Guidance and Suggested Format
For the Development of a
Manual of Operations and Maintenance

Revised May 2023

Nevada Division of Environmental Protection
Bureau of Safe Drinking Water

Acronym/Abbreviation		Definition
µg/L		micrograms per liter
AWWA		American Water Works Association
BSDW		Bureau of Safe Drinking Water
BWO		Boil Water Order
CFR		Code of Federal Regulations
CFS		Cubic Feet per Second
CPWS		Community Public Water System
E. coli		Escherichia coli
EPA		United States Environmental Protection Agency
GPM		Gallons per Minute
IOC		Inorganic Chemicals
MCL		Maximum Contaminant Level
mg/L		Milligrams per liter
MRDL		Maximum Residual Disinfectant Level
MGD		Million Gallons per Day
NAC		Nevada Administrative Code
NCWS		Non-Community Water System
NDEP		Nevada Division of Environmental Protection
NRS		Nevada Revised Statute
NTNC		Non-transient/non-community
O&M		Operations and Maintenance
OSHA		Occupational Health and Safety Administration
ppm		parts per million
PWS		Public Water System
SCADA		Supervisory Control and Data Acquisition
SDWA		Safe Drinking Water Act
SMCL		Secondary Maximum Contaminant Levels
SNHD		Southern Nevada Health Department
SOC		Synthetic Organic Chemicals
TT		Treatment Technique
VOC		Volatile Organic Chemicals
WCHD		Washoe County Health Department

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NEVADA DIVISION OF
ENVIRONMENTAL
PROTECTION

Introduction

Preparing a Manual of Operation and Maintenance (O&M) is an essential part of managing a water system. A water system's Manual of O&M is a "living document" that should be modified based on experience and practical application. It should be reviewed and updated regularly or when there is a modification to the system's infrastructure or management. At the very minimum, the Manual of O&M should be updated prior to a Sanitary Survey.

This "Guidance and Suggested Format for the Development of a Manual of Operations and Maintenance" (referred to as Guidance from hereon) is to assist in completing the "Template for the Development of a Manual of Operations and Maintenance" (referred to as Template from hereon). The Template is intended to provide a consistent format which can be used by small to medium sized drinking water systems. Both the Guidance and Template (in Microsoft Word) are available from the Nevada Division of Environmental Protection, Bureau of Safe Drinking Water's website: https://ndep.nv.gov/water/drinking-water/forms

How to start your Manual of Operations and Maintenance

Begin by getting an overview of the guidance portion of this document, with a goal of completing each section of the "Template" as it pertains to your system. Take your time, break the process down into sections, and work through each system component thoroughly.

Consider the first attempts as draft versions of the Manual. Have other personnel review the draft to see if the plan is clear or needs improvement. Eventually, you will have a completed Manual that can be used for training, operations, and as a reference.

You will want to quickly identify your Manual, so consider making it stand out among all the other binders you have on your shelves. A cover page with the system name and revision date along with your agency logo, and/or a photo representative of your system may be beneficial.

"Template" Format

- This Guidance Document discusses key components of operation and maintenance with suggested formatting of how you may present information in your Manual of O&M. Use this guidance as a tool to provide an overview of operation and maintenance to consider, then complete or modify the "Template".
- The "Template" provides resources to develop your Manual; you should modify them to be specific for your system – add sections, take them out, as appropriate. It is generally recommended that your Manual "flows" like your system: from the water source, to treatment, to storage and pumping, and then to the distribution components.
- Having a Manual of O&M in a consistent format assists regulatory agencies conduct their reviews for compliance.

- Consistent formatting also aids operators that operate more than one public water system or have experience working elsewhere.
- Since your Manual of O&M may contain sensitive information, make sure to keep it stored in a safe and secure location. At a minimum, it is recommended you have one copy stored on-site, one master digital version, and one off-site to ensure the document is available in the event you are unable to access your offices or facilities. Regardless of a water system size, it should be protected against possible sabotage, terrorism, or vandalism.
- There are "Suggested Maintenance Checklists" for various components included in Section 6. These are intended to assist in documenting routine maintenance and use in the field.

Template Guidance and Examples

The following sections provide a format and guidance recommendations to help you develop the Manual of O&M for your water system.

The guidance text and examples will be shown in red. Names, locations, water system references, and businesses used in the examples are fictitious. There is no intention to endorse any businesses used in the examples.

The Template is available for your use to customize and complete in Microsoft Word at the NDEP link: **https://ndep.nv.gov/water/drinking-water/forms**

This Guidance document and the associated Template have been prepared and periodically updated under the direction of staff of NDEP BSDW. If you have questions or comments, please call the Facility Manager assigned to your water system. The general number for NDEP BSDW is (775) 687-9521. Feedback is beneficial for future updates of this guidance.

Requirements for a Manual of Operations and Maintenance

In Nevada, all public water systems are subject to requirements set forth in the Nevada Administrative Code (NAC 445A). For revised regulations that have not yet been codified, please see the BSDW website.

The section specifically pertaining to a Manual of Operations and Maintenance states:

NAC 445A.6667 Manual of operations and maintenance: A supplier of water shall prepare a Manual of Operations and Maintenance regarding all of the facilities of the public water system and submit the Manual to the Division or the appropriate district board of health for review and approval. The manual must:

1. Describe normal procedures for the operation and maintenance of each facility of the public water system and procedures for use in emergencies.
2. Include any plans required pursuant to NAC 445A.535 or subsection 9 of NAC 445A.66795.
3. Be maintained at each facility of the public water system at all times for use by the operators and other personnel of the facility.

So, what does that mean and what does it involve?

A Manual of Operation and Maintenance is an operating guide for personnel who operate and maintain the public water system. The primary purpose is to:

- Explain the functional operation of the system's facilities and their interactions to produce drinking water that meets all regulatory requirements
- Describe the capabilities and limitations of the system
- Identify maintenance procedures to manage the processes of the system over time

You may already have plans or procedures developed that can be incorporated into your Manual. This will be a good opportunity to review existing procedures and update them before incorporating them into the Manual of O&M.

Submitting Documents

After completing your Manual of Operations and Maintenance, it must be submitted to the Nevada Division of Environmental Protection, Bureau of Safe Drinking Water or the appropriate District Board of Health for review.

Submit the following documents:

- Two (2) paper copies of the Application for Approval of a Water Project available at https://ndep.nv.gov/water/drinking-water/engineering-reviews/applications-forms
    - Typically, systems submitting just the Manual of O&M or other plans only need to complete the first two pages.

- 1 USB drive with a complete copy of the documents in PDF. If that is not possible, Microsoft Word is sufficient.
- Two (2) paper copies of these documents. Including appendices.

Deliver the above documents to the Bureau of Safe Drinking Water at the following address:

NDEP Bureau of Safe Drinking Water
Attn: Project Coordinator
901 S. Stewart Street, Suite 4001
Carson City, Nevada 89701

OR to the appropriate District Board of Health.

Section 1: System Information

Section 1.1 System and Contact Information

To easily identify the system, provide the system identification number, system name, and address and other specific identifiers like city, location, population, and the number of service connections. Also, include contact information of the system owner(s), regulatory authorities, laboratories, first responders, and vendors.

System Number or Reference (SDWIS ID)	PWS ID# NV000XXXX
Distribution Classification Required (D1, D2, etc.)	D1
Treatment Classification Required (T1, T2, etc.)	T1
System Name and Address	Nevada Water System
Location/Town	Rural Nevada
Population Served and Service Connections	Population: 200 Connections No. of Residential Connections:____80_____ No. of Commercial Connections:____0_____ No. of Other Connections:_____0___
System Owner	Nevada Public Water System
Name, Title, and Phone Number of Person Responsible for Maintaining and Implementing the Operation and Maintenance Plan	Name: John Doe Title: Operator Phone: (775) Cell: (775) Email: email@email.com
Seasonal Operation? Operational dates?	Year-round operation

Managerial & Administrative Contacts:

	Contact Name	Title	Phone	Email
Administrative Contact	John Doe	Manager/Accounting	(775)	email@email.com
Financial Contact				
Legal Contact				
Other				

System Operators and Certifications: *(NAC 445A.617 to NAC 445A.652)*

Name, Title	Distribution Grade	Treatment Grade	Phone
John Doe, Designated Operator	D1	T1	(775)

Regulatory Agencies and Contacts:

Nevada Division of Environmental Protection (NDEP)

NDEP BSDW	General Phone	Website	
BSDW Front Desk	(775) 687-9521	https://ndep.nv.gov/water/drinking-water	
All contacts for BSDW		Bureau of Safe Drinking Water Contacts | NDEP (nv.gov)	
Contact Title	**Name**	**Email**	**Phone**
BSDW Facility Manager	John Doe	doe@NDEP.nv.gov	(775) 687-
Health District Facility Manager (if applicable)			

Local Emergency Response

Police	911
Police (non-emergency)	(xxx) xxx-xxxx
Fire	911
Fire (non-emergency)	(xxx) xxx-xxxx
Hazmat	(xxx) xxx-xxxx
NDEP Spill Hotline	(775) 687-9485
Others?	

Laboratories

Name	Address	Phone	Lab Capabilities
Nevada State Health Lab	1660 N. Virginia St. Reno, NV 89503	Daytime: (775) 688-1335 Emergency: Same	Coliform and Inorganic

Suppliers and Vendors

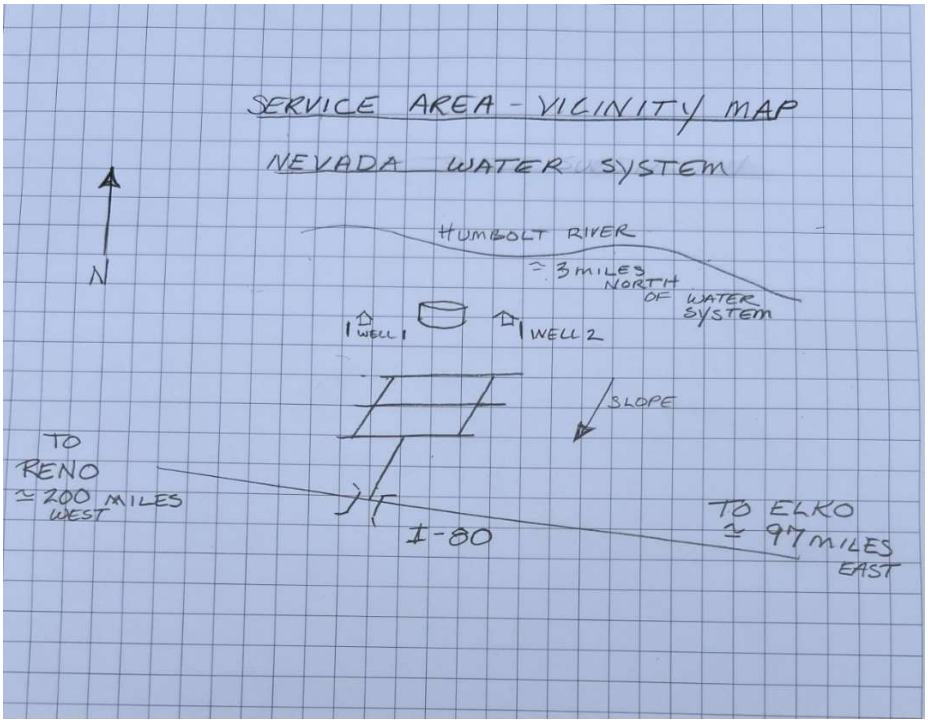
	Name	Phone
Pipe Supply	Eastern Nevada	(775)
Chemicals	B-#4 Chemical	(775)
Pumps / Motors	Esmeralda Seal & Pump	(775)
Safety	Brainger Industrial Supply	(800)
Others?		

