Rainwater Harvesting in Australia

Issues Paper for National Rainwater Harvesting Policy

Appendices for Model Water Efficiency and Stormwater Performance Objectives

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V 2.0

Rainwater Harvesting AUSTRALIA

A DIVISION OF IRRIGATION AUSTRALIA

11/58 Metroplex Avenue, Murarrie 4172
PO Box 13, Cannon Hill, Brisbane 4170
M: 0418 372 489
E: michael.smit@kingspan.com
w: www.rainwaterharvesting.org.au
ACN 002 567 633
ABN 41 002 567 633

Model Water Efficiency and Stormwater Performance Objectives

Rainwater harvesting is not an end in itself. The benefit to the community comes from the performance outcomes that rainwater harvesting can achieve.

Best practice policy in Australia specifies performance outcomes and then allows flexibility in how those outcomes are met to reflect local conditions and preferences. In this policy approach, the performance outcomes are stated in measurable terms, for

- stormwater volume management,
- flow management,
- stormwater pollutants,
- waterway ecology and
- demand management
- disaster resilience
- urban cooling
- groundwater replenishment

Having set a performance outcome Rainwater Harvesting can then be specified as a means of meeting the performance outcomes.

Alternatively, the policy can explicitly nominate rainwater harvesting as a deemed to comply response. Planning and/or Building controls can specify the size of the rainwater tank and connections to specified appliances. Modelling through Insite software in South Australia was used to deliver expected policy outcomes and can be used to build a deemed-to-comply solution.

Sustainability assessment software such as BASIX or BESS (CASBE) can consider local conditions and provide a balanced scorecard for rainwater harvesting and other water management interventions. The advantages of this approach are the ability to fine-tune the response to meet local conditions and priorities and changes over time.

Rainwater Harvesting is not a mandatory requirement and development applications can implement a range of other responses provided they have evidence those responses address the required performance outcomes.

Rainwater tanks that feed garden beds with built-in stormwater overflows have many benefits as does groundwater replenishment in places like Adelaide and Perth. Detention rainwater harvesting systems where stormwater is slowly released after the rain event also have many benefits and are widely used in local government approval processes around Australia.

One size does not fit all local needs. Rainwater Harvesting is scalable by modifying volumes and designs to meet local needs, for example protecting a downstream local shopping centre that is prone to flooding reducing high flow conditions into a high-quality waterway or reducing local water demand where utility supply is constrained.

Most existing rainwater harvesting policy is for residential buildings. Commercial and manufacturing buildings often have large roof and hardstand areas with major stormwater impacts but limited opportunities for using rainwater. Larger rainwater tanks can be used for suitable manufacturing processes, cleaning processes, flush toilets and irrigation. Enabling technologies for flushing the tank before major rain events provides an important stormwater flood response benefit.

Performance Outcomes

The following performance measures reflect a range of Australian state government policy sources. Rainwater harvesting is proposed as a deemed to satisfy response for these performance measures and also allow developers to propose alternative means of addressing these performance outcomes.

The following examples were largely part of the development of the South Australian Planning Code.

Water Efficiency

Maximise conservation of water resources, development design achieves an estimated 40% reduction on 2015 average water use through water-efficient appliances, rainwater harvesting, recycled water and garden design.

Stormwater Volume and Flow Controls

Manage peak stormwater runoff flows and volume to mitigate peak flows and manage the rate and duration of stormwater discharges from the site to ensure the carrying capacities of downstream systems are not overloaded.

Development

(a) maintains:

i. a pre-development peak flow rate from the site based upon a 0.35 runoff coefficient for the 5-year ARI (18.1% AEP) 30-minute storm; and

ii. the stormwater runoff time to peak to match that of the pre-development condition; or

(b) capture and retain the difference in pre-development runoff volume (based upon a 0.35 runoff coefficient) vs post-development runoff volume from the site for a 5-year ARI (18.1% AEP) 30-minute storm; and

(c) manage site-generated stormwater runoff up to and including the 100–year ARI flood event (1% AEP) to avoid flooding of buildings.

Stormwater Pollutant Controls

Manage stormwater runoff quality

Manage stormwater runoff quality to minimise the discharge of sediment, suspended solids, organic matter, nutrients, bacteria, litter and other contaminants to the stormwater system, watercourses or other water bodies and achieve the following stormwater runoff outcomes:

(a) 80 per cent reduction in average annual total suspended solids;

(b) 60 per cent reduction in average annual total phosphorus; and

(c) 45 per cent reduction in average annual total nitrogen

(d) 90 per cent reduction of litter/gross pollutants compared to untreated stormwater runoff; and

(e) no visible oils/grease for flows up to the 1-in-3 month average return interval flood peak flow.

Hydrological Performance and Waterway Ecologies

Maintain natural hydrological systems, establishing performance outcomes (to be determined) for the ecological health of local waterways including retention of key indicators species and seagrasses without negatively impacting:

(a) the quantity and quality of surface and groundwater;

(b) the depth and directional flow of surface and groundwater; or

(c) the quality and function of natural springs.

South Australia determined a deemed to comply rainwater harvesting solution to meet some of these performance outcomes as follows

Residential Development comprising detached, semi-detached or attached dwellings

1) Includes rainwater storage:
   a) Connected to at least
      i) 60% of the roof area for detached dwellings
      ii) In all other cases 80% of the roof area
   b) Connected to all toilets, laundry cold water outlets and hot water service
   c) With a minimum total capacity by Table 1
   d) Where detention is required, include a 20-25mm diameter slow-release orifice at the bottom of the detention component of the tank

Table 1: Rainwater Tank

Site size (m2)	**Minimum retention volume (litres)**	**Minimum detention volume (litres)**
<200	2000	1000
200-400	3000	Site perviousness <30% 1000 Site perviousness >30%: NA
>401	4000	Site perviousness <30% 2000 Site perviousness >30%: NA

APPENDIX 2: Management and Maintenance: Current controls

Rainwater Harvesting Australia has developed a specification for homeowners and practitioners that is not drafted as regulation but provides best-practice guidance supported by evidence

The specification is for above-ground rainwater harvesting systems connected to residential dwellings in urban areas. The specification is for a dual water supply, using mains water and rainwater sourced from roof catchments. The dual water supply system sources rainwater first, when stored rainwater is available, for outdoor, toilet, laundry and hot water supply. When stored rainwater is not available, all household water demands are supplied with mains water. The household is encouraged to choose the highest level of water efficiency.

https://rainwaterharvesting.org.au/wp-content/uploads/2018/01/Rainwater-Harvesting-Guide-Approved.pdf

The Queensland Development Code is an example of a regulatory performance guide for rainwater harvesting, although the Code is not supported by a problem statement or evidence that the regulations provide a net community benefit so many of the actual requirements do not have a community benefit rationale.

Another good guide for management and maintenance is the BASIX guidelines

https://basix.nsw.gov.au/iframe/94-basix-help-notes/water/alternative-water/rainwater.html

Firefighting Requirements

In many urban fringe areas, local councils will require a proportion of the rainwater tank to be reserved as a fire fighting reserve.

Some homeowners have a single rainwater tank that provides a fire water reserve, water for household uses and a detention component for stormwater management.