

### Redesigning streetscapes to protect streams and grow the urban forest

### Project C1.1: Street Trees

This project will investigate alternative designs for streetscape systems that retain runoff and support expansion of the urban forest.

Rapid development in Melbourne's growth areas will negatively impact waterways unless we radically change how we manage stormwater. Road catchments generate significant volumes of runoff which cannot be retained in the private realm. We suggest that streetscapes, including conventional drainage, can be redesigned to retain runoff. This can be achieved by creating storage for stormwater alongside and under roads, in combination with extensive street tree plantings.

Trees have significant potential to utilise runoff, if large storages can be created to detain runoff long enough for trees to access it. Trees are highly valued for the shade and cooling benefits they provide for communities. This has prompted organisations such as Greening the West (GTW), an initiative involving >20 local governments, water corporations and government agencies, to advocate for ambitious canopy cover targets for new developments ([greeningthewest.org.au](http://greeningthewest.org.au)).

In this project, we will develop and test innovative streetscape designs which maximise runoff reduction and support establishment of the urban forest in the west. Our previous work has shown that directing runoff to establishing trees can double growth rates (Grey et al., 2018).

We have also identified species, and more importantly, strategies that trees require to optimise runoff retention performance without jeopardising survival (Szota et al., 2018). We have demonstrated that simple kerb-cut inlets can capture runoff efficiently, but standard tree pits passively irrigated with runoff play a minor role in runoff reduction (Grey et al., In press). If we avoid complicated inlets and create large storages,

significant runoff reduction can be achieved (Szota et al., In review) and trees can utilise large volumes of water (Thom et al., In prep).

The ultimate aim of this project is to develop new streetscape designs and provide the guidance required for a radical shift away from how we conventionally build roads and associated drainage networks.

We plan to develop this project with the intention of submitting an ARC Linkage application in August, 2019. Therefore, in 2018/2019, we propose to scope the project, working with Greening the West to develop our designs and ideas. We will also develop linkages with colleagues from Engineering. The output of the proposed works will be an ARC Linkage proposal.

#### References:

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- Grey, V., Livesley, S.J., Fletcher, T.D., Szota, C., In press. Tree pits to help mitigate runoff in dense urban areas. *J Hydrol*.
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- Szota, C. et al., 2018. Tree water-use strategies to improve stormwater retention performance of biofiltration systems. *Water Res.*, 144: 285-295.
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