Contractors / Repair Services

	Name	Phone / Emergency Phone
Pipe Repairs	A&D Construction	(775)
Electrician	JB Electric	(775)
Plumber	Best Service Plumbing	(775)
Well Driller	Pleasant Valley Water Well Services	(775)
SCADA.	ControlPoint Engineering	(916)
Tank Divers	Conrady Consultant Services	(205)
Others?		

Section 1.2 Service Area Map or Vicinity Map

Please include or insert a drawing or attachment that shows the relationship of your system to other nearby communities within the general area to locate and orient your system for reference. Larger maps or schematics can be attached as an appendix with the location referenced in this section.

Service Area
For the map of the system service area, consider a single page view or as a fold-out, illustrating primary roadways, geological features such as lakes, rivers or drainages, or other defining properties. For a very small system, a simple graphic in this text box may be sufficient. However, larger maps or schematics can be attached as an appendix with the location referenced in this section ***(This basic vicinity map is of a fictitious water system being used as an example for illustration)***   

Section 1.3 System Overview

System/Facilities
Provide a brief narrative overview of the System/Facilities – Describe how the following infrastructure are connected: water sources, wells, treatment, pumps, transmission and distribution system, storage facilities, and other features that would distinguish your system. Example: “Nevada Water System” a community water system, relies on two groundwater wells for supply. Well #1 is equipped with a submersible pump and has a capacity of 50 GPM. There is a cinder block well house adjacent. In the well house, there is a meter, logbook, and LMI pump used to inject sodium hypochlorite from a 50-gallon drum. It is considered the primary well to meet demand. Well # 2 is also equipped with a submersible pump with capacity of 40 GPM. The water exceeds the secondary standard for iron (0.6 mg/L) therefore, the water is treated with a Green Sand Filter to reduce the iron concentration, prior to chlorination. The green sand filter and chlorination equipment are housed in a cinder block well house adjacent to well #2. There is one 500,000-gallon, bolted steel water tank located at an elevation of 4315 feet. The tank is located on the north side of the service area. It is equipped with high level switches to prevent overfilling and a low-level switch to send a signal to Well #1 to come on. When the demand increases and the tank level drops, a signal is sent to Well #2 to come on. The local fire authority has required a fire flow storage of 120,000 gallons. The homes within the service area vary in elevation resulting in water pressures in the distribution system ranging from 50 psi to 95 psi. The distribution piping is principally 10”, 8”, and 6” PVC C900 piping. Isolation valves are located at most fittings. Each residence is metered with remote read capability. Fire hydrants are located throughout the subdivision approx. 400’ apart. The topography is such there are high points equipped with air/vac assemblies and low points are equipped with flush assemblies.

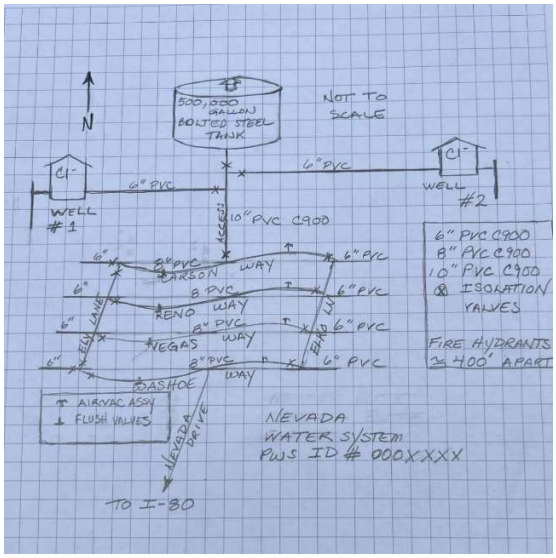
Simplified Graphic or Flow Chart of Water System

For a very small system, a simple graphic in this text box may be sufficient. However, many systems may have maps or schematics 11”x14” or greater providing a general layout of system components. These can be attached as an appendix with the location referenced in this section.

The schematic must include general depictions of water sources, treatment facilities, storage facilities, pumping facilities, and distribution mains (size of water mains, location of valves, etc). This can also be attached as an appendix.

If water sources are from springs, groundwater, or surface waters, descriptions may include reference to larger geological features.

(This basic schematic is of a fictitious water system being used as an example for illustration)



Section 1.4 Water Source Description

Check the box(es) that applies to your water source		
☒	Groundwater	
☐	Surface Water	Name of Source:
☐	Spring	Name of Springs (if applicable):
☐	Purchased Water (Treated)	Name of Supplier:

Section 2: System Components

Ideally, each specific component will reference information such as the make, model and serial number. This can often be found on the component's nameplate. By collecting this information, you will also be able to find component specific O&M guidance more easily through the manufacturer. The manufacture's specific recommendations may be included as an appendix to your Manual of O&M.

Provide a general overview of the primary components of your system. More specific information will be documented further in the manual.

Primary components of the water system:	**Brief Description (location, capacity, requirements, etc.)**
Source Water: Wells and Well Pumps, Surface Water Diversions, Spring Collection Systems	Groundwater - Two wells each equipped with submersible pumps. Well #1 has a capacity of 50 GPM and Well #2 has a capacity of 40 GPM.
Treatment/ Disinfection	Each well is chlorinated with Sodium Hypochlorite (12.5%) using LMI pumps. Flow from Well #2 is also treated with a green sand filter to bring the iron concentration below the secondary standard of 0.6 mg/l.
Storage Tanks/ Reservoirs	There is one 500,000-gallon bolted steel above grade, gravity flow tank.
Distribution System	The distribution system is made up of PVC C900 piping in sizes 6", 8" and 10". Gate valves are located at fittings to isolate sections. Air-vac valves are located at high points. Fire hydrants are located at 400' intervals. Flush assemblies are at low points and dead ends such as at the end of cul-de-sacs. There is one pressure zone ranging from 50 psi to 95 psi. All the homes have ¾" metered services.

SCADA and other System Monitoring Devices	A SCADA system is in place programmed to turn on each of the wells when there is a demand. Low and high set points within the storage tank trigger the well pumps. Concurrent with the well pumps, the chlorination pumps begin injection. The green sand filter on Well #2 provides pressure readouts. When the pressure differential increases by 10 psi, the filter is set to back wash.
Other	

Section 2.1 Source Water

Your system may have one or more sources of water: groundwater well, surface water diversion, spring source, wholesale inter-tie OR a combination of source types. Even if the source is only intended to be an emergency source or supplemental, it must be identified.

Section 2.1.1 Wells

(NAC 445A.66855 to NAC 445A.6693, inclusive: General requirements and design)
For revised regulations that have not yet been codified, please see the BSDW website.

Photograph of Well(s)
Provide a photograph of the well(s). Attach the following documents (if available) in the Appendix: construction drawings, specifications and well driller log.

Well #1

Well #2

Well Specifications

COPY FORMAT AND ADD AS MANY WELLS/PUMPS AS NECESSARY

Well ID	Well #1
Location	Latitude:39°24'14.48" N Longitude:119°47'54.48"W
Well Depth (feet)	200'
Well Casing Material	Steel
Screen Interval Depths	90' to 190'
Pump Type	Submersible
Pump Manufacturer (If Available)	Unknown
Pump Horsepower (If Available)	Unknown
Designed (GPM) (If Available)	50 GPM
Date Installed (If Available)	7/15/2015
Date of Last Flow Rate Test (If Available)	Unknown
Static Level (feet below ground level - If Available)	85'
Drawdown (feet below ground level - If Available)	100'

Well ID	Well #2
Location	Latitude:39°24'1.5 "N Longitude:119°48'40.16"W
Well Depth (feet)	150'
Well Casing Material	Steel
Screen Interval Depths	60' to 120'
Pump Location and Type	Submersible

Pump Manufacturer (If Available)	Unknown
Pump Horsepower (If Available)	Unknown
Designed (GPM) (If Available)	40 GPM
Date Installed (If Available)	8/25/2016
Date of Last Flow Rate Test (If Available)	9/20/2016
Static Level (feet below ground level - If Available)	70’
Drawdown (feet below ground level - If Available)	85’

Normal Operations
Include relevant operating procedures for normal operation of your well system.

These may include:

- Well Start-Up/Shut-Down
- Flush to waste – note where it discharges. Is it acceptable?
- Overview of controls
  - Adjusting of control settings

Maintenance
Routine maintenance procedures will need to be identified and documented for each system component. Incorporate any system specific maintenance activities as well as those recommended by the manufacturer and/or installer. Include the routine maintenance procedures in “Section 6: Routine Maintenance” of your completed document.

Checklists of suggested general maintenance activities for system components are included in Section 6: Routine Maintenance. These checklists are intended to identify and document the system’s routine maintenance procedures. The checklists provided are general and address most water system components, but not all. It will be up to you, the preparer, on behalf of the water system, to modify the maintenance checklists to match the system components and actual maintenance practices. Once complete, the checklists will be a resource for operators and for use in the field.

If the water system has an alternative means of documenting their maintenance practices (or reference specific AWWA standard practices), in lieu of the suggested checklists, these should be identified in Section 6: Routine Maintenance of the Manual of O&M.

Ensure that any system specific maintenance activities, including those recommended by the manufacturer and/or installer, are included.

Section 2.1.2 Surface Water Diversion, Spring Source, or Wholesale Intertie

Source Water Photograph
Provide a photograph of the surface water diversion, spring source, or wholesale intertie. Drawings and specifications (if available) may be included in the Appendix. **Example: Spring Source shows area of the collection gallery and distribution box**      

Source Water Specifications

COPY FORMAT AND ADD AS MANY SOURCES AS NECESSARY

Source	
Location	*latitude/longitude and/or description with Township, Range Section and Qtr Qtr as identified in water rights*
Conveyance structure; diversion, collection, or intertie	
Other details as applicable	

Normal Operations

Include relevant operating procedures for normal operation of your source water structure.

These may include:

- Opening/Closing gates or valves
- Adjusting weirs
- Reading meters

Maintenance

Routine maintenance procedures will need to be identified and documented for each system component. Incorporate any system specific maintenance activities as well as those recommended by the manufacturer and/or installer. Include the routine maintenance procedures in “Section 6: Routine Maintenance” of your completed document.

Checklists of suggested general maintenance activities for system components are included in Section 6: Routine Maintenance. These checklists are intended to identify and document the system’s routine maintenance procedures. The checklists provided are general and address most water system components, but not all. It will be up to you, the preparer, on behalf of the water system, to modify the maintenance checklists to match the system components and actual maintenance practices. Once complete, the checklists will be a resource for operators and for use in the field.

If the water system has an alternative means of documenting their maintenance practices (or reference specific AWWA standard practices), in lieu of the suggested checklists, these should be identified in Section 6: Routine Maintenance of the Manual of O&M.

Ensure that any system specific maintenance activities, including those recommended by the manufacturer and/or installer, are included.

