CSN Procedure	Facilities Management
Category: Environmental Health and Safety	**Effective Date: 08/21/2025**

Water Management Plan

I. PURPOSE

The purpose of this Water Management Plan is to establish a systematic approach to monitor, detect, and respond to the presence of *Legionella* and other pathogens in the potable and non-potable water systems at the College of Southern Nevada (CSN). This plan aims to reduce the risk of *Legionella* and other pathogens contamination by providing clear procedures for sampling, interpreting results, and implementing corrective actions when *Legionella* and other pathogens are detected. Implementation of the Water Management Plan improves water safety, increases operational efficiency, and has the potential to optimize cost while providing alignment with ANSI/ASHRAE Standard 188: *Legionellosis: Risk Management for Building Water Systems*.

II. SCOPE

This plan applies to all potable and non-potable water systems at CSN campuses, including but not limited to:

- Potable water supplied to buildings
- Interior plumbing systems
- Drinking fountains and bottle fillers
- Ice machines
- Showers and sinks used for hygienic purposes
- Dental Unit Waterlines (DUWL)
- Cooling towers
- Decorative fountains
- Laboratory water systems

III. DEFINITIONS

- **Legionella**: A genus of bacteria found in freshwater environments. Certain species, such as *Legionella pneumophila*, can cause Legionnaires' disease, a severe form of pneumonia.
- **Legionnaires' Disease**: A respiratory infection caused by inhaling aerosolized water droplets containing *Legionella* bacteria.
- **Bacteria:** A member of a large group of unicellular microorganisms which have cell walls but lack organelles and an organized nucleus, including some that can cause disease.
- **Potable Water**: Water that is safe for human consumption and meets State and Federal drinking water quality standards.
- **Non-Potable Water**: Water that is not safe for human consumption.
- **Sampling**: The process of collecting water samples for laboratory testing to detect the presence and concentration of *Legionella*.
- **CFU/L**: Colony-forming units per liter; the unit used to quantify *Legionella* and *Bacterium* concentration in water.
- **Action Level**: The concentration of *Legionella* at which specific mitigation steps are required, generally ≥1 CFU/mL (or ≥1,000 CFU/L).
- **Remediation Action**: Steps taken to remediate the system when *Legionella* is detected above the action level, such as flushing, disinfection, or system modification.
- **Water Management Team (WMT)**: A designated group responsible for implementing, maintaining, and reviewing the Water Management Plan. Includes representatives from Facilities Management, Environmental Health & Safety (EH&S), and other stakeholders.

IV. PROCEDURE

A. Roles and Responsibilities

1. Environmental Health & Safety (EH&S)

   - Manage Water Management Plan (WMP) documentation and revision.
   - Coordinate sampling events and laboratory analysis.
   - Interpret results and initiate remediation protocols.
   - Communicate with campus stakeholders (e.g., CSN Leadership).
   - Communicate with public health authorities, if needed.

2. Facilities Management

   - Perform system flushing, disinfection, and corrective maintenance.
   - Maintain system schematics and plumbing infrastructure maps.
   - Ensure proper function and operation of potable and non-potable water fixtures and systems.

3. Water Management Team (WMT)

   - The WMT will evaluate the necessary hazard controls and validation strategies to ensure the water systems at the respective campuses minimize any hazard to students, faculty, employees and visitors (*See Appendix A for a current roster of WMT members*).

4. Campus Stakeholders (e.g., CSN Leadership)

   - Support access to sampling locations.
   - Assist with communication to building occupants, if needed.
   - Encourage water use in underutilized buildings.

B. System Inventory

As part of this Water Management Plan, a comprehensive inventory of the building water systems at the College of Southern Nevada shall be conducted and maintained (*See Appendix B for the Inventory of System Components*). This inventory includes identifying all water sources, treatment systems, storage tanks, heaters, distribution lines, outlets, and endpoints where water is used by occupants. Special attention will be given to areas with increased risk for *Legionella* growth, such as devices that generate aerosols (e.g., showers, fountains, ice machines).

The inventory will include system process flow diagrams and will be reviewed and updated at least annually or whenever significant modifications occur (*See Appendix C for Process Flow Diagrams*). A complete and accurate system inventory is essential for determining sampling points, assessing risk, and implementing targeted control measures.

C. Risk Assessment

A risk assessment will be conducted as part of the Water Management Plan to evaluate the potential for *Legionella* growth and exposure within the drinking water systems at the College of Southern Nevada (*See Appendix D for a summary of the System Risk Assessment*). This assessment will identify areas of elevated risk based on factors such as water temperature fluctuations, stagnation potential, presence of aerosol-generating devices, population vulnerability, and history of water quality issues. Each building and its associated water systems will be evaluated individually to prioritize monitoring and control efforts. The findings will guide the selection of control measures, sampling locations, and response strategies. The risk assessment will be reviewed annually and updated whenever significant changes to system design, usage patterns, or occupancy occur.

D. Sampling Plan

1. Routine Sampling

- **Frequency**: At minimum, quarterly sampling of representative potable water fixtures shall be

conducted. Sampling of non-potable water systems including cooling towers, decorative fountains, and laboratory water systems shall be conducted on an annual basis. High-risk areas (e.g., buildings serving immuno-compromised populations or those with complex plumbing) may be sampled more frequently (*See Appendix E for Sampling Criteria Table*).

- **Sampling Locations**:
  Samples will be collected from:
  - Building inlets (point-of-entry)
  - Representative distal outlets (e.g., showers, sinks, drinking fountains, bottle fillers)
  - Locations with water heaters and storage tanks
  - Locations with dental unit waterlines
  - Locations with ice machines
  - Locations with cooling towers

- **Sample Collection Method**:
  - Follow CDC and industry best practices (e.g., ASHRAE Guideline 12-2020) for *Legionella* sampling.
  - Use sterile bottles containing sodium thiosulfate.
  - Record temperature and chlorine residual at each sample location, where applicable.

2. Triggered (Non-Routine) Sampling

Triggered sampling will occur in response to any of the following:
- Clinical case of Legionnaires' disease potentially linked to the facility.
- Detection of *Legionella* or other pathogens in a nearby system.
- Following construction, renovation, or long-term vacancy of buildings.
- After system shutdowns, significant pressure losses, or water quality complaints.

E. Response Actions

1. Interpretation of Laboratory Results

- **< 1 CFU/mL (1,000 CFU/L):**
  - Acceptable. No action required beyond routine monitoring.
- **≥ 1 CFU/mL but < 10 CFU/mL (1,000–10,000 CFU/L):**
  - Resample to confirm result.
  - Investigate system conditions (e.g., stagnation, temperature, residual disinfectant).
  - Consider flushing and localized disinfection.
- **≥ 10 CFU/mL (≥10,000 CFU/L):**
  - Initiate immediate remediation action.
  - Conduct full system flushing and disinfection.
  - Provide alternate water sources (e.g., bottled water), if risk is high.
  - Notify affected departments and stakeholders.
  - Resample after corrective actions to confirm remediation.

2. Remediation Actions

- System flushing: Open all outlets to flush stagnant water.
- Temperature control: Maintain hot water above 120°F (49°C) and cold water below 77°F (25°C) where feasible.
- Disinfection: Shock chlorination or thermal disinfection performed by qualified personnel (*See Appendix F for System Specific Remediation Protocols*).
- Fixture replacement or cleaning: Remove aerators, clean, and disinfect outlets.
- Infrastructure modifications: Address dead ends, low-flow zones, or underused areas.

3. Communication Protocol

- EH&S will notify Facilities Management immediately upon positive detection above action

levels to initiate remediation actions.
- If a clinical case is confirmed or suspected, coordinate with Southern Nevada Health District (SNHD).
- Communicate findings and actions to building occupants when relevant.

