



Designing for the future: sediment accumulation analysis through maintenance of WSUD assets

Mr Fotos Melaisi¹

¹*Stormwater360 Australia, Alexandria, Australia*

Overview

An increased amount of pollutants entering streams via stormwater runoff continuously deteriorate the biodiversity of waterways hence, effective water quality solutions are being implemented to safeguard the environment. We take a look at the shortage of maintenance programs and how a lack of proper maintenance can lead to failure to comply with regulations relating to water quality. Site owner's and property manager's alike need to be educated on the responsibilities of maintaining treatment devices and how periodic servicing benefits the environment. We present a series of data obtained from the ongoing servicing of the StormFilter EnviroPod (SFEP) treatment train. Over the past three years, sediment accumulation data has been collected across 102 sites. Key catchment characteristics were collected including geographical location, land usage, total site area, percentage impervious, cleaning frequency and total waste removed. Pollutant loads for different land uses and applications are simulated for both private and public assets. This simulation is then compared with MUSIC modeling guidelines for validation with current industry standards.

Objectives

The ultimate objective is to provide Stormwater quality designers with further analysis on Stormwater runoff pollutant concentrations generated onsite. This study also serves to drive policy for regulatory authorities looking to minimise the impacts of urbanisation. How we shift the current focus on design and installation and move towards maintenance to complete the WSUD cycle and provide the industry with a turnkey solution. We look at potential solutions to avoid stormwater structures or storage facilities becoming clogged and how to avoid reduced flow or storage capacity which may result in flooding.

Method

Routine maintenance is scheduled across multiple sites four monthly. After completing service works, waste is disposed at a waste management facility allowing maintenance personnel to record data from weight bridge. This information along with site specific catchment characteristics obtain from previous MUSIC modelling forms a database. Cross correlation is then established by comparing this database with current MUSIC Modelling Guidelines.

Results

The analysis shows that across all land uses an average of 925KG/ha/annum of pollutant loads are generated with commercial developments being the dirtiest. It was found that the data spread is significantly variable therefore difficult to estimate. Further monitoring of traffic activities and topography will assist to estimate loads more accurately. However, this matches up closely with Blacktown City Councils MUSIC Modelling Guideline parameters.

It was found that Blacktown City Council currently have the most progressive policy in this regard and thus encourage all LGA's to adopt a similar practice.

Council compliance program costs and sediment removal costs are compared with the cost of installing new infrastructure through offset schemes.

Conclusions

Across the 102 sites analysed, the total area being treated is approximately 154ha. Assuming this is 10% of all SFEP systems installed across Australia we estimate 1,540ha of area are accumulating an estimated 950 tonnes of sediment / annum. This raises public health issues which authorities need to handle and adopt a uniform maintenance approach.

In comparison to the dataset used, MUSIC modelling load parameters were found to be relatively similar, however, strategies need to be in place to counteract the lack of maintenance that can be seen across WSUD assets nationwide. Great emphasis is put on correct testing, hydraulic design and installation of these assets, we now need to look at appropriate long term sediment removal and further studies on what pollutants are actually washing off.

As more and more Local Government Authorities engage in an integrated planning approach for water cycle management, it is evident how effective policy is at promoting conservation of existing environmental values as well as maintaining ecological sustainability. Effective planning control measures and mandatory maintenance programs are highly commended for future decision makers as LGA's have been identified as the primary drivers. Further parameters which need to be incorporated into future study include traffic movement and pollutant generating influences. In addition, this study will further benefit by incorporating a larger data range.