

Checklist: Surface Water (SW)

Manitoba



Sustainable Development

The Drinking Water Safety Act
Self Assessment or Qualified Person
Checklist

Revised: September 18, 2018

Section 1: Owner Information

Owner Water System	<input type="text"/>				
Operator Water System	<input type="text"/>				
Owner Mailing Address	<input type="text"/>				
Town/ City	<input type="text"/>	Province	<input type="text"/>	Postal Code	<input type="text"/>
Email	<input type="text"/>		Phone/ Cell	<input type="text"/>	

Section 2: Water System Information

Public Water System (PWS)	<input type="checkbox"/>	PWS Code # (i.e. 123.00)	<input type="text"/>
Semi-Public Water System (SPWS)	<input type="checkbox"/>	SPWS Code # (i.e. 1000.00)	<input type="text"/>
Operating License #	<input type="text"/>	Seasonal?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Section 3: Assessor Information *(please fill this out even if Self Assessment)*

Name	<input type="text"/>		
Company	<input type="text"/>		
Email	<input type="text"/>	Phone/ Cell	<input type="text"/>

Section 4: Certification

The information contained in this report is complete and accurate to the best of my knowledge.

Signature of Owner or Owner's Representative

Date

Personal information is collected under the authority of The Drinking Water Safety Act and its pursuant regulations, and is used to issue permits and licenses, and for enforcement purposes. Information collected is protected by the privacy provisions of The Freedom of Information and Protection of Privacy Act. If you have any questions, contact the Access & Privacy Coordinator, 200 Saulteaux Crescent, Box 85, Winnipeg MB, R3J 3W3.

Checklist: Surface Water (SW)

Attachments

Section 5: Suggestions or Recommendations for Improvements *(please don't leave blank)*

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Checklist: Surface Water (SW)

Section 6: SW System - Description

Type of Water System Connections: Hospital/ Health Care Centre Apartments/ Condos
 Year-round Residential Restaurant/ Food Establish. Day Care Facility
 Seasonal Cottages School Rec./ Community Centre
 RV Hook-ups Personal Care Home Other:
 Open Campsites/ Standpipes Seniors Manor/ Apartments

Average # People Served per Day

Peak # People Served per Day

Building or Service Connections (include standpipes)

WATER USE: PROVIDE UNITS! (volume water/ time) i.e. Liters, cubic meters, US or Imperial gallons.

Average Day Demand **Don't just write "gallons".**
 Metered Estimated
1 US gallon = 3.785 L
1 Imp gallon = 4.546 L

Peak/ Max Day Demand
 Metered Estimated

Peak Hourly Flow
 Metered Estimated

Note:
This is not the same information sent to the Groundwater section for the Manitoba Government for annual water usage.

Additional comments:

Schematic or Flow Diagram: Attachment/s

Please attach a schematic or flow diagram of your water system, only for the raw water intake, wet wells, storage ponds, pumphouse, and water treatment plant.

Distribution system maps are not required.

If you are physically mailing a hand-drawn hardcopy to the Office of Drinking Water, please keep a copy for your own records.

Checklist: Surface Water (SW)

Section 7: SW System - General Information

Is your system currently under a drinking water advisory? Yes No N/A

If yes, what type of advisory? (i.e. Boil Water, Water Quality - Arsenic). Type:

If yes, when was it issued? Date:

If the system is under an advisory, are water users notified and public areas posted with the advisory notice? Yes No N/A

Are all water system components (supply, water treatment plant, storage tanks, pumps, etc...) adequately protected from vandalism? Yes No N/A

Is the water treatment plant locked? Yes No N/A

Has the wet wells, storage ponds, or water treatment plant ever been flooded? Yes No N/A

Can water supply be maintained during power outages? Yes No N/A

Yes, standby generator (genset) Yes, fuel-driven pump
How many electrical power outages per year or per season?

Standby generator (genset) or fuel-driven pump located above the reservoir? Yes No N/A

If yes, is it in a metal or epoxy coated box to protect the reservoir from spills? Yes No N/A

Does the system experience frequent water outages due to equipment failures or water supply capacity issues? Yes No N/A

System experienced failures in the past of treatment/ disinfection equipment? Yes No N/A

Is the water system equipped with flow meters to monitor water use? Yes No N/A

Raw water Treated water Blended water Backwash water
 Rural distribution water Town distribution water Bulk/ truck/ pail fill water

Are water service connections metered? Yes No N/A

System able to meet peak water demands with adequate at-tap pressures? Yes No N/A

What is the rated treatment or design capacity of the water treatment system? Units.

What is the peak or maximum day demand on the water system? Units.

Is the water treatment plant or pumphouse equipped with an alarm system?

Yes, local alarm/ exterior light only Yes, sent to operator No N/A

What alarm conditions are monitored?

Distribution pump failure Low reservoir level Power failure UV failure

Chlorination pump failure High reservoir level Building flood

Low chlorine residual Low incoming pressure Intrusion

High turbidity Low distribution pressure Other:

Checklist: Surface Water (SW)

Section 7: SW System - General Information

-
- Is the water system equipped with a suitable raw water sampling tap? Yes No N/A
- Is the water system equipped with a suitable treated water sampling tap? Yes No N/A
- Is the water system equipped with other sampling taps between treatment units? Yes No N/A
-
- Are there any obvious cross-connections within the piping between raw, partially treated, treated, or distributed water? Yes No N/A
- Are there any by-passes around critical treatment equipment or treatment processes such as a cartridge filter, or a UV unit? Yes No N/A
- Are these by-passes tagged or labelled? Yes No N/A
- Are there procedures for activating by-passes including DWO notification? Yes No N/A
-
- Does the system provide appropriate water treatment given the type of raw water source and the raw water quality? Yes No N/A
- Does the system receive frequent or repeated complaints from water users about water quality? Yes No N/A
- Describe redundancy level in the water supply, treatment, storage and pumping systems. (i.e. 2 filters)

- Was the system designed by a Professional Engineer? Yes No N/A
- Was the system approved by the Office of Drinking Water? Yes No N/A
- Owner/ operator aware of the need to obtain approval (i.e. permit) before starting treatment upgrades or significant alterations to the system? Yes No N/A
- This includes watermain extensions.
- Is the installation of treatment equipment or disinfection equipment required by the Office of Drinking Water as noted in an advisory letter or inspection letter? Yes No N/A
- Adequate space in the building to install additional treatment equipment? Yes No N/A
-
- Are key water pipes, valves, taps, and components labelled to assist with O&M? Yes No N/A
- Is the equipment accessible for O&M and inspection? Yes No N/A
- Is there adequate space around equipment to perform O&M? Yes No N/A
-

Checklist: Surface Water (SW)

Section 7: SW System - General Information

Any changes, upgrades, or expansions to the system since the last assessment? Yes No N/A

If yes, explain:

What is the average age (years) of the following components of the system?

Intake Structure

Treatment

Storage

Distribution

At inspection time, were all water system components in good working order? Yes No N/A

If no, explain:

What is the general condition of the buildings?

Good

Fair - nearing end of useful life

Poor - replacement required

Additional comments:

Checklist: Surface Water (SW)

Section 8: SW System - Water Supply Intake

Name of Surface Water (SW) source:

Is there only one raw water intake? Yes No N/A

If more than one intake, how are the intakes used? Alternating Back-up/ emergency

Is the intake equipped with a fish screen? Yes No N/A

Does the fish screen meet the Department of Fisheries and Oceans (DFO) Fish Screen Guideline? Yes No N/A

Has the intake been inspected? Yes No N/A

Year of last inspection:

Does the intake remain submerged at all times? Yes No N/A

Is the intake located to avoid water quality, sediment, or ice issues, at the surface (i.e. algae) and at the bottom of the lake, river, or stream bed? Yes No N/A

Length of intake from shore? Units.

Height of intake from bottom? Units.

Depth of intake below surface? Units.

