

The Future Of Water Sensitive Streets & Places: The Landscape Elements of WSUD

The vast amount of water caught every day within our streets, car parks and footpaths is an unrecognised resource going to waste. In a country facing increasing pressure on its dwindling water resources, we should be recycling and harvesting these lost waters of our urban systems. In the town centre of Toowoomba we calculated once that only 3% of the total surface area of the CBD was not either sealed up by pavements or built upon with structures. Vast areas of our towns are 'sealed up' without regard for recycling the water back into the land or its natural systems. In the meantime, we pay to water the remainder of the areas with drinkable water.

This talk focuses on how we can sustainably design the streets and footpaths which people desire in the new millennium. Our research and workshops with the broader community throughout Australia shows that there is an overwhelming desire for 'softer' streets which incorporate grass or vegetated swales and which minimise street widths and kerb and channelling. This is particularly strong in rural and semi-rural places, and calls for an immediate strong shift in the types of road and infrastructure systems being built for these places.

Changing the Paradigm

Until probably the last ten years, a culture created by professional barriers dictated that the driveable parts of our landscapes were exempt from being considered part of the natural systems, which they sat upon. With increasing collaboration across the design, environmental and engineering disciplines, we can see the emergence of a more holistic approach to streets and urban pavements. This is increasingly an environmentally led process, which seeks to link culture, nature and infrastructure into seamless and interactive ecological systems.

The basic building blocks of streets and places are thus being questioned and rebuilt:

- How should roads and drain systems look like to fit into their environments?
- How should a surface for driving or walking be? Can it be permeable?
- How should a road drain? Where should it drain?
- What edges should be made? What is the best edge for the intended road? Do you need a kerb or a channel?
- Where will water go? How far should it travel? How will it be absorbed and cleaned? How can it be recycled?

In my own work as a landscape architect and urban designer, asking these questions has led to a quiet revolution in the projects which I've planned.

How Should A Road Drain?

In the village of Scarborough in Redcliffe city, Queensland, we undertook a community-led scheme to retrofit the public esplanade and shopping area. An older population called for traffic calming as well as universal access through the village, and these goals merged with the desire to harvest and recycle stormwater. The 'creative village' project at Scarborough sought to do this in an artful manner, which would make it the creative hub of Redcliffe city.

The straight road alignment of the old esplanade has been meandered in order to slow vehicles and to create usable pockets of public space along the footpath. The street allows for lots of space for outdoor dining and shady sitting. Terrace sitting walls feature inbuilt recycled timber seats.

Kerbs have been removed from one half of the main streets, a radical move toward the future where access for the aged and disabled will become a crucial priority. Kerbs have been replaced by boulder barriers and customised concrete bollards specially designed for parallel and angled parking bay situations.

The street has become one of the first sustainable main streets in Queensland, utilising water recycling from roads to gardens, natural and soft stormwater systems with gravel filters, low maintenance endemic plants and low energy locally fabricated urban elements. Flush kerbs allow water from the carriageway to enter and absorb into a linked series of gardens. These act as a longitudinal filter along the road prior to water entering Moreton Bay.

These design initiatives at Scarborough show that it is possible to reconfigure the main street of an urban centre to incorporate water recycling. Roads can drain into natural systems and be designed to irrigate gardens, which in turn can clean the water as it passes through the landscape.

How Permeable Can A Place Be?

The 'sealing up' of the urban environment is a major cause of stress to the water, soil and plant systems underlying it. In a natural system, such as a rainforest, there is a continual flow of materials, energy and water. These flows create the necessary elements for a healthy, living place. How can we make developments open and permeable to such flows?

A recent inner city elderly housing project at Ryan Street, West End, Queensland, shows that even higher density living areas can be made to fit into natural systems. Twelve units for elderly aboriginal residents at the Jean Barnie Court have been planned into a 2000 m² site. The land is located on an underground spring, and this subsurface water flow has been incorporated into the design through placement of water absorbing gardens.

