PROPOSED ORDINANCE

BE IT ORDAINED, by the Cook County Board of Commissioners, that Chapter 118, Articles IV and V of the Cook County Code are hereby enacted as follows:

Article IV. - ALTERNATE WATER SOURCES FOR NONPOTABLE APPLICATIONS

Sec. 118-50. – General.

(1) *Applicability*. The provisions of this chapter shall apply to the construction, alteration, and repair of alternate water source systems for nonpotable applications.
   (a) *Allowable use of alternate water*. Where approved or required by the Building Commissioner, alternate water sources [reclaimed (recycled) water, gray water, and on-site treated nonpotable water] shall be permitted to be used instead of potable water for the applications identified in this chapter.

(2) *System design*. Alternate water source systems shall be designed in accordance with this chapter by a licensed plumbing contractor or a registered design professional. Components, piping, and fittings used in any alternate water source system shall be listed.
   Exceptions:
   (a) A registered design professional is not required to design gray water systems having a maximum discharge capacity of 250 gallons per day (gal/d) (0.011 L/s) for single family and multi-family dwellings.
   (b) A registered design professional is not required to design an on-site treated nonpotable water system for single-family dwellings having a maximum discharge capacity of 250 gal/d (0.011 L/s).

(3) *Permit*. It shall be unlawful for a person to construct, install, alter, or cause to be constructed, installed, or altered an alternate water source system in a building or on a premise without first obtaining a permit to do such work from the Building Commissioner.

(4) *Component identification*. System components shall be properly identified as to the manufacturer.

(5) *Maintenance and inspection*. Alternate water source systems and components shall be inspected and maintained in accordance with Section 118-50.5(a) through Section 118-50.5(c).
   (a) *Frequency*. Alternate water source systems and components shall be inspected and maintained in accordance with Table 118-50.5 unless more frequent inspection and maintenance are required by the manufacturer.
   (b) *Maintenance log*. A maintenance log for gray water and on-site treated nonpotable water systems is required to have a permit in accordance with Section 118-50.3 and shall be maintained by the property owner and be available for inspection. The property owner or designated appointee shall ensure that a record of testing, inspection, and maintenance in accordance with Table 118-50.5 is maintained in the log. The log will indicate the frequency of inspection and maintenance for each system.
   (c) *Maintenance responsibility*. The required maintenance and inspection of alternate water source systems shall be the responsibility of the property owner unless otherwise required by the Building Commissioner.

TABLE 118-50.5 MINIMUM ALTERNATE WATER SOURCE TESTING, INSPECTION, AND MAINTENANCE FREQUENCY

DESCRIPTION	MINIMUM FREQUENCY
Inspect and clean filters and screens, and replace (where necessary).	Every 3 months
Inspect and verify that disinfection, filters, and water quality treatment devices and systems are operational and maintaining minimum water quality requirements as determined by the Building Commissioner.	In accordance with manufacturer's instructions, and the Building Commissioner.
Inspect pumps and verify operation.	After initial installation and every 12 months thereafter
Inspect valves and verify operation.	After initial installation and every 12 months thereafter
Inspect pressure tanks and verify operation.	After initial installation and every 12 months thereafter
Clear debris from and inspect storage tanks, locking devices, and verify operation.	After initial installation and every 12 months thereafter
Inspect caution labels and marking.	After initial installation and every 12 months thereafter
Inspect and maintain mulch basins for gray water irrigation systems.	As needed to maintain mulch depth and prevent ponding and runoff.
Cross-connection inspection and test*	After initial installation and every 12 months thereafter

* The cross-connection test shall be performed in the presence of the Building Commissioner in accordance with the requirements of this chapter.

(6) *Operation and maintenance manual*. An operation and maintenance manual for gray water and on-site treated water systems required to have a permit in accordance with Section 118-50.3 shall be supplied to the building owner by the system designer. The operation and maintenance manual shall include the following:
   (a) Detailed diagram of the entire system and the location of system components.
   (b) Instructions for operating and maintaining the system.
   (c) Details on maintaining the required water quality for on-site nonpotable water systems.
   (d) Details on deactivating the system for maintenance, repair, or other purposes.
   (e) Applicable testing, inspection, and maintenance frequencies in accordance with Table 118-50.5.
   (f) A method of contacting the manufacturer(s).

(7) *Minimum water quality requirements*. The minimum water quality for alternate water source systems shall meet the applicable water quality requirements for the intended application as determined by the Building Commissioner. In the absence of water quality requirements, for on-

site treated nonpotable systems, the water quality requirements of IAPMO IGC 324 or NSF/ANSI 350 shall apply.

Exception: Water treatment is not required for gray water used for subsurface irrigation.

(8) *Material compatibility*. Alternate water source systems shall be constructed of materials that are compatible with the type of pipe and fitting materials, water treatment, and water conditions in the system.

(9) *Commercial, industrial, and institutional restroom signs*. A sign shall be installed in restrooms in commercial, industrial, and institutional occupancies using reclaimed (recycled) water and on-site treated water, for water closets, urinals, or both. Each sign shall contain ½ of an inch (12.7 mm) letters of a highly visible color on a contrasting background. The location of the sign(s) shall be such that the sign(s) are visible to users. The location of the sign(s) shall be approved by the Building Commissioner and shall contain the following text:

TO CONSERVE WATER, THIS BUILDING USES *_____* TO FLUSH TOILETS AND URINALS.

(a) *Equipment room signs*. Each room containing reclaimed (recycled) water and on-site treated water equipment shall have a sign posted in a location that is visible to anyone working on or near nonpotable water equipment with the following wording in 1 inch (25.4 mm) letters:

CAUTION: NONPOTABLE *_____*, DO NOT DRINK. DO NOT CONNECT TO DRINKING WATER SYSTEM. NOTICE: CONTACT BUILDING MANAGEMENT BEFORE PERFORMING ANY WORK ON THIS WATER SYSTEM.

*_____*Shall indicate RECLAIMED (RECYCLED) WATER or ON-SITE TREATED WATER, accordingly.

(10) *System controls*. Controls for pumps, valves, and other devices that contain mercury that come in contact with alternate water source water supply shall not be permitted.

Sec. 118-51. – Inspection and testing.

(1) *General*. Alternate water source systems shall be inspected and tested in accordance with Section 118-51.2 through Section 118-51.3(d).

(2) *Supply system inspection and test*. Alternate water source systems shall be inspected and tested in accordance with this code for testing of potable water piping.

(3) *Annual cross-connection inspection and testing.* An initial and subsequent annual inspection and test shall be performed on both the potable and alternate water source systems. The potable and alternate water source system shall be isolated from each other and independently inspected and tested to ensure there is no cross-connection in accordance with Section 118-51.3(a) through Section 118-51.3(d).

(a) *Visual system inspection*. Before commencing the cross-connection testing, a dual system inspection shall be conducted by the Building Commissioner as follows:

1. Meter locations of the alternate water source and potable water lines shall be checked to verify that no modifications were made and that no cross-connections are visible.
2. Pumps and equipment, equipment room signs and exposed piping in equipment room shall be checked.
3. Valves shall be checked to ensure that the valve lock seals are still in place and intact. Valve control door signs shall be checked to verify that no signs have been removed.

(b) *Cross-connection test*. The procedure for determining cross-connection shall be followed by the applicant in the presence of the Building Commissioner to determine whether a cross-connection has occurred as follows:

1. The potable water system shall be activated and pressurized. The alternate water source system shall be shut down, depressurized, and drained.
2. The potable water system shall remain pressurized for a minimum period specified by the Building Commissioner while the alternate water source system is empty. The minimum period the alternate water source system is to remain depressurized shall be determined on

a case-by-case basis, taking into account the size and complexity of the potable and the alternate water source distribution systems, but in no case shall that period be less than 1 hour.

