

Water Management Program Summary

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1.0 Purpose and Scope

Reed College has implemented a water management program to ensure proper maintenance and care of water infrastructure campus wide and to provide clean, safe water to our community. In collaboration with NALCO Water, the water management program prescribes preventative maintenance practices, such as hot water heater flushing, as well as a rigorous monitoring and sampling schedule of potable and non-potable water throughout the Reed campus.

For plan specifics including system schematics, monitoring and sampling schedule, and historical data please reach out to the [Environmental Health and Safety Department](#).

2.0 Responsibilities of Positions

2.1 Environmental Health and Safety Department (EHS)

EHS oversees the overall Water Management Program including compliance and reporting within the organization or to outside parties. EHS provides executive oversight and is responsible for contacting the appropriate stakeholders in the event of suspected or confirmed Legionnaires' case.

2.2 Facilities Management

Facilities Management is responsible for the implementation of the Water Management Plan. This includes maintenance, monitoring, and operations of systems outlined within the document.

2.3 Building Services

Building Services is responsible for maintaining the cleanliness of potable water sources, including the cleaning of sinks, bathing showers, and water fountains.

3.0 Plan Action Items

3.1 Preventative Maintenance

Facilities maintenance and building services work collaboratively to maintain a clean and functioning water system. The following list of tasks are performed at least on an annual basis, but often more frequently on specific systems.



- Inspection and certification that all devices and gauges are functioning properly.
- Flushing and blow down of hot-water systems on a regular basis, after periods of extended inoperation (such as vacant dormitories and other lodging) or after a non-compliant sample has been identified (see [Remediation](#) for more details).
- Flushing of cold-water systems, including eyewashes and safety showers.
- Regular cleaning and disinfecting of potable water discharge points such as bathing shower fixtures, sinks, and water fountains.
- Adding disinfectant to evaporative cooling systems.

3.2 Monitoring and Sampling

Regular monitoring and sampling of water systems is conducted in order to certify proper mechanical function as well protection from waterborne pathogens and other hazards. Specific criteria vary between systems and locations, but in general the following threshold values are utilized.

- Water Temperature
 - Cold Water Systems
 - Less than 77 degrees Fahrenheit at all points Cold Water Systems
 - Hot Water Systems (monitored at one of three locations).
 - Greater than 140 degrees Fahrenheit at the supply point (tank).
 - 120-125 degrees Fahrenheit at the nearest faucet discharge.
 - 115-120 degrees Fahrenheit for return water.
- Disinfectant Residual
 - 0.5 – 2.0 ppm free Chlorine depending on system specifications.
- Legionella Culture Test
 - Less than 1 Colony Forming Unit per milliliter of water sampled.
- Cooling towers and evaporative cooling systems will additionally have the following parameters monitored
 - pH
 - Limit of 8-9
 - Conductivity
 - 550 – 650 micro-ohms
 - Aerobic Bacterial Growth
 - Less than 10,000 Colony Forming Units per milliliter of water sampled
- Lead (Pb)*
 - Less than 0.015 milligrams per liter of water sampled
- Copper (Cu)*
 - Less than 1.3 milligrams per liter of water sampled
- Iron (Fe)*
 - Less than 0.3 milligrams per liter of water sampled



- The Swimming pool is monitored and maintained by the Sports Center staff. Water chemistry is monitored regularly and altered as needed. Sampling for Legionella is conducted semiannually.

*Sampling of heavy metals done independently by EHS

3.3 Remediation

Should a system or sample fail the criteria listed above one or more remediation efforts will take place. Affected parties will be notified after a known exposure to a failed quality standard and prior to any disruption to normal water access.

- System Flushing and Blowdown
 - System wide flushing will be conducted in the event of a failed temperature check, lack or over prevalence of disinfectant residual, detection of Legionella, high bacterial indicator count, or any other failed parameter.
- Outlet Cleaning and Disinfecting
 - Cleaning of discharge points will be conducted in the event of a detection of Legionella or a high bacterial count. Cleaning may be restricted to only the affected outlet if there is no indication of systemic failure.
- Thermal Shock
 - Remedial Thermal Shock
 - Return temperature of hot water systems should be increased to be at a minimum of 124 degrees Fahrenheit. The system should then be run and flushed for 30 minutes.
 - Emergency Thermal Shock
 - Maintain storage tank water temperature at 158 degrees Fahrenheit for 24 hours while progressively flushing each outlet (including sinks, showers, and drain valves) for at least 20 minutes.
- Chemical Shock
 - Remedial Chemical Shock
 - Return temperature of hot water systems should be increased to be at a minimum of 124 degrees Fahrenheit.
 - Add chlorine to the system at the distribution point so that a free chlorine level of 2 – 4 milligrams per liter is achieved throughout the system.
 - Maintain chlorine levels for at least 4 but up to 24 hours.
 - Flush the system with fresh water.
 - Emergency Chemical Shock
 - Inject chlorine into the system at the distribution point, adding enough to achieve 50 milligrams per liter of free chlorine residual throughout the system.



- Flush all outlets until a noticeable odor is present.
- Verify the chlorine residual at the outlet.
- Maintain chlorine levels for 24 hours (alternatively, maintain 200 milligrams per liter of free chlorine residual for 3 hours).
- Flush the system with fresh water
- Fixture/Pipe replacement
 - Sampling strategy based on the EPA's "Drinking Water Requirements for States and Public Water Systems. Testing Schools and Childcare Centers for Lead in the Drinking Water."
 - Remediation actions include but are not limited to:
 - Cleaning of sink aerator debris
 - Replacement of fixtures
 - Replacement of piping

4.0 References

- 3Ts for Reducing Lead in Drinking Water in Schools and Child Care Facilities (2018) – Environmental Protection Agency Office of Ground Water and Drinking Water
- Water Management Program Prepared for Reed College – Nalco Water, An Ecolab Company



Appendix 1:

Exhibit 4.2 Sample Strategy Flowchart (*3Ts for Reducing Lead in Drinking Water in Schools: Revised Technical Guide. EPA Ground Water and Drinking Water (2007)*)



Exhibit 4.2: Sample Strategy Flowchart

