

# Response to the DELWP Issues Paper for the Improving Stormwater Management Advisory Committee – June 2018

Submission by Megan A. Farrelly<sup>1</sup> & Peter M. Bach<sup>2,3</sup>

DOCUMENT VERSION: 25<sup>TH</sup> JUNE 2018



## 1. INTRODUCTION

This document aims to provide feedback on the DELWP Issues Paper for the *Improving Stormwater Management Advisory Committee* (June 2018). Our insights are drawn from recent qualitative research, which involved over 100 face-to-face interviews with urban water stakeholders across Australia. As the data analysis is currently underway, our insights are preliminary and partial. However, we believe that our initial findings may provide relevant insight and opportunities for guiding future stormwater management in Victoria.

We first provide a general overview of the overarching project that our data set originates from followed by general comments to the outlined key issues. This is followed by our response to the 14 key questions, some recommendations and concluding remarks.

## 2. OVERVIEW OF VR WATER

The VR Water Project is the short title for an Australian Research Council Discovery Early Career Researcher Award (DECRA) project DE170100042: “Virtual Reality for Planning of Green Urban Water Infrastructure”, which commenced in 2017. The project, led by Dr Peter M. Bach, in close collaboration with Associate Professor Megan Farrelly, strives to build a serious game for planning sustainable urban water systems in hopes of harnessing better mutual understanding and new approaches to collaboration among stakeholders in the urban water sector.

VR Water not only explores the technical aspects of serious game development, but also the social aspects in planning. In its first phase (from February 2017 to December 2017), the research has involved 100 face-to-face interviews with a range of urban water practitioners, who operate at the forefront of stormwater management across Australia (38 interviews were conducted in Victoria). The data comprised a diversity of organisations including local and state government, developers, consultants, utilities, regulators and capacity builders. Analysis of interviews is ongoing and involves in-depth coding of pertinent themes, linguistic and stakeholder network analysis among other approaches.

## 3. GENERAL COMMENTS TO KEY ISSUES

There is much to commend the State Government’s historical and contemporary policies related to stormwater management, but we agree more can be done. Through the lens of multi-level governance, stormwater management engages multiple actors at varying scales and across diverse domains. Emerging from our interview data and reflecting on the Issues Paper, what is needed is clear policy guidance and flexibility at the State-scale, with keen attention provided to guiding and supporting Local Government actions both in their local policy-making and the provision of opportunities for mutual learning and informal engagement. The DELWP integrated water forums are a useful starting point in this direction.

It is worthwhile noting the eight key issues highlighted in the document were reflected throughout the interviews in Victoria, and to some extent from other cities. We offer some general reflection on these issues.

Integration of stormwater, Water Sensitive Urban Design (WSUD) and flood management planning with landscape, recreation space planning and the broader planning process deserves greater attention. Many interviewees reflected on the need to consider stormwater planning as early as possible in the planning workflow, especially if the multiple benefits are to be harnessed and ‘competition of space’ is an issue. This has been particularly pressing in cases where affordable housing developments have been pushed. We generally observe that synergistic opportunities of providing stormwater management in multi-functional urban spaces are recognised, but difficult to realise given the current level of priority given to stormwater management in the planning workflow.

It is conceivable that stormwater management solutions are currently not designed to provide broader benefits such as improved amenity. Current compliance objectives and planning requirements have a limited foothold in ensuring delivery as rightfully noted by Kay & Hussey (2013) among the key issues. We observe that much of the onus rests with local government to develop and enforce local policy that ensures implementation and compliance of BPPEM and other benefits, only to be overridden by the unwillingness of developers to deliver these systems or intra-organisational pressures of strained asset management and maintenance in

<sup>1</sup> Associate Professor, School of Social Sciences, Faculty of Arts, Monash University, Clayton 3800 VIC, Australia

<sup>2</sup> Monash Infrastructure, Dept. of Civil Engineering, Monash University, Clayton 3800 VIC Australia

<sup>3</sup> Swiss Federal Institute of Aquatic Science & Technology (Eawag), Überlandstrasse 133, Dübendorf, 8600, Switzerland

Contact: [megan.farrelly@monash.edu](mailto:megan.farrelly@monash.edu) / [peter.bach@monash.edu](mailto:peter.bach@monash.edu)

cases where highly motivated and innovative developers are striving to deliver place-based approaches.

Discouragement to implement small-scale WSUD appears to originate from: (1) challenges of financial responsibility and cost-sharing of constructed assets, (2) outdated state-level planning policy that do not align with current visions of sustainable and liveable cities and (3) disempowerment of local government to deliver its vision. We would also like to stress, our data does not show a (1) lack of understanding, awareness and vision around improved stormwater management, (2) nor a lack of incentives by developers to provide WSUD, and (3) overlooking of synergistic opportunities, to be as significant as suggested in the Issues Paper.