Is the intake located to avoid physical damage from boats etc.? Yes No N/A

Are there significant seasonal changes in water quality? Yes No N/A

Describe water quality changes:

Have algae blooms occurred near the intake? Yes No N/A

Have zebra mussels been found near the intake? Yes No N/A

Is there zebra mussel prevention or mitigation? i.e. chlorine at intake Yes No N/A

What is the nature of surrounding land use within approximately 100 m (300 feet) of the intake?

Urban/ Residential Cottages/ Recreational Agricultural/ Crop Production

Commercial Natural/ Undeveloped Agricultural/ Livestock

Any potential sources of contamination within 100 m (300 feet) of the intake? Yes No N/A

- | | | |
|--|--|---|
| <input type="checkbox"/> Recreational boating | <input type="checkbox"/> Livestock area | <input type="checkbox"/> Landfill site |
| <input type="checkbox"/> Major bank erosion | <input type="checkbox"/> Manure storage area | <input type="checkbox"/> Petroleum storage area |
| <input type="checkbox"/> Municipal wastewater discharge | <input type="checkbox"/> Manure application area | <input type="checkbox"/> Chemical storage area |
| <input type="checkbox"/> Industrial wastewater discharge | <input type="checkbox"/> Composting site | <input type="checkbox"/> Feed/ grain storage area |
| <input type="checkbox"/> Major highway | <input type="checkbox"/> Other: <input type="text"/> | <input type="checkbox"/> Herbicide/ fertilizer apply area |
| <input type="checkbox"/> Major rail line | | |

Checklist: Surface Water (SW)

Section 8: SW System - Water Supply Intake

Is the water supply diverted to a raw water impoundment or storage pond? Yes No N/A

Is the water diverted all the time or only when water quality issues occur?

Year-round diversion Seasonal diversion

Is the raw water pond equipped with an aeration system? Yes No N/A

Has the raw water pond experienced algae issues? Yes No N/A

Is there a screen on the intake from the raw water pond? Yes No N/A

Are there chemical feeds to the raw water pond? Yes No N/A

Is there a raw water wet well? Yes No N/A

Is the raw water wet well equipped with at least two cells with pumping capacity in each cell to allow cell isolation and O&M? Yes No N/A

Where is the raw water pump located?
i.e. intake, wet well, water treatment plant

Does the raw water source have adequate capacity to meet demands? Yes No N/A

What is the capacity of the raw water pumping system? Units.

What is the peak or maximum day demand on the water system? Units.

How is the raw water pump controlled?

Distribution pressure switch Storage level Other:

Is the pump equipped with isolation and discharge check valves? Yes No N/A

Is there a pressure gauge on the raw water supply line to the treatment system? Yes No N/A

Is the raw water supply line to the water treatment plant adequately sized and the appropriate pressure rated pipe? Yes No N/A

Is the raw water supply line securely anchored to the bottom of the surface water source or raw water storage pond? Yes No N/A

Once the raw water supply line reaches the shore, is the line protected from damage by being buried with at least 2.4 m (8 feet) cover for year-round systems or 0.45 m (18 inches) for seasonal? Yes No N/A

If piped sewer is present, is there at least 3 m (10 feet) horizontal distance separation between raw water lines and sewer mains, where they run parallel? Yes No N/A

Are there any service connections from the raw water supply line? Yes No N/A

Checklist: Surface Water (SW)

Section 8: SW System - Water Supply Intake

What is the average age (years) of the raw water supply?

Supply

What is the general condition of the raw water supply?

- Good
- Fair - nearing end of useful life
- Poor - replacement required

Additional comments:

-
- Attachment/s:
Please attach a sketch or map showing intake and approximate distances to any potential sources of contamination, and to the water treatment plant or pumphouse.

Checklist: Surface Water (SW)

Section 9: SW System - Pressure Filters *(complete one for each type)*

Section is Not Applicable to this System.

What is the type of pressure filter? i.e. sand, multi-media

How many units?

How are the pressure filters being used?

turbidity control barrier pre-treatment post-treatment polishing

Is the rated capacity of the filters able to meet peak or maximum day demands? Yes No N/A

What is the capacity of the filters? Units.

What is the peak or maximum day demand on the water system? Units.

What type(s) of media are in the filters? (layers)

Other:

Anthracite Carbon Sand Greensand Gravel

Can the filters be visually inspected for maintenance and repair?

Yes No N/A

Are the filters regularly inspected?

Yes No N/A

Inspection frequency for the filters?

Has the filter media ever been replaced or topped up?

Yes No N/A

Year media last replaced or topped up:

Does the system use pre-coagulation?

Yes No N/A

If yes, which chemical?

If yes, what is the target dosage? (mg/L)

Can head loss be determined for the filters?

Yes No N/A

Are the filters regularly backwashed?

Yes No N/A

Backwash frequency for the filters?

What is the trigger and trigger value to initiate a backwash?
(time, pressure loss, turbidity)

Is the backwash flow rate adequate?

Yes No N/A

What is the source of backwash water? Filtered and chlorinated water

Filtered and unchlorinated water Raw water

Checklist: Surface Water (SW)

Section 9: SW System - Pressure Filters (complete one for each type)

Section is Not Applicable to this System.

How is the backwash disposed of? Holding tank or septic system Other:
 Municipal sewer system Discharged to environment

If the backwash disposal is to sewer or drain, is there an air gap? Yes No N/A
(i.e. there is no direct connection to avoid backflow)

Is an effective air scour part of the backwash procedures? Yes No N/A

Is there an effluent reverse pipe trap to help prevent draining of filters? Yes No N/A

Does the filter system have an air release valve, pressure relief valve, or both? Yes No N/A

Is there a suitable sample tap for water leaving the filters? Yes No N/A

What were the turbidity levels (NTU) in the raw and filtered water at time of the inspection?

Turbidity - raw Turbidity - filtered

Is a carbon filter used for colour/ organics removal or polishing? Yes No N/A

Change out frequency for the GAC? i.e. every 6 months, never

What is the trigger for changing out the carbon (GAC) carbon media?
i.e. annually, UVT, TOC

Is the Empty Bed Contact Time (EBCT) known? Yes No N/A

If yes, how much time is the water in contact with the GAC? i.e. minutes

What is the average age (years) of the filtration equipment?

Filtration

What is the general condition of the filtration equipment? Good
 Fair - nearing end of useful life
 Poor - replacement required

Additional comments:

Checklist: Surface Water (SW)

Section 10: SW System - Cartridge Filters (single or bank of micron filters)

Section is Not Applicable to this System.

How is the filtration equipment being used? Turbidity control Pre-treatment filter
 UV Pre-treatment filter

Are the filter housings and cartridge filters NSF certified? Yes No N/A

If yes, to which NSF standards? (i.e. 53, 60, 61)

Is the rated capacity of the filters able to meet peak or maximum day demands? Yes No N/A

What is the capacity of the filters? Units.

What is the peak or maximum day demand on the water system? Units.

Can pressure loss across individual filters be monitored? Yes No N/A

Are spare cartridges kept on-hand? Yes No N/A

Are cartridges changed as per manufacturer's requirements? (i.e. pressure loss) Yes No N/A

LIST ALL CARTRIDGE FILTERS IN THEIR ORDER IN THE TREATMENT PROCESS.

	Size (microns)	Manufacturer's listed max. pressure loss (psi)	Trigger and trigger value to change filter (pressure loss, time, turbidity)	Change out frequency (days)
Cartridge #1	<input style="width: 80px; height: 20px;" type="text"/>	<input style="width: 80px; height: 20px;" type="text"/>	<input style="width: 150px; height: 20px;" type="text"/>	<input style="width: 80px; height: 20px;" type="text"/>
Cartridge #2	<input style="width: 80px; height: 20px;" type="text"/>	<input style="width: 80px; height: 20px;" type="text"/>	<input style="width: 150px; height: 20px;" type="text"/>	<input style="width: 80px; height: 20px;" type="text"/>
Cartridge #3	<input style="width: 80px; height: 20px;" type="text"/>	<input style="width: 80px; height: 20px;" type="text"/>	<input style="width: 150px; height: 20px;" type="text"/>	<input style="width: 80px; height: 20px;" type="text"/>
Cartridge #4	<input style="width: 80px; height: 20px;" type="text"/>	<input style="width: 80px; height: 20px;" type="text"/>	<input style="width: 150px; height: 20px;" type="text"/>	<input style="width: 80px; height: 20px;" type="text"/>

Is there a suitable sampling tap for water leaving each filter? Yes No N/A

Is there a suitable sampling tap for the final filter effluent? Yes No N/A

Are the filters equipped with an air release valve, pressure relief valve, or vent? Yes No N/A

What were the turbidity levels (NTU) in the raw and filtered water at time of the inspection?

