

Architecture's role in the repair of the natural environment

Louise Wright and Mauro Baracco



Cover image. Street interface, Prince Alfred Park and Pool by Neeson Murcutt Architects with Sue Barnsley Design Landscape Architecture (Image: Brett Boardman)

Abstract

Through the theme *Repair*, diverse approaches to the repair of environmental, social and cultural issues were presented at the Australian Pavilion for the 2018 Venice Architecture Biennale. This paper discusses three of the exhibited projects, demonstrating how architecture can engage with the environment across multiple scales to effect repair of the places it is part of. Through these projects a shift of design focus in primary decision making is proposed to include the relationship to ecosystems across both small and large scales.

Background

Parts of this paper were initially developed to accompany the exhibition *Repair*, the theme presented by the Creative Directors Mauro Baracco and Louise Wright in collaboration with Linda Tegg, by the Australian Institute of Architects for the Australian Pavilion at the 16th International Architecture Exhibition of La Biennale di Venezia.

The Biennale is a forum where many countries present the interests and issues facing their architectural culture. The overall theme of the Biennale, *Freespace*, set by curators Yvonne Farrell and Shelley McNamara (Farrell & McNamara, 2017), sought the affirmation of the role of architecture, what it has to offer and what it is capable of (ArchitectureAU, 2017). Responding to this theme, *Repair* aimed to expand the point of view from the object of architecture, to the way it operates in its context, advocating a role for architecture that catalyses or actively engages with the repair of the places it is part of: the soil, hydrology, habitat, connections, microorganisms and vegetation. This type of repair is central to enacting other types of repair: urban health, social, economic and cultural among others.

In this context, the injury to be repaired is the natural environment. Given the extensive need for the repair of Australia's natural environment and that Australian architects work in one of the most ecologically diverse countries in the world, this approach should be an important part of our wider architectural culture.

Repair presented 15 projects that are examples of diverse types of repair, including projects that directly engaged with environmental restoration – which isn't about restoring to some pre-European condition, but aims to repair ecological processes which sometimes involves the inclusion of new elements as well as adaptation. Several projects also aimed to improve Indigenous services and presence and provide for cultural practice. Of the 126 submissions received through an open call, 26 were situated in or involved participation with Indigenous communities.

With the assistance of wider creative team member, Paul Memmott, and his colleagues Carroll Go-Sam and Reuben Berg, a selection of these projects was presented and while they couldn't reflect the totality of complex and comprehensive issues facing Australia in this need for repair, they indicated a range of approaches.

The exhibited projects contain subtle shifts and developments in approach, form and relationships. Repair doesn't require a completely new way of thinking. In fact, many projects, both historical and contemporary, work in the ways we describe, and the projects described here are just a selection.

The projects reassert and validate the power of design decisions to be inclusive, complex, nuanced, strategic and meaningful beyond their initial brief

When the lens of repair is applied, these opportunities are revealed and advocate a renewed or validated relevance and role for architecture to expand from the object of architecture, to the way it operates in its context.

The role for architecture

Putting one's finger on how architecture, at the level of a building, can repair the natural environment is difficult. Unlike landscape architecture, a building is limited in being able to directly repair the environment in the ways suggested. We have focused on the fact that architecture takes up land. A statement so obvious it should go without saying – and yet in order to consider the consequences and potential of architecture in relation to repair, we need to focus on this elemental fact.

When considering architecture in this way, at least two factors can be identified that are critical to the involvement of architecture in the repair of the natural environment: a shift in process of how buildings are conceived and primary attention given to the ground plane in decision making.

Both of these factors require consideration at a micro and macro scale.

The shift in process we propose is to include the study of micro and macro conditions of natural systems and to identify opportunities and strategies for repair at design commencement, allowing this process to inform formal decision making (form making). This would require architects to widen their knowledge base to include the domains of landscape architecture, urban design, urban ecology and land management. Rather than architects becoming all things, these disciplines can excitingly meet, converge and influence each other.

