
Introduction

The Darling Walk public domain rainwater re-use system storage tank receives rainwater from the building roof, external roof service areas and part open plant room areas.

Planter and public trafficable areas do not drain to the rainwater tank.

This is a rainwater re-use system and not a recycled water system. The recycled water system is only supplying the cooling towers, toilet flushing and the irrigation on level 6.

The re-used rainwater will be supplied to;

- **Irrigation** 90 % of total water collected.
- **Water Feature** 10 % of total water collected.

Standards

The rainwater re-use system is designed in accordance with the following standards and guides

- AS 3500.1 Plumbing and Drainage – Water Services
- *Guidance on use of rainwater tanks* – Australian Government enHealth Council 2004
- *Plumbing for rainwater tanks* – Sydney Water

Rainwater Tank

The 300,000 L nominal capacity rainwater tank is located underground in the public domain. It is provided with an overflow to the public domain stormwater drainage system.

Treatment

The following pre- and post treatment systems are incorporated into the rainwater re-use system.

Pre-Treatment

- Syfonic® roof outlets are provided with leaf guards
- First flush is provided in the rainwater tank to drain the first 5,000 to 15,000 L of rainwater direct to the stormwater system.

Post-Treatment

- 100 micron automatic back wash filters to treat rainwater for use in the irrigation system
- 50 micron automatic back wash filters to treat rainwater for use in the water features.
- UV sterilisation and bag filtration to treat rainwater for use in the water features.

Domestic Water make up

Domestic water is provided to the rainwater re-use system as a back up. The water supply is connected to the 250mm Sydney Water main in Darling Harbour and provided with a separate Sydney Water meter.

A reduced pressure zone device provides backflow prevention between the domestic water and rainwater supply.

Domestic water is automatically supplied when the level in the rainwater tank falls to a set point. A manual change over is also available to override the automatic function.

Risk assessment

The main hazards that can be found in the collected rainwater are;

Microbial hazards

- Faecal material (droppings) deposited by animals.
- Dead animals and insects, either on the roof or in the tank itself.
- Mosquitoes

Chemical hazards

- Not controlled by the owner – vehicle transmission particles and dust.
- Controlled by the owner – chemical from roof/façade cleaning and plant room maintenance.
- Paints and finishes material leaching over time.

Risk management

The management of the rainwater re-use system involves the owner/operator of the property as the source of the rainwater and SHFA as the user of the rainwater.

Risk minimisation is achieved by maintenance process and communication between the two parties.

Owner/operator

- Selection of roof materials must be suitable for rainwater collection.
- Roof cleaning must involve non toxic, non foaming biodegradable cleaning compounds.
- Spillages of chemicals need to be contained using spill kits and procedures to prevent chemicals from entering the rainwater re-use system.
- The first flush tank will hold the initial spill should it not have been contained. The owner/operator will then need to arrange for a pump out of the first flush tank by an authorised disposal company.
- The rainwater tank needs to be inspected and cleaned as follows;
 - On completion of the construction works.
 - 3 month after completion of construction works.
 - 12 month after completion of construction works

SHFA

- SHFA will need to maintain the rainwater treatment plant.
- The rainwater tank needs to be inspected and cleaned as follows;
 - 3 monthly inspection after the initial 12month defects period and,
 - 12 monthly cleaning thereafter.

Conclusion

The owner/operator of the building has limited control over the pollutants that may enter the rainwater system. SHFA as the end user of the rainwater will need to satisfy itself that the rainwater as collected and treated is in the end suitable for the use in the irrigation and the water feature system.

The water treatment systems provided as part of the water feature will ensure that the water quality is generally suitable for the use in this application. However these treatment systems cannot process unusual pollutants or chemical spills.

In the unlikely event of an accident, a number of additional safety measures if deemed necessary could be provided at a later date to reduce the severity and or impact of an unusual contamination.

- 1) Treat all water for water feature with a reverse osmosis (RO) membrane filtration. This will insure that the majority of pollutants are removed up to a certain concentration. A typical RO system will however reject up to 30% of processed water in the membrane maintenance process and will not be able to deal with very high loads of chemicals.
- 2) Provide additional automatic process monitoring for PH, turbidity and conductivity and twice weekly manual testing of stored rainwater by a registered laboratory to detect heavy metals and toxins.
- 3) Maintain a daily activity log of all work that is carried out in the rainwater catchment area and facilitate 6 monthly emergency drills.

The above measures would provide a better management and detection of eventual spills or contaminations but would not be able to completely eliminate the risk.

We would therefore recommend that:

Re-used rainwater is used for water feature treatment system in the civic connector and the irrigation system.

Domestic Water is used for the water supply for the **water play treatment systems**.

