Sustainable Water Challenge 2006

Council: **Ku-ring-gai Council**

Project Title: **Urban Biodiversity - Normurra Avenue Street Tree Pits**

Project Category: **Landscaping**

Project Summary:

Urban development and biodiversity is usually not associated with one another. However, in an area like Ku-ring-gai where urban development is intercepted by creek lines and remnant bushland, a connection between the two is essential.

In line with the objectives of Council's newly adopted Biodiversity Strategy (May 2006) and second generation local catchment plans (2003-2006), Council is constructing a number of street tree bioretention pits within its local commercial centres. The first site is located in North Turramurra and is providing a working example of form, through integrating public art, and function via water quality and biodiversity outcomes.

Project Objectives:

Street trees can be designed to provide a small scale bioretention system in streetscapes where there is limited vegetation or landscaping for linear swales or larger scale rain gardens. This is particularly relevant for town centres where space is limited and hard stand areas dominate the landscape. In this example roof water and runoff from the road and pavement is diverted into the bioretention system for treatment prior to being discharged to the stormwater system.

The overall objective of the Normurra Street tree pit project is to help achieve the objectives of Council's Biodiversity Strategy (May 2006). The Strategy states that Council is to;

- Increase and enhance native vegetation along road sides
- Increase green corridors and biolinks
- Increase community awareness of the value of nature strip vegetation for biodiversity and amenity
- Pursue opportunities for strategic water quality and aquatic habitat enhancement and prevent / ameliorate urban impact such as runoff, pollutants and exotic plants.

The project objectives include:

1. Demonstration:

- Develop the first street tree bio-retention pit within the Ku-ring-gai area to inform and provide working example as part of the design process for the master planning for Council's 6 town centres

- Case study this type of technology as part of the implementation of Council's second generation stormwater plans that have identified the benefits of such an approach

2. Community and council partnerships;

- Build relationships with local shopping centre, and cross department (Open Space (trees and catchment), Technical Services (drainage and flooding) Community Services (public art)
- Integrate with Community via artworks being included in the design of the project, improving the aesthetics of the surrounding area

3. Water quality:

- Improve the quality of stormwater runoff by capturing water borne pollutants such as sediments, metals and hydrocarbons from stormwater flows through the street tree bioretention system.

4. Increase native vegetation:

- Link project to Councils long term commitment to street tree planting and re-establishing canopy levels to 1992 levels using native plants

A photo of a tree pit is shown in Plate 1.

Project Outcomes:

Environmental:

The tree pits capture runoff from the local road as well as roof runoff from the local shopping strip and runoff from a car park. The immediate catchment is 100% impervious.

Streets account for a significant proportion of water borne pollutants. The bioretention system will reduce the impact of pollutants such as sediments, metals and hydrocarbons that are generated by stormwater flow over streets that adversely impact on receiving waters and waterway health.

Tests will be carried out by Council to monitor the amount of silt being captured by the system as to maintain the effectiveness of the filtration system. Soil ph levels will be compared to the initial levels recorded to assess when replacement is needed so to increase the quality of the runoff storm water.

The native species will increase biodiversity in the local area, and will help Council achieve their targets in terms of bio corridors and canopy levels.

Technical:

The tree pits has been designed in accordance with the design shown in Drawing 1. Three different sizes of filtration media have been used for effective filtration and to prevent fine sediments from clogging the system.

The Street Tree Planter Bioretention Systems will:

- Reduce runoff volumes
- Capture pollutants before they reach sensitive downstream areas
- Provide an opportunity to implement artwork into the streetscape.
- Build on the bioretention examples of Council's Minnamurra Ave Street project as a 'next add on'.

Transferable:

Through the environmental levy Ku-ring-gai Council is undertaking a range of Water Sensitive Urban Design (WSUD) projects. This project has increased the capacity within Council to undertake similar projects and has helped to reduce concerns towards WSUD and in particular bioretention features in landscape and streetscape planning.

The use of compatible pavement types and public art in the design of the pits has assisted in personalising the project to fit in to the surrounding area and has show how new concepts can be successfully implemented in existing developments without adverse aesthetic impact.

Master plans for Council's town centres and sub-regional centres are currently being developed, and the lessons learnt from this project will inform the design of these centres.

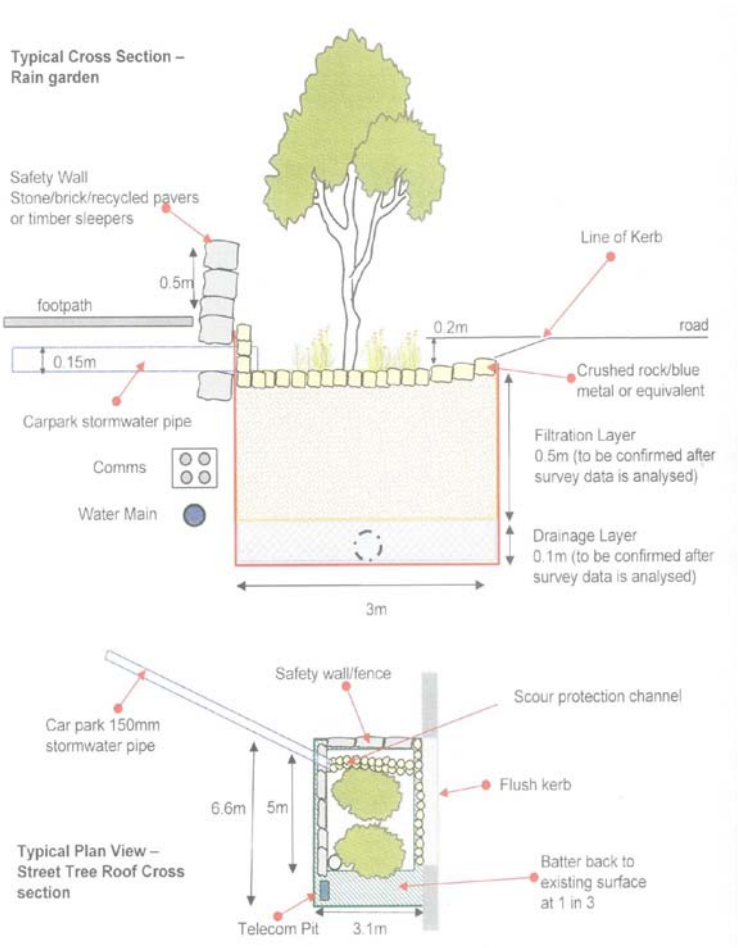
Difficulties Encountered

Very few problems were encountered during the planning and construction of the project. As WSUD systems are new to many professions, ongoing construction supervision to ensure that the intent of the design is carried through is important but this was not conceived as a problem.

Services need to be carefully delineated to ensure that the base of the bioretention system is not impacted by the location of these services. A design decision had to be taken on site at one stage, as a local water main was not located where originally anticipated. However, this did not have an impact on the function of the tree pits and was more of an aesthetic decision.

The work was delayed due to rain, as the empty pits filled up with water, but was otherwise carried out according to plan. Temporary protective measures during the building phase preserved the functional infrastructure of the system whilst also providing a temporary erosion and sediment control facility.

Plates and Drawings:



<u>Drawing 1</u> Street Tree Planter Bioretention System design

<u>Plate 1</u> Street Tree Planter Bioretention System, Normurra Avenue Water Sensitive Urban (art work not installed at time of photo)

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