F. Documentation and Review

- Sampling records, lab reports, and corrective action logs will be maintained for a minimum of **five (5) years**.
- The WMP will be reviewed **annually** and revised as needed based on:
  - System changes or building modifications
  - New guidance from CDC, ASHRAE, or local health departments
  - Past test results and trends
- Audit of WMP effectiveness will be conducted by EH&S in collaboration with Facilities Management annually

V. AUTHORITY AND CROSS REFERENCE LINKS

ANSI/ASHRAE Standard 188: *Legionellosis: Risk Management for Building Water Systems*. *https://www.ashrae.org/technical-resources/standards-and-guidelines/guidance-on- reducing-the-risk-of-legionella*

Water Management Program Template: *Colorado Hospital Association, https://cha.com/wp-content/uploads/2019/03/Water-Management-Program-Template.pdf*

Legionnaires' Disease eTool: Water Sampling Guidelines: *United State Department of Labor, https://www.osha.gov/dts/osta/otm/legionnaires/sampling.html#Protocol*

VI. APPENDIXES

Appendix A – Water Management Team

Appendix B – Inventory of System Components

Appendix C – Process Flow Diagrams

Appendix D – System Risk Assessment

Appendix E – Sampling Criteria Table

Appendix F – Remediation Protocols

Appendix A

Water Management Team

Name	Title	Functional Area	Team Role	Email
Albert Rodriguez	Director of Technical Services	HVAC and Electrical	Member	albert.rodriguez@csn.edu
Allen Berndsen	Maintenance Manager	Facilities Management	Member	allen.berndsen@csn.edu
Carey Sedlacek	EH&S Director	EH&S	Chairman	carey.sedlacek@csn.edu
Dan Brown	Plumber III	Facilities Management	Member	daniel.brown@csn.edu
Daniel Gonzalez	Custodial Supervisor	Custodial Services	Member	daniel.gonzalez@csn.edu
Eva Berik	EH&S Specialist	EH&S	Member	eva.berik@csn.edu
Paul Powers	Operations Manager of Technical Services	Ice Machines, Closed Loop, Cooling Towers	Member	paul.powers@csn.edu
Steven Ross	EH&S Asst. Director	EH&S	Member	steven.ross@csn.edu
Teresa Heben	Program Officer	Work Control	Member	teresa.heben@csn.edu
Brad Jensen	Interim Senior Associate VP	Facilities Management	Member	brad.jensen@csn.edu
Benpeng Lin	Consultant	Independent Expertise	Facilitator	blin@dominion-env.com
Benjamin Bojda	Vice President	Independent Expertise	Facilitator	bbojda@dominion-env.com

Appendix B

Inventory of System Components

This table summarizes the water features covered by this WMP in relation to the water processing steps used across the campus.

WEST CHARLESTON CAMPUS

Building Name	Building Code	Softeners	Water Heaters	Insta-Hot Water Heaters	Drinking Fountains	Ice Mach.	Kitchen/ FSE	Auto-Faucets	Sinks	Mop Sinks	Showers	Eye Wash/ Emergency Showers	Dental Water	RO	DI	Hydrotherapy Tubs
Proc. Step:		**3A**	**4A**		**6A**	**6A**		**6A/7A**				**6A/7A**	**7C**	**7D**		**7E**
Claude I. Howard	**A**	No	Yes	Yes	Yes	Yes (not for humans)	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes
Donald F. Stone	**B**	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	No	Yes	No
Interactive	**C**	No	Yes	No	Yes	No	No	No	Yes	Yes	No	No	No	No	No	No
Paul E. Meachan	**D**	No	Yes	No	Yes	No	No	No	Yes	Yes	No	No	No	No	No	No
Administration	**E**	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes (3rd Floor)	No	No	No	No	No
CSN/CLV Fire	**F**	No	Yes	No	Yes	No	No	Yes	Yes	Yes	No	No	No	No	No	No
Laboratory	**G**	No	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	No	No
General Science	**H**	No	Yes	No	Yes	Yes (not for humans)	No	No	Yes	Yes	No	No	No	No	No	No
Library	**I**	No	Yes	No	Yes	No	No	Yes	Yes	Yes	No	No	No	No	Yes	No
Ralph & Betty	**K**	No	Yes	No	Yes	No	No	Yes	Yes	Yes	No	Yes	No	No	No	No
The Loux Center	**L**	No	Yes	No	Yes	No	No	Yes	Yes	Yes	Yes	No	No	No	No	No
Police	**M**	No	Yes	No	No	Yes	No	No	Yes	Yes	No	No	No	No	No	No
Ken & Carolyn	**N**	No	Yes	No	Yes	No	No	No	Yes	Yes	No	Yes	No	No	No	No
KNPR Radio	**O**	No	Yes	No	Yes	NA	No	N/A (leased)	Yes	Yes	N/A (leased)	No	No	No	No	No
Facilities	**P**	No	Yes	No	Yes	Yes	No	No	Yes	Yes	No	Yes	No	No	No	No
Student Union	**U**	Yes	Yes	Yes (1, small)	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No	No

NORTH LAS VEGAS CAMPUS

Building Name	Bld Code	Water Softeners	Water Heaters	Insta-Hot Water Heaters	Ice Machines	Drinking Fountains	Kitchen/ FSE	Auto-Faucets	Sinks	Mop Sinks	Showers	Eye Wash/ Emergency Showers	RO	DI
Proc. Step:		**3A**	**4A**		**3B/6B**	**6A/6C**							**7D**	
A Building	**A**	No	Yes	No	No	Yes	No	No	Yes	Yes	No	No	No	No
B Building	**B**	No	Yes	No	No	No	No	No	Yes	Yes	No	No	No	No
C Building	**C**	Yes [1]	No [2]	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes	No
E Wing	**E**	No	Yes	No	No	Yes	Yes	No	Yes	Yes	No	No	No	No
F Building	**F**	No	No	Yes	No	Yes	No	No	Yes	Yes	No	No	Yes	No
G Building	**G**	No	Yes	No	No	Yes	No	No	Yes	Yes	Yes	No	No	No
H Wing – Horn	**H**	No	No	Yes	No	Yes	No	No	Yes	Yes	Yes	No	No	No
M0D1 – ECDL		No	Yes	No	No	Yes	No	No	Yes	No	No	Yes	No	No
M0D2 - Bio		No	Yes	No	Yes [4]	No	No	No	Yes	No	No	Yes	Yes	No
MOD3 - Events		No	No	No	No	No	No	No	No	No	No	No	No	No
MOD4 - EHS		No	No	No	No	No	No	No	No	No	No	No	No	No
MOD5 – CSN HS		No	No	No	No	No	No	No	No	No	No	No	No	No
MOD6 – CSN HS		No	No	No	No	No	No	No	No	No	No	No	No	No
MOD7 - Facilities		No	No	No	No	No	No	No	Yes	No	No	No	Yes	No
MOD8 - Facilities		No	No	No	No	No	No	No	No	No	No	No	No	No
MOD9 - Facilities		No	No	No	No	No	No	No	No	No	No	No	No	No
MOD10 - Facilities		No	No	No	No	No	No	No	No	No	No	No	No	No
MOD11 - Facilities		No	No	Yes	No	No	No	No	Yes	No	No	No	No	No
N Wing	**N**	No	No [3]	No	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	No
Observatory	**O**	No	No	No	No	No	No	No	No	No	No	No	No	No

P Building	**P**	No	No	Yes	No	No	No	No	Yes	No	No	No	No	No
S Wing	**S**	No	Yes	No	Yes [4]	Yes	No	No	Yes	Yes	No	Yes	Yes	Yes
T Building	**T**	No	Yes	No	Yes	No	No	Yes	Yes	Yes	No	Yes	No	No
U Student Union	**U**	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	Yes	No	No

FOOTNOTES:

1. Softened water system in place but currently not in use (bypassed).
2. Boilers with three 500-gallon storage tanks
3. Plate and frame
4. Not for human consumption

HENDERSON CAMPUS

Building Name	Bld Code	Water Softeners	Water Heaters	Insta-Hot Water Heaters	Ice Machines	Drinking Fountains	Kitchen/ FSE	Auto-Faucets	Sinks	Mop Sinks	Showers	Eye Wash/ Emergency Showers	RO	DI
Proc. Step:		**3A**	**4A**		**3B/6B**	**6A/6C**							**7D**	
A Building	**A**	No	Yes	No	No	Yes	No	No	Yes	Yes	Yes	Yes	No	No
Student Services	**B**	No	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	No	Yes	No
Academic Computer Ctr.	**C**	No	Yes	No	No	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes
Club House	**D**	No	Yes	No	Yes	Yes	No	No	Yes	Yes	Yes [1]	No	No	No
Health Sciences	**H**	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes
Softball Field House	**M**	No	No	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	No	No
Student Union	**U**	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
MOD 2		No	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No
MOD 3		No	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No
MOD 4		No	Yes	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No
MOD 5		No	No	No	No	No	No	Yes	Yes	Yes	Yes	No	No	No
MOD 6		No	No	Yes	No	No	No	Yes	Yes	Yes	Yes [1]	No	No	No

FOOTNOTES:

1. Installed but not in use.

Appendix C
Process Flow Diagrams

Working Document

College of Southern Nevada
Charleston Campus - Building A, Claude I. Howard Health Science Center
Potable & Non-Potable Water Process Flow Diagram
(This does not depict a plumbing riser diagram)
*Potable & Non-potable water is defined according to ASHRAE

