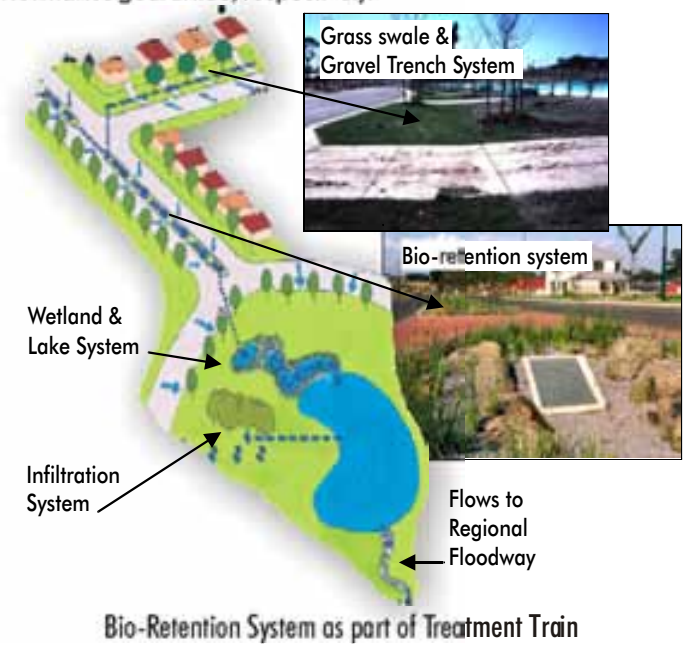
A Case Study in
*Water Sensitive Urban Design:
Lynbrook Estate, Melbourne, Australia

Lynbrook Estate is a green field residential development that incorporates Water Sensitive Urban Design (WSUD) principles at the streetscape and sub-catchment scale. The drainage system is designed to attenuate and treat stormwater flows for the protection of receiving waters.

Lynbrook lies approximately 35 km south-east of Melbourne in the city's major growth corridor. The project involves key stakeholders working collaboratively: the developer (Urban Land Corporation), the drainage authority (Melbourne Water Corporation), local government (City of Casey), a research and monitoring organisation (the {Cooperative Research Centre}CRC for Catchment Hydrology) and the developer's consultant team (KLM Development Consultants and Murphy Design Group). In this case, local government approved this demonstration project condition that the developer and drainage authority underwrote the maintenance contract and performance guarantee, respectively.



Bio-Retention System as part of Treatment Train

Planning and Design Features at Lynbrook Estate

The estate includes an 800 lot development (<55 ha) that incorporates the following WSUD / SuDS features:

- Grass swales and underground gravel trench system to collect, infiltrate, convey road run-off from local streets to main boulevard.
- Roof run-off is piped directly to the underground drainage system (grass swale overlying gravel trench in perforated pipe).
- The median strip incorporates a bio-retention system in main boulevard that collects, infiltrates, treats and conveys road run-off. There are no kerbs or gutters along the median strip.
- Secondary treatment of catchment run-off in a serpentine wetland system prior to discharging flows to ornamental lake.
- The infiltration system is gravity fed from the lake to ensure adequate water supply to remnant river red gums.

ACKNOWLEGDEMENTS: Chris Chesterfield, Caroline Carvahlo, Robin Allison, Melbourne Water Corporation

*Water Sensitive Urban Design (WSUD) offers sustainable solutions for integrating land development and the natural water cycle. SuDS are a component of WSUD. Source: Water Sensitive Design in the Australian Context, conference held 30th - 31st August 2000, Melbourne, Australia.

For further performance details, please refer to the following website: http://www.melbournewater.com.au/context/library/WSUD/case-studies/lynbrook.pdf

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Monitoring Cost:

The CRC for Catchment Hydrology has been engaged in a 3 year monitoring program to compare the performance between the WSUD infrastructure and conventional drainage design. The study is looking at the quantity and quality of run-off, as well as costs of construction, ongoing issues of maintenance and community acceptance of WSUD. The monitoring results to date indicate that the system is performing well: stormwater is draining smoothly through the system; the red gums are reviving and water is being filtered and is cleaner when it arrives at the end of the system before being discharged into the local waterway and to Port Phillip Bay.

Preliminary results of the CRC's assessment of pollutant removal performance has found that the system excludes all litter and can remove up to 80% of total phosphorus (TP), 60% of total nitrogen (TN) and 90% of total suspended solids (TSS) from the stormwater before it enters the drainage system. This removal rate betters the Urban Stormwater Best Practise Environment Management Guidelines (Water Storm Water Committee 1999), which require a reduction of TN 45%, TP 45% and TSS of 80%. Hydraulically, the system has also performed well under various conditions in line with its design requirements.

The cost of implementing a WSUD stormwater management scheme at Lynbrook was compared with a conventionally designed stormwater drainage system. The comparison shows a cost increase of 5% in the drainage component of the development. As the drainage works component represents only 10% of the overall land development cost, the incorporation of WSUD into the stormwater management system only increased the total development budget by approximately 0.5%.

Degree of Acceptance

The promotion of the aesthetic and environmental aspects of the development has added value to the development. This attracted buyers and sales performance increased from an initial 12 sales per month to 30+ sales per month as a result. Since the market response has been positive and the Urban and Regional Land Corporation now intends to implement

WSUD practices at other development sites. Three stages of the Lynbrook development have been constructed and a further 5 stages are approved for development. The staged approach to construction enabled progressive modification and improvements to the design of the stormwater conveyance system.

Lynbrook was the recipient of the Urban Development Institute of Australia Awards for Excellence in 2000 and in 2001 received the Cooperative Research Centres Association Technology Transfer Award.