P157-24 Part I

IPC: SECTION 202, SECTION 202 (New), CHAPTER 13, 1301.1, 1301.2, TABLE 1301.2(1) (New), TABLE 1301.2(2) (New), TABLE 1301.2(3) (New), 1301.2.1, 1301.2.2, 1301.3, 1301.4, 1301.5, 1301.6, 1301.7, 1301.8, 1301.9, 1301.9.1, 1301.9.2, 1301.9.3, 1301.9.3.1, 1301.9.3.2, 1301.9.4, 1301.9.5, 1301.9.6, 1301.9.7, 1301.9.8, 1301.9.9, 1301.9.10, 1301.10, 1301.10.1 (New), 1301.10.2 (New), 1301.10.3 (New), 1301.11, 1301.12, 1301.13 (New), SECTION 1302, 1302.1, 1302.2, 1302.2.1, 1302.4 (New), 1302.3, 1302.4, 1302.4.1, 1302.4.2, 1302.4.3, 1302.4.4, 1302.5, 1302.8 (New), 1302.6, 1302.6.1, 1302.7, 1302.7.1, 1302.7.2, 1302.8, 1302.8.1, 1302.8.2, 1302.9, 1302.10, 1302.11, 1302.11.1, 1302.11.2, 1302.11.3, 1302.12, 1302.12.1, 1302.12.2, 1302.12.3, 1302.12.4, 1302.12.5, 1302.12.6, 1302.14.7 (New), 1302.13, 1302.13.1, 1302.13.2, 1302.13.3, 1302.13.4, DOE (New), (New)

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THIS IS A 2 PART CODE CHANGE. PART I WILL BE HEARD BY THE PLUMBING CODE COMMITTEE. PART II WILL BE HEARD BY THE IRC-MP CODE COMMITTEE. SEE THE TENTATIVE HEARING ORDER FOR THESE COMMITTEES.

2024 International Plumbing Code

SECTION 202
GENERAL DEFINITIONS

Add new definition as follows:

BLACKWATER. Wastewater that contains urine or fecal matter.

BLACKWATER CONTRIBUTION (BWC). The fraction equal to the quantity of blackwater divided by the sum of the quantities of raw and treated blackwater plus surface water, groundwater, and water from approved potable water systems.

LOG REDUCTION VALUE (LRV). The measure of the ability of a treatment process to remove or inactivate microorganisms such as bacteria, protozoa and viruses. LRV is the logarithm base 10 of the ratio of the levels of a pathogenic organism or other contaminant before and after treatment.

POTABLE REUSE. The practice of treating wastewater and utilizing it for potable applications.

REUSE WATER. Wastewater or rainwater treated to a level of quality suitable for reuse.

WASTEWATER. The water generated after use of freshwater, raw water, drinking water, or saline water in a deliberate application or process.

WATER REUSE SYSTEM. A system for the treatment, storage, distribution, and reuse of water including, but not limited to, wastewater and captured rainwater.

Revise as follows:

CHAPTER 13
~~NONPOTABLE~~ WATER REUSE SYSTEMS

1301.1 General. The provisions of Chapter 13 shall govern the materials, design, construction and installation of systems for the ~~collection~~ treatment, storage, ~~treatment~~ and distribution of ~~nonpotable~~ reuse water. ~~For nonpotable rainwater systems, the~~ The provisions of CSA B805/ICC 805 shall be an alternative for regulating the materials, design, construction and installation of systems for rainwater collection, storage, treatment and distribution ~~of nonpotable water~~. The application of water reuse systems shall comply with all applicable laws, rules, and ordinances of the jurisdiction. ~~The use and application of nonpotable water shall comply with laws, rules and ordinances applicable in the jurisdiction~~.

1301.2 ~~Water~~ Reuse water quality. ~~Nonpotable~~ Reuse water ~~for each end use application~~ quality shall meet the minimum ~~water quality~~

requirements as specified in Tables 1301.2(1), 1301.2(2), 1301.2(3), and as established for the intended application by ~~the~~ all applicable laws, rules and ordinances ~~applicable in~~of the jurisdiction. Where ~~nonpotable~~ water from ~~different~~multiple sources is combined ~~in a system~~, the system shall comply with the most stringent of the requirements of this code that are applicable to such sources.

Add new text as follows:

TABLE 1301.2(1) REQUIRED WATER QUALITY FOR REUSE APPLICATIONS

Use Category	Application	Exposure[a]	Quality Tier[b]
Direct Potable Reuse	Direct Potable Reuse	DC	4
Indirect Potable Reuse (Treatment Follows Reuse Application)	Aquifer Recharge - Direct Injection	IC	2
	Aquifer Recharge - Surface Application	IC	2
	Aquifer Storage and Recovery	IC	2
	Rapid Infiltration Basins	IC	2
	Infiltration/Percolation Lagoons	IC	2
	Raw Water Augmentation	IC	2
	Saltwater Intrusion Barrier	IC	2
	Surface Water Augmentation to a Supply Source	IC	2
Irrigation of Food Crops for Human Consumption (Spray/Drip)	Food crop with processing that destroys pathogens (Restricted Access)	LC	1
	Orchards and Vineyards	AC/LC	4/1
	Water contacts edible portion of food crop (Includes Root Crops)	AC	4
	Water doesn't contact edible portion of food crop (Restricted Access)	IC	2
Irrigation of Crops Not for Human Consumption (Spray/Drip)	Christmas Tree Farms	AC/LC	3/1
	Hemp Crops	AC/LC	3/1
	Fiber crops	AC/LC	3/1
	Fodder /Feed Crop/ Forage Crops	AC/LC	3/1
	Ornamental nursery stock	AC/LC	3/1
	Seed Crops	AC/LC	3/1
	Silviculture / Tree Farms	AC/LC	3/1
	Sod/Turf Crops	AC/LC	3/1
	Tobacco	AC/LC	3/1
Landscape Irrigation (Spray/Drip)	Athletic Fields	AC/LC	3/1
	Cemeteries	AC/LC	3/1
	College and University Campuses	AC/LC	3/1
	Commercial Campuses	AC/LC	3/1
	Golf Courses (Restricted Access)	LC	1
	Golf Courses (Unrestricted Access)	AC/LC	3/1
	Highway/Freeway Medians/ Roadside Vegetation	AC/LC	3/1
	Open Access Land Irrigation	AC/LC	3/1
	Pasture for Milk Producing Animals (Restricted Access)	LC	1
	Pasture for Non-Milk Producing Animals (Restricted Access)	LC	1
	Parks	AC/LC	3/1
	Playgrounds	AC/LC	3/1
	Residential Irrigation	AC/LC	3/1
	Landscape Irrigation (Restricted Access)	LC	1
	Urban Landscaping	AC/LC	3/1
	Schoolyards	AC/LC	3/1
Water Features	Decorative Fountains	AC	3
	Landscape Impoundments (With Fountain(s))	AC	3
	Landscape Impoundments (Without Fountain(s))	LC	1
	Ponds and Lagoons	LC	1
	Recreational Impoundments (Restricted Access)	LC	1
	Recreational Impoundments (Unrestricted Access)	AC	3
	Reservoir Augmentation (Recreational)	AC	3
	Wetland Creation	LC	1
	Wetland Discharge / Application	LC	1
Life Safety	Fire Fighting Via Plane	AC	3
	Fire Hydrant Water Supply	AC	3
	Fire Protection systems	AC	3
	Non Structural Fire Fighting	AC	3
	Structural Fire Fighting	AC	3
Construction	Concrete and Cement mixing	LC	1
	Dust Control	LC	1
	Equipment Operation (Ex. Cooling Power Equipment)	LC	1