1. RECEIVING
A – Municipal Supply (Chlorine)
G - Dental Water CL

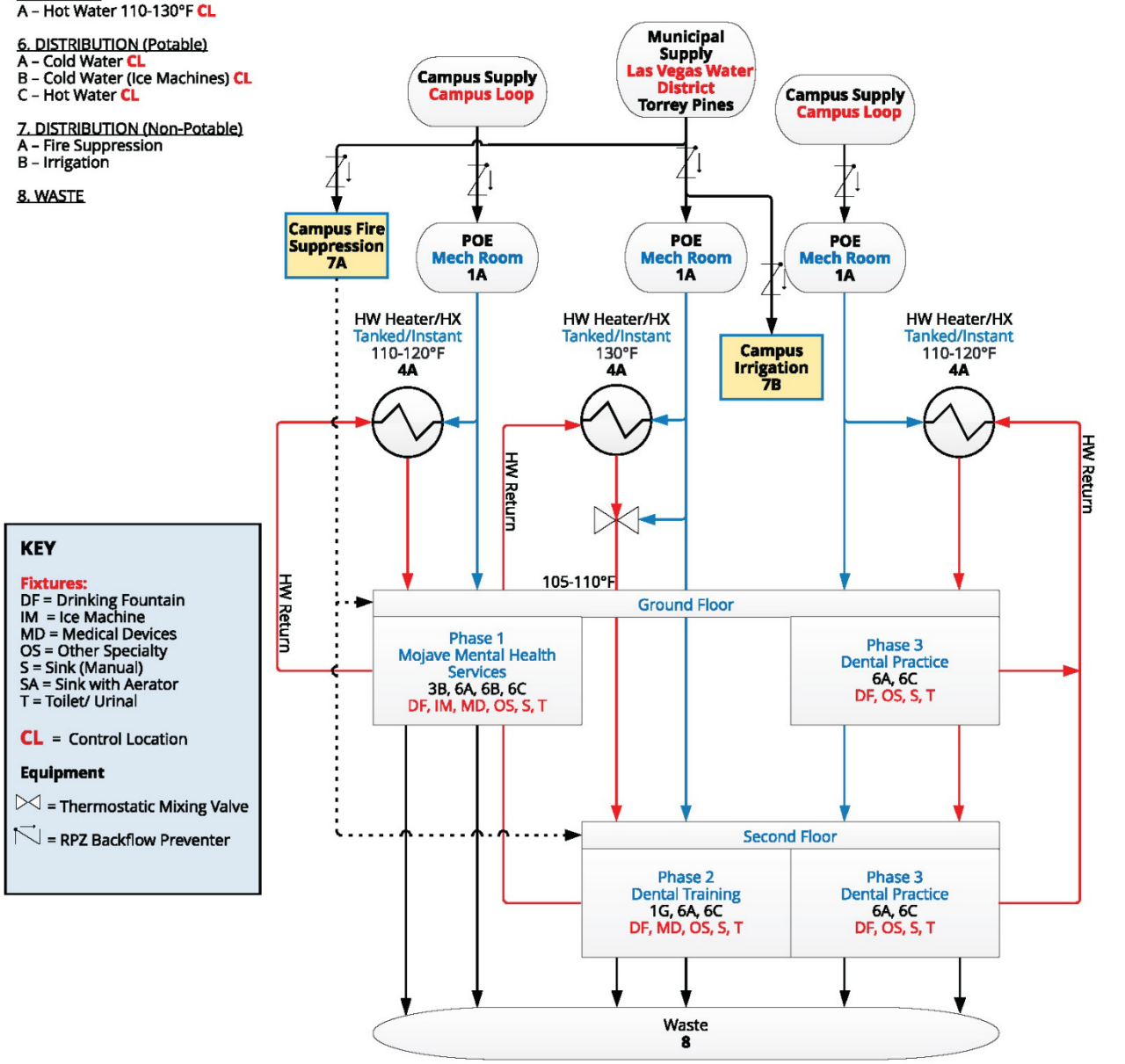
3. CONDITIONING
B – Filtration (Ice Machines) CL

4. HEATING
A – Hot Water 110-130°F CL

6. DISTRIBUTION (Potable)
A – Cold Water CL
B – Cold Water (Ice Machines) CL
C – Hot Water CL

7. DISTRIBUTION (Non-Potable)
A – Fire Suppression
B – Irrigation

8. WASTE



KEY

Fixtures:
DF = Drinking Fountain
IM = Ice Machine
MD = Medical Devices
OS = Other Specialty
S = Sink (Manual)
SA = Sink with Aerator
T = Toilet/ Urinal

CL = Control Location

Equipment

= Thermostatic Mixing Valve

= RPZ Backflow Preventer

Working Document

College of Southern Nevada
Charleston Campus
Non-Potable: Utility Water
Process Flow Diagram
(This does not depict a plumbing riser diagram)

1. RECEIVING
A – Municipal Supply

2. CONDITIONING
B - Filtration

3. TREATMENT
D – Treatment, Cooling Tower **CL**

4. HEATING & COOLING
B - Hot Water Generation
C - Chilled Water Generation
D - Cooling Tower **CL**

6. DISTRIBUTION
A – Circulation, Chilled Closed Loop
B – Circulation, Hot Closed Loop

7. Waste

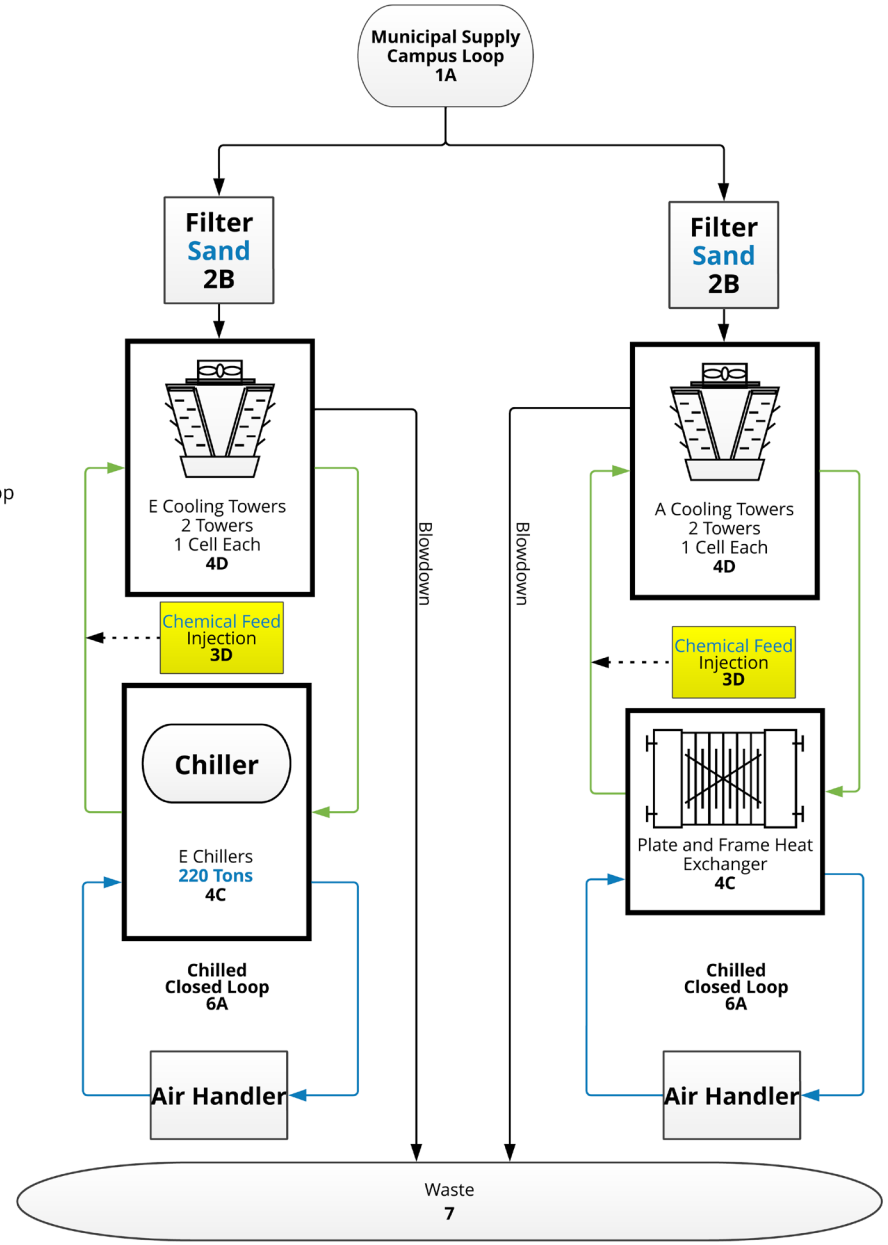
KEY

CL = Control Location

Equipment

= Thermostatic Mixing Valve

= RPZ Backflow Preventer



Working Document

College of Southern Nevada
Charleston Campus
Non-Potable: Utility Water
Process Flow Diagram
(This does not depict a plumbing riser diagram)

