Submission to Department of Planning, Transport and Infrastructure
28 February 2020

Draft Planning and Design Code for South Australia

Phase 3 Urban Areas and Planning Policy

Submission by the South Australia Rainwater Harvesting Industry Group, Rainwater Harvesting Australia¹ and Associate Professor Peter Coombes, Chair of Engineering, Southern Cross University

Introduction

Thank you for the opportunity to make a submission.

This submission supports an integrated water management approach to managing our cities and using rainwater harvesting as a deemed to comply solution. This submission seeks to ensure that stormwater management requirements are applied equitably over the urban system and explains why it is necessary to retain the provisions of the National Construction Code for rainwater harvesting on all new buildings.

Rainwater Harvesting provides stormwater management benefits for flooding and local waterways and irrigation opportunities for increased green infrastructure and liveability as well as water efficiency benefits to the household and operational and capital savings to water utilities. These are significant integrated water management benefits from a simple piece of infrastructure.

While recognition of the stormwater management benefits of rainwater harvesting is important, it is still only a small part of the integrated water management discussion. There is insufficient recognition in the Code about protecting the ecology of local waterways, economic efficiency and demand management.

The research, policy framework and successful implementation of the BASIX program in NSW requiring water efficiency performance targets on new buildings was established in 2004, nearly 20 years ago. A performance based integrated water management design process for urban buildings is clearly and demonstrably in the interests of the general public.

Urban Planning is one of the disciplines that actively recognises a systems, or holistic understanding of urban areas. This submission provides key research from Associate Professor Coombes on the whole of community benefits of distributed, at source solutions for urban water management. The economics of urban water infrastructure strongly support the deemed to satisfy rainwater harvesting provisions of the draft Planning Code,

¹ All members of the rainwater harvesting industry have a commercial interest in this submission.
not just as a stormwater management tool but to protect vulnerable waterways and provider greater economic efficiency through rainwater harvesting as a water source.

Adelaide has traditionally been one of the strongest cities in Australia for rainwater harvesting however there has been a substantial (5%) decline in volume of rainwater supply, discussed below.

Rainwater harvesting is also an important local employer of approximately 600 direct and indirect jobs. Rainwater tanks are locally constructed in Adelaide and generally use Australian materials providing an important boost to the local community.

Value of the Rainwater Harvesting Industry to the SA Economy

Data was collected in 2020 from local industries and analysed by Associate Professor PJ Coombe in order to inform this submission.

In 2020, the annual sales of rainwater harvesting products is greater than $23 million and more than 146 people are directly employed. The rainwater industry would also indirectly employ about 875 people (plumbers, sales people, maintenance, other peripherals and services).

If we assume that the fixed value of the businesses is equivalent to the 2020 annual turnover and there is 1% growth in the rainwater businesses to 2050 (using a 4% discount rate), the present value of the SA rainwater industry in 2020, is more than $920 million.

So, removal of requirements supporting rainwater harvesting could decrease the value of the SA economy by $1 Billion.

These estimates do not include the water resources, environmental and stormwater values supplied to you elsewhere – this estimate ONLY refers to the value of the rainwater businesses in South Australia.

It is noteworthy that about 1,000 employees (direct and indirect) and annual revenue of $23 million is significant in the context of the South Australian economy and employment challenges. Increasing rainwater harvesting will make a positive contribution to the economy and employment in South Australia. Removing rainwater harvesting would strongly impact on the economy and employment.

These are local economic benefits – this is a contrast to other preferred centralised sourced of water that only partially contribute to the SA economy due to external businesses providing the staff and resources.
Regulatory Commentary on Water Sensitive Urban Design

The policy findings of the People and Neighbourhoods Policy and Discussion Paper are supported:

**High levels of stormwater run-off associated with infill development can result in increased flood risk, public infrastructure costs, loss of water to green our suburbs and pollution in waterways.**

As part of the response the Code has proposed simple water sensitive urban design measures for small scale infill as a deemed to satisfy response in the form of rainwater harvesting.

Deemed to satisfy rainwater harvesting provisions for water sensitive urban design are supported as decentralised local solutions that happen at source and at the same time as development, improving our cities for everybody. Deemed to satisfy solutions seem to be good policy as they are simple to administer, provide guidance to the development industry and allow alternative solutions if required.

