpm for two hours
2,500 gpm for two hours
3,500 gpm for two hours

2.6 WELL CAPACITY ANALYSIS

The Village currently has a total of one wells. The maximum capacity of the Well #1 is noted as 500 gpm per the 2014 pump replacement data.

Firm capacity is the capacity of the water supply sources assuming the largest source is out of service. Firm capacity is evaluated for the following two conditions:

1. If the pumping capacity can meet the average day demand by pumping 12 hours per day with the largest water source out of service;

2. If the pumping capacity can meet the maximum day demand by pumping 18 hours per day with the largest water source out of service.

The firm well capacity of the water supply system, which is the capacity with the largest well (Well #1) out of service, is 0 gpm. Therefore, there is an obvious firm well capacity deficiency and need for a second water supply source.

Based on the current demands, Well #1 pumps approximately 2.6 hours on an average day and 8.5 hours on a maximum day.

Based on projected future (2040) demands, Well #1 would pump approximately 3.0 hours on an average day and 9.9 hours on a maximum day.

The maximum day water demand in the Village of Arena over the last 10 years occurred in 2019, and was 713,000 gallons. This use was due to water tower drain and cleaning, and appears to be significantly greater than maximum day water demands over the last 10 years. During this event, system pressure was maintained by continuous pumping of Well #1 and discharging water through pressure relief valves. If a VFD is installed on the existing well, or temporary pressure tanks are installed, the amount of water needed to supply system pressure when the elevated reservoir is out of service would be greatly reduced compared to the 2019 event.

Therefore for the purpose of this study, the second highest maximum day water demand, which was 256,000 gallons in 2019 will be used.

2.7 STATIC PRESSURE AND ELEVATION LIMITS

The highest street elevation in the Village with watermain appears to be approximately 771 feet (Reimann Road), and the lowest street elevation in the Village appears to be 727 feet. The elevated water storage tank ground elevation is approximately 752 feet and the height to overflow is 147 feet. The water tower level typically ranges from 1 foot below the overflow elevation to 9 feet below the overflow elevation.

The elevation difference between the water level in the reservoir and the ground elevation at the user determines the static pressure in the main gravity pressure zone. Static water pressure in the system ranges from 52 psi to 74 psi. Wisconsin Administrative Code NR 811.60(1) requires the system static pressure to be between 35 psi and 100 psi. The system meets NR code requirement for static water pressure.

2.8 WATER SYSTEM CAPACITY ANALYSIS

The existing storage tank has a full tank capacity of approximately 150,000 gallons. Approximately one turnover per day helps keep the water fresh as chorine residual reduces with time. Also the high turnover rate will help keep the tanks from freezing in the winter. Based on the 2019 Average Day Pumpage, the calculated turnover of 150,000 gallons of total storage is 1.9 days.

Based on the minimum day water use (0 gallons), the calculated turnover of 150,000 gallons of total storage is infinite.

Based on the maximum day water use (256,000 gallons), the calculated turnover of 150,000 gallons of total storage is 0.6 days.

Effective storage is defined as the total volume capable of providing minimum pressure requirements of the system. As NR 811 code requires 20 psi pressure at the ground surface in all pumping conditions, effective storage should be based on the reservoir level that results in less than 20 psi at a given location. Most commonly effective storage is the volume of water between the low water level and the bottom of the reservoir. Given a typical low water level of 9 feet below the overflow, the effective storage is assumed to be 75% of the total storage volume.

Different scenarios and calculation methodologies are presented below in evaluating the need for additional storage in the Village.

Scenario #1 – Average Day

Total Storage Volume	150,000 gal.
Average Day Demand (Current)	78,000 gal.
Average Day Demand (Future)	91,000 gal.

This calculation shows that existing storage is adequate for current and future average day demands.

Scenario #2 – Max Day Demand, 3,500 gpm Fire Event, Firm Well Capacity (PSC Equation 3)
This scenario assumes system demand is the sum of a 3,500 gpm fire demand plus the maximum day demand divided by the analysis time basis (2-hours). Supply includes firm well capacity. This is "Equation 3" as presented in "How Much Water Supply Capacity Should a Public Water System Have?", WWA Journal, Spring 2013, by Andy Jacque.

Effective Storage (0.113 MG) / Fire Duration (2 hr)	938 gpm
+ Firm Well Capacity	0 gpm
= Total Supply	938 gpm

Maximum Day Current (.256 MG) /24 hr	177 gpm
+ Fire Demand	3,500 gpm
= Total Demand	3,677 gpm

Spare Capacity (Deficiency)	(2,739 gpm)

This calculation shows a total system space capacity deficiency of approximately 2,739 gpm. According to this calculation, additional system capacity is justified.

Scenario #3 – Max Day Demand, 2,500 gpm Fire Event, Firm Well Capacity (PSC Equation 3)
This scenario assumes system demand is the sum of a 2,500 gpm fire demand plus the maximum day demand divided by the analysis time basis (2-hours). Supply includes firm well capacity. This is "Equation 3" as presented in "How Much Water Supply Capacity Should a Public Water System Have?", WWA Journal, Spring 2013, by Andy Jacque.

Effective Storage (0.113 MG) / Fire Duration (2 hr)	938 gpm
+ Firm Well Capacity	0 gpm

= Total Supply	938 gpm
Maximum Day Current (.256 MG) /24 hr	177 gpm
+ Fire Demand	2,500 gpm
= Total Demand	2,677 gpm
Spare Capacity (Deficiency)	(1,739 gpm)

This calculation shows a total system space capacity deficiency of approximately 1,739 gpm. According to this calculation, additional system capacity is justified.

Scenario #4 – Max Day Demand, 1,500 gpm Fire Event, All Well Capacity

This scenario assumes system demand is the sum of 1,500 gpm fire demand plus the maximum day demand divided by the analysis time basis (2-hours). Supply includes full well capacity:

Effective Storage (0.113 MG) / Fire Duration (2 hr)	938 gpm
+ All Well Capacity	500 gpm
= Total Supply	1438 gpm
Maximum Day Current (.256 MG) / 24 hr	177 gpm
+ Fire Demand	1,500 gpm
= Total Demand	1,677 gpm
Spare Capacity (Deficiency)	(239 gpm)

This calculation shows a total system spare capacity deficiency of approximately 239 gpm. According to this calculation, additional system capacity is justified.

Based on the analysis above, the Village is in need of additional water system capacity.

It is recommended that the Village and the local fire department discuss and understand the capabilities and limitations of the water system.

CHAPTER 3 – ALTERNATIVE ANALYSIS

3.1 ALTERNATIVES TO INCREASE SYSTEM CAPACITY

The following alternatives have been considered in order to increase water system capacity.

1. Do Nothing – This option does not address the firm well deficiency and lack of redundancy in the water supply of the system.
2. Conservation Efforts – Neither conservation efforts, nor reducing non-revenue water has the potential impact that could negate the need for a replacement well.
3. Increase Well Capacity at Existing Well #1 – Since Well #1 would be the only well in the water system, increasing the capacity of Well #1 would not improve firm well capacity. Therefore, increasing the capacity of Well #1 would not avoid the need for a second well.
4. Construct Additional Storage – The provision of additional storage presents the risk of freezing water and water quality problems, and does not improve firm well capacity. Therefore the provision of additional storage is not considered a feasible alternative to construction of a new well.
5. Construct a New Well #2 and Related Infrastructure.– The construction of a new Well #2, wellhouse and related facilities, has been determined to be the most cost-effective means for addressing the water supply deficiency. The estimated cost for this alternative is $1.3 to 1.8 million. Given the presence of existing Well #1, it appears feasible to develop a new well with capacity of 500 gpm and similar water quality to Well #1 that would avoid the need for extensive treatment beyond chemical feed injection.

CHAPTER 4 – RECOMMENDATIONS

4.1 WELL #2 CONSTRUCTION

The construction of a new Well #2, wellhouse and related facilities has been determined to be the most cost-effective means for addressing the current water supply deficiency.

The proposed project would first require a well site investigation. This investigation would review proposed well sites for proximity to potential contamination sources, wetlands, floodplains, and utilities, as well as a review of existing well construction records and publications regarding hydrogeology in order to estimate available water quantity. Construction of a test well is recommended to confirm satisfactory water quality and quantity at a given well site.

The proposed Well #2 project would include the construction of a new potable water municipal sandstone well. The proposed capacity of Well #2 is assumed to be 500 gallons per minute (gpm), which is similar to the pumping capacity of the existing well. A new masonry building (wellhouse) would be constructed at the well site to house the well pump, electrical controls, mechanical piping, chemical feed systems, plumbing, and heating and ventilation equipment. The project also would include the construction of sanitary sewer service, sanitary sewer main, water service (to serve the wellhouse when the well is being maintained), watermain, three-phase electrical service, and natural gas service. The project further would include the installation of a permanent stand-by generator and supervisory control and data acquisition (SCADA) system modifications to incorporate the new facility into the existing municipal water system. Given the age of the current electrical controls equipment, the entire water system SCADA is recommended to be upgraded.

See Appendix F for a description of the process and timeline for the construction of a new municipal well.

4.2 ELEVATED STORAGE TANK IMPROVEMENTS

Recommendations are primarily based on the 2019 Elevated Water storage Tank inspection report included in Appendix D.

The interior platforms are in need of rehabilitation as soon as possible. There are also minor repairs that could be done in the next year to extend the life of the coating systems, namely repairing rust spots on the exterior, repairing rust spots on the wet interior and installing a mixer in the tank to mitigate coating damage due to ice.

Since the cost of overcoating the tank is approximately half the cost of full removal and replacement, it is recommended that the tank be overcoated within the next 2-4 years. If coating systems degrade enough, full removal and replacement will be required. Ideally the overcoating project would take place after a VFD has been installed on Well #1, or Well #2 (with a VFD) is placed into service. By utilizing a VFD, more consistent system pressure could be maintained, and less water would be wasted while the tank is out of service.

4.3 LEAK DETECTION STUDY

Since the reported water loss over the past three years has been approximately 15%, further investigation is warranted. The mag meter at Well #1 was calibrated in January 2020. Meter calibrations should also be done on the meters of the largest water users. Since the Village's largest water customer (Cheese Factory) uses about one-third of the total Village pumpage, it is important to verify accuracy of their meter. Assuming meter calibrations do not result in water loss below 10%, a system-wide leak detection study is recommended.

4.4 WELL #1 IMPROVEMENTS

The 2020 DNR Sanitary Survey has identified a number of recommendations and non-conforming features at the existing wellhouse #1 facility, and include provision of secondary containment for each chemical, modify fluoride injection to be downstream of shut-off valve, direct venting of the fluoride tank, and the addition of a separate chemical room for fluoride.

Additionally, it is recommended that a VFD be installed at Well #1 to allow improved operation when the elevated water storage tank is taken out of service. It is also recommended that the manual transfer switch at this well be upgraded to an automatic transfer switch to allow more immediate well operation in the event of a power failure.

As the SCADA system is limited and dated, the controls at Well #1 should be upgraded at the same time as the Well #2 project.

4.5 UPSIZE SMALL DIAMETER WATERMAIN

The Village has approximately 688 feet of 4-inch and 2-inch diameter watermain. When the streets in these areas are improved, it is recommended to replace these small diameter mains with at least 6-inch diameter mains.

4.6 SUMMARY

A summary of all the recommended improvements for the water system in the next 5-years is included below in Table 5.1.

]

CHAPTER 5 – COST ESTIMATES AND FUNDING

5.1 PROJECT COST ESTIMATES

The total Well #2 project cost is estimated to be between $1.4 to $1.8 million dollars, and depends upon a number of factors such as available water quality and quantity at a specific location, distance to connect to existing utilities (water, sewer, 3-phase electric and natural gas), SCADA control system features, building materials and features, and extent of improvements at the existing water system sites.

Additional cost estimates for recommended projects are included below in Table 5.1.

5.2 FUNDING OPPORTUNITIES

For a summary of funding programs and Village eligibility that may be applicable to the Well #2 project, refer to Appendix G.

The Village submitted the required Intent to Apply (ITA) to the Safe Drinking Water Loan Program (SDWLP) for funding for construction of a second well and associated facilities prior to the October 31, 2020 deadline. Assuming this funding source is pursued for state fiscal year 2022, a SDWLP application would need to be submitted by June 30, 2021 deadline. The projects that could be covered under this SDWLP project are noted below in Table 5.1.

Based on the current criteria for awarding SDWLP principal forgiveness (PF - basically grant funds) to projects the City is eligible for up to 30% PF towards either project with a maximum of $500,000 provided to the community in one funding year. The remainder of the project would be financed with a 20-year, low-interest loan (currently rate is approximately 1%).

The Village also appears to be eligible for USDA Rural Development funding, which could provide up to a 45% grant for the Well #2 project.

Wisconsin Department of Administration Community Development Block Grant – Public Facilities (CDBG-PF) has been used to fund new municipal well projects. Since the current low to moderate income (LMI) level in the Village is less than 51%, the Village is not currently eligible for this program.

The Village has one active tax incremental financing district. Since a new well will ultimately benefit the entire water system, the Village should review the current project list with their financial consultant to determine if the project could be financed using TID funds.

5.3 RECOMMENDED WATER SYSTEM PROJECTS AND SCHEDULE

Table 5.1below shows a summary of the recommend water system projects in the next five years, as well as preliminary project cost estimates.

The proposed Well #2 project would take approximately three years before the new well would be put into service. Therefore it is recommended that the Village start this well process in 2021 by completing a well site investigation and test well construction.

Table 5.1 Recommended Water System Projects and Schedule

Project Description	Estimated Project Cost	Year	SDWL ITA Scope	Comments
Well Site Investigation & Test Well Construction	$100,000	2021	Included	
Elevated Storage Tank Platforms & Mixer	$20,000	2021		
Leak Detection Study	$10,000	2021		
Final Well #2 Construction	$200,000	2022	Included	
Wellhouse #2 Construction	$1,300,000	2023	Included	
Wellhouse #1 Improvements (Chem feed, VFD, and automatic transfer switch)	$60,000	2023	Included	Does not include additional chemical room.
Wellhouse #1 Chemical Room Addition	$150,000	2023	Included	
Water System SCADA Improvements	$60,000	2023	Included	At Well #1 and Elevated Storage Tank
Elevated Storage Tank Overcoating	$200,000	2023		Cost would double if a full remove/replace is needed
Replace Undersized Watermains		Varies		Replace piping along with street reconstruction

APPENDIX A

Existing Water System Map

Figure A-1 Existing Water System Map

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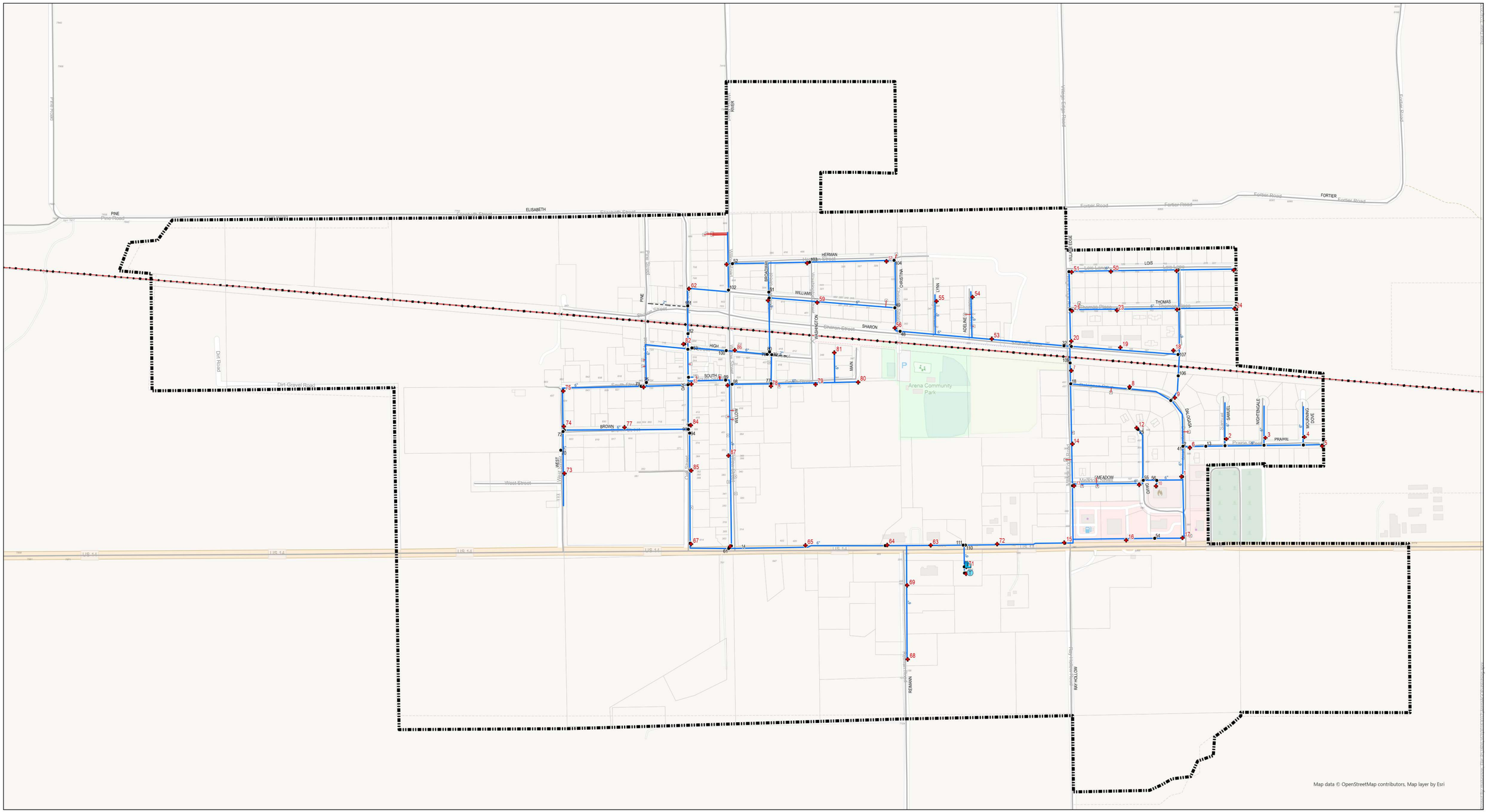

Curb Stop Valves
Hydrants
Main Valves

Water Mains
2"
6"

Water Structures
Well
Tower
Village Limits

Data Sources: MSA, Iowa Co. base data

0 250 500 1,000
US Feet

Water System Map

July 2018

MSA

Village of Arena
Iowa Co., Wisconsin

APPENDIX B

2020 WDNR Sanitary Survey

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State of Wisconsin
DEPARTMENT OF NATURAL RESOURCES
3911 Fish Hatchery Road
Fitchburg WI 53711-5397

Tony Evers, Governor
Preston D. Cole, Secretary
Telephone 608-266-2621
Toll Free 1-888-936-7463
TTY Access via relay - 711

August 11, 2020

PWS ID#: 12500730
Arena Waterworks-MC
Arena, WI
Iowa County

Lisa Kopic

345 W STREET
ARENA, WI 53503

Subject: Sanitary Survey Report and Notice of Noncompliance

Dear Lisa Kopic:

The purpose of a sanitary survey is to evaluate the system's source, facilities, equipment, operation, maintenance, and management as they relate to providing safe drinking water. The sanitary survey is also an opportunity to update the Department's records, provide technical assistance, and identify potential risks that may adversely affect drinking water quality. This Sanitary Survey Report also serves as a Notice of Noncompliance.