The formal decisions that could be affected are numerous. Examples are listed below in relation to the ground. The ground connects ecologies and sustains life. Attention to the ground includes:

- Avoiding clearance of remnant vegetation
- Reuse of existing buildings
- Primary decision making/advocacy/agency on whether buildings should ethically be situated in certain environments at all, due to the incompatibility of their presence and occupation with the health of that ecosystem
- Building form that allows for dynamic natural systems (eg floods, sand dunes, habitat movement) to evolve, such as through a small or elevated footprint that creates minimal impact on the ground plane
- Avoiding 'cutting' (such as flattening land forms for example) or sealing (concreting over) the soil
- Positioning the building/built elements to allow connection to adjoining open space and beyond
- Long-term strategies that might include architecture that can be relocated or removed
- Allowing water to move across the site, potentially filtered through vegetation
- Stopping sediment runoff
- Provision of adequate and proportionally correct open space for canopy trees (and linking canopy trees)
- The reinstatement of natural systems, wherever possible, such as wetlands, indigenous vegetation and watercourses
- Where the building sits on a site, so that it can allow, or at least not hinder, an integration with the repair to be enacted.

These strategies are applicable to all built conditions from peri-urban to dense urban areas. If applied to the public realm of our cities – some 45 per cent in the local government area of Melbourne (City of Melbourne, 2017) – the connectivity and use on private land of these approaches would be more effective.

Through discussion in the following section of 3 of the 15 projects exhibited – *Grassland Common*, *Glebe4: The Foreshore Walk* and *Prince Alfred Park and Pool* – ways that design can engage with the repair of the natural environment, and wider types of repair, are proposed. *Grassland Common* is an unbuilt proposal, that can afford to think through repair without time and commercial constraints that often form a barrier to repair; *Glebe4: The Foreshore Walk* connects natural systems and urban environments through landscape modes and scales; and *Prince Alfred Park and Pool* demonstrates a range of decisions on a smaller urban site that straddle architectural and landscape design methods to effect repair of the natural and urban environment. All three propose an expansion or strengthening of the natural environment as a meaningful and enduring framework for repair.

Projects

Grassland Common, d____Lab. RMIT University



Figure 1. View of Melbourne CBD skyline from the grasslands of the northern growth corridor. This image is taken from the site of Grassland Common, currently being developed and further cleared. Much of this grassland would have extended into the area where Melbourne now sits (Image: Linda Tegg)

Recent urban expansion projects in Melbourne's northern growth corridor (Figure 1) have resulted in the clearing of extensive areas of native grasslands despite temperate grasslands being the most threatened ecosystem in Australia (Greening Australia, n.d.). This area is characterised by large areas of plains grasslands and grassy woodlands, interspersed with agricultural land and volcanic hills from the top of Craigieburn to the south edge of Wallan, along the Merri Creek north catchment area.

This unbuilt project proposes a visionary alternative to low density housing estates that are laid across the landscape of this area and generally also found in peri-urban development sites on the fringe of Australian cities. It explores the possibility of development coexisting as part of a healthy ecosystem, integrating the new built spaces with a shared public 'grassland common' that is kept free from building footprint by concentrating the construction along arterial existing arterial roads (Figure 2).

