Resolution Report on ANSI Public Review Comments – Second Public Review

CSA/ICC B805 Rainwater Harvesting Systems

CSA/ICC Joint Technical Committee on Rainwater Harvesting Systems - IS-RCSDI

Second Public Review: 11/1/2016-1/2/2017

Note: This draft standard is under development and subject to change; it should not be used for reference purposes.

PR2 No.	Name	Clause	Comments	Proposed change	Resolution
2	Jeffrey Hugo	All	Global change to document. Changing fire suppression to fire protection. Fire suppression is not specifically defined in the IFC, but fire protection is (as is automatic fire sprinkler system). Where fire suppression is a specific function of a system or technique, the IFC definition of fire protection is general to all fire control and suppression systems, actions and techniques. Fire protection is a better term to encompass standpipe and fire sprinkler systems.	This Standard addresses roof surface rainwater and stormwater (i.e., rainwater that has come in contact with the ground) being used as the source water. This Standard addresses rainwater intended for use in non-potable applications (e.g., irrigation, fire protection suppression, toilet and urinal flushing, clothes washing, hose bibs, decorative fountains, and vehicle washing) as well potable applications (e.g., human consumption, oral care, food preparation, dishwashing, and bathing). The term rainwater harvesting is used generically in this Standard and can refer to harvesting of either roof runoff or stormwater	AS: All occurrences of the term “fire suppression” will be changed to “fire protection” throughout the document.

3	Wilson Chu	0	Second paragraph, first sentence "this Standard provides different methods for protecting water based on the influent water quality, the system, and the application."	Replace the words "the system" with the words "the treatment system".	AM: The committee opted to replace the word "system" with "rainwater harvesting system" to better state the intent as shown below. "Recognizing that risk to public health increases with the number of persons using a ~~treated~~ rainwater harvesting ~~water~~ system…"
5	Bernard McGovern	0	First sentence of the first paragraph states "...stormwater (i.e., rainwater that has come in contact with the ground)". Green roofs of any type should be included in the stormwater category since green roofs typically use plant material, growing medium and fertilizers.	The recommended wording change is: "…stormwater (i.e., rainwater that has come in contact with the ground or a green roof) "	AS
7	Wilson Chu	1.2	Section (b) "collection of surface water" may be confusing. Strictly speaking, stormwater can be surface, especially when looking at a definition of surface water on page 21 or the definition of catch base on page 19. The examples provided under surface water are narrower, this begs the question of what is really meant: I believe what is really meant is "stormwater collected in surface water storage facilities"	Replace the wording in Section 1.2 (b) "collection of surface water" with "stormwater collected in surface water storage facilities".	D: The term "surface water" has a very specific definition provided in Section 3.1 that provides sufficient guidance to avoid confusion.
12	Neal Shapiro	3	Sewer: should define "wastes" in other liquid wastes. Does this include rainwater, stormwater, which are not wastes. Or add note that this term excludes RW/SW, only sanitary sewer waste liquid. For combined systems	Sewer: A piping system that transports sewage and other liquid wastes to a point of disposal, in the case of combined sewer systems. For MS4 systems, this Manual applies to the Separate Storm Sewer System..	AM: The term "sewer" is not used in the main body of the standard and is therefore not necessary. Delete definition for "sewer" in it's entirety.

			then yes, includes all liquid. For MS4, separate systems, sanitary sewer and storm sewer, both use sewer, so important to distinguish.		
13	Bernard McGovern	3.1	I am concerned that a secondary directly connected water supply is still being considered. Unless I am mistaken the Canadian National Plumbing Code specifically prohibits a direct physical connection between a potable and non-potable water system. A backflow device such as a double check valve assembly or reduced pressure device is not considered as acceptable protection. Only an air gap is allowed.	I suggest that the wording be change to stipulate that the secondary water supply must discharge into the storage tank via an air gap	AM: Revise the definition to clarify the definition to indicate per 7.3.7 that a secondary water supply is inclusive of several methods. Canadian national and many provincial plumbing codes allow for various methods of backflow prevention between potable and non-potable water distribution systems. The acceptability is up to the local municipal jurisdiction and local plumbing code. "Secondary ~~directly-connected~~ water supply: An alternate ~~secondary~~ source of water that serves a ~~distribution system independently from the~~ rainwater harvesting system. ~~Note: Secondary directly connected water supplies are typically intended to be used when the rainwater harvesting system is unable to provide sufficient water from the main supply. This water is not intended to be introduced directly to the storage tank, but to the distribution system piping."~~
14	Wilson Chu	3.1	Add new definition called Makeup water supply. This will help clarify the difference between a top-up system and a secondary water supply; secondary water supply's are a	Makeup water supply: An alternate source of water that is provided to maintain water levels in the rainwater/storm-water storage tank. Note: Makeup water supplies are	D: Per action on #13

			separate system that can be turned on in the event that the primary system is nonfunctional or out of commission. Also, there is already a section in the standard section 7.3.7.5 that refer to the Makeup Water Supply.	typically intended to be used when the rainwater/storm-water harvesting system is unable to provide sufficient water from the main rainwater/storm-water supply. If a utility-provided potable water supply is made available as a makeup water supply to the rainwater/storm-water system then such a supply must be through an approved air gap into the rainwater/storm-water storage tanks.	
15	Wilson Chu	3.1	The term Secondary directly-connected water supply, poses a risk to the potable water supply provided by utilities, as this type of cross connection can be subjected to microbiological risks. Pathogens, bacteria, and other microorganisms are opportunistic in nature; they colonize and migrate throughout connected piping systems. Backflow preventers are not able to prevent these risks as they are mechanical by design and are subject to periodic failures throughout the device's life cycle. Air gap separations or physical separations between a potable and non potable system is the only appropriate way to mitigate the risk of possible microbiological contamination between the two systems. Thus our recommendation is to use the term Secondary water supply instead.	Secondary water supply: A secondary source of water that serves a distribution system independently from the rainwater/ storm-water harvesting system. Note: Secondary water supplies are typically intended to be used when the rainwater/storm-water harvesting system is unable to provide sufficient water due to routine system and tank maintenance, unexpected equipment or pump failures, repairs and replacements, etc. If a utility-provided potable drinking water supply is required as a secondary water supply to the distribution system then such a supply must be provided through an approved air gap into a potable water storage tank that provides potable water to the distribution system.	D: Per action on #13
17	Neal Shapiro	3.1	Rainwater definition: simplify the definition	Rainwater: Collected water from natural precipitation.	D: Definition already matches the proposed language.