On 07/15/2020, Theera Ratarasarn conducted a sanitary survey of your water system, Arena Waterworks. During the sanitary survey Mike Schmidt was present. At the completion of the survey, Mr. Schmidt were briefed on the preliminary findings. This report outlines the final findings, discusses problems that need to be addressed, and timelines for corrective action where appropriate.

A plan for corrective action, including a work schedule must be completed by 09/25/2020. A proposed corrective action plan and schedule is included below. Please contact me to discuss this before 09/25/2020. Depending on the type of corrective action you employ, you may need to obtain prior approval and submit additional plans to the Department.

Due to the Governor's Safer at Home Instructions during the Covid-19 situation, this survey was conducted remotely by phone and email. Attached pictures of the system were taken by Operator Mike Schmidt.

System Summary

The Village of Arena is in northeastern Iowa County, about 25 miles west of the City of Madison. Per DNR records, the original water system began operation in 1965 for fire protection and general use. The population an number of services have increase over the past 20 years. The population in 1975 was 400, increase to 525 in 1990, and is about 834 today (per this survey). The public water system is owned by the Village and includes the following: one well and chemical addition equipment for the addition of chlorine, fluoride, and polyphosphate, a 150,000-gallon elevated tank built in 2004, and a water distribution system. About 78,000-gallons of water is pumped daily (ADD-2019 PSC). There is a generator for emergency power capabilities at the well house that is tested monthly, and quarterly with load. Chlorine is added to the water at the well for disinfection purposes and to control nuisance bacteria in the system. Fluoride is being added for dental health. A polyphosphate is added to sequester iron and reduce red water. It is highly recommended that the Village acquire another well to increase system reliability and fire protection. Over 800 people and commercial/ industrial users rely on the one well for their daily needs and it would be prudent to add another well to prevent disruption to the water supply. It is noted that the Village is in the process of evaluating the system for potential addition of another well.

For additional information, please see the attached survey checklist

Significant Deficiencies

During the course of the sanitary survey, 0 significant deficiencies were identified. 0 Significant deficiencies indicate noncompliance with one or more Wisconsin Administrative Codes and/or represent an immediate health risk to consumers.

Deficiencies

During the course of the sanitary survey, 3 deficiencies were identified. Deficiencies are problems in the drinking water system that have the potential to cause serious health risks or represent long-term health risks to consumers. These deficiencies may indicate noncompliance with one or more Wisconsin Administrative Codes. Corrective action should be completed for these deficiencies as soon as possible.

Deficiency	Compliance Due Date	Code Citation
1. A comprehensive materials inventory has not been completed	09/25/2020	NR 809.119
2. A current, adequate, distribution system map is not available or a copy of the map is not on file with the Department.	11/12/2020	NR 810.26(2)
3. System is not implementing a comprehensive Private Well Abandonment / Permitting Program.	08/12/2021	NR 810.16

Discussion and Schedule for Correction of Deficiencies:

1. Materials Inventory

   Upon review of the Village's lead and copper monitoring and sampling history, it was determined that the Village of Arena has not completed a comprehensive materials inventory for lead, copper, and other materials in the distribution system. The Department recommends that during meter change-outs and residential cross connection inspections, the inspector make note of the service line material entering the home and generally what the premise plumbing is, along with the age of the home. With the future change to the EPA's Lead and Copper Rule, robust material inventories can help water systems keep track of the condition of their systems and be prepared for any potential changes to federal and state regulations related to lead and copper.

Per ss. NR 809.119(4) and NR 809.547(1)(b) Wis. Adm. Code, the Village is required to collect information where possible during normal operations, including checking service line materials when reading meters or performing maintenance activities including meter replacements, complaints, cross connection inspections and all construction activities.

Please indicate in your response due <u>09/25/2020</u> that the Village has established a Materials Inventory for lead and copper within the system. The Material Inventory should be completed as soon as possible but no later than 3 years after the process has been established.

Monitoring Site Plan

An approved site plan was sent to the Village on 06/09/2020. The lead and copper monitoring site plan was discussed with operator Mike Schmidt during the inspection.

2. Per the Village's Well abandonment ordinance, all private wells on facilities also served by public water shall be abandoned or permitted. During the inspection it is noted that there is one (1) residence which has not met this ordinance requirement. <u>Please have this well either abandoned or permitted by 08/12/2021</u>.

3. A recent search of Department files shows that we have an outdated overall map of the water distribution system for Area water system (1985). The owner of every community water system is required to keep copies of a current map of the water system on file with the Department. The map should show the size and locations of all waterworks facilities, such as water mains, valves, hydrants, wells, and storage facilities. Any pressure zones shall be delineated. Overflow elevations and elevations at appropriate intersections should also be included on the map. In addition to our needs, the operators need updated maps to locate hydrants, valves, and curb stops. Per discussion with operator during inspection, there is a more recent copy of the water system map. <u>Please submit an updated electronic copy of your distribution water system map to the Department by 11/12/2020.</u>

Recommendations

During the course of the sanitary survey, 6 recommendations were identified. Recommendations are problems in the water system that hinder your public water system from consistently providing safe drinking water to consumers.

Recommendation
1. Another well is recommended for the system
2. Proper secondary fluoride controls are not provided.
3. Primary contact for water system should work towards obtaining GD1 certification
4. It is recommended that water losses be kept below 10%
5. Changes to the cross-connection inspection schedule is recommended
6. Updates to the ERP is recommended

Discussion of Recommendations:

1. **It is highly recommended that the Village of Arena obtain an additional well to increase system reliability and fire protection. Given the amount of water used in the system and the number of residential, commercial, and industrial facilities that rely on municipal water, another well capable of supplying enough water for normal and peak demand would be beneficial to the Village. Well pumps do occasionally break down. Having another well in addition to the elevated storage will ensure an uninterrupted supply of water to customers.**

2. It is recommended that secondary containment be provided for chlorine, fluoride, and phosphates. When the tanks are replaced, dual wall tanks should be purchased or some other means of providing secondary containment should be provided to bring the chemical storage up to present code standards.

3. It is recommended that the system's primary contact and operator - Mike Schmidt, work towards reclassification to Grade 1 for GD. Current operators that have Grade 1 certifications for the Village are Greg Wipperfurth and Jeff Brindley. Both Mr. Wipperfurth and Mr. Brindley are involved with the system but not the primary DNR contact for the Village's water system.

4. Based on data provided in the annual PSC report prepared by Village of Arena (2019), the Utility has been experiencing losses greater than 10%. The 2019 PSC report shows and unaccounted for water loss of 14%. The Department recommends that the utility investigate and identify possible sources of unaccounted water. Some ways to investigate water loss sources are leak detection studies, increasing the testing of well meters to once every year, or reviewing the billing of customers to avoid any clerical errors. Reducing the unaccounted water amount could result in significant cost savings to the utility and can help the Village have a better idea for future water demands and capacity needs.

5. For residential services, the Department requires cross-connection inspections to be completed and documented when meters are changed – up to 20 years. For commercial properties, the Department recommends that the utility consider re-categorizing some customers to a more appropriate inspection schedule. Commercial customers that have water usage similar to residential services, such as having just break rooms or bathrooms, can be inspected every 10-years. All other high-risk commercial i.e. restaurants, gas stations, dry cleaners etc. and industrial services are required to be inspected every 2 years, similar to industrial facilities. Please indicate in your response due 09/25/2020 the list of commercial services the Village plans to place on a 2-year and 10-year inspection schedule. Public authority buildings that have water usage similar to residential services can also to be placed on a 10-year schedule.

6. It is recommended that the Public Notice and Precautionary Boil Water Advisory Templates be added to the Emergency Response Plan for use when and if boil water events occur. Please see attached Templates.

Non-conforming Features

During the course of the sanitary survey, 3 features that met code requirements at the time of your public water system's construction, but would not be allowed in the current code were discovered. These are referred to as "non-conforming features." Though you are not required to correct these non-conforming features at this time, they will need to be corrected when any major work is done in the future.

Non-conforming Features
1. The fluoride chemical is not being added downstream of the check and shut-off valve.
2. The well(s) do not meet the appropriate construction requirements.
3. Fluoride should be in separate chemical room

Discussion of Non-conforming Features:

1. Per NR811.392(f)2 All chemicals shall be fed downstream of the check valve. Strong acids such as fluorosilicic acid shall be fed downstream of both the check valve and the shut-off valve. During the inspection operator stated that fluoride is most likely the chemical fed upstream of the shut off valve. See picture No. 5 (attached). If this is incorrect please provide the actual sequence of chemical addition in your response due 09/25/2020.

2. The current well (BF949) constructed in 1965 is grouted from 0-50.3'. Per NR 811.12(e)Minimum protective casing. All permanent wells shall have a minimum of 60 feet of grouted protective casing, wherever practical. Please note that continuous disinfection is a requirement (not just recommendation) to be provided for wells with less than 60 feet of grouted protective casing.

3. Per NR811.40(1)L Chemical storage of fluoride should be in a separate room from chlorine and phosphate. The next time major work is done at this well house, the Village may be required to bring the well house up to current standards.

Water Quality Monitoring and Reporting

Your system has a very good record of compliance with monitoring and recording requirements. We appreciate your continued efforts in complying with these Safe Drinking Water Act requirements. There are no current water quality concerns with the Arena water system.

A review of Department records shows a very good history of bacteriological sampling for the last 3-year period. For the Arena water system, 2 samples are required from the distribution system each month and records show that these samples have been collected. The required number of quarterly raw samples have also been submitted. All sample were submitted to certified labs for bacteriological analysis. The only positive sample in the past 3 years was collected on 03/27/2018. TC+ E.Coli negative. As required, the coliform bacteria samples from the distribution system are collected throughout the month and at different locations throughout the system.

The fluoridation program for the Arena water system indicate no exceedances during the last 12-month period. Monthly split samples were collected and submitted to the State Lab of Hygiene. No samples fell outside the 10% differential range. Residuals are maintained between 0.6- 0.9 ppm which falls within the range WDNR recommends.

Lead and Copper
You are encouraged to have processes in place for flushing your system any time the water remains stagnant for an extended period of time and prior to anyone using the water, but not perform either fixture or facility-wide flushing prior to a lead and copper sampling event. Flushing of the lines six hours before sample collection is not allowed by the Lead and Copper Rule. Homeowners should be advised to remove and clean aerators on a regular basis, but not prior to collecting the lead and copper samples. Samples should be collected under typical conditions, after the water sits for at least six hours.

We have been informed the US EPA will be revising the current Lead and Copper Rule. Our recommendations are based on discussions with the US EPA. The Department is stepping up statewide efforts to reduce consumer's exposure to any amount of lead coming from the drinking water. One part of the new rule will likely require utilities to have a more detailed inventory of their water system, including materials on the customer side of the curb box, and possibly include what materials are used inside each residence. In addition, the Department is asking water system to review their lead and copper monitoring sites to ensure that all sites are appropriate locations (kitchen and bathroom sinks) and that the sites meet the required Tier criteria.

Homes with lead services must be included as Tier 1 sites if any part of the service is lead, including the gooseneck, the Utility portion, or the customer portion. Partial lead service line replacement should be avoided, since this could result in an increase of lead and copper levels to the customer. The entire lead service should be replaced, from main to meter. If lead is detected at levels greater than 15 ppb in a home, we are asking that the homeowner be notified within 24 hours, even if the code requirement is 30 days. An updated and approved monitoring site plan was sent to the Village on 06/09/2020.

Required Reports, Records, and Utility Programs
Our records show that the Utility has distributed the required Consumer Confidence Reports (CCRs). All reports were completed, and it appears that the reports were properly distributed. The certification forms were also sent to this office. The CCRs must continue to be distributed and submitted to the Department before July 1 of every year. Please continue to send me your copies of your final report and completed certification forms. The 2019 CCR and certification for Arena was received on 06/29/2020.

System hydrants are required to be flushed at least once every two years and all valves need to be exercised once every two to five years. Flushing of the water mains removes sediment and biofilms that can accumulate in pipes over time and can lead to taste and odor problems. A valve exercising and maintenance program helps guarantee that all valves work properly when needed, especially during emergency situations. Exercising valves on a regular basis locates defective valves, helps prevent accumulation of debris in valve seats, and helps prevent valves from being unable to turn during emergencies. The DNR requires that hydrants be flushed at least once every 2 years. Valves are required to be exercised at least once every 2-5 years.

Cross connection inspections are to be done when meters are changed and customers replace water softeners. Cross connections are any connection to a potable water system which could allow unsafe/unknown material to enter the water system through backpressure or back-siphonage. Any connections between the public water system and any other sources of questionable water, such as a private well, the sanitary sewer, or any other sources of contamination must be eliminated. Residential meters in Arena are changed on a 10 to 20-year schedule. In addition to performing inspections, the water system must also submit an annual report to the Department that shows how many inspections were made in the previous year. The report is due by March 1 of every year. Cross connection inspections play a very important role in ensuring that the quality of the System's water supply is maintained. See Recommendation No. 5.

The Water System is required to enforce a well abandonment ordinance. This ordinance required the proper abandonment of all unused, unsafe, or improperly constructed private wells located on premises within the

System limits that is served municipal water. If well owners wish to keep their well active, they must meet the criteria set forth in the ordinance along with obtaining a well operating permit. If well operating permits are not obtained, then proper abandonment is required to prevent the well from acting as a passage for surface contaminants to enter the aquifer from which the System wells obtain their water. The Utility reports that they have no known private wells remaining. The current well operation permits, or abandonment reports must continue to be kept of file for each well for periodic review by Department personnel. As new wells are discovered or properties are annexed, the owners must also be made aware of the requirements in the private well abandonment ordinance. Per survey inspection, there is one private well permit that has expired. See Deficiency No. 2

Storage Facilities
Basic interior inspections are required once every five years with a full drain down inspection required every other interior inspection. An inspection report must also be completed by the inspector, signed by the Utility, and then submitted to the Department after each inspection. In addition to the 5-year interior inspection, the screens on the vents and overflow pipes, as well as the integrity of the gaskets on the hatches, need to be checked at least once per year. It is noted that the last storage facility inspection was completed in December 2019.

Certified Operator
Chapter NR 114, Wis. Admin. Code, specifies the requirements for a certified waterworks operator. To be fully certified for the Arena water system, the Utility must employ at least one person that is a Grade 1 operator in Groundwater (G) and Distribution (D). Grade T indicates operator-in-training status and successful completion of a written exam. Grade 1 indicates successful completion of Grade T requirements plus one year of satisfactory experience in the subclass. An operator-in-training is given a Grade T status until proper experience is obtained and reported. The Utility must also designate the operator-in-charge. To maintain their certification, all operators must attend continuing education classes. See Recommendation No. 3.

Revenue
For the past 2 years, the Arena Water Utility had a positive net operating income in 2019 and 2018, indicating that operating expenses did not exceed operating revenues. 2019 NOI/ Total Operating Expenses - $47,408/$118,497. 2018 NOI/ Total Operating Expenses - $29,308/$120,508. Based off these numbers, the NOI falls within the acceptable range of 90 days/ year reserve for Total Operating Expenses in 2019 and 2018.

Water System Security
We recommend that you conduct a daily security check of your entire drinking water system to ensure doors are locked and windows secured.

System Summary Information
A water system summary is attached. Please review for accuracy. If there are changes that need to be made, contact Theera Ratarasarn at 608-228-0555.

This sanitary survey serves as an evaluation of the capabilities of your water system. This system has been determined to have adequate technical, managerial, and financial capacity to provide safe drinking water. The ability to plan for, achieve, and maintain compliance with applicable drinking water standards has been demonstrated. **As discussed in the letter, there are a number of deficiencies that must be corrected within the given deadlines for the system to maintain capacity requirements. Failure to correct these deficiencies may result in the Department failing capacity requirements, which will be reevaluated periodically and during each survey, and determined based on the System's actions in correcting the mentioned deficiencies.**

The next sanitary survey of your system is scheduled to take place in 2023. You will be contacted prior to the survey to schedule a date that is convenient for you.

Within 30 days of correcting each significant deficiency, please provide written notification to Theera Ratarasarn of the date each correction was completed. This notification can be sent via email, or regular mail. If using regular mail, the postmarked date will serve as the date of your notification. Failure to provide this notification within 30 days of correcting each significant deficiency will result in a violation. Please also consider correcting the non-conforming features and recommendations discussed in this letter.

Thank you for your assistance during the sanitary survey. If you have any questions, you can reach me by phone at 608-228-0555, by e-mail at theera.ratarasarn@wisconsin.gov, or by postal mail at the address on this letterhead.

