

NURSERY PAPERS

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Extensive Green Roof by Jungleyfy at Bridgepoint, Canberra.

INTEGRATING GREEN LIFE INTO BUILDINGS AND INFRASTRUCTURE

There is a compelling case for prioritising green infrastructure; after all it makes our cities cooler, promotes architectural and development diversity, and makes communities healthier and happier.

Now fresh research is calling for improved recognition of the health and social benefits of green infrastructure in sustainability rating tools commonly used in Australia's infrastructure and property industry.

This nursery paper looks at the recently completed project, *Integrating Plant Life into Building and Infrastructure Rating Tools (NY16007)*, and outlines the key findings that can help support the business case for more urban greening in Australia.

Summary

- Green infrastructure is a relatively new term, which can be designed into different assets such as indoor plants, green roofs and walls, and city parks.
- Plants offer a range of social, economic and environmental benefits in urban areas, from better mental health to reduced energy bills.
- Australia's construction sector has a revenue of \$356.4 billion and is projected to grow 2.5% each year between 2019-2023.
- Current plant sales to the built environment sector account for 0.33% of their total spend on products and material.
- There is a significant opportunity for Australian nurseries to increase this market share through better collaboration and inclusion of green infrastructure.
- Evidence of the benefits of green infrastructure can strengthen sustainability tools such as Green Star and the Infrastructure Sustainability (IS) rating scheme.
- Ongoing engagement with architects, urban designers and developers via these tools is essential, as they are key influencers in increasing or decreasing green infrastructure in the built environment.

BACKGROUND

Green infrastructure is a relatively new term. It refers to a broad range of different 'green' elements and structures which can perform a range of functions, including local climate regulation, water and air purification, support cultural value, as well as reduce erosion.

Currently, Australia's construction sector has a revenue of \$356.4 billion and is projected to grow 2.5% each year between 2019-2023. The majority of this spend (55%) is on materials and products that go into the built environment.

In 2015-16, the farm gate value of nursery plants sold to landscapers, developers and builders was \$558.4 million (24% of all plant sales), with turf accounting for another \$92 million (34% of all turf sales). Together, they account for just 0.33% of the total construction sectors spend on materials and products.

An opportunity exists to significantly boost this market share as the benefits of green infrastructure are increasingly highlighted and communicated to key stakeholders within the construction, property and nursery sectors.

The project 'Integrating Plant Life into Building and Infrastructure Rating Tools' was tasked with consolidating these benefits and providing them to the Green Building Council of Australia (GBCA) and the Infrastructure Sustainability Council of Australia (ISCA), to help underpin the development and improvement of 'credits' in their rating tools relating to the integration of plants into buildings and infrastructure. These are known as Green Star and the IS rating scheme.

The research was carried out by Sydney-based sustainability consultancy Edge Environment and funded by Hort Innovation using the nursery industry levy with funds from the Australian Government.



Junglery Breathing Wall and Green Wall at Lendlease Head Office, Sydney.

CO-BENEFITS OF GREEN SPACE

Did you know that one element of green space can produce a myriad of benefits? Studies have shown that a green wall in an office can help to improve air quality while also contributing to the mental health of employees, as well as boost their productivity. These co-benefits strengthen the argument for replacing grey infrastructure with a greener alternative!

THE RESEARCH

Literature Review

The first part of the project was to compile and organise knowledge on the sustainable benefits that can be harnessed from the use of plants in the built environment.

The review covered 144 studies with the majority of sources pointing to science and technical literature, including peer reviewed academic outputs and technical reports.

It categorised information relating to different green infrastructure types, for instance green roofs, green walls, urban parks and their specific sustainability benefits.

Gap Analysis

Building on the literature review, the gap analysis sought to further strengthen the mechanisms by which sustainability rating tools reward the use of plants in property and infrastructure.

It involved a credit-by-credit review of Green Star and the IS rating scheme, to assess how each reward the use of green life in projects.

Edge Environment delivered the key findings of the literature review and

gap analysis to GBCA and ISCA, then discussed what measures could be taken to improve or bolster their respective rating tools.

Stakeholder Consultation and Communication

A key part of the project was understanding the experience of greening experts and identifying barriers and opportunities when it came to the implementation and ongoing management of green infrastructure.