Having identified a holistic urban issue, it is important there is a holistic response in the planning code. A finding of the Victorian Stormwater Management Advisory Committee was that inconsistent application of planning controls was also inequitable. Why should some stakeholders and some developments bear the brunt of regulatory compliance when other development that generates stormwater impacts has no requirement to meet important urban objectives such as stormwater management? As a result, stormwater management performance objectives have now been extended to industrial and commercial development in Victoria.

A similar argument applies to South Australia. Application of the planning requirements for stormwater management, and a deemed to satisfy response, should be applied to all development, in all zones, and not discounted as part of an ‘on balance’ planning assessment. Stormwater management is important for every part of the city and should be equitably applied.

Different parts of the city however have different stormwater challenges. The stormwater management requirements may vary in different parts of the city in accordance with the 3 typologies identified in ‘The Philosophy of Urban Stormwater Management’ as follows

1. **Future growth areas/greenfield development.** The over-riding strategic objective commonly applied is to preserve the nature and amenity of their waterways in terms of hydrology and aquatic communities. This can be achieved using source control measures applied throughout the contributing catchments for urban waterways that provide accumulative benefits (see Figure 1). These measures include rainwater tanks, bio-retention facilities, rain gardens and land use controls as well opportunities for

---

2 Improving Stormwater Ministerial Advisory Committee report 2018
3 Coombes, Peter, & Russo, Steve. (2019). The Philosophy of Urban Stormwater Management, Ch3, Book 9 of the Australian Rainfall and Runoff Guidelines. Commonwealth of Australia (Geosciences Australia), Australia
comprehensive 'neighbourhood scale' and 'regional scale' placement strategies. The criterion is to keep the volume discharged from each site the same after development as before, for design flood events. Argue\(^4\) refers to a 'regime in balance' strategy for these areas.

Figure 1: A systems perspective on the cumulative impacts of distributed stormwater source control measures after Coombes (2018)\(^5\)

2. Highly urbanised catchments where the strategic objective is often to minimise the need for further modification for upgrades to conveyance networks as development and redevelopment continues. Limited opportunities for neighbourhood or regional schemes mean that volume management to match pre-development volumes can be achieved through ‘source control’ measures identified above.

3. Over developed catchments characterised by frequent flash flooding and resulting community disruption. The strategy identified by Argue is a ‘yield minimum’ strategy where new development goes further than to match pre-development conditions and minimise the volume of additional stormwater runoff. The objective is to move the catchment volumes closer to infrastructure capacity.

The take home message of these three typologies is volume reduction and at source are controls are recommended for all types. This suggest that designed rainwater harvesting


systems in accordance with approved software assessment could be deemed to comply for WSUD throughout the city.

In addition, the last typology is interesting in that it proposes that future development will need to ameliorate not only the impact of that development, but the impact of previously approved inappropriate development.

Jason Byrne⁶, MPIA, recently provided commentary on urban flood planning and this issue of addressing ‘over developed’ catchments – there is an urgent need for planning systems to begin to engage with retro-fitting built environments...

There is also a need for greater clarity as to what need the deemed to satisfy provisions are meeting. This is important to document to ensure alternative solutions meet the same criteria and result in similar outcomes. It is not clear to us that the full range of stormwater considerations are being addressed, i.e., volume reduction, peak flow reduction, water quality outcomes and stormwater harvesting/infiltration targets. We suggest that there is some confusion in the current draft of the code. Many performance outcomes have been articulated as deemed to satisfy responses when in fact they are important outcomes. These performance outcomes need to be articulated and then the deemed to satisfy provisions used as a means of delivering them. As a result we have made a recommendation in the submission to modify the Planning Framework to include a State Planning Policy on integrated water management and a modified PO 5.1 for all development.

The Rainwater Harvesting Industry also notes the public interest in increasing tree canopy cover in Adelaide and suggests that irrigating private trees is an important benefit of a local rainwater tank, reducing some of the demand for additional water for additional green infrastructure.