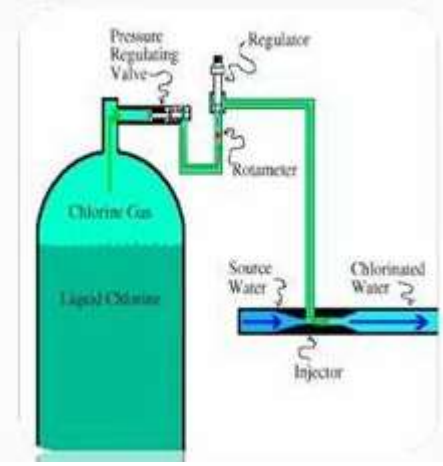
Section 2.2 Disinfection

(NAC 445A.66825 to 445A.6685, inclusive)
For revised regulations that have not yet been codified, please see the BSDW website.

If your water system does not provide disinfection of your finished water, please check:
☐ *"Not Applicable".*

If disinfection other than chlorination is used, update the table to reflect your system.

Disinfection	
What type of disinfection is used?	Sodium Hypochlorite
Where is disinfection input?	In well house
Typical % of concentration level?	12.5 %
Typical contact time in distribution? (if available)	
What is the primary purpose of disinfection? Pathogen destruction or for residual in the distribution system?	☐ Pathogen destruction ☒ To maintain a residual in the distribution system
Target maximum residual?	2.5 ppm
Target minimum residual?	0.2 ppm
Typical temperature of water source?	62° Fahrenheit
How often is pH checked?	weekly
Typical pH range?	7.1 – 7.3
Other disinfectants?	No
Additional information	
Dilution ratio	Example: water to chlorine

Disinfection System Graphic or Photograph
Sample Graphic only This can also be attached as an appendix. 

Normal Operations
Describe operating procedures for normal operation of your treatment systems.

These may include:

- Frequency and guidance on filling chemical tanks
  - Please note, any chemicals used for treatment or disinfection must be certified to all relevant NSF /ANSI Certifications
- Typical control setting
- Procedures for ensuring proper dosing
- Operating procedures provided by manufacturer/installer/engineer

Maintenance

Routine maintenance procedures will need to be identified and documented for each system component. Incorporate any system specific maintenance activities as well as those recommended by the manufacturer and/or installer. Include the routine maintenance procedures in “Section 6: Routine Maintenance” of your completed document.

Checklists of suggested general maintenance activities for system components are included in Section 6: Routine Maintenance. These checklists are intended to identify and document the system’s routine maintenance procedures. The checklists provided are general and address most water system components, but not all. It will be up to you, the preparer, on behalf of the water system, to modify the maintenance checklists to match the system components and

actual maintenance practices. Once complete, the checklists will be a resource for operators and for use in the field.

If the water system has an alternative means of documenting their maintenance practices (or reference specific AWWA standard practices), in lieu of the suggested checklists, these should be identified in Section 6: Routine Maintenance of the Manual of O&M.

Ensure that any system specific maintenance activities, including those recommended by the manufacturer and/or installer, are included.

Section 2.3 Treatment

Section 2.3.1 Non-Surface Water Treatment (groundwater and springs)

If your water system does not provide treatment of the source water, please check:
☐ “Not Applicable”.

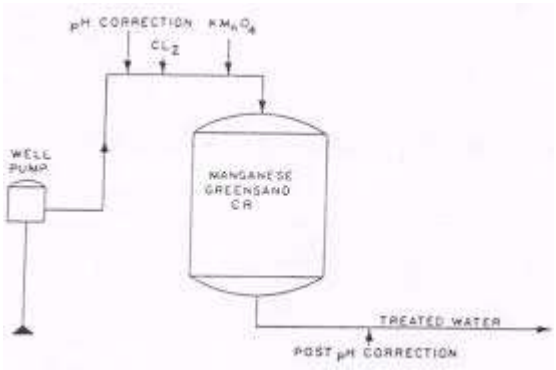
Modify the table as applicable to reflect your system:

Treatment Processes	
The source water does not meet drinking water standards. The contaminants exceeding the standards are as listed.	Avg Concentration Units (mg/l or µg/l) Primary : Meets standards Secondary: 0.8 mg/L Fe
Identify the type of treatment and expected reduction level of the contaminate.	Greensand Filter
Typical flow rate (GPM, GPH, MGD or other)	40 GPM
Automated or manual?	☒ Automated ☐ Manual
Identify operational considerations of the treatment process.	Backwash (pressure differential) Regeneration (treatment quality performance) Replacement (degraded performance with time)
Describe how the water quality may change besides lowering the level of the contaminant of concern.	
If an ion exchange process is being used, what is the name of the filter media?	Examples: Green Sand, synthetic resin, zeolite
What triggers backwashing?	Pressure differentials of 7-10 psi.
Approx. frequency of backwashing?	Weekly
What triggers regeneration of the media? Approximate frequency?	

	Reduced removal of contaminate, treated water is not attaining desired reduction. Regenerated monthly.
Type of solution is used for regeneration?	Permanganate solution
Anticipated years till media replacement	5 years

Provide a Graphic Representation of your Treatment Processes.

Please include a basic flowchart illustrating key components such as: treatment pumps, injection locations, isolation valves, sampling taps, tanks used for chemicals or treatment, and other appurtenances.

Treatment System Graphic
Sample Graphic 

Normal Operations

Describe operating procedures for normal operation of your treatment systems.
These may include:

- Frequency and guidance on filling chemical tanks
  - *Please note, any chemicals used for treatment or disinfection must comply with all relevant NSF /ANSI Certifications*
- Typical control setting
- Procedures for ensuring proper dosing
- Operating procedures provided by manufacturer/installer/engineer

Maintenance

Routine maintenance procedures will need to be identified and documented for each system component. Incorporate any system specific maintenance activities as well as those recommended by the manufacturer and/or installer. Include the routine maintenance procedures in “Section 6: Routine Maintenance” of your completed document.

Checklists of suggested general maintenance activities for system components are included in Section 6: Routine Maintenance. These checklists are intended to identify and document the system's routine maintenance procedures. The checklists provided are general and address most water system components, but not all. It will be up to you, the preparer, on behalf of the water system, to modify the maintenance checklists to match the system components and actual maintenance practices. Once complete, the checklists will be a resource for operators and for use in the field.

If the water system has an alternative means of documenting their maintenance practices (or reference specific AWWA standard practices), in lieu of the suggested checklists, these should be identified in Section 6: Routine Maintenance of the Manual of O&M.

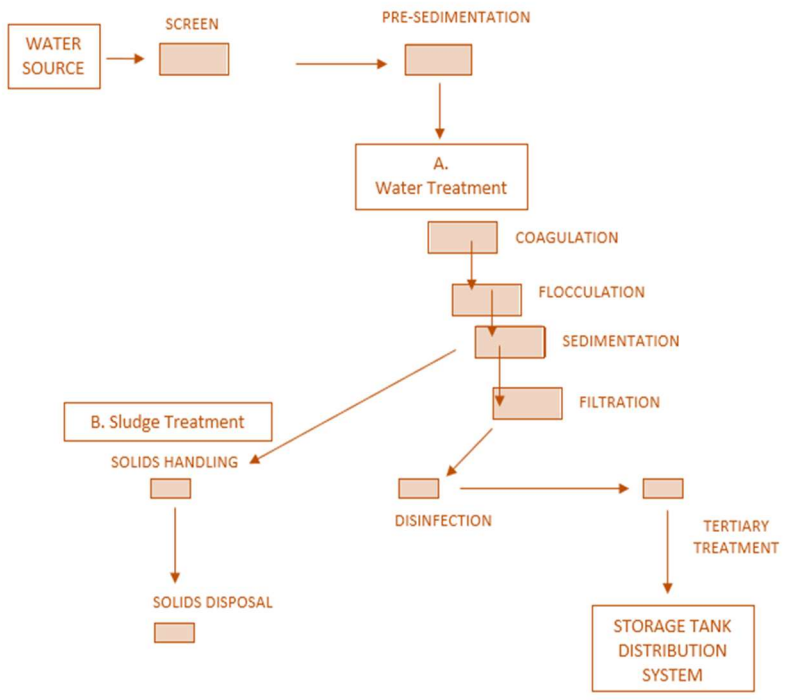
Ensure that any system specific maintenance activities, including those recommended by the manufacturer and/or installer, are included.

Section 2.3.2 Surface Water Treatment

Is the source water surface water or groundwater under the direct influence of surface water?
☐ Yes ☐ No

If no, not applicable

If yes: - In a table, include a summary of all technical information regarding each treatment process. These processes may include, but are not limited to, screening, pre-sedimentation, coagulation, flocculation, sedimentation, filtration, and disinfection.

Filtration System Graphic
Sample Graphic only 

Normal Operations
Describe routine operating procedures for normal operation of your surface water treatment system.

Maintenance
Routine maintenance procedures will need to be identified and documented for each system component. Incorporate any system specific maintenance activities as well as those recommended by the manufacturer and/or installer. Include the routine maintenance procedures in “Section 6: Routine Maintenance” of your completed document.

Surface water treatment varies so much between systems, no general maintenance worksheets have been developed or provided.

Section 2.4 Water Storage Tanks / Reservoirs

(NAC 445A.67065 to NAC 445A.67095, inclusive General Requirements and Design*)*
For revised regulations that have not yet been codified, please see the BSDW website.

Water Storage Tank(s) / Reservoir(s) Graphic or Photograph
The purpose of storage tanks is to maintain system pressure, and provide flow during peak demand, surge relief, sufficient quantity, and pressure flow during fire demand, and to provide additional detention time. 

Section 2.4.1 Storage Specifications

Does your system have Hydropneumatic (Pressure) tank(s) and a gravity storage tank?
☐ Yes ☐ No
If yes, then complete both Sections 2.4.1 and 2.4.2

Does your system only have Hydropneumatic (Pressure) tank(s)?
☐ Yes ☐ No
If yes, then complete Section 2.4.2

If no, then complete this section 2.4.1 describing storage details.

Modify the table as applicable to reflect your system:

Storage Details	
Location	Latitude: 39°24'0.62" N, longitude: 119°48'42.03" W
Type	Example: Above ground i.e., buried, aboveground
Material	Example: Bolted steel i.e., concrete, steel, etc.
Storage Volume	500,000 gallons
Age	7 years
Condition	☐ Poor ☐ Fair ☒ Good
Date of Last Inspection	6/15/2021
Inspection Frequency	5 years
Turnover Rate (If known)	

Security Specifications	Notes
Fence	Chain link fence encompasses entire tank area
Lighting	Sensor light at gate
Locks installed	Locks on the access gate, on tank ladder access, on tank access hatch
Key codes securely documented	In office
Alarm system	Yes
Other	

Normal Operations

Include relevant operating procedures for normal operation of your storage and/or pressure tank system.

These may include:

- Overview of controls
- Tank level or pressure settings
- Spray aeration system for TTHM removal

Maintenance

Routine maintenance procedures will need to be identified and documented for each system component. Incorporate any system specific maintenance activities as well as those recommended by the manufacturer and/or installer. Include the routine maintenance procedures in "Section 6: Routine Maintenance" of your completed document.

Checklists of suggested general maintenance activities for system components are included in Section 6: Routine Maintenance. These checklists are intended to identify and document the system's routine maintenance procedures. The checklists provided are general and address most water system components, but not all. It will be up to you, the preparer, on behalf of the water system, to modify the maintenance checklists to match the system components and actual maintenance practices. Once complete, the checklists will be a resource for operators and for use in the field.