	Material Washing and Sieving	LC	1
	Soil Compaction and Consolidation	LC	1
Process Water	Agricultural Cleaning (Animal Washing & Animal Pens)	AC	3
	Aquaculture	LC	1
	Boiler Feed	LC	1
	Building Washing	AC	3
	Chemical Mixing (Herbicides, Pesticides, Fertilizers)	LC	1
	Commercial Car Washes	AC	1
	Commercial Laundries	AC	3
	Cooling Power Equipment	LC	3
	Cooling systems with aerosolization	AC	1
	Cooling systems with no aerosolization	LC	1
	Dust Control (Roads and Streets)	LC	1
	Flushing Sanitary Sewers	LC	1
	Flushing Toilets and Urinals	AC	3
	Bidets and personal hygiene devices	DC	4
	Frost Protection	LC	1
	Gas Pipeline Testing	LC	1
	Hydro Seeding	AC	3
	Impoundments at Fish Hatcheries	LC	1
	Industrial Oil and Gas Operations	LC	1
Process Water	Industrial Process Water (Possibility of Human Contact or Evaporative)	AC	1
	Industrial Washwater applications	AC	3
	Livestock Drinking Water (Milk Producing)	AC	3
	Livestock Drinking Water (Non-Milk Producing)	AC	3
	Parts Cleaning	LC	1
	Pool Water Makeup	AC	3
	Pressure Washing	AC	3
	Priming Drainage Traps	LC	1
	Road Milling	LC	1
	Ship Ballasting	LC	1
	Snow Making (Commercial / Recreational Use)	AC	3
	Snow Making (Storage)	AC	3
	Stack Scrubbing	LC	3
	Stream Flow Augmentation	LC	1
	Street, Sidewalk, Parking Lot Cleaning (Restricted Access)	LC	1
	Street, Sidewalk, Parking Lot Cleaning (Unrestricted Access)	AC	3
	Vehicle and equipment Washing	AC	3
	Wastewater Treatment (Process Uses)	LC	1
	Window Washing	AC	3

a. Where two Exposures and two Tiers are cited, the first refers to spray irrigation and the second refers to drip irrigation (or other subsurface irrigation).

b. Where the equipment manufacturer or the jurisdiction requires a level of free residual disinfectant that exceeds the requirement of the quality Tier indicated, such excess shall be provided.

DC (Quality Tier 4) = Direct Public Contact/Consumption Intended

AC (Quality Tier 3) = Aerosolization, or Accidental/Limited

Consumption Possible

IC (Quality Tier 2) = Indirect Public Consumption Intended or Possible

LC (Quality Tier 1) = Limited Contact / No Consumption Intended

TABLE 1301.2(2) WATER QUALITY FOR TIERS OF REUSE

Quality Tier	Minimun Design Water Quality

4	United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards (40 CFR 141), plus 18/15/15 Log Removal of Enteric Viruses, Giardia, and Cryptosporidium
3	Compliant with all applicable laws, rules, ordinances and NSF 350
2	Compliant with all applicable laws, rules, ordinances, and end use fixture / equipment manufacturer requirements
1	Compliant with all applicable laws, rules, ordinances, and end use fixture / equipment manufacturer requirements

TABLE 1301.2(3) LOG REDUCTION (LRV) CREDITS APPLICALBLE TO DPR BASED ON SOURCE WATER

Source Water	Maximum LRV Credits for DPR
Blackwater	0/0/0
Blackwater blended with groundwater [a]	LRV credit [b] = negative log of BWC
Blackwater blended with surface water [a]	LRV credit [b] = negative log of BWC
Blackwater blended with groundwater and surface water [a]	LRV credit [b] = negative log of BWC
Graywater	Case by case basis
Stormwater	Case by case basis
Rainwater	Case by case basis
Industrial Water	Case by case basis
Process Water	Case by case basis

a. Groundwater and surface waters must be either an untreated source of drinking water approved by the jurisdiction or a treated drinking water approved by the jurisdiction.

b. LRV credit for all source waters containing blackwater shall not exceed 2.0.