1. RECEIVING
A – Municipal Supply

2. CONDITIONING
B - Filtration

3. TREATMENT
D – Treatment, Cooling Tower **CL**

4. HEATING & COOLING
B - Hot Water Generation
C - Chilled Water Generation
D - Cooling Tower **CL**

6. DISTRIBUTION
A – Circulation, Chilled Closed Loop
B – Circulation, Hot Closed Loop

7. Waste

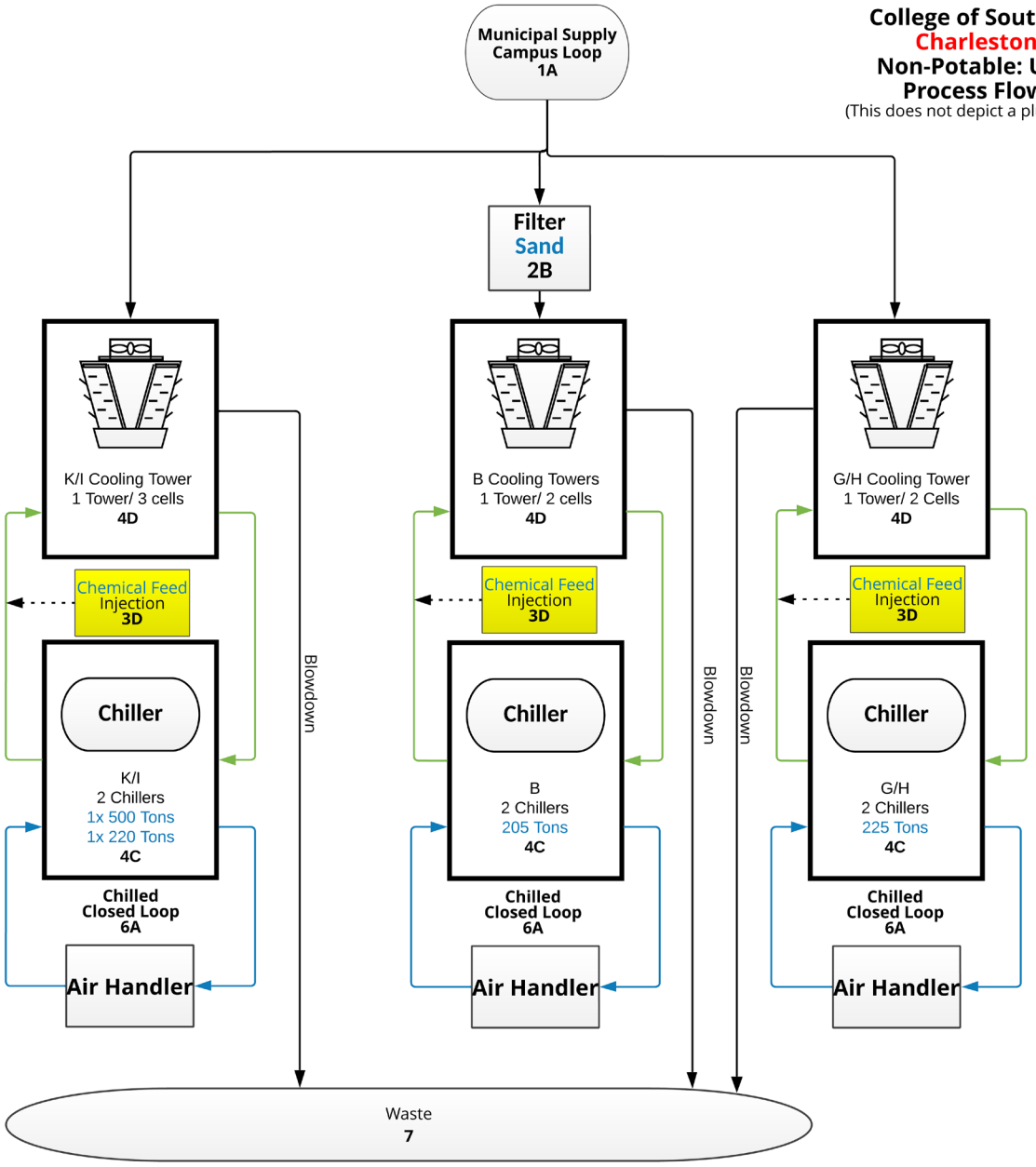
KEY

CL = Control Location

Equipment

= Thermostatic Mixing Valve

= RPZ Backflow Preventer



Working Document

College of Southern Nevada
Charleston Campus
Non-Potable: Utility Water
Process Flow Diagram
(This does not depict a plumbing riser diagram)

1. RECEIVING
A – Municipal Supply

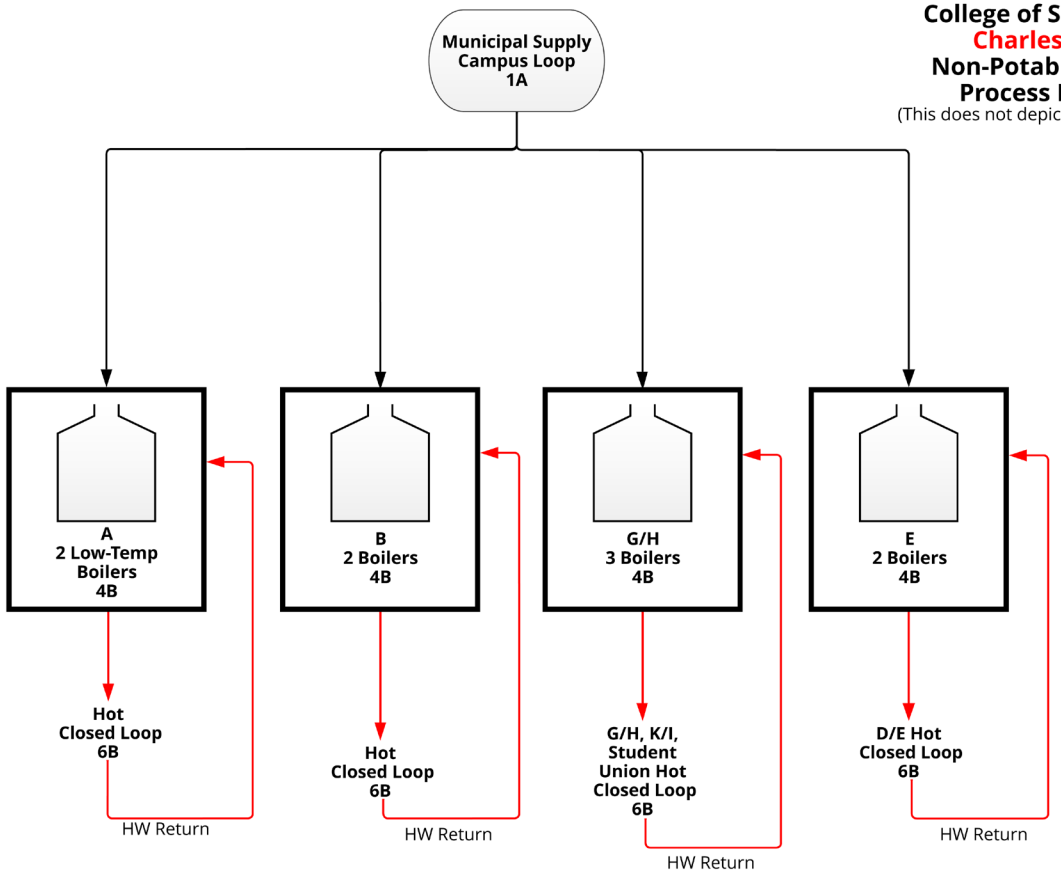
2. CONDITIONING
B - Filtration

3. TREATMENT
D – Treatment, Cooling Tower **CL**

4. HEATING & COOLING
B - Hot Water Generation
C - Chilled Water Generation
D - Cooling Tower **CL**

6. DISTRIBUTION
A – Circulation, Chilled Closed Loop
B – Circulation, Hot Closed Loop

7. Waste



KEY

CL = Control Location

Equipment

= Thermostatic Mixing Valve

= RPZ Backflow Preventer

Working Document

College of Southern Nevada
North Las Vegas Campus
CP1 and CP2
Non-Potable: Utility Water
Process Flow Diagram
(This does not depict a plumbing riser diagram)