The practical impacts of regulating stormwater management through development approvals has been the subject of conference proceedings in Victoria and the commentary about rainwater harvesting vs other infrastructure solutions is important. In summary the land use planners found that rainwater harvesting was the first and most important element of water sensitive urban design with practical benefits for decision making time frames, implementation, and reduced enforcement and compliance issues.

https://az659834.vo.msecnd.net/eventsairaueprod/production-gems-public/d97f4e49865e4468a837be0a2715ef26


Another element of this discussion is a long-term strategy for managing urban runoff and providing financial benefits for effective stormwater management. The practice of a tax or levy on impermeable surfaces is common in the US and Germany and can be very effective because it provides a financial incentive directly linked to the cause of the problem. The levy acts as an incentive for developers and land owners to implement WSUD and a funding stream

for government to implement infrastructure to deal with existing problems.

Public Benefit and integrated water management

As discussed above, integrated water management is more than a stormwater management exercise, although this is an important element. Key research on these issues was documented by Coombes et al\(^7\) and identified that the performance of buildings at the lot level were a key determinant of behaviour of entire urban regions\(^8\). Managing building performance at lot level has benefits for urban performance at all scales and is inherently more efficient than central infrastructure solutions. This applies to water and sewage services, stormwater services and protecting local ecologies. We would suggest that the test of this research is not consensus support, the true test is what is in the best interests of the public.\(^9\) The analysis of different options needs to consider the broader needs of the community, not rely on the narrowly defined scope of a particularly stakeholder. This implies a need for a different mode of analysis and the intervention of government to protect the public interest.

There is no clear separation of water services powers between operation, planning, ownership, auditing and governance in state governments, and there is economic dependence between these elements of government processes.\(^10\) This fosters a sameness of opinion about solutions and barriers to innovation (such as rainwater harvesting). It is important to include the concept of separation of powers in evaluating and implementing alternative solutions (such as rainwater harvesting).\(^11\)

Ecological Impact of Urban Development on local Waterways

While the People and Neighbourhoods Policy Discussion Paper makes some important statements about the benefits of rainwater harvesting for cooling urban heat islands and increasing liveability there is insufficient consideration of the ecological impact of urban

---


development of local waterways. The work by Argue (2017)\textsuperscript{12} and Walsh (2014)\textsuperscript{13} demonstrates that impermeable urban surfaces largely destroy natural waterway ecologies by reversing the natural balance of groundwater and surface flows. A water sensitive urban design that protects local water way ecologies including indicator species and seagrasses is imperative for inclusion in the Code.

Because of the significant increase in impermeable surfaces our urban waterways are suffering from loss of groundwater when it isn’t raining, and damaging flooding when it does rain. This impacts on local waterways, the Torrens River and the seagrasses in the Bay. Those seagrasses are important to fishing, sea lions, our beaches and even capturing carbon from the air. Rainwater tanks diverted to household uses, groundwater replenishment and away from surface runoff will significantly improve urban waterway health. Trees help as well by creating pathways for groundwater replenishment.

Stormwater SA has made an important point in relation to the practical aspects of improving water quality. Using rainwater harvesting for stormwater management could be the biggest water quality benefit for local waterways in the entire planning code.

Stormwater SA also noted that Rainwater harvesting is also often the most practical solution as most of the development in Adelaide is small scale redevelopment of essentially flat land. The lack of vertical fall across the block makes some forms of water quality improvement such as soakage trenches and raingardens challenging and requires careful management of levels and potentially pumping to achieve water quality objectives. As noted in the examples from Moreland City Council there are practical implementation and compliance benefits from rainwater harvesting in the planning process because they are simple to install, inspect and maintain.

Implications of Regulatory Change to the NCC Provisions

Removal of the current NCC requirements for rainwater harvesting is not recommended until comprehensive measures have been put in place to address both the urban flooding risk associated with new development subject to the current requirements and the means of achieving state government water conservation policy objectives.

The draft Planning Code supports rainwater harvesting and flood management as a deemed to satisfy response and a performance outcome, not as a mandatory requirement. How the Planning Code operates in practice remains to be seen and based on the discretionary application of planning objectives development approvals may be issued without adequate stormwater management.


