

Optimizing Water Sensitive Urban Design (WSUD) techniques to lower Total Suspended Solids (TSS) load under exiting development condition in an urban catchment in west Melbourne



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Background

Urban stormwater runoff poses a significant threat to waterways health. Although research in WSUD has advanced over the years, many techniques in both new and existing developments are still implemented without sufficient actual data or robust modeling. A recurring challenge is that hydrological models like SWMM are often left uncalibrated due to the lack of actual stormwater quality and quantity data.

GreenPlan-IT

Locate and determine cost effective watershed scale Green Infrastructure implementation scenarios



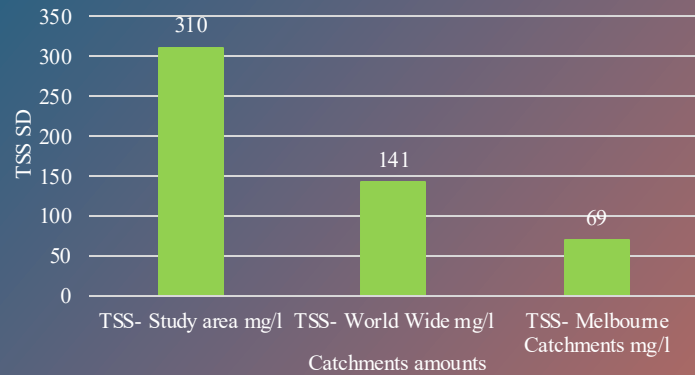
Background

Today I'll share how we applied the GreenPlan-IT tool—developed by the San Francisco Estuary Institute—to optimize Water Sensitive Urban Design (WSUD) placement for Total Suspended Solids (TSS) reduction in a developed catchment in Melbourne. This tool can get linked to SWMM.



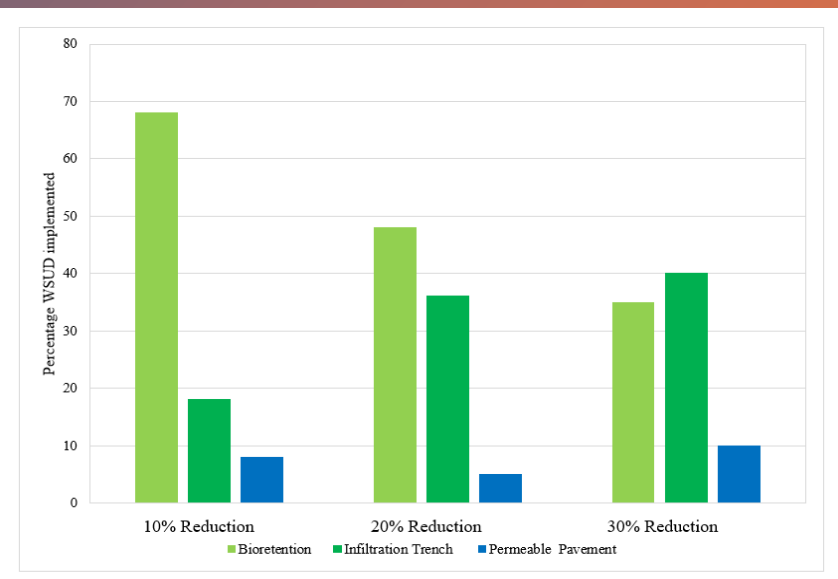
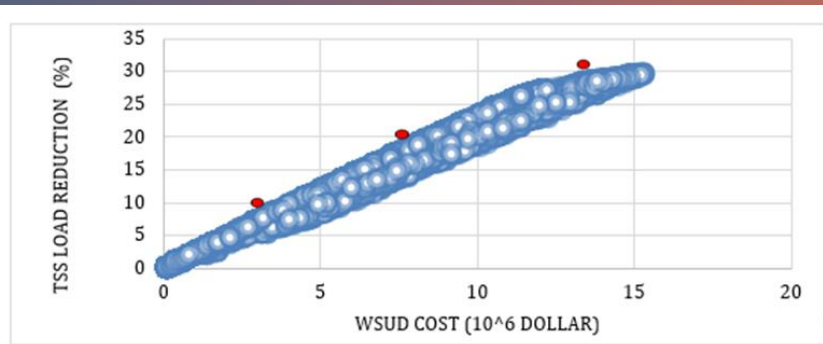
Steps...

- Choosing WSUD techniques—bio-retention systems, infiltration trenches, and permeable pavements
- Collecting 30 stormwater samples from the study area for analysis, focusing on pollutants identified through the literature review.
- Analyzing Total Suspended Solid and compared with limited old Melbourne catchments data and globally, which showed significantly high levels.



Findings ...

- Scenarios tested included single storms and continuous rainfall, applying WSUD at allotment and street scales under current and future conditions, including climate change.
- Chosen techniques did reduce TSS at the catchment outlet in a range of 33% to 40% with a cost below \$20 million. However, reductions didn't meet Melbourne's waterway health targets.
- Placement challenges in dense urban areas limit system effectiveness.
- Performance under heavy rainfall events remained consistent.
- The most effective technique was bio-retention.





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Acknowledgment