1. RECEIVING
A – Municipal Supply

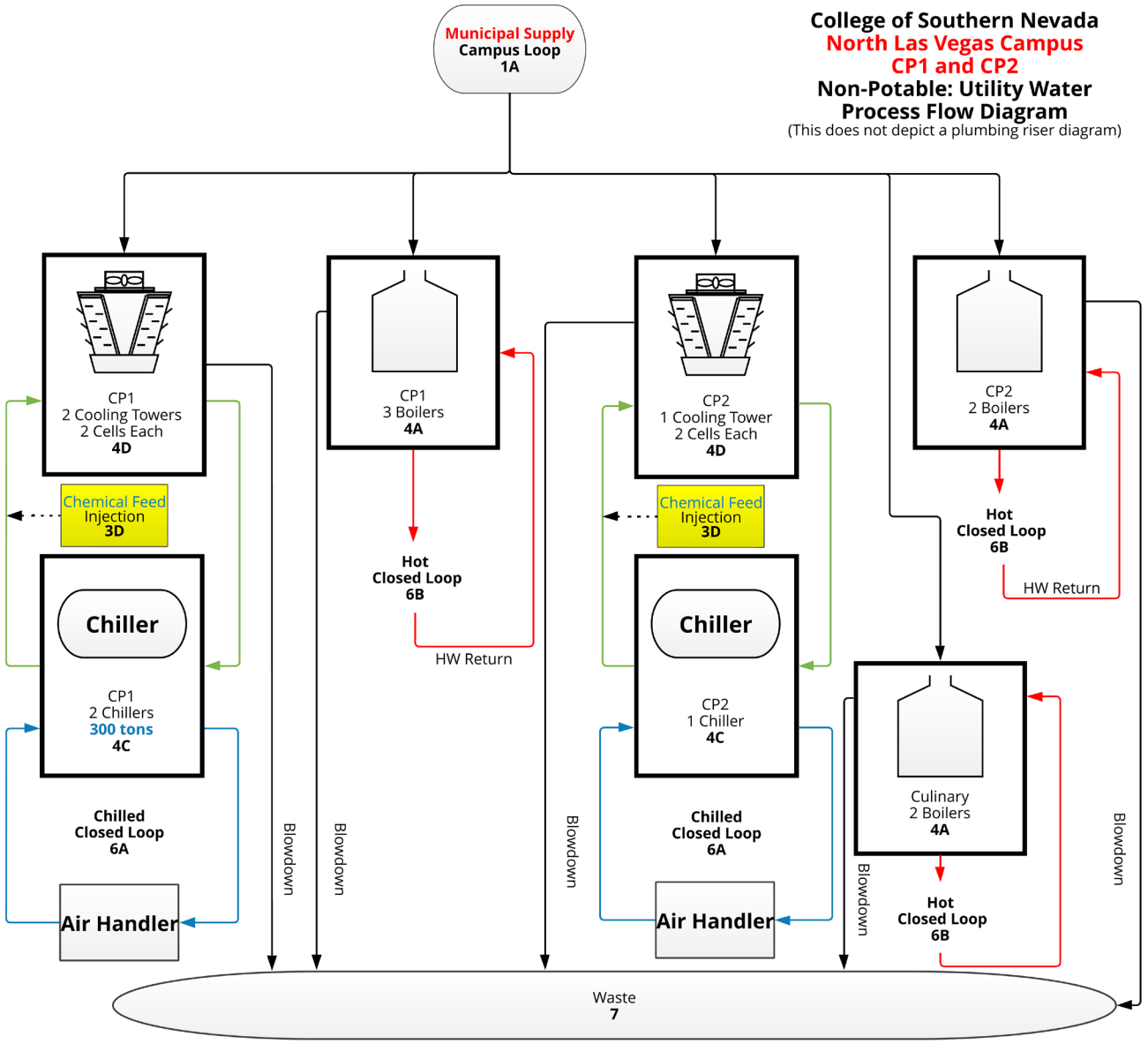
3. TREATMENT
D – Treatment, Cooling Tower **CL**

4. HEATING & COOLING
B - Hot Water Generation
C - Chilled Water Generation
D - Cooling Tower **CL**
E - Evaporative Condener **CL**

6. DISTRIBUTION
A – Circulation, Chilled Closed Loop
B – Circulation, Hot Closed Loop

7. Waste

KEY
CL = Control Location
Equipment
= Thermostatic Mixing Valve
= RPZ Backflow Preventer



Working Document

College of Southern Nevada
North Las Vegas Campus
Building T
Non-Potable: Utility Water
Process Flow Diagram
(This does not depict a plumbing riser diagram)

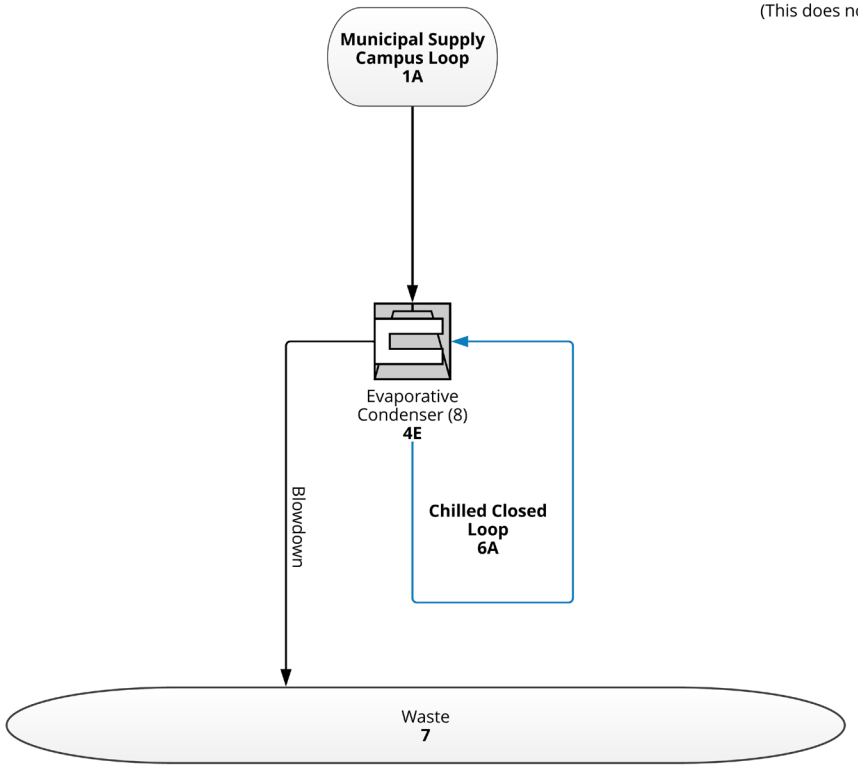
1. RECEIVING
A – Municipal Supply

3. TREATMENT
D – Treatment, Cooling Tower **CL**

4. HEATING & COOLING
B - Hot Water Generation
C - Chilled Water Generation
D - Cooling Tower **CL**
E - Evaporative Condenser **CL**

6. DISTRIBUTION
A – Circulation, Chilled Closed Loop
B – Circulation, Hot Closed Loop

7. Waste



KEY

CL = Control Location

Equipment

= Thermostatic Mixing Valve

= RPZ Backflow Preventer

Working Document

College of Southern Nevada
Henderson Campus
Non-Potable: Utility Water
Process Flow Diagram
(This does not depict a plumbing riser diagram)