Sincerely,

Theera Ratarasarn, P.E.
Water Supply Engineer – WDNR

Encl: Sanitary Survey Pictures
Sanitary Survey Checklist
Boil Water Advisory Templates

cc: Bureau of Drinking Water/Groundwater

Water System Summary Information
System ID: 12500730
System Name: ARENA WATERWORKS
County: Iowa
Type: Municipal Community
Basin: Wisconsin River (lower)
Population: 834
Service Connections: 0
Owner: LISA KOPIC

345 W STREET
ARENA, WI 53503
(608) 753-2133 Fax: (608) 753-2851 vilarena@villageofarena.net
Date Security VA Complete:
Date ERP Complete:
Date ERP Last Exercised/Updated:
Emergency Phone:
Emergency Fax:
Emergency E-mail:

Certified Operators

Name	Lic. #	Expires	Phone/Fax/E-mail	Address 1	Address 2	City, State, Zip
JEFFREY BRINDLEY	33491	05/01/2021	(608) 924-1520ridgewaypwd@mhtc.net	105 S GROVE ST		BARNEVELD, WI 53507
ERIC DRACHENBERG	38025	11/01/2021	(608) 753-2133eric.drachenberg@gmail.com	7187 LOY ROAD		ARENA, WI 53503
MICHAEL SCHMIDT	38431	11/01/2022	(608) 370-2650arenawater@villageofarena.net	345 WEST STREET		ARENA, WI 53503
GREG WIPPERFURTH	31355	05/01/2021	(608) 588-7055	E6535 WIPP RD		SPRING GREEN, WI 53588

Affiliations

Name	Affiliation	Start Date	End Date	Primary?	Phone
BEN THOMPSON	SAMPLER	02/10/2017		Y	608-753-2133
LISA KOPIC	PLAN_CON	09/04/2012		Y	608-753-2133
LISA KOPIC	OWNER	09/04/2012		Y	608-753-2133
ARENA, VILLAGE OF	LEGAL_OWN	10/21/2015		Y	608-753-2133
THEERA RATARASARN	DNR_REP	04/29/2019		Y	608-228-0555

Entry Points and Sources of Water (Basic Data)

Source ID	Name	WUWN	Status	Type	Source	Depth	Cased	Grouted
1		BF949	Active	ENTRY PT/SOURCE	Ground Water Source	415	316	50.3

Entry Points and Sources of Water (Misc. Data)

Source ID	PLSS	Lat./Long.	Pump Cap.	Pump Type	Lube	Aux. Power?
1	T8, R5E, S21, Q-NE QQ-NW	43.16126N x 89.90557W	375	Vertical_Turbine		Yes

Storage

ID/Location	Type	Vol. (gal)	Firm Pumping Capacity (gpm)	Height to Overflow (ft.)	Overflow Elev. (sea-level, ft.)	Aux. Power?	Mfg.	Model
Hwy 14	ELEVATED TANK	50000				No	Caldwell tank	

Booster Stations

ID/Location	Type	Firm Pumping Capacity (gpm)	Aux. Power?

None

System Interconnects

ID/Location	Type	Capacity (gpm)	Metered?	Chemical Injection Capable?

None

Treatment Summary Data

Source ID	Type	Description	Begin	End	Objective(s)	Pump Model	Cap.	Stroke %	Speed %	Sol. Tank Cap.	Dil. Ratio	Comments
1	380	Fluoridation	09/01/2002		Other							
1	421	Hypochlorination, Post	11/21/1997		Disinfection							
1	447	Inhibitor, Polyphosphate	11/21/1997		Corrosion Control							

System Evaluation Summary

Inspector/Reviewer	Date	Report Date	Type	Agency	Response Due	Response Recd
RATARASARN, THEERA	07/15/2020	08/11/2020	SURVEY	DNR	09/25/2020	
BLASEB, BRYCE	10/05/2017	11/02/2017	SURVEY	DNR	12/01/2017	
BLASEB, BRYCE	10/09/2014	11/06/2014	SURVEY	DNR	12/10/2014	
BLASEB, BRYCE	10/11/2011	11/09/2011	SURVEY	DNR	12/15/2011	12/10/2011
BLASEB, BRYCE	10/13/2008	01/12/2009	SURVEY	DNR	02/27/2009	02/03/2009
BLASEB, BRYCE	02/11/2008	02/26/2008	ANNUAL	DNR		
BLASER, BRYCE	02/20/2007	02/27/2007	ANNUAL	DNR		
BLASER, BRYCE	03/15/2006	03/30/2006	ANNUAL	DNR		
BLASER, BRYCE	01/18/2005	02/10/2005	ANNUAL	DNR		
BLASER, BRYCE	10/30/2003	12/10/2003	SURVEY	DNR		
BLASER, BRYCE	09/17/2002	10/07/2002	ANNUAL	DNR		
BLASER, BRYCE	11/13/2001	12/26/2001	ANNUAL	DNR		
BLASER, BRYCE	03/20/2001	04/10/2001	ANNUAL	DNR		

Inspector/Reviewer	Date	Report Date	Type	Agency	Response Due	Response Recd
BLASER, BRYCE	10/12/1999	12/15/1999	ANNUAL	DNR		
BLASER, BRYCE	09/18/1998	09/30/1998	SURVEY	DNR		
BLASER, BRYCE	08/19/1997	09/30/1997	ANNUAL	DNR		
BLASER, BRYCE	03/03/1997	04/11/1997	ANNUAL	DNR		
BLASER, BRYCE	03/15/1996	04/09/1996	ANNUAL	DNR		
BLASER, BRYCE	01/17/1995	03/30/1995	ANNUAL	DNR		
	11/16/1993		SURVEY	DNR		
	09/17/1992		ANNUAL	DNR		

Bacteriological Sampling History

Year	Distribution Safe	Distribution Unsafe	Confirmed Unsafe	Missed Samples	Raw Safe	Raw Unsafe	Fecal Positive?
2020	14			0	3		N
2019	26			0	4		N
2018	23	1		2	4		N
2017	24			0	2		N
2016	24			0	4		N
2015	24			0	4		N
2014	24			0	5		N

Chemical Sampling History

Year	Sample Group	Source ID	Samples Taken	Missed Samples	MCL Violations
2020	FLUORIDE		7	0	0
2020	NITRATE	1	2	0	0
2019	FLUORIDE		12	0	0
2019	DBP		1	0	0
2019	NITRATE	1	4	0	0
2018	FLUORIDE		13	0	0
2018	DBP		1	0	0
2018	NITRATE	1	1	0	0
2017	PBCU		10	0	0
2017	FLUORIDE		11	2	0
2017	SOC	1	1	0	0
2017	VOC	1	1	0	0
2017	DBP		1	0	0
2017	IOC	1	1	0	0
2017	RAD	1	1	0	0
2016	FLUORIDE		12	0	0
2016	DBP		1	0	0
2016	NITRATE	1	1	0	0
2015	FLUORIDE		12	0	0
2015	DBP		1	0	0
2015	NITRATE	1	1	0	0
2014	PBCU		10	0	0
2014	FLUORIDE		12	0	0
2014	VOC	1	1	0	0
2014	DBP		1	0	0
2014	IOC	1	1	0	0
2014	RAD	1	1	0	0

Sample Group	Last Sampled
BACTI	2020
FLUORIDE	2020
IOC	2017
RAD	2017
HAA5	2008
PBCU	2017
NITRATE	2020
VOC	2017
SOC	2017
TTHM	2008
DBP	2019

MCL Violations

Source ID		Contaminant	Concentration	MCL	Units	Viol. Start	Viol. End	Continuing Operation?

None

Definitions

MCL = Maximum Contaminant Limit (as set by the Environmental Protection Agency (EPA))
BACTI = Bacteriological Sample
IOC = Sample for Inorganic Compounds
NITRATE = Nitrate Sample
PBCU = Lead and Copper Sample
RAD = Sample for Radioactivity
SOC = Sample for Synthetic Organic Compounds
VOC = Sample for Volatile Organic Compounds
FLUORIDE = Fluoride from Fluoridation
TTHM = Total Trihalomethane Sample

1

- Well No. 1 BF949

2

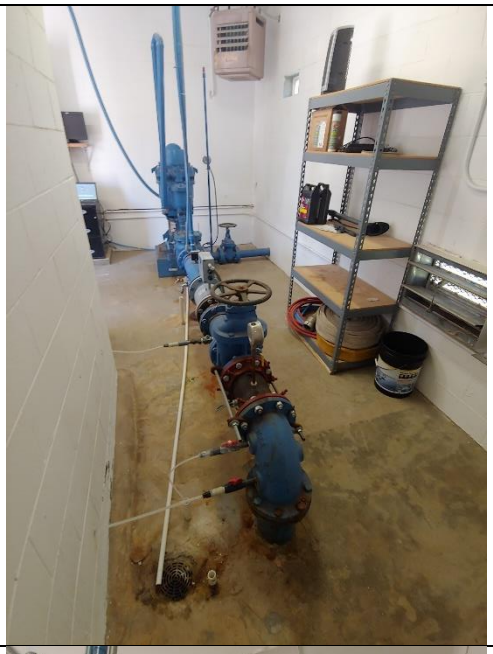
- Well No. 1 – Raw water sample tap

3

- Well No. 1 water meter and chemical injection

4

- Well No. 1 – pump to waste



5

- Well no. 1 components
- Floor drain
- Chemical addition – Fluoride, phosphate, chlorine per direction of water flow

6

- Well No. 1 ceiling access

7

- Well No. 1 EP sample tap

8

- Well No. 1 Emergency generator

9

- Well No. 1 Water meter/ gate valve

10

- Well No. 1 components

11

- Well No. 1 wellhouse

12

- Well No. 1 Chem room

13

- Chemical labels
- Hydrofluorosilicic acid
- LPC-4 Blended corrosion inhibitor
- Azone 15

14

- Chem pumps

15

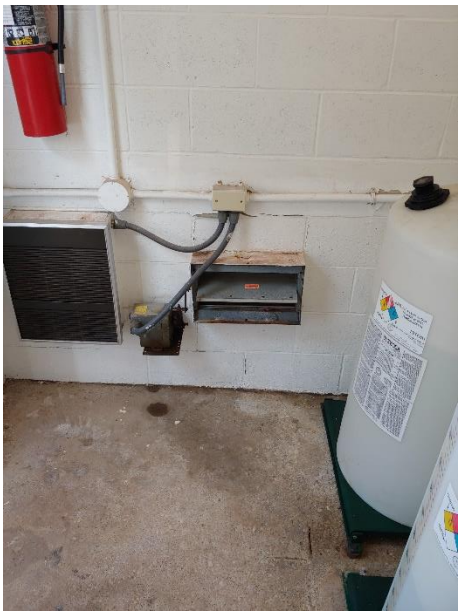
- Fluoride chem pump setting

16

- Corrosion inhibitor chem pump setting

17

- Chorine chem pump setting



18

- Chemical room ventilation

19

- Wash station

- Water tower (150k gallons)

20

- Water tower overflow

21

22

- Overflow screen

Sanitary Survey Checklist for Arena Waterworks, Date of Survey: 07/15/2020

Question	Answer	Comments
I. Is the source adequate (protection, physical components, capacity)?	N	
A. Are there no new contaminant sources identified?	Y	No new contaminant sources per operator
B. Does the well(s) meet the appropriate construction requirements including the elimination of dual aquifer situations? (811.12(1))	N	Well is grouted to 50'. Non conforming
1. Are well construction reports on file and accurate including reconstruction? (811.12(3))	Y	WCR is on file with Department
C. Are unused wells properly abandoned (including report on file with DNR)? (811.13 (1) - (8))	N/A	
D. Do all "emergency" wells have an updated extended abandonment agreement on file with the Department? (810.22; 811.13)	N/A	No emergency wells
E. Are emergency wells set up in the DWS with the appropriate monitoring schedule (quarterly raw water bacti, annual nitrates, 6-year cycle for IOC/SOC/VOC/RADs? (810.22(4)-(6))	Y	
F. Has an adequate wellhead protection program been designed and implemented including a water conservation plan? (811.12(6))	N/A	
G. Is the source capacity adequate to meet current and future demand? (NR 811.26)	Y	Source is listed at 831 gpm. Operating capacity is listed at 375 gpm. ADD is calculated at 78k gpd. Source capacity is adequate. A secondary well is recommended. The Village is in the process of aquiring another well
H. Is the backup source adequate to meet demand including any emergency interconnection? (811.26)	N	No back up source
I. Is the monitoring assessment material accurate and up-to-date? (809.205(5), 809.245(5), 809.115(2) & (3), 809.53(2), 809.547(7), 809.61(1), 809.66(1))	Y	MA material is up to date
J. Are all sources protected from flooding? (811.12(5)(b))	Y	Source is in well house with adequate base
K. None of the sources require groundwater under the direct influence of surface water review? (810.02(25)); (810.27); (811.02(34)); (811.16(2)); (811.17(2))	N/A	
L. Are all sources adequately protected from unauthorized access?(810.23); (811.25(c))	Y	
M. Is the source water from surface water?	N/A	
1. Is the intake adequately separated from contaminant sources? (811.21)	N/A	
2. Is the source water quality the best available? (811.21); (809.75)	N/A	
3. Is the source water quality regularly monitored? (809.331)	N/A	
4. Is there adequate redundancy of the intake and other source facilities?	N/A	
5. Is the intake protected from zebra mussels? (811.232)	N/A	
6. Are the intakes regularly inspected?	N/A	
7. Has water quality or quantity from the intake(s) remained consistent over the last three years?	N/A	
8. Are the intakes free of freezing problems?	N/A	
9. Are the means for collecting intake raw water samples adequate (crypto LT2 chlorine requirements)?	N/A	

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Question	Answer	Comments
10. Is the intake piping valved for back flushing and leak detection? (811.23(1)(f))	N/A	
11. Is the amount of water from the shore wells within the limits of the amount approved for withdrawal (Great Lakes Annex requirements)?	N/A	
12. Are the shore well motors and electrical equipment above grade? (811.23(1)(a))	N/A	
13. Is there sufficient low lift pumping capacity with the largest pump out of service? (811.26)	N/A	
14. Is there backup power for the low lift pumps? (811.27)	N/A	
15. Are the chemical addition and chemical feed points adequate for the shore well? (811.39)	N/A	
16. Can the raw water be sampled prior to any points of chemical addition? (811.37(5)(b))	N/A	
17. Is there a raw water meter? (811.37(5)(d))	N/A	
II. Is the finished water storage facility(ies) adequate, including pressure tank(s)? (NA if none)	Y	
A. Are hydropneumatics tanks inspected at least once every five years and are these inspections documented? (810.13)	N/A	150k Single pedestal sphreroid
B. Does the Hydro-Pneumatic Tank(s) meet the standards in 811.61?	N/A	
C. Are the drains and overflows of elevated and ground level storage facilities brought down to within 12 to 24 inches of the ground surface and discharged with a free air break of at least 12 inches over a splash pad, drainage inlet structure or rip rap? (811.64(4))	Y	See attached picture
D. Are all overflows of elevated storages provided with a sufficient 4 mesh non corrodible screen, and all ground level overflows provided with a sufficient 24 mesh noncorrodible screen? (811.64(4))	Y	See attached picture
E. Are water storage facilities inspected at least once every 5 years and are these inspections documented? (810.14)	Y	Last inspection was in 12/2019
F. Is an annual inspection conducted and documented for all screens on storage structure vents and overflows, and all seals on storage structure inspection hatches? (810.14)	Y	
G. To the best of your knowledge, do the reservoirs meet all of the other NR 811 requirements and is the O & M of the storage facilities adequate? (811 Sub. VII - Hydro Pneumatic Tanks & Sub. IX - Storage Facilities)? Check most recent reservoir inspections.	Y	Per inspection report, the platforms are in need of paint repairs. A new 'DNR complianct hatch gasket' to the access hatch was also added
H. Does the paint on the outside of the storage facility(ies) look adequate and clean with no apparent corrosion? (810.14)	Y	See attachd picture
I. Is the storage capacity sufficient to meet water use demands? (811.62)	Y	Storage capacity is listed at 150k. ADD was calculated at 77k gpd. Storage is adequate
J. Has a recent study for storage been conducted for the system?	Y	Storage is also being studied as part of their process for adding a new well
K. Are adequate security measures in place at the storage facility(ies) to prevent unauthorized access? (NA if no storage) (811.64(2)(d))	Y	
L. Is emergency power available and adequate for pumping from ground reservoir(s)? (811.27)	N/A	No ground reservoir
M. Is the storage facility(ies) protected from flooding? (NA if no storage) (811.63(1)(a), 811.61(1) Hydro-Pneumatic Tanks)	Y	

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Question	Answer	Comments
N. Are buried suction lines from reservoirs under a continuous pressure head, which is higher than the elevation of the ground surface at all times? (811.37(1))	Y	TBK
O. In cases where the primary system cannot provide positive pressures in all areas served by the booster pumps, are elevated storage facilities provided for the boosted zone? (811.82)	Y	All areas within the system have adequate pressure. Around 62-67 psi.
P. Are all exposed ground storage reservoir overflows metal? (811.64(4)(a)3)	Y	
Q. Are the high/low levels set for adequate operation?	Y	
R. Are clear wells used? (811.65(2))	N/A	
1. Are there no direct drain cross-connection to sewers (sanitary and storm) to the clear wells? (811.64(3))	N/A	
2. Is the floor of the clear well at least two feet above the water table? (811.63(4))	N/A	
3. Is overall clear well protection adequate? (811.63(2))	N/A	
4. Do the clear wells have adequate venting, overflows, and access hatches, etc? (811.64)	N/A	
5. Are the clear well high lift pumps above grade? (811.30(1))	N/A	
6. Do the clear well high lift pumps have adequate capacity?	N/A	
7. Are the appurtenances for the clear well high lift pump discharge piping adequate?	N/A	
8. Is there adequate maximum operating capacity for the clear wells, high lift pumps, and discharge piping? (811.65(2))	N/A	
III. Are the pump(s), discharge piping, pump facility(ies) and controls adequate?	N	
A. Is emergency power available to operate one or more of the well pump(s) to supply at least an average day supply of water during a power outage? (811.27)	Y	Emergency power available at well
B. Is the pumping capacity adequate, with the largest unit out of service, to ensure continued operation (firm pumping capacity) (N/A if 50 or less living units)? (811.26(2))	N	Another well is recommended
C. Is the pump facility protected from flooding (i.e. pump house floor >2' above flood elevation)? (811.25(1)(d))	Y	Well/ pump in wellhouse on adequate pump base. Room has floor drain. See pictures
D. Is a properly constructed pump house provided over each well that includes a pump access opening in the roof, concrete floor, outward opening door, proper floor drain (> 2' from well), heater, etc.? (811.25)	Y	See attached pictures
E. Is a minimum 12" high concrete pump base provided for vertical turbine pump installations, or in the case of submersible pumps, does the casing terminate at least 12" above the floor with a minimum 6" high concrete collar surrounding the casing? (811.31(1)); (811.32(1))	Y	See attached pictures
F. Is the seal between the concrete base and metal pump casting or the sanitary seal and the well casing water tight? Are all openings in the well seal or pump casting properly sealed to prevent contamination? (811.31(1)); (811.32(1))	Y	TBK
G. In the case of gravel pack wells, do the gravel refill or observation pipes pass through the concrete pump base at least 4" above the floor and terminate with a threaded cap at least 12" above the floor? (811.14(6))	N/A	
H. For oil lubricated vertical turbine pumps, is the oil a food grade, NSF/ANSI certified product? (811.31(2))	N/A	