Turbidity - raw Turbidity - filtered

Does the system use pre-coagulation? Yes No N/A

If yes, which chemical?

If yes, what is the target dosage? (mg/L)

Checklist: Surface Water (SW)

Section 10: SW System - Cartridge Filters (single or bank of micron filters)

Section is Not Applicable to this System.

Are cartridge filters used as a primary barrier?
i.e. turbidity standard applied Yes No N/A

Is the final stage cartridge filter rated at 1 micron absolute? Yes No N/A

Does the 1 micron absolute filter carry certification to NSF Standard 53 for
removal of *Cryptosporidium* and *Giardia*? Yes No N/A

Is the final stage cartridge filter flushed after changing out the filter and
before returning the filter to service? Yes No N/A

What is the average age (years) of the filtration equipment?

Filtration

What is the general condition of the filtration equipment? Good
 Fair - nearing end of useful life
 Poor - replacement required

Additional comments:

Checklist: Surface Water (SW)

Section 11: SW System - Anion Exchange for Organics/ THM Control

Section is Not Applicable to this System.

What type of resin is used inside the unit?

i.e. product name or Type II macroporous strong base polyacrylic resin

Type:

Is there a suitable sample tap for water entering the units?

Yes No N/A

Is there a suitable sample tap for water leaving the units?

Yes No N/A

Is UVT (UV Transmittance) measured with a hand-held or online unit?

Yes No N/A

What is the manufacturer or supplier's published or quoted TOC (Total Organic Carbon) removal rate? i.e. 60-80%

How often (frequency) is the resin regenerated? Units.

How is the regeneration frequency set?

Based on volume of water treated Timed

Based on removal of organics Other

What is used to regenerate the resin?

Sodium chloride Other

Is the salt used for regeneration food grade and NSF 60 certified?

Yes No N/A

Has the resin ever undergone a chemical clean with an acid solution?

Yes No N/A

Where is the waste brine discharged after regeneration?

Municipal sewer Holding tank or septic system Discharged to environment

If the brine disposal is to sewer or drain, is there an air gap?
(i.e. there is no direct connection to avoid backflow)

Yes No N/A

What are the alkalinity levels (mg/L) after anion exchange?

Alkalinity - raw

Alkalinity - filtered

What are the pH levels after anion exchange?

pH - raw

pH - filtered

Is the water showing signs of being corrosive?

Yes No N/A

Is there a valved bypass to allow blending to control water corrosivity?

Yes No N/A

Checklist: Surface Water (SW)

Section 11: SW System - Anion Exchange for Organics/ THM Control

Section is Not Applicable to this System.

What is the average age (years) of the equipment?

Anion Exchange

What is the general condition of the equipment?

Good

Fair - nearing end of useful life

Poor - replacement required

Additional comments:

Checklist: Surface Water (SW)

Section 12: SW System - Conventional Treatment (coagulation-flocculation-clarification-filtration)

Section is Not Applicable to this System.

Type of conventional treatment system. i.e. steps/ components

Is the conventional treatment system a packaged unit system?

Yes No N/A

Manufacturer/ model #

Is the rated capacity of the system able to meet peak or maximum day demands? Yes No N/A

What is the capacity of the system? Units.

What is the peak or maximum day demand on the water system? Units.

Does the system use coagulation?

Yes No N/A

Does the system use polymerization?

Yes No N/A

If yes, which chemicals?

If yes, what is the target dosage or dosage range? (mg/L)

Is the chemical feed rate or dosage adjusted seasonally?

Yes No N/A

If yes, what are the adjustments based on? Turbidity changes UVT changes Other

Is the pH of the water within the optimal range for the chemicals?

Yes No N/A

For solids contact units, does the system use pH adjustment chemical?

Yes No N/A

If yes, which chemical? i.e. hydrated lime, quick lime, etc...

If yes, what is the target dosage or dosage range? (mg/L)

Is non-carbonate hardness an issue?

Yes No N/A

If yes, is soda ash used to meet hardness targets?

Yes No N/A

Checklist: Surface Water (SW)

Section 12: SW System - Conventional Treatment (coagulation-flocculation-clarification-filtration)

Section is Not Applicable to this System.

Is a rapid mix stage or in-line mixer provided after chemical addition? Yes No N/A

Is a separate flocculation stage provided with slower mixing? Yes No N/A

Are several mixers provided with decreasing mix rates to promote floc formation? Yes No N/A

Is a detention time of at least 30 minutes provided for flocculation? Yes No N/A

Is the clarifier at least 3 m (10 feet) in depth to allow settling and sludge deposition? Yes No N/A

Is a retention time at least 4 hours provided by the clarifier? Yes No N/A

Is the clarifier designed to enhance floc settling rates? Yes No N/A

What type of settling units in the clarifer? Other:

Tube settlers Plate settlers Sludge blanket

Is there an adequate sludge removal system? Yes No N/A

Is the clarifier equipped with a sloped base to a valved drain? Yes No N/A

Is there an air gap at the drain for backflow prevention? Yes No N/A

Is a recarbonation basin used to decrease pH after clarifier? Yes No N/A

Recarbonation details:

What type(s) of media are in the filters? (layers) Other:

Anthracite Carbon Sand Greensand Gravel

Can the filters be visually inspected for maintenance and repair? Yes No N/A

Are the filters regularly inspected? Yes No N/A

Inspection frequency for the filters?

Has the filter media ever been replaced or topped up? Yes No N/A

Year media last replaced or topped up:

Checklist: Surface Water (SW)

Section 12: SW System - Conventional Treatment (coagulation-flocculation-clarification-filtration)

Section is Not Applicable to this System.

Can head loss be determined for the filters? Yes No N/A

Are the filters regularly backwashed? Yes No N/A

Backwash frequency for the filters?

What is the trigger and trigger value to initiate a backwash?
(time, pressure loss, turbidity)

Is the backwash flow rate adequate? Yes No N/A

What is the source of backwash water? Filtered and chlorinated water
 Filtered and unchlorinated water Raw water

How is the backwash disposed of? Holding tank or septic system Other:
 Municipal sewer system Discharged to environment

If the backwash disposal is to sewer or drain, is there an air gap?
(i.e. there is no direct connection to avoid backflow) Yes No N/A

Is an effective air scour part of the backwash procedures? Yes No N/A

Is the filter equipped with filter-to-waste following backwash? Yes No N/A

Is the filter-to-waste period automatically controlled based on turbidity levels? Yes No N/A

If manually controlled, explain the trigger and trigger value for stopping the filter-to-waste?
i.e. turbidity levels, timed, etc...

Trigger to stop filter-to-waste:

Is there a suitable sample tap for water leaving each of the filters? Yes No N/A

What were the turbidity levels (NTU) in the raw and filtered water at time of the inspection?

Turbidity - raw Turbidity - filtered

Checklist: Surface Water (SW)

Section 12: SW System - Conventional Treatment (coagulation-flocculation-clarification-filtration)

Section is Not Applicable to this System.

What is the average age (years) of the treatment equipment?

Treatment

What is the general condition of the treatment equipment?

Good

Fair - nearing end of useful life

Poor - replacement required

Additional comments:

Checklist: Surface Water (SW)

Section 13: SW System - Slow Sand/ Biological Filtration

Section is Not Applicable to this System.