Whilst the outdoor areas around each unit are tight, we have sought to achieve linked overland stormwater systems which absorb and filter water through gardens and through permeable pavements for vehicles. The car park features drainage pavers, and water is harvested from hard areas throughout the site into dry creek-bed like corridors. This is part of a ground water strategy which captures emerging subsurface waters from the hillslope and recycles it to plant-supportive areas. Water sensitive urban design principles have been applied throughout the site, from establishment of water catchment landscape units, to the selection of plants and drip irrigation. With a strong environmental mandate, applied finishes are minimal and low-energy materials dominate. Fences are hardwood timbers stained with organic tung oil, and various areas too small for lawns are treated with decomposed granite.

Gardens are ideal mechanisms to absorb roof and surface water. When designed to incorporate swales and gravel sumps, as in the courtyards of Ryan Street, they can effectively replace piped stormwater in many situations. Gravel sumps (areas of deep permeable stones sitting along the line of stormwater flow and drainage) can be effectively used in tight urban situations to hold and slow water, to clean

and filter it, and to create water 'tanks' which can feed garden areas. Gravel paths and agricultural pipe can be incorporated into gardens to double-up as soft drainage corridors when there is little room available.

What can water be recycled for?

Current planning for an ecovillage in the Currumbin Valley of Gold Coast City shows that the entire layout of a development can be built around the notion of recycling.

In the Landmatters Ecovillage, narrow village lanes with grass swales will recycle water into food production areas. Linear corridors of fruit and nut orchard trees will be planted adjacent to swales, to re-use the water in a proactive manner. Water from the roofs of homes will be recycled into gardens and localised agricultural plots. Wastewater will be treated in the village and then recycled to irrigate larger agricultural areas and orchards along the lanes. At the same time, water will be stored in tanks throughout the site to provide drinking water and fire management water. The system will recycle all types of water in the village, enabling Landmatters Ecovillage to be independent of normal council water supply.

This type of strategy is the future of water sensitive streets and places – to design places that re-use their resources and materials so effectively that they can be self-sufficient. This effectively closes the ecological loop, enabling the flow of water to stay within the site and recirculate as it passes through the landscape and living areas.

What should water sensitive places look like?

We have brainstormed the question of retaining rural character with hundreds of residents throughout Australia, including communities in the Central Coast of Tasmania, the Atherton Tablelands and throughout South-East Queensland.

There is an unequivocal and consistent call through these places to build infrastructure which is not 'urban' or 'suburban' in character. People are passionate about the natural qualities of rural living, and are dissatisfied with the current design standards for new streets, subdivisions and drainage systems. These new systems, whilst being effective and safe, are destroying the very qualities which people sought in these rural areas.

The suburban set of development rules and characteristics are being comprehensively rejected, and in time this will be reflected in the development market. What then are the things that people really want in their rural living places?

In the beautiful valley of Cedar Creek in Pine Rivers Shire north of Brisbane, a small rural estate called Massey's Court is being designed which shows the key elements which are part of the re-emergence of rural quality in subdivision design. A small lane leading to nine rural lots is part of a current staged application. This lane has been site designed and pegged to minimize cut and fill and to channel water into soft-grassed swales and dry creek beds. The lane will be as narrow as possible to enable two cars to pass, and there will be no kerb and channelling. The edges of the lanes will be thickened with asphalt to prevent edge erosion, in a simple solution to the traditional argument about needing kerbs to hold up the lane edges.

People don't want to see a kerb or a channel in these rural settings. In fact, all infrastructure should be subtle and rural in character: people for example don't want street lights or a plethora of traffic devices and signs. We have an obligation to design rural and water sensitive alternatives to the current suburban model, which is only suited to the urbanised realm.

Conclusion

Roads and pavements in all places need to be considered as part of an overall ecological system. Water recycling is a critical part of retaining the balance of natural landscapes, and to achieve it requires current suburban engineering and design standards to be retrofitted. The most urgent need is for contemporary water sensitive streets and places which are relevant and suited in character to the vast number of rural and semi-rural landscapes. These areas urgently require different rules and designs before they lose their rural amenity in the process of accommodating growth and change.

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