18	Wilson Chu	3.1	Rainfall abstraction definition.	Replace the wording "from absorption into roof surfaces" with "from absorption onto impervious or pervious surfaces"	D: Absorption is meant to address water no longer available for collection because it has soaked into roofing materials. The use of the word "onto" is incompatible with absorption and by definition impervious surfaces are not subject to absorption.
19	Wilson Chu	3.1	Roof runoff definition. Whether it is accessible by pedestrians has nothing to do with it being roof runoff. If one does not want pedestrian access, that is ok but it should be said explicitly as a condition. The construct in section 7.1.2 does read well, especially for 7.1.2 (b), as you start off with roof material and then it sounds like the access is an afterthought.	Delete the words "that is not subject to pedestrian access".	D: Pedestrian access is included since it pertains to the types of contaminants that can be expected. Potential contaminants dramatically widen when public access is provided for various uses (e.g. rooftop decks).
21	Wilson Chu	3.1	Vegetative roof definition, see the note. A blue roof denotes storage, which should not happen on vegetative roofs	Delete the word "blue roof" from the note.	AS
22	Bernard McGovern	3.1	Backflow description which state "Backflow: A flowing back or reversal of the normal direction of flow." is incomplete. When I was trained in cross connection control the term backflow include the concept of that pressure was the cause of the backflow.	Suggest wording change to the following "Backflow: A flowing back or reversal of the normal direction of flow caused by a force exerting pressure in the reverse direction to the normal direction of flow."	D: The proponent's wording would be appropriate for a commentary, but backflow prevention is not the primary topic of this document. Backflow prevention is addressed in code and other standards (like CSA B64) which should be consulted for more detailed information on the topic. The definition merely points to a reversal of flow, regardless of the cause.
23	Bernard McGovern	3.1	Back siphon or siphon is not included in the definitions. Siphon is caused by a vacuum in the pipe system rather than a pressure source. Therefore I believe	Recommended wording is as follows " Siphon or back siphon: A flowing back or reversal of the normal direction of flow caused by a vacuum in the pipe	D: The proponent's wording would be appropriate for a commentary. However, the definition merely points to a reversal of flow, regardless of

			the term should be added.	system.".	whether it is caused by back pressure or back siphoning.
24	Bernard McGovern	3.1	Anti-siphon devices are not mentioned in the definitions. Suggest that the term anti-siphon be added to the definitions.	Recommended wording as follows "Anti-siphon device: A device that prevents flow reversal due to a siphon effect."	D: Section 4.3 requires adherence to local codes or laws. Any device or assembly used must meet local rules and regulations, which could in some cased be a device or an assembly. This standard should not try to determine which device or assembly would be applicable in all situations.
25	Edward Van Giesen	3.1	A few definitions are missing or are incomplete in the standard. See below.	REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTION ASSEMBLY. A backflow prevention device consisting of two independently acting check valves, internally force-loaded to a normally closed position and separated by an intermediate chamber (or zone) in which there is an automatic relief means of venting to the atmosphere, internally loaded to a normally open position between two tightly closing shutoff valves and with a means for testing for tightness of the checks and opening of the relief means. BACKFLOW CONNECTION. Any arrangement whereby backflow is possible. BACKFLOW PREVENTER. A backflow prevention assembly, a backflow prevention device or other means or method to prevent backflow into the potable water supply. BACKFLOW. Pressure created by any means in the water distribution system, which by being in excess of	AM: Previous actions negated the need for all definitions except inlet pre-filtration. The proposed new term “inlet pre-filtration” added to 7.2.10.2 as shown and the definition proposed is accepted as submitted. Other changes to 7.2.10.2 shown made for clarity and consistency with the definitions. “7.2.10.2 Pre-filtration Inlets accepting water from collection surfaces shall be protected with a debris excluder, inlet pre-filter or equivalent device to prevent the entry of large contaminants and debris into the conveyance system (e.g., vermin, leaves, sticks, ~~pine~~ tree needles, tree fruit, bark, and moss).” “INLET PRE-FILTER. A device installed on the rainwater conveyance pipe prior to the primary storage vessel on a rainwater system. It is intended to

				the pressure in the water supply mains causes a potential backflow condition. INLET PRE-FILTER. A device installed on the rainwater conveyance pipe prior to the primary storage vessel on a rainwater system. It is intended to mitigate the introduction of vermin, leaves, roof contaminants, or any other unwanted debris that could enter the system. MAKEUP WATER SUPPLY. Secondary water supplied to maintain minimum water levels within storage tank. Makeup water supply is provided by enduser. RAINWATER: Collected water from natural precipitation including, but not limited to rain and snowmelt events.	mitigate the introduction of vermin, leaves, roof contaminants, or any other unwanted debris that could enter the system. “
29	Gina Palino	3.1	This is a little unclear	Change "potable water is drinking water" to " potable water is more commonly referred to as drinking water"	AS
30	Bernard McGovern	3.1	Suggest modifying definition of "Stormwater runoff" to include water harvested from a vegetative roof.	Suggested wording as follows " Stormwater runoff: All rainwater that is not roof runoff except for water that runs through and/or off a vegetative roof."	AM: Revised to expand the suggested addition and place it in a note since the list is not necessarily exhaustive. "Stormwater runoff: All rainwater that is not roof runoff Note: This includes precipitation runoff from rain or snowmelt events that flows over land and/or impervious surfaces (e.g., streets, parking lots, and vegetative rooftops, roofs with public access)."
32	Andrew F.	6	Residential Rainwater Harvesting	All residential Rainwater Harvesting	D: Licensure and recording

	Grese		systems should be designed by an engineer and approved in a Plumbing Plan Review. The average homeowner installing the system with little or no knowledge of the dangers of non-potable water may cause themselves and others harm with the systems.	Systems must be designed by a licensed engineer and approved with a Plumbing Plan review. It should also be considered that the existence of the system be recorded in the deed of the property to insure that future owners or occupants are aware of the systems and the required maintenance of the systems.	requirements are outside of the scope of this document.
33	Michael Cudahy	6.3	Flow rates are also considerations, and the list should be alphabetical.	6.3 Pressure and temperature Operational Conditions Components used in rainwater harvesting systems shall be suitable for use at the components' anticipated maximum and minimum operating water temperatures, and pressures. flow rates, pressures and temperatures.	AM: Redundant text removed. "6.3 ~~Pressure and temperature~~ Operational Conditions Components used in rainwater harvesting systems shall be suitable for use at the components' anticipated maximum and minimum operating water temperatures, ~~and~~ pressures, and flow rates."
35	Michael Cudahy	6.5	Non-potable pressure piping should also be marked, labeled and or colored purple to identify it as non-potable. This should be done inside and outside to protect occupants. This would only apply to a non-potable system.	6.5 Buried collection and distribution piping Except for irrigation piping located outside of a building and downstream of a backflow preventer, buried non-potable collection and distribution piping shall maintain the separation distances from potable water piping specified by the authority having jurisdiction; and be protected from damage and potential sources of contamination in accordance with the plumbing code. c. identified as non-potable in accordance with the plumbing code.	AS
36	Gina Palino	9.6	At the end of the first recommend adding the following text for accuracy	and municipal water supplier where applicable	AM: Incomplete and no enforcement available. Also revise to strike the