Is the rated capacity of the filters able to meet peak or maximum day demands? Yes No N/A

What is the capacity of the filters? Units.

What is the peak or maximum day demand on the water system? Units.

Are there two filter beds each with independent biological layers to allow for cleaning and repairing? Yes No N/A

Is the biological layer scraped? Yes No N/A

If yes, what is the frequency?

Can the filters be visually inspected for maintenance and repair? Yes No N/A

Are the filters regularly inspected? Yes No N/A

Inspection frequency for the filters?

Is there an ozone generator? Yes No N/A

If yes, what is the source gas for the ozone generator?

Compressed air Concentrated oxygen Liquid oxygen (LOX)

What is the applied dosage range for the ozone (mg/L)?

Is the ozone feed rate or dosage adjusted seasonally? Yes No N/A

If yes, what are the adjustments based on? Turbidity changes UVT changes Other

Is the ozone injected in a sidestream using a venturi? Yes No N/A

Is an ozone contactor tank provided immediately after ozone injection? Yes No N/A

Is the ozone contactor equipped with an ozone destruction unit vented to the atmosphere? Yes No N/A

Is an ambient ozone monitor/ sensor located near the ozone equipment? Yes No N/A

Were all ozone systems functional at the time of the inspection? Yes No N/A

Is there a gravel roughing filter provided ahead of the slow sand filter? Yes No N/A

How often (frequency) is the roughing filter backwashed?

What is the trigger and trigger value to initiate a backwash?
(time, head loss, turbidity)

Do the slow sand filters have at least 750 mm (30 inches) of sand? Yes No N/A

Has the slow sand filter media ever been replaced or topped up? Yes No N/A

Can head loss be determined for each slow sand filter? Yes No N/A

Checklist: Surface Water (SW)

Section 13: SW System - Slow Sand/ Biological Filtration

Section is Not Applicable to this System.

Are the slow sand filters backwashed? Yes No N/A

If yes, what is the frequency?

What is the trigger and trigger value to initiate a backwash?
(time, head loss, turbidity)

Is the backwash source treated & unchlorinated water? Yes No N/A

Is the filter equipped with filter-to-waste following backwash? Yes No N/A

Is the filter-to-waste period automatically controlled based on turbidity levels? Yes No N/A

If manually controlled, explain the trigger and trigger value for stopping the filter-to-waste?
i.e. turbidity levels, timed, etc...

Trigger to stop filter-to-waste:

Are there Biological Activated Carbon (BAC) filters after the slow sand filters? Yes No N/A

Are the BAC filters backwashed? Yes No N/A

If yes, what is the frequency?

Is the backwash source treated & unchlorinated water? Yes No N/A

How is the backwash water from the biological filters disposed? N/A
 Municipal sewer system Holding tank or septic system Other:

Discharged to environment

If the backwash disposal is to sewer or drain, is there an air gap?
(i.e. there is no direct connection to avoid backflow) Yes No N/A

Is there a suitable sample tap for water leaving each of the filters? Yes No N/A

What is the average age (years) of the filtration equipment?

Filtration

What is the general condition of the filtration equipment? Good
 Fair - nearing end of useful life
 Poor - replacement required

Additional comments:

Checklist: Surface Water (SW)

Section 14: SW System - Microfiltration (MF) or Ultrafiltration (UF) Membrane

Section is Not Applicable to this System.

Questions Specific to MF or UF Systems:

What type(s) of membranes are used? Microfiltration (MF) Ultrafiltration (UF) Both

Is third party verification testing available to demonstrate at least 3-log removal efficiency for *Cryptosporidium* and *Giardia*? Yes No N/A

If yes, what is the log removal rating?

Does the system use pre-coagulation?

Yes No N/A

If yes, which chemical?

If yes, what is the target dosage? (mg/L)

Does rapid mixing and flocculation promote a pin-sized floc?

Yes No N/A

Are there duty and standby coagulant feed pumps?

Yes No N/A

What type of direct integrity test is performed?

pressure decay Other:

What type of indirect integrity test is performed?

continuous turbidity monitoring Other:

Is a direct integrity test performed at least daily when a membrane module is operating?

Yes No N/A

Is a direct integrity test performed if there is an alarm or automatic shut-down?

Yes No N/A

Is the direct integrity test capable of detecting a breach with resolution less than or equal to 3 microns? $\leq 3\mu\text{m}$

Yes No N/A

Maximum pressure decay set-point for direct integrity test failure?

Log Removal Value (LRV) set-point for direct integrity test failure?

What is the response to a direct integrity test failure?

alarm automatic shut-down

Are broken or damaged fibres repaired on-site (i.e. pinned) or does a vessel or module have to be sent out for repairs?

repaired on-site sent out

Checklist: Surface Water (SW)

Section 14: SW System - Microfiltration (MF) or Ultrafiltration (UF) Membrane

Section is Not Applicable to this System.

Membrane model #

How many sealed vessels/ modules?

Are there sampling taps for: filtrate Yes No N/A

Are there sampling taps for: reject Yes No N/A

Are there sampling taps for: individual vessels/ modules Yes No N/A

Are the filtrate and reject metered? filtrate reject

Is a filtrate flush done after each shut-down? Yes No N/A

Is there an Enhanced Flux Maintenance (EFM) system and cleaning process? Yes No N/A

Is there a Clean-In-Place (CIP) unit for cleaning the membrane to limit fouling and scaling? Yes No N/A

If yes, list the cleaning chemicals.

Are all treatment and cleaning chemicals certified to NSF Standard 60? Yes No N/A

Is the CIP unit equipped with a heater to heat the cleaning water? Yes No N/A

Have rules been established for initiating a membrane cleaning? Yes No N/A

What triggers a chemical CIP membrane cleaning?

Run Time Transmembrane Pressure (TMP) Flow reduction Initiated manually Operator

Approximately how often is a CIP performed?

How is the reject water disposed? Municipal sewer system Holding tank or septic system

N/A Discharged to environment Other:

If the backwash disposal is to sewer or drain, is there an air gap? Yes No N/A
(i.e. there is no direct connection to avoid backflow)

Checklist: Surface Water (SW)

Section 14: SW System - Microfiltration (MF) or Ultrafiltration (UF) Membrane

Section is Not Applicable to this System.

Is there a pre-filter? Yes No N/A

If yes, specify pore size in mm or microns.

Are there pressure gauges on the inlet and outlet of the pre-filter? Yes No N/A

Is there redundancy to ensure water demands can be met during shut-downs such as cleanings? (i.e. dual trains, extra modules, treated water storage) Yes No N/A

What types of monitors or indicators are provided for the membrane unit?

Run Time Transmembrane Pressure (TMP) Pressure Temperature

What alarms are provided for the membrane unit?

Low feed pressure High feed pressure Low feed flow rate

Other: Other:

Was the membrane system installed to achieve compliance with specific water quality standard(s) or guideline(s)? i.e. TOC or turbidity Yes No N/A

What was the level (i.e. mg/L) in the raw and treated water in the most recent chemistry report for the parameter required to achieve compliance with a water quality standard(s)?

parameter: raw: treated:

What is the removal rate (%) for the parameter?

Is the expected removal rate (%) being achieved? Yes No N/A

What is the average age (years) of the filtration equipment?

Filtration

What is the general condition of the filtration equipment? Good
 Fair - nearing end of useful life
 Poor - replacement required

Additional comments:

Checklist: Surface Water (SW)

Section 15: SW System - Nanofiltration (NF) or Reverse Osmosis (RO) Membrane

Section is Not Applicable to this System.

What type(s) of membranes are used? Nanofiltration (NF) Reverse Osmosis (RO) Both

Membrane model #

What is the recovery rate (%)?

What is the reject rate (%)?

How many sealed vessels/ modules?

How many membrane elements in each vessel/ module?

Is there an isolation valve for each vessel/ module?

Yes No N/A

Are there pressure gauges on influent & effluent piping for each vessel/ module?

Yes No N/A

Does the concentrate/ reject piping rise after the final stage to prevent air locking and draining after the shutdown flush?