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Question	Answer	Comments
I. Does pump discharge piping include all required and properly installed valves and appurtenances (i.e. smooth-end raw water and entry point sample taps, check valve, meter, pressure gauge, chemical injection tap(s), air-vacuum relief valve where required, shut-off valve)? (811.37(5))	Y	
J. For water lubricated pumps, is the water use minimized by the use of a solenoid operated valve or is lube line metered? (811.31(2)(b))	N/A	
K. In cases where the pump is expected to backspin, is a time delay or a ratchet provided to protect the pump from damage if energized while still back spinning? (811.33)	N/A	
L. Is at least one adequately sized well vent installed through the well pump casing, well seal, or concrete pump base and does it terminate at least 24" above the floor in reverse bend (or mushroom style cap) with a 24-mesh screen? (811.36(1))	Y	
M. Are means available to determine well water levels (i.e. electric depth gauge, pressure transducer, or airline and altitude gauge) and is the device properly sealed through pump head or well seal? Is the upper end of any extra airline sealed shut? (811.36(2))	Y	Water levels are adequately reported to DNR
N. Are all threaded faucets properly protected against back-siphonage? (811.06)	Y	
O. Is pump discharge piping adequately painted or coated to prevent corrosion?	Y	See attached pictures
P. If excess pipe sweating and pipe corrosion is noted, is a dehumidifier or other means (i.e. fan ventilation, air conditioning, etc.) provided? (811.25(6))	Y	No excess sweating noticed
Q. Are pump controls adequate for automatic operation of the pump(s)? (811.28(4))	Y	
R. Are all pump discharge meter(s) tested (and recalibrated if needed) at least once every 2 years? (810.13(2)(e), PSC 185.83(2))	Y	Meter last tested/ calibrated 01/28/2020
S. Is the pumping facility(ies) adequately protected against unauthorized access? (810.23) & ((811.25(c)) for CWS's)	Y	
T. Does all well discharge piping and/or delivery piping between a booster pump, which is separated from a ground reservoir, remain under positive pressure which is least above ground elevation? (811.37(1))	N/A	No ground reservoir
U. Is all exposed discharge piping metal? (811.28(5)(b))	Y	See attached pictures
V. Is a means for pumping to waste provided at the pump house? (811.37(4))	Y	See attached picture
IV. Is the water treatment adequate? (NA if no treatment)	N	
A. Are all closed treatment vessels opened up, where practicable, and inspected at a minimum of once every 5 years? (810.13(c))	N/A	Not evaluated during survey
B. Are chemical feeders used?	N	
1. Is the proper chemical feed equipment used for the type of chemical and does it meet all design criteria (anti siphon, minimum stroke of 10% for peristaltic, minimum speed of 12 strokes per minute, proper size rotameters and emergency rotameters)? (811.39(2))	Y	
2. If a peristaltic chemical feeder pump is used, does it have a back-pressure relief valve, pressure gauge and back pressure valve or has alternative criteria been approved? (811.39(2)(e))	Y	TBK
3. Are all chemicals fed at a point of positive displacement, downstream of the check valve, or in alignment with code alternative? (811.39(2)(f))	Y	See picture of chemical injection points

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Question	Answer	Comments
4. Is the location of the chemical feed equipment adequate (minimize length of feed line, serviceable, curbed or contained)? (811.39(3)(a))	Y	
5. Are electrical control settings for chemical feeders adequate (auto controls can convert to manual, controlled electrical outlets clearly marked)? (811.39(4))	Y	
6. Are feed lines installed appropriately (includes corp stops or PVC ball check assembly, injectors installed in vertical pipe or bottom half of horizontal pipe)? (811.39(7))	Y	
7. Is chemical storage and handling procedures appropriate (amount, labels, covered/unopened, scales, tank volume, etc.)((811.40)	N	Secondary containment is recommended for all chemical tanks
8. Are the proper means for determining chemical usage adequate (calculations, scales, tanks)? (811.40)	Y	Graduations and scales are used in the chemical room. See attached pictures
C. Is aeration used? (811.45)	N/A	
1. Has the aeration unit remained the same as the approval?	N/A	
2. Is natural draft aeration used? (811.45(1))	N/A	
a. Is the proper inert media used? (811.45(1)(e))	N/A	
3. Is forced or induced draft aeration used? (811.45(2))	N/A	
a. Is the aeration insect-proof, watertight, and light-proof? (811.45(2)(g))	N/A	
b. Is the water outlet properly sealed to prevent unwanted loss of air? (811.45(2)(i))	N/A	
c. Can interior and exterior sections of the aerator be easily reached or removed for maintenance? (811.45(2)(j))	N/A	
4. Is pressure aeration used? (811.45(3))	N/A	
a. Is the aeration functioning properly and operated properly (811.45(3)	N/A	
5. Is the post aerated water properly disinfected? (811.45(5))	N/A	
6. Is the water properly protected from contamination entering through aeration? (811.45(7))	N/A	
7. Is there proper carbon dioxide removal (aeration) for aggressive water? (811.58(5))	N/A	
D. Is clarification used? (811.47)	N/A	
1. Are duplicate units available for rapid mix, flocculation, or sedimentation? (811.47(1))	N/A	
2. Can one unit be taken out of service without disrupting the treatment process? (NR 811.47(3))	N/A	
3. Is the pre-sedimentation basin properly maintained and operated? (811.47(7)(a))	N/A	
4. Is the rapid mix process properly maintained and operated? (811.47(7)(b))	N/A	
5. Is the flocculation process properly maintained and operated? (811.47(7)(c))	N/A	
6. Is the sedimentation process properly maintained and operated? (811.47(7)(d))	N/A	
7. Are the solids contact units properly maintained and operated? (811.47(7)(e))	N/A	
8. Are the tube/plate settlers properly maintained and operated? (811.47(7)(f))	N/A	
E. Is chlorination used? (811.48)	Y	
1. Is emergency chlorination capable of feeding 2 mg/l in an emergency? (811.48(1)(b))	Y	

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Question	Answer	Comments
2. Are all disinfectants NSF 60 approved? (810.09(1)(c))	Y	See attached picture
3. Is the proper contact time (CT) achieved and proper point-of-application used? (811.48(2))	N/A	CT was not evaluated during survey
4. Are the CT calculations properly calculated (pre/post filtration, C10, tracer study)? (811.02(18)); (810.02(10))	N/A	
5. Is the proper residual testing equipment used (i.e., DPD method) and calibrated? (811.48(3))	Y	
6. If chlorine gas is used, is proper housing available (ventilation, ammonia for leak detection, safety equipment)? (811.48(5))	N/A	Sodium hypochlorite
7. If ammoniation is used, is proper housing available (ventilation, separate from chlorine, hydrochloric acid for leak detection)? (811.48(8))	N/A	
8. Is proper safety equipment for chlorine gas available? (NR 811.48(7))	N/A	
F. Is UV disinfection used? (811.60)	N/A	
1. Does the UV system continue to be in compliance with the plan approval? (min of 40 mJ/sq.cm, lamps housed in quartz sleeves, required valves, UVT analyzers, sample taps) (811.60(5))	N/A	
2. Is the UV system being operated in accordance with the plan approval, including any required pre-treatment, UV dose and documentation (daily bench sheets and documented on the monthly operating reports showing CTs are met) (810.03)	N/A	
G. Is filtration used? (811.49)	N/A	
1. Is rapid rate sand filtration used? (811.49(1))	N/A	
a. Is the proper pretreatment used for water prior to filtration? (811.49(1)(a))	N/A	
b. Is the filter operating at the approved filtration rate? (811.49(1)(c))	N/A	
c. Is surface wash functioning properly? (811.49(1)(h))	N/A	
d. Is air scouring functioning properly? (811.49(1)(i))	N/A	
e. Are the proper appurtenances available for every filter (i.e. handrail, curbing)? (811.49(1)(d) and (j))	N/A	
f. Are the backwash facilities functioning properly? (811.49(1)(k))	N/A	
g. Are roof drains properly diverted away from the filters? (811.49(1)(l))	N/A	
h. Is filter performing as designed? (810.03)	N/A	
2. Is membrane filtration used? (811.50)	N/A	
a. Is pretreatment performing as designed? (811.50(5))	N/A	
b. Is there adequate membrane area to meet peak demands for summer and winter?	N/A	
c. Is backwashing and chemical cleaning effective? (811.50(8) and (9))	N/A	
d. Is membrane integrity testing conducted accordingly? (811.50(10))	N/A	
e. Are fiber repairs done promptly? (810.03)	N/A	
f. Is proper/adequate disinfection achieved (2-log virus for UF & 4-log virus for MF)? (810.27(1)(a) and (b))	N/A	
g. Has a WPDES permit been issued for the backwash discharge to surface water? (811.860(3))	N/A	

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Question	Answer	Comments
h. Are there proper alarms for shutdown and response? (811.50(19))	N/A	
H. Is fluoridation used? (811.51)	N	
1. Do fluoridation chemicals conform to the applicable N.S.F. and A.W.W.A. standards? (811.51)	Y	See attached picture
2. Is proper fluoride storage used (sealed containers, stored indoors, vented to the atmosphere outside of the building)? (811.51(1))	Y	Fluoride tank is not directly vented outside chemical room. Chemical room is vented
3. Is proper housing for fluoridation available? (811.51(2))	Y	
4. Is the chemical feed system properly sized and properly installed? (811.51(3))	Y	
5. Is the fluoride feed rate providing a concentration within the optimal range (0.6 - 0.8 mg/L)? (809.74(1)(a))	Y	Fluoride appears to be within range per monthly pumpage reports
6. Are proper secondary fluoride controls available? (811.51(4))	N	Secondary containment not present
7. Is proper dust control implemented (for powder fluoride)? (811.51(5))	N/A	
8. Is proper protective equipment available onsite? (811.51(6))	Y	
9. Is proper testing equipment available (e.g., electrode method required if adding phosphates)? (811.51(7))	Y	Split samples are within 10% of lab samples
10. Is proper dilution equipment available? (811.51(8))	Y	No diluation per monthly reports
11. Is fluoride feed downstream of the check and shut-off valve? (811.39(2)(f))	N	Fluoride is fed downstream of the check valve but upstream of the gate valve. See picture No. 5
I. Is iron or manganese removed by oxidation-detention-filtration or oxidation-filtration? (811.52(1))	N/A	
1. Is filtration (gravity filter or a rapid rate pressure filter) properly equipped and maintained? (811.52(1)(d))	N/A	
2. If lime process is used, does it meet the requirements of code? (811.52(2))	N/A	
3. If greensand treatment is used, is it properly operating and maintained? (811.52(3))	N/A	
4. If ion-exchange is used, is it properly used and maintained? (811.52(4))	N/A	
5. Is proper testing equipment available and used? (811.52(5))	N/A	
J. Are packed column aerators used? (811.53(2))	N/A	
1. Do the blowers have proper equipment (e.g., screens)? (811.53(2))	N/A	
2. Is the media routinely examined? (810.03)	N/A	
3. Is the aerator free of freezing problems? (811.53(2)(c))	N/A	
4. Do the aeration towers meet all other requirements? (e.g., sample taps, meters, disinfection, bypass) (811.53(2)(e))	N/A	
K. Are granular activated carbon filters used? (811. 53(3))	N/A	
1. Are the filters operated at the proper filtration rates? (811.53(3)(a))	N/A	
2. Is the post-filter water (treated water) disinfected? (811. 53(3)(b))	N/A	
3. Is the filter media NSF 61 certified and virgin carbon? (811. 53(3)(d))	N/A	

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4. Is the filter material, after usage, properly disposed of? (811. 53(3)(f))	N/A	
5. If required, are dual filters available and installed in series (redundancy of filters)?	N/A	
L. Is ozonation used for desired treatment or disinfection? (811. 54(1))	N/A	
1. Is the feed gas preparation operating properly? (811. 54(2))	N/A	
2. Are the ozone generators operating properly? (811. 54(3))	N/A	
3. Are the ozone contactors operating properly? (811. 54(4))	N/A	
4. Is the ozone destruction operating properly? (811. 54(5))	N/A	
5. Is the ozone treatment achieving target CT or treatment goal? (811.54(4)(d))	N/A	
6. Are the gauges, instrumentation, and alarm systems (including air alarms) functioning properly? (811.54)	N/A	
7. Is the quenching system adequate enough to remove detectable ozone levels leaving the contactors? (811.54(5)(b))	N/A	
M. Is blending used as a form of treatment for meeting the standards?	N/A	
1. Is treatment installation in accordance with approved plans?	N/A	
2. Are the proper blending ratios established?	N/A	
3. Is the required/target water quality level achieved?	N/A	
4. Is the proper equipment available to control the blending (e.g., a SCADA system)?	N/A	
N. Is radionuclide treatment used? (811.55)	N/A	
1. Is the radionuclide removal (combined radium, uranium, gross alpha, beta particles) process functioning properly and achieving the target setting and water quality standards? (811.55(1))	N/A	
2. Is the treatment process operated in accordance with the DNR approval?	N/A	
3. Are the proper chemicals and proper amount of chemicals needed for treatment available onsite (811.40)?	N/A	
O. Are phosphates used for sequestration? (811.56)	Y	
1. Are the iron and manganese levels in the workable range for sequestration? (811.56(1))	Y	
2. Is there a detectable level of chlorine residuals in the distribution system? (811.56(1)(a))	Y	Around 0.2 - 0.6 mg/l per monthly reports
3. Are phosphates used NSF 60 approved and does the phosphate have the proper ratios (e.g., ortho/poly)? (811.56(1)(d))	Y	
4. Are the total phosphate levels at or below 10 mg/l (as PO4) in the distribution system? (811.56(1)(f))	Y	Around 0.8 - 1.5 mg/L per monthly reports
5. Are the proper testing equipment used for phosphate testing? (811.56(1)(g))	Y	
6. Is the plan approved phosphate chemical the one currently in use? (810.03)	Y	
P. Are silicates used for sequestration? (811. 56(2))	N/A	
1. Is the sequestration prior to air contact? (811.56(2))	N/A	
2. Is chlorine added before the silicates? (811.56(2))	N/A	
3. Are the iron and manganese levels in the workable range for sequestration? (811.56(2))	N/A	

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Question	Answer	Comments
4. Is there a detectable level of chlorine residuals in the distribution system (needed for sequestration)? (811.56(2)(b))	N/A	
5. Are the proper levels of silicates maintained in the distribution system (e.g., can add up to 20 mg/l and total of less than 60 mg/l)? (811.56(2)(d))	N/A	
6. Are the silicates fed downstream of iron and manganese removal? (811.56(2)(f))	N/A	
7. Are the silicates used NSF 60 approved? (811.56(2)(g))	N/A	
Q. Is the lime or lime-soda process used? (811.57(1))	N/A	
1. Is the process achieving the desired goals? (Reactor Basin: Lime only: pH =9-9.5. lime and soda ash: pH =11-11.3; recarbonation basin: pH = 8-8.3, hardness = 40-120 mg/l)?	N/A	
2. Is the treated water properly stabilized at each stage of treatment? (811.57(1)(c) and the stabilization section 811.58)	N/A	
3. Is the sludge properly disposed of? (811. 57(1)(d))	N/A	
R. Is ion-exchange process used? (811.57(2))	N/A	
1. Do the softeners have the proper treatment capacity (including nitrate treatment)? (811. 57(2)(b))	N/A	
2. Do the softeners have the proper resin depth (Including nitrate treatment)? (811.57(2)(c))	N/A	
3. Are softeners operating within the proper softening and backwash rates? (811.57(2)(d))	N/A	
4. Do the softeners have the proper bypass ratio (through/bypass = 40/60)) (? (811.57(2)(h))	N/A	
5. Is the resin material used NSF 61 approved? (810.09(5))	N/A	
6. Are there proper brine storage tanks? (811.57(2)(j))	N/A	
7. Is the brine properly disposed of (e.g., sanitary sewer or WPDES permit)? (811. 854)	N/A	
8. Are the proper sample taps available for monitoring? (811.57(2)(l))	N/A	
9. Is there proper stabilization of the treated water? (811. 57(2)(m), and stabilization section)	N/A	
S. Are any methods of stabilization used (e.g., silicates, carbon dioxide, phosphates, caustic soda)? (811.58)	N/A	
1. Is carbon dioxide used? (811. 58(1))	N/A	
a. Is the carbon dioxide feed properly functioning? (811.39)	N/A	
b. Is there adequate contact time provided (for liquid, gas, or combustion)? (811. 58(1)(a))	N/A	
c. Is there proper maintenance of the recarbonation basin? (811. 58(1)(d))	N/A	
2. Are silicates, phosphates, or caustic soda used for sequestering, corrosion control, or alkali feed? (811.58(2))	N/A	
a. Are the chemicals NSF 60 approved? (811. 58(2)(b))	N/A	
b. Is there a detectable level of chlorine residuals in the distribution system (for phosphates only)? (810.09)	N/A	
c. Is the caustic soda kept at a temperature above 65 degrees Fahrenheit (e.g., pumps kept at 70 degrees)?	N/A	
d. Are corrosion control treatment doses maintained within the plan approved ranges? (108.03(1),	N/A	