					following text since there are other standards pertaining to these products. ~~In the absence of code requirements, backflow preventers shall be tested in accordance with CSA B64.10.1.~~
40	Jeffrey Hugo	5.1.13.1	Rainwater harvesting systems can and are often connected to fire protection systems. Shutting off the rainwater system to irrigation has no life safety consequences as it does with the fire protection system. Due care must be taken when the rainwater portion is abandoned and the abandonment cannot occur until another water supply is approved for the fire protection system.	5.1.13.1 Abandonment Abandoned rainwater harvesting systems shall comply with the requirements of the applicable local codes. Rainwater harvesting systems connected to fire protection systems shall not be abandoned until permanent approved water supply is connected to the fire protection system. In addition, when a rainwater harvesting system is permanently removed from service, all system piping connecting to a secondary water system shall be removed or disabled; storage tanks shall be abandoned in accordance with Clause 7.3.6.4; inlet piping shall be disconnected and redirected to drain systems; vents, inlets and outlets, and related piping shall be sealed; and electrical power shall be permanently disconnected.	D: This is generally addressed in locally adopted plumbing codes.
44	Bernard McGovern	5.1.2.3	I suggest the word "Fit" is not the most appropriate word to use in this context.	Recommend the word "Suitability" be used instead of fit.	D: The wording used is consistent with the language used in the WSP sections. It is also consistent with general industry usage.
49	Bernard McGovern	5.1.9	Suggest that wording is incomplete.	Suggest following changes "(d) seismic" be changed to "(d) seismic activity" "(e) extreme rainfall" be changed to "(e) extreme rainfall (i.e.	AM: Not all conditions can be listed, therefore the statement is revised to add "<u>including but not limited to:</u>" to make it clear that many other

				frequency, intensity)" Suggest following additions (j) soil conditions (i.e. type, texture, depth) (k) vegetation	conditions should and could be considered.
50	Wilson Chu	5.1.9	Add the term drought, as a local site condition.	Add "(j) drought" to the list.	D: Per action on #49
51	Michael Cudahy	5.1.9	Local site conditions may include unusual rainwater with pH that could be corrosive to materials and should at least be considered for design and materials.	(j) rainwater pH	D: Per action on #49
52	Wilson Chu	5.1.9	What about migratory bird patterns?	Add "migratory bird patterns" as a new bullet.	D: Per action on #49
53	Rosanna Breiddal	5.1.9	Local Site Conditions (page 25) – item (d) should be changed from 'seismic' to 'seismic events';	Local Site Conditions (page 25) – item (d) should be changed from 'seismic' to 'seismic events';	D: Per action on #49
54	Edward Van Giesen	5.1.9	What does extreme rainfall mean? Need to define this. Recommend striking.	(e) extreme rainfall;	D: Per action on #49
58	Michael Cudahy	5.2.1.2	I suspect the potential for contact in some cases could also be influenced by time (only irrigating at 3AM, for example)	The potential for human contact through ingestion, inhalation, or skin contact is characterized as low, medium, or high under normal operation and times for the intended use. A low exposure potential applies to end uses where humans rarely come in contact with the treated rainwater due to the nature of the installation that limits direct or indirect contact under normal operation. A medium exposure potential applies to end uses where human contact with the treated rainwater is indirect or limited under normal operation. A high exposure	D: Time is one of the many considerations/factors of the normal operation. "normal operation" encompasses numerous factors including time. Typically addressed in WSP.

				potential applies to end uses where human contact with the treated rainwater is direct under normal operation.	
63	Jeffrey Hugo	5.2.2	Change fire suppression to fire protection in the end use tiers tables. Fire suppression is not specifically defined in the IFC, but fire protection is (as is automatic fire sprinkler system). Where fire suppression is a specific function of a system or technique, the IFC definition of fire protection is general to all fire control and suppression systems, actions and techniques. Fire protection is a better term to encompass standpipe and fire sprinkler systems.	Cannot alter tables: fire suppression protection	D: Per action on #2
64	Bernard McGovern	5.2.2	I believe that it is inappropriate to include spray irrigation in Tier 1. Regardless of the precaution taken to restrict access people will find a way to gain access to the irrigation system when it is operating or be exposed to the water during repair and maintenance operations. Also if the irrigation system is operated in windy conditions (winds in excess of 10mph) the water can be carried a considerable distance from the intended area of coverage.	Remove spray irrigation from Tier 1 and/or define restricted access such as an area that secured from possible entry using a lock mechanism.	AM: The WSP should establish the risk for the application and location. The current language allows for the local conditions (including access and exposure) to be considered in the WSP and assignment of tiers. The WSP would establish what is to be considered restricted and unrestricted access. Add a note to Table 5.1, 8.3 and 8.4 for Tier 1 and 3 spray irrigation to clarify the role of the WSP with the tables. "The WSP shall establish whether a given application is restricted or unrestricted access or exposure."
65	Bernard McGovern	5.2.2	I am uncertain that fire suppression should be included in Tier 1. If the fire	If we are looking at the fire system only when it is not activated then Tier	D: Stored and stagnant water is problematic and subject to degradation.

			system is not activated then there is no exposure risk. When a fire system is activated, depending on the system type, a single sprinkler may discharge water or a large block of sprinklers may discharge simultaneously.	1 is an appropriate placement. If we are looking at the fire system possibly being activated then Tier 2 or 3 are more appropriate options.	The suitability of applications and access restrictions (if any) should be left to the local jurisdiction.
66	Edward Van Giesen	5.2.2	If potential exposure through inhalation for HVAC evaporative cooling is high as pointed out in footnote at the bottom of the chart, then why is it in tier 2? Should it not be in tier 3? I believe it should be moved to tier 3.	HVAC evaporative cooling† (e.g., cooling tower, evaporative condenser, spray cooler, direct and indirect evaporative cooling) Move to tier 3 for high risk	AM: ASHRAE 188 and mfg requirements are referenced so both legionella and system compatibility are addressed. Revised note in 5.1 to align with Med. risk in table cell. Deleted note in 5.1: ~~† Exposure potential through inhalation for HVAC evaporative cooling is high.~~
69	Edward Van Giesen	6.7.1	How does one control the discharge rates? Recommend striking this.	(d) that volume and discharge rates are in compliance with stormwater management requirements as specified by the authority having jurisdiction.	D: In many jurisdictions, discharge rates for stormwater may need to be controlled, and where the rainwater harvesting system functions as a part of that stormwater system, it control of discharge rates must be maintained.
70	Michael Cudahy	6.7.1	The continuous supply may not always be possible - it's rain! A back up source will be needed in some cases and the standard should be clear another source of water should be available if needed.	6.7.1 General Controls for rainwater harvesting systems shall ensure effective and safe operation of the system; a continuous supply of rainwater, or other suitable water, as applicable; that operation is within intended design parameters of the system; and that volume and discharge rates are in compliance with stormwater management requirements as specified by the authority having jurisdiction.	D: This is already addressed in Section 5.1.3 and is up to the AHJ to determine whether continuous supply is required. The supply referenced is the supply to the load (building).
75	Tige Procyshyn	6.8.2	Not convinced this is the universally accepted signage for non-potable	Please change symbol to human figure drinking from a glass with the red	D: The included symbol is the most commonly cited do not drink symbol

