at water conservation within the Chewaucan River Basin Aquifer. These consist of cessation or limitations of domestic water use for all purposes other than sanitary and essential needs. Actions which are not allowed during supply shortages include outside watering, washing of personal vehicles, or similar non-vital activities which would tax the water system further. Examples of public notices pursuant to the Water Curtailment Plan are included in Exhibit 5.

The distribution system is currently functional and provides adequate supply for the City of Paisley. However, the system manager and system operator have noted an increase in leaks during the summer of 2021, along with increased repair costs. The original pipe within the distribution system is reaching the end of its lifespan and replacement is recommended.

The City's Water Curtailment Plan include the following defined triggers:

Supply Triggers:

Mild Stage – The static water level in any well drops 10 feet.

Moderate Stage – The static water level in any well drops 15 feet or a minor pump/well failure occurs.

Critical Stage – The static water level in any well drops 25 feet or a major pump/well failure occurs.

Demand Triggers:

Mild Stage – Water use reached 1 million gallons per day (MGD) for 3 consecutive days.

Moderate Stage – Water use reaches 90% of the ability to refill the storage tank.

Critical Stage – Wells are not able to fill the storage tank.

Capacity Triggers:

Mild Stage – Water use reaches 60% of system capacity.

Moderate Stage – Water use reaches 85% of system capacity.

Critical Stage – Water use reaches 90% of system capacity.

The actions for each stage of alert are as followed:

Stage 1 – Mild Alert

Encourage customers to voluntarily reduce water with flyers, newspaper articles, and/or social media posts. Encourage customers to voluntarily water their landscape between 6 am to 10 am and from 6 pm to 10 pm. Minimize washing of private vehicles or wetting down unnecessary areas.

Stage 2 – Moderate Alert

Allow outside watering ONLY between 6 am to 10 am and from 6 pm to 10 pm to all customers. Prohibit use of water for construction unless authorized by the City. Prohibit washing of private vehicles for all customers. Prohibit washing or wetting down of driveways, parking lots, etc. for all customers.

Fines will be added to the customers' bill for disobeying and water services may be shut off for repeat offenders.

Stage 3 – Critical Alert

Prohibit all outdoor watering at all times of the day for all customers. Allow water from hydrants only for firefighting. Implement limitations on commercial or domestic uses of water. Perform public service announcements to notify customers of the severity of the shortage.

Fines will be added to the customer's bill for disobeying and water services may be shut off for repeat offenders.

If any of the supply, demand, or capacity triggers occur, the appropriate state of alert is put into effect throughout the City. The alert is shared through a combination of methods to ensure that the public is well aware of the alert and what it means for their water usage. Each customer is mailed an alert notice, it is published in the local paper, and flyers are posted at local businesses. If the alert is such that the effects and conservation measures must be instantaneous, the City will hand deliver notices to each customer while enlisting help from the Sheriff and/or Fire Department to aid in getting the alert information out to all of Paisley as fast as possible.

9.9 Conservation Benchmarks

The 2002 WMCP established conservation benchmarks for the City to implement. Unfortunately, a digital copy of this plan is not available and a hard copy was not found in OWRD or City records. OWRD does have a Water Management Plan from 2000, but it would have been superseded by the conservation stipulations of the 2002 WMCP. As a result, it is not possible at this time to assess the success in implementing previously set conservation benchmarks.

Section 9 of this Master Plan will serve as the next edition of the WMCP for the City to implement conversation measures required by OAR 690-086-0150. Conservation benchmarks will be set by this section of the Master Plan.

The City will strive towards meeting the following conservation benchmarks over the next ten years.

Conduct Annual Water Audits

The City's water services are charged via a usage-based structure, as noted in Section 2. As a result of this rate structure, consistent individual meter readings are performed each month in Paisley, conducted by the water system operator. Although the City tracks total usage from the wells and individual meters usages for accurate billing purposes, a formal water audit has not been conducted. A formal water audit should include the following:

- A quantification (%) of significant water losses and the location (if known) of those losses.
- A systematic and documented methodology for estimating any un-metered authorized and unauthorized uses, such as water taken from a fire hydrant.

The City does have the resources to successfully meet this benchmark at this time. At the end of each year, a water audit will occur. This entails analyzing meter data taken from the well meters and comparing it to the customer meter information collected each month throughout the year. The analysis and comparison of these data sets allows the City to accurately assess water system losses. Each year as the annual water audit is conducted, the final step involves recommendations to curtail any losses through the distribution system and create a plan of action to address those losses. The City will coordinate with local fire-fighting services to collect data for hydrant use when required. Some municipal buildings do not have meters and care should be taken to estimate the water usage of these buildings in the annual audit so as not to overestimate water loss within the system.

Implement Full Metering

An important component of collecting accurate water use information is to consistently read all meters each month. Additionally, water usage taken from hydrants for either official firefighting purposes or other purposes is not tracked.

The City will reassess the need for adding service meters to all municipal buildings. In the past, water use from these buildings have been estimated based on the amount of time these buildings are open to public use. Regardless of how accurate these usage estimates are, none of these buildings have the ability to use enough water to impact the system significantly as water services are limited to sinks and public bathrooms and are not consistently used.

Of greater concern, in terms of accurate water tracking and conservation efforts are unmetered hydrants within the City of Paisley. The City will work with the fire department to come up with

a plan of action to accurately track water taken from hydrants and to prevent pirating of water from hydrants.

The City's water system is fully-metered, less the aforementioned exceptions. In order to reach this benchmark, the City will either meter the remaining unmetered municipal buildings or present a detailed assessment of why metering those building is unnecessary; the assessment should be reassessed each year. Additionally, the City must create an action plan for tracking water usage from hydrants with the cooperation of the fire department; this plan will also include methods to curtail any water pirating from hydrants by people not associated with the fire department. Significant progress to meet this benchmark is defined as an assessment of the unmetered buildings and the initial stages of an action plan to track hydrant usage in cooperation with the fire department.

Implement a Leak Detection Program

The City has noticed an increasing number of leaks in the system during 2021. This is likely due to the age of the original distribution pipe reaching the end of its natural lifespan. Replacement of the original asbestos concrete piping should significantly reduce leaks throughout the system.

However, if more than a 10% system volume loss is noted during any annual water audit, a tracer system will be put into action to accurately locate and repairs leaks within the system. Meeting this benchmark will be shown through the use of a tracer program if greater than 10% system volume losses are noted. Significant progress towards this benchmark will be measured by securing funding to replace the distribution system as laid out in this Master Plan or by creating an initial plan of action to implement a tracer program. If less than 10% water volume is noted within the system during the annual water audit, no further action is required to meet this benchmark.

Annual Meter Maintenance Program

Meter readings are currently obtained on a monthly basis for billing purposes. If any meter is found to have an anomalous change from the previous month, the meter will be checked by the system operator to ensure it is working properly. The meter will then be repaired or replaced as necessary. As Paisley is a small community, reading meters each month serves as a full system meter maintenance program. The City is currently meeting this benchmark.

Implement a Public Education Program

The City has implemented a public education program that includes water conservation recommendations as well as provides customers with information about water quality or actions performed in an effort to be transparent to the community. In general, these conservation efforts have focused around voluntary and mandatory restrictions on non-essential water use. Limiting the hours permissible to water lawns has been one of the main tools the City implements to ensure water conservation. The City will directly mail voluntary conservation efforts to customers or will go door-to-door if immediate action is required. Exhibit 5 shows a recent flyer that was delivered to customers in regards to transparency of water quality within Paisley's system with conservation recommendations at the top of the flyer. In the past, restricted hours for lawn maintenance have varied, but have always been put in place.