3. The drain on the alternate water source system shall be checked for flow during the test and fixtures, potable and alternate water source, shall be tested and inspected for flow. Flow from an alternate water source system outlet indicates a cross-connection. No flow from a potable water outlet shall indicate that it is connected to the alternate water source system.
4. The potable water system shall then be depressurized and drained.
5. The alternate water source system shall then be activated and pressurized.
6. The alternate water source system shall remain pressurized for a minimum period specified by the Building Commissioner while the potable water system is empty. The minimum period the potable water system is to remain depressurized shall be determined on a case-by-case basis, but in no case shall that period be less than 1 hour.
7. Fixtures, potable, and alternate water source shall be tested and inspected for flow. Flow from a potable water system outlet indicates a cross-connection. No flow from an alternate water source outlet will indicate that it is connected to the potable water system.
8. The drain on the potable water system shall be checked for flow during the test and at the end of the test.
9. Where there is no flow detected in the fixtures which would indicate a cross-connection, the potable water system shall be repressurized.

(c) *Discovery of cross-connection*. If a cross-connection is discovered, the following procedure, in the presence of the Building Commissioner, shall be activated immediately:

1. The alternate water source piping to the building shall be shutdown at the meter, and the alternate water source riser shall be drained.
2. Potable water piping to the building shall be shutdown at the meter.
3. The cross-connection shall be uncovered and disconnected.
4. The building shall be retested in accordance with Section 118-51.3(a) and Section 118-51.3(b).
5. The potable water system shall be chlorinated with 50 parts-per-million (ppm) chlorine for 24 hours.
6. The potable water system shall be flushed after 24 hours, and a standard bacteriological test shall be performed. Where test results are acceptable, the potable water system shall be permitted to be recharged.

(d) *Annual inspection*. An annual inspection of the alternate water source system, following the procedures listed in Section 118-51.3(a) shall be required. Annual cross-connection testing, following the procedures listed in Section 118-51.3(b) shall be required by the Building Commissioner, unless site conditions do not require it. In no event shall the test occur less than once in 4 years. Alternate testing requirements shall be permitted by the Building Commissioner.

(4) *Separation requirements*. Underground alternate water source service piping other than gray water shall be separated from the building sewer in accordance with this code. Pipes carrying treated nonpotable water shall be permitted to be run or laid in the same trench as potable water pipes with a 12 inch (305 mm) minimum vertical and horizontal separation where both pipe materials are approved for use within a building. Where horizontal piping materials do not comply with this requirement, the minimum separation shall be increased to 60 inches (1524 mm). The potable water piping shall be installed at an elevation above the treated nonpotable water piping.

(5) *Abandonment*. Alternate water source systems that are no longer in use or fail to be maintained in accordance with Section 118-50.5 shall be abandoned. Abandonment shall comply with Section 118-51.5(a) and Section 118-51.5(b).

(a) General. An abandoned system or part thereof covered under the scope of this chapter shall be disconnected from remaining systems, drained, plugged, and capped in an approved manner.
(b) Underground Tank. An underground water storage tank that has been abandoned or otherwise discontinued from use in a system covered under the scope of this chapter shall be completely drained and filled with earth, sand, gravel, concrete, or other approved material or removed in a manner satisfactory to the Building Commissioner.

(6) *Sizing*. Unless otherwise provided for in this chapter, alternate water source piping shall be sized in accordance with 18-29-601 for sizing potable water piping.

Sec. 118-52. – Gray Water Systems.

(1) *General*. The provisions of this section shall apply to the construction, alteration, and repair of gray water systems.

(2) *System requirements*. Gray water shall be permitted to be diverted away from a sewer or private sewage disposal system, and discharge to a subsurface irrigation or subsoil irrigation system. The gray water shall be permitted to discharge to a mulch basin for single-family and multi-family dwellings. Gray water shall not be used to irrigate root crops or food crops intended for human consumption that comes in contact with soil.
   (a) Surge Capacity. Gray water systems shall be designed to have the capacity to accommodate peak flow rates and distribute the total amount of estimated gray water on a daily basis to a subsurface irrigation field, subsoil irrigation field, or mulch basin without surfacing, ponding, or runoff. A surge tank is required for systems that are unable to accommodate peak flow rates and distribute the total amount of gray water by gravity drainage. The water discharge for gray water systems shall be determined in accordance with Section 118-52.8(a) or Section 118-52.8(b).
   (b) *Diversion*. The gray water system shall connect to the sanitary drainage system downstream of fixture traps and vent connections through a gray water diverter valve. The gray water diverter valve shall comply with IAPMO PS 59 and be installed in an accessible location and clearly indicate the direction of flow.
   (c) *Backwater valves*. Gray water drains subject to backflow shall be provided with a backwater valve so located as to be accessible for inspection and maintenance.

(3) *Connections to potable and reclaimed (recycled) water systems*. Gray water systems shall have no direct connection to a potable water supply, on-site treated nonpotable water supply, or reclaimed (recycled) water systems. Potable, on-site treated nonpotable, or reclaimed (recycled) water is permitted to be used as makeup water for a non-pressurized storage tank provided the connection is protected by an air gap in accordance with this code.

(4) *Location*. No gray water system or part thereof shall be located on a lot other than the lot that is the site of the building or structure that discharges the gray water, nor shall a gray water system or part thereof be located at a point having less than the minimum distances indicated in Table 118-52.4.

TABLE 118-52.4 LOCATION OF GRAY WATER SYSTEM[7]

MINIMUM HORIZONTAL DISTANCE IN CLEAR REQUIRED FROM	SURGE TANK (feet)	SUBSURFACE AND SUBSOIL IRRIGATION FIELD AND MULCH BED (feet)
Building structures[1]	5[2], 9	2[3], 8

Property line adjoining private property	5	5[8]
Water supply wells[4]	50	100
Streams and lakes[4]	50	50[5]
Sewage pits or cesspools	5	5
Sewage disposal field[10]	5	4[6]
Septic tank	0	5
On-site domestic water service line	5	5
Pressurized public water main	10	10[7]

For SI units: 1 foot = 304.8 mm

Notes:

[1] Including porches and steps, whether covered or uncovered, breezeways, roofed carports, roofed patios, carports, covered walks, covered drive- ways, and similar structures or appurtenances.

[2] The distance shall be permitted to be reduced to 0 feet for aboveground tanks where first approved by the Building Commissioner.

[3] Reference to a 45 degree (0.79 rad) angle from the foundation.

[4] Where special hazards are involved, the distance required shall be increased as directed by the Building Commissioner.

[5] These minimum clear horizontal distances shall apply between the irrigation or disposal field and the ocean mean higher high tide line.

[6] Add 2 feet (610 mm) for each additional foot of depth more than 1 foot (305 mm) below the bottom of the drain line.

[7] For parallel construction or crossings, approval by the Building Commissioner shall be required.

[8] The distance shall be permitted to be reduced to 1½ feet (457 mm) for drip and mulch basin irrigation systems.

[9] The distance shall be permitted to be reduced to 0 feet for surge tanks of 75 gallons (284 L) or less.

[10] Where irrigation or disposal fields are installed in the sloping ground, the minimum horizontal distance between a part of the distribution system and the ground surface shall be 15 feet (4572 mm).

(5) *Plot plan submission*. No permit for a gray water system shall be issued until a plot plan with data satisfactory to the Building Commissioner has been submitted and approved.

(6) *Prohibited location*. Where there is insufficient lot area or inappropriate soil conditions for adequate absorption to prevent the ponding, surfacing, or runoff of the gray water, as determined by the Building Commissioner, no gray water system shall be permitted. A gray water system is not permitted on a property in a geologically sensitive area as determined by the Building Commissioner.

