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# A review of the effectiveness of catchment scale stormwater management strategy in urbanised cities

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*Biography:*
*I'm currently undertaking a research degree (PhD) in University of Queenaland and also working part time as Senior Water Engineer (RPEQ) with Brisbane City Council and has more than 10 years of experience in surface water management including planning/ design and construction supervision. I have undertaken projects in various areas such as waterway health enhancement (WHE), water sensitive urban design (WSUD), Water conveyance, stormwater quality studies, floodplain management and planning, urban drainage design and investigations. I also have special interest in sustainable development design, Water Sanitation, and Hygiene (WASH) in emergency areas, sediment and erosion control planning.*
*I have had various roles from contract development, tender evaluation, proposal preparation, project management to design and documentation of civil engineering projects with appropriate technical standards. I have scoped projects, designed, coordinated stakeholder engagement activities, reviewed design drawings and carried out contract management construction liaison for civil and waterways work.*

***Abstract:***
Urbanisation in last century has had substantial impact on natural water cycle. Through urbanisations we create immense impervious areas and paved surfaces that result in a large portion of rainfall that cannot infiltrate or evapotranspired anymore, convey as runoff quickly through drainage system outside urbanised areas. Effective management of stormwater is a significant challenge faced by cities around the globe and with population growth and positive migration toward living in the cities, this subject problem will be even more severe in the next century. Changes in precipitation intensity and pattern as a result of climate change, heatwaves and draughts is further intensifies the challenge in the field of stormwater management.

Stormwater control measures (SCM) as an approach in sustainable development and a technique to minimise urbanisation impact on natural water cycle has gained interest in many parts of the world. SCM, Green Infrastructure (GI), Water Sensitive Urban Design (WSUD) in Australia and Low impact development (LID) principals in United State has been implemented in many of greenfield development throughout the world. Distributed GIs and SCMS disconnect impervious surfaces to decrease pollutant transport, reduce stormwater runoff volumes, lessen runoff frequency and slow down runoff response time. These systems placement and installation has mostly been approached with opportunistic, empirical placement strategies.

A number of researches has uncovered the benefits of SCM principals to improve water quality, reduction of peak flow and frequent flow management at site and local scale. Despite the increasing implementation of SCM across the world, only a few empirical studies have considered the cumulative effects of multiple systems on hydrology at the catchment scale. Given the significant ongoing and

imminent investment in stormwater management that intended to improve watershed-scale conditions, there is an urgent need for research on develop understanding on cumulative effectiveness of SCM in restoring natural water cycle, to inform catchment managers and policy makers on decision-making about trade-offs across different stormwater management strategies.

This research aims to improve the understanding of SCM function in catchment scale in subtropical climate with focus on infill development and unveil optimal scale and spatial arrangement of technologies of SCM. This research through an empirical study explores the impacts of catchment changes through rapid urbanisation on stormwater runoff and effectiveness of SCM implemented since 2000 in subtropical climate in Brisbane in mimicking natural water cycle. Understanding the interaction of land surfaces in landscape including stormwater strategies, is critical for successful management of undesirable effects of stormwater in urban areas.