Delete without substitution:

~~**1301.2.1 Residual disinfectants.** Where chlorine is used for disinfection, the nonpotable water shall contain not more than 4 ppm (4 mg/L) of chloramines or free chlorine when tested in accordance with ASTM D1253. Where ozone is used for disinfection, the nonpotable water shall not contain gas bubbles having elevated levels of ozone at the point of use.~~

~~**Exception:** Reclaimed water sources shall not be required to comply with these requirements.~~

~~**1301.2.2 Filtration required.** Nonpotable water utilized for water closet and urinal flushing applications shall be filtered by a 100-micron (0.1 mm) or finer filter.~~

~~**Exception:** Reclaimed water sources shall not be required to comply with these requirements.~~

Revise as follows:

1301.3 Signage required. ~~Nonpotable~~ Where nonpotable water is supplied to outlets such as hose connections, hydrants, open-ended pipes and faucets, each outlet shall be identified at the point of use ~~for each outlet~~ with signage that reads as follows: ~~"Nonpotable water is utilized for [application name].~~ CAUTION: NONPOTABLE WATER – DO NOT DRINK." The words shall be legibly and indelibly printed on a tag or sign constructed of corrosion-resistant waterproof material or shall be indelibly printed on the fixture. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and in colors in contrast to the background on which they are applied. In addition to the required ~~wordage~~ text, the pictograph shown in Figure 1301.3 shall appear on the signage required by this section.

1301.4 Permits. Permits shall be required for the construction, installation, operation, alteration and repair of ~~nonpotable~~ water reuse systems. Construction documents, engineering calculations, diagrams, operations and maintenence manuals,and other such data pertaining to the ~~nonpotable~~ water reuse systems shall be submitted with each permit application.

1301.5 Potable water connections. Where a potable system is connected to a nonpotable water system, the potable water supply shall be protected against backflow in accordance with Section 608.

Revise as follows:

1301.6 Components and materials. Piping, plumbing components and materials used in ~~collection and~~ conveyance and distibution systems shall be of material approved ~~by the manufacturer~~ for the intended application.

1301.7 Insect and vermin control. The system shall be protected to prevent the entrance of insects and vermin into process tanks and equipment, storage tanks and piping systems. Screen materials shall be compatible with contacting system components and shall not accelerate the corrosion of system components.

1301.8 Freeze protection. Where ~~sustained~~ freezing temperatures occur, provisions shall be made to keep storage tanks, process tanks and equipment and the related piping from freezing.

1301.9 ~~Nonpotable water storage~~ Water tanks. ~~Nonpotable w~~Water storage and process tanks shall comply with Sections 1301.9.1 through 1301.9.10.

1301.9.1 Location. Any storage tank, process tank and equipmentor portion thereof that is above grade shall be protected from direct exposure to sunlight by one of the following methods:

1. Tank construction using opaque, UV-resistant materials such as heavily tinted plastic, fiberglass, lined metal, concrete, ~~wood,~~ or painted to prevent algae growth.
2. Specially constructed sun barriers.
3. Installation in garages, crawl spaces or sheds.

1301.9.2 Materials. ~~Where collected on-site,~~ Prior to treatment for reuse, water shall be collected in an *approved* tank constructed of durable, nonabsorbent and corrosion-resistant materials. The ~~storage~~ tank shall be constructed of materials compatible with ~~any~~ all disinfection systems used to treat water upstream of the tank and with ~~any~~all systems used to maintain water quality in the tank. ~~Wooden storage tanks that are not equipped with a makeup water source shall be provided with a flexible liner.~~

1301.9.3 Foundation and supports. ~~Storage~~ All tanks shall be supported on a firm base capable of withstanding the weight of the ~~storage~~ tank when filled to capacity. ~~Storage t~~Tanks shall be supported in accordance with the *International Building Code*.

1301.9.3.1 Ballast. Where the soil can become saturated, an underground ~~storage~~ tank shall be ballasted, or otherwise secured, to ~~prevent the tank from floating out of the ground~~ resist buoyant forces when empty. The combined weight of the empty tank and hold-down ballast shall ~~meet or~~ exceed the buoyancy force ~~of~~ applied to the tank. Where the installation requires a foundation, the foundation shall be flat and shall be designed to resist the maximum buoyant forces when the tank is empty, and to support the weight of the ~~storage~~ tank when full, consistent with the bearing capability of adjacent soil.

1301.9.3.2 Structural support. Where installed below grade, ~~storage~~ tank installations shall be designed to withstand earth and surface structural loads without damage and with minimal deformation when empty or filled with water.

1301.9.4 Makeup water. Where an uninterrupted supply is required for the intended application, ~~potable or reclaimed water shall be provided as a~~an additional source of makeup water shall be provided for the storage tank. ~~The~~ All makeup water supply~~y~~ies shall be protected against backflow in accordance with Section 608. A *full-open valve* located on the makeup water supply lines to the storage tank ~~shall be provided~~. ~~Inlets to~~ Flow into the storage tank shall be controlled by fill valves or other automatic supply valves installed to prevent the tank from overflowing and to prevent the water level from dropping below a predetermined point. ~~Where makeup water is provided,~~ tThe water level shall not be permitted to drop below the ~~source water inlet or the~~ intake of any ~~attached~~ pump supplying makeup water.

1301.9.5 Overflow. ~~The storage t~~Tanks shall be equipped with an overflow pipe having a diameter not less than that shown in Table ~~606.5.4~~ 606.5(4). The overflow pipe shall be protected from insects ~~or~~ and vermin and shall discharge in a manner consistent with all applicable laws, rules, and ordinances of the jurisdiction for storm water runoff requirements of the jurisdiction. The overflow pipe shall discharge at a sufficient distance from the tank to avoid damaging the tank foundation or the adjacent property. Drainage from overflow pipes shall be directed to prevent freezing on roof walkways, and on sidewalks, pavement, and other accessways subject to vehicular or pedestrian traffic. The overflow drain shall not be equipped with a shutoff valve. A cleanout shall be provided on each overflow pipe in accordance with Section 708.

1301.9.6 Access. Not less than one access opening shall be provided to allow inspection and cleaning of the tank interior. Access openings shall have an *approved* locking device or other *approved* method of securing access. Below-grade ~~storage~~ tanks, located outside of the building, shall be provided with ~~a manhole~~ an access opening either not less than 24 inches (610 mm) square or with an inside diameter not less than 24 inches (610 mm). ~~Manholes~~ Access opening shall extend not less than 4 inches (102 mm) above ground ~~or~~ and shall be designed to prevent water infiltration. ~~Finished~~ The finished grade shall be sloped away from the ~~manhole~~ maintenance hole to divert surface water. ~~Manhole~~ Access opening covers shall be secured to prevent unauthorized access. Service ports in ~~manhole~~ access opening covers shall be not less than 8 inches (203 mm) in diameter and shall be not less than 4 inches (102 mm) above the finished grade level. The service port shall be secured to prevent unauthorized access. Access locations to confined spaces shall be labeled “CONFINED SPACE.”

