



UNIVERSITY OF NORTH CAROLINA
CHARLOTTE

APPENDIX

RECLAIMED WATER

University of North Carolina at Charlotte Design Standards and Guidelines

Appendix – Reclaimed Water

Non-Potable Water

Definitions

- Harvested Rainwater- Rainwater collected from rooftops or other surfaces and stored in cisterns.
- Non-potable water (NPW) – Non-drinking water from variety of sources that is allowed for irrigation, toilet flushing, and other specific uses.
- Reclaimed Water (RCW)- Highly treated wastewater distributed to UNC Charlotte by CLTW. Allowable uses, irrigation application rates, labeling and identification requirements, and permitting requirements are regulated by 15A NCAC 02T .0900

Regulations

The following regulations apply to Non-potable water projects. Their applicability is further described in subsequent sections.

- North Carolina Administrative Code – Reclaimed Water Regulations**
Currently section 15 A NCAC 02T .0900. Proposed rule changes would relocate the Reclaimed Water regulations to section 15A NCAC 02U. These rules are administered by the NCDENR DWQ Land Application Unit.
- North Carolina Plumbing Code**
Currently appendix C-1 addresses rainwater harvesting.
- CLTW Ordinance for the Control of Backflow and Cross-connection**
The CLTW ordinance and associated Manual implement state level regulations within the CLTW service area. At the state level, the NCDENR DEH Public Water Section administers cross-connection control and distribution line extensions.
- CLTW Rainwater System Requirements and Charges.**
This policy addresses cross-connection control and sewer charges.

Permitting

- All Reclaimed Water Uses**
All RCW uses require a site-specific amendment to UNC Charlotte utilization permit from the Division of Water Quality Land Application Unit. Contact UNC Charlotte EHS to review permit submittal requirements and obtain the proper, partially completed form. The Project Designer is responsible for completing the Division of Water Quality application form, providing the required specifications and drawings, obtaining a soil scientist / agronomist report for irrigation projects, and providing the application fee. The draft application materials will be submitted to UNC Charlotte EHS for internal review, applicant signature, and submitted to DWQ.
- Extensions to Reclaimed Water Distribution Lines**
Any project extending the CLTW reclaimed water distribution lines must submit a Reclaimed Water Distribution System application. This application process will be conducted by the Project Designer and UNC Charlotte Project Manager with CLTW.

Distributions Lines

- CLTW Requirements**
Extensions to the CLTW reclaimed water distribution system will be reviewed by CLTW based on the CLTW Manual of specifications, standards, and design and the NC Administrative Code (NCAC) – 15A NCAC 02T. 0909 requirement for Reclaimed Water Distribution systems.
- UNC Charlotte Standards**
Reclaimed water and combined non-potable water distribution lines to be owned by UNC Charlotte will follow the CLTW reclaimed water distribution standards unless otherwise

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specified in this document or by the UNC Charlotte or by the UNC Charlotte Water Resource Manager.

Plumbing for Toilet and Urinal Flushing Applications

The UNC Charlotte design requirements for non-potable water use in indoor plumbing for toilet and urinal flushing rely on several sources described below.

- a. Applicability
All new toilet and urinal system shall be designed with dual plumbing for use of non-potable water.
- b. Materials
The following UNC Charlotte requirements for RCW and NPW systems serve as a further safeguard against cross-connections with potable water and provide greater corrosion resistance.
 - i. Pipe material shall be CPVC Schedule 80, Cell Class 24448 (up to 6”) or 23447 (8” or greater).
 - ii. Fittings, Valves, and other appearances shall be CPVC Schedule 80, Cell Class 23447.
 - iii. All brass fittings, including flush valves, shall be DZR (dezincification resistant).
- c. Pipe Color
All pipes, fixtures, valves, and other fittings must be labeled per the NC Administrative Code – Reclaimed Water Regulations (RCW only) and the NC Plumbing Code (all NPW)
The color currently designated for plumbing systems with reclaimed water, harvested rainwater, and blended non-potable water is purple (pantone 522).

This color requirement can be found in the NC Administrative Code Reclaimed Water Regulations and the NC Plumbing Code.