However, to meet the benchmark in its entirety the City will also begin including a fact sheet about water conservation efforts as provided for by OWRD once a year. The fact sheet will either be included with their bill or mailed as a separate letter.

9.10 Recommendations

Records

In order to make decisions and prioritize resources on water system maintenance it is important to have data on the system operation and pipe characteristics in a usable and easily accessible form. If information is recorded promptly and precisely, and stored in a way that is easy to access, the system operator can make decisions for the water system based on accurate data. Having accurate usage readings from service meters will allow the City to continue to properly charge for their services and conduct an annual water audit. Proper conservation methods can be implemented and system maintenance will be improved. Continuing to perform full system meter readings each month is highly recommended.

Maps, drawings, and records also provide a method for recording information necessary for the efficient operation and maintenance of a water distribution system. Maps and records must be updated regularly to include system changes, improvements, or new construction. Out-of-date maps and records not only hinder daily operations but can also pose additional problems during emergencies.

The City should also continue all required quality control and static water level monitoring as per their operational permits and Section 9 of this report, which serves as their WMCP.

Plan(s) of Action

The City is currently meeting the majority of their benchmark conservation goals. Due to good record keeping and regularly performed full system meter readings, only minor changes to how the system is managed need to be implemented to reach all benchmark conservation goals.

There is currently a minor water use tracking deficiency regarding how much water is used by hydrants. The City needs to start working on a plan of action, in coordination and/or conjunction with the local fire department to figure out how to accurately track hydrant use. As this action has not been done in the past, putting together a plan of action can help the implementation of this new task occur in an efficient manner.

Additionally, conducting yearly water system audits will start occurring to better assess system loss. As this has not been done in the past, it is recommended that the City develop a plan of action that outlines when the audits are conducted, how to conduct them, and how to analyze the results so the information can be used to improve system performance.

These plans will be used internally as a guide to ensure that at least significant progress towards conservation benchmarks goals can be reached and maintained. Detailed logs will be associated with each plan and must be kept as a record until the benchmark of the action item in question is met; these logs and/or action plan(s) will be included on the next iteration of the WMCP to show how the benchmark goal was implemented and successfully completed.

Although creating these action plans is not required if the goal is accomplished by other means, accomplishing any new goal can only be aided by the creation of an action plan. It is strongly recommended that action plans are created for the aforementioned issues prior to implementing the action in question.

Water Rates

The majority of funds available for system maintenance come from water service revenue. The City currently has a usage-based rate system. The current rate system is sufficient to support all regular system maintenance tasks. However, current rates may not be adequate to meet debt service demands for system upgrades or establish a reserve account for future improvements. It is recommended that the City review current rates with these issues in mind and consider preparing a rate study to evaluate future revenue needs.

Wellhead Protection

The community of Paisley is completely dependent on groundwater sourced from aquifers within the Chewaucan River Basin, pumped out of the ground via one of three wells. These wells have shown elevated arsenic in the past, but after the installation of an arsenic treatment

system, water quality is no longer an issue for the City. However, Wells #2 and #3 pull from the same aquifer; this aquifer has shown a consistent drop in static level over the years. One of the improvements laid out in this Master Plan is drilling a new well in a different aquifer. As a location for the new well has not yet been determined, not many actions for wellhead protection can be taken at this time. However, the possible need for future actions should be kept in mind when choosing a new well location and during subsequent construction and use of that new well.

The existing wells in the system are located in locked buildings with access limited to the system operator and system manager. Historically, other than contamination due to chemical species already in the water, additional well head protection has not been needed or required. Arsenic contamination in the groundwater is consistent with the historical geochemical nature of groundwater in this area. When a new well is constructed, wellhead protections may be required to ensure the new well is protected from surface or groundwater contamination. Wellhead protection, even if limited in extent, should be implemented by the City at the new well. A number of commonly used land-use controls, source controls, and other tools have been found to be highly useful for the protection of wellhead areas. Some of these tools are as followed:

Zoning Ordinance – Many local governments have used zoning to restrict or regulate certain land uses within wellhead protection areas.

Site Plan Review and Design Standards – Site plan reviews and design standards are tools that can be used to ensure that new buildings or structure placed within a wellhead protection area are designed so as not to pose a threat to the water supply.

Source Prohibitions – Source prohibitions are regulations that prohibit the presence or use of chemicals or hazardous activities within a given area. Local governments can place restrictions on the storage of hazardous materials within a wellhead protection area to eliminate the threat of contamination.

Public Education – Public education could be implemented using brochures, pamphlets, and/or flyers designed to inform the public about wellhead area problems and protection efforts. This tool promotes the use of voluntary protection efforts and builds public support of a community's protection program. It can also prevent the illegal disposal of hazardous materials, especially within wellhead areas. Maps could be developed of well capture zones and a land use/public education program could be implemented to protect these areas. Any informational material associated with wellhead protection would also be considered part of the public education program conservation benchmark goal.

Additionally, pump tests can be performed on all wells annually in order to determine well adequacy and productivity. This gives advanced notification to future well production problems. Power usage of each well can be monitored during these pump tests in order to calculate a cost per gallon at each well to determine which wells are most cost effective to operate. Water quality can be sampled and tested for all required contaminants. The results from the pump tests and water quality tests can be recorded for comparison and determination of pending impacts. Also, a contamination model could be derived in order to quantify chlorination input. The City currently obtains water samples on a monthly and yearly basis, and has an established schedule for contaminant testing in compliance with all operational permits.

Wells

Discharge pipes for start-up drainage at each well should have flappers installed to prevent unwanted backflow and animal habitat. This would allow the wells to be set for initial discharge, which would prevent damage to the pump motor if started unintentionally. Generally, site landscaping including mowing weeds would improve well appearances. Site improvements would help with public acceptance and awareness for a wellhead protection program.

Instrumentation

Instruments can be used to measure, display, and record the conditions and changes in a water distribution system. They can indicate what is happening at a given instant and guard against equipment overload and overuse, which results in additional operation costs. The instruments do not replace the operator but simplify the process and help improve performance, safety, and reliability. To monitor conditions at distant locations, a telemetry system may be installed. Telemetry will bring all data to a single location. The components of a telemetry system are a sensor connected to a transmitter, which sends a signal over a transmission channel to a receiver. The transmission channel is either special wiring, telephone line, or radio transmission. The receiver converts the signal to standard electrical values to operate the indicator.

Currently, the City system does not have any telemetry. The tank has a staff gauge positioned on the outside so the operator can look up from downtown Paisley and see if he needs to take actions to increase the water level in the storage tank by turning on any of the well pumps. It is recommended that after the improvements in this Master Plan are completed, the City discuss the viability to adding a telemetry system. This will remove any human error from the equation and ensure that the storage tank always maintains required storage levels no matter the time of day, day of the week, etc. Additionally, it is likely that the new well location will not be clustered around the other wells, so turning on that new well will be more difficult for the operator without a telemetry system.

It is highly recommended that the three wells have a static water level test conducted each month until a new well can be utilized. The static level must be taken after 24 hours of the pump being shut down. This will truly show the static water level of the water source and allow

for a plan of action to mitigate negative impacts. Based on the noted drop in static water levels over the years for Well #2 and #3, it is highly recommended that additional care is taken to accurately characterize the static water levels in these wells.