Sanitary Survey Checklist for Arena Waterworks, Date of Survey: 07/15/2020

Question	Answer	Comments
809.543(8))		
e. Has the corrosion control treatment performance been re-evaluated within the last 3 years? (809.543(9))	N/A	
f. Is a blended phosphate product with at least 70% orthophosphate (as % of active product) used for corrosion control treatment?	N/A	
g. Is a blended phosphate with higher than 30% polyphosphate (as % of active product) used as part of corrosion control treatment, due to high Fe, Mn, hardness, or combination?	N/A	
h. Are the total phosphates equal to or less than 10 mg/l (as PO4)? (811. 58(2)(e))	N/A	
i. Is there proper alkali feed setup for ion-exchange softening? (811. 58(4))	N/A	
j. Is there proper lab equipment available to determine effectiveness of stabilization? (811. 58(7))	N/A	
k. If silicates are used, are the proper levels of silicates maintained in the distribution system (e.g., can add up to 20 mg/l and total of less than 60 mg/l)? (811.56(2)(d))	N/A	
T. Is there taste and odor control? (811. 59)	N/A	
1. Is powdered activated carbon (PAC) treatment effective and adequate? (811. 59(3))	N/A	
2. Is granular activated carbon (GAC) treatment effective and adequate? (811. 49(1)(f))	N/A	
3. Is chlorine feed point downstream of the PAC or GAC?	N/A	
4. Is the PAC properly stored in a separate room (811.59(3)(f))?	N/A	
5. Is aeration treatment effective and adequate? (811. 45)	N/A	
6. Is potassium permanganate treatment effective and adequate? (811. 59(7))	N/A	
7. Is ozone treatment effective and adequate? (811. 59(8))	N/A	
V. Is the distribution system adequate? (NA if no distribution system)	N	
A. Is an overall distribution system map available to the operators and managers and is a current copy of the map on file with the Department and is the map adequate? (810.26(2))	N	Latest map on file with Department dated 1985
B. Is a comprehensive materials inventory maintained? (809.119)	N	Material inventory should be maintained
C. Are all water mains made of approved materials? (811.69(1))	Y	
D. Under normal operating conditions, is the static pressure range in the distribution system between 35 and 100 psi at all locations? (810.10)	Y	Pressure range is between 62-67 psi per operator
E. Is the system maintaining a minimum residual pressure > 20 psi at all points in the distribution system under all conditions of flow? (811.70(4))	Y	Per hydrant testing done at the village, all hydrants meet 20 psi at 500 gallons
F. Did the system respond adequately to any pressure loss affecting 25% or more of the system? (810.12)	Y	System responded adequately to loss of pressure incidence in November, 2019. Boil advisory templates are attached to this survey to include in the Villages ERP
G. Are all water mains serving fire hydrants at least 6 inches in diameter, if not, can fire flows be met or customers be adequately served by a nearby hydrant off of a larger main? (811.70(5))	Y	Per discussion with operator during survey

Sanitary Survey Checklist for Arena Waterworks, Date of Survey: 07/15/2020

Question	Answer	Comments
H. Does the utility have a program to replace under sized mains?	Y	Replacement of undersized mains was discussed with operator during survey
I. Can all fire hydrants produce 500 gpm at 20 psi residual pressure? (811.70(6))	Y	Per hydrant tests sent to DNR and per operator during survey
J. Are hydrants with insufficient flows color coded or tagged and has the fire chief been notified in writing of the locations of those hydrants? (810.11)	N/A	
K. Does the latest fire flow study reflect existing conditions?	Y	
L. Are the number of dead-end mains minimized? (811.70(8))	Y	
M. Are all existing dead-ends equipped with approved hydrants? (811.70(8))	Y	
N. Are isolated service areas minimized or eliminated?	Y	
O. Is the flushing schedule adequate for the dead-ends? (810.13(2))	Y	Flushing is done 2/year per operator
P. Is the flushing schedule adequate for the system? (810.13(2))	Y	
Q. Are adequate records kept of all flushing and fire department use? (810.13)	Y	
R. Is the valve exercise/replacement program adequate? (810.13(2))	Y	Valves are exercised yearly per operator
S. Are there adequate maintenance and location records for all hydrants and valves? (At a minimum, records should show hydrant or valve number, date of flushing or exercising, and comments. Written location descriptions or sketches are also preferred.) (810.13)	Y	
T. Are faulty valves and hydrants repaired or replaced promptly?	Y	
U. Is the unaccounted for water < 10%?	N	Unaccounted for water is listed at 14% per 2019 PSC report, and 15% for 2018
V. Has there been a recent leak detection study on the entire water system?	N	A leak detection survey is recommended
W. Are the disinfectant residuals adequate? (NA if no disinfection or no distribution system) (810.09); (811.42(5))	Y	Around 0.2 - 0.6 mg/L
X. Are the water mains adequately separated from sewerage components including sewer manholes? (811.74)	Y	TBK
Y. Are water main breaks repaired promptly and correctly?	Y	
Z. Are air relief facilities and chambers in the distribution system properly designed and maintained? (811.72)	N/A	
AA. Are all water loading stations provided with adequate backflow/backsiphonage protection? (811.78)	Y	TBK
AB. Is the water system designed properly so that there are no "flow through" situations within the distribution system (multiple connections to private property, mobile home parks, etc.) (811.68)	Y	TBK
AC. Where minimum static pressures of 35 psi is not provided, is there a booster station provided or individual pressure boosting systems on each service line and are there less than ten individual pressure boosting systems? (811.66(1)), (811.79)	N/A	
1. Are the booster pumps equipped with an automatic cutoff control that will stop the pumps when the suction pressure falls below 20 psi? (811.81(4))	N/A	
2. Where no elevated storage is provided in the boosted zone, is the booster station equipped with a	N/A	

Sanitary Survey Checklist for Arena Waterworks, Date of Survey: 07/15/2020

Question	Answer	Comments
continuously running pump to maintain pressure in the boosted zone or is a small bladder type hydro-pneumatic tank available with a 3 minute minimum run timer on the pump? (811.81(6))		
3. If a booster station serves more than 50 living units and an emergency power source is not provided, is there elevated storage available serving the boosted zone? (811.82)	N/A	
4. If a boosted zone serves more than 50 living units and cannot maintain pressures over 20 psi from the main system and does not have elevated storage in the boosted zone, is emergency power provided for the booster station? (811.83)	N/A	
5. Is the on-off operation of the booster pumps and the system pressure at the booster station monitored at one of the main pumping stations or waterworks facilities? (811.84(1))	N/A	
6. Is the booster station equipped with pressure gauges on the suction and discharge lines? (811.84(2))	N/A	
7. Can the pumping units in a booster station be automatically bypassed when the pumps are not operating and can the booster station be bypassed when the station is not in service? (811.84(5))	N/A	
8. Does the booster station have adequate heating, ventilation, and dehumidification equipment? (811.25); (811.84(9))	N/A	
VI. Is water system operations and management adequate?	N	
A. Is the system implementing a comprehensive Cross-Connection Control Program? (i.e., Description of the program, Ordinance with Comm. 82 reference, 10 year schedule for inspection and re-inspection (2 years for Ind. & Comm.), written documentation of inspections performed) (810.15(1))	N	Changes recommended
B. Is the system implementing a comprehensive Private Well Abandonment / Permitting Program? (i.e. ordinance requiring abandonment of unused, unsafe or non-complying private wells, permits issued for all other private wells located on properties connected to the water system) (810.16)	N	2 wells need to be repermitted per operator
C. Is the system maintaining and practicing a comprehensive Emergency Operations Plan? (contacts, communications, mutual aid, auxiliary power procedures, loss of system pressure, emergency chlorination plan) (810.23(2))	N	BWA templates are recommended to be added to ERP
D. Can the system achieve a free chlorine residual of 0.5 ppm throughout the entire distribution network in 4 hours? (810.26(8))	Y	
E. Is the system exercising their auxiliary power (testing once a month, quarterly under full load) and keeping a log book? (810.13(1)(d)	Y	System is operating 1/ month and quarterly with load - per operator
F. Have measures been taken to enhance the security of the water supply system? (Recommendations listed in security manual)	Y	
G. Does the system have adequate manpower, training and equipment to perform all necessary duties to provide an adequate quantity of safe drinking water to consumers? (810.03)	Y	
H. Have past inspection deficiencies, outlined in previous inspection reports, been corrected as required? (Review / initiate stepped enforcement process)	Y	Past deficiencies were discussed with operator and have been resolved
I. Are inspection reports reviewed by the Water Commission or Municipal Board when received and written response submitted if required? (Operator present for discussion?)	Y	
J. Do PSC annual reports show that the system has adequate financial viability (does not show net operating losses for two consecutive years, has more than 90 days cash on hand)?	Y	System is financially viable per 2019 and 2018 PSC records. NOI/TOE=

Sanitary Survey Checklist for Arena Waterworks, Date of Survey: 07/15/2020

Question	Answer	Comments
		$47,408/$118,497 for 2019, and $29,308/ $120,568 for 2018
K. Does the system have a working budget or financial plan established?	Y	
L. Do revenues from water rates and charges cover water system costs?	Y	
M. Does the system have a schedule/plan for capital improvements (infrastructure replacement)?	Y	
N. Are customer complaints logged and responded to as necessary?	N/A	
O. Has the system always obtained approvals for improvements such as extensions or alterations which may affect water quality or quantity? (811.08)	Y	Per records
P. Have start-up inspections been completed prior to system improvements being placed on-line? (810.26)	Y	TBK
Q. Is the system following proper disinfection procedures before placing any facilities on-line? (811.41)	Y	TBK
R. Has a comprehensive water system study been performed recently?	Y	A water system study is being conducted to determine if second well is necessary
S. Is the customer meter testing/replacement program appropriate? (PSC 185.76)	Y	
VII. Is all monitoring/reporting/data verification adequate and accurate?	Y	
A. Has the system been in compliance with their monitoring requirements with respect to samples taken and frequency?	Y	
B. Are there updated monitoring plans on file with the department for bacteria (809.31(1)(a)), lead/copper ((809.547(1)(a)) and disinfection byproducts ((809.565(6))?	Y	
C. Does the system appropriately implement sampling plans in order to meet monitoring rule requirements? (sample sites spatially appropriate and rotate from site to site)	Y	L/C monitoring site plan was discussed with operator during survey
D. Has the system been in general compliance with regards to water quality?	Y	There are no water quality issues with the Village of Arena
E. Has water quality generally not degraded since the last sanitary survey?	Y	
F. Has the system published adequate Consumer Confidence Report(s)? (809.833)	Y	CCR report/ certification was recieved on 06/29/2020
G. Has the system sent a copy of their CCR(municipals only) and their Certification form to DNR? (809.837(3))	Y	
H. Are monthly operating reports complete and submitted in a timely manner (required for MC's, OTM's that have treatment or chemical addition, all hi-caps)? (810.07)	Y	
I. Have the appropriate public notices been issued in a timely manner (Tier 3 public notices may be published in the CCR per (809.950))?	Y	TBK
J. Are bench sheets, on-site logs, and monthly operational reports accurate and up-to-date?	Y	
K. Does the monitoring data reported to the DNR match that on file in the system's records? (809.82)	Y	
L. Are all records of sample results, actions to correct violations, correspondence related to sanitary surveys, variances or exemptions and lead/copper monitoring and reporting retained for the specific time periods? (809.82)	Y	

Sanitary Survey Checklist for Arena Waterworks, Date of Survey: 07/15/2020

Question	Answer	Comments
M. Are sampling faucets and faucet locations appropriate for each type of sample (including raw, entry point and distribution)? (811.37(5))	Y	Water system has adequate Raw and EP sample taps. See attached pictures
VIII. Has the operator(s) fulfilled certification requirements?	N	
A. Is the operator(s) certified with appropriate grade of certification? (NR 114 Subchapter I or III)	N	It is recommended that primary operator contact - Mike Schmidt obtain GD1 certification. Currently operators Greg Wipperfurth (31355) and Jeff Brindly (33491) are certified as GD1
B. Has the operator(s) fulfilled continuing education requirements? (NR 114 Subchapter I or III)	Y	
C. Is the appropriate "operator-in-charge" assigned to the water system and on file with the DNR? (NR 114 Subchapter I or III)	Y	See VIII.A
D. Is the operator(s) aware of renewal requirements and certification expiration date?	Y	Certification for Mike Schmidt expires 11/01/2022
E. Does the system provide for adequate operator support/training?	Y	

Boil/Bottle Water Advisory

Arena Waterworks water is contaminated with E. Coli

E. Coli bacteria were found in our water supply. These bacteria can make you sick, and are a particular concern for people with weakened immune systems.

We routinely monitor for the presence of drinking water contaminants. The presence of coliform bacteria including E.Coli bacteria in your drinking water is a violation of State and Federal Safe Drinking Water Regulations. A water sample collected on_____Indicated the presence of E. coli bacteria. Further sampling on _____confirmed their presence.

What precautions should be taken at this time?

Discontinue use of this water for human consumption. Human consumption means drinking, cooking, food preparation and making ice, dishwashing, and all personal hygiene needs (e.g., showering, hand washing, bathing and oral hygiene). Ice, food, and any beverages prepared with unsafe water must be discarded. You should boil or use commercially bottled water for drinking, food preparation, and making ice. If you boil water, the water should be heated to a rolling boil for at least **ONE** minute before use.

What does this mean?

E. coli *are bacteria whose presence indicate that the water may be contaminated with human or animal wastes. Human pathogens in these wastes can cause short-term effects, such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly, and people with severely compromised immune systems.*

The symptoms above are not caused only by organisms in drinking water. If you experience any of these symptoms and they persist, you may want to seek medical advice. People at increased risk should seek advice about drinking water from their health care providers.

What is being done to correct the problem?

Corrective action(s) taken: _____

_____

_____

You should use boiled or bottled water until we inform you that our sampling shows that no bacteria are present. We are working to resolve this problem as soon as possible.

If you have questions regarding the safety of our drinking water, please contact:

_____
Name of Responsible Person Area Code-Telephone Number

_____
Street Address City State Zip

I certify that the information and statements contained in this public notice are true and correct and have been provided to consumers in accordance with the delivery, content, format, and deadline requirements in Subchapter VII of ch. NR 809, Wis. Adm. Code.

X _____ _____
Signature Date

Tier 1 Notice

** Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

Boil/Bottle Water Advisory

Arena Waterworks water has failed to maintain pressure and could be contaminated with Fecal Coliform/E. coli.

We experienced a disruption in the water distribution system. Such a system failure carries with it a high potential that fecal contamination or other acute, disease-causing organisms could enter the distribution system. These conditions may pose an imminent and substantial health endangerment to persons served by the system. State and Federal Safe Drinking Water Regulations requires that we inform you of the disruption and potential drinking water contamination.

What precautions should be taken at this time?

Water supplied by our system should not be used for drinking, cooking, food preparation and making ice, dishwashing, and personal hygiene needs (e.g. oral hygiene) where water enters your body. Use caution with any other contact, such as showering and bathing, and hand washing. Ice, food, and any beverages prepared with potentially contaminated water must be discarded. You should boil or use commercially bottled water for the purposes listed above. If you boil water, the water should be heated to a rolling boil for at least **ONE** minute before use.

What does this mean?

Inadequately treated water may contain disease-causing organisms. These organisms include bacteria, viruses, and parasites which can cause symptoms such as diarrhea, cramps, nausea, headaches, or other symptoms. They may pose a special health risk for infants, young children, some of the elderly and people with severely compromised immune systems.

The symptoms above are not caused only by organisms in drinking water. If you experience any of these symptoms and they persist, you may want to seek medical advice. People at increased risk should seek advice about drinking this water from their health care providers.

What is being done to correct the problem?

Corrective action(s) taken: _____

_____

_____

You should use boiled or bottled water until we inform you that our sampling shows that no bacteria are present. We are working to resolve this problem as soon as possible.

If you have questions regarding the safety of our drinking water, please contact:

_____
Name of Responsible Person — Area Code-Telephone Number

_____
Street Address — City — State — Zip

I certify that the information and statements contained in this public notice are true and correct and have been provided to consumers in accordance with the delivery, content, format, and deadline requirements in Subchapter VII of ch. NR 809, Wis. Adm. Code.

X _____ _____
Signature — Date

Tier 1 Notice

** Please share this information with all the other people who drink this water, especially those who may not have received this notice directly (for example, people in apartments, nursing homes, schools, and businesses). You can do this by posting this notice in a public place or distributing copies by hand or mail.

APPENDIX C

Existing Well Information

Figure C-1	Well #1 Well Construction Report
Figure C-2	Well #1 Geologic Log
Figure C-3	Well #1 2014 Pump Replacement Data

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WISCONSIN UNIQUE WELL NUMBER **BF949**

SOURCE: WELL CONSTRUCTION

State of Wi-Private Water Systems-DG/2
Department Of Natural Resources, Box 7921
Madison, WI 53707

Form 3300-77A
(Rev 12/00)

Property Owner: ARENA, VILLAGE OF
Telephone Number: 608 - 753 - 2133
Depth: 415 FT

Mailing Address: PO BOX 134 VILLAGE H
City: ARENA
State: WI
Zip Code: 53503
County of Well Location: 25 IOWA
Co Well Permit No W:
Well Completion Date: January 1, 1965

1. Well Location
V (T=Town C=City V=Village) of ARENA
Fire#:
Street Address or Road Name and Number: HWY 14 WELL #1
Subdivision Name:
Lot#:
Block #:
Gov't Lot: or NE 1/4 of NW 1/4 of
Section 21 T 8 N R 5 W

Well Constructor: LAYNE CHRISTENSEN
License #: 582
Facility ID (Public): 125007300
Address: W229 N5005 DUPLAINVI
Public Well Plan Approval#: 65-0392
City: PEWAUKEE
State: WI
Zip Code: 53072
Date Of Approval: 7/13/1965
Hicap Well #: 79499
Common Well #: 001
7.8 gpm/ft

2. Well Type 1 (1=New, 2=Replacement, 3=Reconstruction)
(See item 12 below)
GRN Status
of previous unique well # _____ constructed in 0
Reason for replaced or reconstructed Well?