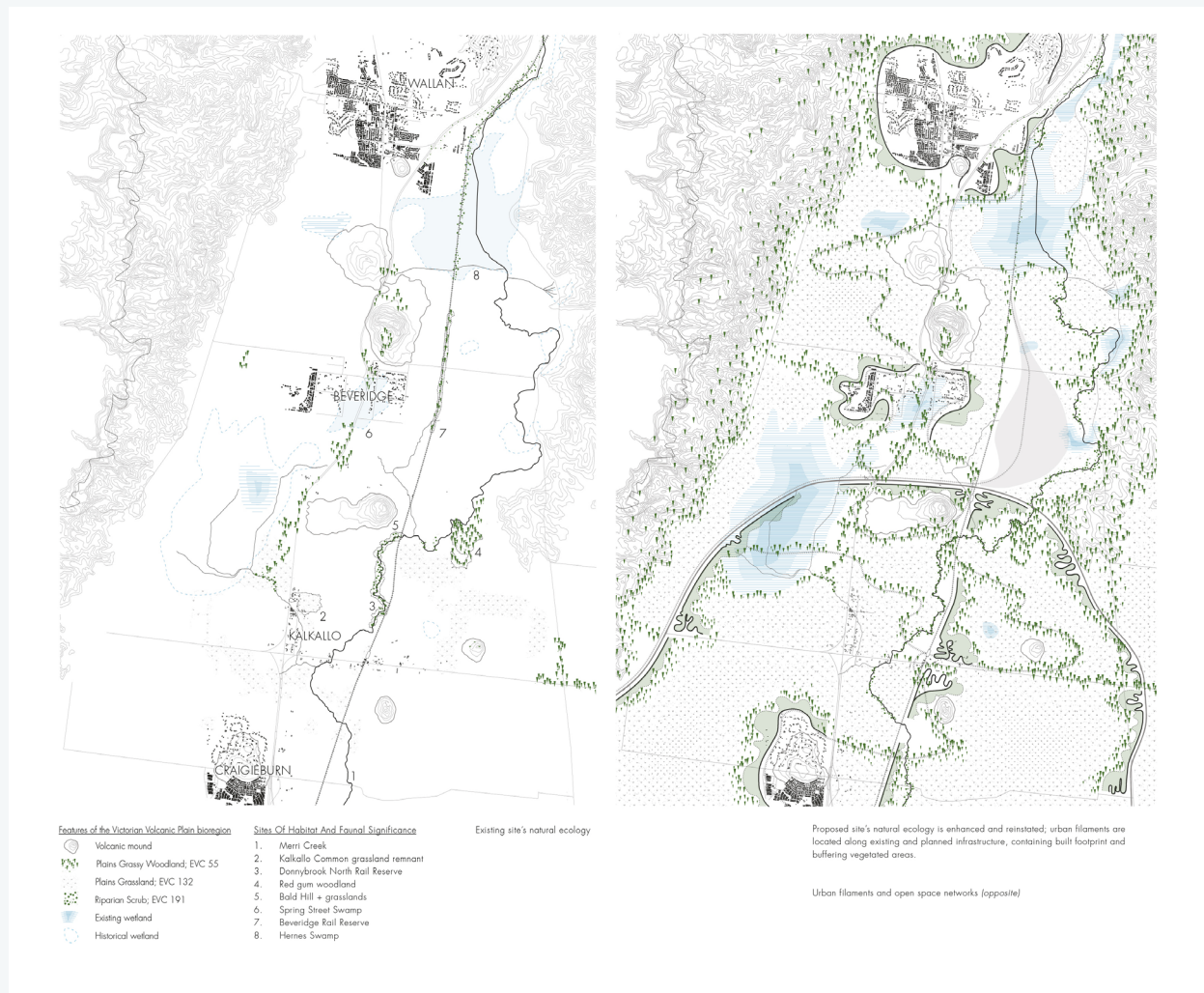


Figure 2. Plan showing existing (LHS) and proposed (RHS). The existing landscape is mapped, the new proposal working along future (by others) arterial roads to contain road networks and built footprint and maximise the existing landscape and its connectivity [Source: d___Lab. RMIT University 2015]

Development is often seen as incompatible with the natural environment which is usually cleared, flattened and destroyed during the development process. 'Offsetting', a policy allowing the conservation of another similar area of vegetation as a trade-off for a cleared area, is often used to justify the clearing of land on the urban fringes of metropolitan areas as well as more remote bushland for agriculture. Land clearing continues to be a source of destruction of Australia's environment. Figures released in October 2017 showed a 33 per cent rise in clearing in Queensland to almost 400,000 hectares in 2015-16, 35 per cent of which was of remnant bushland (Robertson, 2017). Queensland now equals two-thirds the annual rate of deforestation in the Brazilian Amazon (Robertson, 2017).

Principles explored in the design were:

- Working with the ecological foundations of the site
- Recognition of natural systems and processes as primary conditioning factors of urban/architectural/landscape/infrastructural design
- Reduction of urban sprawl and consolidation of the urban footprint within contained areas, inclusive of all infrastructural and 'hard' urban services to areas along existing main arterial roads
- Buffer zones between the buildings and grassland areas so that they can be burnt as part of their ecological management (Baracco et al 2015).

Historical and current vegetation mapping revealed a unique opportunity for the site to enhance ecological connectivity between important areas in the east and west. At a local scale, remnant patches of grasslands and grassy woodlands can be connected through habitat restoration. More broadly, the site may also provide a green corridor between Kinglake and Mount Macedon, as Merri Creek provides an existing green connection between the established northern suburbs of Melbourne and the Great Dividing Range to the north. The area is home to numerous native species, including the threatened Growling Grass Frog and iconic River Red Gum (*Eucalyptus camaldulensis*).