Existing State Government policy for water sensitive urban design\(^{14}\) includes efficient water systems, the state-wide performance target is demonstrated compliance with the South Australian residential building requirements for water efficiency. This refers to the existing NCC volume 2 requirements for a rainwater tank on Class 1 buildings. Removal of the NCC requirement would also remove the only means of meeting State policy on water conservation without an examination of the impact of that change.

Urban flooding is the most expensive of all natural disasters.\(^{15}\) We attach in Appendix A correspondence from 2019 showing that there is a relationship between flood management, urban development approvals, climate change and rainwater harvesting.

Removing the current provisions requiring rainwater harvesting on new residential buildings from the National Construction Code may incur a direct future liability for damages on government if it can be shown that the removal contributed to additional flood damages and was not consistent with best practice stormwater management in Australia.

**Rainwater Harvesting and Engineering Australia Best Practice**

Rainwater Harvesting is recognised as a common volume management facility configuration in Table 9.4.3 of the Australian Rainfall and Runoff Guidelines 2019 at Lot, Site, Neighbourhood and Precinct Scale. Recognition of cumulative impacts at different scales demonstrates this is a viable configuration for both single lot and greenfield precinct development. Table 9.4.4 indicates that rainwater harvesting is suitable as a design solution for controlling peak discharge (with some limitations), improving water quality and harvesting or infiltrating stormwater.\(^{16}\)

**Commentary from elements of the Building Industry**

Commentary from some organisations in the building industry on the impact of rainwater harvesting on housing affordability, because it is an additional expense, is noted. It would seem that a similar argument could be applied to housing insulation, electrical safety switches and any other building regulation. No evidence has been presented to our knowledge that a better, cheaper alternative for stormwater management and water conservation and protecting local waterways is available. No evidence has been presented to our knowledge of the predicted savings that would result from removal of rainwater

---


Regulatory Compliance, monitoring and performance of Rainwater Harvesting

The Rainwater Harvesting Industry does not consider it sufficient to include a requirement for a rainwater tank, with important community benefits, without a regulatory regime to ensure those benefits are realised. There has arguably been poor practice in South Australia in this regard.

The occupancy certificate for a new building should include any requirement for a rainwater tank and the current loophole allowing installation of a rainwater tank at a later date should be removed.

Similarly, it is crucial that the size, dimensions and location of the rainwater tank form part of the planning permit and endorsed plans for the development. This will avoid considerable heartache for the building owner, confusion and enforcement after approval at the time of building when it is discovered that a tank cannot be delivered to its location. We have noted that BIM files are available making plan drafting quite simple.

In relation to Private Open Space we recommend a requirement for the applicant to nominate the footprint of all services including hot water systems, rainwater tanks etc and to make clear that the footprint for a rainwater tank is additional to the POS and does not detract from it.

It is important that the requirement for rainwater harvesting, and indeed a whole range of stormwater infrastructure, is recognised and is transparent. It is recommended that the Local Government Act be amended to include a requirement for a public register of stormwater infrastructure, including privately owned rainwater tanks. Having a public register should act as an incentive for normal maintenance, asset management and enforcement regimes to operate.

South Australia has a reputation for innovation and technology. The technologies for real time monitoring of every rainwater harvesting system are already commercially available. A requirement for monitoring and maintenance programs through a third party commercial provider could have enormous benefits for local government, water providers and stormwater managers in South Australia and we recommend a trial be carried out by the

---

Department with commercial providers. We declare that members of Rainwater Harvesting Australia are providers of this technology and have a direct financial interest.

Rainwater tanks are an important piece of infrastructure and having a support framework for monitoring and maintenance may be attractive to achieve the full benefits of rainwater harvesting. This could be an example of private industry and local government working together to achieve a good outcome for the community, local government and local industries.