## 4. RESPONSE TO KEY QUESTIONS

***Are there any other key issues or opportunities (that are directly related to the Committee's Terms of Reference) that the Committee should consider?***

### 4.1 OPPORTUNITIES TO EXTEND THE COVERAGE OF STORMWATER PLANNING REQUIREMENTS

***a) What are your views on the conceptual planning control option?***

In theory, we agree with the notion of applying BPEM requirements as stated in the conceptual planning control option. However, this does raise questions of capacity and challenges related to compliance. An assumption stated in the report - "*adequate guidance and tools will be available to assist home owners and developers to determine what is needed to meet the BPEM requirements on their site.*" - will require significant attention to tailor such guidance to suit a diverse range of actors involved in the successful delivery (and maintenance) by homeowners, landscape architects, plumbers, and gardeners, among others.

Noting that there can't be a 'cooked-cutter' approach to adopting improvement stormwater management, a number of questions were raised regarding how this approach would be "enforced" from a compliance perspective. Ensuring BPEM standards can be enforced requires a feasible approach to performance monitoring. Whether this is done through an independent body or in-house, financial provision for this is essential given the already stressed nature of maintenance budgets within local government authorities. For example, the DA approvals typically involves sign off at the drawing stage, but will there also be an on-site signoff/visual confirmation of systems implementation/ operation within private lots? Is it likely systems on private property can be maintained appropriately?

***b) What (complementary) changes to the building and plumbing regulations or guidance, or any other mechanisms, are needed?***

While we cannot provide direct advice here, extrapolating to anticipated lot-scale changes, one can envision changes are required regarding plumbing requirements (e.g. for rain

tanks to toilets) or establishing raingardens/porous pavements.

### 4.2 OPPORTUNITIES TO PROVIDE BROADER BENEFITS

***a) What stormwater planning provisions, or other mechanisms, would help to deliver the broader benefits listed in Section 2.2?***

Our research analysis confirms practitioners recognise and value the multiple benefits derived from improved stormwater management (as outlined in the Issues Paper). Delivering these benefits, however, requires multiple reinforcing leverage points throughout the workflow of planning, design, construction, asset handover and maintenance.

Interviewees unpacked contemporary challenges to the WSUD workflow process –revealing a number of standout points: (i) WSUD requires early engagement in the planning process at the high-level strategic, regional-level statutory and local level precinct scales; (ii) getting as many stakeholders within the organisation and across organisations, particularly time-strapped asset management and maintenance teams, on board from the start of the process; (iii) related to this, embedding WSUD principles across the entire local government organisation, and (iv) ensuring proper construction of assets including as-constructed drawings for later maintenance and catching faults early in the process, among others.

Additionally, interviewees strongly asserted that to achieve broader societal and environmental benefits, planning provisions should require other key state agencies responsible for key infrastructure and major projects, e.g. Vic Roads and the Level Crossing Authority, to also comply with meeting BPEM requirements.

Furthermore, to achieve multiple benefits, a more nuanced, thorough and integrated catchment to catchment assessment would be required, identifying, for example, imperviousness and green space (public and private)– and then looking strategically at what can achieve the greater outcomes.

The data also suggested the potential of greater implementation given a more merit-based system that, rather through prescribed objectives and targets, would be based on the fulfillment of a combination of multiple benefits to a significant level of service. This can lead to less of 'paying oneself out of stormwater management' and greater ownership of stormwater management planning. This is similar to the Healthy Waterways Flexible Stormwater Management Framework (see <http://hlw.org.au/drop/#section-home>) (Health Waterways, 2018).

### 4.3 OPPORTUNITIES TO DELIVER A 'PLACE BASED' APPROACH

***a) Should stormwater standards vary spatially and, if so, on what basis and at what scale?***

Ideally, yes stormwater standards should vary spatially, but the challenge here lies with having access to detailed,

rigorous, catchment-based ecosystem assessments before localised/regionalised ‘standards’ can be established. For example, what is an appropriate level of imperviousness? Do we have accurate registries of public and private realm green space, can we anticipate/expect land use changes all of which influences decisions regarding stormwater standards.

Alternatively, if they are set for a particular catchment, within the sub-catchment, perhaps there can be flexibility about where the effort is placed.