The ecological values of the site are addressed by applying principles described as Biodiversity Sensitive Urban Design (Garrard & Bekessy, 2015; Baracco et al 2015) which aim to create urban environments that are a net positive for biodiversity, while also meeting needs of development. Large, connected areas of plains grasslands and plains grassy woodlands provide important habitats for the Golden Sun Moth and Striped Legless Lizard, which are nationally threatened species. A series of well-connected wetlands and large buffer zones between the Merri Creek and built areas will benefit the Growling Grass Frog and other endemic fauna species. The dispersal of native species is facilitated by mitigating major barriers to movement, such as roads, in natural areas, and connecting high value remnants to the east and west. The minimisation of disturbance is achieved by the concentration of the built form and reduced noise from less reliance on roads. The minimal footprint also reduces the amount of runoff from the site, while the compact design of the built form accommodates the

need for fire in the landscape facilitating natural processes to renew and generate growth.

The urban and architectural resolutions of the approach are based on the following principles (Figures 3, 4, 5 and 6):

- New built volumes as 'filaments' along existing and/or planned infrastructure, benefiting from adjacency to services and circulation, as well as minimising and containing new footprints, with a narrow cross-section and raised from the ground (Figures 3 and 4)
- Vegetated berms accommodating services – pipelines, ducts, private carparks – and buffering residential buildings from the highway (Figures 2, 3 and 4)
- New built semi-public areas, buffered from but, relating to the public 'grassland common' consisting of a mix of integrated programs including residential, work, social, entertainment, commercial, educational, sport, institutional activities and green house farming spaces (Figures 3 and 4)
- Flexibility in apartment layout to enable potential growth in stages within the original footprint – apartments are masterplanned to shift over time from one to two and three bedrooms (Figure 5).

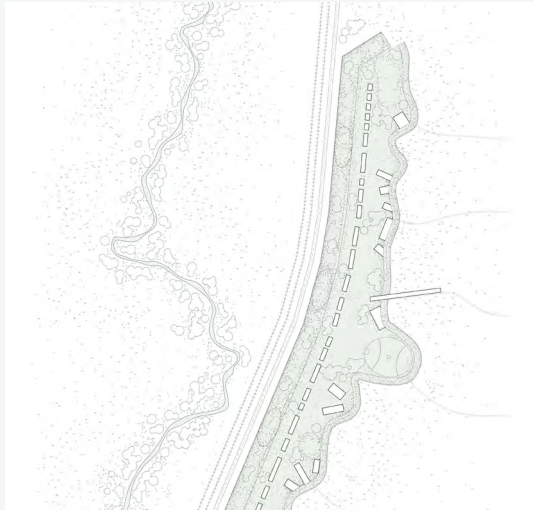


Figure 3. Plan detail of 'filament' footprint along arterial road and vegetated berm toward grassland (Source: d___Lab. RMIT University, 2015)



Figure 4. Section view showing services located to the road edge, 'filament' building form and mixed use external spaces buffered from grassland by landscape berm (Source: d___Lab. RMIT University, 2015)



Figure 5. Plan of the apartments changing over time from one to three bedrooms within the original footprint (Source: d___Lab. RMIT University, 2015)



Figure 6. Illustration of the urban vision showing filament buildings along arterial roads (Source: d___Lab. RMIT University, 2015)

In determining development objectives for the site, guidance was taken from RMIT research reports, which suggest that infill development in Melbourne's existing suburbs could accommodate 41 per cent of the projected growth area dwelling targets (Buxton, Phelan & Hurley, 2015). Approximately 20,000 new dwellings are accommodated in the urban filaments of the Grassland Common project – higher yield could be achieved by increasing density at key points along the filaments, such as service and transport hubs. This compares with a business-as-usual development such as 'Cloverton', which almost blankets the landscape with low density detached single family houses accommodating 11,000 new dwellings (Stockland, n.d.). The design of 'Cloverton' covers around half the of the proposed restoration area of Grassland Common (114 acres in and around Kalkallo), providing limited conservation of the local ecology and less dwellings.

Glebe4: The Foreshore Walk, James Mather Delaney design



Figure 7. Aerial view of layered coastal edge consisting of new path and vegetation, historic sandstone and new sandy beaches (Image: Linda Tegg)

The *Glebe4* project includes four elements of a regenerated site in inner west Sydney: *The Foreshore Walk* by James Mather Delaney design; *Jubilee Park*, *The Crescent* and the new open space at Harold Park with heritage adaptation of the *Grandstand* and *Bellevue Villa* by Lacoste Stevenson Architects and Tonkin Zulaikha Greer Architects (shelters).

