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MEMO

TO: **All Building Officials in Miami-Dade County**

FROM: **Herminio F. González, P.E., M.S., Director**
Building Code Compliance

DATE: **March 2nd, 2010**

SUBJECT: **Miami-Dade County Board of Rules and Appeals Approved Rainwater Harvesting Guidelines**

On February 4, 2010 a joint Sub-Committee comprised of members from both the Broward and Miami-Dade County Board of Rules and Appeals was convened.

The task undertaken by the joint Sub-Committee was to review existing procedures and create clear, concise and understandable guidance to building department officials and others regarding the uniform permitting, design and installation of rainwater harvesting systems. By identifying minimum requirements and introducing standardization, the community's access to innovative and environmentally friendly systems will be enhanced.

The joint Sub-Committee established a set of procedures titled *"Rainwater Harvesting Guidelines"*. (See attached). This document was presented to the full Miami-Dade County Board of Rules and Appeals (BORA) and approved for countywide implementation at their February 18, 2010 meeting.

If you have any questions on this information, please contact my staff, Mr. Michael L. Goolsby, RRC at (305) 375-4496.

HFG:MG:jms

Attachment

MIAMI-DADE COUNTY
BOARD OF RULES AND APPEALS

APPROVED

RAINWATER HARVESTING GUIDELINES

Introduction

This document has been created to assist owners, designers, contractors and building department personnel with the application of appropriate guidelines when addressing the permitting, installation and inspection of a *rainwater harvesting system (RWS)* for irrigation and other non-potable outdoor domestic uses in one- and two-family dwellings. The *Rainwater Harvesting Guidelines* addresses only rainwater harvesting systems collecting from roof surfaces. The *Rainwater Harvesting Guidelines* are not intended to contemplate all *rainwater harvesting system* designs, systems, materials or components either currently in use or under development. Rather, where little regulatory direction exists, the *Rainwater Harvesting Guidelines* will serve to introduce a level of countywide uniformity and consistency in the design, review, permitting and installation of *rainwater harvesting systems*.

Section 1.0
Scope

Although beyond the scope of the *Rainwater Harvesting Guidelines*, rainwater may be approved by the Authority Having Jurisdiction for a variety of purposes for both potable and non-potable uses in one- and two-family dwellings, multifamily, commercial, institutional or industrial facilities.

The *Rainwater Harvesting Guidelines* are intended primarily for use to assist owners, designers and building department personnel with the application of appropriate procedures when addressing the installation of a rainwater harvesting system for non-potable use for irrigation and other outdoor domestic uses in one- and two-family dwellings. The *Rainwater Harvesting Guidelines* are applicable to the High-Velocity Hurricane Zones of Broward and Miami-Dade Counties.

Rainwater harvesting systems must be appropriately configured for each individual application and comply with the Florida Building Code, this guideline, and published manufacturer's installation instructions. The provisions of the *Rainwater Harvesting Guidelines* shall only apply to non-potable use for irrigation and other outdoor domestic uses in residential dwellings and shall not apply to any indoor potable or non-potable applications.

Section 2.0
Definitions

In addition to other definitions used in the Florida Building Code, the following definitions apply to rainwater harvesting systems:

BACKFLOW PREVENTER - a device to prevent the reverse flow of water from a potentially polluted source into a potable water supply system.

CISTERN - the central storage component of the rainwater harvesting system.

CONVEYANCE SYSTEM - the roof, guttering, downspouts and catchment piping that transports rainwater from the roof to the cistern; including debris excluders, roof washers or first flush diverters.

DEBRIS EXCLUDER - a device installed on the gutter or downspout system to prevent the accumulation of leaves, needles, or other debris from the first flush into the system.

FERROCEMENT - a type of thin wall reinforced concrete construction where usually hydraulic cement is reinforced with layers of continuous and relatively small diameter mesh.

FIRST FLUSH - the initial runoff from a roof surface.