Yes No N/A

Are there sampling taps for: permeate

Yes No N/A

Are there sampling taps for: concentrate/ reject

Yes No N/A

Are there sampling taps for: blended water

Yes No N/A

Are there sampling taps for: individual vessels

Yes No N/A

Are the permeate, concentrate/ reject, by-pass metered?

permeate concentrate by-pass

Is there online conductivity monitoring?

feed permeate

Is there online turbidity monitoring?

feed permeate

Is there online pH monitoring?

Yes No N/A

Is an antiscalant added to the influent water to reduce fouling?

Yes No N/A

If yes, list chemical and dosage.

Is an acid solution added to reduce pH prior to the membrane?

Yes No N/A

If yes, which type of acid solution is used?

hydrochloric sulphuric Other:

What method is used to stabilize the permeate water?

blending

pH adjustment using sodium hydroxide (caustic soda)

alkalinity & pH adjustment using sodium carbonate (soda ash)

limestone contactor

degasification or air stripping to remove carbon dioxide

Checklist: Surface Water (SW)

Section 15: SW System - Nanofiltration (NF) or Reverse Osmosis (RO) Membrane

Section is Not Applicable to this System.

Are the alkalinity and pH levels of the finished water suitable for distribution to limit corrosion? Yes No N/A

Is a permeate flush done after each shut-down? Yes No N/A

Is there a Clean-In-Place (CIP) unit for cleaning the membrane to limit fouling and scaling? Yes No N/A

If yes, list the cleaning chemicals.

Are all treatment and cleaning chemicals certified to NSF Standard 60? Yes No N/A

Is the CIP unit equipped with a heater to heat the cleaning water? Yes No N/A

Have rules been established for initiating a membrane cleaning? Yes No N/A

What triggers a chemical CIP membrane cleaning?

Run Time Transmembrane Pressure (TMP) Flow reduction Initiated manually Operator

Approximately how often is a CIP performed?

How is the concentrate/ reject or CIP waste disposed? Municipal sewer system Holding tank or septic system N/A Discharged to environment Other:

If the concentrate or CIP waste disposal is to sewer or drain, is there an air gap? (i.e. there is no direct connection to avoid backflow) Yes No N/A

Is there a pre-filter? Yes No N/A

If yes, specify pore size in microns.

Are there pressure gauges on the inlet and outlet of the pre-filter? Yes No N/A

Is there redundancy to ensure water demands can be met during shut-downs such as cleanings? (i.e. dual trains, extra modules, treated water storage) Yes No N/A

What types of monitors or indicators are provided for the membrane unit?

Run Time Transmembrane Pressure (TMP) Pressure Temperature

What alarms are provided for the membrane unit?

Low feed pressure High feed pressure Low feed flow rate

Other: Other:

Checklist: Surface Water (SW)

Section 15: SW System - Nanofiltration (NF) or Reverse Osmosis (RO) Membrane

Section is Not Applicable to this System.

Was the membrane system installed to achieve compliance with specific water quality standard(s) or guideline(s)? Yes No N/A

What was the level (i.e. mg/L) in the raw and treated water in the most recent chemistry report for the parameter required to achieve compliance with a water quality standard(s)?

parameter: raw: treated:

What is the removal rate (%) for the parameter?

Is the expected removal rate (%) being achieved? Yes No N/A

parameter: raw: treated:

What is the removal rate (%) for the parameter?

Is the expected removal rate (%) being achieved? Yes No N/A

parameter: raw: treated:

What is the removal rate (%) for the parameter?

Is the expected removal rate (%) being achieved? Yes No N/A

parameter: raw: treated:

What is the removal rate (%) for the parameter?

Is the expected removal rate (%) being achieved? Yes No N/A

What is the average age (years) of the filtration equipment?

Filtration

What is the general condition of the filtration equipment? Good
 Fair - nearing end of useful life
 Poor - replacement required

Additional comments:

Checklist: Surface Water (SW)

Section 16: SW System - Chlorination

Section is Not Applicable to this System.

What type of chlorine solution is used? Sodium hypochlorite fed directly from container
 Diluted sodium hypochlorite
 Solution from calcium hypochlorite powders or tablets
 Unscented household bleach
 On-site sodium hypochlorite generation ("analyte")

What is the make-model-brand name of the chlorine or generator used? (i.e. supplier label)

Does the chlorine solution, or powder/ tablets, or salt carry NSF 60 certification? Yes No N/A

Does the on-site sodium hypochlorite generator carry NSF 60 certification? Yes No N/A

Does the on-site sodium hypochlorite generator carry NSF 61 certification? Yes No N/A

Is an adequate amount of chlorine chemical kept on-hand at all times? (i.e. 30 days minimum) Yes No N/A

Is the chlorine solution stored away from sunlight? Yes No N/A

Is the sodium hypochlorite solution used within 3 months of purchase? Yes No N/A

Are chlorine tanks stored over a spill tray? Yes No N/A

Is the chlorine stored in a separate chemical storage room? Yes No N/A

Is the system equipped with duty-standby chlorine pumps with automatic switchover in the case of pump failure? Yes No N/A

Is there only a single feed chlorine pump? Yes No N/A

Is there a spare feed chlorine pump? (i.e. "shelf spare") Yes No N/A

Are critical spare parts kept on-hand to maintain the feed pump? Yes No N/A

What triggers operation of the chlorine feed? (i.e. raw water pump, reservoir level, etc...)

Is operation of the feed pump controlled by the raw water pump (fixed injection rate) or by a flow meter (flow-paced injection rate)?

N/A Raw water pump Flow meter Other:

Do feed pump settings suggest a properly sized feed pump? Yes No N/A

Checklist: Surface Water (SW)

Section 16: SW System - Chlorination

Section is Not Applicable to this System.

What type of chlorine residual test kit is used?

N/A Digital DPD colorimeter Colour wheel Unapproved unit (i.e. pool kit)

When was the equipment last calibrated?

Is the system equipped with an online chlorine residual analyzer?

Yes No N/A

Explain where the analyzer sample draw water goes:

Normally, what is the free chlorine residual (mg/L) of the outgoing water?

Is chlorine gas (Cl₂) used for chlorination?

Yes No N/A

If yes, what type of chlorine gas addition is used?

100# 150# cylinders ton cylinders N/A

Is there automatic changeover equipment to switch from one cylinder or bank of cylinders to another cylinder or bank of cylinders, to ensure that unchlorinated water is not allowed into the distribution system?

Yes No N/A

Does gas chlorinator provide discharge at a point of positive pressure?

Yes No N/A

Is the chemical feed equipment located in a separate room to reduce hazards and vapors?

Yes No N/A

What is the average age (years) of the chlorination equipment?

Chlorination

What is the general condition of the chlorination equipment? Good

Fair - nearing end of useful life

Poor - replacement required

Additional comments:

Checklist: Surface Water (SW)

Section 17: SW System - Other Treatment Chemicals

Section is Not Applicable to this System.

	Chemical Name/s	Dosage (mg/L)
Chemical #1	<input type="text"/>	<input type="text"/>
Chemical #2	<input type="text"/>	<input type="text"/>
Chemical #3	<input type="text"/>	<input type="text"/>
Chemical #4	<input type="text"/>	<input type="text"/>
Chemical #5	<input type="text"/>	<input type="text"/>

Are all chemicals that may come into contact with the potable water certified to NSF Standard 60? Yes No N/A

Is an adequate amount of treatment chemicals kept on-hand at all times? (i.e. 30 days minimum) Yes No N/A

Are the chemicals stored in accordance with the supplier's instructions? Yes No N/A

Are chemical tanks stored over a spill tray? Yes No N/A

Are chemicals stored in a separate chemical storage room? Yes No N/A

Is the system equipped with duty-standby chemical pumps with automatic switchover in the case of pump failure? Yes No N/A

Are there only single feed chemical pumps? Yes No N/A

Is there a spare feed chemical pump? (i.e. "shelf spare") Yes No N/A

Are critical spare parts kept on-hand to maintain the feed pumps? Yes No N/A

What triggers operation of the chemical feeds? (i.e. raw water pump, reservoir level, etc...)