			water.	circle and slash. This is far more demonstrative of not wanting someone to drink water than a faucet filling a pot.	used internationally and is cited by ICO/TC 45 Graphical Symbols in ISO 7000, 7001 https://www.iso.org/files/live/sites/isoorg/files/archive/pdf/en/graphical-symbols_booklet.pdf
81	Jason Carlson	7.1.3.2	For Table 7.1 the (*) footnote should clarify that a product certified to P151 may be used for potable end use tier 4 regardless if the material type is listed on the table or if it is listed for a lower tier. For example a "Polymer and acrylic" type material may pass P151 testing and meet the requirements for potable water contact despite it not making tier 4 in this table. "unless the water collected is treated to address the constituent contaminants" should be removed. There is no way for a typical user to know what contaminants a material would release and at what concentrations. Typical filtration units reduce contaminants down from already safe levels to lower levels. Lower end RO units, ultra, nano, and micro filtration may be ineffective at reducing unsafe levels of organic or inorganic chemical contaminants leached from un-tested materials. Such contaminants may include formulation specific ingredients, processing aids, additives such as biocides, algaecides, fungicides, plasticizers, UV stabilizers, dye and pigments. See Figure A.1 for	Completely remove footnote * Roofing products used within rainwater harvesting systems collecting water for use as drinking water can be third-party certified to NSF P151-1995 Health Effects from Rainwater Catchment System Components unless the water collected is treated to address the constituent contaminants. Replace with footnote * Roofing products used within rainwater harvesting systems collecting water for use as drinking water that are third-party certified to NSF P151 can be used regardless if their material type is found on table 7.1 or the material is listed at a lower tier.	D: The proposed change would add normative language to a non-normative note to be used for reference only.

			illustration of this point.		
82	Neal Shapiro	7.1.3.2	The term, "reuse," should be applied for used water resources, which are being collected and reused a 2nd or more time. Rainwater and stormwater are collected for a first time use, so not Reuse but Use. However, if combined with sanitary sewage, then such is not applicable due to the wastewater component. But generally stormwater will be collected from MS4 systems for use, not the sanitary sewer, in which case it is Blackwater to reuse. To be consistent, should change all Reuse to Use when discussing rainwater/stormwater.	Colder climate regions subject to some degree of snowfall during the year and use of salt for de-icing shall not collect stormwater runoff for reuse unless . . .	AM: The term "Reuse" should be reserved for the treatment of water which has been used for a specific purpose, collected, and then treated to an acceptable standard for a second use (reuse), versus directly recycled without treatment for a second use. "7.1.3.2 Colder climate regions subject to some degree of snowfall during the year and use of salt for de-icing shall not collect stormwater runoff for ~~reuse~~ <u>use</u> unless appropriate treatment is undertaken to address salt content."
83	Bernard McGovern	7.1.3.2	I believe the wording in section 7.1.3.2 is incomplete and needs further clarification.	Recommended wording change is as follows: Colder climate regions subject to some degree of snowfall during the year. Therefore areas that are subject to the use of salt for de-icing shall not be used to collect stormwater runoff for reuse unless appropriate treatment is undertaken to address salt content.	D: The impact of any additive or contaminant has to be taken into consideration in determining treatment and suitability for a particular water use.
86	Wilson Chu	7.1.3.2	In Table 7.1 there is a reference to "Street, freeway, shoulder areas, paved parking". This is confusing because of the reference to parking surfaces (two rows above).	Delete the words "paved parking".	AS
87	Wilson Chu	7.1.3.2	In Table 7.1 for the references "Street, freeway, shoulder areas, paved parking" and "surface waters and stormwater detention ponds" can we please replace "none" by "not in the	Replace the word "none" with "not in the scope of this standard".	AS

			scope of the standard" after all we are looking to continue to use these stormwater use systems. Marking it as none might create unnecessary barriers.		
88	Edward Van Giesen	7.1.3.2	Does this include all membrane roof surfaces? Perhaps not. For example PVC is not listed. So as not to prohibit certain roof types this list should either be exhaustive or amplified. Add PVC Polyvinyl Chloride and TPO Thermoplastic Polyolefin	COLLECTION SURFACES PER WATER END USE TIER FOR THE PRESCRIPTIVE APPROACH Collection Surface End Use Tier Roofing material* Asbestos cement None Asphalt 1, 2, 3, 4 Asphalt felt and bituminous and tar membranes 1, 2, 3 Ceramic 1, 2, 3, 4 Clay 1, 2, 3, 4 Concrete 1, 2, 3, 4 Copper 1, 2, 3 Fiberglass 1, 2, 3, 4 Glass 1, 2, 3, 4 Polyethylene membrane 1, 2, 3, 4 Polymer and acrylic 1, 2, 3 PVC Polyvinyl Chloride Rubber/Butyl /EPDM membrane 1, 2, 3 Steel - Coated 1, 2, 3, 4 Steel - Stainless 1, 2, 3, 4 Tin 1, 2, 3, 4 TPO Thermoplastic Polyolefin Wood - Untreated 1, 2, 3 Wood - Treated 1, 2, 3	AM: Added Tiers 1-4 for each new material. Per treatment of other materials in the table. PVC | 1, 2, 3, 4 TPO | 1, 2, 3, 4
89	Neal Shapiro	7.1.3.2	In Table 7.1, why is Street, freeway row None? Would seem that end use Tier should be listed, the one for the highly polluted runoff. And why Surface water, ponds also None. So no treatment needed?	Add at least one Tier number to each of these, unless no treatment required, in which case should add superscript with Note.	D: Per action on #87
90	Wilson Chu	7.1.3.2	In Table 7.1 the first foot note references "for use as drinking water can be", the word can should be replaced with shall. See also section 7.1.4.	Replace the word "can" with "shall".	AM: Moves the required language to the main body to clarify when it applies. ~~** Roofing products used within rainwater harvesting systems collecting water for use as drinking*~~

					~~*water can be third-party certified to NSF P151-1995 Health Effects from Rainwater Catchment System Components unless the water collected is treated to address the constituent contaminants.*~~ 7.1.4 Collection surfaces for potable water applications Roofing materials used for the collection of rainwater shall be third-party certified to NSF 61 unless the water collected is treated to address the constituent contaminants. Paints , liners ~~or~~ and coatings applied to surfaces used for collection of rainwater for potable applications shall be third-party certified to NSF/ANSI 61 or NSF P151 ~~or NSF/ANSI 61~~, and applied in accordance with manufacturer's installation instructions. Lead, chromium, or zinc-based paints and coatings that are third-party certified to NSF/ANSI 61 or NSF P151 shall not be used on surfaces used for collection of rainwater for potable applications.
93	Jason Carlson	7.1.4	There are zinc based paints and coatings that have been approved to NSF 61. Remove the zinc-based paint restriction. You can confirm this on NSF or UL's websites for NSF 61 approved barrier materials.	Remove zinc and keep lead and chromium restriction. Lead or chromium based paints and coatings shall not be used....	AM: Some zinc paint and coatings are approved to the standards. "coatings not NSF 61 or NSF P151 approved shall"
95	Neal Shapiro	7.2.10.1	Why is stormwater management systems used instead of rainwater	Inlets to conveyance subsystems that also serve as primary or secondary	D: No specific language change proposed.