**Economic Efficiency of Water Demand Management, Water Efficiency and Rainwater Harvesting**

*The primary object of this Act is to support and enhance the State's liveability and prosperity in ways that are ecologically sustainable*.\(^{18}\)

We believe this objective includes the sustainable and efficient management of water use in buildings and we note the Planning, Development and Infrastructure Act 2016 makes provision for regulation of buildings and building design to ensure sustainable and efficient use of water. (Schedule 5:16)\(^{18}\)

We note the following support for regulating sustainable building design in the Code

*State Planning Policy 2: Design Quality, the design of environmentally sustainable buildings and places by applying water sensitive urban design and energy efficiency design solutions.*

*State Planning Policy 14: Water Security and Quality identifies a policy need to reduce the reliance on the River Murray, diversify water supplies and improve our water use efficiency.*

*Existing State Government policy for water sensitive urban design\(^ {14}\) includes efficient water systems, the state wide performance target is demonstrated compliance with the South Australian residential building requirements for water efficiency. This refers to the existing NCC volume 2 requirements for a rainwater tank on Class 1 buildings.*

The strong existing policy basis for considering water efficiency in building design is not reflected in the Code and this is a major failing. There was considerable concern identified by local members of the Rainwater Harvesting industry about the reliance of South Australia on water from the Murray and the need to reduce the impact on this already stressed ecosystem.

\(^{18}\) Planning, Development and Infrastructure Act . (2016). State of South Australia
The already proven NSW performance measure of a 40% savings on an average benchmark is recommended for the South Australian Code. A range of options should be recommended for meeting the performance measure, including rainwater harvesting, water efficient appliances etc.

Rainwater harvesting is generally the most economically efficient solution for urban water uses when used in conjunction with a water utility supply and provides an efficient and reliable supply. Increased economic efficiency from rainwater harvesting can be measured in lower household water services bills, by hundreds of dollars per household each year.

Australian research led by Professor PJ Coombes shows that rainwater-harvesting and water efficient appliances reduce water consumption, operating costs of water utilities and therefore water bills.

There is insufficient recognition in the planning scheme of the opportunity to address building design water demand management and water efficiency in one of the hottest and driest cities in Australia and the opportunity to integrate this requirement into an urban planning objective.

What evidence is there of increased economic efficiency from rainwater harvesting and water efficient appliances?

Australia is fortunate in that NSW adopted the BASIX policy in 2004 and has provided an economic case study of the impacts of a performance target for water use on all new development. Australian research led by Professor PJ Coombes shows that rainwater-harvesting and water efficient appliances reduce water consumption, operating costs of water utilities and therefore water bills. Sydney Water, which benefits from rainwater harvesting and water efficient appliances through the BASIX program, has only seen a 7% increase in real expenses for water and sewerage bills since 2003. South East Queensland, which reversed rainwater harvesting friendly legislation in 2012 saw bills rise by 45%, and operating costs for water utilities rose by 167% in real terms.

Detailed analysis of ABS data shows that Adelaide has experienced a decline of nearly 5% in rainwater harvesting while Sydney, Melbourne and Brisbane all experienced strong growth. At the same time Adelaide has seen the greatest increase in household expenses for water and sewage services since 2003 at 70% in real terms. This is causing real water stress with nearly one quarter of Adelaide homes spending more than 10% of available income on water bills.

It seems strange that there is a reduction in rainwater harvesting and significant increases in water service costs in South Australia despite a building requirement for rainwater

---

harvesting on new developments. Anecdotal advice from the industry is that some local governments have not been implementing and enforcing this requirement and therefore the benefits of rainwater have not always been realised. In addition, the NCC requirement allows only laundry uses as an alternative to water closet and water heater water use, reducing the actual yield.

Solutions need to respond to the variability at the many different scales within cities. Nevertheless, centralised solutions are preferred and the benefits of local strategies such as water sensitive urban design (WSUD) are often contested. Evolving planning policies are also driven by infill development strategies that aim to protect prime agricultural land and avoid the costs of extending of water cycle services. A mindset of separate analysis of alternatives rather than evaluation of distributed solutions as part of a linked system results in missed opportunities. 21

Firstly, it is important to understand the scale of water savings achieved by rainwater harvesting and water efficient appliances. Figure 2 shows the savings in Sydney are over 90GL, equivalent to the annual production of their desalination plant. Even in Adelaide, which has the smallest benefit, the savings are over 15GL each year.