Fire Protection Services

Fire protection for Paisley is generally sufficient with adequate flows and pressures at existing functional hydrants. There are a number of hydrants in the system which are not currently functioning and it is strongly recommended that these hydrants be repaired or replaced as soon as possible. A general design rule for future growth and water system improvements should be that fire hydrants be located no further than 500 feet apart to avoid excess head loss occurring in fire hoses and to ensure adequate resources.

Implementation Priorities

The City has the resources to meet conservation benchmark goals by implementing a few system management changes. By the end of 2021, action plans need to be created with implementation beginning in early 2022. In the first month of 2022, using all meter reading data from 2021, the first water system audit will occur. With the exception of these changes, system management and operation will continue as is.

Financing Options

USDA Rural Utilities Services – Provide assistance to developers in the form of low interest loans or grants. Grants are given based on specific qualifications for each type of development.

General Obligation Bonds - These are funds that are voted on by the City and would be paid back with increased property taxes.

Revenue Bonds - Funds voted on by the City to be paid back with increased utility rates.

Local Improvement Districts – Assess the occupants of the area a lower rate on utilities.

Business Oregon - Infrastructure Finance Authority (IFA) – IFA offers grants and loans to promote development in areas that will create jobs and boost the economy in the community. There are funding opportunities for improvements to municipal water systems.

Economic Development Administration – Funds in the form of grants to low-income communities, which have decreased in population due to shortages in employment. These developments would also have to boost economy and create jobs and would be geared toward commercial and economic development.

9.11 Conclusion

The City of Paisley is in a good position to meet all conservation benchmark goals laid out in Section 9 of this report without securing funding. As a result of their current usage-based rate structure, monthly data in regards to water use is already collected accurately each month. Meters are checked each month to ensure that they are functioning correctly and are repaired or replaced as necessary. Special care should be given to ensuring static water levels in each well are measured monthly until a new well can be constructed to ensure adequate water supply to maintain consistent services throughout Paisley. Water conservation measures have already been successfully implemented and the community has been supportive of such efforts over the years. With the additional water conversation benchmark goals, Paisley will continue to succeed in providing reliable and consistent water services.

EXHIBIT 1

Storage Tank Integrity Report

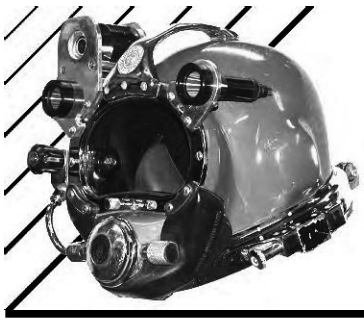
200KG Reservoir

City of Paisley

Report of Findings
From the
Diving Operations
Conducted on

July 10, 2020

by



LiquiVision Technology

DIVING SERVICES

711 Market Street, Klamath Falls, OR 97601, (800) 229-6959 www.divingservices.com

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Fax: (541) 883-1361
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liquivision@divingservices.com

Underwater Inspection of 200KG Reservoir

July 10, 2020

Travis Way
City of Paisley
P.O. Box 100
Paisley, OR 97636

Following is the report of findings during the underwater work conducted on your reservoir.

It will focus on issues of concern or areas that need attention. In order to see a complete and detailed inspection, please view each video.

Color images of all plumbing fixtures, components and areas of concern were taken via underwater digital camera. The images should give you a clear view of the conditions described. The video may give you another view and a clearer understanding of any area that you may wish to look at more closely.

METHODOLOGY:

Disinfection of All Equipment With 200ppm+ Chlorine Solution Immediately Prior to Entering System: This process prevents contamination of the water supply. All LVT equipment was properly disinfected prior to entering the potable water system.

Full-Time Voice Communication between surface and Diver: The system allowed for constant communication between the diver, and all surface personnel. In addition, customers were able to communicate with the diver at any time. For purposes of a more efficient inspection, cleaning, and repair program, that enabled the diver to immediately discuss any observations he made inside the reservoir.

Full-Time Live High-Resolution Color Video: Allowed for constant viewing of the diver's work and observations. This also enabled the district personnel to view what the diver in the reservoir was witnessing.

200KG Reservoir

TERMINOLOGY:

When describing the features or areas of interest inside the reservoir, an image number is placed next to the description that corresponds with the inspection findings. The diagram is shown in a view looking from the top down. The entry hatch is referred to as the 12:00 o'clock position.

Following the diagram are pictures of the pertinent areas of the reservoir and the locations where the pictures were taken. Each picture is descripted and numbered.

The standards used to evaluate the condition of the reservoir include: Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces – SSPC-Vis 2-82 & ASTM D 610-85 NACE Standard RP0196-96 & RP0388-2001 or Condition of Concrete In-service – ACI 201.1R-92.

200KG Reservoir

OVERVIEW OF RESERVOIR INSPECTED:

Customer Name:	City of Paisley	**Reservoir Name:**	200KG Reservoir
Manager:	Travis Way	Construction:	OG Welded
Job Number:	OR102220R1T3	Capacity (gal.):	200,000
Date of Inspection:	July 10, 2020	Diameter or L x W:	34'
Report Writer:	Yanni Vlahakis	Height:	32'
Diver:	Chris Westphal	Floor Square FT:	907.9
Tender:	Michael Ivezic	Date Built:	Unknown

N/A –not applicable **Excellent** (Ex.) –like new condition, no repairs needed. **Good –** Cosmetic only problems, repairs if wanted. **Fair-**Minor problems, repairs needed, not immediate. **Poor –**Major problems, structural or like, immediate repairs needed.

1. Rust Grades

Grades	% of Surface Rusted	Description
10	0% - 0.01%	No rusting or less than 0.01% of surface rusted
9	0.01% - 0.03%	Minute rusting, less than 0.03% of surface rusted
8	0.03% - 0.1%	Few isolated rust spots, less than 0.1% of surface rusted
7	0.1%- 0.3%	Less than 0.3% of surface rusted
6	0.3% - 1%	Extensive rust spots, but less than 1% of surface rusted
5	1% - 3%	Rusting to the extent of 3% of surface rusted
4	3% - 10%	Rusting to the extent of 10% of surface rusted
3	10% - 16%	Approximately one sixth of the surface rusted (16%)
2	16% - 33%	Approximately one third of the surface rusted (33%)
1	33% - 50%	Approximately one half of the surface rusted (50%)
0	50% - 100%	Approximately 100% of the surface rusted

2. Concrete Deformities

Unable to Evaluate	Good Condition	Cracks	Blistering	Chalking	De-Lamination	Pitting	Popouts	Scaling	Spalling	Warping
UE	GC	CK	BL	CH	DL	PT	PO	SC	SP	WA