Is operation of the chemical pumps controlled by the raw water pump (fixed injection rate) or by a flow meter (flow-paced injection rate)?

N/A Raw water pump Flow meter Other:

Do feed pump settings suggest properly sized feed pumps? Yes No N/A

Checklist: Surface Water (SW)

Section 17: SW System - Other Treatment Chemicals

Section is Not Applicable to this System.

What is the average age (years) of the chemical equipment?

Chemicals

What is the general condition of the chemical equipment?

Good

Fair - nearing end of useful life

Poor - replacement required

Additional comments:

Checklist: Surface Water (SW)

Section 18: SW System - UV Disinfection

Section is Not Applicable to this System.

Are the UV units certified to NSF Standard 55 Class A? Yes No N/A

Does the unit provide a minimum dosage of 40 mJ/cm²? Yes No N/A

What is the make-model-brand name of the UV units?

How many UV units are used?

Is the UV disinfection system equipped with Uninterruptible Power Supply (UPS) for low power events like brown-outs? Yes No N/A

Is the system equipped with a minimum 5 micron cartridge pre-filter or another type of pre-filter, such as iron filter? Yes No N/A

Have the units been installed in the right orientation (horizontal or vertical) based on the manufacturer's specifications? Yes No N/A

Is there a by-pass around the UV disinfection system that could allow un-disinfected water to be sent to distribution or taps? Yes No N/A

Are these by-passes tagged or labelled? Yes No N/A

Are there procedures for activating by-passes including DWO notification? Yes No N/A

Are there isolation valves before and after the UV units? Yes No N/A

Are proper procedures being followed to clean the sleeve and sensor? Yes No N/A

How often are the sleeves cleaned?

Are UV bulbs being changed at least annually? Yes No N/A

Is there a spare UV bulb available? (i.e. "shelf spare") Yes No N/A

Are the UV sensors being calibrated once per year, or as per manufacturer's requirements, or when an unresolved alarm occurs? Yes No N/A

UV system or sensor checked by the equipment supplier in the last year? Yes No N/A

Has Operator or supplier had to replace sensors? Yes No N/A

What is the usual UVT level (%), or at the time of the inspection?

Have the UV units experienced ongoing or frequent alarms suggesting an issue with the water quality (UVT level) or the sensor? Yes No N/A

Does the UV unit have an automatic shut-off (i.e. solenoid valve) that shuts off the water supply if there is a UV alarm? Yes No N/A

How frequent are UV alarms? no alarms (haven't had any) infrequent (i.e. bulb change only)

frequently (i.e. weekly) - need to clean sleeve or sensor issues

constantly (i.e. daily or anytime UV runs) - cleaning only resolves issues for a short period of time

What kind of alarms? N/A visual audible sent to computer sent to cellphone
Check all that apply. other

Checklist: Surface Water (SW)

Section 18: SW System - UV Disinfection

Section is Not Applicable to this System.

What is the average age (years) of the UV equipment?

UV

What is the general condition of the UV equipment?

Good

Fair - nearing end of useful life

Poor - replacement required

Additional comments:

Checklist: Surface Water (SW)

Section 19: SW System - Treated Water Storage in Aboveground Tank(s)

Section is Not Applicable to this System.

What type of tank is used to store treated water before it is distributed?

(Note: Pressure or hydropneumatic tanks with a single inlet/outlet pipe meant to reduce pump cycling are not considered storage tanks.)

flow-through pressurized tank/s atmospheric tank/s (poly) other:

What is the total volume of the tank/s? Units.

How many tanks? List # and each volume.

For atmospheric tanks:

What is the total volume of the tank/s based on the lowest operating level? Units.

Are the tanks in series (flow through one to another) or parallel (separate flows)?

single (1) tank multiple tanks tanks in series tanks in parallel N/A

What is the tank material?

polyethylene (PE) fibreglass (FRP)

epoxy-coated steel other:

Is the tank material or interior tank coating certified or approved for use in a potable water system? (i.e. NSF 61 or FDA approved)

Yes No N/A

What is the purpose of the water storage?

to meet peak demands chlorine contact time

Check all that apply.

fire protection other

Storage tanks sized to meet peak demands?

Yes No N/A

Storage tanks sized for at least 20 minutes chlorine contact time?

Yes No N/A

don't know

Storage tanks sized for fire protection?

Yes No N/A

If no for fire protection, do the tanks provide at least 1 Average Day Demand (ADD) and less than 3 ADD of storage?

Yes No N/A

What is the peak hourly flow rate? Units.

What is the hydraulic retention time at the estimated peak hourly flow rate when the tanks are at their lowest operating level (atmospheric tanks) or at their normal full volume (pressurized tanks)?

(Divide the volume from above by the peak hourly flow rate from above. Convert to same units.)

Retention time: (i.e. 2.50 hours or 150 minutes)

Checklist: Surface Water (SW)

Section 19: SW System - Treated Water Storage in Aboveground Tank(s)

Section is Not Applicable to this System.

The following table is taken from the "Filtration and Disinfection Log Reduction Credits" document from the Office of Drinking Water. This document is available online.

Table 1: Baffling Factors for Water Storage Systems.

Storage System Configuration:	Baffling Factor:	(This System)
Hydropneumatic tank with single inlet and outlet	no contact time	<input type="checkbox"/> Yes <input type="checkbox"/> No
Single unbaffled retention tank; or multiple tanks in parallel	0.1	<input type="checkbox"/> Yes <input type="checkbox"/> No
Two storage tanks in series	0.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
Three or more storage tanks in series	0.3 - 0.4	<input type="checkbox"/> Yes <input type="checkbox"/> No
Baffled tank or baffled reservoir cell	0.3 - 0.6	<input type="checkbox"/> Yes <input type="checkbox"/> No

Based on the above table, what is the baffle factor for this system:

What is the effective chlorine contact time?
(Multiply the retention time from previous page by the baffle factor from above.)

Effective chlorine contact time: (i.e. 25 minutes)

Storage tanks sized for at least 20 minutes effective chlorine contact time? Yes No N/A
 don't know

For atmospheric tanks, are the tanks equipped with level sensors for pump operation? Yes No N/A
 floats pressure sensors ultrasonic sensing system other (contact probes)

Are the tanks accessible for visual inspection? Yes No N/A

Are the tanks equipped with access or inspection hatches? Yes No N/A

Are the tanks regularly inspected? Yes No N/A

Last inspected or inspection frequency:

Are the tanks regularly cleaned and disinfected? Yes No N/A

Last cleaned or cleaning frequency:

Checklist: Surface Water (SW)

Section 19: SW System - Treated Water Storage in Aboveground Tank(s)

Section is Not Applicable to this System.

Are the inlet and outlet pipes located to minimize the chance of water short-circuiting through the tanks and leading to water stagnation? Yes No N/A

Is the pump intake line properly sealed and located at least 150 mm (6 inches) above the bottom of the tank? Yes No N/A

Can individual tanks be isolated for inspection or maintenance?; without interrupting water service or interrupting chlorine contact time. Yes No N/A

Are pumps connected to multiple tanks to allow for isolation? Yes No N/A

Are all openings sealed watertight? Yes No N/A

Are all vents, overflows, and drain lines equipped with screens? Yes No N/A

Are all vents, overflows, and drain lines located to avoid backflow or run-off? Yes No N/A

If the tanks are located outside the building:

Are the tanks protected from vandalism (fenced area or locked hatches)? Yes No N/A

Are the tanks protected from direct sunlight (opaque or covered?) Yes No N/A

What is the average age (years) of the storage equipment?

Storage

What is the general condition of the storage equipment? Good
 Fair - nearing end of useful life
 Poor - replacement required

Additional comments:

Checklist: Surface Water (SW)

Section 20: SW System - Treated Water Storage Inground Reservoir or Buried Tank(s)

Section is Not Applicable to this System.