A survey of 16 professionals was conducted to validate the research. Participants covered different locations within Australia, as well as experience with a wide range of green infrastructure projects.

All interviewees had a high level of experience in their discipline such as architecture, engineering, landscape architecture, academic, government and civil infrastructure, as well as in horticulture.



EVIDENCE OF GREEN INFRASTRUCTURE BENEFITS

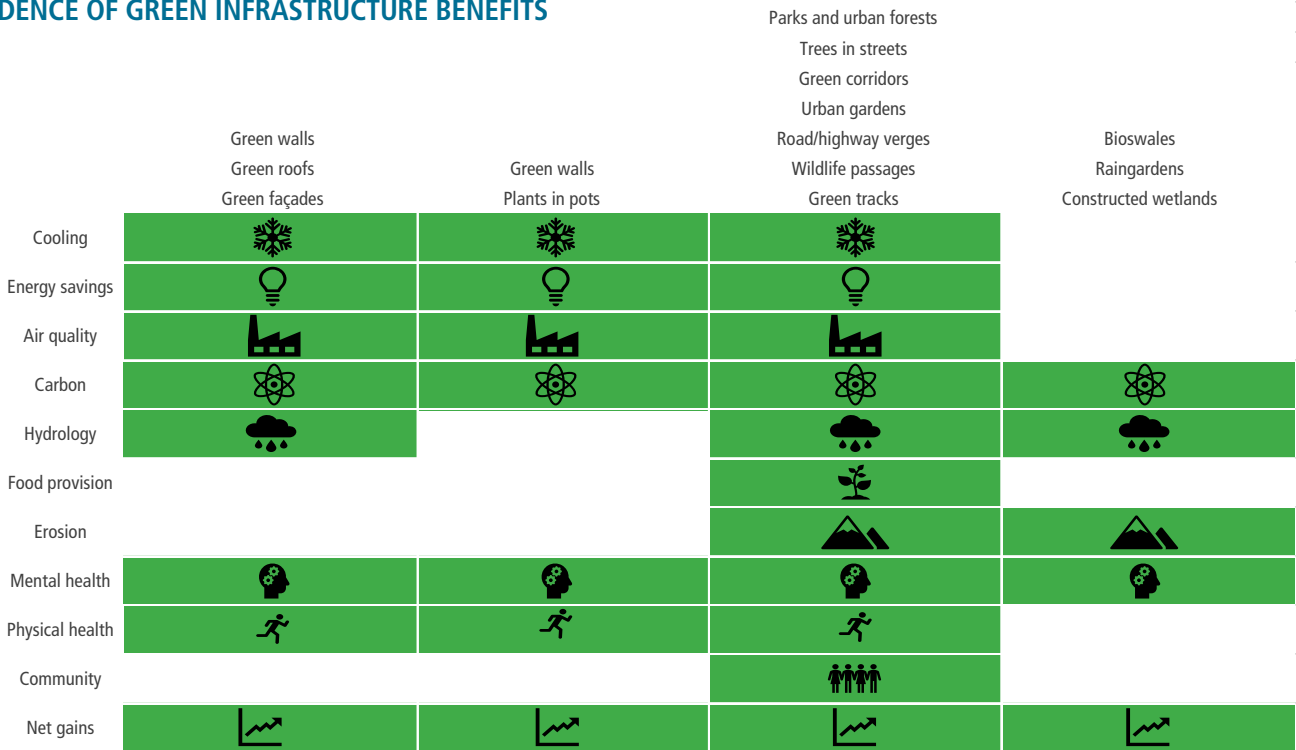


Figure 1 – Map of evidence found for significant benefits and services provided by each building or infrastructure asset

The initial project findings were delivered at an industry event held in March 2018, which attracted more than 50 greening experts, and presented at relevant seminars and conferences during the year.

KEY FACTS

- A green roof can reduce the cooling load of the building up to 60%.
- People in contact with vegetation are healthier, happier and more productive.
- A survey among Australians concluded they would give up 5% of their salary to have regular interaction with nature during their workday and pay a further 7% for a home if a green space is nearby.

