

# Reclaimed Water for Cooling Towers

## A viable alternative water source

Meet your company's business and sustainability goals and show your commitment to environmental stewardship by using reclaimed water. The Town of Cary's **proven** reclaimed water system offers a **cost-effective, high-quality** and **reliable** source of water as an alternative to potable water that can be used for irrigation, toilet flushing or cooling tower applications within designated service areas. It is **exempt from water conservation and water shortage restrictions**.

This primer identifies important planning, design and management considerations to help ensure the satisfactory long-term operation of your cooling tower using reclaimed water.



## Cooling Tower Management

When customers properly manage Cary's reclaimed water quality in their cooling towers, they reduce the rate of water loss from blowdown and increase cycles of concentration while protecting the towers from corrosion, scaling and biofouling.

**Water Loss** occurs from evaporation due to heat loads, drift (water lost to wind in the cooling tower), minor system leaks and blowdown (water drained from the system and replaced at set intervals to maintain water quality).

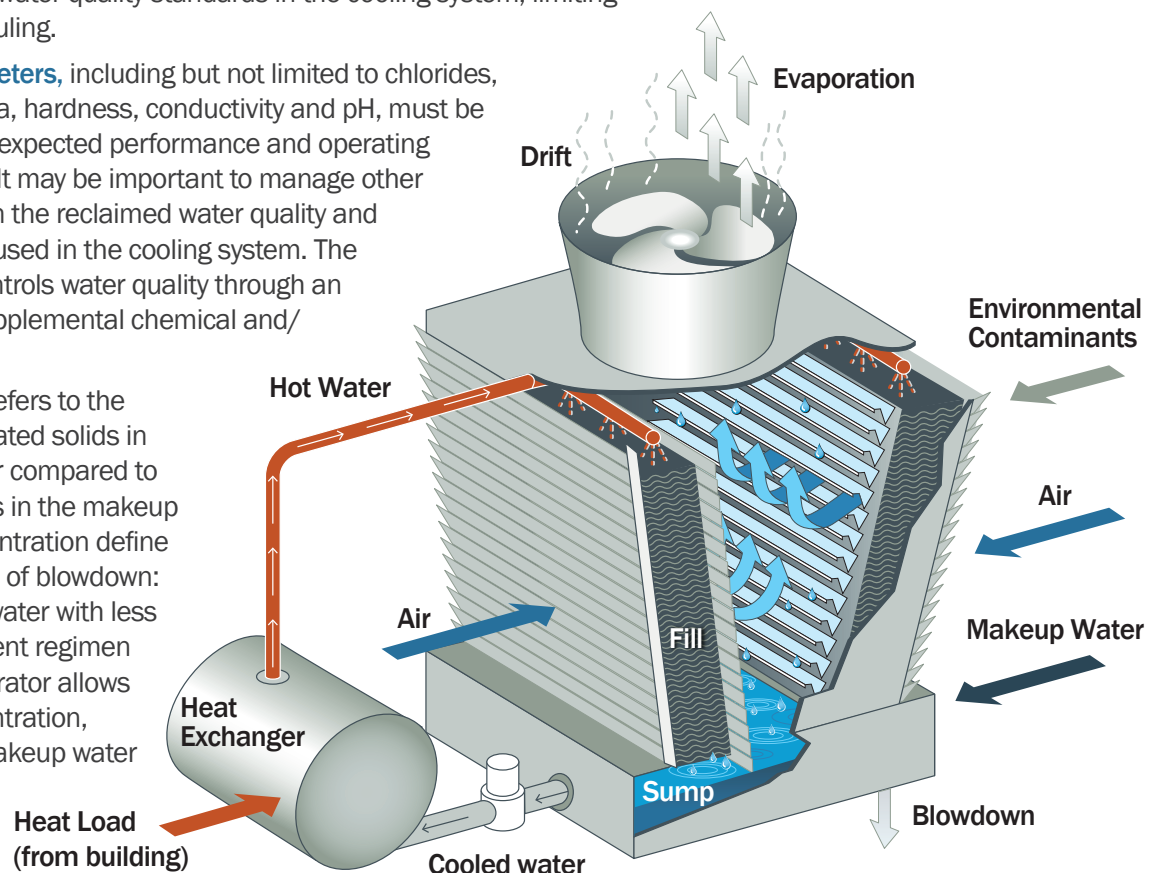
**Environmental Contaminants** typically enter the cooling tower from the environment during operations and contribute to water quality decline and are eventually purged from the system through blowdown.