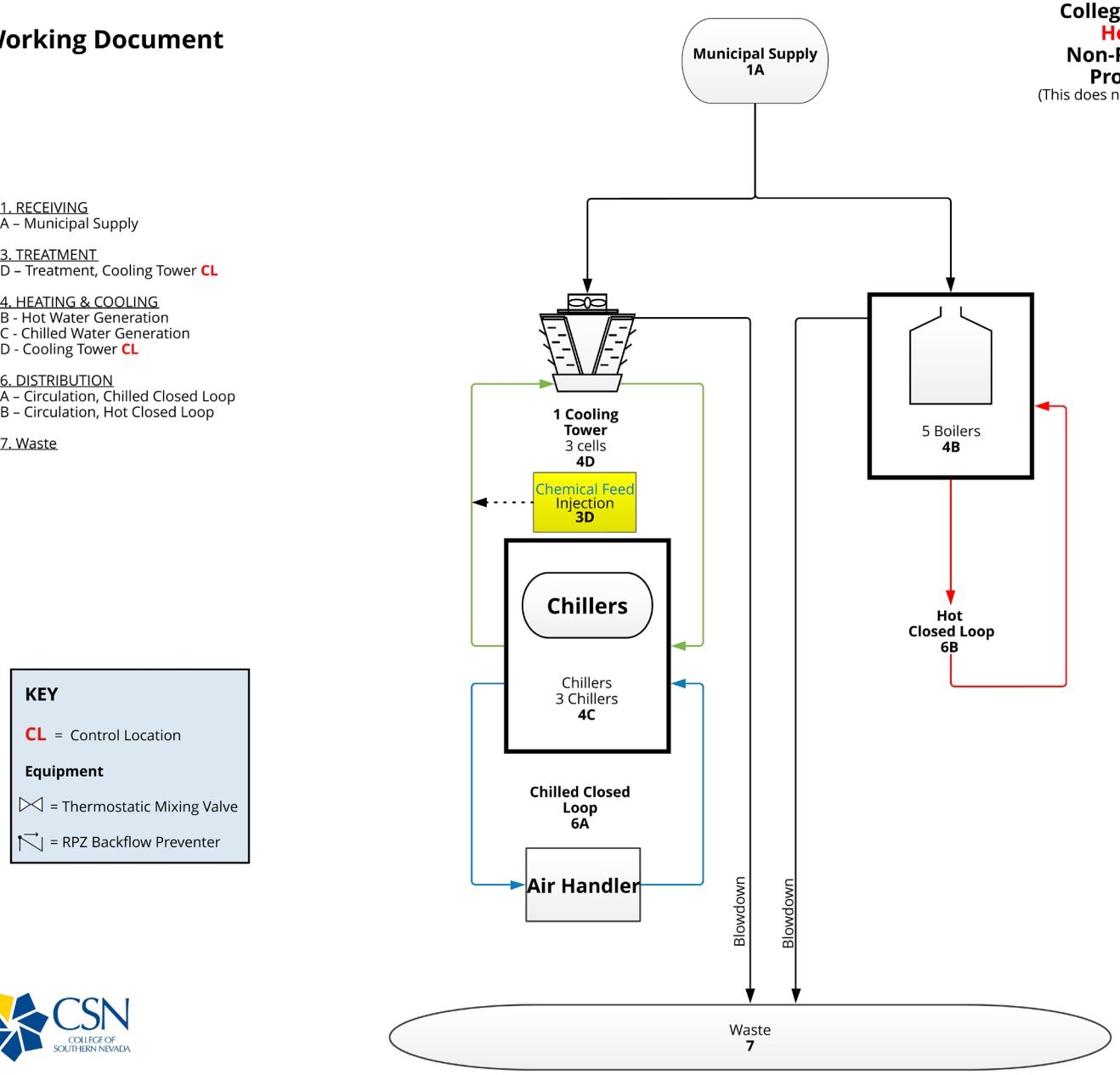
1. RECEIVING
A – Municipal Supply

3. TREATMENT
D – Treatment, Cooling Tower **CL**

4. HEATING & COOLING
B - Hot Water Generation
C - Chilled Water Generation
D - Cooling Tower **CL**

6. DISTRIBUTION
A – Circulation, Chilled Closed Loop
B – Circulation, Hot Closed Loop

7. Waste



Appendix D
Risk Assessment

Processing Step	Potential Hazards			Risk Significant?	Risk Basis	Control Measure(s)
1A. RECEIVING Municipal Supply	B	C	P	NO	Cold water is received from the Las Vegas Valley Water District. Water is processed in accordance with Primary Drinking Water Standards as required in the Code of Federal Regulations. This risk assessment reflects the CSN WMT's assessment of the risk at this water processing step. It applies to the implementation of the WMP at the campuses listed below, where this processing step exists: • Charleston, where the municipality treats water with chlorine and the buildings either take a water feed directly from the city, or get water from the campus water loop, which is fed by the municipal supplier. • North Las Vegas – North Las Vegas Water Supply • Henderson – Henderson Water Supply	1. Confirm Source Water Safety 2. Confirm Source Water Quality
3A. CONDITIONING Softening	B			NO	Softeners can host microbial growth and reseed the system after flushing if not properly sized and maintained. This risk assessment reflects the CSN WMT's assessment of the risk at this water processing step. It applies to the implementation of the WMP at the campuses listed below, where this processing step exists: • Charleston in the Student Union • North Las Vegas in the Student Union, and where there is one bypassed softener in Building C • Henderson in the student union	1. Preventative Maintenance
3C/6B. CONDITIONING/DISTRIBUTION Ice Machines	B			YES	Ice machines have been associated with cases of waterborne pathogen disease based upon the potential for water aspiration by a patient. The heat produced by the machine's compressor can cause the inlet water temperature to increase, leading to tempered or warm water entering the machine. Proper maintenance of ice machines and drinking fountain equipment is important for safe and reliable operation. This risk assessment reflects the CSN WMT's assessment of the risk at this water processing step. It applies to the implementation of the WMP at the campuses listed below, where this processing step exists:	1. Preventative Maintenance 2. Supplemental Disinfection

Processing Step	Potential Hazards			Risk Significant?	Risk Basis	Control Measure(s)
					• Charleston ice machines in use at several buildings across the campus **[pending confirmation of scope]** • North Las Vegas Buildings C, M02, N Wing, S Wing, Student Union, with at least the unit in M02 managed by an outside vendor: Culligan • Henderson Buildings B, D, M, SU	
3E/7C. CONDITIONING Dental Water and MEDICAL DEVICES Dental Equipment	B			**YES**	Dental water, frequently used as a spray into the mouth, poses a high aspiration exposure probability. A separate water quality program may be maintained by the staff in the dental practice, dental hygiene, and dental assisting programs to address this risk, and, if so, it is not the purpose of this WMP to reproduce the details of that downstream WMP here. This risk assessment reflects the CSN WMT's assessment of the risk at this water processing step. It applies to the implementation of the WMP at the campuses listed below, where this processing step exists: • Charleston there is dental equipment in building A, the Claude I. Howard Health Science Center. This equipment is used and maintained by the dental practice and dental school staff. • North Las Vegas N/A • Henderson N/A	1. RO Water Maintenance 2. Disinfect Water Reservoirs
4A/4B. HEATING Tanked & Instantaneous Hot Water Heaters	B		P	**YES**	Heating is accomplished at CSN facilities by a mixture of tanked and instantaneous hot water heaters. The setpoint for these heaters is 120°F. The temperature setpoint of 120°F does not kill all *Legionella* and/or other bacteria but also reflects the need to reduce the scald potential. The recirculating nature of hot water systems also leads to increased water age and decreased disinfectant residual. This risk assessment reflects the CSN WMT's assessment of the risk at this water processing step. It applies to the implementation of the WMP at the campuses listed below, where this processing step exists: • Charleston potable hot water serving campus buildings is generated via tanked and instantaneous hot water heaters, all with a target temperature of 120°F. Most buildings have only tanked hot water heaters, while	1. Temperature Monitoring 2. Flushing

Processing Step	Potential Hazards			Risk Significant?	Risk Basis	Control Measure(s)
					some (SU, A) have some tanked hot water heaters as well as instantaneous hot water heaters. • North Las Vegas potable hot water serving campus buildings is generated by tanked and instantaneous hot water heaters, with most buildings having either/or except for the Student Union and S Wing, which each have both styles of heating equipment. **[Pending info on temperature setpoint.]** • Potable hot water serving campus buildings is generated by tanked and instantaneous hot water heaters, with most buildings having either/or except High School M05, which has neither.	
6A. DISTRIBUTION (Potable) Cold Water	B			YES	Cold water temperatures reduce the potential for microbiological growth compared to a hot water system. Based on outlet types in the distribution system, exposure to waterborne pathogens is still possible. Aerosolization of water and exposure to that aerosolized water occurs at the fixtures on the distribution system. At the College of Southern Nevada campuses, a range of fixtures are installed on the distribution system. This risk assessment reflects the CSN WMT's assessment of the risk at this water processing step. It applies to the implementation of the WMP at the campuses listed below, where this processing step exists: • Charleston extensive cold water distribution systems across multiple buildings • North Las Vegas extensive cold water distribution systems across multiple buildings • Henderson extensive cold water distribution systems across multiple buildings	1. Flushing 2. Disinfectant Monitoring
6C. DISTRIBUTION (Potable) Hot Water (110 120° F)	B			YES	The hot water distribution system can be extensive and complex within the building water system. Along with favorable temperatures for growth, there is potential for disinfectant residuals to dissipate as a function of time, and recirculation of hot water loops leads to higher water age. All risks discussed relative to the cold-water distribution system are also present on the hot water distribution system as well.	1. Flushing 2. Disinfectant Monitoring