What type of storage system is used to store treated water before it is distributed?

inground concrete reservoir buried tank/s other:

What is the total volume of the reservoir/s or tank/s? Units.

How many reservoir cells or tanks? List # and each volume.

What is the total storage volume based on the lowest operating level? Units.

Are the cells or tanks in series (flow through one to another) or parallel (separate flows)?

single (1) cell multiple cells cells in series cells in parallel N/A

What is the reservoir or tank material? concrete fibreglass (FRP)
 polyethylene (PE) other:

Is the reservoir or interior tank coating certified or approved for use in a potable water system? (i.e. NSF 61 or FDA approved) Yes No N/A

What is the purpose of the water storage? to meet peak demands chlorine contact time
Check all that apply. fire protection other

Reservoir or tanks sized to meet peak demands? Yes No N/A

Reservoir or tanks sized for at least 20 minutes chlorine contact time? Yes No N/A
 don't know

Reservoir or tanks sized for fire protection? Yes No N/A

If no for fire protection, does it provide at least 1 Average Day Demand (ADD) and less than 3 ADD of storage? Yes No N/A

What is the peak hourly flow rate? Units.

What is the hydraulic retention time at the estimated peak hourly flow rate when the cells/ tanks are at their lowest operating level?
(Divide the volume from above by the peak hourly flow rate from above. Convert to same units.)

Retention time: (i.e. 2.50 hours or 150 minutes)

Checklist: Surface Water (SW)

Section 20: SW System - Treated Water Storage Inground Reservoir or Buried Tank(s)

Section is Not Applicable to this System.

The following table is taken from the "Filtration and Disinfection Log Reduction Credits" document from the Office of Drinking Water. This document is available online.

Table 1: Baffling Factors for Water Storage Systems.

<u>Storage System Configuration:</u>	<u>Baffling Factor:</u>	<u>(This System)</u>
Hydropneumatic tank with single inlet and outlet	no contact time	<input type="checkbox"/> Yes <input type="checkbox"/> No
Single unbaffled retention tank; or multiple tanks in parallel	0.1	<input type="checkbox"/> Yes <input type="checkbox"/> No
Single unbaffled cell reservoir, inlet and outlet at opposite ends	0.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
Two storage tanks in series	0.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
Two cell reservoir, inlet and outlet in same cell	0.2	<input type="checkbox"/> Yes <input type="checkbox"/> No
Two cell reservoir, inlet and outlet at opposite ends of separate cells	0.3	<input type="checkbox"/> Yes <input type="checkbox"/> No
Three or more storage tanks in series	0.3 - 0.4	<input type="checkbox"/> Yes <input type="checkbox"/> No
Baffled tank or baffled reservoir cell	0.3 - 0.6	<input type="checkbox"/> Yes <input type="checkbox"/> No

Based on the above table, what is the baffle factor for this system:

What is the effective chlorine contact time?

(Multiply the retention time from previous page by the baffle factor from above.)

Effective chlorine contact time: (i.e. 25 minutes)

Reservoir or tanks sized for at least 20 minutes effective chlorine contact time?

Yes No N/A
 don't know

Is the reservoir or tanks equipped with level sensors for pump operation?

Yes No N/A

floats pressure sensors ultrasonic sensing system other (contact probes)

Are the cells or tanks accessible for visual inspection?

Yes No N/A

Are the cells or tanks equipped with access or inspection hatches?

Yes No N/A

Are the cells or tanks regularly inspected?

Yes No N/A

Last inspected or inspection frequency:

Are the cells or tanks regularly cleaned and disinfected?

Yes No N/A

Last cleaned or cleaning frequency:

Checklist: Surface Water (SW)

Section 20: SW System - Treated Water Storage Inground Reservoir or Buried Tank(s)

Section is Not Applicable to this System.

Are the inlet and outlet pipes located to minimize the chance of water short-circuiting through the cells or tanks and leading to water stagnation? Yes No N/A

Are there at least two isolatable cells or tanks with a valved interconnection? Yes No N/A

Can individual cells or tanks be isolated for inspection or maintenance?; without interrupting water service or interrupting chlorine contact time. Yes No N/A

Is pumping capacity available in at least two cells or tanks to allow water supply to be maintained when cleaning the reservoir cells or tanks? Yes No N/A

Are access hatches curbed and sealed watertight? Yes No N/A

Are all openings sealed watertight? Yes No N/A

Are pipe entries into the reservoir or tanks sealed watertight to prevent contamination? (i.e. LinkSeal or cast-in-place sleeve) Yes No N/A

Do any floor drains or wastewater pipes pass over or through the reservoir? Yes No N/A

Yes - floor drain Yes - wastewater Yes - other

If yes, are these pipes encased in concrete? Yes No N/A

Are pipes through walls protected from differential settling? (i.e. flexible joints/ ball-and-socket joints) Yes No N/A

Are all vents, overflows, and drain lines equipped with screens? Yes No N/A

Is the reservoir or tank equipped with a screened air vent? (i.e. gooseneck or inverted J-pipe) Yes No N/A

Is the reservoir or tank equipped with an adequately sized screened overflow that discharges to the ground? Yes No N/A

Are all vents, overflows, and drain lines located to avoid backflow or run-off? Yes No N/A

Is the reservoir or tank protected from contamination from run-off or spills into the water treatment plant? Yes No N/A

Is the reservoir or tank located at least 15 m away from sewer system components such as sewer lines or holding tanks? Yes No N/A

If the reservoir extends beyond the footprint of the water treatment plant building, is the reservoir roof adequately sloped and drained? Yes No N/A

Is the reservoir or tank site graded to drain away? Yes No N/A

If the cells or tanks are located outside the building:

Are the cells or tanks protected from vandalism (fenced area or locked hatches)? Yes No N/A

Please attach a schematic of reservoir cells or tanks showing the inlet, outlet, pump locations, baffles. Attachment/s

Checklist: Surface Water (SW)

Section 20: SW System - Treated Water Storage Inground Reservoir or Buried Tank(s)

Section is Not Applicable to this System.

What is the average age (years) of the storage equipment?

Storage

What is the general condition of the storage equipment?

Good

Fair - nearing end of useful life

Poor - replacement required

Additional comments:

Checklist: Surface Water (SW)

Section 21: SW System - Distribution Pumping (if not relying on raw pump)

Section is Not Applicable to this System.

**Pump sizes and flow rates (capacities) can be estimated; units can be given in HP.
If unknown, fill out what information is available.**

LIST ALL PUMPS IN THE SYSTEM: (write Units)

	Pump Name or Description:	Size: (HP)	Output Pressure: (psi or kPa)	Size: Total Dynamic Head TDH (feet or meters)	Size: Flow Rate (L/s or USGPM)
Pump #1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Pump #2	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Pump #3	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Pump #4	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Pump #5	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>
Pump #6	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>	<input type="text"/>

Are the distribution pumps controlled by the distribution system pressure? Yes No N/A

What is the pressure set-point (psi) for the distribution header?

System able to meet peak water demands with adequate at-tap pressures? Yes No N/A

Does the pumping system have adequate capacity to meet demands? Yes No N/A

What is the total capacity of the pumping system? Units.

What is the peak or maximum day demand on the water system? Units.

Are there any engine-driven pumps with fuel? Yes No N/A

If yes, is there proper containment for the fuel to prevent contamination? Yes No N/A

Is the distribution pumping system equipped with appropriate check valves, shut-off valves, pressure gauges, pressure relief or air/ vacuum relief valves? Yes No N/A

Are taps or connections to mechanical equipment, where there is potential backflow of hazardous substances, protected with an air gap or appropriate backflow prevention device?
(i.e. devices such as washdown sink, hose bib, boiler, heat exchanger, etc.) Yes No N/A

Checklist: Surface Water (SW)

Section 21: SW System - Distribution Pumping (if not relying on raw pump)

Section is Not Applicable to this System.

What is the average age (years) of the pumping equipment?