			management systems? The document introduction states that rainwater will be the preferred term, though stormwater is included. No definition of stormwater management system so why it is used here and elsewhere? Is it necessary to use this term due distinguish at-grade systems from roof systems? Roof systems are rainwater mngt and at-grade are stormwater mngt? If agree, need to be consistent throughout document and change all.	roof drains or stormwater rainwater management systems shall . . .	
97	Edward Van Giesen	7.2.9	Most commercial gutters are run level and do not have slope for example on big box retail centers. Recommend inserting additional language.	Gutters and collection piping that use gravity to produce flow shall have a slope along their entire length and shall not permit the collection or pooling of water at any point. Exceptions to this are on certain commercials gutters that are hung from the structure and are run level. Siphonic roof drain systems shall be installed in accordance with Clause 7.2.12 and shall not be sloped.	AM: Delete 7.2.9 since the topic is already addressed in 7.2.12, 7.2.13 and the issue is addressed in plumbing codes. Delete last sentence in 7.2.13 since this is already addressed in plumbing codes.
99	Jeffrey Hugo	7.3.1.2	Changing fire suppression to fire protection. Fire suppression is not specifically defined in the IFC, but fire protection is (as is automatic fire sprinkler system). Where fire suppression is a specific function of a system or technique, the IFC definition of fire protection is general to all fire control and suppression systems, actions and techniques. Fire protection is a better term to encompass standpipe and fire sprinkler systems.	Tanks used for fire protection suppression shall comply with the fire code.	D: Per action on #2.

100	Raymond Wilkinson	7.3.12.1	Don't use any other languages than the English used in this standard to describe possible alternate wording. Translations to other languages should be done separately from this standard to ensure that all meanings used in other languages are clearly translated and understood.	Tanks for rainwater harvesting systems shall have at least the following markings: the rated capacity; for storage tanks containing non-potable water, the words "CAUTION: NON-POTABLE WATER - DO NOT DRINK"*.; where openings allow for the entry of personnel, the words "DANGER - CONFINED SPACE" † and a warning indicating the need for procedures for safe entry into confined spaces. *The equivalent French wording is “ATTENTION: EAU NON POTABLE – NE PAS BOIRE” and the equivalent Spanish wording is “ATENCIÓN: AGUA NO POTABLE – NO BEBER”. †The equivalent French wording is “DANGER - ESPACE CONFINÉ” and the equivalent Spanish wording is “PELIGRO - ESPACIO REDUCIDO”. Tanks for rainwater harvesting systems shall have at least the following markings: the rated capacity; for storage tanks containing non-potable water, the words "CAUTION: NON-POTABLE WATER - DO NOT DRINK"*.; where openings allow for the entry of personnel, the words "DANGER - CONFINED SPACE" † and a warning indicating the need for procedures for safe entry into confined spaces. Delete these translations: *The equivalent French wording is “ATTENTION: EAU NON POTABLE – NE PAS BOIRE” and the	D: Some jurisdictions require signage to be provided in multiple languages.

				equivalent Spanish wording is “ATENCIÓN: AGUA NO POTABLE – NO BEBER”. †The equivalent French wording is “DANGER - ESPACE CONFINÉ” and the equivalent Spanish wording is “PELIGRO - ESPACIO REDUCIDO”.	
101	Wilson Chu	7.3.2	In the first sentence, there is a reference to "stormwater or detention (management)". It might not only be applied for stormwater detention but also for stormwater retention or runoff volume control.	Replace the words "stormwater or detention (management)" with "stormwater or detention/retention (management)".	AM: Revised for clarity "stormwater <u>management</u> (detention <u>or retention</u> ~~management~~)"
102	Michael Cudahy	7.3.2	This may be excessive for small systems, esp for single family.	7.3.2 Sizing The minimum capacity of the rainwater storage tank for non-residential systems shall consider the output water demand, dedicated fire reserve volume, stormwater or detention (management) volume, and storage loss factors and shall be in accordance with the requirements of the authority having jurisdiction. See also Annex D for guidance on tank sizing methodologies and calculations.	D: This requirement provides general guidance and allows significant flexibility to the system designer and AHJ. Limiting it to non-residential tanks would leave residential tanks with little design guidance in this standard. Adding the proposed wording does not accomplish the stated goal.
103	Edward Van Giesen	7.3.4.3.1	add additional language	The design of buried or partially buried tanks shall consider the (a) external loads on the tank including the weight of the backfill together with hydrostatic, overburden, and live loads; and (b) soil type at the site and the tank loading when the tank is either full and empty. and (c) manufacturers installation requirements/guidelines	AS
106	Edward Van	7.3.6.1	add exceptions for certain	Access openings shall be located to	D: Committee intends for all tanks to be

	Giesen		underground modular tanks	facilitate the pumping and cleaning of tanks and the servicing and inspection of inlets and outlets. At least one access opening shall be provided to allow inspection and cleaning of the interior of each tank. Access openings shall be secured to prevent unauthorized access. Openings shall be watertight and weatherproof and shall be constructed to prevent entry of vermin and insects and ingress of contaminants. Exceptions can be made for certain underground tanks including modular plastic types and pillow types.	provided with access openings for maintenance and inspection.
108	Michael Cudahy	7.3.6.2	Prevent is impossible, the goal is to limit access.	7.3.6.2 Access openings Where installed, openings intended for human access shall have a minimum dimension of 0.50 m (20 in) and an area of at least 0.20 m2 (314 in2). Access openings shall extend at least 100 mm (4 in) above ground or shall be designed to prevent water infiltration. Finished grade shall be sloped away from the access opening to divert surface water. Access openings and covers shall be secured to prevent limit prevent unauthorized access and vandalism.	D: The word "prevent" is used in other locations. The goal should be prevention.
111	Wilson Chu	7.3.7.5	A directly-connected make up water supply poses a microbiological risk to the purveyor's potable water supply. Pathogens and other opportunistic bacterium are opportunistic in nature; they colonize and migrate throughout	Where make up water is utilized, it shall be provided to rainwater harvesting systems to maintain minimum water levels within the storage tank. Makeup water supply systems shall use an automatic level	D: Sections 4.3 and 5.1.6.2 requires adherence to local codes or laws. An air gap is not mandated in all jurisdictions. Directly-connected makeup water is not mandated in this standard. Also per action on #36.