The four interconnected projects delivered for the client, the City of Sydney, over 13 years, have returned the foreshore of Glebe to the public; achieving recreational, environmental, urban and heritage outcomes by knitting together disparate open spaces, restoring existing parkland and providing a significant new park. Combined, these form the western most segment of the City of Sydney's planned harbour foreshore walk from Woolloomooloo to Rozelle.

The Foreshore Walk element operates along the coastal edge (Figure 7), a highly urbanised precinct that was locked away from public access for more than a century. The project repaired industrial land and reclaimed harbour areas in multiple ways by:

- Regenerating foreshore brownfield areas and archeological sites
- Introducing a clear circulation network for pedestrians and cyclists
- Establishing mangroves and intertidal habitats on an area of reclaimed land
- Building a new beach and water stairs for access and small boat launching
- Creating a generous foreshore walk that preserves existing fabric and anticipates sea level rise
- Providing terrestrial habitat
- Building on-site stormwater treatment.

The coastal edge repair project reflects the type of repair project required in many urban and post-industrial sites in Australia. Sydney Harbour foreshore has suffered privatisation, industrialisation and reclamation for over 200 years. This new and dynamic edge mitigates the negative effects of this history, to reconnect to a broader landscape and systems.



Figure 8. Aerial view of mature replanted fig tree, new path and sea stairs (Image: Linda Tegg)

Through *The Foreshore Walk* in particular, many sites are regenerated, ranging from the micro scale (Figure 8) such as small areas of tidal inundation that have allowed salt marsh to flourish, to the macro scale of the precinct with its streets, buildings and infrastructure. Various ecosystems, stormwater infrastructure and circulation networks were patched, repaired, infilled and reconnected – largely through the built fabric of the extended area. Flooding issues were contained and turned into habitat opportunity, soils were remediated, walls were repaired, cliffs stabilised, and contamination capped and contained. Water stairs were introduced where sand naturally accumulates (Figures 9 and 10), walls deflect to make way for existing trees, and resting spots and material variations are located where the sea wall changes direction, construction technique or form.



Figure 9. Detail sandstone edge (Image: Linda Tegg)



Figure 10. Side view of mature replanted fig tree, new path and sea stairs (Image: Linda Tegg)

The existing site materiality that has built up over time is kept with new layers added allowing the historical stratification to remain. Path orientations, junctions and changes in direction are designed to draw attention to the rich variety of micro detail, whether sandstone rock shelves below the high tide mark, remnants of industrial concrete, or the cliff and its repair. Where a new seawall was required and there was no option but to use a vertical wall, the precast units were designed with shelves and recesses to trap water between tides to encourage colonisation by marine life.

Providing the only artificial mangrove environment in Sydney Harbour, the project builds and restores marine intertidal and terrestrial habitats to connect with larger systems including harbour and foreshore areas, riparian zones and sea level change. Plants are grown from local seeds in a community nursery connecting at the social scale and at the Sydney Basin Flora scale ensuring genetic diversity. Stormwater at the catchment level was addressed through a variety of measures to clean water and control flood paths while generating public space. Mature fig trees were lifted from toxic soils and replanted, site excavated sandstone was crushed to make soils for autochthonous species grown by the community nursery and shallow gradients were reintroduced to the intertidal zones to build habitats.

New sea stairs provide access to previously inaccessible small beaches. A new beach was built that allows small boat and canoe launching, bringing back a diversity of craft to a harbour dominated by large motorboats. Industrial heritage was repaired and valued, stormwater was cleaned using rain gardens, and terrestrial habitats were repaired by the introduction of shrub layers to allow for small birds, animals and plants.

The project connects physically to the broad scale site outside its boundary including various areas and ecosystems: Sydney Harbour and its ecology, tidal range, mud flats, mangroves and foreshore; the freshwater system of Johnstons Creek and the urban stormwater infrastructure with its nineteenth century canals; the terrestrial ecology of sandstone and clay with its endemic species and small birds; the nineteenth century industrial landscape and urban form of the suburbs of Glebe and Annandale; and the surrounding recreational and social open space network.

The project provides paths, cycle routes and hitherto missing connections to streets encouraging walking to promote health and wellbeing, creating a diversity of transport options and allowing the system to operate more legibly. At an urban scale this project responds to the increased need for connectivity between open space and the urban fabric.