- d. Labeling
All pipes, fixtures, valves, and other fittings must be labeled per the NC Administrative Code – Reclaimed Water Regulations (RCW only) and the NC Plumbing Code (all NPW). These regulations specify locations, wording, frequency, color, size, etc.
The University requires the following language to be included in the labeling:

RECLAIMED WATER – DO NOT DRINK – NO TOMAR
Or
NON-POTABLE WATER – DO NOT DRINK – NO TOMAR

- e. Point of Use Signage
Signs must be placed in every toilet stall and over each group of urinals where NPW is in use. The university has developed standard signage for this purpose that can be produced by the UNC Charlotte sign shop. This fulfills requirements in the NC Administrative Code- Reclaimed Water Regulations.

The standard signage for toilet and urinal flushing sites uses the following language:

UNC CHARLOTTE CONSERVES DRINKING WATER BY
FLUSHING THESE TOILETS AND URINALS WITH NON-POTABLE WATER
DO NOT DRINK -NO TOMAR

- f. Cross-Connection Control

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Connections between potable and non-potable water systems are not permitted. The CLTW ordinance and state regulations require an air gap between potable and non-potable water distribution lines. If a potable back-up without an air-gap is deemed necessary and is acceptable to UNC Charlotte Facilities Management and EHS, then an application for a site specific alternative cross-connection measure must be submitted to NCDENR DEH Public Water Supply.

g. Meters

For accurate billing for sanitary sewer utilization, the CLTW Rainwater System Requirements and Charges Policy requires measurement of NPW entering the building.

If the building uses reclaimed water only, the CLTW reclaimed water meter will be used to bill for sewer charges.

If the building uses rainwater only or a combination of reclaimed water with non-potable water sources, an CLTW meter measuring NPW entering the building will be used for sewer charges from CLTW.

The CLTW meters will also be used to bill for NPW usage.

Irrigation Systems

The UNC Charlotte design requirements for irrigation systems utilizing non-potable water rely on several sources described below.

a. Applicability

Irrigation systems planning for reclaimed water utilization must meet the NC Administration Code Reclaimed Water Regulations for setbacks from wells and surface waters.

It is recommended that all new irrigation systems use pipe and other components meeting non-potable water standards to prevent future costs associated with retrofits.

b. Pipe and Fixture Color

The color currently designated for irrigation systems with reclaimed water, harvested rainwater, and blended non-potable water is purple (pantone 522).

This color requirement can be found in the NC Administrative Code Reclaimed Water Regulations.

c. Sprinkler Heads

The NC Administrative Code consider sprinkler heads to be part of the distribution system that must be color-coded and labeled.

d. Spigots and Hose Bibs

Per the NC Administrative and NC Plumbing code, spigots, hose bibs/connections, and other outlets must either:

- i. Be located in locked, below grade vaults and labeled.
- ii. Require operation with tool that permits operation by authorized personnel only and be labeled.

e. Labeling

All pipes, sprinkler heads, fixtures, valves, and other fittings must be labeled per the NC Administrative Code – Reclaimed Water Regulations. UNC Charlotte requires that all NPW irrigation systems utilize the labeling in this regulation. These regulations specify locations, wording, frequency, color, size, etc.

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The University requires the following language to be included in the labeling:

RECLAIMED WATER – DO NOT DRINK – NO TOMAR

Or

NON-POTABLE WATER – DO NOT DRINK – NO TOMAR

f. Irrigation Area Signage

Signs must be placed at every site where reclaimed water is in use for irrigation. The university has developed standard signage for this purpose that can be produced by the UNC Charlotte sign shop. This fulfills requirement in the NC Administrative Code – Reclaimed Water Regulations.

The standard signage for irrigation sites uses the following language:

UNC CHARLOTTE CONSERVES DRINKING WATER BY
FLUSHING THESE TOILETS AND URINALS WITH NON-POTABLE
WATER
DO NOT DRINK -NO TOMAR

g. Cross-Connection Control.

Connections between potable and non-potable water systems are not permitted. The CLTW ordinance and state regulations require an air gap between potable and non-potable water distribution lines. If a potable back-up without an air-gap is deemed necessary and is acceptable to UNC Charlotte Facilities Management and EHS, then an application for a site specific alternative cross-connection measure must be submitted to NCDENR DEH Public Water Supply

h. Meters

A meter is required at each new irrigation site. Meters will be used to fulfill record keeping requirements under the UNC Charlotte Reclaimed Water Utilization Permit. Meter will also be used to bill for NPW usage.