3. Well Serves M (M=Munic O=OTM N=NonCom P=Private Z=Other X=NonPot A=Anode L=Loop H=Drillhole)
# of homes and or (eg: barn, restaurant, church, school, industry, etc.)
High Capacity: Well? Property?

1 (1=Drilled 2=Driven Point 3=Jetted 4=Other)

4. Is the well located upslope or sideslope and not downslope from any contamination sources, including those on neighboring properties?
Well located in floodplain?
Distance in feet from well to nearest: (including proposed)

1. Landfill
2. Building Overhang
3. 1=Septic 2= Holding Tank
4. Sewage Absorption Unit
5. Nonconforming Pit
6. Buried Home Heating Oil Tank
7. Buried Petroleum Tank
8. 1=Shoreline 2= Swimming Pool
9. Downspout/ Yard Hydrant
10. Privy
11. Foundation Drain to Clearwater
12. Foundation Drain to Sewer
13. Building Drain 1=Cast Iron or Plastic 2=Other
14. Building Sewer 1=Gravity 2=Pressure 1=Cast Iron or Plastic 2=Other
15. Collector Sewer: ___ units ___ in . diam.
16. Clearwater Sump
17. Wastewater Sump
18. Paved Animal Barn Pen
19. Animal Yard or Shelter
20. Silo
21. Barn Gutter
22. Manure Pipe 1=Gravity 2=Pressure 1=Cast iron or Plastic 2=Other
23. Other manure Storage
24. Ditch
25. Other NR 812 Waste Source

5. Drillhole Dimensions and Construction Method

Dia.(in.)	From (ft)	To (ft)
16.0	surface	50
10.8	50	170
10.0	170	316
8.0	316	415

Upper Enlarged Drillhole / Lower Open Bedrock
-- 1. Rotary - Mud Circulation
-- 2. Rotary - Air
-- 3. Rotary - Air and Foam
-- 4. Drill-Through Casing Hammer
-- 5. Reverse Rotary
-- 6. Cable-tool Bit _____ in. dia
-- 7. Temp. Outer Casing _____ in. dia. _____ depth ft. Removed ?
Other

6. Casing Liner Screen

Dia. (in.)	Material, Weight, Specification Manufacturer & Method of Assembly	From (ft.)	To (ft.)
16.0	STEEL-1.5' ABOVE SURFACE	surface	50
10.0	STEEL-2.6' ABOVE SURFACE	0	170
8.0	STEEL	162	316

Dia.(in.)	Screen type, material & slot size	From	To

7. Grout or Other Sealing Material

Method	Kind of Sealing Material	From (ft.)	To (ft.)	# Sacks Cement

8. Geology

Geology Codes	Type, Caving/Noncaving, Color, Hardness, etc	From (ft.)	To (ft.)
__SG	SAND	0	170
__N_	SANDSTONE-DRESBACH	170	210
G_HL	SHALE-DRESBACH	210	265
E_NL	SANDSTONE-DRESBACH	265	285
E_L_	DOLOMITE-DRESBACH	285	290
__N_	SANDSTONE-DRESBACH	290	415

9. Static Water Level
0.0 feet A (A=Above B=Below) ground surface

10. Pump Test
Pumping level 106.0 ft. below surface
Pumping at 831.1 GP M 12.0 hrs

11. Well Is:
0 in. Grade (A=Above B=Below)
Developed?
Disinfected?
Capped?

12. Did you notify the owner of the need to permanently abandon and fill all unused wells on this property?
If no, explain

UNIVERSITY OF WISCONSIN GEOLOGICAL & NATURAL HISTORY SURVEY
1815 University Avenue, Madison, Wisconsin 53706

Log No. Iw-102
Issued: July, 1968

County: Iowa

Well name Village of Arena, Well #1

Owner.... Village of Arena
Address.. Arena, Wis.

Driller.. Layne-Northwest Co.
Engineer. General Engineering Co.
Portage, Wis.

Completed... Sept.,1965
Field check.
Altitude.... 745' ETM
Use..... Municipal
Static w. l. -- Well flowing
Spec. cap...

R.5E.
T. 8 N.
Sec. 21

Quad. Arena 7½'

Drill Hole						Casing & Liner Pipe or Curbing							
Dia.	from	to	Dia.	from	to	Dia.	Wgt.& Kind	from	to	Dia.	Wgt.& Kind	from	to
16"	0	50'4"				16"	steel	+1'6"	50'4"				
10¾	50'4"	170'1"				10"	steel	2'7"	170'1"				
10"	170'1"	316'											
8"	316'	415'				8"	steel	162'	316'				

Grout: Kind	from	to
Neat cement	+1'6"	50'4"

Samples from 0 to 415' Date received: 3/2/66
Sample Nos. 264521 to 264603 Examined by: J. M. Warren Date: 4/14/67
Formations: Surface, Dresbach

Remarks: Well tested for 12 hours at 831 gpm. Water level dropped to 106 feet during pumping test.

LOG OF WELL:

SURFACE	0-10	10		Snd,dk yl or&mxd clr,C/fn,Srnd, F srtg, mstly qtz;tr st & org mat
	10-15	5		Snd,dk yl or&mxd clr,M & C,Srnd, F srtg,mstly qtz,ltl fn&VC;tr fn gvl
	15-20	5		Snd,mxd clr,C&VC,Srnd,F srtg,mstly qtz,ltl M;mch fn gvl,tr ooliccht
	20-30	10		Snd,mxd clr,C&VC,rnd,F srtg,mstly qtz, ltl M; tr fn gvl
	30-35	5		Snd,mxd clr, C,rnd, F srtg,mch M & VC,mstly qtz;mch fn gvl,tr M
	35-40	5		Snd,mxd clr,C,rnd,F srtg,mch M&VC,mstly qtz;tr fn gvl, tr M
	40-50	10		Snd,mxd clr,M,Srnd,F srtg,mch C,ltl VC & fn,mstly qtz;tr M gvl
	50-55	5		Snd,mxd clr,C,rnd,G srtg,mch M & VC,mstly qtz;ltl fn gvl
	55-60	5		Snd,mxd clr,C,rnd,F srtg,mch M & VC,mstly qtz;mch fn gvl,tr M
	60-70	10		Snd,mxd clr,C,rnd,F srtg,mch VC,ltl M,mstly qtz; ltl fn gvl
	70-75	5		Snd,mxd clr,C,rnd,F srtg,mch VC,ltl M,mstly qtz;mch fn gvl,tr M
	75-85	10		Snd,mxd clr,M & C,rnd,G srtg, ltl VC,mstly qtz; tr fn gvl
	85-90	5		Snd,mxd clr,M & C,rnd,G srtg, ltl VC & fn, mstly qtz
	90-95	5		Snd,mxd clr,C,rnd,G srtg,ltl M & VC,mstly qtz;
	95-100	5		Snd,mxd clr,M & C, rnd, G srtg, ltl VC, mstly qtz
	100-115	15		Snd,mxd clr,M & C,rnd, G srtg, ltl VC, mstly qtz; tr fn gvl
	115-120	5		Snd,mxd clr,M & C, rnd, G srtg, mch VC, mstly qtz; tr fn gvl
	120-125	5		Snd,mxd clr,C & VC,rnd, G srtg, ltl M,mstly qtz,;mch fn gvl,tr M
	125-130	5		Snd,mxd clr, M, rnd, G srtg, ltl C & fn,tr VC,mstly qtz; tr fn gvl
	130-135	5		Snd,mxd clr,M & C,rnd, G srtg, ltl VC, tr fn, mstly qtz;
	135-140	5		Snd,mxd clr,C,rnd,G srtg,mch M & VC,tr fn, mstly qtz; tr fn gvl
	140-150	10		Snd,mxd clr,C & VC,rnd,G srtg,ltl M,tr fn,mstly qtz;mch fn gvl
	150-155	5		Snd,mxd clr,M & C,rnd, G srtg,mch VC,mstly qtz;mch fn gvl,ltl M&C
	155-160	5		Snd,mxd clr,C & VC,rnd, G srtg,ltl M,mstly qtz;mch fn gvl
	160-165	5		Gvl,mxd clr,fn & V fn,rnd, G srtg, mstly qtz & ig;mch C & VC snd
170'	165-170	5		Snd,mxd clr,C & VC,rnd, G srtg, ltl M,mstly qtz; mch fn & C gvl,ltl M
DRES	170-180	10		Ss,V pl yl, M & fn,F srtg, ltl C, tr VC;
	180-195	15		Ss,V pl yl or, M, rnd, G srtg, ltl C & fn;

UNIVERSITY OF WISCONSIN GEOLOGICAL & NATURAL HISTORY SURVEY
1815 University Avenue, Madison, Wisconsin 53706

Log No. Iw-102

Well name Village of Arena, Well #1
Sample Nos. 264521 to 264603

DRESBACH

195-210	15		Ss,V lt gry,M&fn,Srnd,G srtg,ltl C&V fn,tr VC;mch sndy gry sh
210-225	15		Sh,gry,P srtg;ltl gry&bn dol,mch V fn snd,ltl fn/C,tr VC
225-230	5		Sh,gry,P srtg;ltl gry dol,mch V fn snd, tr fn/C,tr pyr
230-235	5		Sh,gry,P srtg;ltl gry dol,mch V fn snd,tr fn/C,tr pyr & glauc
235-240	5		Dol,gry mot lt gry, V fn,dns;ltl fn&V fn snd,mch dolic ss,ltl pyr-cem
240-250	10		Sh,dk gry,P srtg,;mch V fn snd/C snd,tr fn xln glaucic dol
250-255	5		Sh,gry mot lt gry, F srtg;ltl V fn snd, tr V fn xln dol
255-260	5		Sh,gry mot lt gry, P srtg; ltl V fn snd/C snd,tr yl or cht
260-265	5		Sh,gry mot lt gry,P srtg;ltl V fn/M snd,tr V fn xln dol
265-270	5		Ss,lt ol gry,M&fn,Sang,P srtg,F-G dol-cem,ltl C&V fn;mch gry sndy dol,ltl gry
270-275	5		Ss,lt ol gry,fn,F-G dol-cem,ltl V fn,M&C,tr VC;mch sh&dol
275-285	10		Ss,lt ol gry,fn,F dol-cem,ltl V fn,M&C,trVC;ltl gry sndy dol&sh
285-290	5		Dol, dk ol gry,V fn,dns; ltl V fn snd,tr fn, M & C
290-295	5		Ss,V pl or bn,M&C,rnd,F srtg,ltl fn;tr gry dol&sh,tr gn sh
295-305	10		Ss,pl yl gry,M,rnd,F srtg,ltl C&fn;tr Fe stn,tr snd dol & gry sh
305-315	10		Ss,pl yl gry,M&C,rnd,G srtg;tr Fe stn,pyr & dol
315-320	5		Ss,dk rd or bn,M&fn,F lim-cem;tr gry sh,mch lim-cem&Fe stn
320-325	5		Ss,V pl rd or bn,M,P lim-cem,mch C,ltl fn;mch Fe stn,ltl lim-cem
325-335	10		Ss,V pl yl or,M&C,P dol-cem,VP lim-cem,tr VC & fn;ltl Fe stn, ltl dol-cem,
335-345	10		Ss,V pl yl or,M&C,VP lim-cem,ltl fn;ltl lim-cem & Fe stn, tr dol
345-350	5		Ss,V pl yl or,M,VP lim-cem,ltl C;ltl lim-cem & Fe stn
350-360	10		Ss,V pl yl or,M&C,rnd,VP lim-cem,tr VC;ltl lim-cem&Fe stn,tr pyr
360-365	5		Ss,V pl yl or,C,rnd,G srtg,ltl VC&M;ltl Fe stn,tr lim-cem&sndy gry sh
365-375	10		Ss,V pl yl or,C,rnd,VP dol&lim-cem,ltl VC&M;ltl Fe stn,tr lim-cem
375-385	10		Ss,V pl yl or,M&C,VP dol&lim-cem,tr VC;ltl dol&sndy dol,tr Fe stn
385-390	5		Ss,V lt ol gry,fn,rnd,P srtg,VP lim-cem,mch M,ltl C,tr VC;ltlFe stn
390-400	10		Ss,V lt ol gry,M&fn,VP lim-cem,ltl C,tr VC&V fn;ltl Fe stn,lim-cem& gry dol
400-405	5		Ss,V lt ol gry,M&fn,G srtg,VP lim-cem;tr Fe stn&lim-cem,tr gry dol
405-410	5		Ss,V lt or gry yl,M,F srtg,VP lim-cem,ltl fn;tr Fe stn & lim-cem
415 410-415	5		Ss,V lt or gry yl,M&C,P srtg,VP lim-cem,ltl VC&fn;tr dk bn gry dol

END OF WELL

MUNICIPAL
WELL & PUMP
A Division of Midwest Well Services, Inc

Operation & Maintenance Manual

Well #1 Pump Replacement

Village of Arena

April 2014

Corporate Office
1212 Storbeck Drive
PO Box 311
Waupun, WI 53963
Phone: 920-324-3400
Fax: 920-324-3431
www.municipalwellandpump.com

MUNICIPAL
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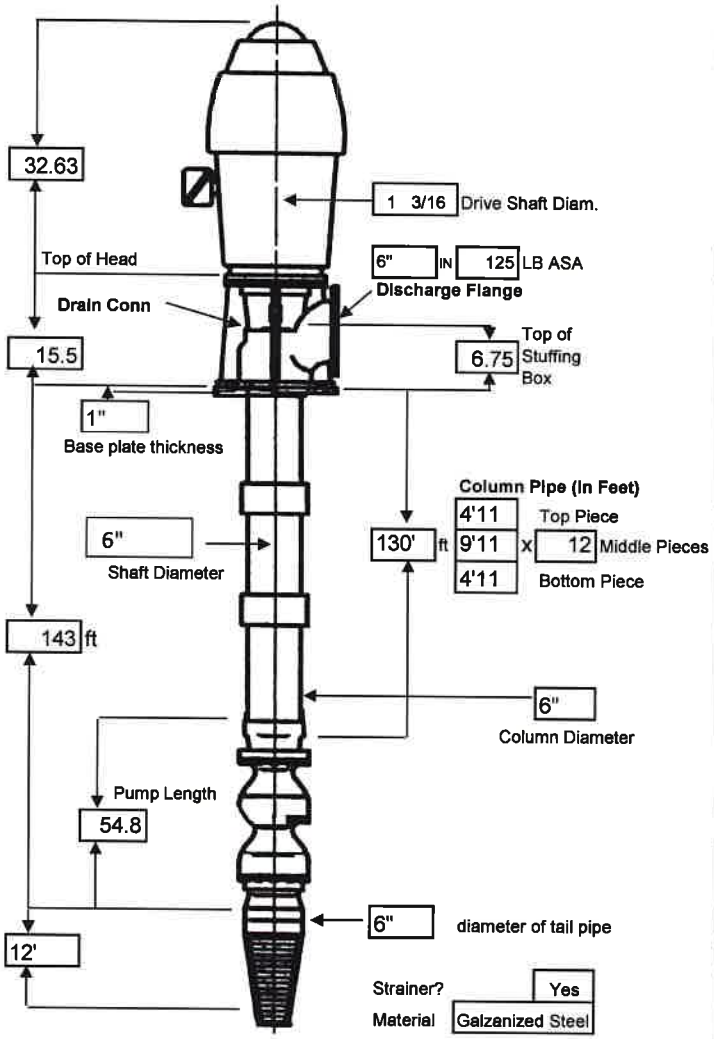
Line Shaft Turbine Pump

Installation Outline

		Job #	MH14-148
		Completed by:	PSH
Project Name	Village of Arena Well #2	Date	5/12/2014



Customer Information					
Customer:	Village of Arena				
Address:	345 West St				
City:	Arena	ST:	WI	ZIP:	53503
Phone #	608-753-2133	Fax: #			
Contact Name:	Brian Schultz	MWP Salesman		Patrick Harrington	

Material of Construction			
Bowl:	Cast Iron	Impeller:	Bronze
Bowl Shaft:	416 SS	Shaft Coupling:	416 SS
Bowl Bearings:	Bronnze	Shaft Bearings:	Buna Rubber
Strainer:	n/a	Bowl W/R:	Bronze
Shaft Sleeves:	304 SS	Column Pipe:	ASTM A-53-B
Lineshaft:	416 SS	Packing:	Graphote
Base Plate:	Steel	Head:	

Pump			
Manufacturer Name:	Goulds / Mid-America	Model:	9RCHC - 5 stage
Suction:	6" x 10'	Discharge Head:	Goulds
Lineshaft:	1 3/16"	Discharge:	6"
Lubrication:	Water	Column Pipe:	6"
Stage:	5	Shaft Sleeves:	SS
TDH:	212	Trim:	6.38"
GPM:	500	BHP:	
RPM:	1800	Serial Number	MA-231527-14

Motor			
Manufacturer Name	US Motors	Type:	RUSI
Enclosure:		NRR:	Yes
SRC:	1.15	HP:	40
RPM:	1780	Phase:	3
Hertz:	60	Voltage:	460
Frame No:	324TPH	Type Coupling:	
Serial Number	HO40V2BLF		

Form Revised: 1/5/2010

WI: PO Box 311, Waupun, WI 53963 - Office: 920-324-3400 - Toll-Free: 800-383-7412 - Fax: 920-324-3431 IL: 1206 West North Wind Drive, Sandwich, Il 60548 - Office: 847-541-8816 - Fax: 815-570-4317
www.municipalwellandpump.com

MUNICIPAL WELL & PUMP

Pump Equipment Install Data

Job #	MH14-148
Date	4/9/2014
Well #	1

Customer Information

Customer:	Arena, Village of					Contact Name:	Brian Schultz
Address:	345 West St					MWP Salesman	Patrick
City:	Arena	ST:	WI	ZIP:	53503	Form Completed by:	Bob Kooima
Phone #		Fax: #					

Pump Data

Description of Equipment	Mid America				
Design Data Capacity	GPM @	TDH @	RPM		

Bowl Assembly

Manufacturer Name:	Mid America	Model:	5-9RCHC-GP	# Stages	5
Serial Number	MA-231527-14				
Special Features					

Discharge Head

Manufacturer Name:	Goulds	Model:	VIT-CT	Discharge Conn Diam	6'
Serial Number	481965				
Special Features					

Sub Discharge Elbow

					Yes/No
Column Diameter	6	Elbow Dia	6	Column Coupled directly below Plate?	Yes
Plate Thickness	1.5"	Plate Dia.	20"	Junction Box coupled to Plate?	No
No. of Lifting Eyes	2			Airline sealed with compression coupling?	Yes
				Elec. Wires seal with compression couplings?	Yes

Column Assembly

						Setting Depth	130'
Shaft Diameter	1 3/16"	Material	S.S	Column Diameter	6"	Column Sch. Type	40
Shaft Sleeve OD	1 3/8"	Material	S.S	Column Couplings OD		Shaft TPI	8 TPI
Head Shaft Length	5'	Type (Threaded / Drop IN)		Drop In		Rubber Bearing OD	2"
Motor Shaft Length	33.25"	Motor Shaft Diameter	1 3/16"	Thread Length		2.25"	
Comb. Couplings (Y/N)	No	Special Features					

Jump Couplings

Are there Any? (Yes / No)	No	Material		Shft Diam Top		Shaft Diam Bottom	
Location(s)				TPI Top		TPI Bottom	
Other Notes							

Pump Equipment Install Data (con't)

Job #	MH14-148
Date	4/9/2014
Well #	1

Suction Pipe

Length	10 '	Diameter	6"	Schedule:	40	Strainer(Y/N)	Yes
Strainer Material	Painted galvanized			Threaded/Welded		Threaded	
Special Features	Reused						

Motor Data

Manufacturer Name:	U.S Motor		Model:		BF43A	Type	RUSI
HP	40	RPM	1780	Design		Code	
Volts	460	Hertz	60	Phase	3	Amps	45
Service Factor	1.15	Temp Rating		Bearing #s (Upper / Lower)			
Serial Number	HO40V2BLF				Frame #	324TPH	
Special Features							

Right Angle Gear Data

N/A

Manufacturer Name:		Model:		Ratio	
Serial Number		HP		RPM	
Special Features					

Submersible Cable

N/A

Size		Ground Wire Size		Wire Material	
Stranded or Solid		Wire Type (Rd / Par / Flt - Jkt)		Insulation Type	
Remarks					

Project Notes

New sleeves, rubber bearings and pipe, except for tailpipe and 5' in head.