Prince Alfred Park and Pool, Neeson Murcutt Architects with Sue Barnsley Design Landscape Architecture



Figure 11. Aerial view showing pool surrounds knitting into park (Image: Brett Boardman)

Located at the edge of central Sydney, the project was part of the reinvigoration plan of an underutilised area of 7.5 hectares in Prince Alfred Park – it contributed to this by upgrading the public pool and addressing its relationship to the park and street. The overriding design principle preferred landscape over built form to activate and make public open space in all its interfaces, rather than to produce a building ‘in’ a park.

The visual and physical opening up of the park was enabled by the removal of the 1950s pool building from the middle of the park, while the existing pool was renovated. This opening up of the park created a new spatial quality and enabled a more vital ecology that connects the pool’s perimeter to the wider park, bounding streets and local waterways (Figure 11).

The site belongs to a series of urban systems – a collection of public open spaces, public pools and different recreational typologies including playgrounds, pedestrian and cycle pathways, and sport infrastructure. It sits within a greater water catchment that extends up to Surry Hills and Redfern, and down to Blackwattle Bay – the site of *The Foreshore Walk* project in Glebe.

Site-wide stormwater management was redesigned with capture from the upper catchment for irrigation of the adjacent playing field and pool lawns, while bio-retention swales filter and cleanse the reduced flows to the harbour. New trees and an extensive understorey landscape have restored and recalibrated the experience and health of the urban ecology of the park, the layered strata protecting mature trees from compaction and providing habitat. It is a sectional site – with canopy, ground plane and an important subterranean dimension.

The new 1000 square metre pool building is conceived as a folded ground plane with a green roof of native 'meadow' (Cover image and Figure 12) grasses that connect to the surrounding park and the memory of both the former landscape and Cleveland Paddocks. In the spatial urban realm, the green roof is more street infrastructure, or an extension of the ground plane and park, than a roof, and it is only once one enters the pool that its role as a roof is revealed: a 2320 square metre biotic surface topped with 35,917 plants, continually transpiring, oxygenating, cooling and humidifying the site, sequestering carbon and insulating the rooms below, as well as being an urban habitat for birds and insects.

The roof 'meadow' creates biodiversity with five varieties of indigenous wildflowers and grasses including kidney weed (*Dichondra repens*), short-hair plume grass (*Dichelachne micrantha*), lavender grass (*Eragrostis elongata*), common tussock grass (*Poa labillardieri*), and bluebells (*Wahlenbergia spp*) – a small grassland herb first seen when the lawn was left unmown around the old pool. To ensure the long-term viability of this constructed landscape, soil scientists SESL designed a lightweight growing mix for these conditions and the grassland specialists Australian Wetlands Consulting supervised installation of the plants.



Figure 12. Detail of grass 'meadow' (Image: Linda Tegg)

The building, 6 metres deep x 120 metres long, is intimate yet monumental, scaled to both the swimmer and the city. Two shaped landscape mounds made from contaminated fill, define the outdoor pool enclosure, simultaneously connecting and separating park and pool, while a ribbon-like fence secures the site, weaving across the topography to come in and out of view.

The landscape roof conceals the presence of Chalmers Street (Figure 13) with its busy traffic from the actual pool, while also creating a generous streetscape for the pedestrian (Figures 14 and 15). The roof and grassy mounds soundproof the pool from the road, park and railway, and buffer winds, giving it an otherworldly atmosphere.



Figure 13. View from vegetated roof toward concealed pool (Image: Linda Tegg)



Figure 14. View from footpath within park (Image: Linda Tegg)



Figure 15. Street interface to Chalmers St (Image: Linda Tegg)

This project has positively impacted on social sustainability, local community and wellbeing. Prince Alfred Park was underutilised and perceived as dangerous, with a degree of criminal activity – a place to be avoided. It is now a popular, accessible and safe year-round destination that also improves access to Central Station, encouraging visitors not only from the surrounding suburbs but also from the growth areas south of the city.

Application of strategies

Many of the strategies employed in these projects could be used on dense urban sites. Our urban areas are connected to larger natural systems, often in proximity to a major waterway. For instance, *Glebe4: The Foreshore Walk* and *Prince Alfred Park Pool*, both in the urban inner west of Sydney, have stormwater and overland flows that run into Blackwattle Bay.