Exception: ~~Treated water storage t~~Tanks that are less than 800 gallons (3028 L) in volume and installed below grade shall not be required to be equipped with a manhole an access opening provided that the tank has a service port of not less than 8 inches (203 mm) in diameter.

1301.9.7 Venting. ~~Storage t~~Tanks that receive flow by gravity shall be provided with a vent sized in accordance with Chapter 9 and based on the aggregate diameter of all tank influent pipes. The reservoir vent shall not be connected to sanitary drainage system vents. Vents shall be protected from contamination by means of an *approved* cap or U-bend installed with the opening directed downward. Vent outlets shall extend not less than 4 inches (102 mm) above grade or as necessary to prevent surface water from entering the ~~storage~~ tank. Vent openings shall be protected against the entrance of vermin and insects in accordance with the requirements of Section 1301.7.

1301.9.8 Draining of tanks. Tanks shall be provided with a means of emptying the contents for the purpose of service or cleaning. Tanks shall be drained by using a pump or by a drain located at the lowest point in the tank. The tank drain pipe shall discharge as required for overflow pipes and shall not be smaller in size than specified in Table ~~606.5.7~~ 606.5(7). Not less than one cleanout shall be provided on each drain pipe in accordance with Section 708.

Revise as follows:

1301.9.9 Marking and signage. Each nonpotable water ~~storage~~ tank shall be labeled with its rated volumetric capacity. The contents of ~~storage~~ tanks shall be identified with the words “CAUTION: NONPOTABLE WATER – DO NOT DRINK.” Where an opening is provided that could allow the entry of personnel, the opening shall be marked with the words, “DANGER – CONFINED SPACE.” Markings shall be indelibly printed on the tank or on a tag or sign constructed of corrosion-resistant waterproof material that is mounted on the tank. The letters of the words shall be not less than 0.5 inch (12.7 mm) in height and shall be of a color in contrast with the background on which they are applied.

1301.9.10 ~~Storage t~~Tank tests. ~~Storage~~ Pressurized tanks shall be be certified in accordance with Section 303.4. Tanks that receive flow by gravity shall tested in accordance with the following: ~~Storage t~~Tanks shall be filled with water to the overflow line prior to and during inspection. Seams and joints shall be left exposed and the tank shall remain watertight without leakage for a period of 24 hours.

1. After 24 hours, supplemental water shall be introduced for a period of 15 minutes to verify proper drainage of the overflow system and that there are no leaks.
2. The tank drain shall be observed for proper operation.
3. The makeup water system shall be observed for proper operation and successful automatic shutoff of the system at the refill threshold shall be verified.

1301.10 System abandonment. If the owner of an on-site ~~nonpotable~~ water reuse system or ~~rainwater collection and conveyance system~~ components thereof, elects to cease use of, or fails to properly maintain such system, the system shall be abandoned and shall comply with ~~the following:~~ Sections 1301.10.1 through 1301.10.3.

~~1. All system piping connecting to a utility-provided water system shall be removed or disabled.~~

~~2. The distribution piping system shall be replaced with an *approved* potable water supply piping system. Where an existing potable pipe system is already in place, the fixtures shall be connected to the existing system.~~

~~3. The storage tank shall be secured from accidental access by sealing or locking tank inlets and access points, or filling with sand or equivalent.~~

Add new text as follows:

1301.10.1 Utility-Connected Piping. All system piping connecting to a utility-provided water system shall be removed or disabled.

1301.10.2 Distribution Piping. The distribution piping system shall be removed or replaced with an approved potable water supply piping system. Where an existing potable pipe system is already in place, the fixtures shall be connected to the existing system.

1301.10.3 Tanks. Tanks shall be removed, or secured from accidental access by sealing or locking tank inlets and access points, or filling with sand or equivalent.

Revise as follows:

1301.11 Trenching requirements for nonpotable water piping. Nonpotable water ~~collection and~~ distribution ~~piping and reclaimed water~~ piping shall be separated from the *building sewer* and potable water piping underground by 5 feet (1524 mm) of undisturbed or compacted earth. Nonpotable water ~~collection and~~ distribution piping shall not be located in, under or above cesspools, septic tanks, septic tank drainage fields or seepage pits. Buried nonpotable water piping shall comply with the requirements of Section 306.

Exceptions:

1. The required separation distance shall not apply where the bottom of the nonpotable water pipe within 5 feet (1524 mm) of the *sewer* is not less than 12 inches (305 mm) above the top of the highest point of the *sewer* and the pipe materials conform to Table 702.3.
2. The required separation distance shall not apply where the bottom of the potable water service pipe within 5 feet (1524 mm) of the nonpotable water pipe is not less than 12 inches (305 mm) above the top of the highest point of the nonpotable water pipe and the pipe materials comply with the requirements of Table 605.4.
3. Nonpotable water pipe is permitted to be located in the same trench with a *building sewer*, provided that such *sewer* is constructed of materials that comply with the requirements of Table 702.2.
4. The required separation distance shall not apply where a nonpotable water pipe crosses a *sewer* pipe, provided that the pipe is sleeved to not less than 5 feet (1524 mm) horizontally from the *sewer* pipe centerline on both sides of such crossing, with pipe materials that comply with Table 702.2.
5. The required separation distance shall not apply where a potable water service pipe crosses a nonpotable water pipe, provided that the potable water service pipe is sleeved for a distance of not less than 5 feet (1524 mm) horizontally from the centerline of the nonpotable pipe on both sides of such crossing, with pipe materials that comply with Table 702.2.
6. Irrigation piping located outside of a building and downstream of the backflow preventer is not required to meet the trenching requirements where nonpotable water is used for outdoor applications.

1301.12 Outdoor outlet access. Sill cocks, hose bibbs, wall hydrants, yard hydrants and other outdoor outlets supplied by nonpotable water shall be located in a locked vault or shall be operable only by means of a removable key and marked in accordance with Section 1301.3.