Form Revision: 12-18-13

Pump Data Sheet - Turbine 60 Hz

Company: Municipal Well and Pump
Name: Patrick Harrington
Date: 5/21/2014

Customer: Village of Arena Well #1
Order No: MH14-148

GOULDS WATER TECHNOLOGY
a xylem brand

Pump:

Size: 9RCHC (5 stage)

Type: Lineshaft
Synch speed: 1800 rpm

Speed: 1770 rpm
Dia: 6.38 in

Curve: E6409CCPC2

Impeller:

Specific Speeds:

Ns: 2283
Nss: ---

Dimensions:

Suction: —
Discharge: —

Vertical Turbine:

Bowl size: 9.25 in
Max lateral: 0.88 in
Thrust K factor: 4.9 lb/ft

Pump Limits:

Temperature: 120 °F
Pressure: 400 psi g
Sphere size: —

Power: —
Eye area: —

Search Criteria:

Flow: 500 US gpm

Head: 212 ft

Near miss: 1 % of Head

Fluid:

Water
SG: 1
Viscosity: 1.105 cP

Temperature: 60 °F
Vapor pressure: 0.2563 psi a
Atm pressure: 14.7 psi a

NPSHa: —

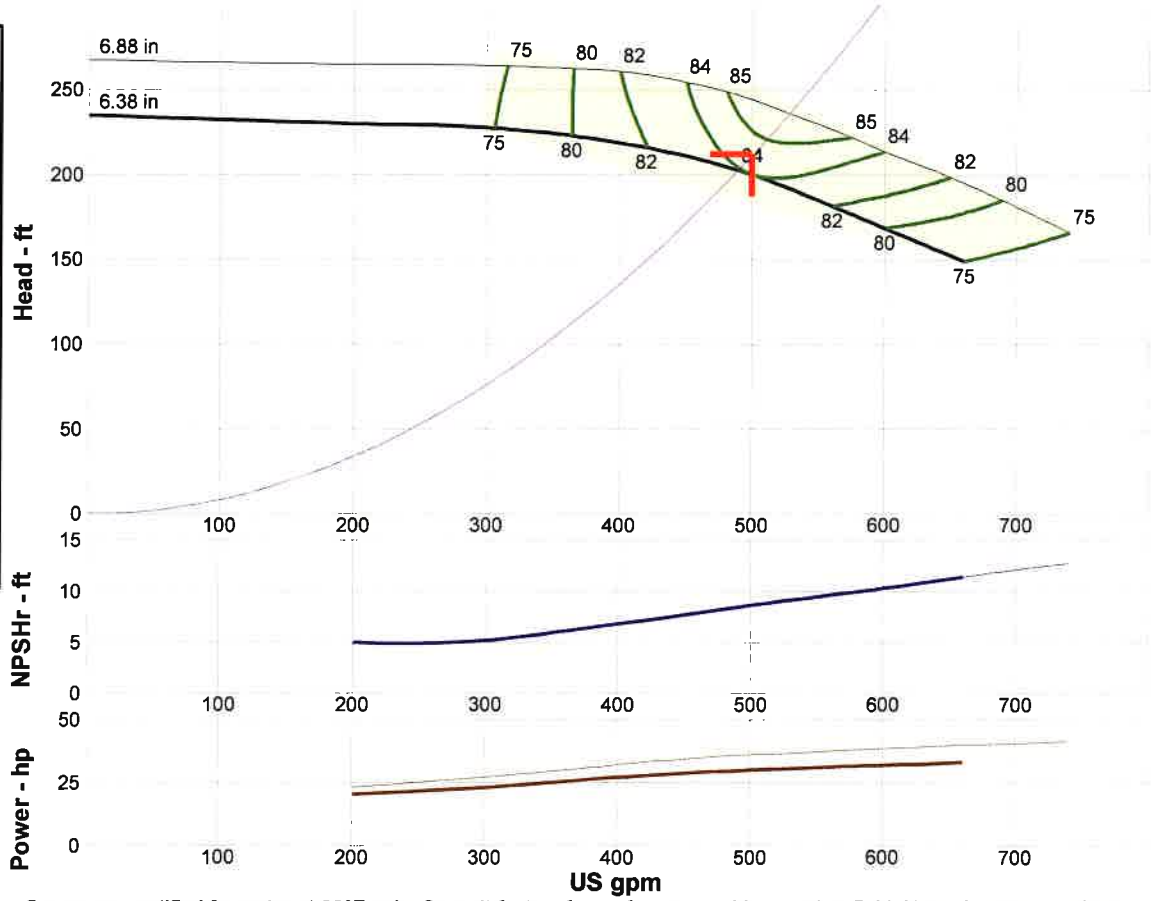
Motor:

Standard: NEMA
Enclosure: WPI

Size: 40 hp
Speed: 1800
Frame: 324

Sizing criteria: Max Power on Design Curve

--- Data Point ---	
Flow:	500 US gpm
Head:	200 ft
Eff:	84%
Power:	30.1 hp
NPSHr:	8.64 ft
--- Design Curve ---	
Shutoff head:	235 ft
Shutoff dP:	102 psi
Min flow:	---
BEP:	84% @ 500 US gpm
NOL power:	33.1 hp @ 660 US gpm
-- Max Curve --	
Max power:	41.4 hp @ 740 US gpm



Curves are certified for water at 60°F only. Consult factory for performance with any other fluid. Note: Contains unofficial Goulds Water Technology catalog content, not to be used for production.

Performance Evaluation:

Flow US gpm	Speed rpm	Head ft	Efficiency %	Power hp	NPSHr ft
600	1770	169	80	31.9	10.3
500	1770	200	84	30.1	8.64
400	1770	218	81.3	27.1	6.84
300	1770	228	74.1	23.2	5.24
200	1770	230	57	20.4	5

Selected from catalog: goulds lineshaft.60 Vers: 3.4

MUNICIPAL
WELL & PUMP

Test of Well Report

Job #	MH14-148

Customer Name	Arena, Village of

Date	4/9/2014

Test Information

Well No:	1	Well Location	345 West St				Tested By	Bob Kooima	
Dia. Orifice	6 x 5	Static Level	0 ft	in		Well Depth	ft		
Drilled by		Length of Airline		130		Gauge to Ground Level:	ft	in	
Pump Set to Disharge Nozzle		ft				To Tail Pipe	ft		

Reading No:	Time	Inches on orifice	GPM	Alt. Ga. in Feet	Pumping Level Ft.	Drawdown In Feet	Back Pressure	Specific Capacity	Water Appearance: clear, cloudy, murky muddy, sandy, temp., odor
	Start		0						
1	9:55 AM	8	350	98.	32.	32.	79	10.94	Black
2	10:00 AM	4	247	98.	32.	32.	84	7.72	Clear
3	10:09 AM	7	327	94.	36.	36.	80	9.08	
4	10:25 AM	6.5	315	94.	36.	36.	80	8.75	
5	10:29 AM	9.5	381	86.	44.	44.	68	8.66	
6	10:36 AM	9.5	381	86.	44.	44.	68	8.66	
7	10:47 AM	9.5	381	86.	44.	44.	68	8.66	
8	10:57 AM	9.5	381	86.	44.	44.	68	8.66	
9									
10									
11									
12									
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14									
15									
16									
17									
18									
19									

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MUNICIPAL
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Vibration Analysis
Vertical Hollow Shaft

Job #	MH14-148
Completed by	Bob Kooima

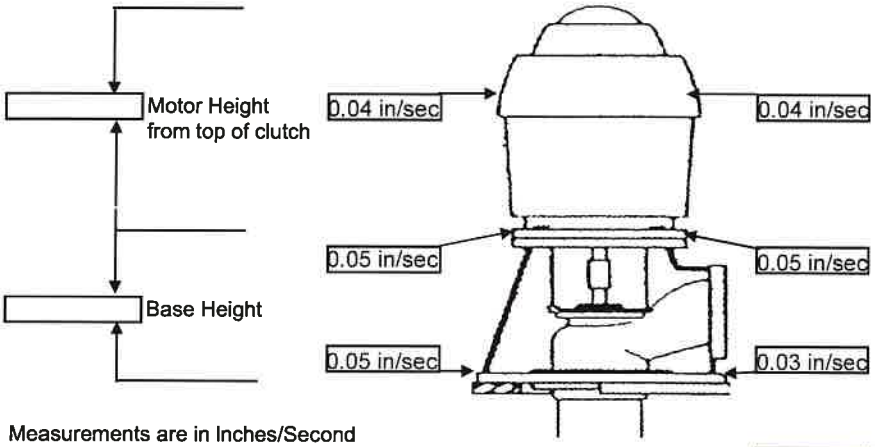
Project Name	Arena Well #1 Pump Replace	Date	4/9/2014

Pump & Motor Information

Pump Mfg.	Goulds/ Mid-America		Model #	9RCHC-	Pump Setting:	130	
Motor Mfg.	US Motors		Model #	BF43A	Serial #	HO40V2BLF	
Shaft Diam	1&3/16	Tube		Column Diam.		Other	

HP	40
RPM	

Flow Direction

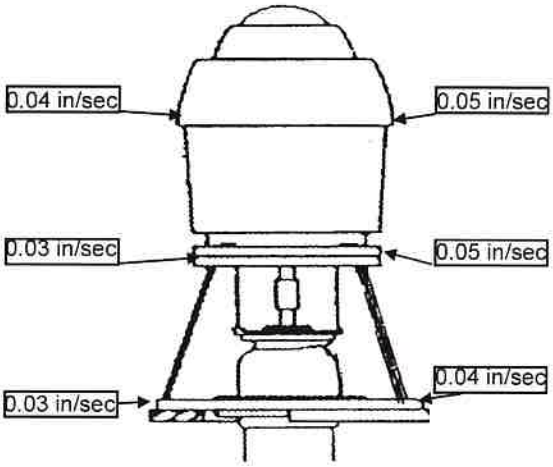


Gear Drive	
Top	
Middle	
Bottom	

Measurements are in Inches/Second
US Motor Standards < .20 in/sec

Notes:

Cross Flow Direction



Gear Drive	
Top	
Middle	
Bottom	

Form Revised: 1/5/2010

Notes:

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Appendix D

Existing Elevated Reservoir Information

Figure D-1 2019 Water Storage Tank Inspection Report

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State of Wisconsin
Department of Natural Resources
PO Box 7921, Madison WI 53707-7921
dnr.wi.gov

Water Storage Facility Inspection Report

Form 3300-248 (R 4/18)

Notice: Pursuant to ch. NR 810.14, Wis. Adm. Code, this form, along with supporting documentation (i.e. written report, pictures, video and test results), is required to be submitted to the Department of Natural Resources (DNR) following the inspection (*) but no later than 5 years since the previous inspection date. *Public Water Systems (PWS) are required to inspect and maintain water storage facilities (defined in ch. NR 810.02(47) Wis. Adm. Code as vented reservoirs, water towers, standpipes, and treatment plant basins including ground and elevated storage structures) once every 5 years. Maintenance shall include removal of sediment and biofilm prior to evaluation. Personal information collected will be used for administrative purposes and may be provided to requesters to the extent required by Wisconsin's Open Records Law (ss. 19.31-19.39, Wis. Stats.). *Unless otherwise noted, citations refer to Wisconsin Administrative Code.*

SECTION A - OWNER AND UNIT INFORMATION

Owner (Municipality/Facility)/Telephone	Facility Identifier (FID #)	Construction Year / Roof Membrane Year
Village of Arena, WI		/
Storage Facility Location	**Manufacturer and Serial Number**	**Last Exterior Paint Year**
Hwy 14 Arena, WI	Caldwell Tanks E-5599	2004
Type of Storage Facility	**Capacity (Volume in Gallons)**	**Last Interior Paint Year**
Elevated single pedestal sphere.	150,000	2004

SECTION B - INSPECTION AGENT INFORMATION

Inspection Agent (Company)	Inspection Date
Water Tower Clean & Coat, Inc.	12/30/2019
Company Address	**Telephone Number**
W11822 Reynolds Road, Lodi, WI 53555	(608) 592-7574

Certifications:
- ☐ Professional Engineer
- ☐ American Welders Society (AWS)
- ☒ Steel Structures Painting Council (SSPC)
- ☒ National Assoc. of Corrosion Engineers (NACE)

SECTION C - GENERAL INSPECTION INFORMATION

Elements below may be operational in nature and may need to be provided by the water system operator or owner.

Type of Inspection (s. NR810.14(2)):
- ☒ Complete Drain Down
- ☐ Float Down or Partial Drain Down
- ☐ Diver
- ☐ ROV
- ☒ Annual Vents/Screens/Hatches
- ☐ Other (explain)

Soak-Down Testing conducted? (Required when roof cracks are observed unless waived by WDNR field engineer.)	○ Yes ◉ No (explain) ○ Waiver
Commercial diver certification standards met (Section 12.0 of the Consensus Standards for Commercial Diving and Underwater Inspections)	○ Yes ○ No (explain) ◉ N/A
Diver/ROV equipment disinfection requirements met (200mg/l Total Chlorine)	○ Yes ○ No (explain) ◉ N/A
Chlorine residual of storage water was at or above .5mg/l for diver/ROV inspection?	○ Yes ○ No (explain) ◉ N/A
Which AWWA C652 (Disinfection of Water-Storage Facilities) method was used?	○ Method 1 ◉ Method 2 ○ Method 3
Free chlorine residual test result(s) before unit was placed into service (mg/l)?	0.55
Bacteriological test result(s) were safe before unit was placed into service?	◉ Yes ○ No (explain)
Distribution system pressure maintained ≥ 20psi during cleaning/inspection process?	◉ Yes ○ No (explain)
External Bypass/Isolation/Drain Valves Functional and Described on System Map(s)?	◉ Yes ○ No (explain)

Explanations (if applicable):

SECTION D - PREMAINTENANCE OBSERVATIOINS

Describe observations to the right of each element. They may include clarity, color, odor, film, biofilm, staining, oil, or other concerns.

Surface (walls/ceiling) Characteristics	Typical iron stains.
Water Quality Characteristics	Excellent
Sediment Characteristics	Thick iron sediment.
Sediment Depth and Distribution	2' in sediment trough.
Stratification (include temperature gradients if known)	n/a
Were water/sediment/film samples collected (explain)?	No, nothing unusual was found.

SECTION E - SPECIFIC INSPECTION OBSERVATIONS

Describe observations: note whether each element is satisfactory (S), unsatisfactory (U), or is not present (not applicable - N/A). If a rating is unsatisfactory, provide an explanation to the right of the element and/or provide this information in attached documentation by referencing the inspection element's identification number.