![Figure 2: Water savings from rainwater harvesting and water efficient appliances for each region](image)

Figure 3 shows an interesting correlation between water savings from water efficient appliances and reduced operational expenditures. Sydney has shown only a 15% real increase in operating costs. South East Queensland, which rejected rainwater harvesting and implemented a water recycling plant, desalination plant and a water grid has experienced a 167% increase in operating costs. Adelaide is not far behind with a 73% real increase in operating costs. Perth is an anomaly here in that it has an expensive desalination system and

low rates of rainwater harvesting. It may be that not all the costs of the desalination plant are reflected in the Perth operating costs.

Figure 2: Regional utility operating costs in Sydney, SEQ, Melbourne, Adelaide and Perth regions

Finally Figure 4 shows how this is affecting the most important stakeholders, the householders paying annual utility water and sewerage expenses. This data shows that Adelaide has experienced one of the largest increase of the capital cities assessed, with a 70% real increase in household water expenses. Sydney is the lowest at 7% and South East Queensland is 70%.
Real increases in household expenses for utility water services were observed to impact on available income and associated household welfare in each capital city region. Reduced disposable income will also diminish consumption of goods which impacts on the viability of local economies. The impacts of changes in utility water expenses on household welfare were lowest in Sydney. The overall reduction in household water use due to water efficient appliances and rainwater harvesting has also produced lower tariffs for water services in Sydney that benefit all households. These outcomes are possible for Adelaide.

The contribution of Rainwater Harvesting systems to Stormwater performance across the whole of Adelaide region

Review of historical information and supplementary modelling by Coombes et al (2016) revealed that existing rainwater harvesting systems produce widespread benefits to the Greater Adelaide region.\textsuperscript{22}

In 2016, there were over 167,000 rainwater harvesting systems that provided 7.2 GL rainwater supply at a value of more than $31 m. The use of harvested rainwater reduced demands for utility water supply and improved the impacts on regional rivers and demands for desalination.

These rainwater harvesting systems also decreased pollution discharging to waterways by 829 tonnes of total suspended solids (sediments), 1.7 tonnes of total phosphorus and 11.8 tonnes of total nitrogen in 2016. These outcomes improve the health of waterways and decrease impacts on sea grasses.

The existing use of rainwater harvesting for the Greater Adelaide region also produces a long term annual water security of $31 m and reduces greenhouse gas emissions by 21,000 tonnes of CO\textsubscript{2}.

The importance of clear, science-based targets

It is important to set the vision for integrated water management, more sustainable and liveable cities but it is even more important to set performance measures that can be practically applied to new and existing land use development for at least three key reasons.

Firstly, without a clear performance measure it is not possible to measure the effectiveness of the policy. It is not possible to assess if the policy is working or if it needs to be modified or changed.

\textsuperscript{22} Coombes P. J., Smit M., Byrne J., Walsh C. J., (2016), Stormwater, waterway benefits and water resources benefits of water conservation measures for Australian cities, 37th Hydrology & Water Resources Symposium 2016: Water, Infrastructure and the Environment, Engineers Australia, Queenstown, New Zealand
Secondly, there are many important stakeholders in the urban context. Clear performance measures avoid discretion and inconsistent application of regulatory controls on different stakeholders. Public servants are empowered to apply the policy without fear or favour and government is clearly accountable for development outcomes which is a good thing for public confidence.

Thirdly when clear performance measures are established it allows a holistic assessment of the outcomes highlighting inconsistencies across the urban area.

For example, the draft Performance Outcome 22.1 includes maximising conservation of water resources as the first outcome, with no performance measure or guidance on how this might be achieved.

**Conclusion**

Rainwater Harvesting provides water efficiency benefits to the household, operational and capital savings to water utilities, stormwater management benefits for flooding and local waterways and irrigation opportunities for increased green infrastructure and liveability. These are significant integrated water management benefits from a simple piece of infrastructure.

The recommendations below are intentionally based on clear performance measures, using the BASIX targets as a guide. We suggest the general public will expect that the SA government adopt a clear performance target that provides accountability to the community.

Because the draft Planning Code is a discretionary, not a mandatory requirement for WSUD controls, the current provisions of the NCC should be maintained until the impact of the Planning Code can be assessed.