Add new text as follows:

1301.13 Operations and monitoring. The design, installation, and continued operation of water reuse systems shall be in accordance with an approved operating and monitoring program. The program shall be implemented by an individual or entity in accordance with the requirements of the *International Property Maintenance Code*.

Revise as follows:

SECTION 1302
~~ON-SITE NONPOTABLE~~ WATER REUSE SYSTEMS

1302.1 General. The provisions of ASTM E2635 and Section 1302 shall govern the construction, installation, alteration and repair of water reuse systems. ~~on-site nonpotable water reuse systems for the collection, storage, treatment and distribution of on-site sources of nonpotable water as permitted by the jurisdiction water reuse systems.~~.

1302.2 Graywater ~~S~~sources. ~~On-site nonpotable water~~ Graywater reuse systems shall collect waste discharge from only the following sources: bathtubs, showers, lavatories, clothes washers ~~and laundry trays~~ , laundry trays, condensate, and other domestic wastewaters that are not expected to contain urine, fecal matter, grease, or food wastes. ~~Where *approved* and as appropriate for the intended application, water from other nonpotable sources shall be collected for reuse by on-site nonpotable water reuse systems.~~.

1302.3 ~~1302.2.1 Prohibited~~ Blackwater sources. ~~Wastewater containing urine or fecal matter~~ Blackwater shall ~~not~~ be ~~diverted to on-site nonpotable water reuse systems and shall discharge~~ discharged to the sanitary drainage system ~~of the building or premises~~ in accordance with Chapter 7~~. Reverse osmosis system reject water, water softener discharge water, kitchen sink wastewater, dishwasher wastewater and wastewater discharged from wet hood scrubbers shall not be collected for reuse in an on-site nonpotable water~~or to an approved on-site blackwater reuse system.

Add new text as follows:

1302.4 Other sources.. Other sources including, but not limited to, condensate, reverse osmosis system reject water, water softener discharge water, and wastewater discharged from wet-hood scrubbers shall also be considered for use in a water reuse system.

Revise as follows:

1302.5 ~~1302.3~~ Traps. Traps serving fixtures and devices discharging ~~wastewater to on-site nonpotable~~ water to water reuse systems shall comply with Section 1002.4.

Delete without substitution:

~~**1302.4 Collection pipe.** On-site nonpotable water reuse systems shall utilize drainage piping *approved* for use in plumbing drainage systems to collect and convey untreated water for reuse. Vent piping *approved* for use in plumbing venting systems shall be utilized for vents in the graywater system. Collection and vent piping materials shall comply with Section 702.~~

~~**1302.4.1 Installation.** Collection piping conveying untreated water for reuse shall be installed in accordance with Section 704.~~

~~**1302.4.2 Joints.** Collection piping conveying untreated water for reuse shall utilize joints *approved* for use with the distribution piping and appropriate for the intended applications as specified in Section 705.~~

~~**1302.4.3 Size.** Collection piping conveying untreated water for reuse shall be sized in accordance with drainage sizing requirements specified in Section 710.~~

Revise as follows:

1302.6 ~~1302.4.4~~ Pipe marking. Additional marking of collection piping conveying untreated water for reuse shall not be required beyond that required for sanitary drainage, waste and vent piping by Chapter 7.

1302.7 ~~1302.5~~ ~~Filtration~~ Treatment. ~~Untreated w~~Water collected for reuse shall be ~~filtered as required for the intended end use. Filters shall be provided with *access* for inspection and maintenance. Filters shall utilize a pressure gauge or other *approved* method to provide indication when a filter requires servicing or replacement. Filters shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.~~treated to meet the quality standards required in Tables 1301.2(1) and 1301.2(2).

Add new text as follows:

1302.8 Treatment systems.. Treatment systems shall be installed to allow access for inspection and maintenance. All treatment equipment shall utilize pressure gauges, level sensors, intensity meters, or other approved methods to indicate when servicing or replacement is required. All treatment equipment shall be installed with shutoff valves immediately upstream and downstream to allow for isolation during maintenance.

Revise as follows:

1302.9 ~~1302.6~~ ~~Disinfection and treatment~~ Tanks. ~~Where the intended application for nonpotable water collected on-site for reuse requires disinfection or other treatment or both, it shall be disinfected as needed to ensure that the required water quality is delivered at the point of use. Nonpotable water collected on-site containing untreated graywater shall be retained in collection reservoirs for not longer than 24 hours.~~ Nopotable tanks utilized in water reuse systems shall comply with Sections 1301.9, 1302.8.1 and 1302.8.2.

Delete without substitution:

~~**1302.6.1 Graywater used for fixture flushing.** Graywater used for flushing water closets and urinals shall be disinfected and treated by an on-site water reuse treatment system complying with NSF 350.~~

~~**1302.7 Storage tanks.** Storage tanks utilized in on-site nonpotable water reuse systems shall comply with Sections 1301.9, 1302.7.1 and 1302.7.2.~~

Revise as follows:

1302.9.1 ~~1302.7.1~~ Location. ~~Storage t~~Tanks shall be located with a minimum horizontal distance between various elements as indicated in Table ~~1302.7.1~~ 1302.7(1).

1302.9.2 ~~1302.7.2~~ Outlets. Outlets shall be located not less than 4 inches (102 mm) above the bottom of the ~~storage~~ tank and shall not skim water from the surface.

1302.10 ~~1302.8~~ Valves. Valves shall be ~~supplied~~ installed on ~~on-site nonpotable~~ the collection of the water reuse systems in accordance with Sections 1302.~~8~~ 9.1 and 1302.~~8~~ 9.2.

1302.10.1 ~~1302.8.1~~ Bypass valve. One three-way diverter valve listed and labeled to NSF 50 or other *approved* device shall be installed on collection piping upstream of each storage tank, ~~or drain field,~~ as applicable, to divert untreated on-site reuse sources to the sanitary *sewer* or approved receiving tank to allow servicing and inspection of the system. Bypass valves shall be installed downstream of fixture traps and vent connections. Bypass valves shall be marked to indicate the direction of flow~~, connection and storage tank or drainfield connection~~. Bypass valves shall be provided with *access* that allows for removal. Two shutoff valves shall not be installed to serve as a bypass valve.