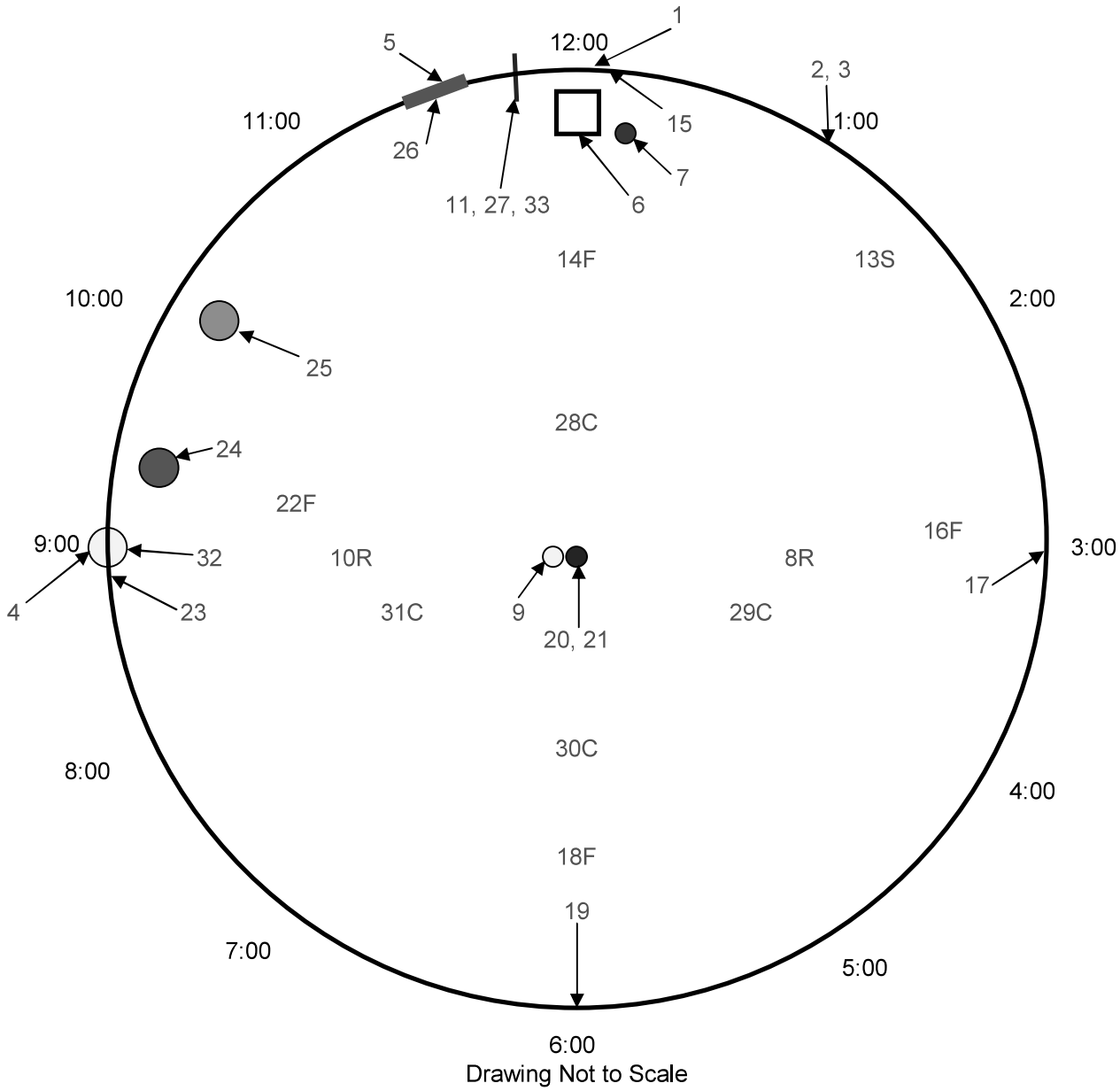
200KG Reservoir

RECOMMENDATIONS:

Recommendation	Estimated Time - Hrs.
Install weather stripping on entry hatch to limit the risk of bugs and other matter from entering the reservoir.	1 HR
Perform a regular cleaning, inspection and repair cycle every 2-3 years in order to ensure superior water quality and proper maintenance of coating condition and appurtenances is performed.	Please contact our sales office for an estimate.

200KG Reservoir

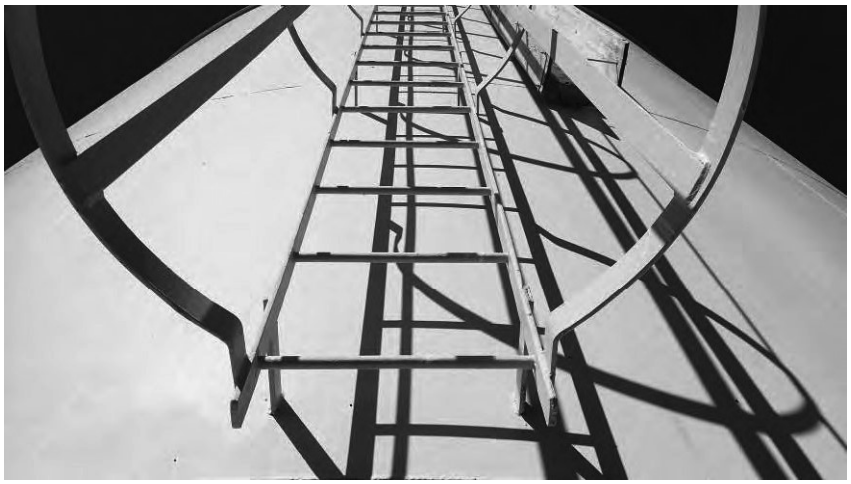
Reservoir Diagram



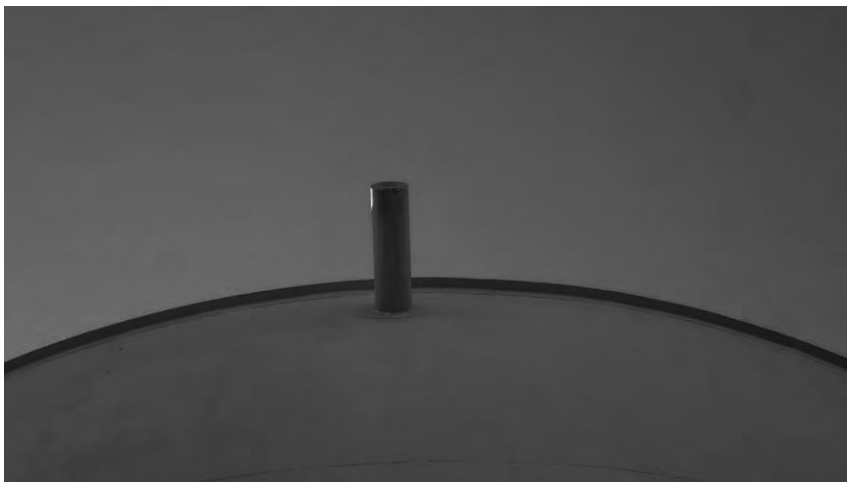
Drawing Not to Scale

	Entry Hatch		Overflow		Support Column
	Drain/Scour		Man Entry		Air Vent
	Common Inlet/Outlet		Liquid Level Indicator		Capped Off Pen.