The authors of the draft Planning Code are to be congratulated on the recognition of the importance of integrating WSUD and rainwater harvesting into the Code. However, there is more work to be done. The water conservation and local waterway ecology aspects of integrated water management have been overlooked. There is strategic need to consolidate all aspects of integrated water management into a single policy applying to all development.

In addition, performance outcomes for the code should be exactly that, they should specify performance, not goals or objectives and the measurable performance outcomes should not be buried in the deemed to satisfy provisions, allowing substandard alternatives to be proposed.

On that basis the Planning Framework should include both a policy with clear performance outcomes and a PO – Performance Outcome in the Code that applies to all development as discussed in the recommendations below.

Such an approach would be an improvement and SIMPLIFICATION of the current code provisions and provide clearer outcomes for community, government and the building industry alike. Requiring a certificate of compliance based on online software would ensure a
high level of compliance and reduce the opportunity for ‘planning trade offs’ of stormwater management vs, for example, carparking.
Recommendations

1. The proposed WSUD provisions in the draft Planning Code to use rainwater harvesting to meet WSUD and stormwater management challenges as a deemed to comply response are supported.

2. Because the draft Planning Code is a discretionary, not a mandatory, requirement for WSUD controls the current provisions of the NCC should be maintained until the impact of the Planning Code can be assessed.

3. A State Planning policy for all urban areas specifically on integrated water management with performance outcomes (proposed below). A planning permit would be subject to certificate of compliance with these outcomes based on online design tool assessment. Planning permit cannot issue without certificate.

Performance Outcomes

Manage peak stormwater runoff flows and volume management

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.

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 achieves 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.

Maintain hydrological performance and waterway ecologies

3. 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.

Manage Water Conservation

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

Similarly, the Planning Code would be modified in accordance with the policy to set performance outcomes for ALL development as follows

Currently:

PO 5.1

Development sited and designed to maintain natural hydrological systems 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.
PO 5.1

Development sited and designed to support integrated water management

1. 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.

2. 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 achieves 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.

3. Maintain natural hydrological systems, establishing performance outcomes 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.

4. 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.

Bibliography


12th June 2019

The Hon Rob Lucas, SA Treasurer, treasurer.dff@sa.gov.au
The Hon Stephan Knoll, SA Minister for Planning, minister.knoll@sa.gov.au
The Hon David Speirs, SA Minister for Environment, minister.speirs@sa.gov.au

Dear Ministers

Rainwater Harvesting and Risks of Climate Change

Rainwater Harvesting Australia has been researching the implications of removing regulatory requirements for rainwater harvesting on new development in Australia.

By removing the requirement for rainwater harvesting we believe you may cause damages to South Australians resulting from:

- Increased urban flooding and damage to buildings
- Decreased urban water quality
- Increased costs to customers

This creates a risk of negligence that could create a legal liability. The impact of climate change is likely to increase the risks of damages to South Australians. Failure to act on these risks may subject the South Australian government to legal liability for damages.

Wheater (2006) and UN (2015) highlight that urban flooding is a recurring and increasing global challenge. The inquiry into stormwater management by the Australian Senate (2015) reveals that flooding and ecological degradation is an escalating problem in Australia. Urbanisation drives substantial increases in flood risks and ecological damage at the small catchment scale (Wheater 2006; Walsh 2004; Coombes, Babister, and McAllister 2015). Substantial proportions of insurance claims for flood damage are associated with urban stormwater run-off (Wheater 2006; Australian Senate 2015).

Status of transforming stormwater drainage to a systems approach to urban water cycle management – moving beyond green pilots, Coombes 2018

Current arrangements for managing stormwater in new developments in Victoria are inadequate for meeting the Victorian Government’s policy objectives of protecting the long-term health of urban waterways and bays and for maintaining the resilience and liveability of our towns and cities, particularly with future population growth and climate change. The state’s stormwater planning provisions are inconsistent and therefore inequitable. The provisions exempt many types of development from managing stormwater, including those that create the most harmful stormwater impacts.

Improving Stormwater Management Advisory Committee Report 2018, Victoria
What are the risks of Climate Change?