FIRST FLUSH DIVERTER - a device used to automatically divert the initial rainfall, during a rain event, away from the cistern.

GREYWATER - waste discharged from lavatories, bathtubs, showers, clothes washers and laundry trays.

GUTTER - a trough or channel along or under the eaves of a roof, to carry off rain water.

HARVESTED WATER - rainwater that has been intercepted, collected, and stored for any outdoor non-potable use.

POTABLE - water that is safe to drink and fit for domestic purposes without further treatment.

PUMP OR PRESSURE SYSTEM - the mechanical device necessary to distribute the harvested rainwater from the cistern to the designated fixtures.

RAINWATER HARVESTING SYSTEM (RWS) – a roof, guttering system, conveyance piping, cistern(s), fittings, pumps and other plumbing appurtenances required for and/or used to harvest and distribute rainwater.

RECLAIMED WATER – water that has received treatment and is reused after flowing out of a domestic wastewater treatment facility.

ROOF SURFACE - the collection surface that rainwater falls on.

ROOF WASHER – a device to mechanically remove sediment and debris from captured rainwater before entry into the cistern(s).

SCREEN - corrosion resistant wire or other approved mesh having openings in determined sizes.

Section 3.0
General Material and Installation Guidelines

3.1 The requirements and allowances in this portion of the guide apply to one and two family dwellings only.

3.2 All rainwater harvesting systems shall comply with the Florida Building Code. In the event that the *Rainwater Harvesting Guidelines* or the manufacturer's published installation instructions are in conflict with those of the code, the code shall prevail. In the event that the published manufacturer's installation instructions are in conflict with the *Rainwater Harvesting Guidelines* the published manufacturer's installation instructions shall prevail.

3.3 All rainwater harvesting installations shall be designed, constructed and installed to conform to good engineering practice.

3.4 Engineered systems shall be installed per plans and specifications of the architect/engineer of record.

3.5 Rainwater distribution may be accomplished by a gravity system or include the pumps and pipes needed to move water from the storage system to the end use area.

3.6 All systems shall be designed to drain away from footings and foundations to an approved location.

3.7 Harvested rainwater may only be used for outdoor irrigation and other outdoor non-potable purposes.

Section 4.0
Catchment Area

4.1 Rainwater shall only be harvested from roof surfaces.

Section 5.0
Conveyance System

5.1 Gutters and Debris Excluder

(a) Gutters intended to capture rainwater shall be designed and constructed in accordance with the Florida Building Code High Velocity Hurricane Zone Roofing Application Standard 111, Section 12 and shall be sized in accordance with the Florida Building Code, Residential Chapter 44.

(b) Gutters shall have a continuous grade of a minimum of 1/16" per foot.

(c) Gutters shall be clean and maintained in suitable working order. Installation of a debris excluder or screening is recommended to prevent large debris from entering the system.

(d) All downspouts from the gutter to the cistern shall be graded from the roof to the storage tank.

5.2 First Flush Diverter/Roof Washer

(a) Except for first flush diverters, no section of piping shall be installed in a manner to hold water.

(b) All rainwater harvesting systems shall be equipped with a first flush diverter or roof washer. If not site built, follow the published manufacturer's installation instructions.

(c) First flush diverters shall divert away from the cistern or storage tank a minimum of the first 1 gallon for each 100 square feet of collection surface generated by the rainwater harvesting system during any rain event.

(d) Water drained from the first flush diverter/roof washer will be piped away from the cistern or storage tank to an approved location.

(e) First flush diverter systems shall be equipped with an automatic self-draining device and a clean-out fitting.

Section 6.0
Storage

6.1 Cisterns or storage tanks may be installed above or below grade. Cisterns and storage tanks shall be watertight and be designed to withstand the structural loads required by their shape and size.

6.2 Cisterns or storage tanks may be constructed of fiberglass, polypropylene, metal, concrete, ferrocement, wood or other approved material.