Processing Step	Potential Hazards			Risk Significant?	Risk Basis	Control Measure(s)
					This risk assessment reflects the CSN WMT's assessment of the risk at this water processing step. It applies to the implementation of the WMP at the campuses listed below, where this processing step exists: • Charleston hot water distribution systems within all buildings • North Las Vegas has extensive cold water distribution systems across multiple buildings except M03 through M10 and the motorcycle training area. • Henderson hot water distribution systems within all buildings	
7A. DISTRIBUTION (Non-Potable) Fire Suppression	B			NO	The fire suppression system is fed from the municipal supply, splitting off after the backflow preventor inside the building. Though there is potential for microbiological growth due to stagnant lines, exposure is limited. In the event of a fire or activation of the sprinkler system, the affected area would be under evacuation. This risk assessment reflects the CSN WMT's assessment of the risk at this water processing step. It applies to the implementation of the WMP at the campuses listed below, where this processing step exists: • Charleston • North Las Vegas • Henderson	1. Flush Testing
7B. DISTRIBUTION (Non-Potable) Irrigation	B			NO	Irrigation systems can serve as an additional point of exposure depending on where they are located, the style, and what time during the day they're operated. The source of irrigation water on CSN campuses is municipal water. This risk assessment reflects the CSN WMT's assessment of the risk at this water processing step. It applies to the implementation of the WMP at the campuses listed below, where this processing step exists: • Charleston - the irrigation system is fed with municipal water via the potable cold-water system. The system operates across campus and operates on a schedule that is determined by the weather. They style the irrigation system and how/when it is routinely run will	1. Irrigation Schedule 2. Flushing

Processing Step	Potential Hazards			Risk Significant?	Risk Basis	Control Measure(s)
					inform the potential for exposure here. The source of the irrigation is municipally treated water. • North Las Vegas **[Pending information]** • Henderson **[Pending information]**	
8. Wastewater	B	C	P	NO	All potable water outlets drain to the municipal waste system; there is no water reclamation or recycling, and no history of safety issues associated with the campus's drainage system. This risk assessment reflects the CSN WMT's assessment of the risk at this water processing step. It applies to the implementation of the WMP at the campuses listed below, where this processing step exists: • Charleston • North Las Vegas • Henderson	1. Sanitary Sewer 2. Backflow Prevention
3D/4D. TREATMENT & HEATING AND COOLING Condenser Water (Cooling Towers)	B	C		YES	Open loop condenser water systems are documented sources of microbial growth due to the operating temperatures, exposure to open air, and the aerosolization of waters through the mechanical cooling process and subsequent evaporation of water. This risk assessment reflects the CSN WMT's assessment of the risk at this water processing step. It applies to the implementation of the WMP at the campuses listed below, where this processing step exists: • Charleston [pending confirmation] There are 5 different cooling tower loops on campus. • North Las Vegas • Henderson	1. Water Chemistry Monitoring 2. Monitoring of Residual Oxidant
4C. HEATING AND COOLING Chilled Water Generation	B	C		NO	At this processing step, heat transfer occurs to control the temperature of the chilled water. Hazards are contained within the closed system or controlled with the hazard control chemicals applied in the open condenser water loop. However, the chilled loop is a closed system limiting exposure.	1. Monitoring

Processing Step	Potential Hazards			Risk Significant?	Risk Basis	Control Measure(s)
					This risk assessment reflects the CSN WMT's assessment of the risk at this water processing step. It applies to the implementation of the WMP at the campuses listed below, where this processing step exists: • Charleston • North Las Vegas • Henderson	
6A. DISTRIBUTION Circulation, Chilled Closed Loop	B	C		NO	Growth of microorganisms is reduced due to lower operating temperatures and chemical treatment applied to the chilled water used for cooling. Exposure is limited by the closed nature of the system. This risk assessment reflects the CSN WMT's assessment of the risk at this water processing step. It applies to the implementation of the WMP at the campuses listed below, where this processing step exists: • Charleston 5 closed chilled water loops, 4 using chillers, 1 using a plate & frame heat exchanger.	1. Monitoring
7. Wastewater	B	C	P	NO	Sewage can transmit pathogens or other contaminants; however, exposure is limited and well controlled. Sewage drains to the sanitary waste system. There is no additional risk from utility waste not already described in potable waste step 8A. This risk assessment reflects the CSN WMT's assessment of the risk at this water processing step. It applies to the implementation of the WMP at the campuses listed below, where this processing step exists: • Charleston • North Las Vegas • Henderson	1. Sanitary Sewer 2. Backflow Prevention

Potential Hazards: (B)iological, **(C)**hemical, **(P)**hysical

Appendix E
Sampling Criteria Table

Criteria Type	Sampling Trigger	Sample Locations	Frequency	Rationale
Baseline Sampling	Initial implementation of WMP or major system upgrade	Representative distal outlets, water heaters, building inlets	One-time	Establish system baseline for *Legionella* presence
Routine Sampling	Standard proactive monitoring in high-risk or representative areas	Random 2–3 distal outlets per campus - Water heaters, faucets, ice machines, drinking fountains, showers, etc.	Quarterly (min)	Detect trends and validate control measures
High-Risk Buildings/Fixtures	Healthcare areas, childcare, immunocompromised occupants, or previously positive *Legionella* history	Key fixtures in those areas (e.g., showers, drinking fountains, DUWL's, etc.)	Quarterly	Higher occupant sensitivity to waterborne pathogens
Non-Potable Water Sources	Cooling towers, decorative fountains, laboratory water systems.	All cooling towers, water features, and laboratory water systems.	Annually	Detect trends and validate control measures
After Inactivity	Buildings unused for >4 weeks (e.g., school breaks, COVID closures)	At least 1 POE and 2–3 distal fixtures	Within 1 week of re-occupancy	Stagnant water increases risk of bacterial growth
After Renovation/Work	Plumbing modifications, water main shutoffs, or new fixture installations	Affected areas including nearest and farthest fixtures from the work zone	Within 7 days post-activity	Disturbance or replacement of plumbing may introduce or mobilize *Legionella*
Post-Remediation	After corrective actions (e.g., flushing, disinfection) following a positive *Legionella* and hi *Bacteria* detection	Same locations as original positive samples	7–14 days post-remediation	Validate effectiveness of mitigation
Incident Response	Confirmed or suspected case of Legionnaires' disease in a campus occupant or visitor	Locations used by affected individual, surrounding fixtures	As directed by EH&S/SNHD	Epidemiological investigation and source confirmation
Complaint-Based	Occupant-reported issues such as discolored water, foul odor, or concerns about water quality or illness	Complaint location and adjacent areas	As needed	Supports transparency and responsiveness to occupant concerns
Random Validation	Periodic quality control or to confirm absence of *Legionella* even without other triggers	Random selection across campuses (rotate buildings over time)	Every 2–3 years	Ensure WMP remains effective even where no known risks exist

Appendix F
Remediation Protocols

Protocol #1 - Potable Water Fixture Remediation Protocol

(This applies to sinks, faucets, shower heads, hot water sprays, eyewash stations and similar fixtures.)

Preparation:

1. Notify occupants of temporary water disruption.
2. Wear PPE: gloves, eye protection, and protective clothing.
3. Gather supplies: potable-approved bleach (sodium hypochlorite with no scents or additives), clean cloth, scrub brush, container, thermometer, and chlorine test strips.
4. Turn off water supply to the fixture.

Disinfection:

1. Prepare a disinfecting solution by mixing ½ to 1 cup of potable-approved bleach with approximately 2–4 gallons of clean, cold water.
2. Remove the fixture from its installation.
3. Disassemble the fixture, including removing screens or aerators.
4. Soak all parts in the bleach solution for at least 15 minutes.
5. Remove the parts from the solution.
6. Clean and scrub the parts using clean cloths and brushes to remove corrosion and scale.
7. Soak the cleaned parts again in the bleach solution for at least 15 minutes.
8. Remove and rinse all parts thoroughly with clean, cold water.
9. Reassemble the fixture.
10. Reinstall the fixture.

Finishing Steps:

1. Wipe the fixture surfaces with a clean, water-dampened cloth.
2. Dry the floor to prevent any standing water.
3. Turn the water supply back on (if it was shut off) and flush the fixture for at least two minutes before returning it to service.

Protocol #2 – Hot Water Heater Remediation Protocol

(This applies to hot water heaters and warm/hot water storage tanks.)