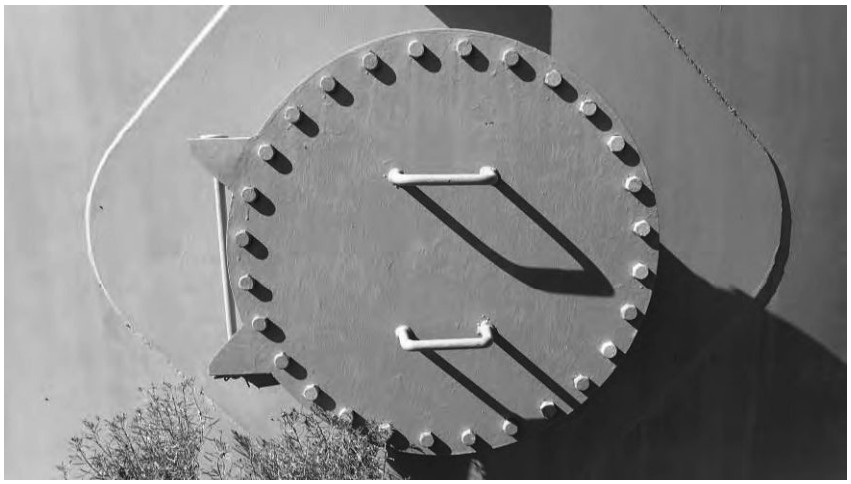
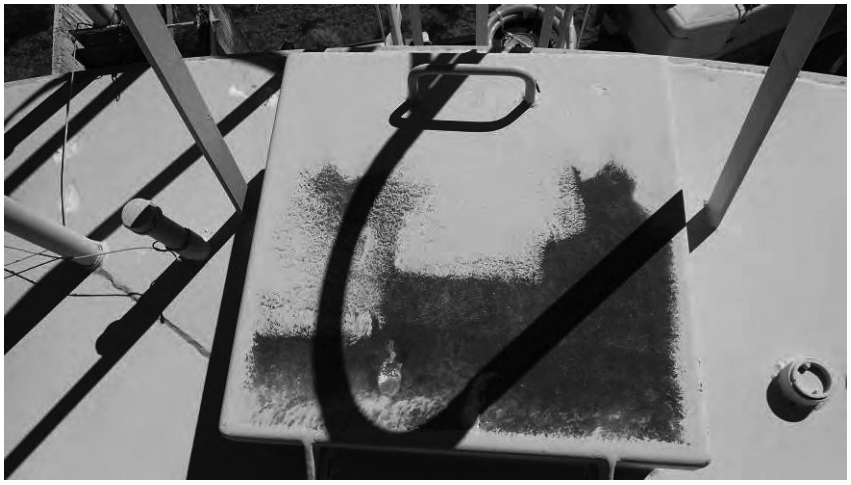
200KG Reservoir

Image **#1** *Exterior Ladder 12:00* **Condition:** Rust Grade[1] **8.** **Description:** Exterior Ladder appeared to be in good condition with a minor amount of corrosion.	
Image **#2** *Exterior Base 1:00* **Condition:** Concrete Deform[3] **DL.** **Description:** Exterior Base appeared to be in fair condition with a moderate amount of delamination.	

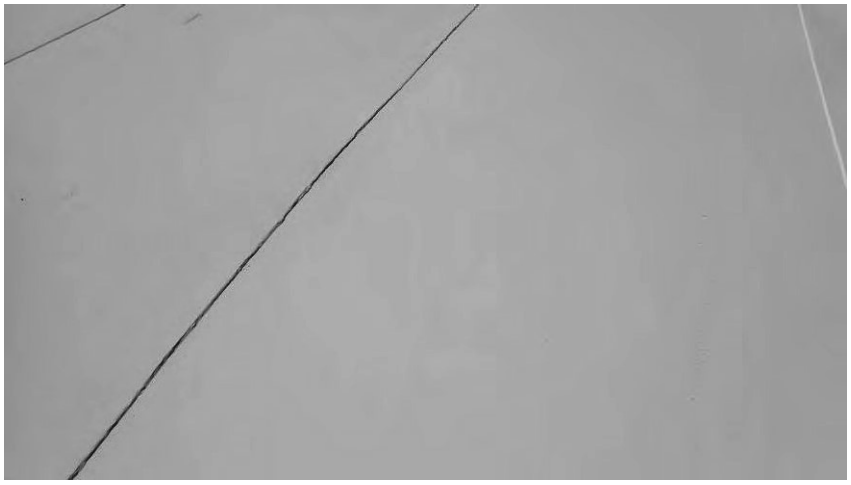
200KG Reservoir

Image #3 *Exterior Wall 1:00* **Condition:** Rust Grade[1] **8.** **Description:** Exterior Wall appeared to be in good condition with a minor amount of corrosion.	
Image #4 *Overflow 9:00* **Condition:** Rust Grade[1] **7.** **Description:** 4" Overflow appeared to be in fair condition with a minor amount of corrosion.	

200KG Reservoir

Image #5 *Man Way 11:30* **Condition:** Rust Grade[1] **8.** **Description:** 36" Man Way appeared to be in good condition with a minor amount of corrosion.	
Image #6 *Entry Hatch 12:00* **Condition:** Rust Grade[1] **8.** **Description:** 24" X 24" Entry Hatch appeared to be in good condition with a minor amount of corrosion. Entry hatch does not have weather stripping.	

200KG Reservoir

Image #7 *Capped Off Penetration 12:10* **Condition:** Rust Grade[1] **8.** **Description:** 1 1/2" Capped Off Penetration appeared to be in good condition with a minor amount of corrosion.	
Image #8 *Roof 3:00* **Condition:** Rust Grade[1] **9.** **Description:** Roof appeared to be in good condition with a minor amount of corrosion.	

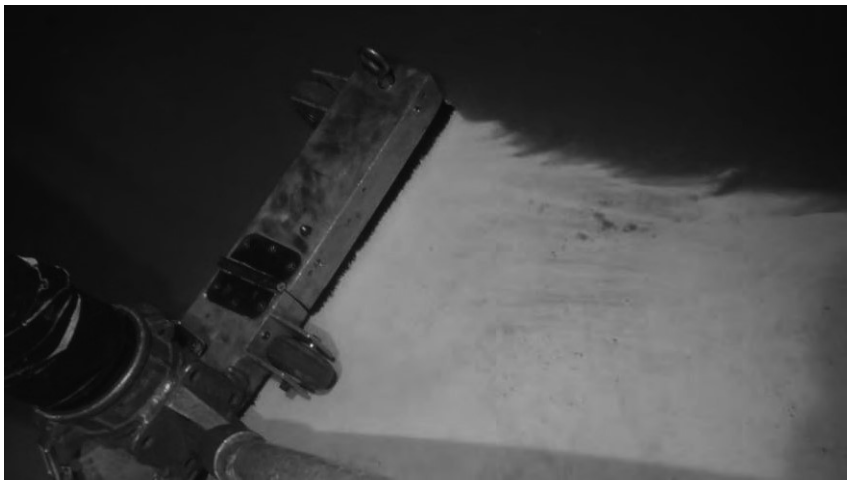
200KG Reservoir

Image #9 *Vent Center* **Condition:** Rust Grade[1] **8.** **Description:** 12" Vent appeared to be in good condition with a minor amount of corrosion. Vent has fine mesh.	
Image #10 *Roof 9:00* **Condition:** Rust Grade[1] **9.** **Description:** Roof appeared to be in good condition with a minor amount of corrosion.	

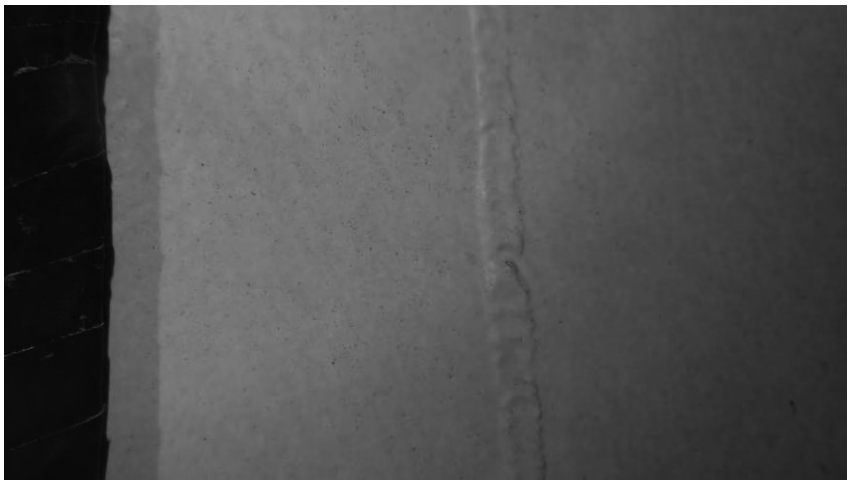
200KG Reservoir

Image **#11** *Liquid Level Indicator Penetration 11:50* **Condition:** Rust Grade[1] **8.** **Description:** 1 1/2" Liquid Level Indicator Penetration appeared to be in good condition with a minor amount of corrosion.	
Image **#12** *Diver being disinfected with a 220ppm chlorine solution.*	