1302.10.2 ~~1302.8.2~~ Backwater valve. One or more backwater valves shall be installed on each overflow and tank drain pipe. Backwater valves shall be installed in accordance with Section 714.

1302.11 ~~1302.9~~ Pumping and control system. Mechanical equipment including pumps, valves and ~~filters~~ treatment units shall have

access ~~and be removable~~ in order to ~~perform~~ to replace, repair, ~~maintenance~~ maintain and clean~~ing~~. The minimum flow rate and flow pressure delivered by the pumping system shall be appropriate for the application and in accordance with Section 604.

1302.12 ~~1302.10~~ Water pressure-reducing valve or regulator. Where the water pressure supplied by the pumping system exceeds 80 psi (552 kPa) static, a pressure-reducing valve shall be installed to reduce the pressure in the ~~nonpotable~~ water distribution system piping to 80 psi (552 kPa) static or less. Pressure-reducing valves shall be specified and installed in accordance with Section 604.8.

1302.13 ~~1302.11~~ Distribution piping. Distribution piping utilized in ~~on-site nonpotable~~ water reuse systems shall comply with Sections ~~1302.11.1~~ 1302.12.1 through ~~1302.11.3~~ 1302.12.3.

Exception: Irrigation piping located outside of the building and downstream of a backflow preventer.

~~1302.11.1~~ 1302.13.1 Materials, joints and connections. Distribution piping shall conform to the standards and requirements specified in Section 605.

~~1302.11.2~~ 1302.13.2 Design. ~~On-site nonpotable w~~Water reuse distribution piping systems shall be designed and sized in accordance with Section 604 for the intended application.

~~1302.11.3~~ 1302.13.3 Labeling and marking. ~~On-site n~~Nonpotable water distribution piping labeling and marking shall comply with Section 608.9.

1302.14 ~~1302.12~~ Tests and inspections. Tests and inspections shall be witnessed by the designer and performed in accordance with Sections 1302.12 14.1 through 1302.12 14.6.

1302.14.1 ~~1302.12.1~~ Collection pipe and vent test. Drain, waste and vent piping used for on-site water reuse systems shall be tested in accordance with Section 312.

1302.14.2 ~~1302.12.2~~ ~~Storage t~~Tank tests. ~~Storage t~~Tanks shall be tested in accordance with Section 1301.9.10.

1302.14.3 ~~1302.12.3~~ Water supply system test. The testing of makeup water supply piping and distribution piping shall be conducted in accordance with Section 312.6.

1302.14.4 ~~1302.12.4~~ Inspection and testing of backflow prevention assemblies. The testing of backflow preventers and backwater valves shall be conducted in accordance with Section 312.11.

1302.14.5 ~~1302.12.5~~ Inspection of vermin and insect protection. Inlets and vents to the system shall be inspected to verify that each is protected to prevent the entrance of insects and vermin into the ~~storage t~~ank and piping systems in accordance with Section 1301.7.

1302.14.6 ~~1302.12.6~~ Initial ~~W~~water quality test. The quality of the water for the intended application shall be verified at the point of use in accordance with ~~the requirements~~ all applicable laws, rules, and ordinances of the jurisdiction.

Add new text as follows:

1302.14.7 Operational water quality testing.. The quality of the water for the intended application(s) shall be verified at the point of use in accordance with all applicable laws, rules, ordinances of the jurisdiction, and in accordance with the operation and maintenance manual, and where required, the operating permit.

Revise as follows:

1302.15 ~~1302.13~~ Operation and maintenance manuals. Operation and maintenance materials shall be supplied with nonpotable on-site water reuse systems in accordance with Sections 1302.13.1 through 1302.13.4~~.~~ and the maintenance program shall be implemented by an individual or entity in accordance with the requirements of the *International Property Maintenance Code*.

1302.15.1 ~~**1302.13.1**~~ **Manual.** A detailed operations and maintenance manual shall be supplied in hardcopy form with all systems.

1302.15.2 ~~**1302.13.2**~~ **Schematics.** The manual shall include a detailed system schematic, and the locations and a list of all system components, including manufacturer and model number.

1302.15.3 ~~**1302.13.3**~~ **Maintenance procedures.** The manual shall provide a schedule and procedures for all system components requiring periodic maintenance. Consumable parts, including filters, shall be noted along with part numbers.

1302.15.4 ~~**1302.13.4**~~ **Operations procedures.** The manual shall include system startup and shutdown procedures. The manual shall include detailed operating procedures for the system.

Add new text as follows:

DOE

US Department of Energy
1000 Independence Avenue
Washington, DC 20585

Add new standard(s) as follows:

N/A. 40 CFR 141 United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards

Reason: A version of this proposal was presented in 2020 and rejected. Feedback from the PMGCAC has been considered and addressed herein as follows:

The definitions of graywater, wastewater, and blackwater are unclear.

It is unclear how a code official would enforce odor controls.

Odors are addressed in this proposal by reference to 40 CFR 141, NSF 350, and required compliance with all applicable laws, rules, and ordinances. Furthermore, The designer is required to address odor control in the operation and monitoring program, if the code official has any concerns.

Wastewater reuse should be governed locally, not in ICC code.

More detail is needed on blackwater reuse and related quality.

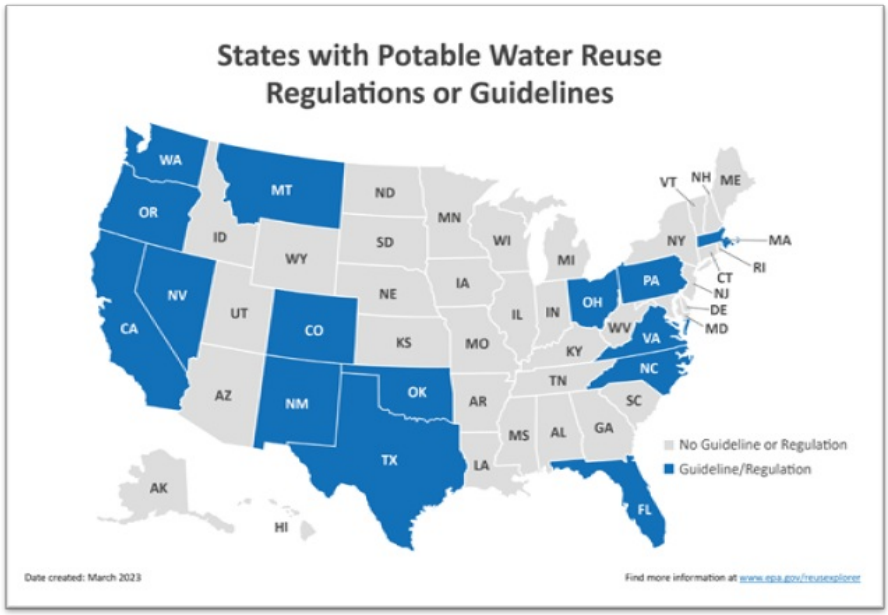
This proposal includes rigorous quality standards based on current science and focused on public safety.