***b) How can the planning system be used to guide and implement local IWM related standards?***

A recent critical review of WSUD planning in the urban form published in *Environmental Modelling & Software* (Kuller et al. 2017)<sup>4</sup> revisits the notion of ‘Best Planning Practice’, which has received far less attention than ‘Best Management Practices’. Kuller et al. (2017) developed a framework aligned with ecological sustainable development principles and ecosystem services literature. The fundamental message of this framework, namely: “*WSUD needs a place and a place needs WSUD*”, outlines the necessity of embracing broader ecosystem services in a two-pronged approach to effectively plan sustainable local IWM solutions and for realising a ‘place-based approach’.

Insights from the interviews confirm the predominant ad-hoc approach to WSUD implementation and a lack of coherent and holistic strategy aligned with catchment thinking. Whilst the Victorian Planning Provisions provide opportunity for local-scale schedules, there should be opportunity for greater consideration of the larger urban catchments spanning multiple local government areas.

#### **4.4 OPPORTUNITIES TO LINK WATER MANAGEMENT AND URBAN PLANNING**

***a) How should IWM plans, and or frameworks (Section Error! Reference source not found.), be linked to the planning system?***

We agree that there is a need for alignment, at least for ensuring Councils that do not currently engage in this domain, do so – however, there are many challenges in a top-down, heavy handed approach and we are all too aware of the ‘presumptive policy errors’ that are all too real within this space (e.g. Morison et al. 2010; 2011). The challenge remains regarding appropriately funding Councils (for assets in the public realm) so that they can effectively maintain/renew the assets. Research interviews highlighted the challenge many councils face when ‘*receiving many WSUD assets*’ but are unable to maintain them effectively for they do not come with a concomitant increase in budget, thus finding clever mechanisms to ensure Councils have sufficient budgets for this will be required.

***b) What mechanisms should be used to strengthen the links between water management and public realm planning or the planning system more broadly?***

As one interviewee puts it – we need “*a playground in a floodplain*” which can demonstrate and embrace the multifunctionality of spaces. Mechanisms to strengthen this are required not just at a State level – active recreation – design embracing multifunctional cases – have this as validation as safe and function.

***c) What guidance material or tools are needed to help implement stormwater management through the planning system?***

Guidance materials/tools are required on a number of fronts:

**(1) Revisiting the suite of available and adopted modelling tools** – MUSIC and STORM are mentioned in the Issues paper. These have been rigorously tested and have been positively supporting the implementation of stormwater management for over a decade. There is recognition in the power of models to support the planning system. The scope limitations of MUSIC and STORM, however, warrant the need for new tools to complement them. There are a number of newly developed models that have emerged in the recent decade. Among others is UrbanBEATS<sup>5</sup> developed by Peter M. Bach as part of a large team spanning two Australian and two international Universities, designed to integrate sustainable urban water planning with urban development and the urban form. We, however, also refer to a collection of reviews that focus on other modelling tools that can support stormwater planning and management (Lerer et al., 2015; Kuller et al., 2017).

**(2) More detailed ecological assessments** regarding environmental quality/water quality; green space versus imperviousness e.g. to assist in strategically locating assets.

#### **4.5 OPPORTUNITIES TO IMPROVE COMPLIANCE AND IMPLEMENTATION**

***a) Where are the weakest links in the chain of compliance and implementation of stormwater management requirements (including design, operation and people related issues)?***

Our interview data unpacks the “planning through to asset-handover and maintenance” workflow related to WSUD assets. While there are a number of key critical issues emerging from our dataset, we only highlight a select few here (similar to 4.2(a)).

- Requirement for developers to provide ‘as constructed drawings’ for too often the constructed assets: do not align with originally intended designs; may not be constructed with same materials; or in their stated location, for example.
- Internal allocation of costs are often incorrect, and allocated to the wrong internal teams/divisions.

<sup>4</sup> We are more than happy to provide a copy of this document upon request.

<sup>5</sup> For more information, visit [www.urbanbeatsmodel.com](http://www.urbanbeatsmodel.com)

- Internal organisational structures (and cultures) can often inhibit effective implementation workflows. Having either hybrid teams (or key ‘floating’ individuals) that work across internal silos is often a useful strategy.
- Ensuring Developers are engaged in thinking about WSUD requirements early in design phase is important, and aligned with this, is having good quality consultants on board early during this pre-design phase to ensure consistency in understanding and quality of approach/design.
- In matters relating to >60ha, Melbourne Water’s authority to define stormwater management assets should explicitly require local council involvement in negotiation processes to ensure that the best outcomes are achieved (and are reflective of local context).

***b) What actions are the most critical to improve compliance and implementation?***

Given the preliminary nature of the data analysis, we are as of yet unable to identify ‘the most critical’ compliance and implementation actions – but the above points are aligned with this question.