If the water system has an alternative means of documenting their maintenance practices (or reference specific AWWA standard practices), in lieu of the suggested checklists, these should be identified in Section 6: Routine Maintenance of the Manual of O&M.

Ensure that any system specific maintenance activities, including those recommended by the manufacturer and/or installer, are included.

Section 2.4.2 Hydropneumatic (Pressure Tanks) Systems

(NAC 445A.6706)

Modify the table as applicable to reflect your system

Pressure System ID or Name	Size (gallons)	Location	Operating Pressure (PSI)	Make/Model/Serial Number

Normal Operations

Include relevant operating procedures for normal operation of your storage and/or pressure tank system.

These may include:

- Overview of controls
- Adjusting bladder (Air or water) in pressure tank
- Operations of pressure tanks (bladderless)

Maintenance

Routine maintenance procedures will need to be identified and documented for each system component. Incorporate any system specific maintenance activities as well as those recommended by the manufacturer and/or installer. Include the routine maintenance procedures in "Section 6: Routine Maintenance" of your completed document.

Checklists of suggested general maintenance activities for system components are included in Section 6: Routine Maintenance. These checklists are intended to identify and document the system's routine maintenance procedures. The checklists provided are general and address most water system components, but not all. It will be up to you, the preparer, on behalf of the water system, to modify the maintenance checklists to match the system components and actual maintenance practices. Once complete, the checklists will be a resource for operators and for use in the field.

If the water system has an alternative means of documenting their maintenance practices (or reference specific AWWA standard practices), in lieu of the suggested checklists, these should be identified in Section 6: Routine Maintenance of the Manual of O&M.

Ensure that any system specific maintenance activities, including those recommended by the manufacturer and/or installer, are included.

Section 2.5 Distribution System

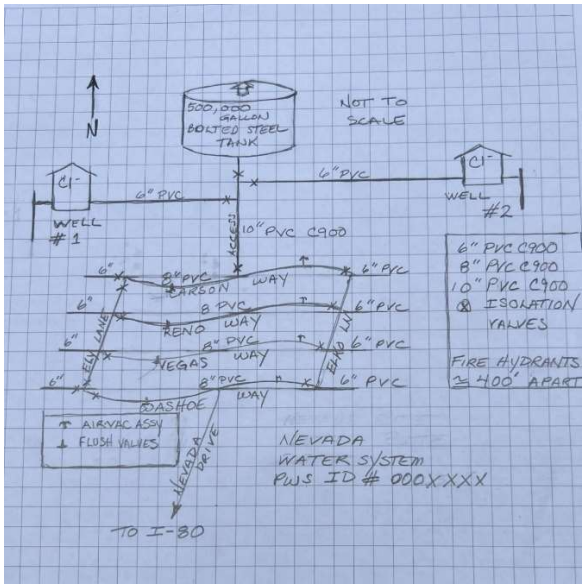
(NAC 445A.67105 to NAC 445A.67145, inclusive General Requirements and Design)
For revised regulations that have not yet been codified, please see the BSDW website.

Distribution System Graphic (can be a simple line drawing)

The purpose of the distribution network is to:

- supply safe drinking water to all customers with sufficient pressure
- provide adequate pressures and flows for fire suppression
- maintain a watertight system to keep losses to a minimum
- configured to minimize impacts to customers when repairs are made

Please include a map of your distribution system. If available, you can reference the location of as-built drawings and/or physical or electronic maps or include them in the appendix. If no maps are available, please include a graphic representation of the system below, including locations and sizes of distribution lines, booster pumps, pressure reducing valves, isolation valves, hydrants, flush assemblies, air release valves and other key appurtenances. This can also be attached as an appendix.



Section 2.5.1 Distribution System Pumps

(NAC 445.6702 to NAC 445A.6706, inclusive General Requirements and Design*)*
For revised regulations that have not yet been codified, please see the BSDW website.

The source of power for pumping facilities must be identified as described in NAC 445A.6705

Are the distribution system pump(s) electrically powered?

☐ Yes ☐ No

If no, then identify the means of power:

This table must correlate with the booster pumps shown on the distribution system map and identify their locations, size, and type.

Modify the table as applicable to reflect your system

Pump Name	Manufacturer/ Model Number	Pump Location	Flow Capacity GPM)	RPM	Horsepower (HP)	Type of Pump

Normal Operations

Include relevant operating procedures for normal operation of your Distribution System Pumps.

These may include:

- Adjusting controls
- Ensuring the necessary flow is maintained to meet the system demand.
- Verifying the pressure is sufficient to attain at least 30 psi in the distribution system but not over pressuring.

Maintenance

Routine maintenance procedures will need to be identified and documented for each system component. Incorporate any system specific maintenance activities as well as those recommended by the manufacturer and/or installer. Include the routine maintenance procedures in “Section 6: Routine Maintenance” of your completed document.

Checklists of suggested general maintenance activities for system components are included in Section 6: Routine Maintenance. These checklists are intended to identify and document the

system's routine maintenance procedures. The checklists provided are general and address most water system components, but not all. It will be up to you, the preparer, on behalf of the water system, to modify the maintenance checklists to match the system components and actual maintenance practices. Once complete, the checklists will be a resource for operators and for use in the field.

If the water system has an alternative means of documenting their maintenance practices (or reference specific AWWA standard practices), in lieu of the suggested checklists, these should be identified in Section 6: Routine Maintenance of the Manual of O&M.

Ensure that any system specific maintenance activities, including those recommended by the manufacturer and/or installer, are included.

Section 2.5.2 Isolation Valves

Typically, there are a variety of types and sizes of valves throughout a water system. Ideally, your drinking water distribution system should have sufficient isolation valves to make repairs with minimal service disruption to customers.

Malfunctioning, closed, frozen, and lost valves can make isolating for emergency or routine repairs difficult and often have a substantial impact on system performance. A distribution system valve preventative maintenance program enhances the utility operator's capability to prolong the life of the valves; ensure that the valves can be located, accessed, and operated; and allows the utility to better plan capital and operating budgets.

Describe Your Valve Preventative Maintenance Program
In its simplest form, a valve preventive maintenance program involves: • Locating and mapping all valves in the system • Recording pertinent information • Cleaning out valve boxes or vaults • Operating (exercising) all valves to ensure they function properly • It is recommended this is performed at least annually For more information the AWWA has published the Manual of Water Supply Practices – M44, “Distribution Valves: Selection, Installation, Field Testing, and Maintenance”.

An example of a water line break. A pressurized line can produce dramatic failures.

Modify the table as applicable to reflect your system

Valve #	Manufacturer / Model Number	Location	Size (in)

Section 2.5.3 Air Release or Air/Vacuum Valves

These assemblies are part of the distribution system that need to be checked and maintained on a regular basis. Expand the table as necessary.

Typically located at high points within a system, air release valves allow large volumes of air to be exhausted from a pipeline as it is filled. Air/Vacuum valves are dual purpose, in addition to allowing air to be exhausted as the pipeline fills, when the pipeline drains, the float drops and allows air to enter, preventing a vacuum and possible pipeline collapse.

If an Air/Vacuum Valve fails and is located below grade, there is potential of back siphoning collected water in the vault. If they fail in an above grade location, it will likely discharge water.

Modify the table as applicable to reflect your system

Air/Vac Assembly (No.)	**Location**	**Above Grade or Below Grade**
		☐ Yes ☐ No
		☐ Yes ☐ No
		☐ Yes ☐ No
		☐ Yes ☐ No
		☐ Yes ☐ No

Section 2.5.4 Pressure Reducing Valves (PRV)

Maintenance will help to ensure that the pressure reducing valve continues to function efficiently and reliably. Expand the table as necessary.

PRVs are important components of water distribution systems that help regulate and reduce high water pressures, ensuring that water flows at safe and controlled levels to customers.

Modify the table as applicable to reflect your system

PRV (No.)	**Make/Model**	**Location** (GPS if available)	**Pressure Zone From - To**	**Pressure IN**	**Pressure OUT**

Section 2.5.5 Flush Assemblies

Maintenance will help to ensure that the flush assembly is intact and able to function when needed. Expand the table as necessary.

In the absence of fire hydrants, flush assemblies should be located at low points or ends of water lines. These are locations where there is the potential of collecting fine materials such as dirt or sand or becoming stagnant. Flushing allows a means to discharge the material and create a flow through the segment of pipe.

Modify the table as applicable to reflect your system

Flush Assy. (No.)	**Make/Model**	**Type**	**Location** (GPS if available)	**Flow Capacity** (gpm)

Section 2.5.6 Fire Hydrants

Fire hydrants are primarily to provide water for fire suppression at a specified flow and pressure. They can also be used for flushing or other approved uses. Coordination with the local fire authority is paramount to ensure the water system is supplying sufficient flow, pressure and quantity for fire suppression. It is important the lines of responsibility be communicated and formally established. Maintenance of hydrants may be performed by the fire department as they have a serious interest in making sure they are functioning as intended.

The fire authority may conduct flow/pressure tests at hydrants. This may stir up material within the water lines resulting in customer complaints of discolored water, bad odors, tastes etc. Ideally, the fire department will notify the water system of when and what areas of the system they are conducting their tests.

Describe your system's role in the maintenance of fire hydrants and any agreements with the jurisdictional fire department within your service area.

Modify the table as applicable to reflect your system

Hydrant (No.)	**Make/Model**	**Type** (Dry/Wet Barrel)	**Location** (GPS if available)	**Flow Capacity** (GPM)	**Inspection Frequency**	**Color**

Section 2.5.7 System Flushing

Routine flushing should be performed on a regular basis. The frequency largely depends upon the material accumulation and the velocity and volume through the pipes when being delivered. Flushing of water distribution systems is critical to ensure customers receive the best water quality. Aging infrastructure, poor quality pipelines and high temperatures are all contributing factors to scale and biofilm building up inside pipelines. It is an important maintenance task to ensure water is pushed through the system at a decent velocity to clear out stagnant water. Dead-end mains, typically in cul-de-sacs, at the end of rural streets, or even in a looped line, are known problem areas for water stagnation. Residential neighborhoods under construction and large underpopulated developments often have slow-moving or stagnant drinking water.

Flushed water must be discharged to an acceptable location. When viable, flushing the line into a sanitary sewer manhole is best, assuming it is acceptable to the jurisdiction responsible. Flushing water into a storm drain or water way may constitute an unauthorized discharge unless permitted by NDEP Water Pollution Control, (775) 687-9418. In a case where a sanitary sewer manhole is not available, a basin with confinement may be an option. Here again, check with NDEP.

More discussion regarding a Distribution Flushing Program and an example Flushing Program Template is included in Section 6.

Describe your system's flushing program.

In the absence of a flushing valve and without fire hydrants, you may consider the installation of a hydrant, wharf head or flush assembly to allow for flushing of distribution lines. Be sure and consider winter temperatures when installing any type of flushing valve. Hydrants, wharf head or

flushing valves should be installed about 1000 feet from a well. In general, consider some type of flushing valve at the end of the system and a means to isolate the distribution system while flushing so you do not need to shut the entire system down. Also, consider discussing your options with an engineer and plumbing contractor.