6.3 All cisterns and storage tanks shall be designed and installed to prohibit algae growth.

6.4 Commercially available above-ground and below-ground cisterns or storage tanks shall be installed in compliance with manufacturers' recommendations.

6.5 All site-built and manufactured cisterns shall be approved for their intended purpose and provide adequate access for cleaning and maintenance.

6.6 All openings in cisterns and storage tanks must be completely covered or otherwise screened to prevent mosquito breeding.

6.7 Cisterns and storage tanks shall be equipped with an overflow equal in size to the tank inlet. Overflows shall be directed away from the tank to an approved disposal area.

6.8 Connection of overflow piping to any sanitary or storm/sanitary combined sewer piping is prohibited.

6.9 Above ground cisterns or storage tanks shall be placed on a stable level surface capable of accommodating the size and weight of the full tank.

6.10 Where the installation requires a foundation, the foundation shall comply with the requirements of the Florida Building Code and be flat and capable of supporting the cistern weight when the cistern is full.

6.11 Cisterns or storage tanks may be located on roof decks where the supporting structure has shown compliance with wind, gravity and all other loads as required by the Florida Building Code.

6.12 Above or below grade cisterns or storage tanks shall be installed on the exterior of the building. Placement of cisterns or storage tanks in garages, carports, covered patios and other interior installations require the approval of the Authority Having Jurisdiction.

6.13 Underground storage tanks shall be reinforced and able to withstand the weight of the surrounding fill and soil and the full capacity of water and be tied-down or otherwise anchored to prevent lifting/buoyancy caused by groundwater.

6.14 Water must be drawn from the cistern or storage tank at least four inches above the bottom of the tank.

6.15 Cleaning of accumulated debris and sediment in the bottom of the cistern or storage tank must be possible by cleaning, vacuuming or other approved method.

6.16 Cisterns or storage tanks shall not be connected directly with public or municipal water supply. Make-up water shall be connected by utilizing a properly sized and constructed air gap or by an approved back-flow preventer device.

Section 7.0
Distribution System

7.1 Pumps

(a) Electrically driven pumps and controls shall be designed and installed in accordance with the National Electric Code Article 675 *Electrically Driven or Controlled Irrigation Machines.*

(b) When installed pumps shall be of an approved type and listed, designed and intended for water use. Pumps may include submersible pumps, booster pumps or a combination.

(c) Install an automatically resetting dry run protection to prevent damage to the pump in the event the water level in the tank is not sufficient for the pump to operate.

7.2 Pipes

(a) Piping shall be separate from and shall not include direct connection to any potable water piping.

(b) Pipes and fittings shall meet the requirements of the Florida Building Code, Residential Part VII or Sections 7.3 through 7.6 herein.

7.3 PVC Pipe and Fittings

(a) PVC pipe should comply with one of the following standards ASTM D 1785, ASTM D 2241, AWWA C-900, or AWWA C-905. SDR-PR pipe shall have a minimum wall thickness as required by SDR-26. All pipe used with effluent water systems shall be designated for non-potable use by either label or by the industry standard color purple.

(b) All solvent-weld PVC fittings shall, at a minimum, meet the requirements of Schedule 40 as set forth in ASTM D 2466.

(c) Threaded PVC pipe firings shall meet the requirements of Schedule 40 as set forth in ASTM D 2464.

(d) PVC gasketed fittings shall conform to ASTM D 3139. Gaskets shall conform to ASTM F 477.

(e) PVC flexible pipe should be pressure rated as described in ASTM D 2740 with standard outside diameters compatible with PVC IPS solvent-weld fittings.

(f) PVC cement should meet ASTM D 2564. PVC cleaner-type should meet ASTM F 656.

7.4 Ductile Iron Pipe and Fittings

(a) Gasket fittings for iron pipe should be of materials and type compatible with the piping material being used.