**Makeup Water** is added at set intervals to replace water lost during operations in order to maintain desired water quality standards in the cooling system, limiting corrosion, scale and biofouling.

**Key Water Quality Parameters**, including but not limited to chlorides, sulfates, phosphates, silica, hardness, conductivity and pH, must be managed to maintain the expected performance and operating life of the cooling system. It may be important to manage other parameters, depending on the reclaimed water quality and materials of construction used in the cooling system. The cooling tower operator controls water quality through an operating strategy and supplemental chemical and/or physical treatment.

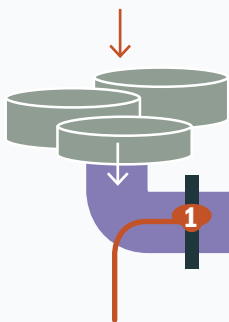
**Cycles of Concentration** refers to the concentration of accumulated solids in the cooling system's water compared to the concentration of solids in the makeup water. The cycles of concentration define the frequency and volume of blowdown: higher water quality (i.e., water with less solids) or a proper treatment regimen by the cooling system operator allows for higher cycles of concentration, reducing the volume of makeup water required for operation.

The design of a reliable cooling tower must consider a number of factors to ensure its satisfactory long-term operation.



# Key Steps to Help Achieve Your System's Satisfactory Performance and Longevity Using Reclaimed Water

## Obtain reclaimed water quality data from the Town of Cary.

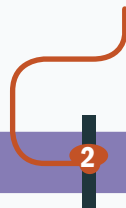


### 1. Project Planning

- Determine heat loads and water volume required.
- Determine if reclaimed water is available to site.
- Obtain Town's current reclaimed water fees and rates which are set to incentive its use.
- Select materials of construction that are compatible with reclaimed water quality.
- Consult qualified water treatment provider to evaluate options for cycles of concentration and level of treatment needed.
- Conduct business case evaluation to select preferred materials, water and treatment regimen, to confirm life cycle cost is lower for cooling tower supplied with reclaimed water.

### 2. Designing

- Prepare design plans and technical specifications that match planning requirements.
- Define treatment strategies tailored for reclaimed water quality.
- Identify minimum performance standards for system.
- Add a backup potable water supply for cooling towers as required by the Town.



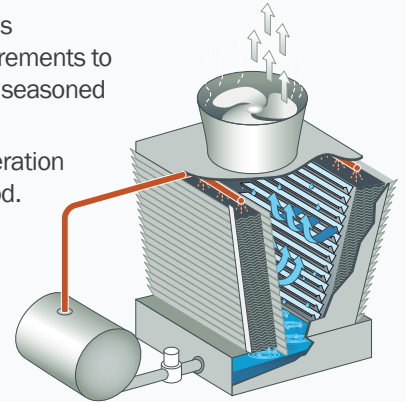
### 3. Bidding and Construction

- Confirm proposed system meets minimum performance standards.
- Have design engineer review and approve equipment submittals.
- Confirm that the installed system meets the design intent.



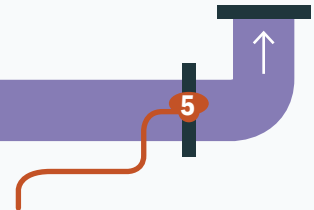
### 4. Commissioning

- Follow manufacturer's commissioning requirements to ensure the system is seasoned properly.
- Carefully monitor operation during warranty period.



### 5. Operational

- Water system management is critical. Engage a qualified treatment provider to operate system to performance standards.
- Periodically monitor makeup water quality for changes.
- Perform scheduled preventive maintenance to remove accumulated corrosion, scaling and biofouling.
- Use backup potable water supply during Cary's annual reclaimed water maintenance holiday.



For more, including EPA guidelines for Water Reuse, independent research and industry best practices from the American Institute of Chemical Engineers, search "Reclaimed Water" at [www.townofcary.org](http://www.townofcary.org) or call (919) 469-4090.