Guiding asset resilience in a changing climate

Overview
Northern Beaches Council partnered with the Institute of Public Works Engineering Australasia (IPWEA) to produce a companion document to Practice Note 12: Useful life of infrastructure, to provide methodology and guidance on assessing the impact of climate change on infrastructure, to the year 2100.

The resulting Practice Note 12.1: Climate Change Impacts on the Useful Life of Infrastructure, PN 12.1, was piloted by Northern Beaches Council on projects at four sites, to ensure its applicability and usability for local government infrastructure asset managers.

Background
In 2014, the Climate Council found if no action is taken to protect infrastructure from inundation resulting from climate change, Australia’s coastal asset exposure will be greater than $226 billion.

This project saw Northern Beaches Council in partnership with the IPWEA, meet the challenge of providing the necessary guidance to ensure climate change impacts are incorporated into estimates of asset useful life, leading to more reliable annual depreciation estimates and operating results.

Implementation
This project developed guidance on likely impacts of climate change variables on assets while testing the efficacy of adaptive approaches to climate change.

A technical working group including Council technical staff and project manager and IPWEA representatives was formed to scope the project and test the outcomes. A workshop was held on the Canute sea level rise calculator and site visits to the four study locations at a Collaroy Beach stormwater outlet, Mona Vale SLSC, Fairy Bower Public Amenities Building and Macpherson Street road raising.

A decision tree and worksheet to estimate the impacts of climate change variables on asset useful life was developed and trialled for these locations, with feedback provided by project and asset managers, and Sydney Coastal Council Group staff.

Although references are provided in PN 12.1 to assist with cost benefit analysis of adaptation, financial modelling was not included as it cannot be accessed freely by all council asset managers.

Dr Jacqueline Balston of the University of South Australia was commissioned to write PN 12.1. Drafts were sent for review by council staff, the steering committee, IPWEA peer reviewers, a technical panel and Local Government NSW between November 2017 and March 2018.

Outcomes
The resulting practice note enables the whole of asset lifecycle to be considered, leading to more sustainable, resilient and cost effective investment.
PN 12.1 enables better comparative understanding of:

- asset and climate change factors to be considered in estimating the impacts of climate change on the useful life of assets
- current and future trends of climate change across Australia to 2100
- likely impacts of climate change variables on asset materials and components
- how climate change adaptation can affect the useful life of an asset
- the process for estimating the impacts of climate change on a range of asset components using a decision tree worksheet and supporting tables
- where to find more information and economic modelling tools for high value assets.

It is now available at no cost to local government in NSW. IPWEA is developing training so more council asset managers will be able to assess climate change impacts on a national basis.

The Northern Beaches Council pilot resulted in the application of innovative, adaptive coastal solutions, including:

- the design of an HDPE stormwater pipe to be built into the new sea wall at Collaroy Beach to better withstand storms and sea level rise. The stormwater outlet also features a one-way valve to prevent back-flow and subsequent inundation in the upper catchment.
- risk based approach to selecting appropriate foundations to accommodate sea level rise at Mona Vale SLSC
- use of materials with greater resilience to coastal storm events at the Fairy Bower amenities block
- highlighting the importance of assets that enable evacuation, so communities are more resilient to extreme events such as floods by the raising of Macpherson Street.

**Key learnings**

An issue faced in the development of PN 12.1 was the quantification of climate change risks, exposure and vulnerabilities in calculating costs associated with the asset’s useful life.

The Practice Note 12.1 details a range of climate impacts on materials and infrastructure and a traffic light approach was adopted to indicate the likely climate impact on the useful life of an asset type, consistent with the earlier Practice Note 12, which was established to meet financial accounting practices. The traffic lights show the likely impacts of 6 climate variables on the useful life of an asset class: green for low, amber for medium and red for high vulnerability.

A Decision Tree Worksheet was developed to assist asset managers apply PN 12.1 to a project to determine the magnitude of the change in climate variables and whether these impacts will materially alter the useful life of the asset. The worksheets also encourage asset managers to incorporate adaptation measures to address the likely climate impacts so that the useful life of the asset is able to be extended to account for lifecycle and depreciation costs.

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