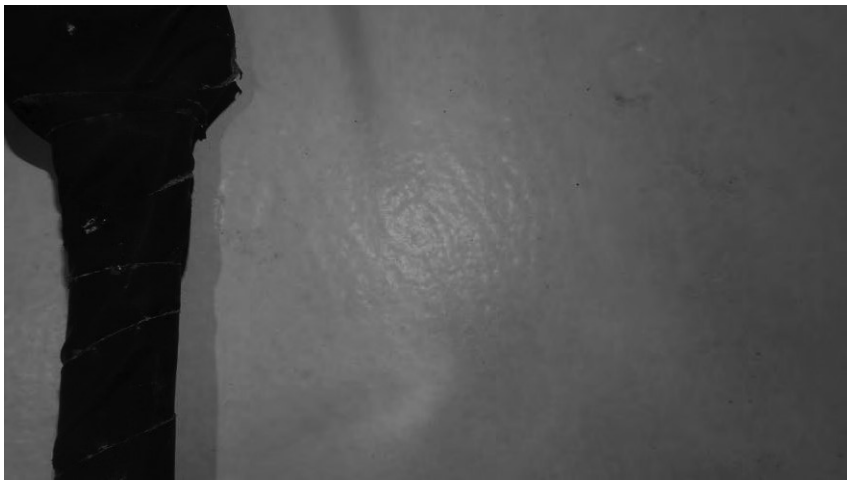
200KG Reservoir

Image **#13** *Sediment* **Description:** 1/16" of sediment was removed from reservoir floor.	
Image **#14** *Floor 12:00* **Condition:** Rust Grade[1] **8.** **Description:** Floor appeared to be in good condition with a minor amount of corrosion.	

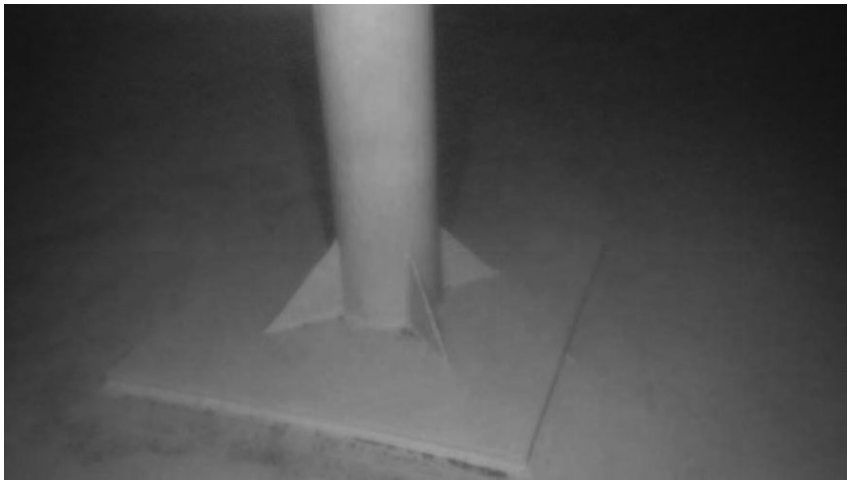
200KG Reservoir

Image **#15** *Wall 12:00* **Condition:** Rust Grade[1] **8.** **Description:** Wall appeared to be in good condition with a minor amount of corrosion.	
Image **#16** *Floor 3:00* **Condition:** Rust Grade[1] **8.** **Description:** Floor appeared to be in good condition with a minor amount of corrosion.	

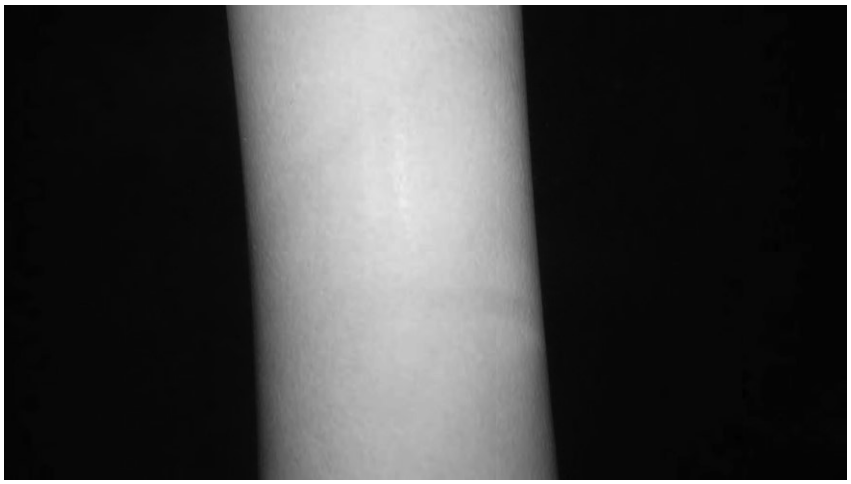
200KG Reservoir

Image **#17** *Wall 3:00* **Condition:** Rust Grade[1] **8.** **Description:** Wall appeared to be in good condition with a minor amount of corrosion.	
Image **#18** *Floor 6:00* **Condition:** Rust Grade[1] **8.** **Description:** Floor appeared to be in good condition with a minor amount of corrosion.	

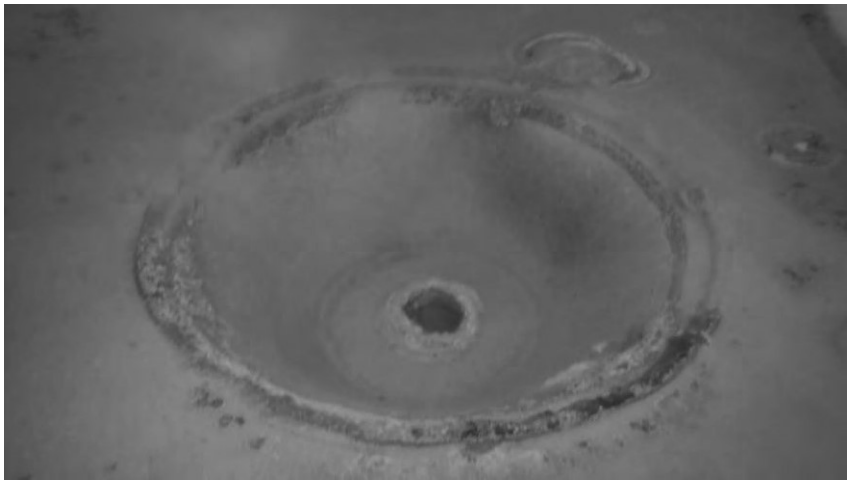
200KG Reservoir

Image **#19** *Wall 6:00* **Condition:** Rust Grade[1] **8.** **Description:** Wall appeared to be in good condition with a minor amount of corrosion.	
Image **#20** *Column Base Center* **Condition:** Rust Grade[1] **8.** **Description:** 24" X 24" Column Base appeared to be in good condition with a minor amount of corrosion.	