In response to urban stormwater, storm events and flooding, 'the problems created by an overabundance of untreated stormwater from urban areas require an ambitious 'water sensitive retrofitting' of the entire urban landscape' (Macmillan 2011). Some of these approaches are already being implemented in urban settings (see City of Melbourne *Nature in the City Strategy*, 2017 and Melbourne Water *Stormwater Strategy*, 2013 among others).

Rethinking how such approaches could work requires an understanding of the presence and role of natural systems in urban settings. The biodiversity value of small (sometimes remnant) isolated fragments of bushland, interspersed and surrounding our urbanised areas, is often questioned as isolated and unsustainable and therefore considered not of value. In Victoria, several local councils map such remnant vegetation (City of Yarra [Biosis Research, 2001] and City of Melbourne, 2017). Their value, as well as that of other vegetation in urban environments is entering a new phase of re-evaluation through the science of urban ecology, a recognition that urban densification and the physical and mental health of urban inhabitants rely on amenity – largely provided through open and vegetated space (Hahs, 2017; Threlfall et al, 2017).

Scientists and academics Mark McDonnell and Kelly Holland suggest that the preservation, restoration and ecologically sound management of urban biodiversity is crucial to the maintenance of global and regional biodiversity

'Typically, the preservation of biodiversity in urban environments requires the preservation of open space and remnant plant communities, but gardens, roadside and riparian strips can also provide valuable habitat for indigenous organisms...Loss of native habitat can be minimised during urban planning by reducing low-density sprawl and maintaining green spaces and habitat corridors...The "matrix" in urban areas can also be enhanced to provide additional habitat and linkages between remnants for a wider variety of species in parks, dead trees and understorey vegetation.'
(McDonnell & Holland, 2008).

Sites of environmental repair can become places that ameliorate the effect of urban processes on the wider natural environment and become meaningful frameworks for the development of our cities.

Conclusion

The three *Repair* projects discussed demonstrate a shift in the process of how buildings are conceived, where decisions of form and siting have been influenced by natural connections within and beyond the site boundary, such as soil health, water quality, restoration of vegetation and above all primary attention to the ground plane.

The projects negotiate the small scale while also forming connections or relationships to large scale natural systems such as waterways, plant communities and vegetated corridors; contributing to the large-scale reparation of land, waterways and oceans, the medium scale of natural systems such as creeks and local habitats found in peri-urban areas, and the small scale of suburban and urban spaces required in Australia. They indicate multiple ways forward including decisions that enable vegetated space or not, seal the ground or not, join or isolate open space, work with stormwater and overland flow, retain a site's hydrology, retain or improve soil health and create habitat. These fundamental decisions can be at the core of a built environment's framework and its effect on microorganisms, local ecologies and by extension larger natural systems.

Engagement with natural systems to inform primary decision making in the built environment requires a shift of perspective in design approach – a readjustment in conceiving architecture as an object within space to the way 'it' relates and operates in its context.