Modify the table as applicable to reflect your system

Location	**Hydrant/Flush Assembly Number**	**Flushing Volume** (Gallons)	**Pressure Needed** (psi)	**Disinfection Type**	**De-Chlorination Required** (Yes/No)

Section 2.5.8 Flow Meters

Flow meters should be tested and calibrated per the manufacturer's recommendation. If your water system does not have the capability to perform this service without proper equipment or training. It is recommended to explore contracting this service out.

Describe your flow meter calibration program.

Flow meters provide an accounting of your system's most valuable component – the water!

It is important to track the amount of source water going into the system as well as the amount consumed within the system. Rarely do the input and output match exactly, but you should establish an acceptable percent difference. If the difference is excessive, it may be indicative of losses due to leakage in the system that needs to be identified. Your customers should be provided with accurate meter readings to calculate billings.

Identifying and listing all your system meters may not be practical, however, identifying the types of meters and housings may be a helpful reference.

Modify the table as applicable to reflect your system

Location	**Meter Type**	**Housing**	**Measures in (?) Units**	**Frequency of Readings**

Section 2.5.9 Routine Operations and Maintenance of the Distribution System

Normal Operations
Include relevant operating procedures for normal operation of your distribution system.

These may include:
- Overview of controls
- PRV Settings
- Others as appropriate

Maintenance
Routine maintenance procedures will need to be identified and documented for each system component. Incorporate any system specific maintenance activities as well as those recommended by the manufacturer and/or installer. Include the routine maintenance procedures in “Section 6: Routine Maintenance” of your completed document.

Checklists of suggested general maintenance activities for system components are included in Section 6: Routine Maintenance. These checklists are intended to identify and document the system’s routine maintenance procedures. The checklists provided are general and address most water system components, but not all. It will be up to you, the preparer, on behalf of the water system, to modify the maintenance checklists to match the system components and actual maintenance practices. Once complete, the checklists will be a resource for operators and for use in the field.

If the water system has an alternative means of documenting their maintenance practices (or reference specific AWWA standard practices), in lieu of the suggested checklists, these should be identified in Section 6: Routine Maintenance of the Manual of O&M.

Ensure that any system specific maintenance activities, including those recommended by the manufacturer and/or installer, are included.

Section 2.6 System Monitoring (Telemetry and/or SCADA)

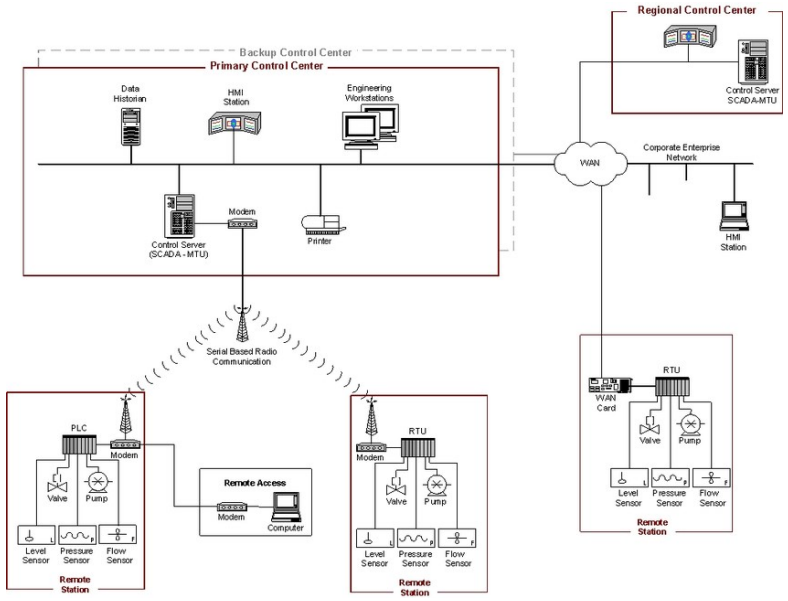
Utilities have become very dependent upon SCADA systems. Water systems and other utilities have become targets of cyberattacks, ransomware and terrorism. Maintenance of your software and SCADA systems is as important as any other component of your water system. Recognize that in the event your SCADA systems were to be compromised, your system would need to be operated manually.

The United States Environmental Protection Agency has developed self-assessment tools for Cybersecurity to assist water systems evaluate their vulnerability to cyber threats.

Controls Graphic (can be a simple line drawing)

Purpose – A control system may be used to remotely control and monitor the condition of field-operations from a central location. Field-based operations include wells, pump stations, valves, treatment plants, tanks, and reservoirs. This may include basic pressure switches, telemetry or SCADA systems.

Provide Graphic Representation:
Please indicate location and settings of key system controls. For more complex controls and SCADA systems, consider referencing guidance documents specific to the system design. This can also be attached as an appendix.



Section 2.6.1 Controls Specifications

Monitoring/Controls installed on:	
Well(s)	☒ Yes ☐ No ☐ Not applicable
Booster Pump Station	☐ Yes ☐ No ☐ Not applicable
Pump (Other)	☒ Yes ☐ No ☐ Not applicable
Valves (Water Treatment)	☐ Yes ☒ No ☐ Not applicable
Motors	☒ Yes ☐ No ☐ Not applicable
Tanks/ Reservoirs	☒ Yes ☐ No ☐ Not applicable
Tracking Hydraulic Pressure	☒ Yes ☐ No ☐ Not applicable

Components	
Remote Terminal Unit (RTU) Types and Locations?	In office
Programmable Logic Controller Type and Locations?	PLC – Maintenance building and Well house #2
Security Software	Webroot
Wireless Configuration	Point/Multipoint
Computer Hardware Purchase Date and Vendor	1/26/2022 Computer and SCADA Sales
Software last update	2/15/2023
Software Vendor	Controls & sons
Where is software backup is stored?	Cloud storage
Monitor Locations	Office
# of Cell Phones with SCADA Access	2 (operators)

Operations and Maintenance for SCADA/Controls

Normal Operations

Include relevant operating procedures for normal operation of your control/SCADA system.

These may include:

- Standard settings
- Adjusting controls

Maintenance

Routine maintenance procedures will need to be identified and documented for each system component. Incorporate any system specific maintenance activities as well as those recommended by the manufacturer and/or installer. Include the routine maintenance procedures in “Section 6: Routine Maintenance” of your completed document.

Checklists of suggested general maintenance activities for system components are included in Section 6: Routine Maintenance. These checklists are intended to identify and document the system’s routine maintenance procedures. The checklists provided are general and address most water system components, but not all. It will be up to you, the preparer, on behalf of the water system, to modify the maintenance checklists to match the system components and actual maintenance practices. Once complete, the checklists will be a resource for operators and for use in the field.

If the water system has an alternative means of documenting their maintenance practices (or reference specific AWWA standard practices), in lieu of the suggested checklists, these should be identified in Section 6: Routine Maintenance of the Manual of O&M.

Ensure that any system specific maintenance activities, including those recommended by the manufacturer and/or installer, are included.

Section 2.7 Spare Parts Inventory

Maintaining an inventory of critical replacement parts allows for more successful operation of the water system. Water systems must maintain certain key inventory components specific to chlorination equipment (NAC 445A.6683.3), water wells (NAC 445A.6686), and pumps (NAC 445A 66995). Additionally, it is recommended the water system have an inventory of spare parts for other system components so that repairs can be made quickly.

Identify your system's spare parts inventory in the table and expand as necessary.

Some possible inventory items to include are chlorinator repair kits, additional treatment chemicals, spare valves and appurtenances, spare pipe in various diameters and extra fittings. The availability of parts can vary, and long lead times should be identified. If a particular valve is needed, but it will take 6 weeks to obtain, it would be wise to have an extra on the shelf. The inventory should be reviewed and updated regularly to maintain appropriate components.

Modify the table as applicable to reflect your system

Associated System Component	Part Type	Part Number	Quantity	Supplier	Date Stocked	Check Date
Distribution System (Example)	*6" Mueller Gate Valve*	*UFP009*	*2*	*Ferguson*	*4/16/2018*	*5/1/2020*

Section 3: Water Quality Monitoring

Section 3.1 Monitoring Assessment Plan and Monitoring Status Report

All water systems are required to sample in adherence with their established monitoring plans. The monitoring assessment plan and monitoring status reports are provided by the Bureau of Safe Drinking Water and can be provided when requested. The monitoring assessment plan dictates which contaminants you are required to sample for, where the samples must be taken, and when the samples must be taken. The monitoring status report includes which samples must be taken in the given year, and when recent samples were reported to BSDW. A **current** copy of your monitoring assessment plan and monitoring status must be included in this document.

Section 3.2 Distribution Sample Maps/Plans

Include a copy of your **approved** site sample plan for those contaminants tested for in the distribution system. This may include total coliform, lead and copper, and disinfection byproducts.

Section 3.3 Entry Point and Source Samples

Describe any procedures used, as approved by BSDW, to collect samples at the entry point(s) and source(s). These samples, including nitrate, VOCs, metals, and more are often collected from a smooth nose sample tap located in the well house. Typically, the source samples are taken prior to any treatment and the entry point samples are collected after treatment, but before the treated water enters the distribution system. Refer to your Monitoring Assessment Plan to determine which samples must be taken at these points.

Frequently, the laboratory being used for analysis of samples will provide appropriate containers, preservative (if needed) and specific sampling instructions. On-site care must be taken by the sampler to ensure the collection does not result in contamination of the sample.

Common issues are:

- bacterial contamination of coliform samples by mishandling the container, lid or tap
- organics contamination from sampling tubing
- not properly filling the sample container as specified
- the sample tap introducing air into the sample

Section 3.4 Sampling Records

All water sampling results must be maintained for not less than 3 years (NAC 445A.536). Please describe where historical and recent sample results may be found. This may reference either a physical or digital location.

If records are available through an online account, please include a link to the website.

Section 4: Personnel Safety

For immediate emergency response to serious health conditions, **call 911**

Identify where:

First Aid Kits are located:
Office, Maintenance building and Well house #2

Automated External Defibrillator (AED) is located:
Maintenance building

Eye wash/Emergency Shower facilities are located:

Maintenance building and Well house #2

The operation and maintenance of water systems can be dangerous. The combination of chemical use, electrical components and confined space issues can create hazardous situations for a system operator and staff. The following Section does not include all components of a safety plan but can be used to assist in the beginnings of a plan. If the water system has an established safety plan, include the document or a reference:

IDENTIFY WHERE A HARD COPY OF OUR SAFETY PLAN IS AVAILABLE:
Office – primary file cabinet, top drawer

IDENTIFY WHERE A DIGITAL VERSION OF OUR SAFETY PLAN IS AVAILABLE:
Cloud storage – Safety folder

Section 4.1 Potential Water System Hazards to Consider

The following checklist can be used to identify potential safety hazards encountered in the operation of the water system. If a hazard is identified in the system, you should work to develop an appropriate safety plan to minimize risks. Additionally, if any of the listed, or other, chemicals are present, ensure all Safety Data Sheets (SDS) are provided and made readily available.