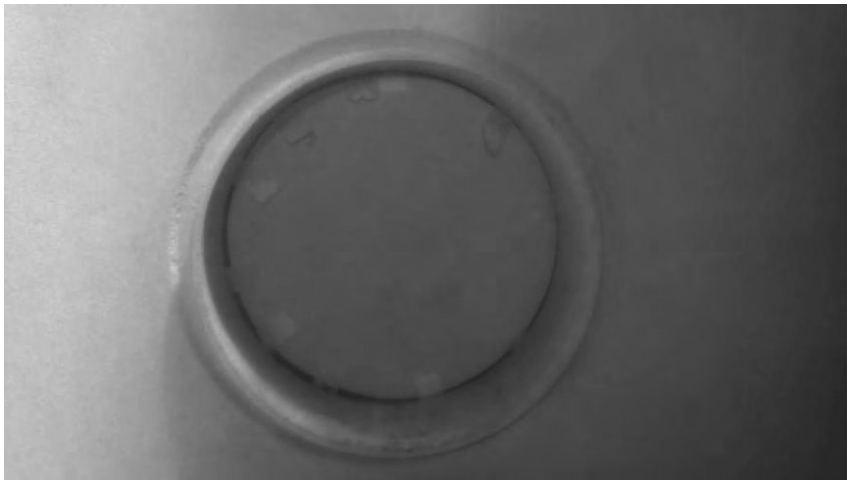
200KG Reservoir

Image **#21** *Column Center* **Condition:** Rust Grade[1] **8.** **Description:** 12" Column appeared to be in good condition with a minor amount of corrosion.	
Image **#22** *Floor 9:00* **Condition:** Rust Grade[1] **8.** **Description:** Floor appeared to be in good condition with a minor amount of corrosion.	

200KG Reservoir

Image **#23** *Wall 9:00* **Condition:** Rust Grade[1] **8.** **Description:** Wall appeared to be in good condition with a minor amount of corrosion.	
Image **#24** *Drain 9:15* **Condition:** Rust Grade[1] **5.** **Description:** 12" to 3" Drain appeared to be in fair condition with a moderate amount of corrosion.	

200KG Reservoir

Image **#25** *Inlet / Outlet 10:00* **Condition:** Rust Grade[1] **6.** **Description:** 10" Inlet / Outlet appeared to be in fair condition with a moderate amount of corrosion.	
Image **#26** *Man Way 11:30* **Condition:** Rust Grade[1] **8.** **Description:** 24" Man Way appeared to be in good condition with a minor amount of corrosion.	

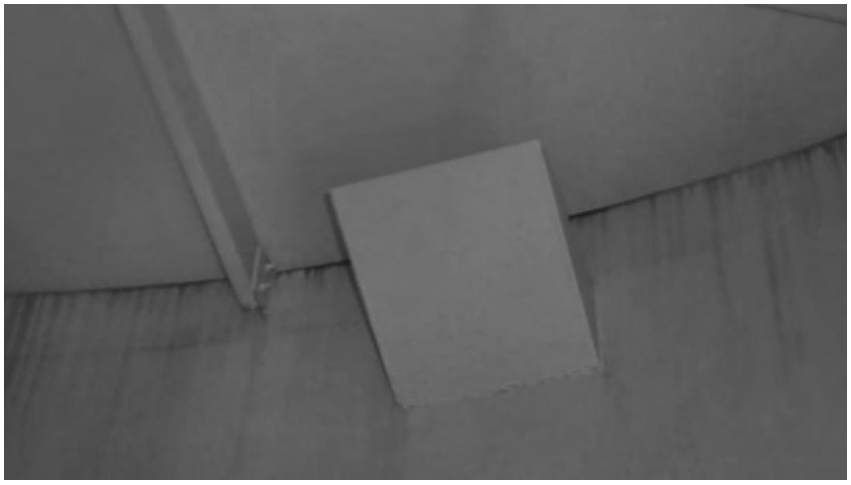
200KG Reservoir

Image **#27** *Liquid Level Indicator Base 11:50* **Condition:** Rust Grade[1] **8.** **Description:** Liquid Level Indicator Base appeared to be in good condition with a minor amount of corrosion.	
Image **#28** *Ceiling 12:00* **Condition:** Rust Grade[1] **7.** **Description:** Ceiling appeared to be in fair condition with a minor amount of corrosion. Coating failure.	

200KG Reservoir

Image #29 *Ceiling 3:00* **Condition:** Rust Grade[1] **8.** **Description:** Ceiling appeared to be in good condition with a minor amount of corrosion.	
Image #30 *Ceiling 6:00* **Condition:** Rust Grade[1] **8.** **Description:** Ceiling appeared to be in good condition with a minor amount of corrosion.	

200KG Reservoir

Image **#31** *Ceiling 9:00* **Condition:** Rust Grade[1] **7.** **Description:** Ceiling appeared to be in fair condition with a minor amount of corrosion. Coating failure.	
Image **#32** *Overflow 9:00* **Condition:** Rust Grade[1] **8.** **Description:** 12" X 6" Overflow appeared to be in good condition with a minor amount of corrosion.	

200KG Reservoir

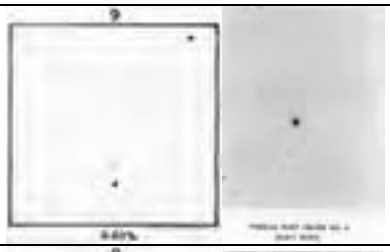
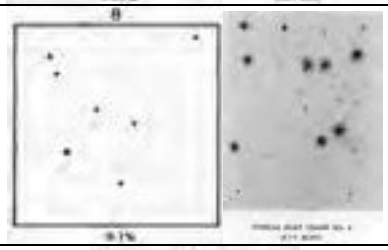
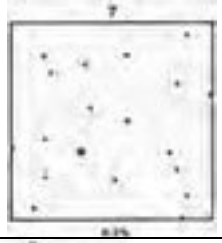
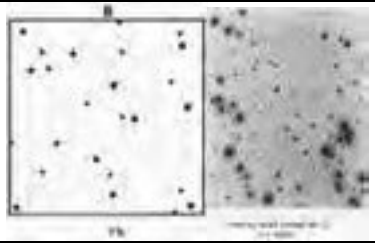
Image **#33** *Liquid Level Indicator Float 11:50* **Condition:** Rust Grade[1] **7.** **Description:** Liquid Level Indicator Float appeared to be in fair condition with a minor amount of corrosion.	

REFERENCES:

Standard Method of Evaluating Degree of Rusting on Painted Steel Surfaces – SSPC-Vis 2-82 & ASTM D 610-85 (1989)

The graphical representations show examples of area percentages, which may be helpful in rust grading. The use of photographical reference standards requires the following precautions:

1. Some finishes are stained by rust. This staining must not be confused with the actual rusting involved.
2. Accumulated dirt or other material may make accurate determination of the degree of rusting difficult.
3. Certain types of deposited dirt that contain iron or iron compounds may cause surface discoloration that should not be mistaken for corrosion.
4. It must be realized that failure may vary over a given area and discretion must therefore be used in applying these reference standards.
5. In evaluating surfaces, consideration shall be given to the color of the finish coating, since failures will be more apparent on a finish that shows color contrast with rust, such as white, than on a similar color, such as iron oxide finish.
6. The photographic reference standards are not required for use of the rust-grade scale since the scale is based upon the percent of the area rusted and any method of assessing area rusted may be used to determine the rust grade.