(7) *Drawings and specifications*. The Building Commissioner shall require the following information to be included with or in the plot plan before a permit is issued for a gray water system, or at a time during the construction thereof:

(a) Plot plan drawn to scale and completely dimensioned, showing lot lines and structures, direction and approximate slope of surface, location of present or proposed retaining walls, drainage channels, water supply lines, wells, paved areas and structures on the plot, number of bedrooms and plumbing fixtures in each structure, location of private sewage disposal system and expansion area or building sewer connecting to the public sewer, and location of the proposed gray water system.

(b) Details of construction necessary to ensure compliance with the requirements of this chapter, together with a full description of the complete installation, including installation methods, construction, and materials in accordance with the Building Commissioner.

(c) Details for holding tanks shall include dimensions, structural calculations, bracings, and such other pertinent data as required.

(d) A log of soil formations and groundwater level as determined by test holes dug in proximity to proposed irrigation area, together with a statement of water absorption characteristics of the soil at the proposed site as determined by approved percolation tests.
Exception: The Building Commissioner shall permit the use of Table 118-53.2 instead of percolation tests.

(e) Distance between the plot and surface waters such as lakes, ponds, rivers or streams, and the slope of the plot and the surface water, wherein close proximity.

(8) *Procedure for estimating gray water discharge*. Gray water systems shall be designed to distribute the total amount of estimated gray water on a daily basis. The water discharge for gray water systems shall be determined in accordance with Section 118-52.8(a) or Section 118-52.8(b).

(a) *Single family dwellings and multi-family dwellings*. The gray water discharge for single family and multi-family dwellings shall be calculated by water use records, calculations of local daily per person interior water use, or the following procedure:

1. The number of occupants of each dwelling unit shall be calculated as follows:

First bedroom	2 occupants
Each additional bedroom	1 occupant

2. The estimated gray water flows of each occupant shall be calculated as follows:

Showers, bathtubs, and lavatories	25 gallons (95 L) per day/occupant
Laundry	15 gallons (57 L) per day/occupant

3. The total number of occupants shall be multiplied by the applicable estimated gray water discharge as provided above and the type of fixtures connected to the gray water system.

(b) *Commercial, industrial, and institutional occupancies*. The gray water discharge for commercial, industrial, and institutional occupancies shall be calculated by utilizing the

procedure in Section 118-52.8(a), water use records or other documentation to estimate gray water discharge.

(9) *Gray water system components*. Gray water system components shall comply with Section 118-52.9(a) through Section 118-52.9(g).

(a) *Surge tanks*. Where installed, surge tanks shall be in accordance with the following:

1. Surge tanks shall be constructed of solid, durable materials not subject to excessive corrosion or decay and shall be watertight. Surge tanks constructed of steel shall be approved by the Building Commissioner, provided such tanks are in accordance with approved applicable standards.
2. Each surge tank shall be vented in accordance with this code. The vent size shall be determined based on the total gray water fixture units as outlined in this code.
3. Each surge tank shall have an access opening with lockable gasketed covers or approved equivalent to allow for inspection and cleaning.
4. Each surge tank shall have its rated capacity permanently marked on the unit. Also, a sign stating GRAY WATER, DANGER — UNSAFE WATER shall be permanently marked on the holding tank.
5. Each surge tank shall have an overflow drain. The overflow drains shall have permanent connections to the building drain or building sewer, upstream of septic tanks. The overflow drain shall not be equipped with a shutoff valve.
6. The overflow drainpipes shall not be less in size than the inlet pipe. Unions or equally effective fittings shall be provided for piping connected to the surge tank.
7. Surge tank shall be structurally designed to withstand anticipated earth or other loads. Surge tank covers shall be capable of supporting an earth load of not less than 300 pounds per square foot (lb/ft^2) (1465 kg/m^2) where the tank is designed for underground installation.
8. Where a surge tank is installed underground, the system shall be designed so that the tank overflow will gravity drain to the existing sewer line or septic tank. The tank shall be protected against sewer line backflow by a backwater valve installed in accordance with this code.
9. Surge tanks shall be installed on dry, level, well-compacted soil where underground or on a level 3 inch (76 mm) thick concrete slab where aboveground.
10. Surge tanks shall be anchored to prevent against overturning where installed aboveground. Underground tanks shall be ballasted, anchored, or otherwise secured, to prevent the tank from floating out of the ground where empty. The combined weight of the tank and hold down system shall meet or exceed the buoyancy forces of the tank.

(b) *Gray water pipe and fitting materials*. Aboveground and underground building drainage and vent pipe and fittings for gray water systems shall comply with the requirements for aboveground and underground sanitary building drainage and vent pipe and fittings in this code. These materials shall extend not less than 2 feet (610 mm) outside the building.

(c) *Subsoil irrigation field materials*. Subsoil irrigation field piping shall be constructed of perforated high-density polyethylene pipe, perforated ABS pipe, perforated PVC pipe, or other approved materials, provided that sufficient openings are available for distribution of the gray water into the trench area. Material, construction, and perforation of the pipe shall be in accordance with the appropriate absorption field drainage piping standards and shall be approved by the Building Commissioner.

(d) *Subsurface irrigation field and mulch basin supply line materials*. Materials for gray water piping outside the building shall be polyethylene or PVC. Drip feeder lines shall be PVC or polyethylene tubing.

(e) *Valves*. Valves shall be accessible.

(f) *Trap*. Gray water piping discharging into the surge tank or having a direct connection to the sanitary drain or sewer piping shall be downstream of an approved water seal type trap(s).

Where no such trap(s) exists, an approved vented running trap shall be installed upstream of the connection to protect the building from possible waste or sewer gases.

(g) *Backwater valve*. A backwater valve shall be installed on gray water drain connections to the sanitary drain or sewer.

Sec. 118-53. – Subsurface irrigation system zones.

(1) *General*. Irrigation or disposal fields shall be permitted to have one or more valved zones. Each zone shall be of a size to receive the gray water anticipated in that zone.

(2) *Required area of subsurface irrigation fields, subsoil irrigation fields, and mulch basins.* The minimum effective irrigation area of subsurface irrigation fields, subsoil irrigation fields, and mulch basins shall be determined by Table 118-53.2 for the type of soil found in the excavation, based upon a calculation of estimated gray water discharge under Section 118-52.8. For a subsoil irrigation field, the area shall be equal to the aggregate length of the perforated pipe sections within the valved zone multiplied by the width of the proposed subsoil irrigation field.

(3) *Determination of maximum absorption capacity*. The irrigation field and mulch basin size shall be based on the maximum absorption capacity of the soil and determined using Table 118-53.2. For soils not listed in Table 118-53.2, the maximum absorption capacity for the proposed site shall be determined by percolation tests or another method acceptable to the Building Commissioner. A gray water system shall not be permitted, where the percolation test shows the absorption capacity of the soil is unable to accommodate the maximum discharge of the proposed gray water irrigation system.

(4) *Groundwater level*. No excavation for an irrigation field, disposal field, or mulch basin shall extend within 3 feet (914 mm) vertical of the highest known seasonal groundwater level, nor to a depth where gray water contaminates the groundwater or surface water. The applicant shall supply evidence of groundwater depth to the satisfaction of the Building Commissioner.