Source: 1. Green Roofs as Urban Ecosystems: Ecological Structures, Functions, and Services. Orbendorfer, E., et al. 10, 2007, BioScience, Vol. 57, pp. 823-833. 2. Planet Ark. Valuing trees: what's Nature worth? Sydney : Planet Ark, 2014.

KEY FINDINGS

Benefits of green infrastructure for use in rating tools

The project reaffirmed that plants are used in a variety of ways in the built environment and offer a wide range of economic, environmental and social benefits.

Figure 1 outlines the multiple services and benefits that are available from each type of green infrastructure. It demonstrates that different projects can be designed to achieve specific targets.

Drivers of green space

The project found that leadership and branding are strong drivers for the inclusion of green infrastructure, with participants citing One Central Park and Lendlease's headquarter Breathing Wall both in Sydney, as prime examples.

Those employed in civil infrastructure identified that green infrastructure is increasingly perceived as best practice and an important differentiator, and helped to mitigate potential negative impacts in various ways. For instance, implementing

wildlife passages or fauna bridges to reduce impact on habitat connectivity or using green roofs and walls to improve visual amenity.

Managing risks and pressures from regulatory bodies and the community is a common driver of green space, especially for large scale developments and infrastructure assets.

Green infrastructure is driven inside a business largely by an employee having skillsets in the discipline and the capability to encourage internal buy-in. The economic benefits – such as increased property values – are an important driver to replace grey infrastructure with green space.

Barriers to green space

Barriers to the adoption of green infrastructure in Australia fell into four main categories: economic risk, lack of information, climate change resilience and institutional issues.

The project found that a key challenge was associated with correctly costing both the construction and maintenance of green infrastructure, which are often perceived as high due to uncertainty around general upkeep and plant success rates.



International Convention Centre, Sydney.

It also found a lack of knowledge around the magnitude of benefits that green infrastructure delivers, as well as the performance of many green infrastructure types. Climate change and how it conditions plant performance and species selection, and the resilience of assets where green infrastructure is applied, was also identified as a key challenge.

Addressing regulatory and contractual issues, as well as prioritising green space, could lead to a more streamlined green infrastructure implementation.

IMPLICATIONS FOR THE NURSERY INDUSTRY

The report found that there is a significant opportunity for the nursery industry to increase its market share in the property and infrastructure sectors in Australia.

The industry can contribute to the momentum of green infrastructure by pursuing a range of opportunities, these include:

1. **Set an Australian Industry Definition for green infrastructure**
2. **Develop technical support for the delivery of green infrastructure** and develop guidelines to encourage greater adoption of green infrastructure in the construction sector.
3. **Enable effective monitoring of performance** and provide guidelines that can assist in cost-effective monitoring for different types of green infrastructure projects.

4. **Support the associated horticulture services industry** to ensure a skilled workforce can implement and manage green infrastructure projects.
5. **Advocate for early engagement with the nursery industry during the planning and design phase** to ensure species selection and propagation can be started early and that stock is available at the right maturity.
6. **Articulate the dollar value of Green Infrastructure benefits** including financial metrics that can be used in project costing to better articulate the business case to the construction community.
7. **Describe the co-benefits and allocate financial values** to increase adoption of green infrastructure.
8. **Develop a community of practice** as well as case studies to showcase best practice.
9. **Continue to build upon species selection knowledge and tools** which is being investigated in the strategic investment project, *Which Plant Where*.
10. **Maintain the momentum** in development of knowledge and practice to support the growth of this market including continued engagement with GBCA and ISCA in regard to their respective rating tools.

The full report, *Integrating Plant Life into Building and Infrastructure Rating Tools* (NY16007) is available upon request via <https://horticulture.com.au/resources/final-report-order-form/>.

LINKS TO RESOURCES

Which Plant Where: <https://www.whichplantwhere.com.au/>

The Green Cities Fund: <https://hortfrontiers.com.au/green-cities-fund/>

2020 Vision: <http://2020vision.com.au/>

PAST EDITIONS OF NURSERY PAPERS ARE AVAILABLE ONLINE on the Nursery & Garden Industry Australia website http://www.ngia.com.au/Section?Action=View&Section_id=46