Preparation:

1. Notify affected occupants of planned work, expected water outage, and potential temporary changes in water taste or odor.
2. Gather materials: potable-approved bleach (sodium hypochlorite without scents or additives), thermometer, hose, wrenches, clean cloths, and scrub brushes.
3. Wear PPE: gloves, eye protection, and protective clothing.
4. Ensure drain lines discharge to an approved sanitary sewer connection.

System Isolation:

1. Shut off power or fuel supply to the water heater to prevent normal use.
2. Turn off the cold-water supply at the top of the tank.
3. Allow the unit to cool to safe handling temperature if water is above 140 °F (60 °C).
4. Adjust the plumbing connection to allow atmospheric pressure into the top of the tank.

Draining:

1. Attach a hose to the drain valve.
2. Open the bottom drain valve and completely drain and flush all water from the tank.
3. Close the drain valve once empty.

Disinfection:

Option A – Thermal Disinfection:

1. Fill the tank with fresh water.
2. Restore power or fuel and heat the water to at least 158 °F (70 °C).
3. Maintain this temperature for a minimum of 1 hour.
4. Open distal outlets (farthest taps) one by one and flush hot water until outlet temperature is ≥ 158 °F (70 °C) for 5 minutes each.
5. Shut down heating and allow water to cool to safe temperature before returning to service.

Option B – Chemical Disinfection:

1. Close the outlet valves and partially refill the tank with cold water.
2. Add at least 16 fluid ounces (1 pint) of potable-approved bleach (sodium hypochlorite with no scents or additives).
3. Fill the tank completely with cold water.
4. Clean and scrub the drain valve or other sampling location using clean cloths and brushes to remove corrosion and scale.
5. Let the solution sit for at least one (1) hour.

6. After contact time, drain the tank through the bottom valve.
7. If time permits, repeat Steps 1–5.
8. Refill with fresh water and flush until chlorine residual is ≤ 2 mg/L (normal drinking water level).
9. Return the water heater to normal operation.

Finishing Steps:

1. Restore power or fuel supply to the water heater.
2. Confirm normal operating temperature (typically 120–140 °F / 49–60 °C).
3. Verify system chlorine levels meet potable water standards.

Protocol #3 - Drinking Fountain Remediation Protocol

(For potable water fixtures in public or workplace settings)

Preparation:

1. Shut off the fountain's water supply if needed for disassembly.
2. Post signage to indicate the fountain is out of service during cleaning.
3. Gather materials: potable-approved bleach (sodium hypochlorite), spray bottles, clean cloths, scrub brushes, and personal protective equipment (gloves, safety glasses).

Cleaning:

1. Remove any visible debris from the mouthpiece, protective guard, and basin.
2. Prepare a disinfecting solution in a spray bottle by mixing ½ to 1 cup of potable-approved bleach (sodium hypochlorite with no scents or additives) with approximately 2–4 gallons of clean, cold water. Note: bleach solution is only good for 24 hours. You must make a new solution each day.
3. Spray disinfectant solution onto all interior surfaces of the mouthpiece and protective guard.
4. Using a scrub brush, clean both the interior and exterior of the mouthpiece and protective guard.
5. Rinse the mouthpiece and the protective guard thoroughly with water.

Finishing Steps:

1. Wipe the drinking fountain surfaces with a clean, water-dampened cloth.
2. Dry the floor around the fountain to prevent any standing water.
3. Turn the water supply back on (if it was shut off) and flush the fountain for at least two minutes before returning it to service.

Protocol #4 - Ice Machine Disinfection Protocol

(This applies to potable ice-making equipment)

Preparation

1. Turn off and unplug the ice machine to ensure safety.
2. Shut off the water supply to the machine.
3. Remove and discard any remaining ice from the bin.
4. Allow all ice to melt if necessary—do not use hot water to speed up melting, as this can damage components.

Cleaning & Disassembly

1. Remove all removable components, such as ice bins, baffles, water troughs, and filters, following the manufacturer's instructions.
2. Prepare a cleaning solution using warm water and an approved ice machine cleaner (per manufacturer's recommended dilution).
3. Scrub all removable parts with the cleaning solution using clean cloths or non-abrasive brushes.
4. Rinse parts thoroughly with clean water to remove all cleaner residue.

Disinfection

1. Prepare a disinfecting solution by mixing ½ to 1 cup of potable-approved bleach (sodium hypochlorite with no scents or additives) with approximately 2–4 gallons of clean, cold water.
2. Spray or immerse all removable parts in the disinfectant, ensuring full contact with all surfaces.
3. Allow parts to soak for at least 15 minutes.
4. Remove parts and allow them to dry air completely.

Machine Interior & Exterior

1. Spray disinfectant onto all interior food-contact surfaces of the ice machine, including the bin, walls, and water-contact components, ensuring full coverage.
2. Wipe with clean cloths to remove debris, then spray again to ensure disinfection.
3. Allow to air-dry and not rinse unless specified by the disinfectant manufacturer.
4. Wipe exterior surfaces with a clean, damp cloth, then dry.

Reassembly & Restart

1. Reinstall all removable parts once completely dry.
2. Turn on the water supply and restore power to the unit.
3. Allow the ice machine to cycle and discard the first batch of ice produced after cleaning to ensure no residual disinfectant remains.

Protocol #5 - Cooling Tower Remediation Protocol

Preparation

1. **Notify personnel**: Inform building occupants and maintenance staff of the disinfection schedule.
2. **PPE**: Ensure all personnel wear appropriate personal protective equipment (PPE), including gloves, goggles, and respiratory protection.
3. **System shutdown**: Turn off the cooling tower and associated systems (fans, pumps, etc.).

Pre-Cleaning Inspection

1. Inspect for visible debris, scale, or biofilm.
2. Document the condition of the system before cleaning.

Physical Cleaning

1. Drain the basin and remove all visible debris.
2. Scrub accessible surfaces (basin, fill, drift eliminators) with brushes and detergent.
3. Rinse thoroughly with clean water.

Chemical Disinfection

1. **Initial shock treatment**:
    a. Refill the system with clean water.
    b. Add a disinfectant (e.g., sodium hypochlorite or other oxidant) to achieve **50 ppm free chlorine**.
    c. **Add** an appropriate dispersant. Apply antifoam, if needed. Apply appropriate corrosion inhibitors.
    d. Circulate the disinfectant through the system for **at least 24 hours**.
2. **Monitor chlorine levels**: Maintain target concentration of 25 ppm throughout the contact time.
3. **Reduce** the cycles of concentration (if necessary) to achieve and maintain a pH of less than:
    a. 8.0 for chlorine-based disinfectants
    b. 8.5 for bromine-based disinfectants

Post-Disinfection Flushing

1. Drain the system completely.
2. Refill with clean water and flush thoroughly to remove residual disinfectant.

System Restart

1. Inspect and verify all components are clean and operational.
2. Restart the system and resume normal operation.

Protocol #6 - Dental Unit Waterline Disinfection Protocol

(This applies to dental unit waterlines)

Preparation

1. Review the **manufacturer's instructions** for mixing and safety precautions.
2. Put on **appropriate PPE** (gloves, safety glasses).
3. Remove and **empty the current water bottle** from the dental unit.
4. Ensure the lines are not in use and the unit is powered appropriately for maintenance.

Mixing the Disinfectant

1. In a clean, dedicated bottle, mix **Liquid Ultra-Solution 1 and Liquid Ultra-Solution 2** in the **recommended ratio** (typically 1:1 unless otherwise specified).
    a. **Liquid Ultra-Solution 1** contains 1.05% hydrogen peroxide as the active ingredient. **Liquid Ultra-Solution 2** contains 0.5% n-Alkyl dimethyl ethyl benzyl ammonium chloride and 0.5% n-Alkyl dimethyl benzyl ammonium chloride.
2. Gently swirl or shake the bottle to fully combine the solutions to form a pink solution.
3. **Label the bottle** clearly as "Disinfectant – Ultra-Solutions 1 & 2" and include the date.

Application to Waterlines

1. Attach the disinfectant bottle to the dental unit.
2. Activate all waterline-connected devices (handpieces, air/water syringes, ultrasonic scaler lines) to draw the disinfectant into the tubing.
3. **Purge each line for 30–60 seconds** or until the pink solution is visible exiting the lines.
4. Stop flow and allow the solution to **remain in the waterlines for full contact time** (typically overnight but no more than 24 hours).

⚠ **Do not use the dental unit during this disinfection period.**

Post-Disinfection Rinse

1. Remove the disinfectant bottle once the contact time is complete.
2. Fill a new clean rinse bottle with **distilled or deionized water**.
3. Attach the rinse bottle and **flush each waterline** through all waterline-connected devices until the water runs clear and the rinse bottle is empty to purge all chemical residues (or as directed by the manufacturer).