POTENTIAL HEALTH HAZARDS	
General	
☐	Electrical
☐	Extreme Heat
☐	Extreme Cold
☐	Hazardous Insects/Animals
☐	Trenches
☐	Falls
☐	Confined Space
☐	Heavy Equipment
☐	Highway Work Zones
☐	Power or Hand Tool Use
☐	Noise
☐	Weather related/Lightening/Snow /Ice
☐	Other (please enter specific hazards)
☐	Other (please enter specific hazards)
☐	Other (please enter specific hazards)
☐	
Chemicals Present	
☐	Sodium Hypochlorite (Enter solution strength)
☐	Calcium Hypochlorite
☐	Liquid Chlorine
☐	Gaseous Chlorine
☐	Chlorine Dioxide
☐	Ammonia
☐	Other (please enter specific chemical)
☐	Other (please enter specific chemical)
☐	Other (please enter specific hazards)
☐	Other (please enter specific hazards)
☐	Other (please enter specific hazards)

Section 4.2 Safety Plan Resources
Additional safety resources are available from Federal and State Occupational Safety & Health Administration (OSHA).

Nevada OSHA has the Nevada Safety Consultation and Training Section (SCATS). SCATS may provide free safety consultations to small to medium Nevada businesses. See https://www.4safenv.state.nv.us/

Other resources: American Water Works Association (AWWA) and your risk management authority.

Establishing a Safety Program in the Utility Guide

This free guide from AWWA includes information on:

- Establishing a safety program in your utility
- Understanding your safety requirements
- Key steps for establishing a safety policy
- Tips for a successful implementation

Available as a free download on awwa.org

Section 4.3 Confined Space

The simplest confined space program for small systems is not to enter confined spaces. Confined Spaces can be extremely dangerous. Many people have died unknowingly entering a confined space. Vaults with valves, cross connection control devices or PRVs could be a confined space. If you are not sure about the definition of a confined space or what a confined space is or the requirements to enter confined space – contact your facilities manager, technical assistance provider, or safety professional for advice. If your system has an approved confined space program, use this space for reference location of the plan and any necessary equipment.

Also See:
Confined Spaces - Overview | Occupational Safety and Health Administration (osha.gov)
may provide free safety consultations to small to medium Nevada businesses. See https://www.4safenv.state.nv.us/

Section 5: Communications

Section 5.1 Public Notice

The water system may need to send out notice to customers regarding water quality or availability concerns. The most common reasons for sending out public notice are confirmed and unconfirmed bacteriological contamination and pressure loss events. The following sections provide guidance on various types of public notice. To ensure all public notice is completed appropriately, you must coordinate your efforts with BSDW.

Section 5.1.1 Coliform Positive Results

The Nevada Administrative Code (NAC) requires certified laboratories to report Total Coliform sample results that are present (detected) for Coliform bacteria or E. coli to the "proper authority" with a phone call. The proper authority is the public water system involved and the Nevada Department of Environmental Protection, Bureau of Safe Drinking Water. Do not leave a voice mail or an email unless you have already spoken directly to someone. If E. coli is determined after hours, contact the SPILL HOT LINE. If total coliform is determined after hours, contact the regulatory authority by 9 am the next business day.

NDEP – Bureau of Safe Drinking Water (BSDW) – 775-687-9521
Nevada Spill Hotline (After Hours) - 775-687-9485
901 S. Stewart St. Suite 4001
Carson City, NV 89701

Or Local Health District (if applicable)

Boil water advisory and order templates can be found below, or through the Bureau of Safe Drinking Waters website.

If your customers are unable to boil water, such as a gas station, utilize Out of Order or Do Not Drink signage. Alternatively, consider shutting off water access until the situation is resolved, if possible.

Section 5.2 Notification Types

Tier 1 - Notify within 24 hours.
Any time a situation occurs where there is the potential for human health to be immediately impacted, water suppliers have 24 hours to notify of the situation. Water suppliers must use media outlets such as television, radio, and newspapers, post their notice in public places, or personally deliver a notice to their customers in these situations.

Tier 1 violations are:
- E. coli MCL violations; failure to test for E. coli.
- Nitrate/Nitrite MCL violation; failure to take confirmation.
- Chlorine Dioxide MRDL violation; failure to take repeat.
- Exceedance of maximum turbidity level, where the State determines Tier 1 is required.
- Nitrate exceedances for NCWS allowed to exceed standard.
- Waterborne disease outbreak or another waterborne emergency
- Other situations as determined by the primacy agency.

Tier 2 - Notify as soon as possible, but within 30 days of the violation.
Any time a water system provides water with levels of a contaminant that exceeds EPA or state standards or that has not been treated properly, but that does not pose an immediate risk to human health, the water system must notify its customers as soon as possible, and no later than within 30 days of the violation. Notice may be provided via the media, posting, or through the mail.

Tier 2 violations are:
- All other MCL, MRDL, and TT violations that are not Tier 1.
- Monitoring and testing procedure violations, where State requires a Tier 2 (rather than Tier 3) notice.
- Failure to comply with variance and exemption (V&E) conditions

Tier 3 - Notify within one year of the violation.
When water systems violate a drinking water standard that does not have a direct impact on human health (for example, failing to take a required sample on time) the water supplier has up to one year to provide a notice of this situation to its customers. The extra time gives water suppliers the opportunity to consolidate these notices and send them with annual water quality reports (consumer confidence reports).

Tier 3 violations are:
- All other monitoring or testing procedure violations not already requiring a tier 1 or tier 2 notice.
- Operation under a Variance or Exemption
- Special public notices:
    - Exceedance of Fluoride SMCL
    - Announcing the availability of unregulated monitoring results

Boil Water Orders are available at Do Not Drink & Boil Water Orders | NDEP (nv.gov) and include:

E. coli Present samples

- Precautionary Boil Water Order Public Notice
- Official Boil Water Order Public Notice English
- Official Boil Water Order Public Notice Spanish

Other Boil Water Order Events Boil Water Rescind Notice

- Precautionary Boil Water Order Guidance for Public Water Systems
- Loss of Pressure Boil Water Order Public Notice
- Boil Water Order Rescind Notice Template

Do Not Drink Orders

- Nitrate Public Notice Template
- Unknown Water Quality Public Notice Template
- Do Not Drink Notice Rescind Template

Section 5.3 Customer Complaints

Reviewing and responding to customer complaints is a valuable tool in the successful operation of a water system. It is recommended that your utility establish a protocol to respond to all customer complaints. Sample below.

Water Quality/Consumer Complaint Report Form		
Instructions: This form is provided to guide the utility while evaluating water quality data or consumer complaints.		
Complaint is based on:	☐ Quality ☐ Quantity ☐ Color ☐ Odor ☐ Other:	
What is the water quality complaint?		
What are the specifics of the color, odor, pressure or taste associating the complaint?		
Do other consumers have the same complaint?		
Are the unusual water quality observations sporadic over a wide area, or are they clustered in a particular area?		
What is the extent of the area?	☐ A pressure zone ☐ A neighborhood ☐ A city block ☐ A street ☐ A building	
Based on recent complaints, does the unusual water quality appear to be part of a trend (i.e., occurring over several days or longer)?		
Internal Questions for System Operators:		
What is the baseline of "normal" water quality for…?	Quality: Quantity: Color: Odor:	
Have there been any operational changes at the plant or in the affected area of the system?		☐ Yes ☐ No
Has there been any flushing or distribution system maintenance in the affected area?		☐ Yes ☐ No
Has there been any repair or construction in the area that could impact water quality?		☐ Yes ☐ No
Is the property protected by a cross connection control device?		☐ Yes ☐ No
Name of person completing form:		Date/time:
Name of person reviewing complaint:		Date/time:
What was the outcome?		Date/time:

Section 5.4 Communications Records

Various communications, such as those with the Bureau of Safe Drinking Water, the lab used, and for system repairs or upgrades, must be maintained. Please describe how communications are stored for your system. Ensure that all records are maintained for no less than 3 years.

Section 6: Routine Maintenance

Checklists of suggested general maintenance activities for system components are provided. These checklists are intended to identify and document your system's routine maintenance procedures. The checklists are general and address most water system components, but not all. It will be up to you, the preparer, on behalf of the water system to modify the maintenance checklists to match the system components and actual maintenance practices.

Once complete, the checklists will be a resource for your operators and for use in the field. Ensure that any system specific maintenance activities, including those recommended by the manufacturer and/or installer.

O&M Checklists for Wells and Well Pumps

These are suggested check lists based upon common maintenance. Please be aware that your system components may have critical maintenance practices recommended by the designer, manufacturer or installer.

WELL AND WELL PUMPS (These check sheets are intended for use in the field)	
Daily or Weekly	
☐	Check well house interior and grounds for general cleanliness, evidence of rodents, bird nests, and similar that may pose threats.
☐	Check any warning lights or alarms – low water level in well, intrusion, power outage, pump failure, etc.,
☐	Read source water meter. Record water-production data in well house log.
☐	Read pump run hour meters and record data in well house log (unless automatic data storage is available).
☐	Check pump-cycling rate. If it runs continuously or cycles more than predetermined design times per hour.
☐	Check well house buildings for signs of security problems – graffiti, vandalism, doors or locks damaged, entry, etc.
☐	Check wells source site after any adverse weather – high winds, heavy snow, ice, rains, and so on. Look for indications of erosion and surface water entering the casing.

☐	Review source related customer complaints and evaluate corrective actions and planning.
WELL AND WELL PUMPS (These check sheets are intended for use in the field)	
Monthly	
☐	Check well water level if source capacity is marginal or there are drought conditions.
☐	Check area for excessive vegetation or dangerous conditions – uncut grass, brush, dead trees, fire hazard, etc.
☐	Check well house control valves for proper positions, open or closed. You should post this information.
☐	Check source control system – pressure switch settings, cycling, pressure tanks, water levels, etc.
☐	Check well house valves for damage or leaks.
☐	Check for leaks – read source meter when you expect the water usage to be zero.
☐	Check source pump cycling and pressure switch settings, on/off pressures, and line pressures. Is there evidence that may prompt new settings?
☐	Check well site for water ponding, poor drainage areas, channeling effecting the well casing, excessive vegetation, unhealthy trees, fire hazards, etc. Be sure to observe the well site through an entire pump cycle.
☐	Monitor complete pumping cycle to ensure proper operation.
☐	Check area for evidence of rodent intrusion and burrowing.
WELL AND WELL PUMPS (These check sheets are intended for use in the field)	
Quarterly	
☐	Measure source pump capacity in gallons per minute (GPM) to detect pump output problems.
☐	Check source facilities conditions – corrosion, vent screens, vehicular or other damage, animal activity, etc.

☐	Check cold weather protection – insulation, heating system, alarm system, and so on.
☐	Verify sanitary integrity of the sources – screened vents, no unprotected openings, electrical box sealed, etc.
☐	Evaluate source use designations (permanent, seasonal, emergency, or inactive).
☐	Operate valves and test run emergency source wells to waste. Do not supply distribution system unless coordinated with BSDW.
☐	Implement seasonal start-up or shut-down procedures.
☐	Observe areas surrounding the well house for new sources of potential contamination such as; erosion, animal enclosures, new development, infiltration basins, etc. Review Wellhead or Watershed Protection Plans if available.
☐	Review source water quality test results for trends, such as increasing nitrate or seasonal coliform problems.
☐	Check electrical meter readings to see if there are significant changes in efficiency.
WELL AND WELL PUMPS (These check sheets are intended for use in the field)	
Annually or Seasonal	
☐	Evaluate general source capacity to meet water system demand. Use water use and production records.
System Specific O&M for Wells and Well Pumps	
☐	
☐	
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Maintain a log of all preventive maintenance completed on your water well and pump system. Photographs with adequate field notes or videotape with audio explanation can be valuable tools. **Include a reference to the location of where all records are kept.**

O&M Checklists Chlorine Disinfection

These are suggested check lists based upon common maintenance. Please be aware that your system components may have critical maintenance practices recommended by the designer, manufacturer, or installer.