			connected piping systems. Air gap separations or physical separations between a potable and non-potable system is the only appropriate way to mitigate the risk of possible microbiological contamination between the two systems. As such we recommend that the wording in this section be updated to reflect this.	control valves to maintain the minimum water level in the tank for uninterrupted operation. The automatic controls shall limit the makeup water level before the tank overflow. If a utility-provided potable water supply is made available as a makeup water supply to the rainwater / storm-water system then such a supply must be through an approved air gap into the rainwater / storm-water storage tank.	
112	Neal Shapiro	7.3.7.5	Why does the makeup potable water have to end up in the storage tank and then be pumped into the distribution system a distance, or go through the treatment system first and get treated again before distribution? Why not offer other options: inject potable makeup after storage and treatment, with a T valve activated by switch when the storage tank level goes below a specific level. This is our strategy in Santa Monica. So the makeup goes right into the distribution line post-treatment. Or have the makeup go into the day tank, also post-treatment, avoiding further treatment and pumping.	Where makeup water is utilized, it shall be provided to rainwater harvesting systems in a way that protects public health and maintains uninterrupted operation. Through a 3-way valve post-storage and treatment, directly into the distribution line; through the day tank, post-storage and treatment; or in a way to maintain minimum water levels within the storage tank, in which. Makeup water supply systems shall use automatic level control valves to maintain the minimum water level in the tank for uninterrupted operation. The automatic level controls shall limit the makeup water level below the tank overflow.	D: The provision of make-up water is a user decision. The owner could elect to switch over to using an alternative potable water system once the rainwater runs out. This makes more sense from a sustainability perspective, particularly for maintenance, there needs to be an alternative source of water in parallel with the rainwater system as in most cases the costs of storage are too great to rely on rainwater as the sole source of water for a residence. Dictating how a makeup water system should be controlled is also not appropriate.
114	Edward Van Giesen	7.3.7.6	need to remove last sentence from the provision this will excessively onerous for smaller simpler systems the key is to maintain the backflow prevention	7.3.7.6 Secondary directly-connected water supply Secondary directly-connected water supplies shall be connected to the distribution system	Withdrawn by proponent.

			device see edits below	to maintain the water supply and sized to meet the maximum anticipated demand of the end use. Where an automatic secondary directly-connected water supply is utilized, an alert shall be provided in accordance with Clause 6.7.5 indicating when the secondary directly-connected water supply system is in operation.	
115	Wilson Chu	7.3.7.6	Secondary water supply systems, with a direct connection should require approval by the local authority having jurisdiction. This needs to be clear in this section.	Reword first sentence to: When a secondary directly-connected water supplies is permitted/approved by the local authority having jurisdiction, the secondary system shall be sized to meet the maximum demand of the end use.	D: Proper sizing of a secondary supply must comply with all plumbing code requirements per 4.1 and sizing is already addressed in 7.3.7.2.
116	Wilson Chu	7.3.7.6	A secondary directly-connected water supply is a cross connection that poses a microbiological risk to the purveyor's potable water supply even though a backflow preventer is provided on the water supply. Waterborne disease pathogens (i.e. E. coli, and other parasitic microoganisims) are opportunistic in nature; they colonize and migrate through out connected piping systems. Backflow preventers are not able to prevent these risks as they are mechanical by design and are subject to periodic failures throughout the device's life cycle. An Air gap separation or physical separation between a potable and non-potable water system is the only appropriate	Change heading to "7.3.7.6 Secondary Water Supply". And replace the existing wording with: "Secondary water supplies should be provided to the distribution system to maintain the water supply and sized to meet the maximum anticipated demand of the end use. Where an automatic secondary water supply is utilized, an alert shall be provided in accordance with clause 6.7.5 indicating when the secondary water supply is in operation. If a utility-provided potable drinking water supply is required as a secondary water supply to the distribution system then such a supply must be provided through an approved air gap into a potable water	D: Section 4.3 requires adherence to local codes or laws. An air gap is not mandated in all jurisdictions. Also per action on #13, #36, #111.

			way to mitigate the risk of possible microbiological contamination between the two systems. As such we recommend that the wording in this section be updated to reflect this.	storage tank that provides potable water to the distribution system. There shall be no direct connection between the potable drinking water supply and the distribution system."	
117	Chris Twemlow	7.3.8.6	7.3.8.6 is a violation of the NPC	Adopt NPC language: 7.4.2.2. Connection of Overflows from Rainwater Tanks 1) An overflow from a rainwater tank shall not be directly connected to a drainage system	D: The section does not mandate direct connections and local codes will prevail per Section 4.1
119	Neal Shapiro	7.3.8.6	Clarify "sewer" by adding "sanitary" Moreover, in this section you distinguish between sanitary and storm sewers but earlier in document, I commented how you only referenced sewer and didn't distinguish.	Tank overflows directly connected to sanitary sewer or storm drainage systems shall have a means to prevent backflow.	D: "Sewer" applies to sanitary, storm and combined sewers. See also resolution to #12.
120	Wilson Chu	7.3.8.6	Add proposed text at end of clause.	Add the following text at the end of the clause. "The maximum possible water level in the downstream sanitary or storm drainage system shall be taken into account when designing backflow prevention provisions."	D: This is covered by local plumbing codes and can be considered a design.
128	Edward Van Giesen	8.1.4	Recommend setting a range on chlorine residual in this and subsequent sections.	8.1.4 Control of growth of opportunistic pathogens Rainwater harvesting systems whose water temperature is anticipated to be between 25 °C and 55 °C (77 °F and 131°F) shall have a means to control the growth of opportunistic pathogens (e.g., Legionella, Pseudomonas aeruginosa, Mycobacterium avian complex). Water supplied for multi-residential and commercial applications shall	AM: Remove 7.4.4.2.5, last sentence of 8.1.4 to eliminate redundancy and confusion. Note: Section 6.1 provides basic requirements for material compatibility with disinfection processes which must be addressed by system designers. There is the potential for more specific provisions on corrosion control with certain materials and committee recommends further development of

				maintain a chlorine residual between of 0.5 mg/L and 4mg/L in accordance with Tables 8.3 and 8.4.	material on this topic in subsequent editions of the document.
131	Jeffrey Hugo	8.1.5	Changing fire suppression to fire protection. Fire suppression is not specifically defined in the IFC, but fire protection is (as is automatic fire sprinkler system). Where fire suppression is a specific function of a system or technique, the IFC definition of fire protection is general to all fire control and suppression systems, actions and techniques. Fire protection is a better term to encompass standpipe and fire sprinkler systems.	Cannot alter tables: Change to fire protection suppression	D: Per action on #2
132	Wilson Chu	8.1.5	Reference to "Harvested Rainwater" should be "Harvested Stormwater".	In Table 8.2, first foot note, replace "Harvested Rainwater" with the words "Harvested Stormwater".	AM: Delete the footnote entirely. ~~** It is unlikely that human infectious viruses are present in harvested rainwater. For below ground tanks where there is a potential for sewage contamination, a 4 log reduction shall be required in accordance with the WSP.~~
133	Sara Finley	8.1.5	These quality standards are, beyond a shadow of a doubt, excessively strict for non-potable water uses. I fear this will have the effect of effectively disallowing the re-use of rainwater to supplement the use of potable water, especially at the single-family residential level. As a rainwater harvesting systems designer, I can guarantee that zero (or perhaps *very* few) single-family houses will be	This subject was considered at length by a committee of experts involved in the Water Use Efficiency task group at the CNRC. We performed extensive literature review and considered the equivalencies of codes and standards in place around the world, including those that have long been implemented without issue in numerous US cities, foreign cities, and other countries. The above quality	D: No specific language proposed to revise the document. To undertake a useful epidemiological study to possibly show impact from drinking harvested rainwater, over 30,000 people-records would need to be studied (as estimated for reclaimed water by Sinclair, M.; O'Toole, J.; Forbes, A.; Carr, D.; Leder, K., Health status of residents of an urban dual