Water reuse options should be expanded in the plumbing code not only because of the moral imperative to improve water efficiency and reduce consumption of valuable potable water for nonpotable purposes, but also because current technologies safely enable such practices. For example, by treating and reusing its own wastewater, a commercial office building can offset 100% of its toilet and urinal flushing demand, which can represent up to 70% of its total indoor potable water demands. In San Francisco, the San Francisco Public Utilities Commission headquarters building treats wastewater onsite for toilet and urinal flushing, reducing the use of potable water within the building by approximately 50%. In Sydney, Australia at 1 Bligh Street, a commercial high rise tower is offsetting 100% of the building's nonpotable water demands by reusing wastewater. In Portland, Oregon the Hassalo on Eighth eco-district, a cluster of residential, commercial, and mixed-use buildings is collecting its wastewater and reusing it for toilet flushing and irrigation. This system saves up to 7 million gallons of potable water per year. In New York City, the Solaire Building has successfully operated an onsite blackwater reuse system for two decades to meet the building's toilet flushing, cooling tower makeup, and irrigation demands. Similar to San Francisco, New York City has several buildings treating blackwater onsite for non-potable end uses. These are just a few examples of successfully operating nonpotable reuse systems with long histories.

Today, focus has shifted to Indirect Potable Reuse (IPR) and Direct Potable Reuse (DPR). IPR is when treated wastewater is supplied to a raw drinking water source such as an aquifer or reservoir. The naturally blended water is then withdrawn for treatment in a drinking water treatment facility prior to public consumption. DPR eliminates the environmental buffer and provides treated wastewater directly for public consumption.

According to the EPA, treated wastewater can be used for potable consumption in California, Colorado, Connecticut, Delaware, Florida, Massachusetts, Montana, Nevada, New Mexico, North Carolina, Oklahoma, Oregon, Pennsylvania, Texas, Virginia, and Washington. Some of these states also permit DPR. Still other states are in the process of developing DPR regulations, including Arizona where the

practice is currently labeled “Advanced Water Purification” (AWP) instead of DPR.



Health & Safety. Standards such as NSF 350 exist to guide the implementation of onsite treatment and reuse systems. Water quality standards are also evolving as public health regulators and utilities from across the country are adopting a health risk-based approach that applies to water sources including blackwater, graywater, and rainwater. This health risk- framework focuses on the removal of pathogens and ongoing monitoring to ensure water is treated appropriately based on the end use. Public health and safety is paramount. States including California and Washington are proceeding with establishing health risk-based frameworks for the treatment of onsite blackwater.

The quality defined for the sole Tier 4 application (DPR) is by necessity not only based on common drinking water quality standards (USEPA), but also on the recognition that additional biological barriers are appropriate, given the source water's origin. Extensive studies have been conducted in the past few decades to determine the level of treatment required to ensure public health and safety.

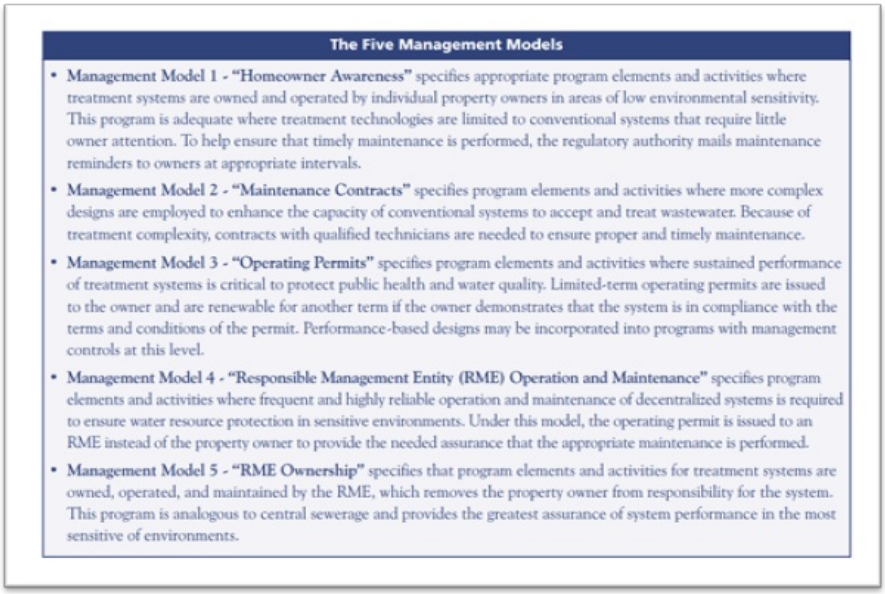
Log removals of Enteric Viruses, Giardia, and Cryptosporidium (18/15/15, respectively) are based on the National Water Research Institute's "DPR Criteria Expert Panel: Preliminary Findings and Recommendations", Fountain Valley, California, June 23, 2023

These log reductions, mean that enteric viruses are reduced by 99.9999999999999999% (18 nines), that giardia and cryptosporidium oocysts are each reduced by 99.9999999999999% (15 nines)

Engineering process design is expected to be based on treatment technique log removal values (LRVs), as published by generally accepted industry leaders and institutions (e.g., United States Environmental Protection Agency, Water Environment & Research Foundation, World Health Organization, etc.). Treatment verification is expected to be demonstrated by periodic challenge tests, as described by generally accepted industry leaders and institutions (see above). Due to the rapid evolution and variety of treatment techniques and challenge test protocols, neither are further specified herein although they may be in the future. Additionally, periodic challenge testing may not be required where treatment process surrogates are monitored to ensure ongoing performance within a credited window. At this time, flexibility is needed to promote water conservation and to empower decision makers.