ID	S	U	N/A	Site or Property Assessment	Explanation
1	◉	○	○	Roads and Accessibility	
2	◉	○	○	Positive Drainage	
3	○	○	◉	Vegetation (top and sides)	
4	○	○	◉	Lighting	
5	○	○	◉	Fencing	
6	◉	○	○	Security	
ID	**S**	**U**	**N/A**	**Miscellaneous or Ancillary Equipment**	**Explanation**
7	○	◉	○	Steps and Platforms	The platforms are in need of paint repairs.
8	◉	○	○	FPD, Rungs, Friction Brakes, Harness and Attachment	
9	◉	○	○	Safety Rails, Catwalks	
10	◉	○	○	Painter Rings and Brackets	
11	◉	○	○	Electrical Wiring/Conduits/Junction Boxes	
12	◉	○	○	Cathodic Protection System: Wiring, Anodes, Support	
13	○	○	◉	Aviation Lights	
14	◉	○	○	Antennae	
15	◉	○	○	Riser Expansion Joint, Pipe, and Hardware	
16	◉	○	○	Chemical Injection Tap/Port	
17	◉	○	○	Sample Tap	
18	○	○	◉	Freeze Protection	
ID	**S**	**U**	**N/A**	**Valve Vault**	**Explanation**
19	○	○	◉	Structure or Housing	
20	○	○	◉	Drain/Sump	
21	○	○	◉	Valves/Piping	
22	○	○	◉	Electrical Equipment	
23	○	○	◉	Security	
ID	**S**	**U**	**N/A**	**Controls**	**Explanation**
24	◉	○	○	Method Used to Control Water Level (also note the type used)	SCADA transducer
25	◉	○	○	Penetration and Seal Integrity	
26	◉	○	○	Electrical Equipment and Wiring	
27	◉	○	○	Floats, Switches, Sensors	
28	○	○	◉	Mercury Switches	
29	◉	○	○	Control/Electrical Box Security	
ID	**S**	**U**	**N/A**	**Mixing**	**Explanation**
30	○	○	◉	Mixing Method	
31	○	○	◉	Penetration and Seal Integrity	
32	○	○	◉	Operation and Functionality	
33	○	○	◉	General Effectiveness	

ID	S	U	N/A	Access	Explanation
34	◉	○	○	Structure and Associated Parts	
35	◉	○	○	Steel/Metal Structures (pits, corrosion, holes, buckling, etc.)	
36	◉	○	○	Lip Distance to Ground/Roof Surfaces	4"
37	◉	○	○	Lip, Hatch, and Hatch to Lip Overlap	+2"
38	◉	○	○	Fit, Seal, Gaskets	
39	◉	○	○	Locking System and Security	
40	○	○	◉	Sealed Access Tube Air-Gap Boot/Seal (CBI Spheroid)	
ID	**S**	**U**	**N/A**	**Vents**	**Explanation**
41	◉	○	○	**Number and Size(s)**	1 vent 12"
42	◉	○	○	Structure and Associated Parts	
43	◉	○	○	Distance to Ground/Roof Surfaces (feet)	+1'
44	◉	○	○	Screen Mesh Size (number of strands per linear inch)	
45	◉	○	○	Screen Corrosion Resistance	
46	◉	○	○	Screen (attachment method, coverage, integrity)	Built-in.
47	◉	○	○	Rain, Drip, Wind Shield	
48	○	○	◉	Pressure Pallets (release/screen)	
49	○	○	◉	Security Shroud/Hood/Device	
ID	**S**	**U**	**N/A**	**Overflow**	**Explanation**
50	◉	○	○	Number and Sizes (diameter)	1 overflow 6"
51	◉	○	○	Pipe Material (non-metal is prohibited)	
52	◉	○	○	Pipe Integrity	
53	◉	○	○	Air Break Distance to Splash Pad (12" to 24" required)	+12"
54	◉	○	○	Screen Mesh Size (number of strands per linear inch)	
55	◉	○	○	Screen Corrosion Resistance	
56	◉	○	○	Screen (attachment method, coverage, integrity)	opposing flanges
57	○	○	◉	Flapper	
58	◉	○	○	Splash Pad (material and integrity)	concrete
59	◉	○	○	Head Wall	
60	◉	○	○	Erosion Protection	
61	◉	○	○	Drainage (positive and safe)	
62	○	○	◉	Security Shroud/Hood/Device	
63	○	○	◉	Overflow Test Results (if overflow was tested on inspection)	
ID	**S**	**U**	**N/A**	**Foundation and Anchoring**	**Explanation**
64	◉	○	○	Supporting Soils (settling, erosion, leak evidence)	
65	◉	○	○	Final Grade is 4" to 6" Below Base Plate	
66	◉	○	○	Concrete (spall, crack, rebar, corrosion, efflorescence, etc.)	
67	◉	○	○	Anchors (anchor, bolt, thread condition/fully threaded/tight)	
68	◉	○	○	Chairs (cleanliness and condition)	
69	○	○	◉	Leg Struts and Connections	
70	○	○	◉	Column Shoes/Riser Plates (erosion/corrosion/grout seal)	
71	○	○	◉	Wind Rods (condition, tightness, pins properly secured)	

ID	S	U	N/A	Internal Observations (ceiling, walls, floor, other)	Explanation
72	◉	○	○	Compatible Materials (no wood, lead, mercury, coal tar, etc.)	
73	◉	○	○	Drain, Sump, Silt Trap	
74	○	○	◉	Control Valves and Pipes	
75	◉	○	○	Equipment Support Systems	
76	◉	○	○	Penetration Points (sealed, integrity, etc.)	
77	◉	○	○	Roof Support System (trusses, rafters, welds, etc.)	
78	○	○	◉	Concrete (spall, crack, rebar, corrosion, efflorescence, etc.)	
79	○	○	◉	Pre-stressed Concrete (seams, anchors, wire winding)	
80	◉	○	○	Steel/Metal Structures (pits, corrosion, holes, buckling, etc.)	Several small rust spots are visible.
81	○	○	◉	Internal Membrane	
82	◉	○	○	Seams (welds, gaskets, bolts, rivets, seals, etc.)	
83	◉	○	○	Mastics (gaskets, caulk, mortar, grout, rubber, epoxy, etc.)	
84	◉	○	○	Surface Coating (paint, rubber, glass, epoxy, etc.)	
85	◉	○	○	Paint Testing (thickness, adhesion, etc.)	Mil thickness and adhesion are very good.
86	○	◉	○	Ice/Freezing Protection (explain any damage)	Visible ice damage to coating.
ID	**S**	**U**	**N/A**	**External Observations (roof, walls, and other)**	**Explanation**
87	◉	○	○	Roof and Sidewall Drainage	
88	○	○	◉	Cover Material (sod, foam, etc.)	
89	○	○	◉	External Membrane	
90	◉	○	○	Equipment Support Systems	
91	◉	○	○	Penetration Points (sealed, integrity, etc.)	
92	○	○	◉	Riser and Stay Rods	
93	○	○	◉	Piping and Valves	
94	○	○	◉	Concrete (spall, crack, rebar, corrosion, efflorescence, etc.)	
95	○	○	◉	Pre-stressed Concrete (seams, anchors, wire winding)	
96	◉	○	○	Steel/Metal Structures (pits, corrosion, holes, buckling, etc.)	Some small rust spots noted in report.
97	◉	○	○	Seams (welds, gaskets, bolts, rivets, seals, etc.)	
98	◉	○	○	Mastics (gaskets, caulk, mortar, grout, rubber, epoxy, etc.)	
99	◉	○	○	Surface Coating (paint, rubber, glass, epoxy, etc.)	
100	◉	○	○	Paint Testing (thickness, adhesion, etc.)	Mil thickness and adhesion tested very good.
101	○	○	◉	Ice/Freezing Protection (explain any damage)	

SECTION F - REPAIRS COMPLETED

Describe repairs made to the water storage facility or associated parts. Include names of any products used to coat or seal internal surfaces. Detailed information can be provided in supporting documentation attached to this form. Please note: WDNR plan review and approval is required prior to applying products to water storage facilities; and may be required for modification and repairs.

We added a new DNR compliant hatch gasket to the access hatch.

SECTION G - RECOMMENDATIONS

Detailed information can be provided in supporting documentation attached to this form.

SECTION H - REPORTING CHECKLIST

Use the checklist below to ensure the form and submittals are complete.

Supporting Documentation (check all that apply)	☒ Pictures ☐ Video ☐ Sample Results
Unsatisfactory Observations Described	◉ Yes ○ No ○ N/A
Repairs Described	◉ Yes ○ No ○ N/A
Recommendations Described	◉ Yes ○ No ○ N/A
Written Report and Supporting Documentation Sent to Owner	◉ Yes ○ No

SECTION I - SIGNATURES

I certify that the information provided on this form is accurate and true to the best of my ability.

Inspection Agent Signature	Date
Inspection Agent Printed Name Russ Fiene	Telephone Number (608) 592-7574
Municipal Official or Owner Signature	Date
Municipal Official or Owner Printed Name	Telephone Number

SUBMITTAL INSTRUCTIONS

Submit Form 3300-248 and any narrative report, pictures, and video to the attention of the water system's WDNR regional water supply representative (https://dnr.wi.gov/topic/drinkingWater/documents/CountyContacts.pdf) at:

WDNR Northern Region
107 Sutliff Avenue
Rhinelander, WI 54501

WDNR Northeast Region
2984 Shawano Avenue
Green Bay, WI 54313

WDNR Southeast Region
2300 N. Dr. Martin Luther King, Jr. Dr.
Milwaukee, WI 54212

WDNR South Central Region
3911 Fish Hatchery Road
Fitchburg, WI 53711

WDNR West Central Region
1300 West Clairmont Avenue
Eau Claire, WI 54701

Appendix E

Water Quality Information

Figure E-1 2019 Consumer Confidence Report

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2019 Consumer Confidence Report Data ARENA WATERWORKS, PWS ID: 12500730

Water System Information

If you would like to know more about the information contained in this report, please contact Mike Schmidt at (608) 753-2133.

Opportunity for input on decisions affecting your water quality

Public Works Committee Meetings held on the second Tuesday of each month at 5PM at Village Hall. Regular Full Board Meetings held on first Tuesday of each month at 7PM.

Health Information

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the Environmental Protection Agency's safe drinking water hotline (800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune systems disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available from the Environmental Protection Agency's safe drinking water hotline (800-426-4791).

Source(s) of Water

Source ID	Source	Depth (in feet)	Status
1	Groundwater	415	Active

To obtain a summary of the source water assessment please contact, Mike Schmidt at (608) 753-2133.

Educational Information

The sources of drinking water, both tap water and bottled water, include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

- Microbial contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.
- Inorganic contaminants, such as salts and metals, which can be naturally- occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- Pesticides and herbicides, which may come from a variety of sources such as agriculture, urban stormwater runoff and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff and septic systems.
- Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities.

In order to ensure that tap water is safe to drink, EPA prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. FDA regulations establish limits for contaminants in bottled water, which shall provide the same protection for public health.

Definitions

Term	Definition
AL	Action Level: The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.
Level 1 Assessment	A Level 1 assessment is a study of the water system to identify potential problems and determine, if possible, why total coliform bacteria have been found in our water system.
Level 2 Assessment	A Level 2 assessment is a very detailed study of the water system to identify potential problems and determine, if possible, why an E. coli MCL violation has occurred or why total coliform bacteria have been found in our water system, or both, on multiple occasions.
MCL	Maximum Contaminant Level: The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

Term	Definition
MCLG	Maximum Contaminant Level Goal: The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.
MFL	million fibers per liter
MRDL	Maximum residual disinfectant level: The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.
MRDLG	Maximum residual disinfectant level goal: The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.
mrem/year	millirems per year (a measure of radiation absorbed by the body)
NTU	Nephelometric Turbidity Units
pCi/l	picocuries per liter (a measure of radioactivity)
ppm	parts per million, or milligrams per liter (mg/l)
ppb	parts per billion, or micrograms per liter (ug/l)
ppt	parts per trillion, or nanograms per liter
ppq	parts per quadrillion, or picograms per liter
TCR	Total Coliform Rule
TT	Treatment Technique: A required process intended to reduce the level of a contaminant in drinking water.

Detected Contaminants

Your water was tested for many contaminants last year. We are allowed to monitor for some contaminants less frequently than once a year. The following tables list only those contaminants which were detected in your water. If a contaminant was detected last year, it will appear in the following tables without a sample date. If the contaminant was not monitored last year, but was detected within the last 5 years, it will appear in the tables below along with the sample date.

Disinfection Byproducts

Contaminant (units)	Site	MCL	MCLG	Level Found	Range	Sample Date (if prior to 2019)	Violation	Typical Source of Contaminant
HAA5 (ppb)	1	60	60	1	1		No	By-product of drinking water chlorination

Contaminant (units)	Site	MCL	MCLG	Level Found	Range	Sample Date (if prior to 2019)	Violation	Typical Source of Contaminant
TTHM (ppb)	1	80	0	5.1	5.1		No	By-product of drinking water chlorination

Inorganic Contaminants

Contaminant (units)	Site	MCL	MCLG	Level Found	Range	Sample Date (if prior to 2019)	Violation	Typical Source of Contaminant
BARIUM (ppm)		2	2	0.033	0.033	9/26/2017	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
FLUORIDE (ppm)		4	4	0.9	0.9	9/26/2017	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
NICKEL (ppb)		100		0.8000	0.8000	9/26/2017	No	Nickel occurs naturally in soils, ground water and surface waters and is often used in electroplating, stainless steel and alloy products.
SODIUM (ppm)		n/a	n/a	2.30	2.30	9/26/2017	No	n/a
THALLIUM TOTAL (ppb)		2	0.5	0.2	0.2	9/26/2017	No	Leaching from ore-processing sites; Discharge from electronics, glass, and drug factories

Contaminant (units)	Action Level	MCLG	90th Percentile Level Found	# of Results	Sample Date (if prior to 2019)	Violation	Typical Source of Contaminant
COPPER (ppm)	AL=1.3	1.3	0.4100	0 of 10 results were above the action level.	9/26/2017	No	Corrosion of household plumbing systems; Erosion of natural deposits; Leaching from wood preservatives
LEAD (ppb)	AL=15	0	0.85	1 of 10 results were above the action level.	9/26/2017	No	Corrosion of household plumbing systems; Erosion of natural deposits

Radioactive Contaminants

Contaminant (units)	Site	MCL	MCLG	Level Found	Range	Sample Date (if prior to 2019)	Violation	Typical Source of Contaminant
RADIUM, (226 + 228) (pCi/l)		5	0	2.6	2.6	9/26/2017	No	Erosion of natural deposits

Health effects for any contaminants with MCL violations/Action Level Exceedances

Contaminant	Health Effects
LEAD	Infants and children who drink water containing lead in excess of the action level could experience delays in their physical or mental development. Children could show slight deficits in attention span and learning abilities. Adults who drink this water over many years could develop kidney problems or high blood pressure.

Additional Health Information

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components

associated with service lines and home plumbing. Arena Waterworks is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at www.epa.gov/safewater/lead.

Appendix F

Project Cost Estimates

Not included at this time

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PROCESS FOR THE CONSTRUCTION OF A NEW MUNICIPAL WELL

PHASE I – Planning and Well Site Investigation (Approximate Duration – 3 to 6 months)

- Review various DNR databases for potential contamination sources
- Review potential contamination sources with client
- Map areas of potential contamination
- Review publications and data regarding area hydrogeology
- Compile and review well construction reports and geologic logs in the area
- Review water loss records and potential conservation measures
- Sample private wells in the area, especially deeper high capacity wells, if available
- Identify test well site(s)
- Prepare Well Site Investigation Report in compliance with [Wis. Admin. Code 811.09(4)] and submit to WDNR
- Receive comments from PSC and WDNR, and finalize Well Site Investigation Report

PHASE II – Test Well (Approximate Duration – 3 to 9 months)

- Obtain option to purchase for site(s), obtain easements if necessary
- Review availability of water main, 3-phase power, telephone, sanitary sewer
- Prepare plans and specifications for test well
- Obtain DNR approval of test well
- Construct test well
- Test pumping to determine quantity and quality

PHASE III - Design (Approximate Duration – 6 to 8 months)

- Purchase well site
- Design of final well, wellhouse, mechanical, electrical, plumbing, connecting water main
- Begin wellhead protection planning process
- Prepare plans and specifications for well, wellhouse, and related facilities
- Prepare final cost estimate for well, wellhouse, and related facilities
- Obtain Public Service Commission (PSC) construction authorization
- Obtain DNR approval for well, wellhouse, and related facilities

PHASE IV – Bidding and Construction (Approximate Duration 10 to 12 months)

- Obtain DNR approval for well, wellhouse, and related facilities
- Advertise for bids, bid opening
- Bid evaluation
- Award bids
- Construct final well, conduct test pumping
- Construct wellhouse and related facilities
- Obtain DNR approval of wellhead protection plan
- Well start-up

Appendix G

Potential Funding Sources Eligibility Summary

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FUNDING SCORE CARD
Village of
Arena

CDBG Public Facilities Grant

LMI*: 42.07% Need 51% by Community Survey

Rural Development Grant

Grant Eligible: 45%

2% MHI = $1,040.00 /per year**

Average Sewer Cost: _____ /per year

Average Water Cost: _____ /per year

SEARCH Grant Eligible: No

WDNR Safe Drinking Water Fund Loan Program (SDWLP)

	If applied for in June 2020	*If applying in June 2021*
Estimated Principal Forgiveness:	30%	30%
Estimated Interest Rate for 20 Year Bond @:	1.650%	

Estimated Interest Rate from DNR; Subject to Change Quarterly
PF up to $500,000

WDNR Clean Water Fund Program (CWFP)

	If applied for in September 2020	*If applying in September 2021*
Estimated Principal Forgiveness:	30%	30%
Estimated Interest Rate for 20 Year Bond @:	1.650%	

Estimated Interest Rate from DNR; Subject to Change Quarterly
PF up to $750,000 (additional PF Available for Regionlization, Phosphorus, and Focus on Energy)

Local Share - TID Eligible

12% Test: 15.61%

Active TIDs:	Expenditure Date	Max Life	Extended Life***
TID	9/28/2021	9/28/2026	

* = ACS 2011-2015 LMISD ** = ACS 2006-2010 used for RD

*** = Estimated Interest Rate from DNR; Subject to Change Quarterly **** = distressed TID

Scorecard created on: 1/11/2021

MSA

FUNDING SCORE CARD
Village of
Arena

CDBG Public Facilities Grant

LMI*: 42.07% Need 51% by Community Survey

Rural Development Grant

Grant Eligible: 45%

2% MHI = $1,040.00 /per year**

Average Sewer Cost: _____ /per year

Average Water Cost: _____ /per year

SEARCH Grant Eligible: No

WDNR Safe Drinking Water Fund Loan Program (SDWLP)

	If applied for in June 2020	*If applying in June 2021*
Estimated Principal Forgiveness:	30%	30%
Estimated Interest Rate for 20 Year Bond @:	1.650%	

Estimated Interest Rate from DNR; Subject to Change Quarterly
PF up to $500,000

WDNR Clean Water Fund Program (CWFP)

	If applied for in September 2020	*If applying in September 2021*
Estimated Principal Forgiveness:	30%	30%
Estimated Interest Rate for 20 Year Bond @:	1.650%	

Estimated Interest Rate from DNR; Subject to Change Quarterly
PF up to $750,000 (additional PF Available for Regionlization, Phosphorus, and Focus on Energy)

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TID	9/28/2021	9/28/2026	

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Scorecard created on: 1/11/2021

MSA