**This manual shall remain with the building throughout the life-cycle of the structure.**

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| **Prepared for:** | *Insert Address* |
| **Rainwater Harvesting System Installer(s)**  | *Insert Installer Name(s) and Contact Information* |
| **Installation Date:** | *Insert Date* |
| **System Use:** | *Describe fixtures supplied to rainwater harvesting piping* |

This operations and maintenance manual outlines the responsibilities of the system owner/operator and explains maintenance guidelines for the rainwater harvesting system components. The owner/operator is responsible for:

* Reading the owner’s manual specific to each system component
* Following a maintenance plan
* Replacing broken equipment

Attachments include:

* An as-built diagram of the rainwater harvesting system and location of system components.
* Manufacturer specifications for the cistern
* Owner’s manual for the pump and controls
* Owner’s manual for sediment filtration
* Insert other applicable specifications for disinfections systems, first flush devices, etc.

**System Start Up**

*Insert specific start-up instructions*

**System Shut Down**

*Insert specific shut-down instructions*

**Description of Components and Recommended Maintenance Frequencies**

**Gutters & Downpouts**

To maximize water quality, gutters must be inspected and all materials, especially organic matter, must be removed frequently.

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| **Task Description** | **Minimum Frequency** |
| Inspect and clear leaves, organic matter, algae, mold, sediment and asphalt particles from the roof, gutters and downspouts | Every 3-6 months  |
| Flush gutters with water to remove sediment and debris | Once a year – Before rainy season |
| Remove tree branches and vegetation overhanging roof collection surfaces | As needed |
| Inspect and repair loose hardware, connections, and sagging gutter sections | Once a year – Before rainy season |

**Debris screen**

**Insert Manufacturer - Model #**

A debris screen of 1/16” maximum mesh is required as the first line of defense to prevent leaves, twigs, carcasses, and other large debris from entering the cistern. If not cleaned often, gutters may become blocked, water will be wasted, and decomposing debris will be more likely to enter the cistern.

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| **Task Description** | **Minimum Frequency** |
| Inspect and clean all debris screens and replace (if necessary) | Every 3 months and/or after every major rain storm |

**Roof Washer and First Flush Diverter**

*Delete this section if not applicable*

**Insert Manufacturer - Model #**

Roof washers and first flush diverters are an optional second line of defense against contamination after debris screens. These devices trap sediment and organic matter and should be cleaned monthly according to the manufacturers specifications to ensure that dirty water is not sitting in piping.

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| **Task Description** | **Minimum Frequency** |
| Inspect and clean clogged drain outlets and plugged screens.  | Monthly |

**Cistern**

**Insert Manufacturer - Model #**

Several features of the cistern and piping components should be checked. The tank foundation should be inspected for cracking, erosion, and settling and repaired as needed. Because cisterns may crack, they should be checked for water leaking in or out. Vent screens should be inspected for nesting animals and other blockages. Internal tank features such as floats should be checked regularly to ensure that they are working properly and that associated tubing is not cracked or broken.

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| **Task Description** | **Minimum Frequency** |
| Inspect water inside the cistern. Use a pool sweep to collect large debris that have entered the cistern. | Every 3 months (more frequently if a debris screen has been repaired, clogged, or broken) |
| Inspect cistern base to ensure stability, slope and drainage  | Every 3 months |
| Inspect cistern locking devices | Every 3 months |
| Check for leaking water at cistern inlets and outlets | Every 3 months |

**Cistern Cleaning Procedure**[[1]](#footnote-1)

A cistern is a confined space. It can be deadly to enter confined spaces such as tanks or cisterns without proper training and equipment. If a confined space must be entered, U.S. Occupational Safety and Health Administration (OSHA) regulations must be followed.

When warranted by tank conditions such as accumulation of large amounts of debris and pollutants from pre-tank filter failure or large storms, the cistern can be cleaned by thoroughly washing it and applying a water/chlorine mixture to all surfaces according the following procedure:

1. Clean and remove debris from the roof catchment area, gutters, debris screens, and downspouts.
2. Disconnect/lock out all electrical devices.
3. Remove all debris and water from the cistern.
4. Follow OSHA confined space entry procedures. NEVER enter a tank without an observer present.
5. Wear protective equipment: goggles, rubber boots, and a chemical suit.
6. Make sure the area is well ventilated before using chlorine.
7. Scrub the inside of the cistern with a stiff brush and a solution of 1 cup of unscented liquid household bleach (5%-6%) mixed with 10 gallons (about 38 liters) of water.
8. Allow the sprayed surface to dry
9. Rinse the tank thoroughly until the debris and chlorine are gone. Effluent from the rinsing should be directed toward the sanitary sewer or a mulched, un-landscaped area and should NEVER enter a storm drain.
10. Document the cleaning process, date, chemicals, used, and ratio of water to bleach.

