Submission to Senate Enquiry into Stormwater

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About IPWEA

The Institute of Public Works Engineering Australasia (IPWEA) is the professional organisation providing member services and advocacy for those involved in and delivering public works and engineering services to the community in both Australia and New Zealand. Previously known as the Institute of Municipal Engineering Australia, the organisation has widened its traditional local government engineering focus to encompass public works more broadly and all levels of government and private practice.

In June 2013, INGENIUM in New Zealand joined as a Special Division of IPWEA to become IPWEA NZ. This followed many years of close cooperation and collaboration between the two organisations.

The change of name reflects the new direction the organisation is embarking upon. Increasingly, engineers are working as part of multi-disciplinary teams, rather than working within traditional departments. Public works and services for all levels of government are being provided increasingly by consultants, contractors, suppliers of goods, services and machinery as well as those directly employed by government. Membership criteria for IPWEA has also changed from an emphasis on engineering qualifications and position within council, to criteria based on what people do in their jobs. Members come from the wide range of professions involved in public works and services - engineers, technicians, public works directors, contractors, consultants, managers, and other technical staff and managers. The IPWEA organisation comprises a national body and State Divisions in all Australian states, as well as New Zealand.

IPWEA has a long established working relationship with the Institution of Engineers Australia, as its technical society for local government engineering. This relationship provides savings and additional benefits to IPWEA members, including accreditation of qualifications, training, networking and exchange of specialist expertise.

Why our submission?

IPWEA has a keen interest in stormwater and drainage because they are core functions of local councils and hence are activities that IPWEA members are responsible for, either directly as council employees or indirectly as employees of consultants or contractors providing services and products to local councils. Another reason for IPWEA's interest in stormwater is its strong commitment to sustainability, through which it considers stormwater as a valuable resource, rather than as a waste product to be disposed of as quickly as possible.

Terms of Reference and our Comments

a) *the quantum of stormwater resource in Australia and impact and potential of optimal management practices in areas of flooding, environmental impacts, waterway management and water resource planning;*

The quantum is the average annual rainfall on urban areas, less infiltration and evaporation. Sydney Water notes that each year about 500 billion litres of stormwater flows to the ocean from its area of operation – about as much water as in Sydney Harbour!

The multiple benefits of optimal stormwater management are listed in many publications. Some of those benefits can be quantified, but many cannot. This makes valuing the benefits, as often required when preparing a business case for a proposed stormwater project, especially challenging. However, it can be appreciated that the higher density developments now occurring in our major cities, combined with likely increased storm rainfall intensities and more severe droughts due to climate change, will increase the benefits of sound stormwater management and the dis-benefits of poor stormwater management.

b) *the role of scientific advances in improving stormwater management outcomes and integrating these into policy at all levels of government to unlock the full suite of economic benefits;*

Research institutions, specifically CSIRO and the universities, are better placed than IPWEA to provide comment and recommendations on this Term of Reference. However it is observed that, whilst much good scientific research on stormwater has been undertaken in Australia, integrating those scientific advances into supportive government policies and industry practice is often lacking.

c) *the role of stormwater as a positive contributor to resilient and desirable communities into the future, including 'public good' and productivity outcomes;*

Stormwater can enhance community resilience by providing an alternative decentralised water source in urban areas, thereby reducing our current reliance on the centralised water supply system. Whilst (except for roof runoff) most stormwater is unsuitable for drinking , it is fine for most other uses, noting that only a small proportion of urban water is used for potable purposes.

Moreover, by sustaining water and vegetation features in highly urbanised areas, such as swales, wetlands, woodlands, natural creeks, riparian vegetation zones and lakes, stormwater helps improve amenity and liveability in our cities. The high cost of urban land is driving more and more high density developments that cover, pave or otherwise seal areas formerly available for infiltration of rainwater. As a result, stormwater runoff from impervious surfaces is becoming the main source of water flow in urban creeks that sustains creek biodiversity and vegetation. In this way stormwater materially contributes to improved urban amenity and recreation opportunities, as well as counteracting the urban heat island effect.

The more severe droughts and heat waves that are expected as climate change strengthens will increase the resilience, public good and productivity benefits of urban stormwater.

There is increasing interest in stormwater harvesting. But high evaporation rates and the high cost of land in our cities makes it difficult to store large volumes of stormwater for use in dry periods. Rainwater tanks are the most widely used means of storing roof runoff at the individual property scale. Another solution, successfully used for several decades by several local councils in Adelaide, where geological conditions allow it, is aquifer storage and recovery (ASR). This involves capturing substantial amounts of stormwater during wet periods and pumping it into underground aquifers, then recovering the stormwater by pumping it out to use in drier times.

d) model frameworks to develop economic and policy incentives for stormwater management;

No comments submitted

e) model land use planning and building controls to maximise benefits and minimise impacts in both new and legacy situations;

Land use planning and building controls should seek to minimise or avoid both flood damage to the new development or re-development caused by stormwater runoff from upstream, as well as the development itself causing adverse flooding or water pollution impacts on downstream properties.

A key principle of stormwater-related planning and building controls is 'polluter pays'. It says that it is preferable to manage stormwater quality and quantity at to its source, rather than at the 'end of pipe'. Successful application of that principle would mean that the owner of a property generating polluted stormwater runoff or greater volumes of stormwater runoff (thereby exacerbating downstream flooding) treats the stormwater to an acceptable degree to avoid/ mitigate adverse downstream impacts before it leaves the site.

The on-site stormwater detention (OSD) policy, pioneered by the Upper Parramatta River Catchment Trust in western Sydney between 1990 and 2006 for infill or redevelopments, and now widely adopted throughout Sydney and some other cities, is one of the most successful examples of 'polluter pays' as applied to stormwater quantity/ flood control and, to a limited degree, stormwater pollution. In jurisdictions where 'polluter pays' policies are not applied, the owner whose property generates stormwater pollution or increased and quicker stormwater runoff is allowed to pass the resulting extra costs onto the downstream environment (additional pollution), downstream property owners (increased flood risk) and local councils (cost of building and operating stormwater treatment devices and/or flood mitigation measures). The Trust's OSD policy suggests that 'polluter pays' stormwater policies are more likely to be successful where the upstream source sites and downstream impacted sites are both within the area of the responsible council or other agency.

In new urban release areas that are master planned, regional flood detention basins are generally preferred over on-site detention systems for reducing post-development flood peak discharges to pre-development levels. These regional basins may include some form of pollution trapping devices. The basins are often constructed by land development companies and then handed over to the local council to maintain. Despite the extra costs and liabilities involved, many local councils prefer to manage a small number of large regional basins under their direct control, instead of trying to manage large numbers of OSD and stormwater pollution traps on private properties over which they have limited control. Only time will tell which approach is the more sustainable.

The above discussion concerns how to best ensure that new developments or re-developments do not worsen downstream flooding or water pollution. It is also important that

the new development or re-development itself should be designed and constructed to minimise the likelihood of over-floor flooding.

In most urban areas in Australia the flood characteristics of rivers and major creeks (called 'mainstream flooding') have been modelled and mapped. This makes it relatively easy for local councils to identify flood liable properties and set building controls (especially minimum floor levels) to ensure a sufficiently low risk of flood damages. However overland flow flooding, caused by surcharge of the upstream stormwater drainage system, is much harder to treat with building and/or development controls. Overland flow flooding is much harder to model due to the fine-scale details required and can change significantly in particular locations as a result unforeseen and unmanageable circumstances. For example, a car may be parked very close to the kerb at the time of storm so that, when the water in the gutter is unable to flow past the car, it overtops the kerb and flows into a property.

The easiest way to minimise property damage due to overland flooding is to raise the minimum standards. Currently the Building Code of Australia only requires a minimum difference in level between the floor level of a building and the surrounding ground level (called 'freeboard'). Over time, even this modest level of protection can be lost through landscaping and other improvements that raise the effective ground level around a building. It is therefore recommended that the minimum freeboard should be 300mm to provide a margin for safety. This would allow for the uncertainties in overland flow modelling and our inability to manage the local issues that can cause localised flooding.

f) funding models and incentives to support strategic planning and investment in desirable stormwater management, including local prioritisation;

At many local councils stormwater improvements and maintenance are funded from general rates revenue and so stormwater must compete with other demands on limited public funds. There is a well-known saying 'out of sight, out of mind'. Because most stormwater assets are underground or otherwise out of sight, and only show their value during occasional heavy rain, and unless there has been a recent local stormwater flooding or pollution incident, stormwater projects and stormwater maintenance by local councils are often given a lower priority for funding than work providing highly visible and frequent benefits. The funding difficulty for local councils' stormwater management contrasts sharply with the more adequate and assured funding for regional stormwater management and trunk drainage raised through property-based stormwater, drainage or waterways service charges by metropolitan water authorities (e.g. Sydney Water, Melbourne Water).

This suggests that the best solution, for funding both regional and local stormwater management, is a dedicated property-based funding source in which charges are directly related to each property's stormwater quality and quantity impact on the overall stormwater system. The Upper Parramatta River Catchment Trust levied service charges on the 80,000 properties in its catchment related to the size of each property and hence its potential contribution to the serious downstream flood problems the Trust was principally established to address. Preferably, to encourage responsible community behaviours, such property-based stormwater charges should include appropriate discounts to encourage at-source quality and quantity controls.

A significant impediment to strategic planning and investment in stormwater management (especially in cities with multiple small local government areas – Sydney has 40 local councils, with populations ranging from 13,000 to 330,000 - where the stormwater catchment covers many council areas) is that often the main source of a stormwater flooding and/or pollution issue is in a different local council area to its main impact. Furthermore, in some cases, the optimal site for a mitigation measure (e.g. pollution trap, wetland, detention basin)

is in a third local council area. Effectively addressing that impediment requires a metropolitan or major catchment scale agency responsible for stormwater planning, co-ordinating, monitoring and technical support to local councils, together with building and operating major stormwater mitigation/ treatment measures. Melbourne Water's strong leadership role in regard to metropolitan-wide stormwater quality and quantity management, shows what is possible.

g) asset management and operations to encourage efficient investments and longevity of benefit;

The international suite of standards, ISO 55000, supports alignment of good asset management practice around the world. ISO 55000 defines Asset Management as the 'coordinated activity of an organisation to realise value from assets'. In turn, it defines Assets as: 'an item, thing or entity that has potential or actual value to an organisation'. This definition is deliberately wider than physical assets, but these form an important focus for most organisations.

Asset Management involves the balancing of costs, opportunities and risks against the desired performance of assets, to achieve the organizational objectives, possibly over different time frames. Asset management also allows an organisation to examine the need for, and performance of, assets and asset systems at different levels. As well, it enables the application of analytical approaches to managing an asset through the different stages of its life cycle. This can start with considering the need for the asset, through to its disposal, and should include managing of any potential post disposal liabilities.

Asset Management is the 'art and science of making the right decisions and optimising the delivery of value'. The key objective should be to minimise the whole life cost of the assets, although there may be other critical considerations, such as risk or business continuity.

In the past the only design objective for stormwater assets was to dispose of the stormwater as quickly as possible through hydraulically-efficient gutters, pipes, drains and canalised water courses. The resulting stormwater assets had high upfront (capital) costs, but low ongoing (operational) costs. In contrast, modern stormwater assets are designed to achieve multiple objectives, such as flood control, pollution removal, biodiversity enhancement and improved amenity. This necessarily entails higher operational costs, highlighting the importance of considering total life cycle costs of proposed new or upgraded stormwater assets.

Over the past decades and continuing, IPWEA has lead efforts, both within Australia and increasingly internationally, to encourage more systematic and comprehensive asset management of public infrastructure. In particular, IPWEA's International Infrastructure Management Manual (IIMM 2011) is the global reference and practical guide on 'how to' implement good asset management practice with asset-specific guidance. Other IPWEA measures to improve asset management practice include:

- publishing and running training workshops on its series of asset management Practice Notes
- conducting online certificate courses in asset management planning and infrastructure financial management
- developing and providing training in use of the computer-based NAMS.PLUS asset management tool.

Of particular relevance, IPWEA conducts workshops for council staff on how to assess the condition of stormwater drainage assets - a critical initial step in asset management. Over the past three years those workshops have provided training to staff of 52 NSW, 33 Victorian, 36 Queensland, 29 Western Australian, 26 South Australian and 15 Tasmanian local governments

All of the above-listed initiatives have materially assisted in raising the standard of management of stormwater assets, as well as other types of public assets, in Australia and elsewhere.

h) the role of innovation in supporting desirable outcomes and transparent decision-making, including access to information and novel technologies for planning, design and implementation; and

No comments submitted

i) any related matters.

END OF SUBMISSION