Rust Grades	Description	Graphical Representation
10	No rusting or less than 0.01% of surface rusted	Unnecessary
9	Minute rusting, less than 0.03% of surface rusted	
8	Few isolated rust spots, less than 0.1% of surface rusted	
7	Less than 0.3% of surface rusted	
6	Extensive rust spots, but less than 1% of surface rusted	

200KG Reservoir

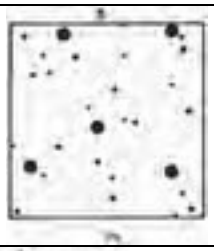
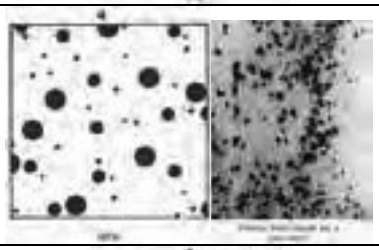
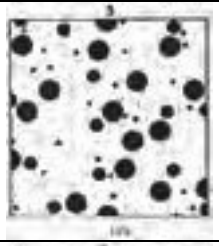
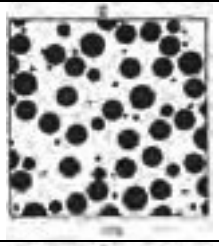
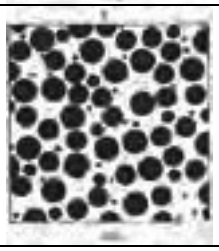
5	Rusting to the extent of 3% of surface rusted	
4	Rusting to the extent of 10% of surface rusted	
3	Approximately one sixth of the surface rusted (16%)	
2	Approximately one third of the surface rusted (33%)	
1	Approximately one half of the surface rusted (50%)	
0	Approximately 100% of the surface rusted	Unnecessary

EXHIBIT 2

Water World Article

WaterWorld.

TECHNOLOGIES | PIPES

The Asbestos Beneath Our Streets

An overview of how machine learning can help prioritize the planning of large-scale drinking water pipe replacement projects, such as the replacement of asbestos cement pipes.

Author — Lars Stenstedt

Feb 1st, 2019

Leveraging AI to Address AC Pipe in Drinking Water Distribution Systems

At one time in the United States, the use of asbestos cement (AC) pipe in drinking water distribution systems was very popular. It was first installed as early as the 1930s with the peak of installation in the mid-20th century. It was used because of its light weight, low coefficient of friction and resistance to corrosion. Unfortunately, it was later discovered through scientific studies that people who consume water with high amounts of asbestos over extended periods may face an increased risk of developing benign intestinal polyps and

an increased risk of cancer, including mesothelioma. Because of this, the U.S. Environmental Protection Agency (EPA) promulgated regulations to monitor the level of asbestos in drinking water.

Under the Safe Drinking Water Act, asbestos is limited to 7 million fibers per liter (MFL) of water. There are several notable cases of AC pipe failure and potential health issues from detection of high levels of asbestos in the drinking water. The Town of Woodstock, NY experienced AC pipe issues in 1985.1 Devin, Texas, detected higher than normal asbestos levels in its water in 2016.2 Schools in Arp, Texas, faced issues with AC pipe last year.3 Eventually the concern over asbestos in drinking water ended new installation of AC pipe in drinking water systems, but it didn't necessarily require, or lead to, the replacement of existing AC pipe.

There are thousands of miles of AC pipes still in the ground today, and many of them have reached or are reaching the end of their lifecycle, leading to potential problems for water consumers. An HDR Engineering study estimated more than 600,000 miles of AC pipe are installed in the U.S. and Canada, with a typical design life of 50 years.4 In addition, AC pipe can contain as much as 12 percent asbestos fiber content. In its Buried No Longer (BNL) initiative, the American Water Works Association (AWWA) estimated average life expectancy for AC pipe across the U.S.5 On the West Coast, for example, the average life of AC pipe is estimated at 65-105 years, depending on a "long service life" or "short service life" assumption.

Pipe break rates are one indicator of the condition of water pipes in a distribution network. A Utah State University study showed U.S. break rates for cast iron (CI) pipe at 35/100 miles/year, an increase of 43 percent over the past 6 years.6 While CI pipe break rates are high, AC pipe break rates are also significant and are increasing dramatically (the same study showed U.S. break rates for AC of 10/100 miles/year, an increase of 46 percent over the past 6 years). More disturbing among engineers is that while CI pipe failures usually start small (with just a pinhole leak) and gradually grow to a full break, giving early warning before a catastrophic main break occurs, AC pipe often fails catastrophically when it first breaks without prior warning.

Asbestos cement pipe was originally used because of its light weight, low coefficient of friction and resistance to corrosion. Unfortunately, it was later discovered that people who consume water with high amounts of asbestos over extended periods may face an increased risk of developing benign intestinal polyps and an increased risk of cancer, including mesothelioma.

Addressing the AC Pipe Challenge

So, how does a utility address aging AC pipe? There are four basic alternatives for thorough management of AC water mains:

1. Total AC pipe replacement: With this approach, the end result is that there is no AC remaining, so the entire risk has diminished. However, a typical cost for total replacement is $1M/mile and the process can take as long as 50-100 years.

2. Engineering-driven desktop condition assessment: This strategy ensures your pipes will be thoroughly reviewed by a professional engineer who is trained and experienced in condition assessment. But, it can take as long as 2-3 years to execute and cost in the range $3,000-5,000/mile of water main. Desktop condition assessments are substantially built on age and break history of the pipes, and thus aren't optimal to predict "first" breaks. Also, desktop assets are based on arbitrary assumptions and weights (i.e., older pipes are more in need of replacement than newer pipes). As mentioned earlier, this is not always the case.

More advanced statistical modeling may help decipher differences between various variables, although many of these approaches may not have the ability to consider the importance of some adjacent details such as proximity to light rails or the contribution of elevation or pipe material, therefore impacting its accuracy.

3. Pipe-level, detailed physical condition assessment: This results in a very accurate and reliable assessment of the pipe tested and may only take a few months. However, costs can range from $20,000 to $50,000/mile, and it only provides analysis on the specific chosen pipe. Physical condition assessments tend to be labor intensive and multiple physical measurements are required for correlation and confirmation. The results are difficult to extrapolate to system-wide recommendations. Moreover, one must be careful not to disturb the integrity of the AC pipe during testing.

4. Digital condition assessment using artificial intelligence (AI), specifically machine learning: Machine learning consumes large, complex data sets containing more variables than humans can process with current tools. This objective, data-driven method overcomes human limitations with their inherent subjectivity and biases and provides results that help utilities make effective AC pipe replacement decisions. A commercially available off-the-shelf (COTS) digital condition assessment solution using machine learning can provide a condition assessment of an entire water distribution system in 4-8 weeks at a cost of less than $100 per mile.

For some water utilities with manageable amounts of AC pipe, the first approach can make sense: just replace all the AC pipe. For utilities with available time, funding and engineering resources, the second approach may be the way to go. The third alternative is best suited for large transmission pipes that can't be allowed to "run to failure." For many utilities, the fourth approach, using data-driven machine learning, can be a very fast, accurate and affordable approach for a full, system-wide analysis that can then be used to prioritize the AC pipe for replacement, leak detection or valve maintenance, or further detailed analysis.

Technology company Fracta (Redwood City, Calif.) is currently working with over 30 U.S. water utilities on condition assessments of their potable water systems using its proprietary COTS digital water main condition assessment software. It calculates and visualizes the Likelihood of Failure (LoF) for every water pipe segment. The LoF score represents the mathematical probability of a pipe failure and, used in conjunction with Consequence of Failure (CoF), level of service, hydraulic modeling, etc., can support AC pipe replacement decisions.