If a site is served by RCW only, the CLTW RCW meter will serve the above purposes if the meter serves the irrigation only.

If a site is served by rainwater only or a combination of reclaimed water with other non-potable water sources, a separate UNC Charlotte NPW meter is required for measuring the combined NPW utilized for irrigation only. The UNC Charlotte NPW meters will conform to CLTW meter standards unless otherwise approved by UNC Charlotte Engineering Services Water Resource Manager.

Condensate Recovery

Use of condensate in non-potable water system is allowed and may be blended with rainwater when the provision of the NC Plumbing Code and the following UNC Charlotte Requirement are followed:

- a. Only condensate from UV treated air handling units are accepted.
- b. A valve on the condensate drain lines must be provided to divert coil cleaning wastewater to sanitary sewer drain.
- c. A raised drain to the storm/roof drainage is necessary to prevent accidental collection of any waste water.
- d. Signage indicating “No Biocide – Drains to Storms” must be placed on the air handler access doors.

Rainwater Harvesting

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Further design guidance on harvested rainwater treatment and cistern is forthcoming. The following are minimum standards.

- a. Harvested Rainwater for indoor toilets and urinal flushing uses is required by the NC Plumbing Code to be filtered and disinfected. UNC Charlotte requires UV as the disinfection method.
- b. Filtering prior to distribution within the irrigation system is recommended to protect irrigation heads.

Plumbing for Cooling Tower Make Up Water Applications

The UNC Charlotte design requirements for non-potable water use in cooling tower make up water rely on several sources described below.

- a. Applicability
All new cooling tower system shall be designed to consider the installation of Reclaimed water system as described herein to act as the primary source of make-up water.
- b. Materials
The following UNC Charlotte requirements for RCW and NPW systems serve as a further safeguard against cross-connections with potable water and provide greater corrosion resistance.
 - iv. Pipe material shall be CPVC Schedule 80, Cell Class 24448 (up to 6") or 23447 (8" or greater).
 - v. Fittings, Valves, and other appearances shall be CPVC Schedule 80, Cell Class 23447.
 - vi. All brass fittings, including flush valves, shall be DZR (dezincification resistant).
- c. Pipe Color
All pipes, fixtures, valves, and other fittings must be labeled per the NC Administrative Code – Reclaimed Water Regulations (RCW only) and the NC Plumbing Code (all NPW)
The color currently designated for plumbing systems with reclaimed water, harvested rainwater, and blended non-potable water is purple (pantone 522).

This color requirement can be found in the NC Administrative Code Reclaimed Water Regulations and the NC Plumbing Code.
- d. Labeling
All pipes, fixtures, valves, and other fittings must be labeled per the NC Administrative Code – Reclaimed Water Regulations (RCW only) and the NC Plumbing Code (all NPW). These regulations specify locations, wording, frequency, color, size, etc.
The University requires the following language to be included in the labeling:

RECLAIMED WATER – DO NOT DRINK – NO TOMAR
Or
NON-POTABLE WATER – DO NOT DRINK – NO TOMAR
- e. Point of Use Signage
Signs must be placed in RUPs and Cooling Tower Facilities where NPW is in use. The university has developed standard signage for this purpose that can be produced by the UNC Charlotte sign shop. This fulfills requirements in the NC Administrative Code- Reclaimed Water Regulations.

The standard signage for toilet and urinal flushing sites uses the following language:

UNC CHARLOTTE CONSERVES DRINKING WATER BY
PROVIDING COOLING TOWER MAKE UP WATER

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WITH NON-POTABLE WATER
DO NOT DRINK -NO TOMAR

- f. Cross-Connection Control
Connections between potable and non-potable water systems are not permitted. The CLTW ordinance and state regulations require an air gap between potable and non-potable water distribution lines. If a potable back-up without an air-gap is deemed necessary and is acceptable to UNC Charlotte Facilities Management and EHS, then an application for a site specific alternative cross-connection measure must be submitted to NCDENR DEH Public Water Supply.
- g. Meters
For accurate billing for make-up water utilization, the CLTW System Requirements and Charges Policy requires measurement of NPW Make Up Water Utilization by the cooling towers.



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