CHLORINE DISINFECTION (These check sheets are intended for use in the field)	
Daily or Weekly	
☐	Check for any security issues at the treatment plant and surrounding area – fences, gates, doors, locks, any evidence of tampering or vandalism.
☐	Check solution level in the tank: Refill if necessary and be sure to replace the cover. We recommend posting procedure to mix chlorine solution in the treatment building. The solution tank should be visibly marked to make measuring the number of gallons remaining easy and accurate.
☐	Verify that the supply of sodium hypochlorite is adequate for normal operation – 30 to 60 days.
☐	Check for leaks or excessive chlorine smell. Locate and repair any leaks and improve ventilation, if needed.
☐	Check pump for unusual vibrations or warmth, indicating worn or damaged bearings or gears. Take care; it may be hot.
☐	Test the free chlorine residual in the distribution system using an EPA approved test kit. Evaluate and log results into a monthly chlorination residual report form. Are free chlorine levels consistent?
☐	Adjust the pump feed-rate control as needed. Adjust the controls only when the pump is running and never force the controls. Typically, the feed-rate control should be in the middle of its range. This makes it possible to adjust the dosage easily. If adjustments to controls no longer meet chlorine demand, you may have to adjust your solution strength, or possibly get a different size hypo-chlorinator.
☐	Record results of all tests, chemical use, water production, and maintenance in a daily logbook.
☐	Check records of logbooks for unusual data, trends and other indicators or possible problems.

CHLORINE DISINFECTION (These check sheets are intended for use in the field)	
Quarterly	
☐	Calibrate chemical feed pump to verify the performance of the pump output – follow manufacturer's instructions.
☐	Wash and clean the chlorine solution tank if there is any sediment build-up. Clean the chlorinator, lines, injector quill/valve and foot valve as needed – follow manufacturer's instructions. Ensure spent chlorine solutions are disposed of in accordance with the Bureau of Water Pollution Control.
☐	
Annually or Seasonal	
☐	Clean the chlorinator and replace the O-rings, valves and worn or damaged parts – use the spare parts kit to make repairs and follow manufacturer's instructions. You should have a back-up chemical feed pump to provide continuous disinfection.
System Specific O&M for Chlorine Disinfection	
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Maintain a log of all preventive maintenance completed on your treatment and disinfection system. Photographs with adequate field notes or videotape with audio explanation can be valuable tools. **Include a reference to the location of where all records are kept.**

O&M Checklists: Storage Tanks

These are suggested check lists based upon common maintenance. Please be aware that your system components may have critical maintenance practices recommended by the designer, manufacturer, or installer.

WATER STORAGE FACILITIES – RESERVOIRS AND TANKS (These check sheets were designed to be printed separately and used in the field)	
Daily or Weekly	
☐	Check any warning lights or alarms – low water level, high water level, intrusion, power outage, and so on.
☐	Check storage tank for signs of security breaches – damaged fences, open gates, graffiti, vandalism, etc.
☐	Check water level indicator – functioning, adequate amount of stored water, excessive water use.
☐	Check the overflow line, vents, ladder access locks, roof access hatches, and controls that are readily visible from the ground for damage, vandalism, or other conditions.
☐	Check storage tank and site after any adverse weather – high winds, heavy snow, ice, rains, etc.
Monthly	
☐	Check water level indicator.
☐	Verify all openings are protected from surface runoff, windblown contaminants, insects, birds, and animals.
☐	Check tank overflow lines for signs of damage, such as, screens, flapper valves, check valves, splash plate, etc.,
☐	Check area for excessive vegetation or dangerous conditions – uncut grass, brush, dead trees, fire hazard, etc.
☐	Check control valves for proper positions, open or closed.
☐	Check control valves for damage or leaks.
☐	Check low water temperature alarm – cold weather only.

☐	Check high water temperature limit switch – when heating system in service.

WATER STORAGE FACILITIES – RESERVOIRS AND TANKS (continued)	
Quarterly	
☐	Thoroughly inspect the exterior of storage tanks for structural defects, corrosion, leaks.
☐	Check mechanical water level indicators are functional.
☐	Inspect tank exterior and roof for signs of damage, corrosion, degradation, leakage, or structural problems.
☐	Inspect all openings into the reservoir roof and sidewall vents, access hatch, overflow outlet, etc.,
☐	Check tank-supporting structure for signs of damage, corrosion, degradation, structural or seismic inadequacy.
☐	Tank catwalks/ladders free from signs of damage, corrosion, degradation, structural condition, vandalism, etc.
☐	Tank area and roof for water ponding, poor drainage areas, excessive vegetation, unhealthy trees, fire hazards, etc.
☐	Tank area free from combustible storage, trash, debris, brush, or other material that could present a fire hazard.
☐	Tank area free of accumulation of material on or near parts resulting in accelerated corrosion or rot.
☐	Tank and support free of ice buildup.
☐	Check earth embankments for erosion, burrowing animals, improper drainage, and leakage.
☐	

WATER STORAGE FACILITIES – RESERVOIRS AND TANKS (continued)
Annually or Seasonal

☐	Thoroughly inspect the interior of storage tanks for structural defects, corrosion, leaks, and cleaning needs such as sediment and biofilm buildup.
☐	Storage tanks will be cleaned and disinfected following all construction, maintenance, and repairs using an AWWA-approved cleaning method.
☐	Check storage tank's structural, seismic, and sanitary integrity – leaks, corrosion, cracks, supports, warping, etc.
☐	Inspect storage tank interior coating for pitting, concrete spalling, rot, corrosion, rust, water level sensors, biofilm build-up etc.
☐	Operate (Exercise) valves and make repairs as needed.
☐	Document inspection and maintenance activity as part of an O&M program.
☐	Inventory and evaluate storage facilities capacity, condition, replacement costs and plan for improvements.
☐	Evaluate stored water for clarity, sediments, floating materials or films, unusual odors, insects, birds, or animals.
☐	Plan for storage facility improvements and budget for the associated cost.
☐	Inspect overflow discharge area for integrity and damage from erosion or rodents.
WATER STORAGE FACILITIES – RESERVOIRS AND TANKS (continued)	
Three to Five Years	
☐	Inspect and consider the timing for recoating the exterior and interior.
☐	Approved methods can be found in the AWWA Standard C654 for Disinfection of Water-Storage Facilities
☐	Have tank inspected by a professional.
☐	Drain, inspect, clean, and disinfect storage tank or use a diving maintenance service without draining tank.
☐	Respond to any evidence of storage tank problems
SYSTEM SPECIFIC FOR RESERVOIRS AND TANKS	

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Maintain a log of all preventive maintenance completed on your water system. Photographs with adequate field notes or videotape with audio explanation can be valuable tools. **Include a reference to the location of where all records are kept.**

HYDROPNEUMATIC (PRESSURE) TANKS (These check sheets were designed to be printed separately and used in the field)	
Daily or Weekly	
☐	Check for sediments in Hydro pneumatic tanks by visually checking sight tube.
☐	Complete security inspection of pump house or well house and surrounding areas.
☐	Check for leaks in pressure tank lines, valves, and connections.
☐	Check water line pressures using pressure gauges installed in the pump house.
☐	Check condition of exterior surface of pressure tanks, note corrosion or damage.
☐	Calculate the number of pump cycles per hour.
☐	Check the functioning of any air compressors used to maintain water levels in pressure tank.
☐	
Monthly	
☐	Check bladder tanks for waterlogged condition – use manufacturer's procedures.

☐	Check air-to-water ratios in Hydro pneumatic tanks by visually checking sight tube.
☐	Maintain air compressors on Hydro pneumatic tanks.
☐	Verify control systems and alarms are functioning properly and settings are proper.
☐	Check ASME pressure relief valve function.
☐	
☐	

HYDROPNEUMATIC (PRESSURE) TANKS
(These check sheets were designed to be printed separately and used in the field)

Quarterly	
☐	
☐	
Annually	
☐	Check pressure tank supports for anchor, structural condition, and seismic integrity.
☐	Check pressure tanks for rust, corrosion, and damage.
☐	
☐	
☐	
System Specific O&M for Pressure Tanks	
☐	
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☐	

Maintain a log of all preventive maintenance completed on your water system. Photographs with adequate field notes or videotape with audio explanation can be valuable tools. **Include a reference to the location of where all records are kept.**

O&M Checklists for Distribution Components

These are suggested check lists based upon common maintenance. Please be aware that your system components may have critical maintenance practices recommended by the designer, manufacturer, or installer.

- Distribution Pumps
- Valves – Valve Working Program
- Air Vacs/Air Release
- Pressure Reducing Valves
- Flush Assy/Fire Hydrants
- Sample Flushing Program
- Meters

Distribution Pumps	
Daily or Weekly	
☐	Check Packing
☐	Check pump for bearings that may be noisy
☐	Check bearing oil for water and/or unusual color
☐	Check temperature of bearings by feel
☐	Inspect all bearing and oil rings
☐	Check for oil leaks, especially around gaskets
☐	Check that flow indicator and needle valve adjustments are functioning properly
☐	Check all mechanical seal conditions
☐	Check for leaks at casings and gaskets
☐	Listen for cavitation problems.
☐	
Monthly	
☐	Add oil to the bearing reservoirs, if necessary.

☐	Check that oil level is correct distance from shaft centerline.
☐	Clean out debris from bearing brackets.
Quarterly	
☐	Apply light coat of rust protection to exposed surfaces
Annually or Seasonal	
☐	Inspect couplings for sign of wear
☐	Check driver shaft for damage
☐	Tighten bolts if necessary
☐	Do an oil change out, if required. Check manual.
☐	Inspect for damaged or missing insulation
Three to Five Years	
☐	Develop and evaluate as part of a Priority Replacement Schedule, Capital Improvement Plan and Asset Management.
☐	
SYSTEM SPECIFIC O&M FOR PUMPS (Other than Well Pumps)	
☐	
☐	

Maintain a log of all preventive maintenance completed on your pumping system. Photographs with adequate field notes or videotape with audio explanation can be valuable tools. **Include a reference to the location of where all records are kept.**

Distribution Components – Recommended Annually at a Minimum	
Isolation Valves	
☐	Clean out valve enclosures to ensure access
☐	Operate (Exercise) valve by fully closing and opening

☐	Periodic testing of valves, such as pressure testing or flow testing, can help identify any problems that may not be apparent during routine exercising or inspection.
☐	Valves that are beyond repair or have reached the end of their useful life should be replaced promptly to prevent system failures.
Air Release or Air/Vac Assemblies	
☐	Inspect ARVs and AVVs regularly to ensure that they are operating correctly. Check for any leaks or signs of corrosion, and make sure that the valve is functioning correctly
☐	Keep the area around the valve clean and free from debris. Dirt and debris can clog the valve and prevent it from operating correctly.
☐	Calibrate the valve periodically to ensure that it is releasing or allowing air into the system at the correct pressure.
☐	Test the valve periodically to ensure that it is operating correctly. This can be done by closing the valve and checking the pressure in the system, or by using a pressure gauge.
Pressure Relief Valves (PRVs)	
☐	Regular inspection of PRVs is critical to ensure that they are working properly. Inspect the valve housing, control valve, and any associated components for damage, wear, or corrosion.
☐	Check that the pressure gauge readings are consistent with the setpoint pressure and the pressure drop across the valve. If the valve is not functioning properly, it may need to be adjusted or replaced.
☐	PRVs can become clogged with debris or sediment over time, so it's important to clean them periodically. This involves shutting off the water supply and removing the valve assembly for cleaning. Clean the valve seat and trim, as well as any strainers or filters.
☐	Use the manufacturer's recommended lubricant and apply it to the valve stem, gland, and other moving parts.