**4.6 OPPORTUNITIES TO SUPPORT STORMWATER MANAGEMENT IN THE PUBLIC REALM**

***a) What would help responsible authorities to determine and communicate the costs and benefits of public stormwater infrastructure?***

***b) What mechanisms should councils use to recover the construction and maintenance costs of public stormwater infrastructure?***

At this point in our data analysis, there have been many and varied statements regarding this, but we are yet to arrive at a position here.

***c) Should offsets be used to improve stormwater management? If so, how should they be used?***

Offsets can play a role when used sparingly and in the right context. If adopted widely, offsets will continue to promote ‘end-of-pipe’ solutions, which fundamentally contradicts the ‘place-based approach’ advocated in the Issues Paper, and challenges the shift towards integrated approaches for urban water management broadly. This is particularly pertinent for peri-urban/greenfield developments, alongside larger brownfield redevelopments.

Offsets could be useful within the dense, heavily urbanized inner city – whereby small lot redevelopments may contribute towards improving stormwater management in other areas where a larger impact may be obtained, similar to the approach outlined in the Issues Paper.

Ultimately, if we are to deliver multi-functional landscapes, whilst meeting the stated objectives for water in the *Water for Victoria* plan, then offsets should be considered only in the most extreme cases, and developers (and local councils) should be made to accommodate WSUD principles within their place-based designs.

**5. RECOMMENDATIONS & CONCLUSION**

The research findings outlined here have emerged from our preliminary data analysis of over 100 urban water practitioners (38 in Melbourne) – the final data analysis will continue over the next six months. Nevertheless, our reflection on the Issues Paper and our data set assisted us in deriving five key recommendations at this point in time:

- **The place-based approach** is strongly supported – though this needs to be situated within a clear, integrated catchment ecosystem assessment.
- **The notion of compliance needs to be revisited.** Compliance remains an important mechanism for ensuring base level application, however, interviewees often regarded the process as ‘adversarial’ as opposed to “*collaborative with opportunities for negotiation*”. This also requires attention to costs associated with this.
- **Offsets:** in principle we agree with offsets on the proviso they can be used flexibly, whilst maintaining a base level of expected compliance and outcome. Potential for a continuum (establishing baseline and aspirational levels) depending on level of contribution.
- **Tools:** we are currently using outdated models and there needs to be insight into/willingness to test new models. New research into the multiple benefits have yet to be fully applied within planning framework.
- **Guidance materials:** there is much that can be done in the space of assisting and guiding local governments and developers with regard to embedding integrated workflows. That much of what is needed is ‘how to’ guides.

As we uncover greater depth in our analysis, we will be providing ongoing publication and communication of our state- and national-level findings.

**ACKNOWLEDGMENTS & FURTHER INFORMATION**

The VR Water project is funded by the Australian Government, Australian Research Council Discovery Early Career Researcher Award (DECRA) Project ID DE170100042 titled “Virtual Reality for Planning of Green Urban Water Infrastructure”. We would like to thank all interviewees for their time, openness and willingness to participate in this project.



For more information, visit [www.petermbach.com/VRwater](http://www.petermbach.com/VRwater)

You can also contact the authors at the following:  
Associate Professor Megan Farrelly – [megan.farrelly@monash.edu](mailto:megan.farrelly@monash.edu)  
Dr Peter Bach – [peter.bach@monash.edu](mailto:peter.bach@monash.edu)

**REFERENCES**

Healthy Waterways (2018) Flexible Stormwater Management Framework – Tools to support decision-making. <http://hlw.org.au/drop/#section-home>.  
Kuller, M., Bach, P. M., Ramirez-Lovering, D. & Deletic, A. (2017) Framing water sensitive urban design as part of the urban form: a critical review of tools for best planning practice, *Environmental Modelling & Software*, 96, pp. 265-282.  
Lerer, S. M., Arnbjerg-Nielsen, K. & Mikkelsen, P. S. (2015) A Mapping of Tools for Informing Water Sensitive Urban Design Planning Decisions - Questions, Aspects and Context Sensitivity, *Water Asset Mgt Journal*, 7, pp. 993-1012.

Morison, P.J. & Brown, R.R. (2010) Avoiding the presumptive policy errors of intergovernmental environmental planning programmes: a case analysis of urban stormwater management planning *J. Emt Planning & Mgt* 5: 197-217.

Morison, P.J. & Brown, R.R. (2011) Understanding the nature of publics and local policy commitment to Water Sensitive Urban Design. *Landscape and urban planning*, 99: 83-92.