TABLE 118-53.2 DESIGN OF SIX TYPICAL SOILS		
TYPE OF SOIL	MINIMUM SQUARE FEET OF IRRIGATION AREA PER 100 GALLONS OF ESTIMATED GRAY WATER DISCHARGE PER DAY	MAXIMUM ABSORPTION CAPACITY IN GALLONS PER SQUARE FOOT OF IRRIGATION/ LEACHING AREA FOR A 24-HOUR PERIOD
Coarse sand or gravel	20	5.0
Fine sand	25	4.0
Sandy loam	40	2.5
Sandy clay	60	1.7
Clay with consider- able sand or gravel	90	1.1
Clay with small amounts of sand or gravel	120	0.8

For SI units: 1 square foot = 0.0929 m^2, 1 gallon per day = 0.000043 L/s

(5) *Subsurface and subsoil irrigation field design and construction*. Subsurface and subsoil irrigation field design and construction shall be in accordance with Section 118-53.5(a) through Section 118-53.7(c). Where a gray water irrigation system design is predicated on soil tests, the subsurface or subsoil irrigation field or mulch basin shall be installed at the same location and depth as the tested area.

(a) *Subsurface irrigation field*. A subsurface irrigation field shall comply with Section 118-53.5(b) through Section 118-53.5(g).

(b) *Minimum depth*. Supply piping, including drip feeders, shall be not less than 2 inches (51 mm) below finished grade and covered with mulch or soil.

(c) *Filter*. Not less than 140 mesh (105 microns) filter with a capacity of 25 gallons per minute (gpm) (1.58 L/s), or equivalent shall be installed. Where a filter backwash is installed, the backwash and flush discharge shall discharge into the building sewer or private sewage disposal system. Filter backwash and flush water shall not be used.

(d) *Emitter size*. Emitters shall be installed in accordance with the manufacturer's installation instructions. Emitters shall have a flow path of not less than 1200 microns (μ) (1200 μm) and shall not have a coefficient of manufacturing variation (Cv) exceeding 7 percent. Irrigation system design shall be such that emitter flow variation shall not exceed 10 percent.

(e) *Number of emitters*. The minimum number of emitters and the maximum discharge of each emitter in an irrigation field shall be in accordance with Table 118-53.5(e).

(f) *Controls*. The system design shall provide user controls, such as valves, switches, timers, and other controllers, to rotate the distribution of gray water between irrigation zones.

(g) *Maximum pressure*. Where pressure at the discharge side of the pump exceeds 20 pounds-force per square inch (psi) (138 kPa), a pressure-reducing valve able to maintain downstream pressure not exceeding 20 psi (138 kPa) shall be installed downstream from the pump and before an emission device.

TABLE 118-53.5(e) SUBSURFACE IRRIGATION DESIGN CRITERIA FOR SIX TYPICAL SOILS

TYPE OF SOIL	MAXIMUM EMITTER DISCHARGE (gallons per day)	MINIMUM NUMBER OF EMITTERS PER GAL-LON OF ESTIMATED GRAY WATER DISCHARGE PER DAY* (gallons per day)
Sand	1.8	0.6
Sandy loam	1.4	0.7
Loam	1.2	0.9
Clay loam	0.9	1.1
Silty clay	0.6	1.6
Clay	0.5	2.0

For SI units: 1 gallon per day = 0.000043 L/s

* The estimated gray water discharge per day shall be determined in accordance with Section 118-52.8 of this code.

(6) *Mulch basin design and construction*. A mulch basin shall comply with Section 118-53.6(a) through Section 118-53.6(d).

(a) *Single family and multi-family dwellings*. The gray water discharge to a mulch basin is limited to single family and multi-family dwellings.

(b) *Size*. Mulch basins shall be of sufficient size to accommodate peak flow rates and distribute the total amount of estimated gray water on a daily basis without surfacing, ponding or runoff. Mulch basins shall have a depth of not less than 10 inches (254 mm) below finished grade. The mulch basin size shall be based on the maximum absorption capacity of the soil and determined using Table 118-53.2.

(c) *Minimum depth*. Gray water supply piping, including drip feeders, shall be not less than 2 inches (51 mm) below finished grade and covered with mulch.

(d) *Maintenance*. The mulch basin shall be maintained periodically to retain the required depth and area, and to replenish the required mulch cover.

(7) *Subsoil irrigation field*. Subsoil irrigation fields shall comply with Section 118-53.7(a) through Section 118-53.7(c).

(a) *Minimum pipe size*. Subsoil irrigation field distribution piping shall be not less than 3 inches (80 mm) diameter.

(b) *Filter material and backfill*. Filter material, clean stone, gravel, slag, or similar material acceptable to the Building Commissioner, varying in size from ¾ of an inch (19.1 mm) to 2½ inches (64 mm) shall be placed in the trench to the depth and grade in accordance with Table 118-53.7(c). The perforated section of subsoil irrigation field distribution piping shall be laid on the filter material in an approved manner. The perforated section shall then be covered with filter material to the minimum depth in accordance with Table 118-53.7(c). The filter material shall then be covered with porous material to prevent the closure of voids with earth backfill. No earth backfill shall be placed over the filter material cover until after inspection and acceptance.

(c) *Subsoil irrigation field construction*. Subsoil irrigation fields shall be constructed in accordance with Table 118-53.7(c). Where necessary on sloping ground to prevent excessive line slopes, irrigation lines shall be stepped. The lines between each horizontal leaching section shall be made with approved watertight joints and installed on the natural or unfilled ground.

TABLE 118-53.7(c) SUBSOIL IRRIGATION FIELD CONSTRUCTION

DESCRIPTION	MINIMUM	MAXIMUM
Number of drain lines per valved zone	1	–
Length of each perforated line	–	100 feet
Bottom width of trench	12 inches	18 inches
Spacing of lines, center to center	4 feet	–
Depth of earth covers of lines	10 inches	–
Depth of filter material cover of lines	2 inches	–
Depth of filter material beneath lines	3 inches	–
Grade of perforated lines level	level	3 inches per 100 feet

For SI units: 1 inch = 25.4 mm, 1 foot = 304.8 mm, 1 inch per foot = 83.3 mm/m

(8) *Gray water system color and marking information*. Pressurized gray water distribution systems shall be identified as containing nonpotable water in accordance with 18-29-608.8 of this code.

(9) *Other collection and distribution systems*. Other collection and distribution systems shall be approved by the local Building Commissioner, as allowed by 18-29-105.4 of this code.

(a) *Higher Requirements*. Nothing contained in this chapter shall be construed to prevent the Building Commissioner from requiring compliance with higher requirements than those contained herein, where such higher requirements are essential to maintaining a safe and sanitary condition.

(10) *Testing*. Building drains and vents for gray water systems shall be tested in accordance with this code. Surge tanks shall be filled with water to the overflow line prior to and during the inspection. Seams and joints shall be left exposed, and the tank shall remain watertight. A flow test shall be performed through the system to the point of gray water discharge. Lines and components shall be watertight up to the point of the irrigation perforated and drip lines.

(11) *Maintenance*. Gray water systems and components shall be maintained in accordance with Table 118-50.5.

Sec. 118-54. – Reclaimed (recycled) water systems.

(1) *General*. The provisions of this section shall apply to the installation, construction, alteration, and repair of reclaimed (recycled) water systems intended to supply uses such as water closets, urinals, trap primers for floor drains and floor sinks, aboveground and subsurface irrigation, industrial or commercial cooling or air conditioning and other uses approved by the Building Commissioner.

(2) *Permit*. It shall be unlawful for a person to construct, install, alter, or cause to be constructed, installed, or altered a reclaimed (recycled) water system within a building or on premises without first obtaining a permit to do such work from the Building Commissioner.

(a) Plumbing Plan Submission. No permit for a reclaimed (recycled) water system shall be issued until complete plumbing plans, with data satisfactory to the Building Commissioner, have been submitted and approved.