☐	Keep accurate records of PRV maintenance and testing, including the date, the results of the tests, and any maintenance or repairs performed.
Flush Assemblies/ Fire Hydrants	
☐	The flow rate of flush assemblies should be calibrated periodically to ensure that they are functioning as intended
☐	Flush assemblies should be cleaned regularly to prevent clogging and ensure proper operation.
☐	Verify the integrity of the assembly – look for evidence of leakage. These are typically below grade and attached at low points making them easy to be neglected.
☐	Keep accurate records of flush assembly maintenance, including the date, and any repairs performed.
☐	Regularly inspect fire hydrants to identify any signs of damage, corrosion, or leaks. Inspect caps, gaskets, and nozzles to ensure they are in good working condition.
☐	Apply lubrication to the operating nut and any other moving parts to ensure smooth operation.
☐	Regularly paint fire hydrants to protect against rust and ensure they are visible and easy to locate in case of an emergency.
☐	If any damage or issues are identified during the inspection of fire hydrants, make necessary repairs or replacements promptly to avoid any problems during an emergency.
☐	Follow manufacturer guidelines for maintenance and to keep accurate records of maintenance activities
☐	
Meters	
☐	Dirt and debris can build up inside the water meters, which can lead to inaccurate readings. Cleaning the meters with a soft brush or cloth can help ensure that they are functioning correctly.

☐	Water meters can become less accurate over time due to wear and tear. Calibration involves checking the accuracy of the meter and making any necessary adjustments to ensure it is measuring water usage accurately.
☐	
☐	

Sample Distribution Flushing Program and Template

Distribution Flushing Program

The typical objectives of a flushing system may include removing sediments and debris from the water distribution system, maintaining water quality, preventing stagnation, reducing the risk of bacterial growth, and improving taste and odor.

First Step is Planning: Review your distribution system maps to identify the location of valves, fire hydrants and blowoffs/flush assemblies. You may need to field verify the accessibility of these appurtenances. It is beneficial if you know the pipe sizes and piping material.

The distribution maps may provide insights into the low points and dead-ends within the piping system. These are locations where sediments can collect and are more prone to becoming stagnant.

Identify the flushing points: Flushing points should be strategically located throughout the distribution system to ensure that the entire system is flushed. Flushing points may include hydrants, valves, and flush assemblies on dead-end mains.

Determine the flushing duration: The flushing duration will depend on the size of the distribution system and the water quality parameters. Ideally, line velocity should be 5.0 ft/sec with a minimum of 2.5 ft/sec. An estimated volume of water and time to be flushed can be calculated based upon the pipe sizes. Typically, flushing should be done for at least 30 minutes per flushing point. A visual estimate of complete flushing may be when the water is clear. The disinfectant residual may also be an indicator the line has been flushed sufficiently. Generally, flushing should be done at least once a year, but it may be required more frequently in areas with poor water quality.

Develop a flushing plan: The flushing plan should include a schedule of when and where flushing will occur, the duration of flushing, and identify where the flushed water will be discharged. Line flushing can result in large quantities of water and should be directed away from traffic, pedestrians, utility vaults and private lands. If the intent is to direct the flushed water to storm drains, basins or water courses, confirm there is sufficient capacity to accommodate the quantity of water over and above normal flow.

The primary goal of flushing lines is to move water through the pipes sufficiently to remove silts and biofilm that may have built up over time. Consequently, this action can affect water quality. The water may become turbid, bubbly, smelly, and/or dirty.

Initially, you may only speculate on the expected impact on the water quality. However, over time and experience, you will likely develop a much more realistic expectation of the resulting water quality.

Create a standard format of recording the flushing sequence and associated parameters such as flow and quality. Water quality should be monitored before and after flushing to ensure that the objectives of the flushing system have been achieved. The plan should state how to determine the lines are sufficiently flushed.

Prior to initiating any flushing: As with any maintenance task, there may be unexpected events. Closing and opening valves, increased flow in a line, opening flush assemblies, etc. may result in some type of failure. Check your resources for manpower and availability of parts for repairs in the event they are needed.

Flushed water must be discharged to an acceptable location. When viable, flushing the line into a sanitary sewer manhole is best, assuming it is acceptable to the jurisdiction responsible. Flushing water into a storm drain or water way may constitute an unauthorized discharge unless permitted by NDEP. In a case where a sanitary sewer manhole is not available, a basin with confinement may be an option. Here again, check with NDEP.

Notify your customers: Your customers and the public should be notified in advance of the flushing schedule, areas that will be affected, and any precautions that should be taken.

Implement the flushing plan: Flushing should be done systematically, starting at the highest elevation in the distribution system and working downward. Flushing should be done during low demand periods to minimize the impact on customers. Monitor and record information such as the flow rate, pressure and chlorine residual, etc. Once the lines are flushed sufficiently, inspect the area for damage that may need to be addressed, open previously closed valves and return to normal operation.

Evaluate and update the flushing plan: The records of routine flushing should be retained for future reference. Establishing and documenting a history of line flushing will be helpful to evaluate if the flushing plan is meeting its objectives and to identify any areas for improvement.

Included is a SAMPLE Distribution Flushing Program Plan that can be customized for your use.

Distribution Flushing Program Plan

<Water System Name>
<PWS ID #>
Date Developed or Updated:<___>

Goal:

The objectives of this flushing system may include removing sediments and debris from the water distribution system, maintaining water quality, preventing stagnation, reducing the risk of bacterial growth, and improving taste and odor. Disinfectant residuals can deplete due to low usage and disinfectants may combine with materials in the system to form undesirable byproducts. These conditions may be mitigated by implementing a flushing program.

Flushing Plan:

<Water System Name> intends to conduct a flushing program during periods of low water demand and when the flushed water will have minimal risk of creating problems. The entire distribution system will be systematically flushed annually or more often if needed to maintain desired water quality. This is anticipated to be conducted between **<date to date>.** The flushing will be performed by water system personnel or an authorized contractor. The flushing will be conducted in a manner to minimize the system pressures dropping and at no point drop below 20 psi.

Flushed water must be discharged to an acceptable location. When viable, flushing the line into a sanitary sewer manhole is best, assuming it is acceptable to the jurisdiction responsible. Flushing water into a storm drain or water way may constitute an unauthorized discharge unless permitted by NDEP. In a case where a sanitary sewer manhole is not available, a basin with confinement may be an option.

<Water System Name> will strive to identify dead-ends, low spots and areas vulnerable to silt accumulation and stagnation that may need more frequent flushing.

These actions are intended to remedy issues such as:

- Air in the lines
- Sediment in the lines
- Taste, odor or color problems
- Maintaining a free chlorine residual (or other approved disinfectant)

Flushing will be optimally performed at approximately 5.0 ft/s, but not less than 2.5 ft/s.

Flushing should continue until the following conditions are met:

- No air is detected
- Water is clear with no visible sediment
- No objectionable taste or odor remains
- The desired free chlorine residual is attained

Monitoring and Record Keeping

<Water System Name>will maintain records of each flushing such as:

Date
Time
Locations
Persons responsible
Amount of time flushing in minutes
Free chlorine residual before and after flushing
Amount of water used during flushing
Observed Turbidity
Pressure at representative points within the system
Where the flushed water was safely directed

Predetermined Flushing Points

ID#	LOCATION	MAIN SIZE	OUTLET SIZE	HYDRANT OR FLUSH ASSEMBLY

<Water System Name>

Sample Flushing Report

Date	ID#	Location	Start Time	Stop Time	Total Min.	Flow GPM	Observed Turbidity	Static PSI	Cl2 Residual	Comments	Initials

NEVADA DIVISION OF
ENVIRONMENTAL
PROTECTION

O&M Checklists for System Monitoring (SCADA)

These are suggested check lists based upon common maintenance. Please be aware that your system components may have critical maintenance practices recommended by the designer, manufacturer or installer.

SYSTEM MONITORING (SCADA) (These check sheets were designed to be printed separately and used in the field)	
Daily or Weekly	
☐	Visual Inspection SCADA Security; Gates, Locks, Night Lighting, etc.,
Monthly	
☐	Test Emergency Electrical Power Source
☐	Solar Panels – Visually Inspect for debris, dust and clean if necessary
☐	Run Software Security Scans
☐	Visual Inspection of all system components
Quarterly	
☐	Functional testing by simulating control commands or alarm conditions and verifying on/off functionality
☐	Assess Condition of Solar Panels ☐ Good ☐ Fair ☐ Poor
☐	The United States Environmental Protection Agency has developed self-assessment tools for Cybersecurity to assist water systems evaluate their vulnerability.
Annually or Seasonal	
☐	Assess needed modifications and costs to include in the annual budget
☐	Replace hardware and update software that has reached its official end-of-life or no longer supported by the manufacturer or vendor.
☐	Inspect Grounding System

SYSTEM MONITORING (SCADA) (continued)

Three to Five Years	
☐	Solar Panels – Consider replacement, check solar panels supports.
☐	Check Antenna Alignment
☐	Replace backup batteries as required by manufacturer
☐	
☐	
SYSTEM SPECIFIC O&M FOR SCADA	
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☐	

Maintain a log of all preventive maintenance completed on your SCADA system. Photographs with adequate field notes or videotape with audio explanation can be valuable tools. **Include a reference to the location of where all records are kept.**

APPENDIX

As you develop the Manual of O&M, the Appendix of your Manual must contain at a minimum, a copy of your:

- Emergency Response Manual
- Cross Connection Control Plan

For your reference, include the most recent edition of:

- AWWA C653 Disinfection of Water Treatment Plants,
- AWWA C654 Disinfection of Water Wells,
- AWWA C651 Disinfection of Water Mains
- AWWA C652 Disinfection of Storage Facilities
- Forms and Fees available from NDEP (nv.gov)

AWWA C651 Disinfection of Water Mains

AWWA C652 Disinfection of Water Storage Facilities

AWWA C653 Disinfection of Water Treatment Plants

AWWA AC654 Disinfection of Water Wells

Links to Forms and Fees available from NDEP (nv.gov)

Do Not Drink & Boil Water Orders

- Boil Water Orders
- Do Not Drink Orders

Bacteriological Monitoring

- TCR Sampling Plan [Forms]
- RTCR Level 1 Assessment Form
- RTCR Seasonal Startup Checklist
- Seasonal Systems SOP Template

Disinfectant and Disinfection Byproducts

- Chlorine Residual Compliance Procedures SM4500 Cl-G
- Disinfection Byproducts [Forms]

Consumer Confidence Reports

- Consumer Confidence Reports (external link to ccriwriter.com)
- Certificate of Delivery for a Consumer Confidence Report

Lead and Copper

- Lead and Copper [Forms]