			willing to invest in both micro-filtration and disinfection just to use rainwater in the garden or in the toilet. These are extremely low-risk activities and no illnesses have ever been actually documented from the use of rainwater for these uses. This excessively cautious approach risks quashing interest in rainwater harvesting in Canada, even as it becomes more necessary from an environmental standpoint and interest in the practice grows. I encourage you to take a look at the German rainwater code, in place since 1989- the German code allows untreated rainwater reuse for a range of non-potable purposes, and no adverse health effects have ever been reported in relation to this permissive code. In Australia, 10 million people drink untreated rainwater on a daily basis. The fears of illness from reusing this water are unfounded and unproven, and obligating would-be water-conserving residential users to disinfect rainwater for use in the toilet or the garden is excessively restrictive. Quoting Susan R. Ecker (Senior Plumbing Engineer, Rumsey Engineers) "Recent studies conducted in Germany have shown that although the quality of rainwater in reservoirs generally does not meet the quality of potable water, it is extremely well suited for domestic uses such as	criteria are hundreds of times stricter than each and every other rainwater standard and code consulted, and there is no logical reason for Canada to be so much more cautious in this regard. Based on this research, the committee decided to allow a performance route and a design route to meet acceptable levels of quality for rainwater. The code section proposed is below. I can also supply research documents and detail on foreign codes and standards in attached material if required. Please do not hesitate to contact me for more documentation. A rainwater harvesting system shall be provided with a means to treat the water in such a way that the quality of the delivered non-potable water conforms to appropriate provincial/territorial requirements or, in the absence of such requirements. [a] --) shall be provided with a means to treat the water in such a way that the delivered non-potable water contains less than the maximum acceptable levels stated in ARCSA/ASPE 63, “Rainwater Catchment Systems” as follows: [i] --) 100 CFU/100ml of Escherichia coli, [ii] --) 10 NTU of Protozoan Cysts, or [b] --) shall be provided with a treatment system consisting of, [i] --) a 6mm mesh size debris screen before the inlet to the cistern, [ii] --) a first-	reticulation system. Int J Epi 2010, 39, (6), 1667-75.). That however, would only have sensitivity to detect a 30% increase in gastrointestinal illness, whereas U.S. EPA targets one infection per 10,000 people/y for drinking water acceptable risk, i.e. over 100-fold less risk than detectable by a good epi study. Hence, why we now use (as do other jurisdictions, Australia, Canada, USA, WHO) quantitative microbial risk assessment to estimate potential risks and set log-reduction targets. As described for toilet flushing in the USA (Schoen, M. E.; Ashbolt, N. J.; Jahne, M. A.; Garland, J., Risk-based enteric pathogen reduction targets for non-potable and direct potable use of roof runoff, stormwater, greywater, and wastewater. Microbial Risk Analysis 2017, 5, 32-43). Furthermore, there are various outbreaks reported from drinking contaminated harvested rainwater, which provide direct evidence of the risk, and why we set such log-reductions; e.g. in Australia & New Zealand (Merritt, A.; Miles, R.; Bates, J., An outbreak of Campylobacter enteritis on an island resort, north Queensland. Communicable Diseases Intelligence 1999, 23, (8), 215-219; Thornley, C. N.; Simmons, G. C.; Callaghan, M. L.; Nicol, C. M.; Baker, M. G.; Gilmore, K. S.;

			flushing toilets. One study took several billion fecal bacteria and mixed them in a toilet bowl with the water from of rainwater reservoir, which has a maximum concentration of 10,000 E. coli per liter. According to the literature, the probability of a single bäcterium reaching the vicinity of the human mouth during the flushing action is in the order of approximately 1:1,000,000. From this the study concludes that the possibility of any E. coli reaching the vicinity of the human mouth when toilets are flushed can be virtually excluded. These studies were performed to demonstrate that no special disinfection measures were necessary for rainwater to be used for non-potable water functions." I also strongly caution against the use of performance-based (log-reduction based) quality standards for rainwater. This criteria format is intended to gauge the effectiveness of wastewater treatment, where log-reductions of bacteria represent millions of specimens removed. In rainwater, raw water bacterial counts are many orders of magnitude lower (usually well below 100CFU/100mL), so even a 2 log removal effectively means 0 bacteria, and 4-log removal has no real scientific meaning for water of this raw quality. This level of disinfection is absolutely excessive for these	flush diversion system with a 0.3 l/m2 of roof area before the inlet to the cistern, [iii] --) a calming inlet or settling chamber before the inlet to the cistern, [iv] --) a device to prevent sediment entrainment into the suction of the pump, and [v] --) where rainwater is used for indoor applications, a maximum 50 micron filter.	Garrett, N. K., First incursion of Salmonella enterica serotype typhimurium DT160 into New Zealand. Emerg Inf Dis 2003, 9, (4), 493-5; Franklin, L. J.; Fielding, J. E.; Gregory, J.; Gullan, L.; Lightfoot, D.; Poznanski, S. Y.; Vally, H., An outbreak of Salmonella Typhimurium 9 at a school camp linked to contamination of rainwater tanks. Epi Inf 2009, 137, (3), 434-40.). Yet for developing regions, drinking rainwater is considered less risky than unproved source water (Dean, J.; Hunter, P. R., Risk of gastrointestinal illness associated with the consumption of rainwater: a systematic review. Environ Sci Technol 2012, 46, (5), 2501-7). So, the comment “fears of illness from reusing this water are unfounded and unproven, and obligating would-be water-conserving residential users to disinfect rainwater for use in the toilet or the garden is excessively restrictive. “ is clearly in error. The comment that "In Australia, 10 million people drink untreated rainwater” is simply wrong, i.e. that would be nearly half the population. Recent studies in the major cities (i.e. where most Australian’s live) indicate only a few hundred thousand in each major city (i.e. Melbourne, Adelaide and Sydney; see: Moglia, M.;

			purposes, and the wastewater-based criteria system is effectively meaningless when rainwater is considered. This standard effectively requires that well-meaning single-family homes treat rainwater to potable levels in order to be allowed to use it for garden watering. Its application would discourage rainwater use entirely, or encourage scofflaws to develop unpermitted systems. It is far too strict.		Tjandraatmadja, G.; Delbridge, N.; Gulizia, E.; Sharma, A. K.; Butler, R.; Gan, K.; Pollard, C. Survey of savings and conditions of rainwater tanks, Final Project Report 10TR4-001; Smart Water Fund & CSIRO: Melbourne, 2015; p 133.). Lastly, we recommend a residual chlorine in non-single dwellings, i.e. not needed in single homes, just larger buildings where it is likely to reach temperatures over 25C, as even with drinking water, Legionella pneumophila can grow and represents a far greater risk than residual enteric pathogens, as these legionellae grow in piped water biofilms (Ashbolt, N. J., Environmental (saprozoic) pathogens of engineered water systems: Understanding their ecology for risk assessment and management. Pathogens 2015, 4, (2), 390-405) unless a chlorine residual is maintained to the point of use.
135	Scott Robinson	8.1.5	Toilet flushing should not require any UV or any other treatment. This goes against any European rainwater harvesting standards/regulations that have been tried and tested. We have sold and used rainwater havesting systems using the European four stage cleaning process for toilet flushing and laundry without any issue. This will defer the use of rainwater harvesting systems due to the upfront cost	toilet/ urnial flushing should be a low risk option.	D: There is a health risk and therefore a need for the modest level of disinfection specified for water supplied to toilets and urinals.