CSIRO's State of the Climate 2018 report outlines that Australia can expect to experience future increases in temperature, with more extremely hot days, an increase in fire risk, high-intensity storms and more intense heavy rainfall throughout Australia, particularly for short-duration extreme rainfall events.

 Whilst the impacts are difficult to assess the Garnaut climate change review estimated that climate change, without adaption, will reduce Australia's gross domestic product by 5%-6% by 2100. These findings are consistent with the findings of the Stern Review in the UK. The key finding of both these reports are that the costs of acting on climate change are less than the costs of not acting.

The Garnaut Climate Change Review – Update 2011

What does this mean for South Australia?

Our discussions with Stormwater South Australia are that the impact of widespread and intense infill development in urban areas has significantly increased the proportion of impermeable urban surface areas.

An increase in impermeable surfaces (roofs, roads, pavements) in residential developments puts neighbourhoods at greater risk of flooding as rain and stormwater are less easily absorbed. (Green Adelaide – A new approach to managing our urban environment).

We understand this increase in impermeable surfaces has generally not been matched by an increase in the capacity of the stormwater network to address the increased volume, flow and contaminants in urban stormwater. Performance measures for reducing pollutant load, reducing flooding risk and protecting waterways are defined in the Water Sensitive SA policy documents.

While this is a significant issue in its own right, the combination of increased impermeable surfaces and the increased probability of intense heavy rainfall associated with climate change appears to result in a further, non-linear, increase in risk of both urban flooding and damage to local waterways and receiving waterways including coastal Adelaide.

How important is Rainwater Harvesting to this issue?

Rainwater Harvesting has emerged as an important means of reducing risk and damage from stormwater in the revised Australian Rainfall and Runoff Guidelines 2019. Book 9 of the ARR has a section dedicated to Rainwater Harvesting and the importance of ‘at source’ stormwater management.

According to Argue (2017), the urban designer aims at managing the impact of urban stormwater runoff ‘at source’ and at multiple scales by retaining stormwater in landscapes and soil profiles, rainwater harvesting and disconnecting impervious surfaces from drainage networks (Poelstra et al., 2013).


Rainwater Harvesting is also recognised in ARR as being suitable for multiple objectives of stormwater management including controlling peak discharge, improving water quality and harvest or infiltrate stormwater. (Table 9.4.4 Indicative Suitability of Common Volume Management Design Solutions, ARR as above).
How serious are the potential losses and damages from Climate Change?

Australia's financial regulators, the Australian Prudential Regulation Authority (APRA), the Australian Securities and Investments Commission (ASIC), the Reserve Bank of Australia (RBA) have each spoken publicly about the systemic economic risks posed by climate change and highlighted an increased focus on the financial implications of climate change scenario analysis. In March 2019, RBA Deputy Governor, Guy Debelle emphasised in reference to the Recommendations that "both the physical impact of climate change and the transition are likely to have first-order economic effects."

Are you prepared for the increasing investor scrutiny on climate risk disclosures? Climate Risk Disclosure Barometer: Australia 2019, EY 2019

We need to think in terms of trend rather than cycles in the weather. Droughts have generally been regarded (at least economically) as cyclical events that recur every so often. In contrast, climate change is a trend. The impact of a trend is ongoing, whereas a cycle is temporary. The recent IPCC report documents that climate change is a trend rather than cyclical, which makes the assessment much more complicated. What if droughts are more frequent, or cyclones happen more often? The supply shock is no longer temporary but close to permanent.

Guy Debelle Deputy Governor, Reserve Bank of Australia, Speech 2019

CONCLUSIONS

Rainwater Harvesting Australia has received reports that climate change related risks amount to hundreds of millions for individual organisations and billions of dollars for city government. Given the significance of these issues, there are two key questions for the South Australian government:

1. Has South Australia assessed the risk of losses and damages from not acting to avoid climate change impacts, specifically including stormwater urban flooding and water way quality associated with patterns of urban development?

2. Has South Australia assessed the impact of removing requirements for rainwater harvesting from new development in the light of the recommendations from APRA, ASIC and RBA to assess increased risk and liability associated with climate change?

Yours sincerely,

[Signature]

Mike Thompson,
Chair Rainwater Harvesting Australia,
(a division of Irrigation Australia)