

Blackmore Park Estate

Land use / development type	Scale
Residential	Precinct
Development	
Public open space	Precinct
Stormwater controls	Scale
Vegetated swales	Street
Raingardens	Street
Retention of native vegetation and land form	Precinct
Efficient use of water	Scale
Unirrigated park	Precinct
Waterwise landscaping	Precinct
Site conditions	
Soils	Class A: Sand and rock
Groundwater	>22 m
Slope	Average 1-2% up to 22%
Local government	Location
City of Wanneroo	Girrawheen

Blackmore Park Estate is a 4.1ha development situated on the former Blackmore Primary School site in Girrawheen. It comprises 70 residential lots ranging in size from 210sqm to over 500sqm.

The construction of Blackmore Park Estate has incorporated water sensitive urban design principles to deliver a fully integrated landscape and water management strategy that enhances the connection between people and the natural environment.

Effective management of stormwater quality and quantity is provided within the lots and streets to reduce impacts on open space. The development also successfully balances the demand for scheme and groundwater through limiting the need for irrigation and incorporating efficiency into the public and private realm.

Careful design and early planning ensured that the development could make the best use of existing natural systems and broadly maintain the original site topography and hydrology

and protect established trees. A total of 29 mature trees with sufficient root zones were identified early for retention by the developer.

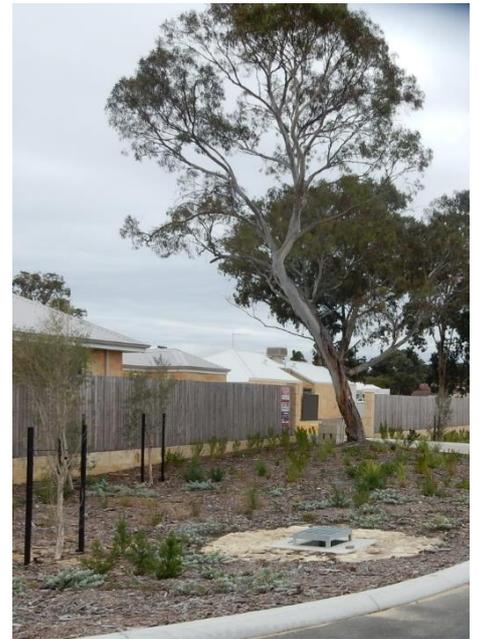
The landscape design provides open spaces for conservation and protection of the environment, passive recreation, enhanced amenity and integrated stormwater management. Master planning for the site identified two key areas of high quality vegetation to be retained as natural areas within the estate's public open space. Native species were planted as supporting understory in these areas to optimise habitat for local wildlife. All public open spaces and streetscapes utilise waterwise landscaping.

During construction, any felled trees were salvaged to provide the nature play equipment (hobbit houses and climbing poles) and mulch in the dry park. The design included the salvaging of grasstrees for landscaping in the public and private realm.

The stormwater management system comprises a combination of water quantity and quality elements that address the hydrological changes in the urbanised catchment. Due to the high infiltration capacity of the soils, all lots were able to retain runoff from major rainfall events on site. This significantly reduced the need for downstream flood storage and maximises groundwater recharge.

Stormwater runoff from roads and paving is managed in roadside swales and raingardens within the widened road verge. The base of these structures is layered with bio-retention media and planted with appropriate locally native species to assist with treatment of runoff from small rainfall events.

The 1% annual exceedance probability (AEP) event is managed via a swale to the south of the estate. The swale was turfed in keeping with the active recreation function of this area.



Key Project Features

- Existing native vegetation incorporated into road verges and public open spaces.
- Runoff from major rainfall events retained on residential lots via raingardens and soakwells. This maintains groundwater recharge.
- Effective management of erosion risk from steep road grades through addition of rock pitch in high risk areas.
- Vegetated swales and raingardens designed to treat the first 15mm of stormwater runoff from roads prior to infiltration.
- Landscape strategy generates habitat for birds and insects. Along with environmental benefits, Blackmore Park Estate has provided a place for passive recreation and educational opportunities for the community.
- Waterwise landscaping promoted to residents via incentives and implemented within public open space.

Development Costs¹

Roadside swales	\$ 1,950/m ²
Rock pitching	\$ 165/m ²
Flush kerbing	\$48/Lm

¹All costs are site-specific and are an approximation given for guidance purposes only

Issues

A pre-development vegetation survey identified 176 trees from the 29 locally native and exotic species. The development layout was modified in response to the vegetation survey, which retained 29 mature trees.

The sandy nature of the site means there is almost no surface runoff after a rain event, with the majority of stormwater infiltrating into the ground. Given the high permeability of the soils, the City agreed to manage lot runoff from major rainfall events through the use of soakwells.

Half the site manages runoff from roads up to the major rainfall event (1% AEP) in vegetated roadside swales. The City of Wanneroo agreed to manage up to the 20% AEP in raingardens for the other half of the site. Runoff from major rainfall events overflows to a large, grassed swale outside the development footprint in Blackmore Park, adjacent to the southern boundary. This demonstrates the most efficient use of land, effectively incorporating multiple uses into the neighbouring public open space.



Outcomes

Early engagement with the City of Wanneroo regarding the public realm and infrastructure design as well as the development layout was fundamental to the excellent outcomes achieved at Blackmore Park Estate. Water sensitive urban design features are evident throughout this development. These include:

Water Conservation

- Provision and installation of water efficient appliances and fixtures throughout the house through house and land packages.
- Waterwise landscaping packages for households.

- Dry park landscaping incorporated into public open space.

Stormwater Management

- Soakwells and swales capture and either infiltrate or discharge stormwater at predevelopment rates.
- All lots manage their own stormwater runoff up to the 1% AEP event on site.
- Raingardens and vegetated swales used to manage small, minor and major rainfall event runoff from roads.
- Runoff from major rainfall events directed safely to adjacent public open space via overland flow.

Ecosystem Protection

- Raingardens treat stormwater and improve the water quality prior to entering downstream ecosystems via groundwater.
- Households provided with information such as minimising lawn area and construction of Waterwise gardens.

Groundwater Management

- Pre-development groundwater recharge rates maintained through the use of stormwater infiltration systems.

Contact details for further information

City of Wanneroo	(08) 9407 1600
LandCorp	(08) 9482 7499
Porter Consulting Engineers	(08) 9315 9955

"Building waterwise community water saving initiatives will encourage residents to live more sustainably and reduce water wastage." – LandCorp