(3) *System changes*. No changes or connections shall be made to either the reclaimed (recycled) water system or the potable water system within site containing a reclaimed (recycled) water system without approval by the Building Commissioner.

(4) *Connections to potable or reclaimed (recycled) water systems*. Reclaimed (recycled) water systems shall have no connection to a potable water supply or alternate water source system. Potable water is permitted to be used as makeup water for a reclaimed (recycled) water storage tank provided the water supply inlet is protected by an air gap or reduced-pressure principle backflow preventer in accordance with this code.

(5) *Water pressure*. Reclaimed (recycled) water systems supplying water to water closets, urinals, and trap primers shall be capable of delivering not less than 15 pounds-force per square inch (psi) (103 kPa) residual pressure at the highest and most remote outlet served. Where the water pressure in the reclaimed water supply system within the building exceeds 80 psi (552 kPa), a pressure reducing valve reducing the pressure to 80 psi (552 kPa) or less to water outlets in the building shall be installed.

(6) *Initial cross-connection test*. A cross-connection test is required in accordance with Section 118-51.3. Before the building is occupied or the system is activated, the installer shall perform the initial cross-connection test in the presence of the Building Commissioner. The test shall be ruled successful by the Building Commissioner before final approval is granted.

(7) *Reclaimed (recycled) water system materials*. Reclaimed (recycled) water supply and distribution system materials shall comply with the requirements of this code for potable water supply and distribution systems unless otherwise provided for in this section.

(8) *Reclaimed (recycled) water system color and marking information*. Reclaimed (recycled) water systems shall have a colored background and marking information in accordance with 18-29-608.8 of this code.

(9) *Valves*. Valves, except fixture supply control valves, shall be equipped with a locking feature.

(10) *Hose Bibbs*. Hose bibbs shall not be allowed on reclaimed (recycled) water piping systems located in areas accessible to the public. Access to reclaimed (recycled) water at points in the system accessible to the public shall be through a quick-disconnect device that differs from those installed on the potable water system. Hose bibbs supplying reclaimed (recycled) water shall be marked with the words: “CAUTION: NONPOTABLE RECLAIMED WATER, DO NOT DRINK,” and the symbol in Figure 118-54.10.

FIGURE 118-54.10

(11) *Required appurtenances*. The reclaimed (recycled) water system and the potable water system within the building shall be provided with the required appurtenances (e.g., valves, air/vacuum relief valves, etc.) to allow for deactivation or drainage as required for a cross-connection test in accordance with Section 118-51.3.

(12) *Same trench as potable water pipes*. Reclaimed (recycled) water pipes shall be permitted to be run or laid in the same trench as potable water pipes with 12 inches (305 mm) minimum vertical and horizontal separation where both pipe materials are approved for use within a building. Where piping materials do not meet this requirement, the minimum horizontal separation shall be increased to 60 inches (1524 mm). The potable water piping shall be installed at an elevation above the reclaimed (recycled) water piping. Reclaimed (recycled) water pipes laid in the same trench or crossing building sewer or drainage piping shall be installed in accordance with this code for potable water piping.

(13) *Signs*. Signs in rooms and water closet tanks in buildings using reclaimed (recycled) water shall be in accordance with Section 118-50.9 and Section 118-50.9(a).

(14) Inspection and Testing. Reclaimed (recycled) water systems shall be inspected and tested in accordance with Section 118-51.1.

Sec. 118-55. – On-site treated nonpotable water systems.

(1) *General*. The provisions of this section shall apply to the installation, construction, alteration, and repair of on-site treated nonpotable water systems intended to supply uses such as water closets, urinals, trap primers for floor drains and floor sinks, above and belowground irrigation, and other uses approved by the Building Commissioner.

(2) *Plumbing plan submission*. No permit for an on-site treated nonpotable water system shall be issued until complete plumbing plans, with data satisfactory to the Building Commissioner, have been submitted and approved.

(3) *System changes*. No changes or connections shall be made to either the on-site treated nonpotable water system or the potable water system within a site containing an on-site treated nonpotable water system without approval by the Building Commissioner.

(4) *Connections to potable or reclaimed (recycled) water systems*. On-site treated nonpotable water systems shall have no connection to a potable water supply or reclaimed (recycled) water source system. Potable or reclaimed (recycled) water is permitted to be used as makeup water for a non-pressurized storage tank provided the makeup water supply is protected by an air gap in accordance with this code.

(5) *Water pressure*. On-site treated non-potable water systems supplying water to water closets, urinals, and trap primers shall be capable of delivering not less than 15 pounds-force per square inch (psi) (103 kPa) residual pressure at the highest and most remote outlet served. Where the water pressure in the on-site treated non-potable water supply system within the building exceeds 80 psi

(552 kPa), a pressure reducing valve reducing the pressure to 80 psi (552 kPa) or less to water outlets in the building shall be installed.

(6) *Initial cross-connection test*. A cross-connection test is required in accordance with Section 118-51.3. Before the building is occupied or the system is activated, the installer shall perform the initial cross-connection test in the presence of the Building Commissioner. The test shall be ruled successful by the Building Commissioner before final approval is granted.

(7) *On-site treated nonpotable water system materials*. On-site treated nonpotable water supply, and distribution system materials shall comply with the requirements of this code for potable water supply and distribution systems unless otherwise provided for in this section.

(8) *On-site treated nonpotable water devices and systems*. Devices or equipment used to treat on-site treated nonpotable water to maintain the minimum water quality requirements determined by the Building Commissioner shall be listed and labeled (third-party certified) by a listing agency (accredited conformity assessment body) or approved for the intended application. Devices or equipment used to treat on-site treated nonpotable water for use in the water closet and urinal flushing, surface irrigation, and similar applications shall comply with IAPMO IGC 324, NSF/ANSI 350 or approved by the Building Commissioner.

(9) *On-site treated nonpotable water system color and marking information*. On-site treated water systems shall have a colored background and marking information in accordance with 18-29-608.8 of this code.

(10) *Design and installation*. The design and installation of on-site treated nonpotable systems shall be in accordance with Section 118-55.10(a) through Section 118-55.10(e).

(a) *Listing terms and installation instructions*. On-site treated nonpotable water systems shall be installed in accordance with the terms of its listing and the manufacturer's installation instructions.

(b) *Minimum water quality*. On-site treated nonpotable water supplied to toilets or urinals or for other uses in which it is sprayed or exposed shall be disinfected. Acceptable disinfection methods shall include chlorination, ultraviolet sterilization, ozone, or other methods as approved by the Building Commissioner. The minimum water quality for on-site treated nonpotable water systems shall meet the applicable water quality requirements for the intended applications as determined by the public health Building Commissioner.

(c) *Deactivation and drainage*. The on-site treated nonpotable water system and the potable water system within the building shall be provided with the required appurtenances (e.g., valves, air/vacuum relief valves, etc.) to allow for deactivation or drainage as required for a cross-connection test in accordance with Section 118-51.3.

(d) *Near underground potable water pipe*. On-site treated nonpotable water pipes shall be permitted to be run or laid in the same trench as potable water pipes with a 12 inch (305 mm) minimum vertical and horizontal separation where both pipe materials are approved for use within a building. Where piping materials do not meet this requirement the minimum separation shall be increased to 60 inches (1524 mm). The potable water piping shall be installed at an elevation above the on-site treated nonpotable water piping.

(e) *Required filters*. A filter permitting the passage of particulates no larger than 100 microns (100 µm) shall be provided for on-site treated nonpotable water supplied to water closets, urinals, trap primers, and drip irrigation system.

(11) *Valves*. Valves, except fixture supply control valves, shall be equipped with a locking feature.

(12) *Signs*. Signs in buildings using on-site treated nonpotable water shall comply with Section 118-50.9 and Section 118-50.9(a).