Pumping

What is the general condition of the pumping equipment?

Good

Fair - nearing end of useful life

Poor - replacement required

Additional comments:

Checklist: Surface Water (SW)

Section 22: SW System - Distribution System (not intended for a building plumbing system)

Section is Not Applicable to this System.

Are there up-to-date maps of the distribution system indicating locations of:
service connections, valves, flush-outs, hydrants, etc... Yes No N/A

What types of watermain materials exist in the distribution system? Check all that apply.

PVC (polyvinyl chloride) AC (asbestos cement) iron - cast
 HDPE (high-density polyethylene) other iron - ductile

Are watermains adequately sized?
(i.e. 50 mm (2 inch) if no fire protection, 150 mm (6 inch) if fire protection) Yes No N/A

Are watermains adequate pressure rating?
(i.e. minimum 100 psi or 690 kPa) Yes No N/A

Is adequate at-tap pressure of 30-to-60 psi (200-to-400 kPa) maintained
in the distribution system at all times? Yes No N/A

Does the system have a watermain replacement or renewal strategy? Yes No N/A

Are a set of standards available for new construction?;
reference to Manitoba Water Services Board (MWSB) or
City of Winnipeg standard construction specifications or similar,
to ensure proper materials and construction procedures are followed? Yes No N/A

Have minimum design and construction standards been established for
new service connections? Yes No N/A

Is all new construction inspected to meet these requirements? Yes No N/A

Are all new watermains, service lines, and related equipment CSA or NSF
certified for use in potable water systems? Yes No N/A

Are all new watermains and water lines disinfected as per AWWA, MWSB,
or City of Winnipeg disinfection standards including
confirmatory bacterial testing before placed into service? Yes No N/A

If piped sewer is present, is there at least 3 m (10 feet) horizontal distance
separation between watermains and sewer mains, where they run parallel? Yes No N/A

If watermains are closer than 3 m (10 feet) from sewer mains
are the watermains vertically above the sewer mains? Yes No N/A

If yes, do the watermains have a vertical distance separation at least
0.45 m (18 inches)? Yes No N/A

If watermains cross: sewer mains, raw or other non-potable water lines,
oil or gas pipelines, etc... is the watermain above at least 0.45 m (18 inches)? Yes No N/A

Are watermains protected from damage by being buried with at least
2.4 m (8 feet) cover for year-round systems or 0.45 m (18 inches) for seasonal? Yes No N/A

Has the distribution system had any issues with frozen service lines? Yes No N/A

Are "bleeder" lines or valves used to prevent frozen service lines?
(These are used in some northern communities.) Yes No N/A

Checklist: Surface Water (SW)

Section 22: SW System - Distribution System (not intended for a building plumbing system)

Section is Not Applicable to this System.

Are water service connections metered?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	<input type="checkbox"/> some connections
Are water losses kept under 15% to reduce water production requirements?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	<input type="checkbox"/> don't know
What is the estimated % of water loss for this water system?	% <input type="text"/> <input type="checkbox"/> don't know

Are dead ends supplied with hydrants or flush-outs?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Are valves and hydrants regularly inspected and exercised?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Are there adequate number of valves, hydrants, and flush-outs to isolate and flush the system? Drain the system if seasonal.	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Are watermains and distribution lines flushed at least annually?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Flushing frequency:	<input type="text"/>

Are there any known lead service lines present in the system?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
	<input type="checkbox"/> don't know
If found, has a strategy been developed to remove lead service lines?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is there a cross connection and backflow prevention program?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Are connections where there is potential for backflow of hazardous materials protected by backflow prevention assembly or air gap? (i.e. potential locations include agricultural operations, wastewater treatment plants, etc.)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Are connections from heat exchangers prohibited from being connected to the water supply? (i.e. prohibited from returning water to the potable water line)	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is there equipment within the distribution system with a high water table or potential to be flooded? Includes: manholes with potable water equipment, underground meter/ valve pits	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Are all manholes with potable water equipment or underground meter/ valve pits or similar installations, watertight and free from non-potable water intrusion?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Are air relief valves within the distribution system located aboveground?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Checklist: Surface Water (SW)

Section 22: SW System - Distribution System (not intended for a building plumbing system)

Section is Not Applicable to this System.

Are there periodic changes in treated water quality in the distribution system? Yes No N/A

Do the distribution system bacterial records suggest it is well operated and well maintained? Yes No N/A

Do the distribution system chlorine residual records suggest it is well operated and well maintained? Yes No N/A

Do the records suggest any specific water quality issues? Yes No N/A

If yes, please explain:

What is the average age (years) of the distribution system?

Distribution

What is the general condition of the distribution system? Good
 Fair - nearing end of useful life
 Poor - replacement required

Additional comments:

Checklist: Surface Water (SW)

Section 23: SW System - Bulk Fill/ Truck Fill/ Pail Fill

Section is Not Applicable to this System.

Does the bulk/ truck/ pail fill have appropriate backflow prevention? Yes No N/A

If yes, what type of backflow prevention is used? Check all that apply. other:

backflow prevention assembly: double check valve plus siphon break

backflow prevention assembly: reduced pressure principle

hose bib vacuum breaker (only allowed on pail fill)

air gap

Is the station equipped with appropriate signage indicating that only drinking water containers are allowed to be filled? Yes No N/A

Is access to the fill station limited? (i.e. locked, FOB electronic key, card swipe) Yes No N/A

Is there a flow meter that monitors water usage (volumes) at the fill station? Yes No N/A

Is there a separate or dedicated pump for the fill station? Yes No N/A

No - combo pump

Is the hose length such that it is off the ground at least 1 m (3 feet)? Yes No N/A

What is the average age (years) of the fill station equipment?

Fill Station

What is the general condition of the fill station?

Good

Fair - nearing end of useful life

Poor - replacement required

Additional comments:

Checklist: Surface Water (SW)

Section 24: SW System - Operation and Maintenance (O&M)

Is the water system checked on a daily basis when it is operating?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
How many hours per day does the water treatment system run?	<input style="width: 100%; height: 20px;" type="text"/>
How many hours per day does the pump/s run?	<input style="width: 100%; height: 20px;" type="text"/>
How many hours per day does the operator spend on the water system?	<input style="width: 100%; height: 20px;" type="text"/>
<hr/>	
Is there a back-up operator for the water system?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
<hr/>	
Has the water treatment facility and/or water distribution system been classified under the operator certification program?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
water treatment facility: <input type="checkbox"/> small system <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4	
water distribution system: <input type="checkbox"/> small system <input type="checkbox"/> 1 <input type="checkbox"/> 2 <input type="checkbox"/> 3 <input type="checkbox"/> 4	
Have any operators been classified under the operator certification program?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
<hr/>	
Is there an up-to-date emergency contact list?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is there a list of critical water users (i.e. hospitals, personal care homes, schools) to be contacted during an emergency?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is there a procedure for emergency notification of water users if a water quality issue occurs or there is an advisory?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is there a plan for obtaining water on an emergency basis?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
<hr/>	
If the system is operated on a seasonal basis, are Office of Drinking Water procedures followed for start-up and shut-down of the water system?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
<hr/>	
Have written procedures been developed for key activities such as: backwashing filters, watermain repairs, etc?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is there an up-to-date process schematic or water system drawing available?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is there an up-to-date O&M manual available with equipment specifications, product sheets, supplier information, O&M instructions, troubleshooting?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Has the operator received training from the equipment supplier on O&M of critical water system components such as treatment equipment, controls, etc?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Is there a maintenance log for recording preventive maintenance, repairs, etc?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Are water system records kept for a minimum of 2 years?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
<hr/>	
Are instruments regularly calibrated, in particular, water testing equipment to ensure reliable test results?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
Are extra bacterial sample bottles kept on-hand for emergency purposes?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A
<hr/>	
Is the system in compliance with the sampling parameters and frequency listed in the Operating Licence?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A

Checklist: Surface Water (SW)

Section 24: SW System - Operation and Maintenance (O&M)

Additional comments: