Seasonal eco-hydrological regimes and local catchment modelling to protect high value ecosystems in urbanizing catchments.

Mr David Carew[1], Mr Andrew John[1], Mr Dom Blackham[1], Prof Barry Hart[2]
[1]*Alluvium Consulting,* [2]*Water Science Pty Ltd*

Biography:
David Carew is an ecologist with expertise in waterway and stormwater asset management. He has worked across non-profit, private and government sectors for more than 20 years.
David joined Alluvium after working at Melbourne Water where he provided vegetation advice to their River Health program then oversaw the management of their Stormwater Treatment Systems. He was involved in the revision of Melbourne Water Constructed Wetland Manual and developing the MW Vegetation Templates. During his 10 years at Melbourne Water David collaborated with University of Melbourne on specialist vegetation projects, established innovative methods for assessing wetland condition and developed Stormwater Asset management regimes.
David understands the policy and institutional drivers through his work in the government sector and the challenges faced by industry in delivering those outcomes. He understands how to bring science to practice and is passionate about achieving long term sustainable outcomes that provide real ecological and social benefits.

Change in hydrology is a listed threatening process for some water-dependent federally (EPBC) listed species and ecological communities. Despite knowledge of this threat, drainage systems have predominately been designed to provide safe drainage solution with statutory stormwater treatment. Ecological protection has not always been prioritised.
This presentation will consider the findings of three studies in Melbourne, which investigated the changes in catchment hydrology as a result of urban development and the impact on known local ecological values. The pre and post development hydrology was modelled to determine the scale of seasonal hydrological change. This is relevant to understand the ecological impacts on water dependent species - more so than extreme events used to design flood protection. The hydrological regimes generated were compared with ecological water regimes that were defined for the local ecosystems and protected species.
The studies found that current approaches to drainage design result in unacceptable impacts on the local ecological values, primarily as a result of an increase in volume and changes in seasonality of flows. Concept designs were developed to provide solutions that protect the local ecological values and ensure best practice drainage and stormwater treatment outcomes - while maximising the amenity benefits to the local communities. In one case stormwater harvesting was identified as an important part of the solution to alleviate the threat when too much water was generated.
Development across Melbourne's fringes is projected to accelerate even further with a growing population. The type of studies discussed form the basis for a universal framework to assess hydrological impact on ecological values in urbanising catchments. They also build knowledge and develop appropriate eco-hydrology regimes and mitigation solutions. Conducting studies of this nature in drainage design, using this proposed framework, has the potential to maximise development, social and environmental outcomes at minimal additional cost.