This proposal does not seek to specifically define water quality requirements for Tier 1 and 2 applications. It is recognized that such standards may be highly dependent on source water quality,and should remain flexible to empower decision makers.

Public health and safety are further assured by requiring competent management of all water reuse systems. Section 1302.14 specifies Management Model 4 or Management Model 5 of USEPA's Management Guidelines for Decentralized Wastewater Management (EPA 832-B-03-001, March 2003)



The Five Management Models

- **Management Model 1 - "Homeowner Awareness"** specifies appropriate program elements and activities where treatment systems are owned and operated by individual property owners in areas of low environmental sensitivity. This program is adequate where treatment technologies are limited to conventional systems that require little owner attention. To help ensure that timely maintenance is performed, the regulatory authority mails maintenance reminders to owners at appropriate intervals.
- **Management Model 2 - "Maintenance Contracts"** specifies program elements and activities where more complex designs are employed to enhance the capacity of conventional systems to accept and treat wastewater. Because of treatment complexity, contracts with qualified technicians are needed to ensure proper and timely maintenance.
- **Management Model 3 - "Operating Permits"** specifies program elements and activities where sustained performance of treatment systems is critical to protect public health and water quality. Limited-term operating permits are issued to the owner and are renewable for another term if the owner demonstrates that the system is in compliance with the terms and conditions of the permit. Performance-based designs may be incorporated into programs with management controls at this level.
- **Management Model 4 - "Responsible Management Entity (RME) Operation and Maintenance"** specifies program elements and activities where frequent and highly reliable operation and maintenance of decentralized systems is required to ensure water resource protection in sensitive environments. Under this model, the operating permit is issued to an RME instead of the property owner to provide the needed assurance that the appropriate maintenance is performed.
- **Management Model 5 - "RME Ownership"** specifies that program elements and activities for treatment systems are owned, operated, and maintained by the RME, which removes the property owner from responsibility for the system. This program is analogous to central sewerage and provides the greatest assurance of system performance in the most sensitive of environments.

SAMPLE LRV CREDIT CALCULATION REGARDING IPC TABLE 1301.2(3) and IRC Table P3401.2(3):

10,000 gpd of Blackwater

70,000 gpd of groundwater

20,000 gpd of surface water

BWC = 10,000 / (10,000 + 70,000 + 20,000)

BWC = 0.10

LRV Credit = -log (BWC)

LRV Credit = -log (0.10)

LRV Credit = 1.0

This proposal is submitted by the ICC Plumbing Mechanical Gas Code Action Committee (PMGCAC) PMGCAC was established by the ICC Board of Directors in July 2011 to pursue opportunities to improve and enhance assigned International Codes or portions thereof. In 2023 PMGCAC has held 26 virtual meetings open to any interested party. In addition, there were several virtual Working Group meetings for the current code development cycle, which included members of the committee as well as interested parties. Related documents and reports are posted on the PMGCAC website at PMGCAC.

Bibliography: Alsup, Kayla and Alsup, Kayla E., "Sustainable Water Treatment Systems: A Direct Potable Proposal" (2021). Murray State University Honors College Theses. 89.

Case Studies of Innovative Water Reuse and Resource Recovery Projects, San Francisco Public Utilities Commission (SFPUC), https://sfpuc.org/documents/case-studies-innovative-water-reuse-and-resource-recovery-projects, accessed July 27, 2023.

Derivation of Log Removal Values for the Addendum to A Framework for Regulating Direct Potable Reuse, presenting an early draft of the anticipated criteria for DPR

, California State Water Board Division of Drinking Water, June 15, 2021.

Drinking Water Quality Standards, United States Environmental Protection Agency, Code of Federal Regulation https://www.ecfr.gov/current/title-40/chapter-I/subchapter-D/part-141.

Ghernaout, D. , Elboughdiri, N. and Alghamdi, A. (2019) Direct Potable Reuse: The Singapore NEWater Project as a Role Model. Open Access Library Journal, 6, 1-10. doi: 10.4236/oalib.1105980.

Kehoe P. & Nokhoudian T. 2022 “Onsite Water Recycling: an Innovative Approach to Solving an Old Problem”. San Francisco, CA.

Leslie, Jacques., “Where Water is Scarce, Communities Turn to Reusing Wastewater,” Yale Environment 360, May 1, 2018.

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Rich, D., Andiroglu, E., Gallo, K., & Ramanathan, S. (2023). A Review of Water Reuse Applications and Effluent Standards in Response to Water Scarcity. *Water Security*. Accepted through Peer Review July 2023.

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Tchobanoglous, George, Franklin L. Burton, H. David Stensel, Metcalf & Eddy., Wastewater engineering : treatment and reuse. (4th ed.). Boston: McGraw-Hill. 2003. ISBN 0-07-041878-0. OCLC 48053912.

Cost Impact: The change proposal is editorial in nature or a clarification and has no cost impact on the cost of construction

Justification for no cost impact:

The proposal to expand implementation of onsite wastewater reuse will not increase the cost of construction. The proposal is allowing for onsite wastewater reuse systems as an option, but not mandating installation. Buildings that choose to install a system would experience increased construction costs to install tanks, treatment, and distribution piping. However, buildings can also realize cost savings on water and sewer bills by reusing wastewater onsite. As a result, the building would consume less potable water and send less wastewater to the sewer.

An analysis was conducted to evaluate the amount of wastewater that could be treated and reused onsite in proposed mixed-use development in San Francisco. Using the water utility's rate schedule to estimate the financial savings, the analysis showed installing an onsite wastewater reuse system could result in savings of about $50,000 annually based on reduced potable consumption alone. As the cost of potable water increases, so would such savings.

Staff Analysis: A review of the standard proposed for inclusion in the code, DOE 40 CFR 141 *United States Environmental Protection Agency (USEPA) Primary and Secondary Drinking Water Quality Standards* , with regard to some of the key ICC criteria for referenced standards (Section 4.6 of CP#28) will be posted on the ICC website on or before March 18, 2024.