(13) *Inspection and Testing*. On-site treated nonpotable water systems shall be inspected and tested in accordance with Section 118-51.1.

Article V. – NONPOTABLE RAINWATER CATCHMENT SYSTEMS

Sec. 118-56. – General.

(1) *Applicability*. The provisions of this chapter shall apply to the installation, construction, alteration, and repair of nonpotable rainwater catchment systems.
   (a) *Allowable Use of Alternate Water*. Where approved or required by the Building Commissioner, rainwater shall be permitted to be used instead of potable water for the applications identified in this chapter.

(2) *System design*. Rainwater catchment systems shall be designed in accordance with this chapter by a licensed plumbing contractor or registered design professional. Components, piping, and fittings used in a rainwater catchment system shall be listed.
   Exceptions:
   (a) A person registered or licensed to perform plumbing design work is not required to design rainwater catchment systems used for irrigation with a maximum storage capacity of 360 gallons (1363 L).
   (b) A person registered or licensed to perform plumbing design work is not required to design rainwater catchment systems for single family dwellings where outlets, piping, and system components are located on the exterior of the building.

(3) *Permit*. It shall be unlawful for a person to construct, install, alter, or cause to be constructed, installed, or altered a rainwater catchment system in a building or on a premise without first obtaining a permit to do such work from the Building Commissioner.
   Exceptions:
   (a) A permit is not required for exterior rainwater catchment systems used for outdoor drip and subsurface irrigation with a maximum storage capacity of 360 gallons (1363 L).
   (b) A plumbing permit is not required for rainwater catchment systems for single family dwellings where outlets, piping, and system components are located on the exterior of the building. This does not exempt the need for permits where required for electrical connections, tank supports, or enclosures.

(4) *Component identification*. System components shall be properly identified as to the manufacturer.

(5) *Maintenance and inspection*. Rainwater catchment systems and components shall be inspected and maintained in accordance with Section 118-56.5(a) through Section 118-56.5(c).
   (a) *Frequency*. Rainwater catchment systems and components shall be inspected and maintained in accordance with Table 118-56.5 unless more frequent inspection and maintenance are required by the manufacturer.

TABLE 118-56.5
MINIMUM ALTERNATE WATER SOURCE TESTING, INSPECTION, AND MAINTENANCE FREQUENCY

DESCRIPTION	MINIMUM FREQUENCY
Inspect and clean filters and screens, and replace (where necessary).	Every 3 months
Inspect and verify that disinfection, filters, and water quality treatment devices and systems are operational and maintaining minimum water quality	In accordance with manufacturer's instructions and the Building Commissioner.

requirements as determined by the Building Commissioner.	
Inspect and clear debris from rainwater gutters, downspouts, and roof washers.	Every 6 months
Inspect and clear debris from the roof or another above- ground rainwater collection surfaces.	Every 6 months
Remove tree branches and vegetation overhanging a roof or other aboveground rainwater collection surfaces.	As needed
Inspect pumps and verify operation.	After initial installation and every 12 months thereafter
Inspect valves and verify operation.	After initial installation and every 12 months thereafter
Inspect pressure tanks and verify operation.	After initial installation and every 12 months thereafter
Clear debris from and inspect storage tanks, locking devices, and verify operation.	After initial installation and every 12 months thereafter
Inspect caution labels and marking.	After initial installation and every 12 months thereafter
Cross-connection inspection and test.*	After initial installation and every 12 months thereafter
Test water quality of rainwater catchment systems required by Section 118-58.4 to maintain a minimum water quality.	Every 12 months. After system renovation or repair.

* The cross-connection test shall be performed in the presence of the Building Commissioner in accordance with the requirements of this chapter.

(b) *Maintenance log*. A maintenance log for rainwater catchment systems is required to have a permit in accordance with Section 118-56.3 and shall be maintained by the property owner and be available for inspection. The property owner or designated appointee shall ensure that a record of testing, inspection, and maintenance in accordance with Table 118-56.5 is maintained in the log. The log will indicate the frequency of inspection and maintenance for each system.

(c) *Maintenance responsibility*. The required maintenance and inspection of rainwater catchment systems shall be the responsibility of the property owner unless otherwise required by the Building Commissioner.

(6) *Operation and maintenance manual*. An operation and maintenance manual for rainwater catchment systems required to have a permit in accordance with Section 118-56.3, shall be supplied to the building owner by the system designer. The operating and maintenance manual shall include the following:

(a) Detailed diagram of the entire system and the location of system components.

(b) Instructions for operating and maintaining the system.

(c) Details on maintaining the required water quality as determined by the Building Commissioner.

(d) Details on deactivating the system for maintenance, repair, or other purposes.

(e) Applicable testing, inspection, and maintenance frequencies in accordance with Table 118-56.5.

(f) A method of contacting the manufacturer(s).

(7) *Minimum water quality requirements*. The minimum water quality for rainwater catchment systems shall comply with the applicable water quality requirements for the intended application as determined by the Building Commissioner. Water quality for nonpotable rainwater catchment systems shall comply with Section 118-58.4.

Exceptions:

(a) Water treatment is not required for rainwater catchment systems used for aboveground irrigation with a maximum storage capacity of 360 gallons (1363 L).

(b) Water treatment is not required for rainwater catchment systems used for subsurface or drip irrigation.

(8) *Material compatibility*. Rainwater catchment systems shall be constructed of materials that are compatible with the type of pipe and fitting materials, water treatment, and water conditions in the system.

(9) *System controls*. Controls for pumps, valves, and other devices that contain mercury that come in contact with rainwater supply shall not be permitted.

(10) *Separation requirements*. Underground rainwater catchment service piping shall be separated from the building sewer in accordance with 118-58.2. Treated nonpotable water pipes shall be permitted to be run or laid in the same trench as potable water pipes with a 12 inch (305 mm) minimum vertical and horizontal separation where both pipe materials are approved for use within a building. Where horizontal piping materials do not meet this requirement, the minimum separation shall be increased to 60 inches (1524 mm). The potable water piping shall be installed at an elevation above the treated nonpotable water piping.

(11) *Abandonment*. Rainwater catchment systems that are no longer in use, or fail to be maintained in accordance with Section 118-56.5, shall be abandoned. Abandonment shall comply with Section 118-56.11(a) and Section 118-56.11(b).

(a) *General*. An abandoned system or part thereof covered under the scope of this chapter shall be disconnected from remaining systems, drained, plugged, and capped in an approved manner.

(b) *Underground tank*. An underground water storage tank that has been abandoned or otherwise discontinued from use in a system covered under the scope of this chapter shall be completely drained and filled with earth, sand, gravel, concrete, or other approved material or removed in a manner satisfactory to the Building Commissioner.

(12) *Sizing*. Unless otherwise provided for in this chapter, rainwater catchment piping shall be sized in accordance with 118-56 for sizing potable water piping.

Sec. 118-57. – Nonpotable rainwater catchment systems.

(1) *General*. The installation, construction, alteration, and repair of rainwater catchments systems intended to supply uses such as water closets, urinals, trap primers for floor drains and floor sinks, irrigation, industrial processes, water features, cooling tower makeup and other uses shall be approved by the Building Commissioner. Rainwater catchment systems for collecting precipitation from rooftops shall comply with ARCSA/ASPE/ANSI 63.

(2) *Plumbing plan submission*. No permit for a rainwater catchment system shall be issued until complete plumbing plans, with data satisfactory to the Building Commissioner, have been submitted and approved.

(3) *System changes*. No changes or connections shall be made to either the rainwater catchment system or the potable water system within a site containing a rainwater catchment system requiring a permit without approval by the Building Commissioner.