**Piping and Connections**

Plastic pipes and fittings should be checked for cracks, leaks, and deformation. When any damaged component or fitting is replaced the piping should be inspected continuously until it is determined there are no leaks. PVC plastic exposed to sunlight can degrade and become brittle and yellow. All exposed PVC piping should be painted with a latex paint designed for PVC.

**Sediment Filters**

**Insert Manufacturer - Model #**

Filters are designed to keep particles larger than 100 microns from entering the indoor fixture supply lines. As the surface of the filter becomes clogged with particles, the water flow is hampered and the pressure drops. Water pressure gauges installed on the upstream and downstream sides of a filter indicate a drop in pressure. This drop signals that filter maintenance is needed.

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| **Task Description** | **Minimum Frequency** |
| Clean sediment filter | *Insert Manufacturers recommendations* |
| Replace sediment filter | *Insert Manufacturers recommendations* |
| Inspect sediment filter  | Monthly |

**Pump**

**Insert Manufacturer - Model #**

Under most circumstances, electric motors last for years without needing replacement. Pre-mature pump failure can be caused by multiple starts within a short period of time or lack of water in the pump housing. Follow the attached manufacturer’s recommendations for pump maintenance and troubleshooting.

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| **Task Description** | **Minimum Frequency** |
| Inspect pump systems and valves and verify operation | Once a year |

**Ultraviolet Disinfection System**

**Insert Manufacturer - Model #**

A UV light bulb operates continuously, regardless of water flow rate, and has an expected lifespan. Because continuous operation produces heat, the UV components ma become hot to the touch during prolonged periods of no flow.

Change the UV bulb every year, or follow the manufacturer’s recommendations. The intensity of the ultraviolet bulb diminishes over time and is not noticeable by inspection.

After replacing the bulb according to the manufacturer’s recommendations, replace all covers and flood the UV device before turning on the light. Be sure that all air bubbles are removed to prevent the bulb from overheating.

The clear tubing that houses the UV light needs to be wiped down with a lint-free cloth on occasion, at least quarterly, depending on the rate of build up. Tube cleaning and bulb replacement should be documented

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| **Task Description** | **Minimum Frequency** |
| Change UV bulb  | Once a year *or Insert Manufacturers recommendations* |
| Clean tubing | Every 3 months |

**System Maintenance Summary**

*Review and delete unnecessary items*

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| --- | --- |
| **Task Description** | **Minimum Frequency** |
| Flush gutters with water to remove sediment and debris | Annually – Before rainy season |
| Inspect gutters and downspouts and repair loose hardware, connections, and sagging gutter sections | Annually – Before rainy season |
| Inspect pump systems and valves and verify operation | Annually |
| Change UV bulb  | Annually *or Insert Manufacturers recommendations* |
| Inspect caution labels and signage | Annually |
| Backflow and cross connection test  | Annually |
| Inspect and remove leaves, organic matter, algae, mold, sediment and asphalt particles from the roof, gutters and downspouts | Every 3-6 months  |
| Remove tree branches and vegetation overhanging roof collection surfaces | As needed |
| Inspect and clean all debris screens and replace (if necessary) | Every 3 months and/or after every major rain storm |
| Inspect water inside the cistern. Use a pool sweep to collect large debris that have entered the cistern. | Every 3 months (more frequently if a debris screen has been repaired, clogged, or broken) |
| Inspect cistern base to ensure stability, slope and drainage  | Every 3 months |
| Inspect cistern locking devices | Every 3 months |
| Check for leaking water at cistern inlets and outlets | Every 3 months |
| Clean UV tubing | Every 3 months |
| Clean sediment filter | *Insert Manufacturers recommendations* |
| Replace sediment filter | *Insert Manufacturers recommendations* |
| Inspect sediment filter  | Monthly |
| Inspect and clean clogged drain outlets and plugged screens on first flush device | Monthly |
| Other?  |  |
| Other? |  |
| Other? |  |
| Other? |  |

1. Centers for Disease Control and Prevention, 2010, www.cdc.gov [↑](#footnote-ref-1)