7.5 Steel Pipe and Fittings

(a) All steel pipe shall be rated Schedule 40 or greater and be hot-dipped galvanized or black in accordance with ASTM 53.

(b) Threaded fittings for steel pipe should be Schedule 40 Malleable Iron.

7.6 Polyethylene Pipe

(a) Flexible swing joints shall be thick-walled with a minimum pressure rating of 75 psi (517 kPa) in accordance with ASTM D 2239.

(b) Low pressure polyethylene pipe for micro-irrigation systems shall conform with ASAE S-435.

(c) Use fittings manufactured specifically for the type and dimensions of polyethylene pipe used.

(d) All above ground piping and each hose bib, spigot or outlet shall be purple in color and labeled NON-POTABLE WATER – DO NOT DRINK.

Section 8.0
Zoning Requirements

8.1 Rainwater harvesting systems must comply with applicable provisions of the local planning and zoning regulations including design review requirements and location and set-backs for all rainwater harvesting system components including fences and enclosures.

Section 9.0
Permit Application

9.1 Where applicable the following minimum information must be provided with the permit application for a rainwater harvesting system, additional information may be necessary in some cases:

9.2 Site Plan

(a) Property address

(b) Lot dimensions

(c) Set back/separation (assumed property lines)

(d) Lot area

(e) Elevations

(f) Existing and proposed improvements

(g) Existing and proposed enclosures, walls or fences

9.3 Rainwater Harvesting System Plan

(a) Roof Slope Plan

(b) Gutter and downspouts – material, size, attachment, debris excluder or screens

(c) First flush diverter/Roof washer

(d) Storage system above grade, below grade, size, and published manufacturers specifications/instructions

(e) Storage system constructed on-site, design, material, footings, foundations, etc.

9.4 Plumbing Plan

(a) Valves

(b) Unions

(c) Pumps

(d) Pressure tanks

(e) Air gaps

(f) Vents

(g) Overflows

(h) Make-up water

(i) Backflow prevention

9.5 Structural Plans and Details

(a) Foundation Plan

(b) Footing Details

(c) Storage tank pad and anchoring

(d) Retaining structures

(e) Enclosures, walls or fences

(f) Design loads

(g) Wind requirements

(h) Structural calculations

9.6 Electrical Plan

(a) Overcurrent protection

(b) Pumps

(c) Motors

(d) Wiring/Raceways

(e) Ground Fault Circuit Protection

(f) Switches/Disconnects

(g) Receptacles

Section 10.0
Permits Required

10.1 Rainwater storage barrels are single or multiple containers with a combined volume of 250 gallons or less placed below a downspout and are exempt from the *Rainwater Harvesting Guidelines* when not connected to an irrigation system.

10.2 The following permits are required for the installation of a rainwater harvesting system:

(a) A plumbing permit for rainwater harvesting systems, with categories added as required.

(b) An electrical permit for the pump or other electrical controls.

(c) Building permits for cistern footings, foundations, enclosures, walls or fences and conveyance systems. Grading permits or erosion control may be necessary for underground tanks.

(d) Roofing – For gutters, downspouts and leaders.

Section 11.0
Inspections

11.1 Construction or work for which a permit is required shall be subject to inspection by the building official and such construction or work shall remain accessible and exposed for inspection purposes until approved.

11.2 The building official shall determine the timing and sequencing of when inspections occur and what elements are inspected at each inspection.

11.3 Final inspection shall be made after the rainwater harvesting system is complete, including the conveyance system, storage system, pumps and distribution system and all associated fixtures are in place and properly connected.

Section 12.0
System Abandonment

12.1 If the owner of a rainwater harvesting system elects to cease use of, or fails to properly maintain such system, the rainwater harvesting system shall be properly disconnected and abandoned. To abandon the system:

(a) Obtain a demolition permit and other permits as necessary.

(b) Remove the system entirely.

(c) Piping which has been utilized for purposes other than conveying potable water shall not be used for conveying potable water.