(4) *Connections to potable or reclaimed (recycled) water systems*. Rainwater catchment systems shall have no direct connection to a potable water supply or alternate water source system. Potable or reclaimed (recycled) water is permitted to be used as makeup water for a rainwater catchment system provided the potable or reclaimed (recycled) water supply connection is protected by an air gap or reduced-pressure principle backflow preventer in accordance with this code.

(5) *Initial cross-connection test*. Where a portion of a rainwater catchment system is installed within a building, a cross-connection test is required in accordance with Section 118-60.3. Before the building is occupied or the system is activated, the installer shall perform the initial cross-connection test in the presence of the Building Commissioner. The test shall be ruled successful by the Building Commissioner before final approval is granted.

(6) *Sizing*. The design and size of rainwater drains, gutters, conductors, and leaders shall comply with 18-29-1101 of this code.

(7) *Rainwater catchment system materials*. Rainwater catchment system materials shall comply with Section 118-57.7(a) through Section 118-57.7(d).

(a) *Water supply and distribution materials*. Rainwater catchment water supply and distribution materials shall comply with the requirements of this code for potable water supply and distribution systems unless otherwise provided for in this section.

(b) *Rainwater catchment system drainage materials*. Materials used in rainwater catchment drainage systems, including gutters, downspouts, conductors, and leaders shall be in accordance with the requirements of this code for storm drainage.

(c) *Storage tanks*. Rainwater storage tanks shall comply with Section 118-58.5.

(d) *Collections surfaces*. The collection surface shall be constructed of a hard, impervious material.

(8) *Rainwater catchment system color and marking information*. Rainwater catchment systems shall have a colored background in accordance with 18-29-608.8. Rainwater catchment systems shall be marked, in lettering in accordance with 18-29-608.8, with the words: “CAUTION: NONPOTABLE RAINWATER, DO NOT DRINK.”

(9) *Deactivation and drainage for cross-connection test*. The rainwater catchment system and the potable water system within the building shall be provided with the required appurtenances (e.g., valves, air or vacuum relief valves, etc.) to allow for deactivation or drainage as required for a cross-connection test in accordance with Section 118-60.3.

Sec. 118-58. – Design and installation.

(1) *Rainwater catchment systems*. The design and installation of nonpotable rainwater catchment systems shall be in accordance with Section 118-58.2 through Section 118-58.20.

(2) *Outside hose bibbs*. Outside hose bibbs shall be allowed on rainwater piping systems. Hose bibbs supplying rainwater shall be marked with the words: “CAUTION: NONPOTABLE RAINWATER, DO NOT DRINK” and in Figure 118-58.2.

FIGURE 118-58.2

(3) *Rainwater catchment collection surfaces*. Rainwater shall be collected from roof surfaces or other manmade, aboveground collection surfaces.
   (a) *Other Surfaces*. Natural precipitation collected from surface water runoff, vehicular parking surfaces, or manmade surfaces at or below grade shall be in accordance with the stormwater requirements for on-site treated nonpotable water systems in Section 18-29-1506.0.
   (b) *Prohibited Discharges*. Overflows and bleed-off pipes from roof-mounted equipment and appliances shall not discharge onto roof surfaces that are intended to collect rainwater without prior approval from the Building Commissioner.

(4) *Minimum water quality*. The minimum water quality for harvested rainwater shall meet the applicable water quality requirements for the intended applications as determined by the Building Commissioner. In the absence of water quality requirements determined by the Building Commissioner, the minimum treatment and water quality shall be in accordance with Table 118-58.4, IAPMO IGC 324 or NSF/ANSI 350.

   Exception: No treatment is required for rainwater used for subsurface or nonsprinkled surface irrigation where the maximum storage volume is less than 360 gallons (1363 L).

(5) *Rainwater storage tanks*. Rainwater storage tanks shall comply with IAPMO/ANSI Z1002 and be installed in accordance with Section 118-58.6 through Section 118-58.12.

(6) *Location*. Rainwater storage tanks shall be permitted to be installed above or below grade.

(7) *Above grade*. Above grade, storage tanks shall be of an opaque material, approved for aboveground use in direct sunlight or shall be shielded from direct sunlight. Tanks shall be installed in an accessible location to allow for inspection and cleaning. The tank shall be installed on a foundation or platform that is constructed to accommodate loads in accordance with the building code.

(8) *Below grade*. Rainwater storage tanks installed below grade shall be structurally designed to withstand anticipated earth or other loads. Holding tank covers shall be capable of supporting an earth load of not less than 300 pounds per square foot (lb/ft^2) (1465 kg/m^2) where the tank is designed for underground installation. Below grade rainwater tanks installed underground shall be provided with manholes. The manhole opening shall be not less than 20 inches (508 mm) in diameter and located not less than 4 inches (102 mm) above the surrounding grade. The surrounding grade shall be sloped away from the manhole. Underground tanks shall be ballasted, anchored, or otherwise secured, to prevent the tank from floating out of the ground where empty. The combined weight of the tank and hold down system shall meet or exceed the buoyancy force of the tank.

(9) *Drainage and overflow*. Rainwater storage tanks shall be provided with a means of draining and cleaning. The overflow drain shall not be equipped with a shutoff valve. The overflow outlet shall discharge in accordance with this code for storm drainage systems. Where discharging to the storm drainage system, the overflow drain shall be protected from backflow of the storm drainage system by a backwater valve or other approved method.

TABLE 118-58.4
MINIMUM WATER QUALITY

APPLICATION	MINIMUM TREATMENT	MINIMUM WATER QUALITY
Car washing	Debris excluder or other approved means in accordance with Section 118-58.17, and 100 microns in accordance with Section 118-58.18 for drip irrigation.	N/A
Subsurface and drip irrigation	Debris excluder or other approved means in accordance with Section 118-58.17, and 100 microns in accordance with Section 118-58.18 for drip irrigation.	N/A
Spray irrigation where the maximum storage volume is less than 360 gallons	Debris excluder or other approved means in accordance with Section 118-58.17, and disinfection in accordance with Section 118-58.15.	N/A
Spray irrigation where the maximum storage volume is equal to or more than 360 gallons	Debris excluder or other approved means in accordance with Section 118-58.17.	Escherichia coli: < 100 CFU/100 mL, and Turbidity: < 10 NTU
Urinal and water closet flushing, clothes washing, and trap priming	Debris excluder or other approved means in accordance with Section 118-58.17, and 100 microns in accordance with	Escherichia coli: < 100 CFU/100 mL, and Turbidity: < 10 NTU

	Section 118-58.18.	
Ornamental fountains and other water features	Debris excluder or other approved means in accordance with Section 118-58.17.	Escherichia coli: < 100 CFU/100 mL, and Turbidity: < 10 NTU
Cooling tower make-up water	Debris excluder or other approved means in accordance with Section 118-58.17, and 100 microns in accordance with Section 118-58.18.	Escherichia coli: < 100 CFU/100 mL, and Turbidity: < 10 NTU

For SI units: 1 micron = 1 µm, 1 gallon = 3.785 L

(a) *Overflow outlet size*. The overflow outlet shall be sized to accommodate the flow of the rainwater entering the tank and not less than the aggregate cross-sectional area of inflow pipes.

(10) *Opening and access protection*. Rainwater tank openings shall be protected to prevent the entrance of insects, birds, or rodents into the tank. Rainwater tank access openings exceeding 12 inches (305 mm) in diameter shall be secured to prevent tampering and unintended entry by either a lockable device or other approved method.

(11) *Marking*. Rainwater tanks shall be permanently marked with the capacity and the language: "NONPOTABLE RAINWATER." Where openings are provided to allow a person to enter the tank, the opening shall be marked with the following language: "DANGER-CONFINED SPACE."