			(already a huge issue) and the ongoing maintenance / life cycle costs.		
140	Rosanna Breiddal	8.1.5	In BC, Health regulates water supplies that provide water to anything more than a single family dwelling. We will therefore, only comment on treatment requirements for multi-residential and non-residential buildings: Table 8.3 : Roof runoff treatment requirements for multi-residential and non-residential and Table 8.4 Stormwater runoff for Multi-residential and non-residential applications): Potable water:Microbiology -the requirement for a log reduction of bacteria is not comparable to our regulatory requirement, which is based on zero presence of E.coli. - Viruses: While it is unlikely that human infectious viruses are present in harvested rainwater that is collected and stored above-ground, would suggest referencing research or evidence that backs up this reasoning and address potential risk of the transmission of avian influenza virus from wild aquatic birds to domestic poultry to mammalian species, including humans. For example: (Webster, R. G. (1997). Influenza virus: transmission between species and relevance to emergence of the next human pandemic. In Viral Zoonoses and Food of Animal Origin (pp. 105-113). Springer Vienna.) - If site assessment includes nearby sewage site or wastewater treatment works, suggest considering risk from aerosols as wind can carry viruses (Fewtrell, L., & Kay, D. (2007). Microbial quality of rainwater supplies in developed countries: a review. Urban Water Journal, 4(4), 253-260.). - It would be helpful to have an explanation and references to academic journals as to why a particular requirement is in place for each end tier use, i.e. how was it decided that a certain water treatment requirement was appropriate for the level of risk? Hard to comment on the guideline value chosen without some evidence-based justification. -pH: Rainwater standard says pH range: 7-10, while the GCDWQ pH range is: 7-10.5. Suggest changing to match GCDWQ. Potable water: Chemical -Our expectation is that at the end of the day, water quality would be safe to drink without further treatment and that it meets the Guidelines for Canadian Drinking Water Quality. Non-potable water: Microbiology -In BC, we are developing a non-potable water guidance document that does not have specific water treatment requirements for non-potable water at this time, but suggests options to mitigate risk. This is not un-similar to the water safety plan concept in the draft. Approval of systems would be subject to review and evaluation by officials issuing permits for systems	AM: Approve pH change from 10 to 10.5 max for potable, but otherwise no specific language proposed. Committee notes the use of the WERF Risk-Based Framework for the Development of Public Health Guidance for Decentralized Non-Potable Water Systems (2017) in the creation of Tables 8.1-8.4.

			delivering non-potable water. -The end tier uses are in the rainwater harvesting standard similar to those that we have developed in our draft for non-potable water, however there are some discrepancies, such as - toilet/urinal flushing (Non-potable draft categorizes as low risk as opposed to medium) -surface irrigation (Non-potable draft categorizes as medium risk as opposed to low) -Activities in End-use tier 3, we would be likely to categorize as Medium-High risk, as opposed to High Risk. Non-potable water: Chemical -Recommend referencing the MACs in the Guidelines for Canadian Drinking Water Quality. Proposal: See above.		
142	Edward Van Giesen	8.2.5	recommend keeping all reference to chlorine residual consistent throughout document in this table it reads ".5mg/L - 2mg/L there are other references to 4mg/L recommend to the committee to either stick with 2mg/L as max or go to 4mg/L as max amount	0.5 - 4 mg/l	Withdrawn by proponent.
146	Cameron Braun	C.1.1.3	Would you not include tanks certified to CSA B126?	Include reference to tanks certified to CSA B126.	D: CSA B126 is already referenced. See paragraph 7.3.1.1

147	Dave Lentz	C.2.1	Some tanks are manufactured monolithically, while others are produced using an assembly of components, some of which are not thermoplastic resins. Requiring NSF/ANSI 61 compliance for the resin only does not consider a wide spectrum of designs. I propose stating that all wetted materials within the tank must comply with NSF/ANSI 61. This addresses resins as well as other wetted materials. ASTM D1998 is titled "Standard Specification for Polyethylene Upright Storage Tanks", meaning that the materials for a modular plastic tank are limited to polyethylene. Injection molded polypropylene tanks are sold in the marketplace today, thus, this requirement is overly restrictive and limits market participation. I propose calling out polyethylene upright storage tanks as complying with ASTM D1998, and specifying in the last sentence that injection molded tanks may be tested per ASTM D790 (flexural modulus of elasticity). Testing per ASTM D790 is a secondary option to testing under ASTM D1621. Testing of injection molded tanks per ASTM D790 is currently published in Section 7.1.2.3 of IAPMO/ANSI Z1002-2014.	C.2.1 Materials Tanks intended for potable and non-potable water applications shall be manufactured with recycled or virgin polymers. <u>All wetted materials within the tank</u> shall comply~~ing~~ with the applicable requirements of NSF/ANSI 61. <u>Polyethylene upright storage tanks shall comply with</u> ~~and~~ ASTM D1998~~, respectively~~. Injection molded products shall use polymer material tested in accordance with ASTM D1621 <u>or ASTM D790</u>.	AM: Revised for clarification. Polyethylene upright tanks already addressed in 7.3.1.1. Wetted material limitation already addressed in NSF 61 scope. Compliance with IAPMO Z1002 is already an option per section "C.2.1 Materials ~~Tanks intended for potable and non-potable water applications shall be manufactured with recycled or virgin polymers complying with the applicable requirements of NSF/ANSI 61 and ASTM D1998, respectively. Injection molded products shall use polymer material tested in accordance with ASTM D1621.~~ <u>Tanks shall comply with ASTM D1998 and where used for potable water applications shall also comply with NSF/ANSI 61."</u>
149	Neal Shapiro	C.3	ASTM D1998 is titled "Standard Specification for Polyethylene Upright Storage Tanks", meaning that the	Note: Flexible tanks are known as "pillow tanks" and "bladder tanks".	D: Language in proposal matches language in document. No other specific language proposed. Also based on

			materials for a modular plastic tank are limited to polyethylene. Injection molded polypropylene tanks are sold in the marketplace today, thus, this requirement is overly restrictive and limits market participation. I propose calling out polyethylene upright storage tanks as complying with ASTM D1998, and specifying in the last sentence that injection molded tanks may be tested per ASTM D790 (flexural modulus of elasticity). Testing per ASTM D790 is a secondary option to testing under ASTM D1621. Testing of injection molded tanks per ASTM D790 is currently published in Section 7.1.2.3 of IAPMO/ANSI Z1002-2014.		action on #147

LEGEND

AS: Approve As Submitted. The comment submitted has been approved as submitted by the commenter with no changes (no reason statement from the committee is needed in this case).
AM: Approve As Modified. The comment submitted has been approved as modified by the committee, per the reason statement provided.
D: Disapprove. The comment submitted has been disapproved by the technical committee per the reason statement provided.
Editorial: The comment proposed does not change the technical meaning of the standard.