References

- ArchitectureAU, 2017, 'Theme revealed for 2018 Venice Architecture Biennale', accessed 15 June 2017, <https://architectureau.com/articles/theme-revealed-for-2018-venice-architecture-biennale/>
- Baracco, M, Bekessy, S, Garrard, G, Ednie-Brown, P and Amati, M 2015, *Linking Ecology and Architecture*, RMIT University, Melbourne, Victoria, Australia.
- Biosis Research 2001, *Incorporated Document to the Yarra Planning Scheme: Local Policy 'Protection of Biodiversity' - Sites of Remnant Vegetation*, accessed 01 November 2018, <https://www.yarracity.vic.gov.au/-/media/files/the-area/yarras-future/incorporated-documents/map-sites-of-remnant-vegetation.pdf?>
- Buxton M, Phelan K and Hurley J 2015, *Melbourne at 8 Million: Matching Land Supply to Dwelling Demand*, RMIT University, Centre for Urban Research, September, accessed 10 November 2015, <http://cur.org.au/project/melbourne-8-million-matching-land-supply-dwelling-demand/>
- City of Melbourne 2017, *Nature In The City: Thriving Biodiversity And Healthy Ecosystems*, accessed 10 September 2018 <https://www.melbourne.vic.gov.au/community/parks-open-spaces/urban-nature/pages/nature-in-the-city-strategy.aspx>
- Farrell, Y and McNamara, S 2017, '16th International Architecture Exhibition, Biennale Architettura 2018, Freespace', *La Biennale di Venezia*, accessed 15 June 2017, www.labiennale.org/en/architecture/2018/16th-international-architecture-exhibition
- Garrard, G and Bekessy, S 2015, *Biodiversity Sensitive Urban Design: Creating urban environments that are good for people and good for nature*, RMIT University, Centre for Urban Research and The Meyer Foundation, Melbourne, accessed 24 February 2018, https://ggarrardresearch.files.wordpress.com/2012/11/bsud-final_reduced-size2.pdf
- Greening Australia n.d. 'Great Southern Landscapes: Victorian Volcanic Plains', *Greening Australia*, viewed 20 January 2018, <https://www.greeningaustralia.org.au/projects/victorian-volcanic-plains/>
- Hahs, A K, 2017, 'Soft cities: Making room for nature in our urban future', *Foreground*, accessed 20 April 2017, <https://www.foreground.com.au/environment/biodiversity-in-our-urban-future>
- McDonnell, M Holland, K, 'Biodiversity', in Peter W Newton (ed.), *Transitions: Pathways Towards Sustainable Urban Developments in Australia*, CSIRO Publishing, Collingwood, VIC, Australia, 2008
- Melbourne Water, 2013, *Stormwater Strategy: A Melbourne Water strategy for managing rural and urban runoff*, November 2013, accessed 10 September 2018, https://www.melbournewater.com.au/sites/default/files/2017-10/Stormwater-strategy_0.pdf
- Merri Creek Management Committee, 2009, 'Water Quality and Stream Health', in *Merri Creek and Environs Strategy 2009-2014*, Merri Creek Management Committee, East Brunswick, Melbourne, Australia, May 2009, as quoted in Macmillan, L, 2011, 'Merri Creek', in Mauro Baracco (ed.), *Tree Sprawl*, School of Architecture and Design, RMIT University, Melbourne, Australia
- Robertson J, 2017, 'Alarming' rise in Queensland tree clearing as 400,000 hectares stripped', *The Guardian*, accessed 05 October 2017 <https://www.theguardian.com/environment/2017/oct/05/alarming-rise-in-queensland-tree-clearing-as-400000-hectares-stripped>
- Threlfall, C, Mata, L, Mackie, J, Hahs, A, Stork, N, Williams, N and Livesley, S, 2017, 'Increasing biodiversity in urban green spaces through simple vegetation interventions', *Journal of Applied Ecology*, 2017, accessed 08 January 2018, <https://besjournals.onlinelibrary.wiley.com/doi/abs/10.1111/1365-2664.12876>
- Stockland, n.d., 'Cloverton', accessed 16 July 2018 <https://www.stockland.com.au/residential/vic/cloverton/life-at-cloverton>

About the Authors

Louise Wright

B. Interior Design (Hons) University of Technology
Sydney

B. Architecture (Hons) RMIT University

PhD Architecture, RMIT University

Louise Wright is a director of Baracco+Wright
Architects, founded in 2004 with Mauro Baracco.

Mauro Baracco

Associate Professor, School of Architecture and
Design, RMIT University, Melbourne, Australia

B. Architecture (Hons), Turin Polytechnic

PhD, Architecture, RMIT

Mauro Baracco is a practicing architect and a
director of Baracco+Wright Architects. He has a
PhD in Architecture from and is also an Associate
Professor at RMIT University in the School of
Architecture and Design, Melbourne, Australia
where he was the Deputy Dean of Landscape
Architecture (2013-15).

Baracco+Wright Architects

Baracco+Wright combine the academic and
practice world and are shifting more and more
towards landscape-based approaches that effect
and catalyse environmental repair through
decisions of siting, ground plane, hydrology
and other ecological conditions. They seek
opportunities to position architecture in a catalytic
role that places the architect in the role of strategic
thinker across disciplinary boundaries.



Australian
Institute of
Architects

DISCLAIMER

The views expressed in this paper are the views of the author(s) only
and not necessarily those of the Australian Institute of Architects (the
Institute) or any other person or entity.

This paper is published by the Institute and provides information
regarding the subject matter covered only, without the assumption of a
duty of care by the Institute or any other person or entity.

This paper is not intended to be, nor should be, relied
upon as a substitute for specific professional advice.

Copyright in this paper is owned by the Australian Institute of
Architects.



Australian
Institute of
Architects