(12) *Storage tank venting*. Where venting using drainage or overflow piping is not provided or is considered insufficient, a vent shall be installed on each tank. The vent shall extend from the top of the tank and terminate not less than 6 inches (152 mm) above grade and shall be not less than 1½ inches (40 mm) in diameter. The vent terminal shall be directed downward and covered with a ³⁄₃₂ of an inch (2.4 mm) mesh screen to prevent the entry of vermin and insects.

(13) *Pumps*. Pumps serving rainwater catchment systems shall be listed. Pumps supplying water to water closets, urinals, and trap primers shall be capable of delivering not less than 15 pounds-force per square inch (psi) (103 kPa) residual pressure at the highest and most remote outlet served. Where the water pressure in the rainwater supply system within the building exceeds 80 psi (552 kPa), a pressure reducing valve reducing the pressure to 80 psi (552 kPa) or less to water outlets in the building shall be installed in accordance with this code.

(14) *Roof drains*. Primary and secondary roof drains, conductors, leaders, and gutters shall be designed and installed in accordance with this code.

(15) *Water quality devices and equipment*. Devices and equipment used to treat rainwater to maintain the minimum water quality requirements determined by the Building Commissioner shall be listed or labeled (third-party certified) by a listing agency (accredited conformity assessment body) and approved for the intended application.

(16) *Freeze protection*. Tanks and piping installed in locations subject to freezing shall be provided with an approved means of freeze protection.
(17) *Debris removal*. The rainwater catchment conveyance system shall be equipped with a debris excluder or other approved means to prevent the accumulation of leaves, needles, other debris and sediment from entering the storage tank. Devices or methods used to remove debris or sediment shall be accessible and sized and installed in accordance with manufacturer's installation instructions.
(18) *Required filters*. A filter permitting the passage of particulates not larger than 100 microns (100 µm) shall be provided for rainwater supplied to water closets, urinals, trap primers, and drip irrigation system.
(19) *Roof gutters*. Gutters shall maintain a minimum slope and be sized in accordance with 18-29-1106.6.
(20) *Rainwater diversion valves*. Rainwater diversion valves ranging from 2 inches (50 mm) through 4 inches (100 mm) in diameter shall comply with IAPMO PS 59. Rainwater diversion valves ranging from 6 inches (150 mm) to 12 inches (300 mm) in diameter shall comply with IAPMO IGC 352. Valves shall be accessible and include a filter located upstream of the valve when required.

Sec. 118-59. – Signs.

(1) *General*. Signs in buildings using rainwater shall be in accordance with Section 118-59.2 and Section 118-59.3.
(2) *Commercial, industrial, and institutional restroom signs*. A sign shall be installed in restrooms in commercial, industrial, and institutional occupancies using nonpotable rainwater for water closets, urinals, or both. Each sign shall contain ½ of an inch (12.7 mm) letters of a highly visible color on a contrasting background. The location of the sign(s) shall be such that the sign(s) shall be visible to users. The number and location of the signs shall be approved by the Building Commissioner and shall contain the following text:
TO CONSERVE WATER, THIS BUILDING USES RAINWATER TO FLUSH TOILETS AND URINALS.
(3) *Equipment room signs*. Each equipment room containing nonpotable rainwater equipment shall have a sign posted with the following wording in 1 inch (25.4 mm) letters:
CAUTION NONPOTABLE RAINWATER, DO NOT DRINK. DO NOT CONNECT TO DRINKING WATER SYSTEM. NOTICE: CONTACT BUILDING MANAGEMENT BEFORE PERFORMING ANY WORK ON THIS WATER SYSTEM.
This sign shall be posted in a location that is visible to anyone working on or near rainwater equipment.

Sec. 118.60. – Inspection and Testing.

(1) *General*. Rainwater catchment systems shall be inspected and tested in accordance with Section 118-60.2 and Section 118-60.3.
(2) *Supply system inspection and test*. Rainwater catchment systems shall be inspected and tested in accordance with the applicable provisions of this code for testing of potable water and storm drainage systems. Storage tanks shall be filled with water to the overflow opening for a period of 24 hours, and during the inspection, or by other means as approved by the Building Commissioner. Seams and joints shall be exposed during the inspection and checked for watertightness.
(3) *Annual cross-connection inspection and testing*. An initial and subsequent annual inspection and test in accordance with Section 118-57.5 shall be performed on both the potable and rainwater catchment water systems. The potable and rainwater catchment water systems shall be isolated from each other and independently inspected and tested to ensure there is no cross-connection in accordance with Section 118-60.3(a) through Section 118-60.3(d).
    (a) *Visual system inspection*. Prior to commencing the cross-connection testing, a dual system inspection shall be conducted by the Building Commissioner as follows:

1. Pumps, equipment, equipment room signs, and exposed piping in an equipment room shall be checked.

(b) *Cross-connection test*. The procedure for determining cross-connection shall be followed by the applicant in the presence of the Building Commissioner to determine whether a cross-connection has occurred as follows:

1. The potable water system shall be activated and pressurized. The rainwater catchment water system shall be shut down and completely drained.
2. The potable water system shall remain pressurized for a minimum period of time specified by the Building Commissioner while the rainwater catchment water system is empty. The minimum period the rainwater catchment water system is to remain depressurized shall be determined on a case-by-case basis, taking into account the size and complexity of the potable and rainwater catchment water distribution systems, but in no case shall that period be less than 1 hour.
3. Fixtures, potable, and rainwater shall be tested and inspected for flow. Flow from a rainwater catchment water system outlet shall indicate a cross-connection. No flow from a potable water outlet shall indicate that it is connected to the rainwater system.
4. The drain on the rainwater catchment water system shall be checked for flow during the test and at the end of the period.
5. The potable water system shall then be completely drained.
6. The rainwater catchment water system shall then be activated and pressurized.
7. The rainwater catchment water system shall remain pressurized for a minimum period of time specified by the Building Commissioner while the potable water system is empty. The minimum period the potable water system is to remain depressurized shall be determined on a case-by-case basis, but in no case shall that period be less than 1 hour.
8. Fixtures, potable and rainwater catchment, shall be tested and inspected for flow. Flow from a potable water system outlet shall indicate a cross-connection. No flow from a rainwater catchment water outlet shall indicate that it is connected to the potable water system.
9. The drain on the potable water system shall be checked for flow during the test and at the end of the period.
10. Where there is no flow detected in the fixtures which would indicate a cross-connection, the potable water system shall be repressurized.

(c) *Discovery of cross-connection*. In the event that a cross-connection is discovered, the following procedure, in the presence of the Building Commissioner, shall be activated immediately:

1. Rainwater catchment piping to the building shall be shutdown at the meter, and the rainwater riser shall be drained.
2. Potable water piping to the building shall be shutdown at the meter.
3. The cross-connection shall be uncovered and disconnected.
4. The building shall be retested following procedures listed in Section 118-60.3(a) and Section 118-60.3(b).
5. The potable water system shall be chlorinated with 50 ppm chlorine for 24 hours.
6. The potable water system shall be flushed after 24 hours, and a standard bacteriological test shall be performed. Where test results are acceptable, the potable water system shall be permitted to be recharged.

(4) *Annual inspection*. An annual inspection of the rainwater catchment water system, following the procedures listed in Section 118-60.3(a) shall be required. Annual cross-connection testing, following the procedures listed in Section 118-60.3(b) shall be required by the Building Commissioner, unless site conditions do not require it. In no event shall the test occur less than once in 4 years. Alternate testing requirements shall be permitted by the Building Commissioner.

Effective date: This ordinance shall be in effect immediately upon adoption.